SECOND RECIRCULATED DRAFT EIR

FOR THE

SIERRA PACIFIC COGENERATION POWER PROJECT

SCH# 2009072011

FEBRUARY 2012

Prepared for:

Shasta County Department of Resource Management
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This section summarizes the purpose of the Second Recirculated Draft Environmental Impact Report (EIR) for the Sierra Pacific Industries (SPI) Cogeneration Power Project (project). The following discussion addresses the environmental procedures that are to be followed according to State law; the intended uses of the Second Recirculated Draft EIR; the contents of the Second Recirculated Draft EIR; the procedures for submittal of public and agency comments on the Second Recirculated Draft EIR; and the requirements for responding to comments on the original Draft EIR, the Recirculated Draft EIR and the Second Recirculated Draft EIR.

1.1 INTRODUCTION

The California Environmental Quality Act (CEQA) requires that all state and local government agencies consider the environmental consequences of programs and projects over which they have discretionary authority before taking action on those projects or programs. Where there is substantial evidence that a project may have a significant effect on the environment, the agency shall prepare an environmental impact report (EIR) (CEQA Guidelines, Section 15164[a]). An EIR is an informational document that will inform public agency decision makers and the general public of the significant environmental effects of a project, identify possible ways to minimize the significant effects, and describe reasonable alternatives to the project.

CEQA requires that a Draft EIR be prepared and circulated for public review. Following the close of the public review period, the lead agency prepares a Final EIR, which includes the comments received during the review period (either verbatim or in summary), and responses to the significant environmental issues raised in those comments. Prior to taking action on a proposed project, the lead agency must certify the EIR and make certain findings.

A lead agency is required to recirculate a Draft EIR, prior to certification, when "significant new information" is added to the EIR after the public review period begins (CEQA Guidelines Section 15088.5). New information is deemed significant if it reveals the following:

- A new significant environmental impact resulting from either the project itself or a new proposed mitigation measure;
- A substantial increase in the severity of an environmental impact would result unless mitigation measures are adopted that reduce the impact to a level of insignificance;
- A feasible project alternative or mitigation measure considerably different from others previously analyzed would clearly lessen the significant environmental impacts of the project, but the project proponent declines to adopt it; or
- The Draft EIR was so fundamentally inadequate and conclusory that it precluded meaningful public review and comment.

In addition, a lead agency may choose to recirculate an EIR if additional studies or analyses are conducted for a project before a specific action is taken by local decision makers to approve a

project. Recirculation may be limited to those chapters or portions of the EIR that have been modified (CEQA Guidelines Section 15088.5(c).

1.2 PROJECT BACKGROUND AND REASONS FOR EIR RECIRCULATION

Notice of Preparation

The County circulated a Notice of Preparation (NOP) of an EIR for the proposed project and an Initial Study on July 3, 2009 to trustee and responsible agencies, the State Clearinghouse, and the public. A public scoping meeting was held on July 21, 2009. Concerns raised in response to the NOP were considered during preparation of the Draft EIR.

Draft EIR

The County circulated a Draft EIR to the State Clearinghouse, trustee and responsible agencies, and the public on August 6, 2010. A Notice of Completion (NOC) was filed, and a 45-day public review period was provided between August 6, 2010 and September 21, 2010 to receive public and agency comments on the adequacy of the environmental analysis contained in the Draft EIR. The Draft EIR contains a description of the project, description of the environmental setting, identification of project impacts, and mitigation measures for impacts found to be significant, as well as an analysis of project alternatives, identification of significant irreversible environmental changes, growth-inducing impacts, and cumulative impacts. The Draft EIR identifies issues determined to have no impact or a less than significant impact, and provides detailed analysis of potentially significant and significant impacts. The original Draft EIR concluded that the proposed project would result in a significant and unavoidable impact to greenhouse gases (GHGs) and global climate change.

Recirculated Draft EIR

The County received numerous comments on the original Draft EIR relating to the analysis of GHGs and climate change. In light of the comments received, the County determined that the preparation of a revised GHG analysis was warranted. The County then oversaw preparation of a revised GHG and climate change analysis that employed a more refined and comprehensive methodology, including the use of a qualitative threshold of significance for the GHG analysis, and utilized the expanded fuel supply information provided by the project applicant.

The County prepared and circulated a Recirculated Draft EIR to the State Clearinghouse, trustee and responsible agencies, the public, and all parties and individuals that submitted comments on the original Draft EIR on September 2, 2011. A Notice of Completion (NOC) was filed, and a 45-day public review period was provided between September 2, 2011 and October 17, 2011 to receive public and agency comments on the adequacy of the environmental analysis contained in the Recirculated Draft EIR. The Recirculated Draft EIR included additional details regarding the project's fuel supplies and a revised greenhouse gas (GHG) analysis.

The revised GHG and climate change analysis contained in the Recirculated Draft EIR resulted in a conclusion that impacts to greenhouse gases and global climate change associated with the proposed project would be less than significant.

REASONS FOR THE SECOND RECIRCULATED DRAFT EIR

The Recirculated Draft EIR utilized a qualitative, or non-numeric, threshold of significance in the GHG analysis. The analysis of GHGs in the Recirculated Draft EIR concluded that the proposed project would result in less than significant impacts related to GHGs and climate change. The County received comments on the Recirculated Draft EIR that challenged the use of a qualitative threshold of significance. Comments on the Recirculated Draft EIR suggested that the use of a quantitative threshold of significance for the GHG analysis was more appropriate. In light of these comments, the County has determined that the use and application of a quantitative threshold is in fact appropriate.

This Second Recirculated Draft EIR includes a revised analysis of GHG impacts that may result from project implementation, and utilizes a quantitative threshold of significance. The impact determination related to GHGs in this Second Recirculated Draft EIR has not changed when compared to the Recirculated Draft EIR; both documents have determined that impacts related to GHGs would be less than significant. However, the County has elected to circulate this Second Recirculated Draft EIR to provide the public and interested agencies an opportunity to review and comment on this revised approach and the use of a numeric threshold of significance for GHG impacts.

Procedures for commenting on this revised analysis in the Second Recirculated Draft EIR are detailed below.

1.3 SUMMARY OF CHANGES

One section of the Recirculated Draft EIR has been revised and is included in this Second Recirculated Draft EIR. The Greenhouse Gas and Climate Change Section of the Recirculated Draft EIR has been revised, and is included in this document for public review and comment. The GHG analysis in this Second Recirculated Draft EIR supplants and replaces the GHG analysis that was included in the Recirculated Draft EIR. As described above, the significance conclusions related to GHGs and climate change have not changed. However, this Second Recirculated Draft EIR utilizes a numeric threshold of significance to determine the significance of GHG and climate change impacts, while the Recirculated Draft EIR utilized a qualitative threshold of significance.

No changes to the Project Description have been made as part of this Second Recirculated Draft EIR. The Project Description, which was included as Section 2.0 of the Recirculated Draft EIR, describes the full range of actions and activities contemplated under CEQA for the proposed project.

1.4 COMMENTS ON THE SECOND RECIRCULATED DRAFT EIR

In accordance with Section 15088.5(f)(2) of the CEQA Guidelines, *"When an EIR is revised only in part and the lead agency is recirculating only the revised chapters or portions of the EIR, the lead agency may request that reviewers limit their comments to the revised chapters or portions of the recirculated EIR. The lead agency need only respond to (i) comments received during the initial circulation period that relate to chapters or portions of the document that were **not** revised and recirculated, and (ii) comments received during the recirculation period that relate to the chapters or portions of the earlier EIR that were revised and recirculated."*

The SPI Cogeneration Power Project Draft EIR was originally circulated for a 45-day public review and comment period between August 6, 2010 and September 21, 2010. The Recirculated Draft EIR was circulated for a 45-day public review and comment period between September 2, 2011 and October 17, 2011.

The County of Shasta, acting as the lead agency for the project, formally requests that reviewers of the Second Recirculated Draft EIR **limit their comments to the revised portions of the Recirculated Draft EIR included herein**.

The Final EIR, which will be prepared after the public review period for the Second Recirculated Draft EIR, will include responses to comments received on all sections of the original Draft EIR that were **not** recirculated, responses to comments received on the Recirculated Draft EIR that relate to the portions that were Recirculated but not included in the Second Recirculated Draft EIR (the Project Description), and responses to comments received on the Second Recirculated Draft EIR. In other words, comments related to the GHG and climate change analysis included in the original Draft EIR and Recirculated Draft EIR will **not** be included in the Final EIR responses to comments. Comments and responses related to the GHG and climate change analysis contained in this Second Recirculated Draft EIR **will** be included in the Final EIR.

1.5 PUBLIC NOTICE/PUBLIC REVIEW

CEQA requires a public review period of at least 45 days for a recirculated draft EIR (Guidelines Sections 15088.5 and 15105). Additionally, Public Resources Code Section 21092.1 requires Shasta County to send a notice of recirculation to every agency, person, or organization that commented on the original Draft EIR and the Recirculated Draft EIR. Consistent with CEQA, the review period for this Recirculated Draft EIR is forty-five (45) days. County Planning staff will be available to answer questions from the public regarding the Second Recirculated Draft EIR. Public comment on the Second Recirculated Draft EIR will be accepted in written form. All comments or questions regarding the Second Recirculated Draft EIR should be addressed to:

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(530) 225-5532

RESPONSE TO COMMENTS/FINAL EIR

Following the public review period, a Final EIR will be prepared. The Final EIR will include responses to comments received on all sections of the original Draft EIR and Recirculated Draft EIR that were **not** recirculated, and responses to comments received on the Second Recirculated Draft EIR that relate to the portions that were recirculated.

CERTIFICATION OF THE EIR/PROJECT CONSIDERATION

The County will review and consider the Final EIR. If the County finds that the Final EIR is adequate and completed in compliance with CEQA, the Planning Commission may certify the Final EIR in accordance with CEQA. As set forth by CEQA Guidelines Section 15151, the standards of adequacy require an EIR to provide a sufficient degree of analysis to allow decisions to be made regarding the proposed project that intelligently take account of environmental consequences.

Following review and consideration of the Final EIR, the County may take action to approve, modify, or reject the project. A decision to approve the proposed project, for which the original Draft EIR identifies significant environmental effects, must be accompanied by written findings in accordance with State CEQA Guidelines Sections 15091 and 15093. A Mitigation Monitoring Program would also be adopted in accordance with Public Resources Code Section 21081.6(a) and CEQA Guidelines Section 15097 for mitigation measures that have been incorporated into or imposed upon the project to reduce or avoid significant effects on the environment. This Mitigation Monitoring Program will be designed to ensure that these measures are carried out during project implementation, in a manner that is consistent with the EIR.

1.6 ORGANIZATION OF THE DOCUMENT

This Second Recirculated Draft EIR includes two chapters as follows:

CHAPTER 1.0 – INTRODUCTION

This chapter summarizes the purpose of the Second Recirculated Draft EIR, describes the environmental procedures that are to be followed according to State law, the intended uses of the Second Recirculated Draft EIR, the contents of the Second Recirculated Draft EIR, including a summary of changes made to the original Draft EIR and Recirculated Draft EIR, the procedures for submittal of public and agency comments on the Second Recirculated Draft EIR, and the requirements for responding to comments on the original Draft EIR, the Recirculated Draft EIR, and the Second Recirculated Draft EIR.

REVISED CHAPTER 2.0 – GREENHOUSE GASES AND CLIMATE CHANGE

Chapter 2.0 provides background information on the existing environmental and regulatory settings as they relate to GHGs and climate change, identifies the methodologies used to complete the GHG analysis, identifies the thresholds of significance used in the analysis, and includes both a quantitative and qualitative analysis of the proposed project's impacts related to GHGs and climate change. The GHG and climate change analysis has been revised to include new

quantitative thresholds of significance to assess impacts related to GHGs generated by the proposed project, as previously described. The original Draft EIR concluded that impacts related to GHGs and global climate change would be significant and unavoidable. The Recirculated Draft EIR and Second Recirculated Draft EIR both conclude that impacts related to GHGs and global climate change would be less than significant.

2.0 GREENHOUSE GASES AND CLIMATE CHANGE

The following section provides a summary of greenhouse gases and climate change linkages, discusses the potential global and localized (State of California) effects of climate change, summarizes the applicable regulatory setting related to climate change and greenhouse gases, and discusses the proposed project's potential to result in cumulative climate change impacts.

As described in greater detail below, emissions of greenhouse gases (GHGs) have the potential to adversely affect the environment in a cumulative context. The emissions from a single project will not cause global climate change, however, GHG emissions from multiple projects throughout the world could result in a cumulative impact with respect to global climate change. Therefore, the analysis of GHGs and climate change presented in this section is presented in terms of the proposed project's cumulative contribution and potential to result in cumulatively considerable impacts related to GHGs and climate change.

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., human-made) 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 for 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 (on a global basis) additions. 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.

2.1 ENVIRONMENTAL SETTING

GREENHOUSE GASES AND CLIMATE CHANGE LINKAGES

Various gases in the Earth's atmosphere, classified as atmospheric greenhouse gases (GHGs), play a critical role in determining the Earth's surface temperature. Solar radiation enters Earth's atmosphere from space, and a portion of the radiation is absorbed by the Earth's surface. The Earth emits this radiation back toward space, but the properties of the radiation change from high-frequency solar radiation to lower-frequency infrared radiation.

Naturally occurring greenhouse gases include water vapor (H_2O), carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and ozone (O_3). Several classes of halogenated substances that contain fluorine, chlorine, or bromine are also greenhouse gases, but they are, for the most part, solely a product of industrial activities. Although the direct greenhouse gases CO_2, CH_4, and N_2O occur naturally in the atmosphere, human activities have changed their atmospheric concentrations. From the pre-industrial era (i.e., ending about 1750) to 2005, concentrations of these three greenhouse gases have increased globally by 36, 148, and 18 percent, respectively (IPCC 2007)[1].

