



APPENDIX 3.7-A KNE ENERGY TECHNICAL REPORT



ENERGY TECHNICAL REPORT

K LINE NORTHERN EXTENSION



Metro

JULY 2024

K LINE NORTHERN EXTENSION TRANSIT CORRIDOR PROJECT

Energy Technical Report

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JULY 2024

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ABBREVIATIONS/ACRONYMS

ACRONYM	DEFINITION
AB	Assembly Bill
ACC II	Advanced Clean Cars II
BMPs	best management practices
BTU	British thermal unit
CAA	Clean Air Act
CAAP	Climate Action and Adaptation Plan
CAFE	Corporate Average Fuel Economy
CARB	California Air Resources Board
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CO ₂	carbon dioxide
CPUC	California Public Utilities Commission
Division 16	Rail Division 16 Maintenance Yard
ECMP	Energy Conservation and Management Plan
EIR	Environmental Impact Report
EO	Executive Order
Expo	Metro E Line
FLM	First and last mile
FR	Federal Register
GHG	greenhouse gases
GWh	Gigawatt-hour
I-10	Interstate 10
kBtu	thousand British thermal units
KNE	K Line Northern Extension
kWh	kilowatt-hours
LA	Los Angeles
LADWP	Los Angeles Department of Water and Power
LAX	Los Angeles International Airport
LED	light-emitting diode
LEV III GHG	Low-Emission Vehicle III Regulation for GHG
LRT	light rail transit

ACRONYM	DEFINITION
LRV	light rail vehicle
MAP-21	Moving Ahead for Progress in the 21st Century Act
MBSSP	Moving Beyond Sustainability Strategic Plan
Metro	Los Angeles County Metropolitan Transportation Authority
MMBtu	Million British thermal units
MSF	maintenance and storage facility
NHTSA	National Highway Traffic Safety Administration
Project	K Line Northern Extension Project
PV	photovoltaic
RPS	Renewables Portfolio Standard
RSA	Resource Study Area
RTP	Regional Transportation Plan
SAFE	Safer Affordable Fuel-Efficient
SAFE Vehicles Rules	Safer Affordable Fuel-Efficient Vehicles Rule
SB	Senate Bill
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SCE	Southern California Edison
SCS	Sustainable Communities Strategy
SEM	sequential excavation method
SIP	State Implementation Plan
SoCalGas	Southern California Gas Company
TBM	tunnel boring machine
TOD	transit-oriented development
USEIA	United States Energy Information Administration
USEPA	U.S. Environmental Protection Agency
VMT	vehicle miles traveled
ZEB	zero-emission bus
ZEV	Zero-Emission Vehicle

CHAPTER 1 INTRODUCTION

1.1 PROJECT OVERVIEW

The Los Angeles County Metropolitan Transportation Authority (Metro) is preparing a Draft Environmental Impact Report (EIR) for the K Line Northern Extension Transit Corridor Project (KNE, the Project) (Figure 2-1). The Project would provide a northern extension of the Metro light rail transit (LRT) K Line from the Metro E Line (Expo) to the Metro D Line (Purple) and B Line (Red) heavy rail transit lines. The Project would serve as a critical regional connection, linking the South Bay, the Los Angeles International Airport (LAX) area, South Los Angeles, Inglewood, and Crenshaw corridor to Mid-City, Central Los Angeles, West Hollywood, and Hollywood, allowing for further connections to points north in the San Fernando Valley via the Metro B Line. The Project would also connect major activity centers and areas of high population and employment density.

1.2 TECHNICAL REPORT SUMMARY

This technical report evaluates the Project's environmental impacts as they relate to energy resources. It describes existing conditions, the current applicable regulatory setting, potential impacts from construction and operation of the alignment alternatives, stations, design option, and maintenance and storage facility (MSF), as well as mitigation measures where applicable. This technical report was conducted in compliance with the California Environmental Quality Act (CEQA) (Sections 21000 et seq.) and the CEQA Guidelines (Section 15000 et seq.), which require state and local agencies to identify the significant environmental impacts of their actions, including significant impacts associated with energy, and to avoid or mitigate those impacts, when feasible.

The technical report is organized into eight chapters:

- Chapter 1 – Introduction, provides an overview of the Project and a summary of the technical report's contents.
- Chapter 2 – Project Description, provides a description of the Project's alignment alternatives, stations, design option, and MSF. This section also describes the construction approach for the Project.
- Chapter 3 – Regulatory Framework, discusses applicable federal, state, and local regulatory requirements, including plans and policies relevant to Project jurisdictions.
- Chapter 4 – Methodology and Significance Thresholds, describes the analysis methodologies applied for this Project and provides a summary of CEQA significance thresholds adopted by state and local jurisdictions.
- Chapter 5 – Existing Setting, describes the existing conditions as relevant to the Project alignment alternatives, stations, design option, and MSF.
- Chapter 6 – Impacts and Mitigation Measures, discusses the impact analyses conducted for the Project's alignment alternatives, stations, design option, and MSF, and discusses applicable mitigation measures. It also discusses any project measures that would be implemented as part of design and construction of the Project.

- Chapter 7 – Cumulative Impacts, discusses the cumulative impacts for the Project’s alignment alternatives, stations, design option, and MSF.
- Chapter 8 – References, lists the references used to prepare this technical report.

This section provides information pertinent to the components of the Project as evaluated in the technical report. The Project components for evaluation in this technical report include three light rail alignment alternatives with stations, one design option, and one MSF.

2.1 ALIGNMENT ALTERNATIVES

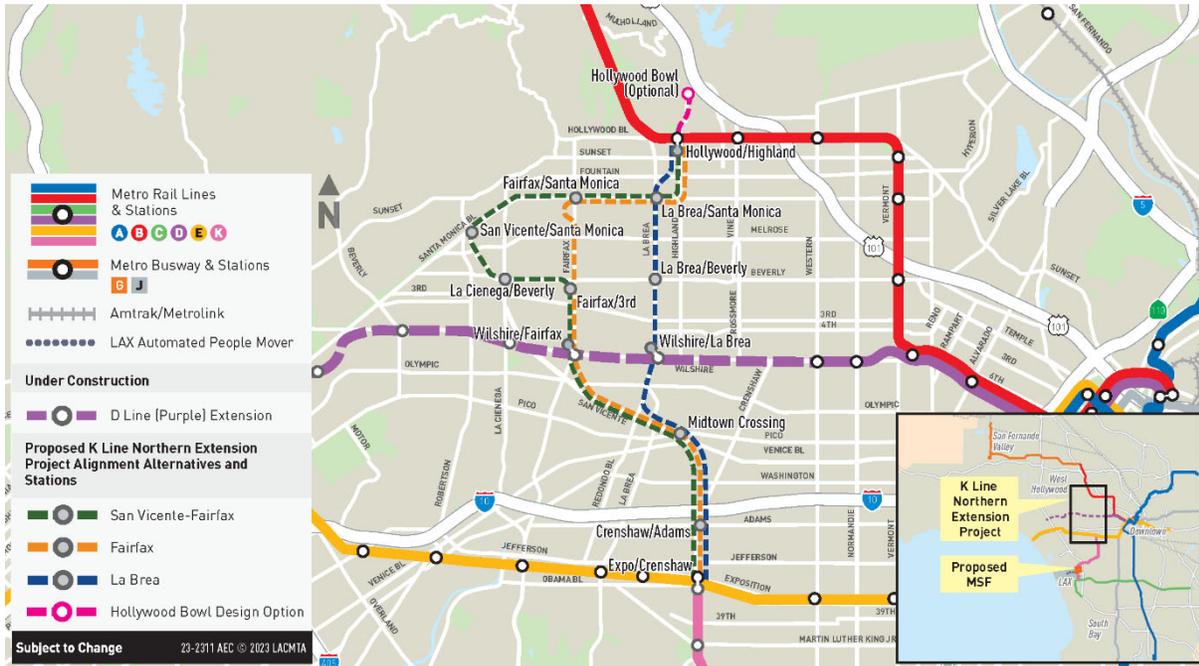
As shown in Figure 2-1, each of the three alignment alternatives would provide a northern extension of the Metro K Line from its current terminus at the Expo/Crenshaw Station to the Metro B Line Hollywood/Highland Station. All three alignment alternatives would operate entirely underground in parallel twin-bore tunnels with some station elements at the surface, including the station entrance and ventilation structures. Due to the project length and pending funding availability, the alignment alternatives would be constructed sequentially in sections.

The alignment alternatives are as follows:

- **Alignment Alternative 1: San Vicente–Fairfax.** This alignment alternative would travel north from the existing Metro K Line Expo/Crenshaw Station before heading northwest under San Vicente Boulevard, with a connection to the future Metro D Line Wilshire/Fairfax Station. It would continue north under Fairfax Avenue before turning west under Beverly Boulevard to rejoin San Vicente Boulevard. The alignment would then turn east under Santa Monica Boulevard, and then turn north just east of La Brea Avenue to follow Highland Avenue north to connect to the Metro B Line at the Hollywood/Highland Station.
- **Alignment Alternative 2: Fairfax.** This alignment alternative would travel north from the existing Metro K Line Expo/Crenshaw Station before heading northwest under San Vicente Boulevard and north under Fairfax Avenue, where it would connect with the future Metro D Line Wilshire/Fairfax Station. It would continue north under Fairfax Avenue and turn east under Santa Monica Boulevard. The alignment would then turn north just east of La Brea Avenue to follow Highland Avenue north to connect to the Metro B Line at the Hollywood/Highland Station.
- **Alignment Alternative 3: La Brea.** This alignment alternative would travel north from the existing Metro K Line Expo/Crenshaw Station before heading northwest under San Vicente Boulevard and north under La Brea Avenue, where it would connect with the future Metro D Line Wilshire/La Brea Station. From there, it would continue north under La Brea Avenue and turn northeast north of Fountain Avenue to follow Highland Avenue to connect with the Metro B Line at the Hollywood/Highland Station.

Table 2-1 provides a summary of the characteristics of each of the alignment alternatives and Table 2-2 identifies which stations would be constructed under each alignment alternative. In total, 12 station areas are identified, including the option to extend to the Hollywood Bowl.

FIGURE 2-1. K LINE NORTHERN EXTENSION ALIGNMENT ALTERNATIVES



Source: Connect Los Angeles Partners 2023

TABLE 2-1. CHARACTERISTICS OF THE ALIGNMENT ALTERNATIVES AND DESIGN OPTION

PROJECT COMPONENTS	ALIGNMENT ALTERNATIVES			DESIGN OPTION
	1. SAN VICENTE-FAIRFAX	2. FAIRFAX	3. LA BREA	HOLLYWOOD BOWL EXTENSION
Alignment Length	9.7 miles underground	7.9 miles underground	6.2 miles underground	+ 0.8 mile underground
Stations	9 underground	7 underground	6 underground	+1 underground
Travel time from Expo/Crenshaw to Hollywood/Highland Stations	19 minutes	15 minutes	12 minutes	+2 minutes (from Hollywood/Highland)

Source: Connect Los Angeles Partners 2023

TABLE 2-2. STATIONS BY ALIGNMENT ALTERNATIVE

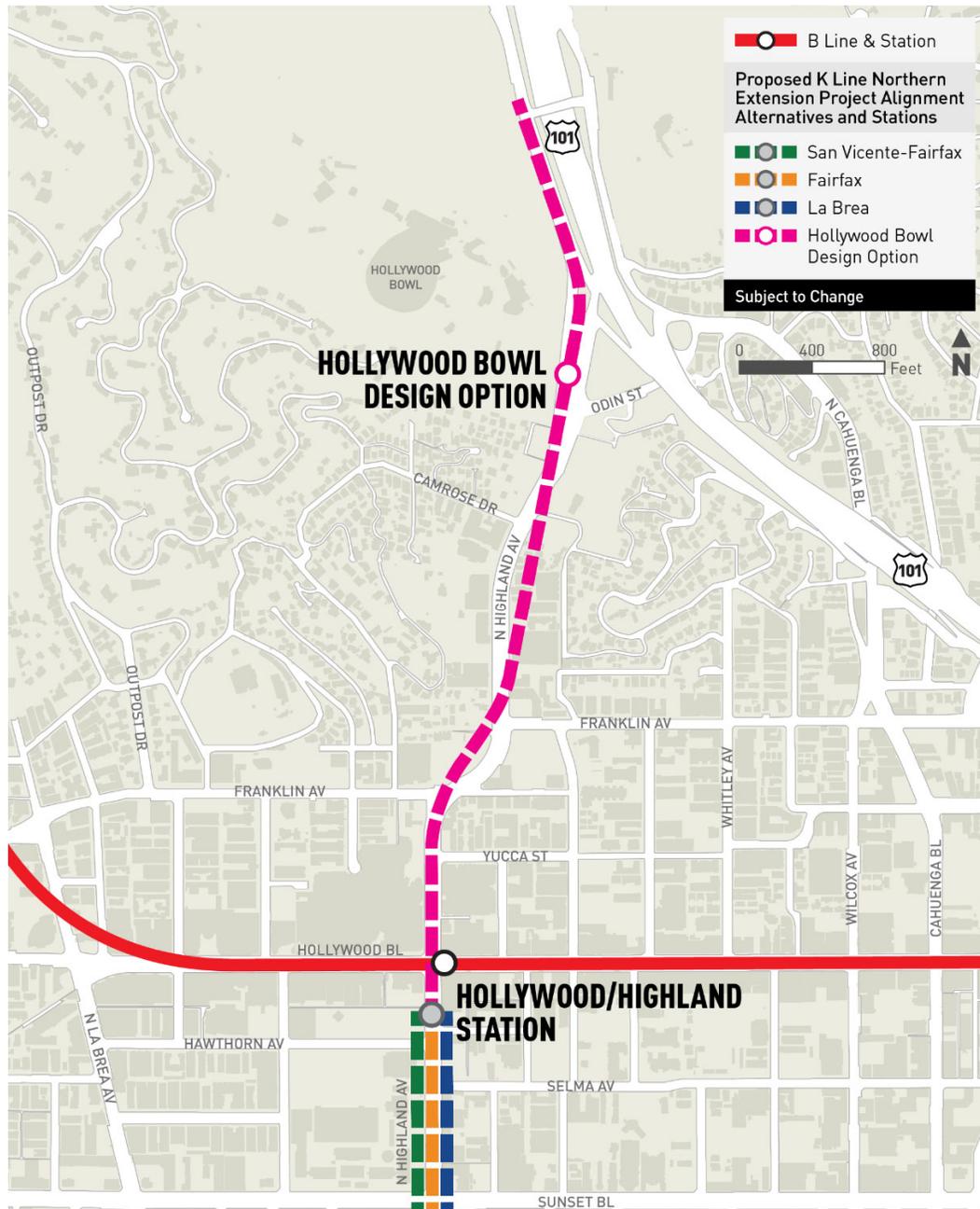
STATION	SAN VICENTE–FAIRFAX	FAIRFAX	LA BREA
Crenshaw/Adams (City of Los Angeles)	●	●	●
Midtown Crossing (City of Los Angeles)	●	●	●
Wilshire/Fairfax (City of Los Angeles)	●	●	
Fairfax/3 rd (City of Los Angeles)	●	●	
La Cienega/Beverly (City of Los Angeles)	●		
San Vicente/Santa Monica (City of West Hollywood)	●		
Fairfax/Santa Monica (City of West Hollywood)	●	●	
La Brea/Santa Monica (City of West Hollywood)	●	●	●
Hollywood/Highland (City of Los Angeles)	●	●	●
Wilshire/La Brea (City of Los Angeles)			●
La Brea/Beverly (City of Los Angeles)			●
Hollywood Bowl (City of Los Angeles)	●	●	●

Source: Connect Los Angeles Partners 2023

2.2 HOLLYWOOD BOWL DESIGN OPTION

For every alignment alternative, there is one design option under consideration. The Hollywood Bowl Design Option includes an alternate terminus station at the Hollywood Bowl, north of the proposed Hollywood/Highland Station, as shown in Figure 2-2.

FIGURE 2-2. HOLLYWOOD BOWL DESIGN OPTION



Source: Connect Los Angeles Partners 2023

2.4 CONSTRUCTION APPROACH

The Project would be constructed in sections that would be built sequentially, depending on available funding. The development of the Project would employ conventional construction methods, techniques, and equipment similar to other Metro projects that require underground tunneling. Detailed information on construction techniques can be found in the KNE Construction Approach Report. Major construction activities for the Project include surveys and preconstruction, which consist of local business surveys, building and utility assessments, and site preparations; right-of-way acquisition; tunnel construction, including tunnel boring machine (TBM) excavation and segmental lining and installation; utility relocation and installation work; station, crossover, and connection box construction; MSF construction, including site grading, maintenance building construction, and storage and access track construction; street restorations, including paving and sidewalks; ventilation and emergency egress construction; systems installation and facilities, including trackbed, rail, overhead contact system, conduit, electrical substation, and communications and signaling construction; and construction of other ancillary facilities.

The tunnels would be bored with TBMs, and the stations and track crossover boxes would be constructed via cut-and-cover methods, which entail excavating down from the ground surface and stabilizing the ground with an excavation support, then placing temporary decking surfaces above the excavation and conducting all excavation inside the supported area. The tunnel and station associated with the Hollywood Bowl Design Option would be constructed by sequential excavation method (SEM), which entails conventional mining techniques and equipment for hard rock excavation, which would reduce surface impacts.

Construction staging areas have been identified at each of the station locations, both of which are described and illustrated in Appendix A of the KNE Construction Approach Report. In order to construct a station, a minimum of one to two acres of construction staging sites would be needed for the duration of the station construction period. A larger construction staging site of three to four acres would be required if the site is also used to launch the TBMs and support tunneling activities. The TBM launch sites have been identified at the Midtown Crossing, San Vicente/Santa Monica, and La Brea/Santa Monica Stations. Temporary street, lane, sidewalk and bike lane closures as well as street reconfigurations will be part of construction activities. Construction and operational impacts related to energy resources are identified and discussed in this technical report.

CHAPTER 3 REGULATORY FRAMEWORK

3.1 FEDERAL REGULATIONS

3.1.1 ENERGY POLICY AND CONSERVATION ACT OF 1975 AND ALTERNATIVE MOTOR FUELS ACT OF 1988

The Energy Policy and Conservation Act of 1975 promotes energy conservation when feasible, including mandating vehicle economy standards. The Alternative Motor Fuels Act of 1988 amends a portion of the Energy Policy and Conservation Act to encourage the use of alternative fuels, including electricity. The act directs the Secretary of Energy to take action to ensure that the maximum practical number of federal passenger vehicles and light-duty trucks be powered by alcohol or natural gas, or be dual-fueled vehicles.

3.1.2 MOVING AHEAD FOR PROGRESS IN THE 21ST CENTURY ACT

Moving Ahead for Progress in the 21st Century Act (MAP-21), the federal surface transportation funding authorization, was signed into law on July 6, 2012. The first multi-year transportation authorization enacted since 2005, MAP-21 establishes new regulations and implementation guidance related to planning, environmental review, and funding for transit projects, including consideration for projects and strategies that “protect and enhance the environment, promote energy conservation, improve the quality of life, and promote consistency between transportation improvements and state and local planned growth and economic development patterns...” MAP-21 incorporates energy conservation as a core consideration in surface transportation development and includes, in surface transportation development funding, the funding of a public transportation research program with a focus on energy efficiency, system capacities, and other surface transportation factors.

3.1.3 ENERGY POLICY ACTS OF 1992 AND 2005

First enacted in 1992, the Energy Policy Act addressed all aspects of energy supply and demand in the United States, including the use of alternative fuels and renewable energy, and energy efficiency. The act established regulatory and voluntary measures to encourage the use of alternative fuels. The act was followed in 2005 with amended fuel economy testing procedures and other regulations and requirements to establish tax incentives, grant programs, and demonstration and testing initiatives intended to promote the adoption of alternative-fueled vehicles.

3.1.4 ENERGY INDEPENDENCE AND SECURITY ACT OF 2007

The Energy Independence and Security Act of 2007 consists of various provisions to enhance energy efficiency and the availability and adoption of renewable energy and alternative fuel. These provisions include the introduction or expansion of:

- Corporate Average Fuel Economy (CAFE) standards, which regulate how far passenger vehicles and light-duty trucks must travel on a gallon of fuel;

- Renewable Fuels Standard program, which regulates fuel-blending requirements for renewable and conventional fuels to reduce reliance on imported oil;
- Energy Efficiency Equipment Standards program, which regulates minimum energy efficiencies for residential and commercial lighting and appliance equipment; and,
- Repeal of certain oil and gas tax incentives.

3.1.5 AFFORDABLE FUEL-EFFICIENT VEHICLES RULE PART ONE: ONE NATIONAL PROGRAM

In August 2018, the U.S. Environmental Protection Agency (USEPA) and National Highway Traffic Safety Administration (NHTSA) proposed the “Safer Affordable Fuel-Efficient Vehicles Rule for Model Years 2021–2026 Passenger Cars and Light Trucks” (SAFE Vehicles Rule). The SAFE Vehicles Rule amends existing CAFE and tailpipe carbon dioxide (CO₂) emissions standards for light-duty vehicles and establishes new standards covering model years 2021–2026. The USEPA also proposed to withdraw the waiver previously provided to California under Section 209 of the Federal Clean Air Act (CAA) for the state’s greenhouse gases (GHG) and Zero-Emission Vehicle (ZEV) programs.

The NHTSA proposed regulatory text implementing its statutory authority to set nationally applicable fuel economy standards that made explicit that those state programs would also be preempted under NHTSA’s authorities. On September 27, 2019, the USEPA and NHTSA published its Final Rule to revoke California’s waiver and establish the federal preemption in the Federal Register (FR) (84 FR 51310). California and a coalition of other states has sued both the USEPA and the NHTSA, challenging their decisions that would block states from setting tougher automobile fuel efficiencies and emissions standards. On April 30, 2020, the SAFE standards for model year 2021–2026 light-duty vehicles were made final (USEPA/NHTSA 2020).

On February 8, 2021, litigation was held in abeyance pending review under Presidential Executive Order (EO) 13990, Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis (United States Court of Appeals for the District of Columbia Circuit 2021). This order mandates the review of actions or policies taken between January 20, 2017, and January 20, 2021 for consistency with current national climate objectives, and tasks agencies to suspend, revise, rescind, or amend these actions or policies as appropriate (USEOP 2021). In accordance with this order, on August 10, 2021, new CAFE standards were proposed for 2024-2026 model year light-duty vehicles, and on December 21, 2021, the NHTSA repealed the SAFE Vehicles Rule preemption on state fuel efficiency and GHG standards.

3.1.6 CORPORATE AVERAGE FUEL ECONOMY AND GREENHOUSE GAS EMISSIONS STANDARDS

The federal government is responsible for establishing regulations to improve the efficiency of motor vehicles. The NHTSA CAFE standards regulate how far vehicles must travel on a gallon of fuel. NHTSA sets CAFE standards for passenger cars and light trucks (collectively, light-duty vehicles) and separately sets fuel consumption standards for medium- and heavy-duty trucks and engines. Jointly with CAFE,

NHTSA also regulates GHG emissions from vehicles of various weight classes. The CAFE and GHG emissions standards have been rolled out in multiple phases.

On April 1, 2022, the NHTSA announced new fuel economy standards. The CAFE standards require an industry-wide fleet average of approximately 49 miles per gallon for passenger cars and light trucks in model year 2026, the strongest cost savings and fuel efficiency standards to date. The new standards will increase fuel efficiency eight percent annually for model years 2024-2025 and ten percent annually for model year 2026. They will also increase the estimated fleetwide average by nearly 10 miles per gallon for model year 2026, relative to model year 2021. The new CAFE standards for model year 2024-26 will reduce fuel use by more than 200 billion gallons through 2050, as compared to continuing under the old standards.

In July 2023, NHTSA announced new CAFE standards for passenger cars and light trucks built in model years 2027-2032, and new fuel efficiency standards for heavy-duty pickup trucks and vans built in model years 2030-2035. If finalized, the proposal would require an industry fleetwide average of approximately 58 miles per gallon for passenger cars and light trucks in model year 2032, by increasing fuel economy by two percent each year for passenger cars and by four percent each year for light trucks.

3.2 STATE REGULATIONS

3.2.1 CALIFORNIA ENERGY COMMISSION

The California Energy Commission (CEC) is responsible for, among other things, forecasting future energy needs for the state. Senate Bill (SB) 1389 (Chapter 568, Statutes of 2002) requires the CEC to prepare a biennial integrated energy policy report that includes assessments and forecasts of energy supply, production, transportation, delivery, distribution, demand, and price, as well as assessing major energy trends and issues facing the state's electricity, natural gas, and transportation fuel sectors. The assessments and forecasts are used to develop energy policies that conserve resources, protect the environment, ensure energy reliability, enhance the state's economy, and protect public health and safety. The 2023 Integrated Energy Policy Report is currently being prepared (CEC 2023).

3.2.2 CALIFORNIA GREEN BUILDING STANDARDS CODE, TITLE 24

In January 2010, the State of California adopted the California Green Building Standards Code, which establishes mandatory green building standards for all buildings in California. The code covers five categories: planning and design; energy efficiency; water efficiency and conservation; material conservation and resource efficiency; and indoor environmental quality. These standards include a set of minimum requirements and more rigorous voluntary measures for new construction projects to achieve specific green building performance levels. This code went into effect as part of local jurisdictions' building codes on January 1, 2011. The 2022 California Building Standards Code (Cal. Code Regs., Title 24) was published July 1, 2022, with an effective date of January 1, 2023.

3.2.3 ALTERNATIVE AND RENEWABLE FUEL AND VEHICLE TECHNOLOGY PROGRAM

Assembly Bill (AB) 118 (Chapter 750, Statutes of 2007) establishes the Alternative and Renewable Fuel and Vehicle Technology Program under administration of the CEC. The program establishes measures, including grant awards, revolving loans, and loan guarantees, to develop and deploy new fuel and vehicle technologies to help achieve California’s target petroleum reductions, air quality, and climate change goals. The program was amended in 2008 and 2013 to allow the CEC to develop and deploy alternative and renewable fuels, alternative and renewable fueled vehicles, and other advanced transportation technologies to meet the state goals.

3.2.4 ASSEMBLY BILL 1007, ALTERNATIVE FUELS PLAN

AB 1007 (Pavley, Chapter 371, Statutes of 2005) requires the CEC to prepare an alternative fuels plan to increase the use of alternative fuels in California. The State Alternative Fuels Plan, approved by the CEC on November 2, 2007, aims to clean the state’s air, diversify fuel sources, and protect the state from oil spikes that affect prices, the economy, and jobs. The State Alternative Fuels Plan focuses on transportation fuels and alternative fuels but recognizes other components of the transportation system, including advanced vehicle technology and efficiency improvements in conventional vehicles. Additionally, the plan indicates that significant efforts would be needed to reduce vehicle miles traveled (VMT) by all Californians through more effective land use and transportation planning and greater mass movement of people and goods.

3.2.5 ASSEMBLY BILL 1493, CALIFORNIA ADVANCED CLEAN CARS PROGRAM

AB 1493 (“Pavley” regulation) requires the California Air Resources Board (CARB) to develop and adopt GHG emission standards for automobiles. AB 1493 became law in 2002, and CARB enacted subsequent regulations in September 2004. In 2012, CARB, in coordination with the USEPA and NHTSA, developed a set of regulations that are collectively known as the Advanced Clean Cars Program. The singular state and federal timeframe for fuel and economy standards aligned the Pavley standards with federal CAFE standards for passenger cars and light-duty trucks. The Low-Emission Vehicle III Regulation for GHG (LEV III GHG) builds upon AB 1493, which established GHG emission standards for 2009 through 2016 model year passenger vehicles, by requiring further reductions in passenger vehicle GHG emissions for 2017 and subsequent model years. The LEV III GHG regulation is projected to reduce GHG emissions by 40 percent in 2025 when compared to 2012 model year vehicles. The ZEV regulation also requires auto manufacturers to offer for sale specific numbers of full battery-electric, hydrogen fuel cell, and plug-in hybrid-electric vehicles. Approximately eight percent of California new vehicle sales in 2025 are predicted to be ZEVs and plug-in hybrids (CARB 2019).

3.2.6 CALIFORNIA ADVANCED CLEAN CARS II PROGRAM

On September 30, 2022, the Advanced Clean Cars II (ACC II) regulations were adopted, imposing the next level of low-emission and ZEV standards for model years 2026-2035 that contribute to meeting federal ambient air quality ozone standards and California’s carbon neutrality targets. The regulations are two-pronged. First, they amend the Zero-Emission Vehicle Regulation to require an increasing

number of ZEVs and rely on currently available advanced vehicle technologies, including battery-electric, hydrogen fuel cell electric and plug-in hybrid-electric vehicles, to meet air quality and climate change emissions standards. These amendments support Governor Newsom's 2020 EO N-79-20, described below, that requires all new passenger vehicles sold in California to be zero emissions by 2035. Second, the Low-emission Vehicle Regulations were amended to include increasingly stringent standards for gasoline cars and heavier passenger trucks to continue to reduce smog-forming emissions.

3.2.7 INNOVATIVE CLEAN TRANSIT REGULATION

Enacted in December 2018 in Section 2023.1 of the California Code of Regulations, the Innovative Clean Transit Regulation requires all public transit agencies to gradually transition to a 100 percent zero-emission bus (ZEB) fleet. Beginning in 2029, 100 percent of new purchases by transit agencies must be ZEBs, with a goal for full transition by 2040. It applies to all transit agencies that own, operate, or lease buses with a gross vehicle weight rating greater than 14,000 lbs. It includes standard, articulated, over-the-road, double-decker, and cutaway buses.

