





Climate Change Proposed Scoping Plan Appendices

VOLUME III:
CALIFORNIA ENVIRONMENTAL QUALITY ACT FUNCTIONAL EQUIVALENT DOCUMENT

a framework for change

OCTOBER 2008

Pursuant to AB 32

The California Global Warming Solutions Act of 2006

Prepared by
the California Air Resources Board
for the State of California

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I. INTRODUCTION AND BACKGROUND

The California Environmental Quality Act (CEQA) and ARB policy require an analysis to determine any potentially adverse environmental impacts of ARB's regulations. The measures proposed in this Scoping Plan were developed for the purpose of reducing emissions of greenhouse gases in California as directed by the California Global Warming Solutions Act of 2006 (AB 32, Chapter 488, Statutes of 2006). However, as these measures are developed into rules and regulations and subsequently implemented, there is potential for them to have an adverse environmental impact on natural resources.

This Appendix presents an analysis of potential impacts and also identifies potential mitigation measures that could be implemented to offset or avoid any potentially significant impacts. This Appendix contains an Environmental Checklist, a resource-based discussion of potential cumulative and adverse environmental impacts and mitigations related to each sector by resources category and an accompanying matrix that summarizes the impacts of the Scoping Plan and potential mitigation measures.

A. The California Environmental Quality Act and Functional Equivalency

The California Environmental Quality Act (CEQA) and ARB policy require an analysis to determine the potentially adverse environmental impacts of proposed projects. This document presents ARB's analysis of the potential adverse environmental impacts of the Proposed Scoping Plan (Scoping Plan). This document summarizes and discusses the specific strategies in the Scoping Plan that, if adopted and implemented, will reduce greenhouse gas emissions throughout California.

California Public Resources Code §21080.5 allows public agencies with regulatory programs to prepare a plan or other written document in lieu of an environmental impact report once the Secretary of the Resources Agency has certified the regulatory program. The California Secretary for Resources has determined that ARB meets the criteria for a Certified State Regulatory Program (Title 14, California Code of Regulations (CCR) §15251(d)). This certification allows ARB to adopt rules, regulations, standards and plans, and exempts ARB from the requirement to prepare Initial Studies, Notices of Preparation, Negative Declarations or Environmental Impact Reports (EIRs). As a certified agency, however, ARB is required to prepare a substitute document subject to other provisions of CEQA, such as avoiding significant adverse effects on the environment where feasible. ARB has used the Initial Study Checklist as a basis for assessing the potential environmental impacts associated with implementation of the Scoping Plan. This document considers cumulative impacts and addresses adverse activities and impacts associated with the proposed measures. A 45-day review period is provided pursuant to CEQA. ARB will respond to all significant environmental concerns raised by the public during this comment period, or at the Board Hearing.

Scope of Analysis

The scope of the analysis is intended to help focus public review and to assure that any questions and comments are appropriate and meaningful. This Appendix specifically focuses on potential *adverse* environmental impacts.

One of the requirements of AB 32 (Health and Safety Code (HSC) §38561(d) and §38562 (b)(1) and (6)) is for the Scoping Plan to evaluate the total potential costs and benefits of the Plan on the environment and public health. Appendix H presents an analysis of the potential effects of the Scoping Plan on public health and natural resources, and that analysis is incorporated by reference in the scope of this document.

Programmatic Approach

This analysis is necessarily programmatic. It will provide a basis for future environmental analyses and allows future project-specific environmental analysis to focus solely on the new effects or detailed environmental issues not previously considered. A program environmental document allows consideration of broad policy alternatives and program-wide mitigation measures at a time when an agency has greater flexibility to deal with basic problems of cumulative impacts. A programmatic document also plays an important role in establishing a structure within which future reviews and related actions can effectively be conducted. This concept of covering broad policies in a program document and incorporating by reference the information contained therein into subsequent documents for specific projects is known as "tiering" (CEQA Guidelines §15152)

This Appendix cannot and does not contain a detailed quantitative impact analysis for each of the measures in Scoping Plan. Because the Scoping Plan identifies proposed future actions to adopt and implement greenhouse gas reduction regulations for which specific regulatory language has not yet been developed, the analysis is necessarily general and qualitative. This Appendix also does not set forth in detail the beneficial environmental impacts that will result from the proposed Plan. While ARB is proposing the strategies contained in the Plan because they will reduce greenhouse gases, some of the strategies may also benefit air quality, improve public health and reduce our dependency on non-renewable natural resources. An analysis of the positive environmental and air-quality related public health benefits of the Plan is contained in Appendix H.

This functionally equivalent document (FED) is intended to disclose potential adverse impacts and identify potential mitigation measures specific to the Scoping Plan recommendations. This FED may be incorporated by reference for actions that continue to evolve and future measures, regulations and rules that will require additional environmental documentation.

It is important to note that the Plan identifies actions that will be implemented by other agencies, and also that many of the ARB measures are regulatory. For those measures that are regulatory, implementing agencies will be required to complete the regulatory development process and a separate environmental analysis will be prepared. Although

CEQA discourages forecasting and speculation (CEQA Guidelines §15144 and §15145), drafting an environmental document necessarily involves some degree of forecasting. While foreseeing the unforeseeable is not possible, an agency must use its best efforts to find out and disclose all that it reasonably can. Further, if after thorough investigation, a lead agency finds that a particular impact is too speculative for evaluation, the agency should note its conclusion and terminate discussion of the impact. Although ARB provides as much detail as possible in the analysis, it is not possible to provide project or site-specific analysis at this time.

CEQA also requires a specific alternative of "No Project" to be evaluated, and this alternative essentially serves as ARB's baseline for analysis. CEQA documents typically assume that the adoption of a "no project" alternative would result in no further action by the project proponent or lead agency. Some of the measures in the Scoping Plan are already underway and would not be expected to change as a result of the Scoping Plan.

II. ENVIRONMENTAL CHECKLIST

An environmental checklist was used to identify and evaluate potential cumulative impacts of the measures proposed in the Scoping Plan. The environmental impacts checked below indicate those that may be affected by the proposed measures. Further discussion will follow regarding the impacts that measures may have, and potential mitigation strategies that can be implemented to lessen the impacts.

Evaluation of Cumulative Environmental Impacts

	Potentially Significant Impact	**Less Than Significant Impact**	**No Impact**
I. AESTHETICS. Could the Scoping Plan:			
a) Have a substantial adverse effect on a scenic vista?	☐	X	☐
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	X	☐
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	X	☐
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	X	☐
II. AIR QUALITY. Could the Scoping Plan:			
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	X	☐
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☐	X	☐

Evaluation of Cumulative Environmental Impacts

	Potentially Significant Impact	Less Than Significant Impact	No Impact
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	☐	X	☐
d) Expose sensitive receptors to substantial pollutant concentrations?	☐	X	☐
e) Create objectionable odors affecting a substantial number of people?	☐	X	☐
III. AGRICULTURAL RESOURCES. could the Scoping Plan:			
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	X	☐	☐
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	X	☐	☐
c) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use?	X	☐	☐

Evaluation of Cumulative Environmental Impacts

	Potentially Significant Impact	Less Than Significant Impact	No Impact
IV. BIOLOGICAL RESOURCES. Could the Scoping Plan:			
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	X	☐	☐
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the California Department of Fish and Game or US Fish and Wildlife Service?	☐	X	☐
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	X	☐
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	X	☐	☐
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	X	☐
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	X	☐

Evaluation of Cumulative Environmental Impacts

	Potentially Significant Impact	Less Than Significant Impact	No Impact
V. CULTURAL RESOURCES. Could the Scoping Plan:			
a) Cause a substantial adverse change in the significance of a historical resource as defined in CEQA Guideline Section 15064.5?	☐	X	☐
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to CEQA Guideline Section 15064.5?	☐	X	☐
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	X	☐
d) Disturb any human remains, including those interred outside of formal cemeteries?	☐	X	☐
VI. ENERGY DEMAND. Could the Scoping Plan:			
a) Conflict with adopted energy conservation plans?	☐	☐	X
b) Result in the need for new or substantially altered power or natural gas utility systems?	X	☐	☐
c) Create any significant effects on peak and base period demands for electricity and other forms of energy?	☐	X	☐
d) Comply with existing energy standards?	☐	☐	X
VII. GEOLOGY AND SOILS. Could the Scoping Plan:	☐	X	☐
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:			

Evaluation of Cumulative Environmental Impacts

	Potentially Significant Impact	Less Than Significant Impact	No Impact
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	X	☐
ii) Strong seismic ground shaking?	☐	X	☐
iii) Seismic-related ground failure, including liquefaction?	☐	X	☐
iv) Landslides?	☐	X	☐
b) Result in substantial soil erosion or the loss of topsoil?	☐	X	☐
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	X	☐
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	☐	X	☐
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	☐	X	☐

Evaluation of Cumulative Environmental Impacts

	Potentially Significant Impact	Less Than Significant Impact	No Impact
VIII. HAZARDS AND HAZARDOUS MATERIALS. Could the Scoping Plan:			
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	X	☐
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	X	☐
c) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	X	☐
d) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	☐	X	☐
e) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	X
f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	X

Evaluation of Cumulative Environmental Impacts

	Potentially Significant Impact	Less Than Significant Impact	No Impact
g) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	X	☐
IX. LAND USE AND PLANNING. Could the Scoping Plan:			
a) Physically divide an established community?	☐	X	☐
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	X	☐
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	X
X. MINERAL RESOURCES. Could the Scoping Plan:			
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	X	☐
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	X	☐

Evaluation of Cumulative Environmental Impacts

	Potentially Significant Impact	Less Than Significant Impact	No Impact
XI. NOISE. Would the Scoping Plan:			
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	X	☐
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☐	X	☐
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	X	☐	☐
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	X	☐
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	X
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	X
XII. POPULATION AND HOUSING. Could the Scoping Plan:			
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	X	☐

Evaluation of Cumulative Environmental Impacts

	Potentially Significant Impact	Less Than Significant Impact	No Impact
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	X	☐
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	X	☐

XIII. PUBLIC SERVICES. Would the Scoping Plan**:**

a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:			
Fire protection?	☐	X	☐
Police protection?	☐	☐	X
Schools?	☐	☐	X
Parks?	☐	☐	X
Other public facilities?	☐	☐	X

Evaluation of Cumulative Environmental Impacts

	Potentially Significant Impact	Less Than Significant Impact	No Impact
XIV. RECREATION			
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	X
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	X
XV. SOLID/HAZARDOUS WASTE. Could the Scoping Plan:			
a) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	X	☐
b) Comply with federal, state, and local statutes and regulations related to solid and hazardous waste?	☐	X	☐
XVI. TRANSPORTATION/TRAFFIC. Could the Scoping Plan:			
a) Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?	☐	X	☐
b) Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?	☐	X	☐

Evaluation of Cumulative Environmental Impacts

	Potentially Significant Impact	Less Than Significant Impact	No Impact
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	☐	X	☐
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	X
e) Result in inadequate emergency access?	☐	☐	X
f) Result in inadequate parking capacity?	☐	X	☐
g) Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?	☐	X	☐
XVII. WATER QUALITY. Could the Scoping Plan:			
a) Violate any water quality standards or waste discharge requirements?	☐	X	☐
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	☐	X	☐

Evaluation of Cumulative Environmental Impacts

	Potentially Significant Impact	Less Than Significant Impact	No Impact
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?	☐	X	☐
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?	☐	X	☐
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☐	X	☐
f) Otherwise substantially degrade water quality?	☐	X	☐
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	X	☐
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	☐	X	☐
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	X	☐
j) Inundation by seiche, tsunami, or mudflow?	☐	X	☐

Evaluation of Cumulative Environmental Impacts

	Potentially Significant Impact	Less Than Significant Impact	No Impact
XVIII. MANDATORY FINDINGS OF SIGNIFICANCE			
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	X	☐
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	☐	X	☐
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	X	☐

III. PROPOSED PROJECT DESCRIPTION

Under AB 32, California must reduce greenhouse gas emissions to 1990 levels by 2020. This means reducing greenhouse gas emissions by 169 million metric tons CO_2 equivalent ($MMTCO_2E$) from a projected 596 $MMTCO_2E$ business as usual (BAU) case in 2020. The Scoping Plan provides a recommendation for achieving these reductions through a mix of new and existing policies and regulatory measures, including market mechanisms.

The proposed project is adoption and implementation of the Scoping Plan and the measures described in the plan. The mix of measures included in the Scoping Plan provides a comprehensive approach to reduce emissions to achieve the 2020 target, and to initiate the transformations required to achieve the 2050 target. The cap-and-trade program will cover about 85 percent of greenhouse gas emissions throughout California's economy. ARB staff recognizes that due to several factors, including new information that may be discovered during regulatory development, technology maturity, and implementation challenges, actual reductions from individual measures aimed at achieving the 2020 target may be higher or lower than current estimates. The inclusion of many of these emissions within the cap-and-trade program, along with a margin of safety in the uncapped sectors, will help ensure that the 2020 target is met. The combination of approaches provides certainty that the overall program will meet the target despite some degree of uncertainty in the estimates for any individual measure. In addition, by internalizing the cost of CO_2E emissions throughout the economy, the cap-and-trade program supports the complementary measures and provides further incentives for innovation and continuing emissions reductions from energy producers and consumers, thereby setting California on a path toward the 2050 goal.

ARB staff has also designed the recommendations to ensure that reductions will come from throughout the California economy. Transportation accounts for the largest share of California's greenhouse gas emissions. Accordingly, a large share of the reduction of greenhouse gas emissions from the recommended measures comes from this sector. Measures include the inclusion of transportation fuels in the cap-and-trade program, the Low Carbon Fuel Standard to reduce the carbon intensity of transportation fuels, enforcement of regulations that reduce greenhouse gas emissions from vehicles, and policies to reduce transportation emissions by changes in future land use patterns and community design as well as improvements in public transportation.

In the Energy sector, the recommended measures increase the amount of electricity from renewable energy sources, and improve the energy efficiency of industries, homes and buildings. The inclusion of these sectors and the Industrial sector in the cap-and-trade program provides further assurance that significant cost-effective reductions will be achieved from the sectors that contribute the greatest emissions. Additional energy production from renewable resources may also rely on measures suggested in the Agriculture, Water, and the Recycling and Waste Management Sectors.

Other sectors are also called upon to cut emissions. The cap-and-trade program covers industrial sources and natural gas use. The recommended measures would require industrial processes to examine how to lower their greenhouse gas emissions and be more energy efficient, and would require goods movement operations through California's ports to be more energy efficient. Other measures address waste management, agricultural and forestry practices, as well as the transport and treatment of water throughout the state. Finally, the recommended measures address ways to reduce or eliminate the emissions of high global warming potential gases that, on a per-ton basis, contribute to global warming at a level many times greater than carbon dioxide.

This document discusses the measures and also focuses on the potential adverse environmental impacts that may result from these measures. This document cannot and does not contain a detailed, quantitative impact analysis of the strategies contained in the Scoping Plan. Because the Scoping Plan is a plan for future action to adopt measures and strategies for which specific regulatory language has not yet been developed, this analysis is necessarily general and qualitative. Each strategy and measure will be developed over time. Some may be developed as incentive or voluntary programs, some through future legislation, and some may require further policy decisions by local, regional and state governments. The proposed regulatory measures will undergo further environmental analysis as required by CEQA, and ARB regulations will be discussed at public workshops, and will go through the public hearing process as required by law under the Administrative Procedure Act, (Government Code §11340 et seq.). As specific regulatory proposals are developed, it will be possible to analyze potential environmental impacts in greater detail. In this Appendix, potential environmental impacts are estimated to the extent currently feasible.

ARB incorporates by reference the Programmatic Environmental Impact Report/ Statement (EIR/S) (State Clearinghouse (SCH)# 2001042045) prepared by the High Speed Rail Authority, and its subsequent EIR/Ss. The project requires passage of a bond measure. The additional High Speed Rail (or High Speed Train) projects include the Palm Delta to Los Angeles (SCH# 2007031066), Bay Area to Central Valley (SCH# 2005112051), Los Union Street to Orange County (SCH# 2007031067). Potential and cumulative impacts of the High-Speed Rail project include aesthetics, displacement of commercial and residential properties, disproportionate impacts to minority and low-income populations, community and neighborhood disruption, increased noise and electromagnetic interference along rail corridors, land use policies, traffic impacts associated with stations, effects to historic properties or archaeological sites, impacts to parks and recreation resources, exposure to seismic and flood hazards, water resources, wetlands and sensitive biological species and habitat, land use compatibility, energy use and impacts to agricultural resources. Thus, this FED will not include an environmental analysis for the measure depicted as T-9, the High Speed Rail. The project may proceed with or without adoption of the Scoping Plan.

ARB also incorporates Appendix H of the Scoping Plan by reference in the FED, which discusses the air-quality related public health and environmental benefits of the Scoping Plan measures.

IV. POTENTIAL ADVERSE ENVIRONMENTAL IMPACTS

The basis for analysis originates from the CEQA Initial Study Checklist. The following environmental impact areas are considered for each proposed measure and strategy:

Aesthetics	Land Use and Planning
Air Quality	Mineral Resources
Agricultural Resources	Noise
Biological Resources	Population and Housing
Cultural Resources	Recreation
Energy Demand	Solid Waste
Geology and Soils	Transportation and Traffic
Hazards and Hazardous Materials	Water Resources

Each environmental impact discussion considers impacts that are considered potentially significant and adverse. A reference table identifying each measure in the Scoping Plan, potential adverse impacts, and potential mitigation measures is at the end of this section. It is important to note that some measures are more fully developed than others, and some measures only propose additional research. For those less developed strategies and measures, ARB has attempted to include potential impacts that would be reasonably anticipated given present data and knowledge. Any subsequent regulatory development, new facilities, increases in existing operations and/or throughputs, and subsequent increases in construction activities will be subject to the CEQA (and possibly the National Environmental Policy Act (NEPA)) process and local, regional and state approval on a project-by-project basis.

A. Aesthetics

Cumulative Impact. No element or measure of the Scoping Plan is intended or expected to significantly degrade the natural beauty of California, however, the Scoping Plan contains measures that involve siting and construction of facilities may adversely impact aesthetic values. The measures and their relative impacts and mitigations are discussed below:

TRANSPORTATION
(T-2): Low Carbon Fuel Standard. This measure is undergoing regulatory development for consideration in early 2009. Any impacts associated with aesthetics, siting and construction of facilities supporting the Low Carbon Fuel Standard would be assessed on a location and project-specific basis.

ELECTRCITY AND NATURAL GAS
(E-3): Renewables Portfolio Standard and
(E-4): Million Solar Roofs. Implementation of the Electricity and Natural Gas sector measures in the Scoping Plan may result in impacts to the aesthetic values. The siting and construction of wind or solar farms that would support the expansion of the Renewable Portfolio Standard (RPS) may affect viewsheds. Careful siting of these facilities will avoid impacts so that such a project would not substantially affect a scenic vista, damage scenic resources, degrade the existing visual character or quality of the area, or create new sources of light or glare. A utility scale facility may require a relatively large area if it is to be used to generate electricity at a commercial scale. Large solar facilities may have numerous highly geometric and sometimes highly reflective surfaces, and may create visual impacts; however being visible is not necessarily the same as being intrusive, as aesthetic issues are by their nature highly subjective.[1] Any future development of facilities or infrastructure that would result in a physical change to the visual environment would be subject to the CEQA and/or NEPA process and approval by a city, county or agency on a project-by-project basis. A future facility may ultimately have an adverse aesthetic impact on view sheds, but this depends on the location of a project. Therefore, the measures under the Electricity and Natural Gas sector would have less than significant foreseeable aesthetic impacts[2]. There may be increased light glare associated with installation of large arrays of solar panels and the Million Solar Roof initiative measures. The significance to aesthetic values would be location specific, and ARB cannot speculate on the significance of the potential impact.

[1] Federal Register/ Vol. 73, No. 104, Notices, May 29, 2008, and http://solareis.anl.gov,
[2] Ibid.

B. Impacts to Air Quality

Cumulative Impact. The cumulative impact of the Scoping Plan is to substantially improve air quality; however, there may be potentially significant impacts to air quality associated with implementation of the measures in the Transportation, Electricity and Natural Gas, Water, Industry, Recycling and Waste Management, High Global Warming Potential (GWP) and Agriculture Sectors. These potential impacts are discussed below. With mitigation, the potential impacts would be less than significant.

There may be construction-related air quality impacts which should be evaluated on a project-specific basis. Although not anticipated, there may be increases in criteria and toxic pollutants associated with reformulation of products if a regulatory program is not well designed.

A number of the major measures in the Scoping Plan will significantly reduce demand for electricity and natural gas relative to BAU (or the No Project Alternative, as discussed in the Project Alternatives discussion). However, as the State reduces its reliance on coal-fired generation, additional in-state natural gas generation may be required. Because other measures will decrease overall demand for electricity relative to BAU and will increase the share of renewable resources, it is not clear whether this will result in a net increase in natural gas use for electric generation within California. The cumulative impact of implementing the recommended measures will be to decrease California's demand for electricity and natural gas. A potential result of increased in-state electrical generation could be localized air quality impacts due to associated increases in criteria pollutants and toxic air contaminants. California air pollution regulatory programs at the federal state and local levels address individual source emissions from a regional and localized perspective. Local agencies, such as air pollution districts and planning commissions, could also impose more stringent requirements for sources of criteria pollutants and air toxics to address potential cumulative impacts.

