# 3.16 Energy

## 3.16.1 Regulatory Setting

The California Environmental Quality Act (CEQA) Guidelines, Appendix F, Energy Conservation, state that EIRs are required to include a discussion of the potential energy impacts of proposed projects, with particular emphasis on avoiding or reducing inefficient, wasteful and unnecessary consumption of energy.

The National Environmental Policy Act (NEPA) (42 USC Part 4332) requires the identification of all potentially significant impacts to the environment, including energy impacts.

## 3.16.2 Affected Environment

Consumptive uses of energy in the Southern California Association of Governments (SCAG) region are summarized in Table 3.16.A for the years indicated. These data are the most recent available in each case and are therefore the most representative of current conditions.

Transportation (i.e., the movement of people and goods from place to place) is an important end use of energy in California, accounting for approximately 35 percent of total statewide energy consumption in 2004.[1] Nonrenewable energy products derived from crude oil (e.g., gasoline, diesel, kerosene, and residual fuel) provide most of the energy consumed for transportation purposes by on-road motor vehicles (i.e., automobiles and trucks), locomotives, aircraft, and ships. In addition, energy is consumed in connection with construction and maintenance of transportation infrastructure, such as streets, highways, freeways, locomotives, and airport runways. Trends in transportation-related technology foretell increased use of electricity and natural gas in transportation vehicles.

[1] Retrieved October 6, 2005, from the California Energy Commission Web site: http://www.energy.ca.gov/html/calif_energy_facts.html.

## Table 3.16.A Annual Transportation Energy Consumption in the SCAG Region for Base (Years as Indicated)

NOTE: As of the base year, electricity does not supply a substantial portion of transportation energy needs in the SCAG region.

| Category | Fuel Type | Year | Consumption | Units |
|---|---|---|---|---|
| Motor Vehicles | Gasoline/Diesel | 1997 | 6,091,080 | thousand gallons |
| | Natural Gas | 2000 | 33 | million therms |
| **on Btu basis:** | | | | |
| Motor Vehicles | Gasoline/Diesel | 1997 | 852,751,179 | million Btu |
| | Natural Gas | 2000 | 3,300,000 | million Btu |

Sources:

1. California Energy Commission (June 2000). California energy demand 2000–2010. Sacramento, CA.
2. Southern California Association of Governments (2001). 2001 regional transportation plan update. Los Angeles.
3. Southern California Association of Governments (n.d.). A century of growth: Regional population 1900–2000. Retrieved August 11, 2003, from http://www.scag.ca.gov/census/pdf/regionweb.pdf.
4. United States Army Corps of Engineers (February 28, 2002). Civil works program statistics (Information Paper CECW-ZD). Washington, D.C.
5. United States Bureau of the Census.
6. United States Department of Energy, Energy Information Administration. (n.d.). Table 13: Adjusted sales of distillate fuel oil by energy use in the United States: 1997–2001. Retrieved August 11, 2003, from http://www.eia.doe.gov/pub/oil_gas/petroleum/data_publications/fuel_oil_and_kerosene_sales/current/pdf/table13.pdf.
7. United States Department of Energy, Energy Information Administration. (n.d.). Table 14: Adjusted sales of residual fuel oil by energy use in the United States: 1997–2001. Retrieved August 11, 2003, from http://www.eia.doe.gov/pub/oil_gas/petroleum/data_publications/fuel_oil_and_kerosene_sales/current/pdf/table14.pdf.

Btu = British thermal units
SCAG = Southern California Association of Governments

Transportation energy is derived from a wide variety of petroleum products. Automobiles and trucks consume gasoline and diesel fuel. The transportation sector consumes relatively minor amounts of natural gas or electricity but, propelled mainly by air quality laws and regulations, technological innovations in transportation are expected to increasingly rely on compressed natural gas and electricity as energy sources. Biodiesel, which is derived from plant sources such as used vegetable oils, is a small but growing source of transportation fuel. Vehicles powered by fuels other than gasoline or diesel are referred to as “alternative fuel vehicles.”

Energy consumption by on-road motor vehicles reflects the types and numbers of vehicles, the extent of their use (typically described in terms of vehicle miles traveled), and their fuel economy (typically described in terms of miles per gallon). Trends in energy consumption by on-road motor vehicles generally follow trends in population and per capita income as well as trends in land use development patterns. For example, diffuse land use development patterns can result in an imbalance between jobs and housing, which can lead to longer average commute trips.

## 3.16.3 Environmental Consequences

### 3.16.3.1 Methodology

This energy analysis is based on Caltrans Standard Environmental Reference Volume 1, Chapter 13 – Energy, updated November 2007. The energy analysis addresses two elements: direct and indirect energy consumption. Direct energy refers to the fuel consumed by vehicles using the highway facility. Indirect energy refers to energy associated with the construction and operation of the facility.

Direct transportation energy consumption was estimated for 2035 using the EMFAC2007 air quality model, which provides estimated gasoline and diesel fuel consumption for the MCP Build Alternatives. Estimated energy consumption in 2035 is expected to represent the most conservative (i.e., highest) energy consumption because population and employment are projected to be higher in this year than in any earlier year. Also, no estimate is made of the impact of energy efficiency and conservation measures that are likely to be adopted and that would result in lower energy consumption than projected in these estimates.

Implementation of the MCP project would affect the use of indirect energy resources in the Riverside County and SCAG regions. The analysis of these impacts is at the regional level and is therefore, by its nature an analysis of cumulative impacts. Three main areas of impact have been identified: (1) energy demands for construction; (2) energy demands for operation of the regional transportation system as of 2035; and (3) the cumulative impacts of the growing energy demand associated with implementation of the MCP project.