3.2.8 EXECUTIVE ORDER B-16-12

EO B-16-12, signed into law by Gov. Edmund G. Brown in March 2012, sets aggressive targets to meet certain goals in 2015, 2020, and 2025 and supports the rapid commercialization of clean vehicles. EO B-16-12 also advances two long-term environmental and energy goals for the transportation section: (1) decrease transportation section GHG emissions to 80 percent below 1990 levels by 2050 and (2) reduce at least 1.5 billion gallons of petroleum fuels by 2025 through the use of clean and efficient vehicles (Office of Gov. Edmund G. Brown Jr. 2013).

3.2.9 SENATE BILLS 1078, 350, AND 100

Established in 2002 by SB 1078, California's Renewables Portfolio Standard (RPS) requires electricity providers (i.e., utilities, cooperatives, and community choice aggregators) to provide a specified minimum portion of their electricity supply from eligible renewable resources by milestone target years. Since 2002, state legislative actions have modified and accelerated the RPS several times, resulting in one of the most ambitious renewable energy standards in the country. In October 2015, SB 350 increased the state's renewable electricity procurement goal from 33 percent by 2020 to 50 percent by 2030. In addition, the state is required to double statewide energy-efficiency savings in electricity and natural gas end uses by 2030. To ensure these goals are achieved, large utilities will be required to generate and submit Integrated Resource Plans that detail how each utility will meet its customers' resource needs and ramp up the deployment of clean energy resources, including solar, wind, biomass, and geothermal.

In December 2021, SB 100 increased the renewable electricity procurement goal set by SB 350 from 50 percent to 60 percent by 2030 with new interim targets of 44 percent by 2024 and 52 percent by 2027. Additionally, SB 100 requires renewable energy and zero-carbon electricity system to supply 100 percent of electric retail sales by 2045.

3.2.10 EXECUTIVE ORDER N-79-20

On September 23, 2020, Gov. Gavin Newsom signed EO N-79-20 into effect. The rule establishes a goal for 100 percent of in-state sales of new passenger cars and trucks to be zero-emission by 2035. Additionally, 100 percent of medium- and heavy-duty vehicles in the state shall be zero-emission by 2045 for all operations where feasible and by 2035 for drayage trucks. California shall transition to 100 percent zero-emission off-road vehicles and equipment by 2035 where feasible.

The Governor's Office of Business and Economic Development, in consultation with the State Energy Commission, the California Public Utilities Commission (CPUC), the State Transportation Agency, CARB, the Department of Finance, and other state agencies, local agencies, and the private sector, shall develop a ZEV Market Development Strategy by January 31, 2021, and update it every three years thereafter, that: “a) ensures coordinated and expeditious implementation of the system of policies, programs, and regulations necessary to achieve the goals and orders established by this Order and b) outlines state agencies' actions to support new and used zero-emission vehicle markets for broad accessibility for all Californians.”

In February 2021, the first ZEV Market Development Strategy was released and was centered around the four market pillars of vehicles, infrastructure, end users, and workforce. The strategy is built upon a foundation of five core principles: equity in every decision, embracing all zero-emission pathways, collective problem-solving, public actions drive greater private investment, and designing for system resilience and adaptability (California Governor's Office of Business 2021).

The Energy Commission, CARB, CPUC, and other relevant state agencies shall use existing authorities to accelerate deployment of affordable fueling and charging options for ZEV in ways that serve all communities and in particular low-income and disadvantaged communities, consistent with state and federal law.

3.3 LOCAL REGULATIONS

3.3.1 SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS

The Southern California Association of Governments (SCAG) is required by state and federal mandates to prepare a Regional Transportation Plan (RTP) every three years that also includes a Sustainable Communities Strategies (SCS), the most recent of which is the 2020-2045 RTP/SCS, titled Connect SoCal, fully adopted on September 3, 2020. The RTP provides a long-range regional vision for regional transportation goals and policies, as well as predicted transportation challenges and the region's future transportation strategy. The SCS also combines transportation and land use elements to help meet state climate and air quality goals, as well as advancing community goals. Plan implementation is expected to contribute to reductions in regional energy and water consumption and lower transportation costs for households across the region (SCAG 2020).

The RTP/SCS establishes the following goals that relate to the Project and energy efficiency and conservation:

- Preserve and ensure a sustainable regional transportation system
- Maximize the productivity of the transportation system
- Actively encourage and create incentives for energy efficiency, where possible
- Encourage use and growth patterns that facilitate transit and active transportation

3.3.2 AIR QUALITY MANAGEMENT DISTRICTS

The Project is located within the South Coast Air Basin, which is under the jurisdiction of the South Coast Air Quality Management District (SCAQMD). The SCAQMD has the primary responsibility for developing the plans and regulations that will improve air quality in the South Coast Air Basin. The SCAQMD is responsible for contributing to the development of State Implementation Plans (SIPs) in compliance with the federal CAA and California CAA regulations to reduce unhealthy levels of air pollutants. The SCAQMD contributes to the SIPs by indicating how air quality standards will be met through the development of air quality management plans. Among other strategies, these plans promote reductions in VMT through the development of transportation alternatives.

3.3.3 METRO

Since the mid-2000s, Metro has adopted plans, policies, and strategies that address energy efficiency, including both general goals focused on sustainability and specific actions designed to save energy. The sections that follow provide a brief summary of several of Metro's most applicable energy-efficiency policies, plans, and strategies.

3.3.3.1 ENERGY AND ENVIRONMENTAL POLICIES

Metro's adopted policies that support energy efficiency include the following:

- Energy and Sustainability Policy (Metro 2007a) – Established to aid Metro in controlling energy consumption and encouraging energy efficiency, conservation, and sustainability. Long-term objectives include:
 - ▶ Reducing the use of fossil fuels through the use of ambient and renewable energy sources
 - ▶ Using fuels and electricity as efficiently as possible
- Construction and Demolition Debris Recycling and Reuse Policy (Metro 2007b) – A comprehensive policy that provides guidelines for the consideration of recycled and recyclable materials and products during all phases of design, construction, and procurement of any Metro or Metro-funded project, as well as procedures for the disposal or diversion of construction or demolition debris or wastes that cannot be recycled or reused on site.
- Environmental Policy (Metro 2009) – A comprehensive policy that provides guidance on such aspects as mitigating potential environmental impacts generated by development activities and reducing consumption of natural resources. Specific commitments related to energy

include promoting renewable energy sources to address energy and environmental challenges.

- Renewable Energy Policy (Metro 2011a) – Calls for renewable energy solutions while minimizing non-renewable energy use and also for a review of the technical feasibility of renewable power projects on Metro property and infrastructure.
- Green Construction Policy (2011b) – Adopted to reduce emissions from construction equipment and includes a commitment by Metro that all on-road and off-road vehicles used in construction of a project will be greener and less polluting, and that best practices will be implemented to meet or exceed air quality emission standards. For example, from Jan. 1, 2015 onward, all off-road diesel-powered construction equipment with greater than 50 horsepower shall meet Tier 4 off-road emission standards at a minimum. Measures related to energy use include limiting idling, maintaining equipment to manufacturers’ specifications, and using electric power in lieu of diesel power where available.
- All-Hazards Mitigation Plan (Metro 2022) – Prepared in response to the Disaster Mitigation Act of 2000 requiring state and local governments to document their mitigation planning process, and identify hazards, potential losses, mitigation needs, goals, and strategies.

3.3.3.2 ENERGY CONSERVATION AND MANAGEMENT PLAN

Metro’s Energy Conservation and Management Plan (ECMP) (Metro 2011c) is intended to complement the Energy and Sustainability Policy by guiding energy use in a sustainable, cost-effective, and efficient manner. The ECMP addresses existing and projected energy needs, identifies opportunities to reduce energy consumption and achieve cost savings, and sets forth implementation strategies, including for vehicle propulsion energy.

3.3.3.3 SUSTAINABLE RAIL PLAN

Metro’s Sustainable Rail Plan (2013) examines strategies to reduce energy consumption from rail operations and analyzes their costs and potential energy savings. The study supports implementation of the ECMP.

3.3.3.4 CLIMATE ACTION AND ADAPTATION PLAN

In 2012, Metro developed its first Climate Action and Adaptation Plan (CAAP) to provide a framework for reducing GHG emissions and building climate change resilience. A new CAAP was adopted in 2019 that builds upon the 2012 CAAP and considers evolving approaches to addressing climate change. Many strategies identified in the CAAP for reducing GHG emissions also contribute to improving energy efficiency and reducing nonrenewable energy consumption, including but not limited to, increased renewable energy procurement, increased photovoltaic (PV) installations, replacing lighting and appliances at Metro facilities with more energy-efficient controls and equipment, and an assessment of opportunities for Wayside Energy Storage Substation implementation to store energy from decelerating railcars.

3.3.3.5 COMPLETE STREETS POLICY

The State of California enacted the California Complete Streets Act of 2008 (AB 1358) that requires cities or counties that make substantive revisions to the circulation elements of their general plans to identify how mobility needs of all roadway users will be provided. In response to AB 1358, Metro developed the Complete Streets Policy (Metro 2014) to help advance state, regional, and local efforts to create a more “complete” and integrated transportation network that serves all users and supports environmental sustainability. The Complete Streets Policy demonstrates Metro’s ongoing commitment to improving mobility in the region and ensuring that streets form a comprehensive and integrated transportation network promoting safe and convenient travel for all users while preserving flexibility, recognizing community context, and using design guidelines and standards that support best practices.

3.3.3.6 FIRST/LAST MILE STRATEGIC PLAN

Metro’s First/Last Mile Strategic Plan (Metro 2016) establishes an approach for identifying barriers and planning and implementing improvements to overcome those barriers for the first and last mile (FLM) portions of an individual’s transit. The plan includes an adaptable and systemic implementation framework with data and information-driven support for improvements. Common FLM improvements include infrastructure for walking, rolling, and biking such as sidewalks, crosswalks, bike lanes, and bike parking; facilities for making transit-mode connections, such as bus/rail interfaces; and supporting signage and way-finding aids for transit infrastructure.

3.3.3.7 MOVING BEYOND SUSTAINABILITY PLAN

In September 2020, Metro approved the Moving Beyond Sustainability Plan, which outlines a comprehensive sustainability strategy for the next decade to make Metro facilities greener, reduce air pollution and trash from construction, and reduce smog and greenhouse gases across the County of Los Angeles. The Moving Beyond Sustainability Plan includes an Energy Resource Management category target, which sets goals to reduce energy consumption by 17 percent at facilities from the 2030 business-as-usual scenario, and increase onsite renewable energy generation to 7.5 megawatts.

3.3.3.8 VISION 2028 PLAN (METRO STRATEGIC PLAN)

In 2018, Metro developed the Metro Vision 2028 Plan, which outlines strategic goals for 2018–2028, and the specific actions Metro will take to meet those goals. Vision 2028 outlines the following five goals:

- Provide high-quality mobility options that enable people to spend less time traveling
- Deliver outstanding trip experiences for all users of the transportation system
- Enhance communities and lives through mobility and access to opportunity
- Transform Los Angeles County through regional collaboration and national leadership
- Provide responsive, accountable, and trustworthy governance within the Metro organization

3.3.4 COUNTY OF LOS ANGELES

The Mineral and Energy Resources Section in the Conservation and Natural Resources Element of the Los Angeles County 2035 General Plan addresses the use and management of valuable energy and mineral resources in Los Angeles County. The county identifies that there is a high transportation and non-transportation energy demand and that projected growth in the region will continue to strain the mineral supply. Energy consumption patterns demonstrate that residents in Los Angeles County consume proportionally more energy for transportation than the rest of California and that the low-density, automobile-dependent communities place high demand on such resources (Los Angeles County 2015).

The Conservation and Natural Resources Element sets forth goals and policy direction to promote efficient and sustainable use of renewable and nonrenewable energy resources.

Policy C/NR 12.2 encourages the effective management of energy resources, such as ensuring adequate reserves to meet peak demands, relates specifically to construction of the Project's alignment alternatives since there would be a potential to decrease petroleum use and increase electrically-powered rail lines. Additionally, because of the increasing use of renewables to meet electricity demand, the policy encourages the production and use of renewable energy resources, which also relates to operation of the Project's alignment alternatives.

The Mobility Element of the General Plan includes policy guidance and strategies to reach the county's long-term transportation goals, including the promotion of rail, bus, carpool, bicycle, and pedestrian modes of transportation as alternatives to the single-occupant automobile. Specifically, Goal M4 promotes an efficient multimodal transportation system that serves the needs of all residents, and Goal M5 promotes land use planning and transportation management that facilitates the use of transit. Such policies support reductions in transportation energy demand.

3.3.5 CITY OF LOS ANGELES

The City of Los Angeles has implemented numerous regulations, plans, programs, and policies aimed at reducing citywide energy demands and enhancing energy efficiency. The energy conservation efforts are interrelated with strategies to improve sustainability and regional air quality, as well as transportation and traffic congestion. All projects within the City of Los Angeles are subject to the requirements of the Los Angeles Green Building Code, and implementation of the Project is considered in the context of the Sustainable City Plan (City of Los Angeles 2015) which serves as the City of Los Angeles's guide for addressing the challenges presented by climate change.

In addition to the Green Building Code and Sustainable City Plan, the Los Angeles City Council has directed Los Angeles Department of Water and Power (LADWP) to set building electrification targets for 2028 and 2038 in order to align with the city's GHG targets of 45 percent below 1990 levels by 2025 and 60 percent by 2035 (LADWP 2021). Collectively, the City of Los Angeles strives to reduce energy demand and enhance energy efficiency by promoting green buildings, encouraging transit-oriented development (TOD), and by approving projects that will reduce VMT and provide alternative modes of transportation.

3.3.6 CITY OF WEST HOLLYWOOD

The Infrastructure, Resources, and Conservation Chapter of the City of West Hollywood General Plan (City of West Hollywood 2011) provides background information and policy guidance for energy supply and conservation.

- Goal IRC-4: Reduce the total and per capita amount of energy used in the City.
 - ▶ IRC-4.1: Promote building energy efficiency improvements through strategies that may include the following:
 - Retrofits of existing buildings with energy efficient technology
 - Expanded public outreach in partnership with Southern California Edison on energy efficiency upgrades
 - A voluntary energy audit program for residents and businesses
 - Diverse incentives for energy efficiency
 - ▶ IRC-4.2: Promote land use patterns and mobility decisions that result in reduced vehicle trips and therefore reduced overall energy use from the transportation sector.
 - ▶ IRC-4.3: Maximize the use of renewable energy in the City through strategies that may include the following:
 - A comprehensive renewable energy program that provides incentives, outreach, financing, or similar forms of assistance to residents and businesses in the City
 - Incentives to existing residents to purchase solar water heaters
 - Incentives to encourage commercial properties to develop solar energy production systems on private property and sell the energy to the public utility system
 - ▶ IRC-4.4: As feasible, coordinate with available energy efficiency and conservation programs – such as those administered by Southern California Edison, the United States Department of Energy, or other organizations – to reduce energy use.

CHAPTER 4

METHODOLOGY AND SIGNIFICANCE THRESHOLDS

4.1 METHODOLOGY

The purpose of this assessment is to evaluate the Project against thresholds of significance as the basis for determining the level of impacts related to energy resources. Potential impacts to energy resources are assessed for the construction and operational phases of the Project. The analysis also includes an evaluation of the Project relative to energy conservation through the wise and efficient use of energy as identified in Appendix F of the 2022 CEQA Guidelines. The purpose of Appendix F of the CEQA Guidelines is to ensure that energy implications are considered in project decisions, with emphasis on reducing inefficient, wasteful, and unnecessary consumption of energy.

Analysis of potential impacts to energy resources includes consideration of the following elements:

- Construction-related energy consumption for each of the alignment alternatives, the design option, and the MSF
- Energy consumption required to operate each alignment alternative (including the electricity required for rail propulsion)
- Changes to energy consumption from mobile sources in the area as a result of regional changes in the VMT of cars, trucks, and other vehicles operating in the region
- Energy consumption related to the operation of stations and the MSF
- Project impacts on local and regional energy supplies and on requirements for additional capacity
- The degree to which the Project complies with existing energy standards and regulations

Since energy consumption associated with construction and operation of the Project would occur in various forms (e.g., fuel, electricity, natural gas), for the purposes of comparison, all energy consumption data is converted to a single unit of British thermal units (Btu), which is a measurement of the heat content of fuels or energy sources.

4.2 CEQA SIGNIFICANCE THRESHOLDS

In accordance with Appendix G of the 2022 CEQA Guidelines, the Project would have a significant impact related to energy resources if it would:

- **Impact ENG-1:** Result in a potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources during project construction or operation.
- **Impact ENG-2:** Conflict with or obstruct a state or local plan for renewable energy or energy efficiency.

It is also important to note that energy usage is a possible indicator of environmental impacts, as energy consumption may lead to environmental impacts associated with criteria air pollutants and GHG emissions. The actual physical environmental effects of energy use and the efficiency of energy use are detailed in other environmental resource technical reports. For example, the use of energy for transportation can lead to air pollutant emissions, the impacts of which are addressed in the KNE Air Quality Technical Report. The use of fossil fuels and some other energy resources for the production of electricity leads to indirect GHG emissions, the impacts of which are addressed in the KNE Greenhouse Gas Emissions Technical Report. There is no physical environmental effect associated with energy use that is not addressed in these environmental topic-specific technical reports.

CHAPTER 5 EXISTING SETTING

5.1 STATE SETTING

This section includes a summary of the state's energy resources and consumption trends.

5.1.1 ENERGY RESOURCES

California is rich in conventional and renewable energy resources. It has large crude oil and substantial natural gas deposits in six geological basins located in the Central Valley and along the Pacific Coast. Most of those reserves are concentrated in the southern San Joaquin Basin. California is second in the nation, after Texas, in total electricity generation from renewable resources. The state is the nation's top producer of electricity from solar energy and geothermal resources. In 2022, California was also the nation's second-largest producer of electricity from biomass, after Georgia, and the fourth-largest producer of conventional hydroelectric power, after Washington, Oregon, and New York (United States Energy Information Administration [USEIA] 2023a).

California is the most populous state in the nation, and its total energy demand is second only to Texas. Although California is a leader in the energy-intensive chemical, forest products, glass, and petroleum industries, the state has one of the lowest per capita energy consumption rates in the country (USEIA 2023a). The California government's energy-efficiency programs have contributed to its low per-capita energy consumption. Driven by high demand from California's many motorists, major airports, and military bases, the transportation sector is the state's largest energy consumer. More motor vehicles are registered in California than in any other state, and worker commute times are among the longest in the country.

5.1.2 PETROLEUM

California is one of the top producers of crude oil in the nation, with output accounting for more than one-tenth of total U.S. production. Reservoirs along California's Pacific Coast, including in the Los Angeles Basin and Central Valley, contain major crude oil reserves, and the state holds four percent of the nation's total proved crude oil reserves (USEIA 2023a). Concerns about the risks of offshore crude oil and natural gas development resulted in a permanent moratorium on new offshore oil and natural gas leasing in state waters. No new California offshore federal lease sales have occurred since the federal moratorium in 1982, although 22 older crude oil and natural gas production platforms remain active in federal waters and 11 in state waters off the coast of California.

5.1.3 NATURAL GAS

California natural gas production accounts for less than one percent of total annual U.S. production, which is less than one-tenth of the state's total consumption. Most of California's natural gas reserves and production are in fields in the northern portion of the state's Central Valley (USEIA 2023a).

Several interstate natural gas pipelines enter California from Arizona, Nevada, and Oregon and bring natural gas into California from the Southwest, the Rocky Mountain region, and western Canada.

Although a small amount of natural gas is exported to Mexico, California consumes almost nine-tenths of the natural gas delivered to the state. Some natural gas that enters the state is placed in California's 14 underground natural gas storage reservoirs in its 12 storage fields. In 2021, about 33 percent of the natural gas delivered to California consumers went to the state's industrial sector, and about 31 percent went to the electric power sector, where it fuels more than two-fifths of the state's total electricity generation. The residential sector, where three in five California households use natural gas for home heating, accounted for 22 percent of natural gas use, and the commercial sector consumed about 12 percent. The transportation sector used about one percent as compressed natural gas vehicle fuel (USEIA 2023a).

5.1.4 RENEWABLE ENERGY

As detailed in Section 3.2.8, California has established RPS targets, which is one of California's key programs for advancing renewable energy. As described in Section 5.1.1, California's renewable resources are primarily solar energy and geothermal resources.

Solar energy is the largest source of California's renewable electricity generation. The state's greatest solar resources are in California's southeastern deserts, where all of its solar thermal facilities and several of its largest solar PV plants are located. In 2022, solar energy supplied 19 percent of the state's utility-scale electricity net generation. When small-scale solar generation is included, solar energy provided 27 percent of the state's total electricity net generation. In 2022, California produced 31 percent of the nation's total utility-scale and small-scale solar PV electricity generation and 69 percent of the nation's utility-scale solar thermal electricity generation. At the beginning of 2023, California had more than 17,500 megawatts of utility-scale solar power capacity, more than any other state. When small-scale facilities are included, the state had almost 32,000 megawatts of total solar capacity (USEIA 2023a).

In 2022, wind accounted for seven percent of California's total in-state electricity generation, and the state ranked eighth in the nation in wind-powered generation. The majority of the state's wind turbines are in six major wind resource areas: Altamont, East San Diego County, Pacheco, Solano, San Geronio, and Tehachapi. At the beginning of 2023, California had more than 6,200 megawatts of wind capacity (USEIA 2023a).

California is the nation's top producer of electricity from geothermal resources. In 2022, the state produced 69 percent of the nation's utility-scale geothermal-sourced electricity, and geothermal power accounted for about six percent of California's utility-scale generation and five percent of the state's total in-state generation. The state's operating geothermal power plants have a combined total capacity of 1,867 megawatts (USEIA 2023a).

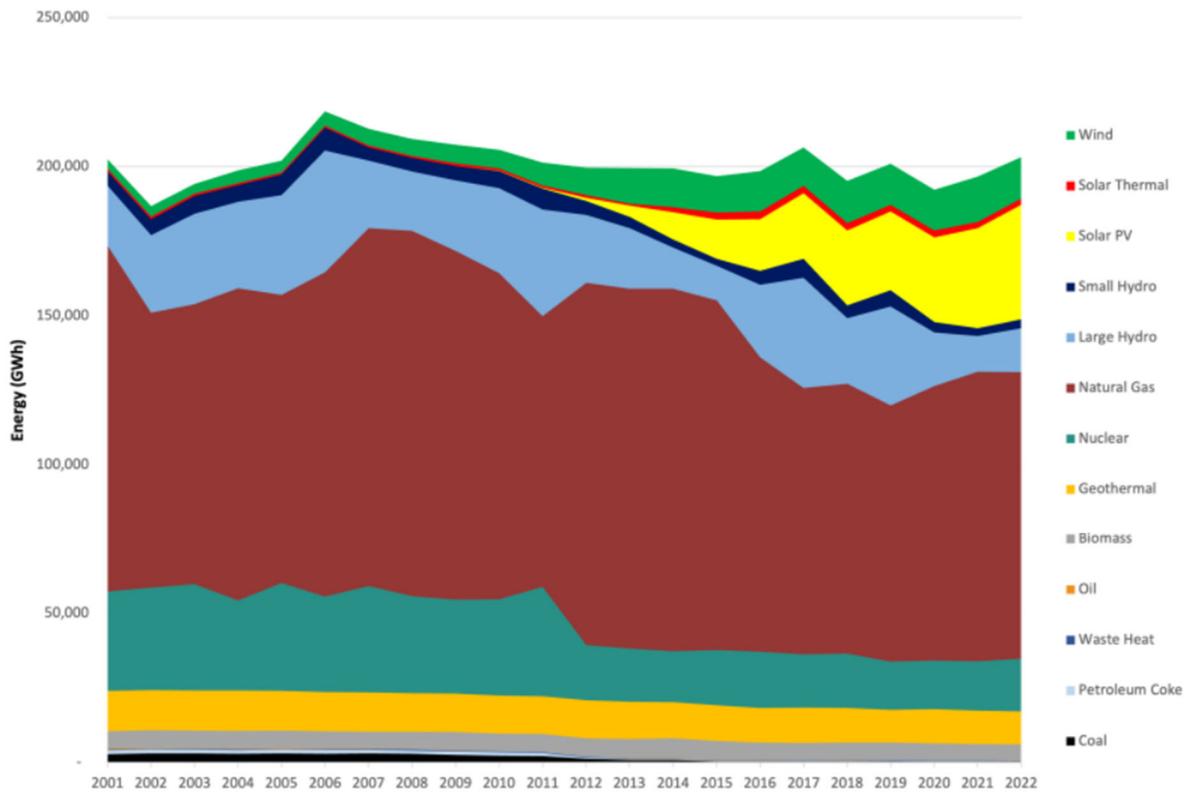
5.1.5 STATE ENERGY CONSUMPTION

The CEC's 2021 Integrated Energy Policy Report identifies that the state's electricity sector is adapting in response to climate policy and market changes. This includes decarbonizing the state's gas system as a fuel source for electric generation to meet air quality, climate, and other environmental goals. In

2022, total system generation for California was 287,220 gigawatt-hours (GWh), an increase of approximately three percent, or 9,456 GWh, from 2021 (CEC 2023).

In recent years, California has witnessed a flat or downward trend in energy demand as a result of energy-efficiency programs and installation of behind-the-meter solar PV systems¹ that directly displace utility-supplied generation. Renewable and non-GHG (nuclear and large hydroelectric) resources accounted for 54.2 percent of total generation in 2022, compared to 52.1 percent in 2021. Figure 5-1 depicts the change in the state’s electricity system generation supply mix from 2001 to 2022, including a doubling of renewable supplies (CEC 2023a).

FIGURE 5-1. IN-STATE ELECTRIC GENERATION BY FUEL TYPE (2011-2022)



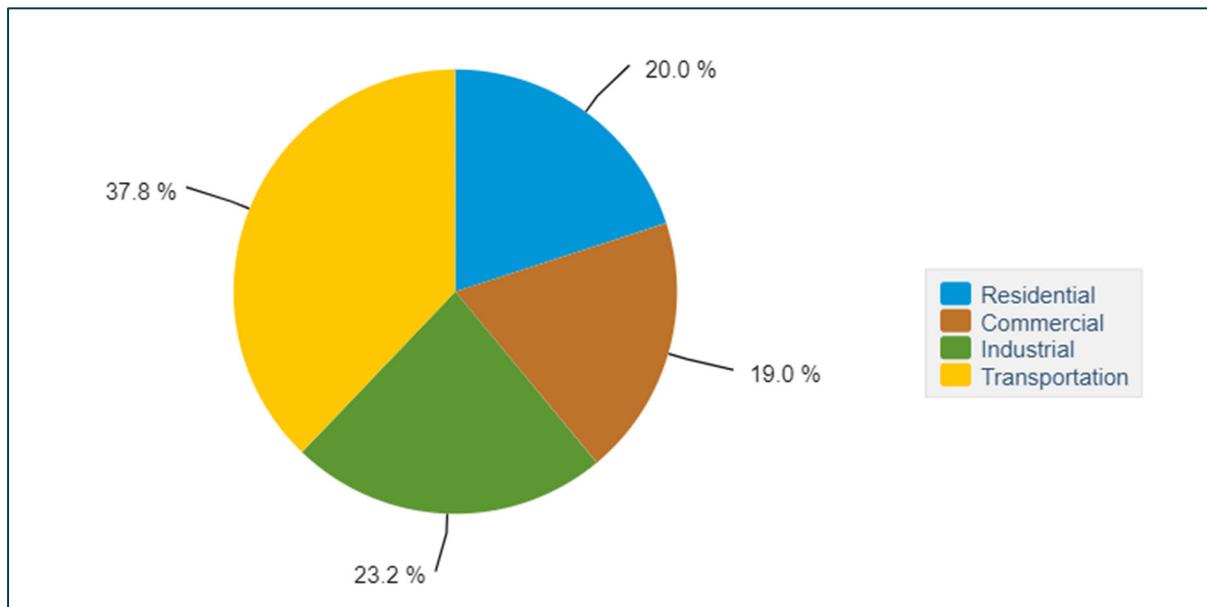
Source: CEC 2023a

¹ Behind-the-meter PV systems provide a single building or facility with direct power without passing through an electric meter.

5.1.6 TRANSPORTATION SECTOR

As shown in Figure 5-2, the transportation sector in California consumes a relatively large amount of energy in the state (approximately 38 percent). Gasoline remains the dominant fuel within the transportation sector, with 97 percent of all gasoline being consumed by light-duty cars, pickup trucks, and sport utility vehicles. In 2022, 13.6 billion gallons of gasoline were sold, according to the California Department of Tax and Fee Administration. Gasoline sold in California at retail is made up of 90 percent petroleum-based gasoline (as specified by the CARB) and 10 percent ethanol. Diesel fuel is the second-largest transportation fuel used in California, representing 17 percent of total fuel sales behind gasoline. According to the state Board of Equalization, in 2015 4.2 billion gallons of diesel, including off-road diesel, were sold (CEC 2023b). However, California has implemented a range of regulations and incentives to advance its clean transportation goals, as further detailed in Section 3.2. Renewable diesel, a fuel made from fats and oils such as soybean oil or canola oil, is processed to be chemically the same as petroleum diesel and can be used as a replacement fuel or blended with any amount of petroleum diesel. The use of renewable diesel in California has increased substantially in recent years; as of June 30, 2021, renewable diesel had displaced 22 percent of petroleum-based diesel in California. This is in addition to the eight percent displaced by biodiesel and the four percent displaced by biomethane.

