

4.6 Greenhouse Gases

This section describes the environmental and regulatory setting for greenhouse gases (GHGs) and discusses GHG impacts associated with construction and operation of the Mesa 500-kilovolt (kV) Substation Project (proposed project) proposed by Southern California Edison Company (SCE, or the applicant). The South Coast Air Quality Management District (SCAQMD) submitted a letter during the scoping period which requested that the Environmental Impact Report include an analysis based on the California Emission Estimator Model (CalEEMod). GHG emissions from construction and operation of the proposed project were estimated using SCAQMD's CalEEMod and are presented in this analysis (and in Appendix C). Other comments from the SCAQMD are discussed and incorporated as appropriate in Section 4.2, "Air Quality."

4.6.1 Environmental Setting

According to the U.S. Environmental Protection Agency (EPA), the term "climate change" refers to any significant change in measures of climate (such as temperature, precipitation, or wind) lasting for an extended period, decades or longer (EPA 2015a). There is broad scientific consensus that humans are changing the chemical composition of earth's atmosphere. Activities such as fossil fuel combustion, deforestation, and other changes in land use are resulting in the accumulation of trace GHGs such as carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), and several industrial gases in the earth's atmosphere. An increase in GHG emissions is said to result in an increase in the earth's average surface temperature, primarily by trapping and thus decreasing the amount of heat energy radiated by the earth back into space. The phenomenon is commonly referred to as global warming. Global warming is expected in turn to affect weather patterns, average sea level, ocean acidification, chemical reaction rates, and precipitation rates, which are collectively referred to as climate change.

The proposed project's main components would be constructed within or would cross several incorporated and unincorporated areas within Los Angeles County, as discussed in Chapter 2.0, "Project Description" and shown in Figure 2-1, "Project Overview." In addition, minor work would occur within the perimeter fence lines of 27 existing satellite substations throughout the Western Los Angeles Basin Electrical Needs Area in southern Los Angeles County and northern Orange County, as shown in Figure 2-2, "Existing Substations and Transmission Lines Associated with the Mesa 500-kV Substation Project" and detailed in Table 2-5.

Climate and meteorological conditions for these areas are described in Section 4.2.1, "Environmental Setting," for air quality.

4.6.1.1 Greenhouse Gases

GHGs allow solar radiation (heat) to pass through the earth's atmosphere but prevent heat from escaping, resulting in atmospheric warming. Certain GHGs occur naturally and help balance the earth's temperature. However, research indicates that since the Industrial Revolution began, human activity has resulted in an elevation of the concentration of some of these gases in the atmosphere. In particular, CO₂ concentrations have increased significantly from the burning of fossil fuels. Much of the carbon in the atmosphere is absorbed by natural "carbon sinks," such as forests or ocean kelp. CO₂ is then emitted back into the atmosphere through natural processes such as animal and plant respiration, and oceanic and geological processes. These natural processes represent "sources." When balanced, the amount of CO₂ emitted from sources and absorbed by carbon sinks is

1 roughly equal; this process is known as the “carbon cycle.” As emission levels rise from human
2 activity, however, carbon sinks are becoming overwhelmed and are unable to sequester the
3 increasing amounts of CO₂.

4
5 The Intergovernmental Panel on Climate Change (IPCC) has predicted that the average global
6 temperature rise between 1990 and 2100 could be as great as approximately 41 degrees
7 Fahrenheit (°F), which could have negative impacts on the natural and human environments (IPCC
8 2014). Although GHG levels have varied for millennia (along with corresponding variations in
9 climatic conditions), industrialization and the burning of fossil carbon fuel sources have caused CO₂
10 concentrations to increase measurably, from approximately 280 parts per million (ppm) in 1750 to
11 400 ppm in 2014 (IPCC 2014). The rate of change has also been increasing as more
12 industrialization and population growth is occurring around the globe as demonstrated by data
13 from the Mauna Loa CO₂ monitor in Hawaii. This monitor documents atmospheric concentrations
14 of CO₂ going back to 1960 when the average annual CO₂ concentration was recorded at
15 approximately 317 ppm. The record shows that approximately 70 percent of the increases in
16 atmospheric CO₂ concentrations since pre-industrial times occurred within the last 54 years.

17
18 Globally, the average annual temperature has risen since 1900 by about 1.5°F and is expected to
19 rise another 2°–10°F by 2100. The average annual temperature in the United States has risen by a
20 comparable amount over the same time period, but is expected to rise more than the global average
21 over this century (Karl et al. 2009).

22
23 In 2006, the State of California enacted the California Global Solutions Warming Act of 2006
24 (Assembly Bill [AB] 32), requiring a reduction in GHG emissions in the state to 1990 levels by 2020.
25 AB 32 targets the GHGs described below.

26 27 **Carbon Dioxide (CO₂)**

28 CO₂ is a colorless, odorless gas generated by both natural and human activity. Natural sources of
29 CO₂ include respiration by bacteria, fungus, and animals; decomposition of organic matter;
30 evaporation of ocean water and geological processes. The primary human-induced sources of CO₂
31 are combustion of fossil fuels, natural gas, and wood.

32 33 **Methane (CH₄)**

34 CH₄ is a highly flammable gas that is a primary component of natural gas. Similar to CO₂, CH₄ is
35 produced by natural and human activity. Natural sources of CH₄ include anaerobic decay of organic
36 matter, geological deposits (e.g., natural gas fields), and cattle. Human-induced sources include
37 emissions generated by the decay of organic material in landfills and fermentation of manure and
38 other organic material.