Greenhouse gases, which are transparent to solar radiation, are effective in absorbing infrared radiation. As a result, this radiation that otherwise would have escaped back into space is now retained, resulting in a warming of the atmosphere. This phenomenon is known as the greenhouse effect. Among the prominent GHGs contributing to the greenhouse effect are carbon dioxide (CO_2), methane (CH_4), ozone (O_3), water vapor, nitrous oxide (N_2O), and chlorofluorocarbons (CFCs).

Emissions of GHGs contributing to global climate change are attributable in large part to human activities associated with the industrial/manufacturing, utility, transportation, residential, and agricultural sectors (California Energy Commission 2006a) [2]. In California, the transportation sector is the largest emitter of GHGs, followed by electricity generation (California Energy Commission 2006a).

As the name implies, global 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, respectively. California produced 492 million gross metric tons of carbon dioxide equivalents ($MMTCO_2e$) in 2004 (California Energy Commission 2006a). By 2020, California is projected to produce 507 $MMTCO_2e$ per year.[3]

Carbon dioxide equivalents are 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 of a GHG, is also dependent on the lifetime, or persistence, of the gas molecule in the atmosphere. Expressing GHG

[1] Intergovernmental Panel on Climate Change. 2007. "Climate Change 2007: The Physical Science Basis, Summary for Policymakers."
http://www.ipcc.ch/publications_and_data/publications_ipcc_fourth_assessment_report_wg1_report_the_physical_science_basis.htm

[2] California Energy Commission. 2006a. Inventory of California Greenhouse Gas Emissions and Sinks 1990 to 2004. http://www.arb.ca.gov/cc/inventory/archive/archive.htm

[3] California Air Resources Board. 2010. "Functional Equivalent Document prepared for the California Cap on GHG Emissions and Market-Based Compliance Mechanisms."

emissions in carbon dioxide equivalents takes the contribution 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.

Consumption of fossil fuels in the transportation sector was the single largest source of California's GHG emissions in 2004, accounting for 40.7% of total GHG emissions in the state (California Energy Commission 2006a). This category was followed by the electric power sector (including both in-state and out of-state sources) (22.2%) and the industrial sector (20.5%) (California Energy Commission 2006a).

EFFECTS OF GLOBAL CLIMATE CHANGE

The effects of increasing global temperature are far-reaching and extremely difficult to quantify. The scientific community continues to study the effects of global climate change. In general, increases in the ambient global temperature as a result of increased GHGs are anticipated to result in rising sea levels, which could threaten coastal areas through accelerated coastal erosion, threats to levees and inland water systems and disruption to coastal wetlands and habitat.

If the temperature of the ocean warms, it is anticipated that the winter snow season would be shortened. Snowpack in the Sierra Nevada provides both water supply (runoff) and storage (within the snowpack before melting), which is a major source of supply for the state. The snowpack portion of the supply could potentially decline by 70% to 90% by the end of the 21st century (Cal EPA 2006)[4]. This phenomenon could lead to significant challenges securing an adequate water supply for a growing state population. Further, the increased ocean temperature could result in increased moisture flux into the state; however, since this would likely increasingly come in the form of rain rather than snow in the high elevations, increased precipitation could lead to increased potential and severity of flood events, placing more pressure on California's levee/flood control system.

Sea level has risen approximately seven inches during the last century and it is predicted to rise an additional 22 to 35 inches by 2100, depending on the future GHG emissions levels (Cal EPA 2006). If this occurs, resultant effects could include increased coastal flooding, saltwater intrusion and disruption of wetlands (Cal EPA 2006). As the existing climate throughout California changes over time, mass migration of species, or failure of species to migrate in time to adapt to the perturbations in climate, could also result. Under the emissions scenarios of the Climate Scenarios report (Cal EPA 2006), the impacts of global warming in California are anticipated to include, but are not limited to, the following.

[4] California Environmental Protection Agency, Climate Action Team. 2006. Climate Action Team Report to Governor Schwarzenegger and the Legislature.
http://www.climatechange.ca.gov/climate_action_team/reports/

PUBLIC HEALTH

Higher temperatures are expected to increase the frequency, duration, and intensity of conditions conducive to air pollution formation. For example, days with weather conducive to ozone formation are projected to increase from 25% to 35% under the lower warming range and to 75% to 85% under the medium warming range. In addition, if global background ozone levels increase as predicted in some scenarios, it may become impossible to meet local air quality standards. Air quality could be further compromised by increases in wildfires, which emit fine particulate matter that can travel long distances depending on wind conditions. The Climate Scenarios report indicates that large wildfires could become up to 55% more frequent if GHG emissions are not significantly reduced.

In addition, under the higher warming scenario, there could be up to 100 more days per year with temperatures above 90°F in Los Angeles and 95°F in Sacramento by 2100. This is a large increase over historical patterns and approximately twice the increase projected if temperatures remain within or below the lower warming range. Rising temperatures will increase the risk of death from dehydration, heat stroke/exhaustion, heart attack, stroke, and respiratory distress caused by extreme heat.

WATER RESOURCES

A vast network of man-made reservoirs and aqueducts capture and transport water throughout the state from northern California rivers and the Colorado River. The current distribution system relies on Sierra Nevada snow pack to supply water during the dry spring and summer months. Rising temperatures, potentially compounded by decreases in precipitation, could severely reduce spring snow pack, increasing the risk of summer water shortages.

The state's water supplies are also at risk from rising sea levels. An influx of saltwater would degrade California's estuaries, wetlands, and groundwater aquifers. Saltwater intrusion caused by rising sea levels is a major threat to the quality and reliability of water within the southern edge of the Sacramento/San Joaquin River Delta, a major state fresh water supply. Global warming is also projected to seriously affect agricultural areas, with California farmers projected to lose as much as 25% of the water supply they need; decrease the potential for hydropower production within the state (although the effects on hydropower are uncertain); and seriously harm winter tourism. Under the lower warming range, the snow dependent winter recreational season at lower elevations could be reduced by as much as one month. If temperatures reach the higher warming range and precipitation declines, there might be many years with insufficient snow for skiing, snowboarding, and other snow dependent recreational activities.

If GHG emissions continue unabated, more precipitation will fall as rain instead of snow, and the snow that does fall will melt earlier, reducing the Sierra Nevada spring snow pack by as much as 70% to 90%. Under the lower warming scenario, snow pack losses are expected to be only half as large as those expected if temperatures were to rise to the higher warming range. How much snow pack will be lost depends in part on future precipitation patterns, the projections for which remain uncertain. However, even under the wetter climate projections, the loss of snow pack

would pose challenges to water managers, hamper hydropower generation, and nearly eliminate all skiing and other snow-related recreational activities.

AGRICULTURE

Increased GHG emissions are expected to cause widespread changes to the agriculture industry reducing the quantity and quality of agricultural products statewide. Although higher carbon dioxide levels can stimulate plant production and increase plant water-use efficiency, California's farmers will face greater water demand for crops and a less reliable water supply as temperatures rise.

Plant growth tends to be slow at low temperatures, increasing with rising temperatures up to a threshold. However, faster growth can result in less-than-optimal development for many crops, so rising temperatures are likely to worsen the quantity and quality of yield for a number of California's agricultural products. Products likely to be most affected include wine grapes, fruits and nuts, and milk.

Crop growth and development will be affected, as will the intensity and frequency of pest and disease outbreaks. Rising temperatures will likely aggravate ozone pollution, which makes plants more susceptible to disease and pests and interferes with plant growth.

In addition, continued global warming will likely shift the ranges of existing invasive plants and weeds and alter competition patterns with native plants. Range expansion is expected in many species while range contractions are less likely in rapidly evolving species with significant populations already established. Should range contractions occur, it is likely that new or different weed species will fill the emerging gaps. Continued global warming is also likely to alter the abundance and types of many pests, lengthen pests' breeding season, and increase pathogen growth rates.

FORESTS AND LANDSCAPES

Global warming is expected to alter the distribution and character of natural vegetation thereby resulting in a possible increased risk of large of wildfires. If temperatures rise into the medium warming range, the risk of large wildfires in California could increase by as much as 55%, which is almost twice the increase expected if temperatures stay in the lower warming range. However, since wildfire risk is determined by a combination of factors, including precipitation, winds, temperature, and landscape and vegetation conditions, future risks will not be uniform throughout the state. For example, if precipitation increases as temperatures rise, wildfires in southern California are expected to increase by approximately 30% toward the end of the century. In contrast, precipitation decreases could increase wildfires in northern California by up to 90%.

Moreover, continued global warming will alter natural ecosystems and biological diversity within the state. For example, alpine and sub-alpine ecosystems are expected to decline by as much as 60% to 80% by the end of the century as a result of increasing temperatures. The productivity of the state's forests is also expected to decrease as a result of global warming.

RISING SEA LEVELS

Rising sea levels, more intense coastal storms, and warmer water temperatures will increasingly threaten the state's coastal regions. Under the higher warming scenario, sea level is anticipated to rise 22 to 35 inches by 2100. Elevations of this magnitude would inundate coastal areas with saltwater, accelerate coastal erosion, threaten vital levees and inland water systems, and disrupt wetlands and natural habitats.

2.2 REGULATORY SETTING

FEDERAL

The Environmental Protection Agency (EPA) is the federal agency responsible for implementing the Clean Air Act (CAA). 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. 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 ON LARGE INDUSTRIAL FACILITIES

On May 13, 2010, EPA issued the Prevention of Significant Deterioration and Title V Greenhouse Gas Tailor Rule. This final rule sets thresholds for greenhouse gas (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.

The rule establishes a schedule that will initially focus permitting programs on the largest sources and then expands beyond certain permitting programs to cover the largest sources of GHGs that may not have been previously covered by the CAA for other pollutants. During Step 1, from January 2, 2011 to June 30, 2011, only sources currently subject to the PSD permitting program (i.e., those that are newly-constructed or modified in a way that significantly increases emissions of a pollutant other than GHGs) would be subject to permitting requirements for their GHG emissions under PSD; and, for these projects, only GHG increases of 75,000 tons (68,039 MT) per year or more, on a CO_2e basis, would need to determine the Best Available Control Technology (BACT) for their GHG emissions. Similarly for the operating permit program, only sources currently subject to the program (i.e., newly constructed or existing major sources for a pollutant other than GHGs) would be subject to Title V requirements for GHG. During this time, no sources would be subject to Clean Air Act permitting requirements due solely to GHG emissions.

Step 2 will build on Step 1. During Step 2, from July 1, 2011 to June 30, 2013, PSD permitting requirements will cover for the first time new construction projects that emit GHG emissions of at least 100,000 tons (90,718 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. In Step 2, operating permit requirements will, for the first time, 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 CO_2e will be subject to Title V permitting requirements.

As part of this rule, EPA also commits 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.

In early 2011, the EPA granted a three-year exemption from this rule for large-scale biomass-burning facilities. At the time of writing of this document, the three-year biomass exemption is in effect. However, this EPA ruling to exempt biomass has been challenged by environmental groups. Given the uncertainties related to when the proposed project will be constructed and operational, and whether or not legal challenges to the EPA's biomass exemption will be successful, it is not known whether or not the proposed Cogen Facility will be required to determine and implement BACT for GHGs under the PSD program.

MANDATORY GREENHOUSE GAS REPORTING RULE

On September 22, 2009, EPA issued a final rule for mandatory reporting of GHGs from large GHG emissions sources in the United States. In general, this national reporting requirement will provide EPA with accurate and timely GHG emissions data from facilities that emit 25,000 metric tons or more of CO_2 per year. This publically 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 at the facility level, except that certain suppliers of fossil fuels and industrial greenhouse gases along with vehicle and engine manufacturers will report at the corporate level. An estimated 85% of the total U.S. GHG emissions, from approximately 10,000 facilities, are covered by this final rule. The proposed Cogen Facility will be subject to the GHG reporting requirements established by this rule.

ENERGY POLICY AND CONSERVATION ACT

The Energy Policy and Conservation Act of 1975 sought to ensure that all vehicles sold in the U.S. would meet certain fuel economy goals. Through this Act, Congress established the first fuel economy standards for on-road motor vehicles in the United States (U.S.). Pursuant to the Act, the National Highway Traffic and Safety Administration, which is part of the U.S. Department of Transportation (USDOT), is responsible for establishing additional vehicle standards and for revising existing standards.

Since 1990, the fuel economy standard for new passenger cars has been 27.5 mpg. Since 1996, the fuel economy standard for new light trucks (gross vehicle weight of 8,500 pounds or less) has been 20.7 mpg. Heavy-duty vehicles (i.e., vehicles and trucks over 8,500 pounds gross vehicle weight) are not currently subject to fuel economy standards. Compliance with federal fuel economy standards is determined on the basis of each manufacturer's average fuel economy for the portion of its vehicles produced for sale in the U.S. The Corporate Average Fuel Economy (CAFE) program, which is administered by the U.S. Environmental Protection Agency (EPA), was created to determine vehicle manufacturers' compliance with the fuel economy standards. The EPA calculates a CAFE value for each manufacturer based on city and highway fuel economy test results and vehicle sales. Based on the information generated under the CAFE program, the USDOT is authorized to assess penalties for noncompliance.

ENERGY POLICY ACT OF 1992 (EPACT)

The Energy Policy Act of 1992 (EPAct) was passed to reduce the country's dependence on foreign petroleum and improve air quality. EPAct includes several parts intended to build an inventory of alternative fuel vehicles (AFVs) in large, centrally fueled fleets in metropolitan areas. EPAct requires certain federal, state, and local government and private fleets to purchase a percentage of light duty AFVs capable of running on alternative fuels each year. In addition, financial incentives are included in EPAct. Federal tax deductions will be allowed for businesses and individuals to cover the incremental cost of AFVs. States are also required by the act to consider a variety of incentive programs to help promote AFVs.

ENERGY POLICY ACT OF 2005

The Energy Policy Act of 2005 was signed into law on August 8, 2005. Generally, the act provides for renewed and expanded tax credits for electricity generated by qualified energy sources, such as landfill gas; provides bond financing, tax incentives, grants, and loan guarantees for a clean renewable energy and rural community electrification; and establishes a federal purchase requirement for renewable energy.