As background, there are four major types of impacts that were considered are related to criteria pollutants, air toxics, global warming and stratospheric ozone depletion.

Criteria Pollutants

These are pollutants determined to be hazardous to human health and regulated under EPA's National Ambient Air Quality Standards. The 1970 amendments to the Clean Air Act require EPA to describe the health and welfare impacts of a pollutant as the "criteria" for inclusion in the regulatory regime. Both the California and federal governments have adopted health-based standards for the criteria pollutants that

include ozone, particulate matter (PM10, PM2.5), carbon monoxide (CO), oxides of nitrogen (NOx) and sulfur (SOx) and reactive organic gases (ROG).

Toxic Air Pollutants

These are air pollutants that may cause or contribute to an increase in mortality or serious illness, or which may pose a hazard to human health. TACs are usually present in minute quantities in the ambient air. However, their high toxicity or health risk may pose a threat to public health even at very low concentrations. In general, for TACs, there is no concentration that does not present some risk. This contrasts with the criteria pollutants for which acceptable levels of exposure can be determined and for which the State and federal governments have set ambient air quality standards. Diesel particulate represents 75 percent of the risk from air toxics in California.

Greenhouse Gases

Greenhouse gases are any gas that absorbs infrared radiation in the atmosphere. Greenhouse gases include, but are not limited to, water vapor, carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrochlorofluorocarbons (HCFCs), ozone (O3), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6).

Stratospheric Ozone Depleting Pollutants

Chemical compounds, such as carbon monoxide, methane, hydrofluorocarbons, chlorofluorocarbons, non-methane hydrocarbons, and nitrogen oxides, which in the presence of solar radiation react with other chemical compounds.

CALIFORNIA CAP AND TRADE PROGRAM LINKED TO WESTERN CLIMATE INITIATIVE PARTNER JURISDICTIONS

The proposed cap and trade regulation is not expected to result in adverse air quality impacts. Since greenhouse gas emission sources also emit criteria and toxic air pollutants, ARB anticipates the proposed measure will generally result in overall air quality improvement as it reduces greenhouse gas emissions. The program as well as other related measures applicable to capped sources would be designed to ensure that program implementation is consistent with State air quality plans and related statutory requirements.

Some individuals have raised concerns that the cap-and-trade program could result in localized environmental impacts. These concerns arise from the possibility that under a cap and trade program, a source of greenhouse gas emissions that impacts a local community adversely impacted by criteria pollutants or toxic air contaminants would not be required to reduce on-site emissions, but instead could obtain allowances or offsets equal to the existing greenhouse gas emissions at their facility. While greenhouse gas emissions have no direct public health impacts, the processes that

result in greenhouse gas emissions also typically emit criteria pollutants and toxic air contaminants that can pose direct and adverse health effects on exposed populations. The cap-and-trade program places a requirement on covered sources of greenhouse gas emissions to surrender allowances equal to their total emissions. This requirement would not exist in the absence of implementation of the Scoping Plan. While the cap-and-trade program would allow facilities to obtain allowances or offsets rather than making on-site reductions, this requirement would not provide an incentive for facilities to increase emissions beyond the levels expected in absence of implementing AB 32. While some localized impacts could result from overall implementation of AB 32, such as increased operation of in-state power plants to replace imported electricity that has higher greenhouse gas emissions, these would not be a direct result of the cap-and-trade program. These possible impacts are addressed in the discussion of cumulative air quality impacts.

Before including a market mechanism in any regulation, ARB must, to the extent feasible, "consider the potential for direct, indirect, and cumulative emission impacts from these mechanisms, including localized impacts in communities that are already adversely impacted by air pollution" and design its cap-and-trade program "to prevent any increase in the emissions of toxic air contaminants or criteria pollutants" and "maximize additional environmental and economic benefits for California" (HSC §38570 et seq). During the development of regulations for the cap-and-trade program, ARB will evaluate the program design to ensure that the program meets AB 32 requirements related to the protection of public health as well as ARB's environmental justice policies.[3] Local agencies, such as air pollution districts and planning commissions, could also impose more stringent requirements for sources of criteria pollutants and air toxics to address potential cumulative impacts.

Capped sectors would include electricity, transportation fuels, natural gas, and large industrial sources. Under the proposed measure, the total amount of greenhouse gas emissions from industrial sources and electricity generation would be capped starting in 2012, and decline over time through 2020. The overall cap would be set at a level approximately 30 percent below business-as-usual projections for 2020. Greenhouse gas emissions from commercial and residential fuel use (e.g., natural gas and propane) and transportation fuels would be capped beginning in 2015. The proposed measure includes allowing the limited use of surplus reductions from non-capped sources, called offsets, which are additional to reductions required by AB 32. They would be subject to stringent criteria and verification procedures to ensure their enforceability and consistency with AB 32 requirements.

Although not directly a result of a cap and trade program, a new source of greenhouse gas emissions may present a potential for adverse localized air quality impacts in a community already adversely impacted by criteria pollutants or toxic air contaminants. While greenhouse gas emissions have no direct public health impacts,

[3] http://www.arb.ca.gov/ch/programs/ej/ejpolicies.pdf, December, 2001

the processes involved in manufacturing and electricity generation that would be capped sources also emit criteria pollutants and toxic air contaminants, which can pose direct and adverse health effects on exposed populations; however, California air pollution regulatory requirements at the federal, state, and local levels address individual source emissions from a regional and localized perspective.

TRANSPORTATION

(T-2): Low Carbon Fuel Standard.

The Low Carbon Fuel Standard (LCFS) is currently undergoing regulatory development in parallel with the AB 32 Scoping Plan. The goal of the LCFS is to reduce the carbon intensity of transportation fuels by at least 10 percent by 2020. Carbon intensity is a representation of the greenhouse gas emissions associated with the lifecycle impacts of producing, transporting, and using the fuel.

There will be a variety of options fuel producers can use to meet this standard which makes the environmental impact of the LCFS a difficult measure to examine in the context of the Scoping Plan. Furthermore, a reduction in carbon intensity does not directly relate to a specific change in criteria or toxic pollutants or in fuel combustion. The LCFS regulatory proposal will contain a more detailed analysis of the potential air quality impacts. Such impacts include the evaluation of the lifecycle greenhouse gas emissions and environmental impacts, potential air quality impacts associated with the production, transportation and use of the fuels, and an assessment of the potential localized and cumulative air quality impacts of building in-state production facilities.

ARB is examining the potential sources and types of air emissions associated with identified lower-carbon fuel that may be used in the implementation of the LCFS. One goal of the LCFS is to maintain or reduce criteria and toxic pollutant emissions. Although ARB expects the LCFS will reduce these criteria pollutants, to be conservative in this analysis ARB has assumed no change in criteria or toxic pollutants. As discussed above, the regulation will more fully document and quantify potential air quality impacts or benefits, and will consider the impacts of the life cycle of each fuel path. As appropriate, the lifecycle analysis will also include an evaluation of greenhouse gas emissions associated with indirect land use changes, and other identified indirect impacts associated with the fuels included in the LCFS.

Low carbon fuels that may be used to comply with the LCFS include low carbon ethanol and biodiesel, natural gas, electricity and hydrogen. Potential fuel sources will be discussed in this evaluation, and potential fuel end uses (e.g. vehicles, energy plants) are discussed under relevant measures in other sectors.

Biofuels: Biofuels is a general term used to describe various fuels produced from renewable sources. These include alcohol fuels, such as ethanol, various types of biodiesel and renewable diesel fuel, and others. Biofuels can be produced from food

crops such as corn-derived ethanol or soy beans. Biofuels can also be produced from non-food crops (e.g. switchgrass, algae), biomass waste residues (including cellulosic residues, municipal waste, forest trimmings, etc.), and vegetable oils (often used cooking oils). Biomass produced from waste residue is expected to play a large role in the latter years due to its expected very low carbon intensity. Biofuels can be used to produce blends of conventional fuels (e.g. gasoline and ethanol; biodiesel and diesel fuel; or can be used as essentially 100 percent biofuels). In addition, some processes are designed to produce fuels that can be used to directly replace conventional fuels, such as renewable diesel fuel.

In addition to California's proposed LCFS, the federal Energy Independence and Security Act (EISA) of 2007 (which revised the federal Renewable Fuel Standard (RFS)) promotes the production of biofuels, especially advanced renewable biofuels derived from cellulosic and waste sources. The federal RFS establishes targets for the production of biofuels derived from cellulosic and waste sources. The federal RFS establishes targets for the production of biofuels with a goal of using 36 billion gallons of renewable fuels per year in 2022.

In order to meet LCFS and federal RFS requirement, it is estimated that California will need to use up to 3 billion gallons of renewable fuel per year by 2020. The actual volume of renewable fuel required in California is not yet known; however, this volume is projected based on California's current consumption of approximately 11 percent of the nation's transportation fuels.

The air emissions associated with acquiring each of these biofuel sources can vary considerably. Some factors that affect the air emissions are described below.

- Recycling of waste materials such as municipal solid waste and green wastes, and agricultural or forest residues to produce biofuels will not typically create a new emission source, and is environmentally preferable to traditional disposal. There are emissions associated with truck trips for collecting these materials, but they most likely do not result in a net increase in co-pollutant or greenhouse gas emissions as they would replace disposal-related truck trips.

- Food crop production for biofuels may create new emission sources for acquiring the feedstock. This would not occur if this is merely a redirection of existing food production to fuel production. It is expected that energy crops will not likely be grown to any significant extent in California. Therefore, ethanol derived from corn is limited largely to the volume imported and the need to still meet the original need for importing corn. Furthermore, it is expected that LCFS biofuel production in California will shift toward the use of waste resources. The potential for greenhouse gas emission from land use conversion is discussed in the Land Resource portion of this evaluation.

- Critical factors in determining air emissions for acquiring the feedstock include where the feedstock is produced (which will impact both other resources needed for production, as well as rail and other transportation-related emissions), whether the biofuel crop is replacing another type of crop (and the difference in air emissions associated with the two crops), and whether the crop is competing with food crops for land. Crop production requires the use of off-road equipment, application of fertilizers and pesticides, and irrigation water. Air emissions from fertilizers and pesticides as well as run-off into streams, rivers and lakes result from traditional agricultural practices. Each of the biofuel production approaches mentioned above has associated air emissions. There are NOx, volatile organic compounds (VOCs), and PM emissions associated with agriculture, as well as emissions associated with truck trips to transport raw material to intermediate processing facilities.

- Non-food crop production for biofuel productions (e.g. energy crops) uses plants that are less resource-intensive (requiring less fertilizer and water), and thus have lower associated air pollutant emissions. The associated truck trip emissions would be expected to be similar to truck trip emissions from food crop production.

- Algae are a relatively newly identified source of biofuels and not yet fully studied.

Biofuel production on a commercial scale will require development of new technologies as well as production of biofuels using conventional biofuel production technology and crop-derived feedstocks. Currently the production capacity of commercial-size biofuel (ethanol and biodiesel) plants ranges from approximately 30 million gallons to 100 million gallons per year.

Production facilities will likely be located in California primarily based on the availability of feedstocks. These will likely be non-crop feedstocks and will include biomass wastes from forestry, municipal solid wastes, agriculture wastes, and waste oils, or will be food crops (i.e. corn) imported from the Midwest. There is competition for certain wastes for use in production of renewable electricity and biomethane. For example, it is expected that most of the forest waste will go to production of renewable electricity and municipal solid waste to produce biomethane, or be converted directly to electricity.

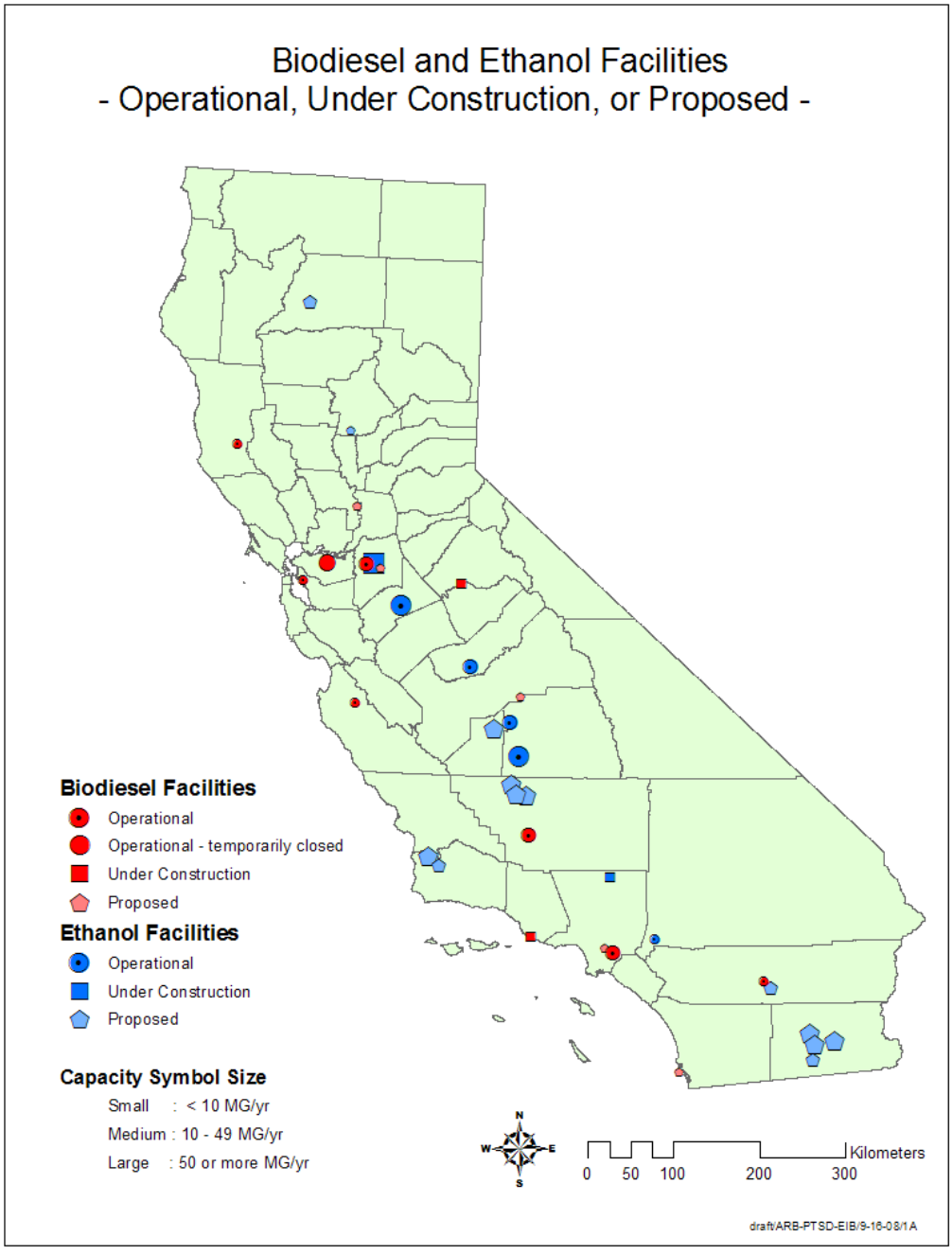
Biofuels will be available to replace both gasoline and diesel with the split between the two fuel types difficult to quantify at this time. In consideration of the competition between potential uses, California biofuel production could reasonably be in the range of 300 million gallons to 1 billion gallons per year. This could result in 10 to 30 new biofuel facilities in California, in addition to existing facilities.

Figure J-1 depicts locations of known and proposed biodiesel and ethanol facilities in California. Figure J-2 displays the feedstocks these facilities are using or propose to use. Note that projections of fuel production will likely change since the use of biofuels (biofuels and ethanol) will be partially driven by the federal EISA as discussed above.

Biodiesel production plants tend to be located close to their feedstocks and secondarily close to rail yards or freeways for distribution to retail sites. Ethanol facilities tend to be located near rail or truck terminals. Siting may also consider proximity to the feedstocks or the users of ethanol co-products. Current biodiesel production facilities are small, ranging from a thousand gallons per year to 30 million gallons per year.

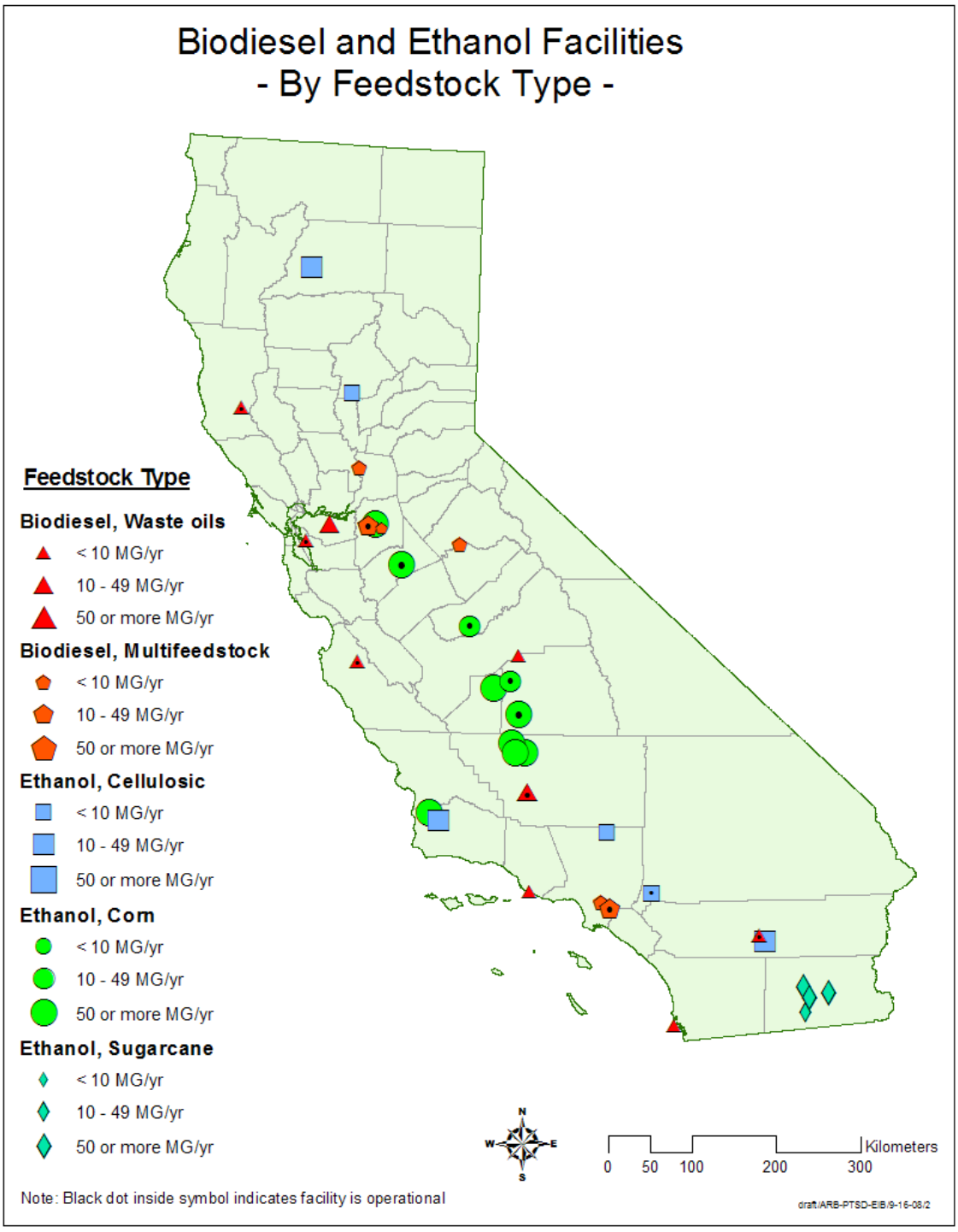
The conversion of biomass feedstocks into energy can result in air quality impacts. Criteria and toxic pollutants, as well as greenhouse gas emissions, will need to be assessed for these facilities during the siting and permitting processes. The pollutants of most concern associated with biomass conversion processes are NOx and VOCs; both are important precursors to the formation of ozone and particulate matter. Particulate matter (PM) emissions, especially from handling feedstocks, also need to be addressed. Greenhouse gas emissions will also need to be considered as part of the siting process and will ultimately be included in the AB 32 process. Finally, any localized criteria or toxic emissions impacts must be considered in the context of localized and cumulative impacts, and impacts on environmental justice concerns.

Figure J-1: Location and Size of Known and Proposed Biodiesel and Ethanol Facilities[4]



[4] Based on ARB staff research

Figure J-2: Feedstocks of Known and Proposed Biodiesel and Ethanol Facilities[5]



[5] Based on ARB staff research

Natural gas: The greenhouse gas emissions from natural gas depend on where it is produced and how it arrives to the final user. The emissions also will vary depending on the form supplied to vehicles either as compressed or liquefied natural gas. Any new distribution facilities including compressors, product quality processors, and liquefaction equipment would have to be permitted and any associated emissions or environmental impacts mitigated.

Hydrogen: Depending upon how it is produced, hydrogen can be a low carbon fuel. As a transportation fuel, hydrogen can be used in either modified internal combustion engines or in fuel cells. Unlike the burning of carbon-based fuels which produces CO_2, CO, NOx, VOC and PM and other potentially toxic compounds, combusting hydrogen produces heat, water, and some oxides of nitrogen. Hydrogen-fueled fuel cell vehicles only produce heat and water vapor.

