



Section 4.13

Energy Resources

This section summarizes the energy resources in the project area, the usage associated with operation of the proposed Eastside Transit Corridor Phase 2 Project alternatives, and the net energy demand associated with changes to the regional transportation network under each of the proposed alternatives. Information in this section is based on, and updated where appropriate from, the Energy Resources Technical Memorandum which is incorporated into this Draft EIS/EIR as Appendix X.

4.13.1 Regulatory Framework/Methodology

4.13.1.1 Regulatory Framework

Energy and energy use within the project area are governed by several federal, state, and local laws and policies, such as:

4.13.1.1.1 Federal

- The Energy Policy and Conservation Act of 1975
- The Alternative Fuels Act of 1988
- Moving Ahead for Progress in the 21st Century Act (MAP-21)
- Section 403(b) of the Power Plant and Industrial Fuel Use Act of 1978 (P.L. 95-629)
- Executive Order 12185, Conservation of Petroleum and Natural Gas (December 17, 1979, 44 F.R. §75093)
- Executive Order 13423, Strengthening Federal Environmental, Energy, and Transportation Management (January 24, 2007, 72 F.R. §3919)

- Executive Order 13514, Federal Leadership in Environmental, Energy, and Economic Performance (October 5, 2009, 75 F.R. §52117)

4.13.1.1.2 State

- California Senate Bill 1389
- Executive Order S-3-05
- Metro's Energy and Sustainability Policy

4.13.1.1.3 Regional/Local

The following regional and local policies play a role in governing energy resources and energy use in the project area and the region:

- Southern California Association of Governmental (SCAG) Regional Transportation Plan
- South Coast Air Quality Management District (SCAQMD) daily and quarterly emission thresholds for construction and operational emission sources; SCAQMD development of State Implementation Plans (SIPs) in compliance with the Federal Clean Air Act (CAA) and California Clean Air Act (CCAA) regulations to reduce unhealthy levels of air pollutants
- Metro's Energy and Sustainability Policy
- County of Los Angeles General Plan
- Other local policies that pertain to energy resources and the LRT alternatives, include the City of Los Angeles General Plan, City of Commerce General Plan, City of Montebello General Plan, Montebello Hills Specific Plan, City of Pico Rivera General Plan, and City of Rosemead General Plan

Electricity and transportation are the major energy use sectors analyzed by the California Energy Commission (CEC). Federal and state policies and regulations are gradually transforming electricity generation to cleaner sources and away from reliance on petroleum sources. More information regarding these laws and policies is available in Appendix X, Energy Resources Technical Memorandum, of this Draft EIS/EIR.

4.13.1.2 NEPA Impact Criteria

The Council on Environmental Quality (CEQ) dictates requirements for reporting environmental consequences under the National Environmental Policy Act (NEPA). While there are no specific NEPA criteria for analyzing impacts to energy resources, 40 CFR § 1502.16(e) directs that environmental impact statements include a discussion of the “energy requirements and conservation potential of various alternatives,” “natural or depletable resource requirements and conservation potential of various alternatives,” and potential mitigation measures.

4.13.1.3 CEQA Impact Criteria

The following significance criteria are based on Appendices F (Energy Conservation) and G (Environmental Checklist Form) of the *California Environmental Quality Act (CEQA) Guidelines*.

The purpose of Appendix F of the *CEQA Guidelines* is to ensure that energy implications are considered in project decisions. As described in the *CEQA Guidelines*, the goal of conserving energy implies the wise and efficient use of energy. The means of achieving this goal include:

- Decreasing overall per capita energy consumption;
- Decreasing reliance on fossil fuels such as coal, natural gas, and oil; and
- Increasing reliance on renewable energy sources.

Specific emphasis is given to reducing inefficient, wasteful, and unnecessary consumption of energy. The *CEQA Guidelines* require that a project’s cost-

effectiveness be reviewed in terms of energy requirements in addition to dollars.

Appendix G of the *CEQA Guidelines* establishes the following criteria, which were used to determine whether the proposed project alternatives would result in a significant impact to energy resources. Significant impacts would result if the proposed project alternatives would:

- Require new (off-site) energy supply facilities and distribution infrastructure or capacity enhancing alterations to existing facilities;
- Conflict with adopted energy conservation plans;
- Use nonrenewable resources in a wasteful and inefficient manner; or
- Result in a need for new systems or substantial alterations to power or natural gas.

4.13.1.4 Area of Potential Impact

The area of potential impact for energy resources analysis is defined based on whether the potential impact stems from direct or indirect energy consumption as related to the proposed alternatives. The areas of direct or indirect potential impacts differ from each other, but are the same for all alternatives.

Direct energy resource consumption and potential impacts would stem from short-term construction-related energy use as well as the long-term operation of stations, buildings, and facilities that are part of the build alternatives. The area of potential impact for direct impacts is defined by Southern California Edison’s (SCE’s) local service area as well as the eastern section of the Los Angeles Department of Water and Power’s (LADWP’s) service area which covers the area of the proposed Mission Junction Maintenance Yard Option.