STATE

CALIFORNIA STRATEGY TO REDUCE PETROLEUM DEPENDENCE (AB 2076)

AB 2076 (Chapter 936, Statutes of 2000) requires the CEC and the California Air Resources Board (CARB) to develop and submit to the Legislature a strategy to reduce petroleum dependence in California. The statute requires the strategy to include goals for reducing the rate of growth in the demand for petroleum fuels. In addition, the strategy is required to include recommendations to increase transportation energy efficiency as well as the use of non-petroleum fuels and advanced transportation technologies including alternative fuel vehicles, hybrid vehicles, and high-fuel efficiency vehicles.

The strategy, *Reducing California's Petroleum Dependence*, was adopted by the CEC and CARB in 2003. The strategy recommends that California reduce inroad gasoline and diesel fuel demand to 15% below 2003 demand levels by 2020 and maintain that level for the foreseeable future; the Governor and Legislature work to establish national fuel economy standards that double the fuel efficiency of new cars, light trucks, and sport utility vehicles (SUVs); and increase the use of non-petroleum fuels to 20% of on-road fuel consumption by 2020 and 30% by 2030.

BIOENERGY ACTION PLAN – EXECUTIVE ORDER #S-06-06

Executive Order #S-06-06 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. The executive order also calls for the state to meet a target for use of biomass electricity, including biomass cogeneration facilities.

GOVERNOR'S LOW CARBON FUEL STANDARD (EXECUTIVE ORDER #S-01-07)

Executive Order #S-01-07 establishes a statewide goal to reduce the carbon intensity of California's transportation fuels by at least 10% by 2020 through establishment of a Low Carbon Fuel Standard. The Low Carbon Fuel Standard shall be incorporated into the State Alternative Fuels Plan required by AB 1007 and is one of the proposed discrete early action GHG reduction measures identified by CARB pursuant to AB 32.

SENATE BILL 97 (SB 97)

Senate Bill 97 was signed by the Governor on August 24, 2007. This bill provides that in an environmental impact report, negative declaration, mitigated negative declaration, or other document required by CEQA for either transportation projects funded under the Highway Safety, Traffic Reduction, Air Quality and Port Security Bond Act of 2006, or projects funded under the Disaster Preparedness and Flood Prevention Bond Act of 2006, the failure to analyze adequately the effects of greenhouse gas emissions otherwise required to be reduced pursuant to regulations adopted under the Global Warming Solutions Act of 2006 does not create a cause of action for a violation of CEQA. The bill provides that this provision shall apply retroactively for any of the above documents that are not final and shall be repealed on January 1, 2010.

The bill requires the Office of Planning and Research (OPR), by July 1, 2009, to prepare, develop, and transmit to the Resources Agency guidelines for the feasible mitigation of greenhouse gas emissions or the effects of greenhouse gas emissions, as required by CEQA, including, but not limited to, effects associated with transportation or energy consumption. The Resources Agency was required to certify and adopt those guidelines by January 1, 2010. The OPR is required to periodically update the guidelines to incorporate new information or criteria established by the CARB pursuant to the California Global Warming Solutions Act of 2006.

CLIMATE ACTION PROGRAM AT CALTRANS

In December 2006, the California Department of Transportation, Business, Transportation, and Housing Agency, issued a Climate Action Program. The goal of the Climate Action Program is to promote clean and energy efficient transportation, and provide guidance for mainstreaming energy and climate change issues into business operations. The overall approach to lower fuel consumption and CO_2 from transportation is twofold: (1) reduce congestion and improve efficiency of transportation systems through smart land use, operational improvements, and Intelligent Transportation Systems; and (2) institutionalize energy efficiency and GHG emission reduction measures and technology into planning, project development, operations, and maintenance of transportation facilities, fleets, buildings, and equipment.

The reasoning underlying the Climate Action Program is the conclusion that "the most effective approach to addressing GHG reduction, in the short-to-medium term, is strong technology policy

and market mechanisms to encourage innovations. Rapid development and availability of alternative fuels and vehicles, increased efficiency in new cars and trucks (light and heavy duty), and super clean fuels are the most direct approach to reducing GHG emissions from motor vehicles (emission performance standards and fuel or carbon performance standards)."

SENATE BILL 375

SB 375, signed in September 2008, aligns regional transportation planning efforts, regional GHG emission reduction targets, 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. CARB 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. The CARB assigned the Shasta County Regional Transportation Planning Agency (Shasta RTPA) with a reduction target of 0% per capita GHG emissions from 2005 levels.

ASSEMBLY BILL 1493

In 2002, then Governor Gray Davis signed AB 1493. AB 1493 required the CARB to develop and adopt, by January 1, 2005, regulations that achieve "the maximum feasible reduction of greenhouse gases emitted by passenger vehicles and light-duty truck and other vehicles determined by the 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 (CCR) adding GHG emission standards to California's existing motor vehicle emission standards in 2004.

Amendments to CCR Title 13 Sections 1900 (CCR 13 1900) and 1961 (CCR 13 1961), and adoption of Section 1961.1 (CCR 13 1961.1) require automobile manufacturers to 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. For passenger cars and light-duty trucks 3,750 pounds or less loaded vehicle weight (LVW), the 2016 GHG emission limits are approximately 37% lower than the during the first year of the regulations in 2009. For medium-duty passenger vehicles and light-duty trucks 3,751 LVW to 8,500 pounds gross vehicle weight (GVW), GHG emissions are reduced approximately 24% between 2009 and 2016.

CALIFORNIA EXECUTIVE ORDERS S-3-05 AND S-20-06, AND ASSEMBLY BILL 32

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

In 2006, this goal was further reinforced with the passage of Assembly Bill 32 (AB 32), the Global Warming Solutions Act of 2006. AB 32 sets the same overall GHG emissions reduction goals while further mandating that CARB create a plan, which includes market mechanisms, and implement rules to achieve "real, quantifiable, cost-effective reductions of greenhouse gases."

Executive Order S-20-06 further directs state agencies to begin implementing AB 32, including the recommendations made by the state's Climate Action Team (CAT). Each CAT working group will develop a Near-term Implementation Plan (CATNIPs) for the specific climate change mitigation measures and adaptation strategies being addressed by the working group. These will be the measures and strategies that will be underway or completed by the end of 2010. The CATNIP will include a brief description of the measures and strategies, the steps to be taken in implementation, the agency/department responsible, and the timeline for completion. The Energy Working Group of the Climate Action Team focuses its efforts on both greenhouse gas emission reduction and adaptation actions affecting the energy sector.

CARB, which is part of Cal-EPA, develops air quality regulations at the state level. The state regulations mirror federal regulations by establishing industry-specific pollution controls for criteria, toxic, and nuisance pollutants. California also requires areas to develop plans and strategies for attaining state ambient air quality standards as set forth in the California Clean Air Act of 1988. In addition to developing regulations, CARB develops motor vehicle emission standards for California vehicles.

ASSEMBLY BILL 32- CLIMATE CHANGE SCOPING PLAN

On December 11, 2008 CARB adopted its *Climate Change Scoping Plan* (Scoping Plan), which functions as a roadmap of CARB's plans to achieve GHG reductions in California required by AB 32 through subsequently enacted regulations. The Scoping Plan contains the main strategies California will implement to reduce CO_2e emissions by 169 million metric tons (MMT), or approximately 30%, from the state's projected 2020 emissions level of 596 MMT of CO_2e under a business-as-usual scenario. (This is a reduction of 42 MMT CO_2e, or almost 10%, from 2002–2004 average emissions, but requires the reductions in the face of population and economic growth through 2020.) The Scoping Plan also breaks down the amount of GHG emissions reductions CARB recommends for each emissions sector of the state's GHG inventory.

The Scoping Plan calls for the largest reductions in GHG emissions to be achieved by implementing the following measures and standards:

- improved emissions standards for light-duty vehicles (estimated reductions of 31.7 MMT CO_2e),

- the Low-Carbon Fuel Standard (15.0 MMT CO_2e),
- energy efficiency measures in buildings and appliances and the widespread development of combined heat and power systems (26.3 MMT CO_2e), and
- a renewable portfolio standard for electricity production (21.3 MMT CO_2e).

The Cal-EPA 2011 Greenhouse Gas Reduction Report Card (January, 2011) reported that in 2009, the date for which the most current data are available, California had achieved a reduction of 1.3 MMT CO_2e compared to 2007 levels from implementation of the RPS program.

SENATE BILL 1368

SB 1368 requires the California Energy Commission (CEC) and the California Public Utilities Commission (CPUC) to set a global warming emissions standard for electricity used in California — regardless of whether it's generated in-state or purchased from plants in other states. The new standard applies to any new long-term financial contracts for base load electricity, and applies both to investor-owned utilities and municipal utilities. The standard for baseload generation owned by, or under long-term contract to publicly owned utilities, is an emissions performance standard (EPS) of 1,100 lbs CO_2 per megawatt-hour (MWh). However, the CPUC has determined that biomass generation of electricity is EPS compliant because alternative means of disposing biomass such as open air burning and landfill deposition have the potential to generate greater concentrations of greenhouse gas in the atmosphere, including methane[5]. This concept is described in greater detail later in this EIR chapter and in the footnotes below.

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

[5] Interim Opinion on Phase I Issues: Greenhouse Gas Emissions Performance Standard. CPUC Decision 07-01-039 January 25, 2007. Specifically, Section 1.6 states: *"In particular, the record shows that electric generation using biomass (e.g., agricultural and wood waste, landfill gas) that would otherwise be disposed of under a variety of conventional methods (such as open burning, forest accumulation, landfills, composting) results in a substantial* ***net reduction*** *(emphasis in original) in GHG emissions. This is because the usual disposal options for biomass wastes emit large quantities of methane gas, whereas the energy alternatives either burn the wastes that would become methane or burn the methane itself, generating CO_2. Since methane gas is on the order of twenty to twenty-five times more potent as a GHG than CO_2, and since methane has an atmospheric residence time of twelve years, after which it is converted to atmospheric CO_2, trading off methane for CO_2 emissions from energy recovery operations leads to a net reduction of the greenhouse effect."*

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.

CALIFORNIA RENEWABLES PORTFOLIO STANDARD (RPS)

Established in 2002 under Senate Bill 1078 and accelerated in 2006 under Senate Bill 107, California's Renewables Portfolio Standard (RPS) is one of the most ambitious renewable energy standards in the country. The RPS program requires electric corporations to increase procurement from eligible renewable energy resources by at least 1% of their retail sales annually, until they reach 20% by 2010. Biomass generated electricity is considered an eligible renewable energy source for the RPS program.

GHG CAP AND TRADE PROGRAM

California's greenhouse gas cap and trade program is a central element of California's Global Warming Solutions Act (AB 32) and covers major sources of GHG emissions in the State such as refineries, power plants, industrial facilities, and transportation fuels. The regulation includes an enforceable GHG cap that will decline over time. The CARB will distribute allowances, which are tradable permits, equal to the emission allowed under the cap. The final cap and trade regulations were adopted on October 20, 2011.

The regulation sets a statewide limit on sources responsible for 85 percent of California's greenhouse gas emissions and establishes a price signal needed to drive long-term investment in cleaner fuels and more efficient use of energy. The program is designed to provide covered entities the flexibility to seek out and implement the lowest-cost options to reduce emissions.

The regulation will cover 360 businesses representing 600 facilities and is divided into two phases: the first, beginning in 2013, will include all major industrial sources along with electricity utilities; the second, starting in 2015, brings in distributors of transportation fuels, natural gas and other fuels.

Companies are not given a specific limit on their greenhouse gas emissions but must supply a sufficient number of allowances (each the equivalent of one ton of carbon dioxide) to cover their annual emissions. As the cap declines each year, the total number of allowances issued in the state drops, requiring companies to find the most cost-effective and efficient approaches to reducing their emissions. The first compliance year when covered sources will have to turn in allowances is 2013.

To ensure a gradual transition, CARB will provide the majority of allowances to all industrial sources during the initial period (2013-2014), using a calculation that rewards the most efficient companies. Those that need additional allowances to cover their emissions can purchase them at regular quarterly auctions CARB will conduct, or buy them on the market. The first auctions of allowances (for 2013 allowances) are slated for August and November 2012.

Electric utilities will also be given allowances to be sold at auction for the benefit of their ratepayers and to help achieve AB 32 goals.

The final regulations for the cap and trade program are codified in Subchapter 10 Climate Change, Article 5, Sections 95800 to 96023, Title 17, California Code of Regulations. Section 95802(a)(31) contains a definition of "biomass" as defined in the cap and trade regulations. *"Biomass means non-fossilized and biodegradable organic material originating from plants, animals, and microorganisms, including products, by-products, residues, and waste from agriculture, forestry, and related industries as well as the non-fossilized and biodegradable organic fractions of industrial and municipal wastes, including gases and liquids recovered from the decomposition of non-fossilized and biodegradable organic material. For the purpose of this article, biomass includes both California Renewable Portfolio Standard (RPS) eligible and non-eligible biomass as defined by the California Energy Commission."*

Section 95852.2 identifies emissions without a compliance obligation under the cap and trade program. As stated in Section 95852.2:

> *Emissions from the following source categories and from the combustion of the following fuel types count toward applicable reporting thresholds, as applicable in MRR (Mandatory Reporting Regulation), but do not count toward a covered entity's compliance obligation set forth in this article unless those emissions are reported as non-exempt biomass- derived CO_2 under MRR. Emissions without a compliance obligation include:*
>
> *(a) CO_2 emissions from combustion of the following biomass-derived fuels:*
>
> *(1) The biogenic fraction of solid waste materials as reported under MRR;*
>
> *(2) Waste pallets, crates, dunnage, manufacturing and construction wood wastes, tree trimmings, mill residues, and range land maintenance residues;*
>
> *(3) All agricultural crops or waste;*
>
> *(4) Wood and wood wastes identified to follow all of the following practices:*
>
> *(A) Harvested pursuant to an approved timber management plan prepared in accordance with the Z'berg-Nejedly Forest Practice Act of 1973 or other locally or nationally approved plan; and*
>
> *(B) Harvested for the purpose of forest fire fuel reduction or forest stand improvement.*

The proposed cogeneration project would utilize fuel that fully meets the definition of biomass, as defined by Title 17 California Code of Regulations Section 95802(a)(31). As such, per the requirements of Section 95852.2, the proposed project would be required to report GHG emissions under the Mandatory Reporting Rule, but GHG emissions from the project would not count towards the project's compliance obligations under the cap and trade program. In other words, GHG emissions from the combustion of biomass fuels for electricity generation are not

required to be offset or reduced under the cap and trade program. The reason for this exemption determination is discussed further below in Section 2.3 and under Impact 2.2.

