4.6 ENERGY RESOURCES

This section evaluates the existing energy resources in the Project Area, and the energy usage impacts from construction of the tunneling method alternatives compared to the Project. The analysis only addresses energy usage during construction because operations of the Project and the evaluated alternatives would have nearly identical associated energy resource impacts. The environmental analysis assumes a conservative, worst-case, condition when determining potential impacts. Section 4.11, Energy Resources of the Final EIS/EIR describes energy demand of existing transportation sources in the project area and analyzes the potential energy resource impacts of the Project. This section focuses on the evaluation of construction methods along Flower Street compared to what was previously analyzed for the Project in Final EIS/EIR.

4.6.1 Affected Environment

This section identifies existing annual energy usage by the transportation sector within the Los Angeles region. Transportation in Los Angeles County continues to be dominated by single-occupancy automobiles. In 2010, 72.3 percent of all people in the Southern California region drove alone to work (US Census Bureau). High percentages of single-occupancy vehicles result in higher vehicle miles travelled (VMT) throughout the state. In turn, high VMT translates into high energy use and increased air pollutants throughout the Southern California Association of Government (SCAG) region.

Metro's electricity use is split between powering the rail system and its transit facilities (Metro 2009). For both rail and facility electricity requirements, Metro buys power from the Los Angeles Department of Water and Power (LADWP), Southern California Edison (SCE), and Pasadena Water and Power (Metro 2009b). In 2008, Metro rail consumed 175 million kilowatt hours (kWh) of electricity (approximately 597 billion British Thermal Units [BTUs]) and Metro facilities consumed 69 million kWh (approximately 235 thousand BTUs) (Metro 2009). Metro would purchase additional electricity from its current providers to operate the proposed project. Metro's *2009 Baseline Sustainability Report* presents goals and recommendations for tracking and improving these performance measures. Appendix W, Energy Resources Technical Memorandum in the Final EIS/EIR provides detailed information regarding existing energy supplies and usage.

4.6.2 Environmental Consequences

The following discussion summarizes the evaluation of potential energy resource impacts for the tunneling method alternatives. Energy impact conclusions for each alternative are based on the significance criteria identified in Appendix B – Regulatory Framework.

In order to compare potential energy resource impacts during construction of the tunneling method alternatives to the Project, energy use impacts from construction activities along Flower Street and the associated construction activities at Little Tokyo were analyzed. Impacts from construction activities for other portions of the Regional Connector project were not analyzed as they would be the same for the evaluated alternatives as for the Project in the Final EIS/EIR.

Construction-related impacts from the evaluated alternatives and the Project were estimated using the Input-Output Approach developed by The California Department of Transportation (Caltrans, 1983), which is the same methodology used for the Final EIS/EIR, and is described in Appendix W of the Final EIS/EIR. This method assigns an energy-to-dollar ratio to various roadway construction activities, which converts construction dollars into energy consumption. Construction-related impacts were estimated by applying a highway construction energy factor to the total estimated direct construction cost for the evaluated alternatives and the Project; indirect cost including contractor fees and schedule delay costs were not considered in this analysis. The estimated construction costs, in 2013 dollars, were based on engineering assumptions and unit price per construction component.

4.6.2.1 Alternative A – EPBM/Open Face Shield/SEM Project Profile

4.6.2.1.1 Construction Impacts

Analysis of potential energy resource-related construction impacts was based on direct costs estimated for construction of Alternative A. Indirect costs such as contractor markup fees and schedule delay costs do not contribute to energy consumption and therefore were not considered in the analysis. Potential energy impacts that may occur during construction of Alternative A are presented in Table 4.6-1. The energy impacts for Alternative A would be temporary for the 15 month extension in duration of construction activities.

Table 4.6-1: Estimated Energy Consumption from Construction for Alternatives A and B

Construction Description	Construction Year Dollars (thousands)[1]	Energy Consumption Factor (Btu/2013$)	Total Btu Consumption[2] (billions)
Alternative A			
Flower Street: • EPBM with Open Face Shield tunnel excavation • SEM tunnel construction	$64,359	5,017	323
Alternative B:			
Flower Street: • EPBM • SEM tunnel construction	$58,726	5,017	295

Acronyms: Btu = British thermal unit; Btu/2013$ = British thermal unit per 2013 dollars; EPBM = earth pressure balance machine; SEM = sequential excavation method

Note:

1. Construction year dollars were estimated based on unit price as of 2013. Construction costs presented in the table do not include indirect costs associated with contractor markup fees and project schedule delay costs.
2. Inputs and supporting energy calculations are provided in Appendix B.

Source: AECOM 2014

In summary, construction of Alternative A would result in short-term, temporary energy usage within the project area due to fuel and electricity usage during equipment operation. The short-term energy usage would be offset by the energy resource benefits from project operation due to reduced VMT from commuter vehicles. As the long-term energy resource benefits exceed the short-term energy

usage impacts during construction, the construction-related energy resource impacts would not be adverse.

4.6.2.2 Alternative B – EPBM/SEM Low Alignment

4.6.2.2.1 Construction Impacts

Analysis of potential energy resource-related construction impacts was based on direct costs estimated for construction of Alternative B. Indirect costs such as contractor markup fees and schedule delay costs do not contribute to energy consumption and therefore were not considered in the analysis. Potential energy impacts that may occur during construction of Alternative B are presented in Table 4.6-1. The energy impacts for Alternative B would be temporary for the seven month extension in duration of construction activities.

In summary, construction of Alternative B would result in short-term, temporary energy usage within the project area due to fuel and electricity usage during equipment operation. The short-term energy usage would be offset by the energy resource benefits from project operation due to reduced VMT from commuter vehicles. As the long-term energy resource benefits exceed the short-term energy usage impacts during construction, the construction-related energy resource impacts would not be adverse.

4.6.3 Mitigation Measures

Mitigation measures identified in the Final EIS/EIR, under air quality, including use of newer, more efficient off-road vehicles would result in reduced energy consumption and ensure energy resources were not consumed in an a wasteful or inefficient manner. As described in this analysis, the long-term reduction in energy use from implementation of the Regional Connector project would result in a net benefit to existing energy resources.