Indirect energy resource consumption would stem from long-term changes in vehicle miles traveled (VMT) and corresponding changes in vehicle fuel consumption (and equivalent barrels of oil). Changes in VMT were calculated by using data generated by the transportation model for both the

region and the project area; therefore, the area of potential impact used to compare changes in VMT and corresponding energy use between alternatives was the same as that used in the transportation modeling and the traffic analysis. The regional area would be that defined by the Metro traffic model, which includes the counties of Imperial, Riverside, San Bernardino, Los Angeles, Orange, and Ventura.

The project area, defined as the more immediate area in the vicinity of the proposed alternative alignments, extends west to east from the intersection of Atlantic Boulevard and SR 60 (at the existing Atlantic Boulevard Metro station) to east of the I-605 Freeway in the vicinity of Peck Road and Lambert Road. The project area to the north and south extends from north of SR 60 near Potrero Grande Drive to south of Washington Boulevard near Slauson Avenue.

While the transportation model generated traffic data for the larger Los Angeles region as well as for the immediate project area, both of which would be affected by operation of the alternative alignments, the energy resources analysis used VMT data for the region to determine and analyze impacts.

4.13.1.5 Methodology

Potential impacts to energy resources were assessed based on the amount of energy consumed during construction of the alternatives, as well as the operational energy consumption associated with station and maintenance yard operation and projected changes in regional VMT for highway and major road vehicle traffic, buses, and light rail.

Energy needs for the proposed alternatives were measured in British Thermal Units (BTUs) and equivalent barrels of crude oil. A BTU is defined as the quantity of heat required to raise the temperature of one pound of water one degree Fahrenheit at sea level. **Table 4.13-1** compares various types of energy and their equivalent BTUs.

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

- Construction-related energy

- Energy operating costs
 - Direct energy consumption (measured in BTUs per vehicle mile for cars, trucks, buses, and light rail operating in the project area)
 - Net project operating energy savings or costs
- Energy consumption during construction was determined by analyzing the energy requirements of construction equipment and construction processes. While energy requirements differ for the construction phase of at-grade alternatives versus aerial alternatives, the methodology for determining construction-related impacts is the same for both build alternatives.

Table 4.13-1. Energy Comparisons

Energy Type	Energy Unit	Equivalent BTUs
Electrical	Kilowatt-Hour (kWh)	3,412
Natural Gas	Cubic Foot	1,034
Crude Oil	Barrel (42 Gallons)	5,800,000
Gasoline	Gallon	125,000

Source: California Energy Commission 2007a.

Construction-related impacts were estimated by applying a highway construction energy factor to the total estimated construction cost of the Eastside Transit Corridor Phase 2 Project. The California Department of Transportation (Caltrans) derived energy consumption for different light rail transit (LRT) facilities in *Energy and Transportation Systems* (1983), and these factors are still widely used in the industry today.

Consumption factors are reported in BTUs per dollar of construction spending. Given the date of this data source (1983), the energy consumption factors were adjusted to account for the change in construction costs. The California Construction

Cost Index was used to adjust the factors to 2010 dollars. The consumption factors used are as follows:

- Track Elements: 7,494 BTU/2010\$
- Stations, stops, and terminals: 7,494 BTU/2010\$
- Parking: 9,218 BTU/2010\$
- Maintenance yards: 9,218 BTU/2010\$
- Site work: 7,494 BTU/2010\$
- Systems: 11,519 BTU/2010\$

Only direct construction costs related to this project were used to calculate energy consumption during construction. The professional engineering and ROW costs were not considered in the analysis.

Operational energy use was determined by calculating changes in VMT for cars, buses, and light rail, as applicable, for each alternative. In order to identify the BTUs for each vehicle type in the project area, the United States Department of Energy's (DOE) *Transportation Energy Data Book*, Edition 27 (2008) was used to determine energy consumption factors for the different modes of transportation. **Table 4.13-2** summarizes these energy consumption factors. For transit buses, the DOE provides only one level of energy intensity regardless of fuel type (e.g., compressed natural gas (CNG) or diesel). The light rail transit mode energy intensity does account for electricity use. Change in VMT was calculated based on the BTU per vehicle mile rate shown in Table 4.13-2. The passenger miles for each alternative were obtained from the travel demand model.

Analysis of the operational energy impact of proposed stations for the build alternatives was determined following the same methodology used in the climate change analysis, which follows Chester and Horvath's electricity usage factors used for the San Francisco Municipal Railway (Muni) in San Francisco.

Table 4.13-2. Energy Consumption Factors

Mode	Factor (BTU/Vehicle Mile)
Cars/Light Trucks ¹	6,213
Buses ²	5,101
Light Rail ²	79,424

Sources:
¹ RY2008 Database: <http://www.ntdprogram.gov/ntdprogram/data.htm>;
² DOE, 2008.