FIGURE 5-2. CALIFORNIA ENERGY USE BY SECTOR (2021)



Source: USEIA 2023a

5.2 RESOURCE STUDY AREA

The existing statewide information presented above describes the energy resources, consumption characteristics, and trends in the state. Since energy resources, particularly those associated with the Project, such as fuel, electricity, and natural gas, are provided on a regional basis, such as electric and natural gas utilities, the energy resource study area (RSA) is identified as the utility service areas for the alignment alternatives, the design option, and the MSF. The utility service areas vary among utility type and service provider and are regional. Section 5.2.1 summarizes the energy setting associated with the various utilities that serve the RSA. Section 5.2.2 describes Metro's energy use in the RSA. In addition, since the Project would improve transit operations and travel in the region, for the purposes of energy consumption associated with regional travel (i.e., fuel consumption for motor vehicles), the RSA for assessing the VMT reduction with Project implementation is the entire SCAG region. Section 5.2.3 identifies the existing regional transportation energy use for the Project's baseline year of 2019.

5.2.1 LOCAL ENERGY USE

5.2.1.1 LOS ANGELES DEPARTMENT OF WATER AND POWER

LADWP serves an area covering 465 square miles that includes over four million residents and 1.4 million power customers. As of 2021, energy sources consisted of 26 percent natural gas, 35 percent eligible renewable sources, 19 percent coal, 14 percent nuclear, and seven percent hydroelectric resources (CEC 2022). According to CEC data, LADWP customers consumed a total of approximately 20,891 million kilowatt-hours (kWh) of electricity in 2021 (CEC 2023).

5.2.1.2 SOUTHERN CALIFORNIA EDISON

Southern California Edison (SCE), a subsidiary of Edison International, provides electricity to approximately 180 cities in 11 counties across Central and Southern California. SCE provides electricity to approximately 15 million people in California and is one of the largest electric utilities in the United States (SCE 2019). The CEC reports on electricity consumption by planning area annually. The total electricity usage in the SCE planning area in 2021 was 81,128.9 million kWh (CEC 2023c). SCE offers various renewable energy purchase programs for their customers. As of 2021, SCE's general power mix consisted of 22 percent natural gas, 31 percent eligible renewable sources, nine percent nuclear, two percent hydroelectric resources, and 35 percent from unspecified power sources (CEC 2022).

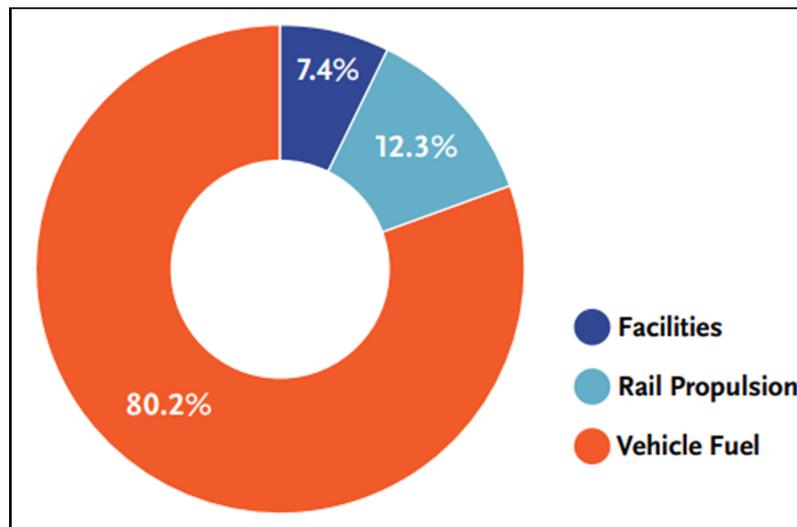
5.2.1.3 SOUTHERN CALIFORNIA GAS COMPANY

The Southern California Gas Company (SoCalGas) is a natural gas provider and subsidiary of Sempra Energy. SoCalGas provides service to about 5.9 million customers (CPUC 2021). In 2021, SoCalGas customers consumed approximately 5,101 million therms (CEC 2023d). SoCalGas aims to achieve net zero GHG emissions by 2045 (SoCalGas 2021).

5.2.2 METRO ENERGY USE

Metro consumes energy in the form of fuel (gasoline, diesel, and compressed natural gas), electricity, and natural gas for its transit operations (e.g., buses, vehicles, and light and heavy rail), as well as electricity and natural gas at its various operational facilities in the region. Since 2013, Metro has steadily reduced energy consumption through conservation measures, efficient building design, and improved fuel efficiency. In 2018 alone, Metro reduced total energy consumption by 7.9 percent compared to 2017 as a result of reduced vehicle fuel consumption by buses and support vehicles (Metro 2019b). As described in Metro’s Sustainability Strategic Plan (2020), building operations support over 1.2 million weekday rail and bus transit patrons. Metro’s building energy consumption alone accounts for just over 100 GWh of electricity consumption per year across its extensive inventory of facilities in Los Angeles County. Metro’s vehicle fleet accounts for 80 percent of the agency’s total energy consumption per year. Vehicle fuels power Metro’s bus fleet, vanpool, and all non-revenue vehicles. Rail propulsion power accounts for more than 200 GWh of electricity use and 12 percent of the agency’s energy consumption (Metro 2020). Metro purchases electricity from local utilities, all of which are mandated to provide carbon-free energy by 2045 (SB 100, as discussed in Section 3.2.8). Figure 5-3 presents Metro’s 2018 energy consumption by end use.

FIGURE 5-3. 2018 ENERGY CONSUMPTION BY END USE



Source: Metro 2020

5.2.3 EXISTING FUEL CONSUMPTION IN THE RSA

Transportation in Los Angeles County continues to be dominated by single-occupancy automobiles. According to the American Community Survey 2019, five-year estimate, 74 percent of Los Angeles County workers over the age of 16 drove alone to work (U.S. Census Bureau 2019). High percentages of single-occupancy vehicles result in high VMT throughout the state. Subsequently, high VMT translates into high energy use, as well as related criteria air pollutants and GHG emissions.

As shown in Table 5-1, existing conditions data for regional transportation-related energy consumption was modeled for the baseline year of 2019. Transportation fuel consumption was estimated based on the annual VMT as provided by the transportation model (approximately 170,339,744,680 miles) and EMFAC2021 fleet mix data for SCAQMD in 2019. Based on EMFAC2021 fleet mix data, the analysis assumed approximately 93 percent of the vehicle trips in the region were gasoline-fueled, one percent were plug-in hybrid, five percent were diesel-fueled, one percent were electric, and less than one percent were compressed natural gas. Refer to Appendix A for detailed model inputs, assumptions, and calculations. Table 5-1 summarizes the fuel demand associated with regional traffic.

TABLE 5-1. ANNUAL REGIONAL TRANSPORTATION ENERGY CONSUMPTION, EXISTING (2019) CONDITIONS

DESCRIPTION	GASOLINE DEMAND (GALLONS)	DIESEL DEMAND (GALLONS)	ELECTRICAL DEMAND (kWh)	NATURAL GAS DEMAND (GALLONS)	TOTAL ENERGY CONSUMPTION (MMBtu)
Regional Transportation-Related Fuel Consumption	6,472,949,770	51,637,916	5,618,749	294,476	816,304,774

Source: Connect Los Angeles Partners 2023; see Appendix A for calculation details.
kWh= kilowatt-hours; MMBtu = million British thermal units

6.1 IMPACT ANALYSIS

This section presents the evaluation of impacts related to energy resources, as well as the corresponding mitigation measures, where applicable. Both construction and operational impacts are evaluated. Table 6-16 in Section 6.1.6 provides a summary of the significance conclusions.

Project measures are design elements, BMPs, or other commitments that Metro implements as part of all alignment alternatives and stations, the design option, and the MSF to reduce or avoid environmental effects associated with the Project. Project measures are not the same as mitigation measures, which are used to reduce an environmental impact's significance level. Where applicable, project measures are identified here as part of the evaluation of environmental impacts in this chapter.

Construction and operation of the Project would result in the release of criteria pollutants and GHG emissions. The KNE Air Quality Technical Report describes project measures to limit release of these emissions and ensure all equipment operates at optimal manufacturer specifications. These project measures (PM AQ-1, PM AQ-3, and PM AQ-4) are also applicable to the KNE Energy Technical Report since the analysis of energy resources is based on GHG emissions data. PM AQ-1, PM AQ-3, and PM AQ-4 would apply to construction activities, while PM AQ-3 and PM AQ-4 also would apply to operational activities. The following project measures would be applicable to impacts related to energy resources.

6.1.1 PM AQ-1: METRO GREEN CONSTRUCTION POLICY

Established by formal adoption of the Green Construction Policy in 2011, Metro commits to the following construction equipment requirements, construction best management practices (BMPs), and implementation strategies for all construction projects performed on Metro properties or rights-of-way (Metro 2011b):

- Construction equipment shall incorporate, where feasible, emissions-reducing technology such as hybrid drives and specific fuel economy standards.
- Maintain equipment according to manufacturer specifications.
- Idling of construction equipment and heavy-duty trucks shall be restricted to a maximum of five minutes when not in use (certain exceptions apply based on CARB exemptions).
- All off-road diesel-powered construction equipment greater than 50 hp shall meet Tier 4 off-road emission standards at a minimum.
- All on-road heavy-duty trucks with a gross vehicle weight rating greater than or equal to 14,000 pounds must have engines meeting U.S. 2010 on-road emission standards.
- Where applicable and feasible, work with local jurisdictions to improve traffic flow by signal synchronization during construction activities.
- Use electric power in lieu of diesel power where available.

- Generators: every effort shall be made to utilize grid-based electric power at any construction site, where feasible. Where access to the power grid is not available, on-site generators must:
 - ▶ Meet a 0.01 gram per brake-horsepower-hour standard for particulate matter; or
 - ▶ Be equipped with Best Available Control Technology for particulate matter emissions reductions.
- Inspections: Metro shall conduct inspections of construction sites and affected off-road and on-road equipment and generator as well as compliance with air quality rules.
- Records: Prior to Notice to Proceed to commence construction and to be verified afterwards consistent with project contract requirements and through enforcement provisions above, the Contractor shall submit to Metro the following information for all construction equipment to be used on Metro properties or rights-of-way:
 - ▶ A certified statement that all construction equipment used conform to the requirements specified above;
 - ▶ A list of all the equipment and vehicles (i.e., off-road equipment, include the CARB-issued Equipment Identification Number) to be used; and
 - ▶ A copy of each Contractor's certified USEPA rating and applicable paperwork issued either by CARB, SCAQMD, and any other jurisdiction that has oversight over the equipment.

6.1.2 PM AQ-3: METRO 2020 MOVING BEYOND SUSTAINABILITY STRATEGIC PLAN

Construction and operation of the Project will adhere to the commitments established by the Moving Beyond Sustainability Strategic Plan (MBSSP) 2020, including, but not limited to, the application of renewable diesel requirements for contractors, the implementation of the Construction and Demolition Debris Policy, the identification of opportunities to decarbonize fuel sources at construction sites, the use of electric medium- and heavy-duty equipment during construction, and the design and build of capital projects to CalGreen Tier 2 standards (Metro 2020).

6.1.3 PM AQ-4: METRO DESIGN STANDARDS

The Project will be designed in accordance with the Metro Rail Design Criteria and the Metro Systemwide Station Design Standards Policy, which includes the installation of high-efficiency LED lighting in all fixtures to reduce electricity consumption (Metro 2017, 2018).

6.1.4 IMPACT ENG-1: ENERGY CONSUMPTION

Impact ENG-1: Would the Project result in a potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?

6.1.4.1 ALIGNMENT ALTERNATIVE 1: SAN VICENTE–FAIRFAX

CONSTRUCTION IMPACTS

Less Than Significant Impact. Implementation of the San Vicente–Fairfax Alignment Alternative would increase energy consumption for the duration of construction in the form of fossil fuel consumption associated with transportation (e.g., gasoline, diesel fuel), including the transport and use of construction equipment (off-road), use of delivery and haul trucks (on-road), and use of passenger vehicles (on-road) by construction employees. Construction-related transportation energy consumption depends on the type and number of trips, VMT, fuel efficiency of vehicles, and travel mode. The use of fuel by on-road and off-road vehicles would be temporary and would fluctuate according to the subphase of construction. Construction fuel use for the San Vicente–Fairfax Alignment Alternative would cease upon completion of construction.

Table 6-1 presents the total fuel consumption anticipated for proposed construction activities for the San Vicente–Fairfax Alignment Alternative, which is anticipated to occur between 2041 and 2051. The total fuel demand in gallons of gasoline and diesel is based on the CO₂ emissions calculations for proposed construction activities and application of the USEIA’s CO₂ emissions coefficients (USEIA 2023b). Appendix A contains calculation details and methodology related to fuel and energy consumption. For additional information related to the CO₂ emissions calculations, refer to the KNE Greenhouse Gas Emissions Technical Report.

As shown in Table 6-1, total energy consumption for construction of the San Vicente–Fairfax Alignment Alternative (including transportation fuel use by off-road equipment, worker vehicle trips, and material delivery and haul truck trips) would be approximately 1,548,648 million British thermal units (MMBtu). Based on the anticipated sequential construction phasing of the San Vicente–Fairfax Alignment Alternative and temporary nature of construction, there would not be unusual characteristics that would necessitate the use of construction equipment that is less energy efficient than at comparable construction sites.

**TABLE 6-1. CONSTRUCTION-RELATED ENERGY CONSUMPTION
 SAN VICENTE–FAIRFAX ALIGNMENT ALTERNATIVE**

ENERGY SOURCE	ENERGY CONSUMPTION (GALLONS OF FUEL; MMBTU)				SAN VICENTE–FAIRFAX ALIGNMENT ALTERNATIVE TOTAL ¹
	SECTION 1	SECTION 2	SECTION 3	MSF	
Off-Road Construction Equipment (gallons [diesel])	2,434,569	1,852,525	2,079,911	453,288	6,820,293
Truck Trips (Hauling, Delivery, Cement) (gallons [diesel])	1,176,776	847,898	1,286,247	120,905	3,431,826
<i>Subtotal Fuel Consumption (gallons [diesel])</i>	<i>3,611,345</i>	<i>2,700,424</i>	<i>3,366,158</i>	<i>574,193</i>	<i>10,252,119</i>
Worker Commute Trips (gallons [gasoline])	373,737	286,772	336,921	73,411	1,070,842
<i>Subtotal Fuel Consumption (gallons [gasoline])</i>	<i>373,737</i>	<i>286,772</i>	<i>336,921</i>	<i>73,411</i>	<i>1,070,842</i>
Total MMBTU	545,083	408,505	506,645	88,415	1,548,648

Source: Connect Los Angeles Partners 2023; see Appendix A for calculation details.

¹ The MSF is an essential element in supporting the reliable operation of an LRT system and would be necessary for the implementation and operation of the San Vicente–Fairfax Alignment Alternative. As such, energy consumption associated with MSF construction has been included in the alignment alternative total.

MMBtu = Million British thermal units

In addition, construction contractors would be required, in accordance with Metro’s Green Construction Policy per PM AQ-1, to minimize the idling time of construction equipment by shutting equipment off when it is not in use or reducing the idling time to five minutes and maintaining equipment to manufacturers’ specifications. These required practices limit wasteful and unnecessary energy consumption associated with the use of heavy-duty equipment during construction. Per Metro’s Construction and Demolition Debris Recycling and Reuse Policy per PM AQ-3, Metro would also give preference to recyclable and recycled products in the selection of construction materials and ensure that facilities used for disposal and recycling are complying with applicable federal, state, or local rules and regulations (Metro 2007b). As such, it is expected that fuel consumption, construction practices, and waste associated with construction of the San Vicente–Fairfax Alignment Alternative would not be wasteful, inefficient, or unnecessary.

Energy consumption from construction activities would be temporary. While this analysis discloses an estimate of temporary, construction-related energy demand, the long-term implications are much more important for understanding the degree to which the San Vicente–Fairfax Alignment Alternative could result in wasteful or inefficient use of energy. As described in more detail under the Operational Impacts subheading below, the short-term energy-related energy consumption would facilitate a reduction in long-term demands. Therefore, the energy demand associated with construction activities would not be wasteful or inefficient.

Based on the analysis above, while the San Vicente–Fairfax Alignment Alternative would require energy usage during temporary construction activities, energy consumption would be minimized by following Metro guidelines, which would avoid use of energy resources in a wasteful, inefficient, or unnecessary manner during construction. Therefore, construction of the San Vicente–Fairfax Alignment Alternative would have a less than significant impact related to energy consumption.

OPERATIONAL IMPACTS

Less Than Significant Impact. Operation of the San Vicente–Fairfax Alignment Alternative would consume energy associated with electricity for LRV propulsion and station operations, such as lighting, elevators/escalators, ventilation, overhead catenary systems, etc. LRV propulsion and station operations were assumed to not use gasoline, diesel, or natural gas. This analysis also evaluated the regional transportation energy consumption for the 2045 opening of the San Vicente–Fairfax Alignment Alternative to compare to the regional transportation energy consumption if the Project were not implemented (2045 without Project conditions). Transportation fuel demand for the San Vicente–Fairfax Alignment Alternative and the 2045 without Project conditions were estimated based on the annual VMT in the SCAG region as provided by the transportation model (approximately 214,090,029,819 and 214,139,478,194 miles, respectively) and EMFAC2021 fleet mix data for SCAQMD in 2045. Fleet mix data for SCAQMD in 2045 includes conventional vehicles (gasoline or diesel-fueled vehicles) as well as alternative vehicle types, including electric and plug-in hybrid vehicles and vehicles fueled by compressed natural gas. Refer to the KNE Greenhouse Gas Emissions Technical Report for additional information on annual VMT in the SCAG region.

Table 6-2 presents the energy consumption associated with operation of the San Vicente–Fairfax Alignment Alternative compared to the 2045 without Project conditions.

Table 6-2 shows that the San Vicente–Fairfax Alignment Alternative would reduce regional energy consumption from the 2045 without Project Conditions by 117,328 MMBtu in 2045. In addition, alignment and station operations would be electric-powered and any energy consumption from maintenance would be offset by long-term operation of the Project. Electricity providers in the region would also continue to use an increasing proportion of renewable energy sources in the electric power mix over time, pursuant to SB 100, thereby minimizing the indirect demand on energy resources. The stations in the San Vicente–Fairfax Alignment Alternative would also be designed to meet Metro Design Standards per PM AQ-4, which would require that stations meet a number of conservation standards, including energy-efficient lighting, and per PM AQ-3, comply with CalGreen and state energy standards under Title 24.

**TABLE 6-2. ANNUAL OPERATIONAL ENERGY CONSUMPTION,
 SAN VICENTE–FAIRFAX ALIGNMENT ALTERNATIVE**

DESCRIPTION	GASOLINE DEMAND (GALLONS)	DIESEL DEMAND (GALLONS)	ELECTRICAL DEMAND (KWH)	NATURAL GAS DEMAND (GALLONS)	TOTAL OPERATIONAL ENERGY CONSUMPTION (MMBTU)
San Vicente–Fairfax Alignment Alternative Regional Transportation Fuel Consumption	4,550,444,805	71,622,738	1,295,541,556	81,651	-
Light Rail Operations	-	-	4,409,586	-	-
Station Operations	-	-	675,648	-	-
San Vicente–Fairfax Alignment Alternative Total Energy Consumption	4,550,444,805	71,622,739	1,300,626,790	81,652	583,139,863
2045 without Project Conditions, Regional Transportation Fuel Consumption	4,551,495,821	71,639,281	1,295,840,787	81,671	583,257,191
Net Energy Consumption	(1,051,016)	(16,542)	4,786,003	(19)	(117,328)

Source: Connect Los Angeles Partners 2023; see Appendix A for calculation details.
 kWh= kilowatt-hours; MMBtu = Million British thermal units

Furthermore, the San Vicente–Fairfax Alignment Alternative would facilitate a reduction in energy demand by providing a critical regional connection between major activity centers and areas of high population and employment density. Thus, the San Vicente–Fairfax Alignment Alternative would reduce automobile VMT in the region, helping to achieve goals such as decreasing reliance on fossil fuels and decreasing overall per capita energy consumption for transportation, as identified in Appendix F of the CEQA Guidelines. Transportation is the largest energy-consuming sector in California; therefore, projects that reduce transportation energy demand are particularly important in promoting energy conservation and other objectives embodied in Appendix F of the CEQA Guidelines.

Based on the analysis above, operation of the San Vicente–Fairfax Alignment Alternative would not constitute a wasteful, inefficient, or unnecessary consumption of energy and the impact related to energy consumption would be less than significant.

6.1.4.2 ALIGNMENT ALTERNATIVE 2: FAIRFAX

CONSTRUCTION IMPACTS

Less Than Significant Impact. Implementation of the Fairfax Alignment Alternative would increase energy consumption for the duration of construction in the form of fossil fuel consumption associated with transportation (e.g., gasoline, diesel fuel), including the transport and use of construction equipment (off-road), use of delivery and haul trucks (on-road), and use of passenger vehicles (on-road) by construction employees. Construction-related transportation energy consumption depends

on the type and number of trips, VMT, fuel efficiency of vehicles, and travel mode. The use of fuel by on-road and off-road vehicles would be temporary and would fluctuate according to the subphase of construction. Construction fuel use for the Fairfax Alignment Alternative would cease upon completion of construction.

Table 6-3 presents the total fuel consumption anticipated for proposed construction activities for the Fairfax Alignment Alternative, which is anticipated to occur between 2041 and 2051. The total fuel demand in gallons of gasoline and diesel is based on the CO₂ emissions calculations for proposed construction activities and application of the USEIA’s CO₂ emissions coefficients (USEIA 2023b). Appendix A contains calculation details and methodology related to fuel and energy consumption. For additional information related to the CO₂ emissions calculations, refer to the KNE Greenhouse Gas Emissions Technical Report.

**TABLE 6-3. CONSTRUCTION-RELATED ENERGY CONSUMPTION
FAIRFAX ALIGNMENT ALTERNATIVE**

ENERGY SOURCE	ENERGY CONSUMPTION (GALLONS OF FUEL; MMBTU)			
	SECTION 1	SECTION 2	MSF	FAIRFAX ALIGNMENT ALTERNATIVE TOTAL ¹
Off-Road Construction Equipment (gallons [diesel])	2,434,569	2,479,902	453,288	5,367,759
Truck Trips (Hauling, Delivery, Cement) (gallons [diesel])	1,176,776	1,558,919	123,263	2,858,959
<i>Subtotal Fuel Consumption (gallons [diesel])</i>	<i>3,611,345</i>	<i>4,038,822</i>	<i>576,551</i>	<i>8,226,718</i>
Worker Commute Trips (gallons [gasoline])	373,737	405,585	72,570	851,892
<i>Subtotal Fuel Consumption (gallons [gasoline])</i>	<i>373,737</i>	<i>405,585</i>	<i>72,570</i>	<i>851,892</i>
Total MMBTU	545,083	608,055	88,635	1,241,774

Source: Connect Los Angeles Partners 2023; see Appendix A for calculation details.

¹ The MSF is an essential element in supporting the reliable operation of an LRT system and would be necessary for the implementation and operation of the Fairfax Alignment Alternative. As such, energy consumption associated with MSF construction has been included in the alignment alternative total.

MMBtu = Million British thermal units

As shown in Table 6-3, total energy consumption for construction of the Fairfax Alignment Alternative (including transportation fuel use by off-road equipment, worker vehicle trips, and material delivery and haul truck trips) would be approximately 1,241,774 MMBtu. Based on the anticipated sequential construction phasing of the Fairfax Alignment Alternative and temporary nature of construction, there would not be unusual characteristics that would necessitate the use of construction equipment that is less energy efficient than at comparable construction sites.

In addition, construction contractors would be required, in accordance with Metro’s Green Construction Policy per PM AQ-1, to minimize the idling time of construction equipment by shutting equipment off when it is not in use or reducing the idling time to five minutes and maintaining equipment to manufacturers’ specifications. These required practices limit wasteful and unnecessary

energy consumption. Per Metro’s Construction and Demolition Debris Recycling and Reuse Policy per PM AQ-3, Metro would also give preference to recyclable and recycled products in the selection of construction materials and ensure that facilities used for disposal and recycling are complying with the applicable federal, state, or local rules and regulations (Metro 2007b). As such, it is expected that fuel consumption, construction practices, and waste associated with construction of the Fairfax Alignment Alternative would not be wasteful, inefficient, or unnecessary.

Energy consumption from construction activities would be temporary. While this analysis discloses an estimate of temporary, construction-related energy demand, the long-term implications are much more important for understanding the degree to which the Fairfax Alignment Alternative could result in wasteful or inefficient use of energy. As described in more detail under the Operational Impacts subheading below, the short-term energy-related energy consumption would facilitate a reduction in long-term demands. Therefore, the energy demand associated with construction activities would not be wasteful or inefficient.

Based on the analysis above, while the Fairfax Alignment Alternative would require energy usage during temporary construction activities, energy consumption would be minimized by following Metro guidelines, which would avoid the use of energy resources in a wasteful, inefficient, or unnecessary manner during construction. Therefore, construction of the Fairfax Alignment Alternative would have a less than significant impact related to energy consumption.

OPERATIONAL IMPACTS

Less Than Significant Impact. Operation of the Fairfax Alignment Alternative would consume energy associated with electricity for LRV propulsion and station operations, such as lighting, elevators/escalators, ventilation, overhead catenary systems, etc. LRV propulsion and station operations were assumed to not use gasoline, diesel, or natural gas. This analysis also evaluated the regional transportation energy consumption for the 2045 opening of the Fairfax Alignment Alternative to compare to the regional transportation energy consumption if the Project were not implemented (2045 without Project conditions). Transportation fuel demand for the Fairfax Alignment Alternative and the 2045 without Project conditions were estimated based on the annual VMT in the SCAG region as provided by the transportation model (approximately 214,092,959,309 and 214,139,478,193 miles, respectively) and EMFAC2021 fleet mix data for SCAQMD in 2045. Fleet mix data for SCAQMD in 2045 includes conventional vehicles (gasoline or diesel-fueled vehicles) as well as alternative vehicle types, including electric and plug-in hybrid vehicles and vehicles fueled by compressed natural gas. Refer to the KNE Greenhouse Gas Emissions Technical Report for additional information on annual VMT in the SCAG region.

Table 6-4 presents the energy consumption associated with operation of the Fairfax Alignment Alternative compared to the 2045 without Project conditions.

TABLE 6-4. ANNUAL OPERATIONAL ENERGY CONSUMPTION, FAIRFAX ALIGNMENT ALTERNATIVE

DESCRIPTION	GASOLINE DEMAND (GALLONS)	DIESEL DEMAND (GALLONS)	ELECTRICAL DEMAND (KWH)	NATURAL GAS DEMAND (GALLONS)	TOTAL OPERATIONAL ENERGY CONSUMPTION (MMBtu)
Fairfax Alignment Alternative Regional Transportation-Related Fuel Consumption	4,550,507,070	71,623,719	1,295,559,283	81,653	-
Light Rail Operations	-	-	3,545,853	-	-
Station Operations	-	-	525,504	-	-
Fairfax Alignment Alternative Total Energy Consumption	4,550,507,070	71,623,719	1,299,630,640	81,653	583,144,382
2045 without Project conditions, Regional Transportation Fuel Consumption	4,551,495,821	71,639,281	1,295,840,787	81,671	583,257,191
Net Energy Consumption	(988,751)	(15,562)	3,789,853	(18)	(112,809)

Source: Connect Los Angeles Partners 2023; see Appendix A for calculation details.
kWh= kilowatt-hours; MMBtu = Million British thermal units

Table 6-4 shows that the Fairfax Alignment Alternative would reduce regional energy consumption from the 2045 without Project conditions by 112,809 MMBtu in 2045. In addition, alignment and station operations would be electric-powered and any energy consumption from maintenance would be offset by long-term operation of the Project. Electricity providers in the region would also continue to use an increasing proportion of renewable energy sources in the electric power mix over time pursuant to SB 100, thereby minimizing the indirect demand on energy resources. The stations that are part of the Fairfax Alignment Alternative would also be designed to meet Metro Design Standards per PM AQ-4, which would require that stations meet a number of conservation standards, including energy-efficient lighting, and per PM AQ-3, comply with CalGreen and state energy standards under Title 24.

Furthermore, the Fairfax Alignment Alternative would facilitate a reduction in energy demand by providing a critical regional connection between major activity centers and areas of high population and employment density. Thus, the Fairfax Alignment Alternative would reduce automobile VMT in the region, helping to achieve goals such as decreasing reliance on fossil fuels and decreasing overall per capita energy consumption for transportation, as identified in Appendix F of the CEQA Guidelines. Transportation is the largest energy-consuming sector in California; therefore, projects that reduce transportation energy demand are particularly important in promoting energy conservation and other objectives embodied in Appendix F of the CEQA Guidelines.

Based on the analysis above, operation of the Fairfax Alignment Alternative would not constitute a wasteful, inefficient, or unnecessary consumption of energy and the impact related to energy consumption would be less than significant.

6.1.4.3 ALIGNMENT ALTERNATIVE 3: LA BREA

CONSTRUCTION IMPACTS

Less Than Significant Impact. Implementation of the La Brea Alignment Alternative would increase energy consumption for the duration of construction in the form of fossil fuel consumption associated with transportation (e.g., gasoline, diesel fuel), including the transport and use of construction equipment (off-road), use of delivery and haul trucks (on-road), and use of passenger vehicles (on-road) by construction employees. Construction-related transportation energy consumption depends on the type and number of trips, VMT, fuel efficiency of vehicles, and travel mode. The use of fuel by on-road and off-road vehicles would be temporary and would fluctuate according to the subphase of construction. Construction fuel use for the La Brea Alignment Alternative would cease upon completion of construction.