39 40 **Nitrous Oxide (N₂O)**

41 As with CO₂ and CH₄, N₂O is produced by both natural and human activity. Natural sources include
42 microbial action in soil and water, particularly at tropical latitudes. Human-induced sources include
43 emissions from manufacturing facilities, fossil fuel power plants, and motor vehicles.

44 45 **Sulfur Hexafluoride (SF₆)**

46 Sulfur hexafluoride (SF₆) is a colorless, odorless, non-flammable, non-toxic gas used mainly as an
47 insulator (when mixed with other gases, such as argon) in the manufacture of electrical equipment.

1 In particular, SF₆ is commonly used in gas-insulated switchgears and circuit breakers installed in
2 electrical substations.

3
4 **Hydrofluorocarbons (HFCs)**

5 Hydrofluorocarbons (HFCs) are human-made compounds consisting of carbon, hydrogen, and
6 fluorine atoms. HFCs were introduced as replacements for atmospheric ozone-depleting chemicals
7 in various industrial and commercial applications. They are used in solvents, refrigerants,
8 firefighting agents, and aerosol sprays.

9
10 **Perfluorocarbons (PFCs)**

11 Perfluorocarbons (PFCs) are human-made chemicals consisting of carbon and fluorine atoms. As
12 with HFCs, PFCs were introduced as an alternative to atmospheric ozone-depleting chemicals and
13 are used in similar industrial and commercial applications.

14
15 **Global Warming Potential**

16 The effect of a particular GHG on global climate change depends on its global warming potential
17 (GWP). Table 4.6-1 shows the GWP for the six GHGs described above. In the IPCC's fourth
18 assessment report (AR4), the GWPs for several GHGs were updated based on the latest science.
19 Both the EPA and California Air Resources Board (CARB) have updated national and statewide GHG
20 inventory and reporting guidelines based on the GWPs published in AR4. GWP is determined by a
21 number of factors, including the GHG's molecular structure, the GHG's ability to absorb infrared
22 radiation, and the amount of time the GHG can exist in the atmosphere before breaking down.
23 These factors help determine the amount of warming potential a pound of GHG would have relative
24 to a pound of CO₂. For example, a pound of methane has approximately 25 times the warming
25 potential of a pound of CO₂.

26 **Table 4.6-1 Global Warming Potential For Greenhouse Gases**

Greenhouse Gas	Global Warming Potential ⁽¹⁾ , 100 Years (relative to CO ₂)
Carbon Dioxide (CO ₂)	1
Methane (CH ₄)	25
Nitrous Oxide (N ₂ O)	298
Perfluorocarbons (PFCs)	7,390-10,300
Hydrofluorocarbons (HFCs)	92-14,800
Sulfur Hexafluoride (SF ₆)	22,800

Source: IPCC 2014

Note:

⁽¹⁾ Effective January 1, 2014, the EPA adopted the IPCC AR4 GWPs in 40 Code of Federal Regulations Part 98.

27
28 The California Air Resources Board (CARB) reported that in 2013 CO₂ represented 84 percent of
29 the GHG emissions produced in California (CARB 2015a). Because CO₂ is such a prevalent GHG, and
30 the GWP for other GHGs is calculated relative to CO₂, GHGs in the atmosphere are reported in terms
31 of CO₂ equivalency (CO₂e). GHG emissions as CO₂e are calculated by multiplying the mass of each
32 GHG emitted by its GWP to determine the equivalent amount of CO₂. For example, one pound of CH₄
33 is equivalent to 25 pounds of CO₂e.

34

1 **Greenhouse Gas Inventories**

2 The latest GHG inventory from the EPA indicates that the United States emitted 6,673 million metric
3 tons (MT) of CO₂e (MTCO₂e) in 2013 (EPA 2015b). The State of California makes up a substantial
4 contribution of those GHG emissions—California produced 459.3 million MTCO₂e in 2013,
5 according to the most recent inventory (CARB 2015b). The state represents the second largest
6 contributor in the United States and the 15th largest emitter of GHGs in the world (CEC 2006).

7
8 **4.6.1.2 Potential Effects from Climate Change**

9
10 In 2008, California Governor Arnold Schwarzenegger issued Executive Order S-13-08, directing the
11 California Natural Resources Agency (CNRA) to determine how state agencies can respond to the
12 challenges posed by climate change. As a result, the CNRA worked with several state agencies to
13 draft the 2009 California Climate Adaptation Strategy. A summary of the potential effects of climate
14 change, as identified in the California Climate Adaptation Strategy, is presented below.

15
16 **Temperature and Precipitation**

17 GHGs can remain in the atmosphere for decades; thus, the temperature changes over the next 30 to
18 40 years will largely be determined by past emissions. By 2050, temperatures could increase by an
19 additional 1.8°–5.4°F (CNRA 2009). California would likely continue to have relatively cool, wet,
20 winters and dry, hot summers; however, temperature increases could become more severe in
21 summer than winter, and inland areas could experience more pronounced warming than coastal
22 regions. Heat waves could also increase in frequency and intensity. Precipitation patterns are
23 anticipated to change due to increasing temperatures, leading to more rainfall and less snow. This
24 would affect California's drinking water supply, which currently originates mainly as snowmelt
25 runoff. More frequent flood events, due to faster runoff, could also increase stress on state and local
26 infrastructure. Finally, these changes in precipitation could lead to more periods of drought, which
27 could have a negative effect on native ecosystems.

