3.17 Energy Resources

3.17.1 Introduction

This section characterizes energy resources, usage associated with the proposed Expo Phase 2 project, and the net energy demand associated with changes to the transportation network with development of the Expo Phase 2 project. Climate change is addressed in Section 3.5 (Global Climate Change).

Greater detail on Energy Resources is contained in the *Energy Resources Technical Background Report.* Full bibliographic references can be found in Appendix B (Bibliography).

3.17.2 Existing Conditions

Transportation Fuels

The primary transportation fuels consumed in this country are petroleum-based gasoline and diesel. In 2005, California's nearly 28 million vehicles consumed more than 16 billion gallons of gasoline and nearly 3 billion gallons of diesel (Energy Information Administration [EIA] 2007). Table 3.17-1 (Energy Consumption in California by Sector~~ource~~, 2004) shows the percentage of energy used by the transportation, industrial, commercial, and residential sectors. Transportation energy consumption far exceeds the other sectors in California.

Table 3.17-1 Energy Consumption in California by Sector, 2004

Sector~~ource~~	**Amount**	**Share of U.S.**
Transportation	3,199,591 billion Btu	11.5%
Industrial	2,052,670 billion Btu	6.1%
Commercial	1,556,272 billion Btu	8.8%
Residential	1,556,056 billion Btu	7.3%

SOURCE: http://tonto.eia.doe.gov/state/state_energy_profiles.cfm?sid=CA November 16, 2007
Btu = British thermal unit

To reduce dependence on petroleum products, particularly from out-of-state or international sources, California has been working to improve the availability of alternative-fueled vehicles and public transit. In 2007~~3~~, there were approximately 117,199~~77,761~~ alternative-fueled vehicles in use in California.[78] This number has increased over the last few years due to the conversion of many transit vehicles to clean air vehicles, and federal and state tax incentives for zero emission vehicles.

[78] Energy Information Administration. *California Quick Facts.* http://tonto.eia.doe.gov/state/state_energy_profiles.cfm?sid=CA October 14, 2009.~~Based on the most recent data available at www.energy.ca.gov/html/energysources.html~~

Metro Fuel Consumption

The Los Angeles County Metropolitan Transportation Authority's (Metro) current operations include a bus fleet of 129 diesel-fueled buses, and 2,506 CNG buses, as well as five electricity-powered rail lines. Metro purchases electricity and petroleum fuels from commercial suppliers. Southern California Edison (SCE) and the Los Angeles Department of Water and Power (LADWP) supply Metro with electricity for operation of stations and rail transit. Electricity is a "reactive" utility, meaning it is provided to customers on an as-needed basis. Metro is an existing customer of SCE and LADWP, and as such, the current service would be expanded to include operation of the proposed project. Petroleum fuels are purchased from a variety of commercial sources. CNG is provided by the Southern California Gas Company, and as with electricity, current service would be expanded to provide for increased demand in order to achieve Metro's goal of running 100 percent of their buses with CNG.

According to current Metro records, operation of Metro's existing rail lines consumes approximately 172,319 megawatt-hours (MWh) annually (588 billion British thermal units [Btu]).[79] As Metro currently operates 73.1 miles of rail lines, it consumes 8 billion Btu of energy per rail mile on an annual basis.

3.17.3 Regulatory Setting

State

No state regulations apply to the analysis of transportation energy usage for the proposed project.

Regional

Metro Energy and Sustainability Policy

As a provider of public transportation, Metro is a large user of energy, both fossil fuels and electricity. The Metro Energy and Sustainability Policy, adopted in June 2007, examines ways that Metro could reduce energy consumption and consequently improve sustainability. Metro is in the process of completing numerous energy efficiency projects, such as lighting upgrades, escalator power controllers, HVAC replacements, and solar projects. The Metro Energy and Sustainability Policy codified an agency commitment to responsible energy management, renewable energy sources, energy efficiency, and general sustainability in Metro's operations.

The immediate goals of the policy are to gain more control over Metro's energy consumption and reduce costs by aggressively pursuing renewable energy sources and energy conservation projects, and to construct all new facilities using energy efficiency and conservation strategies.

3.17.4 Analytic Methodology

Data used to prepare this section were taken from various sources, including the *Transportation Energy Data Book* (USDOT 2008), information from the California Energy Commission (CEC), the *Transportation/Traffic Technical Background Report* prepared for the proposed project, and previous environmental studies prepared for the proposed project.

[79] Metro Accounting, January 2007.

Direct energy consumption would result from the operation of vehicles (trains or buses) within the corridor. Proposed light-rail vehicles and transit stations would be powered by electricity. For the No-Build and TSM Alternatives, which involve the use of buses, fuels consumed would include CNG fuels as Metro anticipates 100 percent of its bus fleet to run on CNG as of project buildout.