2.3 IMPACTS AND MITIGATION MEASURES

THRESHOLDS OF SIGNIFICANCE

As described previously, the State Legislature and the global scientific community have found that global climate change poses significant adverse effects to the environment of California and the entire world.

Per Appendix G of the CEQA Guidelines, climate change-related impacts are considered significant if implementation of the proposed project under consideration would do any of the following:

1. Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment.

2. 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 GHG thresholds have been developed specifically for facilities that generate electricity. Neither the Shasta County Air Quality Management District nor Shasta County has developed GHG CEQA thresholds.

In order to determine whether or not the proposed project would generate GHG emissions that may have a significant impact on the environment, Shasta County has relied on the Inclusion Thresholds for Covered Entities, as described in Section 95812 of the Cap and Trade regulations adopted by CARB in 2011 (Title 17, California Code of Regulations). As described in Section 95812(c)(2), the applicability threshold for an electricity generating facility is based on the annual emissions from which the electricity originated. The applicability threshold for an electricity generating facility is 25,000 metric tons or more of CO_2e per data year.

It is noted and acknowledged that CARB's 25,000 metric ton/year threshold is a reporting threshold for the cap and trade program, and was not specifically established as a CEQA threshold for GHGs. However, in the report titled: *CEQA and Climate Change: Evaluating and Addressing Greenhouse Gas Emissions from Projects Subject to the California Environmental Quality Act*, the California Air Pollution Control Officers Association (CAPCOA) identifies the 25,000 metric ton threshold as used by CARB for their reporting threshold, as a potential and appropriate non-zero GHG threshold for use in a CEQA document (see pages 44-45 of the above-referenced 2008 report).

Additionally, as described above, the U.S. EPA regulations for reporting of greenhouse gas emissions set a 25,000 metric ton threshold for large emission sources. Through its rulemaking process, EPA analyzed several potential reporting thresholds, and concluded that this threshold would "appropriately balanc[e] emission coverage and burden."[6] EPA considered but rejected lower thresholds of 1,000 and 10,000 metric tons, finding that the thresholds would greatly increase the number of covered entities without capturing a significant additional portion of GHG emissions.[7] For similar reasons, the European Union has provided for "small installations" with emissions under 25,000 metric tons to be exempted from its Emissions Trading Scheme; notably, biomass emissions are excluded from this calculation.[8]

In summary, a 25,000 metric ton threshold has been determined in several state, federal, and international rulemaking processes to represent a significant level of emissions with respect to cumulative contributions to global climate change. Given the extensive research and resources that went into the development of the GHG Mandatory Reporting Rule and cap and trade programs adopted by CARB, the U.S. EPA greenhouse gas reporting rule, and the fact that the 25,000 metric ton threshold would capture approximately 94 percent of GHG emissions associated with stationary sources in California (CAPCOA page 44), Shasta County has determined that the use of the 25,000 metric tons/year of CO_2e threshold is the most appropriate quantitative threshold to apply to the proposed project. This numeric threshold is used in this EIR to determine if the proposed project would have a significant impact, or result in a cumulatively considerable contribution, to climate change and the generation of GHGs. In other words, if the proposed project generates 25,000 metric tons of CO_2e or greater in a year, it would be considered to have a significant and cumulatively considerable impact on the environment. If the proposed project would generate less than 25,000 metric tons of CO_2e per year, it would be considered a less than significant and less than cumulatively considerable impact related to climate change and GHGs.

In order to determine if the proposed project would conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases, the proposed project is compared to the most applicable and relevant state-level regulations adopted to reduce GHG levels. These include regulations adopted under the AB 32 Scoping Plan and the Renewables Portfolio Standard (RPS).

[6] 74 Fed. Reg. 56272-73 (Oct. 30, 2009).

[7] Id. at 56272.

[8] See Article 27, European Parliament Directive 2003/87/EC, as amended by Directive 2009/29/EC.

ANALYSIS APPROACH

At the time of preparation of this Recirculated Draft EIR, neither CARB nor the Shasta County Air Quality Management District has formally adopted a recommended methodology for evaluating GHG emissions associated with stationary sources and/or new projects.

The California Office of Planning and Research (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: to determine whether the impacts have the potential to result in a significant project or cumulative environmental impact; and, where feasible mitigation is available, to mitigate any project or cumulative impact determined to be potentially significant. More recently, OPR prepared amendments to the State CEQA Guidelines, pursuant to SB 97 (Statutes of 2007) for adoption by the California Natural Resources Agency. 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.

Specifically, CEQA Guidelines Section 15064.4, as amended March 18, 2010, state:

(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.

Greenhouse Gases In Biomass Context

Facilities fueled or fired by biomass have been treated as "carbon neutral" by national and international carbon tracking and trading systems, including the systems in use by the European Union, and the Regional Greenhouse Gas Initiative, which tracks greenhouse gas emissions in the northeastern U.S.

Of even greater relevance in the context of this CEQA analysis, is the treatment of biomass fueled electricity facilities as carbon neutral by the California Air Resources Board and the California Energy Commission. As previously described above under the Regulatory Setting section of this EIR chapter, Section 95802(a)(31) of the California Code of Regulations contains a definition of "biomass" as defined in the cap and trade regulations. *"Biomass means non-fossilized and biodegradable organic material originating from plants, animals, and microorganisms, including products, by-products, residues, and waste from agriculture, forestry, and related industries as well as the non-fossilized and biodegradable organic fractions of industrial and municipal wastes, including gases and liquids recovered from the decomposition of non-fossilized and biodegradable organic material. For the purpose of this article, biomass includes both California Renewable Portfolio Standard (RPS) eligible and non-eligible biomass as defined by the California Energy Commission."*

The entirety of the fuel mix proposed for the project meets the definition of biomass fuels adopted in the California Code of Regulations.

Section 95852.2 of the California Code of Regulations identifies emissions without a compliance obligation under the cap and trade program. As stated in Section 95852.2:

> *Emissions from the following source categories and from the combustion of the following fuel types count toward applicable reporting thresholds, as applicable in MRR (Mandatory Reporting Regulation), but do not count toward a covered entity's compliance obligation set forth in this article unless those emissions are reported as non-exempt biomass- derived CO_2 under MRR. Emissions without a compliance obligation include:*
>
> *(a) CO_2 emissions from combustion of the following biomass-derived fuels:*
>
> *(1) The biogenic fraction of solid waste materials as reported under MRR;*
>
> *(2) Waste pallets, crates, dunnage, manufacturing and construction wood wastes, tree trimmings, mill residues, and range land maintenance residues;*
>
> *(3) All agricultural crops or waste;*
>
> *(4) Wood and wood wastes identified to follow all of the following practices:*

> *(A) Harvested pursuant to an approved timber management plan prepared in accordance with the Z'berg-Nejedly Forest Practice Act of 1973 or other locally or nationally approved plan; and*
> *(B) Harvested for the purpose of forest fire fuel reduction or forest stand improvement.*

By exempting biomass fuels from the compliance obligations set forth in the State's newly-adopted cap and trade program, CARB's regulation treats biomass fuels as being carbon neutral, and should be treated as such for the purposes of GHG analyses and mitigation programs. In order to further verify and clarify the treatment of biomass fuels as a carbon neutral fuel source, CARB was contacted during the preparation of this EIR to discuss CARB's treatment of biomass fuels in the context of carbon neutrality[9]. CARB staff verified that biomass fuels are exempted from the cap and trade program because they are considered to be a carbon neutral fuel source. Staff further verified that CARB treats biomass fuels as carbon neutral, and this treatment was the foundation for the decision to exempt these fuel types from the cap and trade program,[10] and to include electricity generated from biomass fuels in the RPS program, which is administered by the CEC. CARB staff further stated that the treatment of biomass combustion as carbon neutral in the context of this EIR was both appropriate, and consistent with CARB's treatment of biomass combustion emissions.

The conventional rationale for conferring carbon neutrality on biomass is that the carbon in the biomass, known as biogenic carbon, is already part of the global carbon cycle. Growth of biomass removes carbon from the atmosphere, while combustion of biomass returns the carbon to the atmosphere, thus completing the loop.[11] In this regard, it is important to consider both the role of forest management and the treatment of biomass fuels, as both affect the overall GHG impact.

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[9] Mayeur, Greg. CARB Climate Change Program Operations Sections Manager. Personal communication (phone) with Ben Ritchie, Principal, De Novo Planning Group. January 5, 2012.

[10] See, e.g., Final Statement of Reasons for California's Cap and Trade Program, October 2011, at 1188, ("biomass-derived fuels are exempt from a compliance obligation since CO2 emissions resulting from the combustion of biomass are considered biogenic.").

11 See, e.g., U.S. Environmental Protection Agency, Inventory of U.S. Greenhouse Gas Emissions and Sinks, 1990-2008 (April 15, 2010) at 3-1 ("It is assumed that the carbon (C) released during the consumption of biomass is recycled as U.S. forests and crops regenerate, causing no net addition of CO2 to the atmosphere."); U.S. Department of Agriculture, Forest Service Pacific Southwest Research Station, Biomass to Energy: Forest Management for Wildfire Reduction, Energy Production, and Other Benefits, California Energy Commission report no. CEC-500-2009-080 (January 2010); Intergovernmental Panel on Climate Change, 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Vol. 1, General Guidance and Reporting (treating biomass used for energy production as having zero emissions in the Energy Sector);

Questions have been raised whether biomass combustion should be considered carbon neutral within timeframes relevant to current efforts to mitigate the impacts of climate change. In accounting for the carbon budget of forest fuels, one may look at the status of the source forest as a whole, on a landscape basis. If total biomass in the source forest is increasing over time in conjunction with the supply of forest removals to biomass power production, then the enterprise is actually contributing to the sequestration of atmospheric carbon.[12] In fact, it is well documented that California forests as a whole are acting as a sink (net sequestration) for atmospheric carbon, and that this is a long-term trend that has proceeded in conjunction with past and current levels of forest harvesting and management in the state.[13]

Moreover, in the specific case of the proposed Cogen Facility, it is noteworthy that, as described in the Project Description, the proposed project will not result in any additional timber harvesting operations for the sole purpose of biomass combustion. All commercial timber harvesting in California requires a Timber Harvest Plan (THP) that is certified, by the Director of the Department of Forestry and Fire Protection, as being in compliance with the intent of the Z'berg Nejedly Forest Practice Act (FPA). The FPA requires, among other things, that a THP demonstrate that the harvesting will result in the maximum sustained production of high quality timber products. Additionally, power generation is the lowest-valued use for biomass resources, and only waste and residual materials are used as fuels.

The following discussion addresses the role of forest management practices relating to sequestration of carbon.

Role of Forest Management in Carbon Sequestration

The proposed project, as described in detail in the Project Description, does not involve additional timber harvesting or changes to forest management. However, the following discussion is included as background to address the role of forest management in the analysis of the project's greenhouse gas impacts. CO_2 is consumed by growing trees, which release oxygen and store the carbon as wood fiber. This carbon capture and retention through photosynthesis is also called

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Western Governors' Association, Clean and Diversified Energy Initiative, Biomass Task Force Report (January 2006).

12 This is supported by the IPCC, which states: "In the long term, sustainable forest management strategy aimed at maintaining or increasing forest carbon stocks, while producing an annual yield of timber, fibre, or energy from the forest, will generate the largest sustained mitigation benefit." Nabuurs, G.J., et al., 2007: Forestry. In Climate Change 2007: Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [B. Metz et al. (eds)], Cambridge University Press.

13 See e.g., California Air Resources Board, California's 1990-2004 Greenhouse Gas Emissions Inventory and 1990 Emissions Level: Forest and Rangeland Methods excerpted from the full Technical Support Document, May 2009.

carbon sequestration. Trees process CO_2 through photosynthesis, emit oxygen and store carbon in the wood fiber. Harvesting and replanting the temperate forests of North America, and California in particular, consumes great quantities of CO_2 and sequesters the carbon in wood products out of the atmosphere. In other words, managing temperate forests in North America creates a significant annual net GHG sink. Generalizing about the effects of harvest is especially problematic if one tries to extrapolate from studies in un-managed native forests (sometimes called old growth) or extensively managed forests as compared to forests which may have depleted carbon storage and depleted capacity for removal of CO_2 due to past management.

To date, the California Board of Forestry has not promulgated rules regarding the assessment of GHGs as they relate to timber operations or sustained forest management. The Forest Practices Act and Forest Practice Rules, however, do provide guidance regarding analysis of GHG impacts. These include the requirement for minimum stocking standards including reforestation requirements for even-aged management,[14] the requirement for large landowners to demonstrate Maximum Sustained Production (MSP) of High Quality Timber Products[15] through filing and approval of a site specific, ownership-wide, State reviewed document. In addition, there is a general requirement that any potentially significant adverse cumulative effect potentially emerging from a timber harvest plan be analyzed.