28
29 **Sea-level Rise**

30 Recent studies show that sea levels rose by as much as 7 inches during the twentieth century and
31 are anticipated to rise up to 55 inches by the end of the century (CNRA 2009). Furthermore, even if
32 emissions were substantially lowered, research shows that sea levels will continue to rise; thus,
33 adaptation strategies will be an important part of dealing with this impact (CNRA 2009). Sea-level
34 rise could have a negative effect on coastal wetlands and marshes through inundation. This would
35 not only negatively impact these specially adapted habitats, but could also damage agricultural
36 activities by way of salt water intrusion into fresh water aquifers. Additionally, loss of these
37 habitats as a storm buffer could increase storm-related impacts such as depleted beaches and
38 property damage.

39
40 **Biodiversity and Habitat**

41 As temperatures and precipitation patterns change, these changes may threaten plant and animal
42 species that have adapted to specific conditions. These species may have to shift their geographic
43 range to adapt to the changes; however, if the species are unable to adapt, they may face extinction.
44 As the climate shifts, changes in wildfire patterns may also emerge. While many species in
45 California are adapted to regular fire events, higher temperatures may also result in an increase in
46 the frequency and intensity of fires, which could harm the ability of native plant species to re-
47 germinate between events (CNRA 2009). Overall, climate change could result in very harmful
48 effects on biodiversity. Shifts in species ranges could increase the likelihood of habitat

1 fragmentation, and changes in participation could lead to increased periods of drought, making
2 ecosystems vulnerable to colonization by invasive species.

4 **Agriculture and Forestry**

5 The State of California has some of the most productive agricultural regions in the world. Shifts in
6 climate may impact the ability of certain crops (e.g., grapes, other fruits, and nuts) to produce
7 substantial, high-quality yields. Sea-level rise, changes in growing season length, variation in
8 precipitation, and changes in water supply could affect agricultural productivity, which could have
9 an impact on food supplies.

10
11 The range of forest lands in the state will also likely shift in response to climate change.
12 Temperature rise has the potential to make current forest ranges inhospitable, expand insect
13 populations that impact tree mortality, and allow for the colonization of invasive, non-native
14 species.

16 **Human Health and Social Impacts**

17 Climate change could also result in increased public health risks, including an increase in mortality
18 and morbidity due to heat-related illness and a rise in respiratory illness due to poor air quality
19 caused by higher temperatures. Plant species habitat that shifts due to climate change may also lead
20 to variations in the timing and duration of allergies and the colonization of new habitat by disease
21 vectors such as non-native animals and insects. The elderly, chronically and mentally ill, infants,
22 and the economically disadvantaged will be the most at risk of the negative effects of climate-
23 related illness.

25 **4.6.2 Regulatory Setting**

27 **4.6.2.1 Federal**

28
29 The United States government has established a comprehensive policy to address climate change
30 that includes slowing the growth of emissions; strengthening science, technology, and institutions;
31 and enhancing international cooperation. To implement this policy, the federal government uses
32 voluntary and incentive-based programs to reduce emissions and has established programs to
33 promote climate technology and science (EPA 2015a).

35 **Endangerment Finding and Cause or Contribute Finding for Greenhouse Gases**

36 In December 2009, the EPA issued two separate findings regarding GHGs under Section 202(a) of
37 the Clean Air Act. The Endangerment Finding states that the current and projected concentrations
38 of the six key GHGs (CO₂, CH₄, N₂O, HFCs, PFCs, and SF₆) in the atmosphere threaten public health
39 and welfare. The Cause or Contribute Finding states that the combined emissions of GHGs from new
40 motor vehicles and new motor vehicle engines contribute to GHG pollution.

42 **Mandatory Reporting of Greenhouse Gases Rule**

43 In 2009, the EPA issued the Final Mandatory Reporting of Greenhouse Gases Rule, which requires
44 reporting of GHG emissions from large sources and suppliers in the United States. This rule requires
45 suppliers of fossil fuels and industrial GHGs, manufacturers of vehicles and engines outside of the
46 light-duty sector, and facilities that emit 25,000 MT or more of GHGs per year to submit annual
47 reports to the EPA. The rule is intended to collect accurate and timely emissions data to guide

1 future policy decisions on climate change. The proposed project is not anticipated to emit 25,000
2 MT or more of GHGs per year; therefore, an annual report to the EPA would not be required.

4 **Final Greenhouse Gas Tailoring Rule**

5 The EPA's Final GHG Tailoring Rule, established in May 2010, sets thresholds for GHG emissions
6 that define when permits under the New Source Review, Prevention of Significant Deterioration
7 (PSD) and Title V Operating Permit programs are required for new and existing industrial facilities.
8 This final rule tailors the requirements of these Clean Air Act permitting programs to limit which
9 facilities are required to obtain PSD and Title V permits. Thresholds to trigger PSD and Title V are
10 currently set at 100,000 tons per year of CO₂e. A June 23, 2014 U.S. Supreme Court decision held
11 that EPA may not treat GHGs as an air pollutant for purposes of determining whether a source is a
12 major source required to obtain a PSD or Title V permit.

14 **4.6.2.2 State**

16 **Assembly Bill 32 and Executive Order S-3-05**

17 Executive Order S-3-05, issued in 2005, established statewide GHG emission reduction targets of
18 2000 levels by 2010, 1990 levels by 2020, and 80 percent below 1990 levels by 2050. The Global
19 Warming Solutions Act, AB 32, enacted in 2006, required a reduction in the state's GHG emissions
20 to 1990 levels by 2020 and required that CARB prepare and approve a scoping plan for achieving
21 the maximum technologically feasible and cost-effective reductions in GHG emissions from sources
22 or categories of sources of GHGs by 2020.

