California Air Resources Board

Staff Report: Senate Bill 350 Integrated Resource Planning Electricity Sector Greenhouse Gas Planning Targets

July 2018

CALIFORNIA
AIR RESOURCES BOARD

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Section 1: Introduction

The evidence that the climate is changing is undeniable. The changing climate escalates serious problems, including wildfires, coastal erosion, disruption of water supply, threats to agriculture, spread of insect-borne diseases, and continuing health threats from air pollution. As evidence mounts, the scientific record only becomes more definitive, and further action is imperative to avoid the most catastrophic impacts of climate change. The Paris Agreement—which calls for limiting global warming to well below two degrees Celsius and pursuing efforts to limit it to 1.5 degrees Celsius—frames California's path forward.

California has a long and successful record of climate policies and programs that demonstrate that we are doing our part in the global effort to address climate change and limit greenhouse gas (GHG) emissions. Recent data indicates California is on track to achieve its 2020 GHG reduction target of 1990 levels early. California also has a statutory mandate to reduce GHG emissions by 40 percent below 1990 levels by 2030[1] and a goal to further reduce GHG emissions 80 percent below 1990 levels by 2050.[2]

The 2017 California Climate Change Scoping Plan (2017 Scoping Plan Update),[3] adopted by the California Air Resources Board (CARB or Board) in December 2017, identifies an achievable and cost-effective path to achieve the 2030 GHG emissions reductions target through a mix of regulatory, incentive based, and market-based policies. The 2017 Scoping Plan Update also establishes 260 million metric tons of carbon dioxide equivalent ($MMTCO_2e$) as the mass-based GHG target for 2030.

The electricity sector will play a critical role in achieving the State's GHG emissions reductions target. Transitioning to a low-carbon economy as described in the 2017 Scoping Plan Update will be implemented, in part, by the electrification of several sectors, while decarbonizing the grid. The State's electricity demand and GHG emissions will be affected by transitions already underway, including adoption of energy efficiency measures, the penetration of customer-owned solar, greater renewable energy generation, and electrification of transport, among others.

Building on the State's climate leadership, Senate Bill 350 (SB 350) (De Leon, Chapter 547, Statutes of 2015), the Clean Energy and Pollution Reduction Act of 2015, directs the electricity sector decision-makers to undertake comprehensive integrated resource planning that incorporates multiple goals and mandates. For the first time, Integrated Resource Plans (IRPs) will be required to incorporate what actions may be taken to

[1] Senate Bill 32 (SB 32) (Pavley, Chapter 249, Statutes of 2016), California Global Warming Solutions Act of 2016
[2] Executive Order S-03-05 (2005)
[3] California's 2017 Climate Change Scoping Plan: The Strategy for Achieving California's 2030 Greenhouse Gas Target (December 2017). Retrieved from: https://www.arb.ca.gov/cc/scopingplan/scoping_plan_2017.pdf

achieve California's long-term GHG reduction goals, while considering cost effectiveness, reliability, impacts on disadvantaged communities, as well as statutory mandates such as the fifty percent Renewables Portfolio Standard (RPS).[4] The integrated resource planning process provides an opportunity to plan for the future electricity sector. The IRP process establishes a new level of coordination and collaboration throughout the electricity sector. Holistic consideration of these requirements enables planning at both the individual utility and the sector level to achieve the State's GHG emissions reductions goals.

In order to facilitate this planning and achievement of GHG reductions, SB 350 requires CARB, in coordination with the California Public Utilities Commission (CPUC) and the California Energy Commission (CEC), to set GHG reduction planning targets for the electricity sector and for individual load-serving entities (LSEs) and publicly owned utilities (POUs). This Staff Report describes the proposed methodology for establishing the GHG planning target ranges and the specific proposed GHG planning target ranges for the electricity sector, LSEs, and POUs, for use in IRPs.

Section 2: Electricity Sector Background and GHG Trends

GHG emissions from the electricity sector are a function of the demand for electricity and the carbon intensity of the fuel used to generate electricity. Historically, power plants generated electricity largely by combusting fossil fuels. In the 1970s and early 1980s, a significant portion of California's power supply came from coal and petroleum resources. To reduce air pollution and promote fuel diversity, the State shifted away from these resources to natural gas, renewable energy, and energy efficiency programs, resulting in significant GHG emissions reductions. Indeed, coal generation to serve California electricity demand declined by more than half from 2008 levels.[5]

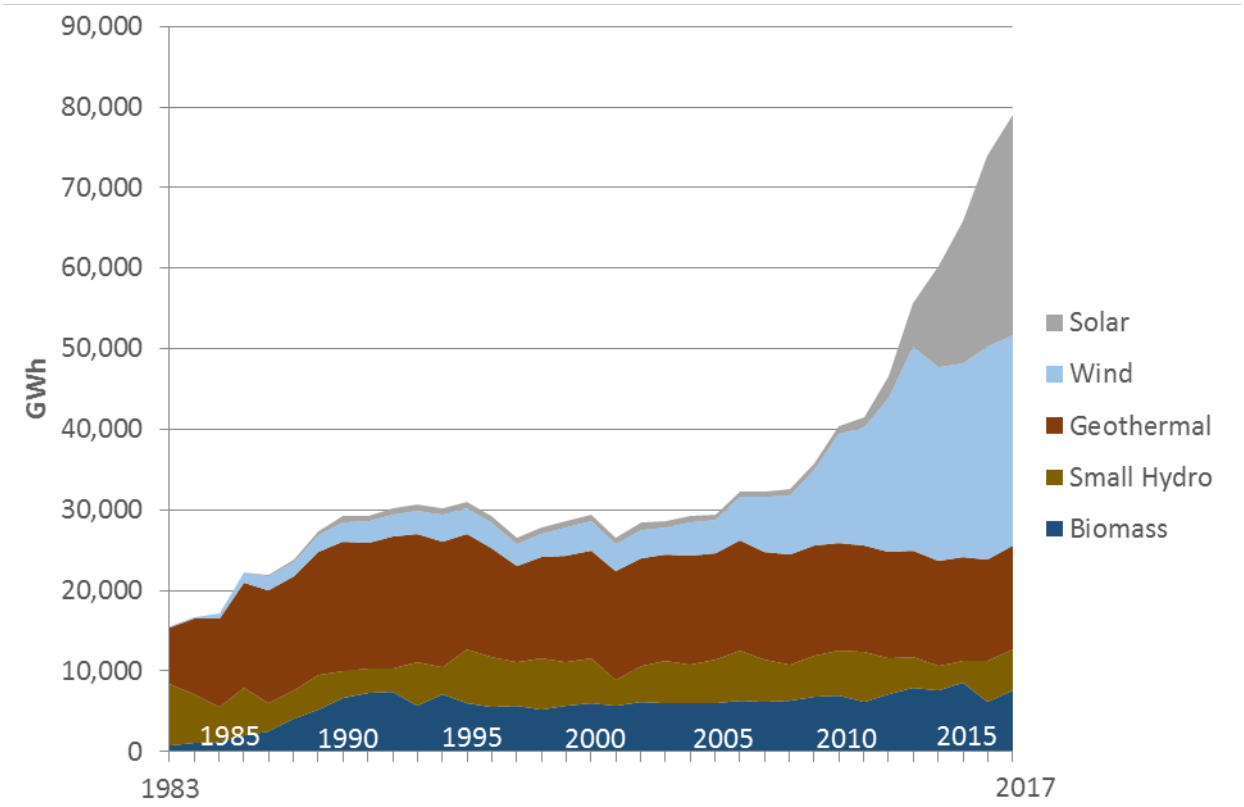
Renewable Energy

Renewable energy has shown tremendous growth, with capacity from solar, wind, geothermal, small hydropower, and biomass power plants growing from 6,600 megawatts (MW) in 2010 to 27,800 MW as of October 2017.[6] Likewise, electricity generation from renewable energy has grown over the past 30 plus years—more than doubling since 2008.[6] The RPS, established in 2002, has driven greater renewable energy generation, and the RPS target was ratcheted upwards in 2006, 2011, and (by

[4] The statutory requirements for IRPs are listed in California Public Utilities (PU) Code Section 9621
[5] California Energy Commission. December 2017. Tracking Progress. California's Declining Reliance on Coal – Overview. Retrieved from: http://www.energy.ca.gov/renewables/tracking_progress/documents/current_expected_energy_from_coal.pdf
[6] California Energy Commission. December 2017. Tracking Progress. Renewable Energy – Overview. Retrieved from: http://www.energy.ca.gov/renewables/tracking_progress/documents/renewable.pdf

SB 350) in 2015. Figure 1 shows renewable energy procured by California utilities from 1983–2017 by resource type.[7]

Figure 1 – Renewable Energy Generation 1983-2017



Source: California Energy Commission, 2017

Electricity Demand

Numerous factors, including population and economic growth, personal income, employment, electrification, and efficiency measures, affect electricity demand. Population in the State of California increased from 34 million in 2000 to nearly 40 million in 2016—a nearly 18 percent increase from 2000 levels.[8] During the same time, the economy has grown by more than 40 percent, from $1.6 trillion in 2000 to $2.3

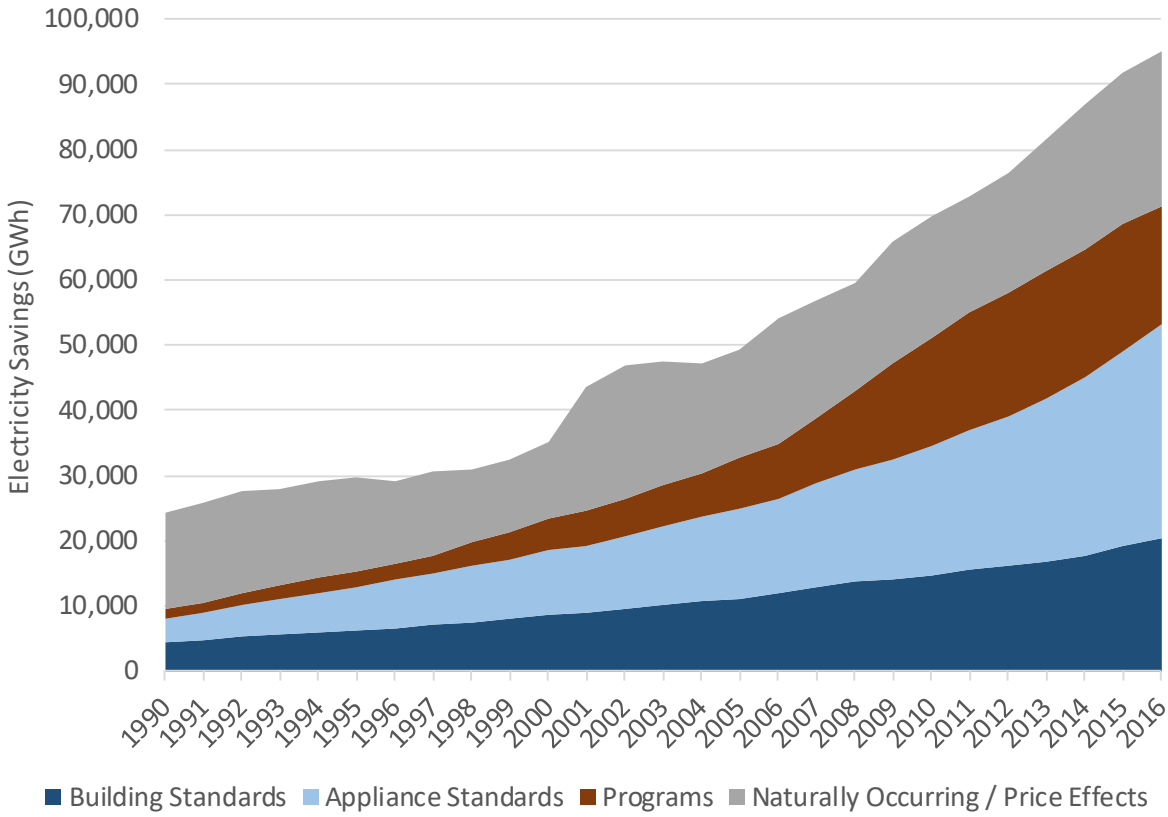
[7] This does not include large hydropower and does not include self-generation or behind-the-meter generation. California Energy Commission. December 2017. Tracking Progress. Renewable Energy – Overview. Retrieved from: http://www.energy.ca.gov/renewables/tracking_progress/documents/renewable.pdf

[8] Population data obtained from California Department of Finance Data in Action-1970 to 2060 on March 22, 2018. Additional information available at: http://www.dof.ca.gov/Forecasting/Demographics/Data_In_Action/

trillion in 2016 in gross state product (reported in 2009 $).[9] Population is estimated to increase further, to 44 million by 2030.

Energy efficiency efforts in California have reduced energy demand. California has been a leader in advancing appliance and building energy efficiency, and over the last 40 years, California has implemented cost-effective appliance and building energy efficiency standards, as well as utility efficiency programs, that have saved consumers billions of dollars. The annual efficiency and conservation savings for electricity were estimated to surpass 95,000 gigawatt hours (GWh) by 2016, as shown in Figure 2.[10]

Figure 2 – Electricity Savings from Statewide Efficiency and Conservation



Source: California Energy Commission, Demand Analysis Office, 2017

Carbon Dioxide Emissions

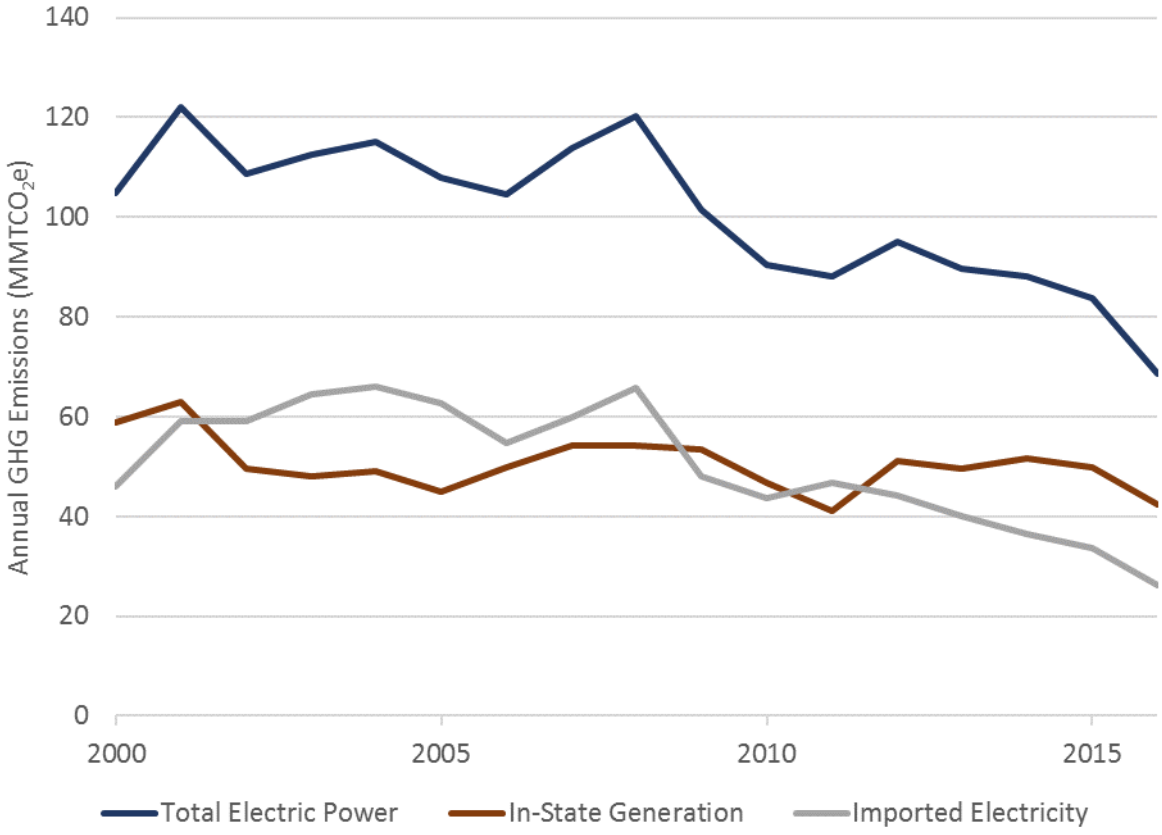
Carbon dioxide is the primary GHG associated with the electricity sector, which is composed of in-state generation and imported power to serve California load. GHG emissions from the electricity sector have decreased by 35 percent since 2000, and are

[9] Gross State Product, California Department of Finance. Retrieved from: http://www.dof.ca.gov/Forecasting/Economics/Indicators/Gross_State_Product/

[10] California Energy Commission. July 2017. Tracking Progress. Energy Efficiency. Retrieved from: http://www.energy.ca.gov/renewables/tracking_progress/documents/energy_efficiency.pdf

on the way to achieving deeper emissions cuts by 2030. Figure 3 illustrates the trend of declining GHG emissions in the electricity sector between 2000 and 2016.[11]

Figure 3 – Electricity Sector GHG Emissions Trends

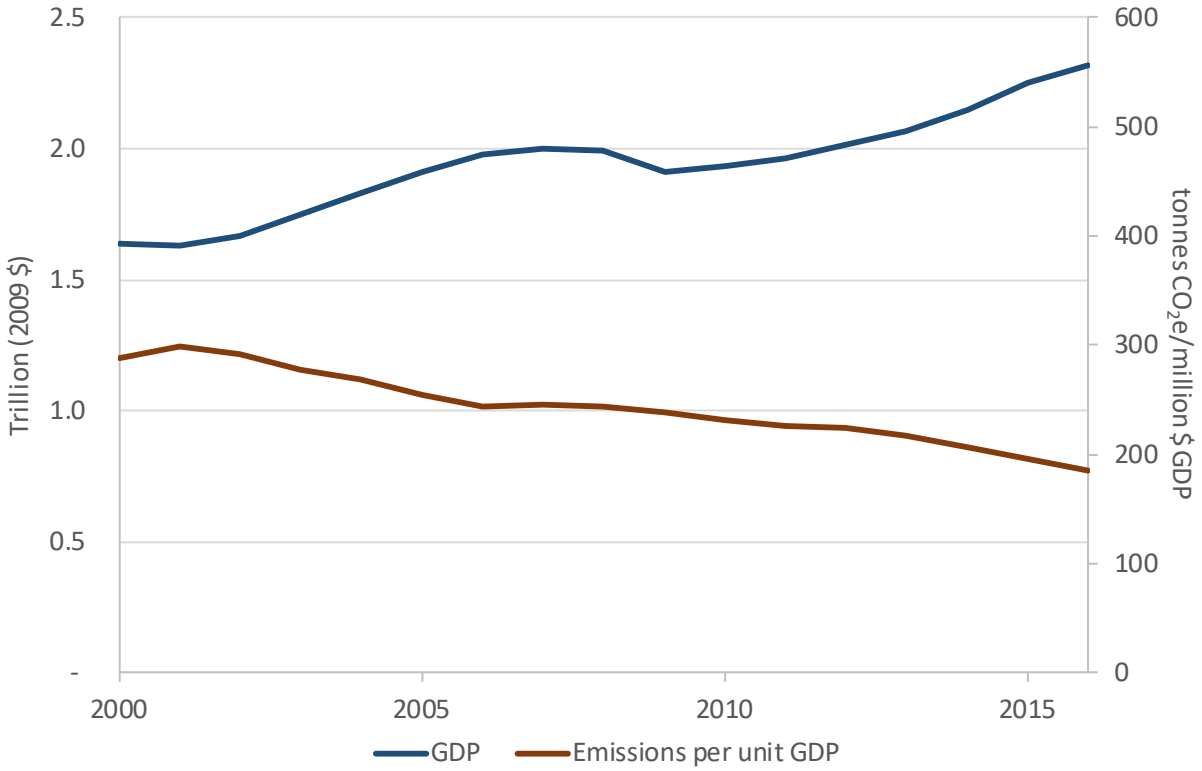


Source: California Air Resources Board, 2018

The population and economy of California have grown, while also becoming less carbon intensive. Since the launch of many of the State's major climate programs, including RPS, energy efficiency standards, and Cap-and-Trade, California has succeeded in reducing GHG emissions while also developing a cleaner, resilient economy that uses less energy and generates less pollution. Figure 4 depicts the trends in economic growth and GHG emissions.[9, 11]

[11] 2018 California GHG Emission Inventory, Scoping Plan Categorization. Retrieved from: https://www.arb.ca.gov/cc/inventory/data/tables/ghg_inventory_scopingplan_sum_00-16.xlsx

Figure 4 – Carbon Intensity of California Economy



Source: California Air Resources Board, 2018

Section 3: Key Climate Legislation and Directives

This section provides a summary of major climate legislation and executive orders that have shaped California's climate programs. These directives and legislation are the underpinnings for the GHG planning target requirements in the IRP process established by SB 350. Together they underscore the critical role the electricity sector has in achieving California's GHG emissions targets.

Assembly Bill 32 (AB 32) (Nuñez, Chapter 488, Statutes of 2006), California Global Warming Solutions Act of 2006

AB 32 codified California's first GHG target, calling on the State to reduce GHG emissions to 1990 levels by 2020 with maintained and continued reductions post-2020. California is on track to achieve its 2020 GHG reductions target earlier than 2020.

Senate Bill 1368 (SB 1368) (Perata, Chapter 598, Statutes of 2006), Emissions Performance Standards

SB 1368 limits long-term investment by the State's utilities in baseload generation to resources that meet emissions performance standards set by CEC and CPUC. The emissions performance standards have been a driving force behind phasing out of long-

term contracts for coal-fired generation with California utilities, and have a key role in decreasing GHG emissions in the electricity sector.[5]

Executive Order B-30-15

In his January 2015 inaugural address, Governor Brown identified actions in five key climate change strategy "pillars" necessary to meet California's ambitious climate change goals:

- Reducing today's petroleum use in cars and trucks by up to 50 percent
- Increasing from one-third to 50 percent our electricity derived from renewable sources
- Doubling the efficiency savings achieved at existing buildings and making heating fuels cleaner
- Reducing the release of methane, black carbon, and other short-lived climate pollutants
- Managing farm and rangelands, forests, and wetlands so they can store carbon

A "sixth pillar" of the Governor's strategy included safeguarding California in the face of a changing climate, highlighting the need to prioritize actions to reduce GHG emissions and build resilience in the face of a changing climate.

Consistent with these goals, Executive Order B-30-15 extended the goals of AB 32 and set a 2030 goal of reducing emissions 40 percent from 1990 levels. This action keeps California on target to achieve the level of reductions scientists say is necessary to meet the Paris Agreement goals.

Executive Order B-30-15 called on CARB, in coordination with sister agencies, to update the AB 32 Climate Change Scoping Plan to incorporate the 2030 target, which the Board adopted in December 2017.

Senate Bill 350 (SB 350) (De Leon, Chapter 547, Statutes of 2015), Clean Energy and Pollution Reduction Act of 2015

SB 350 built on two of the Governor's pillars from his 2015 inaugural address by increasing in the Renewable Portfolio Standard (RPS) to 50 percent by 2030 and directing the Energy Commission to establish targets for statewide energy efficiency savings to achieve a cumulative doubling of statewide energy efficiency savings in electricity and natural gas end uses by 2030.

SB 350 established the requirement to set GHG planning targets for use in IRP for the electricity sector as a whole and among individual POUs and LSEs.[12] Specific requirements include that LSEs and POUs develop IRPs that:

- Meet greenhouse gas reduction targets

[12] Load-serving entities include investor-owned utilities (IOUs), electric service providers (ESPs) and community choice aggregators (CCAs).

- Achieve 50 percent RPS
- Serve customers at just and reasonable rates
- Minimize impacts on ratepayers' bills
- Ensure system and local reliability
- Strengthen diversity, sustainability, and resilience of bulk transmission and distribution systems and local communities
- Enhance distribution systems and demand-side energy management
- Minimize localized air pollutants and other GHG emissions with early priority on disadvantaged communities

Specifically, as it relates to the greenhouse gas planning target, LSEs and POUs are to:

> "Meet the greenhouse gas emissions reduction targets established by the State Air Resources Board, in coordination with the [California Public Utilities Commission] and the Energy Commission, for the electricity sector and each load-serving entity [and publicly owned utility] that reflect the electricity sector's percentage in achieving the economy-wide greenhouse gas emissions reductions of 40 percent from 1990 levels by 2030."[13]

Senate Bill 32 (SB 32) (Pavley, Chapter 249, Statutes of 2016), California Global Warming Solutions Act of 2016

SB 32 affirms the importance of addressing climate change by codifying into statute the GHG emissions reductions target of at least 40 percent below 1990 levels by 2030 contained in Executive Order B-30-15. The 2030 target reflects the same science that informs the agreement reached in Paris by the 2015 Conference of Parties to the United Nations Framework Convention on Climate Change (UNFCCC), aimed at keeping the global temperature increase below 2 degrees Celsius (°C). California's 2030 target represents the most ambitious GHG reduction goal for North America. Based on the emissions reductions directed by SB 32, the annual 2030 statewide target emissions level for California is 260 MMTCO$_2$e.

2017 Scoping Plan Update

The 2017 Scoping Plan Update establishes a path that will enable California to achieve the 2030 GHG emissions reductions target set forth in SB 32. The 2017 Scoping Plan Update builds on the State's successes to date, proposing to strengthen major programs that have been a hallmark of success, while further integrating efforts to reduce both GHG emissions and air pollution.

The 2017 Scoping Plan Board Update Resolution 17-46 adopted by CARB directs staff to use the 2017 Scoping Plan Update to inform the GHG planning targets for the electricity sector and each retail electricity provider pursuant to SB 350.

[13] PU Code Section 454.52(a)(1)(a) and PU Code Section 9621(b)(1)

Board Resolution 17-46 states:

> "…the Board hereby determines that the Final Plan should inform the preliminary 2030 GHG planning target range for the electricity sector, which in coordination with the California Public Utilities Commission and the California Energy Commission, will be evaluated and revised, as appropriate, as part of the Board's process to establish GHG planning targets for the electricity sector and each load-serving entity for use in Integrated Resource Plans pursuant to SB 350."

Section 4: Planning Target Setting Process

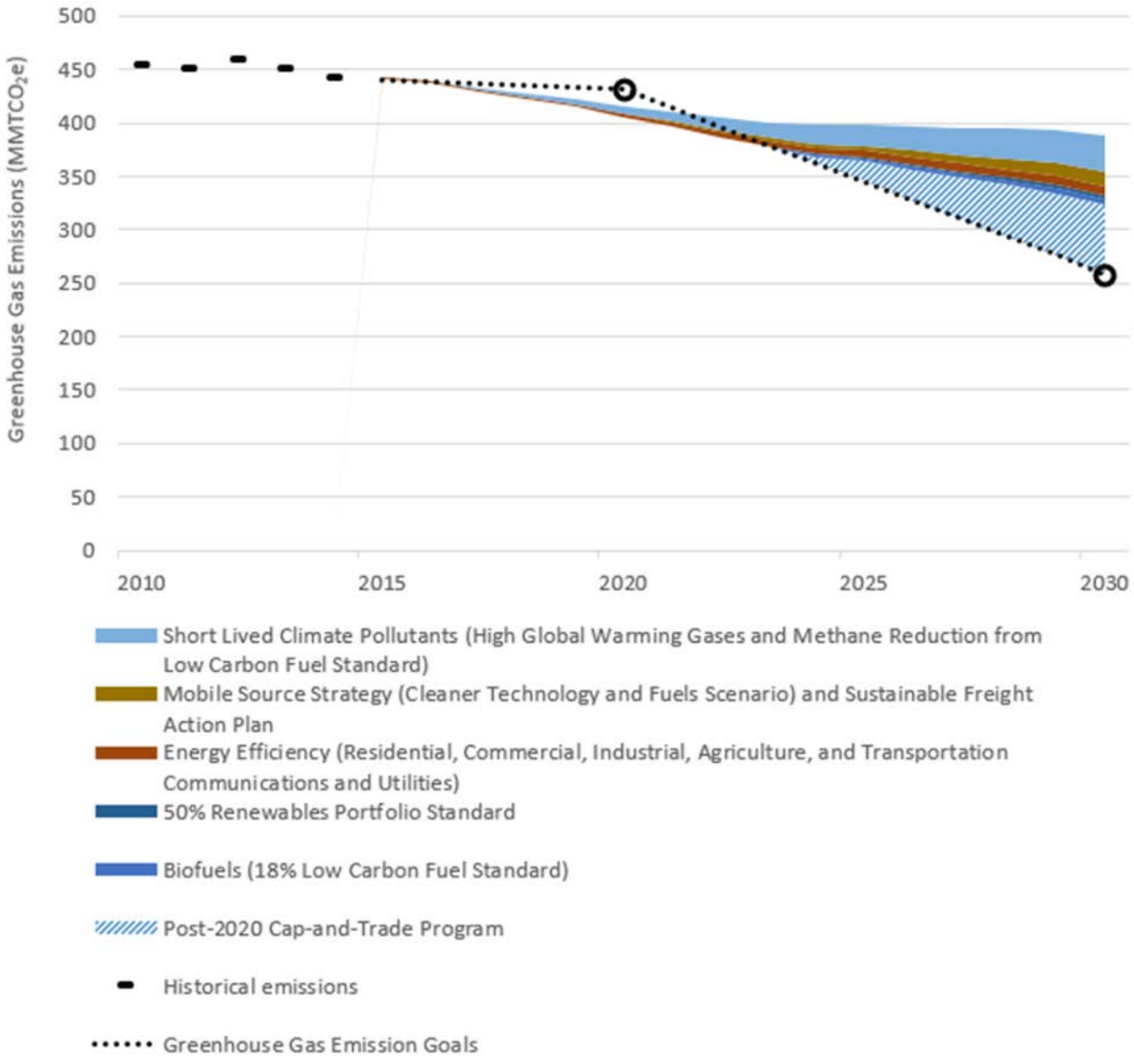
The 2017 Scoping Plan Update[3] informs CARB's approach to setting GHG planning target ranges. CARB staff considered the 2017 Scoping Plan Update and analysis; recommendations made by CEC and CPUC,[14] along with underlying information, data, and analyses; and public input.

2017 Scoping Plan Update

The 2017 Scoping Plan Update reflects the statewide goal of reducing GHG emissions 40 percent below 1990 levels by 2030 called for in SB 32. The 2017 Scoping Plan Update identifies an achievable and cost-effective path to reduce GHG emissions, which includes specific electricity sector actions such as implementation of the 50 percent RPS, doubling of energy efficiency savings, and additional emissions reductions via the Cap-and-Trade Program. Figure 5 illustrates the estimated emissions reductions associated with the measures evaluated in the 2017 Scoping Plan Update Scenario that achieves the State's 2030 GHG target.

[14] CPUC and CEC recommendations are included in Appendices A and B

Figure 5 – Scoping Plan Scenario from the 2017 Scoping Plan Update[15]



Source: California Air Resources Board, 2017

The 2017 Scoping Plan Update used PATHWAYS[16] to model different emissions pathways, or scenarios, that achieve the 2030 GHG emissions target, while acknowledging the need to continue these efforts for the State's long-term 2050 goal. PATHWAYS models GHG emissions while recognizing the integrated relationships of the industrial, economic and energy sectors. For example, if more electric vehicles are

[15] 2017 Scoping Plan Update, PATHWAYS Outputs (December 2017). Retrieved from: https://www.arb.ca.gov/cc/scopingplan/pathways_ghgs_by_measure_101917.xlsx
[16] California PATHWAYS Model Framework and Methods (January 2017). Retrieved from: https://www.arb.ca.gov/cc/scopingplan/california_pathways_model_framework_jan2017.pdf

added to the transportation sector, PATHWAYS responds by reflecting an energy demand increase in the electricity sector. PATHWAYS' ability to capture a subset of interactive effects of policies and measures helps to provide a representation of the interconnected nature of the system and impacts on GHG emissions.

In addition to using the PATHWAYS model to account for GHG emissions and interactive effects of policies, the 2017 Scoping Plan Update also includes an Uncertainty Analysis.[17] The Uncertainty Analysis examines the range of outcomes that could occur under the Scoping Plan Scenario of current and proposed GHG reduction policies and measures, including the measures that affect the electricity sector. The uncertainty factors included in the analysis are:

- Economic growth through 2030
- Emission intensity of the California economy
- Cumulative emissions reductions (2021 to 2030) achieved by the known commitments, including GHG reductions from SB 350 actions
- Cumulative emissions reductions (2021 to 2030) that can be motivated by emission prices under the Cap-and-Trade Program

While the Uncertainty Analysis shows a high probability of the suite of policies achieving the 2030 target, any one of the 2017 Scoping Plan Update measures has the potential to under- or over-perform, adding to the uncertainty of achieving the economy-wide 2030 GHG target. To the extent any measure interacts with the electricity sector, it further increases the uncertainty around the ultimate contribution from the electricity sector in achieving the 2030 target.

CEC and CPUC GHG Planning Target Recommendations

Per SB 350, CARB staff coordinated with CEC and CPUC staff to establish the GHG planning targets. CEC and CPUC made recommendations to CARB on the GHG planning targets for the electricity sector, POUs, and LSEs, as appropriate. Both CEC and CPUC explored defining an overall electricity sector GHG emissions planning target in 2030 for IRP purposes. In addition, CEC and CPUC each developed a methodology to divide the electricity sector planning target among relevant LSEs under CPUC's jurisdiction and POUs filing IRPs with CEC and to set LSE- and POU-specific GHG planning targets. This work formed the basis for CEC and CPUC recommendations for the planning targets. To view CPUC and CEC recommendations to CARB, see Appendices A and B.

Electricity Sector Target Recommendations

CPUC used a capacity-expansion model called RESOLVE to evaluate the need for new resources to achieve GHG planning targets at least cost, while also satisfying reliability

[17] Appendix E, Economic Analysis. 2017 Scoping Plan Update. Retrieved from: https://www.arb.ca.gov/cc/scopingplan/2030sp_appe_econ_final.pdf

requirements and other SB 350 objectives. CPUC analyzed three GHG emissions scenarios, which are further described below.[18] The CPUC based these scenarios on the 2030 electricity sector GHG range identified in the January 2017 Scoping Plan Update draft.[19]

Each scenario the CPUC modeled was designed to represent achievement of the 50 percent RPS requirement, plus roughly 1.5x energy efficiency (consistent with CEC 2016 Integrated Energy Policy Report (IEPR) Mid Additional Achievable Energy Efficiency (AAEE) + AB802 Efficiency),[20] the CPUC's storage requirements, and the continued deployment of rooftop solar under the net energy metering tariff. The CPUC's demand-side assumptions were largely based on the CEC 2016 IEPR Mid Case demand forecast.

- Default Scenario (52 $MMTCO_2e$): Reflected the impact of existing policies and baseline resources, including the 50 percent RPS, but without a binding constraint on GHG emissions by 2030. This scenario was designed to represent the electricity sector constrained by the 50 percent RPS, with the existing policy trajectory maintained.[21]
- 42 $MMTCO_2e$ Scenario: Reflected the midpoint of electricity sector emissions in the Scoping Plan and represented an increase in momentum from current policies, including achieving between 53–57 percent RPS-eligible resources by 2030. This scenario was shown to be roughly on the straight-line path from 2018 toward achieving the State's 2050 goal of 80 percent reductions in GHG emissions below 1990 levels.[22]
- 30 $MMTCO_2e$ Scenario: Reflected electricity sector emissions in the Scoping Plan using additional measures to achieve the statewide GHG emissions goal. In this scenario, the electricity sector contributed a larger share of emission reductions. The results of the CPUC's 30 $MMTCO_2e$ scenario suggested that additional electricity sector investments beyond those included in the 2017 Scoping Plan Update would be needed to achieve the State's economy-wide GHG reduction goals. The CPUC determined that at this time a 30 $MMTCO_2e$

[18] CPUC Proposed Reference System Plan (September 2017). Retrieved from: http://cpuc.ca.gov/uploadedFiles/CPUCWebsite/Content/UtilitiesIndustries/Energy/EnergyPrograms/ElectPowerProcurementGeneration/irp/AttachmentA.CPUC_IRP_Proposed_Ref_System_Plan_2017_09_18.pdf
[19] The 2017 Climate Change Scoping Plan Update: The Proposed Strategy for Achieving California's 2030 Greenhouse Gas Target (January 2017). Retrieved from: https://www.arb.ca.gov/cc/scopingplan/2030sp_pp_final.pdf
[20] CEC 2016 Integrated Energy Policy Report. Retrieved from: http://www.energy.ca.gov/2016_energypolicy/
[21] CPUC Decision (D.) 18-02-018 Retrieved from: http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M209/K771/209771632.PDF
[22] *Id.*

planning target would represent too high a cost burden for the electric sector relative to other sectors of the economy.[23]

Based on this analysis, the CPUC recommended a single point GHG planning target of 42 $MMTCO_2e$ by 2030 for the electricity sector as it represented an increase in momentum relative to current policies and was not so burdensome as to discourage electrification of transportation and natural gas end uses that would benefit the state as a whole.[24] Additionally, the CPUC adopted an optimal system-wide electric resource portfolio, or "Reference System Portfolio," that meets the single point 42 $MMTCO_2e$ GHG planning target and provides planning direction for its jurisdictional load-serving entities. The CPUC point target recommendation is within the 2017 Scoping Plan Update electricity sector range. While a point target can be useful for implementation purposes, the range construct, described below in section 5, is CARB's preferred approach to establishing the GHG planning target in order to provide flexibility and reflect uncertainty of electricity load and supply in 2030.

CEC recommended that CARB establish the electricity sector planning target, and that CARB apportion the electricity sector planning target among POUs using estimated future GHG emissions for the year 2030 for each of these entities from information developed for CARB's Cap-and-Trade Program 2021-2030 Allowance Allocation to Electrical Distribution Utilities (EDUs).[25] The GHG range for the electricity sector from the 2017 Scoping Plan Update was discussed as an option in a draft CEC staff proposal,[26] at joint agency public workshops, [27] and is included in CEC's recommendations to CARB in Appendix B.

Individual POU and LSE Target Recommendations

For establishing individual POU and LSE planning targets, both CEC and CPUC recommended a process that apportions the electricity sector planning target to POUs and CPUC jurisdictional LSEs based on estimated GHG emissions for the year 2030 from information developed for CARB Cap-and-Trade Program 2021-2030 Allowance

[23] *Id.* Finding of Fact 5

[24] Note that due to differences in how CARB and the CPUC account for GHG emissions from combined heat and power facilities sited at industrial facilities, the CPUC estimates the single point 42 MMT GHG planning target equates to approximately 46 MMT under the Scoping Plan Update.

[25] EDUs are defined in the Cap-and-Trade Regulation as entities that own and/or operate an electrical distribution system and include POUs, IOUs and cooperatives. See 2021-2030 EDU Allocation Spreadsheet (April 2017) for the estimated future GHG emissions by EDU. Retrieved from: https://www.arb.ca.gov/regact/2016/capandtrade16/attach10.xlsx

[26] CEC Draft Staff Paper: Proposed Guideline Topics for Publicly Owned Utilities' Integrated Resource Plans, February 2017. Http://docketpublic.energy.ca.gov/publicdocuments/17-IEPR-07/TN216093_20170217T143155_DRAFT_STAFF_PAPER_Proposed_Guideline_Topics_for_Publicly_Owned.pdf

[27] See Joint Agency Workshop on 2030 Greenhouse Gas Emission Reduction Targets for Integrated Resource Planning, February 23, 2017; Workshop to Discuss SB 350 Integrated Resource Plans, March 2, 2018

Allocation to EDUs.[28] For POUs, the CEC recommended that the electricity sector planning target be scaled by each POU's share of total 2030 GHG emissions across all EDUs. CPUC recommended two options for LSEs to demonstrate compliance with the single point 42 $MMTCO_2e$ GHG planning target for the electricity sector: 1) through use of the GHG Planning Price of $150 per $MTCO_2e$ in 2030,[29] which is an output of RESOLVE, or 2) a mass-based, LSE-specific GHG benchmark based on estimated emissions for the year 2030 from information developed for the CARB Cap-and-Trade Program 2021-2030 Allowance Allocation to EDUs. The LSE-specific GHG Benchmarks, proposed by CPUC, include a further proportional division among the host-EDU (Investor Owned Utilities) and non-EDUs within the host-EDU's territory (Community Choice Aggregators and Electric Service Providers)[30] based on their projected 2030 load shares. As described below in Section 6, CARB's proposed approach to establishing LSE and POU GHG planning target ranges reflects both CEC's proposed apportionment methodology and CPUC's benchmarking approach, and results in a range that encompasses CPUC's recommended point estimate.

Public Engagement

Since December 2015, CARB staff has coordinated with CEC and CPUC per SB 350, and has engaged with a wide range of public stakeholders to establish the GHG planning targets. CARB, CEC, and CPUC workshops were made available via webcast, and a web-based comment system was established to provide stakeholders with a medium to publicly communicate their comments to CARB, CEC, and CPUC staff on an ongoing basis.

On December 14, 2015, CARB held a public workshop to kick-off the process of implementing the SB 350 mandates for the electricity sector. Throughout 2015, 2016, and 2017, CARB hosted more than 15 public workshops as part of the 2017 Scoping Plan Update process, including the August 23, 2016 Scoping Plan workshop on the GHG emissions in the electricity sector.

In developing the 2017 Scoping Plan Update, CARB staff maintained a multi-year engagement with the Environmental Justice Advisory Committee (Committee). Starting in July 2016, the Committee, a Legislatively created advisory body, convened almost 20 community meetings throughout California to discuss the 2017 Scoping Plan Update, in

[28] The use of the projected emissions developed in support of the 2021-2030 Allowance Allocation to EDUs as a basis to set GHG planning targets is for IRP planning purposes only and does not affect EDU compliance obligations or allowance allocation within the Cap-and-Trade Program.
[29] The CPUC's GHG Planning Price is distinct from Cap-and-Trade allowance prices. The GHG Planning Price was developed by CPUC to reflect the expected amount LSEs should be willing to pay for marginal GHG emissions reductions in order to meet CPUC's 42 MMT GHG Planning Target in IRPs, and is a tool to guide LSE procurement and planning, not a compliance instrument.
[30] CCAs are governmental entities formed by cities and counties as authorized under PU Code Section 366 to procure electricity for their residents, businesses, and municipal facilities within the service territory of IOUs. ESPs are non-utility entities authorized under PU Code Section 394 that offer direct access electric service to customers within the service territory of IOUs. IOUs provide transmission and distribution service for both CCAs and ESPs.

addition to 20 meetings of its own to provide recommendations. CARB staff coordinated with staff from local government agencies and sister State agencies to contribute insights to the community engagement process. At the community meetings, staff from State and local agencies participated in extensive, topic-specific "world café" discussions with local groups and individuals, including on the electricity sector. The extensive dialogue between the Committee, State agencies, and local agencies provided community residents the opportunity to share concerns and provide input on ways California can meet its 2030 GHG target while addressing a number of environmental and equity issues. For the energy sector, the Committee provided the following key recommendations:

- Developing aggressive energy goals toward 100 percent renewable energy by 2030, including a vision for a clean energy economy, and prioritizing actions in disadvantaged communities
- Setting goals for green buildings
- Enforcing GHG reduction targets for existing buildings, and providing upgrades that enable buildings to use renewable energy technologies and water capture
- Prioritizing and supporting community-owned technologies, such as community-owned solar, for environmental justice communities

On February 23, 2017, CARB participated in the joint agency workshop on 2030 GHG reduction targets for IRP with CEC and CPUC, and on April 17, 2017 CARB presented at the CEC-organized workshop on potential methodologies to establish POU GHG planning targets for IRP. On March 2, 2018, CARB hosted a joint agency workshop with CEC and CPUC to discuss GHG planning targets and the GHG planning target setting process and requested written comments from stakeholders.

In addition to these efforts, CEC and CPUC organized workshops with their respective stakeholders to gather additional input on GHG planning targets and the broader IRP process. CEC has held numerous workshops and webinars since 2016 to obtain stakeholder feedback on IRP, including February and April 2017 joint agency workshops on GHG planning targets.[31] Likewise, CPUC has engaged with stakeholders in a variety of ways since 2016, including through eight public workshops; 13 webinars on modeling, scenario development, and other technical aspects of IRP; 11 staff proposals and other work products; and review of public comments from over 50 parties.[32] On February 13, 2018, CPUC adopted the process and requirements for LSEs to file IRPs.[21] CPUC and CEC submitted their recommendations on the GHG planning targets, which can be found in Appendices A and B, to CARB on March 27, 2018 and April 12, 2018 respectively.

[31] CEC Workshops and Meetings, Integrated Resource Plans. Retrieved from: http://www.energy.ca.gov/sb350/IRPs/documents/
[32] CPUC IRP Events and Materials. Retrieved from: http://www.cpuc.ca.gov/General.aspx?id=6442451195

On April 27, 2018, CARB released the "Draft Staff Report: Senate Bill 350 Integrated Resource Planning Electricity Sector Greenhouse Gas Planning Targets" (Draft Staff Report) containing proposed GHG planning targets for the electricity sector, and each applicable LSE and POU. An accompanying Draft Environmental Assessment was also released for 45-day public review starting on April 27, 2018, and ending on June 11, 2018. CARB hosted a public workshop on April 30, 2018 on the draft GHG planning targets, which provided an additional opportunity to engage with the public on setting electricity sector, LSE, and POU GHG planning targets.

Staff evaluated public comments and updated the Staff Report to improve clarity, add detail, and utilize comparable and consistent, publicly available data. Some of the public comments recommended specific technologies or approaches to reduce electricity sector GHG emissions, methodologies to estimate future GHG emissions, and additional data. While these comments were deemed out of scope for establishing GHG planning targets, entities filing IRPs may choose to review and to consider these concepts when developing their IRPs.

Section 5: Proposed GHG Planning Target Range for the Electricity Sector

Pursuant to Board Resolution 17-46, CARB staff is using the 2017 Scoping Plan Update to inform the GHG planning targets pursuant to SB 350. The 2017 Scoping Plan Update identifies an achievable and cost-effective path to reduce GHG emissions in achieving the 2030 GHG target. As described in Section 4, the 2017 Scoping Plan Update used PATHWAYS to model different GHG emissions scenarios that achieve the 2030 GHG target, while recognizing the integrated relationships of the industrial, economic and energy sectors.[16]

The 2017 Scoping Plan Update includes a range of GHG emissions by sector in 2030 as shown in Table 1.[33] The sector ranges in Table 1 include the electricity sector range, and these ranges may change in response to how the sectors respond to the Cap-and-Trade Program. The 2030 electricity sector range from the Scoping Plan forms the basis for the GHG planning target ranges.

[33] The low end of the sector range is the estimated emissions from the Scoping Plan Scenario, and the high end adjusts the expected emissions by a risk factor that represents sector under-performance – with two exceptions. The electric power range is represented on the high end by the Scoping Plan Scenario and, on the low end, by enhancements and additional electricity sector measures such as deployment of additional renewable power, greater behind-the-meter solar PV and additional energy efficiency. High GWP GHG emissions are anticipated to increase by 2030. As such, the high end of the sector range is the estimated emissions from the Scoping Plan Scenario and the low end adjusts the expected emissions by a risk factor that represents sector over-performance.

Table 1 – Estimated 2030 GHG Emissions by Sector ($MMTCO_2e$)[3]

	1990	2030 Scoping Plan Ranges	% change from 1990
Agriculture	26	24–25	-8 to -4
Residential and Commercial	44	38–40	-14 to -9
Electric Power	108	30–53	-72 to -51
High GWP	3	8–11	267 to 367
Industrial	98	83–90	-15 to -8
Recycling and Waste	7	8–9	14 to 29
Transportation (Including TCU)	152	103–111	-32 to -27
Natural Working Lands Net Sink	-7	TBD	TBD
Sub Total	431	294–339	-32 to -21
Cap-and-Trade Program	n/a	34–79	n/a
Total	431	260	-40

The electricity sector contribution shown in Table 1 will vary depending on the degree of transportation electrification and building energy demand, the degree of energy efficiency demand reduction, and the degree of electrification in the industrial sector, among other factors. The Scoping Plan scenario represents existing programs or actions required by statute (see Figure 5) and results in electricity sector GHG emissions of 53 $MMTCO_2e$ (excluding any additional contribution from the electricity sector associated with the Cap-and-Trade Program). An alternative scenario developed as part of the 2017 Scoping Plan Update includes additional energy efficiency gains, additional ZEVs, and an increase in the RPS, among other measures, that result in electricity sector GHG emissions as low as 30 $MMTCO_2e$.[34]

Uncertainty is inherent in forecasting future emissions. Modeled scenarios incorporate expectations that existing programs continue in their current form and drivers of GHG emissions, such as energy demand, population growth, and economic growth, match modeled projections. It is unlikely that the future will precisely match projections, and use of the modeled range of electricity sector GHG emissions, versus a point estimate, captures some of this uncertainty. Plans for the future electricity sector will reflect similar uncertainties. CARB anticipates IRPs will be based on best available assumptions about current and future projections for electricity demand (e.g., IEPR[35]).

CARB's proposed GHG planning target range for the electricity sector is a range of 30 $MMTCO_2e$ to 53 $MMTCO_2e$. This translates to a GHG decrease in the electricity sector of 55 MMTCO2e to 78 MMTCO2e from 1990 levels by 2030, or 51 to 72 percent below 1990 levels.

[34] For a summary of assumptions, see Appendix D, PATHWAYS from the 2017 Scoping Plan Update. Retrieved from: https://www.arb.ca.gov/cc/scopingplan/2030sp_appd_pathways_final.pdf
[35] For this cycle of IRP, the "2017 Integrated Energy Policy Report" is the most recently adopted IEPR. Retrieved from: http://www.energy.ca.gov/2017_energypolicy/

Alternatives Evaluated

In developing the proposed electricity sector GHG planning target range, CARB evaluated and considered alternative electricity sector ranges and setting an electricity sector point planning target. The specific alternatives evaluated included:

- 30 $MMTCO_2e$ to 42 $MMTCO_2e$ GHG planning target range. This range reflects increased action beyond existing statutes or other requirements, such as greater deployment of renewable energy and increased energy efficiency, or potentially new responses and innovative technologies developed by POUs and LSEs.
- 42 $MMTCO_2e$ to 53 $MMTCO_2e$ GHG planning target range. This reflects some increased action beyond existing statutes or other requirements, such as greater deployment of renewable energy and increased energy efficiency, or potentially new responses and innovative technologies developed by POUs and LSEs.
- 65 $MMTCO_2e$ GHG planning target point. This point target equates to 40 percent below the 1990 levels of electricity sector GHG emissions, which were 108 $MMTCO_2e$ in 1990.

LSEs and POUs each cover different regions of the state and these regions can vary greatly in terms of climate, population, future load growth, and access to transmission.[36,37] These factors may impact the ability of some LSEs and POUs to cost-effectively achieve GHG reductions at the lower end of the range. Technological advancements and progress of greater than expected renewable deployment would lend itself to support a lower GHG planning target range of 30 $MMTCO_2e$ to 42 $MMTCO_2e$ for a subset of the POUs and LSEs, but not all. In addition to technological feasibility, our evaluations also considered cost effectiveness, as the State is attempting to achieve GHG reductions across all sectors with the least cost impact to the economy and households. As described in Section 4, CPUC's IRP modeling results estimated higher costs for meeting 30 $MMTCO_2e$, at this time.[38] CPUC also found that the load-serving entities could meet their share of a 42 $MMTCO_2e$ target in a cost-effective manner.[39] Based on these factors, CARB determined that a more ambitious and

[36] *See,* City of Pasadena Comments on the March 2, 2018 Joint Agency Workshop on SB 350 Integrated Resource Plans, p. 2: Available at: https://www.arb.ca.gov/lists/com-attach/9-carbsb350irp-ws-AXFWJwNyAw8CZwhn.pdf
[37] *See*, California Independent System Operator, 2017-2018 Transmission Plan, March 22, 2018 p.53. Available at: http://www.caiso.com/Documents/BoardApproved-2017-2018_Transmission_Plan.pdf
[38] Attachment A: *CPUC Energy Division Proposed Reference System Plan* from Administrative Law Judge's Ruling Seeking Comment on Proposed Reference System Plan and Related Commission Policy Actions, September 19, 2017, p.65. Retrieved from: http://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M195/K910/195910807.PDF
[39] California Public Utilities Commission Decision (D.) 18-02-018, Finding of Fact 4.

narrower range of 30 $MMTCO_2e$ to 42 $MMTCO_2e$ may not be achievable for all POUs and LSEs due to cost-effectiveness and other unique regional factors.[40]

However, a narrower, higher range of 42 $MMTCO_2e$ to 53 $MMTCO_2e$ may not be sufficiently broad to signal and enable deeper reductions possible for some LSEs and POUs. Deployment of additional renewable power beyond the SB 350 mandate of 50 percent RPS is likely feasible from a technological perspective, based on the largest three IOUs' aggregated forecast that they will meet the 50 percent RPS requirement ten years early, by 2020.[41] Some POUs are also planning for renewable procurement goals that go beyond the RPS level, indicating that additional GHG emissions reductions are possible.[42] As indicated above, CPUC modeling results estimated that for LSEs, 42 $MMTCO_2e$ is likely achievable in a cost-effective manner. In addition, CPUC found that approximately 51 $MMTCO_2e$ is not aggressive enough for LSEs and that the electric sector could do more to reduce GHGs without creating undue cost burdens.[21] An electric sector GHG planning target range that is limited to the upper half of the proposed range will likely result in fewer or less aggressive GHG reduction options and may limit the measures considered and technologies explored to achieve GHG reductions. In addition, the narrow upper range may not accommodate the POUs and LSEs planning for greater GHG reductions.

CARB also evaluated a 65 $MMTCO_2e$ point planning target in 2030. This is higher than the estimated electricity sector GHG emissions in 2030 under business-as-usual conditions (62 $MMTCO_2e$)[43] and equates to less than a 41 percent RPS in 2030, which is inconsistent with the 50 percent RPS mandate in SB 350. Planning for an increase in GHG emissions in the electricity sector is in opposition to achieving the SB 32 mandated economy-wide GHG emissions reductions of 40 percent below 1990 levels by 2030 and other State mandates. With the potential for increased load due to greater electrification and load shift from transportation and other sectors in 2030, it is important to explore electricity generation options such that increased demand does not equate to increased GHG emissions. This concern is reduced as the electricity sector is further decarbonized over the next 15 to 30 years. In addition, a point target does not accommodate for uncertainty inherent in future load and supply projections or LSE- and POU-specific constraints, noted above.

CARB's proposed GHG planning target for the electricity sector is a range of 30 $MMTCO_2e$ to 53 $MMTCO_2e$. This range is sufficiently ambitious on the low end to

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[40] *See,* Turlock Irrigation District Comments on March 2, 2018 Workshop to Discuss SB 350 Integrated Resource Plans, p.2. Available at: https://www.arb.ca.gov/lists/com-attach/10-carbsb350irp-ws-UWBWaFdmAmIHMwU2.pdf

[41] CPUC Renewables Portfolio Standard Annual Report, November 2017. Retrieved from: http://www.cpuc.ca.gov/uploadedFiles/CPUC_Website/Content/Utilities_and_Industries/Energy/Reports_and_White_Papers/Nov%202017%20-%20RPS%20Annual%20Report.pdf

[42] *See,* SMUD Comments on the March 2, 2018 Joint Agency Workshop on SB 350 Integrated Resource Plans, p. 2: Available at: https://www.arb.ca.gov/lists/com-attach/5-carbsb350irp-ws-BmoFZgRiBAgANAIy.pdf

[43] 2017 Scoping Plan Update Reference Scenario

support those POUs and LSEs planning for greater reductions, avoids planning for increases in GHG emissions in the sector, and is consistent with other State mandates. It should also enable POUs and LSEs to evaluate and balance GHG emission reductions with other objectives, including ratepayer impacts, reliability, and local needs. As this range would result in a 51 to 72 percent reduction in the electricity sector's GHG emissions relative to 1990 levels, while recognizing the spectrum of unique factors across different LSEs and POUs, staff believes this range is appropriate to support the flexibility needed to establish initial realistic and achievable IRPs that also take into consideration of ratepayer impacts. Experiences gained during development and implementation of the first IRPs will help inform future efforts to revise the sector and LSE and POU planning ranges.

Section 6: Proposed GHG Planning Target Ranges for POUs and LSEs

Under SB 350, CARB must establish GHG planning targets for individual POUs and LSEs. Staff proposes to utilize the information developed for CARB's Cap-and-Trade Program 2021-2030 Allowance Allocation to EDUs[44] as the basis of apportionment for POUs and IOUs. The information in the EDU Allocation Spreadsheet[45] includes estimated future GHG emissions for each of these entities. These estimates provide a transparent basis for calculating the relative proportion of GHG emissions in 2030 associated with individual POUs and IOUs. The methodology to allocate allowances to EDUs, including the data in the EDU Allocation Spreadsheet, was developed through a multi-year public process. It was adopted by the Board in July 2017 and became effective October 1, 2017.[46]

CARB allocates allowances to EDUs on behalf of electricity ratepayers to ensure that ratepayers do not experience sudden increases in their electricity bills associated with the Cap-and-Trade Regulation.[47] In order to allocate these allowances, the Cap-and-Trade Program developed a methodology to estimate the cost burden to electricity

[44] Attachment C: 2021-2030 Allowance Allocation to Electrical Distribution Utilities. Retrieved from: https://www.arb.ca.gov/regact/2016/capandtrade16/attachc.pdf.
[45] 2021-2030 EDU Allocation Spreadsheet: Retrieved from: https://www.arb.ca.gov/regact/2016/capandtrade16/attach10.xlsx. Note EDU-specific GHG emissions are listed on tabs for each EDU; EDU-specific GHG emissions include the industrial source electricity demand in the spreadsheet. Industrial source electricity demand is excluded for EDU allowance allocation purposes.
[46] Regulation for the California Cap on Greenhouse Gas Emissions and Market-Based Compliance Mechanisms (October 2017) Retrieved from: https://www.arb.ca.gov/cc/capandtrade/capandtrade/unofficial_ct_100217.pdf, https://www.arb.ca.gov/regact/2016/capandtrade16/ctfinro.pdf and Attachment C, 2021–2030 Allocation to Electrical Distribution Utilities (December 2016) https://www.arb.ca.gov/regact/2016/capandtrade16/attachc.pdf
[47] The Regulation stipulates that EDUs must use the value associated with these allowances for the benefit of retail ratepayers of each EDU, consistent with the goals of AB 32.

ratepayers of compliance with the Cap-and-Trade Program. The cost burden is based on estimates of future GHG emissions associated with their loads and related costs that utilities are likely to face due to compliance with the Cap-and-Trade Program.

The EDU Allocation Spreadsheet utilizes 2015 EDU-specific electricity demand and supply forecasts submitted to CEC.[48] These forecasts were the most recent, publicly available projections of load and EDU resources at the time the EDU Allocation Spreadsheet was developed. Resource-specific emissions factors were applied to the forecast electricity supply to estimate GHG emissions for each EDU in the years 2021 through 2030. Resulting EDU-specific GHG emissions were reviewed through the multi-year public process prior to the Board adoption of the allocation methodology and provide a robust basis for estimating the relative proportion of future GHG emissions by EDU. Staff proposes to use the 2030 GHG emissions estimates from the EDU Allocation Spreadsheet to apportion the electricity sector GHG planning target range among the POUs and IOUs.

More recent projections of future electricity demand and expected resource supply are now available. Because updating inputs for one utility impacts planning targets for all utilities, new data must be carefully considered. EDU-specific GHG emissions estimates associated with updated electricity demand and supply projections have not gone through CARB's public review process. Therefore, it would be premature to incorporate these changes at this time. In addition, as some utilities have begun to make resource commitments to achieve GHG reductions, updating the inputs could reduce the GHG planning target ranges for these utilities. Establishing a common baseline for the GHG planning targets utilizing the 2030 emissions projections from the Board-adopted EDU allocation methodology ensures early action is not penalized while providing a clear basis for the initial GHG planning targets. In recognition of the inherent uncertainty and ongoing improvements in projecting future load growth, staff proposes to establish GHG planning target ranges. Each entity is expected to reflect the most recent load projections in its IRP and evaluate the resource supply options to meet its multiple needs. In doing so, Staff expects the resulting IRPs to consider and evaluate whether and how future load growth will impact future resource needs and the ability to meet the GHG planning targets. GHG planning targets will be updated periodically.

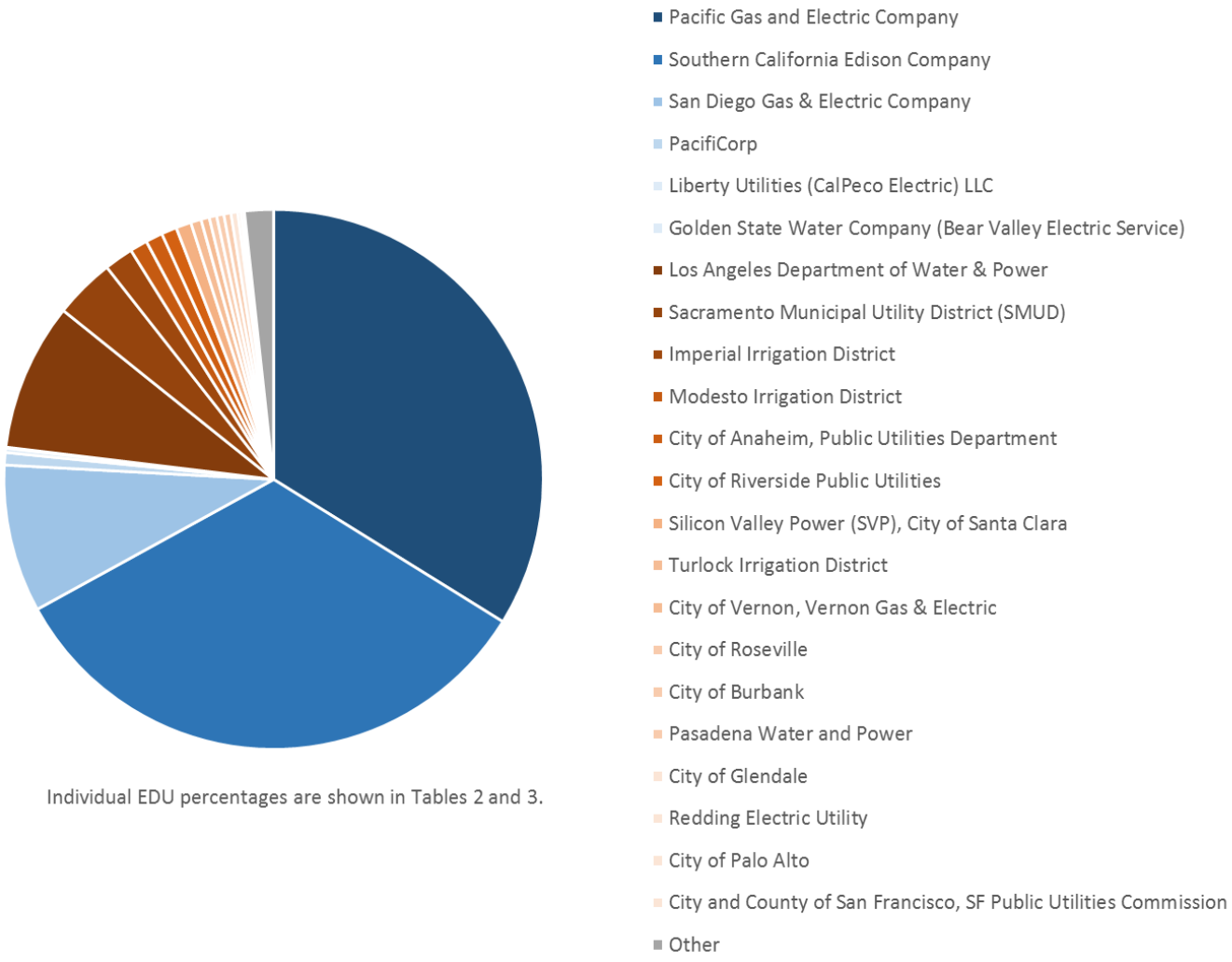
The use of the 2030 GHG emissions estimates from the EDU Allocation Spreadsheet as a basis to set GHG planning target ranges is for IRP planning purposes only and does not affect EDU compliance obligations or allowance allocation within the Cap-and-Trade Program.

Staff proposes to utilize the percentage of 2030 GHG emissions associated with each EDU from the EDU Allocation Spreadsheet in order to apportion the electricity sector GHG planning target range to individual POUs and IOUs. Since IRPs should reflect

[48] 2015 Integrated Energy Policy Report. Retrieved from: http://www.energy.ca.gov/2015_energypolicy/

total electricity demand, the estimated 2030 GHG emissions for the electricity use of covered industrial sources are included in the corresponding EDU proportions of 2030 GHG emissions.[49] Figure 6 shows the proportion of 2030 electricity sector GHG emissions associated with EDUs, the majority of which are required to prepare IRPs under SB 350. The percentage of 2030 electricity sector GHG emissions by EDU is listed in Tables 2 and 3.

Figure 6 – Proportion of 2030 Electricity Sector GHG Emissions by EDU



Source: California Air Resources Board, 2018

Of the 54 EDUs that receive freely allocated allowances in the Cap-and-Trade Program, six EDUs representing 76.9 percent of the 2030 electricity sector GHG emissions report to the CPUC (blue) and 16 EDUs representing 21.4 percent of the electricity sector GHG emissions report to the CEC (brown). There are 32 EDUs representing 1.7

[49] Some EDUs detailed electricity demand and emissions projections have been redacted due to the confidential nature of the electricity demand for some industrial sources.

percent of the 2030 electricity sector GHG emissions that fall under the three-year average annual threshold of 700 gigawatt hours (grey) and are not required to prepare IRPs. Of these, four are cooperatives that report to the CPUC (0.07 percent of the 2030 electricity sector GHG emissions).

This differentiation among entities is relevant for determining which entities have an IRP filing requirement and thus require a GHG planning target, in addition to categorizing entities by LSE and POU classifications pursuant to the requirements of SB 350. The percentages attributed to each EDU are relevant for purposes of establishing each entity's GHG planning target range, as discussed in subsequent sections.

Proposed GHG Planning Target Ranges for POUs

The 2030 GHG emissions percentage associated with each of the 16 POUs that are required to submit IRPs to the CEC is multiplied by the electricity sector GHG planning target range, 30 $MMTCO_2e$ (low) to 53 $MMTCO_2e$ (high). Table 2 lists each POU, the associated proportion of the 2030 electricity sector GHG emissions, and the corresponding 2030 GHG planning target range. The GHG planning target ranges for POUs are consistent with the CEC recommendations in Appendix B.

Table 2 – Proposed GHG Planning Target Ranges for POUs

Publicly Owned Utility	Percentage of 2030 Electricity Sector Emissions*	2030 GHG Planning Target Range, 30-53 MMTCO2e**	
		Low ($MTCO_2e$)	High ($MTCO_2e$)
City of Burbank	0.430%	129,000	228,000
City of San Francisco	0.041%	12,000	22,000
City of Anaheim	1.015%	305,000	538,000
City of Palo Alto	0.174%	52,000	92,000
City of Pasadena	0.426%	128,000	226,000
City of Riverside	0.918%	275,000	487,000
City of Vernon	0.497%	149,000	263,000
City of Glendale	0.396%	119,000	210,000
Imperial Irrigation District	1.745%	524,000	925,000
Los Angeles Department of Water & Power	8.851%	2,655,000	4,691,000
Modesto Irrigation District	1.055%	317,000	559,000
City of Redding	0.191%	57,000	101,000
City of Roseville	0.452%	136,000	240,000
Silicon Valley Power	0.915%	275,000	485,000
Sacramento Municipal Utility District	3.621%	1,086,000	1,919,000
Turlock Irrigation District	0.629%	189,000	333,000

* Percentage of 2030 Electric Sector Emissions are rounded to the nearest thousandth.

** Emission targets for each utility are rounded to the nearest 1,000 $MTCO_2e$.

Proposed GHG Planning Target Ranges for LSEs

A growing number of LSEs are required to submit IRPs to CPUC, particularly as new Community Choice Aggregators (CCAs) are forming. CCAs and Electricity Service Providers (ESPs) serve load but are not EDUs.[30] Each of these entities is located in or can be associated with a host-EDU's (IOU) territory. In order to develop GHG planning target ranges for these LSEs, the GHG planning target ranges associated with the host-EDU are apportioned to the host-EDU and any CCAs or aggregated ESPs operating in the host-EDU territory. The apportionment is equivalent to the projected 2030 electricity demand of the LSE relative to the host-EDU. For most LSEs, the projected 2030

demand for IRP planning purposes is equivalent to what was reported in the adopted 2017 IEPR demand forecasts.[50]

For example, Sonoma Clean Power (SCP) is a CCA operating within the territory of host-EDU, Pacific Gas and Electric Company (PG&E). Based on the EDU Allocation Spreadsheet, PG&E is associated with 33.8 percent of projected 2030 GHG emissions. The 2017 IEPR forecast estimates that SCP will provide 3.1 percent of the electricity demand associated with PG&E. Therefore, the 2030 GHG emissions proportion associated with SCP is 33.8 percent * 3.1 percent or 1.1 percent of the electricity sector GHG planning target range.

Some LSEs, however, were not reflected in the 2017 IEPR demand forecast due to their very recent formation. Because those LSEs are expected to file IRPs with the CPUC in 2018, they were requested by an administrative law judge ruling to file a motion providing their annual demand forecasts until 2030, so that their load would be accounted for and their GHG planning targets could be estimated.[51] Furthermore, all LSEs were permitted the option to file a motion in the CPUC IRP proceeding to modify their 2030 demand forecasts for IRP planning purposes, in case the LSE's internal demand forecast had materially changed since the adoption of the 2017 IEPR. A total of eight CCAs (five of which are new) were assigned forecasts by the CPUC that differ from the 2017 IEPR, in addition to three IOUs whose forecasts were changed as a result of the load departure to CCAs.[52] The apportionment formula described above has been applied to each of these LSE's forecasts as well.

The 2030 GHG emissions percentage associated with each of the LSEs that are required to submit IRPs to the CPUC is multiplied by the electricity sector GHG planning target range, 30 $MMTCO_2e$ to 53 $MMTCO_2e$. Table 3 lists each LSE, the associated proportion of the 2030 GHG emissions, and the corresponding 2030 GHG planning target range. In addition, Table 3 includes the host-EDU proportion of the estimated 2030 GHG emissions and the proportion of 2030 electricity demand for the EDU and

[50] 2017 Integrated Energy Policy Report, Form 1.1c California Energy Demand Forecast 2018 - 2030, Mid Demand Baseline Case, Mid AAEE and AAPV Savings. Retrieved from: http://docketpublic.energy.ca.gov/PublicDocuments/17-IEPR-03/TN222582_20180216T094947_LSE_and_BA_Tables_Mid_Baseline_Demand_Mid_AAEEAAPV_Revised_CCA.xlsx

[51] Administrative Law Judge's Ruling Seeking Comment on Greenhouse Gas Emissions Accounting Methods And Addressing Updated Greenhouse Gas Benchmarks, available at: http://docs.cpuc.ca.gov/SearchRes.aspx?docformat=ALL&docid=212646820

[52] New or amended load forecasts were assigned to the following LSEs: Clean Power San Francisco, Desert Community Energy, King City, Los Angeles Community Choice Energy, Marin Clean Energy, Rancho Mirage Energy Authority, San Jacinto Power, Pacific Gas and Electric, San Diego Gas & Electric, Solana Beach, and Southern California Edison Company. See http://docs.cpuc.ca.gov/SearchRes.aspx?docformat=ALL&docid=216500593.

CCAs or ESPs operating in the host-EDU territory.[53] The GHG planning target ranges for LSEs are consistent with the CPUC recommendations in Appendix A.