Like other fuels, hydrogen must be examined over the entire process chain, including the energy needed to produce the fuel as well to compress or cool the hydrogen for storage. Potential hydrogen production methods include electrolysis of water, steam reformation of natural gas, biomass gasification and coal gasification. Today, the two most common ways to produce hydrogen are steam reformation of natural gas and electrolysis of water. Hydrogen produced using electricity generated from renewable resources and used to power fuel cell vehicles results in extremely low air emissions. Senate Bill 1505 (Lowenthal, Chapter 877, Statutes of 2006) directs ARB to develop environmental regulations for the production of hydrogen for transportation use, a process that started in late 2007.

Electricity: Increasing the number of electric vehicles and plug-in hybrids would substantially lower the carbon intensity of transportation fuels. The co-pollutant emissions associated with electricity as a transportation fuel are expected to be the same as the co-pollutant emissions associated with electricity overall. An increase in the number of electric vehicles and plug-in hybrids would not adversely impact air quality. Off peak loads would increase significantly and grid-rechargeable electric vehicle penetration increases. This increased load would produce some increase in greenhouse gas and co-pollutants from base load plants. Such increases in criteria pollutants and greenhouse gas would be more than offset however, by the displacement of internal combustion vehicles.

(T-5): Ship Electrification at Ports.

In December 2007, ARB adopted the shore power regulation, a Discrete Early Action measure, which will be enforceable starting in 2010. This regulation is included in the State Implementation Plan (SIP) and as part of the regulatory package, and has its own environmental analysis. This measure reduces emissions by allowing ships to shut down the uncontrolled auxiliary engines which traditionally have powered these electric-based activities. A transfer of emissions from ships to power plants may

result in localized impacts. Criteria pollutants associated with incremental electricity generation at power plants would be significantly less than emissions generated by ship engines.

(T-6): Goods Movement. The Goods Movement Emissions Reduction Plan (GMERP) identifies opportunities to improve the efficiency of goods movement, particularly through tracking and better scheduling of activities. The proposed measure adds to this concept by proposing that efficiencies to reduce greenhouse gas emissions also be considered. Although the following strategies are not likely to adversely impact air quality, further evaluation is needed to verify whether specific mitigation measures are needed.

- **Clean (Green) Ships:** This measure proposes to incentivize increased fuel efficiency of ships, such as improving engine efficiency, as well as other technologies that reduce greenhouse gas and NOx. This measure is also included in the 2007 SIP. A voluntary program to reduce vessel speeds at the Ports of Long Beach and Los Angeles may be expanded to ocean going vessels that travel along the State's coastline. The employment of wind assistance is also being explored. No adverse impacts to air quality are anticipated, but the measure is not fully developed at this time.

- **Commercial Harbor Craft:** This measure would develop best management practices and outreach to encourage regular maintenance, the use of non-toxic antifouling materials, vessel speed reduction, and engine efficiency of commercial harbor craft. Air emission reductions have not been quantified, but since the main intention is to reduce criteria pollutants and toxic air contaminants, no adverse impacts to air quality are expected.

- **Cargo Handling Equipment:** Reducing the idling times of diesel-powered equipment could potentially reduce associated criteria pollutants. A future study of idling occurrences and emissions will determine the potential for air emission reductions. This measure is included in the 2007 SIP.

- **Transport Refrigeration Units (TRUs):** Transport Refrigeration Units (TRUs) are refrigeration systems usually powered by diesel internal combustion engines designed to refrigerate or heat perishable products that are transported in various containers, including semi-trailers, truck vans, shipping containers, and rail cars. ARB adopted an Airborne Toxic Control Measure (ATCM) regulation to reduce emissions from in-use TRUs in 2004. This measure is included in the 2007 SIP, and ARB is now evaluating the feasibility of regulations to further reduce air toxic emissions from TRUs by eliminating the use of diesel fuel. No adverse impacts to air quality are anticipated.

ELECTRICITY AND NATURAL GAS

Efficiency and conservation measures, solar water heating and solar roofs that collectively reduce peak demand are likely to reduce air emissions, as aging, less efficient power plants are more likely to be operated when demand is high. Thus, no adverse air quality impacts are anticipated for energy efficiency and conservation measures. Measures in this Sector that have the potential to adversely affect air quality include Increasing Combined Heat and Power, and the Renewables Portfolio Standard.

Reduced reliance on out-of state power plants with high greenhouse gas emissions results in increased electricity generation in California, so consequently there may be emissions related to electricity generation. Implementation of the Scoping Plan will result in lower electricity demand and increased reliance on renewable resources, but the relationship to increased or decreased emissions cannot be determined at this time.

(E-2): Increasing Combined Heat and Power. Combustion-based power plants do not convert all of their available energy into electricity and typically lose more than half of the energy as excess heat. At the same time, there are many industrial facilities that require both electricity and heat which currently purchase electricity from the grid and burn natural gas to generate heat. Combined heat and power (CHP) systems generate both electricity and thermal energy on site. When the systems are optimally sized to either meet the heat load of the industrial facility or provide the maximum amount of electricity that the facility could use during peak demand, excess electricity is produced that could be distributed to other electricity users. Combined heat and power can be a more efficient use of the energy contained in fuel, and may also reduce the need to develop new or expand existing power plants.

As this measure is designed, no adverse impacts are anticipated, however, this is potential for local adverse impacts in the event that individual CHP units are not installed in accordance with this measure. ARB cannot speculate on the significance of the impact at this time.

(E-3): Renewables Portfolio Standard. This recommended measure would increase the overall percentage of renewable energy sources such as wind, solar, biomass and geothermal, of each utility's energy sources. Currently, California's energy profile includes 12 percent renewable sources. The requirement to increase renewable energy could be met through any potential mixture of renewable energy sources, and will most likely be driven by a number of factors, including the availability of renewable sources within the geographic region of each utility. For these reasons, the impacts of each of the renewable resources are evaluated relative to electrical grid natural gas, and are not individually quantified for potential air emissions.

There are air quality impacts associated with the construction of facilities to harness renewable resources – primarily from fugitive dust and diesel particulates from operation of construction equipment. These are assumed to be similar in nature to the construction-related emissions from natural gas-powered power plants, although the location and size of facilities can affect the magnitude and duration of these impacts. These impacts may be temporarily significant, and would be mitigated by employment of best management practices to minimize dust. ARB's implementation of the Diesel Risk Reduction Plan includes reducing diesel particulates from construction equipment operation by 2020, and compliance with this regulation will help mitigate adverse impacts associated with construction.

The remainder of this section focuses on the adverse impacts associated with operation and maintenance of renewable resource facilities.

Wind and solar energy would not adversely impact air quality. Wind power operation and solar energy do not have any associated air emissions.

Biomass energy is harnessed through the combustion of organic waste materials, residuals or agricultural products. Air emissions from biomass sources depend on the fuel type. These are also indirect emissions associated with the production, transportation, and/or disposal of the fuel source. Indirect emissions (from trucks and/or rail) are discussed in the Transportation section above.

Biomass (forest or agricultural residuals) or municipal solid waste (MSW) may be pre-processed and then combusted to generate electricity. Biomass combustion must be controlled to limit emissions of NOx, particulate matter and carbon monoxide, as biomass combustion generates 17 times the amount of NOx and 27 times the amount of PM as electrical grid natural gas power plants per MWh.[6] MSW combustion must also be controlled to limit emissions of NOx, particulate matter and carbon monoxide, as MSW combustion generates 24 times the amount of NOx and 5 times the amount of PM as electrical grid natural gas power plants (per megawatt-hour (MWh)). In some areas of the state, agricultural residuals are burned in open fires as a means of disposal. If the residuals used in a biomass plant were disposed of in open fires, burning the residuals in a biomass plant would reduce the air emissions while also producing electricity. All of these emissions can be minimized with modern control technologies and through good plant design.

Biogas. The anaerobic digestion of human or animal waste produces a gas of 50 to 80 percent methane. This "biogas" can be combusted to produce electricity. Combustion of digester gases must also be controlled to limit emissions of NOx, particulate matter and carbon monoxide, as MSW combustion generates 22 times the

[6] Estimates are based on renewable power generation emission factors developed from ARB surveys and emission inventories in 2000-2001, conducted during the California electricity crisis.

amount of NOx and 9 times the amount of PM as electrical grid natural gas power plants (per MWh).

Combustion of **landfill gases** (mostly methane) to produce electricity puts methane to use that would otherwise be flared to control the methane emissions. Combustion is also used to reduce the toxic air contaminants associated with some landfills. Combustion of landfill gases must be controlled to limit emissions of NOx, particulate matter and carbon monoxide, as its combustion generates 27 times the amount of NOx and 7 times the amount of PM as electrical grid natural gas power plants (per MWh). All of these emissions can be minimized with modern control technologies and through good plant design.

Geothermal energy harnesses naturally occurring geothermal formations, using the steam to produce electricity and returning spent brine to the geothermal resource. Emissions associated with geothermal sources can include hydrogen sulfide, arsenic, mercury, radon 22, and ammonia. The cooling towers at geothermal power plants can emit particulate matter. All of these emissions can be minimized with modern control technologies and through good plant design.

Hydroelectric power uses the potential energy of water to turn turbines that generate electricity. These types of projects do not have associated air emissions.

The addition of significant new renewable resources may also alter the needed transmission infrastructure as renewable facilities are constructed to maximize resource capture at sites with optimal wind, solar, and geothermal resources. ARB has not evaluated the air quality impacts of changes or additions to transmission infrastructure, but notes that there is an ongoing process to examine this issue for several western states and provinces – the Renewable Energy Transmission Initiative (RETI). The RETI is also prioritizing the addition of specific renewable projects to optimize the efficiency and minimize the environmental impact of new transmission infrastructure. There are no long-term air emissions associated with transmission lines, but there are short-term co-pollutant emissions associated with construction that can be minimized through best practices and project design. All of these emissions can be minimized with modern control technologies and through good plant design.

WATER

This sector involves six measures that include Water Use Efficiency, Water Recycling, Water System Energy Efficiency, Reuse Urban Runoff, Increasing Renewable Energy Production, and implementing a Public Goods Charge. The Water Use Efficiency, Water System Energy Efficiency and Public Goods Charge measures are not anticipated to result in adverse impacts to air quality.

(W-2): Water Recycling and
(W-4): Reuse Urban Runoff. These proposed measures may adversely impact air quality due to construction of water capture and storage facilities, as excavation and grading activities may produce short-term construction impacts, such as dust generation, equipment emissions, and objectionable odors. Impacts associated with Low Impact Development would generally be part of the impacts associated with land development projects. Local jurisdictions and air pollution control districts require measures to mitigate construction impacts, such as preparation of grading plans, sprinkling to minimize dust, prohibition on idling equipment and restricted hours of operation. These measures would result in less than significant impacts to air quality with mitigation.

(W-5): Increase Renewable Energy Production. This measure may result in significant impacts to air quality due to new projects; however, this would be evaluated by lead agencies and the California Energy Commission (CEC) on a project-specific basis. This measure overlaps with the Renewables Portfolio Standard (E-3). The potential air quality impacts are discussed in that section.

INDUSTRY
The measures in the Industry Sector involve audits, system efficiency improvements and regulatory changes. Except for possible construction-related air quality impacts, no adverse impacts to air quality are anticipated, however, as these strategies move forward ARB will further evaluate environmental impacts during regulatory development.

RECYCLING AND WASTE MANAGEMENT
(RW-1): Landfill Methane Control. The implementation of the Landfill Methane Control measure involves installation of control devices such as flares and energy recovery systems in order to further reduce greenhouse gas emissions caused by methane. These activities may slightly increase criteria pollutant emissions such as NOx and carbon monoxide (CO) above current levels. Measureable but variable amounts of toxic compounds such as benzene, vinyl chloride, and other carcinogens may be detected in landfill gas at some facilities. To mitigate, any increase in the generation of NOx and CO as a result of landfill gas combusting will need to be included by the affected district in its emission inventory, and depending on a district's non-attainment status, offsets may be required, typically for landfill gas-to-energy projects. This measure does not require the installation of gas-to-energy projects. Gas collection systems with flares or other combustion devices are currently the best means of reducing methane and the potential risk to surrounding populations.

(RW-3): High Recycling/ Zero Waste. This measure includes a suite of strategies, one of which is Composting. Compost facilities are regulated under California Code of Regulations Title 14, Chapter 31. Composting facilities may emit VOCs and NOx, which are criteria pollutants that contribute to ozone formation, but this depends upon

the compost feedstock and emissions control devices on equipment. These facilities may have some region-specific air district permitting requirements. Use of best available control technologies (BACT) would reduce air emissions. According to the California Integrated Waste Management Board's (CIWMB) report, "Emissions Testing of Volatile Organic Compounds from Greenwaste Composting at the Modesto Compost Facility in the San Joaquin Valley," application of a finished compost "blanket" on top of composting materials has the potential to reduce emissions, but should be further studied.

Anaerobic digesters are also included in the suite of strategies. Site and project-specific analysis would be necessary for implementation of the anaerobic digester strategy, as digesters may require a permit action by a responsible agency under CEQA.

HIGH GWP

(H-4): Limit High GWP Use in Consumer Products. This measure involves reformulation to reduce or eliminate fluorinated hydrocarbons, CO_2 and possibly nitrous oxide, which are used as propellants in tire inflator, electronic cleaners, dust removal products, sirens, hobby guns (compressed gas), party products (foam string) and other products. At its June 2008 Board Hearing, ARB approved amendments to the Consumer Products Regulation that will attain approximately a 0.23 $MMTCO_2E$ per year reduction from Pressurized Gas Dusters (2020 reductions). In the 2009-2010 timeframe, staff will evaluate other GHG reduction opportunities from Consumer Products and may propose regulations to attain additional reductions. Consumer Products are also regulated to reduce VOC and TAC emissions. Additional regulations would include analysis to limit the replacement of high GWPs with lower GWPs that could contribute to the formation of ground level ozone.

(H-6): High GWP Reductions from Stationary Sources.

Foam Recovery and Destruction Program. Waste insulation foam that is currently landfilled continues to emit high GWP greenhouse gases into the atmosphere. The measure proposes to recover and destroy waste foam prior to landfilling. If the recovered foams are combusted at treatment facilities, emissions of criteria and toxic pollutants may occur. This program requires further evaluation to determine adverse and beneficial environmental impacts from destruction or reuse practices, which will occur as part of program development.

AGRICULTURE

(A-1): Methane Capture at Large Dairies. This measure is voluntary. This measure would not significantly impact air quality, as digesters are designed to reduce methane emissions, and possibly VOCs from dairy lagoons to produce renewable energy. However, the combustion of biogas in an engine to generate electricity may emit NOx. Emissions controls can reduce the amount of NOx in exhaust gases, but NOx controls for the types and sizes of engines typically used in

conjunction with a dairy digester may not be available, cost effective or able to meet local air district NOx requirements[7,8,9].

[7] Anaerobic Digester Implementation Issues. California Energy Commission, Public Interest Energy Research Program. 2006.
[8] Economic and Technical Advancement Advisory Committee report to the Air Resources Board. Feb. 2008.
[9] Dairy Permitting Advisory Group. Recommendations to the San Joaquin Valley pollution Control Officer Regarding Best Available Control Technology for Dairies in the San Joaquin Valley. Jan. 2006.

C. Impacts to Agricultural Resources

Cumulative Impact. The Scoping Plan measures may result in significant impacts to agricultural resources. The conversion of prime farmland, unique farmland or farmland of statewide importance due to siting of new facilities and its associated supporting infrastructure, or conflict with an existing Williamson Act contract may be significant. Further, the loss of food and fiber for fuel may increase the cost of food if the acreage had formerly been used to grow food crops. With mitigation measures such as avoidance of siting facilities on prime farmland, supporting the California Farmland Conservancy Program, working cooperatively with the landowners, and ensuring conformity with existing Williamson Act contracts, impacts would be substantially mitigated. Existing stationary source locations are presently, and would continue to be, primarily designated as heavy industrial land uses.

TRANSPORTATION

(T-2): Low Carbon Fuel Standard. While future facilities that support the Low Carbon Fuel Standard may be sited on prime agricultural lands, this is unlikely as prime agricultural land is too valuable to be used to grow crops for biofuel production. If siting of facilities results in the conversion of agricultural land, this would be subject to the CEQA process and approval by the city or county on a project-by-project basis. Siting of new stationary sources that convert biomass to fuel may convert prime farmland to other uses – the degree of which would be determined locally, and may conflict with an existing Williamson Act contract. Facilities associated with the Low Carbon Fuel Standard measure would require local approval of conditional use permits, local air permits and possibly waste discharge requirements and would be subject to project-specific compliance with CEQA. Such conversion could be mitigated via a financial throughput mechanism that supports the California Department of Conservation's California Farmland Conservancy Program. Avoidance of siting a facility on Williamson Act contracted land would alleviate potential impacts associated with contract conflicts.

ELECTRICITY AND NATURAL GAS

(E-3): Renewables Portfolio Standard. The siting or expansion of new or existing facilities, and the change of crop from food and fiber to fuel could be potentially significant, depending on a site's soils characteristics and productivity, whether the area has been designated as prime farmland and location or whether a facility is under Williamson Act contract. Mitigation measures include but are not limited to avoidance, supporting California Farmland Conservancy Program or other agricultural easement programs to secure easements, alignment with existing right-of-ways, working cooperatively with land owners in design of project features and providing appropriate financial support to landowners if land is acquired.

WATER

(W-3): Water System Energy Efficiency and
(W-5): Increase Renewable Energy Production. New support facilities may convert or disturb agricultural or natural lands. Project-specific analysis would be necessary.

AGRICULTURE

(A-1): Methane Capture at Large Dairies. Although ARB believes siting of manure digesters on dairy lands would not be a significant impact, the siting of digesters may not be compatible with existing Williamson Act contracts. The landowner is encouraged to check with the city or county to ensure compatibility on a project by project basis.

D. Impacts to Biological Resources

Cumulative Impacts. The measures in the Scoping Plan may adversely impact biological resources when new facilities are sited and constructed or existing facilities are expanded. Project and site-specific analysis and coordination with federal, state and local agencies would be necessary to obtain pertinent information regarding sensitive species within and surrounding a project area. Mitigation measures would be dependent upon the site survey and analyses. The Renewables Portfolio Standard and the Low Carbon Fuel Standard have the greatest potential to impact biological resources and adversely impact sensitive species. Project-level compliance with CEQA, and if appropriate, NEPA would be necessary. Several Water sector measures and the Agriculture measure may impact biological resources as these involve planning, siting, construction of facilities. Until the proposed locations of the facilities are known, it is not possible to determine significance of impact.

TRANSPORTATION

(T-2): Low Carbon Fuel Standard. When converting natural lands or farmlands to industrial or a utility-scale facility, such as an ethanol facility, any adverse impacts are required to be addressed and mitigated through CEQA. These impacts could be to terrestrial, riparian, or aquatic habitat, natural communities, or to any species identified as a candidate, sensitive or special status species in local or regional plans, policies or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service, or §404 of the Clean Water Act. A facility may interfere with the movement of any native resident or migratory fish or wildlife species with established migratory corridors, or it may conflict with the provisions of an adopted Habitat Conservation Plan or other approved local, regional or state habitat conservation plan.

In addition, the refining, marketing and distribution of petroleum fuels may adversely impact water quality due to leaks, spills, and wastewater discharge. These water quality impacts can also impair important habitat, or interfere with critical life-cycles of native species. Any reduction in petroleum fuel use would reduce the opportunity for such occurrences.

Some biofuels feedstocks have the potential to affect native species and biological resources, if feedstocks are produced though conversion of important habitat to agriculture or increase agricultural activities in species' corridors.

Hydrogen production and use should have little or no affect on native species and biological resources outside of any potential effects from its energy and water source.

Specific information will be evaluated as the measures and regulations are further developed; each regulation is required to have its own environmental evaluation.

CEQA and possibly NEPA compliance would be required for each facility with its project-specific environmental evaluation. Figure J-1 depicts known and proposed locations of biofuel facilities.

ELECTRICITY AND NATURAL GAS

(E-3): Renewables Portfolio Standard. Siting of new utility scale facilities and arrays may convert natural lands to other uses – the degree of which would be determined locally. Any utility scale facility may require a relatively large area if it is to be used to generate electricity at a commercial scale, and large arrays of solar collectors may interfere with natural sunlight, rainfall, and drainage which could have a variety of effects on plants and animals. Solar arrays may also create avian perching opportunities that could affect both bird and prey populations. A wind farm may present a potential risk to migrating birds if the facility is sited in a flyway. Careful siting and design of such a facility would minimize the risk for bird strikes.

Of note, a solar thermal plant requires around 50 times more land than combined cycle natural gas fueled power plant per MW. Construction activities associated with solar thermal plants disturb the land, and fencing can interfere with wildlife corridors. Nitrogen dioxide and particulate matter deposition from cooling towers at solar thermal plants and new geothermal projects may also degrade vegetation.