23
24 Based on 1990 to 2004 inventories of GHG emissions in California, CARB designated a total of 427
25 million MTCO₂e as the statewide GHG 1990 emissions level and 2020 emissions limit. The 2020
26 estimates of California's GHG emissions were recently updated to account for future fuel and energy
27 demand, as well as other factors, such as the recent economic recession and anticipated reductions
28 from implemented regulations and the Renewable Portfolio Standard. This update provided a
29 baseline for the proposed Cap-and-Trade regulation, and 2020 emissions are currently forecast as
30 509 million MTCO₂e (CARB 2015c).

31
32 The Climate Change Scoping Plan, approved by CARB in 2008 and updated in 2014 to fulfill AB 32,
33 is California's roadmap for reaching its GHG reduction goals (CARB 2014). The plan outlines a
34 number of key strategies to reduce GHG emissions.

35
36 Climate Change Scoping Plan GHG reduction measures that are applicable to the proposed project
37 include the Low Carbon Fuel Standard, regional transportation-related GHG targets, light-duty
38 vehicle GHG standards, medium/heavy-duty vehicle GHG Standards, vehicle efficiency measures,
39 goods movement, energy efficiency, high GWP gases, and recycling and waste. The California
40 legislature has also passed legislation implementing most of the Climate Change Scoping Plan
41 measures. Legislation applicable to the proposed projects is described below.

43 **Assembly Bill 1493 – Pavley**

44 In 2002, the California legislature adopted regulations to reduce GHG emissions in the
45 transportation sector, the state's largest source of GHG emissions. In September 2004, pursuant to
46 AB 1493, CARB approved regulations to reduce GHG emissions from new motor vehicles beginning
47 with the 2009 model year. In September 2009, CARB adopted amendments to the Pavley
48 regulations to reduce GHG from 2009 to 2016. CARB, EPA, and the National Highway Traffic and

1 Safety Administration have coordinated efforts to develop fuel economy and GHG standards for
2 model 2017 to 2025 vehicles. The GHG standards are incorporated into the “Low Emission Vehicle”
3 Regulations.

4 5 **Executive Order S-01-07 – Low Carbon Fuel Standard**

6 In January 2007, the governor set a new standard for transportation fuels sold in California, which
7 sets a reduction of 2.5 percent in the carbon intensity of transportation fuels by 2015 and a
8 reduction of at least 10 percent by 2020.

9 10 **California Renewable Energy Programs**

11 In 2002, California initially established its Renewables Portfolio Standard (RPS), with the goal of
12 increasing the percentage of renewable energy in the State's electricity mix to 20 percent by 2017.
13 State energy agencies recommended accelerating that goal, and California Executive Order S-14-08
14 (November 2008) required California utilities to reach the 33 percent renewable electricity goal by
15 2020, consistent with the AB 32 Scoping Plan. In April 2011, Senate Bill 2 of the First Extraordinary
16 Session (SB X1-2) was signed into law. SB X1-2 expressly applies the new 33 percent RPS by
17 December 31, 2020, to all retail sellers of electricity and establishes renewable energy standards
18 for interim years prior to 2020.

19 20 **Executive Order B-30-15**

21 In April 2015, Governor Brown signed Executive Order B-30-15, establishing a new interim
22 statewide GHG emission reduction target of 40 percent below 1990 levels by 2030. The interim
23 reduction target was established to ensure that California meets its goal of reducing GHG emissions
24 to 80 percent below 1990 levels by 2050. Executive Order B-30-15 requires state agencies to
25 consider climate change in their planning and investment decisions, giving priority to actions that
26 reduce GHG emissions.

27 28 **Other Mobile Source Reduction Requirements**

29 Several other state provisions address the GHG emissions reduction targets set by CARB for mobile
30 sources. Measures applicable to the proposed projects include the following:

- 31
32 • **Advanced Clean Cars Program:** a set of regulations that would apply to new vehicles with
33 model years between 2017 and 2025, with a goal of GHG emission reduction of 34 percent
34 in 2025.
- 35 • **Heavy-Duty Truck GHG Regulations:** regulations that apply to new heavy duty tractors
36 and trailers to reduce GHG emissions.
- 37 • **On-Road Heavy Duty Diesel Vehicle Regulations:** requires diesel trucks and buses to be
38 upgraded to reduce GHG emissions under a phased implementation that would have almost
39 all buses and trucks updated with 2010 engines by January 1, 2023.

40 **California Code of Regulations Title 17, Sections 95350 to 95359**

41 California Code of Regulations (CCR) Title 17, Sections 95350 to 95359, establish requirements for
42 reducing SF₆ emissions from gas-insulated equipment. The provisions of this regulation apply to
43 owners of active switchgear equipment. It specifies maximum allowable annual SF₆ emission rates,
44 SF₆ inventory measurement procedures, recordkeeping requirements, and annual SF₆ reporting
45 requirements. Because SF₆ is the most potent GHG (about 24,000 times the GWP of CO₂), even

1 small gas-insulated devices could be responsible for significant GHG emissions. The maximum
2 allowable annual SF₆ emission rate specified is 1.0 percent of the total gas contained in gas-
3 insulated equipment. This rate must be achieved by 2020 and each calendar year thereafter.