To assess the net change in energy consumption from the No-Build and TSM Alternatives, the total passenger vehicle and bus-transit vehicle miles traveled (VMT) of these alternatives were derived from Section 3.2 (Transportation/Traffic). The vehicle fleet mix was derived from the URBEMIS 2007[80] Model outputs generated for operational emissions of each alternative. According to the URBEMIS 2007 model, passenger vehicles account for 52.5 percent of total vehicles and transit buses account for 0.2 percent of the total vehicles; therefore, 52.5 percent of total daily VMT for passenger vehicles and 0.2 percent of total daily VMTs for buses for each alternative was assumed. The change in the weekly Btus consumed for the TSM Alternative within the Expo Phase 2 study area was then compared to the No-Build Alternative, as the No-Build Alternative would represent the baseline.

To estimate the net change in energy consumption associated with implementation of the LRT Alternatives, weekly VMT were assessed for light-rail vehicles and were multiplied by energy consumption factors specific to light-rail transport. The estimated Btu per VMT for light-rail vehicles is 62,797 Btu/mile, according to the U.S. Department of Transportation's *Transportation Energy Data Book: Edition 27* (2008). The estimated Btu per VMT for light-rail vehicles was then compared to the estimated Btu for passenger vehicle VMT and bus VMT within the Expo Phase 2 study area for each LRT Alternative.

3.17.5 Criteria, Impact Evaluation, and Mitigation Measures

Criterion	**Would the project lead to a wasteful, inefficient, or unnecessary usage of fuel or energy?**

No-Build Alternative

There would be roadway and transit service improvements associated with the No-Build Alternative. As part of the No-Build Alternative, the I-405 Widening project would propose the installation of HOV lanes which would improve traffic flow thereby reducing energy consumption along the I-405. In addition, the No-Build Alternative would modify the bus fleet to increase the percentage of CNG buses. As a result, the No-Build Alternative would not lead to a wasteful, inefficient, or unnecessary usage of fuel or energy. Therefore, ***no impact*** would occur with respect to energy consumption.

Transportation Systems Management (TSM) Alternative

The TSM Alternative would include all of the improvements under the No-Build Alternative and new on-street bus services to directly serve the Expo Phase 2 community transit needs. Those additional improvements would include minor physical modifications such as upgraded bus

[80] URBEMIS 2007 is a model developed for ARB. The model incorporates mobile source emissions from the EMFAC 2007 computer model as well as the Institute of Transportation Engineers (ITE) trip generation rates for vehicle emission projections.

stops and additional buses. The TSM Alternative results in a reduction of VMT ~~and VHT~~ in the ~~County~~Expo Phase 2 study area, and thus would not lead to a wasteful, inefficient, or unnecessary usage of fuel or energy. Therefore, ***no impact*** would occur with respect to energy consumption.

LRT Alternatives

As shown in Table 3.17-2 (Annual Operational Energy Consumption for Project Alternatives within the Expo Phase 2 Study Area), all of the LRT Alternatives would result in an annual reduction of energy consumed due to the reduction in VMT for both single-passenger vehicles and buses within the Expo Phase 2 study area. The greatest reduction in both single-passenger vehicle energy consumption and bus energy consumption would result from implementation of LRT Alternative 1 (Expo ROW–Olympic), with an estimated annual reduction of 12,960 million Btu from single-passenger vehicles and an estimated annual reduction of 138 million Btu from buses.

Additionally, operation of the LRT Alternatives would require the consumption of energy as a result of LRT services and station operations. Although LRT services and station operations would consume energy, Metro's Energy and Sustainability Policy would be followed, which would serve to reduce Metro's use of fossil fuels through the use of ambient and renewable energy sources. Annual operational energy consumption is estimated in Table 3.17-3 (LRT Alternatives Annual Operational Energy Consumption). The difference in energy consumption is due mainly to length of alignment, as the LRT Alternatives using the Venice/Sepulveda alignment are approximately 1 mile longer. However, relative to the total energy consumed in the transportation sector, the difference in energy use between the four alternatives is slight. Operation of the LRT Alternatives would increase Metro's energy consumption by 5.6~~6.6~~ to 7.4~~7.5~~ percent, depending on the alternative selected. In addition as shown in Table 3.17-2 (Annual Operational Energy Consumption for Project Alternatives within the Expo Phase 2 Study Area), implementation of the LRT Alternatives would result in an overall reduction in total single-passenger vehicle and bus energy consumption within the study area. The LRT Alternatives would result in less energy consumption than baseline conditions and, as such, would result in a beneficial energy impact. In any event, energy usage under the LRT Alternatives would not be considered wasteful or inefficient as more people would be moved through the transportation system. This would be a ***beneficial*** impact that would occur with implementation of any of the LRT Alternatives.

FEIR Design Options

Development of the Sepulveda Grade Separation, Colorado Parking Retention, Colorado/4th Parallel Platform and South Side Parking, Maintenance Facility Buffer, or Expo/Westwood Station No Parking design options would not be anticipated to affect the daily operations of the proposed alignment, nor increase/decrease traffic volumes. As such, no change in energy consumption beyond that discussed above for the LRT Alternatives is anticipated, and impacts would remain ***beneficial***.