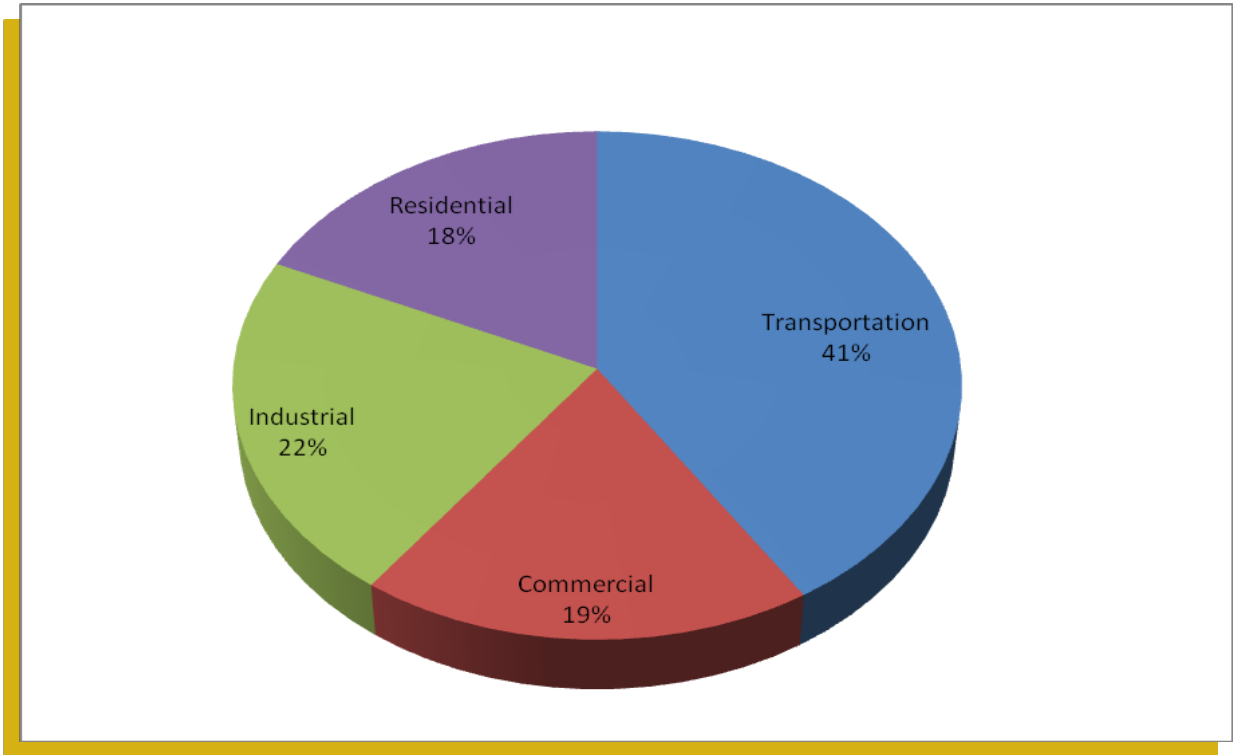
4.13.2 Affected Environment/Existing Conditions

Energy usage in California continues to be dominated by the transportation sector. There has been a dramatic increase in the number of vehicles operated and vehicle miles traveled (VMT) in the state since the early 1970s. The CEC reports that Californians consumed approximately 20 billion gallons of gasoline and diesel fuel from transportation uses in 2007. This amount represents an increase of nearly 50 percent over the last 20 years.

Figure 4.13-1 shows that over 40 percent of all energy consumed in the state is used for transportation.

Similarly, transportation in the County of Los Angeles continues to be dominated by single-occupancy automobiles. In 2005, 74.7 percent of all people in the Southern California region drove alone to work. High percentages of single-occupancy vehicles result in higher VMT throughout the state. In turn, high VMT translate into high energy use and increased air pollutants in the SCAG region.

As described in the Climate Change Technical Memorandum, Appendix S, of this Draft EIS/EIR, transportation is responsible for 38 percent of the state's greenhouse gas (GHG) emissions.



Source: California Energy Commission 2007a.

Figure 4.13-1. California Energy Use by Sector – 2006

Table 4.13-3 summarizes baseline (2010) annual transportation energy usage in the Los Angeles region. The most recent available data for Metro light rail energy consumption in the project region are from 2008. Baseline data for bus operations and energy consumption was modeled with a base year of 2010. Existing conditions for bus and light rail operation show a combined annual VMT of approximately 11.7 million. This translates into approximately 356 billion BTUs and the equivalent of approximately 61,000 barrels of oil. The most recent data for annual automobile energy consumption in the region comes from the transportation model. Automobiles in the region were projected to consume approximately 760,000 billion BTUs in 2010, the equivalent of over 122 million barrels of oil.

Metro’s electricity use is split between powering the rail system and powering transit facilities.

For both light rail and facility electrical requirements, Metro buys power from LADWP, SCE, and Pasadena Water and Power. In 2008, Metro rail consumed 175 million kilowatt hours (kWh) of electricity (approximately 597 billion BTUs) and Metro facilities consumed 69 million kWh (approximately 235,000 BTUs). Metro would purchase additional electricity from its current providers to facilitate the proposed project.

Metro’s 2009 *Baseline Sustainability Report* presents goals and recommendations for tracking and improving these performance measures. (Refer to Appendix X, Energy Resources Technical Memorandum, of this Draft EIS/EIR for more information regarding existing energy supplies and usage.)