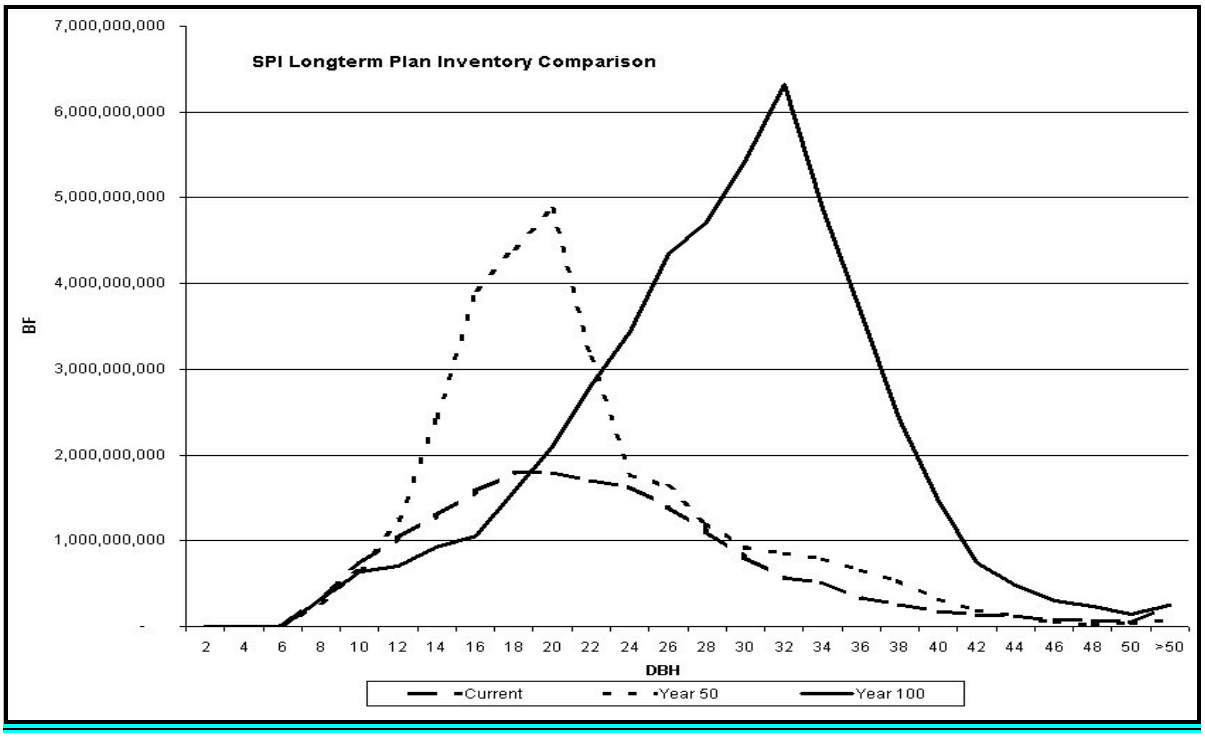
The regulatory underpinning for GHG sequestration through forest management is the demonstration of MSP. Laws which require replanting of harvest areas, and restrictive time frames on harvesting adjacent forest stands, are also factors ensuring future tree growth. Regulatory programs to protect wildlife, rare plants, riparian function with streamside zones, archaeological and soil resources may inhibit the ability to promote, to the maximum extent possible, the sequestration of carbon in forest stands. The reason is that other environmental values dictate that growth and regrowth be slowed or impeded as a result of leaving trees that are slow growing or decadent and therefore prevent the establishment of younger trees that may remove carbon at a faster rate.

Again, the proposed project does not change existing and approved forest management practices; a discussion of those practices is provided here for informational background and context. For its timberlands, SPI's demonstration of MSP shows that SPI's management is a significant sink of GHGs over the next 100 years. The SPI "Option A" demonstration of MSP documents increased average tree diameter (Figure 1), increased total volume and increased sustainable harvest volumes while also increasing the habitat for high canopy closure large tree dependent wildlife species (Figure 3). In the Option A, over the next 100 years, total standing inventory steadily increases (almost triples) and sustainable harvest steadily increases to approximately 2.5 times current levels. (See Table A and Figure 2 below).

14 14 Cal. Code Regs. § 912.7, 932.7, 952.7.

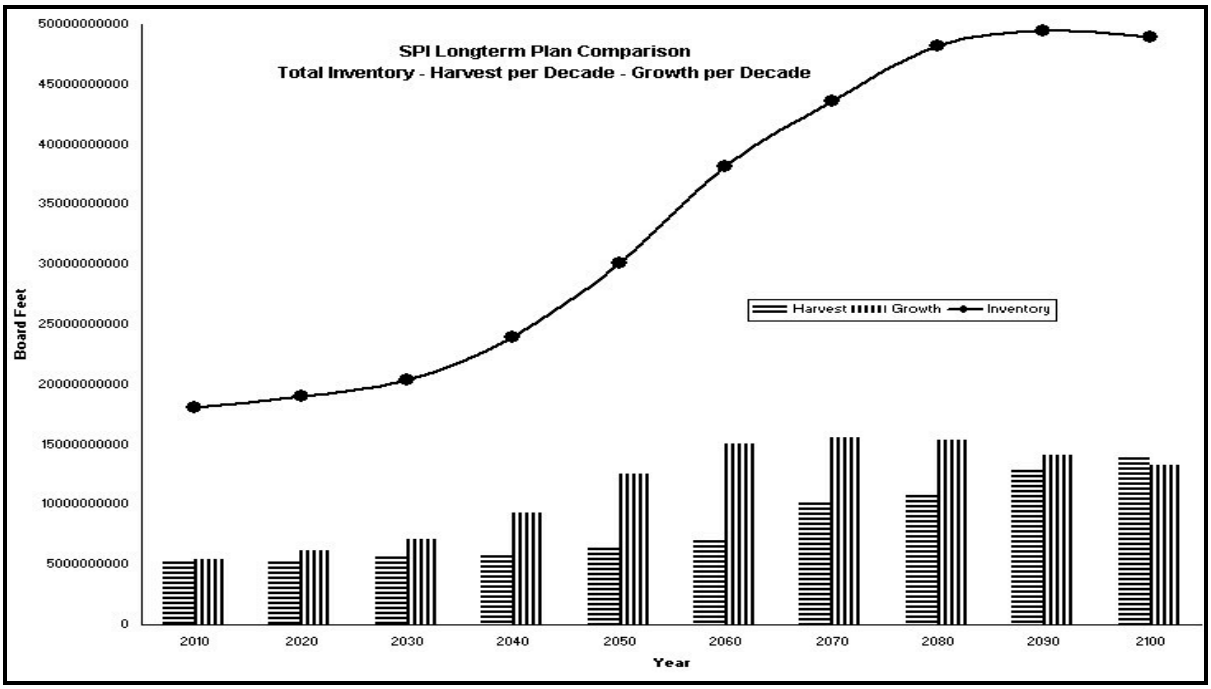
15 14 CCR § 913.11, 933.11, 953.11.

FIGURE 1 - TREE DIAMETERS OVER TIME



SOURCE: SPI'S "OPTION A DEMONSTRATION OF MAXIMUM SUSTAINABLE PRODUCTION FOR THE NORTHERN STATE FOREST DISTRICT," ON FILE WITH THE CALIFORNIA DEPARTMENT OF FORESTRY & FIRE PROTECTION AT ITS NORTHERN DISTRICT OFFICE (SPI OPTION A).

FIGURE 2 – INVENTORY, HARVEST AND GROWTH



SOURCE: SPI OPTION A.

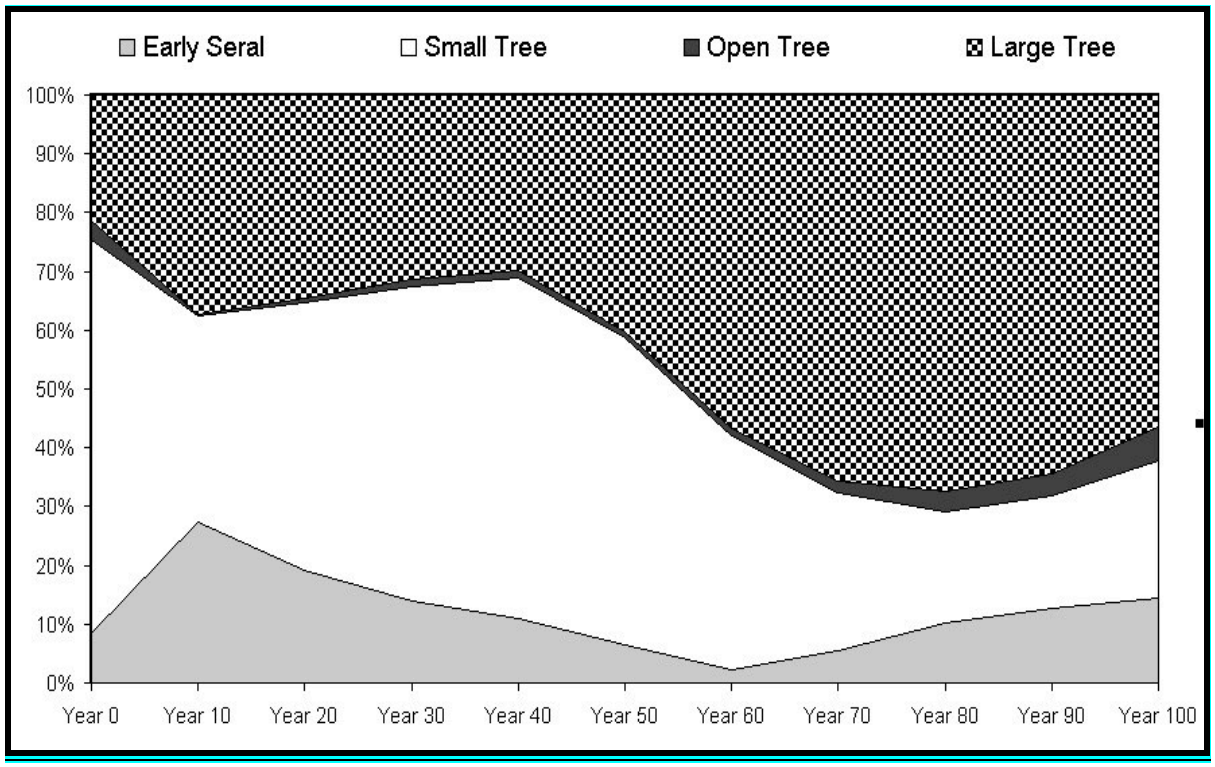
TABLE A - INVENTORY, HARVEST AND GROWTH

Achievement of Maximum Sustained Production Report
For TAA: Combined SPI All California Forest Districts
2,002 scenarios
1,439,350.95 acres (Non forest acres omitted)

		Board Feet Scribner				
Years	Beginning Inventory	Harvest Volume	Residual Inventory	Total Growth	Ending Inventory	Growth bf/ac/yr
0 - 10	17,822,123,342	5,223,087,694	12,599,035,649	5,460,411,126	18,059,446,775	379
10 - 20	18,059,446,775	5,232,931,676	12,826,515,099	6,163,877,866	18,990,392,965	428
20 - 30	18,990,392,965	5,685,778,802	13,304,614,163	7,073,725,610	20,378,339,772	491
30 - 40	20,378,339,772	5,706,865,303	14,671,474,469	9,290,844,461	23,962,318,931	645
40 - 50	23,962,318,931	6,331,666,935	17,630,651,995	12,511,294,421	30,141,946,416	869
50 - 60	30,141,946,416	7,049,037,970	23,092,908,446	15,103,106,506	38,196,014,951	1049
60 - 70	38,196,014,951	10,150,878,450	28,045,136,501	15,545,282,479	43,590,418,981	1080
70 - 80	43,590,418,981	10,729,309,132	32,861,109,849	15,411,797,591	48,272,907,440	1071
80 - 90	48,272,907,440	12,917,332,527	35,355,574,913	14,149,892,255	49,505,467,167	983
90 - 100	49,505,467,167	13,915,398,644	35,590,068,523	13,324,333,648	48,914,402,172	926
Totals		82,942,287,134		114,034,565,963		

SOURCE: SPI OPTION A.

FIGURE 3 - HABITAT DISTRIBUTION CHANGE OVER TIME



SOURCE: SPI OPTION A.

Using this information, SPI has documented how the in-forest stock of carbon increases significantly over the next 100 years. In addition, the amount of long-lived wood products produced annually also increases over time. These products are stored off-site and are subject to less risk of wildfire and other events that could quickly emit them back into the atmosphere as CO_2.

A common myth as applied to temperate forests is that efforts to reduce emissions of GHGs are served better by leaving depleted forests in their current state (i.e., avoidance of harvesting) instead of applying sustainable forest management practices. In fact, forest management results in increasing levels of sequestration, whereas prevented management results in either very slow or declining levels of sequestration. Scientific literature discusses how sustainable forest management is usually a better strategy for controlling GHG emissions over the long term. The GHG benefits of sustainable forest management are associated with forest regrowth after harvest; lower risk of wildfire; production of energy-efficient materials and biomass energy; and carbon sequestration in forests and wood products.[16] In a recent report, the Intergovernmental Panel on Climate Change concluded that "In the long term, sustainable forest management strategy aimed

16 Schlamadinger and Marland 1996; Marland and Schlamadinger 1997; Kurz et al. 2002.

at maintaining or increasing forest carbon stocks, while producing an annual yield of timber, fibre, or energy from the forest, will generate the largest sustained mitigation benefit."[17]

The California Air Resources Board and the California Energy Commission, in their efforts to determine the GHG emissions inventory for California and for the forests lands in California, have determined these lands to be net sequestering between five to 17 million metric tons of CO_2 equivalents annually ($MMTCO_2e$/year). A very detailed baseline analysis for forest GHG emissions and sequestration from and in the forests of northern California indicates that these forests are net of all emissions sequestering 8.76 $MMTCO_2e$/year.[18]

GHG Impacts of Biomass Fuel

The process of using wood as a fuel source for production of electricity and/or biogenic fuels, will continue to present a significant opportunity to improve atmospheric GHG levels. The technology to produce energy without adding net CO_2 to the atmosphere by burning fossil fuels is mature and employed worldwide. CO_2 emissions from the combustion or decomposition of biogenic materials (e.g., paper, wood products, and trimmings) grown on a sustainable basis are considered to mimic the closed loop of the natural carbon cycle—that is, they return CO_2 to the atmosphere that was originally removed by photosynthesis (without any net addition to the total carbon in the atmospheric carbon cycle).[19] Thus for U.S. greenhouse gas inventory purposes, biogenic fuel sources are not counted in emissions inventories. Both the IPCC and U.S. EPA consider biomass fuels "carbon neutral" as long as the fuel source is managed sustainably. Cogeneration is a process by which biomass is burned to make electricity while the cooling steam produced is used to heat and dry lumber (using the steam twice). Using cogeneration to consume the wood fiber waste material and ultimately remove and further sequester the carbon in forests presents a substantial opportunity to go beyond just photosynthesis (atmospheric carbon removal by trees) to help mitigate the problem of rising CO_2 levels in the atmosphere.