Table 3.17-2 Annual Operational Energy Consumption for Project Alternatives within the Expo Phase 2 Study Area

Measure/Alternative	No-Build (baseline)	TSM	LRT 1: Expo ROW–Olympic	LRT 2: Expo ROW–Colorado	LRT 3: Venice/ Sepulveda–Olympic	LRT 4: Venice/ Sepulveda–Colorado
Study Area VMT	2,695,854	2,693,804	2,684,231	2,685,511	2,686,360	2,685,540
Energy Consumed (Million Btu)						
Single-Passenger Vehicle	3,006,055	3,003,769	2,993,094	2,994,522	2,995,468	2,994,554
Buses	31,959	31,935	31,821	31,836	31,846	31,837
Reduction in Energy Consumption from No-Build (Million Btu)						
Single-Passenger Vehicle	N/A	-2,286	-12,960	-11,533	-10,586	-11,500
Buses	N/A	-24	-138	-123	-113	-122

SOURCE: Data from URBEMIS2007; based on VMT in the *Transportation/Traffic Technical Background Report*.

a. VMTs for the No-Build and TSM Alternatives were taken from the URBEMIS outputs generated for operational emissions of each alternative. To derive energy consumptions, 52.5 percent of total daily VMTs were assumed for passenger vehicles and 0.2 percent of total daily VMTs were assumed for buses for each alternative, based on percent fleet mix identified in URBEMIS (URBEMIS, Version 9.2.4).

Table 3.17-3 LRT Alternatives Annual Operational Energy Consumption

LRT Alternative	Annual Trips	Trip Length (miles)	Annual LRV VMT (miles)	Energy Consumed (Million Btu)
LRT 1: Expo ROW–Olympic	92,768	6.6	612,269	38,449
LRT 2: Expo ROW–Colorado	92,768	6.6	612,269	38,449
LRT 3: Venice/Sepulveda–Olympic	92,768	7.5	695,760	43,692
LRT 4: Venice/Sepulveda–Colorado	92,768	7.5	695,760	43,692

SOURCE: PBS&J 2008.

Energy consumption was derived by calculating overall VMT for the LRT Alternatives based on the overall length of the Alternative and converting the VMT into Btu. Light-rail vehicles (LRVs) operate at an average energy consumption rate of 62,797 Btu per vehicle mile; in this case, LRV refers to a train, without qualifiers to the number of cars.

Criterion Would the project result in a substantial increase in demand upon existing energy sources such that the capacity to provide the energy is approached or exceeded and/or require substantial additional capacity or the development of new energy sources?

No-Build Alternative

There would be roadway and transit service improvements associated with the No-Build Alternative. These improvements include HOV lanes along the I-405 and improvements to the various bus fleet operations and expansion of rail service throughout the Los Angeles basin to reduce overall energy consumption. As a result, there would be a ***less-than-significant*** impact on the demand for existing energy sources.

Transportation Systems Management (TSM) Alternative

The TSM Alternative would include all of the improvements under the No-Build Alternative and new on-street bus services to directly serve the Expo Phase 2 community transit needs. Those additional improvements would include minor physical modifications such as upgraded bus stops and additional buses. These improvements would reduce overall energy consumption. As a result, there would be a ***less-than-significant*** impact on the demand for existing energy sources.

LRT Alternatives

Operation of the LRVs, stations, maintenance facility, and other supporting elements would be powered by electricity commercially available through LADWP and SCE. Operation of the LRT Alternatives would increase Metro's energy consumption by 5.6~~6.6~~ to 7.4~~7.5~~ percent, depending on the alternative selected. Although LRT services and station operations would consume energy, Metro's Energy and Sustainability Policy would be followed, which would serve to reduce Metro's use of fossil fuels through the use of ambient and renewable energy sources. As shown in Table 3.17-3 (LRT Alternatives Annual Operational Energy Consumption), the smallest increase of energy consumption associated with implementation of any of the LRT Alternatives would occur under LRT Alternative 1 and LRT Alternative 2. ~~In addition, as~~

As shown in Table 3.17-2 (Annual Operational Energy Consumption for Project Alternatives within the Expo Phase 2 Study Area), implementation of the LRT Alternatives would result in an overall reduction in total single-passenger vehicle and bus energy consumption within the study area. The increased electricity energy demand of the LRT Alternatives would be met by LADWP and SCE, as they would be able to provide the electricity required to operate the proposed alternatives while still providing adequate service to current customers.[81] This would be a ***less-than-significant*** impact.

FEIR Design Options

Development of the Sepulveda Grade Separation, Colorado Parking Retention, Colorado/4th Parallel Platform and South Side Parking, Maintenance Facility Buffer, or Expo/Westwood Station No Parking design options would not result in an increase in energy consumption. Further, as the proposed design improvements would not be anticipated to affect the daily operations of the proposed alignment, nor increase/decrease traffic volumes. As such, no change in energy consumption beyond that discussed above for the LRT Alternatives is anticipated, and impacts would remain ***less than significant***.

[81] Will serve letters from both LADWP and SCE are available for review in the *Energy Resources Technical Background Report*.