Table 4.13-3. Annual Regional Transportation Energy Use, Existing Conditions^a

Vehicle Class	Consumption Factors ^{1,2} (BTU/mi)	Vehicle Miles Traveled (Annual)	Percentage of Total Miles Traveled in Region	Total BTU Consumption (Billions)	Total Equivalent Barrels of Oil	Percentage of Total BTU and Equivalent Barrels of Oil
Light Rail ³	79,424	3,980,819	0.004	316	54,513	0.04
Bus ⁴	5,101	7,697,851	0.007	39	6,770	0.006
Automobiles	6,213	114,083,059,241	99.9	708,789	122,206,559	99.95
Annual Total	N/A	114,094,737,911	100	709,153	122,267,842	100

Sources: ¹ DOE 2008; ² RY2008 (Database: <http://www.ntdprogram.gov/ntdprogram/data.htm>); ³ CDM Smith 2010, AECOM 2013; ⁴ AECOM 2010.

Note:

^a Existing conditions are reported from data sources dated 2008 and 2010. The 2008 data are the most recent available data from the National Transportation Data Program for Metro-reported light rail and bus miles traveled annually.

BTU/mi = British thermal unit per mile

4.13.3 Environmental Impacts/Environmental Consequences

The following sections summarize the evaluation of potential energy resource impacts for each alternative. Impact conclusions for all of the alternatives are based on the thresholds identified above in Section 4.13.1. **Table 4.13-4** summarizes the results of the analysis.

Table 4.13-5 summarizes annual changes in energy consumption associated with regional highway VMT for each of the action alternatives, compared with the No Build Alternative. Calculations were based on data from the transportation model that projected changes in daily VMT throughout the region. As shown in Table 4.13-5, all of the alternatives would result in a

net decrease in VMT throughout the region when compared with the No Build Alternative.

Table 4.13-6 summarizes total operational energy demands under all of the proposed alternatives. Table 4.13-6 compares BTUs and barrels of oil under each alternative, as well as the percent change in BTUs between each build alternative and the No Build Alternative. As discussed below, none of the alternatives would result in a significant impact to energy resources. Therefore, no new (off-site) energy supply facilities, distribution infrastructure, capacity-enhancing alterations to existing facilities, or new systems or substantial alterations to power or natural gas would be required under any of the alternatives. The impact analysis for each alternative, based on the remaining thresholds identified in Section 4.13.1, is included below.

Table 4.13-4. Summary of Potential Energy Resources Impacts

Alternative	Energy Consumption – (NEPA/CEQA)
No Build	<p>Construction: None</p> <p>Operations: None (increase associated with projected growth)</p>
TSM	<p>Construction: Not adverse/Less than significant</p> <p>Operations: None</p>
SR 60 LRT Alternative and North Side Design Variation	<p>Construction: Not adverse/Less than significant</p> <p>Operations: Beneficial long-term effects/beneficial long-term impacts (overall net benefit to energy)</p>
Washington Boulevard LRT Alternative (at-grade and aerial options)	<p>Construction: Not adverse/Less than significant</p> <p>Operations: Beneficial long-term effects/beneficial long-term impacts (overall net benefit to energy)</p>

Table 4.13-5. Estimated Regional Highway VMT and Energy Consumption Comparisons

Scenario	Annual Change in Highway VMT	Annual Change in Energy Consumption (BTUs in billions)	Annual Change in Equivalent Barrels of Oil
TSM Alternative vs. No Build Alternative	(153,594,000)	(954)	(164,531)
SR 60 LRT Alternative vs. No Build Alternative	(158,682,000)	(985)	(169,981)
Washington Boulevard LRT Alternative vs. No Build Alternative	(159,000,000)	(987)	(170,322)

Source: AECOM, CDM Smith 2011.

Note:

Parentheses indicate a reduction compared with the No Build Alternative.

Table 4.13-6. Estimated Annual Operational Energy Consumption for Each Alternative

Annual Regional VMT ¹ (billions) for Each Alternative	BTUs ² (billions)	Barrels of Oil	Total BTUs (billions)	Percent Change in BTUs from No Build ³	Total Barrels of Oil
Baseline (2010)					
Highway – 114.08	708,798	122,206,560	708,837	--	122,213,330
Bus ⁴ – 0.00769	39.26	6,770			
No Build Alternative (2035)					
Highway - 166.91	1,036,999	178,793,367	1,037,037	--	178,799,887
Bus – 0.00741	37.81	6,520			
TSM Alternative					
Highway – 166.75	1,036,042	178,628,836	1,036,099	(0.090)	178,638,619
Bus – 0.01112	56.74	9,783			
SR 60 LRT Alternative					
Highway – 166.75	1,036,011	178,623,386	1,036,118	(0.088)	178,641,778
Bus – 0.01049	53.55	9,233			
Light Rail – 0.000634	50.35	8,682			
Stations – N/A	0.8	137.9			
Maintenance – N/A	1.97	339.7			
SR 60 LRT Alternative North Side Design Variation					
Highway – 166.75	1,036,011	178,623,386	1,036,118	(0.088)	178,641,778
Bus – 0.01049	53.55	9,233			
Light Rail – 0.000634	50.35	8,682			
Stations – N/A	0.8	137.9			
Maintenance – N/A	1.97	339.7			

Table 4.13-6. Estimated Annual Operational Energy Consumption for Each Alternative (continued)

Regional VMT ¹ (billions) for Each Alternative	BTUs ² (billions)	Barrels of Oil	Total BTUs (billions)	Percent Change in BTUs from No Build ³	Total Barrels of Oil
Washington Boulevard LRT Alternative					
Highway – 166.75 ⁵	1,036,011	178,623,045	1,036,138	(0.086)	178,644,879
Bus – 0.01085	55.37	9,547			
Light Rail – 0.000861	68.38	11,790			
Stations – N/A	0.9	156.9			
Maintenance – N/A	1.97	339.7			

Source: AECOM, CDM Smith 2011.