[53] Each ESP is provided one aggregate GHG planning target range for all load served statewide; see Table 4 for individual ESP GHG planning target ranges.

Table 3 – Proposed GHG Planning Target Ranges for LSEs

Electric Distribution Utility	Load Serving Entity	Host-EDU percentage of 2030 Electricity Sector GHG Emissions*	Percentage of 2030 Host-EDU Electricity Demand*	Percentage of 2030 Electricity Sector GHG Emissions*	2030 GHG Planning Target Range, 30-53 $MMTCO_2e$**	
					Low ($MTCO_2e$)	High ($MTCO_2e$)
Pacific Gas and Electric Company	Pacific Gas and Electric Company	33.837%	42.725%	14.457%	4,337,000	7,662,000
	Aggregated Electricity Service Providers		11.898%	4.026%	1,208,000	2,134,000
	Marin Clean Energy CCA		8.490%	2.873%	862,000	1,523,000
	Sonoma Clean Power CCA		3.133%	1.060%	318,000	562,000
	Clean Power San Francisco Clean CCA		4.658%	1.576%	473,000	835,000
	Peninsula Clean Energy Authority CCA		4.473%	1.514%	454,000	802,000
	Silicon Valley Clean Energy CCA		4.364%	1.477%	443,000	783,000
	Redwood Coast Energy Authority CCA		0.779%	0.264%	79,000	140,000
	Pioneer Community Energy CCA		1.344%	0.455%	137,000	241,000
	Monterrey Bay Community Power Authority CCA		4.163%	1.409%	423,000	747,000
	East Bay Community Energy CCA		7.668%	2.595%	779,000	1,375,000
	Valley Clean Energy Alliance CCA		0.907%	0.307%	92,000	163,000
	San Jose City CCA		5.349%	1.810%	543,000	959,000
	King City Community Power CCA		0.050%	0.017%	5,000	9,000
Southern California Edison Company	Southern California Edison Company	33.171%	67.450%	22.374%	6,712,000	11,858,000
	Aggregated Electricity Service Providers		14.603%	4.844%	1,453,000	2,567,000
	Lancaster Energy Clean CCA		0.731%	0.242%	73,000	128,000
	Apple Valley Choice Energy CCA		0.252%	0.084%	25,000	45,000
	Pico Rivera Innovative Municipal Energy CCA		0.088%	0.029%	9,000	15,000
	Los Angeles Community Choice Energy CCA		14.302%	4.744%	1,423,000	2,514,000
	Desert Community Energy CCA		1.920%	0.637%	191,000	338,000
	Rancho Mirage Energy Authority CCA		0.410%	0.136%	41,000	72,000
	San Jacinto Power CCA		0.240%	0.080%	24,000	42,000
San Diego Gas & Electric Company	San Diego Gas and Electric Company	8.843%	79.660%	7.044%	2,113,000	3,733,000
	Aggregated Electricity Service Providers		19.921%	1.762%	529,000	934,000
	City of Solana Beach CCA		0.420%	0.037%	11,000	20,000
PacifiCorp	PacifiCorp	0.746%	100.000%	0.746%	224,000	395,000
Liberty Utilities (CalPeco Electric) LLC	Liberty Utilities (CalPeco Electric) LLC	0.255%	100.000%	0.255%	77,000	135,000
Golden State Water Company (Bear Valley Electric Service)	Golden State Water Company (Bear Valley Electric Service)	0.059%	100.000%	0.059%	18,000	31,000

* Host-EDU percentage of 2030 GHG Emissions, Percentage of 2030 Host-EDU Electricity Demand and Percentage of 2030 Electric Sector Emissions are rounded to the nearest thousandth.

** Emission targets for each utility are rounded to the nearest 1,000 $MTCO_2e$.

ESPs serve customers in areas served by PG&E, Southern California Edison Company (SCE) and San Diego Gas & Electric Company (SDG&E). Table 3 lists the aggregated GHG planning target ranges for ESPs by each of the three host-EDUs, which is estimated using the same approach as for other LSEs. Each individual ESP GHG planning target range is established by apportioning the aggregated ESP GHG planning target range by the proportion of each ESP's total retail sales. Due to a lack of long-term forecast information for all ESPs, CARB proposes to utilize a three-year historical average for each ESP's retail sales from 2014-2016.[54] Table 4 lists each ESP and its associated GHG planning target range.

[54] Retail sales data is based on CEC Energy Consumption Data Management System (ECDMS), form CEC-1306B. Disclosure of this information on a statewide aggregated LSE basis and as an average over a multi-year period is in conformance with California Code of Regulations, Title 20, Sec. 2507, subd. (e)(1)(A)1., which states that data for an LSE that is not a UDC can be released if aggregated at the statewide level by year and by major customer sector. For entities that did not report via ECDMS (Tiger Natural Gas and Commercial Energy), averaged annual retail sales from CEC Power Source Disclosure (PSD) reports for 2014-2016 was used. Where three-years of data was not available (Agera Energy, EDF Industrial Power Services and UC Regents), the most recent data from the year's 2014-2016 was used. Where no ECDMS or PSD data was available, a de minimis target was set (American Powernet).

Table 4 – Proposed GHG Planning Target Ranges for ESPs

Electricity Service Providers	2030 GHG Planning Target Range, 30-53 MMTCO$_2$e	
	Low (MTCO$_2$e)	High (MTCO$_2$e)
3 Phases Renewables, Inc.	44,000	77,000
Agera Energy, LLC	9,000	15,000
American Powernet Management, LP	1,000	2,000
Calpine Energy Solutions, LLC	907,000	1,603,000
Champion Energy Services,LLC	115,000	204,000
Commercial Energy Of California	11,000	19,000
Constellation Newenergy, Inc.	707,000	1,249,000
Direct Energy Business	598,000	1,056,000
EDF Industrial Power Services (Ca), LLC	64,000	113,000
Just Energy Solutions Inc.	50,000	89,000
Liberty Power Delaware LLC	Not serving load as of June 2018	
Palmco Power Ca	Not serving load as of June 2018	
Pilot Power Group, Inc.	202,000	356,000
Praxair Plainfield, Inc.	Not serving load as of June 2018	
Shell Energy	447,000	789,000
Tenaska Power Services Co.	Not serving load as of June 2018	
The Regents of the University of California	35,000	61,000
Tiger Natural Gas, Inc.	1,000	2,000
Yep Energy , Y.E.P	Not serving load as of June 2018	

Note: Table values may not add to the aggregated GHG planning target ranges for ESPs by each of the three host-EDUs due to rounding.

Implementation of GHG Planning Target Ranges in IRPs

For implementation purposes, POUs and LSEs may choose to utilize a point planning target that falls within its specific GHG planning target range. This includes the use of a GHG Planning Price or a mass-based or LSE-specific GHG Benchmark, as recommended by the CPUC and described in Section 4, above.

Section 7: Proposed Process for Future GHG Planning Target Ranges

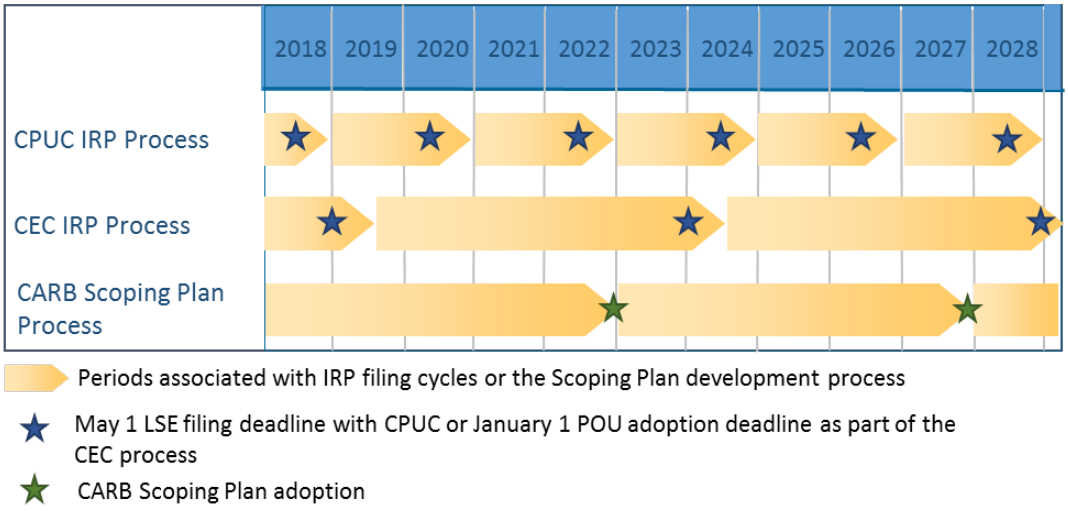
Scoping Plan and IRP Processes

CARB proposes to update the GHG planning target ranges for the electricity sector in coordination with updates to the Scoping Plan, which occurs at least once every five years. During that process, economy-wide trends and progress towards achieving the State's GHG emissions reduction goals will be evaluated and potential changes to the GHG planning target ranges for the electricity sector, LSEs, and POUs will be considered.

CARB believes the five-year schedule for the updates to the Scoping Plan allow for reasonable alignment with the five-year schedule for POUs to submit their IRPs to CEC. For the LSEs, which are on a two-year planning cycle at CPUC, GHG planning target ranges may be revised in advance of each of the CPUC's two-year IRP planning cycles as needed to accommodate shifts in load share between LSEs and the formation of new entities, as described below. While the schedule below offers a way to align planning processes across the Scoping Plan updates and IRP filing requirements, future legislation could result in changes to when electricity sector planning ranges need to be updated, independently of the Scoping Plan update process.

Figure 7 illustrates the timelines associated with CPUC and CEC IRP processes, and CARB Scoping Plan process, along with the dates for IRP filing or adoption and Scoping Plan completion.[55]

Figure 7 – IRP Filing and Scoping Plan Adoption Timelines



[55] The CPUC filing deadline for 2018 was extended to August 1.

Updates to Reflect New LSE Entrants

CARB recognizes that new CCAs and ESPs may form prior to the planned updates to the GHG planning target ranges. In order to address planning target-setting for these new entities and shifts in load share among the host-EDU LSEs, CARB, in coordination with CPUC, proposes to update the GHG planning target ranges by reapportioning the existing GHG planning targets to the host-EDU, existing LSEs, and new CCAs, consistent with the methodology in section 6, above.[56] Staff proposes that the reapportionment be equivalent to the projected 2030 electricity demand of each CCA and aggregated ESP load by host-EDU relative to the host-EDU as reported in the most recently adopted IEPR demand forecasts or CPUC-adopted demand forecasts, depending on the best available information at that time.[57]

As new ESPs form, CARB, in coordination with CPUC, proposes to reapportion the existing GHG planning target ranges to new and existing ESPs, consistent with the methodology in section 6, above. The reapportionment for the new ESPs shall be equivalent to the new ESPs contracted first-year sales as a proportion of the total existing ESP retail sales based on the most recent three-year historical average for each existing ESP or best available historical data.

Based on the GHG planning target ranges for LSEs that CARB establishes, CPUC may use its inherent regulatory authority to further implement or impose IRP requirements on LSEs. If needed for implementation, a single point within the GHG planning target range for the electricity sector may be identified and used for planning purposes by CPUC for LSEs, or by POUs independently. Any additional CPUC requirements for LSEs must ensure that the overall GHG planning target range for the electricity sector is maintained.

Updates Where the Electricity Sector GHG Planning Target Range is Maintained

CARB proposes the Board delegate authority to CARB Executive Officer to update, in coordination with CEC and CPUC, LSE GHG planning target ranges, so long as the most recent Board-approved GHG planning target range for the electricity sector is maintained, and the process utilizes the methodology adopted to establish LSE GHG planning target ranges. This delegation of authority is necessary given the on-going emergence of new and expanding CCAs and ESPs, with corresponding changes in load-share among LSEs. It is important to note that if one LSE's GHG planning target range increases, this necessarily means that another LSE's GHG planning target range must decrease in order to maintain the Board approved GHG planning target range for the electricity sector. Given that changes to one LSE's GHG planning target can affect

[56] CARB will rely on CPUC's determination related to new CCA formation. This includes, but is not limited to, CPUC approval of CCA implementation plans before IRP filing deadlines (August 1 of 2018, or May 1 of each subsequent even-numbered year).

[57] Due to the rapid emergence of CCAs, there may be CCAs that do not yet have IEPR forecasts but are required to submit IRPs. In such cases, CARB will rely on the demand forecasts approved by the CPUC for use in the IRPs.

others, any proposed individual LSE GHG planning target changes will go through a CARB public process in order to provide LSEs, POUs, and the public the opportunity to review and provide comment on proposed changes.

Updates Requiring Modification to the Electricity Sector GHG Planning Target Range

In the event of materially changed circumstances that renders the Board approved electricity sector planning target range redundant, for example due to new legislation, CARB, in coordination with CEC and CPUC, shall revise and propose for Board approval a GHG planning target range for the electricity sector in advance of a Scoping Plan update. This will likely also require revising and seeking Board approval of the POU and LSE planning targets, which will be done through a public process.

Measuring Progress

The IRP process is intended to guide energy planning and procurement decisions, such that LSEs and POUs are able to serve ratepayers, maintain reliability, and are on track to help the State achieve GHG emissions reductions consistent with California's 2030 climate goals, among other state mandates. CARB is supportive of, and will continue to coordinate with, CPUC and CEC efforts to implement IRPs.

IRPs are distinct from other statewide initiatives that are focused on reducing or reporting GHG emissions, including the Cap-and-Trade Program, the Mandatory Reporting Regulation, the Statewide GHG Inventory Program, RPS, or the Power Source Disclosure Program. Table 5 includes a summary of the purpose and point of assessment of these programs and the time periods associated with measuring the progress of each program.

Table 5 – Description of GHG-related Programs

Program	Purpose	Time Period
Integrated Resource Plans (SB 350)	Planning process to guide energy procurement decisions. Objectives include: reliability, achieving 50 percent RPS, energy efficiency, promoting transportation electrification, advancing clean energy access in disadvantaged communities, and planning to meet GHG emissions targets.	IRPs and GHG planning targets for the year 2030
Cap-and-Trade Program	Economy-wide market-based regulation that reduces GHGs from multiple sources. Cap-and-Trade establishes a cumulative statewide limit on GHG emissions through 2030. Compliance obligation is assessed for covered entities, including in-state electricity generation facilities and electricity importers, based on verified GHG emissions from each facility.	Cap on GHG emissions through 2030. Compliance events occur annually and are based on reported emissions of prior 2-3 years.
Mandatory Reporting Regulation	The mechanism to report and verify annual GHG emissions by facility and importer.	Historical; on previous calendar year.
California GHG Emissions Inventory	GHG Inventory tracks progress toward and compliance with the climate goals, includes verified emissions from MRR.	Historical; on previous calendar year.
Renewables Portfolio Standard[a]	Objective of RPS is to increase procurement of eligible renewable energy sources for electricity serving retail customers.	Historical, three-year compliance period.
Power Source Disclosure (AB 1110)	Disclose fuel mix and emission intensity associated with electricity used to by each utility to serve its retail customers.	Historical; annual reporting on previous calendar year

[a] Certain resources may be RPS-eligible but actually GHG-emitting. Other GHG-free resources may not be RPS-eligible.

IRPs are inherently forward-looking, requiring estimates of electricity demand, resource supply, and GHG emissions through 2030. The other initiatives listed in Table 5 require measurements or reporting of past activities. The extent to which estimated GHG emissions in 2030 in each entity's IRP provide reasonable approximations of the GHG emissions that will be measured, verified, and reported in 2030 aids decision-making and increases the likelihood that the State's GHG emission targets will be achieved.

IRPs from all reporting entities, when viewed together, will be a valuable resource to assess the likelihood of meeting the State's GHG emissions targets. The extent to which IRPs include common assumptions and methodologies can increase transparency of that assessment and aid decision-making. In addition, IRPs should utilize each LSE's and POU's best available information regarding characteristics of the 2030 electricity sector. CARB encourages POUs, to the extent feasible, to consider adopting relevant assumptions and methodologies similar to those adopted by the CPUC when incorporating GHG planning targets in IRPs. This will provide greater transparency about how the future electricity sector will contribute to meeting the GHG

planning target ranges and the State's overall GHG emissions goals. It will also facilitate comparison of plans across the entire electricity sector to identify barriers or impediments to achieving the GHG planning target ranges as well as potential solutions.

The electricity sector will play an increasingly prominent role in the State's transition to a low-carbon economy. IRPs provide a mechanism for the electricity sector to proactively plan for this transformation.

Appendix A
California Public Utilities Commission (CPUC) Recommendations

July 2018

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Introduction

This appendix includes California Public Utilities Commission (CPUC) Recommendations to CARB for establishing 2030 electricity sector greenhouse gas emissions targets to use in the State's integrated resource planning process.

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March 27, 2018

Mary D. Nichols, Chair
California Air Resources Board
1001 "I" Street
Sacramento, CA 95814

Dear Chair Nichols,

With this letter I am pleased to transmit to you the California Public Utilities Commission's recommendation for establishing 2030 electric sector greenhouse gas emissions targets to use in the State's integrated resource planning process.

On February 13, 2018, the California Public Utilities Commission (CPUC) issued Decision (D.) 18-02-018, which sets requirements for load serving entities to file integrated resource plans. This decision fulfills the initial phase of the CPUC's responsibilities under Senate Bill 350 (De Leon, Chapter 547, Statutes of 2015) to identify an optimal portfolio of resources to achieve the State's long-term greenhouse gas (GHG) reduction goals, and to create a process for all electric load-serving entities to file integrated resource plans. This decision is the culmination of two years of staff work, including 13 webinars, 8 workshops, 11 staff proposals, review of thousands of pages of public comment from over 50 parties, and close coordination with staff from the Air Resources Board and the California Energy Commission.[1]

Under SB 350, the Air Resources Board (ARB) has a responsibility to establish GHG emission reduction targets for the electricity sector and for each load serving entity in coordination with the CPUC and the California Energy Commission. In D.18-02-018 the CPUC recommends that ARB establish a GHG planning target of 42 million metric tons (MMT) by 2030 for the electric sector to use in the State's integrated resource planning process.[2] To arrive at this target, the CPUC modeled three different electric sector greenhouse gas planning targets for 2030 that each fall within the range of emissions for the electric sector that is reflected in ARB's 2017

[1] The CPUC's entire procedural record for the Integrated Resource Planning Rulemaking (R.16-02-007) is available at https://apps.cpuc.ca.gov/apex/f?p=401:56:0::NO:RP,57,RIR:P5_PROCEEDING_SELECT:R1602007
[2] D.18-02-018, Conclusion of Law (COL) 12.

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Climate Change Scoping Plan.[3] Based on this modeling, the CPUC found that a statewide electric sector GHG planning target of 42 MMT by 2030 represents an increase in momentum relative to current policies and is not so burdensome as to discourage electrification of transportation and natural gas end uses that would benefit the state as a whole.[4] The CPUC is aware that ARB may decide to establish a range for the electric sector GHG planning target. If ARB establishes a planning target range, the CPUC recommends that this range encompass 42 MMT by 2030.

The CPUC's integrated resource planning process will occur over a two-year period, with each planning cycle commencing in an odd-numbered calendar year. In odd-numbered years, the CPUC will analyze and adopt an optimal system-wide electric resource portfolio for its load-serving entities and recommend a GHG planning target for the electric sector in California to ARB.[5] Although the CPUC currently recommends an electric sector GHG planning target of 42 MMT by 2030 for use in integrated resource planning, the CPUC will evaluate the appropriateness of this target in each integrated resource planning cycle, and it may propose a different target in the future.

In order to conduct modeling to identify the optimum portfolio of energy resources capable of meeting the electric sector GHG planning target, grid reliability needs, and other State goals at least cost, the CPUC first needed to determine what portion of the statewide electric sector target applies to its jurisdictional entities. Based on the methodology ARB uses to allocate Cap-and-Trade allowances to electric utilities, the CPUC determined that entities subject to its jurisdiction should have collective responsibility for 76.9 percent of the electric sector GHG planning target.[6] The CPUC reflected these aggregate emissions in its modeling.

The CPUC adopted an optimal Reference System Portfolio of energy resources to meet the 2030 GHG planning target, which includes an expected need among its jurisdictional entities for approximately 10,200 megawatts of new supply-side renewable energy resources and 2,000 megawatts of new battery storage resources by 2030. The marginal cost of GHG abatement associated with the Reference System Portfolio is $150 per metric ton of carbon dioxide equivalent in 2030, which the CPUC refers to as the GHG Planning Price. Both the Reference

[3] Note that due to differences in how ARB and the CPUC account for GHG emissions from combined heat and power facilities cited at industrial facilities, the CPUC's recommended 42 MMT planning target equates to 46 MMT in ARB's Climate Change Scoping Plan.
[4] *Id.* at Finding of Fact (FOF) 4.
[5] *Id.* at Ordering Paragraph (OP) 4.
[6] *Id.* at FOF 13.

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System Plan and its associated GHG Planning Price may change in each integrated resource planning cycle as the electric grid, market conditions and technologies change.

Under the CPUC's integrated resource planning process, load serving entities can demonstrate conformance with the Reference System Portfolio in one of two ways: load serving entities can use either the GHG Planning Price or use a CPUC-assigned GHG Emissions Benchmark,[7] which the CPUC defined based on the relative load share of each load serving entity. These GHG Emission Benchmarks exist as a planning instrument, not as a compliance obligation. The CPUC may modify these benchmarks at any time in response to new information about load serving entities' load forecasts.[8]

Supporting Documents
As ARB conducts its process to establish GHG targets for the State's integrated resource planning process, the CPUC recommends that ARB take notice of two principal CPUC documents listed below (and associated attachments). The September 19, 2017, Administrative Law Judge ruling includes the bulk of the analytical work that underlies D.18-02-018.

1. Final Commission Decision (D.18-02-018) - *Decision Setting Requirements for Load Serving Entities Filing Integrated Resource Plans*: http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M209/K771/209771632.PDF

2. *September 19, 2017, Administrative Law Judge's Ruling Seeking Comment on Proposed Reference System Plan and Related Commission Policy Actions*: http://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M195/K910/195910921.PDF

    - Attachment A: *CPUC Energy Division Proposed Reference System Plan*: http://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M195/K910/195910807.PDF

    - Attachment B: *RESOLVE Documentation: CPUC 2017 IRP Inputs & Assumptions*: http://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M195/K910/195910712.PDF

    - Attachment C: *Summary of RESOLVE Inputs and Outputs*: http://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M195/K910/195910922.PDF

[7] *Id.* at FOF 14 and COL 27.
[8] *Id.* at FOF 17, and COLs 25, 26 and 27.

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- Attachment D: *Summary of Sensitivity Analyses Conducted by Staff in Response to Party Comments*: http://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M195/K910/195910606.PDF

- Attachment E: Energy Division Staff Proposal on *Production Cost Modeling Process to Review Integrated Resource Plan Portfolios*: http://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M195/K910/195910808.PDF

I appreciate the time and effort ARB staff has dedicated over the last two years to coordinate with CPUC staff in establishing an integrated resource planning process and GHG emissions targets, and I look forward to continuing to work with you and your staff as ARB completes its further work in the implementation of the integrated resource planning provisions of SB 350.

Best regards,

Liane M. Randolph
Commissioner
California Public Utilities Commission

Appendix B
California Energy Commission (CEC) Recommendations

July 2018

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Introduction

This appendix includes California Energy Commission (CEC) Recommendations to CARB for establishing 2030 electric sector greenhouse gas emissions targets to use in the State's integrated resource planning process.

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April 12, 2018

Mary D. Nichols, Chair
California Air Resources Board
1001 I Street
Sacramento, CA 95814

Dear Chair Nichols:

I commend the California Air Resources Board (CARB) on the adoption of the 2017 Scoping Plan Update and appreciate the partnership the California Energy Commission, CARB, and the California Public Utilities Commission (CPUC) have established to implement the Integrated Resource Planning (IRP) provisions of the Clean Energy and Pollution Reduction Act of 2015, also known as Senate Bill 350 (De León, Chapter 547, Statutes of 2015) (SB 350). Energy Commission staff and I look forward to continuing to work with our sister agencies and participating in the public process now occurring at CARB to formally establish greenhouse gas (GHG) targets for IRP.

In support of CARB's work to set GHG targets for IRP, Energy Commission staff engaged in a public process to solicit input regarding Publicly Owned Utility (POU) IRPs. Early work began in 2016, culminating in two workshops in 2017, focused on establishing a methodology to determine GHG emission targets for each POU. As a result of this public engagement, Energy Commission staff recommends a methodology, described in further detail in the enclosure, to determine each POU's assigned share of the electricity sector GHG emissions target. The methodology attempts to balance the efforts needed by each POU to reach their respective targets and is based on CARB's method for allocating GHG emissions allowances.

Though Energy Commission staff has not performed independent analysis to determine an appropriate electricity sector-wide GHG target, staff generally supports the work of our sister agencies. CARB engaged in extensive modeling for the Scoping Plan Update, resulting in a 30-53 million metric tons carbon dioxide equivalent (MMTCO2e) emission target range for 2030 for the electricity sector. The CPUC has recommended an electricity sector-wide GHG target of 42 MMTCO2e by 2030 based on separate modeling. Energy Commission staff agrees that 42 MMTCO2e, or a range that encompasses this number, appears to be appropriate based on both CPUC and CARB modeling.

POU Governing Boards are required to adopt their first SB 350 IRPs by January 1, 2019. Thus, POU planning efforts are already underway. Though CARB has not yet formally established the GHG targets for IRP, Energy Commission staff

encourages POUs to utilize its recommended methodology and the 2017 Scoping Plan Update range to estimate an appropriate GHG target for IRP purposes, as further explained in the enclosure. I hope that by using this approach POU plans will ultimately align well with the targets CARB adopts later this year.

I respectfully submit for your consideration Energy Commission staff's recommendation regarding setting GHG emission targets for IRP. Staff and I look forward to our continued partnership on IRP implementation.

Sincerely,

ROBERT B. WEISENMILLER
Chair

Enclosure

April 12, 2018

Energy Commission Staff Recommended Methodology for Setting POU-Specific GHG Emission Reduction Targets for Integrated Resource Planning

Senate Bill 350 (De León, Chapter 547, Statutes of 2015) requires the California Air Resources Board (CARB), in coordination with California Public Utilities Commission (CPUC) and California Energy Commission (Energy Commission), to establish greenhouse gas (GHG) emission reduction targets for the electricity sector and each load-serving entity (LSE), primarily investor-owned utilities (IOU), or publicly owned utilities (POU) that meet a size threshold.[1] The targets would reflect the electricity sector's percentage in achieving economy-wide greenhouse gas emissions reductions of 40 percent from 1990 levels by 2030. The 16 largest POUs are required to submit integrated resource plans (IRP) to the Energy Commission that meet the GHG reduction targets established by CARB. The CPUC must establish a process for IOUs and other load-serving entities to submit IRPs that also meet GHG reduction targets.

Joint Agency Process for GHG Target Setting

The CPUC, Energy Commission, and CARB are working together to establish GHG targets for integrated resource planning. Under the joint agency process the agencies have agreed upon, the Energy Commission and CPUC have engaged the public to solicit feedback as they developed recommendations for CARB to consider when setting GHG emission targets for the sector and each load-serving entity and POU. The *Final 2017 Scoping Plan Update* included the electricity sector target range of 30-53 MMTCO2e and stated that the range would be used to help inform CARB's setting of the SB 350 IRP GHG emission reduction planning targets for the sector. The *Final 2017 Scoping Plan Update* also stated that the Energy Commission, CPUC ,and CARB would continue to coordinate on this effort before final IRP targets are established for the sector and would investigate the potential for and appropriateness of deeper electric sector reductions.[2]

Over the last year and a half, the CPUC and Energy Commission have developed potential GHG allocation methods, held workshops, and solicited public comments on proposed options for establishing targets. On February 10, 2017, the CPUC and Energy Commission released a staff discussion document to assist the joint agencies in developing a 2030 electricity sector GHG planning target and a methodology to split that target between CPUC and CEC jurisdictional entities.[3] The staff paper addressed options for determining the 2030 electricity sector GHG planning target and establishing a method to allocate the electricity sector GHG target between IOUs and POUs.

To determine the 2030 electricity sector GHG planning target, two options were proposed:

- Option 1A: Use the electricity sector's share of statewide 2030 emissions from the Scoping Plan developed by CARB and under Governor Brown's Executive Order B-30-15.
- Option 1B: Scale the statewide 2030 GHG target by the electricity sector's share of CARB's most recent GHG emissions inventory.

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[1] POUs with an average annual electrical demand exceeding 700 gigawatt-hours, as determined on a three-year average commencing January 1, 2013, must adopt an IRP for review by the Energy Commission.

[2] https://www.arb.ca.gov/cc/scopingplan/scoping_plan_2017.pdf

[3] *Options for Setting GHG Planning Targets for Integrated Resource Planning and Apportioning Targets Among Publicly Owned Utilities and Load Serving Entities*, CPUC and California Energy Commission Staff Discussion Document, February 10, 2017. http://docketpublic.energy.ca.gov/PublicDocuments/17-IEPR-07/TN215849_20170210T125610_Options_for_Setting_GHG_Planning_Targets_for_Integrated_Resourc.pdf.

To establish a method to allocate the electricity sector GHG target between IOUs and POUs, three options were proposed:

- Option 2A: Use a method similar to CARB's GHG emissions allowance allocation for electricity distribution utilities for 2021 – 2030.
- Option 2B: Divide the 2030 GHG target based on electricity load served in 2016.
- Options 2C: Develop a bottom-up method for apportioning 2030 GHG targets among all retail sellers of electricity (POUs and IOUs).

On February 23, 2017, the three joint agencies held a workshop on 2030 Greenhouse Gas Emission Reduction Targets for Integrated Resource Planning. On April 17, 2017, the Energy Commission and CARB held a joint workshop to present a proposed method for allocating CARB's 2030 electricity sector GHG planning targets to POUs for use in their IRPs.

To set the electricity sector GHG reduction planning target, stakeholders, including Los Angeles Department of Water and Power (LADWP), California Municipal Utilities Association (CMUA), Northern California Power Agency (NCPA), Southern California Public Power Authority (SCPPA), Sierra Club, Pacific Gas & Electric (PG&E), Community Choice Aggregation Parties and Utility Consumers' Action Network, generally favored using the electricity sector target from the Scoping Plan (Option 1A) as a reasonable starting point. LADWP did not support Option 1B because potential inaccuracies could arise in using the CARB's GHG emission inventory numbers, which have changed over time. SCPPA did not support Option 1B for setting the electricity sector planning target because it uses a 2014 baseline that is different from the SB 32 target of GHG emissions 40 percent below 1990 levels.

For the method to allocate the electricity sector GHG reduction planning target between the LSEs and POUs, several parties noted that Options 2A and 2C were very similar, both relying on a bottom-up approach. LADWP, SMUD, CMUA, NCPA, and SCPPA, generally supported a bottom-up method. Based on stakeholder feedback, the Energy Commission proposed the method described below to allocate the electricity sector planning target between the LSEs and POUs. The same method was also proposed to establish POU-specific GHG reduction targets for use in their IRPs, which again received general support from the POUs.

Recommended Method for Setting POU GHG Emission Reduction Target

The Energy Commission staff's proposed method, based on CARB's method for allocating GHG emissions allowances to distribution utilities for the period 2021 – 2030, uses estimates of GHG emissions in 2030 to determine each utility's assigned share of electricity sector GHG emissions. Once CARB sets an electricity sector emissions target, each utility's share can be used to derive its emissions target for 2030. This method attempts to balance the efforts needed by each POU to reach their respective targets (and thus the electricity sector target) across all POUs by requiring utilities endowed with zero-carbon resources such as large hydroelectricity and nuclear generation, to achieve lower emissions intensities than utilities without those GHG free-resources.

The proposed method uses the Energy Commission's *2015 Integrated Energy Policy Report (2015 IEPR)* demand forecast to derive 2030 estimates of the net energy for load and retail sales of each POU and IOU. The proposed method includes the following elements:

- **Net energy for load** represents the amount of energy that must be generated or procured by the utility to meet customer demand, including industrial loads, and equals consumption (net of what is self-provided by customers) plus (energy) losses during transmission and distribution.

- **Retail sales** are used to estimate the portion of net energy for load that is met in 2030 with **RPS-eligible energy**.[4] Utilities are assumed to procure RPS-eligible energy in an amount equal to 45 percent of retail sales in 2030.
- Another share of the utility's **remaining energy need** is assumed to come from **existing zero-carbon (non-RPS eligible) resources** in its portfolio, such as large hydro or nuclear. The utility-filed *2015 IEPR* Supply Form S-2 was used to estimate energy from such resources in 2030. Average annual energy projected to be generated or procured from such resources over 2013 – 2026 (or some subset of these years, depending upon the stability or stationarity of historical and projected values) is used to calculate the 2030 estimate.[5]
- Remaining energy needs are assumed to be met with natural gas-fired generation with an **emissions intensity** of 0.4354 metric tons (MT) carbon dioxide equivalent (CO_2-e) per megawatt-hour (MWh).[6]

Sample Derivation of a POU GHG Emissions Target

This example demonstrates the steps used to calculate the GHG Emissions target for a sample POU with the following energy needs and resource mix:

Projected 2030 Retail Sales: 1,800 GWh
Net Energy for Load: 2,000GWh
Generation form existing zero-carbon (non-RPS-eligible) resources: 250 GWh

1. Calculate RPS-Eligible Energy:
   45% x Retail Sales
   0.45 X 1,800 GWh = 810 GWh RPS-Eligible Energy

2. Calculate Remaining Energy Need (to be met with non-RPS-eligible energy)
   Net Energy – RPS-Eligible Energy
   2,000 GWh – 810 GWh = 1,190 GWh Remaining Energy Need

3. Calculate Assumed Natural Gas Generation:
   Remaining Energy Need – Existing Zero-Carbon (non-RPS-Eligible) Resources
   1,190 GWh – 250 GWh = 940 GWh Assumed Natural Gas Generation

4. Calculated POU GHG Emissions Target
   Emissions Intensity x Assumed Natural Gas Generation
   0.4354 MT CO2-e/MWh x 1000 MWh/GWh x 940 GWh = 409,276 MT CO2-e
   Rounded to Nearest Thousand = 409,000 MT CO2-e GHG POU Emissions Target

Table 1 presents the shares of electricity sector GHG emissions, including industrial loads, for each POU using the Energy Commission staff recommended methodology. The Table then applies that share to three potential electricity sector emission targets that fall within the *2017 Final Scoping Plan Update* range to illustrate POU-specific targets under various sector targets, pending CARB adoption of final sector targets.

[4] The *2015 IEPR* demand forecast provides values for net energy for load and retail sales through 2026. To estimate values for 2030, the average value during 2024 – 2026 is escalated at the 2014 – 2026 growth rate over 2027 – 2030.

[5] "Stationarity" refers to a time series whose statistical properties such as mean, variance, autocorrelation, and so forth are all constant over time.

[6] CARB, Mandatory GHG Reporting and Cap-and-Trade Program Workshop, June 24, 2016. P. 33. https://www.arb.ca.gov/cc/capandtrade/meetings/062416/arb_and_caiso_staff_presentations_updated.pdf.

Table 1: POU 2030 GHG Emissions Targets (MT CO2-e)

Utility	Share of Sector Target*	Sample POU Target Under Three Potential Sector Targets within Scoping Plan Range (MT CO2-e)**		
		30,000,000	42,000,000***	53,000,000
Anaheim	1.015%	305,000	426,000	538,000
Burbank	0.430%	129,000	181,000	228,000
City and County of San Francisco	0.041%	12,000	17,000	22,000
Glendale	0.396%	119,000	166,000	210,000
Imperial Irrigation District	1.745%	524,000	733,000	925,000
LADWP	8.851%	2,655,000	3,717,000	4,691,000
Modesto Irrigation District	1.055%	317,000	443,000	559,000
Palo Alto	0.174%	52,000	73,000	92,000
Pasadena	0.426%	128,000	179,000	226,000
Redding	0.191%	57,000	80,000	101,000
Riverside	0.918%	275,000	386,000	487,000
Roseville	0.452%	136,000	190,000	240,000
Silicon Valley Power	0.915%	275,000	384,000	485,000
SMUD	3.621%	1,086,000	1,521,000	1,919,000
Turlock Irrigation District	0.629%	189,000	264,000	333,000
Vernon	0.497%	149,000	209,000	263,000
Total Filing POUs****	21.356%	6,407,000	8,970,000	11,319,000
Exempt POUs	1.667%	500,000	700,000	884,000
CPUC Jurisdictional Entities	76.976%	23,093,000	32,330,000	40,797,000

* Share of target percentages were rounded to the nearest thousand.

** Emission targets for each utility are rounded to the nearest 1,000 MT Co2-e.

*** Energy Commission staff recommends that POUs utilize this methodology and the *2017 Final Scoping Plan Update* range, as illustrated in Table 1, to estimate an appropriate GHG target for IRP purposes until CARB establishes targets. Using a sector-target in the middle of the range, such as 42 MMTCO2e, should maximize the chance of alignment with the targets ultimately adopted by CARB later this year.

**** Totals may not sum due to rounding.

Summary

Energy Commission staff recommends the methodology described above, and each POU's share of the electricity sector-wide target reflected in Table 1, to CARB for consideration in setting POU-specific GHG emission targets for IRP.

APPENDIX C

Final Environmental Analysis

For The

STAFF REPORT: SENATE BILL 350 INTEGRATED RESOURCE PLANNING ELECTRICITY SECTOR GREENHOUSE GAS PLANNING TARGETS

State of California

CALIFORNIA AIR RESOURCES BOARD
1001 I Street
Sacramento, CA 95814

Release Date: July 13, 2018

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ACRONYMS AND ABBREVIATIONS

AB	Assembly Bill
AADT	average annual daily traffic
ADT	average daily traffic
BMPs	best management practices
CARB or Board	California Air Resources Board
CCA	Community Choice Aggregators
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CI	carbon intensity
CNEL	community noise equivalent level
CO_2	carbon dioxide
CPUC	California Public Utilities Commission
CWA	Clean Water Act
dBA	A weighted decibels
DOT	Federal Department of Transportation
EA	Environmental Analysis
EDU	Electrical Distribution Utility
EIR	environmental impact report
ESPs	Electric Service Providers
FAA	Federal Aviation Administration
FED	Functional Equivalent Document
FTA	Federal Transit Administration
GHG	greenhouse gas

GWP	global warming potential
HFCs	hydrofluorocarbons
HVAC	Heating, ventilation, and air conditioning
IEPR	Integrated Energy Policy Report
in/sec	inch per second
initial Scoping Plan	The first AB 32 scoping plan
IOUs	Investor Owned Utilities
IRPs	Integrated Resource Plans
ISOR	Initial Statement of Reasons
LCFS	Low Carbon Fuel Standard
L_{dn}	day-night noise level
L_{eq}	equivalent level measurements
L_{max}	maximum noise level
L_{min}	minimum noise level
LSE	Load Serving Entities
$MMTCO_2e$	million metric tons of carbon dioxide equivalent
MW	megawatt
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NOx	oxides of nitrogen
NPDES	National Pollution Discharge Elimination System
ODS	ozone depleting substance
PHEVs	plug-in hybrid electric vehicles

PM	particulate matter
POU	Publicly Owned Utilities
PPV	peak particle velocity
PRC	Public Resources Code
Proposed Targets	~~Draft~~ Staff Report: Senate Bill 350 Integrated Resource Planning Electricity Sector Greenhouse Gas Planning Targets
PV	photovoltaic
RCRA	Resource Conservation and Recovery Act
ROG	reactive organic gases
RPS	Renewable Portfolio Standard
SB	Senate Bill
SCS	Sustainable Communities Strategies
SLCP	short-lived climate pollutant
SNAP	Significant New Alternatives Policy
SWPPP	stormwater pollution prevention plan
SWRCB	California State Water Resources Control Board
TAC	toxic air contaminant
U.S. EPA	U.S. Environmental Protection Agency
VdB	vibration decibels
VMT	vehicle miles travelled
ZEVs	zero emission vehicles

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PREFACE

The California Air Resources Board (CARB) released a Draft Environmental Analysis (Draft EA) for the Proposed Draft Staff Report: Senate Bill 350 Integrated Resource Planning Electricity Sector Greenhouse Gas Planning Targets (Proposed Targets) on April 27, 2018 for a 45-day public review and comment period that concluded June 11, 2018. During the public comment period for the Proposed Targets, eight comment letters were received. None of the comment letters raised significant environmental issues or addressed the Draft EA. Therefore no response to environmental comments document was prepared for the Proposed Targets.

CARB staff made modifications to the Draft EA to create the Final EA. To facilitate identifying modifications to the document, modified text is presented in the Final EA with ~~strike-through~~ for deletions and <u>underline</u> for additions. None of the modifications alter any of the types of foreseeable compliance responses evaluated or conclusions reached in the Draft EA, introduce new significant effects on the environment, or provide new information of substantial importance relative to the EA. As a result, these revisions do not require recirculation of the draft document pursuant to the California Environmental Quality Act (CEQA) Guidelines, California Code of Regulations, title 14, section 15088.5, before consideration by the Board.

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1.0 INTRODUCTION AND BACKGROUND

A. Introduction

Staff has prepared this Final ~~Draft~~ Environmental Analysis (EA) for the California Air Resources Board's (CARB or Board) consideration of the ~~Draft~~ Staff Report: Senate Bill 350 Integrated Resource Planning Electricity Sector Greenhouse Gas Planning Targets (Proposed Targets). SB 350 directs CARB, in coordination with the California Public Utilities Commission (CPUC) and the California Energy Commission (CEC), to establish greenhouse gas (GHG) emissions reduction targets for the electricity sector and for each Publically Owned Utility (POU) or Load Serving Entity (LSE). CARB is also directed to ensure that the targets reflect the electricity sector's percentage in achieving economy-wide greenhouse gas emissions specified in SB 32 (40 percent below 1990 levels by 2030).[1]

This Final ~~Draft~~ EA provides a programmatic analysis of the potential for adverse environmental impacts associated with implementation of the Proposed Targets and describes feasible mitigation measures for identified significant impacts. The Proposed Targets establish high-level GHG planning targets to be used in Integrated Resource Plans (IRPs). The utilities must then develop their IRPs, which will outline detailed activities planned by each entity necessary to meet the long-term electricity demand, reliability and environmental goals, and GHG planning targets. This includes planning to meet the State's greenhouse gas reductions goals as specified in the 2017 Scoping Plan Update. Individual new or modified power plant development projects will then undergo another level of appropriate environmental review.

Approval of the Proposed Targets does not directly lead to any adverse impacts on the environment. However, as described in Chapter 4 of this Final ~~Draft~~ EA, implementation of the expected compliance responses (development of IRPs to meet the Proposed Targets, and ultimately, implementation of proposed actions described in each POU's or LSE's IRP to meet those targets) may indirectly lead to adverse environmental impacts. As discussed further throughout this document, many of these identified potentially significant impacts can be feasibly avoided or mitigated to a less-than-significant level through the project-specific approval or entitlement process related to compliance responses, which typically requires a project-specific environmental review. Nonetheless, in the interest of informed decision-making, this Final ~~Draft~~ EA takes a conservative approach for CEQA compliance purposes. Namely, to avoid any risk of understating an impact at this early planning stage, the Final ~~Draft~~ EA presents conclusions for post-mitigation significance of these indirect impacts as significant and unavoidable where there is the possibility that feasible mitigation either may not be sufficient or there is some risk it may not be implemented by third parties with the authority to approve actions undertaken as foreseeable compliance responses.

[1] Public Utilities Code Section 454.52(a)(1)(a) and Public Utilities Code Section 9621(b)(1).

B. Background Information on Proposed Targets

1. Key Legislation and Directives

Assembly Bill 32, the California Global Warming Solutions Act of 2006 (AB 32, Statutes of 2006, Chapter 488) declared that global warming poses a serious threat to the economic well-being, public health, natural resources, and environment of California and charged CARB with "monitoring and regulating sources of emissions of greenhouse gases that cause global warming to reduce emissions of greenhouse gases" (Health & Saf. Code, § 38510). AB 32 provided initial direction on creating a comprehensive multi-year program to limit California's GHG emissions to 1990 levels by 2020 and initiate the transformations required to achieve the State's long-range climate objectives

On April 29, 2015, Governor Brown issued Executive Order B-30-15, establishing a mid-term GHG reduction target for California of 40 percent below 1990 levels by 2030. All State agencies with jurisdiction over sources of GHG emissions were directed to implement measures to achieve reductions of GHG emissions to meet the 2030 and 2050 targets. Executive Order B-30-15 directs CARB to update the AB 32 Scoping Plan to reflect the path to achieving the 2030 target. In December 2017, the Board adopted the 2017 Scoping Plan Update, which identifies the actions to reduce GHG emissions 40 percent below 1990 levels by 2030

On October 7, 2015 the Governor signed SB 350, which codified an increase in the Renewable Portfolio Standard (RPS) to 50 percent by 2030 and doubled the energy savings required in electricity and natural gas end uses and established the requirement to set GHG planning targets for use in IRP for the electricity sector as a whole and among individual POUs and LSEs.[2] Specific requirements include that LSEs and POUs develop IRPs that:

- Meet greenhouse gas reduction targets;
- Achieve 50 percent RPS;
- Serve customers at just and reasonable rates;
- Minimize impacts on ratepayers' bills;
- Ensure system and local reliability;
- Strengthen diversity, sustainability, and resilience of bulk transmission and distribution systems and local communities;
- Enhance distribution systems and demand-side energy management; and
- Minimize localized air pollutants and other GHG emissions with early priority on disadvantaged communities.

Specifically, as it related to the greenhouse gas reduction target, LSEs and POUs are to meet greenhouse gas emissions reduction planning targets established by CARB. SB

[2] Load-serving entities include investor-owned utilities (IOUs), electric service providers (ESPs) and community choice aggregators (CCAs).

350 directs CARB, in coordination with the CPUC and the CEC, to establish GHG emissions reduction targets for the electricity sector and for each POU or LSE. CARB is also directed to ensure that the targets reflect the electricity sector's percentage in achieving economy-wide greenhouse gas emissions specified in SB 32 (40 percent below 1990 levels by 2030).[3]

On September 8, 2016, the Governor signed SB 32 (Pavley, Chapter 249, Statutes of 2016), which codified into statute the 2030 target in Executive Order B-30-15. The 2030 target establishes a critical mid-term target between 2020 and 2050 that helps frame the suite of policy measures, regulations, planning efforts, and investments in clean technologies and infrastructure needed to continue driving down GHG emissions.

2. 2017 Scoping Plan Update

The 2017 Scoping Plan Update identifies an achievable and cost-effective path to reduce GHG emissions 40 percent below 1990 levels by 2030 called for in SB 32. The 2017 Scoping Plan Update recommends six specific high-level measures to achieve the 2030 target: greater renewable energy and energy efficiency (SB 350), increased stringency of LCFS (18 percent carbon intensity (CI) reduction by 2030), Mobile Source Strategies and Sustainable Freight Strategy, Short-Lived Climate Pollutant (SLCP) Reduction Strategy, increased stringency of SB 375 2035 targets for Sustainable Communities Strategies, and post-2020 Cap-and-Trade Programs with declining caps.

The 2017 Scoping Plan Update affects the State's main economic sectors, including the electricity sector. The 2017 Scoping Plan Update estimates GHG emissions for the electricity sector in 2030 to range from 30 $MMTCO_2e$ to 53 $MMTCO_2e$. The 2017 Scoping Plan Board Update Resolution 17-46 adopted by CARB directs staff to use the 2017 Scoping Plan Update to inform the GHG planning targets for the electricity sector and each retail electricity provider pursuant to SB 350.

Board Resolution 17-46 states:

> "…the Board hereby determines that the Final Plan should inform the preliminary 2030 GHG planning target range for the electricity sector, which in coordination with the California Public Utilities Commission and the California Energy Commission, will be evaluated and revised, as appropriate, as part of the Board's process to establish GHG planning targets for the electricity sector and each load-serving entity for use in Integrated Resource Plans pursuant to SB 350."

C. Prior Environmental Analysis

The 2017 Scoping Plan Update had an associated environmental analysis (Scoping Plan EA). One of the measures included in the 2017 Scoping Plan Update was implementation of the requirements described in SB 350 including:

- 50 percent Renewable Portfolio Standard;

[3] PU Code Section 454.52(a)(1)(a) and PU Code Section 9621(b)(1).

- Doubling of energy efficiency savings in natural gas and electricity end uses statewide; and
- LSEs and POUs file plans to achieve GHG emissions reduction planning targets while ensuring reliability and meeting the State's other policy goals cost-effectively.

The Scoping Plan EA provided a program-level review of significant adverse impacts associated with the reasonably foreseeable compliance responses that appeared most likely to occur because of implementing the recommended measures. The impact discussion includes, where relevant, construction-related effects, operational effects of new or modified facilities, and influences of the recommended measures on GHG and air pollutant emissions. CARB staff prepared the Scoping Plan EA, certified by the Board in December 2017, as a program environmental document for the entire statewide plan of GHG reductions projects.

The Scoping Plan EA evaluated the environmental impacts related to the reasonably foreseeable compliance responses associated with implementing the six measures, which included the assumption that the electricity sector would be required to limit its emissions to the range of 30 $MMTCO_2e$ to 53 $MMTCO_2e$. The following significance determinations were made based on this evaluation: beneficial impacts to energy demand and greenhouse gases; less-than-significant impacts to air quality, energy demand, land use planning, mineral resources, population and housing, public services, and recreation; and potentially significant and unavoidable impacts to aesthetics, agriculture and forest resources, air quality, biological resources, cultural resources, geology and soils, hazards and hazardous materials, hydrology and water quality, land use planning, noise, recreation, transportations and traffic, and utilities. The potentially significant and unavoidable adverse impacts are primarily related to short-term, construction-related activities. This explains why some resource areas are identified above as having both less-than-significant impacts and potentially significant impacts.

D. Environmental Review Process

1. Requirements under the California Air Resources Board Certified Regulatory Program

CARB is the lead agency for the Proposed Targets and prepared this Final ~~Draft~~ EA pursuant to its certified regulatory program for CEQA compliance. Public Resources Code (PRC) Section 21080.5 allows public agencies with regulatory programs to prepare a functionally-equivalent substitute document in lieu of an environmental impact report or negative declaration once the program has been certified by the Secretary for Natural Resources as meeting the requirements of CEQA. CARB's regulatory program was certified by the Secretary for Natural Resources in 1978 (see Cal. Code Regs., tit.14, § 15251.(d)). As required by CARB's certified regulatory program, and the policy and substantive requirements of CEQA, CARB prepared this Final ~~Draft~~ EA to assess the potential for significant adverse and beneficial environmental impacts associated with the recommended actions and to provide a succinct analysis of those impacts (see

Cal. Code Regs., tit.17, § 60005(a) and (b)). The resource areas from the CEQA Guidelines (Cal. Code Regs., tit. 14, § 15000 et. seq.) Environmental Checklist (Appendix G) was used as a framework for assessing potentially significant impacts.

CARB determined that approving the Proposed Targets is a "project," as defined by CEQA (see Cal. Code Regs., tit.14, § Section 15378(a)). The CEQA Guidelines define a "project" as "the whole of an action, which has a potential for resulting in either a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment, and that is … an activity directly undertaken by any public agency."

Although the approval of policy aspects of the Proposed Targets does not directly change the physical environment, indirect physical changes to the environment could occur from reasonably foreseeable compliance responses taken because of implementation of the Proposed Targets.

2. Scope of Analysis and Assumptions

The degree of specificity required in a CEQA document corresponds to the degree of specificity inherent in the underlying activity it evaluates. The environmental analysis for broad plans will necessarily be less detailed than that for specific projects (see Cal. Code Regs., tit.14, § 15146). For example, assessing a construction project would naturally be more detailed than assessing a broad plan because the construction effects can be predicted with a greater degree of accuracy (see Cal. Code Regs., tit.14, § 15146, subd. (a)).

The level of detail in this Final ~~Draft~~ EA reflects that it is a broad statewide-level planning document. Consequently, the analysis is at a programmatic level and does not provide the level of detail that would be presented in subsequent environmental documents prepared for specific actions that other agencies may decide to pursue to reduce GHGs or any analysis carried out for specific construction projects by various entities to comply with policies in the plan (Cal. Code Regs., tit. 14, § 15168).

This Final ~~Draft~~ EA evaluates potential significant adverse impacts and beneficial impacts of the reasonably foreseeable compliance responses for implementing the Proposed Targets, based on currently available information, without being speculative. The EA, including public comments on the Final ~~Draft~~ EA and responses to environmental points raised in public comments, will inform the Board about the environmental implications of approving the Proposed Targets.

The analysis of potentially significant adverse environmental impacts of the Proposed Targets is directed by the following parameters:

1. The analysis addresses the environmental impacts resulting from implementing the Proposed Targets compared to a baseline consisting of existing conditions (discussed further in Chapter 3).

2. The analysis of environmental impacts is based on the effects of compliance responses that are reasonably foreseeable.

3. The analysis in this Final ~~Draft~~ EA addresses environmental impacts both within California and outside the State to the extent they are reasonably foreseeable and do not require speculation.

4. The level of detail of impact analysis is necessarily and appropriately general, because the proposed project sets a target and is itself programmatic. Furthermore, it would be speculative to predict decisions by other entities regarding the specific location and design of new or modified facilities that may be undertaken to meet the target proposed within the proposed project. This is because first, POUs and LSEs will develop their IRPs, which themselves are regional planning-level documents. Then, any additional power generation or storage resources developed under the IRPs would be subject to yet another level of appropriate CEQA review. Therefore, it is not possible to predict location-specific effects with precision at this stage, given the lack of specificity of the actions taken to meet the target, the influence of other business and market considerations, and the numerous locations where facilities might be built. Specific planning actions and development projects undertaken to meet the target in the proposed project would undergo required project-level environmental review and compliance processes at the time they are proposed.

5. This Final ~~Draft~~ EA generally does not analyze site-specific impacts when the location of future facilities or other infrastructure would be speculative. However, the Final ~~Draft~~ EA does examine regional (e.g., air basin) and local (i.e., community-level) issues to the degree feasible and appropriate. Thus, the impact conclusions in the resource sections of Chapter 4, Impact Analysis and Mitigation Measures, cover broad types of impacts, considering the potential effects of the full range of reasonably foreseeable compliance actions undertaken in response to the Proposed Targets.

E. Organization of the Environmental Analysis

This Final ~~Draft~~ EA is organized into the following chapters to assist the reader in obtaining information about the Proposed Targets and the specific environmental issues.

- Chapter 1, Introduction and Background – provides a project overview, background information, and other introductory material.

- Chapter 2, Project Description – summarizes the Proposed Targets, implementation assumptions, and reasonably foreseeable compliance responses expected to be taken to implement the Proposed Targets.

- Chapter 3, Environmental and Regulatory Setting in combination with Attachment A – contains the environmental setting and regulatory framework relevant to the environmental analysis of the Proposed Targets.

- Chapter 4, Impact Analysis and Mitigation – identifies the potential environmental impacts associated with the Proposed Targets and mitigation measures for each resource area impact.

- Chapter 5, Cumulative and Growth-Inducing Impacts – identifies the cumulative effects of implementing the Proposed Targets against a backdrop of past, present, and reasonably foreseeable future projects.

- Chapter 6, Mandatory Findings of Significance – discusses whether the Proposed Targets has the potential to degrade the quality of the environment, cause substantial adverse impacts on human beings, and cause cumulatively considerable environmental impacts.

- Chapter 7, Alternatives Analysis – discusses a reasonable range of potentially feasible alternatives that could reduce or eliminate adverse environmental impacts associated with the Proposed Targets.

- Chapter 8, References – identifies sources of information used in this Final ~~Draft~~ EA.

F. Public Review Process for the Environmental Analysis

At a public workshop held on March 2, 2018, CARB described plans to prepare a Final ~~Draft~~ EA for the Proposed Targets and invited public feedback on the scope of the analysis. In addition, staff also discussed the Proposed Targets at public workshops on February 23, 2017 and April 17, 2017.

In accordance with CARB's certified regulatory program, and consistent with CARB's commitment to public review and input on its proposed actions, this Final ~~Draft~~ EA is subject to a public review process through the posting of the Proposed Targets and this Final ~~Draft~~ EA for a public review period that begins on April 27, 2018 and ends on June 11, 2018.

After the public review period, CARB determined that no comment raising environmental issues were received and therefore no written responses to environmental comment were prepared ~~will prepare written responses to comments received on the Final Draft EA and make revisions, as necessary~~. The Final EA ~~and the written responses to environmental comments~~ will be considered by the Board at a public hearing in July of 2018. If the proposed project is approved, a Notice of Decision

will be filed with the Secretary for Natural Resources. (Cal. Code Regs., tit. 17, § 60007, subd. (b).) The Notice of Decision will also be filed with the State Clearinghouse.

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2.0 PROJECT DESCRIPTION

This section provides a summary of the ~~Draft~~ Staff Report: Senate Bill 350 Integrated Resource Planning Electricity Sector Greenhouse Gas Planning Targets (Proposed Targets) and the reasonably foreseeable compliance responses for purposes of the impact analysis. Please refer to Sections 5 and 6 of the Proposed Targets document for full descriptions.

A. Overview of the Proposed Targets and Scope of the "Project" under CEQA

Building on the State's climate leadership, Senate Bill 350 (SB 350) (De Leon, Chapter 547, Statutes of 2015), The Clean Energy and Pollution Reduction Act of 2015, directs CARB, in coordination with the CPUC and the CEC, to establish GHG emissions reduction planning targets for the electricity sector and for each POU or LSE to be used in IRPs. CARB is also directed to ensure that the targets reflect the electricity sector's percentage in achieving economy-wide greenhouse gas emissions specified in SB 32 (40 percent below 1990 levels by 2030).

For the first time, IRPs will identify what actions may be taken by POUs and LSEs to achieve California's long-term GHG reduction goals, while considering cost effectiveness, reliability, impacts on disadvantaged communities, as well as statutory mandates such as the doubling of energy efficiency savings and the fifty percent Renewables Portfolio Standard (RPS). The IRP process seeks to balance several key objectives of importance to the Legislature. The integrated resource planning process provides an opportunity for the POUs and LSEs to plan for the future electricity sector, and establishes a new level of coordination and collaboration throughout the electricity sector. Holistic consideration of these requirements enables planning at both the individual utility and the sector level to achieve the State's GHG emissions reductions goals.

The IRPs produced by each POU and LSE will describe planned investments in new generation facilities or contracts to obtain electricity, activities expected to result in energy efficiency improvements, and relevant considerations to address additional criteria listed in SB 350. The IRPs will reflect an individual entity's plans to meet statutory obligations such as the 50 percent RPS and doubling energy efficiency. Inclusion of GHG planning target ranges in individual IRPs will lead to detailed plans that, together, are expected to reflect the path to achieving the electricity sector GHG planning target, based on the range identified in the 2017 Scoping Plan Update. Attaining electricity sector GHG emissions corresponding to levels in the 2017 Scoping Plan Update will help achieve the State's goal of reducing GHG emissions to 40 percent below 1990 levels by 2030.

B. Project Objectives

The primary objectives of the Proposed Targets are listed below. These objectives are primarily derived from the requirements of SB 350 and SB 32 (Health & Saf. Code, commencing with § 38500), as well as other governing law, and statutory requirements applicable to and for the approval of AB 32 GHG emission reduction measures (Health & Saf. Code, § 38562).

1. Establish technologically feasible and cost-effective electricity sector GHG planning targets that increase the likelihood of achieving economy-wide GHG emission levels specified in SB 32 (40 percent below 1990 levels by 2030).
2. Establish POU and LSE GHG planning targets that, together, reflect the electricity sector GHG planning target.
3. Establish a transparent, easily updated methodology for associating electricity sector GHG emissions with individual POU and LSE GHG emissions for use in establishing GHG planning targets for current and future IRP cycles.
4. Establish a high-level approach for updating electricity sector and individual POU and LSE GHG planning targets for use in future IRP cycles.

C. Summary of Proposed Targets

The proposed project, for purposes of this analysis, is the establishment of electricity sector, LSE and POU GHG emissions reductions planning targets which will then be used by LSEs and POUs as part of the SB 350 Integrated Resource Planning Process. Through their IRPs, filing entities will demonstrate how they will meet the electricity sector's share of the State's 2030 GHG reduction target, while considering cost effectiveness, reliability, impacts on disadvantaged communities, as well as statutory mandates such as the doubling of energy efficiency savings and the fifty percent Renewables Portfolio Standard (RPS). The Proposed Targets reflect a range of 30 $MMTCO_2e$ to 53 $MMTCO_2e$, as reflected in the 2017 Scoping Plan Update. This range of electricity sector GHG emissions represents the electricity sector's percentage in achieving the economy-wide GHG reductions specified in SB 32.

In addition to establishing the GHG planning target for the electricity sector, the Proposed Targets document sets forth a methodology to calculate individual GHG planning targets for POUs and LSEs, and establishes individual GHG planning targets for POUs and LSEs. The Proposed Targets methodology for establishing those individual GHG planning targets is summarized below:

- The Cap-and-Trade Electrical Distribution Utility (EDU) Allowance Allocation methodology for 2021-2030[4] (Allocation Methodology) provides

[4] 2021-2030 EDU Allocation Spreadsheet: https://www.arb.ca.gov/regact/2016/capandtrade16/attach10.xlsx. Note EDU-specific GHG emissions are listed on tabs for each EDU; EDU-specific GHG emissions include the industrial source electricity demand in the spreadsheet but are excluded for EDU allowance allocation purposes.

the percentage of estimated 2030 electricity sector GHG emissions for individual POUs and Investor Owned Utilities (IOUs).

- The GHG Planning Target ranges for POUs are a product of the estimated 2030 percentage of GHG emissions based on the Allocation Methodology and the electricity sector GHG planning target range, 30 MMTCO2e – 53 MMTCO2e.

- The percentage of 2030 GHG emissions associated with each IOU based on the Allocation Methodology is apportioned among LSEs (IOUs, Community Choice Aggregators (CCAs) and Electric Service Providers (ESPs)) operating within an IOU's territory based on proportion of electricity demand in 2030 reported annually to the CEC as part of the Integrated Energy Policy Report (IEPR).[5] The GHG planning target range for each LSE is the product of the IOU's estimated 2030 percentage of GHG emissions, the LSE's estimated percentage of electricity demand, and the electricity sector GHG planning target range, 30 MMTCO2e – 53 MMTCO2e

- The proportion of electricity demand met by CCAs operating within an IOU's territory is based on forecasts of electricity demand in 2030 reported annually to the CEC as part of the IEPR.

- The proportion of electricity demand met by ESPs operating under the Direct Access set-aside within an IOU's territory is based on three-year averages of recent electricity sales.

D. Reasonably Foreseeable Compliance Responses

SB 350 requires, in part, LSEs and POUs to develop IRPs that meet greenhouse gas reduction planning targets established by CARB in coordination with CPUC and CEC. IRPs provide a description of planned procurement activities that will result in GHG emissions. Together, IRPs filed by POUs and LSEs, are expected to demonstrate how these plans will achieve emission reductions to meet the electricity sector GHG planning targets and contribute to the State's overall achievement of the 2030 target.

The specific actions undertaken by any individual entity to meet GHG planning targets are not known at this time, but the actions will be similar to the electricity sector responses identified in the 2017 Scoping Plan Update. The reasonably foreseeable

[5] 2017 Integrated Energy Policy Report, Form 1.1c California Energy Demand Forecast 2018 - 2030, Mid Demand Baseline Case, Mid AAEE and AAPV Savings. Retrieved from: http://docketpublic.energy.ca.gov/PublicDocuments/17-IEPR-03/TN222582_20180216T094947_LSE_and_BA_Tables_Mid_Baseline_Demand_Mid_AAEEAAPV_Revised_CCA.xlsx

compliance responses, assuming that IRPs are implemented over the next 12 years, include:

- Construction of, or modifications to, buildings, electricity generation facilities, electricity transmission and distribution infrastructure, and industrial facilities.

- New operations or changes to existing operational processes related to electricity generation and delivery in California.

Compliance responses could range from operational changes, to minor modifications to existing facilities, to large-scale construction projects.

Doubling of energy efficiency at existing buildings would include modifications to buildings, such as replacement of heating, ventilation, and air conditioning (HVAC) systems with heat pumps and installation of more efficient water heaters. Other upgrades, such as installation of more-efficient insulation, window replacements, and whole house or whole-building retrofits could occur as well, with the overall goals of creating zero net energy buildings. These activities would occur over a long period, such that the existing production rate of equipment would be sufficient to meet demand. That is, no new manufacturing facilities or other earth-moving activities would be needed.

Large-scale construction projects would generally allow for increased use of renewable energy and/or storage of produced renewable energy. Additional renewable energy supplies may include new wind, solar thermal, solar photovoltaic, geothermal, solid-fuel biomass, biogas, and small hydroelectric facilities. These may require new and upgraded transmission lines to move the electricity from the source of generation to substations near population centers, and upgraded distribution systems to accommodate local distributed energy resources.

Energy storage projects augment electrical grids by capturing excess electrical energy during periods of low demand and storing it in other forms until needed on an electrical grid. This excess electrical energy could originate from buildings with solar panels or large-scale renewable energy facilities. While various technologies can be used to store energy, it is foreseeable that such energy storage systems would primarily be lithium battery-based systems. These systems are likely to be in industrial areas and cover areas of land that could exceed one acre.

In addition, regionalization of the grid may result in increased construction and operation of renewable energy projects. Expansion of the grid may include upgraded and new transmission lines.

In addition to constructing and operating these GHG-free technologies, compliance responses may affect the operation of GHG-emitting technologies. Some responses

may increase use of fossil-fuel generation plants while other responses reduce the use of fossil-fuel generation plants.

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3.0 ENVIRONMENTAL AND REGULATORY SETTING

The California Environmental Quality Act (CEQA) Guidelines require an environmental impact report (EIR) to include an environmental setting section, which discusses the current environmental conditions in the vicinity of the project. This environmental setting constitutes the baseline physical conditions against which an impact is normally compared to determine whether or not it is significant. (Cal. Code Regs., tit. 14 § 15125.) As discussed above in Chapter 1, the California Air Resources Board (CARB or Board) has a certified regulatory program and prepares an environmental analysis (EA) in lieu of an EIR. This Final ~~Draft~~ EA is a functional equivalent to an EIR under CEQA. Therefore, in an effort to comply with the policy objectives of CEQA, an environmental setting, as well as a regulatory setting with relevant environmental laws and regulations, has been included as Attachment A to this document.

The baseline, for purposes of this Final ~~Draft~~ EA, consists of the existing (2018) environmental conditions and regulations described in Attachment A of this document. Historically, power plants generated electricity largely by combusting fossil fuels. In the 1970s and early 1980s, a significant portion of California's power supply came from coal and petroleum resources. To reduce air pollution and promote fuel diversity, the State shifted away from these resources to natural gas, renewable energy, and energy efficiency programs, resulting in significant GHG emissions reductions. Indeed, coal generation has been reduced by more than half from 2008 levels.[6] Power plants fueled by natural gas provide the largest portion of the in-state installed capacity, over 43,000 megawatts (MW), although the share of power plants fueled primarily by natural gas has declined in recent years.[7]

Renewable energy has shown tremendous growth, with capacity from solar, wind, geothermal, small hydropower, and biomass power plants growing from 6,600 MW in 2010 to 27,800 MW as of October 2017.[8] Likewise, electricity generation from renewable energy has grown over the past 30 plus years—more than doubling since 2008.[8] The RPS, established in 2002, has driven greater renewable energy generation, and the RPS target has been ratcheted upwards in 2006, 2011, and (by SB 350) in 2015.

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[6] California Energy Commission. December, 2017. Tracking Progress. California's Declining Reliance on Coal – Overview. Retrieved from: http://www.energy.ca.gov/renewables/tracking_progress/documents/current_expected_energy_from_coal.pdf

[7] California Energy Commission. August, 2017. Tracking Progress. California's Installed Electric Power Capacity and Generation. Retrieved from: http://www.energy.ca.gov/renewables/tracking_progress/documents/installed_capacity.pdf

[8] California Energy Commission. December, 2017. Tracking Progress. Renewable Energy – Overview. Retrieved from: http://www.energy.ca.gov/renewables/tracking_progress/documents/renewable.pdf

Going forward, new electricity generation capacity is likely to be dominated by renewable energy technologies. The CPUC explored a wide variety of scenarios for future electricity generation in California. In order to meet existing laws and policies, additional wind, battery storage and utility-scale solar capacity were selected by the model. A scenario with 30 MMTCO2e in 2030 was realized with larger amounts of wind, solar, geothermal, and lithium ion battery storage. The model did not select new natural gas plants in any of the scenarios explored.[9]

Numerous factors, including population and economic growth, personal income, employment, electrification, and efficiency measures, affect electricity demand. Population in the State of California increased from 34 million in 2000 to nearly 40 million in 2016—a nearly 18 percent increase from 2000 levels.[10] During the same time period, the economy has grown by more than 40 percent, from $1.6 trillion in 2000 to $2.3 trillion in 2016 in gross state product.[11] Population is forecast to increase further, to 44 million by 2030.

Energy efficiency efforts in California have reduced energy demands. California has been a leader in advancing appliance and building energy efficiency, and over the last 40 years, California has implemented cost-effective appliance and building energy efficiency standards, as well as utility efficiency programs, that have saved consumers billions of dollars. The annual efficiency and conservation savings for electricity were estimated to surpass 95,000 gigawatt hours (GWh) by 2016.[12]

The population and economy of California have grown, while also becoming less carbon intensive. Since the launch of many of the State's major climate programs, including RPS, energy efficiency standards, and Cap-and-Trade, California has succeeded in reducing GHG emissions while also developing a cleaner, resilient economy that uses less energy and generates less pollution.

[9] The Decision (p. 32) acknowledges that this result "masks some additional underlying complexity in the modeling results that may affect the economics of operation of natural gas plants that should be further examined." California Public Utilities Commission Decision "Decision Setting Requirements for Load Serving Entities Filing Integrated Resource Plans," Rulemaking 16-02-007. Retrieved from: http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M209/K771/209771632.PDF

[10] Population data obtained from California Department of Finance Data in Action-1970 to 2060 on March 22, 2018. Additional information available at: http://www.dof.ca.gov/Forecasting/Demographics/Data_In_Action/

[11] Gross State Product, California Department of Finance. Retrieved from: http://www.dof.ca.gov/Forecasting/Economics/Indicators/Gross_State_Product/

[12] California Energy Commission. July, 2017. Tracking Progress. Energy Efficiency. Retrieved from: http://www.energy.ca.gov/renewables/tracking_progress/documents/energy_efficiency.pdf

4.0 IMPACTS ANALYSIS AND MITIGATION MEASURES

A. Approach to the Environmental Impacts and Mitigation Measures

This chapter contains an analysis of the environmental impacts resulting from implementation of the ~~Draft~~ Staff Report: Senate Bill 350 Integrated Resource Planning Electricity Sector Greenhouse Gas Planning Targets (Proposed Targets). The California Environmental Quality Act (CEQA) requires the baseline for determining the significance of environmental impacts to normally be the existing conditions at the time the environmental review is initiated. (Cal. Code Regs., tit.14, § 15125(a).) Therefore, significance determinations reflected in this Final ~~Draft~~ Environmental Analysis (EA) are based on a comparison of the potential environmental consequences of implementation of the Proposed Targets with the regulatory setting and physical conditions in 2018 (see chapter 3 above, and Attachment A).

1. Significant Adverse Environmental Impacts and Mitigation Measures

The analysis of adverse impacts on the environment, and significance determinations for those impacts, reflect the programmatic nature of the analysis of the reasonably foreseeable compliance responses to implementation of the Proposed Targets. These reasonably foreseeable compliance responses are described in more detail in Chapter 2, which include broadly-defined types of actions that may be taken by others in the future as a result of implementation of the Proposed Targets.