In California, the designation of the biomass fuels that are used for energy production as carbon neutral is based on a sophisticated analysis, which tracks carbon flows associated with the biomass

17 IPCC. 2007. Climate Change 2007: Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [B. Metz, O.R. Davidson, P.R. Bosch, R. Dave, L.A. Meyer (eds)], Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

18 Brown, S., T. Pearson, A. Dushku, J. Kadyzewski, and Y. Qi. 2004. Baseline Greenhouse Gas Emissions and Removals for Forest, Range, and Agricultural Lands in California. Winrock International, for the California Energy Commission, PIER Energy-Related Environmental Research. 500-04-069F.

19 U.S. EPA, 2009 – Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990 – 2007, page 8-6.

resources that are used as fuels.[20] This methodology – discussed in more detail below – led the California Public Utilities Commission in 2007 to find, in a major Commission decision regulating greenhouse gas emissions: "electric generation using biomass (e.g., agricultural and wood waste, landfill gas) that would otherwise be disposed of under a variety of conventional methods (such as open burning, forest accumulation, landfills, composting) results in a substantial *net reduction* in GHG emissions."[21]

As discussed above, on October 20, 2011, as part of its ongoing implementation of AB 32, the California Air Resources Board (CARB) adopted regulations to implement a cap-and-trade program for greenhouse gas emissions.[22] In section 95852.2 of the regulations, CARB has specifically exempted from any compliance obligation a series of listed fuel types that have been demonstrated to be carbon neutral, and in many cases carbon negative.[23] These exemptions cover all of the fuel sources that will be utilized at the Cogen Facility. This means that these fuels are not considered emission sources that need to be capped or offset either by the use of allowances, or other available offsets in the California regulatory program.[24] Additionally, biomass cogeneration facilities are eligible for inclusion in the state's Renewable Portfolio Standard (RPS) program; indeed, the Cogen Facility has been pre-certified as a participating renewable energy facility by the California Energy Commission.

An article in the October 23, 2009, issue of *Science* magazine challenged the notion that biomass should be granted a blanket finding of carbon neutrality, pointing out that under some conditions, some types of biomass fuels, such as fuels derived from forest harvesting conducted specifically for energy production, may not be carbon neutral.[25] However, the article explicitly acknowledges

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20 Morris, G., Biomass Energy Production in California: The Case for a Biomass Policy Initiative, NREL Report No. NREL/SR-570-28805, November 2000.

21 California Public Utilities Commission, Interim Opinion on Phase 1 Issues: Greenhouse Gas Emissions Performance Standard, D.07-01-039, pg. 18, January 25, 2007, emphasis in original.

22 See http://www.arb.ca.gov/regact/2010/capandtrade10/capandtrade10.htm for more information on the rulemaking process.

23 By comparison, the U.S. Environmental Protection Agency has not yet determined whether or how emissions from biomass generation must be incorporated into permits for GHG emissions. On January 12, 2011, the EPA announced its intention to defer rulemaking on biomass GHG permitting requirements for a three year period in order to be able to more fully study the underlying science.

24 The biogenic emissions from biomass power generation will be reported to the CARB under the Mandatory Reporting Rule, but in a separate category from fossil emissions. Only the fossil emissions will be subject to the regulation.

25 Timothy D. Searchinger et al., Fixing a Critical Climate Accounting Error, at 527.

that the use of waste and residue forms of biomass does not entail this concern, and that waste and residue forms of biomass should be considered carbon neutral. In fact, all of the fuels that will be used by the proposed Cogen Facility are waste and residue forms of biomass, and thus the use of these fuels should be considered carbon neutral or carbon negative fully within the context of the concerns expressed in the *Science* article.

ANALYSIS METHODOLOGY

The proposed SPI Anderson Cogen Facility was analyzed for potential GHG emissions from biogenic sources (verified biomass materials used as fuel for the proposed boiler) as well as non-biogenic, or fossil-based sources, such as natural gas, diesel fuels, etc. Table 2-1 summarizes the project-related activities for which the GHG emissions were estimated, the key input parameters, and the source of the emission factors to be used.

The operational emissions are principally the GHG emissions from the combustion of biomass in the facility (the stationary source) plus there are numerous support emissions, which are emissions that directly support power plant operations and would not otherwise occur.

TABLE 2-1 METHODOLOGIES USED TO ESTIMATE GHG EMISSIONS FOR PROJECT

SOURCE OF GHG	KEY INPUT PARAMETER	GHG EMISSION FACTORS MODELS AND SOURCES
OPERATIONAL EMISSIONS		
Biomass Combustion at Power Plant	Biomass fuel energy content	CARB Mandatory Reporting of GHG Emissions regulations (Title 17 §§95100 to 95133)
Natural Gas Combustion at Power Plant	Natural gas energy content	CARB Mandatory Reporting of GHG Emissions regulations (Title 17 §§95100 to 95133)
Fuel Yard Loader	Hours of off-road equipment use	CARB Offroad2007, CA Climate Action Registry General Reporting Protocol 2009
Truck Idling at Power Plant	Truck idling hours	CARB Emfac2007, CA Climate Action Registry General Reporting Protocol 2009
Employee trips	VMT of employee commute trips	CARB URBEMIS, CA Climate Action Registry General Reporting Protocol 2009
Biomass Hauling	VMT of haul routes	CA Climate Action Registry General Reporting Protocol 2009, CARB EMFAC2007
Hauling of Ash	VMT of haul routes	CA Climate Action Registry General Reporting Protocol 2009
Biomass Harvesting/Processing	On-road vehicle miles traveled (VMT) and hours of off-road equipment use	CARB Offroad2007, Forest Biomass Removal on National Forest Lands (Sierra Nevada Conservancy, November 2008)

The methodology used to analyze the project's contribution to global climate change includes the calculation of GHG emissions using the best available methodologies and specified GHG emission factors available from a variety of models, protocols, and regulatory sources (as listed in Table 2-1) and the GHG Analysis supporting Excel spreadsheets, which are included as Appendix A.

GHG emission factors for the calculation of total GHG emissions from the combustion of biomass materials were sourced from the California Code of Regulations, and the equations used in the GHG analysis were obtained from published California Air Resources Board (CARB) guidance documents. The results of the quantified GHG analysis are shown below in Table 2-4. As shown in Table 2-4, emissions from project operations are shown in two contexts. The first context is the direct GHG emissions that would occur as a result of project operations, and the GHG emissions that are emitted directly from the proposed cogeneration facility as a result of operation are shown. The second context is the net increase in GHG emissions that would result from project implementation. As described in detail above, the combustion of biomass materials in the proposed cogeneration plant would be a carbon neutral activity, since the carbon that is released from the combustion of biomass materials is already a part of the earth's carbon cycle, and the combustion of this biomass material would not result in a net increase in global carbon emissions. Therefore, while the project would result in the direct emission of GHGs associated with biomass combustion, this biomass combustion would not contribute to a net increase in GHG emissions. Therefore, as shown in Table 2-4, the project's GHG emissions associated with biomass combustion are subtracted from the subtotal of all emissions, as this has been determined by the CARB, the CEC, and the U.S. EPA to be a carbon neutral activity, as described throughout this EIR chapter.

For the processing of forest residues by off-road equipment, GHG emission factors were obtained via the CARB OFFROAD2007 model. These models and protocols represent established standards used by California regulatory agencies and the scientific community.

GHG Measurement

Carbon dioxide equivalents (CO_2e) provide a universal standard of measurement against which the impacts of releasing, or avoiding the release of, different GHGs can be evaluated. Every greenhouse gas has a Global Warming Potential (GWP), a measurement of the impact that particular gas has on radiative forcing; that is, the amount of heat/energy that is retained in the Earth's atmosphere through the addition of this gas to the atmosphere. The GWP of a given gas describes its effect on climate change relative to a similar amount of carbon dioxide (the GWP of CO_2 is 1.0 by definition).

The GWP of a gas depends on two factors, the ability of the gas to absorb energy, and the lifetime of the gas in the atmosphere. GWPs can be expressed on an instantaneous basis, which reflects only the relative ability of the gas to absorb energy, or with an explicit time factor built-in. The residence time of CO_2 in the atmosphere is generally believed to be in excess of 100 years, and some of the other GHGs have even longer residence times. Thus, most analyses use a timeframe in the range of 25 – 100 years in determining the warming potential of GHGs that are emitted into the atmosphere today.

Of the five principal GHGs, only CO_2 and CH_4 are emitted during the combustion of fuels, or via the degradation of biomass. On a per-carbon basis, CH_4 has a GWP that is 25 times greater than the GWP of CO_2 on an instantaneous basis. However, the average residence time of CH_4 in the atmosphere is only about one-tenth as long as the average residence time of CO_2, and its clearance involves conversion to CO_2, so when a time factor is added the relative GWP of CH_4 goes down to values in the range of 7.5–12.5 on a per-carbon basis, depending on the length of the timeframe being used in the analysis. GWPs are often reported on a per-weight basis, rather than a per-carbon basis. The instantaneous GWP of methane on a weight basis is 69 relative to the same weight of CO_2, and with a time factor built-in it falls to a range of about 20–35.

IMPACTS AND MITIGATION MEASURES

Impact 2.1: Project implementation would generate GHG emissions that may result in a significant impact on the environment. (Less than significant and less than cumulatively considerable impact)

Implementation of the proposed project would result in the generation of GHG emissions during the construction phase of the project and during operation of the project. The construction phase of the project is a short-term and temporary phase. The operational phase of the project begins once construction is complete, and continues throughout the operational life of the project.

As described above, the proposed project would result in a significant and cumulatively considerable impact to climate change and the generation of GHGs if project operations would generate 25,000 metric tons of CO_2e per year, or greater. If the project generates less than 25,000 metric tons of CO_2e per year, the impact would be less than significant and less than cumulatively considerable.

CONSTRUCTION-RELATED GHG EMISSIONS

Project-related construction activities would result in 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.

The estimated construction GHG emissions are presented below in Table 2-2.

TABLE 2-2: CONSTRUCTION GREENHOUSE GASES

GREENHOUSE GAS	UNMITIGATED EMISSIONS (TONS/YEAR)
Carbon dioxide	120.29

SOURCE: DE NOVO PLANNING GROUP, 2010 (URBEMIS 2007 MODELING)

As shown in Table 2-2, the construction phase of the proposed project would generate up to 120 tons per year of CO_2. These GHG emissions would occur one time only, during project construction, and are significantly below the established threshold of 25,000 metric tons of CO_2e per year. Therefore, construction-related GHG impacts would be **less than significant**, and no mitigation is required.

OPERATIONAL GHG EMISSIONS

The following discussion describes the various operational aspects of the proposed project that would generate GHG emissions and the assumptions related to each operational aspect of the project that were used to quantify project GHG emissions.

Biomass Combustion at Power Plant

The proposed Cogen Facility is to produce 31 MW (gross) of electrical power by consuming 220,000 bone dry tons (BDT) of woody biomass gathered from a variety of sources. Based on information supplied by the project applicant, there were different estimates of the project's biomass fuel blend by fuel type. One estimate assumed that the entire project (100%) could be fueled by mill residuals from the SPI Anderson and the SPI Shasta Lake sawmill operations. It is reported that the SPI Anderson Sawmill facility has the capability to provide sixty-five percent (65%) of the fuel requirements of the proposed biomass facility by using 100% of the SPI Anderson mill residuals. The remaining 35% of the annual biomass needed can be mill residuals from the SPI Shasta Lake Sawmill facility, located eighteen (18) miles north of the SPI Anderson facility.

An alternative fuel type mix was, however, used for this GHG analysis, in order to present a more likely, average, fuel mix over the life of the facility. It assumes that not all the woody biomass for fuel comes from mill residues, but also may come from forest harvesting operations (as harvest slash), forest thinning operations (to reduce wildfire hazards), agricultural woody waste from the Sacramento Valley agricultural areas, and some urban wood waste.

The fuel mix assumptions used in this analysis are considered a conservative "worst-case" scenario. For example, by sourcing fuel from agricultural woody waste sources in the Sacramento Valley, the fuel deliveries to the project site would consume more diesel fuel (associated with truck trips) than if all of the project's fuel were sourced from the SPI Anderson and SPI Shasta Lake sawmill sites. Additionally, fuel supplied from in-forest sources (slash and thinnings) would require the use of heavy machinery for fuel collection and transport. So while the existing sawmills at Anderson and Shasta Lake may supply 100% of the project's fuel in a given year, the project applicant may source up to 35% of the project's fuel from alternative sources and locations in a given year, which may result in increased emissions associated with fuel collection and transport.

The mix of biomass fuel types used in the analysis is presented in Table 2-3 below.

TABLE 2-3: REPRESENTATIVE WOODY BIOMASS FUEL MIX OF PROJECT

ANNUAL FUEL USE	MILL	HARVEST SLASH	THINNINGS	AGRICULTURE	URBAN WOOD	TOTAL
BDT per year	140,000	20,000	20,000	25,000	15,000	**220,000**
Percentage of BDT	64%	9%	9%	11%	7%	**100%**

It should be noted though, that in the calculation of total potential GHG emissions from the combustion of the woody biomass, it is the total of 220,000 BDT that was used, as the location of where it came from for this calculation does not affect the total GHG emissions of the woody biomass combustion.

Natural Gas Combustion at the Power Plant

The proposed project will utilize natural gas during start up and shut down activities, as well as for flame stabilization. The Cogen Facility boiler will be equipped with two (2) natural gas burners, each with a maximum rated heat input of 62.5 MMBtu/hours. The air quality permit for the facility has not yet been issued, but may have the maximum annual natural gas usage set at 10% of the burner annual capacity factor. This would mean that that the natural gas burners could operate at nearly 3,000 hours per year. However, it is expected that the actual usage will be considerably less than this. Thus, for the purposes of GHG emissions calculations, the natural gas usage was set at 500 hours of the two burners operating. The assumption of 500 hours per year of burner operation is based on a review of the operational characteristics of similar facilities in Shasta County, discussions with Shasta AQMD staff, and professional knowledge of biomass facility operations. This assumption is likely an overestimate of actual burner operations on an annual basis, and is considered a very conservative estimate for use in this quantification.

