10 GREENHOUSE GAS EMISSIONS AND CLIMATE CHANGE

On December 30, 2009, the California Natural Resources Agency (CNRA) adopted Amendments to the State CEQA Guidelines for greenhouse gas (GHG) emissions, pursuant to Senate Bill (SB) 97 (Statutes of 2007). These amendments, which became effective on March 18, 2010, specifically require that an EIR include an analysis of the proposed project's GHG impacts.

Emissions of GHGs have the potential to adversely affect the environment because such emissions contribute, on a cumulative basis, to global climate change. The proper context for addressing this issue in an EIR is as a discussion of cumulative impacts, because although the emissions of one single project would 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. In turn, global climate change has the potential to result in rising sea levels, which could inundate low-lying areas; to affect rainfall and snowfall, leading to changes in water supply; to affect habitat, leading to adverse effects on biological resources; and to result in other environmental and economic effects.

Therefore, the cumulative global climate change analysis presented in this chapter of the Draft EIR estimates and analyzes the GHG emissions associated with construction and operation-related activities of the proposed project. Because biomass is considered a renewable fuel, this analysis also estimates the levels of GHG emissions that would be avoided by implementation of the proposed project. The potential effects of global climate change on the project are also identified based on available scientific data.

Cumulative impacts are the collective impacts of one or more past, present, and future projects that, when combined, result in adverse changes to the environment. In determining the significance of a proposed project's contribution to anticipated adverse future conditions, a lead agency should generally undertake a two-step analysis. The first question is whether the *combined* effects from *both* the proposed project *and* other projects would be cumulatively significant. If the agency answers this inquiry in the affirmative, the second question is whether "the proposed project's *incremental* effects are cumulatively considerable" and thus significant in and of themselves. The cumulative project list for this issue (climate change) comprises anthropogenic (i.e., humanmade) GHG emissions sources across the globe, and no project alone would reasonably be expected to contribute to a noticeable incremental change to the global climate. However, legislation and executive orders on the subject of climate change in California have established a statewide context and a process for developing an enforceable statewide cap on GHG emissions. Given the nature of environmental consequences from GHGs and global climate change, CEQA requires that lead agencies consider evaluating the cumulative impacts of GHGs, even relatively small additions (on a global basis). Small contributions to this cumulative impact (from which significant effects are occurring and are expected to worsen over time) may be potentially considerable and, therefore, significant.

The analysis is presented here, rather than the cumulative impacts chapter of the EIR (Chapter 18.9), because this issue is presented in greater project-level detail.

10.1 ENVIRONMENTAL SETTING

This discussion presents the current state of climate change science and GHG emissions sources in California; a summary of applicable regulations; and a description of project-generated GHG emissions and their contribution to global climate change.

10.1.1 ATTRIBUTING CLIMATE CHANGE—THE PHYSICAL SCIENTIFIC BASIS

Certain gases in the earth's atmosphere, 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 carbon dioxide (CO_2), methane (CO_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (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 (Intergovernmental Panel on Climate Change [IPCC] 2007).

Climate change is a global problem. GHGs are global pollutants, unlike criteria air pollutants and toxic air contaminants, 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). GHGs persist in the atmosphere for long enough time periods 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% is sequestered through ocean uptake, uptake by northern hemisphere forest regrowth, and other terrestrial sinks within a year, whereas the remaining 46% 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 toxic air contaminants. The quantity of GHGs that it takes 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 climates. From the standpoint of CEQA, GHG impacts to global climate change are inherently cumulative.

10.1.2 ATTRIBUTING CLIMATE CHANGE—GREENHOUSE GAS EMISSION SOURCES

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 emissions 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) 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 of CO_2 sequestration.

STATE

According to different ranking systems, California is the 12th to 16th largest emitter of CO_2 in the world (CEC 2006a). California produced 478 gross million metric tons (MMT) of CO_2 equivalent (CO_2 e) in 2008 (ARB 2010). CO_2 e 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) (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_2 e 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 fuel in the transportation sector was the single largest source of California's GHG emissions in 2008, accounting for 37% 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%) and the industrial sector (20%) (ARB 2010). See Table 10-1 and Exhibit 10-1 below.

LOCAL

The Sierra Business Council is working together with local government jurisdictions, including Placer County, to develop GHG inventories and eventually climate action plans. This program is funded by California utility customers and administered by the Pacific Gas & Electric Company under the auspices of the California Public Utilities Commission (Sierra Business Council 2012). As part of this program Placer County, completed a municipal GHG inventory in September 2011 and a community-wide GHG inventory for the County will be made available to the public as early as August 2012 (Martin, pers. comm. 2012).

10.1.3 ADAPTATION TO CLIMATE CHANGE

According to the 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). According to CNRA temperatures in California are projected to increase 2–5°F by 2050 (CNRA 2009) and by 4–9°F by 2100.

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. According to the California Energy Commission (CEC 2006b), the snowpack portion of the State's water supply could potentially decline by 30–90% by the end of the 21st century. An increase in precipitation falling as rain rather than snow also could lead to increased potential for floods 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.

Another outcome of global climate change is sea level rise. Sea level rose approximately 7 inches during the last century and it is predicted to rise an additional 7–22 inches by 2100, depending on the future levels of GHG emissions (IPCC 2007). CNRA projects that sea levels along California will rise 12–18 inches by 2050 and 21–55 inches by 2100 (CNRA 2009).