Table 6-5 presents the total fuel consumption anticipated for proposed construction activities for the La Brea Alignment Alternative, which is anticipated to occur between 2041 and 2050. The total fuel demand in gallons of gasoline and diesel is based on the CO₂ emissions calculations for proposed construction activities and application of the USEIA’s CO₂ emissions coefficients (USEIA 2023b). Appendix A contains calculation details and methodology related to fuel and energy consumption. For additional information related to the CO₂ emissions calculations, refer to the KNE Greenhouse Gas Emissions Technical Report.

**TABLE 6-5. CONSTRUCTION-RELATED ENERGY CONSUMPTION
LA BREA ALIGNMENT ALTERNATIVE**

ENERGY SOURCE	ENERGY CONSUMPTION (GALLONS OF FUEL; MMBTU)			
	SECTION 1	SECTION 2	MSF	LA BREA ALIGNMENT ALTERNATIVE TOTAL ¹
Off-Road Construction Equipment (gallons [diesel])	2,278,285	1,991,219	448,371	4,717,875
Truck Trips (Hauling, Delivery, Cement) (gallons [diesel])	1,046,445	1,255,317	122,829	2,424,591
<i>Subtotal Fuel Consumption (gallons [diesel])</i>	<i>3,324,730</i>	<i>3,246,536</i>	<i>571,200</i>	<i>7,142,466</i>
Worker Commute Trips (gallons [gasoline])	353,586	313,552	68,615	735,753
<i>Subtotal Fuel Consumption (gallons [gasoline])</i>	<i>353,586</i>	<i>313,552</i>	<i>68,615</i>	<i>735,753</i>
Total MMBTU	503,011	487,216	87,402	1,077,629

Source: Connect Los Angeles Partners 2023; see Appendix A for calculation details.

¹ The MSF is an essential element in supporting the reliable operation of an LRT system and would be necessary for the implementation and operation of the La Brea Alignment Alternative. As such, energy consumption associated with MSF construction has been included in the alignment alternative total.

MMBtu = Million British thermal units

As shown in Table 6-5, total energy consumption for construction of the La Brea Alignment Alternative (including transportation fuel use by off-road equipment, worker vehicle trips, and material delivery and haul truck trips) would be approximately 1,077,629 MMBtu. Based on the anticipated sequential construction phasing of the La Brea Alignment Alternative and temporary nature of construction, there would not be unusual characteristics that would necessitate the use of construction equipment that is less energy efficient than at comparable construction sites.

In addition, construction contractors would be required, in accordance with Metro's Green Construction Policy per PM AQ-1, to minimize the idling time of construction equipment by shutting equipment off when it is not in use or reducing the idling time to five minutes and maintaining equipment to manufacturers' specifications. These required practices limit wasteful and unnecessary energy consumption. Per Metro's Construction and Demolition Debris Recycling and Reuse Policy per PM AQ-3, Metro would also give preference to recyclable and recycled products in the selection of construction materials and ensure that facilities used for disposal and recycling are complying with applicable federal, state, or local rules and regulations (Metro 2007b). As such, it is expected that fuel consumption, construction practices, and waste associated with construction of the La Brea Alignment Alternative would not be wasteful, inefficient, or unnecessary.

Energy consumption from construction activities would be temporary. While this analysis discloses an estimate of temporary, construction-related energy demand, the long-term implications are much more important for understanding the degree to which the La Brea Alignment Alternative could result in wasteful or inefficient use of energy. As described in more detail under the Operational Impacts subheading below, the short-term energy-related energy consumption would facilitate a reduction in long-term demands. Therefore, the energy demand associated with construction activities would not be wasteful or inefficient.

Based on the analysis above, while the La Brea Alignment Alternative would require energy usage during temporary construction activities, energy consumption would be minimized by following Metro guidelines, which would avoid use of energy resources in a wasteful, inefficient, or unnecessary manner during construction. Therefore, construction of the La Brea Alignment Alternative would have a less than significant impact related to energy consumption.

OPERATIONAL IMPACTS

Less Than Significant Impact. Operation of the La Brea Alignment Alternative would consume energy associated with electricity for LRV propulsion and station operations, such as lighting, elevators/escalators, ventilation, overhead catenary systems, etc. LRV propulsion and station operations were assumed to not use gasoline, diesel, or natural gas. This analysis also evaluated the regional transportation energy consumption for the 2045 opening of the La Brea Alignment Alternative to compare to the regional transportation energy consumption if the Project were not implemented (2045 without Project conditions). Transportation fuel demand for the La Brea Alignment Alternative and the 2045 without Project conditions were estimated based on the annual VMT in the SCAG region as provided by the transportation model (approximately 214,090,021,424 and 214,139,478,193 miles, respectively) and EMFAC2021 fleet mix data for SCAQMD in 2045. Fleet mix

data for SCAQMD in 2045 includes conventional vehicles (gasoline or diesel-fueled vehicles) as well as alternative vehicle types, including electric and plug-in hybrid vehicles and vehicles fueled by compressed natural gas. Refer to the KNE Greenhouse Gas Emissions Technical Report for additional information on annual VMT in the SCAG region.

Table 6-6 presents the energy consumption associated with operation of the La Brea Alignment Alternative compared to the 2045 without Project conditions.

TABLE 6-6. ANNUAL OPERATIONAL ENERGY CONSUMPTION, LA BREA ALIGNMENT ALTERNATIVE

DESCRIPTION	GASOLINE DEMAND (GALLONS)	DIESEL DEMAND (GALLONS)	ELECTRICAL DEMAND (KWH)	NATURAL GAS DEMAND (GALLONS)	TOTAL OPERATIONAL ENERGY CONSUMPTION (MMBtu)
La Brea Alignment Alternative Regional Transportation Fuel Consumption	4,550,444,626	71,622,736	1,295,541,505	81,652	-
Light Rail Operations	-	-	2,818,498	-	-
Station Operations	-	-	450,432	-	-
La Brea Alignment Alternative Total Energy Consumption	4,550,444,626	71,622,736	1,298,810,435	81,652	583,133,641
2045 without Project conditions, Regional Transportation Fuel Consumption	4,551,495,821	71,639,281	1,295,840,787	81,671	583,257,191
Net Energy Consumption	(1,051,195)	(16,545)	2,969,648	(19)	(123,550)

Source: Connect Los Angeles Partners 2023; see Appendix A for calculation details.
 kWh= kilowatt-hours; MMBtu = Million British thermal units

Table 6-6 shows that the La Brea Alignment Alternative would reduce regional energy consumption from the 2045 without Project conditions by 123,550 MMBtu in 2045. In addition, alignment and station operations would be electric-powered and any energy consumption from maintenance would be offset by long-term operation of the Project. Electricity providers in the region would also continue to use an increasing proportion of renewable energy sources in the electric power mix over time pursuant to SB 100, thereby minimizing the indirect demand on energy resources. The stations in the La Brea Alignment Alternative would also be designed to meet Metro Design Standards per PM AQ-4 which would require that stations meet a number of conservation standards, including energy-efficient lighting, and per PM AQ-3, comply with CalGreen and state energy standards under Title 24.

Furthermore, the La Brea Alignment Alternative would facilitate a reduction in energy demand by providing a critical regional connection between major activity centers and areas of high population and employment density. Thus, the La Brea Alignment Alternative would reduce automobile VMT in the region, helping to achieve goals such as decreasing reliance on fossil fuels and decreasing overall per capita energy consumption for transportation, as identified in Appendix F of the CEQA Guidelines.

Transportation is the largest energy-consuming sector in California; therefore, projects that reduce transportation energy demand are particularly important in promoting energy conservation and other objectives embodied in Appendix F of the CEQA Guidelines.

Based on the analysis above, operation of the La Brea Alignment Alternative would not constitute a wasteful, inefficient, or unnecessary consumption of energy and the impact related to energy consumption would be less than significant.

6.1.4.4 HOLLYWOOD BOWL DESIGN OPTION

CONSTRUCTION IMPACTS

Less Than Significant Impact. Construction of the Hollywood Bowl Design Option would employ SEM construction rather than the cut-and-cover construction used for the alignment alternatives, but this would still result in consumption of similar energy resources as described for the alignment alternatives. Construction-related energy sources associated with the design option would include diesel and gasoline fuel for the transport and use of construction equipment (off-road), use of delivery and haul trucks (on-road), and use of passenger vehicles (on-road) by construction employees. Table 6-7, Table 6-8 and Table 6-9 present the total fuel consumption anticipated for proposed construction activities for the design option, which is anticipated to occur in the mid-2040s, for the San Vicente-Fairfax Alignment Alternative, Fairfax Alignment Alternative, and La Brea Alignment Alternative, respectively.

TABLE 6-7. CONSTRUCTION-RELATED ENERGY CONSUMPTION, SAN VICENTE-FAIRFAX ALIGNMENT ALTERNATIVE WITH HOLLYWOOD BOWL DESIGN OPTION

ENERGY SOURCE	ENERGY CONSUMPTION (GALLONS OF FUEL; MMBTU)				SAN VICENTE-FAIRFAX ALIGNMENT ALTERNATIVE TOTAL ¹
	SECTION 1	SECTION 2	SECTION 3	MSF	
Off-Road Construction Equipment (gallons [diesel])	2,434,569	1,852,525	4,032,033	453,288	8,772,414
Truck Trips (Hauling, Delivery, Cement) (gallons [diesel])	1,176,776	847,898	1,301,704	120,905	3,447,283
<i>Subtotal Fuel Consumption (gallons [diesel])</i>	<i>3,611,345</i>	<i>2,700,424</i>	<i>5,333,737</i>	<i>574,193</i>	<i>12,219,698</i>
Worker Commute Trips (gallons [gasoline])	373,737	286,772	532,244	73,411	1,266,165
<i>Subtotal Fuel Consumption (gallons [gasoline])</i>	<i>373,737</i>	<i>286,772</i>	<i>532,244</i>	<i>73,411</i>	<i>1,266,165</i>
Total MMBTU	545,083	408,505	802,586	88,415	1,844,589

Source: Connect Los Angeles Partners 2023; see Appendix A for calculation details.

¹ The MSF is an essential element in supporting the reliable operation of an LRT system and would be necessary for the implementation and operation of the San Vicente-Fairfax Alignment Alternative. As such, energy consumption associated with MSF construction has been included in the alignment alternative total.

MMBtu = Million British thermal units.

TABLE 6-8. CONSTRUCTION-RELATED ENERGY CONSUMPTION, FAIRFAX ALIGNMENT ALTERNATIVE WITH HOLLYWOOD BOWL DESIGN OPTION

ENERGY SOURCE	ENERGY CONSUMPTION (GALLONS OF FUEL; MMBTU)			
	SECTION 1	SECTION 2	MSF	FAIRFAX ALIGNMENT ALTERNATIVE TOTAL ¹
Off-Road Construction Equipment (gallons [diesel])	2,434,569	4,397,808	453,288	7,285,665
Truck Trips (Hauling, Delivery, Cement) (gallons [diesel])	1,176,776	1,574,499	121,992	2,873,267
<i>Subtotal Fuel Consumption (gallons [diesel])</i>	<i>3,611,345</i>	<i>5,972,308</i>	<i>575,279</i>	<i>10,158,932</i>
Worker Commute Trips (gallons [gasoline])	373,737	598,685	71,144	1,043,567
<i>Subtotal Fuel Consumption (gallons [gasoline])</i>	<i>373,737</i>	<i>598,685</i>	<i>71,144</i>	<i>1,043,567</i>
Total MMBTU	545,083	899,014	88,282	1,532,378

Source: Connect Los Angeles Partners 2023; see Appendix A for calculation details.

¹ The MSF is an essential element in supporting the reliable operation of an LRT system and would be necessary for the implementation and operation of the Fairfax Alignment Alternative. As such, energy consumption associated with MSF construction has been included in the alignment alternative total.

MMBtu = Million British thermal units.

TABLE 6-9. CONSTRUCTION-RELATED ENERGY CONSUMPTION, LA BREA ALIGNMENT ALTERNATIVE WITH HOLLYWOOD BOWL DESIGN OPTION

ENERGY SOURCE	ENERGY CONSUMPTION (GALLONS OF FUEL; MMBTU)			
	SECTION 1	SECTION 2	MSF	LA BREA ALIGNMENT ALTERNATIVE TOTAL ¹
Off-Road Construction Equipment (gallons [diesel])	2,278,285	3,958,086	448,371	6,684,742
Truck Trips (Hauling, Delivery, Cement) (gallons [diesel])	1,046,445	1,271,923	121,557	2,439,925
<i>Subtotal Fuel Consumption (gallons [diesel])</i>	<i>3,324,730</i>	<i>5,230,009</i>	<i>569,928</i>	<i>9,124,668</i>
Worker Commute Trips (gallons [gasoline])	353,586	524,426	70,930	948,942
<i>Subtotal Fuel Consumption (gallons [gasoline])</i>	<i>353,586</i>	<i>524,426</i>	<i>70,930</i>	<i>948,942</i>
Total MMBTU	503,011	787,294	87,516	1,377,822

Source: Connect Los Angeles Partners 2023; see Appendix A for calculation details.

¹ The MSF is an essential element in supporting the reliable operation of an LRT system and would be necessary for the implementation and operation of the La Brea Alignment Alternative. As such, energy consumption associated with MSF construction has been included in the alignment alternative total.

MMBtu = Million British thermal units.

Construction of the design option would be temporary and thus, energy consumption would fluctuate according to the subphase of construction. Construction contractors would be required to implement the practices described above for the alignment alternatives. Therefore, construction of the Hollywood Bowl Design Option would have a less than significant impact related to energy consumption.

OPERATIONAL IMPACTS

Less Than Significant Impact. Operation of the Hollywood Bowl Design Option would consume additional electricity for LRV propulsion and for operation of one additional station, beyond that described for the alignment alternatives. As with the alignment alternatives, LRV propulsion and station operations were assumed to not use gasoline, diesel, or natural gas. The annual energy consumption associated with operation of the design option is provided in Table 6-10. A summary of the operational energy consumption for the three alignment alternatives with the Hollywood Bowl Design Option is shown in Table 6-14.

TABLE 6-10. ANNUAL OPERATIONAL ENERGY CONSUMPTION, HOLLYWOOD BOWL DESIGN OPTION

DESCRIPTION	ELECTRICAL DEMAND (KWH)	TOTAL OPERATIONAL ENERGY DEMAND (MMBtu)
Light Rail Operations	454,596	1,552
Station Operations	75,072	256
Total Energy Consumption	529,668	1,808

Source: Connect Los Angeles Partners 2023; see Appendix A for calculation details.
kWh= kilowatt-hours; MMBtu = Million British thermal units

As shown in Table 6-10, operation of the design option would result in approximately 1,808 additional MMBtu per year. However, the design option would only be implemented with an alignment alternative to increase rider connectivity as part of the Project, resulting in an overall net reduction in regional energy consumption due to the avoided VMT in the region (see Table 6-14, which demonstrates that the Project would reduce up to 123,550 MMBtu). After accounting for the additional energy consumption required to operate the design option, the Project would still result in a reduction of 121,742 MMBtu. As shown in the KNE Transportation Technical Report, implementation of the Hollywood Bowl Design Option would result in a small reduction in VMT in the region and there would be no significant annual operational consumption of gasoline, diesel, or natural gas. Therefore, operation of the Hollywood Bowl Design Option would not constitute a wasteful, inefficient, or unnecessary consumption of energy and the impact related to energy consumption would be less than significant.

6.1.4.5 MAINTENANCE AND STORAGE FACILITY

CONSTRUCTION IMPACTS

Less Than Significant Impact. Construction of the MSF would result in consumption of similar energy resources as described for the alignment alternatives. Construction-related energy sources associated with the MSF would include diesel and gasoline fuel for the transport and use of construction equipment (off-road), use of delivery and haul trucks (on-road), and use of passenger vehicles (on-road) by construction employees. Construction-related transportation energy consumption depends on the type and number of trips, VMT, fuel efficiency of vehicles, and travel mode. The use of fuel by on-road and off-road vehicles would be temporary and would fluctuate according to the subphase of construction. Construction fuel use for the MSF would cease upon completion of construction.

Construction of the MSF would occur concurrently with Section 1 and Section 2 of each alignment alternative. MSF construction concurrent with Section 1 would include the addition of four storage tracks to the existing Division 16 site. MSF construction concurrent with Section 2 would include expansion of the existing Division 16 MSF. No MSF construction would occur concurrently with Section 3 of the San Vicente–Fairfax Alignment Alternative. Table 6-11 presents the total fuel consumption anticipated for proposed construction activities for the MSF, which is anticipated to occur in the mid-2040s, depending on the alignment alternative selected.

Construction of the MSF would be temporary. Fuel use related to construction would cease upon completion of construction. Construction contractors would be required to implement the same required practices described above for the alignment alternatives. Therefore, this impact would be less than significant.

TABLE 6-11. CONSTRUCTION-RELATED ENERGY CONSUMPTION, MSF AND ALIGNMENT ALTERNATIVES

EMISSION SOURCE	ENERGY CONSUMPTION (GALLONS OF FUEL; MMBTU)								
	MSF SECTION 1: SAN VICENTE-FAIRFAX ALIGNMENT ALTERNATIVE	MSF SECTION 2: SAN VICENTE-FAIRFAX ALIGNMENT ALTERNATIVE	TOTAL MSF WITH SAN VICENTE-FAIRFAX ALIGNMENT ALTERNATIVE ¹	MSF SECTION 1: FAIRFAX ALIGNMENT ALTERNATIVE	MSF SECTION 2: FAIRFAX ALIGNMENT ALTERNATIVE	TOTAL MSF WITH FAIRFAX ALIGNMENT ALTERNATIVE ¹	MSF SECTION 1: LA BREA ALIGNMENT ALTERNATIVE	MSF SECTION 2: LA BREA ALIGNMENT ALTERNATIVE	TOTAL MSF WITH LA BREA ALIGNMENT ALTERNATIVE ¹
Off-Road Construction Equipment (gallons [diesel])	52,785	400,503	6,820,293	52,785	400,503	5,367,759	47,868	400,503	4,717,875
Truck Trips (Hauling, Delivery, Cement) (gallons [diesel])	12,490	108,415	3,431,826	12,490	110,773	2,858,959	12,055	110,773	2,424,591
<i>Subtotal Fuel Consumption (gallons [diesel])</i>	<i>65,275</i>	<i>508,918</i>	<i>10,252,119</i>	<i>65,275</i>	<i>511,276</i>	<i>8,226,718</i>	<i>59,924</i>	<i>511,276</i>	<i>7,142,466</i>
Worker Commute Trips (gallons [gasoline])	13,578	59,834	1,070,842	13,578	58,992	851,892	10,872	57,743	735,753
<i>Subtotal Fuel Consumption (gallons [gasoline])</i>	<i>13,578</i>	<i>59,834</i>	<i>1,070,842</i>	<i>13,578</i>	<i>58,992</i>	<i>851,892</i>	<i>10,872</i>	<i>57,743</i>	<i>735,753</i>
Total MMBTU	10,705	77,710	1,548,648	10,705	77,930	1,241,774	9,628	77,774	1,077,629

Source: Connect Los Angeles Partners 2023; see Appendix A for calculation details.

¹ The MSF is an essential element in supporting the reliable operation of an LRT system and would be necessary for the implementation and operation of any alignment alternative. As such, energy consumption associated with MSF construction have been presented with alignment alternative energy totals.
MMBtu = Million British thermal units

OPERATIONAL IMPACTS

Less Than Significant Impact. Operation of the MSF would consume additional electricity beyond that described for the alignment alternatives and design option. The MSF would consume electricity for lighting, ventilation, radio and telecommunications, and operations and maintenance equipment, as well as natural gas for space and water heating (which is not required for operation of the alignment alternatives and design option). In addition, water use associated with the MSF would result in indirect electricity consumption associated with the energy required to supply, treat, and distribute water to the South Coast region. It was assumed that additional energy demand for the KNE Section 1 MSF operations that would occur at the existing Division 16 MSF would be minimal since that facility is already in operation and would only require the addition of four storage tracks to accommodate KNE Section 1. Therefore, energy use specific to KNE Section 1 MSF is estimated to be similar to existing conditions and is not included as a separate line item in Table 6-12. The annual energy consumption associated with operation of the MSF expansion at Metro’s Division 16 (buildout of KNE Section 2 MSF) is provided in Table 6-12.

TABLE 6-12. ANNUAL OPERATIONAL ENERGY CONSUMPTION, MSF

DESCRIPTION	ENERGY DEMAND
Electricity Consumption (kWh/year) ¹	310,088
Natural Gas Consumption (kBtu)	49,347
Total Energy Consumption (MMBtu) ²	1,108

Source: Connect Los Angeles Partners 2023; see Appendix A for calculation details.

kWh= kilowatt-hours; kBtu = thousand British thermal units; MMBtu = Million British thermal units

¹ Electricity consumption includes the indirect electricity demand associated with the electricity required to supply, treat, and distribute water. ² Total energy consumption presented in Million British thermal units. Electricity consumption in kilowatt-hours and natural gas consumption in thousand British thermal units has been converted to a single unit of measure.

As shown in Table 6-12, operation of the MSF would result in approximately 1,108 additional MMBtu per year. Operation of the MSF would comply with applicable regulations, including CalGreen and state energy standards under Title 24 per PM AQ-3 and PM AQ-4, which would require that the MSF meet a number of conservation standards, including installation of water-efficient fixtures and energy-efficient lighting and appliances. Furthermore, the MSF would allow for the additional light rail operations under any of the alignment alternatives, therefore providing for the regional VMT and related transportation energy reduction benefit provided by the Project. Therefore, operation of the MSF would not constitute a wasteful, inefficient, or unnecessary consumption of energy and the impact related to energy consumption would be less than significant.

6.1.4.6 SUMMARY OF ENERGY CONSUMPTION

CONSTRUCTION IMPACTS

For comparative purposes, Table 6-13 summarizes the construction-related energy consumption for all alignment alternatives, design option, and MSF, as described in Section 6.1.4. The construction-related energy consumption accounts for construction equipment, haul trucks, delivery trucks, cement trucks, and worker commutes.

TABLE 6-13. CONSTRUCTION-RELATED ENERGY CONSUMPTION SUMMARY

DESCRIPTION		TOTAL ENERGY CONSUMPTION (MMBTU)
ALIGNMENT ALTERNATIVE AND MSF¹		
San Vicente–Fairfax Alignment Alternative	Section 1	545,083
	Section 2	408,505
	Section 3	506,645
	MSF	88,415
Fairfax Alignment Alternative	Section 1	545,083
	Section 2	608,055
	MSF	88,635
La Brea Alignment Alternative	Section 1	503,011
	Section 2	487,216
	MSF	87,402
ALIGNMENT ALTERNATIVE, MSF, AND DESIGN OPTION¹		
San Vicente–Fairfax Alignment Alternative and Hollywood Bowl Design Option	Section 1	545,083
	Section 2	408,505
	Section 3	802,586
	MSF	88,415
Fairfax Alignment Alternative and Hollywood Bowl Design Option	Section 1	545,083
	Section 2	899,014
	MSF	88,282
La Brea Alignment Alternative and Hollywood Bowl Design Option	Section 1	503,011
	Section 2	787,294
	MSF	87,516

Source: Connect Los Angeles Partners 2023; see Appendix A for calculation details.

¹The MSF is an essential element in supporting the reliable operation of an LRT system and would be necessary for the implementation and operation of any alignment alternative. As such, energy consumption associated with MSF construction have been presented with alignment alternative energy totals.

Note: Differences in energy consumption for the MSF construction between the three alignments is due to different assumptions about construction start for this infrastructure, the infrastructure itself is identical. Analysis considers advancements in engine technology, retrofits, and on-road and off-road equipment fleet turnover as stricter standards take effect over time.

MMBtu = Million British thermal units; MSF = maintenance and storage facility

OPERATIONAL IMPACTS

For comparative purposes, Table 6-14 summarizes the operational-related energy consumption for all alignment alternatives, design option, and MSF, as described in Section 6.1.4. The operational-related energy consumption accounts for the total annual energy consumption. As shown in Table 6-14, implementation of the Project would result in a net energy reduction.

TABLE 6-14. ANNUAL OPERATIONAL TOTAL ENERGY CONSUMPTION SUMMARY

	GASOLINE DEMAND (GALLONS)	DIESEL DEMAND (GALLONS)	ELECTRICAL DEMAND (KWH)	NATURAL GAS DEMAND (GALLONS)	TOTAL OPERATIONAL ENERGY CONSUMPTION (MMBTU)	2045 WITHOUT PROJECT CONDITIONS, REGIONAL TRANSPORTATION FUEL CONSUMPTION	NET ENERGY CONSUMPTION
San Vicente–Fairfax Alignment Alternative	4,550,444,805	71,622,739	1,300,626,790	81,652	583,139,863	583,257,191	(117,328)
Fairfax Alignment Alternative	4,550,507,070	71,623,719	1,299,630,640	81,653	583,144,382	583,257,191	(112,809)
La Brea Alignment Alternative	4,550,444,626	71,622,736	1,298,810,435	81,652	583,133,641	583,257,191	(123,550)
Hollywood Bowl Design Option	NA	NA	529,668	NA	1,808	-	-
MSF	NA	NA	310,088	49,347	1,108	-	-

Source: Connect Los Angeles Partners 2023; see Appendix A for calculation details.

kWh= kilowatt-hours; MMBtu = Million British thermal units

6.1.5 IMPACT ENG-2: RENEWABLE ENERGY AND ENERGY EFFICIENCY

Impact ENG-2: Would the Project conflict with or obstruct a state or local plan for renewable energy or energy efficiency?

6.1.5.1 ALIGNMENT ALTERNATIVE 1: SAN VICENTE–FAIRFAX

CONSTRUCTION IMPACTS

No Impact. As described under Impact ENG-1, the San Vicente–Fairfax Alignment Alternative would increase energy consumption for the duration of construction. However, the San Vicente–Fairfax Alignment Alternative would comply with Metro’s Green Construction Policy per PM AQ-1, adhere to commitments established by the MBSSP 2020 per PM AQ-3, and conform with Metro’s Rail Design Criteria and Metro’s Systemwide Station Design Standards Policy per project measure PM AQ-4. This would ensure consistency with the purpose and goals included in state and local energy plans and policies described in Table 6-15 and Sections 3.2 and 3.3 to reduce energy consumption during construction activities. For example, the Green Construction Policy commits Metro contractors to implementing best practices that reduce air emissions, and which have a co-benefit of reducing energy consumption, on all Metro construction projects performed on Metro properties and rights-of-way. Best practices required by the Green Construction Policy related to energy consumption include limiting idling, maintaining equipment to manufacturers’ specifications, and using electric power in place of diesel power where available. The commitments established in the MBSSP 2020 include application of renewable diesel requirements for contractors and identification of opportunities to decarbonize fuel sources at construction sites, which is consistent with the energy-efficiency goals included in the County of Los Angeles Conservation and Natural Resources Element to promote efficient and sustainable use of renewable energy resources as well as the Energy Policy Acts of 1992 and 2005 and AB 1007 (Alternative Fuels Plan) which establish measures to encourage the use of alternative fuels. Similarly, the commitments in Metro’s Green Construction Policy per PM AQ-1 and the MBSSP 2020 per PM AQ-3 would also be consistent with Metro’s adopted policies that support energy efficiency, including the Energy and Sustainability Policy (2007) detailed in Section 3.3.3.1.

In addition, implementation of Metro’s Construction and Demolition Debris Recycling and Reuse Policy (see Section 3.3.3.1) would give preference to recyclable and recycled products in the selection of construction materials and ensure that facilities used for disposal and recycling comply with applicable federal, state, or local rules and regulations for construction and demolition debris recycling. Construction and demolition debris recycling ensures the efficient use of resources and prolongs the supply of natural resources, which is consistent with the goals and policies included in California’s Green Building Standards Code (Title 24), as well as the County of Los Angeles Conservation and Natural Resources Element (Policy C/NR 12.2) and goals for increasing energy efficiency and conservation in the City of West Hollywood’s General Plan (Goal IRC-4.4). By implementing these Metro policies, construction of the San Vicente–Fairfax Alignment Alternative would not conflict with or obstruct state or local plans for renewable energy or energy efficiency. Therefore, there would be no impact.