When converting natural lands to industrial or usage for utility-scale facilities, there may be adverse impacts to terrestrial, riparian, or aquatic habitat, natural communities, or on any species identified as a candidate, sensitive or special status species in local or regional plans, policies or regulations, by the California Department of Fish and Game, the U.S. Fish and Wildlife Service, or §404 of the Clean Water Act. A facility may interfere with the movement of any native resident or migratory fish or wildlife species with established migratory corridors, or it may conflict with the provisions of an adopted Habitat Conservation Plan or other approved local, regional or state habitat conservation plan.

Specific information will be included as the measures and regulations are further developed; each regulation is required to have its own environmental evaluation. CEQA and possibly NEPA compliance would be required for each facility with its project-specific environmental evaluation. Such facilities would require a local approval of conditional use permits, and other permits and would be subject to project-specific compliance with CEQA and NEPA, as appropriate.

WATER

(W-2): Water Recycling,
(W-3): Water System Energy Efficiency,
(W-4): Reuse Urban Runoff, and
(W-5): Increase Renewable Energy Production. Siting and construction of new facilities may convert natural land or disturb biologically sensitive resources. Prior to

implementation of projects associated with these measures, location and project-specific compliance with CEQA and/or NEPA would be required. The lead and implementing entities would be required to contact the appropriate agencies and departments to ensure that potential impacts to sensitive species would be avoided, minimized or mitigated as appropriate. At this time, ARB staff cannot speculate extent or significance of the impacts on biological resources.

AGRICULTURE

(A-1): Methane Capture at Large Dairies. For new or modified dairies and their facilities, operators are required to obtain "Authority to Construct" permits for new construction or modifications, which evaluate the potential CEQA impacts of the proposed project on biological resources prior to granting permits to construct. [10]

[10] Martin, P. March 18, 2008 Update on California Dairy Air Quality Regulations.

E. Impacts to Cultural Resources

Cumulative Impact. Site-specific significant adverse impacts to cultural resources are not expected because the Scoping Plan measures would not require destruction or alteration of any buildings or sites with prehistoric, historic, archeological, religious or ethnic significance. However, some measures in the Scoping Plan, including the **(T-2) Low Carbon Fuel Standard, (E-3) Renewables Portfolio Standard, (W-2) Water Recycling, (W-3) Water System Energy Efficiency (W-4): Reuse Urban Runoff,and (W-5) Increase Renewable Energy Production** may involve siting, grading, construction or expansion of facilities or buildings on lands that have not been surveyed for cultural significance, and may result in adverse impacts to cultural resources if inadvertent disturbance occurs at the time of construction.

Prior to implementation of projects associated with the Scoping Plan measures, location and project-specific compliance with CEQA and/or NEPA would be required. The lead and implementing entities would be required to contact the appropriate agencies and departments to ensure that potential impacts to cultural resources would be minimized or avoided. As ARB staff cannot speculate on the locations of these resources, it is not possible to ascertain the impacts on cultural resources at this level.

F. Impacts to Energy Demand

Cumulative Impact. A number of the major measures in the Scoping Plan will significantly reduce demand for electricity and natural gas relative to BAU (or the No Project Alternative, as discussed in the Project Alternatives discussion). Some measures, discussed below, will result in moderate increases in energy demand. As the State reduces its reliance on coal-fired generation, additional natural gas generation may be required. Because other measures will decrease overall demand for electricity relative to BAU and will increase the share of renewable resources, it is not clear whether this will result in a net increase in natural gas use for electric generation within California. The cumulative impact of implementing the recommended measures will be to decrease California's demand for electricity and natural gas.

CALIFORNIA CAP AND TRADE PROGRAM LINKED TO WESTERN CLIMATE INITIATIVE PARTNER JURISDICTIONS

There may be a shift from internal combustion engines to electric engines, resulting in an increase in energy demand. Although not expected to be significant, it is not possible to definitively determine the level of significance of this potential impact at this time.

TRANSPORTATION

(T-2): Low Carbon Fuel Standard. Future ethanol and other biofuel production facilities in California will likely use natural gas to produce steam and purchase required electricity from a utility. Mitigation would include employment of efficiency and control technologies at facilities and the purchase of offsetting credits. Energy may also be required to move additional natural gas through the pipelines, although this is expected to be minor as the supplies will likely come from existing supplies of natural gas.

Electricity: Increasing the number of electric vehicles and plug-in hybrids would substantially lower the carbon intensity of transportation fuels, but has the potential to increase electricity demand in the long term. Employment of off-peak charging strategies would mitigate to a substantial degree.

(T-5): Ship Electrification at Ports. Allowing ships to run heating, air conditioning, lights, and other operations by plugging into shore-side electrical power would reduce emissions by allowing ships to shut down the uncontrolled auxiliary engines that traditionally have powered these electric-based activities. According to the 2007 SIP, there are toxic air contaminants associated with incremental electricity generation at power plants, but they are significantly less than emissions generated by ship engines. This regulation was evaluated for adverse environmental impacts.

(T-6): Goods Movement. TRUs may increase energy demand through electrification of units. Employment of off peak charging would reduce this impact.

WATER

(W-2): Water Recycling. Water recycling could increase the amount of energy used at local wastewater treatment facilities. To mitigate, wherever possible, water recycling should be performed during off-peak periods.

HIGH GWP

(H-2): SF_6 Limits in Non-Utility and Non-Semiconductor Applications. CalOSHA requires a SF_6 tracer test for fume hoods operating with a specific energy efficient technology. As ARB develops this measure, ARB will need to work with CalOSHA to ensure maintenance of energy conservation efforts.

(H-3): Reduction of Perfluorocarbons in Semiconductor Manufacturing and (H-6): High GWP Reduction From Stationary Sources. Regulatory measures to reduce high GWP emissions from semiconductor manufacturers may require additional energy or electrical use to thermally destroy high GWP gases, as this destruction requires high temperatures. Mitigation measures include purchase and use of highly energy efficient abatement equipment, and catalytic destruction systems which operate at lower temperatures.

G. Impacts to Geology and Soils

Cumulative Impact. At this time, implementation of the Scoping Plan measures (excluding the High Speed Rail projects) are not expected to expose people or structures to potential substantial adverse effects that involve risk of loss, injury or death from rupture of a known earthquake fault, strong seismic ground shaking, seismic-related ground failure, landslides, or result in soil erosion or be located on a geologic unit or soils that is unstable. However, some measures in the Scoping Plan, including the **(T-2) Low Carbon Fuel Standard, (E-3) Renewables Portfolio Standard, (W-2) Water Recycling, (W-3) Water System Energy Efficiency and (W-5) Increase Renewable Energy Production** may involve siting, grading, construction or expansion of facilities or buildings on lands. These measures may require disruption or over covering of soil during construction of facilities, there may be changes in topography or surface relief features, the erosion of beach sand, or a change in existing siltation rates. At this time, ARB cannot speculate on the significance, as any future facility siting, construction or expansion would be required to be evaluated on a project specific basis, and would need to comply with state and local requirements that would mitigate impacts.

H. Impacts Associated with Hazardous Materials

Regulatory Background. Hazardous materials are substances with certain physical properties that could pose a substantial present or future hazard to human health or the environment when improperly handled, disposed, or otherwise managed. As defined in CCR Title 22 Division 4.5, Chapter 11, Article 3, hazardous materials are grouped into the following four categories based on their properties: toxic (causes human health effects), ignitable (has the ability to burn), corrosive (causes severe burns or damage to materials) and reactive (causes explosions or generates toxic gases). A hazardous waste is any hazardous material that is discarded, abandoned, or otherwise is not recycled. If improperly handled, hazardous materials and wastes can result in public health hazards if released to the soil or groundwater or through airborne releases in vapors, fumes or dust.

Under the Resource Conservation and Recovery Act (RCRA), U.S. EPA regulates the generation, transportation, treatment, storage and disposal of hazardous waste. RCRA was amended in 1984 by the Hazardous and Solid Waste Act (HSWA), which affirmed and extended the concept of regulating the use of certain techniques for the disposal of some types of hazardous wastes. Under RCRA, individual states may implement their own hazardous waste program in lieu of RCRA as long as the state program is at least as stringent as the federal RCRA requirements. U.S. EPA approved California's program to implement federal regulations as of August 1, 1992.

The California Department of Toxic Substance Control (DTSC) administers the Hazardous Waste Control Law (HWCL). Under HWCL, DTSC has adopted extensive regulations governing the generation, transportation, and disposal of hazardous wastes. HWCL differs little from RCRA; both laws impose "cradle to grave" regulatory systems for handling hazardous wastes in a manner that protects human health and the environment. Regulations implementing HWCL are generally more stringent than regulations implementing RCRA. HWCL regulations list more than 780 hazardous chemical, as well as nearly 30 more common materials that may be hazardous, and establish criteria for identifying, packaging, and labeling hazardous wastes. They prescribe management practices for hazardous wastes establish permit requirements for hazardous waste treatment, storage, disposal, and transportation; and identify hazardous wastes that cannot be disposed of in landfills.

Under both RCRA and HWCL, hazardous waste manifests must be retained by the generator for a minimum of three years. Hazardous waste manifests list a description of the waste, its intended destination, and regulatory information about the waste. A copy of each manifest must be filed with DTSC. The generator must match copies of hazardous waste manifests with certification notices from the treatment, disposal or recycling facility. Hazardous waste as defined in the Code of Federal Regulations Title 40 (40 CFR) 261.20 and CCR Title 22, Article 9 (including listed substance,

40 CFR 261.30) is disposed of in Class I landfills. California has enacted a strict legislation for regulating Class l landfills (HSC §5209 – 25209.7). For example, the treatment zone of a Class I landfill must not extend more than five feet below the initial surface and the base of the zone must be a minimum of five feet above the highest anticipated elevation of underlying groundwater (HSC §25209.1 (h)). The Health and Safety Code also requires Class I landfills to be equipped with liners, a leachate collection and removal system and a groundwater monitoring system (HSC §25209.2(a)). Such systems must meet the requirements of DTSC and the SWRCB (HSC §25209.5).

Cumulative Impact. The purpose of the Scoping Plan is to help California reduce greenhouse gas emissions. Some measures in the Scoping Plan may require the use of hazardous materials, and may require special handling when materials are disposed of. Scoping Plan-related impacts associated with hazards and hazardous materials are expected to be less than significant, and will be further evaluated during regulatory development.

TRANSPORTATION

(T-2): Low Carbon Fuel Standard.

Biodiesel: Biodiesel production uses sodium hydroxide, hexane, sulfuric acid, and methanol. These will be present in any waste generated. Stearates are also likely generated during the esterification process. Glycerol is a co-product that contains unused catalyst, salt, water, methanol, and soaps, and may be recycled and has economic value.

Ethanol: Current state-of-the-art dry milling plants are expected to generate minimal waste, but any waste materials such as hydraulic oil that is generated would require appropriate disposal if they cannot be, reused or reprocessed.

Hydrogen: Precious metals, such as platinum, are expected to be recovered from fuel cells at the end of their useful life. Carbon fiber used in hydrogen tanks is highly valuable as a recycled material.

(T-6): Goods Movement. These measures are not expected to affect waste disposal or hazardous materials, as they do not propose to significantly materially change vehicles, vessels, structures, or equipment. Reduced upstream transport of fuels would reduce the potential for accidental spills.

One maintenance practice to be considered in the commercial harbor craft measure under T-6 is the use of non-toxic anti-fouling products to be used on the hulls to improve hull smoothness. Copper is an active ingredient in some commonly used anti-fouling products. Excess product, spray mixture, and rinseate associated with the application of copper-containing anti-fouling products must be treated, and disposed of, as hazardous waste if it cannot be used or chemically reprocessed. The

encouragement of non-toxic anti-fouling product use and education of owners/operators on the toxicity of copper should reduce the use of and improper disposal of these chemicals.

ENERGY AND NATURAL GAS

(E-1 and CR-1): Energy Efficiency. Appliance and building efficiency standards are designed to reduce energy and water consumption. Overall the appliance and building turnover rate would not result in an accelerated rate of hazardous or municipal solid waste production. Efficiency standards occasionally result in the use of new or new versions of products that contain hazardous materials and require special recycling or disposal, such as ballasts in compact fluorescent bulbs or batteries. Compliance with special waste handling, recycling and disposal laws and regulations would alleviate potential impacts.

(E-3): Renewables Portfolio Standard. Municipal solid waste may contain hazardous materials, which could result in solid and gaseous hazardous by-products when burned for energy. Ash can be recycled or shipped to landfills permitted to accept such waste, and hazardous materials should be diverted prior to combustion. Solar arrays with photovoltaic panels may contain hazardous materials, and although they are sealed under normal operating conditions, there is the potential for environmental contamination if they were damaged or improperly disposed upon decommissioning. Concentrating solar power systems may employ liquids such as oils or molten salts that may be hazardous and present spill risks. Spill-related impacts can be mitigated through proper planning, handling, spill cleanup, and adherence with disposal protocols (Federal Register/ Vol. 73, No. 104, Notices, May 29, 2008).

(E-4): Million Solar Roofs. As indicated in E-3, above, photovoltaic panels may contain hazardous materials, and although they are sealed under normal operating conditions, there is the potential for environmental contamination if they were damaged or improperly disposed upon decommissioning. Some solar cell manufacturing requires trace amounts of potentially toxic materials. Proper handling and operation and good maintenance practices can be used to minimize impacts from hazardous materials. Proper planning and good maintenance practices can be used to minimize impacts from hazardous materials (Federal Register/ Vol. 73, No. 104, Notices, May 29, 2008).

HIGH GWP

(H-2): SF_6 Limits in Non Utility and Non Semiconductor Applications. One of the proposed measures to reduce SF_6 focuses on its use as a tracer in fume hoods. One possible substitute for SF_6 in this application is N_2O, which is also a greenhouse gas but has far lower greenhouse warming potential. The use of N_2O may pose a risk to vulnerable populations, such as pregnant women, if N_2O is used in place of SF_6 for fume hood tests. Exposure could occur if N_2O is accidentally released. The potential

impact would be mitigated through use of best management practices such as ensuring proper ventilation at exhaust stacks and ensuring only certifiers are in the testing room.

I. Impacts to Land Use and Planning

Cumulative Impact. The Scoping Plan includes a recommended measure to establish a process whereby regions in California integrate development patterns, transportation networks, and other transportation measures and policies in a way that achieves greenhouse gas emission reductions. ARB will work with metropolitan planning organizations to set transportation-related greenhouse gas emissions reductions targets. Shifting land use patterns can improve transportation and build on successful planning processes that integrate sustainable community principles. While worth noting that this impact is significant, it is not adverse.

Some existing facilities, such as landfills, may need to revise their permits in order to implement strategies recommended in the proposed plan. Also, many counties will likely adopt Greenhouse Gas Elements in their General Plans that will translate into updated building codes, energy and water use efficiency measures, and land use decisions. These actions will result in new or revised permitting requirements. Permit approval generally requires compliance with CEQA (or its functional equivalent) and possibly NEPA.

Land use considerations are determined by local governments and no land use or planning requirements would be mandated or altered by the proposed measure. If any federal agencies are involved with the recommended measures in the Scoping Plan, they would be expected to use their land use planning processes to ensure that the public lands are managed in accordance with all applicable laws and regulations under their respective principles of multiple use and sustained yield; recognizing the need for domestic sources of minerals, food, timber and fiber while protecting the quality of the values under their purview.

TRANSPORTATION
(T-2): Low Carbon Fuel Standard. The Low Carbon Fuel Standard is still in the regulatory development process. There are potential land resource issues associated with the biofuels pathways, such as conversion of forestlands, pastureland, and food or fiber to fuel crops. The local jurisdiction having land use authority over such conversion would need to address the potential impacts due to conversion on a project-specific basis.
Biodiesel – Soybeans: The majority of soybeans needed to fill the anticipated 2020 demand for soy-based biodiesel is projected to be produced out of state. Midwestern states and Texas are currently the largest growers of soybeans, and out-of-state biodiesel plants using soybeans tend to be located close to production fields. California could meet future biodiesel demands either through importing soybeans and other raw materials or through importing finished biodiesel. Potential land resource issues related to the use of soybeans to produce fuel include the conversion of undeveloped/natural habitats to agriculture and the conversion of food-based

agriculture lands to fuel-based agriculture lands. These issues will be further evaluated as part of the LCFS regulatory development process.

Biodiesel Production Facilities: Biodiesel production facilities are usually sited based on access to feedstock and the market for the finished product. Production facilities processing out-of-state feedstocks need to be accessible to truck and rail routes. Facilities processing recycled waste tend to be located closer to the sources of that waste – restaurants and industrial facilities. Facilities sited in industrial-zoned areas will already be compatible with existing land use designations since biodiesel production falls into the industrial category. Potential land use impacts could occur if non-compatible areas are rezoned to accommodate the siting of new production facilities.

Ethanol – Corn: Food-to-fuel crop conversion acreage estimates are currently under development as part of the LCFS regulatory process. Potential land resource issues related to the use of corn to produce fuel include the conversion of undeveloped/natural habitats to agriculture and the conversion of food-based agriculture lands to fuel-based agriculture lands. These issues will be further evaluated in the LCFS regulatory development.

Ethanol – Cellulosic: Less is known about the potential land use issues with cellulosic feedstocks, which may be heartier than food crops and thus can be cultivated in locations where food cannot be economically cultivated. Most cellulosic feedstocks will consist of woody waste materials (corn and other crop residues, waste wood chips, forest residues, municipal solid waste and energy crops) which would derive from existing land uses. The only potential land resource issues related to the use of cellulosic materials to produce fuel would occur where (and if) undeveloped/natural habitats or food-based agriculture lands are converted to fuel-based (energy crops) agriculture lands. These issues will be further evaluated in the LCFS regulatory development.

Ethanol Production Facilities: Ethanol production facilities typically need access to sources of feedstock, users of their waste products, and to the market for this finished product. Facilities sited in industrial-zoned areas generally will not cause as many land use concerns as siting in undeveloped areas. Potential land use impacts could occur if non-compatible areas are rezoned to accommodate siting of new ethanol production facilities.

Hydrogen: Hydrogen production stations are typically constructed in developed, populated areas and within zoning that allows for a production station. Stations that use natural gas or on-site solar power as the energy source for production would probably not raise land resource issues if located in developed areas.

The implementation of the LCFS is unlikely to involve any significant conversion of food crop production for biofuel production in California due to the high price of land and current crop production. If this does occur, the potential crop conversion cannot be known at this time. However, the potential impact of the loss of production of food and fiber may be significant, and would require further environmental analysis. The land on which fuels are to be grown may be under Williamson Act contract. The landowner should contact the county to ensure conformity with the terms and conditions of the contract. This impact also relates to the discussion under Agricultural Resources.

(T-3): Regional Transportation-Related Greenhouse Gas Targets. This measure requires the establishment of a process whereby regions integrate development patterns, transportation networks, and other transportation measures and policies in a way that achieves greenhouse gas emission reductions. Achieving significant additional greenhouse gas reductions from changed land use patterns and improved transportation will help achieve the goals of AB 32. While not an adverse impact, this measure will result in a change in land use policies by building on successful Blueprint planning processes, and require metropolitan planning organizations to develop and incorporate sustainable communities strategies.

One of the potential enabling strategies in this measure is to establish an indirect source rule (ISR) for new development. ARB defines an indirect source as "any facility, building, structure or installation, or combination thereof which generates or attracts mobile source activity that results in the emissions of any pollutant for which there is a state ambient air quality standard."[11] This strategy will require its own environmental evaluation.

ELECTRICITY AND NATURAL GAS

(E-3): Renewables Portfolio Standard. Siting of new utility-scale facilities and arrays may conflict with an existing Williamson Act contract, or lands under easement. Avoidance would be the most appropriate mitigation. If land is under easement, the easement conditions must allow such a use. Such facilities may require a local approval of conditional use permits, and other permits and would be subject project-specific compliance with CEQA.

WATER

(W-2): Water Recycling. Projects may conflict with habitat conservation plans or natural community conservation plans. Site-specific, project-level CEQA compliance would be evaluated by appropriate lead agencies.

[11] California Clean Air Act Guidance for the Development of Indirect Source Control Programs, 1990, App.A, p.2

J. Impacts to Mineral Resources

Cumulative Impact. The Scoping Plan measures are not expected to cause any adverse impacts on mineral resources. The measures are not expected to deplete non-renewable mineral resources at an accelerated rate or in a wasteful manner. There are no anticipated significant adverse impacts to mineral resources.

K. Impacts to Noise

Cumulative Impact. Potential adverse noise impacts are not expected to be significant. Many types of equipment generate noise. Construction noise may be potentially significant but is temporary, and can be mitigated through control technologies to a level of less than significant. Implementation of Scoping Plan measures is not expected to result in a substantial increase in noise levels than would otherwise already exist in the course of construction activities during or an industrial process. General Plan Noise Elements and ordinances identify appropriate local noise levels and identify accepted mitigation measures, such as mufflers, limited hours of operation and installation of temporary sound barriers.

(E-3): Renewables Portfolio Standard. Power plants and wind power installations may increase noise levels. General Plan Noise Elements and ordinances identify appropriate noise levels. Accepted mitigation measures may vary with the kind of facility. Limited hours of operation, mufflers, and sound barriers would mitigate the majority of construction and operational noise impacts.