Notes:

¹ Calculation of VMT describes changes in highway VMT within the regional area projected by the transportation model for the 2035 horizon year under each alternative. Project area bus VMT are included in the baseline and all the alternatives. Added light rail VMT are included in the two LRT build alternatives. Operation of buses and light rail outside of the proposed alternatives are assumed to remain unchanged.

² Operational BTUs also include the energy required to operate additional stations and maintenance yards under the LRT build alternatives.

³ This percentage represents percent change in operational BTUs and does not include construction.

⁴ Buses were not included in the traffic model; therefore, bus VMT, calculated as additional buses operating under each alternative, are shown separately in the table by alternative.

⁵ Actual, non-rounded values of annual VMT for the SR 60 LRT and Washington Boulevard LRT Alternatives are 166,749,660,000 and 166,749,342,000, respectively.

4.13.3.1 No Build Alternative

4.13.3.1.1 Impact Analysis

Construction Impacts

The No Build Alternative would not include any construction of new light rail lines in the project area. The No Build Alternative would not result in construction-related impacts to energy use or resources in the project area or region. There would be no adverse effects under NEPA and no impacts under CEQA.

Operational Impacts

Under the No Build Alternative, no energy consumption would be associated with the operation of new light rail lines, stations, or maintenance yards. Increased energy consumption that would occur under the No Build Alternative

represents predicted increases in VMT unrelated to the project. Annual highway VMT in the region would increase from 114.08 billion VMT (2010) to 166.91 billion VMT (2035) as shown in Table 4.13-6. Correspondingly, energy consumption throughout the region would increase by approximately 382,200 billion BTUs (see Table 4.13-6). Since the No Build Alternative assumes that the Eastside Transit Corridor Phase 2 Project would not be built, this increase in BTUs is a result of projected growth in traffic that is expected to occur in the region without the project. There would be no operational impacts as a result of this alternative, since the No Build Alternative assumes that the Eastside Transit Corridor Phase 2 Project would not be constructed. Thus, there would be no adverse effects under NEPA and no impacts under CEQA.

4.13.3.1.2 Mitigation Measures

Mitigation measures are not required because there would be no impacts to energy resources from operation of the No Build Alternative.

4.13.3.1.3 Impacts Remaining After Mitigation

NEPA Finding

The No Build Alternative would not have adverse effects with respect to energy resources in the region.

CEQA Determination

The No Build Alternative would not have significant impacts with respect to energy resources in the region. (Refer to the Energy Resources Technical Memorandum (Appendix X) for complete analysis.)

4.13.3.2 TSM Alternative

4.13.3.2.1 Impact Analysis

Construction Impacts

The TSM Alternative assumes that the project would not be constructed. While some bus stations would be constructed under this alternative, there would be minimal construction impact on energy resources or energy use in the project area or region. For this analysis, it was assumed that no construction energy use would occur under the TSM Alternative. There would be no adverse effects under NEPA and no impacts under CEQA.

Operational Impacts

Operational impacts of the TSM Alternative are compared with the 2035 No Build Alternative to determine significance under NEPA and to the 2010 Baseline to determine significance under CEQA.

Operation of the TSM Alternative (2035) would reduce highway VMT in the project area by approximately 153 million vehicle miles per year compared with the 2035 No Build Alternative, as shown in Table 4.13-5.

Correspondingly, as shown in Table 4.13-5, automobile energy consumption would decrease by over 954 billion BTUs (equivalent to a decrease of

over 164,000 barrels of oil) under the TSM Alternative (2035) compared with the 2035 No Build Alternative. Thus, under NEPA the TSM Alternative would have potentially beneficial effects to energy and vehicle fuel resources in the project area.

Table 4.13-6 summarizes total energy use under the TSM Alternative, including bus and highway VMT. With the addition of bus lines, the TSM Alternative would result in increased bus VMT (an increase of approximately 3.7 million VMT compared with the 2035 No Build Alternative and approximately 3.4 million VMT compared with the 2010 Baseline). As shown in Table 4.13-6, this increased bus VMT would result in corresponding increases in BTUs and barrels of oil consumed by buses/bus operations. Under the TSM Alternative, buses would use 56.74 billion BTU and 9,783 barrels of oil. For bus operations, this is an increase of approximately 18.9 billion BTU and 3,263 barrels of oil compared with the 2035 No Build Alternative, and approximately 17.5 billion BTU and 3,013 barrels of oil compared with the 2010 Baseline.