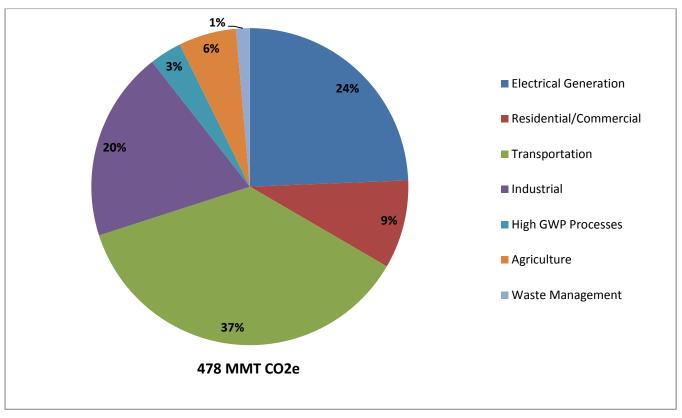
As the existing climate throughout California changes over time, the ranges of various plant and wildlife species could shift or be reduced, depending on the favored temperature and moisture regimes of each species. In the worst cases, some species would become extinct or be extirpated from the state if suitable conditions are no longer available (CNRA 2009).

Changes in precipitation patterns and increased temperatures are expected to alter the distribution and character of natural vegetation and associated moisture content of plants and soils. An increase in frequency of extreme heat events and drought are also expected. These changes are expected to lead to increased frequency and intensity large wildfires (CNRA 2009).

Table 10-1 California Greenhouse Gas Emissions Inventory and Projections					
Emissions Sector	MMT CO ₂ e/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 CO₂e/yr = million metric tons of carbon dioxide equivalent per year.

Sources: ARB 2010, 2007:6, 2011a.



Source: ARB 2010

Exhibit 10-1

California's Greenhouse Gas Emissions by Economic Sector (2008 Average)

¹ Includes in-state-generated and imported electricity production.

² Contained within Industrial Sector emissions.

³ Totals may not sum exactly due to rounding.

Cal-Adapt is a climate change scenario planning tool developed by the California Energy Commission (CEC) that 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. According to Cal-Adapt, temperatures in eastern Placer County on average are projected to rise by 4-7°F by 2100, with the range based on low and high emissions scenarios (Cal-Adapt 2012a). Exhibit 10-2 depicts graphical output of future wildfire risk in the region under both emissions scenarios (Cal-Adapt 2012b). In either scenario, wildfire risk is projected to increase by the end of the century.

10.2 REGULATORY SETTING

10.2.1 FEDERAL

SUPREME COURT RULING

The U.S. Environmental Protection Agency (EPA) is the federal agency responsible for implementing the federal Clean Air Act (CAA) and its amendments. The Supreme Court of the United States ruled on April 2, 2007, that 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

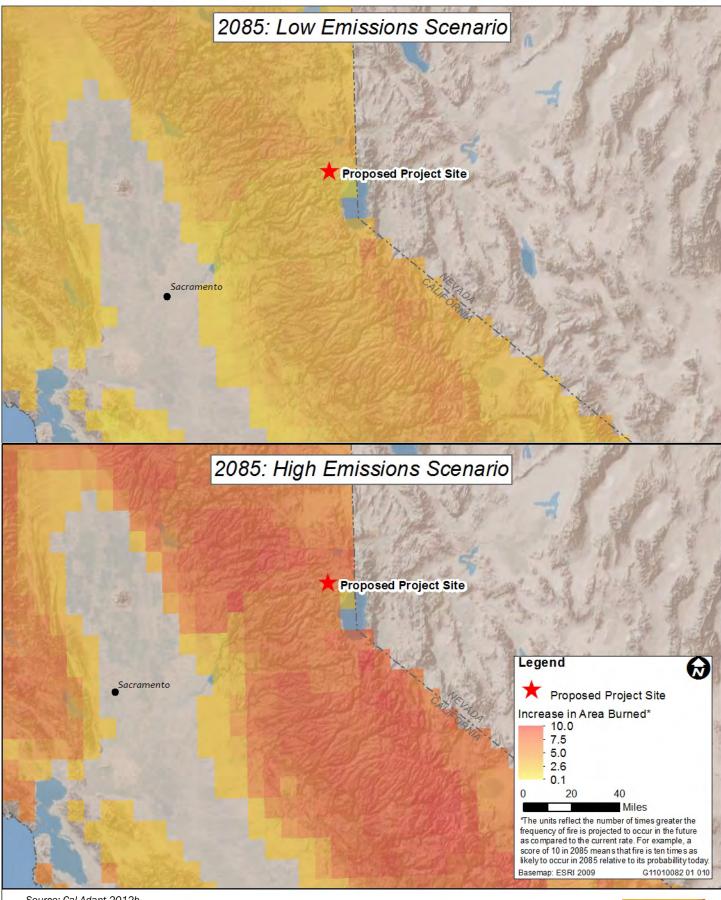
In response to the mounting issue of climate change, EPA has taken actions to regulate, monitor, and potentially reduce GHG emissions.

GREENHOUSE GAS PERMITTING REQUIREMENTS

New major stationary emissions sources and major modifications at existing stationary sources are required by the CAA to obtain an air pollution permit before commencing construction. On May 13, 2010, EPA issued the Prevention of Significant Deterioration and Title V Greenhouse Gas Tailor Rule (EPA 2011). This final rule sets thresholds for GHG emissions that define when permits under the New Source Review Prevention of Significant Deterioration (PSD) and Title V Operating Permit programs are required for new and existing industrial facilities.

