3 Affected Environment, Environmental Consequences, and Mitigation Measures

3.6 Public Utilities and Energy

3.6.1 Introduction

Section 3.6, Public Utilities and Energy, of this *Merced to Fresno Section: Central Valley Wye Draft Supplemental Environmental Impact Report (EIR)/Environmental Impact Statement (EIS)* (Draft Supplemental EIR/EIS) updates the *Merced to Fresno Section California High-Speed Train Final Project Environmental Impact Report/Environmental Impact Statement* (Merced to Fresno Final EIR/EIS) (California High-Speed Rail Authority and Federal Railroad Administration [Authority and FRA 2012]) with new and revised information relevant to public utilities and energy, analyzes the potential impacts of implementing the Central Valley Wye alternatives (and the No Project Alternative), and describes impact avoidance and minimization features (IAMF) that would avoid, minimize, or reduce these impacts. Where applicable, mitigation measures are proposed to further reduce, compensate for, or offset impacts of the Central Valley Wye alternatives. This section also describes public utilities and energy within the region and defines the affected environment in the resource study areas (RSA).

The analysis herein is consistent with the analysis conducted in the Merced to Fresno Final EIR/EIS. Both analyses examine potential impacts on utility services, water use, waste generation, access to the right-of-way, storm drain facilities, and energy consumption. The analyses also use similar information sources, including formal data requests to utilities, region-specific water use rates, and California Energy Commission (CEC) data, and use the same methods for evaluating impacts within the RSAs.

Where information has changed or new information has become available since the Merced to Fresno Final EIR/EIS was prepared in 2012, the Central Valley Wye alternatives analysis uses the updated versions of these sources or datasets. However, relevant portions of the Merced to Fresno Final EIR/EIS that remain unchanged are summarized and referenced in this section but are not repeated in their entirety.

Additional details on public utilities and energy are provided in the following appendices in Volume II of this Draft Supplemental EIR/EIS:

- Appendix 3.6-A, Public Utilities and Energy Local and Regional Plans and Laws Consistency Analysis, provides a discussion of inconsistencies or conflicts that may exist between the Central Valley Wye alternatives and local and regional plans or laws.
- Appendix 3.6-B, Water Use Assessment, provides an analysis and evaluation of anticipated water use requirements for construction and operation of the Central Valley Wye alternatives.
- Appendix 3.6-C, U.S. Bureau of Reclamation Lands, includes a figure depicting U.S. Bureau of Reclamation lands in relationship to the Central Valley Wye alternatives.

This Draft Supplemental EIR/EIS analyzes public utilities and energy because the Central Valley Wye alternatives could require the relocation of public utilities, potentially resulting in short-term temporary impacts on the utilities and utility services. Public utility service would be restored upon completion of the relocation activity. The only effect on public utilities during construction would be the generation and disposal of solid waste from the removal of structures (e.g., lattice steel towers, wood poles) and clearing of vegetation. Information regarding public utilities and energy outside of the project footprints of the Central Valley Wye alternatives are only provided where pertinent to the analysis; therefore, utility information for Stanislaus and Fresno Counties (where only network upgrades are occurring) is only provided for solid waste.

System-wide energy demand is also considered. Four other resource sections in this Draft Supplemental EIR/EIS provide additional information related to public utilities and energy:

- **Section 3.2, Transportation**—Traffic impacts, including road closures and roadway access as a result of utility relocations during construction of the Central Valley Wye alternatives.
- **Section 3.5, Electromagnetic Fields and Electromagnetic Interference**—Impacts of the Central Valley Wye alternatives on sensitive land uses that are susceptible to potential impacts from electromagnetic fields and electromagnetic interference.
- **Section 3.8, Hydrology and Water Resources**—Impacts of the Central Valley Wye alternatives on drainage and stormwater infrastructure and utilities along the alignment during construction.
- **Section 3.14, Agricultural Farmland**—Impacts of constructing the Central Valley Wye alternatives on public improvements on agricultural farmland and the disruption of some utilities and irrigation infrastructure and power systems.

Definition of Resources

The following are definitions for public utilities and energy resources analyzed in this Draft Supplemental EIR/EIS. These definitions are the same as those used in the Merced to Fresno Final EIR/EIS (Authority and FRA 2012).

- **Public Utilities**—Public utilities are defined as any subsurface, aboveground, or overhead facility used for transmission, regardless of size, shape, or method of conveyance. This impact evaluation considers all utilities, but it focuses on major utilities. For purposes of this analysis, major public utilities include the following facilities:
  - Electrical substations
  - High-voltage electrical lines (60 kilovolts [kV] or greater)
  - High-pressure natural gas lines
  - Petroleum and fuel lines
  - Water, wastewater, irrigation, and stormwater canals, conduits, and pipes
  - Fiber-optic and communication infrastructure (i.e., towers and antennas)
- **Energy**—Energy is commonly measured in terms of British thermal units (Btu). A Btu is defined as the amount of heat required to raise the temperature of 1 pound of water by 1 degree Fahrenheit. For transportation projects, energy usage is predominantly influenced by the amount of fuel used. The average Btu content of fuels is the heat value (or energy content) per quantity of fuel as determined from tests of fuel samples. For example, a gallon of gasoline produces approximately 114,000 Btu (USEPA 2010); however, the Btu value of gasoline varies from season to season and from batch to batch. The Btu is the unit of measure used to quantify the overall energy impacts expected to result from construction and operations of the high-speed rail (HSR).
- **Transportation Energy**—Transportation energy is generally defined in terms of direct and indirect energy. Direct energy involves all energy consumed by vehicle propulsion (e.g., automobiles, airplanes). This energy is a function of traffic characteristics such as volume, speed, distance traveled, vehicle mix, and thermal value of the fuel being used. Direct energy also includes the electrical power requirements of the HSR project, including recoverable energy during HSR train braking. Indirect energy consumption involves the nonrecoverable, one-time energy expenditure involved in constructing the physical infrastructure associated with the Central Valley Wye alternatives, typically through the irreversible burning of hydrocarbons for operating equipment and vehicles in which energy is lost to the environment.

3.6.2 Laws, Regulations, and Orders

This section identifies laws, regulations, and orders that are relevant to the analysis of public utilities and energy resources in this Draft Supplemental EIR/EIS. Also provided are summaries of new or updated laws, regulations, and orders that have occurred since publication of the Merced to Fresno Final EIR/EIS.

3.6.2.1 Federal

The following laws, regulations, orders, and plans are the same as those described in Section 3.6.2, Laws, Regulations, and Orders, of the Merced to Fresno Final EIR/EIS (Authority and FRA 2012: pages 3.6-1 through 3.6-2):

- Title 49, United States Code (U.S.C.), Section 108, Norman Y. Mineta and Special Programs Improvement Act, PL 108-426
- 42 U.S.C. Chapter 92, Section 403(b) of the Power Plant and Industrial Fuel Use Act (U.S. Presidential Executive Order 12185; 44 Fed. Reg. 75093; PL 95-620)
- Corporate Average Fuel Economy Standards
- Federal Energy Regulatory Commission
- U.S. Presidential Executive Order 12185, Conservation of Petroleum and Natural Gas (December 17, 1979, 44 Fed. Reg. 75093)

New, additional, or updated federal laws, regulations, and orders follow.

Resource Conservation and Recovery Act (42 U.S.C. § 6901 et seq.)

The Resource Conservation and Recovery Act was enacted in 1976 to provide for proper management of solid and hazardous wastes, from their generation to ultimate disposal or destruction. Implementation of the Resource Conservation and Recovery Act has largely been delegated to federally approved state waste management programs and, under Subtitle D, further promulgated to local governments for management of planning, regulation, and implementation of nonhazardous solid waste disposal. The U.S. Environmental Protection Agency (USEPA) retains oversight of state actions under 40 Code of Federal Regulations (C.F.R.) Part 239–259. Where facilities are found to be inadequate, 40 C.F.R. Part 256.42 requires that necessary facilities and practices be developed by the responsible state and local agencies or by the private sector. In California, that responsibility was created under the California Integrated Waste Management Act of 1989 and Assembly Bill (AB) 939.

3.6.2.2 State

The following laws, regulations, orders, and plans are the same as those described in Section 3.6.2 of the Merced to Fresno Final EIR/EIS (Authority and FRA 2012).

- Public Utilities Code Section 1001–1013 and California Public Utilities Commission (CPUC) General Order 131-D
- Renewable Portfolio Standard Program (Senate Bill [SB] 1078)
- Integrated Waste Management Act (AB 939)
- Pavley Rule (AB 1493)
- Energy Efficiency Standards (Cal. Code Regs., tit. 24, § 6)
- Protection of Underground Infrastructure (Gov. Code, § 4216)

New, additional, or updated state laws, regulations, and orders follow.

Rules for Overhead 25-Kilovolt Alternating Current Railroad Electrification Systems (California Public Utilities Commission General Order 176)

The purpose of these rules, adopted and effective March 26, 2015, is to establish uniform safety requirements governing the design, construction, operation, and maintenance of 25 kV alternating current railroad electrification overhead contact systems. CPUC General Order 176 would apply to the HSR project.

The General Order is for a 25-kV electrification system, which includes new safety rules only for construction and operations of HSR overhead contact systems. The traction power system, which

includes all power substations and required interconnections with utilities, would be constructed pursuant to existing safety rules (General Orders) and is not part of these proceedings. This General Order is not related to relocation of utilities that enable construction of HSR infrastructure. Utility-related work would be performed based on bilateral agreements with utilities and in accordance with existing regulations and design criteria.

California Public Utilities Commission General Order 95

CPUC General Order 95, Rule for Overhead Electric Line Construction, revised January 28, 2016, formulates uniform requirements for overhead electrical line construction, including overhead catenary construction, the application of which would provide adequate service and secure safety to persons engaged in the construction, maintenance, operation, or use of overhead electrical lines and to the public in general.

Water Conservation Act of 2009 (Cal. Water Code § 10608, et seq.)

The Water Conservation Act of 2009 (SB X7-7, Chapter 4, Statutes of 2009 Seventh Extraordinary Session) requires urban and agricultural water suppliers to increase water use efficiency. The urban water use goal within the state is to achieve a 20 percent reduction in per-capita water use by December 31, 2020. Agricultural water suppliers will prepare and adopt agricultural water management plans by December 31, 2012, and update those plans by December 31, 2015, and every 5 years thereafter. Effective 2013, agricultural water suppliers who do not meet the water management planning requirements established by this bill are not eligible for state water grants or loans.

Sustainable Communities and Climate Protection Act of 2008 (Gov. Code, §§ 65080-65080.01)

Adopted in September 2008, SB 375 (Chapter 728, Statutes of 2008) provides a new planning process to coordinate community development and land use planning with regional transportation plans in an effort to reduce sprawling land use patterns and dependence on private vehicles, thereby reducing vehicle miles traveled (VMT) and greenhouse gas emissions associated with VMT. SB 375 is one major tool being used to meet the goals in the Global Warming Solutions Acts (AB 32). Under SB 375, the California Air Resources Board sets greenhouse gas emission reduction targets for 2020 and 2035 for the metropolitan planning organizations in the state. Each organization must then prepare a “sustainable communities strategy” that meets the greenhouse gas emission reduction targets set by the California Air Resources Board. Once adopted, the sustainable communities strategy will be incorporated into the regional transportation plan.

3.6.2.3 Regional and Local

The following local and county plans are the same as those described in Section 3.6.2 of the Merced to Fresno Final EIR/EIS (Authority and FRA 2012: pages 3.6-3 through 3.6-5):

- Merced County Code, Title 9 (2009)
- *Madera County General Plan* (1995)
- *Madera County Integrated Regional Water Management Plan* (2008)
- *Fresno County General Plan* (2003)

There are no new, additional, or updated regional or local laws, regulations, or orders.

General Plan Policies and Ordinances

Table 3.6-1 lists regional and local plans, policies, and objectives relevant to the Central Valley Wye alternatives. Refer to Section 3.6.2.3, Regional and Local, of the Merced to Fresno Final EIR/EIS for more information.

Table 3.6-1 Local Plans and Policies for Public Utilities and Energy

Policy Title	Summary
Merced County	
2030 Merced County General Plan (2013a)	Merced County adopted the 2030 Merced County General Plan on December 10, 2013, updating the previous version of the general plan that was included in Section 3.6.2.3 (page 3.6-3 through 3.6-5) of the Merced to Fresno Final EIR/EIS. The general plan includes the following goals and policies: ▪ Goal PFS-1: Ensure adequate funding for new, expanded, and upgraded public facilities and services. ▪ Policy PFS-1.1: Determine the acceptable minimum level for the efficient delivery and funding of essential County services. ▪ Goal W-2: Ensure the adequate wastewater collection, treatment, and disposal within the County. ▪ Goal PFS-3: Ensure the management of stormwater in a safe and environmentally sensitive manner through the provisions of adequate storm drainage facilities that protect people, property, and the environment. ▪ Goal PFS-4: Ensure the safe and efficient disposal and recycling of solid and hazardous waste generated in the County. ▪ Goal PFS-5: Ensure the provision of adequate utilities to the residents of Merced County. ▪ Policy PFS-5.1: Encourage the provision of adequate gas and electric, communications, and telecommunications service and facilities to serve the needs of existing and future residents and businesses. ▪ Policy PFS-5.3: Encourage new transmission and distribution lines to be sited within existing utility easements and rights-of-way or utilize joint-use of easements among different utilities to avoid impacting existing communities. ▪ Policy PFS-5.4: Require mitigation of electrical interference to adjacent land uses in the placement of electrical and other transmission facilities. ▪ Policy PFS-5.6: Require power transmission and distribution facilities to be located underground within urban communities and residential centers. ▪ Policy PFS-5.7: Coordinate with local gas and electric utility companies in the design and location, and appropriate expansion of gas and electric systems, while minimizing impacts to agriculture and minimizing noise, electromagnetic, visual, and other impacts on residents. ▪ Goal NR-2: Provide adequate and efficient energy supplies by increasing renewable energy production and energy conservation. ▪ Policy NR-2.1: Promote the development and use of renewable energy resources to reduce dependency on petroleum-based energy sources. ▪ Policy NR-2.2: Encourage new electricity providers to use only clean alternative energy sources (e.g., solar, thermal, wind).
Merced Integrated Regional Water Management Plan (2013b)	Merced County adopted the Merced Integrated Regional Water Management Plan in November 2013. The plan includes the following objectives: ▪ Objective B: Meet demands for all uses, including agriculture, urban, and environmental resource needs. ▪ Objective E: Maximize water use efficiency.