L. Impacts to Population and Housing

Cumulative Impact. The Scoping Plan measures are not expected to cause any adverse impacts to population or housing. The proposed measures are not expected to result in the creation of any industry that would significantly affect population growth, or directly or indirectly induce the construction of single- or multiple-family units. Although relocation is identified as a potential impact in the High Speed Rail measure, the analysis is incorporated by reference for the purposes of the Scoping Plan. No significant population relocation or growth inducement is expected from the measures in the Scoping Plan. Population and housing could increase in areas throughout the state from construction of new homes, but not as a direct result of any of the measures in the Scoping Plan.

(W-2): Water Recycling.
The availability of recycled water may represent an additional water supply that may foster community growth by freeing existing potable water supplies. The extent of community development is established by the General Plan. Availability of water supply created by recycling may be considered by communities during General Plan updates and development proposals. Project-level CEQA evaluation would be necessary. Although this additional water supply is worth noting, it is not considered an adverse impact.

M. Impacts to Public Services

Cumulative Impact. The Scoping Plan measures are not expected to cause any adverse impacts to public services. Any need for public service, such as additional transmission electricity infrastructure that would support the Renewables Portfolio Standard requirements to deliver to consumer would be subject to project-specific CEQA analysis by the CPUC or NEPA analysis by federal agencies.

N. Impacts to Recreation

Cumulative Impact. The Scoping Plan measures are not expected to affect recreational opportunities in the State. To the extent that specific industries propose to construct facilities in protected lands to meet statutory or regulatory requirements, these projects would be required to go through NEPA and CEQA review prior to approval.

The U.S. Department of Interior's Bureau of Land Management is preparing an environmental impact statement (Federal Register/ Vol. 73, No. 104, Notices, May 29, 2008) that addresses the siting of solar arrays from lands within the National Landscape Conservation System, such as National Conservation Areas, National Monuments, Wilderness Areas, Wilderness Study Areas, Wild and Scenic Rivers and National Historic and Scenic Trails, and lands that have been identified as environmentally sensitive.

ELECTRICITY AND NATURAL GAS
(E-3): Renewables Portfolio Standard. Siting and construction of wind or solar farms that would support the expansion of the Renewable Portfolio Standard (RPS) may affect view sheds that may indirectly affect recreational resources.

O. Impacts to Solid Waste

Regulatory Background. Solid waste consists of residential wastes (garbage and rubbish produced by households), construction wastes, commercial and industrial wastes, home appliances and abandoned vehicles, and sludge residues (waste remaining at the end of sewage treatment process). CCR Title 14, Division 7, provides the State standards for the management of facilities that handle and /or dispose of solid waste. CCR Title 14, Division 7 is administered by the California Integrated Waste Management Board (CIWMB) and the designated Local Enforcement Agency (LEA). The LEA for each county is the County Department of Environmental Health, and some cities have LEAs.

CCR Title 14, Division 7, establishes general standards to provided required levels of performance for facilities that handle and /or dispose of solid waste. Other Title 14 requirements include operational plans, closure plans, and post-closure monitoring and maintenance plans. Title 14 covers various solid waste facilities including but not limited to landfills, material recovery facilities (MRF), transfer stations, and composting facilities.

Cumulative Impact. Potential adverse waste impacts are not expected to be significant. The proposed measures are not anticipated to result in a substantial increase in the generation of solid waste or require that any permitted facility to expand its capacity to accommodate increased quantities of waste.

P. Impacts to Transportation and Traffic

Cumulative Impact. The Scoping Plan measures are not expected to cause significant adverse impacts to transportation or traffic. Although many control measures in the Scoping Plan call for emission reductions from motor vehicles, these control measures rely on technological changes, which will not impact transportation or traffic. Construction related impacts associated with the Low Carbon Fuel Standard, Renewable Portfolio Standard, Water or Agriculture sector measures are expected to be temporary. For measures that involve construction of facilities, traffic impacts can be mitigated through ingress and egress controls to mitigate for congestions, and facility design should include appropriate traffic controls such as turn lanes, traffic lights, reduced speed zones to ensure safety.

Under the Scoping Plan, ARB will work with metropolitan planning organizations to set transportation-related greenhouse gas reductions targets, depicted as **(T-3) Regional Transportation – Related Greenhouse Gas Targets**. This recommended measure may result in shifting land use patterns to improve transportation, and build on successful planning processes that integrate sustainable community principles. The measure incorporates several supporting strategies that may affect transportation patterns. While worth noting that this impact may be significant, ARB does not consider it to be adverse.

Q. Impacts to Water Resources

Regulatory Background.

State and Regional Water Boards

California has an extensive regulatory program to control water pollution. The most important statute governing water quality is the Porter-Cologne Act, which gives the State Water Resources Control Board (SWRCB) and the nine regional water quality control boards (RWQCB) broad powers to protect surface and groundwater supplies in California, regulate waste disposal, and require cleanup of hazardous conditions (California Water Code sections 3000-13999.16). In particular, the SWRCB establishes water-related policies and approves water quality control plans, which are implemented and enforced by the RWQCBs. The nine regional boards are: North Coast, San Francisco Bay, Central Coast, Los Angeles, Central Valley, Lahontan, Colorado River Basin, Santa Ana, and San Diego.

It is the responsibility of each regional board to prepare water quality control plans to protect surface and groundwater supplies within its region. These plans must: identify important regional water resources and their beneficial uses, such as domestic, navigational, agricultural, industrial, and recreational; establish water quality objectives, limits, or levels of water constituents or characteristics established for beneficial uses and to prevent nuisances; and present an implementation program necessary to achieve those water quality objectives. These plans also contain technical information for determining waste water discharge requirements and taking enforcement actions. The plans are typically reviewed and updated every three years (California Water Code §13241).

California dischargers of waste that "could affect the quality of the waters of the State" are required to file a report of waste discharge with the appropriate regional water board (California Water Code § 13260). The report is essentially a permit application and must contain information required by the regional board. After receipt of a discharge report, the regional board will issue "waste discharge requirements" analogous to a permit with conditions prescribing the allowable nature of the proposed discharge (California Water Code §3263, 13377, and 13378).

National Pollutant Discharge Elimination System Requirements

Most discharges into California's waters are regulated by the National Pollutant Discharge Elimination System (NPDES), a regulatory program under the federal Clean Water Act. The NPDES is supervised by U.S. EPA, and administered in California by the SWRCB. NPDES requirements apply to discharges of pollutants into navigable waters from point sources, discharges of dredged or fill material into navigable waters, and the disposal of sewage sludge that could result in pollutant that is entering navigable waters. California has received U.S. EPA approval of its NPDES program. Pursuant to California's NPDES program, any waste discharger

subject to the NPDES program must obtain an NPDES permit from the appropriate RWQCB. The permits typically include criteria and water quality objectives for a wide range of constituents. The NPDES program is self-monitoring, requiring periodic effluent sampling. Permit compliance is assessed monthly by the local RWQCB. Any NPDES violations are then categorized and reported to U.S. EPA on a quarterly basis.

U.S. EPA has also published regulations that require certain industries, cities and counties to obtain NPDES permits for stormwater discharges (55CFR (1990)). The regulations set permit application requirements for classes of stormwater discharges specifically identified in the federal Clean Water Act. The regulated stormwater discharges include those associated with industrial activity and from municipal storm sewer systems serving a population of 100,000 or more.

Discharges to Publicly Owned Treatment Works (POTWs)
Water discharges to a public sewage system (referred to generically as a POTW), rather than directly to the environment, are not subject to the NPDES discharge requirement. Instead, such discharges are subject to federal pretreatment requirements under sections 307 (b) and (c) of the Clean Water Act (33 USC § 1317 (b)-(c)). Although these retreatment standards are enforced directly by U.S. EPA, they are implemented by local sanitation districts (Monahan et al., 1993). The discharger, however, has the responsibility to ensure that the waste stream complies with the pretreatment requirements of the local system. Any facility using air pollution control equipment affecting water quality must receive a permit to operate from the local sanitation district. In cases where facilities modify their equipment or install air pollution controls that generate or alter existing wastewater streams, owner/operators must notify the local sanitation district and request that their existing permit be reviewed and modified. To ensure compliance with wastewater pretreatment regulations, local sanitation districts sample and analyze the waste water streams from facilities approximately two to four times per year. Persons who violate California's water quality laws are subject to a wide array of enforcement provisions. In 1990, U.S.EPA revised and extended existing regulations to further regulate hazardous waste dischargers and require effluent testing by POTWs. To comply with revised permit limits, POTWs may alter their operations or impose more stringent local limits on industrial user discharges of hazardous wastes (Monahan et al., 1993). POTWs in California are operated by sanitation districts that adopt ordinances establishing permit systems and fee structures.

Cumulative Impact. Overall, impacts to water demand and water quality are expected to be less than significant, but will also require further analysis as the regulations are developed to ensure protection of the water resources of the State. The Scoping Plan measures would reduce a number of air pollutants, and these reductions in deposition may improve overall water quality in California.

Measures that involve construction may have temporary impacts to surface water that can be mitigated by employing best practices to reduce spills, prevent erosion and sedimentation.

TRANSPORTATION

(T-2): Low Carbon Fuel Standard. ARB compared the potential water resources effects of the Low Carbon Fuel Standard to traditional petroleum fuels.

Biofuels. Water demand will be an important consideration in determining the kind of fuel that may be produced in the State. Based on water demand information related to LCFS, ARB staff estimated that a range from 2 to 6 gallons of water is used to produce 1 gallon of ethanol, compared to 1 gallon of water necessary to produce one gallon of biodiesel. [12], [13] The source of water is also important. Wastewater from biorefineries can contain high levels of biological oxygen demand (BOD), grease and salts, and may not be appropriate for use unless treated prior to application.

The greatest potential impact on water resources by biofuels is the production of feedstock. Agriculture in the United States relies on a mixture of natural rainfall and irrigation, the ratio of which depends on the local climate. Irrigation practices can have a very large effect on the overall water consumption by biofuels. Just as irrigation water demand is highly dependent on location, so is the impact of that water demand. In addition to water demand, the chemicals and fertilizers used on these crops can end up in surface or ground waters, effecting water quality. These issues will be further discussed in the LCFS regulatory development.

The location of these water demands determines their ultimate effect. In the Midwest, where much of the corn and soy beans are grown, historic overdraw of groundwater resources and high organic loading of surface waters would suggest that the additional water demand of biofuel production and increase nitrogen loading of feedstock production could impact existing water resources.

In addition, there may be potential adverse impacts to water quality from different formulations of low-carbon fuels in the event of spills. Depending on formulation, potential for biological effects from fuels such as ethanol, biodiesel, renewable diesel and others exist, in the event that there is a discharge to groundwater or surface waters. For example, ethanol may delay biological degradation of benzene, toluene, ethylbenzene and xylene (BTEX) due to bacterial preference for ethanol (2007 State Implementation Plan). Compliance with SWRCB regulations would avoid or

[12] Pate, R.M. Hightower, C. Cameron, and W. Einfeld, Overview of Energy Water Interdependencies and the Emerging Energy Demands on Water Resources. Report SAND 2007-1349C, Los Alamos, NM, Sandia National Laboratories, 2007
[13] Ibid.

minimize this impact. Also, employment of appropriate spill prevention and spill abatement protocols would alleviate the impact.

Finally, chemicals and fertilizers used on crops used to produce fuel can end up in surface or ground waters, affecting water quality. Mitigation measures such as minimizing use, or use of post fumigation water treatments would protect surface water quality.

Hydrogen: Hydrogen fuel can be created from water (through electrolysis) or from hydrocarbon sources such as natural gas, methanol, or petroleum products (steam reforming). Steam reformation of natural gas is the most common form of hydrogen production in the United States.[14] Each of these processes uses water: in electrolysis energy is used to break apart water bonds to create hydrogen, in reforming steam is used to break apart hydrocarbon bonds. The consumptive water resource requirements for these processes are not well documented, but given the pressures on California's water supplies, these requirements should be quantified within the LCFS regulatory process or within the siting process for hydrogen production facilities.

Also, chemicals and fertilizers used on crops used to produce fuel can end up in surface or ground waters, affecting water quality. Mitigation measures such as minimizing use, use of post fumigation water treatments would protect surface water quality.

WATER

(W-2): Water Recycling. Water recycling reduces the quantity of water entering into downstream flows, water table recharge, and infiltration. If wastewater is relied upon for dilution, this reduction could contribute to higher concentrations of contaminants in downstream waters and/or in water tables. All water recycling facilities must be permitted and operated in accordance with the requirements of the Water Boards and the Department of Public Health. Project-level CEQA compliance would be required.

RECYCLING AND WASTE MANAGEMENT

(RW-1): Landfill Methane Control. This measure may have an adverse impact on water quality as the measure requires collection and control of methane emissions from smaller and uncontrolled landfills. This measure may increase the generation of NOx and CO as a result of landfill gas combustion and during a rain event NOx may be scrubbed out of the air and deposited to open water. Although these emissions cannot be quantified at this time to determine significance of impact, they would need to be included by the affected air district's emission inventory. Depending on a district's non-attainment status, offsets may be required, typically for landfill gas-to-energy projects. While the measure would increase the amount of landfill gas

[14] U.S. Department of Energy.
http://www1.eere.energy.gov/hydrogenandfuelcells/education/basics_production.html

condensate generated, existing regulations require storage in double-walled tanks that can be periodically pumped out. The condensate can be transported to a legal disposal facility or treated onsite and disposed of in the local sewer system.

(RW-3): High Recycling/ Zero Waste. This measure includes a suite of strategies, one of which is Composting. Compost operations may adversely affect water quality if waste if discharged to the waters of the State. These impacts can be mitigated by complying with waste discharge requirements.

R. Environmental Justice

In California, environmental justice is defined in state law as the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies (Senate Bill 115, Solis, 1999; California Government Code § 65040.12(c) and defined in statute by SB 115 (Solis, Chapter 690, Statutes 1999).

AB 32 requires that in adopting the greenhouse gas emissions reduction regulations, the ARB must, to the extent feasible:

- Ensure that activities undertaken to comply with the regulations do not disproportionately impact low-income communities (HSC §38562(b)(2))
- Ensure that activities undertaken pursuant to the regulations complement, and do not interfere with, efforts to achieve and maintain federal and state ambient air quality standards and to reduce toxic air contaminant emissions (HSC§38562(b)(4)).
- Consider overall societal benefits, including reductions in other air pollutants, diversification of energy sources, and other benefits to the economy, environment, and public health. (HSC§38562(b)(6)), and
- Maximize additional environmental and economic co-benefits for California and complements the state's efforts to improve air quality (HSC§38501(h)).

Issues relating to meeting environmental justice standards typically can be organized in two categories of potential inequity: "procedural inequity" – referring to the public participation process itself, and "geographical inequity" which refers to undesirable land uses concentrated in certain neighborhoods while benefits are received elsewhere or where "public amenities are concentrated only in certain areas". With regard to public participation, in developing the AB32 Scoping Plan, the ARB conducted extensive and ongoing public workshops with a significant effort included to meet in small-scale community meetings in already-impacted communities throughout the State. Specifically, in designing the Scoping Plan, 5 public workshops were conducted in Los Angeles, San Diego, Fresno, Oakland, and in Sacramento. Five community meetings were coordinated within environmental justice communities including Stockton, Chula Vista, Fresno, and Los Angeles; an additional meeting is planned in Richmond. AB 32 established an Environmental Justice Advisory Committee (EJAC) which has met thirteen times since March 2007 to advise the AB32 Scoping Plan process. Additionally, there have been multiple technical and economic stakeholder meetings, and a public health analysis workshop.

With regard to reviewing the Scoping Plan for geographical inequity, the Scoping Plan is a planning document which provides a broad guide for sectors of the California economy that will fall under greenhouse gas reduction requirements. Considering the programmatic nature of the Scoping Plan, the Plan itself does not

reveal geographical inequities resulting from measures within the Scoping Plan. That said, potential impacts related to implementation of regulations for each sector within the Scoping Plan, as well as for a cap and trade program will need to be analyzed subject to all legal requirements specified in AB32, and as identified by the State of California's General Plan Guidelines, and tested to ensure no geographically-based and/or procedurally-based inequities occur as a result of regulatory adoption.[15]

Further, AB 32 requires that prior to the inclusion of any market-based mechanism, the ARB must, to the extent feasible, "consider the potential for direct, indirect, and cumulative emission impacts from these mechanisms, including localized impacts in communities that are already adversely impacted by air pollution" and design its cap and trade program "to prevent any increase in the emissions of toxic air contaminants or criteria air pollutants" and "maximize additional environmental and economic benefits for California" as appropriate (HSC §38570 et seq).

The Scoping Plan is a programmatic approach to multiple regulatory procedures, each subject to the legal requirements laid out within AB32. In accordance with these laws and with respect to the FED, each proposed regulation within the Scoping Plan will have its own public participation process and its own environmental justice analysis. This is primarily due to the fact that the proposed measures within the Scoping Plan are not fully defined. For example, multiple design aspects within a proposed cap and trade program must have defined trading rules and requirements before significant impacts can be evaluated with any certainty. Any direct impacts resulting from adoption and implementation of such a program would be separately evaluated by the appropriate agency through applicable state and local environmental review processes.

Immediately upon Scoping Plan approval, ARB will embark on a series of technical workshops, public meetings, and a citizen advisory process that will thoughtfully explore options to implement the regulatory procedures for measures within the Scoping Plan and for the establishment of a cap and trade system. ARB will ensure that any implementation of regulations in the Scoping Plan, including the cap and trade program, incorporates necessary safeguards against localized impacts into the regulatory process and into program design. Additionally, the regulation would need to remain consistent with associated regulatory requirements and State policies that apply to capped sources and communities where the sources are located.

Within the Scoping Plan, proposed measures that may have potential positive or negative localized social and environmental justice impacts include the following: energy efficiency measures, the Low Carbon Fuel Standard, Goods Movement, and Industrial Measures. The cap-and-trade program linked to WCI may affect the geographical distribution and magnitude of where greenhouse gas emission changes, and the resultant anticipated localized impacts should be considered as a result of

[15] State of California General Plan Guidelines, Chapter 2 pages 20-31

these sectoral changes as the program details become final. During the regulatory phase, the localized impacts for each of these measures will require particular attention and an environmental justice analysis.

S. Impacts to Public Health and Safety

Cumulative Impact. There are no anticipated adverse cumulative public health impacts from the Scoping Plan. Based on estimated changes in emissions of NOx and PM2.5, ARB estimates there will be a net air-quality related public health benefit from the measures recommended in the Scoping Plan, as described in Appendix H. Several of the measures were determined to have a public health or public safety connection aside from NOx or PM2.5, and were evaluated individually.

TRANSPORTATION

(T-1): Pavley I and II-Light-Duty Vehicle Greenhouse Gas Standards. A potential public safety concern is the high voltage wiring within electric-drive vehicles, which must be handled appropriately in the case of an accident. Hydrogen as a vehicle fuel appears to be as safe as gasoline as a vehicle fuel.

(T-3): Regional Transportation-Related Greenhouse Gas Targets. Various studies suggest that community design has a beneficial impact on public health, as increased general fitness and overall well-being reduce many serious health risks. These benefits are further discussed in Appendix H.

(T-9): High Speed Rail. The High Speed Rail PEIR/EIS evaluated the potential for public safety issues related to electromagnetic frequency exposures due to the wireless communication system associated with the project. The evaluation concludes that the potential adverse effects could be avoided or mitigated to a less-than-significant level.

(GB-1): Green Buildings. Buildings can be *designed* to improve indoor air quality, lighting, sound, and odor, and public health through their choice of materials and through ensuring frequent circulation of fresh air. ARB encourages the incorporation of these elements into Green Buildings to leverage their external environmental benefits.

FORESTS

(F-1): Sustainable Forest Target. Wildfires pose direct and indirect risks to public health and safety. Directly, wildfires can kill and can destroy property, and can, under the right meteorological conditions, result in dangerous levels of ozone and PM2.5. Wildfires pose occupational hazards and exposures to fire fighters. Indirectly, deforestation can result in higher loads of organic carbon in raw water sources, which can react to form potential carcinogens in the drinking water treatment process. One goal of this measure is to reduce the magnitude of wildfires in the State.

HIGH GLOBAL WARMING POTENTIAL

(H-4): Limit High GWP Use in Consumer Products. Some types of consumer products containing compressed gases (for example, whipped cream or computer dusters) are used inappropriately to deprive the brain of oxygen and experience a "high." This deprivation of oxygen can be fatal and can also result in long-term brain damage. The measure recommended in this plan will not change the amount of consumer products or reduce the risk of oxygen deprivation when inhaled.

(H-5): High GWP Reductions from Mobile Sources and
(H-6): High GWP Reductions from Stationary Sources. Workplace guidelines exist to minimize the possibility of acute exposures to refrigerants. In addition to its risks as a refrigerant, N_2O is managed to avoid potentially hazardous interactions with other chemicals.[16] As refrigerant use is highly regulated, and the measures recommended in this plan will not significantly change the amount of or way which refrigerants are used. Though any alternatives will be subject to approval under the U.S. EPA's Significant New Alternative Program (SNAP) to ensure their safety, it is possible that certain alternatives that industry selects may have a higher flammability index than the substances they replace. Also, certain systems may operate at higher pressures, thus requiring additional technician training to properly and safely serve the equipment.