4 5 **California Green Building Standards**

6 CCR Title 24, Part 11 establishes the requirements to improve health, safety, and general welfare by
7 enhancing the planning, design, operation, construction, use, and occupancy of every newly
8 constructed building or structure throughout the State of California. Section 5.408 of this code
9 establishes mandatory requirements for construction waste reduction, disposal, and recycling for
10 nonresidential building structures. In particular, Section 5.408.1 requires recycling and/or
11 salvaging for reuse of a minimum of 50 percent of the nonhazardous construction and demolition
12 waste. In addition, Section 5.408 requires preparation of a construction waste management plan,
13 selection of a waste management company that can provide verifiable documentation, alternatives
14 for waste stream reduction, and requirements for managing excavated soils and land clearing
15 debris.

16 17 **Senate Bill 97**

18 The California Senate passed Senate Bill 97 in 2007, requiring the Governor's Office of Planning and
19 Research to prepare, develop, and transmit guidelines for the feasible mitigation of GHG emissions
20 or their effects, including, but not limited to, effects associated with transportation and energy
21 consumption. In December 2009, pursuant to Senate Bill 97, the CNRA adopted California
22 Environmental Quality Act (CEQA) Guidelines amendments with new language for addressing the
23 quantification and mitigation of GHG emissions. These amendments became effective in March
24 2010.

25 26 **Assembly Bill 1826**

27 Governor Brown signed AB 1826 (Chapter 727, Statutes of 2014) in October 2014. AB 1826
28 requires businesses to recycle their organic waste on and after April 1, 2016, depending on the
29 amount of waste they generate per week. The law also requires local jurisdictions across California
30 to implement organic waste recycling programs to divert organic waste generated by businesses,
31 including multifamily residential buildings that consist of five or more units. AB 1826 was enacted
32 to reduce the disposal of organic waste in landfills in an effort to reduce GHG emissions from
33 landfills, which is a part of the CARB Climate Change Scoping Plan.

34 35 **4.6.2.3 Regional and Local**

36 37 **SCAQMD Interim CEQA GHG Significance Threshold for Stationary Sources, Rules and Plans**

38 SCAQMD is the regional agency with primary responsibility for air quality management in Los
39 Angeles County. To address GHG regulatory developments within the South Coast Air Basin,
40 SCAQMD issued the *Draft Guidance Document: Interim CEQA Greenhouse Gas Significance Threshold*
41 (SCAQMD 2008) and adopted a 10,000 MTCO_{2e} per year significance threshold for industrial
42 projects with construction emissions amortized over 30 years and added to operational GHG
43 emissions (SCAQMD 2008).

44 45 **Southern California Association of Governments**

46 Orange County is part of the six-county Southern California Association of Governments (SCAG)
47 region. SCAG's 2008 Regional Comprehensive Plan is an advisory document for local agencies that

1 includes goals, outcomes, and policies to address regional compliance with AB 32 and other federal
2 and state regulations. GHG topics addressed in this plan include traffic and transportation, water,
3 air quality, solid waste, and energy (SCAG 2008). In addition to the Regional Comprehensive Plan,
4 SCAG also adopted the 2012–2035 Regional Transportation Plan/Sustainable Communities
5 Strategies, which provides a plan for meeting regional emissions reduction targets set forth by
6 CARB: 9 percent per capita reduction target by 2020 and 16 percent by 2035, as required by
7 California Government Code Section 65080 (b)(2)(J)(ii). These targets for SCAG were accepted by
8 CARB in Executive Order G-12-039 (CARB 2012). SCAG Regional GHG goals applicable to the
9 proposed project include the following:

- 10
- 11 • Reverse current trends in GHG emissions to support sustainability goals for energy, water
12 supply, agriculture, and other resource areas.
- 13 • Reduce the region’s GHG emissions to 1990 levels by 2020.
- 14 • Expand green building practices to reduce energy-related emissions from developments to
15 increase economic benefits to business and residents.
- 16

17 **City of Pasadena General Plan**

18 The Open Space and Conservation Element of the City of Pasadena General Plan includes the
19 following goal for reducing GHG emissions (City of Pasadena 2012):

- 20
- 21 • Achieve CO₂ emission reductions of at least 40 percent by 2020.
- 22

23 **City of Pasadena Greenhouse Gas Emissions Inventory**

24 In 2012, the City of Pasadena adopted a Greenhouse Gas Emissions Inventory to identify the
25 sources and quantities of GHG emissions within the city’s jurisdictional boundaries. Goals of the
26 plan included identifying where the greatest opportunities for GHG emission reductions exist and
27 creating a GHG emissions baseline from which the City of Pasadena can set targets for GHG
28 emission reductions and measure future progress.

29 **Energy Efficient Climate Action Plan**

30

31 The Cities of Montebello, Rosemead, and South El Monte participate in the Energy Efficient Climate
32 Action Plan (EECAP) project, which is administered by SCE, along with 24 other participants. The
33 goal of the EECAP is to summarize the city’s existing and future energy use, project future energy
34 use through 2020, identify energy efficiency goals and targets, create an energy efficiency strategy
35 to meet reduction goals, and assist in meeting State and regional goals for GHG reduction.