PSD permitting requirements now cover new construction projects that emit GHG emissions of at least 100,000 tons (90,718 metric tons [MT]) per year even if they do not exceed the permitting thresholds for any other pollutant. Modifications at existing facilities that increase GHG emissions by at least 75,000 tons (68,039 MT) per year will be subject to permitting requirements, even if they do not significantly increase emissions of any other pollutant. Title V Operating Permit requirements apply to sources based on their GHG emissions even if they would not apply based on emissions of any other pollutant. Facilities that emit at least 100,000 tons (90,718 MT) per year of CO₂e will be subject to Title V permitting requirements.

As part of this rule, EPA also committed to undertake another rulemaking, to begin in 2011 and conclude no later than July 1, 2012. That action will consist of an additional Step 3 for phasing in GHG permitting. Step three, if established, will not require permitting for sources with greenhouse gas emissions below 50,000 tons (45,359 MT) per year (EPA 2012).



Source: Cal-Adapt 2012b.

Exhibit 10-2 Increased Wildfire Risk under Cal-Adapt Low and High Emissions Scenarios



As a stationary source, the proposed biomass facility would emit approximately 29,240 tons (26,526 MT) of CO₂e per year (calculations are shown in Appendix D and discussed further in the impact analysis below).

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 MT or more of CO₂e per year. This publicly available data will allow the reporters to track their own emissions, compare them to similar facilities, and aid in identifying cost-effective opportunities to reduce emissions in the future. Reporting is conducted at the facility level, except that certain suppliers of fossil fuels and industrial GHGs along with vehicle and engine manufacturers will report at the corporate level. An estimated 85% of the total U.S. GHG emissions, from approximately 10,000 facilities, are covered by this final rule.

NATIONAL PROGRAM TO CUT GREENHOUSE GAS EMISSIONS AND IMPROVE FUEL ECONOMY FOR CARS AND TRUCKS

On September 15, 2009, EPA and the 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. 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.

10.2.2 STATE

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 initiatives to reduce the state's contribution to GHG emissions are underway.

EXECUTIVE ORDER S-3-05

Executive Order S-3-05, which was signed by Governor 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 level. To combat those concerns, the Executive Order established total GHG emission targets. Specifically, emissions are to be reduced to the 1990 level by 2020, and to 80% below the 1990 level by 2050.

EXECUTIVE ORDER S-6-06

Executive Order S-6-06, the "Bioenergy Action Plan", establishes targets for the use and production of biofuels and biopower, and directs state agencies to work together to advance biomass programs in California while providing environmental protection and mitigation. The executive order establishes the following target to increase the production and use of bioenergy, including ethanol and biodiesel fuels made from renewable resources: produce a minimum of 20% of its biofuels within California by 2010, 40% by 2020, and 75% by 2050.

ASSEMBLY BILL 32, THE CALIFORNIA GLOBAL WARMING SOLUTIONS ACT OF 2006

In September 2006, Governor Arnold Schwarzenegger signed Assembly Bill (AB) 32, the California Global Warming Solutions Act of 2006. 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.

ASSEMBLY BILL 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 MMT of CO₂-equivalent emissions (CO₂e, discussed further below), or approximately 22 percent from the state's projected 2020 emission level of 545 MMT of CO₂e under a business-as-usual scenario (this is a reduction of 47 MMT CO₂e, or almost 10 percent, from 2008 emissions) (ARB 2008). ARB's original 2020 projection was 596 MMT CO₂e, but this revised 2020 projection takes into account the economic downturn that occurred in 2008 (ARB 2011b). The Scoping Plan reapproved by ARB in August 2011 includes the Final Supplement to the Scoping Plan Functional Equivalent Document, 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 2011b):

- ▲ the Low-Carbon Fuel Standard (LCFS) (15.0 MMT CO₂e),
- energy efficiency measures in buildings and appliances (11.9 MMT CO₂e),
- a renewable portfolio and electricity standards for electricity production (23.4 MMT CO₂e), and
- Million Solar Roofs (1.1 MMT CO₂e).

In 2011, ARB adopted the cap-and-trade regulation. The cap-and-trade program covers major sources of GHG emissions in the State such as refineries, power plants, industrial facilities, and transportation fuels. The cap-and-trade program includes an enforceable emissions cap that will decline over time. The State will distribute allowances, which are tradable permits, equal to the emissions allowed under the cap. Sources under the cap will need to surrender allowances and offsets equal to their emissions at the end of each compliance period (ARB 2012a).

With regard to land use planning, the Scoping Plan expects that reductions of approximately 3.0 MMT CO₂e will be achieved through implementation of Senate Bill (SB) 375, which is discussed further below (ARB 2011b).

REGULATION FOR THE MANDATORY REPORTING OF GREENHOUSE GAS EMISSIONS

Reporting of GHGs by major sources is also required by AB 32. Revisions to the regulation were approved by the California Office of Administrative Law, and became effective on January 1, 2012. The revised regulation affects industrial facilities, suppliers of transportation fuels, natural gas, natural gas liquids, liquefied petroleum gas, and carbon dioxide, operators of petroleum and natural gas systems, and electricity retail providers and marketers. ARB's Regulation for the Mandatory Reporting of Greenhouse Gas Emissions (Title 17, California Code of Regulations (CCR), sections 95100-95157) incorporated by reference certain requirements promulgated by the United States Environmental Protection Agency (USEPA) in its Final Rule on Mandatory Reporting of Greenhouse Gases (Title 40, Code of Federal Regulations, Part 98), discussed below. The regulation establishes mandatory GHG reporting requirements for owners and operators of certain facilities that directly emit GHG, including facilities that emit 25,000 MT CO₂e per year. While CH₄ and N₂O emissions from biomass facilities are

subject to the cap-and-trade regulation discussed above and CO₂ emissions are not, CO₂ emissions from biomass facilities still need to be reported (ARB 2012b).