Policy Title	Summary
Storm Water Management Program (2007)	Merced County adopted the Storm Water Management Program in April 2007. The plan includes the following goals and policies: ▪ Merced County manages stormwater drainage in the unincorporated areas of the county. In addition to the county's adopted Storm Water Management Program, various subdivisions within the Merced Irrigation District service area discharge stormwater. ▪ Merced County, Merced Irrigation District, and the cities of Merced and Atwater formed the Merced Storm Water Group to implement the Storm Water Management Program. The plan provides for the continuity of programs that fulfill requirements of the State Water Resources Control Board General Permit and Section 402(p) of the federal Clean Water Act.
Madera County	
Madera County Municipal Code, Title 13 and 14 (2016)	Madera County updated the County Municipal Code in 2016, updating the previous version of the code that was included in Section 3.6.2.3 (page 3.6-4) of the Merced to Fresno Final EIR/EIS. Promotes good water utility practices, encourages economic and efficient development, protects groundwater quality, and establishes minimum standards of design, construction, and operation of water systems. Provides for sewage disposal methods and systems with the unincorporated areas of the county. Provides rules and regulations for water conservation.
Fresno County	
Fresno County Municipal Code, Title 8 and Title 14 (2016)	Fresno County updated the Fresno County Municipal Code in 2016, updating the previous version of the code that was included in Section 3.6.2.3 (page 3.6-5) of the Merced to Fresno Final EIR/EIS. Promotes the general health, safety, and welfare of Fresno County citizens, regulates disposal waste facilities and establishment of service areas. Sets well construction, pump installation, and well destruction standards. Establishes regulations governing the discharge of wastewater into wastewater treatment facilities operated by the County. Prohibits the commencement, conduct, or continuance of illicit discharges to the storm drain system within the county.

Policy Title	Summary
City of Chowchilla	
City of Chowchilla 2040 General Plan (2011a)	An earlier City of Chowchilla general plan was included in Section 3.6.2.3 (page 3.6-6) of the Merced to Fresno Final EIR/EIS but a new one has since been adopted – the *City of Chowchilla 2040 General Plan*. The City of Chowchilla adopted the new general plan on May 2, 2011, and it includes the following objectives and policies: ▪ Objective PF 4: Provide an adequate system of supply and distribution of quality water to support the General Plan level of development. ▪ Policy PF 5.1: Continue to provide sewer services and operate major public facilities. ▪ Policy PF 6.2: The City shall require the extension of storm drains to new areas in accordance with the phasing of a storm drainage master plan. ▪ Policy PF 10.1 and 12.1: The City shall designate adequate, appropriately located land for utility uses, electric substations, and for overhead or underground utility corridors. ▪ Policy OS 24.1: All public and private development—including homes, commercial, and industrial should be designed to be energy-efficient.
City of Chowchilla Municipal Code, Title 13 (2015)	The City of Chowchilla updated the Chowchilla Municipal Code in 2015, updating the previous version of the code that was included in Section 3.6.2.3 (page 3.6-4) of the Merced to Fresno Final EIR/EIS. Sets installation, replacement, and metering requirements for water service connections. Establishes standards for connection to the city's sewer system and the city's exclusive right to make connections.
City of Merced	
Merced Vision 2030 General Plan (2015)	The *Merced Vision 2030 General Plan* was amended in 2015, which updated the previous version of the plan that was included in Section 3.6.2.3 (3.6-4) of the Merced to Fresno Final EIR/EIS. The plan was adopted by the City Council on January 3, 2012, with updates following in 2015, and includes the following policy: ▪ Goal Area P-5: Storm Drainage and Flood Control, Policy P-5.1: Provide effective storm drainage facilities for future development.

Source: City of Chowchilla, 2011a, City of Chowchilla Municipal Code Title 13, 2015; City of Merced, 2015; Fresno County Municipal Code Title 8, Title 14; Madera County Municipal Code, Title 13 and Title 14, 2016; Merced Storm Water Group, 2007; Merced County 2013a, 2013b

3.6.3 Compatibility with Plans and Laws

As indicated in Section 3.1.3.3, Compatibility with Plans and Laws, the California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA) regulations[1] require a discussion of inconsistencies or conflicts between a proposed undertaking and federal, state, regional, or local plans and laws. As such, this Draft Supplemental EIR/EIS describes inconsistency of the Central Valley Wye alternatives with federal, state, regional, and local plans and laws to provide planning context.

[1] NEPA regulations refer to the regulations issued by the Council for Environmental Quality located at 40 CFR Part 1500.

There are a number of federal and state laws and implementing regulations listed in Section 3.6.2.1, Federal, and Section 3.6.2.2, State, that direct the use of public utilities and energy. A summary of the federal and state requirements considered in this analysis follows:

- Acts and orders applicable to the conservation of petroleum, natural gas, and water include the Power Plan and Industrial Fuel Use Act of 1978, Executive Order 12186, Conservation of Petroleum and Natural Gas, and the Water Conservation Act of 2009.
- Acts and orders applicable to the safe transmission of hazardous material, natural gas, oil, and electricity include Norman Y. Mineta and Special Programs Improvement Act and the Federal Energy Regulatory Commission. The Resource Conservation and Recovery Act provides for the proper management of solid and hazardous wastes, from their generation to ultimate disposal or destruction.
- Federal and state initiatives to reduce energy consumed and greenhouse gas emissions from motor vehicles include Corporate Average Fuel Economy, Pavley Rule, and Sustainable Communities and Climate Protection Act of 2008.
- Public electric utilities in California are regulated by the Public Utilities Code. California Code of Regulations, Title 24, Part 6, & Part 11, Energy Efficiency Standards, promotes efficient energy use in new buildings constructed in California.
- Generation and disposal of waste in California is regulated by the Integrated Waste Management Act, which mandates a reduction of waste being disposed. The Local Government Construction and Demolition Guide assists jurisdictions with diverting their construction and demolition material, with a primary focus on CalRecycle.
- The Renewable Portfolio Standard Program requires retail sellers of electricity in California to increase their purchases of electricity generated by renewable sources.
- Prior to excavation of any subsurface installation in California, the excavator is required to contact a regional notification center per the Protection of Underground Infrastructure.
- Overhead electric line construction in California is regulated by CPUC General Order 176 and General Order 95.

The Authority, as the state lead agency proposing to construct and operate the HSR system, is required to comply with all federal and state laws and regulations, and to secure all applicable federal and state permits prior to initiating construction on the selected alternative. Similarly, the Federal Railroad Administration (FRA), as federal lead agency, is required to comply with all federal laws and regulations. Therefore, there would be no inconsistencies between the Central Valley Wye alternatives and these federal and state laws and regulations.

The Authority is a state agency and therefore is not required to comply with local land use and zoning regulations; however, it has endeavored to design and construct the HSR project so that it is compatible with land use and zoning regulations. For example, the Central Valley Wye alternatives would incorporate IAMFs to minimize impacts on public utilities and energy. A total of 12 plans and 35 goals, policies, and objectives were reviewed. The Central Valley Wye alternatives would be consistent with 32 policies and inconsistent with three policies within the City of Chowchilla 2040 General Plan:

- ***City of Chowchilla 2040 General Plan Update*** (City of Chowchilla 2011a)—Policy PF 4, 5.1, and 6.2. Construction of the Central Valley Wye alternatives would not comply with some policies that require development of water and stormwater infrastructure to support the City's General Plan level of development.

Further details and reconciliations are discussed in Appendix 3.6-A. As a state agency, the Authority is not required to develop new local water and sewer facilities and the Authority does not propose to construct such facilities voluntarily. Therefore, the inconsistency would not be reconciled. Although the Central Valley Wye alternatives would be inconsistent with these specific provisions, they would be consistent with the public and environmental health and safety

objectives of these ordinances and plan policies. For example, the Central Valley Wye alternatives would follow the state building code requirements when relocating utilities affected by construction, which would result in upgrades to some utility infrastructure, and would work with local water utilities to coordinate construction activities so as to avoid service interruptions.

3.6.4 Methods for Evaluating Impacts

The evaluation of impacts on public utilities and energy is a requirement of NEPA) and CEQA. The following sections summarize the RSAs and the methods used to analyze impacts on public utilities and energy. As summarized in Section 3.6.1, Introduction, four other sections contain relevant information on utilities and energy resources: Section 3.2, Section 3.5, Section 3.8, and Section 3.14.

3.6.4.1 Definition of Resource Study Area

As defined in Section 3.1, Introduction, RSAs are the geographic boundaries within which the environmental investigations specific to each resource topic were conducted. There are two RSAs for public utilities and energy resources (one RSA for public utilities and energy and one for electricity); these RSAs include areas within and beyond the project footprint for each of the Central Valley Wye alternatives. Major utilities (as defined in Definition of Resources) exist within both RSAs. RSA boundaries vary for public utilities and energy, but generally include infrastructure and service areas of public utilities and electricity sources that could be directly and indirectly affected by construction and operations of the Central Valley Wye alternatives.

Table 3.6-2 describes these public utilities and energy RSAs and provides a general definition and boundary definition for each RSA.[2]

Table 3.6-2 Public Utilities and Energy Resource Study Area Definitions

Resource	General Definition	RSA Boundary Definition
Public Utilities and Energy (excluding electricity)		
Construction and Operations	Utility-owned properties and facilities required for connecting to the HSR system. Facilities could include substations; easements; overhead utility lines (e.g., telephone, cable television); and buried utility lines (e.g., water, wastewater, natural gas lines). Major utilities are defined as follows: overhead electrical lines greater than or equal to 60 kV and underground electrical lines greater than or equal to 300 kV; water line and sewer line pipe diameter greater than 16 inches; stormwater pipeline diameter greater than 18 inches; and gas lines with an operating pressure greater than 60 pounds per square inch or an inside diameter greater than or equal to 6 inches.	Affected service areas of utilities and utility-owned properties that intersect the Central Valley Wye alternative project footprints, including stormwater and water supply lines, electricity transmission facilities, fiber optics, and communication facilities, and required for connecting to the HSR system.
	Solid Waste Facilities	Merced, Madera, Fresno, and Stanislaus Counties

[2]The only change from baseline conditions related to public utilities and energy associated with the electrical interconnections and network upgrades is solid waste disposal during construction. Thus, only the RSA for solid waste facilities was expanded to include Stanislaus and Fresno Counties.

Energy (including electricity)		
Construction and Operations	Electricity generation and transmission systems required for connecting to the HSR system.	The areas both within and beyond the Central Valley Wye alternative project footprints, including the electricity grid in the entire state of California and other western states that produce energy exported to California.[1]

Source: Authority and FRA, 2018
[1] The HSR system would obtain electricity from the statewide grid. Therefore, this analysis cannot apportion to a particular region or area the use of any particular generation facilities.
RSA = resource study area
HSR = high-speed rail
kV = kilovolt

3.6.4.2 Impact Avoidance and Minimization Features

As noted in Section 2.2.3.7, Impact Avoidance and Minimization Features, the Central Valley Wye alternatives would incorporate standardized IAMFs to avoid and minimize impacts. The Authority would incorporate IAMFs during project design and construction and, as such, the analysis of impacts of the Central Valley Wye alternatives in this section factors in all applicable IAMFs. Appendix 2-B, California High-Speed Rail: Impact Avoidance and Minimization Features, provides a detailed description of IAMFs that are included as part of the Central Valley Wye alternatives design. IAMFs applicable to public utilities and energy resources include:

- BIO-IAMF#24: Construction Site Housekeeping
- HYD-IAMF#1: Stormwater Management
- HYD-IAMF#2: Flood Protection
- HYD-IAMF#3: Prepare and Implement a Construction Stormwater Pollution Prevention Plan
- HYD-IAMF#4: Prepare and Implement an Industrial Stormwater Pollution Prevention Plan
- PUE-IAMF#1: Design Measures
- PUE-IAMF#2: Irrigation Facility Relocation
- PUE-IAMF#3: Public Notifications
- PUE-IAMF#4: Utilities and Energy

3.6.4.3 Methods for NEPA and CEQA Impact Analysis

This section describes the sources and methods the Authority and FRA used to analyze potential impacts from implementing the Central Valley Wye alternatives on utility services, water use, waste generation, right-of-way access, storm drain facilities, and energy consumption. These methods apply to both NEPA and CEQA unless otherwise indicated. Refer to Section 3.1.3.4, Methods for Evaluating Impacts, for a description of the general framework for evaluating impacts under NEPA and CEQA.

As described in Section 3.6.1, and in the following discussions, the Authority and FRA have applied the methods and many of the same data sources from the Merced to Fresno Final EIR/EIS to this Draft Supplemental EIR/EIS. Laws, regulations, and orders (see Section 3.6.2) that regulate public utilities and energy were also considered in the evaluation of impacts.

This analysis focuses on both the direct and indirect impacts of implementing the Central Valley Wye alternatives on public utilities and energy resources. Direct and indirect public utility impacts are evaluated quantitatively and qualitatively. Direct impacts include planned or accidental interruptions to major utility services, conflicts with existing utilities and subsequent relocation of affected utilities, and water use during construction activities. Indirect impacts include the disposal of solid waste and hazardous waste generated during construction.

Energy impacts caused by the Central Valley Wye alternatives may include the additional consumption of electricity required to power the HSR (direct use) and consumption of resources to construct the proposed HSR facilities (indirect use). Indirect energy consumption involves the

nonrecoverable, one-time energy expenditure required to construct the physical infrastructure associated with the Central Valley Wye alternatives. Direct and indirect energy impacts are evaluated quantitatively.

Public Utilities

Analysts used and supplemented information contained in the Merced to Fresno Final EIR/EIS, including utility data, such as as-built drawings, utility maps, and encroachment requirements, to identify utility conflicts. In preparation of this Draft Supplemental EIR/EIS, analysts also made additional contacts by telephone and email in November 2014 and reviewed data from the following sources:

- Field surveys were conducted in August 2013 and April 2014 to augment previous information provided by utility service providers for the Merced to Fresno Final EIR/EIS (Authority and FRA 2012).
- Additional contacts to utility owners were made by telephone and email in November 2014 to confirm existing utility information.
- A review of wastewater disposal land data from the Central Valley Regional Water Quality Control Board (Central Valley RWQCB) (2014a) was completed.

Utility conflicts are quantified in Section 3.6.6.3, Central Valley Wye Alternatives, by counting once each time the utility crosses the Central Valley Wye alternatives.

Methods used to estimate water use and waste generated for implementation of the Central Valley Wye alternatives are the same as described for the Merced to Fresno Final EIR/EIS. Analysts estimated water use for construction based on an estimated 5-year time period in which earthmoving and construction activities requiring water use would occur within a longer overall construction period. Estimates of existing water use were generated by applying region-specific water use rates for the known land uses in the project footprints of the Central Valley Wye alternatives (see Section 3.13, Land Use and Development). Water use estimates are presented in Appendix 3.6-B. Analysts estimated waste generated by Central Valley Wye alternatives construction and demolition activities based on estimates provided by the Authority's engineers using the existing characteristics of the Central Valley Wye alternatives' attributes. Because the Central Valley Wye alternatives do not include any stations or maintenance facilities, no operational waste would be generated. Accordingly, operational waste is not discussed further in this analysis.

Energy

Similar to the evaluation of public utilities, analysts used and supplemented information contained in the Merced to Fresno Final EIR/EIS, including utility data such as as-built drawings, utility maps, and encroachment requirements, to identify conflicts relating to energy and electricity resources. When preparing this Draft Supplemental EIR/EIS, analysts also used field survey information gathered in August 2013 and April 2014.