Fuel Yard Loader

The GHG emissions of the fuel yard equipment are included in the operational GHG emissions inventory. The equipment proposed for use in the woody biomass fuel yards is a Caterpillar 980B Front End Bucket Loader. Proposed operational parameters are: Operating 16 hours per day, at six days a week would equal 112 hour/week, or a total of 5,284 hours per year.

Truck Idling

Woody biomass from the forest, agriculture, and urban sources, as well as a portion of the mill residuals coming from other SPI facilities will require that the chip van trucks may idle at the facility while waiting to off load woody biomass fuel. The idling time for each truck was assumed to be 15 minutes. Ash hauling trucks were also included in this GHG emissions calculation.

Employee Trips

The SPI Anderson Cogen Facility project will increase the number of employees by six. Thus, the GHG emissions for six new employees and their commute to and from the facility were calculated.

Average trip length defaults were obtained from the CARB approved emissions models as well as average mix of vehicle types that might be used by the new, additional, employees.

Biomass Hauling

Woody biomass delivered from the variety of off-site sources, including mill residuals from other SPI facilities involve the use of truck and chip trailers combinations. Based upon biomass fuel source data supplied from SPI, via the County of Shasta, the average amount of miles traveled by the chip trucks was calculated for the following off-site biomass fuel sources. Included is the calculated amount of fuel from these sources as well:

Mill Residues

- SPI Shasta Lake - 30,135 BDT @ 18 miles
- SPI Red Bluff - 15,043 BDT @ 26 miles
- SPI Arcata - 3,724 BDT @ 155 miles

Forest Thinnings and Slash

- Various locations - 40,000 BDT @ 68 miles

Agricultural Woody Waste

- Sacramento Valley various locations - 25,000 BDT @ 108 miles

Urban Wood Waste

- Sacramento urban area - 15,000 BDT @ 152 miles

The total miles that the chip trucks would travel (round trips) was calculated and then divided by 13.5, this being the average BDT of woody biomass per delivery truck. GHG emissions factors for heavy-duty diesel trucks were then applied and the total GHG emissions burden for diesel fuel consumed by the trucks was calculated.

Hauling of Ash

For the purposes of this GHG emissions calculation it was assumed that all the ash would be transported to the Anderson Landfill for disposal (approximately 7.2 miles away). An ash hauling truck was assumed to hold 18 tons, and with a projected annual generation of 11,155 tons of ash, it is calculated that there will be 1,248 trips to the landfill annually. Again, assuming the truck hauling the ash would be a heavy-duty diesel, the GHG emissions for the diesel fuel consumed was calculated.

Biomass Harvesting and Processing

The fuel types that will require harvesting, collection, and processing that contribute to the project's GHG emissions burden include the forest thinnings and slash, agricultural woody waste, and urban wood waste. Much of this diesel-fired equipment (such as feller bunchers, grinders, etc.) is off-road diesel equipment. There are some on-road vehicles associated with the forest thinnings/slash and agricultural woody waste that were also used in GHG emissions calculations.

Analysis Results

Table 2-4 displays the results of the GHG analysis for the operations of the proposed Cogen Facility. Included are the direct emissions generated by the proposed project and the net increased emissions attributable to the proposed project.

Detailed calculation worksheets associated with this table are provided in Appendix A.

TABLE 2-4: DIRECT AND NET GHG EMISSIONS GENERATED BY THE PROJECT

SOURCE	DIRECT EMISSIONS CO_2E (MT/YEAR)
OPERATIONAL EMISSIONS	
Biomass Combustion at Power Plant*	317,497
Natural Gas Combustion at Power Plant	3,419
Fuel Yard Loader	926
Truck Idling at Power Plant	18
Employee Trips	39
Biomass Hauling	1,979
Ash Hauling	26
Biomass Harvesting/Processing	5,944
Subtotal of emissions generated	***329,848***
Exclusion of Biomass Combustion at Power Plant*	(317,497)
NET TOTAL OPERATIONAL EMISSIONS	**12,351**

Notes:

*Biomass combustion GHG emissions are shown to result in zero net emissions since biomass combustion for the generation of electricity is considered to be carbon neutral. The support for the finding of carbon neutrality of biomass combustion is provided by the following sources, and is further described in greater detail previously in this EIR chapter.

1. See, e.g., U.S. Environmental Protection Agency, Inventory of U.S. Greenhouse Gas Emissions and Sinks, 1990-2008 (April 15, 2010) at 3-1 ("It is assumed that the carbon (C) released during the consumption of biomass is recycled as U.S. forests and crops regenerate, causing no net addition of CO2 to the atmosphere."); U.S. Department of Agriculture, Forest Service Pacific Southwest Research Station, Biomass to Energy: Forest Management for Wildfire Reduction, Energy Production, and Other Benefits, California Energy Commission report no. CEC-500-2009-080 (January 2010); Intergovernmental Panel on Climate Change, 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Vol. 1, General Guidance and Reporting (treating biomass used for energy production as having zero emissions in the Energy Sector); Western Governors' Association, Clean and Diversified Energy Initiative, Biomass Task Force Report (January 2006).
2. U.S. EPA, 2009 – Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990 – 2007, page 8-6.
3. Morris, G., Biomass Energy Production in California: The Case for a Biomass Policy Initiative, NREL Report No. NREL/SR-570-28805, November 2000.
4. California Public Utilities Commission, Interim Opinion on Phase 1 Issues: Greenhouse Gas Emissions Performance Standard, D.07-01-039, pg. 18, January 25, 2007.
5. Mayeur, Greg. CARB Climate Change Program Operations Sections Manager. Personal communication (phone) with Ben Ritchie, Principal, De Novo Planning Group. January 5, 2012.

SOURCE: TSS CONSULTANTS AND DE NOVO PLANNING GROUP AUGUST 2011 AND JANUARY 2012.

As shown in the table above, operation of the proposed Cogen Facility would result in approximately 12,351 metric tons of CO_2e per year. This level of GHG emissions is below the threshold of 25,000 metric tons of CO_2e per year used for this analysis. Additionally, it is recognized that this analysis does not address the greenhouse gas emissions that would be generated by producing an equivalent amount of energy (31 MW) from fossil fuel sources and that would be avoided through operation of the Cogen Facility, nor does it account for the emissions that would be avoided by using the fuel sources for the Cogen Facility rather than alternate disposal fates (such as open burning), as discussed above. Such an analysis would show how greenhouse gas emissions from the project could fall even further below the threshold.

Therefore, while climate change represents a significant and cumulatively considerable impact to the State of California, the proposed project would result in a **less than significant and less than cumulatively considerable contribution** to climate change and the generation of GHGs. No mitigation is required.

Impact 2.2: Project implementation may conflict with plans, policies and programs adopted to reduce the generation of GHGs (Less than significant impact)

At the time of preparation of this EIR, Shasta County has not formally adopted any policies, plans or programs aimed at reducing GHG levels. The County is in the process of preparing a Climate Action Plan (CAP), however, the CAP has not yet been adopted, nor is it planned for adoption in the immediate future. It is assumed that the CAP will contain goals, policies and implementation measures intended to reduce GHG emissions throughout Shasta County. However, it is not yet known if the CAP will address emissions associated with biomass electricity production. Given that there are no adopted plans, policies or programs in place at the local level to address GHGs, the analysis of this impact addresses the proposed project's consistency with State-level efforts to reduce GHGs.

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

In 2006, this goal was further reinforced with the passage of Assembly Bill 32 (AB 32), the Global Warming Solutions Act of 2006. AB 32 sets the same overall GHG emissions reduction goals while further mandating that CARB create a plan, which includes market mechanisms, and implement rules to achieve "real, quantifiable, cost-effective reductions of greenhouse gases." Executive Order S-20-06 further directs state agencies to begin implementing AB 32, including the recommendations made by the state's Climate Action Team.

The AB 32 Scoping Plan was developed by CARB as the mechanism, or tool, to achieve the target GHG emissions reductions required by AB 32. The AB 32 Scoping Plan, adopted in December 2008, established the business as usual (BAU) 2020 GHG emissions baseline at 596 million metric tons (MMT) of CO_2e. Since 2008, CARB has updated projected BAU emissions based on current economic forecasts (i.e., as influenced by the economic downturn) and reduction measures

already in place. Two new reduction measures [Pavley I and the Renewables Portfolio Standard (12% - 20%)] are incorporated into the updated baseline which was not included earlier. These measures are expected to reduce the 2020 statewide emissions projection to 507 $MMTCO_2e$ by 2020.[26] The updated forecast of 507 MMT CO_2e is referred to as the AB 32 2020 baseline.

The AB 32 Scoping Plan has established a 2020 GHG emissions target of 427 $MMTCO_2e$, which is 80 $MMTCO_2e$ below the projected 2020 GHG BAU calculations of 507 $MMTCO_2e$. Of the 80 $MMTCO_2e$ reduction needed to meet the 2020 GHG emissions target, 21.3 $MMTCO_2e$ are targeted for reductions achieved through the Renewables Portfolio Standard.

Established in 2002 under Senate Bill 1078 and accelerated in 2006 under Senate Bill 107, California's Renewables Portfolio Standard is one of the most ambitious renewable energy standards in the country. The RPS program requires investor-owned utilities (IOUs), electric service providers, and community choice aggregators to increase procurement from eligible renewable energy resources by at least 1% of their retail sales annually, until they reach 20% by 2010. Governor Arnold Schwarzenegger signed Executive Order (EO) S-21-09 on September 15, 2009 directing the CARB to adopt regulations requiring 33% of electricity sold in the state come from renewable energy by 2020. Governor Schwarzenegger had previously established a 33% state goal in EO S-14-08. The California Public Utilities Commission (CPUC) and the California Energy Commission (CEC) jointly implement the RPS program.

The CEC has determined that it is appropriate to define eligible renewable energy resources by renewable resource or fuel, rather than by the specific technology used.[27] For certain eligible renewable energy resources, however, the law contains specific requirements, and the Energy Commission must consider both the resource or fuel and the technology to determine RPS eligibility.

To qualify as eligible for California's RPS, a generation facility must use one or more of the following renewable resources or fuels:

- Biodiesel
- Biogas (including pipeline biomethane)
- Biomass
- Conduit hydroelectric
- Digester gas
- Fuel cells using renewable fuels

[26] California Air Resources Board, Supplement to the AB 32 Scoping Plan Functional Equivalent Document. June 13, 2011. Available at: http://www.arb.ca.gov/cc/scopingplan/scopingplan.htm

[27] California Energy Commission, Commission Guidebook, Renewables Portfolio Standard Eligibility (Fourth Edition). January 2011. Available at: http://www.energy.ca.gov/renewables/documents/index.html#rps

- Geothermal
- Hydroelectric incremental generation from efficiency improvements
- Landfill gas
- Municipal solid waste
- Ocean wave, ocean thermal, and tidal current
- Photovoltaic
- Small hydroelectric (30 megawatts or less)
- Solar thermal electric
- Wind

The generation from a biomass facility is eligible for the RPS provided the facility uses a "biomass" fuel as defined in the *Overall Program Guidebook*. The CEC defines biomass as: "*any organic material not derived from fossil fuels, including, but not limited to, agricultural crops, agricultural wastes and residues, waste pallets, crates, dunnage, manufacturing, construction wood wastes, landscape and right-of-way tree trimmings, mill residues that result from milling lumber, rangeland maintenance residues, biosolids, sludge derived from organic matter, and wood and wood waste from timbering operations.*"[28]

As described above, the proposed project would burn biomass that meets the CEC's definition of eligible fuels for RPS certification of the facility.

The CEC maintains a list of facilities currently certified under the RPS program. SPI, the project applicant, has received pre-certification approval from the CEC to register the proposed facility as a renewable energy production facility under the RPS program.[29] The existing 4MW cogeneration biomass facility located and operational at the project site is currently approved and certified as an RPS facility. The project applicant also operates several other RPS certified biomass energy facilities throughout California.

In summary, the proposed project has received pre-certification approval as an RPS facility. Implementation of the proposed project will further the goals established through AB 32 and will assist with implementation of the AB 32 Scoping Plan by increasing the availability of certified renewable energy sources in California. CARB has determined that the AB 32 Scoping Plan, which relies on implementation of the RPS, is the most feasible and aggressive program available to reduce statewide GHG emissions. Energy produced from biomass is a key component of the RPS, and the proposed project will assist in implementing the AB 32 Scoping Plan and RPS through

[28] California Energy Commission, Commission Guidebook, Renewable Energy Program Overall Program Guidebook (Third Edition). January 2011. Available at: http://www.energy.ca.gov/renewables/documents/index.html#rps

[29] California Energy Commission, California's Renewables Portfolio Standard (RPS) List of Facilities. August 1, 2011. Available at: http://www.energy.ca.gov/portfolio/documents/list_RPS_certified.html

contributing to the State's goal of 33% of California's energy needs coming from renewable sources. Therefore, the proposed project is consistent with the applicable regulations and programs established by the State to reduce GHG emissions. This is a **less than significant impact**, and no mitigation is required.

Impact 2.3: The effects of global climate change could result in adverse impacts on facility operations and structures. (Less than significant impact)[30]

Recent increases in GHG concentrations in the atmosphere have lead to increase average global temperatures (global warming) through the intensification of the greenhouse effect, and associated changes in local, regional, and global average climatic conditions.

Although there is 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.[31] These include:

- increased average temperatures;
- modifications to the timing, amount, and form (rain vs. snow) of precipitation;
- changes in the timing and amount of runoff;
- reduced water supply;
- deterioration of water quality; and,
- elevated sea levels.