This Final ~~Draft~~ EA takes a conservative approach and considers some adverse environmental impacts to be potentially significant because of the inherent uncertainties about the ultimate design or implementation details of the recommended measures. The relationship between reasonably foreseeable physical actions carried out in response to implementation of the Proposed Targets, as well as environmentally sensitive resources or conditions that may be affected, are also taken into consideration.

For later actions carried out by others in response to implementation of the Proposed Targets (e.g., construction of new facilities), many impacts identified in this Final ~~Draft~~ EA can be avoided or reduced to a less-than-significant level by local planning and permitting authorities during project-level environmental review. Nonetheless, at this stage, this Final ~~Draft~~ EA takes a conservative approach in its post-mitigation significance conclusions, to avoid any risk of understating the impact, considering the current uncertainty as to how specific measures will be implemented and whether feasible mitigation would be sufficient or would be implemented by other parties. This approach fulfills CARB's disclosure responsibility under CEQA by noting that potentially significant environmental impacts may be unavoidable.

Where applicable, consistent with CARB's certified regulatory program requirements (Cal. Code Regs., tit.17, § 60005 (b)), this Final ~~Draft~~ EA also acknowledges potential

beneficial impacts on the environment in each resource area that may result from implementation of the Proposed Targets. Any beneficial impacts associated with the Proposed Targets are included in the impact assessment for each resource area described in this chapter.

B. Resource Area Impacts and Mitigation Measures

The following discussion provides a programmatic analysis of the reasonably foreseeable compliance responses that could result from implementation of the Proposed Targets, described in Chapter 2 of this Final ~~Draft~~ EA. The impact analysis is organized by environmental resource areas in accordance with the topics presented in the Environmental Checklist in Appendix G to the CEQA Guidelines (Cal. Code Regs., tit. 14, § 15000 et. seq). These impact discussions are followed by the types of mitigation measures that could be required to reduce potentially significant environmental impacts.

The analysis of the impacts resulting from the Proposed Targets is organized to describe construction-related impacts and operational impacts within each environmental resource area. Please refer back to Chapter 2 for the detailed description and the reasonably foreseeable compliance responses. Only those compliance responses that could lead to environmental impacts within that resource area are discussed, unless there is a need to demonstrate that no impact to that resource area would occur (e.g., it is not obvious by the compliance responses discussed in Chapter 2).

If a later activity would have environmental impacts that are not examined within this Final ~~Draft~~ EA, the public agency with authority over the later activity would be required to conduct additional environmental review as required by CEQA or other applicable statutes.

1. Aesthetics

a. Impact 1.a: Construction-Related Impacts to Aesthetics

As summarized in Chapter 2, the reasonably foreseeable compliance responses associated with the Proposed Targets would require construction activities. These impacts address the building phase of both reasonably foreseeable construction of new facilities or modification of existing facilities that involve earth-moving activities.

Landscape character can be defined as the visual and cultural image of a geographic area. It consists of the combination of physical, biological, and cultural attributes that make each landscape identifiable or unique. Visual character may range from predominately natural to heavily influenced by human development. Its value is related, in part, to the importance of a site to those who view it. Viewer groups typically include: residents, motorists, and recreation users.

Although it is reasonably foreseeable that activities associated with construction of new facilities or modification of existing facilities could occur due to implementation of the Proposed Targets, the exact location or character of any new facilities or modification of existing facilities is uncertain.

Construction of new facilities, although expected to occur in areas appropriately zoned, could conceivably introduce or increase the presence of visible artificial elements (e.g., heavy-duty equipment, vegetation removal, new or expanded buildings) in areas of scenic importance, such as visibility from a State scenic highway. The visual effects of such construction would depend on several variables, including the type and size of facilities, distance and angle of view, visual prominence, and placement in the landscape. In addition, nighttime lighting for safety and security purposes may be necessary during the construction phase of projects, which could affect nighttime view.

Impact Significance Determination

For the reasons described above, construction-related impacts on aesthetics associated with implementation of the Proposed Targets could be potentially significant.

Mitigation Measures

Potential aesthetic impacts could be reduced to a less-than-significant level by mitigation that can and should be implemented by local lead agencies, but is beyond the authority of CARB and not within its purview.

Mitigation Measure 1.a:

The Regulatory Setting in Attachment A includes applicable laws and regulations that provide protection of aesthetic resources. CARB does not have the authority to require implementation of mitigation related to new or modified facilities or infrastructure that would be approved by other State agencies or local jurisdictions. The ability to require such measures is within the purview of jurisdictions with land use approval and/or permitting authority. Project-specific impacts and mitigation would be identified during the project review process carried out by agencies with approval authority. Recognized practices routinely required to avoid and/or minimize impacts to aesthetic resources include:

- Proponents of new or modified facilities, or infrastructure constructed because of reasonably foreseeable compliance responses, would coordinate with State or local land use agencies to seek entitlements for development including the completion of all necessary environmental review requirements (e.g., CEQA). The local or State land use agency or governing body must follow all applicable environmental regulations as part of approval of a project for development.

- Based on the results of the environmental review, proponents would implement all feasible mitigation to reduce or substantially lessen the potentially significant scenic or aesthetic impacts of the project.

- The project proponent would color and finish the surfaces of all project structures and buildings visible to the public to: (1) minimize visual intrusion and contrast by blending with the landscape; (2) minimize glare; and (3) comply with local design policies and ordinances. The project proponent would submit a surface treatment plan to the lead agency for review and approval.

- To the extent feasible, the sites selected for use as construction staging and laydown areas would be areas that are already disturbed and/or are in locations of low visual sensitivity. Where feasible, construction staging and laydown areas for equipment, personal vehicles, and material storage would be sited to take advantage of natural screening opportunities provided by existing structures, topography, and/or vegetation. Temporary visual screens would be used where helpful, if existing landscape features did not screen views of the areas.

- All construction, operation, and maintenance areas would be kept clean and tidy, including the re-vegetation of disturbed soil and storage of construction materials and equipment would be screened from view and/or are generally not visible to the public, where feasible.

- Siting projects and their associated elements next to important scenic landscape features or in a setting for observation from State scenic highways, national historic sites, national trails, and cultural resources would be avoided to the greatest extent feasible.

- The project proponent would contact the lead agency to discuss the documentation required in a lighting mitigation plan, submit to the lead agency a plan describing the measures that demonstrate compliance with lighting requirements, and notify the lead agency that the lighting has been completed and is ready for inspection.

Post-Mitigation Significance Determination

Because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this Final ~~Draft~~ EA does not attempt to address project-specific details of mitigation, the degree of mitigation that may ultimately be implemented to reduce potentially significant scenic and nighttime lighting impacts is uncertain.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this Final ~~Draft~~ EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that construction-related aesthetic impacts associated with the Proposed Targets would be **potentially significant and unavoidable**.

b. Impact 1.b: Operational Impacts to Aesthetics

As summarized in Chapter 2, the reasonably foreseeable compliance responses associated with the Proposed Targets would require long-term operational changes. Development of new facilities, although expected to occur in areas appropriately zoned, could conceivably introduce or increase the presence of visible artificial elements (e.g., heavy-duty equipment, vegetation removal, new or expanded buildings) in areas of scenic importance, such as visibility from a State scenic highway. The visual effects of such development would depend on several variables, including the type and size of facilities, distance and angle of view, visual prominence, and placement in the landscape. In addition, facility operation may introduce substantial sources of glare, exhaust plumes, and nighttime lighting for safety and security purposes.

Implementation of renewable energy and energy efficiency would increase the number of renewable energy projects. Renewable energy supplies include: wind, solar thermal, solar photovoltaic, geothermal, solid-fuel biomass, biogas, and small hydroelectric systems. Depending on the size and location of these types of systems, operations may affect the quality of scenic vistas and damage scenic resources. The operation of wind, solar thermal, and solar photovoltaic energy would occur over large expanses of land (i.e., acres). These types of facilities generally consist of the following features.

- Wind development would introduce into the visual environment large, vertical towers, turbines with revolving turbine blades, access roads, transmission lines, substations, rights-of-way, and other associated facilities.

- Operation of solar thermal facilities may create substantial sources of light or glare due to certain project components, including power towers, and parabolic dishes and troughs. The levels of light and glare may dominate the landscape, which in some cases, may include minimal or no existing lighting. These facilities would also require the use of nighttime lighting for safety and security reasons, which may also result in glare.

- Development of solar photovoltaic energy would occur in various locations throughout the State. Solar photovoltaic installations may create new sources of substantial light or glare, thereby affecting day and nighttime views. Levels of light or glare may dominate the project landscape. These facilities would also require the use of nighttime lighting for safety and security reasons, which may also result in glare. Depending on

specific locations of development, the views of motorists, residents, and recreationists may be affected.

Operation of geothermal, solid-fuel biomass, biogas, and small hydroelectric power generation facilities, as well as any non-renewable energy facilities needed to balance out intermittent renewable resources, would not present the large areas of land required for wind- and solar-based facilities and would generally appear as buildings (see Impact 1.a for a description of these types of impacts). However, operation of these facilities could require nighttime lighting for operational safety and security and glare from night lighting may also occur. Glare from the surfaces of geothermal project facilities during the day may also occur.

Energy storage systems are expected to include lithium battery-based systems, which could produce additional demand for lithium-ion batteries, resulting in increased demand for lithium. Worldwide, the majority (80 to 90 percent) of raw lithium is currently mined and exported from Australia, Chile, Argentina, and Bolivia.[13] Lithium is typically derived from hard rock mining practices or from brine extraction. Hard rock mining, which is typical in Australia, requires the use of heavy-duty equipment (e.g., crushers, rigs, loaders, cutting equipment, cranes) and could result in harmful visual changes to the natural environment such as hillside erosion, contamination of surface waters, artificial drainage patterns, subsidence, night-time lighting, and deforestation. In contrast, brine extract, which occurs in Chile, Argentina, and Bolivia, involves vertical pumping of brine, which evaporates to form brown and white cones of salt minerals. It is reasonably foreseeable that increased lithium could cause adverse visual effects in areas where hard rock mining (Australia) and brine extraction activities (Chile, Argentina, and Bolivia) occur.

The reasonably foreseeable compliance responses could also result in accelerated turnover of lithium-ion batteries which could place additional demand such that existing recycling facilities would need to be expanded or modified. Modifications to existing recycling centers could occur within the confines of such facilities and, therefore, would not result in additions of external equipment that would degrade visual quality; however, development of new facilities, although expected to occur in areas appropriately zoned, could increase the presence of visible human-made elements (e.g., heavy-duty trucks, new structures) in areas of scenic importance. The specific locations of new recycling facilities is uncertain; therefore, adverse effects to scenic vistas or views from a State scenic highway could occur. Further, sources of daytime glare and nighttime lighting associated with these facilities could be introduced.

Impact Significance Determination

For the reasons discussed above, operational aesthetic impacts could be potentially significant due to the presence and operations of new facilities and structures, and

[13] United States Geological Survey. 2017a. Mineral Resources Profile: Lithium. Available: https://minerals.usgs.gov/minerals/pubs/commodity/lithium/mcs-2017-lithi.pdf. Accessed: April 2018

implementation of the reasonably foreseeable compliance responses associated with the Proposed Targets.

Mitigation Measures

Mitigation Measure 1.b: Implement Mitigation Measure 1.a

Potential aesthetic impacts could be reduced to a less-than-significant level by mitigation that can and should be implemented by local lead agencies, but is beyond the authority of CARB and not within its purview.

Post-Mitigation Significance Determination

Because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this Final ~~Draft~~ EA does not attempt to address project-specific details of mitigation, the degree of mitigation that may ultimately be implemented to reduce potentially significant scenic and nighttime lighting impacts is uncertain.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this Final ~~Draft~~ EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that operational aesthetic impacts associated with all the Proposed Targets would be **potentially significant and unavoidable**.

2. Agricultural and Forest Resources

a. Impact 2.a: Construction-Related and Operational-Related Impacts to Agricultural and Forest Resources

As summarized in Chapter 2, the reasonably foreseeable compliance responses associated with the Proposed Targets would require construction and operation of new facilities or modification of existing facilities that involve earth-moving activities.

If facilities or transportation improvements are proposed in response to the Proposed Targets, potential impacts to Prime Farmland, Unique Farmland, Farmland of Statewide Importance, Williamson Act conservation contracts, forest land or timberland, must be reviewed by local or State lead agencies in the context of future project approvals. Many local governments have adopted land use policies to protect important agricultural and forest land from conversion to urban development, including industrial facilities. While it is reasonable to anticipate that land use policies controlling the location of new industrial facilities would generally avoid conversion of important agricultural land, the potential cannot be entirely dismissed. If a facility were located on important farmland or property under a Williamson Act Contract, conversion of the agricultural land to urban uses could occur.

Implementation of the Proposed Targets would increase the number of renewable energy projects. In response to proposals for development of renewable energy projects on important farmland, local governments and State Agencies have faced the challenge of balancing competing public interests in conserving agricultural land and meeting goals for expanding renewable energy generation. Utility-scale solar and wind energy facilities proposed to be located on Important Farmland and/or property under Land Conservation (Williamson Act) contracts have resulted in land use conversions. In 2013, a California appellate court upheld an EIR's evaluation of agricultural land impact and mitigation for a proposed solar project on grazing land and Williamson Act contract land where a contract cancellation was proposed. The mitigation measures adopted by the lead agency in the case included agricultural conservation easements and measures to restore the site after conclusion of the project's useful life. The court decision confirmed that it was appropriate for the local lead agency to consider the State's interest in increasing renewable energy generation as a reason to permit the cancellation of a Williamson Act contract. (*Save Panoche Valley v. San Benito County* (2013) 217 Cal.App.4th 503.) Consequently, conversion of important farmland could occur in response to the Proposed Targets. Because CARB has no land use authority, mitigation is not within its purview to reduce potentially significant impacts to less-than-significant levels. While compliance with existing land use policies, ordinances, and regulations would serve to moderate this impact, because of local priorities for protection of agricultural land, the record of recent project approvals in the State demonstrates the impact has not been avoided.

Increased demand for lithium associated with energy storage systems could place additional demand on lithium ore extraction internationally. Lithium ore derived from brines typically occurs within desert areas, which would not be considered valuable land for agricultural or forestry practices; however, lithium ore extracted from hard rock mining could result in the loss of agricultural and forest lands of importance depending on where new processing and manufacturing facilities are sited.

Impact Significance Determination

For the reasons described above, construction and operational-related impacts on agricultural and forest resources associated with implementation of the Proposed Targets could be potentially significant.

Mitigation Measures

Potential construction and operational-related impacts to agricultural and forest resources could be reduced to a less-than-significant level by mitigation that can and should be implemented by local lead agencies, but is beyond the authority of CARB and not within its purview.

Mitigation Measure 2.a:

The Regulatory Setting in Attachment A includes applicable laws and regulations that provide protection of agricultural and forest resources. CARB does not have the

authority to require implementation of mitigation related to new or modified facilities or infrastructure that would be approved by other State agencies or local jurisdictions. The ability to require such measures is within the purview of jurisdictions with land use approval and/or permitting authority. Project-specific impacts and mitigation would be identified during the project review process and carried out by agencies with approval authority. Recognized practices routinely required to avoid and/or minimize impacts to agriculture and forest resources include:

- Proponents of new or modified facilities, or infrastructure constructed because of reasonably foreseeable compliance responses, would coordinate with State or local land use agencies to seek entitlements for development including the completion of all necessary environmental review requirements (e.g., CEQA). The local or State land use agency or governing body must follow all applicable environmental regulations as part of approval of a project for development.

- Based on the results of the environmental review, proponents would implement all feasible mitigation to reduce or substantially lessen the environmental impacts of the project. Because CARB has no land use authority, mitigation is not within its purview to reduce potentially significant impacts to less-than-significant levels. Any mitigation specifically required for a new or modified facility would be determined by the local lead agency and future environmental documents by local and State lead agencies should include analysis of the following:

  - Avoidance of lands designated as Important Farmlands (State defined Prime Farmland, Farmland of Statewide Importance, and Unique Farmland) as defined by the Farmland Mapping and Monitoring Program.

  - Analysis of the feasibility of using farmland that is not designated as Important Farmland prior to deciding on the conversion of Important Farmland.

  - The feasibility, proximity, and value of the proposed project sites should be balanced before a decision is made to locate a facility on land designated as Important Farmland.

  - Any action resulting in the conversion of Important Farmlands should consider mitigation for the loss of such farmland. Any such mitigation should be completed prior to the issuance of a grading or building permit by providing the permitting agency with written evidence of completion of the mitigation. Mitigation may include but is not limited to:

    - Permanent preservation of off-site Important Farmland (State defined Prime Farmland, Farmland of Statewide Importance, and

Unique Farmland) of equal or better agricultural quality, at a ratio of at least 1:1.

- Preservation may include the purchase of agricultural conservation easement(s); purchase of credits from an established agricultural farmland mitigation bank; contribution of agricultural land or equivalent funding to an organization that provides for the preservation of farmland towards the ultimate purchase of an agricultural conservation easement.

- Participation in any agricultural land mitigation program, including local government maintained, that provides equal or more effective mitigation than the measures listed.

Post-Mitigation Significance Determination

Because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this Final ~~Draft~~ EA does not attempt to address project-specific details of mitigation, the degree of mitigation that may ultimately be implemented to reduce potentially significant impacts to agricultural and forest resources is uncertain.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this Final ~~Draft~~ EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that construction and operational-related impacts to agricultural and forest resources associated with the Proposed Targets would be **potentially significant and unavoidable**.

3. Air Quality

a. Impact 3.a: Construction-Related Impacts to Air Quality

As summarized in Chapter 2, the reasonably foreseeable compliance responses associated with the Proposed Targets would require construction activities. These impacts address the building phase of both reasonably foreseeable construction of new facilities or modification of existing facilities that involve earth-moving activities.

Proposed development of new manufacturing facilities would be required to secure local or State land use approvals prior to their implementation. Part of the development review and approval process for projects located in California requires environmental review consistent with California environmental laws (e.g., CEQA) and other applicable local requirements (e.g., local air quality management district rules and regulations). The environmental review process would include an assessment of whether implementation of such projects could result in construction-related air quality impacts.

At this time, the specific location, type, and number of construction activities is not known and would be dependent upon a variety of factors that are not within the control or authority of CARB and not within its purview. Nonetheless, the analysis presented here provides a good-faith disclosure of the general types of construction emission impacts that could occur with implementation of these reasonably foreseeable compliance responses. Further, subsequent environmental review should be conducted at such time that an individual project is proposed and land use or construction approvals are sought.

During the construction phase for any facilities, criteria air pollutants and toxic air contaminants (TACs) could be generated from a variety of activities and emission sources. These emissions would be temporary and occur intermittently depending on the intensity of construction on a given day. Site grading and excavation activities would generate fugitive particulate matter (PM) dust emissions, which is the primary pollutant of concern during construction. Fugitive PM dust emissions (i.e., respirable particulate matter [PM_{10} and $PM_{2.5}$]) vary as a function of several parameters, such as soil silt content and moisture, wind speed, acreage of disturbance area, and the intensity of activity performed with construction equipment. Exhaust emissions from off-road construction equipment, material delivery trips, and construction worker-commute trips could also contribute to short-term increases in PM emissions, but to a lesser extent. Exhaust emissions from construction-related mobile sources also include reactive organic gases (ROG) and oxides of nitrogen (NOx). These emission types and associated levels fluctuate greatly depending on the type, number, and duration of usage for the varying equipment.

The site preparation phase typically generates the most substantial emission levels because of the on-site equipment and ground-disturbing activities associated with grading, compacting, and excavation. Site preparation equipment and activities typically include backhoes, bulldozers, loaders, and excavation equipment (e.g., graders and scrapers). Although detailed construction information is not available at this time, based on the types of activities that could be conducted, the primary sources of construction-related emissions include soil disturbance- and equipment-related activities (e.g., use of backhoes, bulldozers, excavators, and other related equipment). Based on typical emission rates and other parameters for above- mentioned equipment and activities, construction activities could result in hundreds of pounds of daily NOx and PM emissions (i.e., the amount generated from two to four pieces of heavy-duty equipment working eight hours per day), which may exceed general mass emissions limits of a local or regional air quality management district depending on the location of the emissions. Thus, implementation of new regulations and/or incentives could generate levels that conflict with applicable air quality plans, exceed or contribute substantially to an existing or projected exceedance of State or national ambient air quality standards, or expose sensitive receptors to substantial pollutant concentrations.

Impact Significance Determination

For the reasons described above, construction-related air quality impacts associated with implementation of the Proposed Targets could be potentially significant.

Mitigation Measures

Potential construction-related air quality impacts could be reduced to a less-than-significant level by mitigation measures that can and should be implemented by local lead agencies, but is beyond the authority of CARB and not within its purview.

Mitigation Measure 3.a:

The Regulatory Setting in Attachment A includes applicable laws and regulations that provide protection of air quality. CARB does not have the authority to require implementation of mitigation measures related to new or modified facilities that would be approved by local jurisdictions. The ability to require such measures is within the purview of jurisdictions with local or State land use approval and/or permitting authority. New or modified facilities in California would likely qualify as a "project" under CEQA, because they would generally need a discretionary public agency approval and could affect the physical environment. The jurisdiction with primary approval authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA. Project-specific impacts and mitigation would be identified during the environmental review by agencies with project-approval authority. Recognized practices routinely required to avoid and/or minimize impacts to air quality include the following:

- Proponents of new or modified facilities, or infrastructure constructed because of reasonably foreseeable compliance responses, would coordinate with State or local land use agencies to seek entitlements for development including the completion of all necessary environmental review requirements (e.g., CEQA). The local or State land use agency or governing body must follow all applicable environmental regulations as part of approval of a project for development.

- Based on the results of the environmental review, proponents would implement all feasible mitigation to reduce or substantially lessen the potentially significant air quality impacts of the project.

- Project proponents would apply for, secure, and comply with all appropriate air quality permits for project construction from the local agencies with air quality jurisdiction and from other applicable agencies, if appropriate, prior to construction mobilization.

- Project proponents would comply with the federal Clean Air Act and the California Clean Air Act (e.g., New Source Review and Best Available Control Technology criteria, if applicable).

- Project proponents would comply with local plans, policies, ordinances, rules, and regulations regarding air quality-related emissions and associated exposure (e.g., construction-related fugitive PM dust regulations, indirect source review, and payment into offsite mitigation funds).

- For projects located in PM nonattainment areas, prepare and comply with a dust abatement plan that addresses emissions of fugitive dust during construction and operation of the project.

Post-Mitigation Significance Determination

Because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this Final ~~Draft~~ EA does not attempt to address project-specific details of mitigation, the degree of mitigation that may ultimately be implemented to reduce potentially significant air quality impacts is uncertain.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this Final ~~Draft~~ EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that construction-related air quality impacts with the Proposed Targets would be **potentially significant and unavoidable**.

b. Impact 3.b: Operational Impacts to Air Quality

As summarized in Chapter 2, the reasonably foreseeable compliance responses associated with the Proposed Targets could require long-term operational changes.

Incorporating the Proposed Targets into IRPs is likely to result in plans for and ultimately procurement of additional electricity from renewable sources by 2030, deployment of renewable energy projects, energy storage projects and transmission facilities.

The most prevalent renewable resources used in California are solar and wind. Both solar and wind power produce no direct air emissions from operations. Emissions are possible during routine maintenance activities, such as from use of greases and solvents, but these activities would not be unique to these operations and considered minor (e.g., less than local air district thresholds). However, because grid operators must match electricity supply and demand, variable renewable resources can be more challenging to incorporate into the electricity grid than conventional generation technologies in the absence of battery technology or other quick-response energy

storage mechanism. As a result, today conventional generation such as fast-ramping and load-following combined-cycle or simple-cycle gas turbines often provide the ancillary services necessary to maintain reliable grid operations. Demand response or energy storage technologies (e.g., large battery technology) can provide additional means to optimize use of variable and off-peak renewable generation and provide for the ancillary services currently supplied by gas-fired generation. Absent additional energy storage, increased use of renewables to meet ancillary service needs, demand-side reductions or additional technology development, this could mean increased reliance on gas-fired generation, which could result in an increase in criteria air pollutants.

Other RPS-eligible resources include biogas-fueled generation (anaerobic digestion), solid fuel biomass plants, and geothermal plants. These resources are discussed further below.

Anaerobic digestion is a biological process that produces biogas from organic wastes such as landfills, livestock manure, wastewater treatment plants, and food processing waste. The captured biogas could help offset other emission sources by generating electricity. The quantity and type of emissions depends on the type of digester technology and may include NOx, carbon monoxide (CO), VOC, PM_{10}, $PM_{2.5}$, and SOx.

Biomass is waste and by-products that can be used as fuel for producing energy. Examples of some of the biomass residues used in direct combustion solid fuel biomass power plants include forest slash, urban wood waste, lumber waste, and agricultural waste. Biomass boilers emit criteria air pollutants and TACs. Emissions may also include ammonia slip for units equipped with control technologies that use ammonia for NOx reduction (e.g., selective non-catalytic reduction). Particulate emission controls may include cyclones, baghouses, or electrostatic precipitators. Additional non-combustion particulate emissions may be emitted from on-site fuel receiving, handling, storage, and processing operations.

Geothermal energy is produced by the heat of the earth and is often associated with seismically active regions. Wells can be drilled into underground reservoirs for the generation of electricity. The steam from the reservoir can be used to power a turbine/generator or the hot water can be used to boil a working fluid that vaporizes and then turns a turbine. Most geothermal plants have a closed-loop water system where extracted water is pumped back into the reservoir after it has been used for electricity generation. The pumped hot water may contain sulfur and other minerals. Water is also used for cooling. In closed-loop systems, gases from the well are not exposed to the air and are injected back into the ground to minimize emissions. However, open-loop systems can emit hydrogen sulfide (H_2S), methane, carbon dioxide (CO_2), and other pollutants. In the atmosphere, H_2S is oxidized into SO_2. Small amounts of particulate may also be emitted from cooling towers.

Stationary sources of renewable energy that generate criteria air pollutants and/or TACs would be required to obtain authorities to construct and permits to operate from the

applicable local air district. In addition, stationary sources would be required by law to comply with all applicable air district rules and regulations for criteria pollutants and TACs (e.g., new source review [best available control technologies and offsets for emission increases], toxic best available control technology, health risk evaluation, prohibitory rules, and airborne toxic control measures). The permit process along with adherence to all applicable rules and regulations require that these sources be equipped with required emission controls and that, individually, these sources would not result in emissions that exceed applicable thresholds. In addition, non-permitted sources of emissions (e.g., employee commute trips and deliveries) would be anticipated to be minor.

The Proposed Targets could also be achieved in part through energy efficiency measures in residential and commercial buildings, industry, agriculture, and street lighting. Generally, these could include new HVAC, building shell or end use technology used in the residential and commercial sectors (e.g., a greater share of high efficiency appliances); a reduction in energy services demand, due to conservation or behavior change; and a reduction in total energy demand.

Specifically, these measures include:

- Increase in high efficiency residential electric water heaters, central air conditioners, gas clothes driers, residential refrigerators, and light-emitting diode lightbulbs.
- Improvement in the electric efficiency of other equipment, such as televisions and cable set top boxes.
- Increase in high efficiency commercial natural gas water heaters, heat pump water heaters, electric space heating, electric cooking ranges, light-emitting diode lightbulbs, refrigerators, and ventilation.
- Improvements in the efficiency of other end-uses, such as computers and other electronics.
- Improved efficiency of industrial cooling and refrigeration processes, lighting, machine drive efficiency,
- Improved efficiency in street lighting and agricultural lighting.
- Reduction residential and commercial water heating demand due to urban water efficiency measures.
- Reduction in residential heating and cooling loads due to improved windows and behavioral change (i.e., change in thermostat set point).

- Reduction in residential lighting service demand due to behavioral change (i.e., turning off lights when not in use).

At this time, the specific types of energy efficiency measures may not reflect the specific future energy efficiency programs or activities, and would be identified by POUs or LSEs in their IRPs. Nonetheless, the analysis presented herein provides a good-faith disclosure of the general types of energy efficiency emission impacts that could occur with implementation of these reasonably foreseeable compliance responses.

These energy efficiency measures would reduce the combustion of fossil fuel at the power generating facility or at end-use (i.e., high efficiency natural gas water heater), thus decreasing their associated air emissions.

The Proposed Targets would allow some degree in flexibility in terms of power plant portfolio. Overall, deploying more renewable energy would reduce fossil-fuel power plant electricity generation; thus, decreasing their associated air emissions. However, at this stage CARB cannot predict with any precision what precise mix of energy resources each utility may choose to achieve its target. The long-term operational impacts for fossil-fueled power plants will depend on the portfolio of supply and demand options that each POU and LSE select. There are a number of electricity supply options including wind, solar, geothermal, and biomass power plants, from which to choose. There are a number of energy efficiency improvements that could affect total electricity demand served by each POU and LSE. There are a number of demand response and energy storage technologies that can provide ancillary services to the grid. Each POU and LSE will develop a portfolio of resources choosing among all these technologies to meet all of the IRP criteria that are listed in SB 350, including meet GHG planning targets. Therefore, given these uncertainties CARB cannot dismiss the need for increased nonrenewable electricity generation from individual existing or new power plants due to these decisions by individual utilities.

While CARB believes that resulting localized air impacts are unlikely, the potential for localized increases cannot be entirely dismissed. Other Permitting agencies including but not limiting to Energy commission, U.S. EPA and other State and local agencies, have primary responsibility for evaluating and mitigating impacts from specific power plant projects. Emissions from these stationary sources would be monitored and controlled by these agencies to minimize the negative impacts from the increased production.

Impact Significance Determination

CARB does not believe significant localized increases are likely, and as discussed above, CARB anticipates overall beneficial long-term operational impacts statewide. Nevertheless, in an abundance of caution and for the purposes of complete public disclosure, CARB concludes that long-term local air quality impacts associated with the Proposed Targets could be potentially significant.

Mitigation Measures

Potential operational-related air quality impacts could be reduced to a less-than-significant level by mitigation measures that can and should be implemented by permitting agencies/local lead agencies, but is beyond the authority of CARB and not within its purview.

In addition, pursuant to Assembly Bill 197 (Garcia, Ch. 250, Statutes of 2016), CARB will continue to assess greenhouse gas reduction measures and any potential impact on criteria pollutants or toxic air contaminant emissions. This bill, passed in conjunction with Senate Bill (SB) 32, requires an array of changes to how CARB is governed and overseen by the Legislature and how CARB considers and communicates emissions data (both at facility and regional levels), and it adds transparency regarding the expected emissions benefits of new CARB measures. The elements of AB 197 include:

- A requirement that CARB make available, and update at least annually, on its Internet Web site the emissions of greenhouse gases, criteria pollutants, and toxic air contaminants throughout the state broken down to a local and subcounty level for stationary sources and to at least a county level for mobile sources, and conduct monitoring in cooperation with other agencies to fulfill this requirement. (Health & Safety Code § 39607.)

- A requirement that CARB make available, and update at least annually, on its Internet Web site the emissions of greenhouse gases, criteria pollutants, and toxic air contaminants for each facility that reports to the state board and air districts. CARB is also required, at least once a year at a hearing of the Joint Legislative Committee on Climate Change Policies, to present an informational report on the reported emissions of greenhouse gases, criteria pollutants, and toxic air contaminants from all sectors covered by the scoping plan, including an evaluation of emission trends and a discussion of the factors that influence those trends. (Health & Safety Code § 38531.)

- A directive that CARB, when adopting rules and regulations to achieve greenhouse gas emissions reductions beyond the statewide greenhouse gas emissions limit, must follow the requirements of Health & Safety Code § 38562(b), consider the social costs of GHG emissions, and prioritize regulations that result in direct emission reductions at large stationary sources of GHG emissions, from mobile sources, and from other sources. (Health & Safety Code § 38562.5.)

- Measures to increase transparency regarding the effectiveness of new Scoping Plan measures, by requiring CARB to identify specified information for each proposed emissions reduction measure, including both the range of projected GHG emissions reductions and the range of

traditional air pollution reductions that would result from the measure. (Health & Safety Code § 38562.7.)

In addition to the actions discussed above, other mechanisms are in place to address criteria pollutant and toxics emissions. These other actions will address both mobile and industrial sources, and will require coordination across multiple agencies:

- Achieve better integration of emissions and program data for GHGs, criteria pollutants, and toxics. CARB is working to enhance its Pollution Mapping Tool to include toxics data, and to display multi-pollutant data for all sources at the county and sub-county level. CARB is also working to create an integrated inventory database system, and is investigating ways to harmonize the timing of data submittals and make data methodologies for criteria and toxic pollutants more consistent.[14]

- Continued analysis by OEHHA. Pursuant to the Governor's directive, OEHHA will continue to analyze the benefits and impacts of the GHG emissions limits adopted by CARB within disadvantaged communities with respect to programs adopted pursuant to AB 32. This analysis will include potential benefits and impacts in disadvantaged communities for other AB 32 programs outside of the Cap-and-Trade Program.

- CARB recently adopted the State SIP Strategy, which lists a suite of measures CARB has committed to develop in the coming years. CARB's Mobile Source Strategy and Sustainable Freight Strategy give further information and context regarding CARB's proposed upcoming statewide measures to transform the mobile source and freight sectors.

- The new Industrial Source Action Committee established by CAPCOA and CARB will consider options for community monitoring and prioritize and develop industrial control strategies focused on reducing community exposures to criteria and toxics air pollutants that adversely impact public health. The Committee will first focus on refineries.

Additionally, newly-enacted AB 617 (Garcia, Ch. 136, Statutes of 2017) directs and authorizes CARB to take several actions to improve data reporting from facilities, air quality monitoring, and pollution reduction planning for communities affected by a high cumulative exposure burden. With regard to reporting, it requires CARB to develop a uniform statewide annual reporting system of criteria pollutants and toxic air contaminants for certain categories of stationary sources. As for monitoring, it requires CARB to prepare a monitoring plan by October 1, 2018. Via a public process, this plan would identify the highest priority locations around the state to deploy community air

[14] See ARB Staff Presentation: Informational Update on California's Emission Inventories for Criteria Pollutants, Toxic Air Contaminants, and Greenhouse Gas Air Pollution, January 27, 2017. Available at https://www.arb.ca.gov/board/books/2017/012717/17-1-3pres.pdf.

monitoring systems. By July 1, 2019, any district containing a high priority location would need to deploy a community air monitoring system for that location or locations. The districts would also have authority to require nearby facilities to deploy a fenceline monitoring system under certain conditions. These efforts will help better understand the complex emissions interrelations between the Cap-and-Trade Program and air district criteria and toxics programs.

Finally, with regard to planning, AB 617 also requires CARB to prepare, in consultation with numerous stakeholders (including environmental justice organizations), a statewide strategy to reduce emissions of toxic air contaminants and criteria air pollutants in communities affected by a high cumulative exposure burden. This strategy must be prepared by October 1, 2018. The strategy would select locations around the state for preparation of community emissions reduction programs, which would then be adopted by the air districts and implemented after CARB review.

Also, CARB partners with air districts to address stationary emissions sources and adopts and implements State-level regulations to address sources of criteria and toxic air pollution. The key air quality strategies being implemented by CARB include:

- State Implementation Plans. As referenced in the Initial Statement of Reasons (ISOR_, the 2016 State Strategy for the State Implementation Plan sets forth a comprehensive array of proposed control measures designed to achieve the emission reductions from mobile sources, fuels, stationary sources, and consumer products necessary to meet ozone and fine PM attainment deadlines established by the Clean Air Act.

- AB 1807. AB 1807 requires CARB to use certain criteria in prioritizing the identification and control of air toxics.

- AB 2588 Air Toxics “Hot Spots” Program. AB 2588 imposes air quality requirements on the state. The goals of the program are to collect emission data, identify facilities having localized impacts, ascertain health risks, notify nearby residents of significant risks, and to reduce those significant risks to acceptable levels.

Mitigation Measure 3.b

The Regulatory Setting in Attachment 1 includes applicable laws and regulations that provide protection of air quality. CARB does not have the authority to require implementation of mitigation related to operation of new or modified facilities that would be approved by local jurisdictions. The ability to require such measures is within the purview of jurisdictions with local or State land use approval and/or permitting authority. New or modified facilities in California would likely qualify as a “project” under CEQA, because they would generally need a discretionary public agency approval and could affect the physical environment. The jurisdiction with primary approval authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA. Project-specific impacts and mitigation would be identified

during the environmental review by agencies with project-approval authority. Recognized practices routinely required to avoid and/or minimize impacts to air quality include the following:

- Proponents of new or modified facilities constructed and operated as a result of reasonably foreseeable compliance responses would coordinate with local or State land use agencies to seek entitlements for development including the completion of all necessary environmental review requirements (e.g., CEQA). The local jurisdiction with land use authority would determine that the environmental review process complied with CEQA and other applicable regulations, prior to project approval.
- Based on the results of the environmental review, proponents would implement all feasible mitigation identified in the environmental document to reduce or substantially lessen the operational-related air quality impacts of the project.
- Project proponents would apply for, secure, and comply with all appropriate air quality permits for project operation from the local agencies with air quality jurisdiction and from other applicable agencies, if appropriate, prior to commencement of project operation.
- Project proponents would comply with the federal Clean Air Act and the California Clean Air Act (e.g., New Source Review and Best Available Control Technology criteria, if applicable).
- Project proponents would comply with local plans, policies, ordinances, rules, and regulations regarding air quality-related emissions and associated exposure (e.g., indirect source review, and payment into offsite mitigation funds).
- For projects located in PM nonattainment areas, prepare and comply with a dust abatement plan that addresses emissions of fugitive dust during operation of the project.

Post-Mitigation Significance Determination

Because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this Final ~~Draft~~ EA does not attempt to address project-specific details of mitigation, the degree of mitigation that may ultimately be implemented to reduce potentially significant air quality impacts is uncertain.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this Final ~~Draft~~ EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that operational-related air quality impacts with the Proposed Targets would be **potentially significant and unavoidable**.

c. Impact 3.c: Construction-Related and Operational Odor Impacts

As summarized in Chapter 2, the reasonably foreseeable compliance responses associated with the Proposed Targets would require short-term construction and long-term operational changes.

Impact Significance Determination

Although it is reasonably foreseeable that construction activities could occur, the exact location of any new facilities or modification of existing facilities is uncertain. Typically, such facilities would be located in industrial or rural areas with appropriate zoning to accommodate these specific activities. Short-term construction activities could generate short-term odors associated with operation of diesel equipment; however, such activities would be short-term in nature and would not be expected to adversely affect long-term air quality. With respect to long-term operational impacts associated with odors, implementation of the Proposed Targets would not result in increased odor impacts.

Thus, short-term construction-related odor impacts and long-term operational odor impacts associated with the Proposed Targets would be **less than significant**.

Mitigation Measures

No mitigation is necessary.

4. Biological Resources

a. Impact 4.a: Construction-Related Impacts to Biological Resources

As summarized in Chapter 2, the reasonably foreseeable compliance responses associated with the Proposed Targets would require construction activities. These impacts address the building phase of both reasonably foreseeable construction of new facilities or modification of existing facilities that involve earth-moving activities.

The biological resources that could be affected by the construction of new infrastructure, would depend on the specific location of any necessary construction and its environmental setting. Large-scale renewable projects such as wind and solar are sometimes sited in open areas, such as deserts. Such siting could significantly impact threatened and endangered desert species. Adverse impacts could include modifications to existing habitat; including removal, degradation, and fragmentation of riparian systems, wetlands, or other sensitive natural wildlife habitat and plant communities; interference with wildlife movement or wildlife nursery sites; loss of special-status species; and/or conflicts with the provisions of adopted habitat conservation plans, natural community conservation plans, or other conservation plans or policies to protect natural resources.

Impact Significance Determination

For the reasons described above, construction-related impacts on biological resources associated with implementation of the Proposed Targets could be potentially significant.

Mitigation Measures

Potential construction-related biological resources impacts could be reduced to a less-than-significant level by mitigation that can and should be implemented by local lead agencies, but is beyond the authority of CARB and not within its purview.

Mitigation Measure 4.a

The Regulatory Setting in Attachment A includes applicable laws and regulations that provide protection of biological resources. CARB does not have the authority to require implementation of mitigation related to new or modified facilities that would be approved by local jurisdictions. The ability to require such measures is under the purview of jurisdictions with local or State land use approval and/or permitting authority. New or modified facilities in California would qualify as a "project" under CEQA. The jurisdiction with primary approval authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA statutes. Project-specific impacts and mitigation would be identified during the environmental review by agencies with project-approval authority. Recognized practices that are routinely required to avoid and/or minimize impacts to biological resources include:

- Proponents of new or modified facilities, or infrastructure constructed because of reasonably foreseeable compliance responses, would coordinate with State or local land use agencies to seek entitlements for development including the completion of all necessary environmental review requirements (e.g., CEQA). The local or State land use agency or governing body must follow all applicable environmental regulations as part of approval of a project for development.

- Based on the results of the environmental review, proponents would implement all feasible mitigation to reduce or substantially lessen the potentially significant biological resources impacts of the project.

- Consider impacts to biological resources as part of the site selection process.

- Actions required to mitigate potentially significant biological impacts may include the following; however, any mitigation specifically required for a new or modified facility would be determined by the local lead agency.

    - Retain a qualified biologist to prepare a biological inventory of site resources prior to ground disturbance or construction. If protected species or their habitats are present, comply with applicable federal

and State endangered species acts and regulations. Construction and operational planning will require that important fish or wildlife movement corridors or nursery sites are not impeded by project activities.

- Retain a qualified biologist to prepare a wetland survey of onsite resources. This survey shall be used to establish setbacks and prohibit disturbance of riparian habitats, streams, intermittent and ephemeral drainages, and other wetlands. Wetland delineation is required by Section 404 of the Clean Water Act and is administered by the U.S. Army Corps of Engineers.

- Prohibit construction activities during the rainy season with requirements for seasonal weatherization and implementation of erosion prevention practices.

- Prohibit construction activities in the vicinity of raptor nests during nesting season or establish protective buffers and provide monitoring, as needed, to address project activities that could cause an active nest to fail.

- Prepare site design and development plans that avoid or minimize disturbance of habitat and wildlife resources, and prevent stormwater discharge that could contribute to sedimentation and degradation of local waterways. Depending on disturbance size and location, a National Pollution Discharge Elimination System (NPDES) construction permit may be required from the California State Water Resources Control Board.

- Prepare spill prevention and emergency response plans, and hazardous waste disposal plans as appropriate to protect against the inadvertent release of potentially toxic materials.

- Plant replacement trees and establish permanent protection suitable habitat at ratios considered acceptable to comply with “no net loss” requirements.

- Contractor will keep the site and materials organized and store them in a way to prevent attracting wildlife by not creating places for wildlife to hide or nest (e.g., capping pipes, covering trashcans and emptying trash receptacles consistently and promptly when full).

Post-Mitigation Significance Determination

Because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this Final ~~Draft~~ EA does not attempt to

address project-specific details of mitigation, the degree of mitigation that may ultimately be implemented to reduce potentially significant biological resources impacts is uncertain.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this Final ~~Draft~~ EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that construction-related impacts to biological resources associated with the Proposed Targets would be **potentially significant and unavoidable**.

b. Impact 4.b: Operational Impacts to Biological Resources

As summarized in Chapter 2, the reasonably foreseeable compliance responses related to implementation of the Proposed Targets could result in increased renewable energy projects. Operation of wind farms is likely to result in the direct mortality of birds and bats through collision with rotating turbines or transmission lines or trauma from turbulence or pressure changes surrounding the moving turbines. Direct mortality of many avian and bat species from turbines and transmission lines has been well documented. In some cases, high levels of avian mortality have resulted from operation of wind farms. Diurnal raptors are particularly susceptible to mortality from collision with wind turbines and transmission lines because of their large size and flight characteristics.[15] Better siting and turbine design has reduced wildlife mortality;[16] however, operation of wind-generating projects could result in the direct mortality of bird and bat species, including state and federally listed species.

Wind farms could increase the risk of fire and result in impacts to biological resources. Major fire hazards include hardware and conductor failure, dropping of collection lines, turbine malfunction or mechanical failure, construction related accidents, access vehicle or electrocuted wildlife contact with dry vegetation.

The central environmental issue surrounding solar energy development is direct effects and habitat loss for desert tortoise and other sensitive desert wildlife, although birds can also collide with solar energy facilities due to the “lake effect” caused by the reflection from solar panels. In addition, human activities in previously undeveloped areas

[15] Erickson, W., G. Johnson, D. Young, et al. 2002. Synthesis and Comparison of Baseline Avian and Bat Use, Raptor Nesting and Mortality Information from Proposed and Existing Wind Developments. Prepared for: Bonneville Power Administration, Portland, OR. Prepared by WEST, Inc., Cheyenne, WY

[16] California Energy Commission and California Department of Fish and Game. 2007. *California Guidelines for Reducing Impacts to Birds and Bats from Wind Energy Development.* Commission Final Report. California Energy Commission, Renewables Committee, and Energy Facilities Siting Division, and California Department of Fish and Game, Resources Management and Policy Division. CEC-700-2007-008-CMF. Available at http://www.energy.ca.gov/2007publications/CEC-700-2007-008/CEC-700-2007-008-CMF.PDF

potentially provide food or other attractants in the form of trash, litter, or water, which draw unnaturally high numbers of predators such as the common raven, kit fox, and coyote. Common raven populations in some areas of the Mojave Desert have increased 1,500 percent from 1968 to 1988 in response to expanding human use of the desert.[17] Additional traffic along roadways may result in high numbers of wildlife mortality, which would provide an additional attractant and subsidy for opportunistic predators/scavengers such as ravens.

Implementation of the proposed project could result in increased mining-related activities, including hard rock and continental brines for the procurement of lithium ore. Mining of hard rock would require the use of conventional mining practices including the creation of underground mines and open pits, which would result in the removal of organic material (e.g., bedrock, vegetation). Lithium may also be collected from lake brines and clays. This process involves the pumping of salty groundwater into lagoons where it undergoes evaporation producing salts containing lithium compounds. Such activities could result in substantial disturbances to biological resources and could cause a reduction in sensitive habitat, interference with a wildlife corridor, loss of special-status species, or conflict with a habitat conservation plan or natural community conservation plan.

In addition, operation of hydroelectric facilities and transmission lines may also affect biological or forest resources by altering natural hydrographs of streams, changing water temperature or water quality, inundating uplands by creating reservoirs or other water storage facilities, increasing nonnative species populations (e.g., bass or other warm water fishes and bullfrogs), and altering the predator-prey relationships.

These impacts, as described above, could potentially result in substantial adverse effects on biological resources.

Impact Significance Determination

For the reasons discussed above, impacts on biological resources could be potentially significant due to implementation of the reasonably foreseeable compliance responses associated with the Proposed Targets.

Mitigation Measures

This impact could be reduced to a less-than-significant level by mitigation that can and should be implemented by local lead agencies, but is beyond the authority of CARB and not within its purview.

[17] Boarman, W. I. 2003. Managing a Subsidized Predator Population: Reducing Common Raven Predation on Desert Tortoises. Environmental Management 32: 205-217

Mitigation Measure 4.b: Implement Mitigation Measure 4.a

Potential operational-related biological impacts could be reduced to a less-than-significant level by mitigation that can and should be implemented by local lead agencies, but is beyond the authority of CARB and not within its purview.

Post-Mitigation Significance Determination

Because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this Final ~~Draft~~ EA does not attempt to address project-specific details of mitigation, the degree of mitigation that may ultimately be implemented to reduce potentially significant impacts is uncertain.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this Final ~~Draft~~ EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that operational impacts to biological resources associated with the reasonably foreseeable compliance responses associated with the Proposed Targets would be **potentially significant and unavoidable**.

5. Cultural Resources

a. Impact 5.a: Construction-Related and Operational Impacts to Cultural Resources

As summarized in Chapter 2, the reasonably foreseeable compliance responses associated with the Proposed Targets would require construction activities. These impacts address the building phase of both reasonably foreseeable construction of new facilities or modification of existing facilities that involve earth-moving activities.

Construction activities could require disturbance of undeveloped area, such as clearing of vegetation, earth movement and grading, trenching for utility lines, erection of new buildings, and paving of parking lots, delivery areas, and roadways. Demolition of existing structures may also occur before the construction of new buildings and structures. The cultural resources that could potentially be affected by ground disturbance activities include, but are not limited to, prehistoric and historical archaeological sites, tribal cultural resources, paleontological resources, historic buildings, structures, or archaeological sites associated with agriculture and mining, and heritage landscapes. Properties important to Native American communities and other ethnic groups, including tangible properties possessing intangible traditional cultural values, also may exist. Historic buildings and structures may also be adversely affected by demolition-related activities. Such resources may occur individually, in groupings of modest size, or in districts. Because culturally sensitive resources can also be in developed settings; historic, archeological and paleontological resources, and places important to Native American communities, could also be adversely affected by construction of new facilities.

Properties important to Native American communities and other ethnic groups, including tangible properties possessing intangible traditional cultural values, also may exist. Historic buildings and structures may also be adversely affected by demolition-related activities. Such resources may occur individually, in groupings of modest size, or in districts. Because culturally sensitive resources can also be in developed settings, historic, archeological, and paleontological resources, and places important to Native American communities, could also be adversely affected by construction of new facilities.

New facilities constructed and ongoing earth-moving activities as a potential compliance response may be in a region where significant prehistoric or historic-era cultural resources may have been recorded and there remains a potential that undocumented cultural resources could be unearthed or otherwise discovered during ground-disturbing and construction activities. Prehistoric materials might include flaked stone tools, tool-making debris, stone milling tools, shell or bone items, and fire affected rock or soil darkened by cultural activities; examples of significant discoveries would include villages and cemeteries. Historic material might include metal, glass, or ceramic artifacts; examples of significant discoveries might include former privies or refuse pits (i.e., middens).

Impact Significance Determination

For the reasons discussed above, construction-related and operational impacts on cultural resources associated with implementation of the Proposed Targets could be potentially significant.

Mitigation Measures

Potential impacts to cultural resources could be reduced to a less-than-significant level by mitigation that can and should be implemented by local lead agencies, but is beyond the authority of CARB and not within its purview.

Mitigation Measure 5.a

The Regulatory Setting in Attachment A includes applicable laws and regulations that provide protection of cultural resources. CARB does not have the authority to require implementation of mitigation related to new or modified facilities that would be approved by local jurisdictions. The ability to require such measures is under the purview of jurisdictions with local or State land use approval and/or permitting authority. New or modified facilities in California would qualify as a “project” under CEQA. The jurisdiction with primary approval authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA statutes. Project-specific impacts and mitigation would be identified during the environmental review by agencies with project-approval authority. Recognized practices that are routinely required to avoid and/or minimize impacts to cultural resources include:

- Proponents of new or modified facilities, or infrastructure constructed because of reasonably foreseeable compliance responses, would coordinate with State or local land use agencies to seek entitlements for development including the completion of all necessary environmental review requirements (e.g., CEQA). The local or State land use agency or governing body must follow all applicable environmental regulations as part of approval of a project for development.

- Based on the results of the environmental review, proponents would implement all feasible mitigation to reduce or substantially lessen the potentially significant impacts of the project. Actions required to mitigate potentially significant cultural impacts may include the following; however, any mitigation specifically required for a new or modified facility would be determined by the local lead agency.

  - Retain the services of cultural resources specialists with training and background that conforms to the U.S. Secretary of Interior's Professional Qualifications Standards, as published in Title 36, Code of Federal Regulations, part 61.

  - Seek guidance from the State and federal lead agencies, as appropriate, for coordination of Nation-to-Nation consultations with the Native American Tribes.

  - Provide notice to Native American Tribes of project details to identify potential Tribal Cultural Resources (TCR). In the case that a TCR is identified, prepare mitigation measures that:

    - Avoid and preserve the resources in place,
    - Treat the resource with culturally appropriate dignity,
    - Employ permanent conservation easements, and
    - Protect the resource.

  - Consult with lead agencies early in the planning process to identify the potential presence of cultural properties. The agencies will provide the project developers with specific instruction on policies for compliance with the various laws and regulations governing cultural resources management, including coordination with regulatory agencies and Native American Tribes.

  - Define the area of potential effect (APE) for each project, which is the area within which project construction and operation may directly or indirectly cause alterations in the character or use of historic properties. The APE should include a reasonable construction buffer zone and laydown areas, access roads, and borrow areas, as well as a

reasonable assessment of areas subject to effects from visual, auditory, or atmospheric impacts, or impacts from increased access.

- Retain the services of a paleontological resources specialist with training and background that conforms with the minimum qualifications for a vertebrate paleontologist as described in Measures for Assessment and Mitigation of Adverse Impacts to Non-Renewable Paleontologic Resources: Standard Procedures.[18]

- Conduct initial scoping assessments to determine whether proposed construction activities would disturb formations that may contain important paleontological resources. Whenever possible potential impacts to paleontological resources should be avoided by moving the site of construction or removing or reducing the need for surface disturbance. The scoping assessment should be conducted by the qualified paleontological resources specialist in accordance with applicable agency requirements.

- The project proponent's qualified paleontological resources specialist would determine whether paleontological resources would likely be disturbed in a project area based on the sedimentary context of the area and a records search for past paleontological finds in the area. The assessment may suggest areas of high known potential for containing resources. If the assessment is inconclusive a surface survey is recommended to determine the fossiliferous potential and extent of the pertinent sedimentary units within the project site. If the site contains areas of high potential for significant paleontological resources and avoidance is not possible, prepare a paleontological resources management and mitigation plan that addresses the following steps:

  - a preliminary survey (if not conducted earlier) and surface salvage prior to construction;

  - physical and administrative protective measures and protocols such as halting work, to be implemented in the event of fossil discoveries;

  - monitoring and salvage during excavation;

  - specimen preparation;

[18] Society of Vertebrate Paleontology. 2010. Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources. Available: https://vertpaleo.org/PDFS/68/68c554bb-86f1-442f-a0dc-25299762d36c.pdf. Accessed: November 2015

- identification, cataloging, curation and storage; and
- a final report of the findings and their significance.

Post-Mitigation Significance Determination

Because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this Final ~~Draft~~ EA does not attempt to address project-specific details of mitigation, the degree of mitigation that may ultimately be implemented to reduce potentially significant cultural resources impacts is uncertain.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this Final ~~Draft~~ EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that construction and operational -related cultural resources impacts associated with the Proposed Targets would be **potentially significant and unavoidable**.

6. Energy Conservation

a. Impact 6.a: Construction-Related Impacts to Energy Conservation

As summarized in Chapter 2, the reasonably foreseeable compliance responses associated with the Proposed Targets would require construction activities. These impacts address the building phase of both reasonably foreseeable construction of new facilities or modification of existing facilities that involve earth-moving activities.

Temporary increases in energy demand associated with the construction of new facilities would include fuels used during construction, and gas and electricity demands. Typical earth-moving equipment that may be necessary for construction includes: graders, scrapers, backhoes, jackhammers, front-end loaders, generators, water trucks, and dump trucks. While energy would be required to complete construction for any new or modified facilities or infrastructure projects, it would be temporary and limited in magnitude and would not be expected to exceed available energy supplies or result in the wasteful use of energy.

Impact Significance Determination

Therefore, construction-related impacts on energy conservation, associated with the Proposed Targets, would be **less-than-significant**.

Mitigation Measures

No mitigation is necessary.

b. Impact 6.b: Operational Impacts to Energy Conservation

Implementation of the Proposed Targets is expected to increase the demand for and supply of renewable energy, improve energy efficiency savings, and decrease demand for fossil fuel power generation.

Per Appendix F of the CEQA Guidelines (Cal. Code Regs., tit. 14, § 15000 et seq.), the wise and efficient use of energy includes:

1. Decreasing overall per capita energy consumption;
2. Decreasing reliance on fossil fuel such as coal, natural gas, and oil; and
3. Increasing reliance on renewable energy sources.

As discussed in Chapter 2 of this Final ~~Draft~~ EA, the Proposed Targets would increase reliance on renewable energy sources and improve energy efficiency savings

The Proposed Targets could also be achieved in part through energy efficiency measures in residential and commercial buildings, industry, agriculture, and street lighting. Generally, these could include new HVAC, building shell or end use technology used in the residential and commercial sectors (e.g., a greater share of high efficiency appliances); a reduction in energy services demand, due to conservation or behavior change; and a reduction in total energy demand.

Impact Significance Determination

Thus, the Proposed Targets would support wise and efficient uses of energy, and would result in a **beneficial** long-term operational impact on energy conservation.

Mitigation Measures

No mitigation is necessary.

7. Geology, Seismicity, and Soil Resources

a. Impact 7.a: Construction-Related and Operational-Related Impacts on Geology and Soil Resources

As summarized in Chapter 2, the reasonably foreseeable compliance responses associated with the Proposed Targets would require construction activities. These impacts address the building phase of both reasonably foreseeable construction of new facilities or modification of existing facilities that involve earth-moving activities.

Although it is reasonably foreseeable that construction and operational activities could occur, the exact location of any new facilities or modification of existing facilities is uncertain. Construction activities could require disturbance of undeveloped areas, such as clearing of vegetation, earth movement and grading, trenching for utility lines,

erection of new buildings, and paving of parking lots, delivery areas, and roadways. Additional disturbance could result from the increased mineral ore extraction activities which would provide raw materials to these manufacturing facilities and energy projects. These activities would have the potential to adversely affect soil and geologic resources in construction or mineral ore extraction areas.

New facilities and infrastructure could be in a variety of geologic, soil, and slope conditions with varying amounts of vegetation that would be susceptible to soil compaction, soil erosion, and loss of topsoil during construction. The level of susceptibility varies by location. However, the specific design details, siting locations, and soil compaction and erosion hazards for manufacturing facilities are not known at this time and would be analyzed on a site-specific basis at the project level.

Impact Significance Determination

For the reasons described above, construction-related impacts to geology, seismicity, and soils associated with implementation of the Proposed Targets could be potentially significant.

Mitigation Measures

Potential impacts to geology, seismicity, and soils could be reduced to a less-than-significant level by mitigation that can and should be implemented by local lead agencies, but is beyond the authority of CARB and not within its purview.

Mitigation Measure 7.a

The Regulatory Setting in Attachment A includes applicable laws and regulations that provide protection of geology, seismicity, and soils. CARB does not have the authority to require implementation of mitigation related to new or modified facilities that would be approved by local jurisdictions. The ability to require such measures is under the purview of jurisdictions with local or State land use approval and/or permitting authority. New or modified facilities in California would qualify as a “project” under CEQA. The jurisdiction with primary approval authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA statutes. Project-specific impacts and mitigation would be identified during the environmental review by agencies with project-approval authority. Recognized practices that are routinely required to avoid and/or minimize impacts to geology and soils include:

- Proponents of new or modified facilities, or infrastructure constructed because of reasonably foreseeable compliance responses, would coordinate with State or local land use agencies to seek entitlements for development including the completion of all necessary environmental review requirements (e.g., CEQA). The local or State land use agency or governing body must follow all applicable environmental regulations as part of approval of a project for development.

- Based on the results of the environmental review, proponents would implement all feasible mitigation to reduce or substantially lessen the potentially significant impacts of the project. Actions required to mitigate potentially significant geology and soil impacts may include the following; however, any mitigation specifically required for a new or modified facility would be determined by the local lead agency.

    - Prior to the issuance of any development permits, proponents of new or modified facilities or infrastructure would prepare a geotechnical investigation/study, which would include an evaluation of the depth to the water table, liquefaction potential, physical properties of subsurface soils including shrink-swell potential (i.e., expansion), soil resistivity, slope stability, mineral resources, and the presence of hazardous materials.

    - Proponents of new or modified facilities or infrastructure would provide a complete site grading plan, and drainage, erosion, and sediment control plan with applications to applicable lead agencies. Proponents would avoid locating facilities on steep slopes, in alluvial fans and other areas prone to landslides or flash floods, or with gullies or washes, as much as possible.

    - Disturbed areas outside of the permanent construction footprint would be stabilized or restored using techniques such as soil loosening, topsoil replacement, revegetation, and surface protection (i.e., mulching).

Post-Mitigation Significance Determination

Because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this Final ~~Draft~~ EA does not attempt to address project-specific details of mitigation, the degree of mitigation that may ultimately be implemented to reduce potentially significant impacts to geology, seismicity, and soils is uncertain.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this Final ~~Draft~~ EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that construction and operational-related impacts to geology, seismicity, and soils associated with the Proposed Targets would be **potentially significant and unavoidable**.

8. Greenhouse Gases

a. Impact 8.a: Construction-Related and Operational Greenhouse Gas Impacts

As summarized in Chapter 2, the reasonably foreseeable compliance responses associated with the Proposed Targets would require construction activities. These impacts address the building phase of both reasonably foreseeable construction of new facilities or modification of existing facilities that involve earth-moving activities.

Overall, the Proposed Targets would result in substantial long-term GHG reductions, although certain construction aspects of the Proposed Targets would cause comparatively small short-term GHG emission increases.

Although it is reasonably foreseeable that construction activities associated with new or modified facilities could occur, the exact location of any new facilities or the reconstruction or modification of existing facilities is uncertain. Typical earth-moving equipment that may be necessary for these types of construction activities includes: graders, scrapers, backhoes, jackhammers, front-end loaders, generators, water trucks, and dump trucks. Specific, project-related construction activities would result in increased generation of GHG emissions associated with the use of heavy-duty off-road equipment, materials transport, and worker commutes for the duration of the construction phase. Therefore, construction-related GHG emissions are expected to be short-term and limited in amount.

Local agencies are generally charged with determining acceptable thresholds of GHG emissions, measured in metric tons of carbon dioxide equivalent per year (MT CO_2e/year). Quantification of construction-related GHG emissions is generally based on a combination of methods, including the use of exhaust emission rates from emissions models, such as OFFROAD 2007 and EMFAC 2011. These models require consideration of assumptions, including construction timelines and energy demands (e.g., fuel and electricity). However, most local agencies (e.g., air pollution control districts) do not recommend or require the quantification of construction-generated GHGs for typical construction projects because these only occur for a finite period of time (e.g., during periods of construction) that is typically much shorter than the operational phase. Thus, local agencies generally recommended that GHG analyses focus on operational phase emissions, as discussed below, unless the project is of a unique nature requiring atypical (e.g., large scale, long-term) construction activity levels (e.g., construction of a new dam or levee) for which quantification and consideration (e.g., amortization of construction emissions over the lifetime of the project) may be recommended.

The Proposed Targets are designed to assist POUs and LSEs in planning to decrease GHG emissions, therefore, implementation is anticipated to result in substantial long-term GHG reductions in California as shown in Figure 5 in Section 4 of the Proposed Targets document. When construction-related GHG emissions associated with

implementation of the Proposed Targets are considered in relation to the overall long-term operational GHG reduction benefits discussed in Section 4 of the Proposed Targets document, they are not considered substantial.

Impact Significance Determination

Implementation of the Proposed Targets would result in environmental benefits, including an estimated reduction in GHG emissions. These benefits would be greater than the comparatively small level of GHG emissions related to construction and operation of facilities associated with the compliance responses, as described above. As a result, implementation of the proposed strategy would result in a **beneficial** impact to GHG emissions.

Mitigation Measures

No mitigation is necessary.

9. Hazards and Hazardous Materials

a. Impact 9.a: Construction-Related Hazard Impacts

As summarized in Chapter 2, the reasonably foreseeable compliance responses associated with the Proposed Targets would require construction activities. These impacts address the building phase of both reasonably foreseeable construction of new facilities or modification of existing facilities that involve earth-moving activities.

These construction activities may require the transport, use, and disposal of hazardous materials. Construction activities generally use heavy-duty equipment requiring periodic refueling and lubricating fluids. Large pieces of construction equipment (e.g., backhoes, graders) are typically fueled and maintained at the construction site as they are not designed for use on public roadways. Thus, such maintenance uses a service vehicle that mobilizes to the location of the construction equipment. It is during the transfer of fuel that the potential for an accidental release is most likely. Although precautions would be taken to ensure that any spilled fuel is properly contained and disposed, and such spills are typically minor and localized to the immediate area of the fueling (or maintenance), the potential remains for a substantial release of hazardous materials into the environment. Consequently, construction activities could potentially 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.

Impact Significance Determination

For the reasons described above, construction-related impacts on hazards and hazardous materials associated with implementation of the Proposed Targets could be potentially significant.

Mitigation Measures

Potential impacts on hazards and hazardous materials could be reduced to a less-than-significant level by mitigation that can and should be implemented by local lead agencies, but is beyond the authority of CARB and not within its purview.

Mitigation Measure 9.a

The Regulatory Setting in Attachment A includes applicable laws and regulations that apply to accident-related hazards and risk of upset. CARB does not have the authority to require implementation of mitigation related to new or modified facilities that would be approved by local jurisdictions. The ability to require such measures is under the purview of jurisdictions with local or State land use approval and/or permitting authority. New or modified facilities in California would qualify as a "project" under CEQA. The jurisdiction with primary approval authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA statutes. Project-specific impacts and mitigation would be identified during the environmental review by agencies with project-approval authority. Recognized practices that are routinely required to avoid upset and accident-related impacts include:

- Proponents of new, modified facilities, or infrastructure constructed because of reasonably foreseeable compliance responses, would coordinate with State or local land use agencies to seek entitlements for development including the completion of all necessary environmental review requirements (e.g., CEQA). The local or State land use agency or governing body must follow all applicable environmental regulations as part of approval of a project for development.

- Based on the results of the environmental review, proponents would implement all feasible mitigation to reduce or substantially lessen the potentially significant hazards and hazardous materials impacts of the project.

- Handling of potentially hazardous materials/wastes should be performed under the direction of a licensed professional with the necessary experience and knowledge to oversee the proper identification, characterization, handling and disposal or recycling of the materials generated because of the project. As wastes are generated, they would be placed, at the direction of the licensed professional, in designated areas that offer secure, secondary containment and/or protection from stormwater runoff. Other forms of containment may include placing waste in drums or other suitable containers pending profiling and disposal or recycling.

- The temporary storage and handling of potentially hazardous materials/wastes should be in areas away from sensitive receptors such

as schools or residential areas. These areas should be secured with chain-link fencing or similar barrier with controlled access to restrict casual contact from non-project personnel. All project personnel that may encounter potentially hazardous materials/wastes will have the appropriate health and safety training commensurate with the anticipated level of exposure.

Post-Mitigation Significance Determination

Because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this Final ~~Draft~~ EA does not attempt to address project-specific details of mitigation, the degree of mitigation that may ultimately be implemented to reduce potentially significant impacts on hazards and hazardous materials is uncertain.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this Final ~~Draft~~ EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that construction-related hazards and hazardous materials impacts associated with the Proposed Targets would be **potentially significant and unavoidable**.

b. Impact 9.b: Operational Hazards and Hazardous Materials Impacts

As summarized in Chapter 2, the reasonably foreseeable compliance responses associated with the Proposed Targets could result in increased mining to meet demands for greater supplies of lithium-based batteries associated with renewable energy and energy efficiency.

Batteries used energy storage systems are currently generally lithium based, although other non-lithium based technologies could become more prevalent in the future. Lithium is currently sourced in two ways: from hardrock, and from the evaporation of salt brines. Lithium from rock sources is primarily produced from spodumene, a lithium/aluminum/silicate mineral. Salt brine sources include salt lakes, which are currently the main source of lithium, and geothermal brines and salt brines associated with oil deposits.

The primary hazard posed by lithium batteries is their ability to overheat and ignite, and once ignited, the resulting fires can be especially difficult to extinguish. Notably, the likelihood to overheat or ignite is increased if the batteries are poorly packaged,

damaged, or exposed to a fire or a heat source. When packaged and handled properly, lithium batteries pose minimal environmental hazard.[19]

In addition, lithium-ion batteries may be recycled, and due to increasing demand for zero- and near-zero emission vehicles and technologies, rates of lithium-ion battery recycling has increased.[20] For instance, Tesla, a leading corporation in the design and manufacture of EVs, is currently constructing a "Gigafactory" to produce and recycle lithium-ion batteries capable of recycling used lithium material on site. Further, ten specialized companies process and recycle lithium-ion batteries in the U.S. and Canada. At present, recycling activities for lithium-ion batteries primarily serve to conserve cobalt, which by comparison, is a rarer material (U.S. EPA 2013). Management, including recycling of used batteries, must be done in compliance with existing laws and regulations. Disposal of lithium-ion batteries within the State is required to comply with Hazardous Waste Control law and implementing regulations..

Thus, because lithium-ion batteries are designed to substantially reduce the potential for hazardous conditions associated with transport, use and disposal, and because regulations exist to ensure lithium-ion batteries are disposed of appropriately, impacts would not be significant.

Impact Significance Determination

Therefore, operational-related impacts on hazards and hazardous materials, associated with the Proposed Targets, would be **less-than-significant**.

Mitigation Measures

No mitigation is necessary.

10. Hydrology and Water Quality

a. Impact 10.a: Construction-Related Impacts to Hydrology and Water Quality

As summarized in Chapter 2, the reasonably foreseeable compliance responses associated with the Proposed Targets would require construction activities. These impacts address the building phase of both reasonably foreseeable construction of new facilities or modification of existing facilities that involve earth-moving activities.

[19] Pipeline and Hazardous Materials Safety Administration. 2014. Hazards Materials: Revisions to Requirements for the Transportation of Lithium Batteries. Available: https://www.federalregister.gov/articles/2014/08/06/2014-18146/hazardous-materials-transportation-of-lithium-batteries. Accessed: December 2015

[20] United States Geological Survey. 2017a. Mineral Resources Profile: Lithium. Available: https://minerals.usgs.gov/minerals/pubs/commodity/lithium/mcs-2017-lithi.pdf. Accessed: April 2018

Construction activities could require disturbance of undeveloped areas, such as clearing of vegetation, earth movement and grading, trenching for utility lines, erection of new buildings, and paving of parking lots, delivery areas, and roadways. Construction, grading and trenching have the potential to result in adverse soil erosion resulting in sedimentation and degradation of local waterways. Specific construction projects would be required to comply with applicable erosion, water quality standards, and waste discharge requirements (e.g., NPDES, stormwater pollution prevention plan [SWPPP]). With respect to depleting groundwater supplies, impairing quality, and runoff issues, construction of new facilities would not be anticipated to result in substantial demands due to the nature of associated activities. However, depending on the location of construction activities, there could be adverse effects on drainage patterns and exposure of people or structures to areas susceptible to flood, seiche, tsunami, or mudflow.

Impact Significance Determination

For the reasons described above, construction-related impacts on hydrology and water quality associated with implementation of the Proposed Targets could be potentially significant.

Mitigation Measures

Potential impacts on hydrological resources could be reduced to a less-than-significant level by mitigation that can and should be implemented by local lead agencies, but is beyond the authority of CARB and not within its purview.

Mitigation Measure 10.a

The Regulatory Setting in Attachment A includes applicable laws and regulations regarding hydrology and water quality. CARB does not have the authority to require implementation of mitigation related to new or modified facilities that would be approved by local jurisdictions. The ability to require such measures is under the purview of jurisdictions with local or State land use approval and/or permitting authority. New or modified facilities in California would qualify as a “project” under CEQA. The jurisdiction with primary approval authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA statutes. Project-specific impacts and mitigation would be identified during the environmental review by agencies with project-approval authority. Recognized practices that are routinely required to avoid and/or mitigate hydrology and water quality-related impacts include the following:

- Proponents of new or modified facilities, or infrastructure constructed because of reasonably foreseeable compliance responses, would coordinate with State or local land use agencies to seek entitlements for development including the completion of all necessary environmental review requirements (e.g., CEQA). The local or State land use agency or

governing body must follow all applicable environmental regulations as part of approval of a project for development.