SENATE BILL 1368

SB 1368 is the companion bill of AB 32 and was signed by Governor Schwarzenegger in September 2006. SB 1368 required the California Public Utilities Commission (CPUC) to establish a GHG emissions performance standard (EPS) for base load generation from investor-owned utilities. The CEC was also required to establish a similar standard for local publicly owned utilities by June 30, 2007 which lead to its establishment of an EPS of 1,100 pounds of CO2 per Megawatt-hour (Ib CO2/MW-hr) (equivalent to 0.5 MT CO2/MW-hr). The EPS cannot exceed the GHG emission rate from a base load combined-cycle natural gas fired plant. The EPS of 1,100 lb CO2/MW-hr does only accounts for GHGs emitted by a power plant's stack and not other operation-related activities such as fuel procurement and processing, vehicle trips, and water consumption. The legislation further requires that all electricity provided to California, including imported electricity, must be generated from plants that meet the standards set by the CPUC and CEC.

SENATE BILLS 1078 AND 107 AND EXECUTIVE ORDER S-14-08

SB 1078 (Chapter 516, Statutes of 2002) requires retail sellers of electricity, including investor-owned utilities and community choice aggregators, to provide at least 20% of their supply from renewable sources by 2017. SB 107 (Chapter 464, Statutes of 2006) changed the target date to 2010. In November 2008, Governor Schwarzenegger signed Executive Order S-14-08, which expands the state's Renewable Energy Standard to 33% renewable power by 2020, and supersedes previously set targets.

SENATE BILL 97

As directed by SB 97, CNRA adopted Amendments to the CEQA Guidelines for greenhouse gas emissions 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. This EIR complies with these new guidelines and the CEQA checklist questions are discussed under the thresholds of significance heading below.

SENATE BILL 375

SB 375, signed in September 2008, aligns regional transportation planning efforts, regional GHG emission reduction targets, and land use and housing allocation. SB 375 requires Metropolitan Planning Organizations (MPOs) to adopt a Sustainable Communities Strategy (SCS) or Alternative Planning Strategy (APS), which will prescribe land use allocation in that MPO's Regional Transportation Plan (RTP). ARB, in consultation with MPOs, will provide each affected region with reduction targets for GHGs emitted by passenger cars and light trucks in the region for the years 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 emission reduction targets, transportation projects would not be eligible for funding programmed after January 1, 2012.

10.2.3 LOCAL

Currently, Placer County has no adopted climate change or GHG-related laws, regulations, policies, programs, or plans that are applicable proposed project. Placer County is considering the development of a GHG emissions offset program, which is discussed below.

PLACER COUNTY AIR POLLUTION CONTROL DISTRICT

Placer County Air Pollution Control District adopted Rule 517 regarding "Permitting Requirements for Stationary Sources Emitting Greenhouse Gases" in response to the federal "Greenhouse Gas Permitting Requirements", discussed above. As described above, facilities with the potential to emit GHGs above a certain level would need to obtain an applicable Federal Operating Permit and meet New Source Review or PSD requirements under the Clean Air Act. PCAPCD implements Federal Operating Permit and New Source Review or PSD permitting programs at the local level under PCAPCD Rules 502, 507, and 518.

10.3 IMPACTS

10.3.1 SIGNIFICANCE CRITERIA

Based on the thresholds described in Placer County's Environmental Questionnaire and Appendix G of the CEQA Guidelines, climate change-related impacts are considered significant if implementation of the proposed project would do any of the following:

- Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment; or
- ✓ Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

Very few public agencies in California have adopted GHG thresholds of significance for CEQA, and no CEQA thresholds for analyzing GHGs have been developed specifically for facilities that generate electricity. Neither PCAPCD nor Placer County has developed thresholds. Some agencies have adopted thresholds of significance for stationary-source GHGs that focus on the mass emissions of a project. When using a mass emissions approach, however, the larger the project, the greater the potential that project-generated GHG emissions would exceed the threshold of significance. Using a mass emission approach may be appropriate for evaluating stationary sources if no GHG policies, goals, or regulations have been established that apply to those specific types of stationary sources. Applying this type of approach for the proposed project would overlook the fact that California has determined how (and the degree to which) it will address the sector of GHG emissions associated with electricity production. Indeed, by establishing the 33 percent Renewable Electricity Standard, California has established an aggressive goal to shift to renewable energy to substantially reduce GHG emissions. Thus, in this more appropriate context, the larger the renewable electricity project, the closer the state comes to achieving the Renewable Electricity Standard and associated GHG reductions. Thus, a mass emissions threshold would not be an appropriate metric to determine significance of GHG emissions associated with the proposed project.

In the case of this project, in order to address the two checklist questions regarding GHG emissions, the project's emissions are analyzed in the context of those regulations applicable to the electricity sector that have been developed under the mandate of AB 32, most notably the State's Renewable Energy Standard that aims to have 33% of the state's electricity come from renewable power by 2020. The projected total electricity production to meet California demand in 2020 is estimated to be 316,280 gigawatt-hours per year (GW-hr/year) (Kavalec and Gorin, 2009) and, according to ARB's most recent *Status of Scoping Plan Recommended Measures*, the projected level of GHG emissions generated by the "fleet" of power generation facilities that will produce electricity to meet this demand will be approximately 88.9 million metric tons per year (MMT CO₂e/year) (ARB 2011b). Thus, the GHG-efficiency of electricity consumed in California will need to be 0.28 MT CO₂e per megawatt-hour (MT CO₂e/MW-hr) to meet Scoping Plan targets. The calculation of this metric is included in Appendix D. For sake of comparison, the EPS required by the CEC and CPUC under the mandate of SB 1368, discussed in the regulatory setting above, is 0.5 MT CO₂e/MW-hr. This is equivalent to a combined –cycle natural gas power plant and does not include emissions from operation-related activities such as fuel procurement and processing, vehicle trips, and water consumption.