The HSR system, including the Central Valley Wye alternatives, would obtain electricity from the statewide electricity grid. Any potential impacts on electrical production that may result from the Central Valley Wye alternatives would affect statewide electricity reserves and, to a lesser degree, transmission capacity. To identify the projected energy demand of the Central Valley Wye alternatives, the estimated electrical requirements for Phase I of the HSR system was prorated based on the proportion of the length of HSR guideway within the Central Valley Wye alternatives. Phase I of the HSR system would be approximately 540 miles long. The length of the Central Valley Wye alternatives ranges from approximately 51 to 55 miles, depending on the alternative selected (see Section 2.2.3, Description of the Central Valley Wye Alternatives). The Central Valley Wye alternatives account for approximately 9 to 10 percent of the length of the Phase I HSR system and therefore would consume approximately 9 to 10 percent of the electrical requirements of Phase I of the HSR system.

In calculating estimated energy savings for the Central Valley Wye alternatives, two ridership probability scenarios were used: medium and high. These scenarios are based on probabilistic estimates for Phase I of the HSR system to achieve its ridership projections by 2040. In the case of HSR, *probabilistic* is defined as numerous possible ridership outcomes, each having varying degrees of certainty or uncertainty of occurring.

Energy impacts caused by the Central Valley Wye alternatives may include the additional consumption of electricity required to power the HSR (direct use) and consumption of resources to construct the proposed HSR facilities (indirect use). Energy used for vehicle propulsion is a function of traffic characteristics and the thermal value of the fuel used. Petroleum consumption rates for vehicle travel were derived from the travel demand forecast for the HSR and growth projections performed by the CEC. These consumption rates were used to determine the amount of petroleum used for transportation under the No Project Alternative and the Central Valley Wye alternatives. Current electricity consumption rates from the CEC are compared with the projected energy consumption of the HSR system.

Indirect energy consumption involves the nonrecoverable, one-time energy expenditure required to construct the physical infrastructure associated with the Central Valley Wye alternatives. This analysis uses construction energy data from other sources or existing HSR systems. Construction energy information for comparable HSR systems is not readily available. Consequently, construction energy consumption factors identified for the proposed HSR system were derived from data gathered for typical heavy-rail systems and the San Francisco Bay Area Rapid Transit District heavy-rail commuter system. These data represent the best publicly available statistics and were used to estimate the projected construction energy consumption for the Central Valley Wye alternatives and are presented in in Section 3.6.6, Environmental Consequences.

The construction energy payback period is the number of years required to pay back the energy used in construction of the Central Valley Wye alternatives with operational energy consumption savings of the Central Valley Wye alternatives. The net amount of energy savings from operations of the Central Valley Wye alternatives was determined by subtracting the increase in electrical energy required to operate the Central Valley Wye alternatives from the energy savings from reduction of VMT in Merced and Madera Counties and reduction of airplane travel in the San Joaquin Valley. Calculations assume that the amount of energy saved in the study years (2015 and 2040) would remain constant throughout the payback period.

3.6.4.4 Determining Significance under CEQA

CEQA requires that an EIR identify significant environmental impacts of a project (CEQA Guidelines § 15126). One of the primary differences between NEPA and CEQA is that CEQA requires a significance determination for each impact using a threshold-based analysis (see 3.1.3.4). By contrast, under NEPA, significance is used to determine whether an environmental impact statement (EIS) will be required; NEPA requires that an EIS is prepared when the proposed federal action (project) as a whole has the potential to "significantly affect the quality of the human environment." Accordingly, Section 3.6.9, CEQA Significance Conclusions, summarizes the significance of the environmental impacts on public utility resources and energy for each Central Valley Wye alternative. The Authority is using the following thresholds to determine if a significant impact on public utilities and energy would occur as a result of the Central Valley Wye alternatives.

Public Utilities

For public utilities, a significant impact is one that would:

- Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.
- Need new or expanded entitlements to supply water to the Central Valley Wye alternatives.

- Result in a determination by the wastewater treatment provider that serves or may serve the Central Valley Wye alternatives that it does not have adequate capacity to serve the project's projected demand in addition to its existing commitments.
- Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.
- Be served by a landfill with insufficient permitted capacity to accommodate the Central Valley Wye alternative's solid waste disposal needs.
- Not comply with federal, state, and local statutes and regulations related to solid waste.
- Conflict with a fixed facility such as an electrical substation or wastewater treatment plant.

Energy

For energy, a significant impact is one that would result in:

- A substantial demand on regional energy supply or require significant additional capacity, or significantly increase peak and base period electricity demand.

By contrast, if a Central Valley Wye alternative were to result in energy savings, alleviate demand on energy resources, or encourage the use of efficient transportation alternatives, it would have a beneficial effect.

3.6.5 Affected Environment

This section describes the affected environment for public utilities and energy in the region and along the alignments of the Central Valley Wye alternatives. It also discusses changes to utilities and energy resources in Merced and Madera Counties since publication of the Merced to Fresno Final EIR/EIS. This information provides the context for the environmental analysis and evaluation of impacts.

Table 3.6-3 provides a summary of the utility and energy providers within Merced and Madera Counties. More detailed information on utility and energy resources is provided in Section 3.6.4.3, Methods for NEPA and CEQA Impact Analysis.

Table 3.6-3 Summary of Utility and Energy Providers within the Resource Study Areas

Utility Type		Provider	County/City
Electrical		PG&E	Merced and Madera Counties
Natural Gas		PG&E	Merced and Madera Counties
		California Gas Gathering Inc.	Madera County
Petroleum and Fuel Pipelines		Kinder Morgan, Inc.	Merced and Madera Counties
Communications	Telephone	AT&T	Merced and Madera Counties
		Sprint	
		QWEST	
		Verizon	Merced County
	Cable/ Internet	Comcast	Merced and Madera Counties
		AT&T	Madera County

Utility Type	Provider	County/City
Potable Water Supply	City of Chowchilla	Madera County
	Madera County Maintenance District 33, Fairmead	
	Madera Valley Water Company	
Water Supply[1]	Henry Miller Reclamation District	Merced County
	Central Valley Regional Water Control Board	
	Madera County Flood Control & Water Conservation Agency	
	Central California Irrigation District	
	Le Grand-Athlone Water District	
	Merced Irrigation District	
	Chowchilla Water District	Merced and Madera Counties
	Madera Irrigation District	Madera County
Stormwater	City of Chowchilla	City of Chowchilla
Solid Waste Collection	Madera Disposal, Inc.	Madera County

Source: Authority and FRA, 2016; Madera County Local Agency Formation Commission, *2007; Merced County Local Agency Formation Commission, 2007;* Central California Irrigation District, *2012*
PG&E = Pacific Gas and Electric Company
[1] Includes local maintaining agencies within the public utilities and energy Resource Study Area.

3.6.5.1 Public Utilities

Electrical Transmission Lines

The Pacific Gas and Electric Company (PG&E) provides the major electric lines throughout the San Joaquin Valley. The Central Valley Wye alternatives pass through areas with several high-voltage overhead electric lines that range from 70 kV to 230 kV.

Major Fuel Facilities

Two types of fuel lines are present within the RSA: natural gas and petroleum. Major natural gas lines are present within the rights-of-way of the Central Valley Wye alternatives. The greatest concentration of these fuel lines occurs along the Union Pacific Railroad (UPRR). Identified natural gas lines are owned and regulated by two companies: PG&E and California Gas Gathering Inc.

The Challenger Pipeline is owned by California Gas Gathering. The Challenger Pipeline, an 8-inch steel pipe, is located along Harmon Road north of SR 152 and Flanagan Road south of SR 152 in the San Joaquin Valley. It has a cover depth of about 5 feet and crosses all the Central Valley Wye alternatives. PG&E owns numerous natural gas lines crossing the Central Valley Wye alternatives.

One petroleum product pipeline crosses all the Central Valley Wye alternatives. It is a 12-inch inside diameter, high-pressure, refined petroleum products pipeline owned by Kinder Morgan. This pipeline connects northern California to Kinder Morgan's Fresno Terminal and runs within the UPRR right-of-way near SR 99.

Communication Facilities

Various communication facilities (underground and aboveground) are located within the project footprints of the Central Valley Wye alternatives. All underground communication utilities are

assumed to have shallow depths except those crossing under existing features such as underpasses and creeks. A number of overhead telephone service lines were visually identified during field inspection trips in January and August of 2013.

Telephone customers near the Central Valley Wye alternatives are serviced primarily by AT&T and Verizon (AT&T Knowledge Ventures LLP 2007). Additionally, AT&T, Sprint, and QWEST have fiber optic cables within the UPRR right-of-way near SR 99 that cross all Central Valley Wye alternative alignments. AT&T has an underground fiber optic cable, parallel to Avenue 25 near Chowchilla, crossing the SR 152 (North) to Road 13 and Avenue 21 to Road 13 Wye Alternatives. Verizon has provided written information identifying two locations with twisted-pair copper cables (DSL lines)—one each along Elgin Road and Indiana Road crossing all the Central Valley Wye alternatives.

Water Supply Infrastructure

The Central Valley Wye alternatives are located in an area that is used primarily for agricultural purposes; no effects on potable water were found. The main water infrastructure in this study is irrigation canals. Additional details are provided in the *Merced to Fresno: Central Valley Wye, Utility Engineering Report* (Authority and FRA 2016).

Water conveyance facilities near the Central Valley Wye alternatives consist mostly of dirt-lined irrigation canals owned or regulated by the following agencies and departments:

- California Department of Water Resources (DWR)
- Central California Irrigation District
- Chowchilla Water District
- Henry Miller Reclamation District
- Madera Irrigation District[3]
- Merced Irrigation District
- U.S. Bureau of Reclamation[4]

Wastewater Infrastructure

There are no wastewater pipelines crossing or adjacent to any Central Valley Wye alternatives based on the locations of utilities and utilities infrastructure identified in the *Merced to Fresno: Central Valley Wye, Utility Engineering Report (*Authority and FRA 2016).

Storm Drains

Storm drain systems and pipelines are prominent in developed urban areas. However, in the rural areas that characterize large portions of the public utilities RSA, roadside ditches, irrigation canals, and natural drainages convey stormwater runoff and transport it to retention or detention basins for groundwater recharge. The storm drainage systems near the Central Valley Wye alternatives reflect the limited annual rainfall and relatively flat topography of the region.

Merced County

No Merced County stormwater facilities were identified in the RSA of any of the Central Valley Wye alternatives.

City of Merced

The City of Merced Wastewater Collection Department operates and maintains the City's storm drainage collection system. The storm drainage collection system consists of 112 miles of underground storm drain lines, underground storage pipes, and 141 acres of detention ponds. The Storm Drain Collection crew vacuums 2,448 storm drain catch basins per year, and

[3] Some irrigation facilities are owned by the U.S. Bureau of Reclamation and are operated and maintained by the Madera Irrigation District under contract to the U.S. Bureau of Reclamation.

[4] U.S. Bureau of Reclamation lands are depicted in relationship to the Central Valley Wye alternatives in Appendix 3.6-C, U.S. Bureau of Reclamation Lands.

maintains 56 storm drain pump stations and associated basins, storm inlets, and discharge lines. The system is designed to prevent flooding in the community (City of Merced, n.d.).

Madera County

Madera County operates one storm drainage system, which is located outside the public utilities RSA approximately 31 miles northeast of Chowchilla (City of Chowchilla 2011b). The Storm Water Division of the City of Chowchilla Public Services Department maintains and operates this system to provide control and disposal of stormwater runoff. The system includes approximately 4 miles of drainage ditches, eight stormwater basins, three pump stations, and other storm drainage facilities. Approximately 80–90 percent of the stormwater runoff collected by the drainage system ends up in these stormwater basins. The remainder of the stormwater runoff flows into Ash Slough or privately owned storm basins. Most of the stormwater in the basins percolates to the groundwater (Madera County 2008). These Madera County stormwater facilities are not in conflict with any of the Central Valley Wye alternatives.

Solid Waste Facilities

There are five landfills in Merced, Madera, Fresno, and Stanislaus Counties; Table 3.6-4 summarizes landfill capacity for these sites. These landfills do not accept hazardous wastes. Although none of the landfills within the public utilities RSA accepts hazardous wastes, there are some in-state landfills, such as Chemical Waste Management's Kettleman Hills Landfill in Kings County and permitted landfills in southern California, that accept hazardous wastes (California Department of Toxic Substances Control [DTSC] 2015).

Table 3.6-4 Landfill Facility Summary

Landfill	Landfill Permitted Daily Tonnage (tons per day)	Estimated Permitted Landfill Capacity (cubic yards)	Remaining Landfill Capacity (cubic yards)	Estimated Permitted Closure Date
Billy Wright Landfill[1]	1,500	14,800,000	11,370,000	2054
Highway 59 Landfill[2]	1,500	30,012,352	28,025,334	2065
Fairmead Landfill[3]	1,100	9,400,000	5,552,894	2033
American Avenue Landfill[4]	2,200	32,700,000	29,358,535	2031
Fink Road Sanitary Landfill[5]	2,400	14,640,000	8,240,435	2023

Source: California Department of Resources, Recycling, and Recovery (CalRecycle), 2016a, 2016b, 2016c, 2016d, 2016e; California Integrated Waste Management Board, 2016
[1] Based on 2010 capacity information.
[2] Based on 2008 capacity information.
[3] Based on 2004 capacity information.
[4] Based on 2014 capacity information.
[5] Based on 2014 capacity information.

Billy Wright Landfill is operated by Merced County and its incorporated cities and serves the western part of the county. Wastes accepted at the Billy Wright Landfill include agricultural, construction and demolition, and mixed municipal (CalRecycle 2016a).

The Highway 59 Landfill, which serves eastern areas of the county (including the city of Merced), is located at 6040 North Highway 59, approximately 6 miles north of the city of Merced, and is jointly owned and operated by Merced County and its incorporated cities. In 2008, Merced County estimated that the landfill was approximately 6.7 percent full. Permitted waste types at the Highway 59 Landfill are Class III, nonhazardous solid waste, inert waste, nonfriable asbestos, concrete, asphalt, and wood and green wastes for composting (CalRecycle 2016b) as well as a "designated" Class II landfill, which accepts treated wood (i.e., power poles) (Central Valley RWQCB 2014b).