- Based on the results of the environmental review, proponents would implement all feasible mitigation to reduce or substantially lessen the potentially significant impacts of the project. Actions required to mitigate potentially significant hydrology and water quality impacts may include the following; however, any mitigation specifically required for a new or modified facility would be determined by the local lead agency.

    - Under the oversight of the local lead agency, prior to issuance of any construction permits, the proponents for the proposed renewable energy project would prepare a stormwater drainage and flood control analysis and management plan. The plans would be prepared by a qualified professional and would summarize existing conditions and the effects of project improvements, and would include all appropriate calculations, a watershed map, changes in downstream flows and flood elevations, proposed on- and off-site improvements, features to protect downstream uses, and property and drainage easements to accommodate downstream flows from the site. Project drainage features would be designed to protect existing downstream flow conditions that would result in new or increased severity of offsite flooding.

    - Establish drainage performance criteria for off-site drainage, in consultation with county engineering staff, such that project-related drainage is consistent with applicable facility designs, discharge rates, erosion protection, and routing to drainage channels, which could be accomplished by, but is not limited to: (a) minimizing directly connected impervious areas; (b) maximizing permeability of the site; and, (c) stormwater quality controls such as infiltration, detention/retention, and/or biofilters; and basins, swales, and pipes in the system design.

    - The project proponent would design and construct new facilities to provide appropriate flood protection such that operations are not adversely affected by flooding and inundation. These designs would be approved by the local or State land use agency. The project proponent would also consult with the appropriate flood control authority on the design of offsite stream crossings such that the minimum elevations are above the predicted surface-water elevation at the agency's designated design peak flows. Drainage and flood prevention features shall be inspected and maintained on a routine schedule specified in the facility plans, and as specified by the county authority.

- As part of subsequent project-level planning and environmental review, the project proponent shall coordinate with the local groundwater management authority and prepare a detailed hydrogeological analysis of the potential project-related effects on groundwater resources prior to issuance of any permits. The proponent shall mitigate for identified adverse changes to groundwater by incorporating technically achievable and feasible modifications into the project to avoid offsite groundwater level reductions, use alternative technologies or changes to water supply operations, or otherwise compensate or offset the groundwater reductions.

Post-Mitigation Significance Determination

Because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this Final ~~Draft~~ EA does not attempt to address project-specific details of mitigation, the degree of mitigation that may ultimately be implemented to reduce potentially significant impacts is uncertain.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this Final ~~Draft~~ EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that construction-related impacts on hydrology and water quality associated with the Proposed Targets would be **potentially significant and unavoidable**.

b. Impact 10.b: Operational Impacts to Hydrology and Water Quality

As summarized in Chapter 2, the reasonably foreseeable compliance responses associated with the Proposed Targets could result in increased mining to meet demands for greater supplies of lithium-based batteries associated with renewable energy and energy efficiency. It is reasonable to assume that compliance responses associated with the proposed project would lead to an increase in mining-related activities of hard rock and continental brines for the procurement of lithium ore. Mining of hard rock would require the use of conventional mining practices including the creation of underground mines and open pits, which would result in the removal of organic material (e.g., bedrock, vegetation). Additionally, lithium can be collected from continental brines found in basins. Salty groundwater is pumped into lagoons where it undergoes evaporation producing salts containing lithium compounds. This process could result in overdrafting of groundwater.

Mineral extraction and mining activities within the U.S. would be required to comply with the provisions of the Clean Water Act and the natural resource protection and land reclamation requirements of the appropriate State and federal land managers. For instance, the Bureau of Land Management (BLM) and U.S. Forest Service (USFS)

mining permit conditions contain protections for hydrologic resources and require mining reclamation standards. However, lithium is obtained from areas outside of the U.S., where U.S. and California laws and regulation are not enforced. Thus, water quality impacts related to mining could occur because of implementation of the reasonably foreseeable compliance responses associated with the proposed project.

Implementation of renewable energy and energy efficiency would increase the number of renewable energy projects. Operation of these facilities may result in adverse effects on hydrology and water quality as discussed below.

Solar Thermal

Solar thermal facilities may use substantial quantities of water for long-term operations including steam generation, evaporative cooling of the power generation units, periodic washing of the mirror panels to maintain their efficiency, dust control around the site, and domestic consumption by the work force. In areas, such as arid desert regions of the southwest U.S. where available surface water is limited, the construction and operation of solar thermal facilities may result in the need to install groundwater wells. Groundwater pumping, if it exceeds the natural recharge rates, may result in decreased groundwater levels relative to existing conditions. Groundwater level reductions may adversely affect offsite groundwater users through reduced groundwater yield from a well, or the need to deepen a well, or the need to construct deeper replacement wells. Additionally, surface streams, springs, and wetlands may be hydrologically connected to the groundwater. Consequently, the potential seasonal or long-term reductions in groundwater levels may adversely affect flows in seasonal surface water bodies. In addition, discharges of contaminants in stormwater runoff from industrial cooling water could affect surface water quality. However, absent site-specific project operations and groundwater information, it is not possible to characterize the probability of solar thermal facility operations to cause adverse offsite groundwater effects.

Solar Photovoltaic

Long-term facility operations of solar photovoltaic systems could likely include water use for periodic washing of solar panels, site dust control, and domestic water consumption by the work force. In areas where surface water resources are limited, development of groundwater wells to support groundwater pumping, if it exceeds the natural recharge rates, may result in decreased groundwater levels relative to existing conditions. Groundwater level reductions may adversely affect offsite groundwater users through reduced groundwater yield from a well, or the need to deepen a well, or the need to construct deeper replacement wells. Additionally, surface streams, springs, and wetlands may be hydrologically connected to the groundwater. Consequently, the potential seasonal or long-term reductions in groundwater levels may adversely affect flows in seasonal surface water bodies. In addition, discharges of contaminants in stormwater runoff from industrial cooling water could affect surface water quality. However, absent site-specific project operations and groundwater information, it is not possible to characterize the probability of solar photovoltaic facility operations to cause adverse offsite groundwater effects.

Geothermal

Geothermal energy facilities may use geothermal fluids directly for turbine power generation, which may result in consumptive use through evaporation or discharge to brine ponds if the quality is unsuitable for reinjection back into the aquifer. Geothermal fluids also may be used indirectly as the heat source to generate steam power using supplemental water resources for steam generation, evaporative cooling, or both processes. In arid desert regions where available surface water is limited, the construction and operation of geothermal facilities may result in the need to use groundwater. Consequently, geothermal energy facility operations in areas of limited groundwater availability can potentially adversely affect offsite groundwater resources for other energy sources. In addition, discharges of contaminants in stormwater runoff from industrial cooling water could affect surface water quality. However, absent site-specific project operations and groundwater information, it is not possible to characterize the probability of geothermal facility operations to cause adverse offsite groundwater effects.

Biogas and Solid-fuel Biomass

Solid-fuel biomass energy facilities are likely to be operated to generate steam power using supplemental water resources for steam production and evaporative cooling. In the arid desert regions where available surface water is limited, the construction and operation of biogas may result in the need to use groundwater. Energy facility operations in areas of limited groundwater availability can potentially adversely affect offsite groundwater resources. However, absent site-specific project operations and groundwater information, it is not possible to characterize the probability of solid-fuel biomass or biogas facility operations to cause adverse offsite groundwater effects.

To the extent additional combined cycle or water-cooled natural gas fired energy facilities are needed to augment the increased renewable energy resources, similar offsite groundwater effects could occur.

The potential for construction and placement of energy facilities on the landscape to contribute to offsite flooding, or be exposed to flooding and flood hazards are related to drainage conditions. Increased stormwater drainage runoff rates and volumes may contribute to increased offsite channel flows that lead to additional inundation in existing areas of flooding, or increase the frequency with which channel capacities are exceeded. In the rural desert regions of the southwest, many areas that flood are not mapped and overland flooding can occur on the relatively level terrain, particularly in areas where the soil or bedrock is naturally impervious and generates high volumes of runoff during heavy rain events. Therefore, placement of energy facilities may expose property and workers at risk of exposure to flooding unless the site has been evaluated to determine the potential for flooding to occur. Moreover, encroachment of energy facilities within a floodplain could impede, restrict, or redirect flows, thereby exposing the facilities to flood damage or contribute to backwater upstream of the facility. Absent site-specific project drainage and streamflow information, it is not possible to characterize the probability of facility operations to cause adverse offsite effects to stormwater drainage or flooding risks. Therefore, the specific effects of additional

drainage that could occur in the project area, or risks to and from flooding hazards, are uncertain.

Power generation facilities utilizing steam have the potential to result in long-term operational waste discharges associated with the steam condensation and cooling operations. In arid environments of southern California where many of the anticipated future renewable energy facilities might be located, and where available surface and groundwater resources are limited, cooling operations that use water generally result in the creation of highly saline blowdown water or brine. Brine wastes must be stored in lined containment ponds to prevent leakage and contamination of underlying groundwater. Typical operations would require multiple brine waste evaporation ponds, and dried brine wastes would be periodically collected and hauled to landfills for disposal. Therefore, managed brine waste storage in the arid desert regions is not anticipated to result in discharges of concern to water bodies. While unlikely to occur in the desert regions due to limited water availability, the potential exists for some renewable energy facilities to be constructed adjacent to streams and involve the use of river water for cooling operations, or as receiving water for cooling water derived from a different source water. Conventional once-through cooling also may be more commonly used in less arid environments or coastal settings where a reliable and plentiful water source is available. Cooling water discharged to streams has the potential to cause temperature increases in the receiving water of sufficient magnitude that may exceed the thermal tolerance of aquatic life residing in the stream near the return flow, thus resulting in detrimental effects.

Steam power generation facilities generally are complex facilities that would have larger workforce requirements than other types of renewable energy facilities, may operate continuously depending on the fuel source, and may use and store a variety of operating chemicals, fuels, and other materials onsite. Industrial sites may be exposed to long-term rainfall and runoff that may have the potential to mobilize and transport contaminants that are present offsite to adjacent properties or receiving water bodies. Discharge of contaminants could result in adverse water quality effects to aquatic organisms, which are likely to be the most sensitive beneficial uses affected by stormwater runoff.

Absent site-specific project facility information, it is not possible to characterize the probability of steam power cooling operations and industrial activities to cause adverse offsite effects and contaminant discharges to receiving water bodies. Therefore, the specific effects of long-term facility operations that could occur are uncertain and impacts could be significant.

Impact Significance Determination

For the reasons discussed above, operational impacts on hydrology and water quality could be potentially significant due to implementation of the reasonably foreseeable compliance responses associated with the Proposed Targets.

Mitigation Measures

This impact could be reduced to a less-than-significant level by mitigation that can and should be implemented by local lead agencies, but is beyond the authority of the CARB and not within its purview.

Mitigation Measure 10.b

The Regulatory Setting in Attachment A includes applicable laws and regulations that provide protection of hydrology and water quality. CARB does not have the authority to require implementation of mitigation related to new or modified facilities that would be approved by local jurisdictions. The ability to require such measures is under the purview of jurisdictions with local or State land use approval and/or permitting authority. New or modified facilities in California would qualify as a "project" under CEQA. The jurisdiction with primary approval authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA statutes. Project-specific impacts and mitigation would be identified during the environmental review by agencies with project-approval authority. Recognized practices that are routinely required to avoid and/or minimize impacts to hydrology and water quality include:

- As part of the subsequent project-level planning and environmental review for solar thermal, solar photovoltaic, geothermal, and biogas facilities, the project proponent shall coordinate with the local county groundwater management authority and prepare a detailed hydrogeologic analysis of the potential project-related effects on groundwater resources prior to issuance of any permits. The proponent shall mitigate for identified adverse changes to groundwater by incorporating technically achievable and feasible modifications into the project to avoid offsite groundwater level reductions, use alternative technologies or changes to water supply operations, or otherwise compensate or offset the groundwater reductions that occur to offsite properties. Consistent with state policies, the feasibility of using alternative water sources, such as treated municipal wastewater, shall be considered for use as source water for non-consumption purposes. The feasibility of alternative energy unit cooling methods should be considered that use less water, such as dry cooling methods. A program of monitoring and adaptive management during project implementation should be considered to evaluate the effects of the project and effectiveness of mitigation actions.

- For any planned use of water, identify the water sources, legal entitlements, water rights, adequacy of capacity to serve project demands while maintaining aquatic and riparian resources, quantity of water used for project construction and operational needs, and water

discharges, including but not limited to construction, systems testing, and process and cooling needs.

- Where a groundwater well is proposed to be drilled or used, submit an application to the appropriate local jurisdiction for a permit. Where use of surface water is proposed for industrial purposes, provide a "will serve" and an approved water service agreement with applications to appropriate lead agencies.

- Under the oversight of the local lead agency, prior to issuance of any construction permits, the proponents for the proposed renewable energy project shall prepare a stormwater drainage and flood control analysis and management plan. The plans shall be prepared by a qualified professional and shall summarize existing conditions and the effects of project improvements, shall include all appropriate calculations, a watershed map, changes in downstream flows and flood elevations, proposed on- and off-site improvements, features to protection downstream uses, and property and drainage easements to accommodate downstream flows from the site. Project drainage features shall be designed to ensure no change in existing downstream flow conditions that would result in new or increased severity of offsite flooding.

- Establish drainage performance criteria for off-site drainage, in consultation with county engineering staff, such that project-related drainage is consistent with applicable facility designs, discharge rates, erosion protection, and routing to drainage channels, which could be accomplished by, but is not limited to: (a) minimizing directly connected impervious areas; (b) maximizing permeability of the site; and, (c) stormwater quality controls such as infiltration, detention/retention, and/or biofilters; and basins, swales, and pipes in the system design.

- The project proponent shall design and construct new facilities to provide appropriate flood protection such that operations are not adversely affected by flooding and inundation. These designs shall be approved by the local land use agency. The project proponent shall also consult with the appropriate flood control authority on the design of offsite stream crossings such that the minimum elevations are above the predicted surface-water elevation at the agency's designated design peak flows. Drainage and flood prevention features shall be inspected and maintained on a routine schedule specified in the facility plans, and as specified by the county authority.

- Under the oversight of the local lead agency, prior to issuance of any construction permits, the proponents for the proposed renewable energy project shall comply with applicable construction grading and

erosion control ordinances. Additionally, in compliance with the requirements of the SWRCB general NPDES stormwater permit for construction (Order No. 2009-0009-DWQ), the project proponent shall prepare a SWPPP and identify and implement construction-related best management practices (BMPs) to avoid and minimize erosion and contaminant runoff. The SWPPP describes the site, erosion and sediment controls, means of waste disposal, control of post- construction sediment and erosion control measures and maintenance responsibilities, water quality monitoring and reporting during storm events, corrective actions for identified water quality problems and non-storm water management controls. These measures included in the SWPPP shall ensure compliance with applicable regional, state and federal water quality standards. The project proponent shall obtain authorization under the statewide NPDES stormwater permit for general construction activity (or via local agency if construction activity is managed locally) before beginning work. Construction BMPs shall include, but may not be limited to the following:

- limit construction access routes and stabilize access points;
- stabilize denuded areas with seeding, mulching or other methods;
- stake/mark construction limits;
- designate specific areas of the site, away from storm drain inlets and drainage features for the storage, preparation and disposal of construction materials, chemical products and waste; for auto equipment parking; and for routine vehicle and equipment maintenance;
- store stockpiled materials and wastes under a roof or plastic sheeting; berm around stockpile/storage areas to prevent contact with runoff;
- perform major maintenance, repair and vehicle and equipment washing offsite or in designated and controlled areas on-site;
- sweep up spilled dry construction materials (cement, fertilizer, etc.) immediately; water would not be used to wash them away; and
- clean up liquid spills on paved or impermeable surfaces using “dry” clean-up methods (e.g. absorbent materials, cat litter, rags) and dispose of clean-up materials properly.

Post-Mitigation Significance Determination

Because the authority to determine project-level impacts and require project-level mitigation lies with the land use approval and/or permitting agency for individual

projects, and that the programmatic analysis does not allow project-specific details of mitigation, the degree of mitigation that may ultimately be implemented to reduce potentially significant impacts on hydrology and water quality is uncertain.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this Final ~~Draft~~ EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that operational impacts to hydrology and water quality associated under the Proposed Targets would be **potentially significant and unavoidable**.

11. Land Use and Planning

a. Impact 11.a: Construction-Related Impacts to Land Use and Planning

As summarized in Chapter 2, the reasonably foreseeable compliance responses associated with the Proposed Targets would require construction activities. These impacts address the building phase of both reasonably foreseeable construction of new facilities or modification of existing facilities that involve earth-moving activities.

With respect to effects related to land use and planning, the conversion of lands required to implement the reasonably foreseeable compliance responses associated with the Proposed Targets could be in areas subject to local conservation plans or zoning policies. This could then result in an intensification of adverse effects associated with the conversion or modification of natural land or existing agriculture such as impacts on sensitive species populations; soil carbon content; annual carbon sequestration losses, depending on the land use; long-term erosion effects; adverse effects on local or regional water resources; and long-term water quality deterioration associated with intensified fertilizer use, pesticide or herbicide run-off. However, planning efforts associated with the implementation of compliance responses associated with the Proposed Targets would be made in coordination with local, State, or federal jurisdictions. Thus, reasonably foreseeable compliance responses would not be expected to divide an established community or conflict with a land use or conservation plan.

Impact Significance Determination

Therefore, construction-related land use impacts associated with implementation of the Proposed Targets would be **less-than-significant**.

The environmental consequences of land use changes are considered in their respective sections of the Final ~~Draft~~ EA. Potential indirect environmental impacts associated with land use change on agriculture and forestry, biology, geology and soils, and hydrology and their related mitigation measures are discussed in further detail throughout this chapter.

Mitigation Measures

No mitigation is necessary.

b. Impact 11.b: Operational Impacts to Land Use and Planning

As summarized in Chapter 2, the reasonably foreseeable compliance responses associated with the Proposed would increase the number of renewable energy projects.

Division of Established Communities

Renewable energy projects would include installation of transmission lines, which could traverse both incorporated and unincorporated jurisdictions. In general, transmission lines (both above ground and underground) would not physically divide existing communities because the transmission lines could co-exist with existing uses. Future proposed land uses would be required to follow set-back requirements to avoid potential conflicts with transmission lines. Although temporary and permanent disruptions to land uses could result to make way for transmission rights-of-ways, routing of transmission lines often involves substantial public, agency, and other stakeholder involvement. As such, any disruptions are expected to be isolated and would not likely permanently divide an existing community.

Wind farms, solar thermal, and solar photovoltaic systems are generally located in large open space areas, including farmland, and involve dispersed placement of equipment away from existing communities. Geothermal leasing and development requires a relatively small footprint and the land required is not usually completely occupied by the plant. Therefore, these projects would not be expected to physically divide an existing community.

To be economically feasible, dedicated biomass plants are located either at the source of a fuel supply (such as at a sawmill) or within 50 miles of numerous suppliers (up to 200 miles for a very high-quantity, low-cost supplier). Biomass plants have a relatively small footprint and would generally be compatible with nearby uses (i.e., near the fuel supply or suppliers) and; therefore, development of biomass plants is not expected to physically divide existing communities.

Similarly, although the production of biomass fuel supply requires large amounts of land, fuel production is anticipated to occur in areas already supplying or suitable for supplying certain fuel types. For instance, wood and wood waste are the primary biomass resources and are typically concentrated in areas of high forest-product industry activity. In rural areas, agricultural production can often yield substantial fuel resources that can be collected and burned in biomass plants. Energy crops, such as switchgrass and short rotation woody crops, have also been identified as potential biomass sources. In urban areas, biomass is typically composed of wood wastes such as construction debris, pallets, yard and tree trimmings, and railroad ties. Because

biomass fuel production would likely occur in locations consistent with its production, the production of biomass fuel is not anticipated to physically divide an existing community.

Distributed biogas projects could be constructed throughout the state, but are likely to be in proximity to agricultural areas because of access to fuel and because of potential odor generation. Because landfill/digester gas projects would rely on existing waste for fuel, additional land would not be required to generate fuel. For these reasons, an increase in biogas projects is not expected to physically divide an existing community.

Because small hydroelectric power generation projects would be located at rivers and dams, increased small hydroelectric power generation is not anticipated to physically divide an existing community.

Aviation Considerations

A general air navigation concern is associated with tall structures. Therefore, there could be wind power siting concerns relative to the locations of airports and flight patterns and air space associated with the airports because of the turbines and meteorological towers located at wind energy projects. The Federal Aviation Administration (FAA) must be contacted for any proposed construction or alteration of objects within navigable airspace under any of the following categories:

- proposed objects more than 200 ft above ground level at the structure's proposed location;
- within 20,000 ft of an airport or seaplane base that has at least one runway longer than 3,200 ft, and the proposed object would exceed a slope of 100:1 horizontally from the closest point of the nearest runway;
- within 10,000 ft of an airport or seaplane base that does not have a runway more than 3,200 ft in length, and the proposed object would exceed a 50:1 horizontal slope from the closest point of the nearest runway; and/or
- within 5,000 ft of a heliport and the proposed object would exceed a 25:1 horizontal slope from the nearest landing and takeoff area of that heliport (FAA 2007, Proposed Construction or Alteration of Objects That May Affect the Navigable Airspace, Advisory Circular 70/7470-2K, U.S. Department of Transportation, effective March 1.).

The FAA could recommend marking and/or lighting a structure that does not exceed 200 feet above ground level, or that is not within the distances from airports or heliports mentioned above, because of its location.[21] Because a wind energy

[21] Federal Aviation Administration (FAA). 2007. Obstruction Marking and Lighting, Advisory Circular AC 70/7460-1K, available at http://www.airweb.faa.gov/Regulatory_and_Guidance_Library/rgAdvisoryCircular.nsf/0/b993dcdfc37fcdc486257251005c4e21/$FILE/AC70_7460_1K.pdf. Accessed April 22, 2010.

development project would have to meet appropriate FAA criteria, no adverse impacts to aviation would be expected.

Thus, renewable energy supply projects would not divide established communities or conflict with airport planning**.**

Other Considerations

Given the lack of certainty at this planning level regarding the precise locations of energy facilities ultimately developed in accord with the IRPs, future energy development could conflict with applicable land use plans, policies, or regulations; and could also conflict with applicable habitat conservation plans or natural community conservation plans. Local permitting agencies and wildlife regulatory agencies are expected to minimize or avoid these potential conflicts through adequate planning and project review. However, CARB lacks jurisdiction to make those planning and mitigation decisions, and therefore cannot dismiss the possibility that these potential impacts could occur.

Impact Significance Determination

For the reasons discussed above, operational land use impacts could be potentially significant due to implementation of the reasonably foreseeable compliance responses associated with the Proposed Targets.

Mitigation Measures

This impact could be reduced to a less-than-significant level by mitigation that can and should be implemented by local lead agencies, but is beyond the authority of the CARB and not within its purview.

Mitigation Measure 11.b.i

The Regulatory Setting in Attachment A includes applicable laws and regulations that address land use and planning. CARB does not have the authority to require implementation of mitigation related to new or modified facilities or infrastructure that would be approved by other State agencies or local jurisdictions. The ability to require such measures is within the purview of jurisdictions with land use approval and/or permitting authority. Project-specific impacts and mitigation would be identified during the project review process and carried out by agencies with approval authority.

Proponents of renewable energy projects will coordinate with local land use agencies to reconcile land use plan and zoning designations and the ongoing undeveloped forest condition of the project area. Local land use agencies will complete appropriate reviews to ensure that the project complies with applicable land use plans and regulations, or where conflicts exist, will implement appropriate land use designation changes so that proposed renewable energy projects would be compatible with appropriate land use documents and policies. Land use agencies should consider compatible densities and land use types at the edges of the avoided conversion area and the avoided conversion

project should conform, to the extent feasible, with applicable land use goals, objectives, and policies.

Post-Mitigation Significance Determination

Because the authority to determine project-level impacts and require project-level mitigation lies with the land use approval and/or permitting agency for individual projects, and that the programmatic analysis does not allow project-specific details of mitigation, the degree of mitigation that may ultimately be implemented to reduce potentially significant impacts on land use planning is uncertain.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this Final ~~Draft~~ EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that operational impacts to land use and planning associated under the Proposed Targets would be **potentially significant and unavoidable**.

12. Mineral Resources

a. Impact 12.a: Construction-Related Impacts to Mineral Resources

As summarized in Chapter 2, the reasonably foreseeable compliance responses associated with the Proposed Targets would require of new facilities or modification of existing facilities that involve earth-moving activities. These would likely occur within existing footprints or in areas with consistent zoning where original permitting and analyses considered these issues.

Impact Significance Determination

Therefore, construction-related impacts on mineral resources associated with the Proposed Targets would be **less-than-significant**.

Mitigation Measures

No mitigation is necessary.

b. Impact 12.b: Operational-Related Impacts to Mineral Resources

Long-term operational compliance responses associated with the proposed project include increased mining and processing of rare materials (e.g., lithium, nickel, cobalt, aluminum) used in lithium-ion batteries. Depending on the magnitude of required materials, implementation of the proposed project could affect the availability of known minerals.

The demand for additional mining to meet increased use of batteries could result in the development of new mines and mining of lithium. For the purposes of this document it would be too speculative to determine if, when, and where a new mine may be located. In the case that new mines are required, they would go through independent environmental review at the appropriate federal, state, or local level (see Attachment A for more information). It is assumed, for the purposes of this analysis that any new mines would be in areas with appropriate zoning, and subject to Federal, State, and/or local requirements.

Batteries associated with energy storage systems are currently primarily lithium-based, although battery technology may shift toward use of other minerals in the future. Generally, other types battery options, such as nickel-metal hydride are not as favorable due to challenges related to high cost, high self-discharge, and heat generation at high temperatures. Thus, it is assumed that mineral resource requirements associated with implementation of Proposed Targets would be tied to lithium resources and other lithium-ion battery-related metals (i.e., cobalt).

As of April 2018, the only two domestic lithium mines in operation in the U.S. are brine operations in Nevada and rural California; however, in recent years, 6.9 million tons of new lithium resources have been identified in the U.S. in the form of continental brines, geothermal brines, hectorite, oilfield brines, and pegmatites. Two companies produced a large array of downstream lithium compounds in the U.S. from domestic or South American lithium carbonate, lithium chloride, and lithium hydroxide. Lithium consumption for batteries has increased substantially in recent years due to increased demand for rechargeable lithium batteries. Currently the U.S. imports most lithium from Chile (57 percent), Argentina (40 percent); China (2 percent); and others (1 percent). Worldwide mine production and reserves are provided in Table 4-1.[22]

Table 4-1
Lithium Mine Production and Reserves

Country	2015 (metric tons)	2016 (metric tons)	Reserves (metric tons)
U.S.	N/A	N/A	38,000
Argentina	3,600	5,700	2,000,000
Australia	14,100	14,300	1,600,000
Brazil	200	200	48,000
Chile	10,500	12,000	7,500,000
China	2,000	2,000	3,200,000
Portugal	20	200	60,000
Zimbabwe	1900	900	23,000
World total (rounded)	31,500	35,000	14,000,000

[22] United States Geological Survey. 2017a. Mineral Resources Profile: Lithium. Available: https://minerals.usgs.gov/minerals/pubs/commodity/lithium/mcs-2017-lithi.pdf. Accessed: April 2018

Table 4-1
Lithium Mine Production and Reserves

Country	2015 (metric tons)	2016 (metric tons)	Reserves (metric tons)
Note: Reserves data are dynamic. They may be considered a working inventory of mining companies' supply of an economically extractable mineral commodity. Inventory is limited by many considerations, including cost of drilling, taxes, price of the mineral commodity being mined, and the demand for it. USGS 2017a			

The magnitude of reserves, shown above, is necessarily limited by many considerations, including cost of drilling, taxes, price of the mineral commodity being mined and the associated demand. In addition to the reserves described above, deposits of mineral resources are also important to consider in assessing future supplies. Furthermore, owing to continuing exploration, identified lithium resources have increased substantially worldwide. For instance, lithium resources in the U.S. grew from 5.5 million metric tons in 2014 to 6.9 million metric tons in 2016. Worldwide, lithium resources are currently estimated to be approximately 40 million tons, including 9 million metric tons in Bolivia and Argentina, 7.5 million metric tons in Chile, 2 million metric tons in Australia, 7 million metric tons in China, and 2 million metric tons in Canada. In addition, Congo (Kinshasa), Russia, and Serbia have resources of approximately 1 million metric tons each. Further, due to steadily increasing demand for lithium, domestic recycling of lithium has also increased.[23]

Additionally, cobalt, a bluish-gray metal found in the Earth's crust, is a preferred component used in the production of lithium-ion batteries used for zero- and near-zero emission vehicles and technology. The U.S. currently imports cobalt from China (18 percent), Norway (14 percent), Finland (10 percent), Japan (9 percent), and other (49 percent). Worldwide mine production and reserves for cobalt are provided in Table 4-2.[24]

Table 4-2
Cobalt Mine Production and Reserves

Country	2015 (metric tons)	2016 (metric tons)	Reserves (metric tons)
U.S.	760	690	21,000
Australia	6,000	5,100	1,000,000
Canada	6,900	7,300	270,000
China	7,700	7,700	80,000
Democratic Republic of the Congo	63,000	66,000	3,400,000

[23] United States Geological Survey. 2017a. Mineral Resources Profile: Lithium. Available: https://minerals.usgs.gov/minerals/pubs/commodity/lithium/mcs-2017-lithi.pdf. Accessed: April 2018
[24] United States Geological Survey. 2017b. Mineral Resources Profile: Cobalt. Available: https://minerals.usgs.gov/minerals/pubs/commodity/cobalt/mcs-2017-cobal.pdf. Accessed: April 2018

Table 4-2
Cobalt Mine Production and Reserves

Country	2015 (metric tons)	2016 (metric tons)	Reserves (metric tons)
Cuba	4,300	4,200	500,000
Madagascar	3,700	3,300	130,000
New Caledonia	3,680	3,300	64,000
Philippines	4,300	3,500	290,000
Russia	6,200	6,200	250,000
South Africa	3,000	3,000	29,000
Zambia	4,600	4,600	270,000
Other Countries	11,600	8,300	690,000
World Total (rounded)	126,000	123,000	7,000,000

Note: Reserves data are dynamic. They may be considered a working inventory of mining companies' supply of an economically extractable mineral commodity. Inventory is limited by many considerations, including cost of drilling, taxes, price of the mineral commodity being mined, and the demand for it.
Source: USGS 2017b

The Democratic Republic of the Congo continues to be the world's leading source of mined cobalt, supplying more than one-half of the world cobalt production. Identified cobalt resources in the U.S. are estimated to be about 1 million metric tons, most of which are found in Minnesota; however, other deposits are found in Alaska, California, Idaho, Michigan, Missouri, Montana, Oregon, and Pennsylvania. Identified world terrestrial cobalt resources are about 25 million metric tons. The majority (over 50 percent) of cobalt is found in sediment-hosted stratiform copper deposits in the Democratic Republic of the Congo and Zambia; nickel-bearing laterite deposits in Australia and nearby island countries and Cuba; and magmatic nickel-copper sulfide deposits hosted in mafic and ultramafic rocks in Australia, Canada, Russia, and the U.S. More than 120 million tons of cobalt resources have been identified in manganese nodules and crusts on the floor of the Atlantic, Indian, and Pacific Oceans as well. In 2016, 30 percent of cobalt was obtained from recycled cobalt scrap.[25]

Appendix G of the CEQA Guidelines considers an impact on mineral resources to be the loss of availability of a known mineral resource that would be of value to a local entity, a region, or the state. This type of impact could result from actions such as building a structure over an area that contains mineral resources, thereby prohibiting access to mining activities. Implementation of the proposed project and associated compliance responses could result in an increased development where mining for lithium and cobalt is feasible, which could conceivably affect the availability of these mineral resources if access to resources becomes impeded.

[25] United States Geological Survey. 2017b. Mineral Resources Profile: Cobalt. Available: https://minerals.usgs.gov/minerals/pubs/commodity/cobalt/mcs-2017-cobal.pdf. Accessed: April 2018

Impact Significance Determination

Thus, operational-related impacts on mineral resources associated with the Proposed Targets would be potentially significant.

Mitigation Measures

Potential long-term operational mineral impacts could be reduced to a less-than-significant level by mitigation that can and should be implemented by local lead agencies, but is beyond the authority of CARB and not within its purview.

Mitigation Measure 12.b

The Regulatory Setting in Attachment A includes applicable laws and regulations that provide protection of mineral resources. CARB does not have the authority to require implementation of mitigation related to new or modified facilities that would be approved by local jurisdictions. The ability to require such measures is under the purview of jurisdictions with local or State land use approval and/or permitting authority. New or modified facilities in California would most likely qualify as a "project" under CEQA. The jurisdiction with primary approval authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA statutes. Project-specific impacts and mitigation measures would be identified during the environmental review by agencies with project-approval authority. Recognized practices that are routinely required to avoid and/or minimize impacts to mineral resources include:

- Proponents of construction activities implemented because of reasonably foreseeable compliance responses associated with the Proposed Targets would coordinate with State or local land use agencies to seek entitlements for development including the completion of all necessary environmental review requirements (e.g., CEQA). The local or State land use agency or governing body must follow all applicable environmental regulations as part of approval of a project for development.

- Based on the results of the environmental review, proponents will implement all feasible mitigation to reduce or substantially lessen the potentially significant impacts on mineral resources associated with the project.

- Actions required to mitigate potentially significant mineral resource impacts may include the following; however, any mitigation specifically required for a new or modified facility would be determined by the local lead agency.

    - Prior to the issuance of any development permits, proponents of new or modified facilities or infrastructure will prepare an

investigation/study, which will include an evaluation of the development's impact on the availability of mineral resources valuable to the region and residents of the state or delineated on a local general plan, specific plan, or other land use plan.

- Proponents of new or modified facilities or infrastructure will provide a complete site plan showing any overlapping areas between the proposed project and locally-important mineral resources delineated on a local general plan, specific plan, or other land use plan. Proponents will avoid locating facilities that would result in the loss of availability of locally-important mineral resources, as much as possible.

Post-Mitigation Significance Determination

Because the authority to determine project-level impacts and require project-level mitigation lies with the land use approval and/or permitting agency for individual projects, and this programmatic level of review does not allow project-specific details of mitigation, the degree of mitigation ultimately implemented to reduce the potentially significant impacts is uncertain.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this Final ~~Draft~~ EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that long-term operational-related effects to mineral resources associated with the Proposed Targets would be **potentially significant and unavoidable**.

13. Noise

a. Impact 13.a: Construction-Related Impacts to Noise

As summarized in Chapter 2, the reasonably foreseeable compliance responses associated with the Proposed Targets would require construction activities. These impacts address the building phase of both reasonably foreseeable construction of new facilities or modification of existing facilities that involve earth-moving activities.

Construction noise levels that could result from the implementation of the Proposed Targets would fluctuate depending on the type, number, size, and duration of usage for the varying equipment. The effects of construction noise largely depend on the type of construction activities occurring on any given day, noise levels generated by those activities, distances to noise sensitive receptors, and the existing ambient noise environment in the receptor's vicinity. Construction generally occurs in several discrete stages, each phase requiring a specific complement of equipment with varying equipment type, quantity, and intensity. These variations in the operational characteristics of the equipment change the effect they have on the noise environment

of the project site and in the surrounding community for the duration of the construction process.

To assess noise levels associated with the various equipment types and operations, construction equipment can be considered to operate in two modes: mobile and stationary. Mobile equipment sources move around a construction site performing tasks in a recurring manner (e.g., loaders, graders, dozers). Stationary equipment operates in a given location for an extended period of time to perform continuous or periodic operations. Operational characteristics of heavy construction equipment are additionally typified by short periods of full-power operation followed by extended periods of operation at lower power, idling, or powered-off conditions.

Additionally, when construction-related noise levels are being evaluated, activities that occur during the more noise-sensitive evening and nighttime hours are of increased concern. Because exterior ambient noise levels typically decrease during the late evening and nighttime hours as traffic volumes and commercial activities decrease, construction activities performed during these more noise-sensitive periods of the day can result in increased annoyance and potential sleep disruption for occupants of nearby residential uses.

The site preparation phase typically generates the most substantial noise levels because of the on-site equipment associated with grading, compacting, and excavation, which uses the noisiest types of construction equipment. Site preparation equipment and activities include backhoes, bulldozers, loaders, and excavation equipment (e.g., graders and scrapers). Construction of large structural elements and mechanical systems could require the use of a crane for placement and assembly tasks, which may also generate noise levels. Although a detailed construction equipment list is not currently available, based on this project type, the primary sources of noise would include backhoes, bulldozers, and excavators. Noise emission levels from typical types of construction equipment can range from approximately 74 to 94 A-weighted decibels (dBA) at 50 feet.

Based on this information and accounting for typical usage factors of individual pieces of equipment and activity types, on-site construction could result in hourly average noise levels of 87 dBA equivalent level measurements (L_{eq}) at 50 feet and maximum noise levels of 90 dBA maximum sound level (L_{max}) at 50 feet from the simultaneous operation of heavy-duty equipment and blasting activities, if deemed necessary. Based on these and general attenuation rates, exterior noise levels at noise-sensitive receptors located within thousands of feet from project sites could exceed typical standards (e.g., 50/60 dBA L_{eq}/L_{max} during the daytime hours and 40/50 dBA L_{eq}/L_{max} during the nighttime hours).

Additionally, construction activities may result in varying degrees of temporary groundborne noise and vibration, depending on the specific construction equipment used and activities involved. Groundborne noise and vibration levels caused by various types of construction equipment and activities (e.g., bulldozers, blasting) range from

58 – 109 vibration decibels (VdB) and from 0.003 – 0.089 inch per second (in/sec) peak particle velocity (PPV) at 25 feet. Similar to the above discussion, although a detailed construction equipment list is not currently available, based on this project type, the primary sources of groundborne vibration and noise would include bulldozers and trucks. Per the Federal Transit Administration (FTA), levels associated with the use of a large bulldozer and trucks are 0.089 and 0.076 in/sec PPV (87 and 86 VdB) at 25 feet, respectively. With respect to the prevention of structural damage, construction-related activities would not exceed recommended levels (e.g., 0.2 in/sec PPV). However, based on FTA's recommended procedure for applying a propagation adjustment to these reference levels, bulldozing and truck activities could exceed recommended levels with respect to the prevention of human disturbance (e.g., 80 VdB) within 275 feet.

Thus, implementation of reasonably foreseeable compliance responses could result in the generation of short-term construction noise more than applicable standards or that result in a substantial increase in ambient levels at nearby sensitive receptors, and exposure to excessive vibration levels.

Impact Significance Determination

For the reasons described above, construction-related impacts on noise associated with implementation of the Proposed Targets could be potentially significant.

Mitigation Measures

Potential noise impacts could be reduced to a less-than-significant level by mitigation that can and should be implemented by local lead agencies, but is beyond the authority of CARB and not within its purview.

Mitigation Measure 13.a

The Regulatory Setting in Attachment A includes, but is not limited to, applicable laws and regulations that pertain to noise. CARB does not have the authority to require implementation of mitigation related to new or modified facilities that could be approved by local jurisdictions. The ability to require such measures is under the purview of jurisdictions with local or State land use approval and/or permitting authority. New or modified facilities in California would qualify as a "project" under CEQA. The jurisdiction with primary approval authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA statutes.

Project-specific impacts and mitigation would be identified during the environmental review by agencies with project-approval authority. Recognized practices that are routinely required to avoid and/or minimize noise include:

- Proponents of new or modified facilities, or infrastructure constructed because of reasonably foreseeable compliance responses, would coordinate with State or local land use agencies to seek entitlements for

development including the completion of all necessary environmental review requirements (e.g., CEQA). The local or State land use agency or governing body must follow all applicable environmental regulations as part of approval of a project for development.

- Based on the results of the environmental review, proponents would implement all feasible mitigation to reduce or substantially lessen the potentially significant impacts of the project. Actions required to mitigate potentially significant noise impacts may include the following; however, any mitigation specifically required for a new or modified facility would be determined by the local lead agency.

- Ensure noise-generating construction activities (including truck deliveries, pile driving, and blasting) are limited to the least noise-sensitive times of day (e.g., weekdays during the daytime hours) for projects near sensitive receptors.

- Consider use of noise barriers, such as berms, to limit ambient noise at property lines, especially where sensitive receptors may be present.

- Ensure all project equipment has sound-control devices no less effective than those provided on the original equipment.

- All construction equipment used would be adequately muffled and maintained.

- Consider use of battery-powered forklifts and other facility vehicles.

- Ensure all stationary construction equipment (i.e., compressors and generators) is located as far as practicable from nearby sensitive receptors or shielded.

- Properly maintain mufflers, brakes, and all loose items on construction and operation related vehicles to minimize noise and address operational safety issues. Keep truck operations to the quietest operating speeds. Advise about downshifting and vehicle operations in sensitive communities to keep truck noise to a minimum.

- Use noise controls on standard construction equipment; shield impact tools.

- Consider use of flashing lights instead of audible back-up alarms on mobile equipment.

- Install mufflers on air coolers and exhaust stacks of all diesel and gas-driven engines.

- Equip all emergency pressure relief valves and steam blow-down lines with silencers to limit noise levels.

- Contain facilities within buildings or other types of effective noise enclosures.

- Employ engineering controls, including sound-insulated equipment and control rooms, to reduce the average noise level in normal work areas.

Post-Mitigation Significance Determination

Because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this Final ~~Draft~~ EA does not attempt to address project-specific details of mitigation, the degree of mitigation that may ultimately be implemented to reduce potentially significant noise impacts is uncertain.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this Final ~~Draft~~ EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that construction-related noise impacts associated with the Proposed Targets would be **potentially significant and unavoidable**.

b. Impact 13.b: Operational Impacts to Noise

As summarized in Chapter 2, the reasonably foreseeable compliance responses associated with the Proposed Targets would require long-term operational changes. Implementation of the Proposed Targets could result in increased mining to meet demands for greater supplies of lithium-based batteries associated with renewable energy and energy efficiency. Operational-related activities associated with lithium mining could produce substantial stationary sources of noise. Mechanical equipment (e.g., dozers) required to excavate bedrock and vegetation would generate noise that could be considered adverse to sensitive receptors; however, expansion of existing mines would not involve sensitive receptors given that mines typically are in areas zoned for such uses. While new lithium mines constructed as a compliance response to the Proposed Targets could be in areas of consistent zoning and therefore not in close proximity to sensitive receptors, the exact locations are not known at this time and could result in significant increases in noise.

Implementation of the Proposed Targets would increase the number of renewable energy projects. Implementation of renewable energy supply projects could result in additional vehicle trips on the affected roadway systems from worker commute-, maintenance/operation-, and material delivery-related trips) and, consequently, an increase in traffic source noise. The exact number of daily trips required for project operations or the location of affected roadways segments is not known at this time. However, when the average daily traffic (ADT) volume is doubled on a roadway

segment in comparison to existing conditions, the resultant increase is approximately 3 dB Community Noise Equivalent Level (CNEL)/L_{dn}, which is typically considered substantial as a change of this magnitude is perceivable to the human ear. ADT volumes on roadway segments in the project area vary considerably (e.g., from hundreds to hundreds of thousands) under existing no project conditions. Therefore, project operations could result in a doubling of ADT volumes, especially in rural areas where existing ADT volumes would be lower and considering the increased tire and engine source noise from material delivery-related heavy-duty truck trips, along affected roadway segments. Consequently, based on the information above, exterior noise levels at noise-sensitive receptors located near affected roadways could substantially (e.g., 3 dB CNEL/L_{dn}) increase.

Additionally, implementation of the renewable energy supply projects could introduce new on- site stationary noise sources, including rooftop heating, ventilation, and air conditioning equipment; mechanical equipment (e.g., turbines, engines, pumps, blowers); emergency generators; parking lot activities; loading operations; and other related operational activities. Noise levels associated with these types of sources vary greatly, but would generally range from 70 dBA L_{eq} to 80 dBA L_{max} at 50 feet. Based on these and general attenuation rates, exterior noise levels at noise-sensitive receptors located within hundreds of feet from the location of renewable energy project sites could exceed typical standards (e.g., 50/60 dBA L_{eq}/L_{max} during the daytime hours and 40/50 dBA L_{eq}/L_{max} during the nighttime hours).

To the extent any incremental natural gas fired generation is necessary to balance new intermittent renewable resources, that generation also has the potential to result in similar noise impacts.

Consequently, because the specific noise (and vibration) impacts of energy supply projects cannot be identified with any certainty, operational noise impacts could be significant.

Impact Significance Determination

For the reasons discussed above, substantial operational increases in noise would be associated with the Proposed Targets. These increases could result in potentially significant noise impacts.

Mitigation Measures

This impact could be reduced to a less-than-significant level by mitigation that can and should be implemented by local lead agencies, but is beyond the authority of the CARB and not within its purview.

Mitigation Measure 13.b

The Regulatory Setting in Attachment A includes, but is not limited to, applicable laws and regulations that pertain to noise. CARB does not have the authority to require

implementation of mitigation related to new or modified facilities that could be approved by local jurisdictions. The ability to require such measures is under the purview of jurisdictions with local or State land use approval and/or permitting authority. New or modified facilities in California would qualify as a "project" under CEQA. The jurisdiction with primary approval authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA statutes. Project-specific impacts and mitigation would be identified during the environmental review by agencies with project-approval authority. Recognized practices that are routinely required to avoid and/or minimize noise include:

- All powered equipment shall be used and maintained according to manufacturer's specifications.
- Public notice of activities shall be provided to nearby noise-sensitive receptors of potential noise-generating activities.
- All motorized equipment shall be shut down when not in use. Idling of equipment or trucks shall be limited to 5 minutes.
- All heavy equipment and equipment staging areas shall be located as far as possible from nearby noise-sensitive land uses (e.g., residential land uses, schools, hospitals, places of worship, recreation resources).
- To achieve an interior noise level less than applicable noise standards, the installation of double pane windows and building insulation shall be offered to residences directly affected by significant operational noise levels generated by the noise-generating facility. If accepted by the home owner, the project applicant shall provide the funding necessary to install the appropriate noise- reducing building improvements.

Post-Mitigation Significance Determination

Because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this Final ~~Draft~~ EA does not attempt to address project-specific details of mitigation, the degree of mitigation that may ultimately be implemented to reduce potentially significant impacts is uncertain.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this Final ~~Draft~~ EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that the potentially significant operational impact to noise associated with the Proposed Targets would be **potentially significant and unavoidable**.

14. Population, Employment, and Housing

a. Impact 14.a: Construction-Related Impacts to Population and Housing

As summarized in Chapter 2, the reasonably foreseeable compliance responses associated with the Proposed Targets would require construction activities. These impacts address the building phase of both reasonably foreseeable construction of new facilities or modification of existing facilities that involve earth-moving activities.

The exact location or character of any new facilities is uncertain. Construction activities would be anticipated to require relatively small crews, and demand for these crews would be temporary (e.g., 6 – 12 months per project). Therefore, the need for a substantial amount of construction worker migration would not occur and a sufficient construction employment base would likely be available. Construction activities would not require new additional housing to accommodate or generate changes in land use and, therefore, would not affect the provisions of population and housing

Impact Significance Determination

Therefore, construction-related impacts on population and housing associated with implementation of the Proposed Targets would be **less-than-significant**.

Mitigation Measures

No mitigation is necessary.

b. Impact 14.b: Operational Impacts to Population, Employment, and Housing

As summarized in Chapter 2, the reasonably foreseeable compliance responses associated with the Proposed Targets would require long-term operational changes. These operational changes are related to implementation of renewable energy and energy efficiency. Overall, the Proposed Targets would decrease reliance on fossil fuels, while increasing renewable energy supplies, this would not result in substantial increases in employment opportunities or otherwise induce substantial population growth in the State.

Impact Significance Determination

Thus, operational activities related to the Proposed Targets would not directly or indirectly result in new additional housing or substantial population growth in an area. As a result, impacts to population and housing would be **less-than-significant**.

Mitigation Measures

No mitigation is necessary.

15. Public Services

a. Impact 15.a: Construction-Related Impacts to Public Services

As summarized in Chapter 2, the reasonably foreseeable compliance responses associated with the Proposed Targets would require construction activities. These impacts address the building phase of both reasonably foreseeable construction of new facilities or modification of existing facilities that involve earth-moving activities.

The exact location or character of any new facilities is uncertain. However, these would likely occur in areas with zoning that would permit the development of manufacturing or industrial uses. Construction activities would be anticipated to require relatively small crews, and demand for these crews would be temporary (e.g., 6 – 12 months per project). Therefore, the need for a substantial amount of construction worker migration would not occur and a sufficient construction employment base would likely be available. Construction activities would not require a substantial amount of new additional housing to accommodate new populations or generate changes in land use, and therefore, would not be expected to increase population levels such that the provisions of public services would be significantly affected.

Impact Significance Determination

Therefore, construction-related impacts on public services associated with implementation of the Proposed Targets would be **less-than-significant**.

Mitigation Measures

No mitigation is necessary.

b. Impact 15.b: Operational Impacts to Public Services

As summarized in Chapter 2, the reasonably foreseeable compliance responses associated with the Proposed Targets would require long-term operational changes. These operational changes are related to implementation of renewable energy and energy efficiency. As discussed above under Impact 14.b, the Proposed Targets would not induce substantial population growth. Thus, there would not be an increase demand on fire protection, police protection, schools, or other public services related to the recommended action described in Chapter 2 of this Final ~~Draft~~ EA.

Impact Significance Determination

Thus, operational activities related to the Proposed Targets would not directly or indirectly result in increased demand on public services such that new facilities would need to be constructed. Thus, public services impacts would be **less-than-significant**.

Mitigation Measures

No mitigation is necessary.

16. Recreation

a. Impact 16.a Construction-Related Impacts to Recreation

As summarized in Chapter 2, the reasonably foreseeable compliance responses associated with the Proposed Targets would require construction activities. These impacts address the building phase of both reasonably foreseeable construction of new facilities or modification of existing facilities that involve earth-moving activities.

The exact location or character of any new facilities is uncertain. However, these would likely occur in areas with zoning that would permit the development of manufacturing or industrial uses. Construction activities would be anticipated to require relatively small crews, and demand for these crews would be temporary (e.g., 6 – 12 months per project). Therefore, the need for a substantial amount of construction worker migration would not occur and a sufficient construction employment base would likely be available. Thus, construction activities would not increase population levels such that increased demand would be placed on recreational facilities within communities containing new plants and facilities.

Impact Significance Determination

Therefore, construction-related impacts on recreation associated with the Proposed Targets would be **less-than-significant**.

Mitigation Measures

No mitigation is necessary.

b. Impact 16.b: Operational Impacts to Recreation

As summarized in Chapter 2, the reasonably foreseeable compliance responses associated with the Proposed Targets would require long-term operational changes. These operational changes are related to implementation of new renewable energy projects associated with renewable energy and energy efficiency.

Implementation of the Proposed Targets would increase the number of renewable energy projects. Renewable energy projects could occupy land that also provides important recreation opportunity, supports recreation uses, or provides access to recreation resources elsewhere. This could affect any type of outdoor recreation known to occur on public and private lands throughout rural California and/or nearby Western States. Recreation uses most likely to be affected are activities that involve large land areas, such as off-highway motorized recreation, non-motorized

recreational travel (such as hiking, horseback riding, cycling), or hunting. If these recreation activities were displaced by renewable energy projects, additional use pressure would be transferred to other similar recreation resource lands in the same region of the project. Also, new renewable energy generation and transmission facilities could directly disrupt, indirectly interfere with use of, or reduce the recreational resource qualities of private land occupied by or located near renewable energy projects. While the specific location of projects cannot be identified with any certainty, the magnitude of increased renewable energy is not known, therefore, the specific effects of long-term facility operations that could occur are uncertain and impacts could be significant.

Impact Significance Determination

For the reasons described above, impacts on recreation resources would be potentially significant due to implementation of the Proposed Targets.

Mitigation Measures

Potential impacts on recreation could be reduced to a less-than-significant level by mitigation that can and should be implemented by local lead agencies, but is beyond the authority of CARB and not within its purview.

Mitigation Measure 16.b.

Proponents for proposed renewable energy projects shall coordinate with Federal, State, and regional/local land management agencies with responsibilities for providing outdoor recreation opportunities where facilities are proposed on land supporting outdoor recreation resources, opportunities, or use. If facilities would displace, disrupt, reduce access to, or otherwise adversely affect recreation resources, opportunities, or use, the project siting and/or design shall be modified to the extent feasible to avoid or minimize the impact. Proponents shall also consult with affected outdoor recreation user groups. The information demonstrating that all feasible measures are being taken to avoid or minimize the recreation impact shall be included in the necessary environmental review (i.e., CEQA and/or NEPA).

Post-Mitigation Significance Determination

Because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this Final ~~Draft~~ EA does not attempt to address project-specific details of mitigation, the degree of mitigation that may ultimately be implemented to reduce potentially significant impacts is uncertain.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this Final ~~Draft~~ EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that the potentially significant operational impact to

recreation resources associated with the Proposed Targets would be **potentially significant and unavoidable**.

17. Transportation and Traffic

a. Impact 17.a: Construction-Related and Operational-Related Impacts to Traffic and Transportation

As summarized in Chapter 2, the reasonably foreseeable compliance responses associated with the Proposed Targets would require construction and operation of new facilities or modification of existing facilities that involve earth-moving activities.

Although detailed information about potential specific construction activities is not currently available, it would be anticipated to result in short-term construction traffic (primarily motorized) from worker commute- and material delivery-related trips. The amount of construction activity would vary depending on the type, number, and duration of usage for the varying equipment, and the phase of construction. These variations would affect the amount of project-generated traffic for both worker commute trips and material deliveries. Depending on the amount of trip generation and the location of new facilities, implementation could conflict with applicable programs, plans, ordinances, or policies (e.g., performance standards, congestion management); and/or result in hazardous design features and emergency access issues from road closures, detours, and obstruction of emergency vehicle movement, especially due to project-generated heavy-duty truck trips. In addition, new or expanded mining operations, both within the U.S. and internationally, could generated additional vehicle miles travelled (VMT), or increase cargo ship activity, as lithium ore is traded and distributed on a global scale. Operation of new facilities could also result in increased worker-commute related trips.

Impact Significance Determination

Therefore, construction and operational-related impacts on traffic and transportation associated with the Proposed Targets could be potentially significant.

Mitigation Measures

Potential impacts on transportation and traffic could be reduced to a less-than-significant level by mitigation that can and should be implemented by local lead agencies, but is beyond the authority of CARB and not within its purview.

Mitigation Measure 17.a

The Regulatory Setting in Attachment A includes applicable laws and regulations in regards to transportation. CARB does not have the authority to require implementation of mitigation related to new or modified facilities that would be approved by local jurisdictions. The ability to require such measures is under the purview of jurisdictions with local or State land use approval and/or permitting authority. New or modified facilities in California would qualify as a “project” under CEQA. The jurisdiction with

primary approval authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA statutes. Project-specific impacts and mitigation would be identified during the environmental review by agencies with project-approval authority. Recognized practices that are routinely required to avoid and/or minimize construction traffic impacts include:

- Proponents of new or modified facilities, or infrastructure constructed because of reasonably foreseeable compliance responses, would coordinate with State or local land use agencies to seek entitlements for development including the completion of all necessary environmental review requirements (e.g., CEQA). The local or State land use agency or governing body must follow all applicable environmental regulations as part of approval of a project for development.

- Based on the results of the environmental review, proponents would implement all feasible mitigation to reduce or substantially lessen the potentially significant impacts of the project. Actions required to mitigate potentially significant traffic impacts may include the following; however, any mitigation specifically required for a new or modified facility would be determined by the local lead agency.

    - Minimize the number and length of access, internal, service, and maintenance roads and use existing roads when feasible.

    - Provide for safe ingress and egress to/from the proposed project site. Identify road design requirements for any proposed roads, and related road improvements.

    - If new roads are necessary, prepare a road siting plan and consult standards contained in federal, State, or local requirements. The plans should include design and construction protocols to meet the appropriate roadway standards and be no larger than necessary to accommodate their intended functions (e.g., traffic volume and weight of vehicles). Access roads should be located to avoid or minimize impacts to washes and stream crossings, follow natural contours and minimize side-hill cuts. Roads internal to a project site should be designed to minimize ground disturbance. Excessive grades on roads, road embankments, ditches, and drainages should be avoided, especially in areas with erodible soils.

    - Prepare a Construction Traffic Control Plan and a Traffic Management Plan.

    - revisions to traffic signals,

- requirements to pay a fair share contribution to local traffic operation centers,
- coordination with Caltrans, or other relevant agencies, to broadcast real-time information on existing changeable message signs,
- consultation with local authorities to revise public transit system operations, and
- consultation with local emergency service provides to ensure that operating conditions on local roadways and freeway facilities are maintained.

Post-Mitigation Significance Determination

Because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this Final ~~Draft~~ EA does not attempt to address project-specific details of mitigation, the degree of mitigation that may ultimately be implemented to reduce potentially significant traffic and transportation impacts is uncertain.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this Final ~~Draft~~ EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that construction and operational-related traffic and transportation impacts associated with the Proposed Targets would be **potentially significant and unavoidable**.

18. Utilities and Service Systems

a. Impact 18.a: Operational Impacts on Utilities and Service Systems

As summarized in Chapter 2, the reasonably foreseeable compliance responses associated with the Proposed Targets would require long-term operational changes.

Reasonably foreseeable compliance responses to the proposed project could result in increased demand for lithium-ion batteries energy storage systems. Spent lithium-ion may be recycled, and due to increasing demand for zero- and near-zero emission vehicles and technologies, rates of lithium-ion battery recycling have increased.

In California, disposal of lithium-ion batteries within the State would be required to comply with California's Hazardous Waste Control Law and implementing regulations which contains regulations to prohibit the disposal of used batteries to solid waste landfill, which would ensure that lithium-ion batteries would be properly disposed, refurbished, or recycled. However, lithium batteries may be sold out of state as turnover

increases. In the U.S. overall, there are limited regulations for the disposal of lithium-ion batteries; however, due to value of recovered metals (e.g., cobalt, nickel, lithium), there is incentive to collect and recycle batteries. According to current practice, typical recycling procedures (i.e., hydrometallurgical recovery, high-temperature or pyrometallurgical, and direct recycling) recover an average of approximately 97 percent of the materials, redirecting about 3 percent of waste to landfills.

Implementation of the Proposed Targets would increase the number of renewable energy projects. All renewable energy projects no matter their size, location within the State or out-of-state, or type would be required to seek local land use approvals prior to their implementation. Part of the land use entitlement process would be to determine whether there is adequate water available to serve the proposed development. In the case of the proposed renewable energy projects, most of the project types would have minimal water demands (i.e., wind power, solid-fuel biomass, geothermal, and biogas gas) primarily related to municipal use, maintenance, and landscaping. However, the solar thermal, solar photovoltaic, and small hydroelectric renewable energy projects could have substantial water demands because of the use of water in the electricity generation, operation, or maintenance process. Nonetheless, all project types would be required to seek the approvals of local water service agencies indicating that adequate water supplies exist to serve the project. For projects located in California and that exceed adopted thresholds, a WSA would need to be prepared and approved by the local water purveyor.

Part of the land use entitlement process would be to determine whether there is adequate wastewater treatment and conveyance capacity is available to serve the proposed development. For those projects that would receive wastewater treatment service from an agency or other provider, it is assumed that all necessary permits and waste discharge requirements have been secured such that the discharge from these facilities would not exceed any adopted requirements. Further, these treatment facilities would be regularly monitored to ensure they are meeting compliance requirements For those renewable energy projects that would be served by an individual septic system or on-site treatment facility, it is anticipated that these facilities would comply with appropriate wastewater treatment requirements because appropriate permits and approvals from the RWQCB, land use agency, or other regulatory agency specifying treatment requirements would be required prior to construction of the project.

All renewable energy projects would be provided solid waste from a local provider that would haul the solid waste to an approved and permitted disposal facility. Some of the renewable energy projects may result in the generation of hazardous solid waste. In these cases, the project operators would contract with haulers certified to handle the hazardous waste and would dispose of the waste at a permitted facility that accepts hazardous waste.

Impact Significance Determination

For the reasons described above, operational impacts related to implementation of the Proposed Targets could result in potentially significant impacts related to demands on utilities and service systems.

Mitigation Measures

This impact could be reduced to a less-than-significant level by mitigation that can and should be implemented by local lead agencies, but is beyond the authority of CARB and not within its purview.

Mitigation Measure 18.a.

The Regulatory Setting in Attachment A includes applicable laws and regulations that relate to utilities and service systems. CARB does not have the authority to require implementation of mitigation related to new or modified facilities that would be approved by local jurisdictions. The ability to require such measures is under the purview of jurisdictions with local or State land use approval and/or permitting authority. New or modified facilities in California would qualify as a "project" under CEQA. The jurisdiction with primary approval authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA statutes. Project-specific impacts and mitigation would be identified during the environmental review by agencies with project-approval authority. Recognized practices that are routinely required to avoid and/or minimize utility and service-related impacts include:

- Proponents of new or modified facilities, or infrastructure constructed because of reasonably foreseeable compliance responses, would coordinate with State or local land use agencies to seek entitlements for development including the completion of all necessary environmental review requirements (e.g., CEQA). The local or State land use agency or governing body must follow all applicable environmental regulations as part of approval of a project for development.

- Based on the results of the environmental review, proponents would implement all feasible mitigation to reduce or substantially lessen the potentially significant impacts of the project. Actions required to mitigate potentially significant utility or service-related impacts may include the following; however, any mitigation specifically required for a new or modified facility would be determined by the local lead agency.

    - Comply with local plans and policies regarding the provision of water supply, wastewater treatment, and storm water drainage utilities, and solid waste services.

- Where an on-site wastewater system is proposed, submit a permit application to the appropriate local jurisdiction.

- Where appropriate, prepare a Water Supply Assessment (WSA) consistent with the requirements of Section 21151.9 of the Public Resources Code Section 10910 et seq. of the Water Code. The WSA would be approved by the local water agency/purveyor prior to construction of the project.

- Comply with local plans and policies regarding the provision of wastewater treatment services.

Post-Mitigation Significance Determination

Because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this Final ~~Draft~~ EA does not attempt to address project-specific details of mitigation, the degree of mitigation that may ultimately be implemented to reduce potentially significant impacts is uncertain.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this Final ~~Draft~~ EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that the potentially significant impact to utilities and service systems resulting from the operation of new facilities associated with the Proposed Targets would be **potentially significant and unavoidable**.

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5.0 CUMULATIVE AND GROWTH-INDUCING IMPACTS

A. Approach to Cumulative Analysis

This section satisfies requirements of the California Environmental Quality Act (CEQA) to discuss how the project being analyzed would contribute to cumulative impacts. The California Air Resources Board's (CARB's or Board's) certified regulatory program (17 CCR 60000-60008) does not provide specific direction on a cumulative impacts analysis, and while CARB, by its certified program, is exempt from Chapters 3 and 4 of CEQA and corresponding sections of the CEQA Guidelines, the Guidelines nevertheless contain useful information for preparation of a thorough and meaningful cumulative analysis. The CEQA Guidelines require a lead agency to discuss a cumulative impact if the project's incremental effect combined with the effects of other projects is "cumulatively considerable" (CEQA Guidelines 15130(a)). The discussion of cumulative impacts need not provide as much detail as the discussion of effects attributable to the project alone (CEQA Guidelines 15130). Where a lead agency is examining a project with an incremental effect that is not "cumulatively considerable," a lead agency need not consider that effect significant, but must briefly describe its basis for concluding that the incremental effect is not cumulatively considerable.

In considering cumulative impacts, an agency may choose from among two approaches: it can prepare a list of past, present, and probable future projects that will produce related or cumulative impacts, or it can rely on a summary of projections contained in an adopted planning document or an adopted or certified environmental document for the planning document (CEQA Guidelines 15130(b)). Further, the CEQA Guidelines state that the pertinent discussion of cumulative impacts contained in one or more previously certified environmental impact reports (EIRs) may be incorporated by reference pursuant to provisions for tiering and program EIRs, and that no future cumulative analysis is required when the lead agency determines the regional and area wide impacts have already been addressed in the prior certified EIR for that plan (CEQA Guidelines 15130).

The CEQA Guidelines state that a previously approved plan for the reduction of GHG emissions may be used in cumulative impacts analysis, and that the pertinent discussion of cumulative impacts contained in one or more previously certified EIRs may be incorporated by reference (Cal. Code Regs., tit. 14, §15130(d)). Furthermore, no further cumulative impacts analysis is required when a project is consistent with a general, specific, master or comparable programmatic plan where the lead agency determines that the regional or area wide cumulative impacts of the proposed project have already been adequately addressed, as defined in section 15152(f), in a certified EIR for that plan. (Cal. Code Regs., tit. 14, §15130(d)). CEQA further directs that a tiered EIR focus on significant environmental effects that were not already analyzed in the previous environmental analysis. (Pub. Resources Code §21068.5; 21093; see also 21094(c).)

For purposes of this analysis, CARB is relying on the summary of projections contained in the Environmental Analysis (EA) prepared for California's 2017 Climate Change Scoping Plan (Scoping Plan EA). The Scoping Plan EA provided a program level review of significant adverse impacts associated with the reasonably foreseeable compliance responses that appeared most likely to occur because of implementing the recommended measures. The impact discussion includes, where relevant, construction-related effects, operational effects of new or modified facilities, and influences of the recommended actions on GHG and air pollutant emissions. The Scoping Plan EA considered cumulative impacts of a full range of reasonably foreseeable compliance responses to all the recommendations, including Senate Bill 350 (SB 350), along with the expected background growth in California in its impacts conclusions for each resource topic area. The Scoping Plan EA considered the cumulative effect of other "closely related" past, present, and future reasonably foreseeable activities undertaken to reduce GHGs in response to statewide programs and policies, as well other activities with "related impacts" (CEQA Guidelines 15355(b); 15130(a)(1)). CARB has determined that the cumulative effects of the proposed SB 350 (Proposed Targets) have been examined at a sufficient level of detail in the Scoping Plan EA.[26] Therefore, CARB has determined that for a cumulative analysis of the Proposed Targets, it is appropriate to rely on the cumulative analysis contained in the Scoping Plan EA, which is the statewide plan designed to reduce GHGs. The analysis of the Scoping Plan EA is hereby incorporated by reference. The portions of the Scoping Plan EA relevant to this discussion are also summarized below.

The analysis of cumulative impacts includes the following:

- A summary of the cumulative impacts found for each resource area in the Scoping Plan EA (certified by the Board in December 2017).
- A discussion of the types of compliance responses associated with the Proposed Targets, pertinent to each resource area.
- A significance conclusion that determines if the Proposed Targets could result in a significant cumulative effect or a considerable contribution to an existing significant cumulative impact.

This approach to cumulative impacts analysis is "guided by the standards of practicality and reasonableness" (Cal. Code Regs., tit. 14, §15130(b)) and serves the purpose of providing "a context for considering whether the incremental effects of the project at issue are considerable" when judged "against the backdrop of the environmental effects of other projects." (*CBE v. Cal. Res. Agency* (2002) 103 Cal.App.4th 98, 119).

1. Summary of the Scoping Plan Compliance Responses

The Scoping Plan EA provided a program-level review of significant adverse impacts associated with the reasonably foreseeable compliance responses that appeared most

[26] A copy of the Scoping Plan EA is available at https://www.arb.ca.gov/cc/scopingplan/scoping_plan_2017.pdf.

likely to occur because of implementing the recommended measures. The impact discussion includes, where relevant, construction-related effects, operational effects of new or modified facilities, and influences of the recommended measures on GHG and air pollutant emissions. CARB staff prepared the Scoping Plan EA, certified by the Board in December 2017, as a program environmental document for the entire statewide plan of GHG reductions projects. The Scoping Plan recommended six measures to achieve the 2030 target: renewable energy and energy efficiency, SB 350, increased stringency of Low Carbon Fuel Standard (LCFS) (18 percent carbon intensity (CI) reduction by 2030), Mobile Source Strategies and Sustainable Freight Strategy, Short-Lived Climate Pollutant (SLCP) Reduction Strategy, increased stringency of SB 375 2035 targets for Sustainable Communities Strategies, and post-2020 Cap-and-Trade Programs with declining caps. The compliance responses associated with these sectors measures are described as follows.

a) Renewable Energy and Energy Efficiency

As discussed in the Scoping Plan EA and in this Final ~~Draft~~ EA, reasonably foreseeable compliance responses associated with implementation of proposed measures for renewable energy and energy efficiency, including SB 350 would range from minor modifications to existing buildings and large-scale construction projects that would allow for increased use of renewable energy and storage of produced renewable energy. Additional renewable energy supplies would be produced from new wind, solar thermal, solar photovoltaic, geothermal, solid-fuel biomass, biogas, and small hydroelectric facilities. These may require new and upgraded transmission lines to move the electricity from the source of generation to substations near population centers. Individual energy projects augment electrical grids by capturing excess electrical energy during periods of low demand and storing it in other forms until needed on an electrical grid. This energy storage may be procured from buildings, such as solar panels, and from large-scale renewable energy facilities. Energy storage systems are expected to consist of lithium battery-based systems. These systems are likely to be in industrial areas and cover large areas of land (i.e., more than one acre). In addition, regionalization of the grid may result in increased construction and operation of renewable energy projects. Expansion of the energy grid would require upgraded and new transmission lines.

Doubling of energy efficiency at existing buildings would include modifications to buildings, such as replacement of HVAC systems with heat pumps and installation of more efficient water heaters. Other upgrades, such as installation of more efficient insulation, window replacements, and whole house or whole-building retrofits could occur as well, with the overall goals of creating zero net energy buildings. These activities would occur over a long period, such that the existing production rate of equipment would be sufficient to meet demand. That is, no new manufacturing facilities or other earth-moving activities would be needed.

b) Carbon Intensity Levels under the Low Carbon Fuel Standard

The reasonably foreseeable compliance responses to a carbon intensity (CI) reduction of at least 18 percent in the LCFS regulation could include incentives for various projects, such as processing plants for agriculture-based ethanol, cellulosic ethanol, and biomethane. Such incentives could result in minor expansions to existing operations, such as collection of natural gas from landfills, dairies, and wastewater treatment plants, modifications to crude production facilities (e.g., onsite solar, wind, heat, and/or steam generation electricity), and installation of energy management systems at refineries. It is also reasonably foreseeable that some existing fossil refiners my start to produce biofuels. This may require some minor modifications to existing sites to retrofit onsite technologies and equipment.

c) Mobile Source Strategy (Clean Technology and Fuels Scenario) and Sustainable Freight Strategy

The 2017 Scoping Plan Update contains recommended measures for on-road light-duty vehicles, on-road heavy-duty vehicles, off-road federal and international sources, and off-road equipment. Reasonably foreseeable compliance responses evaluated in the Scoping Plan EA associated with the strategy included increased infrastructure for natural gas and hydrogen refueling stations, increased demand for lithium battery manufacturing and associated increases in lithium mining and exports, increased recycling or refurbishment of lithium batteries, and increased emission testing of vehicles which may cause construction of new testing centers to monitor vehicle emissions throughout the State. The replacement rate of on-road light-duty and heavy-duty vehicles, as well as off-road equipment and engines is anticipated to increase requiring older models to be sold outside of California, scrapped, or recycled. Compliance responses could also include construction or operation of new manufacturing facilities to support zero and near-zero emission technologies and increased manufacturing of low-nitrogen oxide (NO_x) engines.

d) Short-Lived Climate Pollutant Reduction Strategy

In the 2017 Scoping Plan Update, the SLCP sector addressed ozone depleting substances (ODS), a large group of chemicals known to destroy the stratospheric ozone layer when released into the atmosphere. ODS were historically used in a wide variety of applications, including refrigerants, foam blowing agents, solvents, and fire suppressants. Four general concepts were associated with the Short-Lived Climate Pollutants Sector within the 2017 Scoping Plan Update: high-global warming potential (GWP) fluorinated gas phasedown, low-GWP requirements, ODS recovery and destruction, and high-GWP fees. Reasonably foreseeable compliance responses consisted of replacement of high-GWP compounds with low-GWP compounds, which was considered to require construction of new manufacturing facilities or modification of existing manufacturing facilities.