TABLE 6-15. CONSISTENCY WITH PLANS AND POLICIES

PLANNING AGENCY OR JURISDICTION	ADOPTED PLAN	DESCRIPTION OF PLAN	CONSISTENCY WITH PLANS AND POLICIES
State of California	AB 1007, Alternative Fuels Plan	AB 1007 (Pavley, Chapter 371, Statutes of 2005) requires the CEC to prepare an alternative fuels plan to increase the use of alternative fuels in California. The State Alternative Fuels Plan, aims to clean the state's air, diversify fuel sources, and protect the state from oil spikes that affect prices, the economy, and jobs. The State Alternative Fuels Plan focuses on transportation fuels and alternative fuels but recognizes other components of the transportation system, including advanced vehicle technology and efficiency improvements in conventional vehicles. Additionally, the plan indicates that significant efforts would be needed to reduce VMT by all Californians through more effective land use and transportation planning and greater mass movement of people and goods.	The proposed San Vicente–Fairfax, Fairfax, and La Brea Alignment Alternatives, as well as the Hollywood Bowl Design Option and MSF, would not conflict with the policy mechanisms set forth by the Alternative Fuels Plan and would support aspects of the Plan's goals, including reducing VMT by all Californians through more effective land use and transportation planning and greater mass movement of people.
State of California	EO B-16-12	EO B-16-12 also advances two long-term environmental and energy goals for the transportation section: (1) decrease transportation section GHG emissions to 80 percent below 1990 levels by 2050 and (2) reduce at least 1.5 billion gallons of petroleum fuels by 2025 through the use of clean and efficient vehicles.	The proposed San Vicente–Fairfax, Fairfax, and La Brea Alignment Alternatives, as well as the Hollywood Bowl Design Option and MSF, would not conflict with the provisions or policy mechanisms set forth by EO B-16-12. The Project would support the Executive Order by decreasing the use of petroleum fuels and therefore GHG emissions in the transportation sector.
State of California	SB 1078, 350, and 100	In December 2021, SB 100 increased the renewable electricity procurement goal set by SB 350, from 50 percent to 60 percent by 2030 with new interim targets of 44 percent by 2024 and 52 percent by 2027. Additionally, SB 100 requires renewable energy and zero-carbon electricity system to supply 100 percent of electric retail sales by 2045.	The proposed San Vicente–Fairfax, Fairfax, and La Brea Alignment Alternatives, as well as the Hollywood Bowl Design Option and MSF, would not conflict with electricity providers from increasing renewable electricity procurement.
State of California	EO N-79-20	California shall transition to 100 percent zero-emission off-road vehicles and equipment by 2035 where feasible.	The proposed San Vicente–Fairfax, Fairfax, and La Brea Alignment Alternatives, as well as the Hollywood Bowl Design Option and MSF, would not conflict with the provisions set forth by EO N-79-20 that would transition zero-emission off-road vehicles and equipment by 2035 where feasible.

PLANNING AGENCY OR JURISDICTION	ADOPTED PLAN	DESCRIPTION OF PLAN	CONSISTENCY WITH PLANS AND POLICES
SCAG	2020-2045 SCAG RTP/SCS	The RTP provides a long-range regional vision for regional transportation goals and policies, as well as predicted transportation challenges and the region’s future transportation strategy. The RTP/SCS establishes the following goal that relate to the Project and energy efficiency and conservation: <ul style="list-style-type: none"> • Actively encourage and create incentives for energy efficiency, where possible 	The proposed San Vicente–Fairfax, Fairfax, and La Brea Alignment Alternatives, as well as the Hollywood Bowl Design Option and MSF, would not conflict with the goals related to energy efficiency and conservation.
City of Los Angeles	Mobility 2035	<p>Policy 2.3 Pedestrian Infrastructure: Recognize walking as a component of every trip, and ensure high-quality pedestrian access in all site planning and public right-of-way modifications to provide a safe and comfortable walking environment.</p> <p>Policy 2.5 Transit Network: Improve the performance and reliability of existing and future bus service.</p> <p>Policy 2.9 Multiple Networks: Consider the role of each enhanced network when designing a street that includes multiple modes.</p> <p>Policy 2.11 Transit Right-of-Way Design: Set high standards in designing public transit rights-of-way that consider user experience and support active transportation infrastructure.</p> <p>Policy 2.12 Walkway and Bikeway Accommodations: Design for pedestrian and bicycle travel when rehabilitating or installing a new bridge, tunnel, or exclusive transit right-of-way.</p>	The proposed San Vicente–Fairfax, Fairfax, and La Brea Alignment Alternatives, as well as the Hollywood Bowl Design Option, are consistent with Policy 2.3, Policy 2.5, Policy 2.9, Policy 2.11, and Policy 2.12. The alignment alternatives and design option do not conflict with the Los Angeles Mobility Element policies regarding infrastructure, specifically pedestrian infrastructure, transit networks, right-of-way designs, and walkability and bikeway accommodations. The Project would improve the transit network in Los Angeles and would give users more transit options. Furthermore, La Brea Avenue is identified as a “Comprehensive Transit Enhanced Street” and the La Brea Alignment Alternative would further this objective.
City of West Hollywood	General Plan-Mobility Element	M- 5.2 Prioritize property access to promote transit, walking, and bicycling over auto access.	The proposed San Vicente–Fairfax, Fairfax, and La Brea Alignment Alternatives are consistent with this policy as the alignment alternative would contribute to the decrease of vehicle miles traveled and prioritize transit and active transportation.
Metro	First/Last Mile Strategic Plan	The First/Last Mile Plan provides an adaptable vision for addressing first/last mile improvements in a systematic way and coordinating infrastructure investments in areas surrounding stations to extend the reach of transit with the goal of increasing ridership.	Metro would implement this policy for the proposed San Vicente–Fairfax, Fairfax, and La Brea Alignment Alternatives, as well as the Hollywood Bowl Design Option and MSF, which would not conflict with the provisions set forth by this policy.

PLANNING AGENCY OR JURISDICTION	ADOPTED PLAN	DESCRIPTION OF PLAN	CONSISTENCY WITH PLANS AND POLICES
Metro	Green Construction Policy	Adopted to reduce emissions from construction equipment and includes a commitment by Metro that all on-road and off-road vehicles used in construction of a project will be greener and less polluting, and that best practices will be implemented to meet or exceed air quality emission standards. For example, from January 1, 2015, and onward, all off-road diesel-powered construction equipment greater than 50 horsepower shall meet the Tier 4 off-road emission standard at a minimum. Measures related to energy use include limiting idling, maintaining equipment to manufacturers' specifications, and using electric power in lieu of diesel power where available.	Metro would implement this policy for the proposed San Vicente–Fairfax, Fairfax, and La Brea Alignment Alternatives, as well as the Hollywood Bowl Design Option and MSF, per PM AQ-1. Therefore, the Project would not conflict with this policy.
Metro	Energy and Sustainability Policy	Established to aid Metro in controlling energy consumption and encouraging energy efficiency, conservation, and sustainability. Long-term objectives include: <ul style="list-style-type: none"> • Reducing the use of fossil fuels through the use of ambient and renewable energy sources • Using fuels and electricity as efficiently as possible 	Metro would implement the Energy and Sustainability Policy for the construction and operational phases of the proposed San Vicente–Fairfax, Fairfax, and La Brea Alignment Alternatives, as well as the Hollywood Bowl Design Option and MSF. The Project would implement: <ul style="list-style-type: none"> • Reducing the use of fossil fuels through the use of ambient and renewable energy sources. • Using fuels and electricity as efficiently as possible.
Metro	Environmental Policy	A comprehensive policy that provides guidance on such aspects as mitigating potential environmental impacts generated by development activities and reducing consumption of natural resources. Specific commitments related to energy include promoting renewable energy sources to address energy and environmental challenges.	Metro would implement the Environmental Policy for the proposed San Vicente–Fairfax, Fairfax, and La Brea Alignment Alternatives, as well as the Hollywood Bowl Design Option and MSF; therefore, the Project would not conflict with this policy.
Metro	Renewable Energy Policy	Calls for renewable energy solutions while minimizing non-renewable energy use and also calls for a review of technical feasibility for renewable power projects on Metro property and infrastructure.	Metro would implement this policy for the proposed San Vicente–Fairfax, Fairfax, and La Brea Alignment Alternatives, as well as the Hollywood Bowl Design Option and MSF; therefore, the Project would not conflict with this policy.
Metro	Energy Conservation and Management Plan (ECMP)	The ECMP addresses existing and projected energy needs, identifies opportunities to reduce energy consumption and achieve cost savings, and sets forth implementation strategies, including for vehicle propulsion energy.	Metro would implement this plan for the proposed San Vicente–Fairfax, Fairfax, and La Brea Alignment Alternatives, as well as the Hollywood Bowl Design Option and MSF; therefore, the Project would not conflict with this plan.

PLANNING AGENCY OR JURISDICTION	ADOPTED PLAN	DESCRIPTION OF PLAN	CONSISTENCY WITH PLANS AND POLICES
Metro	Sustainable Rail Plan	Examines strategies to reduce energy consumption from rail operations and analyzes their costs and potential energy savings. The study supports implementation of the ECMP.	Metro would implement this plan for the proposed San Vicente–Fairfax, Fairfax, and La Brea Alignment Alternatives, as well as the Hollywood Bowl Design Option and MSF; therefore, the Project would not conflict with this plan.
Metro	Climate Action and Adaptation Plan	Developed to provide a framework for improving energy efficiency and reducing GHG emissions and non-renewable energy consumption, including but not limited to, increased renewable energy procurement, increased photovoltaic installations, replacing lighting and appliances at Metro facilities with more energy-efficient controls and equipment, and an assessment of opportunities for Wayside Energy Storage Substation implementation to store energy from decelerating railcars.	Metro would implement this plan for the proposed San Vicente–Fairfax, Fairfax, and La Brea Alignment Alternatives, as well as the Hollywood Bowl Design Option and MSF; therefore, the Project would not conflict with this plan.

Source: SCAG 2000; City of LA 2016; City of West Hollywood 2011; Metro 2007a, 2009, 2011a, 2011b, 2011c, 2012, 2013, 2014, 2019a

Note: AB = Assembly Bill; VMT = vehicle miles traveled; SB = Senate Bill; EO = Executive Order; GHG = greenhouse gases; MSF = maintenance and storage facility

OPERATIONAL IMPACTS

No Impact. State and local energy conservation plans promote the use of renewable fuels and encourage a reduction in nonrenewable fuel usage and increased transit service to reduce passenger vehicles and the transportation-related fuel consumption on the roadway network. For example, SCAG's 2020-2045 RTP/SCS, Connect SoCal, provides a long-range regional vision for regional transportation goals and policies, which includes preserving and ensuring a sustainable regional transportation system, maximizing the productivity of the transportation system, and encouraging use and growth patterns that facilitate transit and active transportation, which enable energy-efficient growth in the region. Table 6-15 provides a consistency check with the state and local energy plans and policies described in Sections 3.2 and 3.3. The San Vicente–Fairfax Alignment Alternative would be consistent with all state and local energy plans and policies identified in the table. As described in Section 6.1.4.1, operation of the San Vicente–Fairfax Alignment Alternative would result in a regional reduction of approximately 49.4 million VMT in 2045, and thereby, result in a net reduction in energy consumption (shown in Table 6-2). Refer to the KNE Greenhouse Gas Emissions Technical Report for additional information on annual VMT reduction in the SCAG region.

Therefore, operation of the San Vicente–Fairfax Alignment Alternative would be consistent with the goals of the SCAG RTP/SCS to encourage energy efficiency and conservation by preserving and ensuring a sustainable regional transportation system and encouraging use and growth patterns that facilitate transit. Similarly, operation of the San Vicente–Fairfax Alignment Alternative would also be consistent with goals included in the SCAQMD air quality management plan to promote reductions in VMT, and reduce the associated energy consumption, through the development of transportation alternatives. Furthermore, operation of the San Vicente–Fairfax Alignment Alternative would also be consistent with federal plans and policies, including MAP-21 (see Section 3.1.2) which calls for energy conservation through transit projects and consistency between transportation improvements and planned growth and economic development patterns.

As described in further detail in the KNE Transportation Technical Report, Metro would engage in first/last mile planning with local jurisdictions to enhance station access for pedestrians and bicyclists. Therefore, the San Vicente–Fairfax Alignment Alternative would also be consistent with the goals, policies, and strategies related to mobility, sustainability, and energy included in the City of Los Angeles Mobility 2035 (2016) and City of West Hollywood General Plan Mobility Element. The San Vicente–Fairfax Alignment Alternative would align with Metro's Complete Streets Policy to promote walking, bicycling, transit use, and public health, and to promote an integrated, sustainable transportation system that serves all users within the community. These policies that promote alternative forms of transportation encourage the reduction of VMT and the associated energy consumption.

In summary, the San Vicente–Fairfax Alignment Alternative would increase the availability of electric-powered transit, a form of transportation that is not dependent on traditional transportation fuels (i.e., diesel and gas), would result in a net reduction in VMT, and would promote alternative forms of transportation, including walking, bicycling, and transit use. The operation of the San Vicente–Fairfax

Alignment Alternative would not conflict with or obstruct state or local plans for renewable energy or energy efficiency. Therefore, there would be no impact.

6.1.5.2 ALIGNMENT ALTERNATIVE 2: FAIRFAX

CONSTRUCTION IMPACTS

No Impact. As described under Impact ENG-1, the Fairfax Alignment Alternative would increase energy consumption for the duration of construction. However, the Fairfax Alignment Alternative would comply with Metro’s Green Construction Policy per PM AQ-1, adhere to commitments established by the MBSSP 2020 per PM AQ-3, and conform with Metro’s Rail Design Criteria and Metro’s Systemwide Station Design Standards Policy per project measure PM AQ-4. This would ensure consistency with state and local energy plans and policies described in Table 6-15 and Sections 3.2 and 3.3, to reduce energy consumption during construction activities. For example, the Green Construction Policy commits Metro contractors to implement best practices that reduce air emissions and have a co-benefit of reducing energy consumption on all Metro construction projects performed on Metro properties and rights-of-way. Best practices required by the Green Construction Policy related to energy consumption include limiting idling, maintaining equipment to manufacturers’ specifications, and using electric power in place of diesel power where available.

The commitments established in the MBSSP 2020 include application of renewable diesel requirements for contractors and identification of opportunities to decarbonize fuel sources at construction sites, which is consistent with the energy-efficiency goals included in the County of Los Angeles Conservation and Natural Resources Element to promote efficient and sustainable use of renewable energy resources, as well as the Energy Policy Acts of 1992 and 2005 and AB 1007 (Alternative Fuels Plan), which establish measures to encourage the use of alternative fuels. Similarly, the commitments in Metro’s Green Construction Policy per PM AQ-1 and the MBSSP 2020 per PM AQ-3 would also be consistent with Metro’s adopted policies that support energy efficiency, including the Energy and Sustainability Policy (2007) detailed in Section 3.3.3.1.

In addition, implementation of Metro’s Construction and Demolition Debris Recycling and Reuse Policy (see Section 3.3.3.1) would give preference to recyclable and recycled products in the selection of construction materials and ensure that facilities used for disposal and recycling comply with applicable federal, state, or local rules and regulations for construction and demolition debris recycling. Construction and demolition debris recycling ensures the efficient use of resources and prolongs the supply of natural resources, which is consistent with the goals and policies included in California’s Green Building Standards Code (Title 24), as well as the County of Los Angeles Conservation and Natural Resources Element (Policy C/NR 12.2) and goals for increasing energy efficiency and conservation in the City of West Hollywood’s General Plan (Goal IRC-4.4). By implementing these Metro policies, construction of the Fairfax Alignment Alternative would not conflict with or obstruct state or local plans for renewable energy or energy efficiency. Therefore, there would be no impact.

OPERATIONAL IMPACTS

No Impact. State and local energy conservation plans promote the use of renewable fuels and encourage a reduction in nonrenewable fuel usage and increased transit service to reduce passenger vehicles and the transportation-related fuel consumption on the roadway network. For example, SCAG's 2020-2045 RTP/SCS, Connect SoCal, provides a long-range regional vision for regional transportation goals and policies, which includes preserving and ensuring a sustainable regional transportation system, maximizing the productivity of the transportation system, and encouraging use and growth patterns that facilitate transit and active transportation, which enable energy-efficient growth in the region. Table 6-15 provides a consistency check with the state and local energy plans and policies described in Sections 3.2 and 3.3. The Fairfax Alignment Alternative would be consistent with all state and local energy plans and policies identified in the table. As described in Section 6.1.4.2, operation of the Fairfax Alignment Alternative would result in a regional reduction of approximately 46.5 million VMT for the 2045 buildout-year, and thereby result in a net reduction in energy consumption (shown in Table 6-2). Refer to the KNE Greenhouse Gas Emissions Technical Report for additional information on annual VMT reduction in the SCAG region.

Therefore, operation of the Fairfax Alignment Alternative would also be consistent with the goals of the SCAG RTP/SCS to encourage energy efficiency and conservation by preserving and ensuring a sustainable regional transportation system and encouraging use and growth patterns that facilitate transit. Similarly, operation of the Fairfax Alignment Alternative would also be consistent with goals included in the SCAQMD air quality management plan to promote reductions in VMT and reduce the associated energy consumption through the development of transportation alternatives.

Furthermore, operation of the Fairfax Alignment Alternative would also be consistent with federal plans and policies, including MAP-21 (see Section 3.1.2), which calls for energy conservation through transit projects and consistency between transportation improvements and planned growth and economic development patterns.

As described in further detail in the KNE Transportation Technical Report, Metro would engage in first/last mile planning with local jurisdictions to enhance station access for pedestrians and bicyclists. Therefore, the Fairfax Alignment Alternative would also be consistent with the goals, policies, and strategies related to mobility, sustainability, and energy included in the City of Los Angeles Sustainable City Plan and the City of West Hollywood General Plan. The Fairfax Alignment Alternative would align with Metro's Complete Streets Policy to promote walking, bicycling, transit use, and public health, and to promote an integrated, sustainable transportation system that serves all users within the community. These policies that promote alternative forms of transportation encourage the reduction of VMT and the associated energy consumption.

In summary, the Fairfax Alignment Alternative would increase the availability of electric-powered transit, a form of transportation that is not dependent on traditional transportation fuels (i.e., diesel and gas), would result in a net reduction in VMT, and would promote alternative forms of transportation, including walking, bicycling, and transit use. The operation of the Fairfax Alignment Alternative would not conflict with or obstruct a state or local plan for renewable energy or energy efficiency. Therefore, there would be no impact.

6.1.5.3 ALIGNMENT ALTERNATIVE 3: LA BREA

CONSTRUCTION IMPACTS

No Impact. As described under Impact ENG-1, the La Brea Alignment Alternative would increase energy consumption for the duration of construction. However, the La Brea Alignment Alternative would comply with Metro’s Green Construction Policy per PM AQ-1, adhere to commitments established by the MBSSP 2020 per PM AQ-3, and conform with Metro’s Rail Design Criteria and Metro’s Systemwide Station Design Standards Policy per project measure PM AQ-4. This would ensure consistency with the purpose and goals included in state and local energy plans and policies described in Table 6-15 and Sections 3.2 and 3.3, to reduce energy consumption during construction activities. For example, the Green Construction Policy commits Metro contractors to implementing best practices that reduce air emissions, and which have a co-benefit of reducing energy consumption, on all Metro construction projects performed on Metro properties and rights-of-way. Best practices required by the Green Construction Policy related to energy consumption include limiting idling, maintaining equipment to manufacturers’ specifications, and using electric power in place of diesel power where available.

The commitments established in the MBSSP 2020 include application of renewable diesel requirements for contractors and identification of opportunities to decarbonize fuel sources at construction sites, which is consistent with the energy-efficiency goals included in the County of Los Angeles Conservation and Natural Resources Element to promote efficient and sustainable use of renewable energy resources as well as the Energy Policy Acts of 1992 and 2005 and AB 1007 (Alternative Fuels Plan), which establish measures to encourage the use of alternative fuels. Similarly, the commitments in Metro’s Green Construction Policy per PM AQ-1 and the MBSSP 2020 per PM AQ-3 would also be consistent with Metro’s adopted policies that support energy efficiency, including the Energy and Sustainability Policy (2007) detailed in Section 3.3.3.1.

In addition, implementation of Metro’s Construction and Demolition Debris Recycling and Reuse Policy (see Section 3.3.3.1) would give preference to recyclable and recycled products in the selection of construction materials and ensure that facilities used for disposal and recycling comply with applicable federal, state, or local rules and regulations for construction and demolition debris recycling. Construction and demolition debris recycling ensures the efficient use of resources and prolongs the supply of natural resources, which is consistent with the goals and policies included in California’s Green Building Standards Code (Title 24), as well as the County of Los Angeles Conservation and Natural Resources Element (Policy C/NR 12.2) and goals for increasing energy efficiency and conservation in the City of West Hollywood’s General Plan (Goal IRC-4.4). By implementing these Metro policies, construction of the La Brea Alignment Alternative would not conflict with or obstruct state or local plans for renewable energy or energy efficiency. Therefore, there would be no impact.

OPERATIONAL IMPACTS

No Impact. State and local energy conservation plans promote the use of renewable fuels and encourage a reduction in nonrenewable fuel usage and increased transit service to reduce passenger vehicles and the transportation-related fuel consumption on the roadway network. For example,

SCAG's 2020-2045 RTP/SCS, Connect SoCal, provides a long-range regional vision for regional transportation goals and policies, which includes preserving and ensuring a sustainable regional transportation system, maximizing the productivity of the transportation system, and encouraging use and growth patterns that facilitate transit and active transportation, which enable energy-efficient growth in the region. Table 6-15 provides a consistency check with the state and local energy plans and policies described in Sections 3.2 and 3.3. The La Brea Alignment Alternative would be consistent with all state and local energy plans and policies identified in the table. As described in Section 6.1.4.3, operation of the La Brea Alignment Alternative would result in a regional reduction of approximately 49.5 million VMT in 2045, and thereby, result in a net reduction in energy consumption (shown in Table 6-2). Refer to the KNE Greenhouse Gas Emissions Technical Report for additional information on annual VMT reduction in the SCAG region.

Therefore, operation of the La Brea Alignment Alternative would be consistent with the goals of the SCAG RTP/SCS to encourage energy efficiency and conservation by preserving and ensuring a sustainable regional transportation system and encouraging use and growth patterns that facilitate transit. Similarly, operation of the La Brea Alignment Alternative would also be consistent with goals included in the SCAQMD air quality management plan to promote reductions in VMT, and reduce the associated energy consumption, through the development of transportation alternatives. Furthermore, operation of the La Brea Alignment Alternative would also be consistent with federal plans and policies, including MAP-21 (see Section 3.1.2), which calls for energy conservation through transit projects and consistency between transportation improvements and planned growth and economic development patterns.

As described in further detail in the KNE Transportation Technical Report, Metro would engage in first/last mile planning with local jurisdictions to enhance station access for pedestrians and bicyclists. Therefore, the La Brea Alignment Alternative would also be consistent with the goals, policies, and strategies related to mobility, sustainability, and energy included in the City of Los Angeles Sustainable City Plan and the City of West Hollywood General Plan. The La Brea Alignment Alternative would align with Metro's Complete Streets Policy to promote walking, bicycling, transit use, and public health, and to promote an integrated, sustainable transportation system that serves all users within the community. These policies that promote alternative forms of transportation encourage the reduction of VMT and the associated energy consumption.

In summary, the La Brea Alignment Alternative would increase the availability of electric-powered transit, a form of transportation that is not dependent on traditional transportation fuels (i.e., diesel and gas), would result in a net reduction in VMT, and would promote alternative forms of transportation, including walking, bicycling and transit use. Therefore, operation of the La Brea Alignment Alternative would not conflict with or obstruct state or local plans for renewable energy or energy efficiency. Therefore, there would be no impact.

6.1.5.4 HOLLYWOOD BOWL DESIGN OPTION

CONSTRUCTION IMPACTS

No Impact. Similar to the alignment alternatives, the Hollywood Bowl Design Option would comply with applicable requirements of Metro’s Green Construction Policy per PM AQ-1, PM AQ-3, and PM AQ-4, which would ensure consistency with the purpose and goals included in state and local energy plans and policies described in Table 6-15 and Sections 3.2 and 3.3, to reduce energy consumption.

For example, the Green Construction Policy commits Metro contractors to implementing best practices that reduce air emissions, and which have a co-benefit of reducing energy consumption, on all Metro construction projects performed on Metro properties and rights-of-way. Best practices required by the Green Construction Policy related to energy consumption include limiting idling, maintaining equipment to manufacturers’ specifications, and using electric power in place of diesel power where available. The commitments established in the MBSSP 2020 include application of renewable diesel requirements for contractors and identification of opportunities to decarbonize fuel sources at construction sites, which is consistent with the energy-efficiency goals included in the County of Los Angeles Conservation and Natural Resources Element to promote efficient and sustainable use of renewable energy resources as well as the Energy Policy Acts of 1992 and 2005 and AB 1007 (Alternative Fuels Plan), which establish measures to encourage the use of alternative fuels. Similarly, the commitments in Metro’s Green Construction Policy per PM AQ-1 and the MBSSP 2020 per PM AQ-3 would also be consistent with Metro’s adopted policies that support energy efficiency, including the Energy and Sustainability Policy (2007) detailed in Section 3.3.3.1.

In addition, implementation of Metro’s Construction and Demolition Debris Recycling and Reuse Policy (see Section 3.3.3.1) would give preference to recyclable and recycled products in the selection of construction materials and ensure that facilities used for disposal and recycling comply with applicable federal, state, or local rules and regulations for construction and demolition debris recycling. Construction and demolition debris recycling ensures the efficient use of resources and prolongs the supply of natural resources, which is consistent with the goals and policies included in California’s Green Building Standards Code (Title 24), as well as the County of Los Angeles Conservation and Natural Resources Element (Policy C/NR 12.2) and goals for increasing energy efficiency and conservation in the City of West Hollywood’s General Plan (Goal IRC-4.4). By implementing these Metro policies, construction of the Hollywood Bowl Design Option would not conflict with or obstruct state or local plans for renewable energy or energy efficiency. Therefore, there would be no impact.

OPERATIONAL IMPACTS

No Impact. As described above for the alignment alternatives, the Hollywood Bowl Design Option would allow for an additional station at the Hollywood Bowl, which would primarily serve the Hollywood Bowl venue along with the residential land uses in the vicinity of the proposed station. Thus, the Hollywood Bowl Design Option would also facilitate electric-powered transit use in place of passenger vehicle use, which would reduce VMT and be consistent with the goals of the SCAG RTP/SCS, the SCAQMD air quality management plan, MAP-21, the City of Los Angeles Sustainable City Plan, the City of West Hollywood General Plan, and Metro's Complete Streets Policy. Table 6-15 provides a consistency check with the state and local energy plans and policies described in Sections 3.2 and 3.3. The Hollywood Bowl Design Option would not conflict with or obstruct a state or local plan for renewable energy or energy efficiency. Therefore, there would be no impact.

6.1.5.5 MAINTENANCE AND STORAGE FACILITY

CONSTRUCTION IMPACTS

No Impact. Similar to the alignment alternatives and Hollywood Bowl Design Option, the MSF would comply with applicable requirements of Metro's Green Construction Policy per PM AQ-1, PM AQ-3, and PM AQ-4, which would ensure consistency with the purpose and goals included in state and local energy plans and policies described in Table 6-15 and Sections 3.2 and 3.3 to reduce energy consumption.

For example, the Green Construction Policy commits Metro contractors to implementing best practices that reduce air emissions, and which have a co-benefit of reducing energy consumption, on all Metro construction projects performed on Metro properties and rights-of-way. Best practices required by the Green Construction Policy related to energy consumption include limiting idling, maintaining equipment to manufacturers' specifications, and using electric power in place of diesel power where available.

The commitments established in the MBSSP 2020 include application of renewable diesel requirements for contractors and identification of opportunities to decarbonize fuel sources at construction sites, which is consistent with the energy-efficiency goals included in the County of Los Angeles Conservation and Natural Resources Element to promote efficient and sustainable use of renewable energy resources as well as the Energy Policy Acts of 1992 and 2005 and AB 1007 (Alternative Fuels Plan), which establish measures to encourage the use of alternative fuels. Similarly, the commitments in Metro's Green Construction Policy per PM AQ-1 and the MBSSP 2020 per PM AQ-3, would also be consistent with Metro's adopted policies that support energy efficiency, including the Energy and Sustainability Policy (2007) detailed in Section 3.3.3.1.

In addition, implementation of Metro’s Construction and Demolition Debris Recycling and Reuse Policy (see Section 3.3.3.1) would give preference to recyclable and recycled products in the selection of construction materials and ensure that facilities used for disposal and recycling comply with applicable federal, state, or local rules and regulations for construction and demolition debris recycling. Construction and demolition debris recycling ensures the efficient use of resources and prolongs the supply of natural resources, which is consistent with the goals and policies included in California’s Green Building Standards Code (Title 24), as well as the County of Los Angeles Conservation and Natural Resources Element (Policy C/NR 12.2). By implementing these Metro policies, construction of the MSF would not conflict with or obstruct state or local plans for renewable energy or energy efficiency. Therefore, there would be no impact.

OPERATIONAL IMPACTS

No Impact. The MSF would provide support necessary for operation of the Project and would therefore be consistent with the regional and local energy conservation plans detailed above for the alignment alternatives by contributing to implementation of the Project. Table 6-15 provides a consistency check with the state and local energy plans and policies described in Sections 3.2 and 3.3. Since the MSF supports operation of the alignment alternatives and Hollywood Bowl Design Option, it would be consistent with all state and local energy plans and policies identified in the table. In addition, per PM AQ-4, the MSF would be required to comply with energy-efficiency standards set forth by Title 24 of the California Administrative Code and the Appliance Efficiency Regulations. Title 24 requires that a project meet conservation standards, including installation of water-efficient fixtures and energy-efficient lighting. Title 24 also regulates energy consumption for the heating, cooling, ventilation, and lighting of nonresidential buildings. Since the MSF would allow for additional light rail operations under any of the alignment alternatives, it would provide regional VMT reductions and related transportation energy reduction benefit. Operation of the MSF would not conflict with or obstruct a state or local plan for renewable energy or energy efficiency. Therefore, there would be no impact.

6.1.6 SUMMARY OF IMPACT CONCLUSIONS

Table 6-16 provides a summary of the impact conclusions discussed in this section.