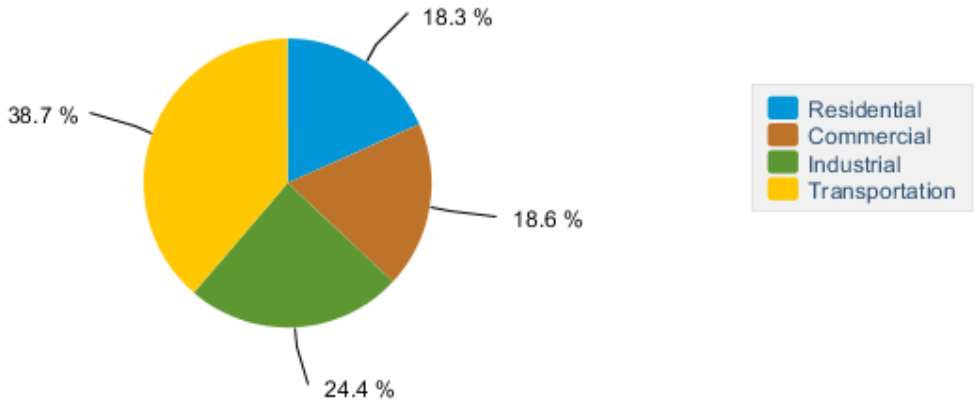
The Fairmead Solid Waste Disposal Site is a landfill located along Road 19 in unincorporated Madera County. Madera County owns Fairmead Landfill and contracts operations to Red Rock Environmental Group. Fairmead Landfill is the only active and permitted disposal facility in Madera County. Approximately 50 percent of the waste produced in Madera County is disposed at Fairmead Landfill; the remaining waste is recycled or diverted to other facilities in Merced or Fresno Counties. According to the California Department of Resources Recycling and Recovery, the Fairmead Landfill had an available capacity of 59.1 percent of its permitted volume in 2004, and is projected to close in 2033 (CalRecycle 2016c). The landfill accepts agricultural wastes, construction and demolition materials, industrial wastes, tires, asbestos, green materials, mixed municipal wastes, and wood wastes (CalRecycle 2016c).

The American Avenue Landfill is located in Fresno County at 18950 West American Avenue in Kerman. The American Avenue Landfill is operated by the County of Fresno, which also operates a small transfer station at Shaver Lake. American Avenue Landfill is a sanitary landfill that accepts household hazardous waste in addition to general refuse. The USEPA defines a sanitary landfill as a disposal site for nonhazardous solid waste spread in layers, compacted to the smallest practical volume, and covered by material applied at the end of each operating day (City of Fresno 2016).

The Fink Road Sanitary Landfill is located in Stanislaus County at 4000 Fink Road in Crows Landing. The Fink Road Sanitary Landfill is owned by Stanislaus County and is operated by the Department of Environmental Resources. The Fink Road Sanitary Landfill is a Class III landfill for nonhazardous municipal solid waste and provides municipal solid waste services to Ceres, Hughson, Modesto, Newman, Oakdale, Patterson, Riverbank, Turlock, Waterford, and the unincorporated areas of Stanislaus County (Stanislaus County 2016).

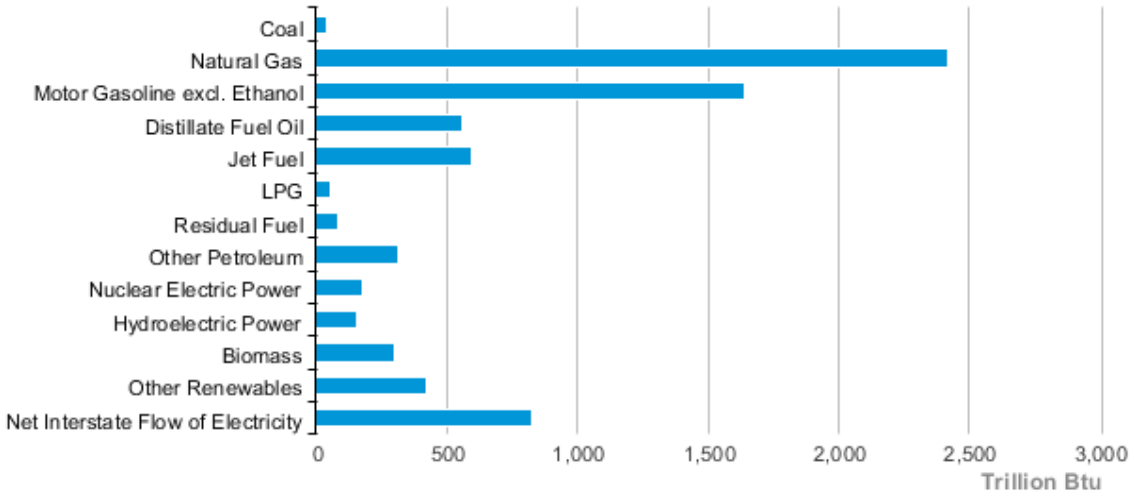
3.6.5.2 Energy

California's total energy consumption in 2014 was 7,620 trillion Btu. The transportation sector accounts for 38.7 percent of California's energy use, the industrial sector 24.4 percent, the residential sector 18.3 percent, and the commercial sector 18.6 percent (U.S. Energy Information Administration 2016). Figure 3.6-1 illustrates California's energy consumption by sector in 2014, and Figure 3.6-2 depicts the California energy consumption estimates by type in 2014.



Source: U.S. Energy Information Administration, 2016

Figure 3.6-1 California Energy Consumption by Sector, 2014



Source: U.S. Energy Information Administration, 2016

Figure 3.6-2 California Energy Consumption Estimates by Type, 2014

Electricity

Demand

There are two ways to measure electricity demand: consumption and peak demand. Electricity consumption is the amount of electricity used by consumers in the state. In 2014, total statewide electricity consumption was 256,971 million kilowatt hours. Table 3.6-5 summarizes electricity consumption in Merced and Madera Counties in 2014.

Table 3.6-5 Electricity Consumption in Merced and Madera Counties in 2014

County	2014 Usage (million kilowatt hours)
Merced County	3,021
Madera County	1,663

Source: California Energy Commission, *2016a* (*CA Energy Consumption Data Management System Website*)
Numbers are rounded.

The highest electric power requirement during a specified period, known as peak demand, is measured as the amount of electricity consumed at any given moment, usually integrated over a 1-hour period. Because electricity must be generated at the instant it is consumed, this measurement specifies the greatest generating capacity that must be available during periods of peak demand. Peak demand is important in evaluating system reliability, identifying congestion points on the electrical grid, and designing required system upgrades. California's peak demand typically occurs in August, between 3 p.m. and 5 p.m. (Burt 2005). In the energy RSA, high air conditioning loads and irrigation pumping contribute to the summer peak demand.

Generation

The projected net power supply within the grid controlled by the California Independent System Operator for summer 2015 was 65,288 megawatts (MW) (CAISO 2015). Table 3.6-6 summarizes fuel sources for electric power generated in California in 2014.

Table 3.6-6 Fuel Sources for Electric Power in California in 2014

Fuel Source	Gigawatt-hours		Percentage of Fuel Mix
Coal	1,011		0.5
Large Hydroelectric	14,052		7.1
Natural Gas	121,934		61.3
Nuclear	17,027		8.6
Petroleum	46		0.0
Renewables			22.5
Geothermal	12,186	44,887	6.1
Biomass	6,721		3.4
Small Hydro	2,426		1.2
Solar	10,557		5.3
Wind	12,997		6.5
Other	16		0.0
Total Electric Industry	**198,973**		**100**

Source: California Energy Commission, *2016a (CA Energy Commission Energy Almanac)*
In-state natural gas-fired power plants account for more than 60 percent of California's electricity generation (California Energy Commission, 2016a).

Electricity Demand and Generation Capacity Outlook

Statewide, the average summer net power supply in 2015 was estimated at 65,288 MW. Assuming 1-in-2 summer temperatures,[5] electricity demand was estimated at approximately 47,188 MW. The result is an average planning reserve margin[6] of 36 percent (CEC 2010). California's population is projected to exceed 42 million by 2025 and more than 47 million by 2040, requiring an additional 86,000 MW of peak summer capacity in 2040[7] to meet demand and have an adequate reserve margin (California Department of Finance [CDOF] 2013).

The CEC's *California Energy Demand 2016–2026, Preliminary Electricity Forecast* (CED 2015 Preliminary Forecast*)* (CEC 2015) describes the CEC's preliminary 10-year forecasts for electricity consumption, retail sales, and peak demand for each of five major electricity planning areas and for the state as a whole. The CED 2015 Preliminary Forecast considers three cases (low, mid, and high) designed to capture a reasonable range of demand outcomes over the next 10 years:

- Preliminary Low Demand: The low-energy demand case incorporates lower economic/demographic growth, higher assumed rates, and higher self-generation impacts.
- Preliminary Mid Demand: The mid case uses input assumptions at levels between the high and low cases. These scenarios are referred to as baseline cases, meaning they do not include additional achievable energy efficiency savings.
- Preliminary High Demand: The high-energy demand case incorporates relatively high economic/demographic growth and climate change impacts, and relatively low electricity rates and self-generation impacts.

5 1-in-2 forecast temperatures are temperatures with a 50 percent chance of not being exceeded.

6 Planning reserve calculation = [(Total Net Supply + Demand Response + Interruptible Power)/1-in-2 Demand] – 1.

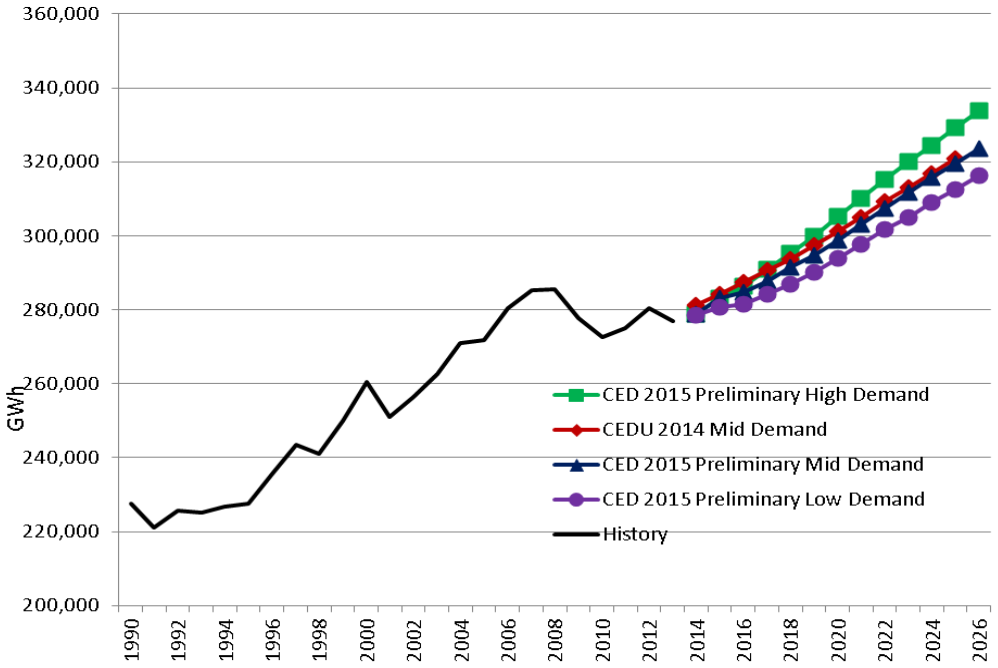
7 This value assumes a 1.5 percent annual growth rate in peak demand and includes a 15 percent reserve margin.

Projected electricity consumption for the three CED 2015 Preliminary Forecast cases and the CED 2014 Updated Forecast mid case (CEC 2014a) is shown in Figure 3.6-3. By 2025, consumption in the new mid scenario is projected to be only 0.4 percent lower than the CED 2014 Updated Forecast mid case, around 1,000 GWh. Annual growth rates from 2013 to 2025 for the CED 2015 Preliminary Forecast average 1.45 percent, 1.20 percent, and 1.01 percent in the high, mid, and low cases, respectively, compared to 1.23 percent in the CED 2014 Updated Forecast mid case.

The increasing demand for electrical energy is based on growth in both population (i.e., households) and commerce (commercial and industrial businesses). Weather can also influence electricity demand. In 2009, California's peak load was approximately 54,000 MW of electric power (DWR 2013).

Transmission

California's high-voltage electric transmission system connects the different regions of the state to each other, to varying degrees, as well as to the transmission systems of the surrounding western states, Canada, and Mexico. The degree to which areas are interconnected depends upon the availability of transmission capacity between the areas. These interconnected electric transmission systems allow power purchases and sales to extend beyond state and national borders. More than 300,000 miles of electrical transmission or distribution lines currently cross California, including more than 32,000 miles of high-voltage electric transmission lines. High-voltage electric transmission lines are defined by the electrical power industry as those that are more than 100 kV. The California Independent System Operator, a nonprofit entity responsible for the system's reliability and nondiscriminatory transmission of energy, operates California's transmission system (DWR 2013).



Source: California Energy Commission, 2014a; 2015

Figure 3.6-3 Statewide Baseline Annual Electricity Consumption

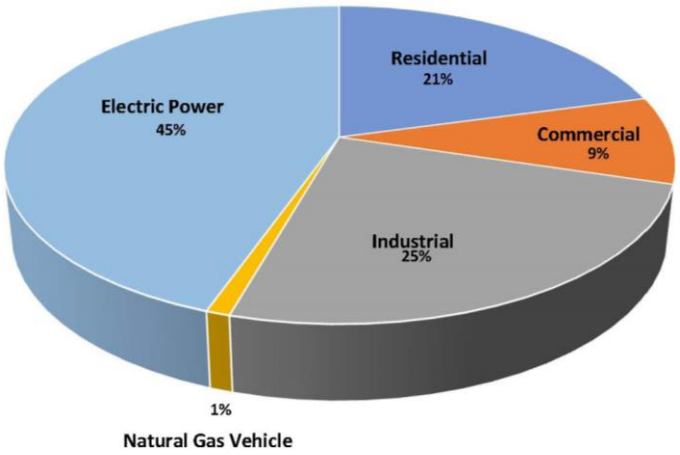
Long-term electric transmission planning identifies transmission upgrades needed to serve future loads, as well as to compensate for changes in generation patterns, such as the renewable power generation being introduced into the grid to meet Renewable Portfolio Standards pursuant to state law (SB 350), requiring that 20 percent of retail sales of all utilities in the state come from

renewable resources by the end of 2013, 25 percent by the end of 2016, and 50 percent by the end of 2030.

Natural Gas

Demand

In 2012, total natural gas demand in California for industrial, residential, commercial, and electric power generation was 2,313 billion cubic feet per year, up from 2,196 billion cubic feet per year in 2010. Demand in all sectors except electric power generation remained relatively flat for the last decade due in large part to energy efficiency measures, but demand for power generation rose about 30 percent between 2011 and 2012 (CEC 2016b). Figure 3.6-4 illustrates the natural gas demand in California by sector for 2012.



Source: California Energy Commission, 2016b

Figure 3.6-4 California Natural Gas Demand by Sector, 2012

Generation

Natural gas produced in California in 2012 accounted for 61 percent of all the power generated in California—a 30 percent increase from 2011. Natural gas (both in-state and imported) accounted for 43 percent of all the power consumed in California. California imported 90 percent of natural gas used in 2012, with most of the supply coming from interstate pipelines carrying gas from the Southwest, the Rocky Mountains, and Canada (CEC 2016b). According to the CEC's *2013 Natural Gas Issues, Trends, and Outlook*, the overall demand for natural gas in California is projected to be 5,639 million cubic feet per day in 2025 (CEC 2014b). This is a decrease from the 2011 demand of 5,738 million cubic feet per day. In all cases, demand for the residential sector remains relatively flat as energy efficiency measures are expected to continue to reduce demand in this sector. Demand in the power-generation sector increased in 2015, followed by a decrease in demand. This is a result of the 2012 closure of the San Onofre Nuclear Generating Station, which required some replacement generation from natural gas. However, by 2020, more installed renewable generation is projected to both decrease the need for natural gas in the power generation sector and to result in a 1 percent decrease in gas demand for power generation between 2011 and 2025 (CEC 2015).