It should be noted that emissions generated by various activities that support any of the power plants in the future electricity fleet, such as employee vehicle trips, truck hauling, the upstream processing of materials (e.g., fuel refining, drilling or mining), or construction, are not incorporated into this efficiency estimate. To be conservative, and in order to address all project-related emissions, however, such emissions are included in the analysis of the proposed project. Also important to note is that the efficiency in which individual power plants will vary. Some plants will exceed the average, meaning others would need to be under the average in order to meet the goals. The GHG-efficiency by which the proposed project would produce electricity is compared to this metric to determine whether the project's GHG emissions are significant. The GHG emissions associated with a proposed power plant that would produce electricity more efficiently than 0.28 MMT CO₂e/MW-hr would be less than significant. The GHG emissions associated with a proposed power plant that would produce electricity less efficiently than the conservatively developed metric of 0.28 MMT CO₂e/MW-hr would be potentially significant.

In addition to being conservative, the efficiency metric of 0.28 MMT CO₂e/MW-hr is reasonable and appropriate because it is specific to stationary sources that exist for the primary purpose of producing electricity and directly relates to the regulatory regime that addresses GHG emissions from electricity generation under the mandate of AB 32. Because this approach is based on the GHG efficiency in which the proposed project would meet electricity demand, it avoids any need to examine whether there would be any additional GHG benefits from displacing electricity generated by fossil fuels.

This is a conservative approach; future electricity demand will be met by whatever source is available at the time, including fossil fuel-based facilities. Thus, if the project was not built, it would not be unreasonable to assume that the energy provided by the project would otherwise be provided by a more GHG-intensive fossil fuel plant. These potential "avoided emissions" are not assumed in this analysis, however.

10.3.2 METHODS AND ASSUMPTIONS

At the time of writing this Draft EIR, neither ARB nor PCAPCD has formally adopted a recommended methodology for evaluating GHG emissions associated with stationary sources and/or new projects. In the case of the project, identifying an appropriate methodology for evaluating GHG emissions is influenced by the fact that the project has been certified as a renewable energy facility by CEC, and as such is intended to help shift reliance from fossil fuel-based electricity generation to a form of electricity generation that is more GHG efficient. As described above, SB 1078 (Chapter 516, Statutes of 2002) in combination with Executive Order S-14-08, requires the 33% of the electricity produced for consumption in the state to be from renewable resources by 2020.

The California Office of Planning and Research's (OPR) recommends that lead agencies under CEQA make a good-faith effort, based on available information, to estimate the quantity of GHG emissions that would be generated by a proposed project, including the emissions associated with construction activities, stationary sources, vehicular traffic, and energy consumption, and to determine whether the impacts have the potential to result in a project or cumulative impact and to mitigate the impacts where feasible mitigation is available (OPR 2008). OPR prepared amendments to the State CEQA Guidelines, pursuant to SB 97 (Statutes of 2007) for adoption by CNRA. The amendments added several provisions reinforcing the requirements to assess a project's GHG emissions as a contribution to the cumulative impact of climate change. The amendments went into effect on March 18, 2010.

Table 10-2 summarizes the project-related activities for which emissions were estimated; the model, protocol, and source of emission factors used; and the key input parameters on which each activity's emissions were determined. Emissions were estimated for both construction- and operation-related emissions. Operational emissions include those stationary-source emissions generated by the power plant and support emissions, which refer to emissions from those activities that directly support operation of the power plant and would not

otherwise occur. In addition, this analysis quantified emissions that would no longer occur due to operation of the power plant—these are referred to as avoided emissions.

Table 10-2 Methodologies Used to Estimate Project-Related Emissions					
Category and Source	Model/Protocol/ Source of Emission Factors	Key Input Parameter(s)			
Construction Emissions	CalEEMod model ¹	hours of off-road equipment use			
Operational Emissions					
Syngas Combustion by Power Plant	ARB's Mandatory Reporting Guidelines ²	energy content of biomass fuel			
Support Emissions					
Chipping Biomass	Pilot Study ³ , ARB's Offroad2007 model ⁴	diesel equipment use			
Trucks Hauling Biomass to Plant	ARB's Emfac2011 model ⁵	VMT of haul routes			
Truck Activity at the Plant (Idling)	ARB's Emfac2011 model (truck module) ⁶	truck-idle hours			
Loader at the Plant and Fuel Yard	ARB's Offroad2007 model ⁴	hours of use			
Employee Trips	ARB's Emfac2011 model ⁵	VMT of employee commute trips			
Trucks Hauling Biochar	ARB's Emfac2011 model ⁵	VMT of haul routes			
Electricity Consumption from the Grid	CalEEMod model ¹	Electricity consumed (parasitic load)			
Water Consumption	CEC's guidance ⁷ , CalEEMod model ¹	volume of water consumed			
Wastewater Treatment	CalEEMod model ¹	volume of wastewater generated			
Avoided Emissions					
Open Burning of Slash from Hazardous Fuels and Forest Thinning	IPCC's National Inventory Guidelines - Vol. 4, Agriculture, Forestry and Other Land Use ⁸	mass of biomass open-burned			

VMT = vehicle miles travelled

Models:

- ¹ South Coast Air Quality Management District. 2011. California Emissions Estimator Model (CalEEMod), Version 2011.1.1. Available:
- http://www.caleemod.com/>. This model has been approved by ARB, PCAPCD, and all air districts in California.
- ² California Air Resources Board. 2012b. ARB's Regulation for the Mandatory Reporting of GHGs. Available:
- http://www.arb.ca.gov/cc/reporting/ghg-rep/regulation/mrr_2010_clean.pdf, which is hyperlinked to other formal are a gov/co/reporting/ghg rep/regulation/2010_regulation html> Accessed April 25, 2010.
- http://www.arb.ca.gov/cc/reporting/ghg-rep/regulation/2010_regulation.htm. Accessed April 25, 2012. Last updated February 29, 2012.
- ³ Sierra Nevada Conservancy. 2008 (November 17). Forest Biomass Removal on National Forest Lands: First Progress Report. Prepared by Placer County Chief Executive Office and TSS Consultants.
- ⁴ California Air Resources Board. 2006. Off-Road 2007 computer program, Version 2.0.1.2. Available:
- http://www.arb.ca.gov/html/soft.htm#modeling>. Last updated April 14, 2010. Accessed May 2010.
- California Air Resources Board. 2012c (February 8). Emfac2011 computer program. Sacramento, CA. Available:
- http://www.arb.ca.gov/msei/modeling.htm>. Last updated [February 9, 2012]. Accessed May 3, 2012.
- 6 California Air Resources Board. 2012c (February 8) (last updated). EMFAC2011 Idling Emission Rates. Available:
- http://www.arb.ca.gov/msei/modeling.htm>. Accessed May 3, 2012.
- 7 California Energy Commission. 2006c (December). Refining Estimates of Water-Related Energy Use in California. Sacramento, CA. CEC-500-2006-118. Available: http://www.energy.ca.gov/pier/project_reports/CEC-500-2006-118.html. Accessed May 3, 2012.
- 8 Intergovernmental Panel on Climate Change (IPCC). 2006. Guidelines for National Greenhouse Gas Inventories, Volume 4, Agriculture, Forestry and Other Land Use. Hayama, Kanagawa, Japan. Available: http://www.ipcc-
- nggip.iges.or.jp/public/2006gl/pdf/4_Volume4/V4_02_Ch2_Generic.pdf>. Accessed June 2010.
- Source: Methodologies researched and identified by Ascent Environmental in 2012.

It is important to note that the GHG analysis methodology used for this EIR is conservative, because not all GHG emissions from project operation may necessarily be "new" emissions, such as emissions associated with employee commute trips, truck hauling, or water consumption, given that a project itself does not result in increased demand for electricity. Rather, the proposed project, like other power plants, would come on line to meet electricity demand and help a utility comply with the 33 percent Renewable Electricity Standard. In other words, the GHG emissions produced by a power plant would not necessarily be entirely new GHG emissions in the local area, state, or world. GHG emissions from power plants are, however, a function of their design, the technology used, and the efficiency of the selected technology.

The methodology used in this EIR to analyze the project's contribution to global climate change includes a calculation of GHG emissions using the best available methodologies available from a variety of models and protocols (listed in Table 10-2), a discussion about the accuracy of these estimations, and discussion about the context in which they can be evaluated. This analysis considers the GHG efficiency in which the proposed project would generate electricity (i.e., mass levels of GHG emissions per unit of electricity produced) in consideration of the applicable GHG reduction goals of the AB 32 mandate and the changing "fleet" of electricity generators that provide electricity to California.

10.3.3 ISSUES OR POTENTIAL IMPACTS NOT DISCUSSED FURTHER

All issues identified above in Section 10.3.1 Significance Criteria are addressed below.

10.3.4 IMPACT ANALYSIS

Impact 10-1

Generation of GHG Emissions. Implementation of the proposed biomass power plant would result in a net increase in GHG emissions. However, the efficiency at which the power plant would produce electricity would be consistent with the state-wide efficiency of electricity generation needed to achieve the level GHG reductions identified for the electric power sector and would be consistent with AB 32's GHG emission reduction target and applicable provisions of the AB 32 Scoping Plan. Thus, the project's contribution of GHG emissions would not be cumulatively considerable.

Project-related construction activities would result in increased generation of GHG emissions. Heavy-duty off-road equipment, materials transport, and worker commutes during construction of the proposed project would result in exhaust emissions of GHGs. GHG emissions generated by construction would be primarily in the form of CO_2 . Although emissions of other GHGs, such as CH_4 and N_2O , are important with respect to global climate change, the emission levels of these other GHGs from on- and off-road vehicles used during construction are relatively small compared with CO_2 emissions, even when factoring in the relatively larger global warming potential of CH_4 and N_2O .

As with criteria air pollutants and precursors discussed under Impact 9-2 in Chapter 9, Air Quality of this Draft EIR, GHG emissions would also be generated throughout the operational life of the proposed project. Stationary-source operational emissions would consist of those emissions resulting from combustion of syngas at the power plant. Additional operational activities would also result in GHG emissions, including the chipping of biomass before it is hauled to the plant, trucks hauling biomass to the plant and idling at the project site, operation of a loader at the plant and fuel yard, employee commute trips, trucks hauling biochar away from the plant, water consumption (because of the electricity consumption associated with the pumping of the water from a nearby well), and treatment of wastewater. As mentioned above, because these activities directly support operation of the power plant and would not otherwise occur but for operation of the plant, emissions from these activities are referred to as support emissions.