TABLE 6-16. IMPACT CONCLUSION SUMMARY TABLE

IMPACT SIGNIFICANCE THRESHOLD	IMPACT CONCLUSION				
	ALIGNMENT ALTERNATIVE 1: SAN VICENTE-FAIRFAX	ALIGNMENT ALTERNATIVE 2: FAIRFAX	ALIGNMENT ALTERNATIVE 3: LA BREA	HOLLYWOOD BOWL DESIGN OPTION	MAINTENANCE AND STORAGE FACILITY
Impact ENG-1: Would the Project result in a potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?	<u>Construction:</u> Less Than Significant Impact <u>Operation:</u> Less Than Significant Impact	<u>Construction:</u> Less Than Significant Impact <u>Operation:</u> Less Than Significant Impact	<u>Construction:</u> Less Than Significant Impact <u>Operation:</u> Less Than Significant Impact	<u>Construction:</u> Less Than Significant Impact <u>Operation:</u> Less Than Significant Impact	<u>Construction:</u> Less Than Significant Impact <u>Operation:</u> Less Than Significant Impact
Impact ENG-2: Would the Project conflict with or obstruct a state or local plan for renewable energy or energy efficiency?	<u>Construction:</u> No Impact <u>Operation:</u> No Impact				

Source: Connect Los Angeles Partners 2023

6.2 MITIGATION MEASURES

As the impact analysis in Section 6.1 demonstrates, construction and operation of any of the Project alignment alternatives and stations, design option, and MSF would result in no impact or a less than significant impact related to energy resources. Therefore, no mitigation is required under CEQA.

CHAPTER 7 CUMULATIVE IMPACTS

7.1 INTRODUCTION

Under the state CEQA Guidelines, cumulative impacts are defined as two or more individual impacts that, when considered together, are considerable or would compound and increase other environmental impacts (Section 15355). These cumulative impacts must be discussed in an EIR when the project’s incremental effect is “cumulatively considerable” (Section 15130). “Cumulatively considerable” is defined as when 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 (Section 15065(a)(3)).

CEQA Guidelines Section 15130(b)(1) includes two methodology approaches for assessing cumulative impacts. One approach is a “list of past, present, and probable future projects producing related or cumulative impacts” (CEQA Guidelines Section 15130(b)(1)(A)). The other approach is a “summary of projections contained in an adopted local, regional, or statewide plan, or related document, which describes or evaluates conditions contributing to the cumulative effect” (CEQA Guidelines Section 15030(b)(1)(B)). For the purposes of this analysis, the latter approach is used due to the long Project implementation time. The forecasted Project completion timeframe is in the mid- to late-2040s based on Metro Measure M funding. Due to the long-term nature of the Project’s implementation, a list of land use and transportation projects is insufficient for the cumulative analysis since the currently known projects would be completed and operational by the Project’s forecasted completion. In addition, it is highly likely many additional projects will be proposed and constructed between now and project implementation in 20 years; therefore, any project list developed now would be incomplete and incorrect.

The SCAG 2020-2045 RTP/SCS Plan is the adopted long-range forecast for population, households, and employment within the six-county Southern California region, which includes all Project elements. The Project is also included in the SCAG 2020 RTP/SCS Plan, as well as Metro’s 2020 Long Range Transportation Plan. The RTP/SCS was adopted in 2020 and proposes land use and transportation strategies to improve mobility options and achieve a more sustainable growth pattern (SCAG 2020). SCAG worked in close coordination with decision-makers and the public across multiple jurisdictions throughout the SCAG region to create the plan. The population, household, and employment growth projections from this plan are used to assess regional growth and its cumulative impact within the vicinity of the Project.

For the cumulative analysis, the RSA is defined as a half-mile radius from the stations, the design option, and the MSF. The half-mile radius is used for all resources to ensure consistency in evaluating cumulative effects. Table 7-1 shows the projected net growth in population, households, and employment between 2019 and 2045 for a half-mile radius from all Project stations, the design option, and the MSF. The data in the table were calculated by merging the SCAG 2020 RTP/SCS growth projections with the SCAG Tier 2 Transportation Analysis Zone boundaries for Los Angeles County, then assessed for a half-mile radius around the stations, the design option, and the MSF. The data show the projected growth from transportation and development projects, as well as associated infrastructure, that when combined with the Project’s construction and operation, could result in cumulative effects.

TABLE 7-1. SCAG PROJECTED PERCENT GROWTH FOR HALF-MILE BUFFER AREAS, 2019-2045

HALF-MILE BUFFER AREA	POPULATION % GROWTH	HOUSEHOLD % GROWTH	EMPLOYMENT % GROWTH
STATIONS			
Expo/Crenshaw	46.0	65.9	26.4
Crenshaw/Adams	35.6	56.3	19.6
Midtown Crossing	20.2	33.1	21.1
Wilshire/Fairfax	19.8	21.2	6.2
Fairfax/3 rd	21.9	23.1	6.5
La Cienega/Beverly	30.7	31.3	6.1
San Vicente/Santa Monica	11.5	11.4	46.2
Fairfax/Santa Monica	7.2	7.7	49.5
La Brea/Santa Monica	16.0	17.2	42.6
Hollywood/Highland	16.2	15.0	3.0
Wilshire/La Brea	22.8	24.3	9.4
La Brea/Beverly	17.9	24.5	14.5
DESIGN OPTION			
Hollywood Bowl Design Option	30.4	29.0	17.4
MAINTENANCE AND STORAGE FACILITY			
MSF	14.0	15.9	9.9

Source: SCAG 2020 RTP/SCS Growth Forecast

Note: MSF = maintenance and storage facility; SCAG = Southern California Association of Governments

7.2 CUMULATIVE IMPACTS

7.2.1 ALIGNMENTS AND STATIONS

The alignments and stations and the projected future development would comply with applicable energy efficiency and management codes and regulations, including, but not limited to, the California Building Standards Code Energy Efficiency Standards (Title 24 Parts 6 and 11) and other provisions of local planning initiatives from Los Angeles County, the City of Los Angeles, and the City of West Hollywood, which would limit the inefficient or wasteful consumption of energy during construction and operational activities. All new Metro projects, including the Project, would be implemented in accordance with the Metro Green Construction Policy per PM AQ-1, with the commitments in the MBSSP per PM AQ-3, and the Metro Design Standards per PM AQ-4, which control expenditure of energy resources to the maximum extent feasible. There is no present regional shortage of energy resources for land use and transportation development planning and implementation, and no foreseeable strains on existing resources have been identified. Moreover, the Project is included in the approved SCAG 2020-2045 Connect SoCal RTP/SCS, and thus, it has already been considered in the forecasted regional energy requirements. In addition, as described in Impact ENG-1, operation of the Project would result in a reduction of energy consumption compared to the 2045 without Project condition scenario. Therefore,

the alignment alternatives and stations, in combination with the projected future projects, would not result in significant cumulative energy effects during construction or operation. Construction and operation of the alignment alternatives and stations would not be cumulatively considerable, and the cumulative impact related to energy resources would be less than significant.

7.2.2 HOLLYWOOD BOWL DESIGN OPTION

The Hollywood Bowl Design Option and projected future development would comply with applicable energy efficiency and management codes and regulations, including, but not limited to, the California Building Standards Code Energy Efficiency Standards (Title 24, Parts 6 and 11) and other provisions of local planning initiatives from Los Angeles County and the City of Los Angeles, which would limit the inefficient or wasteful consumption of energy during construction and operational activities. All new Metro projects, including the Project, would be implemented in accordance with Metro's Green Construction Policy per PM AQ-1 and the Metro Design Standards per PM AQ-4, which control expenditure of energy resources to the maximum extent feasible. There is no present regional shortage of energy resources for land use and transportation development planning and implementation, and no foreseeable strains on existing resources have been identified. Furthermore, the design option would result in a reduction of energy consumption from the 2045 without Project condition scenario. Therefore, the design option, in combination with projected future projects, would not result in significant cumulative energy effects during construction or operation. Construction and operation of the Hollywood Bowl Design Option would not be cumulatively considerable, and the cumulative impact related to energy resources would be less than significant.

7.2.3 MAINTENANCE AND STORAGE FACILITY

The MSF and projected future development would comply with applicable energy efficiency and management codes and regulations, including, but not limited to, the California Building Standards Code Energy Efficiency Standards (Title 24 Parts 6 and 11) and other provisions of local planning initiatives from Los Angeles County and the City of Los Angeles, which would limit the inefficient or wasteful consumption of energy during construction and operational activities. All new Metro projects, including the Project, would be implemented in accordance with the Metro Green Construction Policy per PM AQ-1 and the Metro Design Standards per PM AQ-4, which control expenditure of energy resources to the maximum extent feasible. There is no present regional shortage of energy resources for land use and transportation development planning and implementation, and no foreseeable strains on existing resources have been identified. Therefore, construction and operation of the MSF, in combination with the projected future projects, would not result in significant cumulative energy effects during construction or operation. Construction and operation of the MSF would not be cumulatively considerable, and the cumulative impact related to energy resources would be less than significant.

7.3 CUMULATIVE MITIGATION MEASURES

The Project's effects on energy resources for the alignment alternatives and stations, design option, and MSF would not be cumulatively considerable. Therefore, no mitigation is required under CEQA.

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APPENDIX A ENERGY CONSUMPTION CALCULATIONS



K LINE NORTHERN EXTENSION - Construction-Related Energy Consumption Summary Tables

San Vicente-Fairfax Alignment Alternative Construction Energy Consumption									
Energy Source	Energy Consumption								
	Section 1	Section 2	Section 3	MSF	San Vicente-Fairfax Alignment Alternative Total				
Off-Road Construction Equipment (gallons (diesel))	2,434,569	1,852,525	2,078,911	453,288	6,820,293				
Truck Trips (Hauling, Delivery, Cement) (gallons (diesel))	1,176,776	847,898	1,286,247	120,905	3,431,826				
Worker Commute Trips (gallons (gasoline))	373,737	286,772	336,921	73,411	1,070,842				
Total Fuel Consumption (gallons (diesel/gasoline))	3,611,345	3,737,337	2,700,424	286,772	3,366,158	574,193	73,411	10,252,119	1,070,842
Total MMBTU	545,083	408,505	506,645	88,415				1,548,648	

Fairfax Alignment Alternative Construction Energy Consumption								
Energy Source	Energy Consumption							
	Section 1	Section 2	MSF	Fairfax Alignment Alternative Total				
Off-Road Construction Equipment (gallons (diesel))	2,434,569	2,479,902	453,288	5,367,759				
Truck Trips (Hauling, Delivery, Cement) (gallons (diesel))	1,176,776	1,558,919	123,263	2,858,959				
Worker Commute Trips (gallons (gasoline))	373,737	405,585	72,570	851,892				
Total Fuel Consumption (gallons (diesel/gasoline))	3,611,345	3,737,337	4,038,822	405,585	576,551	72,570	8,226,718	851,892
Total MMBTU	545,083	608,055	88,635				1,241,774	

La Brea Alignment Alternative Construction Energy Consumption								
Energy Source	Energy Consumption							
	Section 1	Section 2	MSF	La Brea Alignment Alternative Total				
Off-Road Construction Equipment (gallons (diesel))	2,278,285	1,991,219	448,371	4,717,875				
Truck Trips (Hauling, Delivery, Cement) (gallons (diesel))	1,046,445	1,255,317	122,829	2,424,591				
Worker Commute Trips (gallons (gasoline))	353,586	313,552	68,615	735,753				
Total Fuel Consumption (gallons (diesel/gasoline))	3,324,730	3,538,586	3,246,536	313,552	571,200	68,615	7,142,466	735,753
Total MMBTU	503,011	487,216	87,402				1,077,629	

San Vicente-Fairfax Alignment Alternative with Hollywood Bowl Design Option Construction Energy Consumption										
Energy Source	Energy Consumption									
	Section 1	Section 2	Section 3 with Hollywood Bowl Design Option	MSF	San Vicente-Fairfax Alignment Alternative with Design Option Total					
Off-Road Construction Equipment (gallons (diesel))	2,434,569	1,852,525	4,032,033	453,288	8,772,414					
Truck Trips (Hauling, Delivery, Cement) (gallons (diesel))	1,176,776	847,898	1,301,704	120,905	3,447,283					
Worker Commute Trips (gallons (gasoline))	373,737	286,772	532,244	73,411	1,266,165					
Total Fuel Consumption (gallons (diesel/gasoline))	3,611,345	3,737,337	2,700,424	286,772	5,333,737	532,244	574,193	73,411	12,219,698	1,266,165
Total MMBTU	545,083	408,505	802,586	88,415					1,844,589	

Fairfax Alignment Alternative with Hollywood Bowl Design Option Construction Energy Consumption								
Energy Source	Energy Consumption							
	Section 1	Section 2 with Hollywood Bowl Design Option	MSF	Fairfax Alignment Alternative with Design Option Total				
Off-Road Construction Equipment (gallons (diesel))	2,434,569	4,397,808	453,288	7,285,665				
Truck Trips (Hauling, Delivery, Cement) (gallons (diesel))	1,176,776	1,574,499	121,992	2,873,267				
Worker Commute Trips (gallons (gasoline))	373,737	598,685	71,144	1,043,567				
Total Fuel Consumption (gallons (diesel/gasoline))	3,611,345	3,737,337	5,972,308	598,685	575,279	71,144	10,158,932	1,043,567
Total MMBTU	545,083	899,014	88,282				1,532,378	

La Brea Alignment Alternative with Hollywood Bowl Design Option Construction Energy Consumption								
Energy Source	Energy Consumption							
	Section 1	Section 2 with Hollywood Bowl Design Option	MSF	La Brea Alignment Alternative with Design Option Total				
Off-Road Construction Equipment (gallons (diesel))	2,278,285	3,958,086	448,371	6,684,742				
Truck Trips (Hauling, Delivery, Cement) (gallons (diesel))	1,046,445	1,271,923	121,557	2,439,925				
Worker Commute Trips (gallons (gasoline))	353,586	524,426	70,930	948,942				
Total Fuel Consumption (gallons (diesel/gasoline))	3,324,730	3,538,586	5,230,009	524,426	569,928	70,930	9,124,668	948,942
Total MMBTU	503,011	787,294	87,516				1,377,822	

MSF and Alignment Alternative Construction Energy Consumption													
Energy Source	Energy Consumption												
	MSF Section 1: San Vicente-Fairfax Alignment Alternative	MSF Section 2: San Vicente-Fairfax Alignment Alternative	Total MSF with San Vicente-Fairfax Alignment Alternative	MSF Section 1: Fairfax Alignment Alternative	MSF Section 2: Fairfax Alignment Alternative	Total MSF with Fairfax Alignment Alternative	MSF Section 1: La Brea Alignment Alternative	MSF Section 2: La Brea Alignment Alternative	Total MSF with La Brea Alignment Alternative				
Off-Road Construction Equipment (gallons (diesel))	52,785	400,503	6,820,293	52,785	400,503	5,367,759	47,868	400,503	4,717,875				
Truck Trips (Hauling, Delivery, Cement) (gallons (diesel))	12,490	108,415	3,431,826	12,490	110,773	2,858,959	12,055	110,773	2,424,591				
Worker Commute Trips (gallons (gasoline))	13,578	59,834	1,070,842	13,578	58,992	851,892	10,972	57,743	735,753				
Total Fuel Consumption (gallons (diesel/gasoline))	65,275	13,578	508,918	59,834	1,070,842	10,252,119	851,892	59,924	10,872	511,276	57,743	7,142,466	735,753
Total MMBTU	10,705	77,710	1,548,648	10,705	77,930	1,241,774	9,628	77,774	1,077,629				

K LINE NORTHERN EXTENSION - Construction-Related Energy Consumption (Diesel and Gasoline Fuel Consumption)
San Vicente-Fairfax Alternative

Section 1 with MSF

Year	Tons CO ₂	Diesel Consumption (gallons)	Diesel (MMBtu)
2041	837	74,590	10,293
2042	2,444	217,864	30,065
2043	4,278	381,120	52,595
2044	4,280	381,323	52,623
2045	4,342	386,779	53,376
2046	3,658	325,868	44,970
2047	3,263	290,685	40,115
2048	3,431	305,663	42,182
2049	1,386	123,461	17,058
2050	0	0	0
2051	0	0	0
Total	27,921	2,487,353	343,255

Year	Tons CO ₂	Diesel Consumption (gallons)	Diesel (MMBtu)
2041	1	96	13
2042	5	464	64
2043	10	910	126
2044	12	1,059	146
2045	6	547	75
2046	3	267	37
2047	4	354	49
2048	3	268	37
2049	0	27	4
2050	0	0	0
2051	0	0	0
Total	45	3,997	551

Year	Tons CO ₂	Diesel Consumption (gallons)	Diesel (MMBtu)
2041	323	28,779	3,972
2042	1,567	139,555	19,259
2043	3,066	273,127	37,492
2044	3,517	313,306	43,236
2045	1,829	163,921	22,463
2046	891	79,420	10,960
2047	1,133	100,938	13,929
2048	890	79,251	10,937
2049	90	7,979	1,101
2050	0	0	0
2051	0	0	0
Total	13,305	1,185,276	163,568

Year	Tons CO ₂	Gasoline Consumption (gallons)	Gasoline (MMBtu)
2041	125	12,926	1,616
2042	310	31,999	4,000
2043	463	47,841	5,989
2044	526	54,337	6,792
2045	574	59,272	7,409
2046	550	56,749	7,094
2047	408	42,166	5,271
2048	473	48,877	6,110
2049	204	21,032	2,658
2050	10	10,466	1,338
2051	16	1,650	206
Total	3,751	387,375	48,474

Section 2 with MSF

Year	Tons CO ₂	Diesel Consumption (gallons)	Diesel (MMBtu)
2041	739	65,856	9,088
2042	2,235	211,552	29,196
2043	4,133	368,233	50,816
2044	2,509	223,547	30,849
2045	1,389	123,779	17,082
2046	3,094	275,659	38,041
2047	4,390	391,109	53,973
2048	4,435	395,136	54,529
2049	2,224	198,157	27,346
2050	0	0	0
2051	0	0	0
Total	25,290	2,253,028	310,918

Year	Tons CO ₂	Diesel Consumption (gallons)	Diesel (MMBtu)
2041	1	59	8
2042	5	481	66
2043	11	1,011	139
2044	5	478	66
2045	2	209	29
2046	2	172	24
2047	4	333	46
2048	4	318	44
2049	1	111	15
2050	0	0	0
2051	0	0	0
Total	36	3,174	438

Year	Tons CO ₂	Diesel Consumption (gallons)	Diesel (MMBtu)
2041	200	17,797	2,455
2042	1,626	144,875	19,923
2043	3,415	304,231	41,984
2044	1,615	143,891	19,857
2045	707	62,993	8,493
2046	979	87,594	11,735
2047	1,117	99,552	13,738
2048	1,068	95,120	13,127
2049	371	33,094	4,567
2050	0	0	0
2051	0	0	0
Total	10,699	953,139	131,533

Year	Tons CO ₂	Gasoline Consumption (gallons)	Gasoline (MMBtu)
2041	113	11,632	1,454
2042	294	29,233	3,663
2043	399	41,196	5,150
2044	257	26,506	3,313
2045	306	31,672	3,951
2046	333	34,314	4,289
2047	562	57,978	7,247
2048	589	60,766	7,596
2049	395	40,750	5,094
2050	10	10,466	1,338
2051	20	2,053	257
Total	3,357	346,606	43,326

Section 3

Year	Tons CO ₂	Diesel Consumption (gallons)	Diesel (MMBtu)
2041	637	56,706	7,825
2042	3,282	292,366	40,347
2043	4,474	398,544	54,099
2044	4,394	391,441	54,079
2045	3,591	319,941	44,152
2046	3,564	317,468	43,811
2047	3,682	328,073	45,078
2048	724	64,472	8,897
2049	-	0	0
2050	-	0	0
2051	-	0	0
Total	23,347	2,079,911	287,028

Year	Tons CO ₂	Diesel Consumption (gallons)	Diesel (MMBtu)
2041	1	60	8
2042	4	386	53
2043	10	1,594	221
2044	10	909	125
2045	7	594	82
2046	6	510	70
2047	2	175	24
2048	0	35	5
2049	0	0	0
2050	0	0	0
2051	0	0	0
Total	48	4,264	588

Year	Tons CO ₂	Diesel Consumption (gallons)	Diesel (MMBtu)
2041	201	17,933	2,475
2042	1,304	116,197	16,035
2043	3,389	299,963	41,224
2044	1,627	143,891	19,857
2045	2,003	178,447	24,426
2046	1,718	153,048	21,121
2047	587	52,271	7,214
2048	118	10,490	1,448
2049	0	0	0
2050	0	0	0
2051	0	0	0
Total	14,390	1,281,883	176,914

Year	Tons CO ₂	Gasoline Consumption (gallons)	Gasoline (MMBtu)
2041	100	10,340	1,292
2042	387	39,999	5,000
2043	474	49,170	6,146
2044	306	31,672	3,951
2045	361	37,555	4,744
2046	395	40,750	5,094
2047	621	64,472	8,247
2048	651	67,766	8,647
2049	400	41,750	5,294
2050	10	10,466	1,338
2051	20	2,053	257
Total	3,263	336,921	42,115

Section 3 with HB Option

Year	Tons CO ₂	Diesel Consumption (gallons)	Diesel (MMBtu)
2041	736	65,607	9,054
2042	5,003	445,660	61,501
2043	3,527	314,794	43,359
2044	4,740	422,264	58,272
2045	9,350	832,970	114,950
2046	7,625	679,275	93,740
2047	8,074	719,288	99,281
2048	9,408	861,148	116,481
2049	797	71,033	9,803
2050	-	0	0
2051	-	0	0
Total	45,260	4,032,053	556,420

Year	Tons CO ₂	Diesel Consumption (gallons)	Diesel (MMBtu)
2041	1	72	10
2042	7	602	83
2043	14	1,204	166
2044	13	1,194	166
2045	6	544	75
2046	5	469	65
2047	6	555	77
2048	2	203	28
2049	0	43	6
2050	0	0	0
2051	0	0	0
Total	49	4,322	596

Year	Tons CO ₂	Diesel Consumption (gallons)	Diesel (MMBtu)
2041	243	21,671	2,991
2042	2,031	180,966	24,973
2043	4,011	362,647	50,065
2044	2,125	189,289	26,121
2045	1,830	162,989	22,492
2046	1,578	140,558	19,397
2047	1,863	165,968	22,904
2048	677	60,354	8,239
2049	145	12,950	1,787
2050	0	0	0
2051	0	0	0
Total	14,563	1,297,382	179,039

Year	Tons CO ₂	Gasoline Consumption (gallons)	Gasoline (MMBtu)
2041	125	12,926	1,616
2042	594	61,332	7,667
2043	386	39,867	4,983
2044	475	49,036	6,129
2045	567	58,777	7,438
2046	561	57,955	7,244
2047	550	56,749	7,094
2048	395	40,750	5,094
2049	178	18,403	2,300
2050	63	6,521	815
2051	0	0	0
Total	5,155	532,244	66,530

MSF Only - Section 1

Year	Tons CO ₂	Diesel Consumption (gallons)	Diesel (MMBtu)
2041	0	0	0
2042	0	0	0
2043	0	0	0
2044	0	0	0
2045	0	0	0
2046	0	0	0
2047	0	0	0
2048	412	36,123	5,086
2049	180	16,062	2,217
2050	0	0	0
2051	0	0	0
Total	592	52,185	7,284

Year	Tons CO ₂	Diesel Consumption (gallons)	Diesel (MMBtu)
2041	0	0	0
2042	0	0	0
2043	0	0	0
2044	0	0	0
2045	0	0	0
2046	0	0	0
2047	0	0	0
2048	0	35	5
2049	0	7	1
2050	0	0	0
2051	0	0	0
Total	0	42	6

Year	Tons CO ₂	Diesel Consumption (gallons)	Diesel (MMBtu)
2041	0	0	0
2042	0	0	0
2043	0	0	0
2044	0	0	0
2045	0	0	0
2046	0	0	0
2047	0	0	0
2048	117	10,490	1,426
2049	23	2,048	283
2050	0	0	0
2051	0	0	0
Total	140	12,448	1,718

Year	Tons CO ₂	Gasoline Consumption (gallons)	Gasoline (MMBtu)
2041	0	0	0
2042	0	0	0
2043	0	0	0
2044	0	0	0
2045	0	0	0
2046	0	0	0
2047	0	0	0
2048	54	4,604	586
2049	39	3,944	493
2050	25	2,617	327
2051	4	413	52
Total	132	13,578	1,697

MSF Only - Section 2

Year	Tons CO ₂	Diesel Consumption (gallons)	Diesel (MMBtu)
2041	0	0	0
2042	0	0	0
2043	0	0	0
2044	0	0	0
2045	571	50,845	7,019
2046	1,124	100,126	13,817
2047	1,245	110,894	15,303
2048	1,245	110,894	15,303
20			

K LINE NORTHERN EXTENSION - Construction-Related Energy Consumption (Diesel and Gasoline Fuel Consumption)
Fairfax Alternative

Section 1 with MSF

Year	Tons CO ₂	Diesel Consumption (gallons)	Diesel (MMBtu)
2041	837	74,590	10,293
2042	2,444	217,844	30,065
2043	4,278	381,120	52,595
2044	4,288	381,323	52,623
2045	4,342	386,179	53,276
2046	3,658	325,868	44,970
2047	3,263	290,685	40,115
2048	3,431	305,663	42,182
2049	1,384	123,461	17,058
2050	0	0	0
2051	0	0	0
Total	27,921	2,487,353	343,255

Year	Tons CO ₂	Diesel Consumption (gallons)	Diesel (MMBtu)
2041	1	96	13
2042	5	464	64
2043	10	910	126
2044	12	1,059	146
2045	6	547	75
2046	3	267	37
2047	4	354	49
2048	3	268	37
2049	0	27	4
2050	0	0	0
2051	0	0	0
Total	45	3,991	551

Year	Tons CO ₂	Diesel Consumption (gallons)	Diesel (MMBtu)
2041	323	28,779	3,972
2042	1,567	139,555	19,259
2043	3,066	273,127	37,492
2044	3,517	313,306	43,236
2045	1,829	164,921	22,465
2046	891	79,420	10,960
2047	1,133	100,938	13,929
2048	890	79,251	10,927
2049	90	7,979	1,101
2050	0	0	0
2051	0	0	0
Total	13,305	1,185,276	163,568

Year	Tons CO ₂	Gasoline Consumption (gallons)	Gasoline (MMBtu)
2041	125	12,925	1,616
2042	310	31,999	4,000
2043	463	47,841	5,989
2044	526	54,337	6,792
2045	574	59,272	7,409
2046	550	56,749	7,094
2047	408	42,166	5,271
2048	473	48,877	6,110
2049	204	21,032	2,658
2050	10	1,046	1,328
2051	16	1,650	206
Total	3,751	387,375	48,474

Section 2 with MSF

Year	Tons CO ₂	Diesel Consumption (gallons)	Diesel (MMBtu)
2041	637	56,706	7,825
2042	3,229	293,933	40,561
2043	5,444	485,179	66,955
2044	5,948	529,925	73,130
2045	5,284	470,938	64,985
2046	5,224	464,311	64,351
2047	4,532	403,752	55,718
2048	1,950	173,204	23,971
2049	0	0	0
2050	0	0	0
2051	0	0	0
Total	32,333	2,880,405	397,496

Year	Tons CO ₂	Diesel Consumption (gallons)	Diesel (MMBtu)
2041	1	60	8
2042	4	388	54
2043	19	1,656	229
2044	18	1,642	227
2045	9	765	106
2046	6	571	80
2047	4	363	50
2048	1	84	12
2049	0	0	0
2050	0	0	0
2051	0	0	0
Total	62	5,536	764

Year	Tons CO ₂	Diesel Consumption (gallons)	Diesel (MMBtu)
2041	201	17,933	2,475
2042	1,311	116,762	16,113
2043	5,597	498,583	68,895
2044	5,550	494,470	68,237
2045	2,588	229,874	31,723
2046	1,943	173,095	23,387
2047	1,219	108,591	14,986
2048	279	24,844	3,420
2049	0	0	0
2050	0	0	0
2051	0	0	0
Total	18,640	1,664,156	229,654

Year	Tons CO ₂	Gasoline Consumption (gallons)	Gasoline (MMBtu)
2041	108	10,340	1,292
2042	387	39,999	5,003
2043	592	61,130	7,641
2044	744	76,867	9,668
2045	727	75,078	9,385
2046	788	80,555	10,063
2047	638	65,884	8,235
2048	422	43,593	5,449
2049	108	11,181	1,398
2050	0	0	0
2051	0	0	0
Total	4,499	464,577	58,022

Section 2 with MSF and HB Option

Year	Tons CO ₂	Diesel Consumption (gallons)	Diesel (MMBtu)
2041	1,049	93,414	12,891
2042	6,065	540,348	74,588
2043	4,571	407,313	54,899
2044	5,038	448,832	61,939
2045	10,007	891,484	123,025
2046	9,407	838,084	115,656
2047	10,462	934,714	128,951
2048	6,435	573,232	79,106
2049	797	71,033	9,803
2050	0	0	0
2051	0	0	0
Total	53,861	4,798,311	662,167

Year	Tons CO ₂	Diesel Consumption (gallons)	Diesel (MMBtu)
2041	1	90	12
2042	9	837	116
2043	19	1,658	229
2044	8	675	93
2045	8	755	104
2046	6	555	77
2047	3	263	36
2048	3	227	31
2049	0	43	6
2050	0	0	0
2051	0	0	0
Total	63	5,590	771

Year	Tons CO ₂	Diesel Consumption (gallons)	Diesel (MMBtu)
2041	302	26,906	3,713
2042	2,827	251,853	34,755
2043	5,668	499,183	68,943
2044	2,275	202,717	27,975
2045	2,545	226,728	31,289
2046	1,864	166,096	22,921
2047	2,516	224,109	30,927
2048	757	67,469	9,311
2049	145	12,950	1,787
2050	0	0	0
2051	0	0	0
Total	18,840	1,678,471	231,621