[16] http://www.osha.gov/SLTC/healthguidelines/nitrousoxide/recognition.html

V. PROJECT ALTERNATIVES

A. Introduction

As discussed at the beginning of this evaluation, ARB meets the criteria for a Certified State Regulatory Program. CEQA requires a certified agency to include one of the following in the document: 1) alternatives to the activity and mitigation measures to avoid or reduce any significant or potentially significant effects that the project might have on the environment; or 2) a statement that the agency review of the project showed that the project would not have any significant or potentially significant effects on the environment, and therefore no alternatives or mitigation measures are proposed to avoid or reduce any significant effects on the environment (CEQA Guidelines §15252).

CEQA also requires an environmental impact report to describe and evaluate the comparative merits of a range of reasonable alternatives to a proposed project that would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project (CEQA Guidelines §15126.6(a)). The range of alternatives required in an EIR is governed by the "rule of reason" that the EIR set forth only those alternatives necessary to permit a reasoned choice. An EIR need not consider an alternative whose effect cannot be reasonably ascertained and whose implementation is remote and speculative (CEQA Guidelines §15126.6(f)(3)).

ARB examined five general alternatives to the proposed project. These alternatives fall into three categories:

- **No Project.** This is evaluated as Alternative 1.

- **Adopting a Variation of the Proposed Strategies or Measures.** Under this alternative, ARB would adopt either a subset or a different mix of the proposed measures. This is evaluated as Alternative 2.

- **Adopting a Program Based Primarily on One Type of Strategy.** Under these alternatives, ARB would adopt programs that rely primarily on a cap-and-trade program, primarily on source-specific regulatory requirements or primarily on a carbon fee. These alternatives are evaluated as Alternatives 3, 4, and 5.

Under CEQA, the alternatives are required to feasibly obtain the objectives of the proposed project. For this reason, it is important to note that AB 32 requires ARB to prepare and approve a Scoping Plan for achieving the maximum technologically feasible and cost-effective greenhouse gas emission reductions (HSC §38561(a)). If

the Scoping Plan were not adopted (i.e., the "No Project" alternative) ARB would fail to fulfill the legal mandates specified in AB 32.

B. Alternative 1: No Project

CEQA requires a specific alternative of "No Project" to be evaluated, and this alternative essentially serves as ARB's baseline for analysis. CEQA documents typically assume that the adoption of a "no project" alternative would result in no further action by the project proponent or lead agency. However, this is not true for some of the actions identified in the Scoping Plan. Some of the measures in the Scoping Plan are already underway and would not be expected to change as a result of the Scoping Plan.

A summary of sector-based conditions follows in the event that the "No Project" Alternative is selected. Descriptions of the 2020 "business as usual" (BAU) forecasts for the major sectors of the emissions inventory are provided in the discussion below. ARB staff BAU emissions estimates were derived by projecting emissions from a past baseline year using growth factors specific to each of the different economic sectors. For the purposes of the Scoping Plan, ARB used three-year average emissions, by sector, for 2002-2004 to forecast emissions to 2020. 2004 was the most recent year for which actual data were available. This three-year average of known emissions will dampen unusual variations in any given year that would make the baseline year unrepresentative for forecasting.[17]

It is important to note that the two main drivers of the No Project scenario involve population growth and current laws and regulations. Population growth in California will result in more vehicle miles travelled, more goods movement, greater water and energy demands, and more consumer products. In 2008, ARB adopted and submitted to the U.S. EPA Administrator a State Implementation Plan that provides for implementation, maintenance and enforcement of national ambient air quality standards. The SIP would remain in place even if the Scoping Plan were not adopted.

A sector by sector description of the "No Project" Alternative, or BAU follows:

[17] http://www.arb.ca.gov/cc/inventory/inventory.htm

Role of State and Local Governments

State Government: State government would continue its current practices, policies, investments, and its influence with California local governments and other states. California state government would impact emissions from agricultural activities, forests, water use, resource use, electricity, fleet, buildings, planes, trains, and automobiles. It is comprised of prisons, hospitals, military bases, veterans homes, fairs, and office buildings that it owns and operates. State government also leases hundreds of buildings, vehicles and pieces of equipment, and holds some sway over thousands of companies with whom it does business. State government's contribution to business-as-usual conditions is included in the sectors below.

Local Government: Local governments have authority over how and where business, commercial and residential developments occur in their communities. Recent legislation requires that ARB work with metropolitan planning organizations to set transportation-related greenhouse gas reduction targets that can shift land use patterns, improve transportation, build on successful planning processes that sustainable environmentally sustainable communities. This law is related to but independent of AB 32. Local government's contribution to business-as-usual conditions is included in the sectors below.

Transportation

Petroleum-based fuels supply 96 percent of California's transportation needs and will continue to provide a substantial portion into the future. Greenhouse gas emissions in 2020 from the transportation sector as a whole are expected to increase from current levels to 225.4 million metric tons of carbon dioxide equivalents ($MMTCO_2E$). This forecasted increase is dominated by increases in emissions from on-road transportation, i.e., passenger cars and heavy-duty trucks. To forecast on-road transportation emissions, ARB staff used 2007 fuel sales data obtained from the California Board of Equalization and estimated 2020 emissions based on the growth in projected vehicle miles traveled (VMT) derived from the 2007 Emissions Factor Model (EMFAC2007). This BAU forecast assumes no change in vehicle fleet mix over time. The BAU forecast also assumes no reductions in VMT or airplane traffic due to the High Speed Rail (HSR), although the HSR has completed all of its environmental evaluations (SCH #2001042045) and could proceed independent of AB 32 implementation.

Goods movement activities in California are projected to increase up to 250 percent between 2006 and 2020, as the United States increases its exports and imports in the globalized economy. This increase translates to more ship and truck trips in and around ports, and more truck activity between and at rail yards and distribution centers. Rail trips will probably not increase, as improvements in locomotive efficiencies accommodate larger hauls. Some of this growth may require new

infrastructure to relieve traffic congestion and improve efficiencies, such as port and highway expansions. ARB adopted and is implementing a Goods Movement Emission Reduction Plan to reduce emissions from goods movement activities and address regional ozone and particulate matter standards, as well as impacts on already adversely-impacted communities, which can be located near ports, rail yards, and distribution centers.

CEC's *2007 Integrated Energy Policy Report* indicates that by 2020, at current trends, more than 44 million Californians will consume more than 24 billion gallons of gasoline and diesel fuel each year. Such increased consumption would require major investments in petroleum refinery and delivery infrastructure expansions. Assembly Bill 1007 (Pavley, Chapter 371, Statutes of 2005) directed the California Energy Commission (CEC) and ARB to develop a plan to increase the use of alternative fuels in California, effectively reducing California's demand on refineries. California's refineries also supply other western states, which are currently expected to increase their demands for gasoline and diesel into the future due to population growth. Fuel diversity has also been identified as a major policy objective in the CEC's *2003 Integrated Energy Policy Report* and the Governor's BioEnergy Executive Order S-06-06 and Bioenergy Action Plan.

California's population is continuing to grow at 1.2 percent per year. If the measures in the Scoping Plan are not implemented, land use patterns and decision making will likely continue to foster leap frog development and urban sprawl, which directly relates to a continued increase in VMT, further degradation of air quality, and an increase in detrimental health effects. Most of the gains made by introducing cleaner vehicles and fuels will be eroded unless more efficient methods of urban and community planning, transit choices, and public safety measures are implemented.

Electricity and Natural Gas

Under a business as usual scenario, population growth in California will affect electricity demand in two ways: the number of residents will increase the overall demand for electricity and natural gas, and the location of those residents, primarily in the state's inland areas, will change the pattern of energy use. Trends toward larger homes and increases in electronic equipment will also increase demand. Historically, California's appliance and building efficiency standards were able to hold our per capita electricity and natural gas demands steady, but under a business as usual scenario these programs will not be able to continue this trend through 2020 and new capacity would be needed.[18] As demands increase, older, less efficient and dirtier power plants would be expected to operate more frequently.

[18] CEC, "2007 Integrated Energy Policy Report", CEC-100-2007-008-CMF.

The pattern of energy use is important, because the electrical system is sized to accommodate peak demands. The base of the state's electrical demand is a minimum amount of energy demanded by the state all the time. The peak demand is the difference between this base and the maximum amount of energy needed, usually during periods of extreme weather. Power plants that provide base energy are the most cost-effective, because they are run fairly constantly. "Peaker" power plants, on the other hand, can be run as little as 4 hours a day on a few very hot summer days, and the low duration of operation tends to result in higher co-pollutant emissions than their base counterparts on a per MW basis. Power plants are typically dispatched starting with the most efficient sources, which are generally also those with lowest emissions. Under BAU conditions, many new power plants will need to be built in California to accommodate load growth and to replace the existing fleet of aging power plants that have low efficiencies and relatively high co-pollutant emissions. There are also several coastal plants that could be closed in response to proposed environmental requirements for their once-through cooling systems.[19]

Power plants are typically located close to power recipients, suggesting that new power plants would most likely follow population growth in the state. Repowering old plants or constructing new plants in the South Coast, where the state's greatest demand is located, has been identified as particularly problematic due to the region's air quality constraints.

Along with reliable power plants, important components of a reliable electricity system are distribution, transmission, and availability of fuel supplies. Like power plants, distribution systems are aging, and require substantial infrastructure investments to ensure their continued reliability. The construction of new transmission lines is needed to increase the state's renewable electricity sources to meet the existing regulatory goals of 20 percent. If these goals are not met, the price of electricity could increase as utilities incur financial penalties. These issues have all been identified in the 2007 Integrated Energy Policy Report (2007 IEPR) as high priorities for the state in the near term.

A third challenge is from the effects of climate change such as increasing frequency and magnitude of extreme weather events. This could drastically affect the duration and magnitude of peak demands, increasing reliance on aging power plants. During the summer months, California also imports energy generated by hydropower from the Northwest to meet peak demand. Decreasing snowpack within California and throughout the west is likely to reduce the availability of this clean and relatively inexpensive hydropower source, further exacerbating the problem. In addition, a large number of power plants in California are located along the coast. The potential for sea level rise associated with climate change could impact the operation of those plants.

[19] State Water Resources Control Board, proposed *Water Quality Control Policy on the Use of Coastal and Estuarine Waters for Power Plant Cooling*, March 2008.

The 2020 business-as-usual greenhouse gas emissions forecast for the electric power sector is 139.2 $MMTCO_2E$. These emissions are the result of in-state power generation plus specified and unspecified imported power. BAU forecasted emissions assume that all growth in electricity demand by 2020 will be met by either unspecified imports or in-state natural gas-fired power plants.

The 2020 BAU forecast for emissions from specified sources of imported electricity (i.e., power received from specific out-of-state power plants) is assumed to decrease resulting from the closure of one coal-fired power plant (Mojave) previously supplying imported electricity. The demand previously served by the closed plant was replaced by in-state natural-gas generation. Based on outputs from the California Energy Commission's (CEC) electricity demand models, in-state electricity generation and specified imports would not meet the State's full electricity demand in 2020. The remaining demand is assumed to be met by unspecified imported electricity (i.e., power received from a mix of power generating sources outside the State).

The Emissions Performance Standard, (EPS) was established by SB 1368 (Perata, Chapter 598, Statutes of 2006), and will effectively reduce emissions from imported, coal-generated electricity. Regulations adopted pursuant to SB 1368 set by the CPUC for investor-owned utilities and by the CEC for publicly-owned utilities prevent all California utilities from entering into long-term contracts that fail to meet an emissions performance standard. As existing agreements expire, coal-intensive electric utilities will see reduced emissions that minimize their need for allowances under cap and trade. Such utilities will need to plan to replace coal-generated electricity with energy efficiency, renewables and less carbon-intensive resources. ARB does not consider the EPS in the forecasted 2020 emissions. This allows the Scoping Plan reductions from increasing renewable power generation to be counted against with the BAU forecasted 2020 emissions without double-counting the reductions.

Electricity and Natural Gas in Residential and Commercial Properties

The Commercial and Residential sector is expected to contribute 46.7 $MMTCO_2E$ or about eight percent of the total statewide greenhouse gas emissions in 2020. Forecasted BAU emissions from the Commercial sector include combustion emissions from natural gas and other fuels (e.g., diesel) used by office buildings and small businesses. Residential emissions result primarily from natural gas combustion used for space heating and for hot water heaters. Growth in emissions from the Commercial and Residential sector is due primarily to the expected increase in population and assumed increased use of natural gas. Emissions from the use of other fuels, such as diesel fuel, are assumed to remain relatively constant over time.

Population growth in California will continue to increase electricity demand. The extent of the increase depends on natural gas used and the location of the users.. Trends towards larger homes and increases in electronic equipment will also increase demand.

According to the Attorney General's website, during 2007 and 2008, an unprecedented number of communities across the state implemented environmentally sensitive, or "green" building requirements in order to increase energy efficiency and decrease greenhouse gas emissions and other environmental impacts within their jurisdictions. In the first half of 2008 alone, nearly a dozen mandatory green building ordinances have taken effect, requiring private developers to utilize and document green building practices used throughout the construction and life of the project. Other California cities, like San Francisco, San Leandro, Santa Rosa, Hayward and Los Altos Hills are currently developing ordinances for enactment in the near future. The experience of these cities has shown that bold, ambitious action to reduce carbon emissions is possible. These efforts have taken place without the Green Building measures being adopted as part of the Scoping Plan, and ARB applauds all the jurisdictions that are moving forward with adopting green building ordinances.

Water

California's water system is stressed today, and will likely be more so in 2020. The California Water Plan Update 2005 presents three potential scenarios for conditions in 2030. All three scenarios indicate a growing demand for water and increasing stresses on a complicated system. The Colorado, Delta, and Klamath water supply systems are experiencing serious conflicts among ecosystem, agricultural, and urban needs, and many infrastructure solutions under discussion today will likely not be in place by 2020.

All sectors will be affected by the changing dynamic in the amounts of water stored in the state's snowpack. Balancing the water needs of the state, the expected increase in water demand for energy production and industrial uses, consumption by an increasing population, increase in demand to grow crops all balanced with maintaining water quality and healthy ecosystems, will become more complex, challenging and expensive.

Water is intricately linked with energy and the State is already experiencing the need to conserve both water and electricity. In California, hydropower provides about 15 percent of the total electricity[20] while approximately 19 percent of the state's electrical demand comes from transporting, treating and using water. California's economy is built upon both reliable and affordable fuels and water. If the State does not implement the water measures identified in this Plan, the already over-allocated

[20] http://www.energyquest.ca.gov/story/chapter12.html

water system will face additional water shortages. Without actions to improve water supplies, water shortages could get worse at rate of approximately two to three percent per year. This rate is likely to be much higher, given the likely impacts that global warming will have on the State's water system. These measures are needed, at a minimum, to meet increasing demand from a growing population.

Green Buildings

Population growth in California will continue to increase electricity demand. Green building measures can help reduce the energy use associated with buildings in California.

There are several policies, codes, and plans in place to increase the environmental efficiency of new and existing commercial, residential, and state buildings by 2020, including the new California Green Building Standards Code adopted by the Building Standards Commission in July 2008. The California Public Utilities Commission (CPUC) also has established "zero net energy" (ZNE) goals for new construction in California. By 2020, the goal is that all new homes will be ZNE. For commercial buildings, the target date is 2030. In the best case, if the state is able to transform new housing and building stock into “net zero energy” stock, and existing buildings are retrofit for greater energy and water efficiency, the demand for water and energy from buildings will be similar to or lower than what it is today. This will depend on both the degree to which new stock is built or existing stock is converted and the degree to which they incorporate environmental efficiency over the next twelve years.

During 2007 and 2008, an unprecedented number of communities across the state implemented environmentally sensitive, or "green" building requirements in order to increase energy efficiency and decrease greenhouse gas emissions and other environmental impacts within their jurisdictions. In the first half of 2008 alone, nearly a dozen mandatory green building ordinances have taken effect, requiring private developers to utilize and document green building practices used throughout the construction and life of the project. Other California cities, like San Francisco, San Leandro, Santa Rosa, Hayward and Los Altos Hills are currently developing ordinances for enactment in the near future. The experience of these cities has shown that bold, ambitious action to reduce carbon emissions is possible and easier than ever before.

Industry

The Industry Sector as defined in the Scoping Plan includes refineries, oil and gas facilities, cement and glass manufacturing, and industrial facilities that employ boilers or general combustion engines. The business-as-usual assumptions for refineries are discussed in the transportation section above. Activity in oil fields in southern California and gas fields in northern California are driven by price and availability,

and could therefore expand in the future if current price trends continue. Off-shore drilling would most likely hold steady, due to the limited yield and potential for severe environmental impacts. While the demand for cement will grow with population growth, most of the demand is likely to be met through out of state production while the current rate of in-state production holds steady. Overall manufacturing is expected to slightly decline, while the commercial sector increases. Manufacturing will likely remain concentrated in the South Coast and Bay Area, with agricultural and food processing concentrated in the San Joaquin Valley.

Emissions for this sector are forecasted to grow to 100.5 $MMTCO_2E$ by 2020, an increase of approximately five percent from the average emissions level of 2002-2004. BAU-forecasted emissions for this sector are variable, but overall are not expected to grow substantially. Most of the growth from this sector comes from the fuel use and process emissions of three industries: cement plants, oil and gas production, and refining. Emissions from the combustion of natural gas are expected to grow for some industries (e.g., cement plants) and decline for others (e.g., food processors). These assumptions of growth and decline in natural gas demand are based on outputs from energy demand modeling conducted by CEC staff for the 2007 IEPR.

Recycling and Waste Management

Currently, California disposes an estimated 42 million tons of waste in landfills each year, of which an estimated 30 percent is compostable organic materials, 22 percent is construction and demolition debris, and 21 percent is paper.[21] Fifty-four percent of California's waste is diverted from landfills and recycled or repurposed. Most of the remainder of California's waste is sent to landfills in the state. In the future, the need for new landfills will be determined by both population growth and by how well the State implements its waste management goals. The CIWMB has a strategic goal of becoming a Zero Waste State. One supporting goal is to halve the volume of organics going to landfills by 2020. These goals will require the development of new facilities to recycle and repurpose waste, but will also reduce the need for new landfill capacity.

Forecasted BAU emissions in 2020 for landfills are 7.7 $MMTCO_2E$. This forecast uses a recognized landfill gas emissions model developed by the Intergovernmental Panel on Climate Change (IPCC) and data from the CIWMB. The forecast reflects assumptions regarding the continued decay of existing waste in landfills and estimates on the amount and character of new waste deposited in landfills through 2020.

[21] From the California Integrated Waste Management Board website: http://www.ciwmb.ca.gov/Climate/ Organics/ default.htm.

Forests

The forest sector is unique to California's greenhouse gas inventory because it combines both positive and negative emissions into a current sink of approximately -5 MMTCO_2E (2002-2004 average). This net number is negative because the gross emission rate from fires, decomposition, harvesting, land conversion, and waste is less than the atmospheric uptake of carbon from forest growth. In addition to being a greenhouse gas sink, forests also provide multiple ecological benefits like habitat, structure, and nutrient cycling, as well as a suite of other human benefits or services such as water storage, soil stability, air and water quality, wood products, and recreation. The BAU inventory shows that forest sector emissions are increasing while forest growth is remaining the same. Two factors addressed in the Scoping Plan which affect forest sector emissions are land conversion and the incidence of wildfires. If this trend continues, emissions will equal uptake by about 2020 meaning that the inventory will increase to zero and this sink will be lost.

As seen in summer 2008, wildfires can significantly impact air quality and threaten public safety. Wildfires in water supply watersheds can also impact drinking water quality for years after they occur. Population growth will increase pressure to develop forest lands and development in close vicinity of forests can further increase risk. Global warming is also likely to increase risks associated with the forest sector through changes to weather patterns which can impact forests both directly and indirectly, by creating hospitable conditions for pests and catastrophic fires.

High Global Warming Potential Gases

Consumer demand, vehicle use patterns, and increased electrical demand due to population growth will increase the amount of high-GWP gases released to the atmosphere. The rates of increase vary by type of activity.

The forecasted BAU 2020 emissions of high-GWP gases are 46.9 MMTCO_2E. High-GWP gases, including sulfur hexafluoride (SF_6) from electric utility applications, substitutes for ozone depleting substances (ODS) (primarily hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs)), and other high-GWP gases used in semiconductor manufacturing and other industrial processes are combined under one sector for purposes of the Scoping Plan. The forecast of business-as-usual emissions of high-GWP gases is derived from the U.S. EPA Vintaging Model, which outputs predicted annual consumption and emissions of all high GWP gases based on end-use equipment, the amount of gas required for manufacture and maintenance, and disposal emissions. Emissions of HFCs and PFCs as ODS substitutes occur from their use in refrigeration and air conditioning systems, among other commercial and industrial applications. The high business-as-usual forecasted emissions in 2020 comes about as ODS's are rapidly replaced by ODS substitutes, as more ODS's are phased out. In addition, ARB assumes that the effect of an expansion of the electrical

transmission system infrastructure, combined with the technical improvements to the equipment in the system, will result in no net change in SF_6 emissions in 2020.

Agriculture

The agriculture sector includes emissions from livestock, i.e., digestive processes and manure management; combustion of liquid and gaseous fuels used for irrigation and crop production; emissions from fertilizer use and application of other soil additives; and emissions from agricultural residue burning. By 2020 there is significant potential for continued conversion of farmlands to urban, commercial or industrial development or other uses. The California Department of Food and Agriculture is currently developing a strategic plan for the future of agriculture in California.