Implementation of the project would also result in the reduction of GHG emissions associated with activities that would occur if the proposed project were not implemented—these are referred to as avoided emissions. Avoided emissions include the open burning of forest thinning slash and hazardous fuels in nearby forests. This is because an equivalent amount of forest-sourced material would be piled and open burned if the proposed biomass power plant were not built and operated. Open burning is the most common approach employed to dispose of slash after forest thinning and hazardous fuels reduction projects (Fournier, pers. comm. 2012; Conway, pers. comm. 2012). The United States Forest Service would continue to masticate and spread some of the biomass to support other forest management goals (e.g., habitat) but only biomass that would otherwise be open burned would be hauled to the biomass plant.

This analysis does not attempt to speculate whether forests would not be thinned but for the proposed project and the extent to which forests, if not thinned, would otherwise burn more frequently in wildfires; or the extent to which the thinning debris, if not removed, would serve as the initial fuels to a more intense catastrophic wildfire that would also burn large tree trunks, forest canopy, and/or forest top soil, potentially resulting in greater GHG emissions than open burning of slash. There is no data available to describe this potential that is specifically attributable to the project; therefore, these assumptions would be speculative.

The degree to which purchase of forest biomass would reduce the cost of thinning, and possibly encourage more thinning is unknown and speculative, but project payments for biomass typically represent a small fraction of the total costs of thinning projects. Further, agency staff from the Tahoe National Forest and the Lake Tahoe Basin Management Unit have indicated that the project would not influence to a greater or lesser degree the number and variety of thinning projects that are planned (Fournier, pers. comm. 2012; Conway, pers. comm. 2012). Therefore, this analysis assumes the project would burn biomass from forest thinning projects that would have occurred with or without the project, and that the project would not indirectly cause more thinning projects to occur.

Table 10-3 summarizes the stationary, support, and avoided emissions associated with the proposed project. The methodologies used for estimating the GHG emissions from all of these activities are summarized in Table 10-2 above. Refer to Appendix D for a detailed summary of the modeling assumptions, inputs, and outputs.

Table 10-3 Annual Greenhouse Gas Emissions of the Proposed Biomass Gasification Power Plant ¹				
Category and Source	CO2e (MT/year)			
Construction Emissions, Amortized across the project life (30 years) ¹	5			
Operational Emissions				
Syngas Combustion by Power Plant	26,526			
Support Emissions				
Chipping Biomass	301			
Trucks Hauling Biomass to Plant	84			
Truck Activity at the Plant (Idling)	2			
Loader at the Plant and Fuel Yard	197			
Employee Trips	35			
Trucks Hauling Biochip	10			
Electricity Consumption from the Grid ²	1,134			
Water Consumption ²	222			
Wastewater Treatment	156			
Total Operational and Support Emissions	28,6678			
Avoided Emissions				
Open Burning of Forest Thinning Slash and Hazardous Fuels	(24,858)			
Net Increase in Operational Emissions	3,809			

CO₂e = carbon dioxide equivalent

MT/year = metric tons per year

Methodologies for estimating emissions from each activity are summarized in Table 10-2. Refer to Appendix D for a detailed summary of the modeling assumptions, inputs, and outputs. Values may not sum exactly to total due to rounding.

Source: Modeling performed by Ascent Environmental in 2012.

Construction activity would generate approximately 150 MT of CO₂ emissions during the entire construction period (approximately 14 months over two construction seasons). The value of 150 MT is amortized across the projected life of the plant, 30 years, which results in rate of 5 MT of CO₂ per year.

² Estimated emissions levels do not account for efficiencies that may result from the implementation of measures consistent with the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) rating system. The LEED features would not be fully known until the technology provider is determined and final design is completed. For instance, the building and industrial dryer would be heated entirely with waste heat.

The emissions estimates shown in Table 10-3 indicate that operation of the project would result in a net increase of 3,809 MT CO_2e /year. The quantitative analysis presented in Table 10-3 does not account for the possibility that, if left in the forest, this forest-sourced material might otherwise serve as ladder fuels in forest fires of the more catastrophic variety that include crown fires and the burning of fully mature trees and roots. If these factors could be incorporated into the quantitative analysis, the net change in emissions would be substantially lower than 3,809 MT CO_2e /year.

Nonetheless, the emission estimates presented in Table 10-3 allow for the GHG efficiency of the project to be estimated. Given that the plant would have a capacity of 2 MW and operate 365 days per year, its GHG-efficiency would be 0.22 MT CO_2e/MW -hr. This estimate includes emissions from those activities that support operation of the biomass facility such as chipping, truck hauling, and other GHG-emitting activities listed in Table 10-3. Calculation of this metric is also included in Appendix D. It should be noted that emissions generated by various activities that support the power plants in the future statewide electricity fleet, such as excavation, drilling, refining and distribution of fossil fuels, as well as employee vehicle trips and water consumption, are not incorporated into the calculation of the GHG efficiency threshold; to be conservative, however, such emissions are included in the analysis of proposed project's GHG emissions.

Thus, the plant would produce electricity more efficiently than 0.28 MT CO₂e/MW-hr, which is the projected efficiency of the statewide "fleet" of power plants in the year 2020. For this reason, the project is considered to be consistent with the goals of the Renewable Electricity Standard, ARB's Scoping Plan, and the reduction target of AB 32. For sake of comparison, the EPS required by the CEC and CPUC under the mandate of SB 1368 is 0.5 MT CO₂e/MW-hr, as discussed in the regulatory setting above. This is equivalent to the efficiency of the stack emissions from a combined –cycle natural gas power plant and does not include emissions from operation-related activities such as fuel procurement and processing, vehicle trips, and water consumption.

In addition, the use of forest biomass by the project would also be consistent with the recommended actions regarding sustainable forests in ARB's Scoping Plan, specifically the recommendation to maintain the current sequestration in the forests through sustainable management practices, potentially including reducing the risk of catastrophic wildfire (ARB 2008, p. 64).