CARB staff presented the Final Short-Lived Climate Pollutant Reduction Strategy, and associated Final EA, to the Board on March 23, 2017. At this hearing the Board certified the Final EA, (including the response to environmental comments document and the CEQA findings and statement of override) and approved the Final Short-Lived Climate Pollutant Reduction Strategy. More information can be found at: http://www.arb.ca.gov/cc/shortlived/shortlived/shortlived.htm

e) Increased Stringency of Senate Bill 375 2035 Targets for Sustainable Communities Strategies

In the 2017 Scoping Plan Update, SB 375 supported the State's climate action goals to reduce GHG emissions through coordinated transportation and land use planning with the goal of more sustainable communities. Reasonably foreseeable compliance responses evaluated in the Scoping Plan included planning and construction responses from new housing, commercial and industrial development, preservation of open space, and roadway and infrastructure improvements. New infrastructure associated with SB 375 and Sustainable community Strategies (SCSs) could include commuter rail lines, electric charging and hydrogen fueling infrastructure, and new manufacturing or modified facilities to accommodate the increased use of zero emission vehicles (ZEVs) and plug-in hybrid electric vehicles (PHEVs).

f) Post-2020 Cap-and-Trade Program with Declining Caps

In the 2017 Scoping Plan Update, the Cap-and-Trade Regulation was updated to include declining caps for the post-2020 program. Anticipated compliance responses include construction activities, infrastructure and equipment installations, and significant operational changes to facilities. An EA was prepared for the post-2020 Cap-and-Trade program, titled Final Environmental Analysis prepared for the Proposed Amendments to the California Cap on Greenhouse Gas Emissions and Market-Based Compliance Mechanisms Regulation, certified by the Board on July 27, 2017, which is hereby incorporated by reference. Refer to that document for a more thorough description of the measures, potential compliance responses, and potential impacts: https://www.arb.ca.gov/regact/2016/capandtrade16/capandtrade16.htm

2. Summary of the 2017 Scoping Plan Update Environmental Impacts

The Scoping Plan EA evaluated the environmental impacts related to the reasonably foreseeable compliance responses described above. Table 5-1 provides a summary of the conclusions of these impacts.

Table 5-1
Summary of California's 2017 Climate Change Scoping Plan Update
Environmental Analysis Impacts by Sector

Resource Areas and Impact Categories	Significance Determination
Aesthetics	
Construction-Related Impacts	PSU
Operational Impacts	PSU
Agriculture and Forest Resources	
Construction-Related Impacts	PSU
Operational Impacts	PSU
Air Quality	
Construction-Related Impacts	PSU
Operational Impacts	LTS
Construction-Related and Operational Odors Impacts	PSU
Biological Resources	
Construction-Related Impacts	PSU
Operational Impacts	PSU
Cultural Resources	
Construction-Related and Operational Impacts	PSU
Energy Conservation	
Construction-Related Impacts	LTS
Operational Impacts	B
Geology and Soils	
Construction-Related Impacts	PSU
Operational Impacts	PSU
Greenhouse Gas	
Construction-Related and Operational Impacts	B
Hazards and Hazardous Materials	
Construction-Related Impacts	PSU
Operational Impacts	PSU
Hydrology and Water Quality	
Construction-Related Impacts	PSU

Table 5-1
Summary of California's 2017 Climate Change Scoping Plan Update
Environmental Analysis Impacts by Sector

Resource Areas and Impact Categories	Significance Determination
Operational Impacts	PSU
Land Use Planning	
Construction-Related Impacts	LTS
Operational Impacts	PSU
Mineral Resources	
Construction-Related Impacts	LTS
Operational Impacts	LTS
Noise	
Construction-Related Impacts	PSU
Operational Impacts	PSU
Population and Housing	
Construction-Related Impacts	LTS
Operational Impacts	LTS
Public Services	
Construction-Related Impacts	LTS
Operational Impacts	LTS
Recreation	
Construction-Related Impacts	LTS
Operational Impacts	PSU
Transportation/Traffic	
Construction-Related Impacts	PSU
Operational Impacts	PSU
Utilities and Service Systems	
Operational Impacts	PSU

B. Significance Determinations and Mitigation

Implementation of the measures in the 2017 Scoping Plan Update was determined to potentially result in cumulatively considerable contributions to significant cumulative impacts in certain resource areas, as discussed below. While suggested mitigation is

provided for each potentially cumulatively considerable impact, the mitigation needs to be implemented by other agencies. Where impacts cannot be feasibly mitigated, the EA recognizes the impact as significant and unavoidable. The Board will need to adopt Findings and a Statement of Overriding Considerations for any significant and unavoidable environmental effects of the project as part of the approval process.

C. Cumulative Impacts by Resource Area

1. Aesthetics

The Scoping Plan EA found that implementation of the recommended actions within the various sectors, which included the recommendation for SB 350, could result in a significant cumulative impact to aesthetic resources from construction and operational activities associated with new or modified facilities or infrastructure. As discussed in the Scoping Plan EA, the exact location of these new facilities or the modification of existing facilities is uncertain. Construction and operation of these facilities (although likely to occur in areas zoned or used for manufacturing or industrial purposes), could conceivably introduce or increase the presence of artificial elements (e.g., heavy-duty equipment, removal of existing vegetation, buildings) in areas of scenic importance, such as visibility from State scenic highways. The visual impact of such development would depend on several variables, including the type and size of facilities, distance and angle of view, visual absorption and placement in the landscape. In addition, facility operation may introduce substantial sources of glare, exhaust plumes, and nighttime glare from lighting for safety and security purposes. Implementation of mitigation measures would not reduce these impacts to a less-than-significant level because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects. Thus, implementation of the recommended actions in the Scoping Plan, which includes SB 350, could result in a significant cumulative aesthetics-related impact.

The proposed project's contribution to this significant impact would be cumulatively considerable, given the conclusion in Chapter 4 that the proposal may itself result in a significant adverse impact on aesthetic resources. Implementation of the identified project-level mitigation could effectively reduce the incremental contribution from the proposed project to a less-than-considerable level, but authority to require that mitigation will rest with other agencies that will be authorizing site-specific projects, and not with CARB. Thus, the proposed project **could result in a cumulatively considerable contribution to a significant cumulative impact** on aesthetic resources.

2. Agricultural and Forest Resources

The Scoping Plan EA found that implementation of the recommended measures within the various sectors, which included the recommendation for SB 350, could result in a significant cumulative impact to agricultural and forest resources. As discussed in the Scoping Plan EA, the exact location of these new facilities or the modification of existing

facilities is uncertain. Construction of new facilities could result in the conversion of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, Williamson Act conservation contracts, or forest land or timberland, resulting in the loss of these resources. Additionally, increased demand for feedstock for fuels could result in indirect land use changes where food-based agriculture could shift to other areas and increase pressure to convert rangeland, grassland, forests, and other uses to agriculture. Because CARB has no land use authority, mitigation is not within its purview to reduce potentially significant impacts to less-than-significant levels. Compliance with existing land use policies, ordinances, and regulations would serve to minimize this impact. Land use impacts would be further addressed for individual projects through the local development review process. Mitigation measures were identified that could reduce these impacts that would be applied through the development review process. However, because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and because of the programmatic nature of this EA, impacts were determined to be potentially significant and unavoidable. Thus, the 2017 Scoping Plan Update, which includes SB 350, could result in a significant cumulative impact to agricultural and forest resources.

The proposed project's contribution to this significant impact would be cumulatively considerable, given the conclusion in Chapter 4 that the proposal may itself result in a significant adverse impact on agricultural and forest resources. Mitigation measures were identified that could reduce these impacts that would be applied through the development review process. However, because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and because of the programmatic nature of this EA, impacts were determined to be potentially significant and unavoidable. Thus, the proposed project **could result in a cumulatively considerable contribution to a significant cumulative impact** on agricultural and forest resources.

3. Air Quality

The Scoping Plan EA found that implementation of the recommended measures within the various sectors, which included the recommendation for SB 350, could result in a significant cumulative impact to short-term construction-related air quality. As discussed in the Scoping Plan EA, reasonably foreseeable compliance responses associated with SB 350 could result in short-term construction-related increases in criteria air pollutants and toxic air contaminants (TACs) in proximity to where fuel production or handling facilities are constructed or modified, as well as generate unpleasant odors that could affect sensitive receptors. These would be generated from using heavy-duty construction equipment on a short-term basis. Therefore, SB 350 could generate emission levels that conflict with applicable air quality plans, violate or contribute substantially to an existing or projected ambient air quality standard violation, result in a cumulatively considerable net increase in non-attainment areas, or expose sensitive receptors to substantial pollutant concentrations or odors. However, all projects, no matter their size or type would be required to seek local or State land use

approvals prior to their implementation. Part of the land use entitlement process in California requires that each of these projects undergo environmental review consistent with California environmental review requirements (e.g., CEQA) and other applicable local requirements (e.g., local air district rules and regulations). This environmental review process would assess whether project implementation would result in short-term construction-related air quality impacts.

CARB identified mitigation measures that could reduce these impacts with the intention that the mitigations be applied through the development review process. However, because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and because of the programmatic nature of this EA, short-term construction-related air quality impacts were determined to be potentially significant and unavoidable. For more detailed discussion on mitigating air quality impacts via project-specific review, see Chapter 4. Thus, the 2017 Scoping Plan Update, which included SB 350, could result in a short-term, construction-related cumulatively considerable impact to air quality.

The proposed project's contribution to this significant impact would be cumulatively considerable, given the conclusion in Chapter 4 that the proposal may itself result in significant adverse short-term construction-related impacts on air quality. Mitigation measures were identified that could reduce these impacts that would be applied through the development review process. However, because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and because of the programmatic nature of this EA, impacts were determined to be potentially significant and unavoidable. Thus, the proposed project **could result in a cumulatively considerable contribution to a significant cumulative short-term construction-related impact** on air quality.

Overall, while some criteria air pollutant emissions and TACs would be associated with operations of the 2017 Scoping Plan Update, which includes SB 350, in the long term the combined measures would result in beneficial operational impacts. Therefore, the 2017 Scoping Plan Update , which includes SB 350, would not have a cumulatively considerable impact on operational air quality.

The proposed project's contribution to this impact would be cumulatively considerable, given the conclusion in Chapter 4 that the proposal may itself result in significant adverse long-term operational-related impacts on air quality. Mitigation measures were identified that could reduce these impacts that would be applied through the development review process. However, because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and because of the programmatic nature of this EA, impacts were determined to be potentially significant and unavoidable. Thus, the proposed project **could result in a cumulatively considerable contribution to a significant cumulative long-term operational-related impact** on air quality.

The Scoping Plan EA found that implementation of the recommended measures within the various sectors, which included the recommendation for SB 350, could encourage the collection of natural gas from dairies, landfills, and wastewater treatment plants. Generally, odor is considered a perceived nuisance and an environmental impact. Factors that would affect odor impacts include the design of collection facilities and exposure duration. In general, odors associated with dairies, landfills, and wastewater treatment plants are part of the existing conditions baseline, and are likely to be reduced using a closed system (e.g., digester facilities). In addition, odor impacts are site-specific, and the gaseous compounds released during operations would be distributed into the atmosphere in a way that would not allow for combined effects.

The proposed project's contribution to this significant impact would not be cumulatively considerable, given the conclusion in Chapter 4 that the proposal would result in a less-than-significant impacts on odor. Thus, implementation of the proposed project **would not result in a cumulatively considerable contribution to a significant cumulative odor impact**.

4. Biological Resources

Implementation of reasonably foreseeable compliance responses associated with recommended measures in the 2017 Scoping Plan Update, which included the recommendation for SB 350, could require construction and operational activities associated with new or modified facilities or infrastructure. The exact location of these new facilities or the modification of existing facilities is uncertain. Construction could require disturbance of undeveloped area, such as clearing of vegetation, earth movement and grading, trenching for utility lines, erection of new buildings, and paving of parking lots, delivery areas, and roadways. These activities would have the potential to adversely affect biological resources (e.g., species, habitat) that may reside or be present in those areas. Because there are biological species that occur, or even thrive, in developed settings, resources could also be adversely affected by construction and operations within disturbed areas at existing manufacturing facilities or at other sites in areas with zoning that would permit the development of manufacturing or industrial uses. In addition, new regulations could affect biological resources depending on the type of crop, location, and need to convert lands, habitat destruction could occur, resulting in the loss of biodiversity. The location of new crop lands may affect conservation plans or disrupt important migratory routes. Indirect effects could occur as well, such as increased pesticide and nutrient use, the runoff of which could be detrimental to individual species.

The biological resources that could be affected by construction and operation associated with implementation of new regulations and/or incentive measures under the 2017 Scoping Plan Update would depend on the specific location of any necessary construction and its environmental setting. Harmful impacts could include modifications to existing habitat; including removal, degradation, and fragmentation of riparian systems, wetlands, or other sensitive natural wildlife habitat and plan communities; interference with wildlife movement or wildlife nursery sites; loss of special-status

species; and/or conflicts with the provisions of adopted habitat conservation plans, natural community conservation plans, or other conservation plans or policies to protect natural resources. Implementation of mitigation measures would not reduce these impacts to a less-than-significant level. Thus, the 2017 Scoping Plan Update, which includes SB 350, could result in a significant cumulative impact on biological resources.

The proposed project's contribution to this significant impact would be cumulatively considerable, given the conclusion in Chapter 4 that the proposal may itself result in a significant adverse impact on biological resources. Implementation of mitigation measures would reduce these environmental effects. However, because the authority to determine activity-level impacts and require activity-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this EA does not attempt to address site-specific details of mitigation, the degree of mitigation that may ultimately by implemented to reduce potentially significant impacts is uncertain.

Consequently, this EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that construction-related and long-term operational impacts on biological resources could be potentially significant and unavoidable. Thus, the proposed project **could result in a cumulatively considerable contribution to a significant cumulative impact** on biological resources.

5. Cultural Resources

Implementation of reasonably foreseeable compliance responses associated with the recommended actions in the 2017 Scoping Plan Update, which included the recommendation for SB 350, could require construction activities associated with new or modified facilities or infrastructure. The exact location of these new facilities or the modification of existing facilities is uncertain. Construction activities could require disturbance of undeveloped area, such as clearing of vegetation, earth movement and grading, trenching for utility lines, erection of new buildings, and paving of parking lots, delivery areas, and roadways. Demolition of existing structures may also occur before the construction of new buildings and structures. The cultural resources that could potentially be affected by ground disturbance activities could include, but are not limited to, prehistoric and historical archaeological sites, paleontological resources, historic buildings, structures, or archaeological sites associated with agriculture and mining, and heritage landscapes. Properties important to Native American communities and other ethnic groups, including tangible properties possessing intangible traditional cultural values, also may exist. Historic buildings and structures may also be adversely affected by demolition-related activities. Such resources may occur individually, in groupings of modest size, or in districts. Because culturally sensitive resources can also be located in developed settings, historic, archeological, and paleontological resources, and places important to Native American communities, could also be adversely affected by construction of new facilities. Implementation of mitigation measures could reduce these impacts, however because the authority to determine specific project-level

impacts and mitigation is outside the purview of CARB, any mitigation identified would not reduce these impacts to a less-than-significant level. Thus, the 2017 Scoping Plan Update, which includes SB 350, could result in a significant cumulative impact on cultural resources.

The proposed project's contribution to this significant impact would be cumulatively considerable, given the conclusion in Chapter 4 that the proposal may itself result in a significant adverse impact on cultural resources. Because the authority to determine project-level impacts and require project-level mitigation lies with the land use approval and/or permitting agency for individual projects, and that the programmatic analysis does not allow project-specific details of mitigation, the degree of mitigation ultimately implemented to reduce the potentially significant impacts is uncertain.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that the short-term construction-related impact on cultural resources. Thus, the proposed project **could result in a cumulatively considerable contribution to a significant cumulative impact** on cultural resources.

6. Energy Conservation

Implementation of reasonably foreseeable compliance responses associated with the recommended actions in the 2017 Scoping Plan Update, which included the recommendation for SB 350, could require construction and operational activities associated with new or modified facilities or infrastructure. Temporary increases in energy demand associated with new facilities would include fuels used during construction, and gas and electric operational demands. Typical earth-moving equipment that may be necessary for construction includes: graders, scrapers, backhoes, jackhammers, front-end loaders, generators, water trucks, and dump trucks. While energy would be required to complete construction for any new or modified facilities or infrastructure projects, it would be temporary and limited in magnitude and would not result in sustained increases in demand that would adversely affect energy supplies. Therefore, the 2017 Scoping Plan Update would not result in a cumulative short-term construction-related impact on energy demand.

The long-term operational energy demand impacts associated with the recommended actions under the 2017 Scoping Plan Update, which includes SB 350, would be primarily beneficial and; thus, the 2017 Scoping Plan Update, which includes SB 350, would not result in a considerable contribution to a cumulative long-term operational impact on energy demand.

Implementation of reasonably foreseeable compliance responses associated with the proposed project could also require construction and operational activities associated with new or modified facilities or infrastructure. While energy would be required to complete construction for any new or modified facilities or infrastructure projects, it

would be temporary and limited in magnitude and would not result in sustained increases in demand that would adversely affect energy supplies. Therefore, the proposed project **would not result in a cumulatively considerable contribution to a cumulative construction-related impact on energy demand**.

The proposed project's contribution to a cumulative long-term operational impact on energy demand would not be cumulatively considerable, given the conclusion in Chapter 4 that the proposed project would result in beneficial impact on energy demand. Therefore, the proposed project **would not result in a cumulatively considerable contribution to a cumulative construction-related impact on energy demand**.

7. Geology and Soils

Implementation of the reasonably foreseeable compliance responses associated with the recommended measures in the 2017 Scoping Plan Update, including 30 to 50 $MMTCO_2e$ electricity sector target range described in the Plan Update, could require construction and operational activities associated with new or modified facilities or infrastructure. The detrimental effects of agricultural practices on soil quality include erosion, desertification, salinization, compaction, and pollution. Loss of topsoil can increase erosion rates and affect water quality, which may be exacerbated through increased use of nutrients and pesticides.

The exact location of these new facilities or the modification of existing facilities is uncertain. Construction and operation could be located in a variety of relatively high-risk geologic and soil conditions that are considered to be potentially hazardous. For instance, the seismic conditions at the site of a new facility may have high to extremely high seismic-related fault rupture and ground shaking potential associated with earthquake activity. New facilities could also be subject to seismic-related ground failure, including liquefaction and landslides. Construction and operational activities could be located in a variety of geologic, soil, and slope conditions with varying amounts of vegetation that would be susceptible to soil erosion. Strong ground shaking could also trigger landslides in areas where the natural slope is naturally unstable or is over-steepened by the construction of access roads and structures. Construction and operation could also occur in locations that would expose facilities and structures to expansive soil conditions. Development of new facilities could be susceptible to the presence of expansive soils particularly in areas of fine-grained sediment accumulation typically associated with playas, valley bottoms, and local low-lying areas.

The specific design details, siting locations, seismic hazards, and geologic, slope, and soil conditions for any particular facilities that could occur as a result of reasonably foreseeable compliance responses are not known at this time and would be analyzed on a site-specific basis at the project level. Therefore, for purposes of this analysis, development of these facilities could expose people and structures to relatively high levels of risk associated with strong seismic ground shaking, including liquefaction and landslides, and instability. These geologic, seismic, and soil-related conditions could

result in damage to structures, related utility lines, and access roads, blocking access and posing safety hazards to people.

Because the authority to determine project-level impacts and require project-level mitigation lies with the land use approval and/or permitting agency for individual projects, and since the programmatic analysis does not allow project-specific details of mitigation, the degree of mitigation ultimately implemented to reduce the potentially significant impacts is uncertain. Thus, the 2017 Scoping Plan Update, which includes SB 350, could result in a significant cumulative impact on geology and soils.

The proposed project's contribution to this significant impact would be cumulatively considerable, given the conclusion in Chapter 4 that the proposed project may itself result in a significant adverse impact on geology and soils. Because the authority to determine project-level impacts and require project-level mitigation lies with the land use approval and/or permitting agency for individual projects, and since the programmatic analysis does not allow project-specific details of mitigation, the degree of mitigation ultimately implemented to reduce the potentially significant impacts is uncertain. Thus, the proposed project **could result in a cumulatively considerable contribution to a significant cumulative impact on geology and soils**.

8. Greenhouse Gases

Implementation of reasonably foreseeable compliance responses associated with the recommended actions in the 2017 Scoping Plan Update, which includes SB 350, could require construction activities associated with new or modified facilities or infrastructure. Specific, project-related construction activities could result in increased generation of short-term GHG emissions in limited amounts associated with the use of heavy-duty off-road equipment, materials transport, and worker commutes. However, a majority of local agencies (e.g., air pollution control districts) do not recommend or require the quantification of short-term construction-generated GHGs for typical construction projects because these only occur for a finite period of time (e.g., during periods of construction) that is typically much shorter than the operational phase, and agencies generally recommended that GHG analyses focus on operational phase emissions, unless the project is of a unique nature requiring atypical (e.g., large scale, long-term) activity levels (e.g., construction of a new dam or levee) for which quantification and consideration (e.g., amortization of construction emissions over the lifetime of the project) may be recommended. Thus, short-term construction related GHG emissions impacts associated with reasonably foreseeable compliance responses for the recommended actions in the 2017 Scoping Plan Update are considered less than significant when considered in comparison to the overall GHG reduction associated with implementation of the 2017 Scoping Plan Update.

The long-term operational impacts to GHG emissions from the recommended actions are primarily beneficial, consistent with the goals and objectives of the 2017 Scoping Plan Update to reduce emissions to achieve 2020 and post-2020 emission reduction goals.

Thus, the 2017 Scoping Plan Update, including SB 350, would not result in a cumulatively considerable contribution to a significant cumulative impact on GHG emissions.

Implementation of reasonably foreseeable compliance responses associated with the proposed project could require construction activities associated with new or modified facilities or infrastructure. Specific, project-related construction activities could result in increased generation of short-term GHG emissions in limited amounts associated with the use of heavy-duty off-road equipment, materials transport, and worker commutes. As described in Chapter 4, a majority of local agencies (e.g., air pollution control districts) do not recommend or require the quantification of short-term construction-generated GHGs for typical construction projects because these only occur for a finite period of time (e.g., during periods of construction) that is typically much shorter than the operational phase, and agencies generally recommended that GHG analyses focus on operational phase emissions, unless the project is of a unique nature requiring atypical (e.g., large scale, long-term) activity levels (e.g., construction of a new dam or levee) for which quantification and consideration (e.g., amortization of construction emissions over the lifetime of the project) may be recommended. Thus, short-term construction related GHG emissions impacts associated with reasonably-foreseeable compliance responses to the proposed project are considered less than significant when considered in comparison to the overall GHG reduction associated with implementation of the proposed project. Thus, the proposed project **would not result in a cumulatively considerable contribution to a significant cumulative impact** on GHG emissions.

9. Hazards and Hazardous Materials

Reasonably foreseeable compliance responses to the recommended measures in the 2017 Scoping Plan Update, which includes SB 350, could include construction and operation of new or modified facilities or infrastructure. The exact locations where construction and operations of new facilities or the modification of existing facilities would occur is uncertain.

Construction activities may require the transport, use, and disposal of hazardous materials. Construction activities generally use heavy-duty equipment requiring periodic refueling and lubricating fluids. Large pieces of construction equipment (e.g., backhoes, graders) are typically fueled and maintained at the construction site as they are not designed for use on public roadways. Thus, such maintenance uses a service vehicle that mobilizes to the location of the construction equipment. It is during the transfer of fuel that the potential for an accidental release is most likely. Although precautions would be taken to ensure that any spilled fuel is properly contained and disposed, and such spills are typically minor and localized to the immediate area of the fueling (or maintenance), the potential remains for a significant release of hazardous materials into the environment. Consequently, construction activities could 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.

The proposed project's contribution to this significant impact would be cumulatively considerable, given the conclusion in Chapter 4 that the proposed project may itself result in a significant adverse impact from hazards and hazardous materials. Implementation of mitigation measures would reduce these environmental effects. However, because the authority to determine activity-level impacts and require activity-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this EA does not attempt to address site-specific details of mitigation, the degree of mitigation that may ultimately by implemented to reduce potentially significant impacts is uncertain.

Consequently, this EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that construction-related and long-term operational impacts from hazards and hazardous materials could be potentially significant and unavoidable. Thus, the proposed project **could result in a cumulatively considerable contribution to a significant cumulative impact** on hazards and hazardous materials.

10. Hydrology and Water Quality

Construction activities and long-term operations associated with reasonably foreseeable compliance responses to the recommended measures in the 2017 Scoping Plan Update, which includes SB 350, could be in a variety of conditions with regards to altering drainage patterns, flooding, and inundation by seiche, tsunami, or mudflow. The level of susceptibility varies by location. In addition, fuels regulation could alter agricultural practices, resulting in discharges to waterways of sediment, nutrients, pathogens, pesticides, metals, and salts. The specific design details, siting locations, and associated hydrology and water quality issues are not known at this time and would be analyzed on a site-specific basis at the project level. Therefore, for purposes of CEQA disclosure, these potential hydrology and water quality-related impacts could be significant. Implementation of mitigation measures to reduce these impacts would not reduce these impacts to a less-than-significant level because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects. Thus, the 2017 Scoping Plan Update, which includes SB 350, could result in a significant cumulative impact to hydrology and water quality.

The proposed project's contribution to this significant impact would be cumulatively considerable, given the conclusion in Chapter 4 that the proposed project may itself result in a significant adverse impact on hydrology and water quality. Implementation of mitigation measures would reduce these environmental effects. However, because the authority to determine activity-level impacts and require activity-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this EA does not attempt to address site-specific details of mitigation, the degree of mitigation that may ultimately by implemented to reduce potentially significant impacts is uncertain.

Consequently, this EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that short-term construction-related impacts to hydrology and water quality could be potentially significant and unavoidable. Thus, the proposed project **could result in a cumulatively considerable contribution to a significant cumulative impact** on hydrology and water quality.

11. Land Use and Planning

Implementation of reasonably foreseeable compliance responses associated with the recommended actions in the 2017 Scoping Plan Update, which includes SB 350, could require both construction and long-term operation of new or modified facilities or infrastructure. The exact location of these new facilities or the modification of existing facilities is uncertain. However, facilities would likely occur within the footprints of existing manufacturing facilities, or in areas with zoning that would permit the development of these facilities. Implementation of the 2017 Scoping Plan Update would also include avoided deforestation through Forest Offset Protocols. Because avoided conversion projects could occur on land planned for other, non-forest uses and, if so, would prevent the planned non-forest use from occurring, avoided conversion projects could conflict with local land use plans. Thus, implementation of the recommended actions could divide an established community or conflict with a land use or conservation plan. Therefore, the 2017 Scoping Plan Update would result in a considerable contribution to a cumulative land use planning-related impact. Thus, implementation of the recommended actions would not be anticipated to divide an established community or conflict with a land use or conservation plan. Therefore, the 2017 Scoping Plan Update, which includes SB 350, would not result in a significant cumulative land use planning-related impact.

The proposed project's contribution to long-term operational-related impacts on land use and planning would be cumulatively considerable, given the conclusion in Chapter 4 that the proposed project may itself result in a significant adverse long-term operational-related impact on land use and planning. Implementation of mitigation measures would reduce these environmental effects. However, because the authority to determine activity-level impacts and require activity-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this EA does not attempt to address site-specific details of mitigation, the degree of mitigation that may ultimately by implemented to reduce potentially significant impacts is uncertain.

Consequently, this EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that long-term operational-related impacts to land use and planning could be potentially significant and unavoidable. Thus, the proposed project **could result in a cumulatively considerable contribution to a significant cumulative impact** on land use and planning.

12. Mineral Resources

Implementation of reasonably foreseeable compliance responses associated with the recommended actions in the 2017 Scoping Plan Update, which includes SB 350, could require both the construction and operation of new or modified facilities or infrastructure. The exact location of these new or modified facilities and infrastructure is uncertain. New facilities and infrastructure would likely occur within existing footprints or in areas with consistent zoning, where original permitting and analyses considered mineral resources issues. Although construction of new facilities and infrastructure could occur in areas outside the footprints of existing facilities, short-term construction impacts would only temporarily affect the availability of known mineral resources of local regional, or state value. Thus, the 2017 Scoping Plan Update would not result in a considerable contribution to a cumulative short-term construction-related impact on mineral resources.

Some of the recommended actions and associated compliance responses could require the extraction of minerals (e.g., lithium or platinum) used to manufacture fuel cell and battery technologies. However, implementation of these measures would not substantially deplete the supply of lithium or platinum and both are currently used in auto manufacturing processes. Therefore, the 2017 Scoping Plan Update, which includes SB 350, would not result in a considerable contribution to a cumulative long-term operational impact on mineral resources.

The proposed project would result in less-than significant effects on availability of mineral resources during construction activities, as described in Chapter 4. Therefore, the proposed project would not result in a cumulatively considerable contribution to a cumulative short-term construction-related impact on mineral resources. Thus, the proposed project **would not result in a cumulatively considerable contribution to a cumulative short-term construction impact** on mineral resources.

The proposed project's contribution to long-term operational-related mineral resources would be cumulatively considerable, given the conclusion in Chapter 4 that the proposed project may itself result in a significant adverse impact on mineral resources. Implementation of mitigation measures would reduce these environmental effects. However, because the authority to determine activity-level impacts and require activity-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this EA does not attempt to address site-specific details of mitigation, the degree of mitigation that may ultimately by implemented to reduce potentially significant impacts is uncertain.

Consequently, this EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that long-term operational-related impacts to mineral resources could be potentially significant and unavoidable. Thus, the proposed project **could result in a cumulatively considerable contribution to a significant cumulative impact** on mineral resources.

13. Noise

Implementation of reasonably foreseeable compliance responses associated with the recommended actions in the 2017 Scoping Plan Update, which includes SB 350, could require construction and operation of new or modified facilities or infrastructure. These activities could result in the generation of short-term construction noise in excess of applicable standards or that result in a substantial increase in ambient levels at nearby sensitive receptors, and exposure to excessive vibration levels, which would be potentially significant. Operational noise impacts would not typically be expected due to the fact that typical compliance response activities would likely occur within footprints of existing facilities, or in areas with zoning that would permit the development of these facilities. However, operational noise related to new facilities, mining operations, and renewable energy projects could emit excessive levels of noise near sensitive receptors. Thus, operational effects of equipment constructed as a result of implementation of recommended actions associated with 2017 Scoping Plan Update could result in potentially significant impacts. Implementation of mitigation measures could reduce potential construction-related or operational noise impacts to a less-than-significant level; however, the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects. Thus, the 2017 Scoping Plan Update, which includes SB 350, could result in significant cumulative construction-related and operational noise impacts.

The proposed project's contribution to this significant impact would be cumulatively considerable, given the conclusion in Chapter 4 that the proposed project may themselves result in a significant adverse impact on noise. Implementation of mitigation measures would reduce these environmental effects. However, because the authority to determine activity-level impacts and require activity-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this EA does not attempt to address site-specific details of mitigation, the degree of mitigation that may ultimately by implemented to reduce potentially significant impacts is uncertain.

Consequently, this EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that construction-related and long-term operational impacts on noise could be potentially significant and unavoidable. Thus, the proposed project **could result in a cumulatively considerable contribution to a significant cumulative impact** on noise.

14. Population and Housing

Implementation of reasonably foreseeable compliance responses associated with the recommended actions in the 2017 Scoping Plan Update, which includes SB 350, could require construction and operation of new or modified facilities or infrastructure. The

exact location of these new facilities or the modification of existing facilities is uncertain. These would likely occur within footprints of existing facilities, or in areas with zoning that would permit the development of such facilities. Construction of these facilities activities would require relatively small crews, and demand for these crews would be temporary (e.g., 6-12 months per project). Therefore, a substantial amount of construction worker migration would not be likely to occur, and a sufficient construction employment base would likely be available. Construction activities would not require new additional housing or generate changes in land use. Therefore, the 2017 Scoping Plan Update, which includes SB 350, would not result in a significant cumulative impact related to population and housing growth.

Implementation of reasonably foreseeable compliance responses associated with the proposed project could require construction and operation of new or modified facilities or infrastructure. The exact location of these new facilities or the modification of existing facilities is uncertain. These would likely occur within footprints of existing facilities, or in areas with zoning that would permit the development of such facilities. Construction of these facilities activities would require relatively small crews, and demand for these crews would be temporary (e.g., 6-12 months per project). Therefore, a substantial amount of construction worker migration would not be likely to occur, and a sufficient construction employment base would likely be available. Construction activities would not require new additional housing or generate changes in land use. The implementation of the proposed project is not expected to lead to job losses or large-scale worker displacement. As cleaner, alternative fuels displace some petroleum-based fuels, jobs may shift from the petroleum industry to other sectors of California's economy, such as agriculture. The shift in consumer dollars from gasoline and diesel toward cleaner, more domestically-produced fuels would spur growth in well-paying jobs in the clean fuels industry.

Therefore, the proposed project **would not result in a cumulatively considerable contribution to a significant cumulative impact** related to population and housing growth.

15. Public Services

Reasonably foreseeable compliance responses associated with the recommended actions in the 2017 Scoping Plan Update, which includes SB 350, could include construction and operation of new or modified facilities or infrastructure. There is uncertainty as to the exact location of these new facilities or the modification of existing facilities is uncertain. These would likely occur within footprints of existing facilities, or in areas with zoning that would permit the development of these facilities. Construction activities would be anticipated to require relatively small crews, and demand for these crews would be temporary (e.g., 6-12 months per project). Therefore, it would be anticipated that the need for a substantial amount of construction worker migration would not occur and that a sufficient construction employment base would likely be available. Construction activities would not require new additional housing to accommodate or generate changes in land use and, therefore, would not affect the

provision of public services. Therefore, the 2017 Scoping Plan Update, which includes SB 350, would not result in a significant cumulative impact related to public services.

Reasonably foreseeable compliance responses associated the proposed project could include construction and operation of new or modified facilities or infrastructure. The exact location of these new facilities or the modification of existing facilities is uncertain. These would likely occur within footprints of existing facilities, or in areas with zoning that would permit the development of these facilities. Construction activities would be anticipated to require relatively small crews, and demand for these crews would be temporary (e.g., 6-12 months per project). Therefore the need for a substantial amount of construction worker migration would not occur and a sufficient construction employment base would likely be available. Construction activities would not require new additional housing to accommodate or generate changes in land use and, therefore, would not affect the provision of public services. Therefore, the proposed project **would not result in a cumulatively considerable contribution to a significant cumulative impact** related to public services.

16. Recreation

Implementation of reasonably foreseeable compliance responses associated with the recommended actions in the 2017 Scoping Plan Update, which includes SB 350, could require construction and operations of new or modified facilities or infrastructure. The exact locations of potential new or modified facilities is uncertain. These activities would likely occur within footprints of existing facilities, or in areas with zoning that would permit their development. In addition, demand for construction of these crews would be temporary (e.g., 6-12 months per project). Therefore, the need for a substantial amount of construction worker migration would not occur and a sufficient construction employment base would likely be available. Thus, construction activities associated with reasonably foreseeable compliance responses would not be anticipated to increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration would occur. In addition, the demand for new (or expansion of) recreational-related facilities would not occur as a result of construction activities. However, new renewable energy projects could be located on recreational land or in close proximity to recreation resources. Therefore, the 2017 Scoping Plan Update, which includes SB 350, would result in a considerable contribution to a cumulative impact related to recreational facilities.

As described in Chapter 4, implementation of reasonably foreseeable compliance responses associated with the proposed project could require construction and operations of new or modified facilities or infrastructure. The exact locations of potential new or modified facilities is uncertain. These activities would likely occur within footprints of existing facilities, or in areas with zoning that would permit their development. In addition, demand for construction of these crews would be temporary (e.g., 6-12 months per project). Therefore, the need for a substantial amount of construction worker migration would not occur and a sufficient construction employment base would likely be available. Thus, construction activities associated with reasonably

foreseeable compliance responses would not be anticipated to increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration would occur. In addition, the demand for new (or expansion of) recreational-related facilities would not occur as a result of construction activities. However, new renewable energy projects could be located on recreational land or in close proximity to recreation resources. Therefore, the proposed project could result in the demand for new (or expansion of) recreational-related facilities as a result of operational activities. Therefore, the proposed project **could result in a cumulatively considerable contribution to a significant cumulative impact** related to recreational facilities.

17. Transportation and Traffic

Implementation of reasonably foreseeable compliance responses associated with the recommended actions in the 2017 Scoping Plan Update, which includes SB 350, could require construction and operations of new or modified facilities or infrastructure. In addition, new fuels standards could result in changes to imports and statewide shipments of feedstock and distribution of fuels. Although detailed information about potential specific construction activities is not currently available, some of the potential compliance responses could result in short-term construction traffic (primarily motorized) from worker commute- and material delivery-related trips. The amount of construction activity would vary depending on the particular type, number, and duration of usage for the varying equipment, and the phase of construction. These variations would affect the amount of project-generated traffic for both worker commute trips and material deliveries. Depending on the amount of trip generation and the location of new facilities, implementation could conflict with applicable programs, plans, ordinances, or policies (e.g., performance standards, congestion management); and/or result in hazardous design features and emergency access issues from road closures, detours, and obstruction of emergency vehicle movement, especially due to project-generated heavy-duty truck trips. As a result, transportation and traffic impacts during construction projects associated with the 2017 Scoping Plan Update, which includes SB 350, would be potentially significant.

Implementation of mitigation measures could reduce short-term construction related impacts to a less-than-significant level, but because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, the impacts are considered potentially significant and unavoidable. Thus, the 2017 Scoping Plan Update could result in a cumulative short-term transportation and traffic-related impact.

Implementation of the reasonably foreseeable compliance responses under the 2017 Scoping Plan Update could also result in impacts associated with long-term operational changes in traffic patterns or vehicle trips, or conflict with existing circulation plans.

The proposed project’s contribution to this significant impact would be cumulatively considerable, given the conclusion in Chapter 4 that the proposed regulations may

themselves result in a significant adverse impact to transportation and traffic. Implementation of mitigation measures would reduce these environmental effects. However, because the authority to determine activity-level impacts and require activity-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this EA does not attempt to address site-specific details of mitigation, the degree of mitigation that may ultimately by implemented to reduce potentially significant impacts is uncertain.

Consequently, this EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that construction-related and long-term operational impacts on transportation and traffic could be potentially significant and unavoidable. Thus, the proposed project **could result in a cumulatively considerable contribution to a significant cumulative impact** on transportation and traffic.

18. Utility Service Systems

Implementation of reasonably foreseeable compliance responses associated with the recommended actions in the 2017 Scoping Plan Update, which includes SB 350, could require construction and operations of new or modified facilities or infrastructure. Newly constructed or modified facilities could generate substantial increases in the demand for water supply, wastewater treatment, storm water drainage, and solid waste services in their local areas. Any new or modified facilities, no matter their size and location would be required to seek local or State land use approvals prior to their development. Part of the land use entitlement process for facilities proposed in California requires that each of these projects undergo environmental review consistent with the requirements of CEQA and the CEQA Guidelines. It is assumed that facilities proposed in other states would be subject to comparable federal, state, and/or local environmental review requirements (e.g., CEQA) and that the environmental review process would assess whether adequate utilities and services (i.e., wastewater services, water supply services, solid waste facilities) would be available and whether the project would result in the need to expand or construct new facilities to serve the project.

The specific location and type of construction needs is not known and would be dependent upon a variety of market factors that are not within the control of CARB including: economic costs, product demands, environmental constraints, and other market constraints. Thus, the specific impacts from construction on utility and service systems cannot be identified with any certainty, and individual compliance responses could potentially result in significant environmental impacts for which it is unknown whether mitigation would be available to reduce the impacts to a less-than-significant level.

Implementation of mitigation measures would not reduce these impacts to a less-than-significant level because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual

projects. Thus, the 2017 Scoping Plan Update, which includes SB 350, could result in a significant cumulative impact with respect to utilities and service systems.

The proposed project's contribution to this significant impact would be cumulatively considerable, given the conclusion in Chapter 4 that the proposed project may itself result in a significant adverse impact to utility service systems. Implementation of mitigation measures would reduce these environmental effects. However, because the authority to determine activity-level impacts and require activity-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this EA does not attempt to address site-specific details of mitigation, the degree of mitigation that may ultimately by implemented to reduce potentially significant impacts is uncertain.

Consequently, this EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that construction-related and long-term operational impacts on utility service systems could be potentially significant and unavoidable. Thus, the proposed project **could result in a cumulatively considerable contribution to a significant cumulative impact** on utility service systems.

D. Growth-Inducing Impacts

As noted above, the proposed project would not directly result in any growth in population or housing. As discussed, effects on the California economy are anticipated to be modest, and would not result in substantial economic growth. Thus, no substantial growth-inducing effects would occur as a result of implementation of the proposed project.

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6.0 MANDATORY FINDINGS OF SIGNIFICANCE

Consistent with the requirements of the California Environmental Quality Act (CEQA) Guidelines section 15065 and section 18 of the Environmental Checklist, this Environmental Analysis (EA) addresses the mandatory findings of significance for the ~~Draft~~ Staff Report: Senate Bill 350 Integrated Resource Planning Electricity Sector Greenhouse Gas Planning Targets (Proposed Targets).

1. Mandatory Findings of Significance

a. Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat for 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?

CEQA requires a finding of significance if a project "has the potential to substantially degrade the quality of the environment." (Cal. Code Regs., tit 14, § 15065, subd. (a).) In practice, this is the same standard as a significant impact on the environment, defined as "a substantial or potentially substantial adverse change in any of the physical conditions within the area affected by the project including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance." (Cal. Code Regs., tit 14, § 15382.)

As with all environmental impacts and issue areas, the precise nature, location and magnitude of impacts would be highly variable, and would depend on a range of reasonably foreseeable compliance responses that could occur with implementation of the Proposed Targets. Location, extent, and a variety of other site-specific factors are not known at this time but would be addressed by environmental reviews to be conducted by local or regional agencies with regulatory authority at the project-specific level.

This Final ~~Draft~~ EA, in its entirety, addresses and discloses potential environmental impacts associated with the proposed project, including direct, indirect, and cumulative impacts in the following resource areas:

Aesthetics
Agriculture and Forest Resources
Air Quality
Biological Resources
Cultural Resources
Energy Demand
Geology and Soils
Hydrology and Water Quality
Land Use and Planning
Mineral Resources
Noise
Population and Housing
Public Services
Recreation

Greenhouse Gases	Transportation/Traffic
Hazards and Hazardous Materials	Utilities and Service Systems

As described in Chapter 4, this Final ~~Draft~~ EA discloses potential environmental impacts, the level of significance prior to mitigation, proposed mitigation measures, and the level of significance after the incorporation of mitigation measures.

i. Impacts on Species

CEQA requires a lead agency to find that a project may have a significant impact on the environment where there is substantial evidence that the project has the potential to (1) substantially reduce the habitat of a fish or wildlife species; (2) cause a fish or wildlife population to drop below self-sustaining levels; or (3) substantially reduce the number or restrict the range of an endangered, rare, or threatened species. (Cal. Code Regs., tit. 14, §15065, subd. (a)(1).) Chapter 4 of this Final ~~Draft~~ EA addresses impacts that could occur to biological resources, including the reduction of fish or wildlife habitat, the reduction of fish or wildlife populations, and the reduction or restriction of the range of special-status species. This Final ~~Draft~~ EA concludes the Proposed Targets could have potentially significant and unavoidable impacts to biological resources, including fish or wildlife species.

ii. Impacts on Historical Resources

CEQA states that a lead agency shall find that a project may have a significant impact on the environment where there is substantial evidence that the project has the potential to eliminate important examples of a major period of California history or prehistory. (Cal. Code Regs., tit. 14, § 15065, subd. (a)(1).) This incorporates the requirement that major periods of California history are preserved for future generations and a finding of significance for substantial adverse changes to historical resources. (Pub. Resources Code §§ 21001, subd. (c), 21084.1.) CEQA establishes standards for determining the significance of impacts to historical resources and archaeological sites that are a historical resource. (Cal. Code Regs., tit. 14, § 15064.5.) Chapter 4 of this Final ~~Draft~~ EA addresses impacts that could occur related to California history and prehistory, historic resources, archaeological resources, and paleontological resources.

b. Does the project have impacts that are individually limited, but cumulatively considerable?

CEQA Guidelines requires a lead agency shall find that a project may have a significant impact on the environment where there is substantial evidence that the project has potential environmental impacts that are individually limited, but cumulatively considerable. (Cal. Code Regs., tit. 14, § 15065.) Cumulatively considerable means "that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects." (Cal. Code Regs., tit. 14, § 15065, subd. (a)(3).) Cumulative impacts are addressed for each of the environmental topics listed above

and are provided in Chapter 5, “Cumulative and Growth-Inducing Impacts,” in this Final ~~Draft~~ EA.

c. Does the project have environmental effects that will cause substantial adverse effects on human beings, either directly or indirectly?

CEQA requires a lead agency to find that a project may have a significant impact on the environment where there is substantial evidence that the project has the potential to cause substantial adverse impacts on human beings, either directly or indirectly (Cal. Code Regs., tit. 14, § 15065, subd. (a)(4)). Under this standard, a change to the physical environment that might otherwise be minor must be treated as significant if people would be significantly affected. This factor relates to adverse changes to the environment of human beings generally, and not to impacts on certain individuals. While changes to the environment that could indirectly affect human beings would be represented by all the designated CEQA issue areas, those that could directly affect human beings include air quality, geology and soils, hazards and hazardous materials, hydrology and water quality, noise, population and housing, public services, transportation/traffic, and utilities, which are addressed in Chapter 4 of this Final ~~Draft~~ EA.

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7.0 ALTERNATIVES ANALYSIS

This section provides an overview of the regulatory requirements and guidance for alternatives analyses under the California Environmental Quality Act (CEQA), a description of each of the alternatives to the ~~Draft~~ Staff Report: Senate Bill 350 Integrated Resource Planning Electricity Sector Greenhouse Gas Planning Targets (Proposed Targets), a discussion of whether and how each alternative meets the project's objectives, and an analysis of each alternative's environmental impacts.

A. Approach to Alternatives Analysis

The California Air Resources Board's (CARB or Board) certified regulatory program (Cal. Code Regs., tit. 17, §§ 60000 – 60008) requires that where a contemplated action may have a significant effect on the environment, a staff report shall be prepared in a manner consistent with the environmental protection purposes of CARB's certified regulatory program and with the goals and policies of CEQA. Among other things, the staff reports must address feasible alternatives to the proposed action that would substantially reduce any significant adverse impact identified.

The certified regulatory program provides general guidance that any action or proposal for which significant adverse environmental impacts have been identified during the review process shall not be approved or adopted as proposed if there are feasible mitigation measures or feasible alternatives available, which would substantially reduce such adverse impact. For purposes of this section, "feasible" means capable of being accomplished in a successful manner within a reasonable period, considering economic, environmental, social, and technological factors, and consistent with the state board's legislatively mandated responsibilities and duties. (Cal. Code Regs., tit. 17, § 60006.)

While CARB, by virtue of its certified regulatory program, is exempt from Chapters 3 and 4 of CEQA and corresponding sections of the State CEQA Guidelines, the Guidelines nevertheless contain useful information for preparation of a thorough and meaningful alternatives analysis. CEQA Guidelines section 15126.6(a) speaks to evaluation of "a range of reasonable alternatives to the project, or the location of the project, which would feasibly attain most of the basic project objectives but would avoid or substantially lessen any of the significant effects, and evaluate the comparative merits of the alternatives." The purpose of the alternatives analysis is to determine whether or not different approaches to or variations of the project would reduce or eliminate significant project impacts, within the basic framework of the objectives, a principle that is consistent with CARB's certified regulatory program requirements. Alternatives considered in an environmental document should be potentially feasible and should attain most of the basic project objectives. It is, therefore, critical that the alternatives analysis define the project's objectives. The range of alternatives is governed by the "rule of reason," which requires evaluation of only those alternatives "necessary to permit a reasoned choice." (Cal. Code Regs., tit. 14, § 15126.6, subd. (f).) Further, an agency "need not consider an alternative whose effect cannot be reasonably

ascertained and whose implementation is remote and speculative." (Cal. Code Regs., tit. 14, § 15126.6, subd. (f)(3).) The analysis should focus on alternatives that are feasible and that take economic, environmental, social, and technological factors into account. Alternatives that are remote or speculative need not be discussed. Furthermore, the alternatives analyzed for a project should focus on reducing or avoiding significant environmental impacts associated with the project as proposed.

B. Selection of Range of Alternatives

This chapter evaluates a reasonable range of alternatives to the Proposed Targets that have the potential to reduce or eliminate the project's significant effects on the environment, while meeting most of the basic project objectives. (Cal. Code Regs., tit. 14, § 15126.6, subd. (a).) Pursuant to CARB's certified regulatory program, this chapter also contains an analysis of each alternative's feasibility and the likelihood that it will substantially reduce any significant adverse environmental impacts identified in the impact analysis contained in Chapter 4 of this Final ~~Draft~~ EA. (Cal. Code Regs., tit. 17, §§ 60005(b), 60006.) Importantly, the overall stringency of the alternatives that can fulfill the project's objectives is driven by the direction given to CARB in SB 350. SB 350 directs CARB to establish GHG emissions reduction targets for the electricity sector and for each POU or LSE that reflect the electricity sector's percentage in achieving economy-wide GHG emissions specified in SB 32, 40 percent below 1990 levels by 2030. The alternatives outlined below vary in their environmental impacts and ability to achieve the project objectives. However, they have been designed to provide the public and decision makers a reasonable range of potential alternatives to consider.

As described earlier, the Proposed Targets rely on the 2017 Scoping Plan Update to establish the electricity sector GHG planning target range. Use of the 2017 Scoping Plan Update to inform the electricity sector GHG planning target range reflects the electricity sector's percentage in achieving economy-wide GHG emissions reductions specified in SB 32. While the 2030 statewide reduction is 40 percent below 1990 levels, the 2030 range for the electricity sector in the 2017 Scoping Plan Update reflects between a 51 to 72 percent reduction from 1990 levels. This range does not include any additional reductions that may occur in response to the steadily escalating carbon price in the Cap-and-Trade Program.

The Proposed Targets utilize the Cap-and-Trade EDU Allowance Allocation Methodology, the 2017 IEPR electricity demand forecast to apportion the GHG planning target range among individual POUs and LSEs, and recent electricity sales to apportion the GHG planning target range among ESPs. This methodology provides a robust and transparent way of associating electricity sector GHG emissions with individual POUs and LSEs for use in the current and future IRP cycles. This approach associates GHG emissions with each entity based on expected GHG emissions and expected electricity demand levels in an equitable manner.

Going forward, Scoping Plan updates will reflect best available knowledge and experience to maintain progress toward achieving the economy-wide 2030 GHG target

for all sectors, including the electricity sector. Future updates to the Scoping Plan can provide a basis for revisions to the electricity sector targets for use in future IRP cycles. Updated data regarding estimated 2030 GHG emissions, electricity demand, and recent electricity sales can be used to apportion revised electricity sector targets among POUs and LSEs.

This Final ~~Draft~~ EA's analysis of the Proposed Targets includes the reasonably foreseeable incorporation of electricity sector, POU, and LSE GHG planning targets in Integrated Resource Plans. Through their IRPs, POUs and LSEs will demonstrate how they will meet the electricity sector's share of the State's 2030 GHG emissions reduction target while considering cost effectiveness, reliability, impacts on disadvantaged communities, as well as statutory mandates such as the doubling of energy efficiency savings and the 50 percent RPS by 2030. The specific actions undertaken by any individual entity to meet GHG planning targets are not known at this time, but the actions will be similar to the electricity sector responses identified in the 2017 Scoping Plan Update. Accordingly, the alternatives considered here represent electricity sector responses identified in the 2017 Scoping Plan Update. The level of detail for each alternative must reflect that the project is a broad plan and, accordingly, the analysis cannot provide the level of detail that will be contained in subsequent environmental review that would be conducted when each of the individual POU and LSE IRPs are implemented (for example, environmental review associated with the development of a new power plant).

A number of GHG reduction measures and policies that are existing or required by statute will be in effect for all alternatives. Table 1 of the 2017 Scoping Plan Update provides a comprehensive summary. Measures and policies that directly or indirectly affect the electricity sector include:

- SB 350 implements a 50 percent RPS and doubling of energy savings;
- Mobile Source Strategy reduces GHGs and other pollutants from the transportation sector through transition to zero-emission vehicles (such as battery-electric and plug-in hybrid electric vehicles); and
- Post-2020 Cap-and-Trade Program reduces GHGs across large GHG emission sources, including fossil-fueled power plants.

CARB has identified a reasonable range of four alternatives that allow the public and Board to understand the differences between different approaches. GHG emission reduction measures ongoing or already implemented as part of the initial Scoping Plan are considered a part of the No-Project Alternative. Since these programs are already underway and reducing emissions at this time, they are reasonably expected to continue. In addition to the No-Project Alternative (Alternative 1), three alternatives are explored: electricity sector targets of 65 $MMTCO_2e$, 30-42 $MMTCO_2e$ Range and 42-53 $MMTCO_2e$ Range. In addition, this section addresses alternatives considered, but dismissed from further consideration due to infeasibility. These are described more fully

below. These alternatives to the project as a whole do not alter the basic nature of the project, while providing sufficient information to allow a comparison with the proposed project.

C. **Project Objectives**

The primary objectives of the Proposed Targets are listed below. These objectives are primarily derived from the requirements of SB 350 and SB 32 (Health & Saf. Code, commencing with § 38500), as well as other governing law, as well from statutory requirements applicable to and for the approval of AB 32 GHG emission reduction measures (Health & Saf. Code, § 38562). The analysis that follows in Section D of this chapter includes a discussion of the degree to which each alternative meets these basic project objectives:

1. Establish technologically feasible and cost-effective electricity sector GHG planning targets that increase the likelihood of achieving economy-wide GHG emissions reductions specified in SB 32 (40 percent below 1990 levels by 2030);
2. Establish POU and LSE GHG planning targets that, together, reflect the electricity sector GHG planning target;
3. Establish a transparent, easily updated methodology for associating electricity sector GHG emissions with individual POU and LSE GHG emissions for use in establishing GHG planning targets for the current and future IRP cycles; and
4. Establish a high-level approach for updating electricity sector and individual POU and LSE GHG planning targets for use in future IRP cycles.

D. **Evaluation of Alternatives**

Descriptions of each alternative are presented below. The analysis that follows the descriptions of the alternatives includes a discussion of the degree to which each alternative meets the basic project objectives, and the degree to which each alternative avoids potentially significant impacts identified in Chapter 4. Table 7-1 also provides a summary comparison of all of the proposed alternatives.

Table 7-1
Comparison of Alternatives to Proposed Targets

Alternative	Electric Sector Target	POU/LSE Apportionment metho
Project (Proposed Targets)	30-53 $MMTCO_2e$	Based on estimated 2030 GHG emissions
Alternative 1 (No Project)	No GHG Planning Targets	No GHG Planning Targets
Alternative 2 (65 $MMTCO_2e$)	65 $MMTCO_2e$ (electric sector 40% below 1990 level)	Based on estimated 2030 GHG emissions
Alternative 3 (30-42 $MMTCO_2e$ Range)	30-42 $MMTCO_2e$ Range	Based on estimated 2030 GHG emissions
Alternative 4 (42-53 MMTCO2e Range)	42-53 MMTCO2e Range	Based on estimated 2030 GHG emissions

1. Alternative 1: No-Project Alternative

a. Alternative 1 Description

CARB is including Alternative 1, the No-Project Alternative, to provide a good faith effort to disclose environmental information that is important for considering the Proposed Targets. CARB's certified regulatory program does not mandate consideration of a "No-Project Alternative." (Cal. Code Regs., tit. 17, § 60006.) Under CARB's certified regulatory program, the alternatives considered, among other things, must be "consistent with the state board's legislatively mandated responsibilities and duties." (Cal. Code Regs., tit. 17, § 60006.)

Moreover, it is not clear that it would be legally feasible for CARB to implement the No-Project Alternative. SB 350 directs CARB, in coordination with the CPUC and the CEC, to establish GHG emissions reduction planning targets for the electricity sector, and for each POU or LSE, while also ensuring that the targets reflect the electricity sector's percentage in achieving economy-wide GHG emissions specified in SB 32 (40 percent below 1990 levels by 2030). Therefore, CARB has a statutory mandate to establish the GHG emissions reduction targets, making it legally infeasible for CARB to not establish these targets.

The No-Project Alternative is included to satisfy CEQA requirements, and to assist in the analysis and consideration of the Proposed Targets and the action alternatives. It is useful to include a "No-Project Alternative" in this analysis for the same reasons that this

type of alternative is called for in the State CEQA Guidelines. As noted in the CEQA Guidelines, "the purpose of describing and analyzing a no-project alternative is to allow decision-makers to compare the impacts of approving the proposed project with the impacts of not approving the proposed project." (Cal. Code Regs., tit. 14, § 15126.6, subd. (e)(1).) The No-Project Alternative also provides an important point of comparison to understand the potential environmental benefits and impacts of the other alternatives.

The No-Project Alternative in this analysis describes a reasonably foreseeable scenario, if CARB did not approve the Proposed Targets. Under the No-Project Alternative, POUs and LSEs would not consider GHG planning targets when developing their initial IRPs or updating future IRPs. Even though measures and policies that exist or are required by statute, such as the SB 350 mandate of 50 percent RPS, would continue to be implemented, the absence of GHG planning targets under the No-Project Alternative is a missed opportunity for IRP filing entities to consider GHG emissions reductions explicitly in their resource planning process as part of comprehensive IRP. These missed opportunities could potentially mean greater reliance on fossil fuel rather than planning for greater energy efficiency and lower carbon emitting resources. In addition, the No-Project alternative could fail to incentivize new low carbon responses and innovative technologies that could be explored by POUs and LSEs, particularly if POUs and LSEs plan to the lower end of the range in the Proposed Targets. Alternative 1 represents the result of actions to achieve other statutorily-mandated requirements, without incorporating the additional GHG-specific reduction targets set by the Proposed Targets.

b. Alternative 1 Discussion

i. Objectives

The No-Project Alternative would not meet any of the project objectives listed in Chapter 2 (and reiterated above). The No-Project Alternative would not establish electricity sector GHG planning targets, diminishing the likelihood of technologically feasible and cost-effective electricity sector GHG planning targets that achieve economy-wide GHG emissions reductions specified in SB 32 (Objective 1). The No-Project Alternative also means that there are no POU and LSE GHG planning targets (Objective 2). Lastly, since GHG planning targets would not be established, this means that neither a methodology for associating the electricity GHG planning target with individual POUs and LSEs, nor an approach for updating the non-existent GHG planning targets for use in future IRP cycles, would be established (Objective 3 and 4).

ii. Environmental Impacts

Alternative 1 would result in potential adverse environmental impacts that are similar to those described in Chapter 4 of the Final ~~Draft~~ EA, but without a level of coordinated resource planning that includes GHG planning targets in the electricity sector and

individual POUs and LSEs. These potential adverse environmental impacts include impacts resulting from short-term construction and long-term operation.

Long-term operational changes related to energy conservation and GHGs could occur. Reduced energy efficiency in buildings and in industrial processes would decrease energy conservation relative to the Proposed Targets. Consumption of fossil fuels would likely increase relative to the Proposed Targets resulting in increased greenhouse gas emissions.

This alternative could also increase the likelihood of localized air pollution increases due to comparatively higher reliance on non-renewable electricity generation and decreased reliance on electricity generated from renewable power plants. However, a substantial amount of new power generation would still be from renewable technologies. At an individual power plant, it is possible for localized air quality impacts to increase or decrease depending on the rest of the portfolio of electricity generation technologies selected by each POU and LSE. The net localized air quality impact of reduced fossil fuel consumption and increased cycling of natural gas plants must be determined on a plant by plant basis in the context of the electricity system portfolio. Alternative 1 would decrease reliance on GHG-free technologies to provide these electricity services relative to the Proposed Targets which may lead to increased localized air pollutant emissions at some individual plant locations that would otherwise be dispatched less frequently if the Proposed Targets were adopted and incorporated into utilities' IRPs.

Due to existing statutory requirements such as 50 percent RPS, this alternative would still involve construction of new electricity generation facilities that do not burn fossil fuels (e.g., wind plants, geothermal plants, photovoltaic (PV) installation), new energy storage facilities (e.g., lithium ion battery) and modifications to buildings to enhance energy efficiency, although to a somewhat lesser degree than would occur if the Proposed Targets are adopted and implemented by POUs and LSEs. Resource areas impacted by short-term construction activities associated with these actions include aesthetics, agricultural resources, air quality, biological resources, cultural resources, energy conservation, geology and soils, greenhouse gases, hazardous materials, hydrology and water quality, land use and planning, mineral resources, noise, population, employment and housing, public services, recreation, transportation/traffic, and utilities and service systems, as described in Chapter 4. These impacts could potentially be lower relative to the Proposed Targets, although certain impacts inherent to power plant construction would continue to be present even if less renewable resources were built, as other new power plant resources would still be needed to meet demand and replace aging power plants.

As explained above, this alternative could potentially result in long-term differences in the state's power generation mix relative to the Proposed Targets. Decreased energy efficiency in buildings and in industrial processes could potentially decrease energy conservation relative to the Proposed Targets. Consumption of fossil fuels could potentially increase relative to the Proposed Targets resulting in increased greenhouse

gas emissions impacts. Use of this target could potentially result in a more GHG-intensive power plant mix compared to the Proposed Targets scenario, which means a comparative increase in both statewide GHG and air pollutant impacts, as well as comparatively increase localized emissions at individual fossil-fueled energy facilities that would otherwise be ramped down if the Proposed Targets were implemented. Relatively greater reliance on non-renewable energy sources could avoid some impacts associated with operating renewable energy resources, depending on the resource, including aesthetics, agricultural resources, biological resources (impacts to avian and other wildlife species), hydrology and water quality, and land use and planning.

2. Alternative 2: 65 MMTCO$_2$e

a. Alternative 2 Description

Alternative 2 establishes the electricity sector GHG planning target at 65 MMTCO$_2$e. This is equivalent to 40 percent below the 1990 levels of electricity sector GHG emissions, which were 108 MMTCO$_2$e in 1990. The metric of 40 percent below 1990 levels by 2030 is established based on the statewide GHG emissions reductions target of 40 percent below 1990 levels by 2030.

The methodology of apportioning the electricity sector GHG planning target among POUs and LSEs would be the same as in the Proposed Targets, based on each entity's percentage of estimated 2030 GHG emissions.

The Alternative 2 target of 65 MMTCO$_2$e in 2030 is higher than both the Proposed Targets range of 30 MMTCO$_2$e to 53 MMTCO$_2$e and the estimated electricity sector GHG emissions in 2030 under business-as-usual conditions (62 MMTCO$_2$e).[27] Planning for an increase in GHG emissions in the electricity sector is in opposition to achieving the SB 32 mandated economy-wide GHG emissions reductions of 40 percent below 1990 levels by 2030.

In addition, the Alternative 2 target equates to less than a 41 percent RPS in 2030, which is below the SB 350 mandate of 50 percent RPS by 2030.[28] As such, the 50 percent RPS makes the 65 MMTCO$_2$e target redundant because the 50 percent RPS implies a target of at least 53 MMTCO$_2$e.[29] In other words, if POUs and LSEs plan for GHG levels derived from the Alternative 2 electricity sector target, they may potentially increase GHG emissions relative to plans they are implementing today. Providing a planning target that does not represent existing policies and measures, such as a 50 percent RPS and doubling of energy efficiency savings, does not promote responses to measures that have already been or are statutorily mandated to be implemented, or

[27] 2017 Scoping Plan Update Reference Scenario

[28] 2017 Scoping Plan Update Reference Scenario estimates achieving a 41 percent RPS by 2030 and the associated GHG emissions for the electricity sector in 2030 to be 62 MMTCO$_2$e.

[29] 2017 Scoping Plan Update PATHWAYS modeling

stimulate new responses from the electricity sector to achieve the economy-wide GHG emissions target.

b. Alternative 2 Discussion

i. Objectives

It is unclear if Alternative 2 would meet the statewide all-sector 2030 GHG emissions reduction target, since the Alternative 2 target of 65 MMTCO2e is higher than the Proposed Targets of 30 MMTCO2e to 53 MMTCO2e (Objectives 1). To achieve the 2030 GHG emissions reduction target with a 65 $MMTCO_2e$ GHG planning target for the electricity sector, other sectors in the economy would need to reduce additional GHG emissions. It is unclear what sector(s) would achieve additional GHG reductions, or if these GHG reductions would be technologically feasible and cost effective. While the Alternative 2 target of 65 MMTCO2e represents a 40 percent reduction for this sector in the context of the 2030 GHG reduction target, this sector must be considered in the context of other climate policies. Load shifting from electrifying the transportation sector, electrifying shipping ports, and additional energy efficiency measures that may shift the residential and commercial sectors from natural gas to electrification are expected to increase electrical load overall. As such, it is important to ensure the increased load does not equate to increased GHG emissions. This concern is reduced as the electricity sector is further decarbonized over the next 15 to 30 years. It is important to ensure the IRP planning target range for the electricity sector remains sufficiently ambitious and consistent with other State mandates, while balancing with other objectives, and protects against GHG emissions increases in the sector – especially in the near-term.

Alternative 2 would meet the objective of establishing POU and LSE GHG planning targets that reflect the electricity sector GHG planning target established in this alternative, since the POU and LSE GHG planning targets would be apportioned using the same methodology as in the Proposed Targets approach (Objective 2 and 3). Likewise, Alternative 2 would meet the objective of establishing an approach for updating GHG planning targets in future IRP cycles, as the approach would be the same as in the Proposed Targets (Objective 4).

ii. Environmental Impacts

Alternative 2 would result in potential adverse environmental impacts that are similar to those described in Chapter 4 of the Final ~~Draft~~ EA. These potential adverse environmental impacts include impacts resulting from short-term construction and long-term operation.

This discussion refers only to the environmental impacts associated with the electricity sector, but it is important to note that activities in other sectors of the economy directed toward achieving the economy-wide 2030 GHG emission target would be greater than that evaluated in association with the Scoping Plan Scenario in the 2017 Scoping Plan

Update and associated with the Proposed Targets. These actions may include components of the 2017 Scoping Plan Update Alternative 1 (No Cap-and-Trade) Scenario. For example, greater reliance on low-carbon fuels could be necessary, which could affect existing undisturbed lands for feedstock cultivation, construction of additional processing facilities, pipelines, and modifications to landfills, dairies, wastewater treatment plants and other renewable gas supplies.

Long-term operational impacts related to energy conservation and GHGs would be affected. Decreased energy efficiency in buildings and in industrial processes would decrease energy conservation relative to the Proposed Targets. Consumption of fossil fuels would likely increase relative to the Proposed Targets resulting in increased greenhouse gas emissions impacts. Use of this target would also be likely to result in a more GHG-intensive power plant mix compared to the Proposed Targets scenario, which means a comparative increase in both statewide GHG and air pollutant impacts, as well as comparatively increase localized emissions at individual fossil-fueled energy facilities that would otherwise be ramped down if the Proposed Targets were implemented.

Due to existing statutory requirements such as 50 percent RPS, this alternative would still involve construction of new electricity generation facilities that do not burn fossil fuels (e.g., wind plants, geothermal plants, PV installation), new energy storage facilities (e.g., lithium ion battery) and modifications to buildings to enhance energy efficiency, although to a somewhat lesser degree than would occur if the Proposed Targets are adopted and implemented by POUs and LSEs. Resource areas impacted by short-term construction activities associated with these actions include aesthetics, agricultural resources, air quality, biological resources, cultural resources, energy conservation, geology and soils, greenhouse gases, hazardous materials, hydrology and water quality, land use and planning, mineral resources, noise, population, employment and housing, public services, recreation, transportation/traffic, and utilities and service systems, as described in Chapter 4. These impacts could potentially be lower relative to the Proposed Targets, although certain impacts inherent to power plant construction would continue to be present even if less renewable resources were built, as other new power plant resources would still be needed to meet demand and replace aging power plants.

As explained above, this alternative would likely result in long-term differences in the state's power generation mix relative to the Proposed Targets. Decreased energy efficiency in buildings and in industrial processes would decrease energy conservation relative to the Proposed Targets. Consumption of fossil fuels would likely increase relative to the Proposed Targets resulting in increased greenhouse gas emissions impacts. Use of this target would also be likely to result in a more GHG-intensive power plant mix compared to the Proposed Targets scenario, which means a comparative increase in both statewide GHG and air pollutant impacts, as well as comparatively increase localized emissions at individual fossil-fueled energy facilities that would otherwise be ramped down if the Proposed Targets were implemented. Relatively

greater reliance on non-renewable energy sources could avoid some impacts associated with operating renewable energy resources, depending on the resource, including aesthetics, agricultural resources, biological resources (impacts to avian and other wildlife species), hydrology and water quality, and land use and planning.

3. Alternative 3: 30 - 42 MMTCO$_2$e Range

a. Alternative 3 Description

Alternative 3 establishes the electricity sector GHG planning target range at 30 to 42 MMTCO$_2$e. This reflects increased action beyond existing statutes or other requirements, such as greater deployment of renewable energy and increased energy efficiency, or potentially new responses and innovative technologies developed by POUs and LSEs.

The methodology of apportioning the electricity sector GHG planning target among POUs and LSEs would be the same as in the Proposed Targets, based on each entity's percentage of estimated 2030 GHG emissions.

Deployment of additional renewable energy beyond the SB 350 mandate of 50 percent RPS is likely feasible from a technological perspective, based on the largest three IOUs' aggregated forecast that they will meet the 50 percent RPS requirement ten years early by 2020.[30] As such, the progress of greater than expected renewable deployment would lend itself to support a lower GHG planning target range for a subset of the POUs and LSEs, but not all. For modeling purposes, CPUC evaluated sector point estimates of 42 MMTCO$_2$e and 30 MMTCO$_2$e. The CPUC modeling results estimated there would be higher costs for the lower end of the range at 30 MMTCO$_2$e.[31] But, CPUC also found for the LSEs, 42 MMTCO$_2$e could be achievable in a cost-effective manner.[32] Again, the electricity sector must be considered within the broader economic sectors (transportation, industry, waste, agriculture, etc.) and there may be other cost-effective opportunities to reduce GHG emissions to help towards achieving the statewide 2030 target. The State is trying to achieve GHG reductions across all sectors with the least cost impact to the economy and households.

Likewise, it is important to recognize that the LSEs and POUs each cover different regions of the state and these regions can vary greatly in terms of climate, population,

[30] CPUC Renewables Portfolio Standard Annual Report, November, 2017. Retrieved from: http://www.cpuc.ca.gov/uploadedFiles/CPUC_Website/Content/Utilities_and_Industries/Energy/Reports_and_White_Papers/Nov%202017%20-%20RPS%20Annual%20Report.pdf

[31] Attachment A: CPUC Energy Division Proposed Reference System Plan from Administrative Law Judge's Ruling Seeking Comment on Proposed Reference System Plan and Related Commission Policy Actions, September 19, 2017, p.65. Retrieved from: http://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M195/K910/195910807.PDF

[32] California Public Utilities Commission Decision (D.) 18-02-018, Finding of Fact 4.

future load growth, and access to transmission.[33] Implications of longer-term changes in climate patterns are also not well understood or predictable at this time, which can have implications for the availability of historical sources of hydrological power, with the need for more fossil power in the near-term,[34] or the need to use energy to convey water over longer distances to support agriculture.[35] Other examples include efforts to address air quality impacts at ports through equipment and engine electrification.[36] This will result in significant electrical load growth relative to other regions. Additionally, some inland regions will experience more population growth than others over the next decade – increasing electrical load.[37] And, during prolonged periods of drought, it may not be possible to compensate for loss of hydro power through wind or solar due to transmission constraints at specific points on the grid. [38] A more ambitious and narrower range as provided in Alternative 3 may not be achievable for all IOUs and LSEs due to cost-effectiveness and other unique regional factors.[39]

Meanwhile, increased energy efficiency beyond the SB 350 mandate of doubling energy efficiency savings in electricity and natural gas end uses is less likely, especially if one considers a more than doubling target only for the electricity sector in isolation.[40] Further, while SB 350 includes a requirement of doubling of energy savings, this must be balanced with cost-effectiveness and it is not clear at this time if there is a cost-effective path to achieve the full doubling of energy savings.