36 **City of Santa Clarita**

37

38 The Open Space and Conservation Element of the City of Santa Clarita General Plan includes the
39 following objectives for reducing GHG emissions that are relevant to the proposed project (City of
40 Santa Clarita 2011):

- 41
- 42 • **Objective CO 8.1:** Comply with the requirements of State law, including AB 32, SB 375 and
43 implementing regulations, to reach targeted reductions of greenhouse gas (GHG) emissions.
- 44

1 **Other General Plans**

2 General Plans for the following jurisdictions were also reviewed, but none of the goals and policies
3 related to greenhouse gases contained in these documents were found to be applicable to the
4 proposed project:

- 5
- 6 • City of Bell Gardens (1995) General Plan
- 7 • City of Commerce (2008) General Plan
- 8 • City of Industry (2014) General Plan
- 9 • City of Long Beach (1996) General Plan
- 10 • City of Montebello (1973) General Plan
- 11 • City of Monterey Park (2001) General Plan
- 12 • City of Palmdale (1993) General Plan
- 13 • City of Rosemead (2010) General Plan
- 14 • City of South El Monte (2000) General Plan
- 15 • County of Los Angeles (2015) General Plan
- 16

17 **4.6.3 Impact Analysis**

18

19 **4.6.3.1 Methodology and Significance Criteria**

20

21 **Methodology**

22 To evaluate the effects of the GHG emissions that the proposed project would generate, GHG
23 emissions were estimated for both construction and operations. The primary source of long-term
24 direct GHG emissions is the potential leakage of SF₆ from gas-insulated electrical equipment that
25 would be installed and operated at the Mesa Substation and the combustion emissions from
26 vehicles during routine maintenance.

27

28 Using CalEEMod, direct GHG emissions from equipment and vehicle usage during construction and
29 operation of the proposed project were estimated. A summary of estimated emissions is attached in
30 Appendix C, "Air Calculations." Direct GHG emissions of SF₆ from gas-insulated electrical equipment
31 were estimated based on the proposed SF₆ storage capacities of the proposed Mesa Substation and
32 manufacturer's leakage rates. GHG emission estimates do not account for unforeseeable repairs due
33 to emergency or other causes.

34

35 **Significance Criteria**

36 Impacts from GHG emissions were evaluated according to the following significance criteria. The
37 criteria were defined based on the checklist items presented in Appendix G of the CEQA Guidelines.
38 The proposed project would cause a significant impact from GHG emissions if it would:

- 39
- 40 a) Generate GHG emissions, either directly or indirectly, that may have a significant impact on
41 the environment; or
- 42 b) Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing
43 the emission of GHGs.

To calculate the proposed project’s GHG emissions, its construction emissions were amortized over the life of the project (defined by SCAQMD as 30 years), and the resulting yearly emissions were added to the project’s annual operational emissions. This total was then compared to the applicable significance threshold of 10,000 MTCO₂e per year for stationary/industrial projects in the SCAQMD. A project that exceeds this threshold would have a significant impact.

Because the quantitative thresholds developed by SCAQMD are based on AB 32 and the California Climate Change Scoping Plan statewide reduction targets, any project that exceeds this threshold would also be in conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions, a significant impact.

4.6.3.2 Applicant Proposed Measures

There are no applicant proposed measures associated with greenhouse gases for the proposed project.

4.6.3.3 Environmental Impacts

Impact GHG-1: Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment

LESS THAN SIGNIFICANT

During construction of the proposed project, GHGs, primarily CO₂, would be emitted from the engine exhaust of diesel- and gasoline-fueled construction equipment and on-road vehicles (e.g., delivery trucks light-duty vehicles, off-road construction equipment, heavy duty diesel vehicles, worker vehicles, and helicopters).

In total, proposed project construction activities would generate approximately 28,852 MTCO₂e of emissions as shown in Table 4.6-2. Amortized over 30 years, this would be equivalent to 962 MTCO₂e per year. Detailed emissions calculations and assumptions are presented in Appendix C, “Air Calculations”.

Table 4.6-2 Total Greenhouse Gas Emissions from Construction of the Proposed Project

Year	Total Greenhouse Gas Construction Emissions (MTCO ₂ e)
2016	8,955.3
2017	6,057.3
2018	4,480.6
2019	7,119.7
2020	1,958.8
2021	280.6
Total emissions	28,852.3
Amortized Construction Emissions (30-Year Period)	961.74

Source: SCE 2015

Key:

MTCO₂e metric tons of carbon dioxide equivalent

1 During operations, equipment containing SF₆ gas, including the 500-kV, 220-kV, and 66-kV circuit
 2 breakers and the 220-kV ground disconnect switches would be installed at the proposed Mesa
 3 Substation. This equipment would be the main source of GHG emissions during operations.
 4 However, the proposed project would also include removal of existing equipment containing SF₆
 5 gas including the existing 220-kV and 66-kV circuit breakers. Annual SF₆ emissions from the
 6 existing substation and anticipated emissions from the proposed project are summarized in Table
 7 4.6-3.
 8

Table 4.6-3 Existing and Proposed SF₆ Gas Emissions

Equipment Type	Quantity of Breakers/Switches	Total Annual SF ₆ Gas Emissions (lbs/year)	Greenhouse Gas Operational Emissions (MTCO ₂ e/year)
Existing Substation			
220-kV Circuit Breaker	23	31.1	336.6
66-kV Circuit Breaker	48	9.6	104.1
Subtotal	N/A	40.7	440.7
Proposed Substation			
500-kV Circuit Breaker	9	65.0	704.9
220-kV Circuit Breaker	33	44.6	483.0
220-kV Ground Disconnect Switch	132	29.7	322.0
66-kV Circuit Breaker	45	9.0	97.6
Subtotal	N/A	148.3	1,607.5
Proposed increase in SF₆ gas emissions	-	107.6	1,166.8

Source: SCE 2015

Key:

MTCO₂e metric tons of carbon dioxide equivalent

9
 10 The total proposed annual increase in anticipated SF₆ emissions is 1,166.8 MTCO₂e. These
 11 emissions estimates assume that the proposed project's circuit breakers and 220-kV ground
 12 disconnect switches would have a maximum annual leak rate of 0.5 percent based on the
 13 manufacturer's guaranteed specifications.
 14

15 In addition to SF₆ gas emissions, the use of equipment and vehicles during routine operations and
 16 maintenance would emit CO₂ and CH₄ from engine exhaust of diesel- and gasoline-fueled vehicles.
 17 However, because equipment and vehicle use for routine operations and maintenance would not
 18 substantially differ from baseline conditions, there would be no anticipated increase in these
 19 emissions (see Section 2.5, "Operation and Maintenance").
 20

21 The proposed project's total annual GHG emissions are estimated by adding estimated construction
 22 emissions, amortized over 30 years, to estimated operational emissions. The SCAQMD's adopted
 23 significance threshold for GHG emissions is 10,000 MTCO₂e per year. Table 4.6-4 shows the total
 24 anticipated annual GHG emissions for the proposed project in comparison with the SCAQMD's
 25 significance threshold.
 26

Table 4.6-4 Overall Greenhouse Gas Emissions of the Proposed Project

Emission Source	Annual GHG Emissions (MTCO ₂ e/year)
SF ₆ Leakage	1,167
Amortized Construction Emissions (30-year period)	962
Annualized GHG Emissions	2,129
Exceeds SCAQMD GHG Threshold of 10,000 MTCO₂e/year?	No

Source: SCE 2015

Key:

GHG greenhouse gas
MTCO₂e/year metric tons of carbon dioxide equivalency per year
SF₆ sulfur hexafluoride
SCAQMD South Coast Air Quality Management District

1
2 The proposed project would not generate GHG emissions, either directly or indirectly, that would
3 have a significant impact on the environment and therefore impacts under this criterion would be
4 less than significant.

5
6 **Impact GHG-2: Conflict with any applicable plan, policy, or regulation adopted for the**
7 **purpose of reducing the emission of GHGs.**
8 *LESS THAN SIGNIFICANT*

9
10 The proposed project's GHG emissions would not exceed regional or quantitative thresholds
11 developed to comply with AB 32 and the California Climate Change Scoping Plan statewide
12 reduction targets, the proposed project would not conflict with an applicable plan, policy, or
13 regulation adopted for the purpose of reducing GHG emissions. Project construction and operation
14 would result in emissions covered by several relevant, plans, policies, and regulations. Table 4.6-5
15 contains an analysis of conformity with those plans, policies, and regulations.

Table 4.6-5 Mesa 500-kV Substation Project Conformity with Plans, Policies, and Regulations

Plan, Policy, or Regulation	Consistency Analysis
Federal vehicle emissions standards	The project would be subject to federal vehicle regulations and would therefore utilize vehicles that comply with federal vehicle emissions standards.
Mandatory reporting of Greenhouse Gas Rule	The proposed project would be required to comply with EPA reporting requirements if the proposed project met threshold requirements for reporting. The proposed project is not anticipated to emit 25,000 MT or more of GHGs per year. Therefore, an annual report to the EPA would not be required. However, the proposed project would not conflict with this requirement.
Final Greenhouse Gas Tailoring Rule	The proposed project is not anticipated to emit 100,000 tons per year of CO ₂ e. Therefore, the project would not be required to obtain a Prevention of Significant Deterioration Permit or Title V Operating Permit

Table 4.6-5 Mesa 500-kV Substation Project Conformity with Plans, Policies, and Regulations

Plan, Policy, or Regulation	Consistency Analysis
AB 32	The project would be subject to and comply with policies and measures in the AB 32 Scoping Plan that have been and will be implemented as regulations. The Scoping Plan sets forth GHG reduction measures such as the Low Carbon Fuel Standard, light and heavy-duty GHG Standards, energy efficiency, and recycling and waste reduction. The proposed project would be in compliance with all of the fuel and vehicle standards and would dispose of and recycle all project waste in the appropriate manner. The proposed project's GHG emissions would not exceed regional or quantitative thresholds developed to comply with AB 32 and the California Climate Change Scoping Plan statewide reduction target.
AB 1493—Pavley	The project would be subject to state vehicle regulations and would therefore utilize vehicles that comply with state vehicle emissions standards.
EO S-01-07—Low Carbon Fuel Standard	Fuels purchased for the project would be required to comply with the Low Carbon Fuel Standard.
California Renewable Energy Programs	In 2002, California initially established its RPS, with the goal of increasing the percentage of renewable energy in the State's electricity mix to 20 percent by 2017. State energy agencies recommended accelerating that goal, and California Executive Order S-14-08 (November 2008) required California utilities to reach the 33 percent renewable electricity goal by 2020, consistent with the AB 32 Scoping Plan. SB X1-2 expressly applies the new 33 percent RPS by December 31, 2020, to all retail sellers of electricity and establishes renewable energy standards for interim years prior to 2020. The proposed project does not involve a decrease or increase in renewable energy generation or aim to specifically increase import of renewable energy. However, it would help alleviate stress on the existing transmission system when a number of once-through cooling (OTC) units and the San Onofre Nuclear Generating System are retired. There would be no conflict with the California Renewable Energy Programs.
Executive Order B-30-15	The interim GHG reduction target was established to ensure that California meets its goal of reducing GHG emissions to 80 percent below 1990 levels by 2050. Executive Order B-30-15 requires state agencies to consider climate change in their planning and investment decisions, giving priority to actions that reduce GHG emissions. The proposed project would not significantly increase GHG emissions in the project area during construction, and GHG emissions during operations and maintenance would remain similar to existing baseline conditions. The proposed project would therefore not conflict with Executive Order B-30-15.
Advanced Clean Cars Program	Vehicles with a model year from 2017 to 2025 purchased for the proposed project would comply with regulations in the Advanced Clean Cars Program.
Heavy Duty Truck GHG Regulations	The project would be subject to heavy duty truck and trailer regulations and would therefore utilize heavy duty trucks and trailers that comply with state regulations.
On-Road Heavy Duty Diesel Vehicle Regulations	The project would be subject to heavy duty truck and trailer regulations and would therefore utilize heavy duty trucks and trailers that comply with state regulations.