Petroleum

Automobile travel is the predominant mode of passenger transportation within the energy RSA. Historically, demand for transportation services (and petroleum consumption) in California has mirrored the growth of the state's population and economic output.

3.6.6 Environmental Consequences

3.6.6.1 Overview

This section evaluates how the No Project Alternative and the Central Valley Wye alternatives could affect public utilities and energy. The impacts of the Central Valley Wye alternatives are described and organized in Section 3.6.6.3, as follows:

Construction Impacts

- Public Utilities Impacts
  - Impact PUE#1: Planned Temporary Interruption of Major Utility Services
  - Impact PUE#2: Accidental Temporary Interruption of Major Utility Services
  - Impact PUE#3: Temporary Impacts from Water Use
  - Impact PUE#4: Temporary Generation of Solid Waste and Hazardous Wastes
  - Impact PUE#5: Permanent Conflicts with Existing Utilities Requiring Relocation
  - Impact PUE#6: Permanent Reduced Access to Existing Utilities in the HSR Right-of-Way
  - Impact PUE#7: Permanent Impacts on Wastewater or Stormwater Pipelines
- Energy Impacts
  - Impact PUE#8: Temporary Impacts from Energy Consumption

Operations Impacts

- Public Utilities Impacts
  - Impact PUE#9: Permanent Impacts on Public Utility Services, Water Use, and Waste Generation
- Energy Impacts
  - Impact PUE#10: Permanent Impacts on Energy Consumption

3.6.6.2 No Project Alternative

The population in the San Joaquin Valley is expected to grow through 2040 (see Section 2.2.2.2, Planned Land Use). Development in the San Joaquin Valley to accommodate the population increase would continue under the No Project Alternative and result in associated direct and indirect impacts on public utilities and energy. Such planned projects that are anticipated to be constructed by 2040 include residential, commercial, industrial, recreational, transportation, and agricultural projects.

As discussed in Section 3.6.5, Affected Environment, local utilities have prepared capital improvement plans to accommodate anticipated population growth. These improvements include the addition of a new wastewater treatment plant in Chowchilla to accommodate growth projections.

Future development projects in Merced and Madera Counties include dairy farm expansions, implementation of airport development and land use plans, and implementation of general and specific plans throughout both counties. Planned projects under the No Project Alternative would also include transportation projects, such as the expansion of SR 99, and residential, commercial, and industrial developments. A full list of anticipated future development projects is provided in Appendix 3.19-A, Cumulative Plans and Non-Transportation Projects List, and Appendix 3.19-B, Cumulative Transportation Projects List.

In addition, demand for energy would also increase at a level commensurate with population growth. The region would increase peak- and base-period electricity demand and would require additional generation and transmission capacity. According to the CEC Demand Analysis Office, CED 2015 Preliminary Forecast (CEC 2015), the average annual growth rate for statewide electricity demand between 2014 and 2026 is forecasted to increase from 0.54 percent (low-energy demand) to 1.27 percent (high-energy demand). The CEC analysis included forecasted impacts of approved efficiency programs, climate change, electric vehicles, other electrification (including ports and HSR), and

demand response (time of use pricing) programs. Energy use in Merced and Madera Counties would be anticipated to trend along the forecasted state average during this same period.

Under the No Project Alternative, recent development trends are anticipated to continue, leading to impacts on public utilities and energy. Existing land would be converted for residential, commercial, industrial, and transportation infrastructure development to accommodate future growth, placing potential pressures on public utilities and energy resources. In addition, the demand for energy would increase because of increased population from newly planned development, leading to additional electricity demand. Higher regional VMT from potential growth in Merced and Madera Counties, as described in Section 2.2.2, No Project Alternative, is also expected to result. Planned development and transportation projects that would occur under the No Project Alternative would likely include various forms of mitigation to address impacts on public utilities and energy.

3.6.6.3 Central Valley Wye Alternatives

Construction of the Central Valley Wye alternatives would result in temporary impacts on utility and energy resources. Impacts on utilities and their customers could occur from planned or potentially accidental interruption for permanent relocation of utility infrastructure. Construction would require water to prepare concrete, clean equipment, and apply soils binders and would generate construction-related waste from clearing of vegetation, removal of existing asphalt and gravel, and demolition of existing structures. Construction of the Central Valley Wye alternatives could also result in reduced access to existing utilities within the HSR right-of-way, because the HSR right-of-way would be permanently fenced and secured after construction. In addition, energy would be consumed to transport construction materials and to support major staging areas, field offices, and security lighting. Operations of the Central Valley Wye alternatives would require an electrified line to supply electric train vehicles with traction power from existing PG&E substations.

Construction Impacts

Construction of the Central Valley Wye alternatives would involve demolition of existing structures; clearing and grubbing; handling, storing, hauling, excavating, and placing fill; possible pile driving; and construction of aerial structures, bridges, road modifications, utility upgrades and relocations, HSR electrical systems, and railbeds. Construction activities are described in Chapter 2, Alternatives.

Public Utilities Impacts

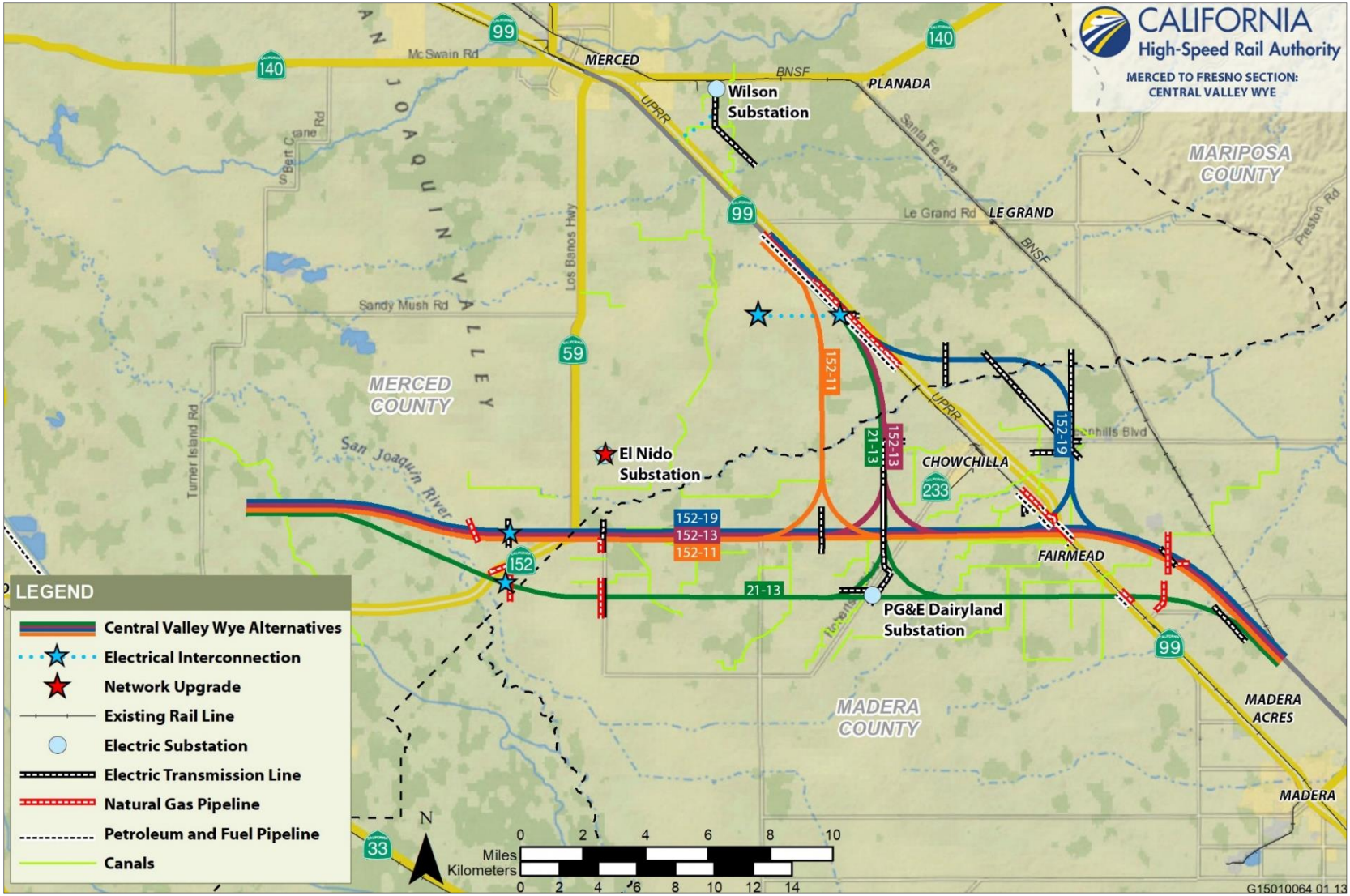
Construction of Central Valley Wye alternatives would result in planned temporary interruptions of utility service, potentially accidental disruptions of services, increased water use, and an increase in waste generation. Table 3.6-7 provides information on the number of utility-related conflicts for each of the Central Valley Wye alternatives. Utility conflicts are counted once each time the utility crosses the Central Valley Wye alternatives. Figure 3.6-5 identifies locations of the major utilities within the public utilities and energy RSA. There would be no water line, sewer, stormwater retention pond, or stormwater pipeline conflicts.[8]

[8] The threshold for water line and sewer line conflicts was a pipe diameter greater than 16 inches. The threshold for stormwater pipeline conflicts was a pipe diameter greater than 18 inches.

Table 3.6-7 Impacts on Major Utilities by Alternative

Utilities	Central Valley Wye Alternatives				Range of Impacts
	SR 152 (North) to Road 13 Wye	SR 152 (North) to Road 19 Wye	Avenue 21 to Road 13 Wye	SR 152 (North) to Road 11 Wye	
Electrical Lines[1]	8	11	11	7	7–11
Natural Gas Transmission Lines[2]	7	9	6	7	6–9
Petroleum and Fuel Pipelines	1	3	1	1	1–3
Electrical Substation	0	0	1	0	0–1
Communications Facilities	6	11	6	6	6–11
Canals/Pipelines	44	42	69	45	42–69

Source: Authority and FRA, 2016
[1] Overhead electrical lines greater than or equal to 60 kV and underground electrical lines greater than or equal to 300 kV.
[2] Gas lines with an operating pressure greater than 60 pounds per square inch gage or an inside diameter ≥ 6 inches.
SR = State Route



Source: *U.S. Geological Survey, 2016a; California Energy Commission, 2014c*

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Figure 3.6-5 Major Utility and Energy Facilities in the Project Vicinity

Impact PUE#1: Planned Temporary Interruption of Major Utility Services

Construction of any of the Central Valley Wye alternatives would result in planned, temporary interruption of major utility service during the 1- to 3-year duration of construction at any given location. The types of construction activities would be the same for all four Central Valley Wye alternatives because they would be conducted in the same approximate geographies and in the same proximity to major utility services such as electrical lines, natural gas transmission lines, petroleum and fuel pipelines, canals, and pipelines. Therefore, all four Central Valley Wye alternatives would result in similar temporary impacts on utilities. Construction, including work associated with reconductoring and connection of electrical interconnection facilities to the grid, would require the temporary shutdown of subsurface, aboveground, or overhead electrical transmission lines; natural gas transmission pipeline facilities; petroleum product conveyance facilities; and water infrastructure. Shutdowns would interrupt utility services to industrial, commercial, agricultural, and residential customers and would be similar for all Central Valley Wye alternatives.

As discussed in Section 3.6.4.2, Impact Avoidance and Minimization Features, the Central Valley Wye alternatives include IAMFs to avoid and minimize impacts to public utilities. PUE-IAMF#1 requires the design-build contractor to implement energy-saving measures during construction to avoid overburdening utility service providers. PUE-IAMF#3 requires that, prior to construction in areas where utility service interruptions are unavoidable, the contractor would notify the public through a combination of communication media (e.g., by phone, email, mail, newspaper notices, or other means) within that jurisdiction and the affected service providers of the planned outage. The notification would specify the estimated duration of the planned outage and would be published no less than 7 days prior to the outage, in accordance with California Independent System Operator requirements (CAISO 2015). Construction would be coordinated to avoid interruptions of utility service to hospitals and other critical users (PUE-IAMF#3). In addition, prior to construction the contractor would prepare a technical memorandum documenting how construction activities would be coordinated with service providers to minimize or avoid interruptions (PUE-IAMF#4). Where relocating an irrigation facility is necessary, the contractor would verify that the new facility is operational prior to disconnecting the original facility, where feasible (PUE-IAMF#2). Irrigation facility relocation preferences are included in the design-build contract and reduce unnecessary impacts on continued operation of irrigation facilities.

CEQA Conclusion

The impact under CEQA would be less than significant because design characteristics of the Central Valley Wye alternatives include effective measures to minimize utility interruptions by coordinating with service providers in advance, notifying the public and affected service providers of any planned outages, and verifying that new facilities are operational prior to disconnecting the original facility. Planned interruptions to water utilities would be temporary and limited to short durations during construction, and therefore would not require the expansion of existing or construction of new water infrastructure, preventing significant environmental effects. Therefore, CEQA does not require mitigation.

Impact PUE#2: Accidental Temporary Interruption of Major Utility Services

Construction of any of the Central Valley Wye alternatives could result in accidental disruption of overhead utility lines or previously unknown or unmarked buried utility lines (e.g., water, wastewater, natural gas lines). The types of construction activities would be the same for all four Central Valley Wye alternatives because these activities would be conducted in the same approximate geography and in the same proximity to major utility services such as electrical lines, natural gas transmission lines, petroleum and fuel pipelines, and canals. Therefore, all four Central Valley Wye alternatives would result in similar temporary impacts on utilities. Such disruptions could interrupt utility services to industrial, commercial, agricultural, and residential customers. The potential for accidental disruption is low in light of the established practices of utility identification, which would be completed prior to commencement of construction. The design-build contractor would be required to verify the location of all underground utilities prior to

construction, thereby minimizing accidental utility interruptions and resulting in similar impacts for all Central Valley Wye alternatives.

CEQA Conclusion

The impact under CEQA would be less than significant because accidental interruptions to water utilities would be temporary and limited to short durations during construction, and therefore would not require the expansion of existing or construction of new water infrastructure, preventing significant environmental effects. Utility identification would be completed prior to commencement of construction, thereby minimizing accidental utility interruptions. Therefore, CEQA does not require any mitigation.