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[33] *See,* City of Pasadena Comments on the March 2, 2018 Joint Agency Workshop on SB 350 Integrated Resource Plans, p. 2: Available at: https://www.arb.ca.gov/lists/com-attach/9-carbsb350irp-ws-AXFWJwNyAw8CZwhn.pdf

[34] https://www.arb.ca.gov/cc/inventory/pubs/reports/2000_2015/ghg_inventory_trends_00-15.pdf

[35] California Natural Resources Agency, and California Department of Food and Agriculture, and California Environmental Protection Agency, California Water Action Plan 2016 Update. Available at: http://resources.ca.gov/docs/california_water_action_plan/Final_California_Water_Action_Plan.pdf

[36] *See*, San Pedro Bay Ports Clean Air Action Plan 2017 Final, November 2017, p. 82. Available at: http://www.cleanairactionplan.org/documents/final-2017-clean-air-action-plan-update.pdf and Los Angeles Department of Water and Power Comments on Senate Bill 350 Integrated Resource Plan Workshop, March 23, 2018, p. 4. Available at: https://www.arb.ca.gov/lispub/comm2/bccomdisp.php?listname=carbsb350irp-ws&comment_num=4&virt_num=4

[37] Public Policy Institute of California, Population. California's Future, January 2018. Available at: http://www.ppic.org/wp-content/uploads/r-118hj2r.pdfhttps://www.arb.ca.gov/lists/com-attach/4-carbsb350irp-ws-BWIVMgBlAydSJAhX.pdf

[38] *See*, California Independent System Operator, 2017-2018 Transmission Plan, March 22, 2018 p.53. Available at: http://www.caiso.com/Documents/BoardApproved-2017-2018_Transmission_Plan.pdf

[39] *See,* Turlock Irrigation District Comments on March 2, 2018 Workshop to Discuss SB 350 Integrated Resource Plans, p.2. Available at: https://www.arb.ca.gov/lists/com-attach/10-carbsb350irp-ws-UWBWaFdmAmIHMwU2.pdf

[40] Energy efficiency savings from electricity only do not achieve a doubling by 2030. However, combined energy efficiency savings from electricity and natural gas end uses approach the doubling target. See CEC Senate Bill 350: Doubling Energy Efficiency Savings by 2030, October, 2017. Retrieved from: http://docketpublic.energy.ca.gov/PublicDocuments/17-IEPR-06/TN221631_20171026T102305_Senate_Bill_350_Doubling_Energy_Efficiency_Savings_by_2030.pdf

b. Alternative 3 Discussion

i.Objectives

While it is likely that Alternative 3 could meet the objective of increasing the likelihood of achieving economy-wide GHG emissions reductions specified in SB 32, it is unclear if Alternative 3 could be achieved cost-effectively since additional costs would be associated with greater renewables, storage, and likely transmission (Objective 1).[41] It is likely that Alternative 3 is technologically feasible for some LSEs and POUs, but not all, assuming technologies such as wind, solar, geothermal, and energy storage are deployed to achieve Alternative 3 (Objective 1), but new electricity system operation criteria would also need to be developed and implemented to maintain system reliability.

Alternative 3 would meet the objective of establishing POU and LSE GHG planning targets that reflect the electricity sector GHG planning target established in this alternative, since the POU and LSE GHG planning targets would be apportioned using the same methodology as in the Proposed Targets approach (Objective 2 and 3). Likewise, Alternative 3 would meet the objective of establishing an approach for updating GHG planning targets in future IRP cycles, as the approach would be the same as in the Proposed Targets (Objective 4).

ii.Environmental Impacts

Alternative 3 would result in potential adverse environmental impacts that are similar to those described in Chapter 4 of the Final ~~Draft~~ EA. These potential adverse environmental impacts include impacts resulting from short-term construction and long-term operation of power plant and energy storage resources.

Short-term construction impacts would be primarily related to new electricity generation facilities that do not burn fossil fuels (e.g., wind plants, geothermal plants, PV installation), new energy storage facilities (e.g., lithium ion battery) and modifications to buildings to enhance energy efficiency. Resource areas impacted by short-term construction activities include aesthetics, agricultural resources, air quality, biological resources, cultural resources, energy conservation, geology and soils, greenhouse gases, hazardous materials, hydrology and water quality, land use and planning, mineral resources, noise, population, employment and housing, public services, recreation, transportation/traffic, and utilities and service systems, as described in Chapter 4. These impacts would be increased relative to the Proposed Targets.

Long-term operational impacts would be primarily associated with increased electricity generation from facilities that do not burn fossil fuels and corresponding reductions in

[41] CPUC Decision 18-02-018 (D.18-02-018). Retrieved from: http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M209/K771/209771632.PDF

operation of facilities that do burn fossil fuels. Increased use of energy storage would also have long-term operational impacts. As discussed in greater detail in Chapter 4 above, renewable electricity generation facilities affect resource areas such as aesthetics, noise, and biological resources. Resource areas such as mineral resources may be impacted by energy storage facilities that rely on lithium ion batteries. These impacts would be increased relative to the Proposed Targets.

Overall, this alternative would further reduce GHG emissions and air pollutants from the power sector compared to the Proposed Targets. However, as with any proposal to modify power generation portfolios, it still has the potential to create localized emissions increases. Electricity generation from wind and solar plants is variable in nature, and other electricity system assets must be utilized to accommodate that variability. For example, natural gas power plants may increase and decrease output, energy storage facilities may charge and discharge power, demand-side resources may be controlled to increase or decrease demand for electricity. Increased cycling of natural gas plants may increase localized air quality impacts while use of energy storage and demand-side resources may reduce those localized air quality impacts. At an individual power plant, it is possible for localized air quality impacts to increase or decrease depending on the rest of the portfolio of electricity generation technologies selected by each POU and LSE. The net localized air quality impact of reduced fossil fuel consumption and increased cycling of natural gas plants must be determined on a plant by plant basis in the context of the electricity system portfolio. Alternative 3 would increase reliance on GHG-free technologies to provide these electricity services relative to the Proposed Targets which may lead to reduced localized air quality impacts at some individual plant locations, while also potentially increasing localized impacts at other plant locations.

4. Alternative 4: 42 - 53 MMTCO2e Range

a. Alternative 4 Description

Alternative 4 establishes the electricity sector GHG planning target range at 42 to 53 $MMTCO_2e$. This reflects increased action beyond existing statutes or other requirements, such as greater deployment of renewable energy and increased energy efficiency, or potentially new responses and innovative technologies developed by POUs and LSEs.

The methodology of apportioning the electricity sector GHG planning target among POUs and LSEs would be the same as in the Proposed Targets, based on each entity's percentage of estimated 2030 GHG emissions.

The high-end of Alternative 4 is indicative of meeting 50 percent RPS by 2030.[42] However, deployment of additional renewable energy beyond the SB 350 mandate of 50 percent RPS is likely feasible from a technological perspective, based on the largest three IOUs' aggregated forecast that they will meet the 50 percent RPS requirement ten years early by 2020.[43]

The low-end of Alternative 4 is based on CPUC modeling results, which indicate that 42 $MMTCO_2e$ could be achievable in a cost-effective manner.[41] However, some POUs and LSEs have adopted and are planning for renewable procurement goals that go beyond SB 350 RPS levels, providing a signal that additional GHG emissions can be reduced beyond what is implied by SB 350.[44] As such, the low-end of Alternative 4 may not provide the flexibility needed to accommodate POUs and LSEs planning for greater GHG reductions.

In addition, the electricity sector must be considered within the broader economic sectors (transportation, industry, waste, agriculture, etc.) and there may be additional cost-effective opportunities in the electricity sector to reduce GHG emissions to help towards achieving the statewide 2030 target. This is particularly relevant as new, lower GHG emitting electric sector technologies mature and their costs decrease. Between 2008 and 2015, costs of major low-carbon technologies affecting the electricity sector have reduced; these include costs reductions in land-based wind (41 percent), distributed photovoltaic (54 percent), utility-scale photovoltaic (64 percent), modeled battery costs (73 percent), and LED bulbs (94 percent).[45] Efforts in California continue to drive down the cost of electricity storage, ranging from incentives for energy storage systems coupled with distributed energy systems, to time-of-use rates and demand response initiatives.[45] As the State tries to achieve GHG reductions across all sectors with the least cost impact to the economy and households, potential decrease in costs in the electric sector may mean that greater GHG emissions reductions are feasible than the low-end of the Alternative 4 range.

b. Alternative 4 Discussion

i.Objectives

While it is likely that Alternative 4 could meet the objective of increasing the likelihood of achieving economy-wide GHG emissions reductions specified in SB 32, it is unclear if

[42] 2017 Scoping Plan Update, Appendix D. Retrieved from: https://www.arb.ca.gov/cc/scopingplan/2030sp_appd_pathways_final.pdf
[43] CPUC Renewables Portfolio Standard Annual Report, November, 2017. Retrieved from: http://www.cpuc.ca.gov/uploadedFiles/CPUC_Website/Content/Utilities_and_Industries/Energy/Reports_and_White_Papers/Nov%202017%20-%20RPS%20Annual%20Report.pdf
[44] *See,* SMUD Comments on the March 2, 2018 Joint Agency Workshop on SB 350 Integrated Resource Plans, p. 2: Available at: https://www.arb.ca.gov/lists/com-attach/5-carbsb350irp-ws-BmoFZgRiBAgANAIy.pdf
[45] CEC Tracking Progress - Energy Storage, November 2017. Retrieved from: http://www.energy.ca.gov/renewables/tracking_progress/documents/energy_storage.pdf

Alternative 4 could be achieved cost-effectively since additional costs would be associated with GHG reductions from other sectors in the economy (Objective 1). It is likely that Alternative 4 is technologically feasible for some LSEs and POUs, but not all, assuming technologies such as wind, solar, geothermal, and energy storage are deployed to achieve Alternative 4 (Objective 1).

Alternative 4 would meet the objective of establishing POU and LSE GHG planning targets that reflect the electricity sector GHG planning target established in this alternative, since the POU and LSE GHG planning targets would be apportioned using the same methodology as in the Proposed Targets approach (Objective 2 and 3). Likewise, Alternative 4 would meet the objective of establishing an approach for updating GHG planning targets in future IRP cycles, as the approach would be the same as in the Proposed Targets (Objective 4).

ii.Environmental Impacts

Alternative 4 would result in potential adverse environmental impacts that are similar to those described in Chapter 4 of the Final ~~Draft~~ EA. These potential adverse environmental impacts include impacts resulting from short-term construction and long-term operation of power plant and energy storage resources.

Due to existing statutory requirements such as 50 percent RPS, this alternative would still involve construction of new electricity generation facilities that do not burn fossil fuels (e.g., wind plants, geothermal plants, PV installation), new energy storage facilities (e.g., lithium ion battery) and modifications to buildings to enhance energy efficiency, although to a somewhat lesser degree than would occur if the Proposed Targets are adopted and implemented by POUs and LSEs. Resource areas impacted by short-term construction activities associated with these actions include aesthetics, agricultural resources, air quality, biological resources, cultural resources, energy conservation, geology and soils, greenhouse gases, hazardous materials, hydrology and water quality, land use and planning, mineral resources, noise, population, employment and housing, public services, recreation, transportation/traffic, and utilities and service systems, as described in Chapter 4. Under this alternative, these impacts would likely be lower relative to the Proposed Targets.

Long-term operational impacts related to energy conservation and GHGs could potentially be affected. Reduced energy efficiency in buildings and in industrial processes could potentially decrease energy conservation relative to the Proposed Targets. Relative greater reliance on non-renewable energy sources could avoid some impacts associated with operating renewable energy resources, depending on the resource, including aesthetics, agricultural resources, biological resources (impacts to avian and other wildlife species), hydrology and water quality, and land use and planning. However, Alternative 4 could also potentially result in a more fossil fuel-intensive power plant mix compared to the Proposed Targets scenario, which means a comparative increase in both statewide GHG and air pollutant impacts at individual

fossil-fueled energy facilities that would otherwise likely be ramped down if the Proposed Targets were implemented.

Overall, this alternative would likely have fewer reductions of GHG emissions and air pollutants from the power sector compared to the Proposed Targets. As with any proposal to modify power generation portfolios, it still has the potential to create localized emissions increases. Electricity generation from wind and solar plants is variable in nature, and other electricity system assets must be utilized to accommodate that variability. For example, natural gas power plants may increase and decrease output, energy storage facilities may charge and discharge power, demand-side resources may be controlled to increase or decrease demand for electricity. Increased cycling of natural gas plants may increase localized air quality impacts while use of energy storage and demand-side resources may reduce those localized air quality impacts. At an individual power plant, it is possible for localized air quality impacts to increase or decrease depending on the rest of the portfolio of electricity generation technologies selected by each POU and LSE. The net localized air quality impact of reduced fossil fuel consumption and increased cycling of natural gas plants must be determined on a plant by plant basis in the context of the electricity system portfolio. Alternative 4 may potentially decrease reliance on GHG-free technologies to provide these electricity services relative to the Proposed Targets, which may lead to fewer reductions of localized air quality impacts at some individual plant locations.

5. Alternative Considered but Eliminated From Detailed Consideration

An additional alternatives was considered during scoping of the Proposed Targets. The CEQA Guidelines Section 15126.6(c) includes three factors that may be used to eliminate alternatives from detailed consideration in an EIR: “i. failure to meet most of the basic project objectives; ii. infeasibility, or iii. inability to avoid significant environmental impact.”

a) Alternative Apportionment Methodology

Alternative methodologies to apportion the electricity sector GHG emission planning target among individual POUs and LSEs were considered. An alternative, such as establishing an equal target for all reporting entities, was dismissed from further consideration as infeasible. Assigning the same GHG planning target range to each filing entity ignores the relative proportion of electricity demand served by each entity and ignores existing assets and plans that lead to projected 2030 GHG emissions. Many entities would have GHG planning target ranges that exceed their expected 2030 GHG emissions, effectively placing these entities in the No-Project Alternative. Other entities would bear a burden to reduce GHG emissions that exceeds that in the Proposed Targets. This inequity may result in IRPs that include drastic, costly GHG reduction actions by some entities while others are exempt from implementing simple, low-cost options.

In addition, the environmental impacts associated with each of the alternatives above are dominated by the electricity sector GHG planning target level. The environmental impacts associated with different apportionment to individual entities were indistinguishable from the impacts associated with the overall electricity sector planning target level. The outcomes regarding precisely how any individual entity will develop a portfolio of electricity supply, storage and demand options is too uncertain.
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ATTACHMENT A: ENVIRONMENTAL AND REGULATORY SETTING

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This chapter contains the environmental and regulatory setting for the U.S. and the State of California. A summary of the environmental setting is provided first, followed by the regulatory setting in the U.S. and the State of California (Tables A2-1 – A2-18).

ENVIRONMENTAL SETTING

A. Aesthetics

1. United States

The U.S., by virtue of their size, setting, and topographic and climatic variation, exhibit tremendous scenic diversity. The varied landscape ranges from coastal to desert and valley to mountain. Innumerable natural features and settings combine to produce scenic resources that are treasured by residents and visitors alike.

2. California

The visual character of California varies greatly related to topography and climate. The foothills form a transitional landform from the valley floor to the higher Sierra Nevada, Cascade, and Coast Ranges. The valley floor is cut by two rivers that flow west out of the Sierra Nevada and east out of the Coast Ranges. Irrigated agriculture land is the primary landscape in the Sacramento and San Joaquin valleys, and the foothill landscape has been altered by grazing, mining, reservoir development, and residential and commercial development. The visual character of the state also varies dramatically from the north, which is dominated by forest lands, and the south, which is primarily residential and commercial development.

B. Agriculture and Forest Resources

1. United States

Forests in the U.S. are very diverse in composition and distribution, including oak-hickory and maple-beech-birch forests, as well as fir, pine, and redwood forests. It is estimated that, at the beginning of European settlement (circa 1630), the area of forest land in the current boundaries of the U.S. was approximately 423 million hectares, or about 46 percent of the total land area. By 1907, the area of forest land had declined to an estimated 307 million hectares or 34 percent of the total land area. Forest area has been relatively stable since 1907. In 1997, 302 million hectares or 33 percent of the total land area of the U.S. was in forest land. As of 2000, forest land area amount to approximately 70 percent of the area that was forested in 1630. Since 1630, approximately 120 million hectares of forest land have been converted to other uses, primarily agriculture (USFS 2000).

U.S. land area amounts to nearly 2.3 billion acres, with nearly 1.2 billion acres in agricultural lands. The proportion of the land base in agricultural uses declined from 63 percent in 1949 to 51 percent in 2007, the latest year for which data are available.

Gradual declines have occurred in cropland and pasture/range, while grazed forestland has decreased more rapidly. In 2007, 408 million acres of agricultural land were in cropland (-17 percent from 1949), 614 million acres were in pasture and range (-3 percent), 127 million acres were in grazed forestland (-52 percent), and 12 million acres were in farmsteads and farm roads (-19 percent) (USDA 2016).

2. California

The State of California maps and classifies farmland through the California Department of Conservation Farmland Mapping and Monitoring Program (FMMP). Classifications are based on a combination of physical and chemical characteristics of the soil and climate that determine the degree of suitability of the land for crop production. The classifications under the FMMP are as follows:

- Prime Farmland—land that has the best combination of features for the production of agricultural crops;
- Farmland of Statewide Importance—land other than Prime Farmland that has a good combination of physical and chemical features for the production of agricultural crops, but that has more limitations than Prime Farmland, such as greater slopes or less ability to store soil moisture;
- Unique Farmland—land of lesser quality soils used for the production of the state's leading agricultural cash crops;
- Farmland of Local Importance—land of importance to the local agricultural economy;
- Grazing Land—existing vegetation that is suitable for grazing;
- Urban and Built-Up Land—land occupied by structures in density of at least one dwelling unit per 1.5 acres;
- Land Committed to Nonagricultural Use—vacant areas; existing land that has a permanent commitment to development but has an existing land use of agricultural or grazing lands; and
- Other Land— land not included in any other mapping category, common examples of which include low-density rural developments, brush, timber, wetland, and vacant and nonagricultural land surrounded on all sides by urban development.

California Environmental Quality Act (CEQA) Section 21095 and CEQA Guidelines Appendix G, together, define Prime, Unique, and Farmland of Statewide Importance as "Important Farmland," whose conversion may be considered significant. Local jurisdictions can further consider other classifications of farmland as important, and can

also utilize an agricultural land evaluation and site assessment (LESA) model to determine farmland importance and impacts from conversion.

As of 2012, California contained approximately 5 million acres of Prime Farmland; approximately 2.6 million acres of Farmland of Statewide Important; approximately 1.3 million acres of Unique Farmland; approximately 3.2 million acres of Farmland of Local Importance; and approximately 19.2 million acres of grazing land (FMMP 2015).

a) Williamson Act

The California Land Conservation Act of 1965--commonly referred to as the Williamson Act--enables local governments to enter into contracts with private landowners for the purpose of restricting specific parcels of land to agricultural or related open space use. In return, landowners receive property tax assessments which are much lower than normal because they are based upon farming and open space uses as opposed to full market value. The Open Space Subvention Act of 1971 provided local governments an annual subvention of forgone property tax revenues from the state through the year 2009; these payments have been suspended in more recent years due to revenue shortfalls.

Of California's 58 counties, 52 have executed contracts under the Land Conservation Act Program. The 15.4 million acres reported as enrolled in Land Conservation Act contracts statewide in 2013, represents approximately 50 percent of California's farmland total of about 30 million acres, or about 31 percent of the State's privately owned land (California Department of Conservation [DOC] 2015).

b) Forestry Resources

Forestland is defined as land that can support 10 percent native tree cover of any species, including hardwoods, under natural conditions, and that allows for management of one or more forest resources, including timber, aesthetics, fish and wildlife, biodiversity, water quality, recreation, and other public benefits (Public Resources Code [PRC] 12220[g]). There are 40,233,000 acres of forested land within California including oak woodlands and conifer forests (California Department of Fish and Wildlife [CDFW] 2014).

Timberland is privately-owned land, or land acquired for state forest purposes, which is devoted to and used for growing and harvesting timber, or for growing and harvesting timber and compatible uses, of, at minimum 15 cubic feet per acre (PRC 51104[g]). Forest managed for harvest is called timberland, and includes 2,932,000 acres in private ownership, 146,000 acres in State ownership, 10,130,000 acres in federal ownership, and 4,551,000 acres of non-industrial timberland in private ownership (CDFW 2014).

C. Air Quality

1. United States

At the federal level, U.S. Environmental Protection Agency (EPA) has oversight of State programs. In addition, U.S. EPA established emission standards for mobile sources

such as ships, trains, and airplanes. The U.S. EPA has set National Ambient Air Quality Standards (NAAQS) for six principal pollutants, which are called criteria air pollutants. Periodically, the standards are reviewed and may be revised. The current standards are listed below in Table A1-1. Units of measure for the standards are parts per million (ppm) by volume, parts per billion (ppb) by volume, and micrograms per cubic meter of air ($\mu g/m^3$).

2. California

The California Air Resources Board (CARB) is California's lead air agency and controls emissions from mobile sources, fuels, and consumer products, as well as air toxics. CARB also coordinates local and regional emission reduction measures and plans that meet federal and State air quality limits. At the federal level, the U.S. EPA has oversight of State programs. In addition, U.S. EPA alone has jurisdiction to establish emission standards for certain mobile sources such as ships, trains, and airplanes.

a) Criteria Air Pollutants

Concentrations of emissions of criteria air pollutants (CAPs) are used to indicate the quality of the ambient air because these are the most prevalent air pollutants known to be deleterious to human health. A brief description of each CAP is provided below. Emission source types and health effects are summarized in Table A1-1.

Table A1-1: Sources and Health Effects of Criteria Air Pollutants

Pollutant	Sources	Acute[1] Health Effects	Chronic[2] Health Effects
Ozone	Secondary pollutant resulting from reaction of reactive organic gases (ROG) and oxides of nitrogen (NO_X) in presence of sunlight. ROG emissions result from incomplete combustion and evaporation of chemical solvents and fuels; NO_X results from the combustion of fuels	Increased respiration and pulmonary resistance; cough, pain, shortness of breath, lung inflammation	Permeability of respiratory epithelia, possibility of permanent lung impairment
Carbon monoxide (CO)	Incomplete combustion of fuels; motor vehicle exhaust	Headache, dizziness, fatigue, nausea, vomiting, death	Permanent heart and brain damage
Nitrogen dioxide (NO_2)	Combustion devices; e.g., boilers, gas turbines, and mobile and stationary reciprocating internal combustion engines	Coughing, difficulty breathing, vomiting, headache, eye irritation, chemical pneumonitis or pulmonary edema; breathing abnormalities,	Chronic bronchitis, decreased lung function

Table A1-1: Sources and Health Effects of Criteria Air Pollutants

Pollutant	Sources	Acute[1] Health Effects	Chronic[2] Health Effects
		cough, cyanosis, chest pain, rapid heartbeat, death	
Sulfur dioxide (SO_2)	Coal and oil combustion, steel mills, refineries, and pulp and paper mills	Irritation of upper respiratory tract, increased asthma symptoms	Insufficient evidence linking SO_2 exposure to chronic health impacts
Respirable particulate matter (PM_{10}) and fine particulate matter ($PM_{2.5}$)	Fugitive dust, soot, smoke, mobile and stationary sources, construction, fires and natural windblown dust, and formation in The atmosphere by condensation and/or transformation of SO_2 and ROG	Breathing and respiratory symptoms, aggravation of existing respiratory and cardiovascular diseases, premature death	Alterations to the immune system, carcinogenesis
Lead	Metal processing	Reproductive/ developmental effects (fetuses and children)	Numerous effects including neurological, endocrine, and cardiovascular effects

[1] Acute refers to effects of short-term exposures to CAPs usually at relatively high concentrations.
[2] Chronic refers to effects of long-term exposures to CAPs, even at relatively low concentrations.
Sources: U.S. EPA 2016

b) Ozone

Ozone is a photochemical oxidant (a substance whose oxygen combines chemically with another substance in the presence of sunlight) and the primary component of smog. Ozone is not directly emitted into the air but is formed through complex chemical reactions between precursor emissions of reactive organic gases (ROG) and oxides of nitrogen (NO_X) in the presence of sunlight. ROG are volatile organic compounds that are photochemically reactive. ROG emissions result primarily from incomplete combustion and the evaporation of chemical solvents and fuels. NO_X are a group of gaseous compounds of nitrogen and oxygen that result from the combustion of fuels.

Anthropogenic emissions of the ozone precursors ROG and NO_X have decreased over the past several years because of more stringent motor vehicle standards and cleaner burning fuels. During the last 20 years the maximum amount of ROG and NO_X over an 8-hour period decreased by 17 percent. However, most counties in California are still in nonattainment for ozone.

c) Nitrogen Dioxide

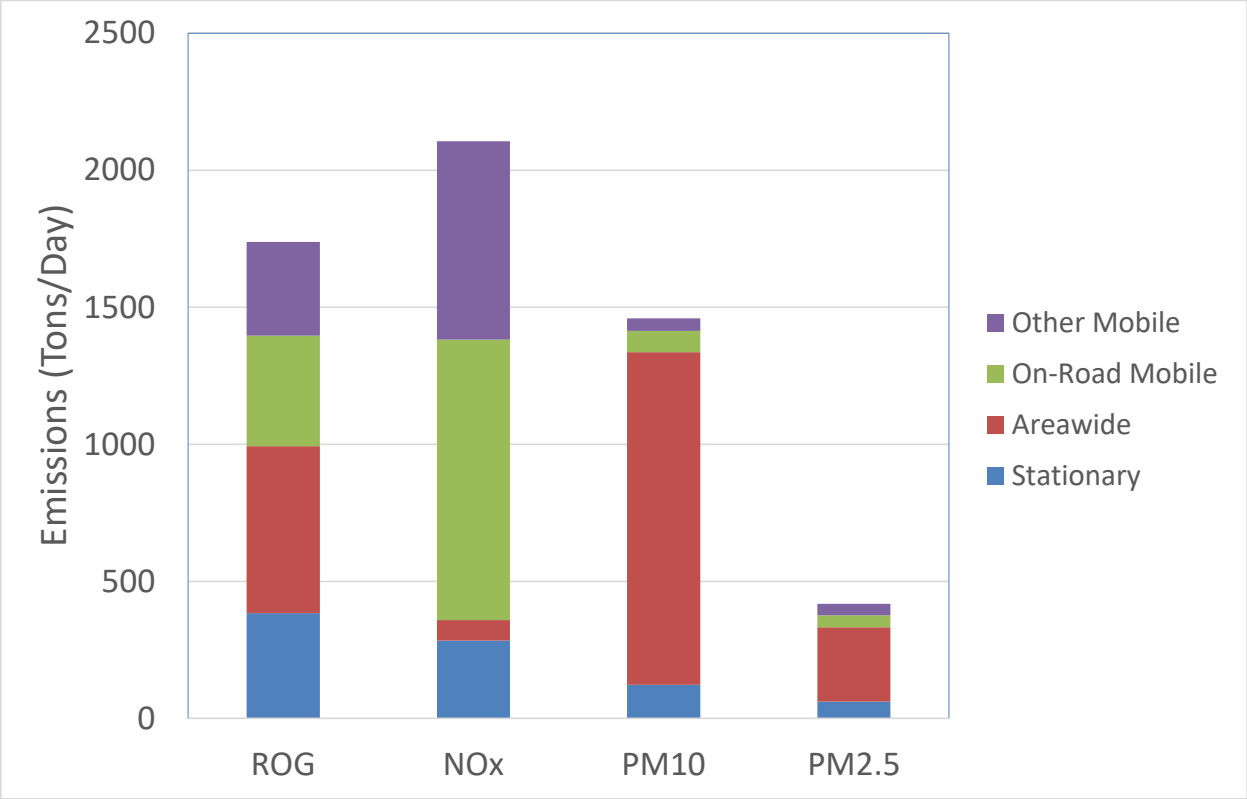
NO_2 is a brownish, highly-reactive gas that is present in all urban environments. The major human-made sources of NO_2 are combustion devices, such as boilers, gas turbines, and mobile and stationary reciprocating internal combustion engines. Combustion devices emit primarily nitric oxide (NO), which reacts through oxidation in the atmosphere to form NO_2. The combined emissions of NO and NO_2 are referred to as NO_X and are reported as equivalent NO_2. Because NO_2 is formed and depleted by reactions associated with photochemical smog (ozone), the NO_2 concentration in a particular geographical area may not be representative of the local sources of NO_X emissions (U.S. EPA 2016).

d) Particulate Matter

Respirable particulate matter with an aerodynamic diameter of 10 micrometers or less is referred to as PM_{10}. PM_{10} consists of particulate matter emitted directly into the air, such as fugitive dust, soot, and smoke from mobile and stationary sources, construction equipment, fires and natural windblown dust, and particulate matter formed in the atmosphere by reaction of gaseous precursors (ARB 2009). $PM_{2.5}$ includes a subgroup of smaller particles that have an aerodynamic diameter of 2.5 micrometers or less. PM_{10} emissions in California are dominated by emissions from area sources, primarily fugitive dust from vehicle travel on unpaved and paved roads, farming operations, construction and demolition, and particles from residential fuel combustion. Direct emissions of PM_{10} have increased slightly in California over the last 20 years, and are projected to continue to increase. $PM_{2.5}$ emissions have remained relatively steady over the last 20 years and are projected to increase slightly through 2020. Emissions of $PM_{2.5}$ are dominated by the same sources as emissions of PM_{10} (ARB 2009).

e) Emission Inventory

Exhibit 1 summarizes emissions of CAPs within California for various source categories. According to California's emission inventory, mobile sources are the largest contributor to the estimated annual average for air pollutant levels of ROG and NO_X accounting for approximately 43 percent and 83 percent, respectively, of the total emissions. Area wide sources account for approximately 83 percent and 65 percent of California's PM_{10} and $PM_{2.5}$ emissions, respectively (ARB 2013).



Source: ARB 2013
Exhibit 1 California 2012 Emission Inventory

f) Toxic Air Contaminants

Concentrations of toxic air contaminants (TACs) are also used to indicate the quality of ambient air. A TAC is defined as an air pollutant that may cause or contribute to an increase in mortality or in serious illness, or that 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 low concentrations.

According to the *California Almanac of Emissions and Air Quality* (ARB 2009), the majority of the estimated health risks from TACs can be attributed to relatively few compounds, the most predominant being particulate-exhaust emissions from diesel-fueled engines (diesel PM). Diesel PM differs from other TACs in that it is not a single substance, but rather a complex mixture of hundreds of substances. Although diesel PM is emitted by diesel-fueled internal combustion engines, the composition of the emissions varies depending on engine type, operating conditions, fuel composition, lubricating oil, and whether an emissions control system is being used. Unlike some TACs, no ambient monitoring data are available for diesel PM because no routine measurement method currently exists. However, CARB has made preliminary concentration estimates based on a PM exposure method. This method uses the CARB emissions inventory's PM_{10} database, ambient PM_{10} monitoring data, and the results from several studies to estimate concentrations of diesel PM. In addition to

diesel PM, the TACs for which data are available that pose the greatest existing ambient risk in California are benzene, 1,3-butadiene, acetaldehyde, carbon tetrachloride, hexavalent chromium, paradichlorobenzene, formaldehyde, methylene chloride, and perchloroethylene.

Diesel PM poses the greatest health risk among these 10 TACs mentioned. Since 1990, the health risk associated with diesel PM has been in California has reduced by 52 percent. Overall, levels of most TACs, except paradichlorobenzene and formaldehyde, have decreased since 1990 (ARB 2009: Chapter 5).

D. Biological Resources

1. United States

The U.S. is comprised of many different biological provinces, or biomes, including tundras, coniferous forests, deciduous forests, rain forests, grasslands, and deserts. Each biome provides a sanctuary to a diverse variety of biological species. The U.S. Fish and Wildlife Service (USFWS) has listed over 400 animal and 700 plant species as endangered, and approximately 360 species as threatened (USFWS 2016).

2. California

The state's geography and topography have created distinct local climates ranging from high rainfall in northwestern mountains to the driest place in North America, Death Valley. North to south, the state extends for almost 800 miles, bridging the temperate rainforests in the Pacific Northwest and the subtropical arid deserts of Mexico. Many parts of the state experience Mediterranean weather patterns, with cool, wet winters and hot, dry summers. Summer rain is indicative of the eastern mountains and deserts, driven by the western margin of the North American monsoon. Along the northern coast abundant precipitation and ocean air produces foggy, moist conditions. High mountains have cooler conditions, with a deep winter snow pack in normal climate years. Desert conditions exist in the rain shadow of the mountain ranges (CDFW 2015).

While the state is largely considered to have a Mediterranean climate, it can be further subdivided into six major climate types: Desert, Marine, Cool Interior, Highland, Steppe, and Mediterranean. California deserts, such as the Mojave, are typified by a wide range of elevation with more rain and snow in the high ranges, and hot, dry conditions in valleys. Cool Interior and Highland climates can be found on the Modoc Plateau, Klamath, Cascade, and Sierra ranges. Variations in slope, elevation, and aspect of valleys and mountains result in a range of microclimates for habitats and wildlife. For example, the San Joaquin Valley, exhibiting a Mediterranean climate, receives sufficient springtime rain to support grassland habitats, while still remaining hot and relatively dry in summer. Steppe climates include arid, shrub-dominated habitats that can be found in the Owens Valley, east of the Sierra Nevada, and San Diego, located in coastal southern California (CDFW 2015).

The marine climate has profound influence over terrestrial climates, particularly near the coast. Additionally, the state is known for variability in precipitation because of the El Niño-Southern Oscillation (ENSO) and the Pacific Decadal Oscillation (PDO). Oscillations are the cyclical shifting of high and low pressure systems, as evidenced by the wave pattern of the jet stream in the northern hemisphere. The ENSO is the cycle of air pressure systems influenced by the location of warm and cold sea temperatures. El Niño events occur when waters are warmer in the eastern Pacific Ocean, typically resulting in greater precipitation in southern California and less precipitation in northern California, and La Niña events occur when waters are colder in the eastern Pacific resulting in drier than normal conditions in southern California and wetter conditions in northern California during late summer and winter. The warmer ocean temperatures associated with El Niño conditions also result in decreased upwelling in the Pacific Ocean (CDFW 2015).

California has the highest numbers of native and endemic plant species of any state, with approximately 6,500 species, subspecies, and varieties of plants, representing 32 percent of all vascular plants in the U.S. Nearly one-third of the state's plant species are endemic, and California has been recognized as one of 34 global hotspots for plant diversity. Within the California Floristic Province, which encompasses the Mediterranean area of Oregon, California, and northwestern Baja, 2,124 of the 3,488 species are endemic, representing a 61 percent rate of endemism. Over 200 species, subspecies, and varieties of native plants are designated as rare, threatened, or endangered by state law, and over 2,000 more plant taxa are considered to be of conservation concern (CDFW 2015).

California has a large number of animal species, representing a substantial proportion of the wildlife species nationwide. The state's diverse natural communities provide a wide variety of habitat conditions for wildlife. The state's wildlife species include approximately 100 reptile species, 75 amphibian species, 650 bird species, and 220 mammal species. Additionally, 48 mammals, 64 birds, 72 amphibians and reptiles, and 20 freshwater fish live in California and nowhere else (CDFW 2015).

California exhibits a wide range of aquatic habitats from the Pacific Ocean to isolated hillside seeps, to desert oases that support both water-dependent species and provide essential seasonal habitat for terrestrial species. Perennial and ephemeral rivers and streams, riparian areas, vernal pools, and coastal wetlands support a diverse array of flora and fauna, including 150 animal and 52 plant species that are designated special-status species. The California Natural Diversity Database identifies 123 different aquatic habitat-types in California, based on fauna. Of these, 78 are stream habitat-types located in seven major drainage systems: Klamath, Sacramento-San Joaquin, North/Central Coast, Lahontan, Death Valley, South Coast, and Colorado River systems. These drainage systems are geologically separated and contain distinctive fishes and invertebrates. California has approximately 70 native resident and anadromous fish species, and 72 percent of the native freshwater fishes in California are either listed, or possible candidates for listing as threatened or endangered, or are extinct (CDFW 2015).

E. Cultural Resources

1. United States

Cultural resources include archaeological sites of prehistoric or historic origin, built or architectural resources older than 50 years, traditional or ethnographic resources, and fossil deposits of paleontological importance. The U.S. has a cultural heritage that dates back to some 25,000-60,000 years ago, when the first known inhabitants of the land that would eventually become the U.S. crossed the Bering land bridge into Alaska.

All areas within the U.S. have the potential for yielding as yet undiscovered archaeological and paleontological resources and undocumented human remains not interred in cemeteries or marked formal burials. These resources have the potential to contribute to our knowledge of the fossil record or local, regional, or national prehistory or history.

Archaeological resources include both prehistoric and historic remains of human activity. Built environment resources include an array of historic buildings, structures, and objects serving as a physical connection to America's past. Traditional or ethnographic cultural resources may include Native American sacred sites and traditional resources of any ethnic community that are important for maintaining the cultural traditions of any group. Paleontological resources, including mineralized, partially mineralized, or unmineralized bones and teeth, soft tissues, shells, wood, leaf impressions, footprints, burrows, and microscopic remains, are more than 5,000 years old and occur mainly in Pleistocene or older sedimentary rock units.

2. California

California was occupied by different prehistoric cultures dating to at least 12,000 to 13,000 years ago. Evidence for the presence of humans during the Paleoindian Period prior to about 8,000 years ago is relatively sparse and scattered throughout the State; most surface finds of fluted Clovis or Folsom projectile points or archaeological sites left by these highly mobile hunter-gatherers are associated with Pleistocene lakeshores, the Channel Islands, or the central and southern California coast (Rondeau et al 2007). Archaeological evidence from two of the Northern Channel Islands located off the coast from Santa Barbara indicates the islands were colonized by Paleoindian peoples at least 12,000 years ago, likely via seaworthy boats (Erlandson et al 2007). By 10,000 years ago, inhabitants of this coastal area were using fishhooks, weaving cordage and basketry, hunting marine mammals and sea birds, and producing ornamental shell beads for exchange with people living in the interior of the State (Erlandson et al 2007). This is the best record of early maritime activity in the Americas, and combined with the fluted points, indicates California was colonized by both land and sea during the Paleoindian period (Jones and Klar 2007).

With climate changes between 10,000 and 7,000 years ago at the end of the Pleistocene and into the early Holocene, Lower Archaic peoples adjusted to the drying

of pluvial lakes, rise in sea level, and substantial alterations in vegetation communities. Approximately 6,000 years ago, vegetation communities similar to those of the present were established in the majority of the state, while the changes in sea level also affected the availability of estuarine resources (Jones and Klar 2007). The archaeological record indicates subsistence patterns during the Lower Archaic and subsequent Middle Archaic Period shifted to an increased emphasis on plant resources, as evidenced by an abundance of milling implements in archaeological sites dating between 8,000 and 3,000 years ago.

Approximately 3,000 years ago, during the Upper Archaic and Late Prehistoric Periods, the complexity of the prehistoric archaeological record reflects increases in specialized adaptations to locally available resources such as acorns and salmon, in permanently occupied settlements, and in the expansion of regional populations and trade networks (Moratto 1984; Jones and Klar 2007). During the Upper Archaic, marine shell beads and obsidian continue to be the hallmark of long-distance trade and exchange networks developed during the preceding period (Hughes and Milliken 2007). Large shell midden/mounds at coastal and inland sites in central and southern California, for example, attest to the regular reuse of these locales over hundreds of years or more from the Upper Archaic into the Late Prehistoric period. In the San Francisco Bay region alone, over 500 shell mounds were documented in the early 1900s (Moratto 1984).

Changes in the technology used to pursue and process resources are some of the hallmarks of the Late Prehistoric period. These include an increase in the prevalence of mortars and pestles, a diversification in types of watercraft and fishhooks, and the earliest record for the bow and arrow in the State that occurs in both the Mojave Desert and northeast California nearly 2,000 years ago (Jones and Klar 2007). The period also witnessed the beginning of ceramic manufacture in the southeast desert region, southwest Great Basin, and parts of the Central Valley.

During the Late Prehistoric period, the development of social stratification and craft specialization accompanied the increase in sedentism, as indicated by the variety of artifacts, including bone tools, coiled and twined basketry, obsidian tools, marine shell beads, personal ornaments, pipes, and rattles, by the use of clamshell disk beads and strings of dentalium shell as a form of currency, and by variation in burial types and associated grave goods (Moratto 1984; Jones and Klar 2007). Pictographs, painted designs that are likely less than 1,000 years old, and other non-portable rock art created during this period likely had a religious or ceremonial function (Gilreath 2007). Osteological evidence points to intergroup conflict and warfare in some regions during this period (Jones and Klar 2007), and there also appears to have been a decline or disruption in the long-distance trade of obsidian and shell beads approximately 1,200 years ago in parts of the State (Hughes and Milliken 2007).

a) Ethnographic Overview

At the time of European contact, California was the home of approximately 310,000 indigenous peoples with a complex of cultures distinguished by linguistic affiliation and

territorial boundaries (Kroeber 1925; Cook 1978; Heizer 1978; Ortiz 1983; d'Azevedo 1986). At least 70 distinct native Californian cultural groups, with even more subgroups, inhabited the vast lands within the State. The groups and subgroups spoke between 74 and 90 languages, plus a large number of dialects (Shipley 1978; University of California at Berkeley 2009-2010).

In general, these mainly sedentary, complex hunter-gatherer groups of indigenous Californians shared similar subsistence practices (hunting, fishing, and collecting plant foods), settlement patterns, technology, material culture, social organization, and religious beliefs (Kroeber 1925; Heizer 1978; Ortiz 1983; d'Azevedo 1986). Permanent villages were situated along the coast, interior waterways, and near lakes and wetlands. Population density among these groups varied, depending mainly on availability and dependability of local resources, with the highest density of people in the northwest coast and Santa Barbara Channel areas and the least in the State's desert region (Cook 1976). Networks of foot trails were used to connect groups to hunting or plant gathering areas, rock quarries, springs or other water sources, villages, ceremonial places, or distant trade networks (Heizer 1978).

The social organization of California's native peoples varied throughout the State, with villages or political units generally organized under a headman who was also the head of a lineage or extended family or achieved the position through wealth (Bean 1978). For some groups, the headman also functioned as the religious ceremonial leader. Influenced by their Northwest Coast neighbors, the differential wealth and power of individuals was the basis of social stratification and prestige between elites and commoners for the Chilula, Hupa, Karok, Tolowa, Wiyot, and Yurok in the northwest corner of the State. Socially complex groups were also located along the southern California coast where differential wealth resulted in hierarchical classes and hereditary village chiefs among the Chumash, Gabrielino, Juaneño, and Luiseño (Bean and Smith 1978; Arnold and Graesch 2004).

At the time of Spanish contact, religious practices among native Californian groups varied, but ethnographers have recognized several major religious systems (Bean and Vane 1978). Many of the groups in the north-central part of the State practiced the *Kuksu* cult, primarily a ceremonial and dance organization, with a powerful shaman as the leader. Log drums, flutes, rattles, and whistles accompanied the elaborate ceremonial dances. The World Renewal cult in the northwestern corner of the State extended as far north as Alaska, entailed a variety of annual rites to prevent natural disasters, maintain natural resources and individual health, and were funded by the wealthy class. The *Toloache* cult was widespread in central and southern California and involved the use of narcotic plant (commonly known as datura or jimsonweed) materials to facilitate the acquisition of power. On the southern coast among Takic-speaking groups, the basis of Gabrielino, Juaneño, and Luiseño religious life was the *Chinigchinich* cult, which appeared to have developed from the Toloache cult. Chinigchinich, the last of a series of heroic mythological figures, gave instruction on laws and institutions, taught people how to dance, and later withdrew into heaven where he rewarded the faithful and punished those who disobeyed his laws. The

Chinigchinich religion seems to have been relatively new when the Spanish arrived, and could have been influenced by Christianity.

Trade and exchange networks were a significant part of the economy and social organization among California's Native American groups (Heizer 1978). Obsidian, steatite, beads, acorns, baskets, animal skins, and dried fish were among the variety of traded commodities. Inland groups supplied obsidian from sources along the Sierra Nevada Mountains, in Napa Valley, and in the northeast corner of the State. Coastal groups supplied marine shell beads, ornaments, and marine mammal skins. In addition to trading specific items, clamshell disk beads made from two clam species available on the Pacific coast were widely used as a form of currency (Kroeber 1922). In northwestern California, groups used strings of dentalium shell as currency.

The effect of Spanish settlement and missionization in California marks the beginning of a devastating disruption of native culture and life ways, with forced population movements, loss of land and territory (including traditional hunting and gathering locales), enslavement, and decline in population numbers from disease, malnutrition, starvation, and violence during the historic period (Castillo 1978). In the 1830s, foreign disease epidemics swept through the densely populated Central Valley, adjacent foothills, and North Coast Ranges decimating indigenous population numbers (Cook 1978). By 1850, with their lands, resources and way of life being overrun by the steady influx of non-native people during the Gold Rush, California's native population was reduced to about 100,000; by 1900, there were only 20,000 or less than seven percent of the pre-contact number. Existing reservations were created in California by the federal government beginning in 1858 but encompass only a fraction of native lands.

In 2004, the Native American population in California was estimated at over 383,000 (OPR 2005). Although acknowledged as non-federally recognized California Native American tribes on the contact list maintained by the Native American Heritage Commission (NAHC), many groups continue to await federal tribal status recognition. As of 2005, there were 109 federally recognized tribes within the state, along with dozens of non-federally recognized tribes. Members of these tribes have specific cultural beliefs and traditions with unique connections to areas of California that are their ancestral homelands.

b) Historic Overview

Post-contact history for the State is generally divided into the Spanish period (1769–1822), Mexican period (1822–1848), and American period (1848–present). The establishment of Fort Ross by Alaska-based Russian traders also influenced post-contact history for a short period (1809–1841) in the region north of San Francisco Bay. Although there were brief visits along the Pacific coast by European explorers (Spanish, Russian, and British) between 1529 and 1769 of the territory claimed by Spain, the expeditions did not journey inland.

i. Spanish Period (1769–1822)

Spain's colonization of California began in 1769 with the overland expeditions from San Diego to San Francisco Bay by Lt. Colonel Gaspar de Portolá, and the establishment of a mission and settlement at San Diego. Between 1769 and 1823, the Spanish and the Franciscan Order established a series of 21 missions paralleling the coast along El Camino Real between San Diego and Sonoma (Rolle 1969). Between 1769 and 1782, Spain built four presidios (San Diego, Monterey, San Francisco, and Santa Barbara) to protect the missions, and by 1871 had established two additional pueblos at Los Angeles and San José.

Under Spanish law, large tracts of land, including cattle ranches and farms, fell under the jurisdiction of the missions. Native Americans were removed from their traditional lands, converted to Christianity, concentrated at the missions, and used as labor on the mission farms and ranches (Castillo 1978). Since the mission friars had civil as well as religious authority over their converts, they held title to lands in trust for indigenous groups. The lands were to be repatriated once the native peoples learned Spanish laws and culture.

ii. Russian Period (1809–1841)

In 1809, Alaska-based Russians started exploring the northern California coast with the goal of hunting otter and seal and feeding their Alaskan colonies. The first Russian settlement was established in 1811–1812 by the Russian–American Fur Company to protect the lucrative marine fur trade and to grow produce for their Alaskan colonies. In 1841, as a result of the decline in local sea otter population and the failure of their agricultural colony, combined with a change in international politics, the Russians withdrew from California (Schuyler 1978).

iii. Mexican Period (1822–1848)

Following independence from Spain in 1822, the economy during the Mexican period depended on the extensive rancho system, carved from the former Franciscan missions and at least 500 land grants awarded in the State's interior to Mexican citizens (Beck and Haase 1974; Staniford 1975). Captain John Sutter, who became a Mexican citizen, received the two largest land grants in the Sacramento Valley. In 1839, Sutter founded the trading and agricultural empire named New Helvetia that was headquartered at Sutter's Fort, near the confluence of the Sacramento and American Rivers in today's City of Sacramento (Hoover et al 2002).

Following adoption of the Secularization Act of 1833, the Mexican government privatized most Franciscan lands, including holdings of their California missions. Although secularization schemes had called for redistribution of lands to Native American neophytes who were responsible for construction of the mission empire, the vast mission lands and livestock holdings were instead redistributed by the Mexican government through several hundred land grants to private, non-indigenous ranchers (Castillo 1978; Hoover et al 2002). Most Native American converts returned to traditional lands that had not yet been colonized or found work with the large cattle ranchos being carved out of the mission lands.

iv. American Period (1848–present)

In 1848, shortly after California became a territory of the U.S. with the signing of the Treaty of Guadalupe Hidalgo ending Mexican rule, gold was discovered on the American River at Sutter's Mill in Coloma. The resulting Gold Rush era influenced the history of the State, the nation, and the world. Thousands of people flocked to the gold fields in the Mother Lode region that stretches along the western foothills of the Sierra Nevada Mountains, and to the areas where gold was also discovered in other parts of the State, such as the Klamath and Trinity River basins (California Department of Transportation [Caltrans] 2008). In 1850, California became the 31st state, largely as a result of the Gold Rush.

c) Paleontological Setting

California's fossil record is exceptionally prolific with abundant specimens representing a diverse range of marine, lacustrine, and terrestrial organisms recovered from Precambrian rocks as old as 1 billion years to as recent as 6,000 year-old Holocene deposits (refer to geologic timescale in Table A1-2). These fossils provide key data for charting the course of the evolution or extinction of a variety of life on the planet, both locally and internationally. Paleontological specimens also provide key evidence for interpreting paleoenvironmental conditions, sequences and timing of sedimentary deposition, and other critical components of the earth's geologic history. Fossils are considered our most significant link to the biological prehistory of the earth (Jefferson 2004).

Table A1-2: Divisions of Geologic Time

Era	Period	Time in Millions of Years Ago (approximately)	Epoch
Cenozoic	Quaternary	< 0.01	Holocene
		2.6	Pleistocene
	Tertiary	5.3	Pliocene
		23	Miocene
		34	Oligocene
		56	Eocene
		65	Paleocene
Mesozoic	Cretaceous	145	
	Jurassic	200	
	Triassic	251	
Paleozoic	Permian	299	
	Carboniferous	359	
	Devonian	416	
	Silurian	444	
	Ordovician	488	

Table A1-2: Divisions of Geologic Time

Era	Period	Time in Millions of Years Ago (approximately)	Epoch
	Cambrian	542	
Precambrian		2,500	
Source: USGS 2010			

Because the majority of the State was underwater until the Tertiary period, marine fossils older than 65 million years are not common and are exposed mainly in the mountains along the border with Nevada and the Klamath Mountains, and Jurassic shales, sandstones, and limestones are exposed along the edges of the Central Valley, portions of the Coast, Transverse, and Peninsular Ranges, and the Mojave and Colorado Deserts. Some of the oldest fossils in the State, extinct marine vertebrates called conodonts, have been identified at Anza-Borrego Desert SP in Ordovician sediments dating to circa 450 million years ago. Limestone outcrops of Pennsylvanian and Permian in the Providence Mountains SRA contain a variety of marine life, including brachiopods, fusulinids, crinoids, that lived some 300 to 250 million years ago.

Fossils from the Jurassic sedimentary layers in San Joaquin, San Luis Obispo, and Stanislaus counties include ammonites, bivalves, echinoderms and marine reptiles, all of which were common in the coastal waters. Gymnosperms (seed-bearing plants) such as cycads, conifers, and ginkgoes are preserved in terrestrial sediments from this period, evidence that the Jurassic climate was warm and moderately wet. In the great Central Valley, marine rocks record the position of the Cretaceous shoreline as the eroded ancestral Sierra Nevada sediments were deposited east of the rising Coast Ranges and became the rock layers of the Sacramento and San Joaquin valleys. These Cretaceous sedimentary deposits have yielded abundant fossilized remains of plants, bivalves, ammonites, and marine reptiles (Paleontology Portal 2003).

Along coastal southern California where steep coastal mountains plunged into the warm Pacific Ocean an abundance of fossil marine invertebrates, such as ammonites, nautilus, tropical snails and sea stars, have been found in today's coastal and near-coastal deposits from the Cretaceous Period. A rare armored dinosaur fossil dated to about 75 million years ago during the Cretaceous was discovered in San Diego County during a highway project. It is the most complete dinosaur skeleton ever found in California (San Diego Natural History Museum 2010). The lack of fossil remains of the majority of earth's large vertebrates, particularly terrestrial, marine, and flying reptiles (dinosaurs, ichthyosaurs, mosasaurs, pleisosaurs, and pterosaurs), as well as many species of terrestrial plants, after the end of the Cretaceous and the start of the Tertiary periods 65 million years ago (the K-T boundary) attests to their abrupt extinction.

F. Energy Demand

1. United States

The major energy sources consumed in the U.S. are petroleum (oil), natural gas, coal, nuclear energy, and renewable energy. The major user sectors of these energy sources are residential and commercial buildings, industry, transportation, and electric power. The pattern of energy use varies widely by sector (United States Energy Information Administration [U.S. EIA] 2016a).

Primary energy includes petroleum, natural gas, coal, nuclear energy, and renewable energy. Electricity is a secondary energy source that is generated using these primary forms of energy. For example, coal is a primary energy source that is burned by electric power plants to generate electricity, which is a secondary source of energy. Primary energy is used in residential and commercial buildings, in transportation, by industry, and by electricity generating facilities. The electric power sector is the largest user of primary energy, followed by the transportation sector. The electric power sector uses primary energy to generate electricity. Nearly all electricity is used in buildings and by industry (U.S. EIA 2016a).

Renewable energy plays an important role in reducing greenhouse gas emissions. When renewable energy sources are used, the demand for fossil fuels is reduced. Unlike fossil fuels, non-biomass renewable sources of energy (hydropower, geothermal, wind, and solar) do not directly emit greenhouse gases. More than half of U.S. renewable energy use is for producing electricity. Biomass (wood and waste) is the second most commonly used renewable energy source. Biomass is used to produce heat and steam for industrial purposes, and it is also used for space heating. Biomass also includes biofuels like ethanol and biodiesel, which are used for transportation (U.S. EIA 2016b).

The production and use of biofuels and non-hydroelectric renewable energy sources doubled from 2000 to 2014, mainly because of state and federal government mandates and incentives for renewable energy. The use of renewable fuels is expected to continue to grow over the next 25 years. The U.S. EIA projects that the U.S. will use nonrenewable fuels to meet most of its energy needs through 2040 (U.S. EIA 2016b).

2. California

Excluding Federal offshore areas, California ranks third in the Nation in crude oil production in 2014. California ranks third in the Nation in conventional hydroelectric generation, second in net electricity generation from other renewable energy resources, and first as a producer of electricity from geothermal energy (in 2012). In 2012, California, left with one remaining nuclear power plant after the San Onofre Nuclear Generating Station was permanently shut down in 2012, ranked fourteenth in net electricity generation from nuclear power plants and eighth in nuclear net summer capacity. Average site electricity consumption in California homes is among the lowest

in the nation (6.9 megawatt hours per year), according to the U.S. EIA's Residential Energy Consumption Survey last conducted in 2009. In 2012, California's per capita energy consumption ranked 49th in the Nation, due in part to its mild climate and energy efficiency programs (U.S. EIA 2016c).

In 2013, California's in-state electricity generation sources consisted of: 44.3 percent natural gas, 18.8 percent renewable sources, 8.8 percent nuclear, 7.8 percent large hydropower, and 7.8 percent from coal. Approximately 63 percent of total electricity generation was from in-state sources, with the remaining electricity coming from out-of-state imports from the Pacific Northwest (12 percent) and the Southwest (21 percent) (California Energy Commission [CEC] 2014a).

In 2012, Californians consumed 274,449 gigawatt hours (GWh) of electricity and 12,897 million therms of natural gas, primarily in the commercial, residential, and industrial sectors. CEC staff forecast of future energy demand shows that electricity consumption will grow by between 0.79 and 1.56 percent per year between 2014 and 2024; and natural gas consumption is expected to reach up to 12,801 million therms by 2024 for an annual average growth rate of up to 0.02 percent (CEC 2014b).

The CEC is the State's primary energy policy and planning agency. Created by the Legislature in 1974, and located in Sacramento, six basic responsibilities guide the CEC as it sets state energy policy: forecasting future energy needs; promoting energy efficiency and conservation by setting the State's appliance and building efficiency standards; supporting public interest energy research that advances energy science and technology through research, development and demonstration programs; developing renewable energy resources and alternative renewable energy technologies for buildings, industry and transportation; licensing thermal power plants 50 megawatts or larger; and planning for and directing state response to energy emergencies.

The CPUC also plays a key role in regulating investor-owned electric, natural gas, telecommunications, water, railroad, rail transit, and passenger transportation companies. The CPUC regulates investor-owned electric and natural gas utilities operating in California, including Pacific Gas and Electric Company, Southern California Edison, San Diego Gas and Electric Company, and Southern California Gas Company.

G. Geology, Seismicity, Soils, and Mineral Resources

1. United States

The U.S. has a diverse, complex and seismically active geology that includes a vast array of landforms. Soils are as diverse as America's geology, and are described and characterized individually and collectively with other soils, and their various compatible uses in soil surveys published by the U.S. Department of Agriculture (USDA). Soils are fundamental and largely non-renewable resources that are the basis for high-level sustained yields of agricultural commodities, forest products, and provide support to the wide variety of ecological communities throughout the State.

The geology of the U.S. is very complex and can be divided into roughly five physiographic provinces: the American cordillera, the Canadian shield, the stable platform, the coastal plain, and the Appalachian orogenic belt. In Alaska, the geology is typical of the cordillera, whereas in Hawaii the major islands consist of Neogene volcanic erupted over a hotspot.

2. California

The state's topography is highly varied and includes 1,340 miles of seacoast, as well as high mountains, inland flat valleys, and deserts. Elevations in California range from 282 feet below sea level in Death Valley to 14,494 feet at the peak of Mount Whitney. The mean elevation of California is approximately 2,900 feet. The climate of California is as highly varied as its topography. Depending on elevation, proximity to the coast, and altitude, climate types include temperate oceanic, highland, sub-arctic, Mediterranean, steppe, and desert (USGS 1995). The average annual precipitation across all California climate types is approximately 23 inches and approximately 75 percent of the state's annual precipitation falls between November and March, primarily in the form of rain, with the exception of high mountain elevations (DWR 2003). Average annual precipitation ranges from more than 100 inches in the mountainous areas within the Smith River in Del Norte County to less than 2 inches in Death Valley, illustrating the extreme differences in precipitation levels within the State (Mount 1995). Overall, northern California is wetter than southern California with the majority of the State's annual precipitation occurring in the northern coastal region.

a) Geology

Plate tectonics and climate have played major roles in forming California's dramatic landscape. California is located on the active western boundary of the North American continental plate in contact with the oceanic Pacific Plate and the Gorda Plate north of the Mendocino Triple Junction. The dynamic interactions between these three plates and California's climate are responsible for the unique topographic characteristics of California, including rugged mountain ranges, long and wide flat valleys, and dramatic coastlines. Tectonics and climate also have a large effect on the occurrence natural environmental hazards, such as earthquakes, landslides, and volcanic formations.

b) Landslides

Landsliding or mass wasting is a common erosional process in California and has played an integral part in shaping the State's landscape. Typically, landslides occur in mountainous regions of the State, but they can also occur in areas of low relief, including coastal bluffs, along river and stream banks, and inland desert areas. Landsliding is the gravity-driven downhill mass movement of soil, rock, or both and can vary considerably in size, style and rate of movement, and type depending on the climate of a region, the steepness of slopes, rock type and soil depth, and moisture regime (Harden 1997).

c) Earthquakes

Earthquakes are a common and unpredictable occurrence in California. The tectonic development of California began millions of years ago by a shift in plate tectonics that converted the passive margin of the North American plate into an active margin of compressional and translational tectonic regimes. This shift in plate tectonics continues to make California one of the most geomorphically diverse, active, and picturesque locations in the U.S. While some areas of California are more prone to earthquakes, such as northern, central, and southern coastal areas of California, all areas of California are prone to the effects of ground shaking due to earthquakes. While scientists have made substantial progress in mapping earthquake faults where earthquakes are likely to occur, and predicting the potential magnitude of an earthquake in any particular region, they have been unable to precisely predict where or when an earthquake will occur and what its magnitude will be.

d) Tsunamis

Coastal communities around the circum Pacific have long been prone to the destructive effects of tsunamis. Tsunamis are a series of long-period, high-magnitude ocean waves that are created when an outside force displaces large volumes of water. Throughout time, major subduction zone earthquakes in both the Northern and Southern Hemispheres have moved the Earth's crust at the ocean bottom sending vast amounts of waters into motion and spreading tsunami waves throughout the Pacific Ocean.

Tsunamis can also occur from subareal and submarine landslides that displace large volumes of water. Subaeral landslide-generated tsunamis can be caused by seismically generated landslides, rock falls, rock avalanches, and eruption or collapse of island or coastal volcanoes. Submarine landslide-generated tsunamis are typically caused by major earthquakes or coastal volcanic activity. In contrast to a seismically generated tsunami, seismic seiches are standing waves that are caused by seismic waves traveling through a closed (lake) or semi-enclosed (bay) body of water. Due to the long-period seismic waves that originate after an earthquake, seiches can be observed several thousand miles away from the origin of the earthquakes. Small bodies of water, including lakes and ponds, are especially vulnerable to seismic seiches.

e) Volcanoes

A volcano is an opening in the Earth's crust through which magma escapes to the surface where it is extruded as lava. Volcanism may be spectacular, involving great fountains of molten rock, or tremendous explosions that are caused by the build-up of gases within the volcano (Ritchie and Gates 2001). Some of the most active volcanic areas in California are located within the Cascade Range - a volcanic chain that is a result of compressional tectonics along the Cascadia subduction zone.

f) Active Faults

A fault is defined as a fracture or zone of closely associated fractures along rocks that on one side have been displaced with respect to those on the other side. Most faults are the result of repeated displacement that may have taken place suddenly or by slow

creep. A fault is distinguished from fractures or shears caused by landsliding or other gravity-induced surficial failures. A fault zone is a zone of related faults that commonly are braided and subparallel, but may be branching and divergent. A fault zone has significant width (with respect to the scale of the fault being considered, portrayed, or investigated), ranging from a few feet to several miles (Bryant and Hart 2007).

In the State of California earthquake faults have been designated as being active through a process that has been described by the 1972 Alquist-Priolo Earthquake Fault Zoning Act. An active fault is defined by the State as one that has "had surface displacement within Holocene time (about the last 11,000 years)." This definition does not, of course, mean that faults lacking evidence for surface displacement within Holocene time are necessarily inactive. A fault may be presumed to be inactive based on satisfactory geologic evidence; however, the evidence necessary to prove inactivity sometimes is difficult to obtain and locally may not exist.

The CGS classifies the regional significance of mineral resources in accordance with the California Surface Mining and Reclamation Act of 1975 and assists in the designation of land containing significant aggregate resources. Mineral Resources Zones (MRZs) have been designated to indicate the significance of mineral deposits. The MRZ categories follow:

> **MRZ-1:** Areas where adequate information indicates that no significant mineral deposits are present or where it is judged that little likelihood exists for their presence.
>
> **MRZ-2:** Areas where adequate information indicates significant mineral deposits are present, or where it is judged that a high likelihood exists for their presence.
>
> **MRZ-3:** Areas containing mineral deposits the significance of which cannot be evaluated from available data.
>
> **MRZ-4:** Areas where available information is inadequate for assignment to any other MRZ.

California ranks as 7th in the U.S. for non-fuel mineral production, accounting for approximately 3.9 percent of the nation's total. In 2011, there were approximately 700 active mineral mines that produced: sand and gravel, boron, Portland cement, crushed stone, gold, masonry cement, clays, gemstones, gypsum, salt, silver, and other minerals (Clinkenbeard and Smith 2013).

H. Greenhouse Gases

1. United States

Climate change is a global problem. GHGs are global pollutants, unlike criteria air pollutants and toxic air contaminants, which are pollutants of regional and local concern. Whereas pollutants with localized air quality effects have relatively short atmospheric

lifetimes (about one day), GHGs have long atmospheric lifetimes (one to several thousand years). GHGs persist in the atmosphere for long enough time periods to be dispersed around the globe. Although the lifetime of any particular GHG molecule is dependent on multiple variables and cannot be determined with any certainty, it is understood that more carbon dioxide (CO_2) is emitted into the atmosphere than is sequestered by ocean uptake, vegetation, and other forms of sequestration. Of the total annual human-caused CO_2 emissions, approximately 55 percent is sequestered through ocean and land uptake every year, averaged over the last 50 years, whereas the remaining 45 percent of human-caused CO_2 emissions remains stored in the atmosphere (Intergovernmental Panel on Climate Change [IPCC] 2013).

The quantity of GHGs in the atmosphere that ultimately result in climate change is not precisely known, but is enormous; no single project alone would measurably contribute to an incremental change in the global average temperature, or to global, local, or micro climates.

a) Attributing Climate Change—The Physical Scientific Basis

Certain gases in the earth's atmosphere, classified as GHGs, play a critical role in determining the earth's surface temperature. Solar radiation enters the earth's atmosphere from space. A portion of the radiation is absorbed by the earth's surface and a smaller portion of this radiation is reflected back toward space. This absorbed radiation is then emitted from the earth as low-frequency infrared radiation. The frequencies at which bodies emit radiation are proportional to temperature. The earth has a much lower temperature than the sun; therefore, the earth emits lower frequency radiation. Most solar radiation passes through GHGs; however, infrared radiation is absorbed by these gases. As a result, radiation that otherwise would have escaped back into space is instead "trapped," resulting in a warming of the atmosphere. This phenomenon, known as the greenhouse effect, is responsible for maintaining a habitable climate on earth.

Prominent GHGs contributing to the greenhouse effect are CO_2, methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). Human-caused emissions of these GHGs in excess of natural ambient concentrations are believed responsible for intensifying the greenhouse effect and leading to a trend of unnatural warming of the earth's climate, known as global climate change or global warming.

According to the Intergovernmental Panel on Climate Change (IPCC, a scientific body established by the World Meteorological Organization (WMO) and by the United Nations Environment Programme (UNEP), available scientific evidence supports the conclusion that most of the increased average global temperatures since the mid-20th century is very likely due to human-induced increases in GHG concentrations. (IPCC 2014).

The current post-industrial warming trend differs alarmingly from past changes in the Earth's climate because GHG emissions are higher and warming is occurring faster

than at any other time on record within the past 650,000 years. Historical long-term as well as decadal and inter-annual fluctuations in the Earth's climate resulted from natural processes such as plate tectonics, the Earth's rotational orbit in space, solar radiation variability, and volcanism. The current trend derives from an added factor: human activities, which have greatly intensified the natural greenhouse effect, causing global warming. GHG emissions from human activities that contribute to climate change include the burning of fossil fuels (such as coal oil and natural gas), cutting down trees (deforestation) and developing land (land-use changes). The burning of fossil fuels emits GHGs into the atmosphere, while deforestation and land-use changes remove trees and other kinds of vegetation that store ("sequester") carbon dioxide. Emissions of GHGs due to human activities have continued to increase over 1970 to 2010, with larger absolute increases between 2000 and 2010. Emissions of CO_2 from fossil fuel combustion and industrial processes contributed about 78 percent of the total GHG emissions increase from 1970 to 2010 (IPCC 2014).

A growing recognition of the wide-ranging impacts of climate change has fueled efforts over the past several years to reduce GHG emissions. In 1997, the Kyoto Protocol set legally binding emissions targets for industrialized countries, and created innovative mechanisms to assist these countries in meeting these targets. The Kyoto Protocol took effect in 2004, after 55 parties to the Convention had ratified it (The UN Climate Change Convention and the Kyoto Protocol). Six major GHGs have been the focus of efforts to reduce emissions and are included in AB 32: CO_2, CH_4, N_2O, HFCs, PFCs and SF_6. They are regulated under the Kyoto Protocol. Nitrogen trifluoride (NF_3) was later added to the list of important GHGs to reduce and codified in California statute.

The "global warming potential" (GWP) metric is used to convert all GHGs into "CO_2-equivalent" (CO_2e) units for a specific time frame. GWPs from the IPCC fourth assessment report over a 100-year warming horizon are used as the national and international standard in GHG inventory development; however, GWPs over a 20-year time horizon are also available and can be more applicable for consideration of short-lived climate pollutants. Each gas's GWP is defined relative to CO_2 for the given time frame. For example, N_2O's 100-yr GWP is 298, meaning a unit mass of N_2O warms the atmosphere 298 times more than a unit mass of CO_2. SF_6 and PFCs have extremely long atmospheric lifetimes, resulting in their essentially irreversible accumulation in the atmosphere once emitted. However, in terms of quantity of emissions, CO_2 dominates world and U.S. GHG emissions.

Because the major GHGs have longer lives, they build up in the atmosphere so that past, present and future emissions ultimately contribute to total atmospheric concentrations. Thus, while reducing emissions of conventional air pollutants decreases their concentrations in the atmosphere in a relatively short time, atmospheric concentrations of the major GHGs can only be gradually reduced over years and decades. More specifically, the rate of emission of CO_2 currently greatly exceeds its rate of removal, and the slow and incomplete removal implies that small to moderate reductions in its emissions would not result in stabilization of CO_2 concentrations, but rather would only reduce the rate of its growth in coming decades. Many of the same

activities that emit conventional air pollutants also emit GHGs (e.g., the burning of fossil fuels to produce electricity, heat or drive engines and the burning of biomass). Some conventional air pollutants also have greenhouse effects; for example, soot/black carbon and tropospheric ozone (see Short-Lived Climate Pollutants below).

GHGs retain heat in the atmosphere, contributing to global warming. The predominant GHGs are CO_2, N_2O, CH_4, SF_6, HFCs, PFCs, and NF_3. GHGs are measured in $MMTCO_2e$ and are calculated based on GWP values. GWP is a scale that normalizes other GHGs based on the heat retention properties of CO_2, which is assigned a value of 1.0. The GWP and atmospheric lifetimes of the GHG subject to the Cap-and-Trade Program are presented below (Table A1-3).