Year	Tons CO ₂	Gasoline Consumption (gallons)	Gasoline (MMBtu)
2041	175	18,095	2,262
2042	723	74,665	9,353
2043	912	93,827	11,943
2044	526	54,337	6,792
2045	1,046	108,007	13,501
2046	984	101,621	12,703
2047	1,378	142,309	17,789
2048	652	67,371	8,421
2049	242	24,976	3,122
2050	126	13,043	1,649
2051	0	0	0
Total	6,356	656,251	82,021

MSF Only - Section 1

Year	Tons CO ₂	Diesel Consumption (gallons)	Diesel (MMBtu)
2041	0	0	0
2042	0	0	0
2043	0	0	0
2044	0	0	0
2045	0	0	0
2046	0	0	0
2047	0	0	0
2048	417	36,732	5,068
2049	183	16,062	2,217
2050	0	0	0
2051	0	0	0
Total	593	52,795	7,284

Year	Tons CO ₂	Diesel Consumption (gallons)	Diesel (MMBtu)
2041	0	0	0
2042	0	0	0
2043	0	0	0
2044	0	0	0
2045	0	0	0
2046	0	0	0
2047	0	0	0
2048	35	263	36
2049	7	43	6
2050	0	0	0
2051	0	0	0
Total	42	306	42

Year	Tons CO ₂	Diesel Consumption (gallons)	Diesel (MMBtu)
2041	0	0	0
2042	0	0	0
2043	0	0	0
2044	0	0	0
2045	0	0	0
2046	0	0	0
2047	0	0	0
2048	117	10,400	1,435
2049	23	2,048	283
2050	0	0	0
2051	0	0	0
Total	140	12,448	1,718

Year	Tons CO ₂	Gasoline Consumption (gallons)	Gasoline (MMBtu)
2041	0	0	0
2042	0	0	0
2043	0	0	0
2044	0	0	0
2045	0	0	0
2046	0	0	0
2047	0	0	0
2048	64	6,606	826
2049	38	3,944	493
2050	25	2,617	327
2051	4	413	52
Total	132	13,578	1,697

MSF Only - Section 2

Year	Tons CO ₂	Diesel Consumption (gallons)	Diesel (MMBtu)
2041	0	0	0
2042	0	0	0
2043	63	5,652	780
2044	802	71,409	9,854
2045	1,245	110,894	15,303
2046	1,245	110,894	15,303
2047	1,141	101,653	14,028
2048	0	0	0
2049	0	0	0
2050	0	0	0
2051	0	0	0
Total	4,494	400,503	55,269

Year	Tons CO ₂	Diesel Consumption (gallons)	Diesel (MMBtu)
2041	0	0	0
2042	0	0	0
2043	0	22	3
2044	0	247	34
2045	0	34	5
2046	0	34	5
2047	0	31	4
2048	0	0	0
2049	0	0	0
2050	0	0	0
2051	0	0	0
Total	4	368	51

Year	Tons CO ₂	Diesel Consumption (gallons)	Diesel (MMBtu)
2041	0	0	0
2042	0	0	0
2043	75	6,696	924
2044	856	74,494	10,260
2045	112	10,014	1,382
2046	112	10,014	1,382
2047	103	9,182	1,267
2048	0	0	0
2049	0	0	0
2050	0	0	0
2051	0	0	0
Total	1,229	118,406	15,236

Year	Tons CO ₂	Gasoline Consumption (gallons)	Gasoline (MMBtu)
2041	0	0	0
2042	0	0	0
2043	13	1,329	166
2044	103	10,602	1,325
2045	140	14,859	1,811
2046	141	14,517	1,815
2047	128	13,177	1,647
2048	25	2,642	338
2049	22	2,236	283
2050	0	0	0
2051	0	0	0
Total	571	58,992	7,324

MSF Only - Section 2 and HB Option

Year	Tons CO ₂	Diesel Consumption (gallons)	Diesel (MMBtu)
2041	0	0	0
2042	0	0	0
2043	0	0	0
2044	63	5,652	780
2045	802	71,409	9,854
2046	1,245	110,894	15,303
2047	1,245	110,894	15,303
2048	1,141	101,653	14,028
2049	0	0	0
2050	0	0	0
2051	0	0	0
Total	4,494	400,503	55,269

K LINE NORTHERN EXTENSION - Construction-Related Energy Consumption (Diesel and Gasoline Fuel Consumption)
La Brea Alternative

Section 1 with MSF

Year	Tons CO ₂	Diesel Consumption (gallons)	Diesel (MMBtu)
2041	873	17,753	10,730
2042	2,481	221,028	30,502
2043	4,287	381,881	52,700
2044	4,204	374,545	51,687
2045	3,555	316,734	43,710
2046	3,474	304,126	41,969
2047	3,278	291,987	40,294
2048	3,481	310,077	42,791
2049	539	48,019	6,682
2050	0	0	0
2051	0	0	0
Total	26,711	2,326,154	321,009

Year	Tons CO ₂	Diesel Consumption (gallons)	Diesel (MMBtu)
2041	1	96	13
2042	5	464	64
2043	10	908	125
2044	11	972	134
2045	5	405	56
2046	3	281	39
2047	3	307	42
2048	3	233	32
2049	0	8	1
2050	0	0	0
2051	0	0	0
Total	47	3,674	507

Year	Tons CO ₂	Diesel Consumption (gallons)	Diesel (MMBtu)
2041	323	28,779	3,972
2042	1,567	139,555	19,259
2043	3,067	273,207	37,305
2044	3,284	292,565	40,374
2045	1,367	121,795	16,808
2046	944	84,289	11,632
2047	940	83,737	11,556
2048	319	28,427	3,923
2049	28	2,473	341
2050	0	0	0
2051	0	0	0
Total	17,840	1,054,826	145,566

Year	Tons CO ₂	Gasoline Consumption (gallons)	Gasoline (MMBtu)
2041	125	12,925	1,616
2042	310	31,999	4,000
2043	463	47,841	5,989
2044	526	54,337	6,792
2045	53	54,004	6,750
2046	88	50,151	6,269
2047	447	46,119	5,765
2048	448	46,235	5,779
2049	124	12,751	1,595
2050	0	0	0
2051	0	0	0
Total	3,530	364,458	45,557

Section 2 with MSF

Year	Tons CO ₂	Diesel Consumption (gallons)	Diesel (MMBtu)
2041	637	56,706	7,825
2042	3,282	292,344	40,347
2043	4,918	438,105	60,459
2044	5,314	473,424	65,332
2045	4,343	386,928	53,396
2046	5,224	445,421	61,228
2047	2,722	242,773	33,503
2048	404	35,966	4,967
2049	0	0	0
2050	0	0	0
2051	0	0	0
Total	26,847	2,391,722	330,058

Year	Tons CO ₂	Diesel Consumption (gallons)	Diesel (MMBtu)
2041	1	60	8
2042	5	425	59
2043	20	1,737	240
2044	11	1,009	139
2045	6	514	71
2046	7	592	82
2047	2	181	25
2048	0	9	1
2049	0	0	0
2050	0	0	0
2051	0	0	0
Total	51	4,529	625

Year	Tons CO ₂	Diesel Consumption (gallons)	Diesel (MMBtu)
2041	201	17,933	2,475
2042	1,434	127,924	17,454
2043	5,873	523,204	72,202
2044	3,409	303,674	41,907
2045	1,733	154,357	21,301
2046	1,995	177,488	24,521
2047	607	54,057	7,460
2048	31	2,721	375
2049	0	0	0
2050	0	0	0
2051	0	0	0
Total	15,284	1,361,561	187,895

Year	Tons CO ₂	Gasoline Consumption (gallons)	Gasoline (MMBtu)
2041	108	10,340	1,292
2042	387	39,999	5,003
2043	541	55,814	6,977
2044	680	70,240	8,780
2045	600	61,907	7,738
2046	698	71,267	8,958
2047	398	40,888	5,106
2048	166	17,173	2,147
2049	36	3,707	463
2050	0	0	0
2051	0	0	0
Total	3,596	371,295	46,412

Section 2 with MSF and HB Option

Year	Tons CO ₂	Diesel Consumption (gallons)	Diesel (MMBtu)
2041	710	63,227	8,725
2042	4,414	393,222	54,285
2043	2,489	211,511	30,249
2044	3,364	299,909	41,387
2045	12,048	1,073,356	148,123
2046	8,679	773,271	106,704
2047	9,545	850,375	113,252
2048	6,888	613,674	84,687
2049	787	70,092	9,673
2050	0	0	0
2051	0	0	0
Total	48,925	4,358,589	601,485

Year	Tons CO ₂	Diesel Consumption (gallons)	Diesel (MMBtu)
2041	1	69	10
2042	7	588	81
2043	16	903	125
2044	7	629	87
2045	11	977	135
2046	5	424	59
2047	7	599	83
2048	4	354	49
2049	0	43	6
2050	0	0	0
2051	0	0	0
Total	57	4,588	633

Year	Tons CO ₂	Diesel Consumption (gallons)	Diesel (MMBtu)
2041	233	20,800	2,870
2042	1,987	176,975	24,423
2043	3,067	273,210	37,309
2044	2,123	189,158	26,104
2045	3,291	293,191	40,440
2046	1,425	126,914	17,514
2047	2,010	179,083	24,713
2048	1,184	105,673	14,583
2049	143	12,733	1,757
2050	0	0	0
2051	0	0	0
Total	15,455	1,376,837	190,004

Year	Tons CO ₂	Gasoline Consumption (gallons)	Gasoline (MMBtu)
2041	113	11,632	1,454
2042	555	57,332	7,167
2043	293	29,286	3,654
2044	372	38,433	4,804
2045	1,186	122,496	15,312
2046	895	92,383	11,548
2047	1,110	114,638	14,523
2048	844	87,184	10,898
2049	204	21,032	2,629
2050	98	10,114	1,284
2051	0	0	0
Total	5,661	584,483	73,060

MSF Only - Section 1

Year	Tons CO ₂	Diesel Consumption (gallons)	Diesel (MMBtu)
2041	0	0	0
2042	0	0	0
2043	0	0	0
2044	0	0	0
2045	0	0	0
2046	0	0	0
2047	59	5,248	724
2048	478	42,602	5,882
2049	0	0	0
2050	0	0	0
2051	0	0	0
Total	577	47,850	6,606

Year	Tons CO ₂	Diesel Consumption (gallons)	Diesel (MMBtu)
2041	0	0	0
2042	0	0	0
2043	0	0	0
2044	0	0	0
2045	0	0	0
2046	0	0	0
2047	0	9	1
2048	0	31	4
2049	0	0	0
2050	0	0	0
2051	0	0	0
Total	0	40	6

Year	Tons CO ₂	Diesel Consumption (gallons)	Diesel (MMBtu)
2041	0	0	0
2042	0	0	0
2043	0	0	0
2044	0	0	0
2045	0	0	0
2046	0	0	0
2047	30	2,640	364
2048	105	9,378	1,284
2049	0	0	0
2050	0	0	0
2051	0	0	0
Total	75	12,015	1,658

Year	Tons CO ₂	Gasoline Consumption (gallons)	Gasoline (MMBtu)
2041	0	0	0
2042	0	0	0
2043	0	0	0
2044	0	0	0
2045	0	0	0
2046	0	0	0
2047	13	1,318	165
2048	26	2,640	338
2049	9	927	116
2050	20	2,023	253
2051	0	0	0
Total	105	10,872	1,359

MSF Only - Section 2

Year	Tons CO ₂	Diesel Consumption (gallons)	Diesel (MMBtu)
2041	0	0	0
2042	0	0	0
2043	444	39,561	5,459
2044	1,043	92,947	12,827
2045	1,245	110,894	15,303
2046	1,245	110,894	15,303
2047	519	46,206	6,376
2048	0	0	0
2049	0	0	0
2050	0	0	0
2051	0	0	0
Total	4,496	400,503	55,269

Year	Tons CO ₂	Diesel Consumption (gallons)	Diesel (MMBtu)
2041	0	0	0
2042	0	0	0
2043	2	156	21
2044	11	131	18
2045	0	34	5
2046	0	34	5
2047	0	14	2
2048	0	0	0
2049	0	0	0
2050	0	0	0
2051	0	0	0
Total	4	368	51

Year	Tons CO ₂	Diesel Consumption (gallons)	Diesel (MMBtu)
2041	0	0	0
2042	0	0	0
2043	526	46,874	6,499
2044	441	39,324	5,427
2045	112	10,014	1,382
2046	112	10,014	1,382
2047	47	4,173	576
2048	0	0	0
2049	0	0	0
2050	0	0	0
2051	0	0	0
Total	1,239	118,408	15,236

Year	Tons CO ₂	Gasoline Consumption (gallons)	Gasoline (MMBtu)
2041	0	0	0
2042	0	0	0
2043	64	6,645	831
2044	128	13,293	1,667
2045	140	14,859	1,811
2046	141	14,517	1,815
2047	51	5,271	659
2048	26	2,640	338
2049	9	927	116
2050	20	2,023	253
2051	0	0	0
Total	559	57,743	7,218

MSF Only - Section 2 and HB Option

Year	Tons CO ₂	Diesel Consumption (gallons)	Diesel (MMBtu)
2041	0	0	0
2042	0	0	0
2043	0	0	0
2044	127	11,303	1,560
2045	842	74,999	10,350
2046	1,245	110,894	15,303
2047	1,245	110,894	15,303
2048	1,037	92,412	12,763
2049	0	0	0
2050	0	0	0
2051	0	0	0
Total	4,496	400,503	55,269

Year	Tons CO ₂	Diesel Consumption (gallons)	Diesel (MMBtu)
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Source: EMFAC2017 (v1.0) Emissions Inventory
Region Type: County
Region: Los Angeles
Calendar Year: 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050
Season: Annual
Vehicle Classification: EMFAC2007 Categories
Units: miles/day for O/M and H/M; Miles/day for Energy Consumption, tons/day for Emissions, 1000 gallons/day for Fuel Consumption

Region	Calendar Year	Vehicle Category	Model Year	Speed	Fuel	Population	Total VMT	NVMT	CVMT	EVMT	Trips	Energy Consumption	Fuel Consumption
Los Angeles	2041	LDK	Aggregate	Aggregate	Gasoline	2894497.723	11340780	57%	11340780	0	13517783.22	0	3123388247
Los Angeles	2041	LDK	Aggregate	Aggregate	Gasoline	2075.42469	2075.42469	0%	2075.42469	0	8506.905268	0	1.339991694
Los Angeles	2041	LD1	Aggregate	Aggregate	Gasoline	248544.184	9689302.364	5%	9689302.364	0	120723174	0	320382326
Los Angeles	2041	LD1	Aggregate	Aggregate	Gasoline	272225.232	10749000.586	2%	10749000.586	0	127484226	0	400771892
Los Angeles	2041	LD2	Aggregate	Aggregate	Gasoline	927141.45	3340081.04	10%	3340081.04	0	3999508.708	0	2491209935
Los Angeles	2041	LD2	Aggregate	Aggregate	Gasoline	7195.909226	278177.052	0%	278177.052	0	3121118023	0	7305354317
Los Angeles	2041	HD01	Aggregate	Aggregate	Gasoline	11297202	331456297	0%	331456297	0	6263344176	0	6262949469
Los Angeles	2041	HD01	Aggregate	Aggregate	Gasoline	1601420244	9071911152	0%	9071911152	0	1609636616	0	1226262621
Los Angeles	2041	HD02	Aggregate	Aggregate	Gasoline	815007093	3894624507	3%	3894624507	0	1630655592	0	4614987411
Los Angeles	2041	HD02	Aggregate	Aggregate	Gasoline	1584024743	7160483742	1%	7160483742	0	3653171378	0	161302125

Region	Calendar Year	Vehicle Category	Model Year	Speed	Fuel	Population	Total VMT	NVMT	CVMT	EVMT	Trips	Energy Consumption	Fuel Consumption
Los Angeles	2042	LDK	Aggregate	Aggregate	Gasoline	289281384	11089209.3	57%	11089209.3	0	13491995.38	0	3100364767
Los Angeles	2042	LDK	Aggregate	Aggregate	Gasoline	198156668	478150222	0%	478150222	0	8174343199	0	13022168
Los Angeles	2042	LD1	Aggregate	Aggregate	Gasoline	267121961	96300891.6	5%	96300891.6	0	12024782429	0	3110604807
Los Angeles	2042	LD1	Aggregate	Aggregate	Gasoline	274100638	106472997	0%	106472997	0	130999460	0	630273296
Los Angeles	2042	LD2	Aggregate	Aggregate	Gasoline	1932001381	7351526.18	1%	7351526.18	0	9717111184	0	2418190748
Los Angeles	2042	LD2	Aggregate	Aggregate	Gasoline	723181742	278334.46	0%	278334.46	0	3188711748	0	7291666057
Los Angeles	2042	HD01	Aggregate	Aggregate	Gasoline	1048798305	326732297	0%	326732297	0	6263344176	0	6262949469
Los Angeles	2042	HD01	Aggregate	Aggregate	Gasoline	6746186244	3269291334	0%	3269291334	0	1599636616	0	1226262621
Los Angeles	2042	HD02	Aggregate	Aggregate	Gasoline	786024644	3733640790	3%	3733640790	0	1630655592	0	4614987411
Los Angeles	2042	HD02	Aggregate	Aggregate	Gasoline	1521551974	717624851	1%	717624851	0	3653171378	0	161302125

Region	Calendar Year	Vehicle Category	Model Year	Speed	Fuel	Population	Total VMT	NVMT	CVMT	EVMT	Trips	Energy Consumption	Fuel Consumption
Los Angeles	2043	LDK	Aggregate	Aggregate	Gasoline	2887088303	110476642	57%	110476642	0	13469930.9	0	3081534474
Los Angeles	2043	LDK	Aggregate	Aggregate	Gasoline	1971632920	467522880	0%	467522880	0	8088323907	0	1272286443
Los Angeles	2043	LD1	Aggregate	Aggregate	Gasoline	2456512262	91291224.224	2%	91291224.224	0	113739724	0	373970429
Los Angeles	2043	LD1	Aggregate	Aggregate	Gasoline	282398232	107426053	0%	107426053	0	131902584	0	43037887
Los Angeles	2043	LD2	Aggregate	Aggregate	Gasoline	193298408	7351526.18	1%	7351526.18	0	9717111184	0	2418190748
Los Angeles	2043	LD2	Aggregate	Aggregate	Gasoline	723181742	278334.46	0%	278334.46	0	3188711748	0	7291666057
Los Angeles	2043	HD01	Aggregate	Aggregate	Gasoline	1048798305	326732297	0%	326732297	0	6263344176	0	6262949469
Los Angeles	2043	HD01	Aggregate	Aggregate	Gasoline	6746186244	3269291334	0%	3269291334	0	1599636616	0	1226262621
Los Angeles	2043	HD02	Aggregate	Aggregate	Gasoline	786024644	3733640790	3%	3733640790	0	1630655592	0	4614987411
Los Angeles	2043	HD02	Aggregate	Aggregate	Gasoline	1521551974	717624851	1%	717624851	0	3653171378	0	161302125

Region	Calendar Year	Vehicle Category	Model Year	Speed	Fuel	Population	Total VMT	NVMT	CVMT	EVMT	Trips	Energy Consumption	Fuel Consumption
Los Angeles	2044	LDK	Aggregate	Aggregate	Gasoline	2887088303	110476642	57%	110476642	0	13469930.9	0	3081534474
Los Angeles	2044	LDK	Aggregate	Aggregate	Gasoline	1971632920	467522880	0%	467522880	0	8088323907	0	1272286443
Los Angeles	2044	LD1	Aggregate	Aggregate	Gasoline	2456512262	91291224.224	2%	91291224.224	0	113739724	0	373970429
Los Angeles	2044	LD1	Aggregate	Aggregate	Gasoline	282398232	107426053	0%	107426053	0	131902584	0	43037887
Los Angeles	2044	LD2	Aggregate	Aggregate	Gasoline	193298408	7351526.18	1%	7351526.18	0	9717111184	0	2418190748
Los Angeles	2044	LD2	Aggregate	Aggregate	Gasoline	723181742	278334.46	0%	278334.46	0	3188711748	0	7291666057
Los Angeles	2044	HD01	Aggregate	Aggregate	Gasoline	1048798305	326732297	0%	326732297	0	6263344176	0	6262949469
Los Angeles	2044	HD01	Aggregate	Aggregate	Gasoline	6746186244	3269291334	0%	3269291334	0	1599636616	0	1226262621
Los Angeles	2044	HD02	Aggregate	Aggregate	Gasoline	786024644	3733640790	3%	3733640790	0	1630655592	0	4614987411
Los Angeles	2044	HD02	Aggregate	Aggregate	Gasoline	1521551974	717624851	1%	717624851	0	3653171378	0	161302125

Region	Calendar Year	Vehicle Category	Model Year	Speed	Fuel	Population	Total VMT	NVMT	CVMT	EVMT	Trips	Energy Consumption	Fuel Consumption
Los Angeles	2045	LDK	Aggregate	Aggregate	Gasoline	2887088303	110476642	57%	110476642	0	13469930.9	0	3081534474
Los Angeles	2045	LDK	Aggregate	Aggregate	Gasoline	1971632920	467522880	0%	467522880	0	8088323907	0	1272286443
Los Angeles	2045	LD1	Aggregate	Aggregate	Gasoline	2456512262	91291224.224	2%	91291224.224	0	113739724	0	373970429
Los Angeles	2045	LD1	Aggregate	Aggregate	Gasoline	282398232	107426053	0%	107426053	0	131902584	0	43037887
Los Angeles	2045	LD2	Aggregate	Aggregate	Gasoline	193298408	7351526.18	1%	7351526.18	0	9717111184	0	2418190748
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Los Angeles	2045	HD01	Aggregate	Aggregate	Gasoline	1048798305	326732297	0%	326732297	0	6263344176	0	6262949469
Los Angeles	2045	HD01	Aggregate	Aggregate	Gasoline	6746186244	3269291334	0%	3269291334	0	1599636616	0	1226262621
Los Angeles	2045	HD02	Aggregate	Aggregate	Gasoline	786024644	3733640790	3%	3733640790	0	1630655592	0	4614987411
Los Angeles	2045	HD02	Aggregate	Aggregate	Gasoline	1521551974	717624851	1%	717624851	0	3653171378	0	161302125

Region	Calendar Year	Vehicle Category	Model Year	Speed	Fuel	Population	Total VMT	NVMT	CVMT	EVMT	Trips	Energy Consumption	Fuel Consumption
Los Angeles	2046	LDK	Aggregate	Aggregate	Gasoline	2887088303	110476642	57%	110476642	0	13469930.9	0	3081534474
Los Angeles	2046	LDK	Aggregate	Aggregate	Gasoline	1971632920	467522880	0%	467522880	0	8088323907	0	1272286443
Los Angeles	2046	LD1	Aggregate	Aggregate	Gasoline	2456512262	91291224.224	2%	91291224.224	0	113739724	0	373970429
Los Angeles	2046	LD1	Aggregate	Aggregate	Gasoline	282398232	107426053	0%	107426053	0	131902584	0	43037887
Los Angeles	2046	LD2	Aggregate	Aggregate	Gasoline	193298408	7351526.18	1%	7351526.18	0	9717111184	0	2418190748
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Los Angeles	2046	HD01	Aggregate	Aggregate	Gasoline	1048798305	326732297	0%	326732297	0	6263344176	0	6262949469
Los Angeles	2046	HD01	Aggregate	Aggregate	Gasoline	6746186244	3269291334	0%	3269291334	0	1599636616	0	1226262621
Los Angeles	2046	HD02	Aggregate	Aggregate	Gasoline	786024644	3733640790	3%	3733640790	0	1630655592	0	4614987411
Los Angeles	2046	HD02	Aggregate	Aggregate	Gasoline	1521551974	717624851	1%	717624851	0	3653171378	0	161302125

Region	Calendar Year	Vehicle Category	Model Year	Speed	Fuel	Population	Total VMT	NVMT	CVMT	EVMT	Trips	Energy Consumption	Fuel Consumption
Los Angeles	2047	LDK	Aggregate	Aggregate	Gasoline	2887088303	110476642	57%	110476642	0	13469930.9	0	3081534474
Los Angeles	2047	LDK	Aggregate	Aggregate	Gasoline	1971632920	467522880	0%	467522880	0	8088323907	0	1272286443
Los Angeles	2047	LD1	Aggregate	Aggregate	Gasoline	2456512262	91291224.224	2%	91291224.224	0	113739724	0	373970429
Los Angeles	2047	LD1	Aggregate	Aggregate	Gasoline	282398232	107426053	0%	107426053	0	131902584	0	43037887
Los Angeles	2047	LD2	Aggregate	Aggregate	Gasoline	193298408	7351526.18	1%	7351526.18	0	9717111184	0	2418190748
Los Angeles	2047	LD2	Aggregate	Aggregate	Gasoline	723181742	278334.46	0%	278334.46	0	3188711748	0	7291666057
Los Angeles	2047	HD01	Aggregate	Aggregate	Gasoline	1048798305	326732297	0%	326732297	0	6263344176	0	6262949469
Los Angeles	2047	HD01	Aggregate	Aggregate	Gasoline	6746186244	3269291334	0%	3269291334	0	1599636616	0	1226262621
Los Angeles	2047	HD02	Aggregate	Aggregate	Gasoline	786024644	3733640790	3%	3733640790	0	1630655592	0	4614987411
Los Angeles	2047	HD02	Aggregate	Aggregate	Gasoline	1521551974	717624851	1%	717624851	0	3653171378	0	161302125

Region	Calendar Year	Vehicle Category	Model Year	Speed	Fuel	Population	Total VMT	NVMT	CVMT	EVMT
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K LINE NORTHERN EXTENSION - Operational Energy Summary

2045 No Project Scenario

	Diesel	Gasoline	Compressed NG	Electricity	Total
Mobile (Regional VMT) [gallons or kWh]	71,639,281	4,551,495,821	81,671	1,295,840,787	
Light Rail Operations (kWh)	-	-	-	-	
Stations (kWh)	-	-	-	-	
MSF (kWh or kBtu)	-	-	-	-	
Water (kWh)	-	-	-	-	
Total (gallons or kWh)	71,639,281	4,551,495,821	81,671	1,295,840,787	
MMBtu	9,886,221	568,936,978	11,328	4,422,665	583,257,191

2045 LB Alternative

	Diesel	Gasoline	Compressed NG	Electricity	Natural Gas	Total
Mobile (Regional VMT) [gallons or kWh]	71,622,736	4,550,444,626	81,652	1,295,541,505	-	
Light Rail Operations (kWh)	-	-	-	2,818,498	-	
Stations (kWh)	-	-	-	450,432	-	
MSF (kWh or kBtu)	-	-	-	219,765	49,347	
Water (kWh)	-	-	-	90,323	-	
Total (gallons for dsl, gas, CNG, kWh for elec, kBtu for NG)	71,622,736	4,550,444,626	81,652	1,298,810,435	-	
MMBtu	9,883,938	568,805,578	11,325	4,432,800	-	583,133,641
Net Energy Total, Compared to 2045 No Project (gallons for dsl, gas, CNG, kWh for elec, kBtu for NG)	(16,546)	(1,051,195)	(19)	2,969,648	-	(123,550)

Design Options	2a
Light Rail Operations (kWh)	454,596
Stations (kWh)	75,072
Total (kWh)	529,668
MMBtu	1,808

	Diesel	Gasoline	Compressed NG	Electricity	Natural Gas	Total
Mobile (Regional VMT) [gallons or kWh]	71,628,397	4,550,804,318	81,658	1,295,643,912	-	
Light Rail Operations (kWh)	-	-	-	1,545,628	-	
Stations (kWh)	-	-	-	225,216	-	
MSF (kWh or kBtu)	-	-	-	-	-	
Water (kWh)	-	-	-	-	-	
Total (gallons for dsl, gas, CNG, kWh for elec, kBtu for NG)	71,628,397	4,550,804,318	81,658	1,297,414,756	-	
MMBtu	9,884,719	568,850,540	11,326	4,428,037	-	583,174,621
Net Energy Total, Compared to 2045 No Project (gallons for dsl, gas, CNG, kWh for elec, kBtu for NG)	(10,884)	(691,502)	(12)	1,573,969	-	(82,570)

2045 SVFF Alternative

	Diesel	Gasoline	Compressed NG	Electricity	Natural Gas	Total
Mobile (Regional VMT) [gallons or kWh]	71,622,739	4,550,444,805	81,652	1,295,541,556	-	
Light Rail Operations (kWh)	-	-	-	4,409,586	-	
Stations (kWh)	-	-	-	675,648	-	
MSF (kWh or kBtu)	-	-	-	219,765	49,347	
Water (kWh)	-	-	-	90,323	-	
Total (gallons for dsl, gas, CNG, kWh for elec, kBtu for NG)	71,622,739	4,550,444,805	81,652	1,300,626,790	-	
MMBtu	9,883,938	568,805,601	11,325	4,438,999	-	583,139,863
Net Energy Total, Compared to 2045 No Project (gallons for dsl, gas, CNG, kWh for elec, kBtu for NG)	(16,543)	(1,051,016)	(19)	4,786,003	-	(117,328)

Design Options	2a
Light Rail Operations (kWh)	454,596
Stations (kWh)	75,072
Total (kWh)	529,668
MMBtu	1,808