Despite these increases in VMT and energy use from the addition of bus lines, operation of the TSM Alternative would still result in total annual net energy savings compared with the No Build Alternative (2035). Net energy savings from operation would be more than 900 billion BTUs (equivalent to approximately 161,000 barrels of oil) as indicated in Table 4.13-5. Given the reduced energy consumption compared with the No Build Alternative (2035), the operational effect of the TSM Alternative would be potentially beneficial under NEPA for energy resources in the long term. Decreases in highway VMT and net decreases in energy use throughout the region would result in beneficial impacts under CEQA.

Total energy use under the TSM Alternative would increase compared with the 2010 Baseline; however, the majority of this increase would be due to background growth in highway vehicle use (projected growth in traffic that is expected to occur in the region without the project), and is not

attributable to the TSM Alternative (see Table 4.13-6).

Given the net reduction in energy consumption compared with the 2035 No Build Alternative, the TSM Alternative would not require new (off-site) energy supply facilities, distribution infrastructure, or capacity-enhancing alterations to existing facilities, or result in a need for new systems or substantial alterations to power or natural gas. Therefore, impacts to these facilities would be less than significant under CEQA.

4.13.3.2.2 Mitigation Measures

Mitigation measures are not required because potential impacts to energy resources from operation of the TSM Alternative would be beneficial.

4.13.3.2.3 Impacts Remaining After Mitigation

NEPA Finding

The TSM Alternative would not have adverse effects with respect to energy resources. The overall net energy effects would be beneficial.

CEQA Determination

The TSM Alternative would not have significant impacts with respect to energy resources. The overall net energy impacts would be beneficial.

4.13.3.3 SR 60 LRT Alternative

4.13.3.3.1 Impact Analysis

Construction Impacts

Construction of the SR 60 LRT Alternative would result in a temporary energy demand of 6,482 billion BTUs as shown in Table 4.13-7.

This impact would be temporary, whereas operation of the project would result in long-term decreases in energy use and highway VMT in the region. LADWP and SCE are committed to increasing electricity generation from renewable energy sources and ensuring a reliable flow of electricity to users in their service areas.

Construction of the SR 60 LRT Alternative North Side Design Variation would have energy consumption requirements similar to those presented and analyzed above. Table 4.13-8 summarizes construction energy impacts of the SR 60 LRT Alternative North Side Design Variation.

Table 4.13-7. Estimated Energy Consumption from Construction – SR 60 LRT Alternative

Project Component	Base Year (2010) Dollars (thousands)	Energy Consumption Factor (BTU/2010\$)	Total BTU Consumption (billions)
Track elements	377,139	7,494	2,826
Stations, stops, terminals	68,750	7,494	515
Parking structures	98,750	9,218	910
Maintenance yard	86,250	9,218	795
Site work	56,081	7,494	420
Systems	88,140	11,519	1,015
Total	775,110	N/A	6,482

Table 4.13-8. Estimated Energy Consumption from Construction – SR 60 LRT Alternative – North Side Design Variation

Project Component	Base Year (2010) Dollars (thousands)	Energy Consumption Factor (BTU/2010\$)	Total BTU Consumption (billions)
Track elements	357,615	7,494	2,679
Stations, stops, terminals	68,750	7,494	515
Parking structures	98,750	9,218	910
Maintenance yard	86,250	9,218	795
Site work	56,256	7,494	422
Systems	88,530	11,519	1,019
Total	756,151	N/A	6,342

Construction-related energy expenditures that differ from the SR 60 LRT Alternative are in bold.

Construction of the SR 60 LRT Alternative North Side Design Variation would result in a one-time energy use of 6,342 billion BTUs. This impact would be temporary and the project would result in net decreases in energy use and highway VMT in the region.

Overall, a net beneficial impact to energy resources would be expected to occur given the long-term reduction in energy use from operation of the SR 60 LRT Alternative or the SR 60 LRT Alternative North Side Design Variation.

Additionally, at the contracting stage, Metro can establish terms encouraging productivity gains and integrated project delivery, which cut down on energy use and waste during construction. Specific energy conservation measures would be confirmed in final design. Implementation of air quality construction mitigation measures would ensure that the SR 60 LRT Alternative and the SR 60 LRT Alternative North Side Design Variation would not consume energy resources in a wasteful or inefficient manner.

There would be no adverse effects under NEPA from construction of the SR 60 LRT Alternative, with or without the North Side Design Variation.

Impacts under CEQA would be less than significant.

Operational Impacts

Under the SR 60 LRT Alternative, with or without the North Side Design Variation, there would be an increase in operational energy uses from added light rail, stations, buses, and the maintenance yard compared with the 2035 No Build Alternative as shown in Table 4.13-6. Table 4.13-5 shows that while operation of the SR 60 LRT Alternative, with or without the North Side Design Variation, would require new energy expenditures (compared with the 2035 No Build condition), this alternative would decrease regional annual highway VMT. Regional VMT would decrease compared with the 2035 No Build Alternative by over 158 million VMT (equivalent to 985 billion BTUs or 169,981 barrels of oil per year). Long-term decreases in highway VMT would be a beneficial effect under NEPA and a beneficial impact under CEQA.