Table 4.6-5 Mesa 500-kV Substation Project Conformity with Plans, Policies, and Regulations

Plan, Policy, or Regulation	Consistency Analysis
State regulations for reducing SF ₆ emissions from gas insulated switchgear (17 CCR Sections 95350 to 95359)	By 2020, the maximum emission requirement would be 1 percent per year for all gas-insulated equipment; the applicant would only purchase and install gas-insulated equipment with a manufacturer's certified SF ₆ leak rate of 0.5 percent per year or less, and implement SF ₆ best management practices during operation and maintenance of the proposed Project. The applicant would be required to report SF ₆ inventories and emissions from the use of gas-insulated electrical equipment at the proposed Mesa substation pursuant to CARB's Regulation for Reducing Sulfur Hexafluoride Emissions from Gas Insulated Switchgear (17 CCR Sections 95350 to 95359).
California Green Building Code (CCR, Title 24 Part 11)	The project proponent would be required to comply with nonhazardous construction and demolition waste requirements, as outlined in the California Green Building Code, for the construction and demolition of nonresidential building structures. Therefore, the proposed project would not conflict with this regulation.
Assembly Bill 1826	The project proponent would be required to recycle their organic waste on and after April 1, 2016, depending on the amount of waste they generate per week. Construction of the proposed project would result in the generation of various waste materials, which would all be salvaged, recycled, or disposed of in the appropriate manner. Therefore, the proposed project would not conflict with this regulation.
SCAG Regional Comprehensive Plan	The project proponent would be required to comply with federal, state, and local regulations adopted to achieve GHG reduction goals as outlined in this plan. Goals include reducing non-renewable energy consumption and developing renewable resources. The proposed project does not involve a decrease or increase in renewable energy generation or aim to specifically increase import of renewable energy. However, it would help alleviate stress on the existing transmission system when a number of OTC units and the San Onofre Nuclear Generating System are retired. There would be no conflict with the SCAG Regional Comprehensive Plan.
SCAG Regional Transportation Plan/Sustainable Communities Strategy	The applicant has not proposed to have its workers participate in any transportation demand management programs. However, the applicable policy from the strategy only aims to encourage such behavior. The proposed project would therefore not be inconsistent with this plan.
City of Pasadena General Plan	The City of Pasadena General Plan includes a policy to achieve CO ₂ emission reductions of at least 40 percent by 2020. The proposed project would have very minor emissions from CO ₂ that would be emitted during construction in the City of Pasadena. Amortized over a 30 year period, these emissions would be negligible in comparison with overall emissions in the county, given that work only includes installation of a transmission structure and a small amount of trenching. Therefore, the proposed project would not conflict with this plan.

Table 4.6-5 Mesa 500-kV Substation Project Conformity with Plans, Policies, and Regulations

Plan, Policy, or Regulation	Consistency Analysis
City of Pasadena Greenhouse Gas Emissions Inventory	The City of Pasadena Greenhouse Gas Emissions Inventory identified the sources and quantities of GHG emissions within the city’s jurisdictional boundaries and creates a GHG emissions baseline from which the City of Pasadena can set targets for GHG emission reductions and measure future progress. The proposed project would have very minor GHG emissions from use of equipment and vehicles for work at the existing Goodrich Substation. Operation emissions would remain about the same as current emissions, as equipment and vehicle use for routine operations and maintenance would not substantially differ from baseline conditions (see Section 2.5, “Operation and Maintenance”). The proposed project would not conflict with any goals or policies identified in the emissions inventory.
Energy Efficient Climate Action Plan	The proposed project would have very minor GHG emissions from use of equipment and vehicles for work in Rosemead, Montebello, and South El Monte. Operation emissions in these locations would remain the same, as equipment and vehicle use for routine operations and maintenance would not substantially differ from baseline conditions (see Section 2.5 “Operation and Maintenance”). The proposed project would not conflict with any goals or policies identified in the Energy Efficient Climate Action Plan.

- Key:
- AB Assembly Bill
 - CCR California Code of Regulations
 - CO₂ carbon dioxide
 - CO₂e carbon dioxide equivalency
 - EO Executive Order
 - EPA U.S. Environmental Protection Agency
 - GHG greenhouse gas
 - kV kilovolt
 - MT metric tons
 - SCAG Southern California Association of Governments

1
2 As demonstrated in Table 4.6-5, the proposed project would not conflict with any applicable plan,
3 policy, or regulation adopted for the purpose of reducing the emission of GHGs. Therefore, impacts
4 under this criterion would be less than significant.

5
6 **4.6.4 Mitigation Measures**

7
8 No mitigation measures are required.