	Diesel	Gasoline	Compressed NG	Electricity	Natural Gas	Total
Mobile (Regional VMT) [gallons or kWh]	71,629,169	4,550,853,357	81,659	1,295,657,874	-	
Light Rail Operations (kWh)	-	-	-	1,782,018	-	
Stations (kWh)	-	-	-	225,216	-	
MSF (kWh or kBtu)	-	-	-	-	-	
Water (kWh)	-	-	-	-	-	
Total (gallons for dsl, gas, CNG, kWh for elec, kBtu for NG)	71,629,169	4,550,853,357	81,659	1,297,665,108	-	
MMBtu	9,884,825	568,856,670	11,326	4,428,891	-	583,181,712
Net Energy Total, Compared to 2045 No Project (gallons for dsl, gas, CNG, kWh for elec, kBtu for NG)	(10,112)	(642,464)	(12)	1,824,320	-	(75,479)

2045 FF Alternative

	Diesel	Gasoline	Compressed NG	Electricity	Natural Gas	Total
Mobile (Regional VMT) [gallons or kWh]	71,623,719	4,550,507,070	81,653	1,295,559,283	-	
Light Rail Operations (kWh)	-	-	-	3,545,853	-	
Stations (kWh)	-	-	-	525,504	-	
MSF (kWh or kBtu)	-	-	-	219,765	49,347	
Water (kWh)	-	-	-	90,323	-	
Total (gallons for dsl, gas, CNG, kWh for elec, kBtu for NG)	71,623,719	4,550,507,070	81,653	1,299,630,640	-	
MMBtu	9,884,073	568,813,384	11,325	4,435,599	-	583,144,382
Net Energy Total, Compared to 2045 No Project (gallons for dsl, gas, CNG, kWh for elec, kBtu for NG)	(15,563)	(988,750)	(18)	3,789,853	-	(112,809)

Design Options	2a
Light Rail Operations (kWh)	454,596
Stations (kWh)	75,072
Total (kWh)	529,668
MMBtu	1,808

	Diesel	Gasoline	Compressed NG	Electricity	Natural Gas	Total
Mobile (Regional VMT) [gallons or kWh]	71,629,169	4,550,853,357	81,659	1,295,657,874	-	
Light Rail Operations (kWh)	-	-	-	1,782,018	-	
Stations (kWh)	-	-	-	225,216	-	
MSF (kWh or kBtu)	-	-	-	-	-	
Water (kWh)	-	-	-	-	-	
Total (gallons for dsl, gas, CNG, kWh for elec, kBtu for NG)	71,629,169	4,550,853,357	81,659	1,297,665,108	-	
MMBtu	9,884,825	568,856,670	11,326	4,428,891	-	583,181,712
Net Energy Total, Compared to 2045 No Project (gallons for dsl, gas, CNG, kWh for elec, kBtu for NG)	(10,112)	(642,464)	(12)	1,824,320	-	(75,479)

MSF Operational Energy Consumptin

	Diesel	Gasoline	Compressed NG	Electricity	Natural Gas	Total
Mobile (Regional VMT) [gallons or kWh]	-	-	-	-	-	
Light Rail Operations (kWh)	-	-	-	-	-	
Stations (kWh)	-	-	-	-	-	
MSF (kWh or kBtu)	-	-	-	219,765	49,347	
Water (kWh)	-	-	-	90,323	-	
Total (gallons for dsl, gas, CNG, kWh for elec, kBtu for NG)	-	-	-	310,088	49,347	
MMBtu	-	-	-	1,058	49	1,108

2019 Existing Conditions

	Diesel	Gasoline	Compressed NG	Electricity	Natural Gas	Total
Mobile (Regional VMT) [gallons or kWh]	51,637,916	6,472,949,770	294,476	5,618,749	-	
Light Rail Operations (kWh)	-	-	-	-	-	
Stations (kWh)	-	-	-	-	-	
MSF (kWh or kBtu)	-	-	-	-	-	
Water (kWh)	-	-	-	-	-	
Total (gallons for dsl, gas, CNG, kWh for elec, kBtu for NG)	51,637,916	6,472,949,770	294,476	5,618,749	-	
MMBtu	7,126,032	809,118,721	40,844	19,177	-	816,304,774

Notes/Sources:

Conversion Factors

Category	Amount	Units
Distillate Fuel Oil No. 2	0.138	MMBtu/gallon
Motor Gasoline	0.125	MMBtu/gallon
Electricity	293	kWh/MMBtu
Compressed Natural Gas	0.139	MMBtu/gallon

Source: The Climate Registry 2023 Default Emission Factors
Bureau of Transportation Statistics (2023): <https://www.bts.gov/content/energy-consumption-mode-transportation>

K LINE NORTHERN EXTENSION - Operational Energy Consumption (Transportation Fuel Consumption [Diesel, Gasoline, Electricity])

2045 No Project Scenario

Annual VMT	214,139,478,194
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Fuel/Energy Use by Type		Unit
Diesel	71,639,281.22	gal/year
Gasoline	4,544,680,746.04	gal/year
Natural Gas	81,670.75	gal/year
Electricity	1,295,840,787.26	kWh/year
Plug-in Hybrid	6,815,074.76	gal/year

2045 LB Alternative

Annual VMT	214,090,021,424
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Fuel/Energy Use by Type		Unit
Diesel	71,622,735.71	gal/year
Gasoline	4,543,631,125.34	gal/year
Natural Gas	81,651.89	gal/year
Electricity	1,295,541,505.22	kWh/year
Plug-in Hybrid	6,813,500.78	gal/year

2045 LB Alternative (Section 1)

Annual VMT	214,106,944,284
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Fuel/Energy Use by Type		Unit
Diesel	71,628,397.16	gal/year
Gasoline	4,543,990,279.08	gal/year
Natural Gas	81,658.34	gal/year
Electricity	1,295,643,911.99	kWh/year
Plug-in Hybrid	6,814,039.36	gal/year

2045 SVFF Alternative

Annual VMT	214,090,029,819
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Fuel/Energy Use by Type		Unit
Diesel	71,622,738.51	gal/year
Gasoline	4,543,631,303.50	gal/year
Natural Gas	81,651.89	gal/year
Electricity	1,295,541,556.02	kWh/year
Plug-in Hybrid	6,813,501.05	gal/year

2045 SVFF Alternative (Section 1)

Annual VMT	214,109,251,449
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Fuel/Energy Use by Type		Unit
Diesel	71,629,169.01	gal/year
Gasoline	4,544,039,244.03	gal/year
Natural Gas	81,659.22	gal/year
Electricity	1,295,657,873.54	kWh/year
Plug-in Hybrid	6,814,112.79	gal/year

2045 FF Alternative

Annual VMT	214,092,959,309
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Fuel/Energy Use by Type		Unit
Diesel	71,623,718.56	gal/year
Gasoline	4,543,693,476.05	gal/year
Natural Gas	81,653.01	gal/year
Electricity	1,295,559,283.50	kWh/year
Plug-in Hybrid	6,813,594.28	gal/year

2045 FF Alternative (Section 1)

Annual VMT	214,109,251,449
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Fuel/Energy Use by Type		Unit
Diesel	71,629,169.01	gal/year
Gasoline	4,544,039,244.03	gal/year
Natural Gas	81,659.22	gal/year
Electricity	1,295,657,873.54	kWh/year
Plug-in Hybrid	6,814,112.79	gal/year

2019 Existing Conditions

Annual VMT	170,339,744,680
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Fuel/Energy Use by Type		Unit
Diesel	51,637,916.16	gal/year
Gasoline	6,472,255,032.36	gal/year
Natural Gas	294,476.37	gal/year
Electricity	5,618,749.48	kWh/year
Plug-in Hybrid	694,737.74	gal/year

Notes/Sources:

Fuel Consumption Rates and Fleet Mix Breakdown

2045

% VMT by Fuel:	
Diesel	5.56%
Gasoline	81.20%
Natural Gas	0.16%
Electricity	10.10%
Plug-in Hybrid	2.98%
	100.00%

Weighted Average Fuel Consumption:	Unit
Diesel	0.00602223 gal/mi
Gasoline	0.026135352 gal/mi
Natural Gas	0.000237107 gal/mi
Electricity	0.059886878 kWh/mi
Plug-in Hybrid	0.001069716 gal/mi

2019

% VMT by Fuel:	
Diesel	4.92%
Gasoline	92.83%
Natural Gas	0.26%
Electricity	0.92%
Plug-in Hybrid	1.07%
	100.00%

Weighted Average Fuel Consumption:	Unit
Diesel	0.006167385 gal/mi
Gasoline	0.040931475 gal/mi
Natural Gas	0.000655165 gal/mi
Electricity	0.00357489 kWh/mi
Plug-in Hybrid	0.000381379 gal/mi

Fuel types and fleet mix based on EMFAC 2021 data for the SCAQMD region

*Note Plug-in Hybrid is summed with Gasoline in Summary Tab.

Total Annual VMT is based on information provided by WSP (KNE Operations GHG and Energy Use 01112024)

K LINE NORTHERN EXTENSION - Operational Energy Consumption (Electricity and Natural Gas)

Total Energy Consumption

	FF Alternative	LB Alternative	SVFF Alternative	Design Option 2a	FF Alternative - Section 1	LB Alternative - Section 1	SVFF Alternative - Section 1
Electricity (kWh/year)	4,381,444	3,579,018	5,395,322	529,668	2,007,234	1,770,844	2,007,234
Natural Gas (kBTU/year)	49,347	49,347	49,347	0	0	0	0

Annual Electricity Consumption

Source	FF Alternative	LB Alternative	SVFF Alternative	Design Option 2a	FF Alternative - Section 1	LB Alternative - Section 1	SVFF Alternative - Section 1
Light Rail Operations (kWh/year)	3,545,853	2,818,498	4,409,586	454,596	1,782,018	1,545,628	1,782,018
Stations (kWh/year)	525,504	450,432	675,648	75,072	225,216	225,216	225,216
MSF (kWh/year)	219,765	219,765	219,765	0	0	0	0

Annual Natural Gas Consumption

Source	FF Alternative	LB Alternative	SVFF Alternative	Design Option 2a	FF Alternative - Section 1	LB Alternative - Section 1	SVFF Alternative - Section 1
MSF (kBTU/year)	49,347	49,347	49,347	0	0	0	0

Annual Water Consumption and Associated Electricity Consumption

Source	FF Alternative	LB Alternative	SVFF Alternative	Design Option 2a	FF Alternative - Section 1	LB Alternative - Section 1	SVFF Alternative - Section 1
Mgal/year	13,2691	13,2691	13,2691	0	0	0	0
kWh/year	90,323	90,323	90,323	0	0	0	0

Notes/Sources:

Source:

Light rail, station, and MSF operational energy consumption based on data provided by WSP (KNE Operations GHG and Energy Use 01112024)

The KNE Section 1 MSF would only require the addition of four storage tracks to the existing Division 16 MSF to accommodate KNE Section 1. It was assumed that energy consumption associated with KNE Section 1 MSF operations that would occur at the existing Division 16 MSF would be minimal since that facility is already in operation, and emissions specific to the KNE Section 1 MSF are estimated to be similar to existing conditions.

Water Energy Intensity Factors for South Coast (kWh per million gallons)

Region	Supply	Treat	Distribute	Wastewater	Total
South Coast	3044	725	1537	1501	6807

From CalEEMod v2022.1 Water Energy Intensity Factors by Hydrologic Region and Process (Appendix G-32)

Source: EMFAC2021 (v1.0.2) Emissions Inventory

Region Type: Air District

Region: South Coast AQMD

Calendar Year: 2045

Season: Annual

Vehicle Classification: EMFAC2007 Categories

Units: miles/year for CVMT and EVMT, trips/year for Trips, kWh/year for Energy Consumption, tons/year for Emissions, 1000 gallons/year for Fuel Consumption

Region	Calendar Year	Vehicle Category	Model Year	Speed	Fuel	Population	Trips	Total VMT	CVMT	% VMT	Fuel Consumption	Fuel Consumption/Mile	EVMT	Energy Consumption	Energy Consumption/Mile
South Coast AQMD	2045	HHTD	Aggregate	Aggregate	Gasoline	15,89201808	103975,3718	581067,071	581067,071	0.00%	110,4745859	0.190123639	0	0	0
South Coast AQMD	2045	HHTD	Aggregate	Aggregate	Diesel	135111,2829	715247274,4	6071220731	6071220731	3.49%	808262,3879	0.133130127	0	0	0
South Coast AQMD	2045	HHTD	Aggregate	Aggregate	Electricity	39248,10217	149876898,4	1173021834	0	0.67%	0	0	1173021834	2110501570	1.799200586
South Coast AQMD	2045	HHTD	Aggregate	Aggregate	Natural Gas	11396,70046	25753430,88	221025392,8	221025392,8	0.13%	32648,9184	0.14771569	0	0	0
South Coast AQMD	2045	LDA	Aggregate	Aggregate	Gasoline	4999219,567	8103334697	67446963842	67446963842	38.79%	1853346,609	0.027478577	0	0	0
South Coast AQMD	2045	LDA	Aggregate	Aggregate	Diesel	3223,510664	5048133,977	39990497,3	39990497,3	0.02%	741,7482161	0.018548112	0	0	0
South Coast AQMD	2045	LDA	Aggregate	Aggregate	Electricity	680921,6458	11166516,32	9360868532	0	5.38%	0	0	9360868532	3614067848	0.386082534
South Coast AQMD	2045	LDA	Aggregate	Aggregate	Plug-in Hybrid	234195,8206	336034702,2	3201556298	1307919298	1.84%	46695,86416	0.035702405	1893637000	571934813,4	0.302029805
South Coast AQMD	2045	LDT1	Aggregate	Aggregate	Gasoline	424327,8344	665413321,6	5342978303	5342978303	3.07%	171530,8481	0.032103976	0	0	0
South Coast AQMD	2045	LDT1	Aggregate	Aggregate	Diesel	4,669412193	7537,043173	61601,55425	61601,55425	0.00%	2,129036808	0.034561414	0	0	0
South Coast AQMD	2045	LDT1	Aggregate	Aggregate	Electricity	11978,85038	1962496,48	163790460	0	0.09%	0	0	163790460	63236635,92	0.386082534
South Coast AQMD	2045	LDT1	Aggregate	Aggregate	Plug-in Hybrid	9167,617251	13154109,78	124562789,7	50723940,29	0.07%	1831,382765	0.036104899	73838849,43	22301533,28	0.302029805
South Coast AQMD	2045	LDT2	Aggregate	Aggregate	Gasoline	3172613,43	5109771955	42036028310	42036028310	24.17%	1391033,058	0.033091448	0	0	0
South Coast AQMD	2045	LDT2	Aggregate	Aggregate	Diesel	12027,05543	19457890,46	160337057,9	160337057,9	0.09%	4105,248258	0.025603864	0	0	0
South Coast AQMD	2045	LDT2	Aggregate	Aggregate	Electricity	124222,2829	204124713,3	1185033880	0	0.68%	0	0	1185033880	457520884	0.386082534
South Coast AQMD	2045	LDT2	Aggregate	Aggregate	Plug-in Hybrid	85340,38572	122450225,8	1147382233	468018041,5	0.66%	16937,51586	0.036189878	679364191,8	205188234,2	0.302029805
South Coast AQMD	2045	LHDT1	Aggregate	Aggregate	Gasoline	143476,0859	698988627,4	1639087418	1639087418	0.94%	98063,68603	0.059828222	0	0	0
South Coast AQMD	2045	LHDT1	Aggregate	Aggregate	Diesel	107053,5876	440338022,8	1195952722	1195952722	0.69%	55133,3861	0.046099971	0	0	0
South Coast AQMD	2045	LHDT1	Aggregate	Aggregate	Electricity	162207,7597	739719097	2298340072	0	1.32%	0	0	2298340072	1291217196	0.561804239
South Coast AQMD	2045	LHDT2	Aggregate	Aggregate	Gasoline	20166,15066	98245710,32	218912431,7	218912431,7	0.13%	14748,73887	0.067372779	0	0	0
South Coast AQMD	2045	LHDT2	Aggregate	Aggregate	Diesel	52003,40937	213902952,6	557713248,5	557713248,5	0.32%	30066,49129	0.053910305	0	0	0
South Coast AQMD	2045	LHDT2	Aggregate	Aggregate	Electricity	43507,53323	188288578	591754097,9	0	0.34%	0	0	591754097,9	332666837,8	0.562170738
South Coast AQMD	2045	IMCY	Aggregate	Aggregate	Gasoline	318274,7437	2208826272,1	619217946,9	619217946,9	0.36%	14571,34873	0.023531858	0	0	0
South Coast AQMD	2045	IMDV	Aggregate	Aggregate	Gasoline	1863034,494	2972801165	23571075297	23571075297	13.56%	948509,1326	0.040240384	0	0	0
South Coast AQMD	2045	IMDV	Aggregate	Aggregate	Diesel	20226,65145	32245902,19	254869208,1	254869208,1	0.15%	8507,643115	0.033380427	0	0	0
South Coast AQMD	2045	IMDV	Aggregate	Aggregate	Electricity	114667,0242	187556681,2	1079838596	0	0.62%	0	0	1079838596	416906822,1	0.386082534
South Coast AQMD	2045	IMDV	Aggregate	Aggregate	Plug-in Hybrid	54351,47608	77985943,71	699738520,7	285726498,3	0.40%	10486,57928	0.036701459	414012022,5	125043970,3	0.302029805
South Coast AQMD	2045	IMH	Aggregate	Aggregate	Gasoline	21286,64683	696351,7807	73328714,29	73328714,29	0.04%	15081,90219	0.206567527	0	0	0
South Coast AQMD	2045	IMH	Aggregate	Aggregate	Diesel	13438,46192	439437,7047	41025428,85	41025428,85	0.02%	4085,513368	0.099584903	0	0	0
South Coast AQMD	2045	MHDT	Aggregate	Aggregate	Gasoline	11693,26975	76504573,76	172111059,7	172111059,7	0.10%	28782,16845	0.167230209	0	0	0
South Coast AQMD	2045	MHDT	Aggregate	Aggregate	Diesel	99679,44195	385836482	1257557003	1257557003	0.72%	126122,9443	0.10029203	0	0	0
South Coast AQMD	2045	MHDT	Aggregate	Aggregate	Electricity	95579,70956	393647073,1	1349826384	0	0.78%	0	0	1349826384	1417103258	1.049841132
South Coast AQMD	2045	MHDT	Aggregate	Aggregate	Natural Gas	1850,280566	5389160,725	23104534,9	23104534,9	0.01%	2710,068204	0.117295943	0	0	0
South Coast AQMD	2045	OBUS	Aggregate	Aggregate	Gasoline	2639,111692	1726694,38	24220050,59	24220050,59	0.01%	4173,060793	0.172297774	0	0	0
South Coast AQMD	2045	OBUS	Aggregate	Aggregate	Diesel	3435,467285	13087714,53	73130504,51	73130504,51	0.04%	9214,162347	0.125996155	0	0	0
South Coast AQMD	2045	OBUS	Aggregate	Aggregate	Electricity	1493,647979	9772365,165	26978438,54	0	0.02%	0	0	26978438,54	28348983,25	1.050801484
South Coast AQMD	2045	OBUS	Aggregate	Aggregate	Natural Gas	703,6769419	1828715,636	10615571,69	10615571,69	0.01%	1075,138477	0.101279376	0	0	0
South Coast AQMD	2045	SBUS	Aggregate	Aggregate	Gasoline	1931,988952	2527041,549	27111630,77	27111630,77	0.02%	2747,091359	0.101325198	0	0	0
South Coast AQMD	2045	SBUS	Aggregate	Aggregate	Diesel	1135,44667	5376294,563	7640197,507	7640197,507	0.00%	922,4351255	0.120734461	0	0	0
South Coast AQMD	2045	SBUS	Aggregate	Aggregate	Electricity	3469,019854	13303553,26	33594991,91	0	0.02%	0	0	33594991,91	38845934,24	1.156301342
South Coast AQMD	2045	SBUS	Aggregate	Aggregate	Natural Gas	3124,845916	14796020,42	20853604,12	20853604,12	0.01%	4504,197093	0.215991301	0	0	0
South Coast AQMD	2045	UBUS	Aggregate	Aggregate	Gasoline	741,5509933	969948,6992	28708670,68	28708670,68	0.02%	1798,360976	0.062641736	0	0	0
South Coast AQMD	2045	UBUS	Aggregate	Aggregate	Electricity	7963,172352	10415829,44	307312043,8	0	0.18%	0	0	307312043,8	642901013,4	2.092013725
South Coast AQMD	2045	UBUS	Aggregate	Aggregate	Natural Gas	163,7475522	214181,7982	4094411,613	4094411,613	0.00%	290,6231617	0.070980446	0	0	0

% VMT by Fuel:	
Diesel	4%
Gasoline	81%
Natural Gas	0%
Electricity	10%
Plug-in Hybrid	3%
	100.00%

Weighted Average Fuel Consumption: Unit	
Diesel	0.00602223 gal/mi
Gasoline	0.026135352 gal/mi
Natural Gas	0.000237107 gal/mi
Electricity	0.059886878 kWh/mi
Plug-in Hybrid	0.001069716 gal/mi

Source: EMFAC2021 (v1.0.2) Emissions Inventory

Region Type: Air District

Region: South Coast AQMD

Calendar Year: 2019

Season: Annual

Vehicle Classification: EMFAC2007 Categories

Units: miles/year for CVMT and EVMT, trips/year for Trips, kWh/year for Energy Consumption, tons/year for Emissions, 1000 gallons/year for Fuel Consumption

Region	Calendar Year	Vehicle Class	Model Year	Speed	Fuel	Population	Trips	Total VMT	CVMT	% VMT	Fuel Consumption	Fuel Consumption/Mile	EVMT	Energy Consumption	Energy Consumption/Mile
South Coast AQMD	2019	HHDT	Aggregate	Aggregate	Gasoline	185.5378903	1213903.17	2296530.233	2296530.233	0.00%	648.5347165	0.282397639	0	0	0
South Coast AQMD	2019	HHDT	Aggregate	Aggregate	Diesel	88453.87202	420093920.5	3744934654	3744934654	2.47%	649008.2447	0.173302956	0	0	0
South Coast AQMD	2019	HHDT	Aggregate	Aggregate	Natural Gas	7039.56295	15168318.77	160944914.1	160944914.1	0.11%	29389.40185	0.182605347	0	0	0
South Coast AQMD	2019	LDA	Aggregate	Aggregate	Gasoline	5945754.169	9691494309	79058064230	79058064230	52.07%	2918914.624	0.03692115	0	0	0
South Coast AQMD	2019	LDA	Aggregate	Aggregate	Diesel	20130.9409	30370142.53	225121324.6	225121324.6	0.15%	5646.065702	0.025080102	0	0	0
South Coast AQMD	2019	LDA	Aggregate	Aggregate	Electricity	118728.8306	209288658.8	1388622209	0	0.91%	0	0	1388622209	536122781.8	0.386082534
South Coast AQMD	2019	LDA	Aggregate	Aggregate	Plug-in Hybrid	92643.77284	132929454.2	1487582133	802360737.9	0.98%	28584.96605	0.035626078	685217475.5	206956100.4	0.302029805
South Coast AQMD	2019	LDT1	Aggregate	Aggregate	Gasoline	564366.1263	865005311.3	6612756849	6612756849	4.36%	291864.0022	0.044136509	0	0	0
South Coast AQMD	2019	LDT1	Aggregate	Aggregate	Diesel	309.4560504	336223.3637	2061792.401	2061792.401	0.00%	88.37019687	0.042860861	0	0	0
South Coast AQMD	2019	LDT1	Aggregate	Aggregate	Electricity	812.6934789	1278307.767	6683010.456	0	0.00%	0	0	6683010.456	2580193.615	0.386082534
South Coast AQMD	2019	LDT1	Aggregate	Aggregate	Plug-in Hybrid	4.824723575	6922.730498	78244.82868	42398.65301	0.00%	1.520774522	0.035868463	35846.17567	10826.61344	0.302029805
South Coast AQMD	2019	LDT2	Aggregate	Aggregate	Gasoline	2374310.56	3868221881	31484063348	31484063348	20.74%	1478301.515	0.046953962	0	0	0
South Coast AQMD	2019	LDT2	Aggregate	Aggregate	Diesel	6235.459157	10575989.48	91966853.54	91966853.54	0.06%	3136.750768	0.034107406	0	0	0
South Coast AQMD	2019	LDT2	Aggregate	Aggregate	Electricity	345.4722009	606153.771	3979789.292	0	0.00%	0	0	3979789.292	1536527.137	0.386082534
South Coast AQMD	2019	LDT2	Aggregate	Aggregate	Plug-in Hybrid	3342.412452	4795843.795	57330899.11	30439519.71	0.04%	1093.741686	0.035931634	26891379.39	8121998.068	0.302029805
South Coast AQMD	2019	LHDT1	Aggregate	Aggregate	Gasoline	211832.0869	1032006266	2433915592	2433915592	1.60%	203777.4651	0.08372413	0	0	0
South Coast AQMD	2019	LHDT1	Aggregate	Aggregate	Diesel	88571.29361	364315752.4	1087584828	1087584828	0.72%	54529.09533	0.050137786	0	0	0
South Coast AQMD	2019	LHDT2	Aggregate	Aggregate	Gasoline	33354.36099	162496201.8	377331991.3	377331991.3	0.25%	35151.67653	0.093158485	0	0	0
South Coast AQMD	2019	LHDT2	Aggregate	Aggregate	Diesel	36714.41197	151015504.9	455905105.1	455905105.1	0.30%	27723.06097	0.060808841	0	0	0
South Coast AQMD	2019	MCY	Aggregate	Aggregate	Gasoline	230221.3851	159773641.3	482597095.5	482597095.5	0.32%	11988.62911	0.024841901	0	0	0
South Coast AQMD	2019	MDV	Aggregate	Aggregate	Gasoline	1589242.586	2547629881	19734974671	19734974671	13.00%	1125888.091	0.057053095	0	0	0
South Coast AQMD	2019	MDV	Aggregate	Aggregate	Diesel	19336.31888	32351781.1	266986574.4	266986574.4	0.18%	11991.63002	0.04491473	0	0	0
South Coast AQMD	2019	MDV	Aggregate	Aggregate	Electricity	60.04751762	94266.45468	503312.7984	0	0.00%	0	0	503312.7984	194320.2808	0.386082534
South Coast AQMD	2019	MDV	Aggregate	Aggregate	Plug-in Hybrid	4977.884492	7142492.674	78671608.94	42476082.01	0.05%	1535.413197	0.036147712	36195526.93	10932127.93	0.302029805
South Coast AQMD	2019	MH	Aggregate	Aggregate	Gasoline	38294.87052	1252743.163	109007427.3	109007427.3	0.07%	22472.23796	0.206153273	0	0	0
South Coast AQMD	2019	MH	Aggregate	Aggregate	Diesel	11545.49722	377537.759	36339531.29	36339531.29	0.02%	3579.61425	0.09850469	0	0	0
South Coast AQMD	2019	MHDT	Aggregate	Aggregate	Gasoline	29321.86199	191841683.4	485542892.3	485542892.3	0.32%	98379.73474	0.20261801	0	0	0
South Coast AQMD	2019	MHDT	Aggregate	Aggregate	Diesel	114546.2905	435522443.1	1453987352	1453987352	0.96%	166630.8929	0.114602711	0	0	0
South Coast AQMD	2019	MHDT	Aggregate	Aggregate	Natural Gas	878.0337173	2523961.173	13721242.98	13721242.98	0.01%	1665.429157	0.121375969	0	0	0
South Coast AQMD	2019	OBUS	Aggregate	Aggregate	Gasoline	6363.679062	41635108.45	87744675.8	87744675.8	0.06%	17997.24916	0.205109301	0	0	0
South Coast AQMD	2019	OBUS	Aggregate	Aggregate	Diesel	3357.093391	12150497.58	69848625.44	69848625.44	0.05%	10133.84407	0.145082942	0	0	0
South Coast AQMD	2019	OBUS	Aggregate	Aggregate	Natural Gas	360.3154291	936387.7372	6987368.356	6987368.356	0.00%	803.4381398	0.114984369	0	0	0
South Coast AQMD	2019	SBUS	Aggregate	Aggregate	Gasoline	2788.454841	3647298.931	38433746.51	38433746.51	0.03%	4461.887961	0.116092975	0	0	0
South Coast AQMD	2019	SBUS	Aggregate	Aggregate	Diesel	3859.860676	18276285.91	26785620.65	26785620.65	0.02%	3689.860982	0.137755292	0	0	0
South Coast AQMD	2019	SBUS	Aggregate	Aggregate	Natural Gas	2681.075729	12694786.33	22623649.45	22623649.45	0.01%	5521.63604	0.244064673	0	0	0
South Coast AQMD	2019	UBUS	Aggregate	Aggregate	Gasoline	884.6688002	1157146.791	31362195.85	31362195.85	0.02%	4616.428071	0.147197221	0	0	0
South Coast AQMD	2019	UBUS	Aggregate	Aggregate	Diesel	43.09657325	56370.31781	1209123.093	1209123.093	0.00%	211.9511443	0.175293273	0	0	0
South Coast AQMD	2019	UBUS	Aggregate	Aggregate	Electricity	81.28595086	106322.0237	1111890.83	0	0.00%	0	0	1111890.83	2327351.355	2.093147359
South Coast AQMD	2019	UBUS	Aggregate	Aggregate	Natural Gas	4988.548655	6525021.64	196340502.6	196340502.6	0.13%	62091.13637	0.316242118	0	0	0

% VMT by Fuel:	
Diesel	5%
Gasoline	93%
Natural Gas	0%
Electricity	1%
Plug-in Hybrid	1%
	100.00%

Weighted Average Fuel C Unit	
Diesel	0.0061674 gal/mi
Gasoline	0.0409315 gal/mi
Natural Gas	0.0006552 gal/mi
Electricity	0.0035749 kWh/mi
Plug-in Hybrid	0.0003814 gal/mi