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

[30]This analysis is provided in the interest of disclosure, although recent court decisions have held that such analysis of the effect of the environment on a project is not required under CEQA. See *Ballona Wetlands Land Trust v. City of Los Angeles* (2011) Case No. B231965,__Cal. App. 4th __ (2011) ("[T]he purpose of an EIR is to identify the significant effects of a project on the environment, not the significant effects of the environment on the project."); *City of Long Beach v. Los Angeles Unified School Dist.* (2009) 176 Cal.App.4th 889, 905; *South Orange County Wastewater Authority v. City of Dana Point* (2011) 196 Cal.App.4th 1604, 1614-1618.

[31] California Energy Commission, The Future is Now: An Update on Climate Change Science, Impacts, and Response Options for California. May 2009. Available at: http://www.climatechange.ca.gov/publications/biennial_reports/index.html

- 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 landslides 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 proposed project could be subject to potential hazards that could be exacerbated by climate change, such as reduced water supply, increased flooding that might prevent haul trucks from accessing the facility, and increased grass or wildland fires from adjacent parcels that are primarily open space and/or used for grazing. Because the project site is located sufficiently far above sea level (more than 430 feet) it is not anticipated that the proposed project would be affected by sea level rise.

Although operation of the biomass facility may result in increased exposure to such hazards, the extent to which the hazards would increase is speculative, and increases in hazard levels would occur over a long time frame (e.g., 100 years or more) compared to the design life of the project (estimated at approximately 30 years). Also, the project would include features that enable it to avoid, adapt to, and be resilient in the face of climate change-associated impacts. These features include:

- Use of non-potable water for operation of the steam turbine and direct reliance on a source of water that appears highly reliable given historical groundwater monitoring of the local aquifer;
- Use of water conservation technologies, including extensive on-site recycled water systems;
- Drainage features for handling storm water runoff on-site during extreme storm events;
- Non-vegetated setbacks between the biomass piles stored in the fuel yard and adjacent parcels that may contain dry vegetation; and
- The existing on-site fire suppression system and available water in the on-site detention ponds.

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. Additionally, the extent to which the climate change-related hazards would increase is speculative, and any increases in hazard levels would occur over a long time frame compared to the design life of the project. For these reasons, this impact is considered **less than significant**, and no mitigation is required.

Appendix ！:　GHG Quantification Worksheets

Completed by: TSS Consultants, Inc.

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Annual GHG Emissions from On-Site Woody Biomass Combustion (Including Natural Gas Start-up and Flame Stabilization)

Combustion of Biomass During Normal Operations

Facility Specifications	Total Plant Value	Total Mill Residuals	Units	Source & Notes
Amount of biomass combusted	220,000	140,000	Tons/year	Project description
High heat value	15.38		MMBtu/ton	Source 1 - Appendix A, Table 4
Emission Factors				
CO2	93.8		kg/MMBtu	Source 1 - Appendix A, Table 4
CH4	30		g/MMBtu	Source 1 - Appendix A, Table 6
N2O	4		g/MMBtu	Source 1 - Appendix A, Table 6
Annual Emissions				
CO2	317,382	201,970	MT/year	Source 2, Chap. 13, Equation 1
CH4	102	65	MT/year	Source 2, Chap. 13, Equation 1
N2O	14	9	MT/year	Source 2, Chap. 13, Equation 1
CO2e	317,497	202,043	MT/year	Global Warming Potential calc.

Combustion of Natural Gas During Start Up and Flame Stablization

				Annual heat input from firing natural	N.G.MMscf/yr	N.G.MMscf/yr
Amount of natural gas	61.2		MMscf/year	gas based on 500 hours	at 500 hours	at 2981 hours
Heat content	1,027		Btu/scf	Source 1 - Appendix A, Table 4	61.2	365.36
Amount of natural gas	62,852.4		MMBtu/yr.	Calcuated		
Emission Factors						
CO2	0.0544		kg/scf	Source 1 - Appendix A, Table 4		
CH4	0.9		g/MMBtu	Source 1 - Appendix A, Table 6		
N2O	0.1		g/MMBtu	Source 1 - Appendix A, Table 6		
Annual Emissions						
CO2	3,419		MT/year	Source 2, Chap. 13, Equation 1		
CH4	0.06		MT/year	Source 2, Chap. 13, Equation 1		
N2O	0.01		MT/year	Source 2, Chap. 13, Equation 1		
CO2e	3,419		MT/year	Global Warming Potential calc.		

Conversion Rates			
Mass conversion rate	1,000	kg/MT	www.onlineconversion.com
Mass conversion rate	1,000,000	g/MT	www.onlineconversion.com
Natural gas volume conversion rate	1,000,000	scf/MMscf	www.onlineconversion.com
Energy conversion rate	1,000,000	Btu/MMBtu	www.onlineconversion.com
Global Warming Potential Compared to CO2			
CH4	23	unitless	IPCC Assessment Report 2001
N20	296	unitless	IPCC Assessment Report 2001

Sources

1 - CA Regulations for the Mandatory Reporting of GHG Emissions (§§95100 to 95133 Title 17 CA Code of Regulations).
At: www.arb.ca.gov/regact/2007/ghg2007/frofinoal.pdf
2 - CA Air Resources Board, December 2008. Instructional Guidance for Mandatory GHG Emission Reporting. At:
www.arb.ca.gov/cc/reporting/ghg-rep/ghg-reg-guid/ghg-rep-guid.htm

Emissions from Biomass Hauling to Power Plant

	Mill Residues	Forest Slash and Thinnings	Agricultural Wood Waste	Urban Wood Waste
Percentage breakdown as BDT	64%	18%	11%	7%
BDT	140,000	40,000	25,000	15,000

Percentage Breakdown by Fuel Type, Origin, and Average VMT

	Amount in BDT	Percentage of Mill Residue Fuel Type	Percentage of Total Fuel Types	Average BDT per Truck	Calculated number of Trucks	Average VMT*	VMT per Round Trip	Total Number of Miles
Mill Residues from SPI Anderson Plant	91,000	65%	64%	13.5	6,741	0	0	0
Mill Residues from SPI Shasta Lake	30,135	22%		13.5	2,232	18	36	80,360
Mill Residues from SPI Red Bluff	15,043	11%		13.5	1,114	26	52	57,943
Mill Residues from SPI Arcata	3,724	3%		13.5	276	155	310	85,514
Forest Slash and Thinning	40,000		18%	13.5	2,963	68	136	402,963
Agricultural Wood Waste	25,000		11%	13.5	1,852	108	216	400,000
Urban Wood Waste	15,000		7%	13.5	1,111	152	304	337,778
							TOTAL	1,364,558

Biomass Hauling Emissions

	Value	Units	Source
Biomass Haul Miles	1,364,558	Miles	Calculated
Heavy Duty Diesel Vehicle Emission Factor	1,450	g/mile	Source 1

Total Annual Hauling Emissions **1,979 MT/year**

***VMT - vehicle mile traveled**

Sources

1 - California Climate Action Registry General Reporting Protocol, Version 3.1, Table C.3, January 2009.

Summary of CO2 Emission Rate Associated with Harvesting and Processing of Biomass Per Bone Dry Ton

(does not include biomass haul to power plant)

	Value	Units
Forest Thinning, Harvested/Processed Biomass		
Off-Road Equipment		
Horizontal grinder	25.54	lbCO2/BDT
Small excavator loader	2.92	lbCO2/BDT
Large excavator loader	6.3	lbCO2/BDT
Feller bundher	24.96	lbCO2/BDT
Grapple skidder	9.04	lbCO2/BDT
On-Road Vehicles		
Truck/chip van	8.48	lbCO2/BDT
Water truck	9.95	lbCO2/BDT
Service truck	45.78	lbCO2/BDT
Crew truck	45.78	lbCO2/BDT
Low bed truck	84.78	lbCO2/BDT
TOTAL	263.53	lbCO2/BDT
	4,775	**MT/year**
Agricultural Waste, Harvested/Processed Biomass		
Off-Road Equipment		
Horizontal grinder	25.54	lbCO2/BDT
Large excavator loader	6.3	lbCO2/BDT
On-Road Vehicles		
Truck/chip van	8.48	lbCO2/BDT
Crew truck	45.78	lbCO2/BDT
TOTAL	86.1	975
	975	**MT/year**
Urban Wood Waste, Harvested/Processed Biomass*		
Off-Road Equipment		
Horizontal grinder	25.54	lbCO2/BDT
Small excavator loader	2.92	lbCO2/BDT
On-Road Vehicles None		
TOTAL	28.46	
	193	**MT/year****
Biomass Harvested/Processed Total Emissions	**5,944**	**MT/year**

Methodology: *Off-road CO2 emissions derived from the CARB OFFROAD 2007 model. On-road CO2 emissions derived from the EMFAC2007 model. The above equipment list is based upon a demonstration project conducted for the Sierra Nevada Conservancy in 2008 in the Tahoe National Forest.*

** A conservative assumption is made here that urban wood waste consumed at the biomass power plant would need to be chipped even though all urban wood waste is nonetheless chipped prior to diversion to other uses (i.e., mulch, soil amendment, daily cover, fuel to biomass plants, etc.)*

***Due to the comparatively very small level of emissions from N2O and CH4, even when factoring in their global warming potential, these emissions would not significantly change the CO2 emission levels*

Fuel Yard Equipment CO2 Emissions

Equipment Specifications

	Value	Units	Description	Source/notes
Front end bucket loader	1	Unit	CAT 980 B	Letter dated 7/13/11 from Sierra Pacific to Shasta County
Daily hours	16	hr/day		Letter dated 7/13/11 from Sierra Pacific to Shasta County
Days per week	7	days/week		Letter dated 7/13/11 from Sierra Pacific to Shasta County
Weeks per year	52	weeks/yr		Calculated
Hours per year	5824	hours/yr		Letter dated 7/13/11 from Sierra Pacific to Shasta County
Year of fleet	2011			
Mass conversion	2,000	lb/ton		onlineconversion.com
Mass conversion	2,205	lb/MT		onlineconversion.com

		Units	Source
Emission Factor for Loader	159	kg/hour	Source 1

Annual Emissions	**926**	MT/year

Sources

1 - California Climate Action Registry General Reporting Protocol, Version 3.1, Table C.3, January 2009.

**Due to the comparatively very small level of emissions from N2O and CH4, even when factoring in their global warming potential, these emissions would not significantly change the CO2 emission levels*

Truck Idling Emissions

Truck Idling Hours On-Site

	Value	Units	Source
Trucks hauling biomass to site (140,000 BDT @ 13.5 BDT per truck)	10,370	trucks/year	Calculated
Trucks hauling ash (11,155 tons @ 18 tons per truck)	620	trucks/year	Calculated
Combined truck visits	10,990	trucks/year	Calculated
Average length of truck visit w/idle	0.25	hours/visit	Assumption
Truck idle hours	2748	hours/year	Calculated
Emission factor truck idle HHD-DSL (Heavy duty diesel truck)	6,542	g/idle hour	EMFAC 2007
Truck idling emissions Annual (tons/year)	19.8	ton/year	Calculated
Annual (MT/year)	**18.0**	**MT/year**	Calculated

**Due to the comparatively very small level of emissions from N2O and CH4, even when factoring in their global warming potential, these emissions would not significantly change the CO2 emission levels*

Ash Hauling Trip Characteristics

Truck loads associated with hauling away of ash to landfill

	Units	Value	Source/notes
Yearly production of ash	tons	11,155	project description
Amount per truck load	tons	18	assumption
Maximum daily truck loads (assume 6 days/wk, 312 days/year)	trucks	2.0	calculated
Average annual daily truck loads	trucks	2.0	
Associatd trips per day per truck	trips/load	4.0	calculated
Number of trips per year	trips	1248	calculated
Trip length (SPI facility to landfill and return)	miles	14.6	Google maps
Total Truck VMT	miles	18,221	caluclated

CO2 Emission Factor for Ash Haul Truck

	CO2	Source
Emission rate @45 miles per hour with HHD-DSL truck (g/mile)	1,450	Source 1

Conversion rates used

	Value	Units	Source
Mass conversion rate	454	g/lb	onlineconversion.com
Mass conversion rate	2,000	lb/ton	onlineconversion.com
Mass conversion rate	1,000,000	g/MT	onlineconversion.com
Time conversion	312	days	assume ash hauling 6 days a week

Annual Emissions for Ash Hauling Trucks	**26.4**	**MT/year**	Calculated

Sources

1 - California Climate Action Registry General Reporting Protocol, Version 3.1, Table C.3, January 2009.

**Due to the comparatively very small level of emissions from N2O and CH4, even when factoring in their global warming potential, these emissions would not significantly change the CO2 emission levels*

Employee Trip Emissions

Employee Trip Generation Rate

	Units	Value	Source/notes
Daily employees	employees	6	Project description
Employee trips per day	trip/day	12	To/from site
Trip length	miles/trip	14.7	URBEMIS default trip length
Total miles/day	miles	176.4	Calculated
Total miles/year	miles	64,386	Calculated using 365 days

Fleet Mix for Employee Trips

Vehicle type	Proportion used in Model run %	No. of vehicle type miles	Average MPG	Gallons	Fuel Type
Light auto	38%	24,338	22	1,106	gasoline
Light truck <3,750 lb	29%	18,350	18	1,019	gasoline
Light truck 3,751 to 5,750 lb	23%	14,744	10	1,474	gasoline
Medium truck 5,751 to 8,500 lb	11%	6,889	7	984	diesel
TOTAL	100%				

Maximum Daily Emissions from Employee Trips

	CO2*	Source
Maximum daily (lb/year)	86,325	Calculated
Annual (ton/year)	43	Calculated

	Value	Units	Source
Mass conversion rate	0.907	MT/ton	onlineconversion.com
CO2 Emissions per year	**39**	**MT/year**	Calculated

**Due to the comparatively very small level of emissions from N2O and CH4, even when factoring in their global warming potential, these emissions would not significantly change the CO2 emission levels*

	Emission Factor	Emission Factor Units			Emission Factor Source
Mobile Combustion					
Gasoline	8.81	kg CO2/gallon	17.86	lbs/CO2 gal	California Climate Action Registry General Reporting Protocol, Version 3.1, Table C.3, January 2009.
Diesel	10.15	kg CO2/gallon	22.38	lbs/CO2gal	California Climate Action Registry General Reporting Protocol, Version 3.1, Table C.3, January 2009.