Impact PUE#3: Temporary Impacts from Water Use

Construction of any of the Central Valley Wye alternatives would require water during construction to prepare concrete, increase the water content of soil to optimize compaction for earthwork, clean equipment, apply soil binders, and reseed disturbed areas post-construction. Table 3.6-8 shows the estimated water use for construction of the Central Valley Wye alternatives. Water used during construction activities would be obtained from existing, permitted commercial sources, predominantly supplied by the 11 public water suppliers identified in Appendix 3.6-B.

The difference in water use between the alternatives is a function of the total guideway length and the type of construction (at-grade, bridge, aerial), which vary by alternative (see Appendix 3.6-B). The Avenue 21 to Road 13 Wye Alternative would use the smallest amount of water during construction, totaling 2,095 million gallons, compared to 2,475 million gallons for the SR 152 (North) to Road 19 Wye Alternative. The SR 152 (North) to Road 13 Wye Alternative would use 2,289 million gallons of water during construction, while the SR 152 (North) to Road 11 Wye Alternative would use 2,125 million gallons of water.

Construction of any of the Central Valley Wye alternatives would not require construction or expansion of a water treatment facility.

In addition, Site 6—El Nido, El Nido Substation, Site 7—Wilson, Wilson Substation, and Site 7—Le Grand Junction/Sandy Mush Road, Dutchman Switching Station would require water for dust suppression during construction. Each site would require approximately 27,000 gallons of water over the entire construction period of 18 months. Therefore, implementation of Site 6—El Nido and Site 7—Wilson, or Site 6—El Nido and Site 7—Le Grand Junction/Sandy Mush Road would require a total of 54,000 gallons of water (0.17 acre-feet) over an 18-month period.

Depending on the alternative constructed, a variety of sources would be available to provide water for construction-related activities. As stated in Appendix 3.6-B, within the public utilities and energy RSA, water is provided by 11 public water suppliers who obtain their water primarily from the Central Valley Project or the Merced River. Private groundwater wells are another major water supply source. Public water suppliers and available acreage of each supplier are as follows:

- San Luis–Delta Mendota Water Authority/1,100,000 acres
- Henry Miller Reclamation District/45,000 acres
- Central California Irrigation District/143,000 acres
- Chowchilla Water District/85,000 acres
- City of Chowchilla Department of Public Works/4,900 acres
- Le Grand–Athlone Water District/24,600 acres
- Merced Irrigation District/164,000 acres
- Madera County Maintenance District 33/Not Available
- Madera Valley Water Company/1,300 acres
- Madera Irrigation District/131,600 acres
- Merced Irrigation District/154,000 acres

Table 3.6-8 Construction Water Use by Wye Alternative and Activity

Length of Construction	Construction Activity	Water Use		
		Annual Construction Use (acre-feet/year)[1]	Total 5-Year Construction Use	
			Acre-Feet	Million Gallons
SR 152 (North) to Road 13 Wye Alternative				
52 miles	Concrete Work	8	38.5	13
	Earthwork	243	1213.4	395
	Dust Control	942	4,708.2	1,534
	Landscaping	213	1065.3	347
	Total	**1,405**	**7,025.4**	**2,289**
SR 152 (North) to Road 19 Wye Alternative				
55 miles	Concrete Work	9	46.2	15
	Earthwork	209	1,045.3	341
	Dust Control	1,061	5,303.7	1,728
	Landscaping	240	1,200.1	391
	Total	**1,519**	**7,595.3**	**2,475**
Avenue 21 to Road 13 Wye Alternative				
53 miles	Concrete Work	7	35.8	12
	Earthwork	266	1,330.1	433
	Dust Control	826	4,128.2	1,345
	Landscaping	187	934.1	304
	Total	**1,286**	**6,428.3**	**2,095**
SR 152 (North) to Road 11 Wye Alternative				
51 miles	Concrete Work	7	34.5	11
	Earthwork	222	1,110.5	362
	Dust Control	877	4,383.4	1,428
	Landscaping	198	991.8	323
	Total	**1,304**	**6,520.3**	**2,125**

Source: Authority and FRA, 2016
SR = State Route

When available, reclaimed water would be used for dust control, and water conservation measures would be implemented. The design-build contractor would be required to prepare a Water Conservation Plan (Authority 2015) per the Authority's standard contract requirements regarding water conservation guidance that clearly describes how water conservation measures would be incorporated in the design and construction of the Central Valley Wye alternatives. Water use during construction must comply with the Authority's Water Conservation Guidance (Authority 2015).

According to the U.S. Geological Survey (USGS) California Water Sciences Center, while surface water for agriculture is used when it is available (from the Central Valley Project and rivers), users in the San Joaquin Basin also rely heavily on groundwater. USGS estimates that groundwater accounts for about 33 percent of the annual supply of water used for both agricultural and urban purposes in the basin (USGS 2016b). Existing water use within the project footprints of the Central Valley Wye alternatives, primarily for agriculture, is 8,916–11,147 acre-feet/year, using both surface water and groundwater. Annual water use for construction would be 1,405 acre-feet/year (14.1 percent of existing water use) under SR 152 (North) to Road 13 Wye Alternative, 1,519 acre-feet/year (13.6 percent of existing water use) under SR 152 (North) to Road 19 Wye Alternative, 1,286 acre-feet/year (14.4 percent of existing water use) under Avenue 21 to Road 13 Wye Alternative, and 1,304 acre-feet/year (13.9 percent of existing water use) under SR 152 (North) to Road 11 Wye Alternative within the project footprint.

Existing groundwater use within the public utilities and energy RSA for irrigation would be 3,278 acre-feet/year under the SR 152 (North) to Road 13 Wye Alternative, 3,679 acre-feet/year under the SR 152 (North) to Road 19 Wye Alternative, 2,942 acre-feet/year under the Avenue 21 to Road 13 Wye Alternative, and 3,086 acre-feet/year under the SR 152 (North) to Road 11 Wye Alternative.[9] Consequently, the amount of groundwater used for construction could be approximately 424 to 501 acre-feet/year, assuming 33 percent of the 1,286 to 1,519 acre-feet/year used for construction is drawn from groundwater sources. This amount of groundwater would be considerably less than the current estimated groundwater use within the project footprints. It is likely that further reductions in groundwater use for construction could be achieved through implementation of the Authority's Water Conservation Guidance, which requires use of nonpotable water, non-water dust suppressants, and other water conservation measures.

Consequently, the average annual water use (surface and groundwater) over the construction period for all Central Valley Wye alternatives would be about 80 percent less than existing water use within the project footprints of the Central Valley Wye alternatives because of the temporary and permanent removal of agricultural land from production. Because the water use within the project footprints for construction of the Central Valley Wye alternatives would be lower relative to existing water use for agricultural activities within this same area, none of the Central Valley Wye alternatives would require new or expanded water entitlements. Information regarding existing water use and anticipated water use for each Central Valley Wye alternatives is summarized in Appendix 3.6-B.

CEQA Conclusion

The impact under CEQA would be less than significant because while a temporary increase in water use during construction would occur, it would not require new or expanded entitlements to supply water. The design characteristics of the Central Valley Wye alternatives include effective measures to conserve water through the implementation of a Water Conservation Plan by the design-build contractor. Therefore, CEQA does not require any mitigation.

Impact PUE#4: Temporary Generation of Solid Waste and Hazardous Wastes

Construction of any of the Central Valley Wye alternatives would generate construction-related solid and hazardous waste. Sources of solid waste would come from the clearing of vegetation, removal of existing asphalt and gravel, and demolition of existing structures.

Construction would also generate hazardous waste consisting of welding materials, fuel and lubricant containers, paint and solvent containers, treated wood, and cement products containing strong basic or acidic chemicals. Demolition of older buildings could also generate hazardous waste, such as asbestos-containing materials and lead-based paint. With the exception of the Highway 59 Landfill, which accepts treated wood, no landfill within the public utilities RSA accepts hazardous wastes. However, there are some in-state landfills, such as Chemical Waste

[9] USGS estimates that groundwater accounts for about 33 percent of the annual supply of water used for both agricultural and urban purposes in the San Joaquin Basin (USGS 2016b).

Management's Kettleman Hills Landfill in Kings County and permitted landfills in southern California, that do accept hazardous wastes (DTSC 2015).

As a standard construction practice under its Sustainability Policy Directive (Poli-Plan-03), the Authority would require through contract specifications, the contractor to divert construction and demolition solid and hazardous waste from landfills by reusing or recycling the waste. The contractor would either segregate or recycle the solid and hazardous waste at a certified recycling facility or contract with an authorized agent to collect mixed waste and dispose of it at a certified recycling facility. The Authority's 2013 sustainability policy specifies that all (100 percent) steel and concrete would be recycled, and a minimum of 75 percent of construction solid and hazardous waste would be diverted from landfills (Authority 2013a). Landfills to which construction and demolition material from the Central Valley Wye alternatives would be sent would be identified by the contractor prior to the start of construction. Each landfill has specific requirements regarding the acceptance of hazardous wastes and construction and demolition material that may influence the selection of disposal sites.

Construction of the Central Valley Wye alternatives would generate from 40,531 to 77,752 tons of solid and hazardous waste within Merced and Madera Counties, depending on the alternative selected. The SR 152 (North) to Road 13 Wye Alternative would generate the most estimated solid and hazardous waste at 77,752 cubic yards. The Avenue 21 to Road 13 Wye Alternative would generate the least estimated solid and hazardous waste at 40,531 cubic yards. Table 3.6-9 presents estimated solid and hazardous waste information. Five landfills in the Central Valley Wye vicinity could be used for solid waste disposal. The Billy Wright Landfill has a remaining landfill capacity of 11,370,000 cubic yards; the Highway 59 Landfill has a remaining capacity of 28,025,334 cubic yards; the Fairmead Landfill has a remaining capacity of 5,552,894 cubic yards; the American Avenue Landfill has a remaining capacity of 29,358,535 cubic yards; and the Fink Road Sanitary Landfill has a remaining capacity of 8,240,435 cubic yards. Therefore, existing landfills would have adequate estimated capacities through 2038 or longer for the disposal of construction and demolition material.

Table 3.6-9 Solid and Hazardous Waste Estimates by Alternative

Facility and Capacity		Estimated Solid and Hazardous Waste Generation by Alternative (tons)			
		SR 152 (North) to Road 13 Wye	SR 152 (North) to Road 19 Wye	Avenue 21 to Road 13 Wye	SR 152 (North) to Road 11 Wye
		77,752	**71,297**	**40,531**	**57,800**
Remaining Landfill Capacity *(cubic yards)*		**Sufficient Remaining Capacity?**			
Billy Wright Landfill	11,370,000	Yes	Yes	Yes	Yes
Highway 59 Landfill	28,025,334	Yes	Yes	Yes	Yes
Fairmead Landfill	5,552,894	Yes	Yes	Yes	Yes
American Avenue Landfill	29,358,535	Yes	Yes	Yes	Yes
Fink Road Landfill	8,240,435	Yes	Yes	Yes	Yes
Kettleman Hills (nonhazardous waste capacity)	16,017,190	Yes	Yes	Yes	Yes

Facility and Capacity		Estimated Solid and Hazardous Waste Generation by Alternative (tons)			
		SR 152 (North) to Road 13 Wye	SR 152 (North) to Road 19 Wye	Avenue 21 to Road 13 Wye	SR 152 (North) to Road 11 Wye
		77,752	71,297	40,531	57,800
Kettleman Hills (hazardous waste capacity)	4,300,040	Yes	Yes	Yes	Yes

Source: California Department of Resources Recycling and Recovery (CalRecycle) 2016a, 2016b, 2016c, 2016d, 2016e

The Authority's contractor would handle, store, and dispose of all hazardous waste in accordance with applicable requirements, including the Resource Conservation and Recovery Act. A certified hazardous waste collection company would transport the waste to an authorized hazardous waste management facility for recycling or disposal (HMW-IAMF#1).

CEQA Conclusion

The impact under CEQA would be less than significant because the temporary increase in solid waste during construction would not result in insufficient landfill permitted capacity. The design characteristics of the Central Valley Wye alternatives include effective measures to minimize waste through the reuse and recycling of waste as directed in the Sustainability Policy Directive. Therefore, CEQA does not require any mitigation.

Impact PUE#5: Permanent Conflicts with Existing Utilities Requiring Relocation

Construction of any of the Central Valley Wye alternatives would result in crossing existing utilities during construction. Construction of the Central Valley Wye alternatives would require excavation to support various HSR facilities including elevated structures, railbeds, or below-ground tracks in areas with existing buried utility lines (water supply pipelines, gas lines, and electrical lines). In addition, construction would occur in areas with existing aboveground or overhead transmission lines. Table 3.6-7 identifies the number of major potential crossings of existing major electrical facilities by the Central Valley Wye alternatives. For example, the SR 152 (North) to Road 11 Wye Alternative would affect seven overhead electric lines, and the SR 152 (North) to Road 13 Wye Alternative would affect eight (contrasted with eleven for the other two alternatives), one of which was identified as a high-complexity line because of its steel truss supports. In total, the SR 152 (North) to Road 13 Wye Alternative would result in 66 utility crossings, the SR 152 (North) to Road 19 Wye Alternative in 76 utility crossings, the Avenue 21 to Road 13 Wye Alternative in 94 utility conflicts, and the SR 152 (North) to Road 11 Wye Alternative in 66 utility conflicts. Conflicts with existing electrical facilities would be considered permanent impacts.

Implementation of the Avenue 21 to Road 13 Wye Alternative would also result in the displacement of the PG&E Dairyland Substation. Pending PG&E approval, two alternative substation locations have been proposed—one adjacent to the north side of the existing substation, and a second along Robertson Boulevard on the south side of the proposed HSR easement. Because of this substation displacement and relocation, four of the overhead major electrical lines that conflict with this alternative are considered to have high complexity. Such high-complexity lines can pose greater challenges for relocation because of anticipated difficulties in connecting the relocated substation to the existing power grid, maintaining power to customers during the transition, and connecting the existing overhead lines to the relocated substation.

Potential impacts associated with reconfiguration or relocation of the substation would consist of reconfiguring potentially affected electrical lines and related components connected to an electrical substation, with the possibility of brief (no more than 12 hours) power service interruptions when disconnecting from existing infrastructure and connecting to replacement electrical service infrastructure.

As discussed in Section 3.6.4.2, numerous design features (IAMFs) are incorporated as part of the Central Valley Wye alternatives design to avoid and minimize impacts. PUE-IAMF#3 would require that, prior to construction in areas where utility service interruptions are unavoidable, the contractor would notify the public through a combination of communication media (e.g., phone, email, mail, newspaper notices, or other means) within that jurisdiction, as well as the affected service providers of the planned outage. The notification would specify the estimated duration of the planned outage and would be published no fewer than 7 days prior to the outage. Construction would be coordinated to avoid interruptions of utility service to hospitals and other critical users. However, accidental interruptions of service would still be possible. Also, prior to construction the contractor would prepare a technical memorandum documenting how construction activities would be coordinated with service providers to minimize or avoid interruptions, including upgrades of existing power lines to connect the HSR system to existing utility substations (PUE-IAMF#4).