Comments received in response to this EIR's Notice of Preparation expressed concerns about the timing of the project's gross operational emissions of GHGs versus the timing of the project's avoided GHG emissions, particularly the avoidance of those emissions that would be generated by likely future catastrophic wildfires if forests are not properly thinned. These comments asserted that the project would not be carbon-neutral in the near term because re-growth of forest vegetation and associated sequestration of carbon would take multiple decades to reach existing levels. The comments expressed concern that the project's near-term operational emissions would be offset only by GHG reductions occurring years later, through forest sequestration. The concern is that near-term GHG emissions may be especially harmful to the environment, given the need expressed by the scientific community to stabilize atmospheric GHG concentrations in the near-term to avoid dangerous climate change.

These concerns could be relevant to biomass projects that involve new logging or new thinning for the primary purpose of generating fuel, and that use long-term forest sequestration of GHGs to offset near-term power plant operational emissions. However, these concerns are not relevant to the proposed biomass facility because the proposed plant would consume forest residuals that would otherwise be open burned, and because this quantitative analysis does not take credit for the carbon sequestration associated with future re-growth of forest vegetation. Instead, for this project, the avoided emissions shown in Table 10-3 would have occurred within 1-2 years as the power plant's operational emissions.

Based on the above analysis, the proposed project would not conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of GHGs in the electricity sector and it would not

generate levels of GHG emissions, either directly or indirectly, that may have a significant impact on the environment. Therefore, the project's contribution of GHGs would not be cumulatively considerable.

Impact 10-2

Impacts of Climate Change on the Project. Climate change is expected to result in a variety of effects on the project area including changes to water supply and increased frequency and intensity of wildfire. Increased risks to the proposed facility could result. However, the proposed project includes design features that would minimize vulnerabilities to climate change impacts including appropriate types of infrastructure to prepare for wildland fire (e.g., reliable water source, water storage, non-vegetated setbacks, and fire-fighting infrastructure), and management practices to minimize risk of wildland fire on surrounding property (e.g., forest fuel management activity). Therefore, this impact would be **less than significant**.

As discussed previously in Section 10.1, human-induced increases in GHG concentrations in the atmosphere have led to increased global average temperatures (climate change) through the intensification of the greenhouse effect, and associated changes in local, regional, and global average climatic conditions.

Although there is a strong scientific consensus that global climate change is occurring and is influenced by human activity, there is less certainty as to the timing, severity, and potential consequences of the climate phenomena. Scientists have identified several ways in which global climate change could alter the physical environment in California (CNRA 2009, CEC 2006b, DWR 2006, IPCC 2007). These include:

- changes in the timing and amount of runoff;
- reduced water supply;
- deterioration of water quality; and
- elevated sea level.

These changes may translate into a variety of issues and concerns that may affect the project area, including but not limited to:

- decreased water supply, reliability, and quality;
- increased frequency and intensity of wildfire as a result of changing precipitation patterns and temperatures; and
- increased risk of flooding and landslide associated with changes to precipitation patterns.

Although uncertainty exists to the precise levels of these impacts, there is consensus regarding the range, frequency, or intensity of these impacts that can be expected. The project could be subject to potential hazards that could be exacerbated by climate change, such as reduced water supply and increased frequency and intensity of wildland fires from adjacent parcels that surround the project site, as well as the forested land in the region that would serve the project with forest fuel. Because the project site is located far above sea level (more than 6,500 feet), it would not be affected by sea level rise.

As shown in Exhibit 10-2, the area burned in wildland fires in the project area is expected to increase by up to 10 times by the end of the century, depending on the emissions scenario (Cal-Adapt 2012b). Nonetheless, it is foreseeable that the frequency, size, and intensity of wild fires will increase in the project area. The proposed biomass facility would be subject to increased exposure to such hazards that would occur over a long time frame (i.e., 100 years or more). As discussed in Chapter 15 "Public Services and Utilities", fire protection services are provided to the project site by the North Tahoe Fire Protection District (NTFPD), the Truckee Fire Protection

District, the California Department of Forestry and Fire Protection (CAL FIRE), and the United States Forest Service, and fire protection services were determined to be adequate under Impact 15-8.

The project would include features that enable adaptation and resiliency in the face of climate change-associated impacts. These features include:

- Reliance on groundwater; a source of water that appears highly reliable and less influenced by timing or extent of snowmelt;
- ✓ Use of non-potable water for operation of the steam turbine (under the direct combustion alternative only) and any water supply needs of the gasification system (under the gasification alternatives);
- Drainage features for handling storm water runoff during extreme storm events;
- ✓ Three existing aboveground water tanks, with capacities of 60,000 gallons, 150,000 gallons, and 250,000 gallons that can be used for fire suppression during emergencies;
- Non-vegetated setbacks between the biomass piles stored in the fuel yard and adjacent parcels that may contain dry vegetation; and
- ✓ Possible implementation of hazard reduction thinning on national forest lands adjacent to the project site that would reduce wildlife potential on these lands.

Inclusion of these features in the design and operation of the proposed project would reduce the extent and severity of climate change-related impacts to the project by providing methods for adapting to these changes. Specifically, the proposed project would include appropriate types of infrastructure to prepare for wildland fire (e.g., reliable water source, water storage, non-vegetated setbacks, and fire-fighting infrastructure), and management practices to minimize risk of wildland fire on surrounding property (e.g., forest fuel management activity). For these reasons, this impact is considered **less than significant**.

10.4 MITIGATION MEASURES

No mitigation measures would be necessary.

This page intentionally blank.