Table A1-3: Atmospheric Lifetimes and GWP of GHGs

GHG	GWP (100 year, SAR)	Atmospheric Lifetime (years)
Carbon Dioxide (CO_2)	1.0	Variable
Nitrous Oxide (N_2O)	310	120
Methane (CH_4)	21	12
Sulfur Hexafluoride (SF_6)	23,900	3,200
Hydrofluorocarbons (HFCs)	Each HFC has its own GWP characteristics, ranging from 140 years (HFC-152a) to 11,700 years (HFC-23).	Most HFCs have atmospheric lifetimes of less than 15 years. The atmospheric lifetime of HFC-152a is about 1-year while the lifetime of HFC-23 is 260 years.
Perfluorocarbons (PFCs)	The two most prolific anthropogenic PFCs are CF_4 (tetrafluoromethane) and C_2F_6 (hexafluoroethane). The GWP of CF_4 is 6,500 and the GWP of C_2F_6 is 9,200.	CF_4 has an atmospheric lifetime of 50,000 years. C_2F_6 has an atmospheric lifetime of 10,000 years.
Nitrogen Trifluoride (NF_3)*	17,200*	740*
*Nitrogen Trifluoride is not included in the UNFCCC SAR.		

b) Attributing Climate Change—Greenhouse Gas Emission Sources

Emissions of GHGs contributing to global climate change are attributable in large part to human activities associated with the transportation, electricity, industrial/manufacturing, utility, residential, commercial and agricultural sectors. In California, the transportation sector is the largest emitter of GHGs, followed by electricity generation. Anthropogenic

emissions of CO_2 are byproducts of fossil fuel combustion. Methane, a potent GHG, is primarily emitted by livestock and landfills with a smaller contribution from fugitive emissions from oil and gas operations and natural gas transmission and distribution. N_2O is also largely attributable to agricultural practices, primarily from nitrogen-based fertilizer and manure application to soils.

Carbon dioxide equivalent is a measurement that uses GWP to account for the fact that different GHGs have different potential to retain infrared radiation in the atmosphere and contribute to the greenhouse effect. The GWP is dependent on the lifetime, or persistence, of the gas molecule in the atmosphere and the specific infrared absorption pattern and strength. For example, the IPCC Fourth Assessment Report 100-yr GWP for methane used in the U.S. EPA and California GHG inventory defines 1 ton of methane as equivalent to 25 tons of CO_2 (IPCC 2013). Therefore, methane is a much more potent GHG than CO_2. Expressing emissions in CO_2e takes the contributions of all GHG emissions to the greenhouse effect and converts them to a single unit equivalent to the effect that would occur if only CO_2 were being emitted.

The California GHG inventory compiles statewide anthropogenic GHG emissions and sinks. It includes estimates for CO_2, methane, N_2O, SF_6, NF_3, HFCs, and PFCs. The current inventory covers years 2000 to 2014 (available at http://www.arb.ca.gov/cc/inventory/data/data.htm).

In 2014, total GHG emissions were 441.5 million metric tons of CO_2 equivalent (($MMTCO_2e$), a decrease of 2.8 $MMTCO_2e$ compared to 2013. This represents an overall decrease of 9.4 percent since peak levels in 2004. During the 2000 to 2014 period, per capita GHG emissions in California have continued to drop from a peak in 2001 of 13.9 tonnes per person to 11.4 tonnes per person in 2014; an 18 percent decrease. Overall trends in the inventory also demonstrate that the carbon intensity of California's economy (the amount of carbon pollution per million dollars of gross domestic product [GDP]) is declining; representing a 28 percent decline since the 2001 peak, while the state's GDP has grown (ARB 2016a).

c) Short-Lived Climate Pollutants

Climate policy and research have mainly concentrated on long-term climate change and controlling the long-lived GHGs. However, there is growing recognition within the scientific community that efforts to address climate change should also focus on actions to reduce climate-warming substances with much shorter atmospheric lifetimes. These non-CO_2 pollutants, known as "short-lived climate pollutants," include methane, short lived fluorinated-gases (primarily HFCs), black carbon, and tropospheric ozone (ARB 2016b).

d) Adaptation to Climate Change

According to the IPCC global average temperature is expected to increase relative to the 1986-2005 period by 0.3–4.8 degrees Celsius (°C) (0.5-8.6 degrees Fahrenheit [°F]) by the end of the 21st century (2081-2100), depending on future GHG emission scenarios (IPCC 2014). According to the California Natural Resources Agency, temperatures in

California are projected to increase 2.7°F above 2000 averages by 2050 and, depending on emission levels, 4.1–8.6°F by 2100 (California Natural Resources Agency [CNRA] 2012). Resource areas other than air quality and global average temperature could be indirectly affected by the accumulation of GHG emissions. For example, an increase in the global average temperature is expected to result in a decreased volume of precipitation falling as snow in California and an overall reduction in snowpack in the Sierra Nevada. Snowpack in the Sierra Nevada provides both water supply (runoff) and storage (within the snowpack before melting), which is a major source of supply for the state. Based upon historical data and modeling, the California Department of Water Resources (DWR) projects that the Sierra snowpack will decrease by 25 to 40 percent from its historic average by 2050 (DWR 2008). An increase in precipitation falling as rain rather than snow also could lead to increased potential for floods because water that would normally be held in the Sierra Nevada until spring could flow into the Central Valley concurrently with winter storm events (CNRA 2012). This scenario would place more pressure on California's levee/flood control system.

Throughout the past century precipitation (i.e., rain and snow) has followed the expected pattern of a largely Mediterranean climate with wet winters and dry summers, and considerable variability from year to year. No consistent trend in the overall amount of precipitation has been detected, except that a larger proportion of total precipitation is falling as rain instead of snow. In addition, during the last 35 years, the Sierra Nevada range has witnessed both the wettest and the driest years on record of more than 100 years. While intermittent droughts have been a common feature of the State's climate, evidence from tree rings and other indicators reveal that over the past 1,500 years, California has experienced dry spells that persisted for several years or even decades (CEC 2012).

Another outcome of global climate change is sea level rise. Sea level rose approximately seven inches during the last century and, assuming that sea-level changes along the California coast continue to reflect global trends, sea level along the state's coastline in 2050 could be 10-18 inches higher than in 2000, and 31-55 inches higher by the end of this century (CNRA 2012).

As the existing climate throughout California changes over time, the ranges of various plant and wildlife species could shift or be reduced, depending on the favored temperature and moisture regimes of each species. In the worst cases, some species would become extinct or be extirpated from the state if suitable conditions are no longer available (CNRA 2012).

Changes in precipitation patterns and increased temperatures are expected to alter the distribution and character of natural vegetation and associated moisture content of plants and soils. An increase in frequency of extreme heat events and drought are also expected. These changes are expected to lead to increased frequency and intensity of large wildfires (CNRA 2012).

The effects of global climate change could lead to a variety of secondary effects to public health, water supply, energy supply, sea level, wildfire risks, and ecosystems. Recent data, climate projections, topographic, demographic, and land use information have led to the findings that:

- The state's electricity system is more vulnerable than was previously understood.
- The Sacramento-San Joaquin Delta is sinking, putting levees at growing risk.
- Wind and waves, in addition to faster rising seas, will worsen coastal flooding.
- Animals and plants need connected "migration corridors" to allow them to move to more suitable habitats to avoid serious impacts.
- Native freshwater fish are particularly threatened by climate change.
- Minority and low-income communities face the greatest risks from climate change.
- There are effective ways to prepare for and manage climate change risks, but local governments face many barriers to adapting to climate change; these can be addressed so that California can continue to prosper.

At the same time, the State has recognized the need to adapt to climate change impacts that can no longer be avoided. In 2014, the CNRA released the Safeguarding California Plan, which serves as an update to the 2009 California Climate Adaptation Strategy. The many adaptation planning efforts underway in virtually every State agency, in numerous regions and local communities, as well as in private businesses suggest that CEOs, elected officials, planners, and resource managers understand the reality that California and the world is facing.

In fact, the latest climate science makes clear that State, national and global efforts to mitigate climate change must be accelerated to limit global warming to levels that do not endanger basic life-support systems and human well-being. Success in mitigation will keep climate change within the bounds that allow ecosystems and society to adapt without major disruptions. Further advances in integrated climate change science can inform California's and the world's climate choices and help ensure a resilient future (CEC 2012).

2. California

Like its topography, California's climate is varied and tends toward extremes. Generally, there are two seasons in California: 1) a long, dry summer, with low humidity

and cool evenings and 2) a mild, rainy winter, except in the high mountains, where four seasons prevail and snow lasts from November to April. The one climatic constant for the state is summer drought.

California has four main climatic regions. Mild summers and winters prevail in central coastal areas, where temperatures are more equable than virtually anywhere else in the U.S. For example, differences between average summer and winter temperatures between San Francisco and Monterey for example are seldom more than 10°F (6°C). During the summer there are heavy fogs in San Francisco and all along the coast. Mountainous regions are characterized by milder summers and colder winters, with markedly low temperatures at high elevations. The Central Valley has hot summers and cool winters, while the Imperial Valley and eastern deserts are marked by very hot, dry summers, with temperatures frequently exceeding 100°F (38°C).

Average annual temperatures for the state range from 47°F (8°C) in the Sierra Nevada to 73°F (23°C) in the Imperial Valley. The highest temperature ever recorded in the U.S. was 134°F (57°C), registered in Death Valley on 10 July 1913. Death Valley has the hottest average summer temperature in the Western Hemisphere, at 98°F (37°C). The state's lowest temperature was -45°F (-43°C), recorded on 20 January 1937 at Boca, near the Nevada border.

Among the major population centers, Los Angeles has an average annual temperature of 63°F (17°C), with an average January minimum of 48°F (9°C) and an average July maximum of 75°F (24°C). San Francisco has an annual average of 57°F (14°C), with a January average minimum of 42°F (6°C) and a July average maximum of 72°F (22°C). The annual average in San Diego is 64°F (18°C), the January average minimum 49°F (9°C), and the July average maximum 76°F (24°C). Sacramento's annual average temperature is 61°F (16°C), with January minimums averaging 38°F (3°C) and July maximums of 93°F (34°C).

Annual precipitation varies from only 2 in (5 cm) in the Imperial Valley to 68 in (173 cm) at Blue Canyon, near Lake Tahoe. San Francisco had an average annual precipitation (1971–2000) of 20 in (51 cm), Sacramento 17.9 in (45.5 cm), Los Angeles 13.2 in (33.5 cm), and San Diego 10.8 in (27.4 cm). The largest one-month snowfall ever recorded in the U.S., 390 in (991 cm), fell in Alpine County in January 1911. Snow averages between 300 and 400 in (760 to 1,020 cm) annually in the high elevations of the Sierra Nevada, but is rare in the Central Valley and coastal lowlands.

Sacramento has the greatest percentage (73 percent) of possible annual sunshine among the State's largest cities; Los Angeles has 72 percent and San Francisco 71 percent. San Francisco is the windiest, with an average annual wind speed of 11 mph (18 km/hr). Tropical rainstorms occur often in California during the winter.

I. Hazards and Hazardous Materials

1. United States

Hazardous materials are substances with physical properties that could pose a substantial present or future hazard to human health or the environment when improperly handled, disposed, or otherwise managed. Hazardous materials are grouped into 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 cannot be safely disposed in the trash or poured down sinks and storm drains. This includes items, such as fuels, industrial solvents and chemicals, process water, and spent materials (e.g., foams).

2. California

California Health and Safety Code (Section 25501) defines “hazardous materials” as any material that, because of its quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment. Hazardous materials are grouped into four categories based on their characteristics: 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 a waste that meets the criteria for identification of a hazardous waste in state law. This may include items, such as spent fuels, industrial solvents and chemicals, process water, and other spent materials (i.e., some types of batteries and fuel cells). California’s hazardous waste regulations provides the following criteria to determine whether or not a waste is hazardous: (1) a list of criteria (toxic, ignitable, corrosive and reactive) that a waste may exhibit; (2) a list of those wastes that are subject to regulation; and (3) a list of chemical names and common names that are presumed to be hazardous in California. The California Hazardous Waste Control Law recognizes more than 780 hazardous chemicals and nearly 30 additional common materials that may be hazardous. Naturally occurring asbestos is also often found in a type of rock (serpentine) located in the California Coast Ranges and Sierra foothills.

J. Hydrology and Water Quality

1. United States

Surface waters occur as streams, lakes, ponds, coastal waters, lagoons, estuaries, floodplains, dry lakes, desert washes, wetlands and other collection sites. Water bodies modified or developed by man, including reservoirs and aqueducts, are also considered surface waters. Surface water resources are very diverse throughout the state, due to the high variance in tectonics, topography, geology/soils, climate, precipitation, and hydrologic conditions.

2. California

Land uses have a great effect on surface water and groundwater water quality in the State of California. Water quality degradation of surface waters occurs through nonpoint- and point- source discharges of pollutants. Nonpoint source pollution is defined as not having a discrete or discernible source and is generated from land runoff, precipitation, atmospheric deposition, seepage, and hydrologic modification (U.S. EPA 1993). Nonpoint-source pollution includes runoff containing pesticides, insecticides, and herbicides from agricultural areas and residential areas; acid drainage from inactive mines; bacteria and nutrients from septic systems and livestock; VOCs and toxic chemicals from urban runoff and industrial discharges; sediment from timber harvesting, poor road construction, improperly managed construction sites, and agricultural areas; and atmospheric deposition and hydromodification. In comparison, point-source pollution is generated from identifiable, confined, and discrete sources, such as a smokestack, sewer, pipe or culvert, or ditch. These pollutant sources are regulated by the U.S. EPA and the State Water Resources Control Board (SWRCB) through the Regional Water Quality Control Board (RWQCB). Many of the pollutants discharged from point-sources are the same as for nonpoint-sources, including municipal (bacteria and nutrients), agricultural (pesticides, herbicides, and insecticides), and industrial pollutants (VOCs and other toxic effluent).

Overall, California has the most diverse range of watershed conditions in the U.S., with varied climatic regimes ranging from Mediterranean climates with temperate rainforests in the north coast region to desert climates containing dry desert washes and dry lakes in the southern central region. The average annual runoff for the State is 71 million acre-feet (DWR 2003). The state has more than 60 major stream drainages and more than 1,000 smaller, but significant drainages that drain coastal mountains and inland mountainous areas. High snowpack levels and resultant spring snowmelt yield high surface runoff and peak discharge in the Sierra Nevada and Cascade mountains that feed surface flows, fill reservoirs and recharge groundwater. Federal, state and local engineered water projects, aqueducts, canals, and reservoirs serve as the primary conduits of surface water sources to areas that have limited surface water resources. Most of the surface water storage is transported for agricultural, urban, and rural residential needs to the San Francisco Bay Area and to cities and areas extending to southern coastal California. Surface water is also transported to southern inland areas, including Owens Valley, Imperial Valley, and Central Valley areas.

The majority of runoff from snowmelt and rainfall flows down mountain streams into low gradient valleys and either percolates into the ground or is discharged to the sea. This percolating flow is stored in alluvial groundwater basins that cover approximately 40 percent of the geographic extent of the state (DWR 2003). Groundwater recharge occurs more readily in areas underlain by coarse sediments, primarily in mountain base alluvial fan settings. As a result, the majority of California's groundwater basins are located in broad alluvial valleys flanking mountain ranges, such as the Cascade Range, Coast Ranges, Transverse Ranges, and the Sierra Nevada.

There are 250 major groundwater basins that serve approximately 30 percent of California's urban, agricultural and industrial water needs, especially in southern portion of San Francisco Bay, the Central Valley, greater Los Angeles area, and inland desert areas where surface water is limited. On average, more than 15 million acre-feet of groundwater are extracted each year in the State, of which more than 50 percent is extracted from 36 groundwater basins in the Central Valley.

Land uses have a great effect on surface water and groundwater water quality in the State of California. Water quality degradation of surface waters occurs through nonpoint- and point- source discharges of pollutants. Nonpoint source pollution is defined as not having a discrete or discernible source and is generated from land runoff, precipitation, atmospheric deposition, seepage, and hydrologic modification (EPA 1993). Nonpoint-source pollution includes runoff containing pesticides, insecticides, and herbicides from agricultural areas and residential areas; acid drainage from inactive mines; bacteria and nutrients from septic systems and livestock; VOCs and toxic chemicals from urban runoff and industrial discharges; sediment from timber harvesting, poor road construction, improperly managed construction sites, and agricultural areas; and atmospheric deposition and hydromodification. In comparison, point-source pollution is generated from identifiable, confined, and discrete sources, such as a smokestack, sewer, pipe or culvert, or ditch. These pollutant sources are regulated by the EPA and SWRCB through RWQCB. Many of the pollutants discharged from point-sources are the same as for nonpoint-sources, including municipal (bacteria and nutrients), agricultural (pesticides, herbicides, and insecticides), and industrial pollutants (VOCs and other toxic effluent).

K. Land Use and Planning

1. United States

The manner in which physical landscapes are used or developed is commonly referred to as land use. Public agencies are the primary entities that determine the types of land use changes that can occur for specific purposes within their authority or jurisdiction. In most states, land uses decisions are made by local governments.

2. California

In California, the State Planning and Zoning Law (California Government Code Section 65000 et seq.) provides the primary legal framework that cities and counties must follow in land use planning and controls. Planned land uses are designated in the city or county general plan, which serves as the comprehensive master plan for the community. Also, city and county land use and other related resource policies are defined in the General Plan. The primary land use regulatory tool provided by the California Planning and Zoning Law is the zoning ordinance adopted by each city and county. Planning and Zoning Law requirements are discussed in the regulatory setting below.

When approving land use development, cities and counties must comply with CEQA, which requires that they consider the significant environmental impacts of their actions and the adoption of all feasible mitigation measures to substantially reduce significant impacts, in the event a project causes significant or potentially significant effects on the environment. In some cases, building permits may be ministerial, and therefore exempt from CEQA, but most land use development approval actions by cities and counties require CEQA compliance.

Land use decisions in California are also be governed by state agencies such as the California Coastal Commission, California State Lands Commission, California Department of Parks and Recreation, and others, where the state has land ownership or permitting authority with respect to natural resources or other state interests.

L. Noise

1. United States and California

a) Acoustic Fundamentals

Acoustics is the scientific study that evaluates perception, propagation, absorption, and reflection of sound waves. Sound is a mechanical form of radiant energy, transmitted by a pressure wave through a solid, liquid, or gaseous medium. Sound that is loud, disagreeable, unexpected, or unwanted is generally defined as noise; consequently, the perception of sound is subjective in nature, and can vary substantially from person to person. Common sources of environmental noise and noise levels are presented in Table A1-4.

Table A1-4: Typical Noise Levels

Common Outdoor Activities	Noise Level (dB)	Common Indoor Activities
	110	Rock band
Jet flyover at 1,000 feet	100	--
Gas lawnmower at 3 feet	90	--
Diesel truck moving at 50 mph at 50 feet	80	Food blender at 3 feet, Garbage disposal at 3 feet
Noisy urban area, Gas lawnmower at 100 feet	70	Vacuum cleaner at 10 feet, Normal speech at 3 feet
Commercial area, Heavy traffic at 300 feet	60	
Quiet urban daytime	50	Large business office, Dishwasher in next room
Quiet urban nighttime	40	Theater, Large conference room (background)

Table A1-4: Typical Noise Levels

Common Outdoor Activities	Noise Level (dB)	Common Indoor Activities
Quiet suburban nighttime	30	Library, Bedroom at night, Concert hall (background)
Quiet rural nighttime	20	Broadcast/Recording Studio
	10	--
Threshold of Human Hearing	0	Threshold of Human Hearing
Notes: dB=A-weighted decibels; mph=miles per hour Source: Caltrans 2009.		

A sound wave is initiated in a medium by a vibrating object (e.g., vocal chords, the string of a guitar, the diaphragm of a radio speaker). The wave consists of minute variations in pressure, oscillating above and below the ambient atmospheric pressure. The number of pressure variation cycles occurring per second is referred to as the frequency of the sound wave and is expressed in hertz.

Directly measuring sound pressure fluctuations would require the use of a very large and cumbersome range of numbers. To avoid this and have a more useable numbering system, the decibel (dB) scale was introduced. A sound level expressed in decibels is the logarithmic ratio of two like pressure quantities, with one pressure quantity being a reference sound pressure. For sound pressure in air the standard reference quantity is generally considered to be 20 micropascals, which directly corresponds to the threshold of human hearing. The use of the decibel is a convenient way to handle the million-fold range of sound pressures to which the human ear is sensitive. A decibel is logarithmic; it does not follow normal algebraic methods and cannot be directly added. For example, a 65 dB source of sound, such as a truck, when joined by another 65 dB source results in a sound amplitude of 68 dB, not 130 dB (i.e., doubling the source strength increases the sound pressure by 3 dB). A sound level increase of 10 dB corresponds to 10 times the acoustical energy, and an increase of 20 dB equates to a 100-fold increase in acoustical energy.

The loudness of sound perceived by the human ear depends primarily on the overall sound pressure level and frequency content of the sound source. The human ear is not equally sensitive to loudness at all frequencies in the audible spectrum. To better relate overall sound levels and loudness to human perception, frequency-dependent weighting networks were developed. The standard weighting networks are identified as A through E. There is a strong correlation between the way humans perceive sound and dBA. For this reason the dBA can be used to predict community response to noise from the environment, including noise from transportation and stationary sources. Sound levels expressed as dB in this section are A-weighted sound levels, unless noted otherwise.

Noise can be generated by a number of sources, including mobile sources (i.e., transportation noise sources) such as automobiles, trucks, and airplanes and stationary sources (i.e., non-transportation noise sources) such as construction sites, machinery, and commercial and industrial operations. As acoustic energy spreads through the atmosphere from the source to the receiver, noise levels attenuate (i.e., decrease) depending on ground absorption characteristics, atmospheric conditions, and the presence of physical barriers (walls, building façades, berms). Noise generated from mobile sources generally attenuate at a rate of 4.5 dB per doubling of distance. Stationary noise sources spread with more spherical dispersion patterns that attenuate at a rate of 6 to 7.5 dB per doubling of distance.

Atmospheric conditions such as wind speed, turbulence, temperature gradients, and humidity may additionally alter the propagation of noise and affect levels at a receiver. Furthermore, the presence of a large object (e.g., barrier, topographic features, and intervening building façades) between the source and the receptor can provide significant attenuation of noise levels at the receiver. The amount of noise level reduction, or "shielding," provided by a barrier primarily depends on the size of the barrier, the location of the barrier in relation to the source and receivers, and the frequency spectra of the noise. Natural barriers such as berms, hills, or dense woods, and human-made features such as buildings and walls may be used as noise barriers.

All buildings provide some exterior-to-interior noise reduction. A building constructed with a wood frame and a stucco or wood sheathing exterior typically provides a minimum exterior-to-interior noise reduction of 25 dB with its windows closed, whereas a building constructed of a steel or concrete frame, a curtain wall or masonry exterior wall, and fixed plate glass windows of one-quarter-inch thickness typically provides an exterior-to-interior noise reduction of 30–40 dB with its windows closed (Caltrans 2002).

b) Noise Descriptors

The intensity of environmental noise fluctuates over time, and several different descriptors of time-averaged noise levels are used. The selection of a proper noise descriptor for a specific source depends on the spatial and temporal distribution, duration, and fluctuation of both the noise source and the environment. The noise descriptors most often used to describe environmental noise are defined below (Caltrans 2009).

- **Equivalent Noise Level (L_{eq}):** The energy mean (average) noise level The Sacramento-San Joaquin Delta is sinking, putting levees at growing risk.

- **Maximum Noise Level (L_{max}):** The highest A/B/C weighted integrated noise level occurring during a specific period of time.

- **Minimum Noise Level (L_{min}):** The lowest A/B/C weighted integrated noise level during a specific period of time.

- **Day-Night Noise Level (L_{dn}):** The 24-hour L_{eq} with a 10-dB "penalty" applied during nighttime noise-sensitive hours, 10 p.m. through 7 a.m.

- **Community Noise Equivalent Level (CNEL):** Similar to the L_{dn} described above, but with an additional 5-dB "penalty" for the noise-sensitive hours between 7 p.m. to 10 p.m., which are typically reserved for relaxation, conversation, reading, and watching television.

Community noise is commonly described in terms of the ambient noise level, which is defined as the all-encompassing noise level associated with a given noise environment. A common statistical tool to measure the ambient noise level is the L_{eq} descriptor listed above, which corresponds to a steady-state A-weighted sound level containing the same total energy as a time-varying signal over a given time period (usually one hour). The L_{eq} is the foundation of the composite noise descriptors such as L_{dn} and CNEL, as defined above, and shows very good correlation with community response to noise.

c) Effects of Noise on Humans

Excessive and chronic exposure to elevated noise levels can result in auditory and non-auditory effects on humans. Auditory effects of noise on people are those related to temporary or permanent hearing loss caused by loud noises. Non-auditory effects of exposure to elevated noise levels are those related to behavioral and physiological effects. The non-auditory behavioral effects of noise on humans are associated primarily with the subjective effects of annoyance, nuisance, and dissatisfaction, which lead to interference with activities such as communications, sleep, and learning. The non-auditory physiological health effects of noise on humans have been the subject of considerable research attempting to discover correlations between exposure to elevated noise levels and health problems, such as hypertension and cardiovascular disease. The mass of research infers that noise-related health issues are predominantly the result of behavioral stressors and not a direct noise-induced response. The extent to which noise contributes to non-auditory health effects remains a subject of considerable research, with no definitive conclusions.

The degree to which noise results in annoyance and interference is highly subjective and may be influenced by several non-acoustic factors. The number and effect of these non-acoustic environmental and physical factors vary depending on individual characteristics of the noise environment such as sensitivity, level of activity, location, time of day, and length of exposure. One key aspect in the prediction of human response to new noise environments is the individual level of adaptation to an existing noise environment. The greater the change in the noise levels that are attributed to a new noise source, relative to the environment an individual has become accustom to, the less tolerable the new noise source will be perceived.

With respect to how humans perceive and react to changes in noise levels, a 1 dB increase is imperceptible, a 3 dB increase is barely perceptible, a 6 dB increase is clearly noticeable, and a 10 dB increase is subjectively perceived as approximately twice as loud (Egan 2007). These subjective reactions to changes in noise levels was

developed on the basis of test subjects' reactions to changes in the levels of steady-state pure tones or broad-band noise and to changes in levels of a given noise source. It is probably most applicable to noise levels in the range of 50 to 70 dB, as this is the usual range of voice and interior noise levels. For these reasons, a noise level increase of 3 dB or more is typically considered substantial in terms of the degradation of the existing noise environment.

Negative effects of noise exposure include physical damage to the human auditory system, interference, and disease. Exposure to noise may result in physical damage to the auditory system, which may lead to gradual or traumatic hearing loss. Gradual hearing loss is caused by sustained exposure to moderately high noise levels over a period of time; traumatic hearing loss is caused by sudden exposure to extremely high noise levels over a short period. Gradual and traumatic hearing loss both may result in permanent hearing damage. In addition, noise may interfere with or interrupt sleep, relaxation, recreation, and communication. Although most interference may be classified as annoying, the inability to hear a warning signal may be considered dangerous. Noise may also be a contributor to diseases associated with stress, such as hypertension, anxiety, and heart disease. The degree to which noise contributes to such diseases depends on the frequency, bandwidth, and level of the noise, and the exposure time (Caltrans 2009).

d) Vibration

Vibration is the periodic oscillation of a medium or object with respect to a given reference point. Sources of vibration include natural phenomena (e.g., earthquakes, volcanic eruptions, sea waves, landslides) and those introduced by human activity (e.g., explosions, machinery, traffic, trains, construction equipment). Vibration sources may be continuous, (e.g., operating factory machinery or transient in nature, explosions). Vibration levels can be depicted in terms of amplitude and frequency, relative to displacement, velocity, or acceleration.

Vibration amplitudes are commonly expressed in peak particle velocity (PPV) or root-mean-square (RMS) vibration velocity. PPV is defined as the maximum instantaneous positive or negative peak of a vibration signal. PPV is typically used in the monitoring of transient and impact vibration and has been found to correlate well to the stresses experienced by buildings (FTA 2006, Caltrans 2004). PPV and RMS vibration velocity are normally described in inches per second (in/sec).

Although PPV is appropriate for evaluating the potential for building damage, it is not always suitable for evaluating human response. The response of the human body to vibration relates well to average vibration amplitude; therefore, vibration impacts on humans are evaluated in terms of RMS vibration velocity. Similar to airborne sound, vibration velocity can be expressed in decibel notation as VdB. The logarithmic nature of the decibel serves to compress the broad range of numbers required to describe vibration.

The typical background vibration-velocity level in residential areas is approximately 50 VdB. Groundborne vibration is normally perceptible to humans at approximately 65 VdB. For most people, a vibration-velocity level of 75 VdB is the approximate dividing line between barely perceptible and distinctly perceptible levels (FTA 2006).

Typical outdoor sources of perceptible groundborne vibration include construction equipment, steel-wheeled trains, and traffic on rough roads. Although the effects of vibration may be imperceptible at low levels, effects may result in detectable vibrations and slight damage to nearby structures at moderate and high levels, respectively. At the highest levels of vibration, damage to structures is primarily architectural (e.g., loosening and cracking of plaster or stucco coatings) and rarely results in damage to structural components. The range of vibration that is relevant to this analysis occurs from approximately 50 VdB, which is the typical background vibration-velocity level, to 100 VdB, which is the general threshold where minor damage can occur in fragile buildings. Construction activities could generate groundborne vibrations that potentially pose a risk to nearby structures. Constant or transient vibrations can weaken structures, crack facades, and disturb occupants (FTA 2006).

Construction vibrations can be transient, random, or continuous. Transient construction vibrations are generated by blasting, impact pile driving, and wrecking balls. Continuous vibrations result from vibratory pile drivers, large pumps, and compressors. Random vibration can result from jackhammers, pavement breakers, and heavy construction equipment. Table A1-5 describes the general human response to different levels of groundborne vibration-velocity levels.

Table A1-5: Human Response to Different Levels of Groundborne Noise and Vibration

Vibration-Velocity Level	Human Reaction
65 VdB	Approximate threshold of perception.
75 VdB	Approximate dividing line between barely perceptible and distinctly perceptible. Many people find that transportation-related vibration at this level is unacceptable.
85 VdB	Vibration acceptable only if there are an infrequent number of events per day.

Notes: VdB = vibration decibels referenced to 1 μ inch/second and based on the root mean square (RMS) velocity amplitude.
Source: FTA 2006.

e) Existing Sources and Sensitive Land Uses

The existing noise environment in the project area is primarily influenced by transportation noise from vehicle traffic on the roadway systems (e.g., highways, freeways, primary arterials, and major local streets) and non-transportation noise from commercial and industrial operations. Other noise sources that contribute to the

existing noise environment include passenger and Sustainable Freight Strategies on-line railroad operations and ground rapid transit systems; commercial, general aviation, heliport, and military airport operations (e.g., jet engine test stands, ground facilities and maintenance) and overflights; and to a much lesser extent construction sites, schools (e.g., play fields), residential and recreational areas (e.g., landscape maintenance activities, dogs barking, people talking), agricultural activities, and others. Those noted above are also considered sources of vibration in the project area. With regards to the covered entities, existing noise conditions vary depending on location, but are typically characterized as noisy urban industrial areas including such noise sources as stationary machinery, transportation (e.g., surface vehicles, heavy-duty diesel trucks, construction equipment), and other industrial-related activities. Noise-sensitive land uses are generally considered to include those uses where noise exposure could result in health-related risks to individuals, as well as places where quiet is an essential element of their intended purpose. Residential dwellings are of primary concern because of the potential for increased and prolonged exposure of individuals to both interior and exterior noise levels. Additional land uses such as parks, historic sites, cemeteries, and recreation areas are also generally considered sensitive to increases in exterior noise levels. Places of worship and transit lodging, and other places where low interior noise levels are essential are also considered noise-sensitive.

Those noted above are also considered vibration-sensitive land uses in addition to commercial and industrial buildings where vibration would interfere with operations within the building, including levels that may be well below those associated with human annoyance. Equipment such as electron microscopes and high-resolution lithographic equipment can be very sensitive to vibration, and even normal optical microscopes will sometimes be difficult to use when vibration is well below the human annoyance level. Manufacturing of computer chips is an example of a vibration-sensitive process. This category does not include most computer installations or telephone switching equipment because most such equipment is designed to operate in typical building environments where the equipment may experience occasional shock from bumping and continuous background vibration caused by other equipment (FTA 2006).

M. Population and Housing

1. United States

The employed civilian labor force, unemployment rates, employment opportunities, and population estimates and projections for cities, counties, and states are collected every ten years by the U.S. Census Bureau (Census). As of July 1, 2015, the U.S. population was approximately 321 million, who live in approximately 134 million housing units. (Census 2016).

2. California

a) Population

The estimated population of California in 2015 was estimated to be approximately 39,256,000 (DOF 2016). Since California became a state in 1850, the population has been increasing rapidly. Within the first 150 years of California's statehood, the population increased from fewer than 100,000 citizens to approximately 37 million in 2000 (DOF 2013). It is expected that the population of California will reach approximately 44 million in 2030 and approximately 52 million in 2060 (DOF 2014).

b) Housing

As population within the state increases, housing distribution and household conditions are expected to evolve. Estimated housing units, households, and vacancy rates for the State of California in 2013 are shown below in Table A1-6. Data was derived from the 2010 Census (Census 2014).

Table A1-6: California Housing Profile

Housing units, 2014	13,900,766
Homeownership rate, 2009-2013	55.3 percent
Households, 2009-2013	12,542,460
Persons per Household, 2009-2013	2.94
Housing units in Multi-units structures, 2009-2013	31 percent
Source: U.S. Census 2014	

c) Employment

In mid-2015, the civilian labor force in California was approximately 19,043,000. Of this labor force, approximately 17,484,000 people were employed and 1,195,000 were considered unemployed. The number of and the unemployment rate decreased steadily decreased in 2015 from 7.0 percent in January to 6.3 percent in June (DOF 2015).

N. Public Services

1. United States

In the U.S., the Federal Bureau of Investigation (FBI) is an agency of the U.S. Department of Justice that serves as both a federal criminal investigative body and an internal intelligence agency. The FBI's main goal is to protect and defend the U.S. against terrorist and foreign intelligence threats, to uphold and enforce the criminal laws of the U.S., and to provide leadership and criminal justice services to federal, state, municipal, and international agencies and partners. The U.S. EPA is an agency of the federal government of the U.S. charged with protecting human health and the

environment, by writing and enforcing regulations based on laws passed by Congress. The U.S. EPA's Criminal Investigation Division primary mission is the enforcement of the U.S.' environmental laws as well as any other federal law in accordance with the guidelines established by the Attorney General of the U.S. (18 United States Code [U.S.C.] 3063). These environmental laws include those specifically related to air, water and land resources.

The U.S. Forest Service is an agency of the USDA that administers the nation's 155 national forests and 20 national grasslands, which encompass 193 million acres (780,000 km2). Major divisions of the agency include the National Forest System, State and Private Forestry, and the Research and Development branch. The Fire and Aviation Management part of the U.S. Forest Service works to advance technologies in fire management and suppression, maintain and improve the extremely efficient mobilization and tracking systems in place, and reach out in support of our Federal, State, and International fire partners.

2. California

a) Law Enforcement

Enforcement of environmental laws in California is the responsibility of the Attorney General's Office, District Attorneys, City Attorneys, and the CalEPA. The Attorney General represents the people of California in civil and criminal matters before trial courts, appellate courts and the supreme courts of California and the U.S. In regards to environmental issues, the Attorney General enforces laws that safeguard the environment and natural resources in the state. Recent actions by the Attorney General related to air quality and climate change issues include: legally defending the state's clean cars law against multiple challenges, filing numerous actions against the Bush Administration regarding regulation of global warming pollution, working with local governments to ensure that land use planning processes take account of global warming, promoting renewable energy and enhanced energy efficiency in California, and working with other state leaders and agencies to implement AB 32, the Global Warming Solutions Act of 2006.

CalEPA was created in 1991 by Governor's Executive Order. CalEPA's mission is to restore, protect and enhance the environment, to ensure public health, environmental quality and economic vitality. The CalEPA is comprised of various boards, departments and offices, including: CARB, Department of Pesticide Regulation, DTSC, Department of Resources Recycling and Recovery, Office of Environmental Health Hazard Assessment, and SWRCB (including the nine RWQCBs).

California's environmental laws are enforced by state and local agencies, each charged with enforcing the laws governing a specific media such as air, water, hazardous waste, solid waste, and pesticides. Enforcement agencies for these media are as follows:

- Air: CARB (part of CalEPA) and Local Air Districts.

- Water: SWRCB (part of CalEPA), RWQCBs (part of CalEPA), local waste water officials, and the California Department of Public Health.
- Hazardous Waste: DTSC (part of CalEPA) and CUPA.
- Carcinogens/Reproductive Toxins: Prop. 65 through the Office of Environmental Health Hazard Assessment (part of CalEPA).
- Pesticides: Department of Pesticide Regulation (part of CalEPA) and County Agricultural Commissioners

Statewide law enforcement service is provided by the California Highway Patrol, which is responsible for protecting State resources and providing crime prevention services and traffic enforcement along the State's highways and byways.

Community law enforcement service is provided by local police and sheriff agencies (i.e., cities and counties, respectively) to prevent crime, respond to emergency incidents, and provide traffic enforcement on local roadways.

b) Fire Protection and Emergency Medical Response Services

State-level fire protection and emergency response service is provided by the California Department of Forestry and Fire Protection (CAL FIRE), primarily in rural areas of the State. CAL FIRE is an emergency response and resource protection department. CAL FIRE protects lives, property and natural resources from fire, responds to emergencies of all types, and protects and preserves timberlands, wildlands, and urban forests.

Local and urban fire protection service is provided by local fire districts and/or local agencies (e.g., fire departments of cities and counties). In addition to providing fire response services most fire agencies also provide emergency medical response services (i.e., ambulance services) within their service areas.

c) Schools

Statewide, the regulation of education for youth is provided by the California Department of Education. The State Board of Education (SBE) is the governing and policy-making body of the California Department of Education. The SBE sets K-12 education policy in the areas of standards, instructional materials, assessment, and accountability. Locally, school districts are responsible for the management and development of elementary, middle, and high-school facilities.

O. Recreation

1. United States and Canada

Recreational resources and facilities are provided and managed at federal, state, and local levels. Recreation resources include national parks and monuments, national forests and grasslands, wildlife refuges, wilderness areas, lakes and lands managed by different agencies in the federal government, wild and scenic rivers, and back country byways, national trials, and marine reserves and estuaries.

2. California

California contains 118 state parks, nine state recreation areas, eight state forests, as well as numerous reserve, wildlife areas, and fish hatcheries. General plans for State parks, recreation areas, and beaches are publicly available. The California Outdoor Recreation Plan and associated research provide policy guidance to all public agencies – federal, state, local, and special districts that oversee outdoor recreation on lands, facilities and services throughout California. Agencies and departments that have involvement in recreational activities include Boating and Waterways, Fish and Wildlife, Tahoe Regional Planning Association, various conservancies, and others (California State Parks 2008).

Recreational lands and facilities are also managed by regional and local park and recreation agencies and open space districts. City and county general plans contain recreation elements that provide framework for planning agencies to consider when projects are developed and implemented.

P. Transportation and Traffic

1. United States and California

Existing roadway systems in-state and in out-of-state areas generally consist of highways, freeways, arterials, local streets, and intersections/ramps. The existing average annual daily traffic (AADT) volumes on the roadway segments that comprise these systems vary considerably (i.e., from hundreds to hundreds of thousands). The level of service (LOS), a scale used to determine the operating quality of a roadway segment or intersection based on volume-to-capacity ratio (V/C) or average delay, also vary from LOS A, the best and smoothest operating conditions, to LOS F, most congested operating conditions. Other roadway and traffic volume characteristics such as roadway length, number of lanes and facility type (e.g., two-lane freeway), right-of-way width and pavement width, terrain classification (e.g., flat), percent of heavy-duty truck traffic, and accident rates (e.g., number of accidents per million vehicle miles traveled) also vary substantially depending on the location. In addition to the roadway systems, circulation networks provide additional transportation opportunities and include mass transit, airports, and non-motorized travel (e.g., pedestrian and bicycle paths).

Q. Utilities and Service Systems

1. United States

Utilities and services systems include water supplies, wastewater treatment facilities, electric and gas supplies, and solid waste collection and disposal. These services are typically provided through regional or local companies and agencies.

The U.S. Bureau of Reclamation (USBR) is a federal agency and it is the largest wholesaler of water in the U.S. and the second largest producer of hydroelectric power (USBR 2011). The Federal Power Commission regulates both the interstate transmission of electricity and the sale of hydroelectric power at the wholesale level in the U.S., and the Federal Energy Regulatory Commission (FERC) has authority over intrastate as well as interstate natural gas production.

2. California

a) Water Supply and Distribution

The principal water supply facilities in California are operated by the USBR and DWR. In California, the Mid-Pacific Region of the USBR is responsible for the management of the Central Valley Project (CVP). The CVP serves farms, homes, and industry in California's Central Valley as well as the major urban centers in the San Francisco Bay Area. The CVP consists of 20 dams and reservoirs, 11 power plants, and 500 miles of major canals and reaches from the Cascade Mountains near Redding in the north to the Tehachapi Mountains near Bakersfield in the south. In addition to delivering water for municipal and industrial uses and the environment, the CVP produces electric power and provides flood protection, navigation, recreation, and water quality benefits (USBR 2011).

DWR is a State agency that is responsible for managing and implementing the State Water Project (SWP). The SWP is a water storage and delivery system of reservoirs, aqueducts, power plants and pumping plants. Its main purpose is to store water and distribute it to 29 urban and agricultural water suppliers in Northern California, the San Francisco Bay Area, the San Joaquin Valley, the Central Coast, and Southern California (DWR 2010).

Local water districts, irrigation districts, special districts, and jurisdictions (e.g., cities and counties) manage and regulate the availability of water supplies and the treatment and delivery of water to individual projects. Depending on their location and the source of their supplies, these agencies may use groundwater, surface water through specific water entitlements, or surface water delivered through the CVP or SWP. In some remote areas not served by a water supply agency, individual developments may need to rely upon the underlying groundwater basin for their water supply. In these cases, the project would be required to secure a permit from the local or state land use authority and seek approval for development of the groundwater well(s).

b) Wastewater Collection and Treatment

The SWRCB is the state agency responsible for the regulation of wastewater discharges to surface waters and groundwater via land discharge. The SWRCB and nine RWQCBs are responsible for development and enforcement of water quality objectives and implementation plans that protect the beneficial uses of the federal and state waters. The SWRCB also administers water rights in California. The RWQCB's are responsible for issuing permits or other discharge requirements to individual wastewater dischargers and for ensuring that they are meeting the requirements of the permit through monitoring and other controls.

Wastewater collection, treatment, and discharge service for developed and metropolitan areas is typically provided by local wastewater service districts or agencies that may or may not be operated by the local jurisdiction (e.g., city or county). These agencies are required to secure treatment and discharge permits for the operation of a wastewater facility from the RWQCB. Wastewater is typically collected from a specific development and conveyed through a series of large pipelines to the treatment facility where it is treated to permitted levels and discharged to surface waters or the land.

In areas that are remote or that are not served by an individual wastewater service provider, developments would be required to install an individual septic tank or other on-site wastewater treatment system. These facilities would need to be approved by the local or state land use authority and the RWQCB.

c) Electricity and Natural Gas

The CPUC regulates investor-owned electric and natural gas companies located within California. The CPUC's Energy Division develops and administers energy policy and programs and monitors compliance with the adopted regulations. One-third of California's electricity and natural gas is provided by one of three companies: Pacific Gas and Electric Company, Southern California Edison, San Diego Gas and Electric Company (CPUC 2010).

Locally, energy service is provided by a public or private utility. New development projects would need to coordinate with the local service provider to ensure adequate capacity is available to serve the development.

d) Solid Waste Collection and Disposal

Statewide, the California Department of Resources Recycling and Recovery (CalRecycle), which is a department of the CalEPA, is responsible for the regulation of the disposal and recycling of all solid waste generated in California. CalRecycle acts as an enforcement agency in the approval and regulation of solid waste disposal and recycling facilities. Local agencies can create local enforcement agencies and, once approved by CalRecycle, they can serve as the enforcement agency for landfills and recycling facilities with their jurisdictions.

Local agencies or private companies own and operate landfill facilities and solid waste is typically hauled to these facilities by private or public haulers. Individual projects would need to coordinate with the local service provider and landfill to determine if adequate capacity exists to serve the project.

REGULATORY SETTING

A. United States, State of California, and Local Regulatory Setting

1. Aesthetics

Applicable laws and regulations associated with aesthetics and scenic resources are discussed in Table A2-1.

Table A2-1: Applicable Laws and Regulations for Aesthetic Resources

Applicable Regulations	Description
Federal	
Federal Land Policy and Management Act of 1976 (FLPMA)	FLPMA is the enabling legislation establishing the Bureau of Land Management's (BLM's) responsibilities for lands under its jurisdiction. Section 102 (a) of the FLPMA states that "…the public lands be managed in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resources, and archeological values…" Section 103(c) identifies "scenic values" as one of the resources for which public land should be managed.
BLM Contrast Rating System	The contrast rating system is a systematic process used by BLM to analyze visual impacts of proposed projects and activities. It is primarily intended to assist BLM personnel in the resolution of visual impact assessment.
Natural Historic Preservation Act (NHPA)	Under regulations of the NHPA, visual impacts to a listed or eligible National Register property that may diminish the integrity of the property's "setting … [or] … feeling" in a way that affects the property's eligibility for listing may result in a potentially significant adverse effect. "Examples of adverse effects … include…: Introduction of visual, atmospheric, or audible elements that diminish the integrity of the property's significant historic features." (Title 36 Code of Federal Regulations CFR (CFR) Part 800.5)
National Scenic Byways Program	Title 23, Sec 162 outlines the National Scenic Byways Program. This program is used to recognize roads having outstanding scenic, historic, cultural, natural, recreational, and archaeological qualities through designation of road as: National Scenic Byways; All-American Roads; or America's Byways. Designation of the byways provides eligibility for Federal assistance for safety improvement, corridor management plans, recreation access, or other

Table A2-1: Applicable Laws and Regulations for Aesthetic Resources

Applicable Regulations	Description
	project that protect scenic, historical, recreational, cultural, natural, and archaeological resources.
State	
Ambient Air Quality Standard for Visibility-Reducing Particles	Extinction coefficient (measure of absorption of light in a medium) of 0.23 per kilometer — visibility of 10 miles or more (0.07 — 30 miles or more for Lake Tahoe) due to particles when relative humidity is less than 70 percent.
California Streets and Highway Code, Section 260 through 263 – Scenic Highways	The State Scenic Highway Program promotes protection of designated State scenic highways through certification and adoption of local scenic corridor protection programs that conform to requirements of the California Scenic Highway Program.
Local	
County and City Controls	Most local planning guidelines to preserve and enhance the visual quality and aesthetic resources of urban and natural areas are established in the jurisdiction's general plan. The value attributed to a visual resource generally is based on the characteristics and distinctiveness of the resource and the number of persons who view it. Vistas of undisturbed natural areas, unique or unusual features forming an important or dominant portion of a viewshed, and distant vistas offering relief from less attractive nearby features are frequently considered to be scenic resources. In some instances, a case-by-case determination of scenic value may be needed, but often there is agreement within the relevant community about which features are valued as scenic resources. In addition to Federal and State designations, counties and cities have their own scenic highway designations, which are intended to preserve and enhance existing scenic resources. Criteria for designation are commonly included in the conservation/open space element of the city or county general plan.

2. Agricultural and Forest Resources

Table A2-2 below provides a general description of applicable laws and regulations that may pertain to agriculture and forest resources.

Table A2-2: Applicable Laws and Regulations for Agriculture and Forest Resources	
Applicable Regulations	**Description**
Federal	
Farmland Protection Policy Act (FPPA)	FPPA directs federal agencies to consider the effects of federal programs or activities on farmland, and ensure that such programs, to the extent practicable, are compatible with state, local, and private farmland protection programs and policies. The rating process established under the FPPA was developed to help assess options for land use on an evaluation of productivity weighed against commitment to urban development.
National Forest Management Act (NFMA) of 1976	NFMA is the primary statute governing the administration of national forests. The act requires the Secretary of Agriculture to assess forest lands, develop a management program based on multiple-use, sustained-yield principles, and implement a resource management plan for each unit of the National Forest System. Goal 4 of the U.S. Forest Service's National Strategic Plan for the National Forests states that the nation's forests and grasslands play a significant role in meeting America's need for producing and transmitting energy. Unless otherwise restricted, National Forest Service lands are available for energy exploration, development, and infrastructure (e.g., well sites, pipelines, and transmission lines). However, the emphasis on non-recreational special uses, such as utility corridors, is to authorize the special uses only when they cannot be reasonably accommodated on non-National Forest Service lands.
State	
The California Land Conservation Act, also known as the Williamson Act (Government Code Section 51200)	The DOC's Division of Land Resource Protection administers the Williamson Act program, which permits property tax adjustments for landowners who contract with a city or county to keep their land in agricultural production or approved open space uses for at least 10 years. Lands covered by Williamson Act contracts are assessed on the basis of their agricultural value instead of their potential market value under nonagricultural uses. In return for the preferential tax rate, the landowner is required to contractually agree to not develop the land for a period of at least 10 years. Williamson Act contracts are renewed annually for 10 years unless a party to the contract files for nonrenewal. The filing of a non-renewal application by a landowner ends the automatic annual extension of a contract and starts a 9-year phase-out of the contract. During the phase-out period, the land remains restricted to agricultural and open-space uses, but property taxes gradually return to levels associated with the market value of the land. At the end of the

Table A2-2: Applicable Laws and Regulations for Agriculture and Forest Resources	
Applicable Regulations	**Description**
	9-year non-renewal process, the contract expires and the owner's uses of the land are restricted only by applicable local zoning. The Williamson Act defines compatible use of contracted lands as any use determined by the county or city administering the agricultural preserve to be compatible with the agricultural, recreational, or open space use of land within the preserve and subject to contract (Government Code, Section 51202[e]). However, uses deemed compatible by a county or city government must be consistent with the principles of compatibility set forth in Government Code, Section 51238.1. Approximately 16 million acres of farmland (about 50 percent of the State's total farmland) are enrolled in the program.
California Farmland Conservancy Program (CFCP) (PRC Section 10200)	The program provides grant funding for agricultural conservation easements. Although the easements are always written to reflect the benefits of multiple resource values, there is a provision in the CFCP statute that prevents easements funded under the program from restricting husbandry practices. This provision could prevent restricting those practices to benefit other natural resources.

Table A2-2: Applicable Laws and Regulations for Agriculture and Forest Resources	
Applicable Regulations	**Description**
Farmland Mapping and Monitoring Program (FMMP) (Government Code Section 65570, PRC Section 612)	Under the FMMP, the DOC assesses the location, quality, and quantity of agricultural lands and conversion of these lands over time. Agricultural designations include the categories of Prime Farmland, Farmland of Statewide Importance, Unique Farmland, Farmland of Local Importance, Grazing Land, Urban and Built-Up Land, and Other Land. FMMP uses the following definitions to describe farmland types. Prime Farmland is defined by the DOC as "Land with the best combination of physical and chemical features able to sustain long term production of agricultural crops. This land has the soil quality, growing season, and moisture supply needed to produce sustained high yields. Land must have been used for production of irrigated crops at some time during the past four years." Farmland of Statewide Importance is defined by the DOC as "Land similar to Prime Farmland that has a good combination of physical and chemical characteristics for the production of agricultural crops. This land has minor shortcomings, such as greater slopes or less ability to store soil moisture than Prime Farmland. Land must have been used for production of irrigated crops at some time during the past four years." Unique Farmland is defined by the DOC as "Lesser quality soils used for the production of the State's leading agricultural crops. This land is usually irrigated, but may include non-irrigated orchards or vineyard as found in some climatic zones in California."
State Lands Commission Significant Land Inventory	The State Lands Commission is responsible for managing lands owned by the State, including lands that the State has received from the federal government. These lands total more than 4 million acres and include tide and submerged lands, swamp and overflow lands, the beds of navigable waterways, and State School Lands. The State Lands Commission has a legal responsibility for, and a strong interest in, protecting the ecological and Public Trust values associated with the State's sovereign lands, including the use of these lands for habitat preservation, open space and recreation. Scoping Plan projects located within these lands would be subject to the State Lands Commission permitting process.
Local	
Open Space Element	State law requires each city and county to adopt a general plan containing at least seven mandatory elements including

Table A2-2: Applicable Laws and Regulations for Agriculture and Forest Resources	
Applicable Regulations	**Description**
	an open space element. The open space element identifies open space resources in the community and strategies for protection and preservation of these resources. Agricultural and forested lands are among the land use types identified as open space in general plans.
Zoning	The city or county zoning code is the set of detailed requirements that implement the general plan policies at the level of the individual parcel. The zoning code presents standards for different land uses and identifies which land uses (e.g., agriculture, residential, commercial, industrial) are allowed in the various zoning districts of the jurisdiction. Since 1971, state law has required the city or county zoning code to be consistent with the jurisdiction's general plan, except in charter cities.

3. Air Quality

Applicable laws and regulations associated with air quality are discussed in Table A2-3.

Table A2-3: Applicable Laws and Regulations for Air Quality

Regulation	Description
Federal	
Clean Air Act (CAA) (40 CFR)	CAA, which was last amended in 1990, requires the U.S. EPA to set NAAQS for pollutants considered harmful to public health and the environment. CAA established two types of NAAQS: primary standards set limits to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly; and secondary standards set limits to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings. U.S. EPA Office of Air Quality Planning and Standards has set NAAQS for six principal pollutants, which are called "criteria" pollutants. Title III of the CAA directed the U.S. EPA to promulgate national emissions standards for Hazardous Air Pollutants. The CAA also required the U.S. EPA to promulgate vehicle or fuel standards containing reasonable requirements that control toxic emissions, at a minimum to benzene and formaldehyde. Performance criteria were established to limit mobile-source emissions of toxics, including benzene, formaldehyde, and 1,3-butadiene. In addition, Section 219 required the use of reformulated gasoline in selected areas with the most severe

Table A2-3: Applicable Laws and Regulations for Air Quality

Regulation	Description
	ozone nonattainment conditions to further reduce mobile-source emissions.
SmartWay	SmartWay is an U.S. EPA program that reduces transportation-related emissions by creating incentives to improve supply chain fuel efficiency. It aims to increase the availability and market penetration of fuel efficient technologies and strategies that help freight companies save money while also reducing adverse environmental impacts.
Other Applicable Federal-Level Regulations	This includes all other applicable regulations at the federal level for portions of the project area that are outside of the U.S. (e.g., Canada).
State	
California Clean Air Act (CCAA) CCR (Titles 13 and 17)	CARB is the agency responsible for coordination and oversight of State and local air pollution control programs in California and for implementing the CCAA. The CCAA, which was adopted in 1988, required the CARB to establish California ambient air quality standards.
Waste Heat and Carbon Emissions Reduction Act	This Act is designed to encourage the development of new combined heat and power (CHP) systems in California with a generating capacity of not more than 20 megawatts. Section 2843 of the Act provides that the Energy Commission's guidelines require that CHP systems: be designed to reduce waste energy; have a minimum efficiency of 60 percent; have NO_X emissions of no more than 0.07 pounds per megawatt-hour; be sized to meet the eligible customer generation thermal load; operate continuously in a manner that meets the expected thermal load and optimizes the efficient use of waste heat; be cost effective, technologically feasible, and environmentally beneficial.
Other Applicable State-Level Regulations	This includes all other applicable regulations at the State level for portions of the project area that are outside of California (e.g., AB 1807 and AB 2588).
Local	
Air Districts	Air Districts have primary responsibility for preparation, adoption, and implementation of mobile, stationary, and area emission control measures and for the preparation of the SIP and any amendments.

4. Biological Resources

Applicable laws and regulations associated with biological resources are discussed in Table A2-4.

Table A2-4: Applicable Laws and Regulations for Biological Resources

Applicable Law	Description
Federal	
Federal Endangered Species Act (ESA)	Designates and provides for protection of threatened and endangered plant and animal species, and their critical habitat. Two sections of the ESA address take of threatened and endangered species. Section 7 covers actions that would result in take of a federally-listed species and have a federal discretionary action. Section 10 regulates actions that would result in take of threatened or endangered species and a non-federal agency is the lead agency for the action. Section 10 of the ESA requires preparation of a habitat conservation plan (HCP). More than 430 HCPs have been approved nation-wide.
Migratory Bird Treaty Act	Makes it unlawful to take or possess any migratory nongame bird (or any part of such migratory nongame bird) as designated in the Migratory Bird Treaty Act.
Clean Water Act (CWA)	Requires the permitting and monitoring of all discharges to surface water bodies. Section 404 requires a permit from the U.S. Army Corps of Engineers (USACE) for a discharge from dredged or fill materials into Waters of the U.S., including wetlands. Section 401 requires a permit from a RWQCB for the discharge of pollutants. By federal law, every applicant for a federal permit or license for an activity that may result in a discharge into a California water body, including wetlands, must request State certification that the proposed activity would not violate State and federal water quality standards.
Rivers and Harbors Act of 1899	Requires permit or letter of permission from USACE prior to any work being completed within navigable waters.
U.S. EPA Section 404 (b)(1) Guidelines	Requires USACE to analyze alternatives in a sequential approach such that USACE must first consider avoidance and minimization of impacts to the extent practicable to determine whether a proposed discharge can be authorized.
California Desert Conservation Area Plan (CDCA)	Comprises one of two national conservation areas established by Congress in 1976. FLPMA outlines how BLM would manage public lands. Congress specifically provided guidance for the management of the CDCA and directed the development of the 1980 CDCA Plan.
Federal Noxious Weed Act of 1974 (Public Law [P.L.] 93-629) (7 U.S.C. 2801 et seq.; 88 Stat. 2148)	Establishes a federal program to control the spread of noxious weeds. Authority is given to the Secretary of Agriculture to designate plants as noxious weeds by regulation, and the movement of all such weeds in interstate or foreign commerce was prohibited except under permit.

Table A2-4: Applicable Laws and Regulations for Biological Resources

Applicable Law	Description
Executive Order 13112, "Invasive Species," February 3, 1999	Federal agencies are mandated to take actions to prevent the introduction of invasive species, provide for their control, and minimize the economic, ecological, and human health impacts that invasive species cause.
Executive Order 11988, "Floodplain Management," May 24, 1977	Requires federal agencies to avoid to the extent possible the long- and short-term adverse impacts associated with the occupancy and modification of flood plains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative.
Executive Order 11990, "Protection of Wetlands," May 24, 1977	Requires all federal agencies to consider wetland protection as an important part of their policies and take action to minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands.
Executive Order 13186, "Responsibilities of Federal Agencies to Protect Migratory Birds," January 10, 2001	Requires that each federal agency taking actions that have, or are likely to have, a measurable negative effect on migratory bird populations develop and implement a Memorandum of Understanding (MOU) with the USFWS that shall promote the conservation of migratory bird populations.
Bald and Golden Eagle Protection Act	Declares it is illegal to take, possess, sell, purchase, barter, offer to sell or purchase or barter, transport, export or import a bald or golden eagle, alive or dead, or any part, nest or egg of these eagles unless authorized. Active nest sites are also protected from disturbance during the breeding season.
BLM Manual 6840 — Special Status Species Management	Establishes special status species policy on BLM land for plant and animal species and the habitats on which they depend. The policy refers to species designated by the BLM State Director as sensitive.
Listed Species Recovery Plans and Ecosystem Management Strategies	Provides guidance for the conservation and management of sufficient habitat to maintain viable populations of listed species and ecosystems. Relevant examples include, but are not limited to, the Desert Tortoise Recovery Plan, Flat-tailed Horned Lizard Rangewide Management Strategy; Amargosa Vole Recovery Plan; and Recovery Plan for Upland Species of the San Joaquin Valley.
State	
California Endangered Species Act of 1984 (Fish and Game Code, Sections 2050 through 2098)	Protects California's rare, threatened, and endangered species.

Table A2-4: Applicable Laws and Regulations for Biological Resources

Applicable Law	Description
Natural Community Conservation Planning (NCCP) Act 1991	The primary objective of the NCCP program is to conserve natural communities at the ecosystem level while accommodating compatible land use. An NCCP identifies and provides for the regional or areawide protection of plants, animals, and their habitats, while allowing compatible and appropriate economic activity. There are currently 23 NCCPs that have been adopted or are in progress in California.
Porter-Cologne Water Quality Control Act	Requires that each of the nine RWQCBs prepare and periodically update basin plans for water quality control. Each basin plan sets forth water quality standards for surface water and groundwater and actions to control nonpoint and point sources of pollution to achieve and maintain these standards.
Wetlands Preservation (Keene-Nejedly California Wetlands Preservation Act) (PRC, Section 5810 et seq.)	California has established a successful program of regional, cooperative efforts to protect, acquire, restore, preserve, and manage wetlands. These programs include, but are not limited to, the Central Valley Habitat Joint Venture, the San Francisco Bay Joint Venture, the Southern California Wetlands Recovery Project, and the Inter-Mountain West Joint Venture.
California Wilderness Preservation System (PRC, Section 5093.30 et seq.)	Establishes a California wilderness preservation system that consists of State-owned areas to be administered for the use and enjoyment of the people in such manner as will leave them unimpaired for future use and enjoyment as wilderness, provide for the protection of such areas, preserve their wilderness character, and provide for the gathering and dissemination of information regarding their use and enjoyment as wilderness.
Significant Natural Areas (Fish and Game Code Section 1930 et seq.)	Designates certain areas such as refuges, natural sloughs, riparian areas, and vernal pools as significant wildlife habitat.
Protection of Birds and Nests (Fish and Game Code Section 3503 and 3503.5)	Protects California's birds by making it unlawful to take, possess, or needlessly destroy the nest or eggs of any bird. Raptors (e.g., hawks and owls) are specifically protected.
Migratory Birds (Fish and Game Code Section 3513)	Protects California's migratory birds by making it unlawful to take or possess any migratory nongame bird as designated in the Migratory Bird Treaty Act or any part of such migratory nongame birds.

Table A2-4: Applicable Laws and Regulations for Biological Resources

Applicable Law	Description
Fur-bearing Mammals (Fish and Game Code Sections 4000 and 4002)	Lists fur-bearing mammals which require a permit for take.
Fully Protected Species (Fish and Game Code Sections 3511,4700, 5050, and 5515)	Identifies several amphibian, reptile, fish, bird, and mammal species that are Fully Protected. CDFW cannot issue a take permit for these species, except for take related to scientific research.
California Environmental Quality Act (CEQA Guidelines 15380)	CEQA defines rare species more broadly than the definitions for species listed under the state and federal Endangered Species Acts. Under section 15830, species not protected through state or federal listing but nonetheless demonstrable as “endangered” or “rare” under CEQA should also receive consideration in environmental analyses. Included in this category are many plants considered rare by the California Native Plant Society and some animals on the CDFW’s Special Animals List.
Oak Woodlands (California PRC Section 21083.4)	Requires counties to determine if a project within their jurisdiction may result in conversion of oak woodlands that would have a significant adverse effect on the environment. If the lead agency determines that a project would result in a significant adverse effect on oak woodlands, mitigation measures to reduce the significant adverse effect of converting oak woodlands to other land uses are required.
Lake and Streambed Alteration Agreement (Fish and Game Code Sections 1600 et seq.)	Regulates activities that may divert, obstruct, or change the natural flow or the bed, channel, or bank of any river, stream, or lake in California designated by CDFW in which there is at any time an existing fish or wildlife resource or from which these resources derive benefit. Impacts to vegetation and wildlife resulting from disturbances to waterways are also reviewed and regulated during the permitting process.
California Desert Native Plants Act of 1981 (Food and Agricultural Code Section 80001 et seq. and California Fish and Game Code Sections 1925-1926)	Protects non-listed California desert native plants from unlawful harvesting on both public and private lands in Imperial, Inyo, Kern, Los Angeles, Mono, Riverside, San Bernardino, and San Diego counties. Unless issued a valid permit, wood receipt, tag, and seal by the commissioner or sheriff, harvesting, transporting, selling, or possessing specific desert plants is prohibited.
Food and Agriculture Code, Section 403	The California Department of Food and Agriculture is designated to prevent the introduction and spread of injurious insect or animal pests, plant diseases, and noxious weeds.

Table A2-4: Applicable Laws and Regulations for Biological Resources

Applicable Law	Description
Noxious Weeds (Title 3, California Code of Regulations, Section 4500)	List of plant species that are considered noxious weeds.
Local	
Various City and County General Plans	General plans typically designate areas for land uses, guiding where new growth and development should occur while providing a plan for the comprehensive and long-range management, preservation, and conservation of and natural resources and open-space lands.
Various Local Ordinances	Local ordinances provide regulations for proposed projects for activities such as grading plans, erosion control, tree removal, protection of sensitive biological resources and open space.

5. Cultural Resources

Applicable laws and regulations associated with cultural resources are discussed in Table A2-5.

Table A2-5: Applicable Laws and Regulations for Cultural Resources

Applicable Regulation	Description
Federal	
Natural Historic Preservation Act (NHPA) of 1966	The NHPA requires federal agencies to consider the preservation of historic and prehistoric resources. The Act authorizes the Secretary of the Interior to expand and maintain a National Register of Historic Places (NRHP), and it establishes an Advisory Council on Historic Preservation (ACHP) as an independent federal entity. Section 106 of the Act requires federal agencies to take into account the effects of their undertakings on historic properties and afford the ACHP a reasonable opportunity to comment on the undertaking prior to licensing or approving the expenditure of funds on any undertaking that may affect properties listed, or eligible for listing, in the NRHP.
National Environmental Policy Act (NEPA) of 1969	NEPA requires federal agencies to foster environmental quality and preservation. Section 101(b)(4) declares that one objective of the national environmental policy is to “preserve important historic, cultural, and natural aspects of our national heritage.” For major federal actions significantly affecting environmental quality, federal agencies must prepare, and make available for public comment, an environmental impact statement.

Table A2-5: Applicable Laws and Regulations for Cultural Resources

Applicable Regulation	Description
Archaeological Resources Protection Act of 1979 (NRPA) (16 USC 470aa-470II)	NRPA requires a permit for any excavation or removal of archaeological resources from public lands or Indian lands. The statute provides both civil and criminal penalties for violation of permit requirements and for excavation or removal of protected resources without a permit.
Native American Graves Protection and Repatriation Act of 1990 (NAGPRA) (Public Law [PL] 101–601)	NAGPRA vests ownership or control of certain human remains and cultural items excavated or discovered on federal or tribal lands, in designated Native American tribes, organizations, or groups. The Act further requires notification of the appropriate Secretary or other head of any federal agency upon the discovery of Native American cultural items on federal or tribal lands; proscribes trafficking in Native American human remains and cultural items; requires federal agencies and museums to compile an inventory of Native American human remains and associated funerary objects, and to notify affected Indian tribes of this inventory; and provides for the repatriation of Native American human remains and specified objects possessed or controlled by federal agencies or museums.
Advisory Council Regulation, Protection of Historic Properties (SHPO) (36 CFR 800)	Establishes procedures for compliance with Section 106 of the NHPA. These regulations define the Criteria of Adverse Effect, define the role of the State Historic Preservation Officer (SHPO) in the Section 106 review process, set forth documentation requirements, and describe procedures to be followed if significant historic properties are discovered during implementation of an undertaking. Prehistoric and historic resources deemed significant (i.e., eligible for listing in the NRHP, per 36 CFR 60.4) must be considered in project planning and construction. The responsible federal agency must submit any proposed undertaking that may affect NRHP-eligible properties to the SHPO for review and comment prior to project approval.
National Park Service Regulations, National Register of Historic Places (NRHP) (36 CFR 60)	Sets forth procedures for nominating properties to the NRHP, and present the criteria to be applied in evaluating the eligibility of historic and prehistoric resources for listing in the NRHP.
Archaeology and Historic Preservation; Secretary of the Interior's Standards and Guidelines (FR 190:44716–44742)	Non-regulatory technical advice about the identification, evaluation, documentation, study, and other treatment of cultural resources. Notable in these Guidelines are the "Standards for Archaeological Documentation" (p. 44734) and "Professional Qualifications Standards for Archaeology" (pp. 44740–44741).

Table A2-5: Applicable Laws and Regulations for Cultural Resources

Applicable Regulation	Description
American Indian Religious Freedom Act of 1978	The American Indian Religious Freedom Act pledges to protect and preserve the traditional religious rights of American Indians, Aleuts, Eskimos, and Native Hawaiians. Before the act was passed, certain federal laws interfered with the traditional religious practices of many American Indians. The Act establishes a national policy that traditional Native American practices and beliefs, sites (and right of access to those sites), and the use of sacred objects shall be protected and preserved.
Department of Transportation Act of 1966, Section 4(f)	Section 4(f) of the Act requires a comprehensive evaluation of all environmental impacts resulting from federal-aid transportation projects administered by the Federal Highway Administration (FHA), FTA, and the Federal Aviation Administration (FAA) that involve the use—or interference with use—of several types of land: public park lands, recreation areas, and publicly or privately owned historic properties of federal, state, or local significance. The Section 4(f) evaluation must be sufficiently detailed to permit the U.S. Secretary of Transportation to determine that there is no feasible and prudent alternative to the use of such land, in which case the project must include all possible planning to minimize harm to any park, recreation, wildlife and waterfowl refuge, or historic site that would result from the use of such lands. If there is a feasible and prudent alternative, a proposed project using Section 4(f) lands cannot be approved by the Secretary. Detailed inventories of the locations and likely impacts on resources that fall into the Section 4(f) category are required in project-level environmental assessments.
State	
California Health and Safety Code Section, and California PRC Section	Disturbance of human remains without the authority of law is a felony (California Health and Safety Code, Section 7052). According to State law (California Health and Safety Code, Section 7050.5, California PRC, Section 5097.98), if human remains are discovered or recognized in any location other than a dedicated cemetery, there shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent human remains until 1) the coroner of the county has been informed and has determined that no investigation of the cause of death is required; 2) and if the remains are of Native American origin, and if the descendants from the deceased Native Americans have made a recommendation to the landowner or the person responsible for the excavation work for means of treating or disposing of with appropriate dignity the human remains and any associated

Table A2-5: Applicable Laws and Regulations for Cultural Resources

Applicable Regulation	Description
	grave goods as provided in PRC Section 5097.98; or the Native American Heritage Commission was unable to identify a descendent or the descendent failed to make a recommendation within 24 hours after being notified by the Commission. According to the California Health and Safety Code, six or more human burials at one location constitute a cemetery (Section 8100), and disturbance of Native American cemeteries is a felony (Section 7052). Section 7050.5 requires that construction or excavation be stopped in the vicinity of discovered human remains until the coroner can determine whether the remains are those of a Native American. If the remains are determined to be Native American, the coroner must contact the Native American Heritage Commission, who has jurisdiction over Native American remains (California Health and Safety Code, 7052.5c; PRC, Section 5097.98).
California Environmental Quality Act (CEQA Guidelines Section 15380)	CEQA requires that public agencies financing or approving public or private projects must assess the effects of the project on cultural resources. Furthermore, it requires that, if a project results in significant impacts on important cultural resources, alternative plans or mitigation measures must be considered; only significant cultural resources, however, need to be addressed. Thus, prior to the development of mitigation measures, the importance of cultural resources must be determined.
Assembly Bill 52 (Statutes of 2014)	Assembly Bill (AB) 52 (Gatto, Chapter 532, Statutes of 2014) recognizes that tribal sovereignty and the unique relationship of California local governments and public agencies with California Native American tribal governments, while respecting the interests and roles of project proponents. This requires specific consultation processes for project review and approval.
Local	
City/County General Plans	Policies, goals, and implementation measures in county or city general plans may contain measures applicable to cultural and paleontological resources. In addition to the enactment of local and regional preservation ordinances, CEQA requires that resources included in local registers be considered (pursuant to Section 5020.1(k) of the PRC). Therefore, local county and municipal policies, procedures, and zoning ordinances must be considered in the context of project-specific undertakings. Cultural resources are generally discussed in either the open space element or the conservation element of the general plan. Many local municipalities include cultural resources preservation elements in their general plans that include some mechanism

Table A2-5: Applicable Laws and Regulations for Cultural Resources

Applicable Regulation	Description
	pertaining to cultural resources in those communities. In general, the sections pertaining to archaeological and historical properties are put in place to afford the cultural resources a measure of local protection. The policies outlined in the individual general plans should be consulted prior to any undertaking or project.
Cooperative Agreements Among Agencies	Cooperative agreements among land managing agencies (BLM, National Park Service, U.S. Forest Services, California State Parks, Bureau of Indian Affairs, Department of Defense, to name a few) the SHPO and ACHP may exist and will need to be complied with on specific projects. In addition, certain agencies have existing Programmatic Agreements requiring permits (CPUC, BLM) to complete archaeological investigations and employ the Secretary of Interior's Professional Qualification Standards and Guidelines (36 CFR 61).