Where relocating an irrigation facility is necessary, the contractor would verify that the new facility is operational prior to disconnecting the original facility, where feasible (PUE-IAMF#2). Irrigation facility relocation preferences are included in the design-build contract and reduce unnecessary impacts on continued operation of irrigation facilities. In addition, transmission lines between the transmission power substations and existing substations would be constructed aboveground and to industry standards, and would not conflict with existing utility infrastructure. Any new or relocated utility facilities would reside within existing utility or road rights-of-way to the extent feasible.

CEQA Conclusion

The impact under CEQA would be less than significant because the relocation of water utilities would not require the expansion of existing or construction of new water infrastructure, preventing significant environmental effects. The design characteristics of the Central Valley Wye alternatives include effective measures to minimize utility interruptions by coordinating with service providers in advance, notifying the public and affected service providers of any planned outages, and verifying that new facilities are operational prior to disconnecting the original facility. Therefore, CEQA does not require any mitigation.

Impact PUE#6: Permanent Reduced Access to Existing Utilities in the HSR Right-of-Way

Existing utilities may be located within the HSR right-of-way, which would be permanently fenced and secured after construction. Any of the four Central Valley Wye alternatives would be located in a similar geographic location with the same proximity to major utilities and would be permanently fenced and secured, which would result affect access to utilities along the HSR right-of-way.

Any underground utilities that conflict with the HSR right-of-way would be relocated or reinforced underneath the HSR right-of-way inside a casing pipe. Utilities that remain in the HSR right-of-way would be placed in a casing pipe strong enough to carry the HSR system facilities and large enough to accommodate equipment for remote monitoring of the carrier pipe's condition. Should a conveyance pipeline need repair or replacement, the casing pipe would remain in place so that HSR operations could continue while work is performed. It is common practice for utility districts to coordinate and schedule in advance any field visits to their facilities with the property owner. This practice would avoid reductions in access to existing utilities in the HSR right-of-way.

The network upgrades, as well as the new tie-lines, would have no impact on access to facilities in the area because existing travel routes would not be impeded. The Site 6—El Nido, El Nido Substation and Site 7—Le Grand Junction/Sandy Mush Road, Dutchman Switching Station would require acquisition of approximately 3 acres north of the existing El Nido Substation and 5.5 acres at the southeast of the intersection of South Bliss Road and East Sandy Mush Road, respectively. Acquisition of these lands would not include any existing access routes or roadways for private use.

CEQA Conclusion

The impact under CEQA would be less than significant because reduced access to existing water utilities during and after construction would not require the expansion of or construction of new water infrastructure, preventing significant environmental effects. The design characteristics of

the Central Valley Wye alternatives include effective measures to address utility owners' access needs, protecting continued access during and after construction by coordinating and scheduling field visits with the property owner in advance. Therefore, CEQA does not require any mitigation.

Impact PUE#7: Permanent Impacts on Wastewater or Stormwater Pipelines

Construction of any of the Central Valley Wye alternatives would not have impacts on storm drain facilities, because no wastewater or stormwater pipelines were identified to be in conflict with any of the Central Valley Wye alternatives. The closest wastewater and stormwater facilities are near developed urban areas including Merced and Chowchilla in Merced County and the city of Madera in Madera County. No impact on facilities in these jurisdictions would occur because these two cities and their facilities are located outside the public utilities RSA. Network upgrades associated with the Site 7—Le Grand Junction/Sandy Mush Road, Warnerville–Wilson 230 kV transmission line would occur within Merced and Waterford, and the expansion of the Site 7—Wilson and the Wilson Substation, and construction of the Site 7—Wilson, 230 kV tie-line would occur in Merced. Reconfiguration of the Site 7—Wilson, Wilson Substation would not affect existing wastewater or stormwater pipelines because the reconfiguration would occur within the fence line of the existing substation. In addition, construction of the Site 7—Wilson, 230 kV tie-line would occur within existing utility rights-of-way. Therefore, existing wastewater and stormwater pipelines would not be affected, and all structures would be designed to avoid any such utilities (PUE-IAMF#1).

Construction of the Central Valley Wye alternatives would cause temporary and permanent changes in drainage patterns from the excavation and placement of fill, placement of new embankments, new bridge and overcrossings structures, bridge abutments, support pies, and new impervious surfaces. These changes would affect stormwater runoff during rain events, including changes in runoff volume and rates and increased pollutant loading, compared to existing conditions. The design of the Central Valley Wye alternatives includes the detainment of on-site stormwater runoff, increases in infiltration rates, and minimizing disruptions to the movement of water (HYD-IAMF#1). The on-site storm drainage system would consist of open ditches or under drains placed at the outer sides of the track bed. An open ditch is a natural or built structure that conveys water with the top surface in contact with the atmosphere. Subsurface drainage systems are necessary to rapidly remove and prevent water from interfering with track stability, roadbeds, and side slopes, or where right-of-way constrains the use of open ditches. The runoff generated on-site would be discharged into the drainage system of the adjacent at-grade trackway. Water from the open ditches and under drains would either enter the local storm drain system or directly enter into the off-site drainage systems. Conceptual drainage was evaluated, and adequate right-of-way is available for drainage and detention.

Elevated sections of track would be designed to prevent saturation, increase infiltration, and stabilize soils where stream-flow velocities are increased to minimize potential impacts related to erosion and surface water hydrology (HYD-IAMF#2). Stormwater management practices and measures as well as permeable surfaces to retain or detain and treat stormwater on-site would also be incorporated into the design of the Central Valley Wye alternatives (HYD-IAMF#3). In addition, stormwater runoff would be effectively managed and treated through the installation of infiltration or detention facilities and incorporation of permeable vegetated surfaces to accommodate increased rates and amount of runoff, and to increase infiltration and groundwater recharge (HYD-IAMF#4). The inclusion of stormwater practices (e.g., swales, ditches, retention basins) and permeable surfaces would be incorporated into the project design prior to implementation of the stormwater pollution prevention plan. The Authority would also implement additional flow control measures where local regulations or drainage requirements dictate. Section 3.8 provides further detailed analysis regarding potential impacts on drainage and stormwater runoff.

CEQA Conclusion

The impact under CEQA would be less than significant because while construction would cause temporary and permanent changes in drainage patterns that would affect stormwater runoff during rain events, these changes would not result in construction of new stormwater drainage

facilities or expansion of existing facilities, preventing significant environmental effects. The design characteristics of the Central Valley Wye alternatives include effective measures to manage and treat stormwater through the installation of infiltration or detention facilities and incorporation of permeable vegetated surfaces to accommodate increased rates and amount of runoff, and to increase infiltration and groundwater recharge. Therefore, CEQA does not require any mitigation.

Energy Impacts

Construction of any of the Central Valley Wye alternatives would result in energy consumption in the energy RSA during the construction period. The exact amount of energy consumed during construction depends on the characteristics of the selected alternative.

Impact PUE#8: Temporary Impacts from Energy Consumption

During construction of the Central Valley Wye alternatives, energy would be consumed to transport construction materials and to support major staging areas, field offices, and security lighting. Operating and maintaining construction equipment during the construction process would also consume energy resources, such as fossil fuels.

The total energy consumption during construction of the Central Valley Wye alternatives depends on the characteristics of the selected alternative, particularly the length of its various design aspects including elevated, at-grade, and trench and box-cover work. Energy consumption estimates range from 2,232,212 Btu (MMBtu) for the SR 152 (North) to Road 11 Wye Alternative to 3,125,586 MMBtu for the SR 152 (North) to Road 19 Wye Alternative (see Table 3.6-10, Construction Energy Consumption Assumptions for the Central Valley Wye Alternatives). The energy used for construction of track work, guideways, support facilities, and other structures would be a one-time, nonrecoverable energy cost.

Detailed engineering of electrical interconnections network upgrades components has not been undertaken and would not be completed until closer to construction; therefore, a quantitative assessment of electricity and indirect energy consumption associated with construction is not feasible. Construction would result in the direct use of fuels (primarily gasoline and diesel) for construction equipment and vehicles as well as electricity for ancillary construction equipment. Construction would also result in indirect use of energy associated with the extraction, manufacturing, and transportation of construction materials. Because of the preliminary nature of project design, the direct and indirect energy usage cannot be estimated because it would be too speculative given existing data; however, the amounts would not be expected to be substantial.

The design of the Central Valley Wye alternatives would include the use of energy-saving measures during construction of the Central Valley Wye alternatives to minimize both electricity and fossil fuel consumption (PUE-IAMF#1). As stated in the *Contribution of the High-Speed Rail Program to Reducing California's Greenhouse Gas Emission Levels* (2013b), all contractors would be required to incorporate the following energy- and greenhouse gas-saving measures: reduce energy use on construction sites, increase energy and fuel efficiency through energy-efficient on- and off-road equipment, and consider cost-effective renewable energy. These requirements would be a part of the final contract requirements for the design-build contractor and its subcontractors. Further, energy efficiency is assumed for the off-site production of construction materials (Authority and FRA 2005), with this assumption based on the cost of nonrenewable resources and the economic incentives for efficiency.

While measurable amounts of energy would be used for construction, the Central Valley Wye alternatives would not require additional peak- or base-load capacity for electricity and other forms of energy during the construction period. Most of the equipment used during construction would use liquid fuel and would not require electricity from the electrical grid to operate. Although energy would be used for construction of the Central Valley Wye alternatives, the continued operation of the high-speed trains would result in overall energy savings through the system's use of renewable energy supply during operations. As a result, energy expended on construction would recovered in about 22–31 months under the 2040 high ridership scenario. Table 3.6-10

provides construction energy use assumptions and payback information for the Central Valley Wye alternatives.

Moreover, HSR would be an energy-efficient mode of transportation and would provide a travel alternative that is less energy intensive than other modes of transportation currently used for travel within the state, such as personal vehicles and commercial air flights. As shown in Table 3.6-10, the payback period for energy consumed during construction would range by alternative from 2.24 to 3.14 years for the medium ridership scenario and from 1.83 to 2.56 years for the high ridership scenario. The 2040 annual energy savings under the medium ridership scenario would be 995,428.20 billion Btu compared to 1,221,599.40 billion Btu for the high ridership scenario.

Table 3.6-10 Construction Energy Consumption Assumptions for the Central Valley Wye Alternatives

Alternative	Total 5-Year Energy Consumption (MMBtu/year)	Medium		High	
		2040 Annual Energy Savings (MMBtu/year)	Payback Period for Energy Used during Construction (years/year)	2040 Annual Energy Savings (MMBtu/year)	Payback Period for Energy Used during Construction (years/year)
SR 152 (North) to Road 13 Wye	2,391,012	995,428.20	2.40 years	1,221,599.40	1.96 years
SR 152 (North) to Road 19 Wye	3,125,586	995,428.20	3.14 years	1,221,599.40	2.56 years
Avenue 21 to Road 13 Wye	2,431,996	995,428.20	2.44 years	1,221,599.40	1.99 years
SR 152 (North) to Road 11 Wye	2,232,212	995,428.20	2.24 years	1,221,599.40	1.83 years

Source: Authority and FRA, 2018
MMBtu = million British thermal unit

Although measurable, the energy used for construction would not require an increase in peak- or base-load capacity for electricity and other forms of energy. As described in Section 3.6.5.2, Energy, California's total energy consumption for 2014 was 7,620 trillion Btu. The highest usage for construction of the Central Valley Wye alternatives is estimated to be 625,117.20 MMBtu annually over 5 years for the SR 152 (North) to Road 19 Wye Alternative, for a total of 3,125,586 MMBtu, which is only 0.04 percent of the annual total over 5 years. The increased energy use during construction would be temporary and would not require additional long-term capacity for either fossil fuel or electricity energy.

CEQA Conclusion

The impact under CEQA would be less than significant because while energy use would increase temporarily during construction, a substantial demand on regional energy supply or significant additional regional energy capacity would not be required. The design characteristics of the Central Valley Wye alternatives include effective measures to minimize energy consumption during construction. Further, HSR would be an energy-efficient mode of transportation and would provide a travel alternative that is less energy intensive than other modes of transportation currently used for travel within the state; therefore, CEQA does not require any mitigation.

Operations Impacts

Operations of the Central Valley Wye alternatives would involve service of the train along the HSR line through the Central Valley Wye. In addition, operations of the Central Valley Wye alternatives would include inspection and maintenance along the track and railroad right-of-way,

as well as on the structures, fencing, power system, train control, and communications. Operations and maintenance activities are described in Chapter 2.

Public Utilities Impacts

Impact PUE#9: Permanent Impacts on Public Utility Services, Water Use, and Waste Generation

No stations or maintenance facilities are included in the Central Valley Wye alternatives. Operations of the Central Valley Wye alternatives would require periodic maintenance of the HSR right-of-way, including trash and vegetation clearing, and periodic maintenance of the traction power substations. Maintenance activities would not require the use of public utility services such as potable water or natural gas. The Central Valley Wye alternatives would introduce no new sources of pollutants from trash because the right-of-way would be fenced, restricting public access and keeping out flying debris, and the HSR trains would not have operable windows allowing riders to discard trash, which is consistent for all Central Valley Wye alternatives. The Authority would prepare a construction site best management practice field manual as part of the Central Valley Wye alternatives that identifies best management practices for temporary soil stabilization and temporary sediment control, among other general site cleanliness measures (BIO-IAMF#24). Therefore, operations of the Central Valley Wye alternatives would not result in a corresponding increased demand on public utility services, water use, or waste generation. Because the track length and types of facilities are largely similar for all four Central Valley Wye alternatives, the operations phase impacts related to routine maintenance activities would be the same for all alternatives.

CEQA Conclusion

The impact under CEQA would be less than significant because operations of the Central Valley Wye alternatives would not result in the expansion of existing or construction of new water infrastructure, water entitlements, or landfills. The design characteristics of the Central Valley Wye alternatives include effective measures to maintain and incorporate general site cleanliness. In addition, the right-of-way would be fenced, restricting public access and keeping out flying debris, and the HSR trains would not have operable windows allowing riders to discard trash. Therefore, CEQA does not require any mitigation.

Energy Impacts

The HSR system, which includes the Central Valley Wye, would be an energy-efficient mode of transportation and would serve to decrease overall per-capita energy consumption by providing a travel alternative that is less energy intensive than the personal vehicles and commercial air flights presently used for travel within the state.

Impact PUE#10: Permanent Impacts on Energy Consumption

Operations of any of the Central Valley Wye alternatives would use an electrified line supporting electric vehicles with traction power connected to existing PG&E substations (see Chapter 2). For determining HSR energy consumption, analysts assumed use of a Siemens ICE-3 Velaro vehicle operating as two 8-car trainsets and traveling 43.1 million annual train miles by 2040. The HSR system would decrease automobile VMT and reduce energy consumption by automobiles, resulting in an overall reduction in energy use for intercity and commuter travel. Table 3.6-11 shows that the estimated decrease in energy use of the Central Valley Wye alternatives would be 995,428.20 MMBtu/) in 2040 under the medium ridership scenario and 1,221,599.40 MMBtu/year in 2040 under the high ridership scenario for the HSR system.