Total annual BTU consumption in 2035 under the SR 60 LRT Alternative, with or without the North Side Design Variation, would be approximately 1,036,118 billion BTUs (see Table 4.13-6). While total BTUs are used to compare overall operational impacts of the SR 60 LRT Alternative with the 2035 No Build conditions, as described in further detail below and shown in Table 4.13-6, the total BTU numbers include background growth in highway

VMT in the region as well as added energy use from light rail, buses, stations, and the maintenance yard. It is important to note that background growth in VMT is unrelated to the project.

Total energy use under the alternative is compared with that of the No Build Alternative (2035) to determine significance under NEPA. Total energy use under the alternative is compared with current (2010) total energy usage to determine significance under CEQA. Section 4.13.3.3.3 includes a CEQA-specific analysis comparing existing conditions with operation of the SR 60 LRT Alternative to existing conditions without operation of the SR 60 LRT Alternative.

Total operational energy consumption under the SR 60 LRT Alternative would be greater than 2010 Baseline levels; however, this increase would result from increases in regional VMT unrelated to the project. Total annual net savings from operation under this alternative compared with the No Build Alternative (2035) would be approximately 919 billion BTUs (equivalent to approximately 158,109 barrels of oil) as shown in Table 4.13-6. Given that this alternative would result in overall reduced energy consumption (compared with the 2035 No Build Alternative), there would be long-term beneficial effects under NEPA and beneficial impacts under CEQA.

Due to the overall decrease in energy use in the region under the SR 60 LRT Alternative, there would be no additional requirement for new (off-site) energy supply facilities, distribution infrastructure, or capacity-enhancing alterations to existing facilities. Operation of the SR 60 LRT Alternative, with or without the North Side Design Variation, would not conflict with adopted energy conservation plans and would not result in the wasteful or inefficient use of nonrenewable resources. In addition, there would be no need for new systems or substantial alterations to power or natural gas. Thus, there would be no impact to these facilities as a result of long-term operation of

the SR 60 LRT Alternative, with or without the North Side Design Variation.

4.13.3.3.2 Mitigation Measures

Mitigation measures are not required because potential impacts to energy resources from operation of the SR 60 LRT Alternative, with or without the North Side Design Variation, would be beneficial.

4.13.3.3.3 Impacts Remaining After Mitigation

NEPA Finding

Construction of the SR 60 LRT Alternative, with or without the North Side Design Variation, would not have adverse effects with respect to energy resources. Long-term reductions in highway VMT and overall net reductions in energy use would be expected to have long-term beneficial effects.

CEQA Determination

Construction and operation of the SR 60 LRT Alternative, with or without the North Side Design Variation, would comply with federal, state, and local energy standards and would not exceed the CEQA significance thresholds listed in Section 4.13.1. The overall net energy impact would be beneficial.

Comparison of Alternative Against Existing Conditions

Construction of the SR 60 LRT Alternative, with or without the North Side Design Variation, would result in one-time energy usage and would not exceed significance thresholds under CEQA; impacts would be less than significant.

The VMT modeling data show a decrease in regional annual VMT and corresponding BTU and equivalent barrels of oil when existing conditions with operation of the SR 60 LRT Alternative are compared with existing conditions without the SR 60 LRT Alternative. That is, VMT and corresponding BTU and equivalent barrels of oil are less with operation of the SR 60 LRT Alternative than under existing conditions in 2010. This is a beneficial impact.

Operation of the light rail trains, stations, and maintenance facilities would consume energy (BTUs and equivalent barrels of oil). However, this energy use would be small compared with the energy reduction derived from decreased annual regional VMT and the corresponding reduction in BTU or barrels of oil consumed. Under the SR 60 LRT Alternative, annual regional VMT would decrease by approximately 60 million vehicle miles (a decrease of approximately 372 billion BTUs and 64,000 equivalent barrels of oil). Long-term impacts under CEQA would be beneficial.

4.13.3.4 Washington Boulevard LRT Alternative

4.13.3.4.1 Impact Analysis

Construction Impacts

Construction of the Washington Boulevard LRT Alternative with the option of at-grade crossings at Rosemead Boulevard and the I-605/San Gabriel River would result in a one-time consumption of approximately 6,439 billion BTUs. Construction of

the alternative with aerial crossings at these locations would result in a one-time total consumption of approximately 6,553 billion BTUs as shown in **Table 4.13-9**. SCE and LADWP are committed to increasing electricity generation from renewable energy sources and ensuring a reliable flow of electricity to users in its service area.

Additionally, at the contracting stage Metro can establish terms encouraging productivity gains and integrated project delivery, which cut down on energy use and waste during construction. Specific energy conservation measures would be confirmed in final design. Implementation of air quality construction mitigation measures would ensure that this alternative would not consume energy resources in a wasteful or inefficient manner. Construction would not result in adverse effects under NEPA. Energy resource impacts under CEQA would be less than significant.