6. Energy Demand

Applicable laws and regulations associated with energy resources are discussed in Table A2-6.

Table A2-6: Applicable Laws and Regulations for Energy Resources

Regulation	Description
Federal	
Energy Policy and Conservation Act	The Energy Policy and Conservation Act of 1975 sought to ensure that all vehicles sold in the U.S. would meet certain fuel economy goals. Through this Act, Congress established the first fuel economy standards for on-road motor vehicles in the U.S. Pursuant to the Act, the National Highway Traffic and Safety Administration, which is part of the U.S. Department of Transportation (DOT), is responsible for establishing additional vehicle standards and for revising existing standards. From 1986 to 2012, fuel economy standards for passenger vehicles remained nearly stagnant at between 20.7 mpg for trucks and 27.5 mpg for light duty cars. In 2010, U.S. EPA adopted new passenger vehicle standards starting with the 2012 model year that incorporates GHG emissions standards on a vehicle-footprint basis and to accommodate the efficiencies of electric and other alternatively fueled vehicles. Additional standards for models years through 2025 were adopted in 2012. Translating the GHG standards to miles per

Table A2-6: Applicable Laws and Regulations for Energy Resources

Regulation	Description
	gallon equivalents, the projected fuel economy standard for new passenger cars and light trucks combined would increase from 30.1 to 54.5 between 2012 and 2025 model years. Until 2010, heavy-duty vehicles (i.e., vehicles and trucks over 8,500 pounds gross vehicle weight) were not subject to fuel economy standards. In 2011, the National Highway Traffic Safety Administration (NHTSA) and U.S. EPA released fuel economy standards for medium and heavy-duty vehicles (over 8,500 pounds gross vehicle weight) for 2014 through 2018 model years. Fuel economy standards for these vehicles vary by vehicle profession and include explicit mpg goals as well as percent reduction targets. Stricter fuel economy standards for medium and heavy-duty vehicles are expected in 2015. Compliance with federal fuel economy standards is determined on the basis of each manufacturer's average fuel economy for the portion of its vehicles produced for sale in the U.S. The Corporate Average Fuel Economy (CAFE) program, administered by the U.S. EPA, was created to determine vehicle manufacturers' compliance with the fuel economy standards. The U.S. EPA calculates a CAFE value for each manufacturer based on city and highway fuel economy test results and vehicle sales. Based on the information generated under the CAFE program, the DOT is authorized to assess penalties for noncompliance.
Energy Policy Act (EPAct) of 1992	EPAct was passed to reduce the country's dependence on foreign petroleum and improve air quality. EPAct includes several parts intended to build an inventory of alternative fuel vehicles (AFVs) in large, centrally fueled fleets in metropolitan areas. EPAct requires certain federal, state, and local government and private fleets to purchase a percentage of light duty AFVs capable of running on alternative fuels each year. In addition, financial incentives are included in EPAct. Federal tax deductions will be allowed for businesses and individuals to cover the incremental cost of AFVs. States are also required by the act to consider a variety of incentive programs to help promote AFVs.
Energy Policy Act of 2005	The Energy Policy Act of 2005 was signed into law on August 8, 2005. Generally, the act provides for renewed and expanded tax credits for electricity generated by qualified energy sources, such as landfill gas; provides bond financing, tax incentives, grants, and loan guarantees for a clean renewable energy and rural community electrification; and

Table A2-6: Applicable Laws and Regulations for Energy Resources

Regulation	Description
	establishes a federal purchase requirement for renewable energy.
State	
Warren-Alquist State Energy Resources Conservation and Development Act of 1974	The Warren-Alquist Act is the legislation that created and gives statutory authority to the CEC (formally called the State Energy Resources Conservation and Development Commission).
Senate Bill 1389, Integrated Energy Policy Reports (Statutes of 2002)	Senate Bill (SB) 1389 (Bowen, Chapter 568, Statutes of 2002) requires the CEC to prepare a biennial integrated energy policy report that contains an assessment of major energy trends and issues facing the State's electricity, natural gas, and transportation fuel sectors and provides policy recommendations to conserve resources; protect the environment; ensure reliable, secure, and diverse energy supplies; enhance the State's economy; and protect public health and safety (PRC Section 25301[a]). The CEC prepares these assessments and associated policy recommendations every 2 years, with updates in alternate years, as part of the Integrated Energy Policy Report (IEPR). Preparation of the IEPR involves close collaboration with federal, state, and local agencies and a wide variety of stakeholders in an extensive public process to identify critical energy issues and develop strategies to address those issues.
California Long-Term Energy Efficiency Strategic Plan	On September 18, 2008, the CPUC adopted California's first Long Term Energy Efficiency Strategic Plan, presenting a single roadmap to achieve maximum energy savings across all major groups and sectors in California. This comprehensive plan for 2009 to 2020 is the State's first integrated framework of goals and strategies for saving energy, covering government, utility, and private sector actions, and holds energy efficiency to its role as the highest priority resource in meeting California's energy needs. Action plans have also been developed to provide a framework for implementing each chapter of the Strategic plan, including the Residential Zero Net Energy (ZNE) Action Plan (June 2015), the Codes and Standards Action Plan (March 2014), Research and Technology Action Plan (2013), Lighting Action Plan (November 2013), and the ZNE Commercial Building Action Plan (June 2011).
California Building Energy Efficiency	California's Building Energy Efficiency Standards conserve electricity and natural gas in new building construction and are administered by the CEC. Local governments enforce the

Table A2-6: Applicable Laws and Regulations for Energy Resources

Regulation	Description
Standards (24 CCR Part 6)	standards through local building permitting and inspections. The CEC has updated these standards on a periodic basis. The new 2016 Building Energy Efficiency Standards, which take effect on January 1, 2017, are approximately 28 percent more efficient than previous standards for residential construction.
Assembly Bill 758, Comprehensive Energy Efficiency Plan for Existing Buildings (Statues of 2009)	AB 758 (Skinner, Chapter 470, Statutes 2009) requires the CEC, in collaboration with the CPUC and stakeholders, to develop a comprehensive program to achieve greater energy efficiency in the State's existing buildings.
Senate Bill X1-2, California 2020 Renewable Energy Portfolio Standard (RPS) (Statutes of 2011), and Senate Bill 350, 2030 RPS Update (Statutes of 2015).	In 2011, Governor Brown signed SB X1-2, which requires retail sellers of electricity, including investor-owned utilities and community choice aggregators, to provide at least 33 percent of their electricity supply (portfolio) from renewable sources by 2020. The CPUC and the CEC jointly implement the Statewide RPS program through rulemakings and monitoring the activities of electric energy utilities in the state. SB 350 (De Leon, Chapter 547, Statutes of 2015) requires that the RPS be increased to 50 percent by 2030.
California Qualifying Facility and Combined Heat and Power Program Settlement	In December 2010, the CPUC approved California's Qualifying Facility and Combined Heat and Power Program Settlement, which established a CHP framework for the State's investor-owned utilities. The settlement established a near-term target of 3,000 megawatts (MW) of CHP for entities under the jurisdiction of the CPUC, although this target includes not just new CHP, but capacity from renewal of contracts due to expire in the next 3 years. The CPUC has also adopted a settlement agreement that includes reforms to the Rule 21 interconnection process to provide a clear, predictable path to interconnection of distributed generation while maintaining the safety and reliability of the grid.
Assembly Bill 2076, California Strategy to Reduce Petroleum Dependence (Statutes of 2000)	AB 2076 (Shelley, Chapter 936, Statutes of 2000) requires the CEC and the CARB to develop and submit to the Legislature a strategy to reduce petroleum dependence in California. The statute requires the strategy to include goals for reducing the rate of growth in the demand for petroleum fuels. In addition, the strategy is required to include recommendations to increase transportation energy efficiency as well as the use of non-petroleum fuels and advanced transportation technologies including alternative fuel vehicles, hybrid vehicles, and high-fuel efficiency vehicles. The strategy, *Reducing California's Petroleum Dependence*, was adopted by the CEC and CARB in

Table A2-6: Applicable Laws and Regulations for Energy Resources

Regulation	Description
	2003. The strategy recommends that California reduce inroad gasoline and diesel fuel demand to 15 percent below 2003 demand levels by 2020 and maintain that level for the foreseeable future; the Governor and Legislature work to establish national fuel economy standards that double the fuel efficiency of new cars, light trucks, and sport utility vehicles; and increase the use of nonpetroleum fuels to 20 percent of on-road fuel consumption by 2020 and 30 percent by 2030.
Assembly Bill 118, Alternative and Renewable Fuel and Vehicle Technology Program (Statutes of 2007)	AB 118 (Nunez, Chapter 750, Statues of 2007) created the CEC's Alternative and Renewable Fuel and Vehicle Technology Program. The statute, subsequently amended by AB 109 (Nunez, Chapter 313, Statues of 2008), authorizes the CEC to develop and deploy alternative and renewable fuels and advanced transportation technologies to help attain the State's climate change policies.
Assembly Bill 1007, Alternative Fuels Plan	AB 1007 requires the CEC to prepare a state plan to increase the use of alternative fuels in California. Any environmental document prepared for a strategic growth plan, regional blueprint general plan metropolitan planning or transportation plan should include an evaluation of alternative fuels for emissions or criteria pollutants, TACs, GHGs, water pollutants, and other harmful substances, and their impacts on petroleum consumption, and set goals for increased alternative fuel use in the state for the next decades, and recommend policies to ensure the alternative fuel goals are attained, including standards on transportation fuels and vehicle and policy mechanisms to ensure vehicles operating on alternative fuels use those fuels to the maximum extent feasible.
Executive Order S-06-06, Bioenergy Action Plan	Executive Order S-06-06, signed in 2006, establishes targets for the use and production of biofuels and biopower and directs state agencies to work together to advance biomass programs in California while providing environmental protection and mitigation. This executive order establishes the following target to increase the production and use of bioenergy, including ethanol and biodiesel fuels made from renewable resources: produce a minimum of 20 percent of its biofuels within California by 2010, 40 percent by 2020, and 75 percent by 2050. The Executive Order also calls for the state to meet a target for use of biomass electricity.
Executive Order S-01-07, Governor's Low Carbon Fuel Standard (LCFS)	Executive Order S-01-07, signed in 2007, establishes a statewide goal to reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020 through establishment of the Low Carbon Fuel Standard (LCFS). The

Table A2-6: Applicable Laws and Regulations for Energy Resources

Regulation	Description
	executive order requires LCFS to be incorporated into the State Alternative Fuels Plan required by AB 1007 and is one of the proposed discrete early action GHG reduction measures identified by CARB pursuant to AB 32. In January, 2010, the Office of Administrative Law approved the LCFS regulation.
Local	
City/County General Plans	Many cities and counties have general plan elements and policies that specifically address energy use and conservation. Those energy conservation measures outlined in the various county and city general plans contain goals, objectives, and policies aimed at reducing energy consumption. Proponents of specific projects would be required to consult the applicable general plans and design the projects consistent with the guidelines of those general plans in which the projects are located.

7. Geology, Soils and Mineral Resources

Applicable laws and regulations associated with geology and soils are discussed in Table A2-7.

Table A2-7: Applicable Laws and Regulations for Geology, Soils, and Mineral Resources

Regulation	Description
Federal	
SDWA - Federal UIC Class II Program for Oil and Gas Related Injection Wells	The Class II Program for Oil and Gas Related Injection Wells requires states to meet EPA's minimum requirements for UIC programs including strict construction and conversion standards and regular testing and inspection. Enhanced oil and gas recovery wells may either be issued permits or be authorized by rule. Disposal wells are issued permits.
CWA	This law was enacted to restore and maintain the chemical, physical, and biological integrity of the nation's waters by regulating point and nonpoint pollution sources, providing assistance to publicly owned treatment works for the improvement of wastewater treatment, and maintaining the integrity of wetlands. This includes the creation of a system that requires states to establish discharge standards specific to water bodies (National Pollution Discharge Elimination System [NPDES]), which regulates storm water discharge from construction sites through the implementation of a Storm Water Pollution Prevention Plan (SWPPP). In California, the State's

Table A2-7: Applicable Laws and Regulations for Geology, Soils, and Mineral Resources

Regulation	Description
	NPDES permit program is implemented and administered by the local Regional Water Quality Control Boards.
Earthquake Hazards Reduction Act and National Earthquake Hazards Reduction Program Act	This Act established the National Earthquake Hazards Reduction Program to reduce the risks to life and property from future earthquakes. This program was significantly amended in November 1990 by the National Earthquake Hazards Reduction Program Act by refining the description of agency responsibilities, program goals and objectives.
Mining and Mineral Policy Act	The Mining and Mineral Act of 1970 declared that the Federal Government policy is to encourage private enterprise in the development of a sound and stable domestic mineral industry, domestic mineral deposits, minerals research, and methods for reclamation in the minerals industry.
State	
Seismic Hazards Mapping Act (PRC Section 2690–2699)	The Seismic Hazards Mapping Act (the Act) of 1990 (PRC, Chapter 7.8, Division 2) directs the California DOC, Division of Mines and Geology (now called California Geological Survey [CGS]) to delineate Seismic Hazard Zones. The purpose of the Act is to reduce the threat to public health and safety and to minimize the loss of life and property by identifying and mitigating seismic hazards. These include areas identified that are subject to the effects of strong ground shaking, such as liquefaction, landslides, tsunamis, and seiches. Cities, counties, and state agencies are directed to use seismic hazard zone maps developed by CGS in their land-use planning and permitting processes. The Act requires that site-specific geotechnical investigations be performed prior to permitting most urban development projects within seismic hazard zones.
Alquist-Priolo Earthquake Fault Zoning Act (PRC Section 2621 et seq.)	California's Alquist-Priolo Act, originally enacted in 1972 as the Alquist-Priolo Special Studies Zones Act and renamed in 1994, is intended to reduce the risk to life and property from surface fault rupture during earthquakes. The Alquist-Priolo Act prohibits the location of most types of structures intended for human occupancy across the traces of active faults and strictly regulates construction in the corridors along active faults (Earthquake Fault Zones). It also defines criteria for identifying active faults, giving legal weight to terms such as "active," and establishes a process for reviewing building proposals in and adjacent to Earthquake Fault Zones. Under the Alquist-Priolo Act, faults are zoned, and construction along or across them is strictly regulated if they are "sufficiently active" and "well-defined." A fault is considered sufficiently active if one or more

Table A2-7: Applicable Laws and Regulations for Geology, Soils, and Mineral Resources

Regulation	Description
	of its segments or strands shows evidence of surface displacement during Holocene time (defined for the purposes of the act as within the last 11,000 years). A fault is considered well-defined if its trace can be clearly identified by a trained geologist at the ground surface or in the shallow subsurface, using standard professional techniques, criteria, and judgment.
California Division of Oil, Gas, and Geothermal Resources (DOGGR)(PRC Section 3106)	PRC Section 3106 mandates the supervision of drilling, operation, maintenance, and abandonment of oil wells for the purpose of preventing: damage to life, health, property, and natural resources; damage to underground and surface waters suitable for irrigation or domestic use; loss of oil, gas, or reservoir energy; and damage to oil and gas deposits by infiltrating water and other causes. In addition, the DOGGR regulates drilling, production, injection, and gas storage operations in accordance with 14 CCR Chapter 4, Subchapter 1.
Landslide Hazard Identification Program (PRC Section 2687(a))	The Landslide Hazard Identification Program requires the State Geologist to prepare maps of landslide hazards within urbanizing areas. According to PRC Section 2687(a), public agencies are encouraged to use these maps for land use planning and for decisions regarding building, grading, and development permits.
California Building Standards Code (CBSC) (24 CCR)	California's minimum standards for structural design and construction are given in the CBSC (24 CCR). The CBSC is based on the Uniform Building Code (International Code Council 1997), which is used widely throughout U.S. (generally adopted on a state-by-state or district-by-district basis) and has been modified for California conditions with numerous, more detailed or more stringent regulations. The CBSC provides standards for various aspects of construction, including (i.e., not limited to) excavation, grading, and earthwork construction; fills and embankments; expansive soils; foundation investigations; and liquefaction potential and soil strength loss. In accordance with California law, proponents of specific projects would be required to comply with all provisions of the CBSC for certain aspects of design and construction.
Surface Mining and Reclamation Act (SMARA)	The intent of SMARA of 1975 is to promote production and conservation of mineral resources, minimize environmental effects of mining, and to assure that mined lands will be reclaimed to conditions suitable for alternative uses. An important part of the SMARA legislation requires the State Geologist to classify land according to the presence or absence of significant mineral deposits. Local jurisdictions are given the

Table A2-7: Applicable Laws and Regulations for Geology, Soils, and Mineral Resources

Regulation	Description
	authority to permit or restrict mining operations, adhering to the SMARA legislation. Classification of an area using MRZs to designate lands that contain mineral deposits are designed to protect mineral deposits from encroaching urbanization and land uses that are incompatible with mining. The MRZ classifications reflect varying degrees of mineral significance, determined by available knowledge of the presence or absence of mineral deposits as well as the economic potential of the deposits.
Local	
Geotechnical Investigation	Local jurisdictions typically regulate construction activities through a process that may require the preparation of a site-specific geotechnical investigation. The purpose of a site-specific geotechnical investigation is to provide a geologic basis for the development of appropriate construction design. Geotechnical investigations typically assess bedrock and Quaternary geology, geologic structure, soils, and the previous history of excavation and fill placement. Proponents of specific projects that require design of earthworks and foundations for proposed structures will need to prepare geotechnical investigations on the physical properties of soil and rock at the site prior to project design.
Local Grading and Erosion Control Ordinances	Many counties and cities have grading and erosion control ordinances. These ordinances are intended to control erosion and sedimentation caused by construction activities. A grading permit is typically required for construction-related projects. As part of the permit, project applicants usually must submit a grading and erosion control plan, vicinity and site maps, and other supplemental information. Standard conditions in the grading permit include a description of Best Management Practices similar to those contained in a SWPPP.
City/County General Plans	Most city and county general plans include an element that covers geology, soil, and mineral resources within that jurisdiction.

8. Greenhouse Gases

Applicable laws and regulations specific to the reduction of GHG emissions are listed in Table A2-8 below. It should be noted that other laws and regulations described under Energy Demand in this Environmental Setting would also reduce GHG emissions.

Table A2-8: Applicable Laws and Regulations for Greenhouse Gases

Regulation	Description
Federal	
Mandatory Greenhouse Gas Reporting Rule	On September 22, 2009, U.S. EPA issued a final rule for mandatory reporting of GHGs from large GHG emissions sources in the U.S. In general, this national reporting requirement will provide U.S. EPA with accurate and timely GHG emissions data from facilities that emit 25,000 metric tons or more of CO_2 per year. This publically available data will allow the reporters to track their own emissions, compare them to similar facilities, and aid in identifying cost effective opportunities to reduce emissions in the future. Reporting is at the facility level, except that certain suppliers of fossil fuels and industrial greenhouse gases along with vehicle and engine manufacturers will report at the corporate level. An estimated 85 percent of the total U.S. GHG emissions, from approximately 10,000 facilities, are covered by this final rule.
National Program to Cut Greenhouse Gas Emissions and Improve Fuel Economy for Cars and Trucks	On September 15, 2009, U.S. EPA and the Department of Transportation's NHTSA proposed a new national program that would reduce GHG emissions and improve fuel efficiency for all new cars and trucks sold in the U.S. EPA proposed the first-ever national GHG emissions standards under the CAA, and NHTSA proposed CAFE standards under the Energy Policy and Conservation Act. This proposed national program would allow automobile manufacturers to build a single light-duty national fleet that satisfies all requirements under both Federal programs and the standards of California and other states. The President requested that U.S. EPA and NHTSA, on behalf of the Department of Transportation, develop, through notice and comment rulemaking, a coordinated National Program under the CAA and the Energy Policy and Conservation Act (EPCA), as amended by the Energy Independence and Security Act (EISA), to reduce fuel consumption by and GHG emissions of light-duty vehicles for model years 2017-2025. U.S. EPA and NHTSA are developing the proposal based on extensive technical analyses, an examination of the factors required under the respective statutes and on discussions with individual motor vehicle manufacturers and other stakeholders. The National Program would apply to passenger cars, light-duty trucks, and medium-duty passenger vehicles (light-duty vehicles) built in those model years (76 FR 48758). The first part of this program (i.e., 2012-2016) is implemented. The next part (i.e., 2017-2025) is currently in process for which

Table A2-8: Applicable Laws and Regulations for Greenhouse Gases

Regulation	Description
	CARB is proposed to accept compliance thereof as also being acceptable for California compliance, similar to what was done for the first part.
Endangerment and Cause or Contribute Findings	On December 7, 2009, U.S. EPA adopted its Proposed Endangerment and Cause or Contribute Findings for Greenhouse Gases under the CAA (Endangerment Finding). The Endangerment Finding is based on Section 202(a) of the CAA, which states that the Administrator (of EPA) should regulate and develop standards for "emission[s] of air pollution from any class of classes of new motor vehicles or new motor vehicle engines, which in [its] judgment cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health or welfare." The rule addresses Section 202(a) in two distinct findings. The first addresses whether or not the concentrations of the six key GHGs (i.e., carbon dioxide [CO_2], methane, nitrous oxide [N_2O], hydrofluorocarbons [HFCs], perfluorocarbons [PFCs], and sulfur hexafluoride [SF_6]) in the atmosphere threaten the public health and welfare of current and future generations. The second addresses whether or not the combined emissions of GHGs from new motor vehicles and motor vehicle engines contribute to atmospheric concentrations of GHGs and therefore the threat of climate change. The Administrator found that atmospheric concentrations of GHGs endanger the public health and welfare within the meaning of Section 202(a) of the CAA. The evidence supporting this finding consists of human activity resulting in "high atmospheric levels" of GHG emissions, which are very likely responsible for increases in average temperatures and other climatic changes. Furthermore, the observed and projected results of climate change (e.g., higher likelihood of heat waves, wild fires, droughts, sea level rise, and higher intensity storms) are a threat to the public health and welfare. Therefore, GHGs were found to endanger the public health and welfare of current and future generations. The Administrator also found that GHG emissions from new motor vehicles and motor vehicle engines are contributing to air pollution, which is endangering public health and welfare. EPA's final findings respond to the 2007 U.S. Supreme Court decision that GHGs fit within the CAA definition of air pollutants. The findings do not in and of themselves impose any emission reduction requirements but rather allow U.S. EPA to finalize the

Table A2-8: Applicable Laws and Regulations for Greenhouse Gases

Regulation	Description
	GHG standards proposed earlier in 2009 for new light-duty vehicles as part of the joint rulemaking with the Department of Transportation.
Significant New Alternatives Policy	U.S. EPA's Significant New Alternatives Policy (SNAP) program provide an evolving list of alternatives (i.e., chemicals that may replace one that is currently in use for a specific purpose). U.S. EPA makes decisions informed by the overall understanding of the environmental and human health impacts as well as the current knowledge regarding available substitutes. Where U.S. EPA is determining whether to add a new substitute to the list, U.S. EPA compares the risk posed by the new substitute to the risks posed by other alternatives on the list and determines whether that specific new substitutes poses more risk than already-listed alternatives for the same use. Section 612 of the Clean Air Act provides that U.S. EPA must prohibit the use of a substitute where it has determined that there are other available substitutes that pose less overall risk to human health and the environment.
State	
Senate Bill 32 and Assembly Bill 197 (Statutes of 2016)	Governor Brown signed SB 32 (Pavley, Chapter 249, Statutes of 2016) and AB 197 (Garcia, Chapter 250, Statutes of 2016) on September 8, 2016. SB 32 establishes a statewide target of reducing statewide GHG emissions to 40 percent below 1990 levels by 2030. This is the same target as Executive Order B-30-15 (2015). SB 32 authorizes CARB to adopt regulations to achieve the maximum technologically-feasible and cost-effective GHG reductions. AB 197 creates a legislative committee to oversee CARB and requires CARB to take specific actions when adopting plans and regulations pursuant to SB 32 related to disadvantaged communities, identification of specific information regarding reduction measures, and information regarding existing greenhouse gases at the local level.
Executive Order B-30-15	Executive Order B-30-15 (2015) established a California GHG reduction target of 40 percent below 1990 levels by 2030. To accomplish this goal, directs state agencies to take measures consistent with their existing authority to reduce greenhouse gas emissions. In addition, the California Air Resources Board will initiate a public process in the summer of 2015 and work closely with other state agencies to update the State's climate change Scoping Plan. The updated Scoping Plan will provide a

Table A2-8: Applicable Laws and Regulations for Greenhouse Gases

Regulation	Description
	framework for achieving the 2030 target and will be completed and adopted by the Air Resources Board in 2016. Concurrent planning efforts related to energy efficiency in existing buildings (AB 758), short-lived climate pollutants, sustainable freight, Greenhouse Gas Reduction Fund Investments, forest health, and others will be coordinated with, and feed into, the updated Scoping Plan.
Executive Order S-3-05	Executive Order S-3-05, which was signed by former Governor Schwarzenegger in 2005, proclaims that California is vulnerable to the impacts of climate change. It declares that increased temperatures could reduce the Sierra's snowpack, further exacerbate California's air quality problems, and potentially cause a rise in sea levels. To combat those concerns, the Executive Order established total greenhouse gas emission targets. Specifically, emissions are to be reduced to the 2000 level by 2010, the 1990 level by 2020, and to 80 percent below the 1990 level by 2050. The Executive Order directed the Secretary of the California Environmental Protection Agency (CalEPA) to coordinate a multi-agency effort to reduce greenhouse gas emissions to the target levels. The Secretary will also submit biannual reports to the governor and state legislature describing: progress made toward reaching the emission targets; impacts of global warming on California's resources; and mitigation and adaptation plans to combat these impacts. To comply with the Executive Order, the Secretary of the Cal/EPA created the Climate Action Team (CAT) made up of members from various state agencies and commission. CAT released its first report in March 2006. The report proposed to achieve the targets by building on voluntary actions of California businesses, local government and community actions, as well as through state incentive and regulatory programs.
Senate Bill 350, Clean Energy and Pollution Reduction Act of 2015 (Statues of 2015)	The Clean Energy and Pollution Reduction Act of 2015 (De León, Chapter 547, Statutes of 2015) requires the amount of electricity generated and sold to retail customers per year from eligible renewable energy resources be increased to 50percent by December 31, 2030. This act also requires doubling of the energy efficiency savings in electricity and natural gas for retail customers, through energy efficiency and conservation, by December 31, 2030.

Table A2-8: Applicable Laws and Regulations for Greenhouse Gases

Regulation	Description
Senate Bill 605, Short-Lived Climate Pollutants (Statutes of 2014)	SB 605 (Lara, Chapter 605, Statutes of 2014) directs CARB to complete a comprehensive strategy to reduce emissions of short-lived climate pollutants in the state through the following actions: (1) Complete an inventory of sources and emissions of short-lived climate pollutants in the state based on available data. (2) Identify research needs to address any data gaps. (3) Identify existing and potential new control measures to reduce emissions. (4) Prioritize the development of new measures for short-lived climate pollutants that offer co-benefits by improving water quality or reducing other air pollutants that impact community health and benefit disadvantaged communities, as identified pursuant to Section 39711 of the Health and Safety Code. (5) Coordinate with other state agencies and districts to develop measures identified as part of the comprehensive strategy.
Assembly Bill 32, the California Global Warming Solutions Act (Statutes of 2006)	In September 2006, former Governor Arnold Schwarzenegger signed AB 32 (Nunez, Chapter 488, Statutes of 2006), the California Global Warming Solutions Act of 2006. AB 32 establishes regulatory, reporting, and market mechanisms to achieve quantifiable reductions in GHG emissions and a cap on statewide GHG emissions. AB 32 requires that statewide GHG emissions be reduced to 1990 levels by 2020. This reduction will be accomplished through an enforceable statewide cap on GHG emissions that was be phased in starting in 2012. To effectively implement the cap, AB 32 directs CARB to develop and implement regulations to reduce statewide GHG emissions from substantial stationary and mobile source categories. Requires CARB to produce a Scoping Plan by 1/1/2009 and at least every 5 years afterwards that details how the state will meet its GHG reduction targets. AB 32 requires that CARB adopt a quantified cap on GHG emissions representing 1990 emissions levels and disclose how it arrives at the cap; institute a schedule to meet the emissions cap; and develop tracking, reporting, and enforcement mechanisms to ensure that the state achieves the reductions in GHG emissions necessary to meet the cap. AB 32 also includes guidance to institute emissions reductions in an economically efficient manner and conditions to ensure that businesses and consumers are not unfairly affected by the reductions.

Table A2-8: Applicable Laws and Regulations for Greenhouse Gases

Regulation	Description
Assembly Bill 1493 (Statutes of 2002)	In September 2004, CARB approved regulations to reduce GHG emissions from new motor vehicles. The Board took this action pursuant to Chapter 200, Statutes of 2002 (AB 1493, Pavley) which directed the Board to adopt regulations that achieve the maximum feasible and cost effective reduction in greenhouse gas emissions from motor vehicles. The regulations, which took effect in 2006 following an opportunity for legislative review, apply to new passenger vehicles and light duty trucks beginning with the 2009 model year.
Executive Order S-1-07	Executive Order S-1-07, which was signed by former Governor Schwarzenegger in 2007, proclaims that the transportation sector is the main source of GHG emissions in California, at over 40 percent of statewide emissions. It establishes a goal that the carbon intensity of transportation fuels sold in California should be reduced by a minimum of 10 percent by 2020. This order also directed CARB to determine if this LCFS could be adopted as a discrete early action measure after meeting the mandates in AB 32. CARB adopted the LCFS on April 23, 2009.
Senate Bill 1368 (Statutes of 2006)	SB 1368 (Perata, Chapter 598, Statutes of 2006) is the companion bill of AB 32 and was signed by former Governor Schwarzenegger in September 2006. SB 1368 requires the CPUC to establish a GHG emission performance standard for baseload generation from investor owned utilities by February 1, 2007. The CEC must establish a similar standard for local publicly owned utilities by June 30, 2007. These standards cannot exceed the GHG emission rate from a baseload combined-cycle natural gas fired plant. The legislation further requires that all electricity provided to California, including imported electricity, must be generated from plants that meet the standards set by the CPUC and CEC.
Senate Bill 1078 (Statutes of 2002), Senate Bill 107 (Statutes of 2006), and Senate Bill x1 2 (Statutes of 2010)	SB 1078 (Sher, Chapter 516, Statutes of 2002) requires retail sellers of electricity, including investor-owned utilities and community choice aggregators, to provide at least 20 percent of their supply from renewable sources by 2017. SB 107 (Simitian, Chapter 464, Statutes of 2006) changed the target date to 2010. In 2010, SBx1 2 (Simitian, Chapter 1, Statutes of 2010) was chaptered, which expanded the State's Renewable Portfolio Standard to 33 percent renewable energy by 2020.
Senate Bill 97 (Statutes of 2007)	As directed by SB 97 (Dutton, Chapter 185, Statutes of 2007), the Natural Resources Agency adopted Amendments to the CEQA

Table A2-8: Applicable Laws and Regulations for Greenhouse Gases

Regulation	Description
	Guidelines for GHG emissions on December 30, 2009. On February 16, 2010, the Office of Administrative Law approved the Amendments, and filed them with the Secretary of State for inclusion in the California Code of Regulations. The Amendments became effective on March 18, 2010.
Senate Bill 375 (Statutes of 2008)	SB 375 (Steinberg, Chapter 728, Statutes of 2008), signed in September 2008, aligns regional transportation planning efforts, regional GHG reduction targets, and land use and housing allocation. SB 375 requires Metropolitan Planning Organizations (MPOs) to adopt a Sustainable Communities Strategy (SCS) or Alternative Planning Strategy (APS), which will prescribe land use allocation in that MPO's Regional Transportation Plan (RTP). CARB, in consultation with MPOs, will provide each affected region with reduction targets for GHGs emitted by passenger cars and light trucks in the region for the years 2020 and 2035. These reduction targets will be updated every 8 years, but can be updated every 4 years if advancements in emissions technologies affect the reduction strategies to achieve the targets. CARB is also charged with reviewing each MPO's SCS or APS for consistency with its assigned targets. If MPOs do not meet the GHG reduction targets, transportation projects would not be eligible for funding programmed after January 1, 2012. This bill also extends the minimum time period for the Regional Housing Needs Allocation (RNHA) cycle from 5 years to 8 years for local governments located within an MPO that meets certain requirements. City or county land use policies (including general plans) are not required to be consistent with the RTP (and associated SCS or APS). However, new provisions of CEQA would incent qualified projects that are consistent with an approved SCS or APS, categorized as "transit priority projects."
Executive Order S-13-08	Sea level rise is a foreseeable indirect environmental impact associated with climate change, largely attributable to thermal expansion of the oceans and melting polar ice. As discussed above in the environmental setting (subheading "Adaptation to Climate Change"), sea level rise presents impacts to California associated with coastal erosion, water supply, water quality, saline-sensitive species and habitat, land use compatibility, and flooding. Former Governor Arnold Schwarzenegger signed Executive Order S-13-08 on November 14, 2008. This executive order directed the California Natural Resources Agency (CNRA) to develop the 2009 California Climate Adaptation Strategy

Table A2-8: Applicable Laws and Regulations for Greenhouse Gases

Regulation	Description
	(CNRA 2009)), which summarizes the best known science on climate change impacts in seven distinct sectors—public health, biodiversity and habitat, ocean and coastal resources, water management, agriculture, forest resources, and transportation and energy infrastructure—and provides recommendations on how to manage against those threats. This executive order also directed OPR, in cooperation with the CNRA, to provide land use planning guidance related to sea level rise and other climate change impacts by May 30, 2009, which is also provided in the 2009 California Climate Adaptation Strategy (CNRA 2009) and OPR continues to further refine land use planning guidance related to climate change impacts. Executive Order S-13-08 also directed CNRA to convene an independent panel to complete the first California Sea Level Rise Assessment Report. This report is to be completed no later than December 1, 2010. The report is intended to provide information on the following: (1) Relative sea level rise projections specific to California, taking into account issues such as coastal erosion rates, tidal impacts, El Niño and La Niña events, storm surge, and land subsidence rates; (2) The range of uncertainty in selected sea level rise projections; (3) A synthesis of existing information on projected sea level rise impacts to state infrastructure (such as roads, public facilities and beaches), natural areas, and coastal and marine ecosystems; and (4) Discussion of future research needs regarding sea level rise for California.
CARB's Landfill Methane Control Measure	The regulation requires owners and operators of certain uncontrolled municipal solid waste landfills to install gas collection and control systems, and requires existing and newly installed gas and control systems to operate in an optimal manner. The regulation allows local air districts to voluntarily enter into agreements with CARB to implement and enforce the regulation and to assess fees to cover costs. Some local air districts have also adopted rules to implement federal standards for the installation of gas collection and control systems.

Table A2-8: Applicable Laws and Regulations for Greenhouse Gases

Regulation	Description
Assembly Bill 341(Statutes of 2011)	AB 341 (Chesbro, Chapter 476, Statutes of 2011) established a State target to reduce by 75 percent the amount of solid waste sent to landfills by 2020 through recycling, composting, and source reduction practices.
Assembly Bill (Statutes of 2014)	AB 1826 (Chesbro, Chapter 727, Statutes of 2014) requires businesses generating specified amounts of organic wastes to begin arranging for the recycling and diversion of those wastes from landfill disposal beginning in 2016.
Refrigerant Management Plan	The Refrigerant Management Plan requires facilities with refrigeration systems with more than 50 pounds of high-GWP refrigerant to: conduct and report periodic leak inspections; promptly repair leaks; and keep service records on site.
Compliance Offset Protocols under the State's Cap-and-Trade Program	Compliance Offset Protocols under the State's Cap-and-Trade Program include a livestock protocol, rice cultivation protocol, and mine methane capture protocol. The protocols provide methods to quantify, report, and credit GHG emission reductions from sectors not covered by the Cap-and-Trade Program.
Assembly Bill 1257 (Statutes of 2013)	AB 1257 (Bocanegra, Chapter 749, Statutes of 2013) directs the CEC to assemble a report by November 2015 (and every four years after), in consultation with other State agencies, to identify strategies for maximizing the benefits obtained from natural gas as an energy source.
Assembly Bill 1900 (Statutes of 2012)	AB 1900 (Gatto, Chapter 602, Statutes of 2012) directed the CPUC to adopt natural gas constituent standards (in consultation with CARB and the Office of Environmental Health and Hazard Assessment). The legislation is also designed to streamline and standardize customer pipeline access rules, and encourage the development of statewide policies and programs to promote all sources of biomethane production and distribution.
Low Carbon Fuel Standard (LCFS)	The LCFS requires transportation fuel providers to procure clean fuels to reduce the carbon intensity of California's fuel mix. The LCFS provides a market signal to incentivize using captured methane as a transportation fuel, among other clean fuel options.
Senate Bill 1122 (Statutes of 2012)	SB 1122 (Rubio, Chapter 612, Statutes 2012) directed the CPUC to require the State's investor-owned utilities to develop and offer 10 to 20-year market-price contracts to procure an additional 250 megawatts of cumulative electricity generation from biogas facilities that commence operating on or after June of 2013.

9. Hazards and Hazardous Materials

Applicable laws and regulations associated with hazards and hazardous materials are discussed in Table A2-9.

Table A2-9: Applicable Laws and Regulations for Hazards and Hazardous Materials

Regulations	Description
Federal	
CWA (40 CFR 112)	The 1972 amendments to the CWA provide the statutory basis for the NPDES permit program and the basic structure for regulating the discharge of pollutants from point sources to waters of the U.S. Section 402 of the CWA specifically required U.S. EPA to develop and implement the NPDES program.
Safe Drinking Water Act (SDWA)	SDWA is the main federal law that ensures the quality of Americans' drinking water. Under SDWA, U.S. EPA sets standards for drinking water quality and oversees the states, localities, and water suppliers who implement those standards. SDWA was originally passed by Congress in 1974 to protect public health by regulating the nation's public drinking water supply. The law was amended in 1986 and 1996 and requires many actions to protect drinking water and its sources: rivers, lakes, reservoirs, springs, and ground water wells. SDWA does not regulate private wells which serve fewer than 25 individuals.
Federal Hazardous Materials Regulations (FHMR) Title 49, Code of Federal Regulations, Parts 100-180	The regulations establish criteria for the safe transport of hazardous materials. Compliance is mandatory for intrastate and interstate transportation.
Toxic Substances Control Act (TSCA) (15 U.S.C. Section 2601 et seq)	TSCA provides U.S. EPA with authority to require reporting, record-keeping and testing requirements, and restrictions relating to chemical substances and/or mixtures. TSCA addresses the production, importation, use, and disposal of specific chemicals including polychlorinated biphenyls (PCBs), asbestos, radon and lead-based paint.
Resource Conservation and Recovery Act (RCRA) 42 U.S.C. Section 6901 et seq. (40 CFR)	RCRA of 1976 gives U.S. EPA the authority to control hazardous waste from the "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also set forth a framework for the management of non-hazardous solid wastes. The 1986 amendments to RCRA enabled U.S. EPA to address environmental problems that could result from underground tanks storing petroleum and other hazardous substances.

Table A2-9: Applicable Laws and Regulations for Hazards and Hazardous Materials

Regulations	Description
	HSWA - the Federal Hazardous and Solid Waste Amendments - are the 1984 amendments to RCRA that focused on waste minimization and phasing out land disposal of hazardous waste as well as corrective action for releases. Some of the other mandates of this law include increased enforcement authority for EPA, more stringent hazardous waste management standards, and a comprehensive underground storage tank program. Federal regulations adopted by U.S. EPA are found in Title 40, Code of Federal Regulations (40 CFR).
Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)	CERCLA, commonly known as Superfund, was enacted by Congress on December 11, 1980. This law created a tax on the chemical and petroleum industries and provided broad Federal authority to respond directly to releases or threatened releases of hazardous substances that may endanger public health or the environment. CERCLA also enabled the revision of the National Contingency Plan (NCP). The NCP provided the guidelines and procedures needed to respond to releases and threatened releases of hazardous substances, pollutants, or contaminants. The NCP also established the NPL. The Superfund Amendments and Reauthorization Act (SARA) of 1986 reauthorized CERCLA to continue cleanup activities around the country. Several site-specific amendments, definitions clarifications, and technical requirements were added to the legislation, including additional enforcement authorities. Also, Title III of SARA authorized the Emergency Planning and Community Right-to-Know Act (EPCRA).
Emergency Planning and Community Right-to-Know Act (EPCRA) (42 USC Section 9601 et seq.)	The SARA of 1986 created EPCRA (40 CFR Parts 350-372), also known as SARA Title III, a statute designed to improve community access to information about chemical hazards and to facilitate the development of chemical emergency response plans by state/tribe and local governments. EPCRA required the establishment of state/tribe emergency response commissions (SERCs/TERCs), responsible for coordinating certain emergency response activities and for appointing local emergency planning committees.
State	
Hazardous Materials Transportation (California Vehicle Code Sections 31301-31309)	Regulations pertaining to the safe transport of hazardous materials are in California Vehicle Code Sections 31301-31309. All motor carriers and drivers involved in transportation of hazardous materials must comply with the requirements contained in federal and state regulations, and must apply for and obtain a hazardous materials transportation license from

Table A2-9: Applicable Laws and Regulations for Hazards and Hazardous Materials

Regulations	Description
	the California Highway Patrol. A driver is required to obtain a hazardous materials endorsement issued by the driver's country or state of domicile to operate any commercial vehicle carrying hazardous materials. The driver is required to display placards or markings while hauling hazardous waste, unless the driver is exempt from the endorsement requirements. A driver who is a California resident is required to obtain an endorsement from California Highway Patrol.
Hazardous Waste Control Law California Health & Safety Code, Division 20, Chapter 6.5, 22 CCR, Division 4.5	California requirements and statutory responsibilities in managing hazardous waste in California – this includes the generation, transportation, storage, treatment, recycling, and disposal of hazardous waste. The statute and regulation are implemented by Cal/EPA Department of Toxic Substances Control.
California Accidental Release Prevention (CalARP) Program 19 CCR Division 2, Chapter 4.5, Sections 2735-2785	The purpose of the CalARP program is to prevent accidental releases of substances that can cause serious harm to the public and the environment, to minimize the damage if releases do occur, and to satisfy community right-to-know laws. This is accomplished by requiring businesses that handle more than a threshold quantity of a regulated substance listed in the regulations to develop a Risk Management Plan (RMP). An RMP is a detailed engineering analysis of the potential accident factors present at a business and the mitigation measures that can be implemented to reduce this accident potential.
Hazardous Material Business Plan & Area Plan Program Health and Safety Code Sections 25500 – 25520 19 CCR, Division 2, Chapter 4, Article 3 & 4	The business and area plans program, relating to the handling and release or threatened release of hazardous materials, was established in California to protect the public health and safety and the environment. Basic information on the location, type, quantity, and the health risks of hazardous materials handled, used, stored, or disposed of in the state, which could be accidently released into the environment, is not now available to firefighters, health officials, planners, public safety officers, health care providers, regulatory agencies, and other interested persons. The information provided by business and area plans is necessary in order to prevent or mitigate the damage to the health and safety of persons and the environment from the release or threatened release of hazardous materials into the workplace and environment. Certified Unified Program Agencies (CUPAs) use information collected from the Business Plan and CalARP programs to identify hazardous materials in

Table A2-9: Applicable Laws and Regulations for Hazards and Hazardous Materials

Regulations	Description
	their communities. This information provides the basis for the Area Plan and is used to determine the appropriate level of emergency planning necessary to respond to a release.
Unified Program Administration Health and Safety Code, Chapter 6.11, Sections 25404-25404.8 27 CCR, Division 1, Subdivision 4, Chapter 1, Sections 15100-15620	A CUPA, which is authorized by the Secretary of Cal/EPA to carry out several of the hazardous waste/hazardous materials regulatory programs administered by the State in a coordinated and consistent manner. The six hazardous waste and materials program elements covered by the CUPA include: (1) Hazardous Waste Generators (2) Underground Tanks (3) Above Ground Tanks (4) Accidental Release Program (5) Hazardous Material Release Response Plans & Spill Notification (6) Hazardous Materials Management Plans & Inventory Reporting The intent of the CUPA is to simplify the hazardous materials regulatory environment and provide a single point of contact for businesses to address inspection, permitting, billing, and enforcement issues.
Fuels and Fuel Additive Program (40 CFR 79)	U.S. EPA regulates diesel fuels under two programs; one is administered under the Office of Pollution Prevention and Toxic Substances (OPPTS) and the other is administered under the Transportation and Air Quality group. The OPPTS requires that all chemicals produced in the U.S. are registered with the Toxic Substances Control Act. The Transportation and Air Quality group requires that any fuels sold for ground transportation purposes must be registered with U.S. EPA and the volumes reported on a quarterly basis.
Local	
Various Local Ordinances	Various ordinances and codes may be adopted at the local level to provide stricter requirements in the management of hazardous materials and waste activities within the jurisdiction.

10. Hydrology and Water Quality

Applicable laws and regulations associated with hydrology, water quality, and water supply are discussed in Table A2-10.

Table A2-10: Applicable Laws and Regulations for Hydrology, Water Quality, and Water Supply

Regulation	Description
Federal	
National Flood Insurance Program (NFIP)	Designated floodplain mapping program, flooding and flood hazard reduction implementation, and federal subsidized flood insurance for residential and commercial property. Administered by the Federal Emergency Management Agency (FEMA).
Executive Order 11988	Requires actions to be taken for federal activities to reduce the risks of flood losses, restore and preserve floodplains, and minimize flooding impacts to human health and safety.
CWA	Administered primarily by the EPA. Pertains to water quality standards, state responsibilities, and discharges of waste to waters of the U.S. Sections 303, 401, 402, and 404.
CWA Section 303	Defines water quality standards consisting of: 1) designated beneficial uses of a water, 2) the water quality criteria (or ”objectives” in California) necessary to support the uses, and 3) an antidegradation policy that protects existing uses and high water quality. Section 303(d) requires states to identify water quality impairments where conventional control methods will not achieve compliance with the standards, and establish Total Maximum Daily Load (TMDL) programs to achieve compliance.
CWA Section 401	State certification system for federal actions which may impose conditions on a project to ensure compliance with water quality standards.
CWA Section 402	Section 402 mandates permits for municipal stormwater discharges, which are regulated under the NPDES General Permit for Municipal Separate Storm Sewer Systems (MS4) (MS4 Permit). Several of the cities and counties issue their own NPDES municipal stormwater permits for the regulations of stormwater discharges. These permits require that controls are implemented to reduce the discharge of pollutants in stormwater discharges to the maximum extent possible, including management practices, control techniques, system design and engineering methods, and other measures as appropriate. As part of permit compliance, these permit holders have created Stormwater Management Plans for their respective locations. These plans outline the requirements for municipal operations, industrial and commercial businesses, construction sites, and planning and land development. These requirements may include multiple measures to control pollutants in stormwater discharge. During implementation of specific projects, applicants will be required to follow the guidance contained in

Table A2-10: Applicable Laws and Regulations for Hydrology, Water Quality, and Water Supply

Regulation	Description
	the Stormwater Management Plans as defined by the permit holder in that location.
CWA Section 404	Permit system for dredging or filling activity in waters of the U.S., including wetlands, and administered by USACE.
National Toxics Rule and California Toxics Rule	Applicable receiving water quality criteria promulgated by U.S. EPA for priority toxic pollutants consisting generally of trace metals, synthetic organic compounds, and pesticides.
State	
California Water Rights	The SWRCB administers review, assessment, and approval of appropriative (or priority) surface water rights permits/licenses for diversion and storage for beneficial use. Riparian water rights apply to the land and allow diversion of natural flows for beneficial uses without a permit, but users must share the resources equitably during drought. Groundwater management planning is a function of local government. Groundwater use by overlying property owners is not formally regulated, except in cases where the groundwater basin supplies are limited and uses have been adjudicated, or through appropriative procedures for groundwater transfers.
Public Trust Doctrine	Body of common law that requires the state to consider additional terms and conditions when issuing or reconsidering appropriative water rights to balance the use of the water for many beneficial uses irrespective of the water rights that have been established. Public trust resources have traditionally included navigation, commerce, and fishing and have expanded over the years to include protection of fish and wildlife, and preservation goals for scientific study, scenic qualities, and open-space uses.
Porter-Cologne Water Quality Control Act and California Water Code (Title 23)	The SWRCB is responsible for statewide water quality policy development and exercises the powers delegated to the State by the federal government under the CWA. Nine RWQCBs adopt and implement water quality control plans (Basin Plans) which designate beneficial uses of surface waters and groundwater aquifers, and establish numeric and narrative water quality objectives for beneficial use protection. RWQCBs issue waste discharge requirements for discharge activities to water and land, require monitoring and maintain reporting programs, and implement enforcement and compliance policies and procedures. Other state agencies with jurisdiction in water quality regulation in California include the Department of Public Health (drinking water regulations), Department of Pesticide Regulation, Department of Toxic Substances Control, CDFW,

Table A2-10: Applicable Laws and Regulations for Hydrology, Water Quality, and Water Supply

Regulation	Description
	and the Office of Environmental Health and Hazard Assessment.
Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California	Commonly referred to as the State Implementation Policy (or SIP), the SIP provides implementation procedures for discharges of toxic pollutants to receiving waters.
Thermal Plan	The Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Water and Enclosed Bays and Estuaries of California was adopted by the SWRCB in 1972 and amended in 1975. The Thermal Plan restricts discharges of thermal waste or elevated temperature waste to waters of the state. Generally, the Thermal Plan prohibits discharges from increasing ambient temperatures by more than 1ºF over more than 25 percent of a stream cross section, increasing ambient temperatures by more than 4ºF in any location, and prohibits discharge of waste that exceeds more than 20ºF above the ambient temperature.
Statewide NPDES General Permit for Stormwater Associated with Land Disturbance and Construction Activity (Order No. 2009-0009-DWQ, NPDES No. CAR000002)	NPDES permit for stormwater and non-storm discharges from construction activity that disturbs greater than 1 acre. The general construction permit requires the preparation of a SWPPP that identifies BMPs to be implemented to control pollution of storm water runoff. The permit specifies minimum construction BMPs based on a risk-level determination of the potential of the project site to contribute to erosion and sediment transport and sensitivity of receiving waters to sediment. While small amounts of construction-related dewatering are covered under the General Construction Permit, the RWQCB has also adopted a General Order for Dewatering and Other Low Threat Discharges to Surface Waters (General Dewatering Permit). This permit applies to various categories of dewatering activities and may apply to some construction sites, if construction of specific projects required dewatering in greater quantities than that allowed by the General Construction Permit and discharged the effluent to surface waters. The General Dewatering Permit contains waste discharge limitations and prohibitions similar to those in the General Construction Permit.

Table A2-10: Applicable Laws and Regulations for Hydrology, Water Quality, and Water Supply

Regulation	Description
Statewide NPDES General Permit for Discharges of Stormwater Associated with Industrial Facilities (Order No. 97-003-DWQ, NPDES No. CAS000001)	NPDES permit for stormwater and non-storm discharges from types of industrial sites based on the Standard Industrial Classification. The general industrial permit requires the preparation of a SWPPP that identifies potential onsite pollutants, BMPs to be implemented, and inspection/monitoring.
Senate Bill 1168 (Statutes of 2014)	This bill (Pavley, Chapter 346, Statutes of 2014) requires all groundwater basins designated as high- or medium-priority basins by DWR that are designated as basins subject to critical conditions of overdraft to be managed under a groundwater sustainability plan or coordinated groundwater sustainability plans by January 31, 2020, and requires all other groundwater basins designated as high- or medium-priority basins to be managed under a groundwater sustainability plan or coordinated groundwater sustainability plans by January 31, 2022. This bill would require a groundwater sustainability plan to be developed and implemented to meet the sustainability goal, established as prescribed, and would require the plan to include prescribed components.
Assembly Bill 1739 (Statutes of 2014)	This bill (Dickinson, Chapter 347, Statutes of 2014) establishes groundwater reporting requirements for a person extracting groundwater in an area within a basin that is not within the management area of a groundwater sustainability agency or a probationary basin. The bill requires the reports to be submitted to the SWRCB or, in certain areas, to an entity designated as a local agency by the SWRCB.
Senate Bill 1319 (Statutes of 2014)	This bill (Pavley, Chapter 348, Statutes of 2014) allows the SWRCB to designate a groundwater basin as a probationary basin subject to sustainable groundwater management requirements. This bill also authorizes SWRCB to develop an interim management plan in consultation with the DWR under specified conditions.
Mining and Mineral Policy Act	The Mining and Mineral Act of 1970 declared that the Federal Government policy is to encourage private enterprise in the development of a sound and stable domestic mineral industry, domestic mineral deposits, minerals research, and methods for reclamation in the minerals industry.

Table A2-10: Applicable Laws and Regulations for Hydrology, Water Quality, and Water Supply

Regulation	Description
Local	
Water Agencies	Water agencies enter into contracts or agreements with the federal and state governments to protect the water supply and to ensure the lands within the agency have a dependable supply of suitable quality water to meet present and future needs.
Floodplain Management	General plans guide county land use decisions, and require the identification of water resource protection goals, objectives, and policies. Floodplain management is addressed through ordinances, land use planning, and development design review and approval. Local actions may be coordinated with FEMA for the National Flood Insurance Program. Typical provisions address floodplain use restrictions, flood protection requirement, allowable alteration of floodplains and stream channels, control of fill and grading activities in floodplains, and prevention of flood diversions where flows would increase flood hazards in other areas.
Drainage, Grading, and Erosion Control Ordinances	Counties regulate building activity under the federal Uniform Building Code, local ordinances, and related development design review, approval, and permitting. Local ordinances are common for water quality protection addressing drainage, stormwater management, land grading, and erosion and sedimentation control.
Environmental Health	The RWQCBs generally delegate permit authority to county health departments to regulate the construction and operation/maintenance of on-site sewage disposal systems (e.g., septic systems and leach fields, cesspools).

11. Land Use and Planning

Applicable laws and regulations associated with land use and planning are discussed in Table A2-11.

Table A2-11: Applicable Laws and Regulations for Land Use and Planning

Regulation	Description
Federal	
FLPMA	FLPMA is the principal law governing how the BLM manages public lands. FLPMA requires the BLM to manage public land resources for multiple use and sustained yield for both present and future generations. Under FLPMA, the BLM is authorized to grant right-of-ways for generation, transmission, and distribution of electrical energy. Although local agencies do not

Table A2-11: Applicable Laws and Regulations for Land Use and Planning

Regulation	Description
	have jurisdiction over the federal lands managed by the BLM, under FLPMA and the BLM regulations at 43 CFR Part 1600, the BLM must coordinate its planning efforts with state and local planning initiatives. FLPMA defines an Area of Critical Environmental Concern (ACEC) as an area within the public lands where special management attention is required (when such areas are developed or used or where no development is required) to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources, or other natural systems or processes, or to protect life and safety from natural hazards. The BLM identifies, evaluates, and designates ACECs through its resource management planning process. Allowable management practices and uses, mitigation, and use limitations, if any, are described in the planning document and the concurrent or subsequent ACEC Management Plan. ACECs are considered land use authorization avoidance areas because they are known to contain resource values that could result in denial of applications for land uses that cannot be designed to be compatible with management objectives and prescriptions for the ACEC.
BLM Resource Management Plans	Established by FLPMA, Resource Management Plans are designed to protect present and future land uses and to identify management practices needed to achieve desired conditions within the management area covered by the Resource Management Plans. Management direction is set forth in the Resource Management Plans in the form of goals, objectives, standards, and guidelines. These, in turn, direct management actions, activities, and uses that affect land management, and water, recreation, visual, natural, and cultural resources.
National Forest Management Act (NFMA)	NFMA is the primary statute governing the administration of national forests. The act requires the Secretary of Agriculture to assess forest lands, develop a management program based on multiple-use, sustained-yield principles, and implement a resource management plan for each unit of the National Forest System. Goal 4 of the USFS's National Strategic Plan for the National Forests states that the nation's forests and grasslands play a significant role in meeting America's need for producing and transmitting energy. Unless otherwise restricted, National Forest Service lands are available for energy exploration, development, and infrastructure (e.g., well sites, pipelines, and transmission lines). However, the emphasis on non-recreational special uses, such as utility corridors, is to authorize the special

Table A2-11: Applicable Laws and Regulations for Land Use and Planning

Regulation	Description
	uses only when they cannot be reasonably accommodated on non-National Forest Service lands.
State	
State Planning and Zoning Law	California Government Code Section 65300 et seq. establishes the obligation of cities and counties to adopt and implement general plans. The general plan is a comprehensive, long-term, and general document that describes plans for the physical development of the city or county. The general plan addresses a broad range of topics, including, at a minimum, land use, circulation, housing, conservation, open space, noise, and safety. In addressing these topics, the general plan identifies the goals, objectives, policies, principles, standards, and plan proposals that support the city or county's vision for the area. The general plan is also a long-range document that typically addresses the physical character of an area over a 20-year period. Although the general plan serves as a blueprint for future development and identifies the overall vision for the planning area, it remains general enough to allow for flexibility in the approach taken to achieve the plan's goals.
Subdivision Map Act (Government Code Section 66410 et seq.)	In general, land cannot be divided in California without local government approval. The primary goals of the Subdivision Map Act are: (a) to encourage orderly community development by providing for the regulation and control of the design and improvements of the subdivision with a proper consideration of its relation to adjoining areas; (b) to ensure that the areas within the subdivision that are dedicated for public purposes will be properly improved by the subdivider so that they will not become an undue burden on the community; and (c) to protect the public and individual transferees from fraud and exploitation. (61 Ops. Cal.Atty. Gen. 299, 301 [1978]; 77 Ops. Cal.Atty. Gen. 185 [1994]). Dividing land for sale, lease or financing is regulated by local ordinances based on the state Subdivision Map Act (Government Code Section 66410 et seq.).
Local	
General Plans	The most comprehensive land use planning is provided by city and county general plans, which local governments are required by State law to prepare as a guide for future development. The general plan contains goals and policies concerning topics that are mandated by state law or which the jurisdiction has chosen to include. Required topics are: land use, circulation, housing, conservation, open space, noise, and safety. Other topics that local governments frequently choose to address are public facilities, parks and recreation, community design, or growth

Table A2-11: Applicable Laws and Regulations for Land Use and Planning

Regulation	Description
	management, among others. City and county general plans must be consistent with each other. County general plans must cover areas not included by city general plans (i.e., unincorporated areas).
Specific and Community Plans	A city or county may also provide land use planning by developing community or specific plans for smaller, more specific areas within their jurisdiction. These more localized plans provide for focused guidance for developing a specific area, with development standards tailored to the area, as well as systematic implementation of the general plan. Specific and community plans are required to be consistent with the city or county's general plan.
Zoning	The city or county zoning code is the set of detailed requirements that implement the general plan policies at the level of the individual parcel. The zoning code presents standards for different uses and identifies which uses are allowed in the various zoning districts of the jurisdiction. Since 1971, state law has required the city or county zoning code to be consistent with the jurisdiction's general plan, except in charter cities.

12. Noise

Applicable laws and regulations associated with noise are discussed in Table A2-12.

Table A2-12: Applicable Laws and Regulations for Noise

Regulation	Description
Federal	
Federal Noise Control Act (1972) EPA (40 CFR 201-211)	This act established a requirement that all federal agencies administer their programs to promote an environment free of noise that jeopardizes public health or welfare. U.S. EPA was given the responsibility for providing information to the public regarding identifiable effects of noise on public health or welfare, publishing information on the levels of environmental noise that will protect the public health and welfare with an adequate margin of safety, coordinating federal research and activities related to noise control, and establishing federal noise emission standards for selected products distributed in interstate commerce. This act also directed that all federal agencies comply with applicable federal, state, interstate, and local noise control regulations.

Table A2-12: Applicable Laws and Regulations for Noise

Regulation	Description
Quiet Communities Act (1978)	This act promotes the development of effective state and local noise control programs, to provide funds for noise research, and to produce and disseminate educational materials to the public on the harmful effects of noise and ways to effectively control it.
14 CFR, Part 150 (FAA)	These address airport noise compatibility planning and include a system for measuring airport noise impacts and present guidelines for identifying incompatible land uses. All land uses are considered compatible with noise levels of less than 65 dBA L_{dn}. At higher noise levels, selected land uses are also deemed acceptable, depending on the nature of the use and the degree of structural noise attenuation provided.
International Standards and Recommended Practices (International Civil Aviation Organization)	This contains policies and procedures for considering environmental impacts (e.g., aircraft noise emission standards and atmospheric sound attenuation factors).
32 CFR, Part 256 (Department of Defense Air Installations Compatible Use Zones [AICUZ] Program)	AICUZ plans prepared for individual airfields are primarily intended as recommendations to local communities regarding the importance of maintaining land uses which are compatible with the noise and safety impacts of military aircraft operations.
23 CFR, Part 772, Federal Highway Administration (FHWA) standards, policies, and procedures	FHWA standards, policies, and procedures provide procedures for noise studies and noise abatement measures to help protect the public health and welfare, to supply noise abatement criteria, and to establish requirements for information to be given to local officials for use in the planning and design of highways.
29 CFR, Part 1910, Section 1910.95 (U.S. Department of Labor Occupational Safety and Health Administration [OSHA])	This regulation established a standard for noise exposure in the workplace.
FTA Guidance	This guidance presents procedures for predicting and assessing noise and vibration impacts of proposed mass transit projects. All types of bus and rail projects are covered.

Table A2-12: Applicable Laws and Regulations for Noise

Regulation	Description
	Procedures for assessing noise and vibration impacts are provided for different stages of project development, from early planning before mode and alignment have been selected through preliminary engineering and final design. Both for noise and vibration, there are three levels of analysis described. The framework acts as a screening process, reserving detailed analysis for projects with the greatest potential for impacts while allowing a simpler process for projects with little or no effects. This guidance contains noise and vibration impact criteria that are used to assess the magnitude of predicted impacts. A range of mitigation is described for dealing with adverse noise and vibration impacts.
49 CFR 210 (Federal Rail Administration [FRA] Railroad Noise Emission Compliance Standards) and FRA Guidance (2005)	This section and guidance provides contains criteria and procedures for use in analyzing the potential noise and vibration impacts of various types of high-speed fixed guideway transportation systems.
State	
CPUC Section 21670	The State Aeronautics Act of the CPUC establishes statewide requirements for airport land use compatibility planning and requires nearly every county to create an Airport Land Use Commission or other alternative.
Section 5000 et seq. (21 CCR Division 2.5, Chapter 6), California Airport Noise Regulations Promulgated in Accordance with the State Aeronautics Act	In Section 5006, the regulations state that: “The level of noise acceptable to a reasonable person residing in the vicinity of an airport is established as a CNEL value of 65 dBA for purposes of these regulations. This criterion level has been chosen for reasonable persons residing in urban residential areas where houses are of typical California construction and may have windows partially open. It has been selected with reference to speech, sleep, and community reaction.
24 CCR, Part 2	These establish standards governing interior noise levels that apply to all new single-family and multi-family residential units in California. These standards require that acoustical studies be performed before construction at building locations where the existing L_{dn} exceeds 60 dBA. Such acoustical studies are required to establish mitigation that will limit maximum Ldn levels to 45 dBA in any habitable room.

13. Population, Employment, and Housing

See land use planning and housing-related regulations in Section 11.0, Land Use and Planning.

14. Public Services

Applicable laws and regulations associated with public services are discussed in Table A2-13.

Table A2-13: Applicable Laws and Regulations for Public Services

Regulation	Description
Federal	**None applicable.**
American with Disabilities Act (ADA)	Guidelines to ensure that facilities are accessible to individuals with disabilities. Implements requirements for the design and construction of buildings.
State	
State Fire Responsibility Areas	Areas delineated by the CAL FIRE for which the state assumes primary financial responsibility for protecting natural resources from damages of fire. Local jurisdictions are required to adopt minimum recommended requirements for road design, road identification, emergency fire suppression and fuel breaks and greenbelts. All projects within or adjacent to a State Fire Responsibility Area must meet these requirements.
State School Funding	Education Code Section 17620 authorizes school districts to levy a fee, charge, dedication, or other requirement for any development project for the construction or reconstruction of school facilities.

15. Recreation

Applicable laws and regulations associated with recreation are discussed in Table A2-14.

Table A2-14: Applicable Laws and Regulations for Recreation

Regulation	Description
Federal	
FLPMA, 1976 – 43 (CFR 1600)	Establishes public land policy; guidelines for administration; and provides for the "multiple use" management, protection, development, and enhancement of public lands. Multiple use management, defined as "management of the public lands and their various resource values so that they are utilized in the combination that will best meet the present and future needs of

Table A2-14: Applicable Laws and Regulations for Recreation

Regulation	Description
	the American people" with recreation identified as one of the resource values.
State	
	None applicable
Local	
General Plans	General plans for cities and counties contain designations for recreational areas. These are policy documents with planned land use maps and related information that are designed to give long-range guidance to those local officials making decisions affecting the growth and resources of their jurisdictions. Because of the number and variety of general plans and related local plans, they are not listed individually.

16. Transportation and Traffic

Applicable laws and regulations associated with transportation and traffic are discussed in Table A2-15.

Table A2-15: Applicable Laws and Regulations for Transportation and Traffic

Regulation	Description
Federal	
40 CFR, Part 77 (FAA)	Requires a determination of no hazard to air navigation for structures that will be more than 200 feet above ground level.
State	
California Vehicle Code (VC) Sections 353; 2500-2505; 31303-31309; 32000-32053; 32100-32109; 31600-31620; California Health and Safety Code Section 25160 et seq.	Regulates the highway transport of hazardous materials.
VC Sections 13369; 15275 and 15278	Addresses the licensing of drivers and the classification of licenses required for the operation of particular types of vehicles and also requires certificates permitting operation of vehicles transporting hazardous materials.
VC Sections 35100 et seq.; 35250 et seq.; 35400 et seq.	Specifies limits for vehicle width, height, and length.
VC Section 35780	Requires permits for any load exceeding Caltrans weight, length, or width standards on public roadways.

Table A2-15: Applicable Laws and Regulations for Transportation and Traffic

Regulation	Description
California Streets and Highways Code Section 117, 660-672	Requires permits for any load exceeding Caltrans weight, length, or width standards on County roads.
California Streets and Highways Code Sections 117, 660-670, 1450, 1460 et seq., and 1480 et seq.	Regulate permits from Caltrans for any roadway encroachment from facilities that require construction, maintenance, or repairs on or across State highways and County roads.

17. Utilities and Service Systems

Applicable laws and regulations associated with utilities are discussed in Table A2-16.

Table A2-16: Applicable Laws and Regulations for Utilities and Service Systems

Regulation	Description
Federal	
Federal Power Act of 1935	In the Federal Power Act of 1935 (49 Stat. 803), created the Federal Power Commission, an independent regulatory agency with authority over both the interstate transmission of electricity and the sale of hydroelectric power at the wholesale level. The act requires the commission to ensure that electricity rates are "reasonable, nondiscriminatory and just to the consumer." The Federal Power Act of 1935 also amended the criteria that the commission must apply in deciding whether to license the construction and operation of new hydroelectric facilities.
Natural Gas Act of 1938	Together with the Federal Power Act of 1935, the Natural Gas Act of 1938 (NGA) (P.L. 75-688, 52 Stat. 821) was an essential piece of energy legislation in the first half of the 20th century. These statutes regulated interstate activities of the electric and natural gas industries, respectively. The acts are similarly structured and constitute the classic form of command-and-control regulation authorizing the federal government to enter into a regulatory compact with utilities. In short, the Natural Gas Act enabled federal regulators to set prices for gas sold in interstate commerce in exchange for exclusive rights to transport the gas.
Natural Gas Policy Act of 1978	The Natural Gas Policy Act of 1978 (NGPA) granted the FERC authority over intrastate as well as interstate natural gas production. The NGPA established price ceilings for wellhead first sales of gas that vary with the applicable gas category and gradually increase over time.

Table A2-16: Applicable Laws and Regulations for Utilities and Service Systems

Regulation	Description
State	
Waste Heat and Carbon Emissions Reduction Act of 2007	The Waste Heat and Carbon Emissions Reduction Act of 2007 (AB 1613), placed requirements on the CPUC, the CEC, and local electric utilities to develop incentive programs and technical efficiency guidelines to encourage the installation of small CHP systems. The CEC approved efficiency and certification guidelines for eligible systems under AB 1613 in January 2010, and the CPUC approved standardized contracting and pricing provisions between CHP operators and the Investor Owned Utilities in November 2012.
Assembly Bill 1900 (Statutes of 2012)	AB 1900 (Gatto, Chapter 602, Statutes of 2012) directed the CPUC to adopt natural gas constituent standards (in consultation with CARB and the Office of Environmental Health and Hazard Assessment). The legislation is also designed to streamline and standardize customer pipeline access rules, and encourage the development of statewide policies and programs to promote all sources of biomethane production and distribution.
Section 21151.9 of the PRC/ Section 10910 et seq. of the Water Code	Required the preparation of a water supply assessment (WSA) for large developments. These assessments are prepared by public water agencies responsible for providing service and address whether there are adequate existing and projected future water supplies to serve the proposed project. All projects that meet the qualifications for preparing a WSA must identify the water supplies and quantities that would serve the project as well as project the total water demand for the service area (including the project's water demands) by source in 5-year increments over a 20-year period. This information must include data for a normal, single-dry, and multiple-dry years. The WSA is required to be approved by the water service agency before the project can be implemented.

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ATTACHMENT B: SUMMARY OF IMPACTS

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Resource Areas and Impact Categories	Significance Determination
Aesthetics	
Construction-Related Impacts	PSU
Operational Impacts	PSU
Agriculture and Forest Resources	
Construction-Related Impacts	PSU
Operational Impacts	PSU
Air Quality	
Construction-Related Impacts	PSU
Operational Impacts	PSU
Construction-Related and Operational Odors Impacts	LTS
Biological Resources	
Construction-Related Impacts	PSU
Operational Impacts	PSU
Cultural Resources	
Construction-Related and Operational Impacts	PSU
Energy Demand	
Construction-Related Impacts	LTS
Operational Impacts	B
Geology and Soils	
Construction-Related Impacts	PSU
Operational Impacts	PSU
Greenhouse Gas	
Construction-Related and Operational Impacts	B
Hazards and Hazardous Materials	
Construction-Related Impacts	PSU
Operational Impacts	PSU
Hydrology and Water Quality	
Construction-Related Impacts	PSU
Operational Impacts	PSU
Land Use Planning	
Construction-Related Impacts	LTS
Operational Impacts	PSU

Resource Areas and Impact Categories	Significance Determination
Mineral Resources	
Construction-Related Impacts	LTS
Operational Impacts	PSU
Noise	
Construction-Related Impacts	PSU
Operational Impacts	PSU
Population and Housing	
Construction-Related Impacts	LTS
Operational Impacts	LTS
Public Services	
Construction-Related Impacts	LTS
Operational Impacts	LTS
Recreation	
Construction-Related Impacts	LTS
Operational Impacts	PSU
Transportation/Traffic	
Construction-Related Impacts	PSU
Operational Impacts	PSU
Utilities and Service Systems	
Operational Impacts	PSU
Notes: B = Beneficial; LTS = Less-Than-Significant; PSU = Potentially Significant and Unavoidable	