Agricultural residue burning and livestock emissions were forecast using ARB's criteria pollutant forecasting approach. Forecasted emissions from the combustion of natural gas were estimated using outputs from the 2007 IEPR developed by CEC. Other agriculture-related emissions were either held constant or extrapolated using historical trends to obtain a 2020 BAU estimate. BAU emissions from the agriculture sector are forecasted to increase about seven percent from current levels to 29.8 $MMTCO_2E$ in 2020, due exclusively to the assumed increase in livestock population. In spite of current measures to preserve farmlands and open space, through Williamson Act contracts, state land purchase, and general plan land zoning, population increases will continue to pressure the conversion of farmlands to urban, commercial and industrial development or other uses.

C. Environmental Impacts of Alternatives 2 through 5

Alternatives 2 through 5 are summarized below. After this summary is a discussion of ARB staff's rationale for choosing as the preferred alternative the specific mix of measures identified in the draft Scoping Plan.

It is important to note that when compared to BAU emissions, Alternatives 2, 3, 4, and 5 (as well as the mix of measures identified in the Scoping Plan) will all result in greenhouse gas emission reductions in California. For any mix of strategies that would succeed in reaching the AB 32 goal, the types of emission reduction activities undertaken will have to be broadly similar. California will need to improve efficiency in all sectors, and move to lower carbon energy resources in all sectors. In essence, each of the alternatives identifies different mechanisms that could be used to accomplish the same basic types of changes. Different approaches could mean more or less reduction activity in any given sector, but the broad impacts would be similar in kind.

For these reasons, we expect that environmental impacts (both positive and adverse) of all the alternatives would be similar to the impacts expected from mix of measures identified the draft Scoping Plan. While the magnitude of impacts might increase or decrease, it would be speculative to try to estimate the effects at this time, before the details of the specific measures are developed.

D. Alternative 2: Adopting a Variation of the Proposed Strategies or Measures

Instead of adopting all the measures identified in the Scoping Plan, ARB could adopt some of them or a different mix of them. Numerous alternatives exist to adopt various subsets and mixes of the measures identified in the Scoping Plan. It is not possible to examine these many alternatives in detail without engaging in speculation, because measures ultimately adopted by ARB will depend on the information that is learned in the future during the development of each measure.

In general, ARB must achieve the maximum technologically feasible and cost-effective reductions in greenhouse gas emissions, and the measures must fulfill this mandate. In the process of implementing the Scoping Plan, however, the exact mix of measures and the amount of reductions from each is likely to change. ARB staff recognizes that due to many factors, including information discovered during each measure's development, technology maturity, and implementation challenges, actual reductions from individual measures aimed at achieving the 2020 target may be higher or lower than current estimates. What is actually implemented will be a variation on the specific mix of recommended measures.

As mentioned above, it is important to note that types of emission reduction activities undertaken under any mix of strategies that meet the AB 32 goal will be broadly similar. ARB will need to improve efficiency in all sectors, and move to lower carbon energy resources in all sectors. Different approaches could mean more or less reduction activity in any given sector, but broad impacts would be similar in kind.

E. Alternative 3: Adopt a Program Based Primarily on Cap and Trade for the Sectors Included in the Cap

Instead of pursuing sector-specific regulations, ARB could pursue greenhouse gas reductions from sector in the cap solely through a cap-and-trade program. "Uncapped" sectors, like high global warming potential gases, would continue to be subject to sector-specific regulations. This alternative would mean that measures in the electricity, natural gas, industry and transportation sectors that are not required under existing law would not be implemented. Such measures include the Low Carbon Fuel Standard, going from 20 percent to 33 percent for the Renewables

Portfolio Standard, increasing combined heat and power, increasing the targets for energy efficiency, and the industrial measures. Instead of implementing these specific measures, an equivalent amount of emission reductions would be achieved through the cap-and-trade program.

Under this alternative, similar types of emission reduction efforts as are currently proposed in the Scoping Plan are likely to be undertaken, but ARB cannot predict in which sectors and in what geographic locations these reductions would occur. For California to meet the AB 32 target for greenhouse gas emission reductions by 2020, significant activities would be needed to increase the efficiency with which Californians use transportation fuels, electricity and natural gas, and additional renewable resources would be needed as part of the transportation fuel mix and electricity supply. While the particular mix of reductions would be left to the marketplace, the general types of activities (e.g. new biofuel production facilities, and new renewable electricity generation facilities) would be same.

Furthermore, if the cap-and-trade program is a regional program as currently proposed, the relative cost of reductions in California compared to the rest of the region could increase or decrease reductions in California as compared to a California-only program. To the extent out-of-state offsets are allowed, this could mean less activity in California as compared to another program that did not allow out-of-state offsets.

F. Alternative 4: Adopt a Program Based Primarily on Source-Specific Regulatory Requirements with No Cap and Trade Component

Instead of pursuing a cap-and-trade program, ARB could pursue source-specific regulations for all sectors. This alternative would mean that additional greenhouse gas emission reductions would need to be required through more aggressive implementation of the measures already recommended or implementation of additional measures in order to meet the 2020 target.

As with the recommendations in the Scoping Plan, measures ultimately adopted by ARB and other state agencies in a program based solely on source-specific regulatory requirements would depend on the information that is learned in the future during the regulatory development processes. Because of that, ARB cannot predict in which sectors and what geographic locations the measures would occur. For California to meet the AB 32 target for greenhouse gas emission reductions by 2020, significant activities would be needed to increase the efficiency with which Californians use transportation fuels, electricity and natural gas, and additional renewable resources would be needed as part of the transportation fuel mix and electricity supply.

As discussed previously, we expect that environmental impacts (both positive and adverse) would be similar at a programmatic level to impacts expected from the Scoping Plan. It would be speculative to attempt to estimate different mixes in more detail at this stage of the process. While the environmental impacts from implementing this alternative would be similar to those from implementing the Scoping Plan, ARB has determined that the combination of a cap-and-trade program and complementary measures is the preferred alternative, as discussed in Chapter II of the Scoping Plan. The development of a California cap-and-trade program that links with other Western Climate Initiative partner programs to create a regional market system will lead to prices on greenhouse gas emissions that would spur reductions in greenhouse gases throughout the California economy, through application of existing technologies and through the creation of new technological and organizational options. This will help ensure that the greenhouse gas emission reductions are achieved in the most cost-effective manner. Working with California's regional partners in WCI will also result in greater emission reductions from the program overall than would be possible from California acting alone. In addition, the cap-and-trade program provides a firm cap on 85 percent of the state's greenhouse gas emissions, increasing California's certainty in meeting the 2020 target, and provides a robust mechanism to achieve the additional reductions needed by 2050.

G. Alternative 5: Adopt a Program Based Primarily on a Carbon Fee

Instead of the proposed mix of measures and strategies in the draft Scoping Plan, ARB could replace the cap-and-trade program in the recommendation with a carbon fee. A carbon fee, like a cap-and-trade program, is a way to price carbon. Because a carbon fee and a cap-and-trade program both force covered sources to either reduce emissions or pay for those emissions, the economic incentives under the two programs are similar. For this reason, ARB staff would expect to see similar types of emission reduction efforts undertaken under a carbon fee-based program as in one relying on a cap-and-trade program, but cannot predict in which sectors and in what geographic locations the reductions would occur.

While a carbon fee and a cap-and-trade program provide very similar economic incentives to those covered, a carbon fee does not provide certainty in terms of the amount of emission reductions that will be achieved. The cap-and-trade program, on the other hand, which provides a firm cap on 85 percent of the state's greenhouse gas emissions, increases California's certainty in meeting the 2020 target and also provides a robust mechanism to achieve the additional reductions needed by 2050.

H. Rationale for Selecting as the Preferred Alternative the Mix of Measures Identified in the Scoping Plan

As discussed in Chapter II of the Scoping Plan, ARB staff believes that the combination of a cap-and-trade program and complementary measures is the preferred alternative. Achieving the emission reductions goals for AB 32 under any strategy or mix of measures will require fundamental changes to lower the carbon-intensity of the resources used and to increase the efficiency of energy use throughout California's economy. In developing the Plan, ARB has considered a wide range of potential measures for reducing greenhouse gas emissions from sources across California's economy.

As can be seen in Table 1, projected business-as-usual emissions in 2020 are spread throughout the major sectors of California's economy, and no one sector has a sufficiently large share to become the primary focus for emission reductions if California is to achieve its overall goal under AB 32 of a 30 percent greenhouse gas reductions in 2020. California will need to see significant reductions in the transportation, electricity, commercial and residential and industrial sectors, as well as contributing reductions from the other sectors of the economy. Because energy is required to transport and treat water, strategies in the Water sector will help reduce energy use and associated greenhouse gases. For the Recycling and Waste sector, emission reductions reach beyond the emissions from landfills shown in Table 1. For example, reducing the generation of waste would reduce the need to transport the waste to landfills – lowering transportation emissions and possibly, landfill methane emissions. Increased recycling or re-use would reduce the carbon emissions embedded in products – it take less energy to make a soda can from recycled aluminum than from virgin feedstock. While the particular mix of reductions and balance across sectors could vary based on different policy approaches, achieving the needed reductions will require some degree of action to decrease the carbon content of fuels used for transportation and electricity generation, and an increase in the efficiency of energy use across all sectors of the economy. For this reason, under any mix of strategies that meets the AB 32 goals, the types of actual emission reduction activities undertaken will be broadly similar. Different approaches could mean more or less reduction activity in any given sector, but the broad impacts would be similar in kind.

Table 1: Projected 2020 Business-as-Usual Emissions

Sector	$MMTCO_2E$	Percent
Transportation	225.4	37.8%
Electricity	139.2	23.4%
Commercial and Residential Combustion	46.7	7.8%
Industry	100.5	16.9%
Recycling and Waste	7.7	1.3%
High GWP	46.9	7.9%
Agriculture	29.8	5.0%
Forest Net Emissions	0.0	0.0%
Emissions Total	**596**	

Because of the diversity of emission sources, achieving the goals of AB 32 in a cost-effective manner will require a wide range of approaches that will provide reductions from every part of California's economy. The recommended measures were developed to reduce greenhouse gas emissions from key sources and activities while improving public health, promoting a cleaner environment, preserving our natural resources, and ensuring that the impacts of the reductions are equitable and do not disproportionately impact low-income and minority communities. These measures also put the state on a path to meet the long-term 2050 goal of reducing California's greenhouse gas emissions to 80 percent below 1990 levels. This trajectory is consistent with the reductions that are needed globally to help stabilize the climate. While the scale of this effort is considerable, our experience with cultural and technological changes makes California well-equipped to handle this challenge.

ARB evaluated a comprehensive array of approaches and tools to achieve these emission reductions. As discussed at the start of Chapter II in the Scoping Plan, reducing greenhouse gas emissions from the wide variety of sources can best be accomplished though a cap-and-trade program along with a mix of complementary strategies that combine market-based regulatory approaches, other regulations, voluntary measures, fees, policies, and programs.[22] ARB will monitor implementation of these measures to ensure that the State meets the 2020 limit on greenhouse gas emissions.

The development of a California cap-and-trade program that links with other Western Climate Initiative partner programs to create a regional market system is a central feature of the overall recommendation. This program will lead to prices on greenhouse gas emissions, prices that would spur reductions in greenhouse gases throughout the California economy, through application of existing technologies and through the creation of new technological and organizational options. This will help

[22] Chapter II, Recommended Actions, of the Proposed Scoping Plan is incorporated by reference.

ensure that the greenhouse gas emission reductions are achieved in the most cost-effective manner. Working with California's regional partners in WCI will also result in greater emission reductions from the program overall than would be possible from California acting alone.

ARB staff also believes that it is critically important to include complementary measures directed at emission sources that are included in the cap-and-trade program in order to spur innovation and overcome traditional market barriers. These complementary measures in the capped sectors are designed to achieve cost-effective emissions reductions while accelerating the necessary transition to the low-carbon economy required to meet the 2050 target.

Each of the complementary measures will help to position the California economy for the future by reducing the greenhouse gas intensity of products, processes, and activities. When combined with the absolute and declining emissions limit of the cap-and-trade program, these policies ensure that we cost-effectively achieve our greenhouse gas emissions goals and set ourselves on a path towards a clean low carbon future.

VI. CONCLUSION

In order to meet the requirements of AB 32 it will be necessary to adopt measures that will achieve the maximum technologically feasible and cost effective emission reductions. ARB staff has chosen as their preferred alternative the specific measures identified in the Scoping Plan. Staff's rationale for this choice is set forth in Chapter 2 of the Scoping Plan and in Appendix J to the Plan (see Chapter V, Project Alternatives, of Appendix J: California Environmental Quality Act Functional Equivalent Document).

The Scoping Plan contains a description of each measure identified in the Plan. However, the final form and specific provisions of each measure will depend on information learned in the future during the process of developing each measure. A more detailed environmental analysis will be prepared for each measure at the time it is developed and adopted.

VII. IMPACTS OF INDIVIDUAL PROPOSED MEASURES

The measures in the Scoping Plan will help make progress toward California's goals of reducing greenhouse gas emissions and of healthy air for all Californians. The following table lists each of the measures, any potentially significant environmental impacts and possible mitigation strategies.

Potential Adverse Environmental Impacts of the Proposed Scoping Plan

Measure	Potential Adverse Environmental Impacts	Potential Mitigation Measures
Proposed Scoping Plan	**Air Quality –** Reduced reliance on out-of-state coal generation could result in increases in in-state natural gas generation, though specific recommended measures will decrease demand for electricity and increase the share of renewable energy resources. It is not clear whether this will result in a net increase in natural gas use for electric generation in California. A potential result of increased in-state electrical generation could be localized air quality impacts.	California air quality regulatory programs at the federal, state, and local levels address individual source emissions from a regional and localized perspective.
	Energy Demand – Reduced reliance on out-of-state coal generation could result in increases in in-state natural gas generation, though specific recommended measures will decrease demand for electricity and others will increase the share of renewable energy resources. It is not clear whether	The cumulative impact of implementation will be to decrease California's total demand for electricity and natural gas.

Measure	Potential Adverse Environmental Impacts	Potential Mitigation Measures
	this will result in a net increase in natural gas use for electric generation within California.	
California Cap-and-Trade Program linked to Western Climate Initiative Partner Jurisdictions (Capped sources include Electricity and Natural Gas, Transportation Fuels and Large Industrial Sources)	**Air Quality** – No adverse impacts are expected. Some individuals have raised concerns about localized impacts as a result of the trading component of the cap and trade program. **Energy Demand** – there may be a shift from combustion engines to electric engines, resulting in an increase in demand.	Before including a market mechanism in any regulation, ARB must, to the extent feasible, "consider the potential for direct, indirect, and localized emission impacts from these mechanisms, including localized impacts in communities that are already adversely impacted by air pollution." It is not possible to definitively determine the level of significance of this potential impact at this time.
Transportation		
(T-1) Pavley I and II – Light –Duty Vehicle Greenhouse Gas Standards	No adverse environmental impacts anticipated.	None necessary.
(T-2) Low Carbon Fuel Standard – includes facilities for ethanol and biodiesel production; use of hydrogen and electricity as alternative fuels.	**Aesthetics** – This measure is undergoing regulatory development. **Air Quality** - Ethanol production requires the use of thermal and electrical power. Process steam production is the primary source of criteria pollutant emissions. The largest sources of PM_{10} are	Any impacts would be assessed on a location and project-specific basis. Procure VOC emissions offsets. Employ best available control technologies which may include Ultra-Low NOx burners on steam boilers, baghouses for PM control, and wet scrubbers to control VOC emissions.

Measure	Potential Adverse Environmental Impacts	Potential Mitigation Measures
	associated with grain handling, and the largest sources of VOCs are associated with the fermentation, distillation, storage, and loading of the ethanol produced.	Site facilities near truck or rail terminals, consider proximity to feedstocks or users of ethanol products to minimize transport emissions.
	Hydrogen can be a low carbon fuel. Can be used in either modified internal combustion engines or in fuel cells. Combusting hydrogen produces heat, water, and may produce minor NOx emissions.	Should be quantified and measures to mitigate identified in regulatory process.
	Agricultural Resources - Siting of new stationary sources, such as ethanol facilities, or facilities that convert biomass to fuel may convert prime farmland to other uses – the degree of which would be determined locally, and may conflict with an existing Williamson Act contract.	Avoid siting on prime agricultural lands, lands under Williamson Act contract, support of the California Farmland Conservancy Program. Such facilities would require a local approval of conditional use permits, local air permits, and other permits and would be subject project-specific compliance with CEQA.
	Biological Resources – When converting natural lands, there may be adverse impacts to terrestrial, riparian or aquatic habitat, natural	Project-specific CEQA compliance will be necessary.

Measure	Potential Adverse Environmental Impacts	Potential Mitigation Measures
	communities or to an species identified as a candidate, sensitive or special status species in local or regional plans, policies or regulations or by CDFG, USFWS or in § 404 of the Clean Water Act.	
	Interference with movement in corridors.	Project-specific CEQA compliance will be necessary.
	Cultural Resources – Future facilities in California may involve siting, grading, construction or expansion on lands that have not been surveyed for cultural significance, and may result in adverse impacts to cultural resources if inadvertent disturbance occurs during construction.	Project-specific compliance with CEQA and/or NEPA would be required. The lead and implementing agencies would be required to contact the appropriate agencies and departments to ensure that potential impacts to cultural resources would be minimized or avoided.
	Energy Demand - Future ethanol production facilities in California will likely use natural gas to produce steam and purchase required electricity from a utility.	Employ efficiency and control technologies at existing facilities.

Measure	Potential Adverse Environmental Impacts	Potential Mitigation Measures
	Hazards and Hazardous Materials – Some of the pathways may generate waste that may contain hazardous materials	Recycle, reuse or reprocess wastes. Wastes that cannot be recycled, reused or reprocessed must be disposed of appropriately.
	Land Use and Planning – Conversion of crops from food and fiber to fuel crops may conflict with Williamson Act contract.	Check with County to ensure conformity with Contract, file for nonrenewal if nonconforming.
	Water Resources **Water Quality** – chemicals and fertilizers used on crops can end up in surface or ground waters, affecting water quality.	Should be discussed and analyzed in the LCFS regulatory development process.
	There may be potential adverse impact to water quality from formulation of low-carbon fuels in the event of spills	Employment of appropriate spill prevention and spill abatement protocols.
(T-3) Regional Transportation-Related Greenhouse Gas Reduction Targets	**Land Use Policies** - May conflict with existing land use policies in some regions of the State	Any land use policy conflicts will be resolved at regional and local levels in a collaborative process.
Congestion Pricing, Indirect Source Rule,	Congestion Pricing – May increase vehicle use on off-hours but would result in no net increase in	Separate environmental evaluation needed.

Measure	Potential Adverse Environmental Impacts	Potential Mitigation Measures
Education and outreach efforts, and Pay as You Drive Insurance support to this measure	emissions. Indirect Source Rule for New Development – requires separate environmental evaluation. Education – no adverse impacts anticipated. Pay as You Drive – Dept. of Insurance is pursuing.	 Separate evaluation needed to adopt regulations. None necessary.
(T-4) Vehicle Efficiency Measures (tire inflation, use of low friction oils, cool paints)	No adverse environmental impacts anticipated, but further analysis will be completed to verify	None necessary.
(T-5) Ship Electrification at Ports	**Air Quality** – Indirect impacts from criteria pollutant emissions associated with incremental electricity generation at power plants **Energy Demand** - May increase energy demand	These emissions are significantly less than emissions generated by ship engines. Environmental evaluation completed as part of regulation. Employ off-peak charging
(T-6) Goods Movement VSR – exploring the requirement to reduce	 No adverse environmental impact anticipated, but will need additional	 Conceptual at this time, not quantified.

Measure	Potential Adverse Environmental Impacts	Potential Mitigation Measures
speed	analysis.	
Cleaner ships – Design and fuel efficiency strategies	Analyzed in 2007 SIP FED	No additional analysis necessary.
Port trucks, drayage	Analyzed in separate FED	Adopted.
Commercial Harbor Craft – voluntary action to use alternative anti-fouling agent	**Hazards and Hazardous Materials** - Anti-fouling agents to improve hull smoothness may contain copper. This measure encourages the use of alternative agents with no copper. Disposal of residual copper-containing agents may have an adverse impact.	Encourage non-toxic anti-fouling product use and education of owners/operators on the toxicity of copper to reduce use and improper disposal of these chemicals.
Cargo handling	No adverse environmental impact anticipated, but additional analysis will verify	May require further analysis. .
Transport Refrigeration Units (TRU)	**Energy Demand** -TRUs may increase energy demand by electrification	Employ off-peak charging to balance electrical load.
(T-7) Heavy Duty Vehicle Greenhouse Gas Emission Reduction – Aerodynamic Efficiency	Regulation currently being developed in separate evaluation in regulation FED	

Measure	Potential Adverse Environmental Impacts	Potential Mitigation Measures
(T-8) Medium and Heavy-Duty Vehicle Hybridization	No adverse impacts anticipated with efficiency measures, however some technologies are in research and development phase. Further evaluation will verify.	None necessary at this time.
(T-9) High Speed Rail	Impact analysis incorporated by reference, SCH# 2001042045, Potential and cumulative impacts include aesthetics, displacement of commercial and residential properties, disproportionate impacts to minority and low-income populations, community and neighborhood disruption, increased noise and electromagnetic interference along rail corridors, land use policies, traffic impacts associated with stations, effects to historic properties or archaeological sites, impacts to parks and recreation resources, exposure to seismic and flood hazards, water resources, wetlands and sensitive biological species and habitat, land use compatibility, energy use and impacts to agricultural resources.	Programmatic EIR/S was prepared in 2001, followed by project environmental documents. Mitigation measures incorporated by reference.