Table 4.13-9. Estimated Energy Consumption from Construction – Washington Boulevard LRT Alternative

Project Component	Base Year (2010) Dollars (thousands) At-Grade Crossing Option	Base Year (2010) Dollars (thousands) Aerial Crossing Option	Energy Consumption Factor (BTU/2010\$)	Total BTU Consumption (billions) At-Grade Crossing Option	Total BTU Consumption (billions) Aerial Crossing Option
Track elements	280,037	296,178	7,494	2,099	2,220
Stations, stops, terminals	76,875	86,250	7,494	576	646
Parking structures	67,500	67,500	9,218	622	622
Maintenance yards	86,250	86,250	9,218	795	795
Site work	108,357	98,061	7,494	812	734
Systems	133,250	133,250	11,519	1,535	1,535
Total	752,269	767,489	N/A	6,439	6,553

Operational Impacts

Similar to the operation of the SR 60 LRT Alternative, operation of the Washington Boulevard LRT Alternative would result in increased energy use from added light rail, stations, buses, and maintenance yards compared with the 2035 No Build Alternative (see Table 4.13-6). Table 4.13-5 shows that while operation of the Washington Boulevard LRT Alternative would require new energy expenditures when compared with 2035 No Build conditions, the alternative would decrease regional annual highway VMT. Regional annual highway VMT would decrease compared with the 2035 No Build Alternative by 159 million VMT (equivalent to 987 billion BTUs or 170,322 barrels of oil). Long-term decreases in highway VMT would be a beneficial effect under NEPA and a beneficial impact under CEQA.

Total annual BTU consumption under the Washington Boulevard LRT Alternative would be approximately 1,036,138 billion BTUs (see Table 4.13-6). While total BTUs are used to compare overall operational impacts of the Washington Boulevard LRT Alternative with the 2035 No Build conditions, as described in further detail below and shown in Table 4.13-6, the total BTU numbers include background growth in highway VMT in the region as well as added energy use from light rail, buses, stations, and the maintenance yard. It is important to note that background growth in VMT is unrelated to the project.

Total energy use under the alternative is compared with the No Build Alternative (2035) to determine significance under NEPA. Total energy use under the alternative is compared with current total energy use (2010) to determine significance under CEQA. Section 4.13.3.4.3 includes a CEQA-specific analysis comparing existing conditions with operation of the Washington Boulevard LRT Alternative to existing conditions without operation of this alternative.

Total operational energy consumption under the Washington Boulevard LRT Alternative would be

greater than 2010 Baseline levels; however, this increase would result from increases in regional VMT unrelated to the project. Total annual net savings from operation under this alternative compared with the No Build Alternative (2035) would be approximately 899 billion BTUs (equivalent to approximately 155,008 barrels of oil) as shown in Table 4.13-6. Given that this alternative would result in overall reduced energy consumption (compared with the 2035 No Build Alternative), there would be long-term beneficial effects under NEPA and beneficial impacts under CEQA.

Due to the overall decrease in energy use in the region under the Washington Boulevard LRT Alternative, there would be no additional requirement for new (off-site) energy supply facilities, distribution infrastructure, or capacity-enhancing alterations to existing facilities. Operation of the Washington Boulevard LRT Alternative would not conflict with adopted energy conservation plans and would not result in the wasteful or inefficient use of nonrenewable resources. In addition, there would be no need for new systems or substantial alterations to power or natural gas. Thus, there would be no impact to these facilities as a result of long-term operation of the Washington Boulevard LRT Alternative.

There would be no difference in energy consumption between the at-grade and aerial crossings options.

4.13.3.4.2 Mitigation Measures

Mitigation measures are not required because potential impacts to energy resources from operation of the aerial and at-grade options of the Washington Boulevard LRT Alternative would be beneficial.

4.13.3.4.3 Impacts Remaining After Mitigation

NEPA Finding

Construction of the Washington Boulevard LRT Alternative, with either the aerial or at-grade option, would not result in adverse effects under NEPA.

Long-term reductions in regional annual highway VMT during operation of the Washington Boulevard LRT Alternative, either aerial or at-grade, and overall net reductions in energy use would be expected to result in beneficial energy resource effects under NEPA.

CEQA Determination

Construction and operation of both the at-grade and aerial options of the Washington Boulevard LRT Alternative would comply with federal, state, and local energy standards and would not exceed the CEQA significance thresholds listed in Section 4.13.1. Long-term (operational) energy use under the at-grade and aerial options of the Washington Boulevard LRT Alternative would be less than significant.

Long-term reductions in regional annual highway VMT would be expected to be a beneficial impact.

Comparison of Alternative against Existing Conditions

Impacts would be similar to those described for the SR 60 LRT Alternative. Construction would result in one-time energy usage and would not exceed significance thresholds under CEQA; impacts would be less than significant.

Long-term operation of the Washington Boulevard LRT Alternative, under either the at-grade or aerial option, would decrease annual regional highway VMT by approximately 50 million vehicle miles (equivalent to approximately 308 billion BTUs and 53,000 equivalent barrels of oil) compared with 2010 Baseline conditions. Any potential net increase in operational BTU consumption associated with operation of added light rail, stations, buses, and maintenance yards would be negligible and less than the accuracy factor inherent in the traffic modeling. These results indicate that there would be no adverse effect on energy consumption when compared with existing 2010 Baseline conditions.