In addition, the number of airplane flights statewide (intrastate) would decrease with operations of the HSR system when analyzed against the future conditions' baseline because travelers would choose to use the HSR rather than fly to their destinations. The average full flight cycle fuel consumption rate for aircraft is based on the profile of aircraft currently servicing the San Francisco to Los Angeles airline corridor. The number of air trips removed as a result of the HSR system was estimated by using the travel demand modeling analysis conducted for the Central Valley Wye alternatives. Table 3.6-11 shows that the contribution of the Central Valley Wye

alternatives would reduce 2040 airplane travel by 299,266.90 MMBtu/year under the medium ridership scenario and by 167,826.70 MMBtu/year in 2040 under the high ridership scenario.

Operating HSR trains would require additional electrical energy. Approximately 1,568,139.30 MMBtu/year of electrical energy in 2040 would be required to operate the trains statewide under the medium ridership scenario, and approximately 1,724,599.20 MMBtu/year would be required under the high ridership scenario. However, the net change in energy use—i.e., after the energy savings from reduction in roadway VMT and reduction in air trips are factored in—would result in an energy savings of 995,428.20 MMBtu/year under the medium ridership scenario and 1,221,599.40 MMBtu/year under the high ridership scenario in 2040.

Table 3.6-11 2040 Estimated Change in Energy Consumption Caused by the Central Valley Wye Alternatives (medium ridership to high ridership scenarios)

Projected Outcomes of the HSR System	Medium Ridership Scenario		High Ridership Scenario	
	Change in Energy Usage in 2040 vs. Current Conditions (2015) (MMBtu/year)	Change in Energy Usage in 2040 vs. 2040 No Project Conditions (MMBtu/year)	Change in Energy Usage in 2040 vs. Current Conditions (2015) (MMBtu/year)	Change in Energy Usage in 2040 vs. 2040 No Project Conditions (MMBtu/year)
Reduced VMT	(1,071,928.70)	(852,975.30)	(1,412,968.00)	(1,226,268.00)
Reduced Airplane Travel	(215,330.10)	(299,266.90)	(120,755.60)	(167,826.70)
Increased Electricity Consumption	1,568,139.30	1,568,139.30	1,724,953.20	1,724,953.20
Net Change in Energy Use	**(1,130,444.90)**	**(995,428.20)**	**(1,361,228.30)**	**(1,221,599.40)**

Source: Authority and FRA, 2018
HSR = high-speed rail
MMBtu = million British thermal units
VMT = vehicle miles traveled

Operations of the Central Valley Wye alternatives would result in electricity consumption within the energy RSA. Because of the similarity in lengths of each of the Central Valley Wye alternatives, impacts from energy use during operations would be the same for all Central Valley Wye alternatives. As a result of the net savings in energy, the Central Valley Wye alternatives would have a beneficial impact on operational energy use.

CEQA Conclusion

There would be no impact under CEQA because implementation of any of the Central Valley Wye alternatives would result in a net savings in energy. Therefore, CEQA does not require any mitigation.

3.6.7 Mitigation Measures

All construction and operations impacts would be minimized or avoided. No mitigation measures are required.

3.6.8 Impacts Summary for NEPA Comparison of Alternatives

This section summarizes and compares the impacts of the Central Valley Wye alternatives and the No Project Alternative. Table 3.6-12 provides a comparison of the potential impacts of the Central Valley Wye alternatives on public utilities and energy. Data from this table and the information in this summary are described in Section 3.6.6.

Under the No Project Alternative, growth and development would continue with associated direct and indirect impacts on public utilities and energy. However, local utilities have developed capital improvement plans to accommodate anticipated population growth. These improvements include the

addition of a new wastewater treatment plant in Chowchilla and infrastructure additions and upgrades to provide services to growing populations. In addition, under the No Project Alternative, demand for energy would increase at a level commensurate with population growth. The region would increase peak- and base-period electricity demand and would require additional generation and transmission capacity. According to the CEC Demand Analysis Office CED 2015 Preliminary Forecast (2015), the average annual growth rate for statewide electricity demand between 2014 and 2026 is forecasted to increase from 0.54 percent (low energy demand) to 1.27 percent (high-energy demand)]. Under the No Project Alternative, the daily VMT in Merced and Madera Counties would increase by 2040, as described in Section 2.2.2. This increase would require an estimated 3.24 million gallons of petroleum in the Merced to Fresno region (Bureau of Transportation Statistics 2010).

Table 3.6-12 Comparison of Central Valley Wye Alternative Impacts

Impacts	Central Valley Wye Alternatives			
	SR 152 (North) to Road 13 Wye	SR 152 (North) to Road 19 Wye	Avenue 21 to Road 13 Wye	SR 152 (North) to Road 11 Wye
Construction				
Public Utilities Impacts				
Impact PUE#1: Planned Temporary Interruption of Major Utility Services	Interruptions to utility services would be temporary and for short durations under any of the Central Valley Wye alternatives.			
Impact PUE#2: Accidental Temporary Interruption of Major Utility Services	Interruptions to water utilities would be temporary and for short durations under any of the Central Valley Wye alternatives.			
Impact PUE#3: Temporary Impacts from Water Use				
Total anticipated water use (in millions of gallons)	2,289	2,475	2,095	2,125
Impact PUE#4: Temporary Generation of Solid Waste and Hazardous Wastes				
Total anticipated waste generation in tons	77,752	71,297	40,531	57,800
Impact PUE#5: Permanent Conflicts with Existing Utilities Requiring Relocation	No anticipated permanent impacts on utilities	No anticipated permanent impacts on utilities	One electrical substation would require relocation	No anticipated permanent impacts on utilities
Electrical lines	8	11	11	7
Natural gas transmission lines	7	9	6	7
Petroleum and fuel pipelines	1	3	1	1

Impacts	Central Valley Wye Alternatives			
	SR 152 (North) to Road 13 Wye	SR 152 (North) to Road 19 Wye	Avenue 21 to Road 13 Wye	SR 152 (North) to Road 11 Wye
Electrical substation	0	0	1	0
Communications facilities	6	11	6	6
Canals/pipelines	44	42	69	45
Impact PUE#6: Permanent Reduced Access to Existing Utilities in the HSR Right-of-Way	Access to utilities would be protected during and after construction of all Central Valley Wye alternatives			
Impact PUE#7: Permanent Impacts on Wastewater or Stormwater Pipelines	No anticipated permanent impacts on wastewater or stormwater pipelines under any of the Central Valley Wye alternatives			
Energy Impacts				
Impact PUE#8: Temporary Impacts from Energy Consumption				
Construction energy consumption in MMBtu	2,391,012	3,125,586	2,431,996	2,232,212
Assuming high ridership, payback period for energy consumed during construction in years	1.96	2.56	1.99	1.83
Assuming medium ridership, payback period for energy consumed during construction in years	2.40	3.14	2.44	2.24
Operations				
Public Utilities Impacts				
Impact PUE#9: Permanent Impacts on Public Utility Services, Water Use, and Waste Generation	No increased demand on public utility services, water use, or waste generation for all Central Valley Wye alternatives.			

Impacts	Central Valley Wye Alternatives			
	SR 152 (North) to Road 13 Wye	SR 152 (North) to Road 19 Wye	Avenue 21 to Road 13 Wye	SR 152 (North) to Road 11 Wye
Energy Impacts				
Impact PUE#10: Permanent Impacts on Energy Consumption	No Impact. Implementation of the Central Valley Wye alternatives would result in a net savings in energy for all Central Valley Wye alternatives.			

Source: Authority and FRA, 2018
[1] Includes water use from: concrete work, earthwork, dust control, and landscaping.

The Merced to Fresno Final EIR/EIS concluded that development of the HSR system would result in potential impacts on public utilities and energy. Construction impacts would be negligible. One existing substation would need to be moved to a new, nearby location. Operations of the HSR system would have negligible impacts on energy consumption. Implementing the Central Valley Wye alternatives could also result in impacts on public utilities and energy from temporary construction activities, permanent relocation of utilities, and changes in energy consumption. One existing substation would need to be relocated as a result of construction of the Avenue 21 to Road 13 Wye Alternative. Operations would have no impact on public utilities because the Central Valley Wye alternatives would not include HSR stations or maintenance facilities, and are completely isolated from public utility systems. Operations of the Central Valley Wye alternatives in conjunction with the rest of the HSR system would result in energy savings over time, and the Authority would procure renewable energy to provide power for HSR operations.

The Central Valley Wye alternatives would incorporate IAMFs to avoid and minimize impacts on public utilities and energy. These IAMFs include design measures to minimize electricity consumption, public notifications prior to outages, and measures to minimize or avoid interruptions.

Construction of any of the Central Valley Wye alternatives has the potential to affect existing utility facilities temporarily, including:

- From 7 to 11 electrical utilities, on which the SR 152 (North) to Road 19 Wye and Avenue 21 to Road 13 Alternatives would have the greatest impact.
- From 6 to 9 natural gas lines and from 1 to 3 petroleum lines, on which the SR 152 (North) to Road 19 Wye Alternative would have the greatest impact.
- From 42 to 69 canals or pipelines, on which the Avenue 21 to Road 13 Wye Alternative would have the greatest impact.
- From 6 to 11 communication facilities, on which the SR 152 (North) to Road 19 Wye Alternative would have the greatest impact.

Utility interruptions during construction would be temporary, and because users would receive advance notice of interruptions, any inconvenience to residents and businesses from relocation activities would be minimized. Conflicts with existing facilities would be permanent. Construction of the Avenue 21 to Road 13 Wye Alternative would result in the displacement of the PG&E Dairyland Substation. Under all the Wye alternatives, the Authority and its contractor would work with utility service providers to coordinate Central Valley Wye alternatives design and phasing of construction activities to minimize impacts.

Construction of the Central Valley Wye alternatives would use from 2,095 to 2,475 million gallons of water for the 5-year construction period, of which the SR 152 (North) to Road 19 Wye Alternative would have the greatest impact. Water for construction of the Central Valley Wye alternatives would be supplied predominately from the 11 public water suppliers previously identified, whose main sources are the Central Valley Project and the Merced River. Further, the contractor would be required by the Authority's Water Conservation Guidance to implement

measures during construction to minimize use of potable water for construction-related activities by using nonpotable water for dust control.

Construction of any of the Central Valley Wye alternatives would not require construction or expansion of a water treatment facility, and the average annual water use over the Central Valley Wye alternatives construction period would be less than existing use for agriculture because of the elimination of water needed for existing agricultural purposes within the project footprints of the Central Valley Wye alternatives. As a result, construction of the Central Valley Wye alternatives would not require new or expanded water entitlements and would not require more water than is currently being used within the project footprints.

Construction of the Central Valley Wye alternatives would generate from 40,531 to 77,752 tons of solid waste with the SR 152 (North) to Road 13 Wye Alternative generating the most solid waste. However, existing landfills have adequate estimated capacities through 2038 or longer for disposal of construction and demolition material under all alternatives. Construction of any of the Central Valley Wye alternatives could result in reduced access to existing utilities within the HSR right-of-way, because the HSR right-of-way would be permanently fenced and secured after construction. For those utilities remaining within the right-of-way, maintenance access by utility owners would be limited.

Construction of any of the Central Valley Wye alternatives would not have impacts on storm drain facilities, because no wastewater or stormwater pipelines were identified to be in conflict with any of the Central Valley Wye alternatives. Construction of any of the Central Valley Wye alternatives would cause temporary and permanent changes in drainage patterns from the excavation and placement of fill, placement of new embankments, new bridge and overcrossings structures, bridge abutments, support piles, and new impervious surfaces. Stormwater management practices would minimize changes in runoff associated with construction, and therefore there would not be a need for new stormwater facilities or an expansion of existing facilities. In addition, stormwater runoff would be captured on-site.

During construction, energy would be consumed to transport construction materials and to support major staging areas, field offices, and security lighting. Operation and maintenance of construction equipment during the construction period would also consume energy resources (fossil fuels). The energy consumption would range from 2,232,212 MMBtu to 3,125,586 MMBtu with payback periods for energy consumed during construction ranging from 1.83 to 2.56 years (at 2040 annual energy savings of 1,221,599.40 MMBtu corresponding to the high ridership scenario). Energy use during construction would be temporary.

Because no stations or maintenance facilities are included in the Central Valley Wye alternatives, no operations impacts on public utilities would occur. Operations of the Central Valley Wye alternatives would decrease automobile VMT and reduce energy consumption by automobiles, resulting in an overall reduction in energy use for intercity and commuter travel. Because of the similarity in lengths of each of the Central Valley Wye alternatives, impacts from energy use during operations would be the same for all Central Valley Wye alternatives. The net change in energy use associated with the Central Valley Wye alternatives would be an energy savings of 995,428.20 MMBtu/year in 2040 under the medium ridership scenario and 1,221,599.40 MMBtu/year in 2040 under the high ridership scenario.

3.6.9 CEQA Significance Conclusions

Table 3.6-13 provides a summary of the CEQA determination of significance for all construction and operations impacts discussed in Section 3.6.6.3. The CEQA level of significance before and after mitigation for each impact in this table is the same for all Central Valley Wye alternatives.

Table 3.6-13 CEQA Significance Conclusions for Public Utilities and Energy for the Central Valley Wye Alternatives

Impacts	CEQA Level of Significance before Mitigation	Mitigation Measures	CEQA Level of Significance after Mitigation
Construction			
Public Utilities Impacts			
Impact PUE#1: Planned Temporary Interruption of Major Utility Services	Less than significant for all alternatives	No mitigation measures are required	Not applicable
Impact PUE#2: Accidental Temporary Interruption of Major Utility Services	Less than significant all alternatives	No mitigation measures are required	Not applicable
Impact PUE#3: Temporary Impacts from Water Use	Less than significant all alternatives	No mitigation measures are required	Not applicable
Impact PUE#4: Temporary Generation of Solid Waste and Hazardous Wastes	Less than significant all alternatives	No mitigation measures are required	Not applicable
Impact PUE#5: Permanent Conflicts with Existing Utilities Requiring Relocation	Less than significant all alternatives	No mitigation measures are required	Not applicable
Impact PUE#6: Permanent Reduced Access to Existing Utilities in the HSR Right-of-Way	Less than significant all alternatives	No mitigation measures are required	Not applicable
Impact PUE#7: Permanent Impacts on Wastewater or Stormwater Pipelines	Less than significant all alternatives	No mitigation measures are required	Not applicable
Energy Impacts			
Impact PUE#8: Temporary Impacts from Energy Consumption	Less than significant all alternatives	No mitigation measures are required	Not applicable
Operations			
Public Utilities Impacts[1]			
Impact PUE#9: Permanent Impacts on Public Utility Services, Water Use, and Waste Generation	Less than significant all alternatives	No mitigation measures are required	Not applicable
Energy			
Impact PUE#10: Permanent Impacts on Energy Consumption	No impact under any alternative	No mitigation measures are required	Not applicable

Source: Authority and FRA, 2018

[1] Because there are no stations or maintenance facilities included in the Central Valley Wye alternatives, no operations impacts on public utilities would occur.