Measure	Potential Adverse Environmental Impacts	Potential Mitigation Measures
Electricity and Natural Gas		
(E-1 and CR-1) Energy Efficiency	**Hazards and Hazardous Materials** - Efficiency Standards may occasionally result in the use of new or new versions of products that contain hazardous materials and require special recycling or disposal.	Compliance with applicable hazardous materials recycling and disposal laws. Disposal of hazardous waste would occur at an appropriated permitted disposal facility.
(E-2) Increasing Combined Heat and Power	**Air Quality** –No adverse air quality impacts are anticipated, unless individual CHP units are installed in a way that is not conforming to the measure design.	Use of BACT. These units are permitted through the Air Districts. Location and project-specific CEQA analysis may be required.
(E-3) Renewables Portfolio Standard	**Aesthetics** - siting and construction of wind or solar farms that would support the expansion of the Renewable Portfolio Standard (RPS) may affect viewsheds. **Agricultural Resources** - Siting of new utility scale facilities and arrays may convert prime farmland to other uses – the degree of which would be determined locally, and may conflict with an existing Williamson Act contract.	Careful design and siting of these facilities will avoid impacts, consistent with available CEC and Department of Fish and Game (DFG) guidance documents and siting requirements of federal agencies. Project- specific analysis would be necessary. Avoid siting on prime agricultural lands, lands under Williamson Act contract. If unavoidable, support of the California Farmland Conservancy Program. Such facilities would require a local approval of conditional use permits, and other permits and would be subject project-specific compliance with CEQA.

Measure	Potential Adverse Environmental Impacts	Potential Mitigation Measures
	Air Quality – Biomass facilities siting and operations may cause an increase in nitrogen oxide, sulfur dioxide, particulate matter (PM_{10} and 2.5).	Use of BACT, such as catalytic converters and filtration. Location and project specific impact analysis will be necessary.
	Biological Resources - Any utility scale facility may require a relatively large area if it is to be used to generate electricity at a commercial scale, and large arrays of solar collector may interfere with natural sunlight, rainfall, drainage which could have a variety of effects on plants and animals. Solar arrays may also create avian perching opportunities that could affect both bird and prey populations. A wind farm may present a potential risk to migrating birds if the facility is sited in a migratory flyway.	Location-specific impact analysis will be necessary. Careful design and siting of wind farms, turbines and infrastructure would minimize the risk for bird strikes. Advances in turbine and wind farm design have resulted in fewer, more powerful turbines and better protection for birds. Use of guidelines by CEC and DFG.
	A solar thermal plant requires around 50 times more land than combined cycle natural gas fueled power plant per MW. Construction activities associate with solar	Specific impacts depend on biological characteristics of the land being developed. Sensitive populations and habitat should be avoided.

Measure	Potential Adverse Environmental Impacts	Potential Mitigation Measures
	thermal plants disturb the land, and fencing can interfere with wildlife corridors.	
	Nitrogen dioxide deposition from cooling towers at solar thermal plants and new geothermal projects may degrade vegetation.	Use of BACT. Provision of habitat compensation, revegetation.
	Cultural Resources – Future facilities in California may involve siting, grading, construction or expansion on lands that have not been surveyed for cultural significance, and may result in adverse impacts to cultural resources if inadvertent disturbance occurs during construction.	Project-specific compliance with CEQA and/or NEPA would be required. The lead and implementing agencies would be required to contact the appropriate agencies and departments to ensure that potential impacts to cultural resources would be minimized or avoided.
	Hazards and Hazardous Materials – Municipal solid waste may contain hazardous materials, which could result in solid and gaseous hazardous by-products.	Ash can be recycled or shipped to landfills permitted to accept such waste, and hazardous materials should be diverted prior to combustion.
	Land Use and Planning – Siting of new utility scale facilities and arrays	Avoidance would be most appropriate mitigation. If land is under easement, conditions must allow use. Such

Measure	Potential Adverse Environmental Impacts	Potential Mitigation Measures
	may conflict with an existing Williamson Act contract, or lands under easement.	facilities would require a local approval of conditional use permits, and other permits and would be subject project-specific compliance with CEQA.
	Conversion of crops from food and fiber to fuel crops may conflict with existing Williamson Act contract.	Check with County to ensure consistency with Contract.
	It is foreseeable that additional transmission infrastructure will be necessary to help support the RPS requirements to deliver renewable power to consumers.	Siting of transmission facilities is subject to project specific CEQA analysis by the CPUC.
	Noise – Powerplants and wind power installations may increase ambient noise levels	General Plan Noise Elements and ordinances identify appropriate local noise levels and accepted mitigation measures such as mufflers, limited hours of operations and installation of sound barriers.
	Recreation (see Aesthetics)	USDI Bureau of Land Management is preparing an environmental impact statement (Federal Register/ Vol. 73, No. 104, Notices, May 29, 2008) that precludes (as mitigation) the siting of solar arrays from lands within the National Landscape Conservation System, such as National Conservation Areas, National Monuments, Wilderness Areas, Wilderness Study Areas, Wild and

Measure	Potential Adverse Environmental Impacts	Potential Mitigation Measures
		Scenic Rivers and National Historic and Scenic Trails, and lands that have been identified as environmentally sensitive.
(E-4) Million Solar Roofs	**Aesthetics** - Roof top solar panels and solar water heaters may adversely affect a neighbor's quality of rooftop views, however, this is a subjective value. These measures may limit where trees may be planted in order to preserve solar access. **Hazards and Hazardous Materials** – solar panels may leak if mishandled and broken. Photovoltaic panels may contain hazardous materials, and although they are sealed under normal operating conditions, there is the potential for environmental contamination if they were damaged or improperly disposed upon decommissioning. Concentrating solar power system may employ liquids such as oils or molten salts that may be hazardous and present	The significance to aesthetic values would be location specific. Proper handling and operation and good maintenance practices can be used to minimize impacts from hazardous materials (Federal Register/ Vol. 73, No. 104, Notices, May 29, 2008).

Measure	Potential Adverse Environmental Impacts	Potential Mitigation Measures
	spill risks. Various fluids commonly used in most industrial facilities, such as hydraulic fluids, coolants, and lubricants and may present a spill related risk.	
Green Buildings		
(GB-1) Green Buildings (Also includes Greening Public Schools, New Residential and Commercial Construction, and Existing Homes and Commercial Buildings)	No adverse environmental impacts anticipated, further analysis would verify	None necessary.
Water		
(W-1) Water Use Efficiency	Ongoing program administered by various state agencies.	None necessary.
(W-2) Water Recycling	**Air Quality** - Installation of water recycling infrastructure would require construction activities, potentially generating typical short-term construction impacts such as dust generation, equipment emissions and objectionable odors. **Biological Resources** – Water recycling has the potential to reduce wastewater discharges, potentially	Local jurisdictions and Air Pollution Control Districts typically require measures to mitigate construction impacts such as preparation of grading plans, dust minimization, minimizing idling of equipment and restriction of hours of operation. Site specific field survey and mitigation may be warranted, and project-level CEQA compliance would be accomplished by appropriate lead agencies as individual

Measure	Potential Adverse Environmental Impacts	Potential Mitigation Measures
	modifying downstream environments and potentially impacting protected habitats and /or species. Project implementation has the potential to adversely impact biological resources located on project sites, along pipeline corridors and in proximity to construction zones.	projects are considered.
	Cultural Resources – Future facilities in California may involve siting, grading, construction or expansion on lands that have not been surveyed for cultural significance, and may result in adverse impacts to cultural resources if inadvertent disturbance occurs during construction.	Project-specific compliance with CEQA and/or NEPA would be required. The lead and implementing agencies would be required to contact the appropriate agencies and departments to ensure that potential impacts to cultural resources would be minimized or avoided.
	Energy Demand – Water recycling could increase the amount of energy used at local wastewater treatment facilities.	Wherever possible, water recycling would be performed during off-peak periods.
	Land Use and Planning – Projects may conflict with habitat	

Measure	Potential Adverse Environmental Impacts	Potential Mitigation Measures
	conservation plan or natural community conservation plan.	
	Population and Housing – The availability of recycled water may represent an additional water supply that may foster community growth.	Site specific, project-level CEQA compliance would be accomplished by appropriate lead agencies.
	Water Resources **Water Quality** – Water recycling reduces the quantity of water entering into downstream flows, water table recharge, and infiltration. If wastewater is relied upon for dilution, this reduction could contribute to higher concentrations of contaminants in downstream waters and/or in water tables.	Availability of water supply created by recycling may be considered during General Plan updates and development proposals. Project-level CEQA evaluation would be necessary. This additional water supply is not considered an adverse impact. All water recycling facilities must be permitted and operated in accordance with the requirements of the Water Boards and the Department of Public Health. Project level CEQA compliance would be accomplished by appropriate lead agencies on a project-level basis.
(W-3) Water System Energy Efficiency	**Agricultural, Biological Resources** - New support facilities may convert or disturb agricultural or natural lands.	Project-specific analysis would be necessary.
	Cultural Resources – Future facilities in California may involve siting, grading, construction or	Project-specific compliance with CEQA and/or NEPA would be required. The lead and implementing agencies would be required to contact the appropriate agencies and

Measure	Potential Adverse Environmental Impacts	Potential Mitigation Measures
	expansion on lands that have not been surveyed for cultural significance, and may result in adverse impacts to cultural resources if inadvertent disturbance occurs during construction.	departments to ensure that potential impacts to cultural resources would be minimized or avoided.
(W-4) Reuse Urban Runoff	**Air Quality –** Construction of water capture and storage facilities would produce short-term construction impacts **Biological Resources** – Construction has the potential to impact sensitive species that exist on project sites. **Cultural Resources** – Future facilities in California may involve siting, grading, construction or expansion on lands that have not been surveyed for cultural significance, and may result in adverse impacts to cultural resources if inadvertent disturbance occurs during construction.	Similar mitigations to W-2. Project-specific evaluations would be necessary and CEQA compliance would be performed by the appropriate lead agencies. Project-specific analysis would be necessary. Project-specific compliance with CEQA and/or NEPA would be required. The lead and implementing agencies would be required to contact the appropriate agencies and departments to ensure that potential impacts to cultural resources would be minimized or avoided.
(W-5) Increase Renewable	**Agricultural Resources –** New	Project-specific analysis would be necessary for new

Measure	Potential Adverse Environmental Impacts	Potential Mitigation Measures
Energy Production	support facilities may convert or disturb agricultural lands	facilities.
	Air Quality – Construction of new facilities would produce short term construction impacts.	Compliance with Authority to Construct permit.
	Biological Resources – Construction has the potential to impact sensitive species that exist on project sites.	Project-specific analysis necessary.
	Cultural Resources – Future facilities in California may involve siting, grading, construction or expansion on lands that have not been surveyed for cultural significance, and may result in adverse impacts to cultural resources if inadvertent disturbance occurs during construction.	Project-specific compliance with CEQA and/or NEPA would be required. The lead and implementing agencies would be required to contact the appropriate agencies and departments to ensure that potential impacts to cultural resources would be minimized or avoided.
(W-6) Public Goods Charge for Water	No direct adverse environmental impacts are anticipated, as this measure is a potential funding source.	None necessary.
Industry		
(I-1) Energy Efficiency and	Audits would have no adverse	None necessary.

Measure	Potential Adverse Environmental Impacts	Potential Mitigation Measures
Co-Benefits Audits for Large Industrial Sources	effects at this time; however, results of audit will determine whether any further actions are necessary.	
(I-2) Oil and Gas Extraction GHG Emissions Reduction – Best Management Practices and technologies to reduce fugitive emissions from venting and leaks from wells, process equipment, separation and storage. Increase compressor capacity - Remove existing regulatory fugitive methane exemptions	No adverse environmental impact anticipated, but additional analysis will verify	Separate environmental evaluation will be conducted during regulatory development.
(I-3) GHG Leak Reduction from Oil and Gas Transmission- Best Management Practices and technologies to reduce fugitive emissions from venting and leaks along natural gas pipelines practices	No adverse environmental impact anticipated, but additional analysis will verify	Separate environmental evaluation will be conducted during regulatory development.
(I-4) Refinery Flare	No adverse environmental impact	Separate environmental evaluation will be conducted

Measure	Potential Adverse Environmental Impacts	Potential Mitigation Measures
Recovery System Improvement	anticipated, but additional analysis will verify	during regulatory development.
(I-5) Removal of Methane Exemption from Existing Refinery Regulations	No adverse environmental impact anticipated, but additional analysis will verify	Separate environmental evaluation will be conducted during regulatory development.
Recycling and Waste Management		
(RW-1) Landfill Methane Control	**Air Quality** – Installation of control devices such as flares and energy recovery systems may slightly increase NOx and CO. **Water Resources** - NOx may be scrubbed out of the air and deposited into open water, adversely impacting water quality.	Include NOx and CO in air district's emission inventory. Obtain offsets if landfill gas to energy project. Gas collection systems with flares or other combustion devices are currently the best means to reduce methane. Not quantified at this time. Use of BACT, collection systems would reduce impact.
(RW-2) Additional Reductions in Landfill Methane: Increasing the Efficiency of Landfill Methane Capture	No adverse environmental impact – preparation of a Best Practices Guidance document.	None necessary.
(RW-3) High Recycling/ Zero Waste	**Air Quality** – Composting facilities may emit VOCs and NOx, which are criteria pollutants that contribute to ozone formation.	Site- and project-specific analysis necessary for new facilities. Compliance with Permit to Construct from air district. Use of BACT. Application of a finished compost blanket would reduce VOC emissions for compost

Measure	Potential Adverse Environmental Impacts	Potential Mitigation Measures
	Anaerobic digesters may emit air pollutants **Water Resources** – Compost operations may adversely impact water quality if waste is discharged to the waters of the State	operations Site- and project-specific analysis necessary for new facilities. Compliance with Permit to Construct from air district. Use of BACT. Compliance with waste discharge requirements.
Forests		
(F-1) Sustainable Forest Target	No significant adverse environmental impacts identified.	Project – level compliance with CEQA or NEPA would be accomplished by appropriate lead agencies.
Implementing Strategies: Forest Conservation, Forest Management, Afforestation/ Reforestation, Urban Forestry, and Fuels Management (Under Evaluation)	No significant adverse environmental impacts identified at this time.	Project – level compliance with CEQA or NEPA would be accomplished by appropriate lead agencies. Each of the strategies that have ground disturbing activities is an independent action and must be considered as such. Some activities will meet the definition of a "project" under CEQA, while others will not be subject to CEQA. Projects taking place on federal lands are subject to NEPA.
High GWP		
(H-1) Motor Vehicle Air Conditioning Systems: Reduction of Refrigerant Emissions from Non-Professional Servicing	No adverse environmental impact identified at this time.	Regulation to be developed. Separate environmental evaluation to be prepared.

Measure	Potential Adverse Environmental Impacts	Potential Mitigation Measures
(H-2) SF_6 Limits in Non-Utility and Non-Semiconductor Applications	**Hazards and Hazardous Materials** – If N_2O were used in place of SF_6 for fume hood tests, a potential exposure could occur if N2O was accidentally released. Impacts to vulnerable populations should be considered. **Energy Demand** – SF6 tracer tests fro fume hoods are required by CAL/OSHA with a specific energy efficient technology. If ARB's regulation did not allow this test, some energy conservation efforts for fume hood may not take place.	Ensure proper ventilation at exhaust stacks and ensure only verifiers are in the testing room. An exemption for this use or a change in the required test/standard would eliminate any impact to energy conservation efforts.
(H-3) High GWP Reduction in Semiconductor Manufacturing	**Energy Demand** – Facilities operate continuously. Compliance achieved with additional abatement equipment could increase peak and off-peak natural gas and /or electricity use as thermal destruction of emissions requires high temperatures.	Purchases of highly energy efficient abatement equipment, purchases of catalytic destruction systems which operate at lower temperatures.
(H-4) Limit High GWP Use in Consumer Products Pressurized Gas Duster Regulation	**Air Quality** - Hydrocarbon propellants (butane, propane, isobutane) may have lower GWPs, but may contribute to the formation of ground-level ozone.	ARB to further evaluate employment of reformulation options.

Measure	Potential Adverse Environmental Impacts	Potential Mitigation Measures
(H-5) High GWP Reductions from Mobile Sources	No adverse environmental impacts known at this time, however, any alternatives will be subject to approval under U.S. EPA's SNAP to ensure their safety. **Pubic Health and Safety** - It is possible that certain alternatives that industry selects may have a higher flammability index than the substances they replace.	Separate environmental evaluation will be prepared when regulation is developed. Additional technician training.
(H-6) High GWP Reductions from Stationary Sources	**Air Quality** – Potential criteria and toxic pollutant emissions from recovered foams if combusted. Though any alternatives will be subject to approval under U.S. EPA's SNAP to ensure their safety, it is possible that certain alternatives that industry selects may have a higher flammability index than the substances they replace. **Energy Demand** – Facilities operate continuously. Compliance achieved with additional abatement equipment could increase peak and off-peak natural gas and /or electricity use as	Separate environmental evaluation will be prepared when regulation is developed. Purchase and employment of highly energy efficient abatement equipment, and catalytic destruction systems which operate at lower temperatures.

Measure	Potential Adverse Environmental Impacts	Potential Mitigation Measures
	thermal destruction of emissions requires high temperatures.	
(H-7) Mitigation Fee on High GWP Gases	No adverse environmental impact anticipated.	None necessary.
Agriculture		
(A-1) Methane Capture at Large Dairies	**Air Quality** – The combustion of biogas in an engine to generate electricity can emit NOx. **Agricultural Resources** – The siting of manure digesters may not be compatible with existing Williamson Act contracts. **Biological Resources** – construction activities of digester facility may impact biological or resources.	Controls can reduce NOx in exhaust gasses, but types and sizes of engines typically used in conjunction with a dairy digester may be unavailable, or able to meet air district NOx requirements. Use of BACT. Check with city or county to ensure compatibility. Digesters will require CEQA compliance to obtain an "Authority to Construct" permit from the air district. Site specific analysis is necessary to determine whether an impact would result.
Fertilizer Use Efficiency	No adverse environmental impact anticipated	None necessary.
Efficiency Improvements	No adverse environmental impact anticipated	None necessary.

VIII. RESOURCES

Bay Area Air Quality Management District, California Clean Air Act Guidance for the Development of Indirect Source Control Programs, App.A, p.2, 1990, http://www.bcaqmd.org/FORMS/ISR.PDF

California Air Resources Board, California Greenhouse Gas Emissions Inventory, http://www.arb.ca.gov/cc/inventory/inventory.htm

California Air Resources Board, Emission Inventories 2000-2001

California Air Resources Board, *The California Almanac of Emissions and Air Qua*lity, 2007

California Air Resources Board, Economic and Technical Advancement Advisory Committee (ETAAC) Report to the Air Resources Board, February 2008, http://www.arb.ca.gov/cc/etaac/ETAACFinalReport2-11-08.pdf

California Air Resources Board, Slide Show: Policies and Actions for Environmental Justice, December 13, 2008, http://www.arb.ca.gov/ch/programs/ej/ejpolicies.pdf

California Energy Commission, *Anaerobic Digester Implementation Issues*, Public Interest Energy Research (PIER) Program, 2006, http://www.energy.ca.gov/2006publications/CEC-500-2006-115/CEC-500-2006-115B.PDF

California Energy Commission, 2007 Integrated Energy Policy Report, December 5, 2007, http://www.energy.ca.gov/2007_energypolicy/index.html

California Environmental Quality Act Guidelines

California Integrated Waste Management Board, Climate Change and Solid Waste Management, Organics, http://www.ciwmb.ca.gov/Climate/ Organics/default.htm

California Integrated Waste Management Board "*Emissions Testing of Volatile Organic Compounds from Greenwaste Composting at the Modesto Compost Facility in the San Joaquin Valley*", revised May, 2008

Dairy Permitting Advisory Group, *Recommendations to the San Joaquin Valley pollution Control Officer Regarding Best Available Control Technology for Dairies in the San Joaquin Valley*, January 2006.

Federal Register, Vol. 73, No. 104, Notices, May 29, 2008, http://www.gpoaccess.gov/fr/

Martin, P. Update on California Dairy Air Quality Regulations, March 18, 2008.

Solar Energy Development Programmatic EIS Information Center, http://solareis.anl.gov

State Water Resources Control Board, proposed *Water Quality Control Policy on the Use of Coastal and Estuarine Waters for Power Plant Cooling*, March 2008.

U.S. Department of Labor, Occupational Safety and Health Administration (OSHA), Health Guidelines for Nitrous Oxide, http://www.osha.gov/SLTC/healthguidelines/nitrousoxide/recognition.html

U.S. Department of Energy, Hydrogen, Fuel Cells and Infrastructure Technology, Education Program Area, http://www1.eere.energy.gov/hydrogenandfuelcells/education/basics_production.html