### 3.16.3.2 Permanent Impacts

#### *Build Alternatives*

Local energy demand for transportation projects typically is dominated by vehicle fuel usage. For this type of project, it is assumed that the energy consumption by vehicles is much larger than the incremental change in electrical energy consumption for any additional lighting (i.e., roadway lighting), which is expected to be minimal. Therefore, energy used from lighting would not have an impact on the environment.

As shown in the air quality and traffic analyses of this EIR/EIS (Sections 3.14 and 3.6, respectively), construction of the MCP Build Alternatives would alter the traffic flow within both the MCP study area and the SCAG region. Based on the traffic analysis, the MCP project would increase the vehicle miles traveled within the MCP study area, but would improve the traffic flow by increasing the average vehicle

speed. The enhanced traffic flow conditions would minimize vehicle delay and improve vehicle fuel efficiency. Table 3.16.B lists the daily fuel consumption and fuel costs associated with the vehicle trips for each MCP Build Alternative within the MCP study area. Table 3.16.C lists the daily fuel consumption and fuel costs associated with the vehicle trips for each Alternative within the SCAG region.

### Table 3.16.B MCP Study Area Daily Fuel Consumption Comparison

| Alternative | VMT | VHT | Average Speed | Fuel Consumption (gallons) | Fuel Cost[1] | Percent Increase from No Build |
|---|---|---|---|---|---|---|
| Existing | 12,828,292 | 334,587 | 38.34 | 538,000 | $1,880,000 | N/A |
| 2035 No Build | 22,577,345 | 599,279 | 37.67 | 1,020,000 | $3,560,000 | N/A |
| 2035 Alternative 4 | 23,550,661 | 603,277 | 39.04 | 1,060,000 | $3,730,000 | 3.922% |
| 2035 Alternative 5 | 23,261,864 | 604,107 | 38.51 | 1,050,000 | $3,670,000 | 2.941% |
| 2035 Alternative 6 | 23,451,322 | 602,708 | 38.91 | 1,060,000 | $3,700,000 | 3.922% |
| 2035 Alternative 7 | 23,403,563 | 603,840 | 38.76 | 1,060,000 | $3,700,000 | 3.922% |
| 2035 Alternative 9 | 23,474,202 | 604,627 | 38.82 | 1,060,000 | $3,720,000 | 3.922% |

Source: VRPA and LSA Associates, Inc., 2007.
Fuel cost was calculated using a cost of $3.50 per gallon.
MCP = Mid County Parkway
N/A = Not Applicable
VMT = Vehicle Miles Traveled
VHT = Vehicle Hours Traveled

### Table 3.16.C SCAG Region Daily Fuel Consumption Comparison

| Alternative | VMT | VHT | Average Speed | Gas Consumption (gallons) | Fuel Cost[1] | Percent Increase from No Build |
|---|---|---|---|---|---|---|
| Existing | 376,374,763 | 10,477,332 | 35.92 | 16,710,000 | $58,500,000 | N/A |
| 2035 No Build | 512,366,927 | 14,342,464 | 35.72 | 23,880,000 | $83,600,000 | N/A |
| 2035 Alternative 4 | 512,625,177 | 14,344,138 | 35.74 | 23,890,000 | $83,600,000 | 0.042% |
| 2035 Alternative 5 | 512,533,278 | 14,351,890 | 35.71 | 23,890,000 | $83,600,000 | 0.042% |
| 2035 Alternative 6 | 512,491,053 | 14,338,511 | 35.74 | 23,880,000 | $83,600,000 | 0.000% |
| 2035 Alternative 7 | 512,514,690 | 14,347,638 | 35.72 | 23,890,000 | $83,600,000 | 0.042% |
| 2035 Alternative 9 | 512,517,922 | 14,338,916 | 35.74 | 23,880,000 | $83,600,000 | 0.000% |

Source: VRPA and LSA Associates, Inc., 2007.
[1] Fuel cost was calculated using a cost of $3.50 per gallon.
N/A = Not Applicable
SCAG = Southern California Association of Governments
VMT = Vehicle Miles Traveled
VHT = Vehicle Hours Traveled

As shown in Table 3.16.B, implementation of the MCP Build Alternatives would result in a increase in fuel consumption (i.e., up to a 3.9 percent increase) within the MCP study area. As shown in Table 3.16.C, within the SCAG region, the proposed MCP project's increase in fuel consumption would be negligible (i.e., an increase of 0.04 percent or less depending upon the alternative). Therefore, implementation of

any of the MCP Build Alternatives would not result in a substantial increase in fuel consumption.

The average increase in speeds for all the alternatives, including the MCP No Build Alternatives, is small; however, these average speeds are measured over the entire MCP study area and include hundreds of miles of roadways, causing the small increase to be substantial for key roadways.

Under the MCP No Build Alternatives, the permanent effects on energy consumption discussed above for the MCP Build Alternatives would not occur for the MCP project itself, but these permanent energy consumption effects would occur for the other transportation improvement projects included in the No Build Alternatives.

### *Discussion of Impacts Relative to MSHCP Amendment*

The EIR/EIS for the Multiple Species Habitat Conservation Plan (MSHCP) found that direct and indirect impacts on sensitive vegetation communities and covered species, including species and habitats associated with wetlands and other waters, are reduced through implementation of the MSHCP, which includes assembly of an approximately 202,340-hectare (500,000-acre) reserve system, adaptive management and monitoring, as well as other protection measures.

The MSHCP includes coverage of a regional transportation corridor upon which the project alternatives for the MCP have been developed. An amendment to the MSHCP would be required to provide coverage to a modified alignment for the transportation corridor. This discussion is provided as a supplemental environmental analysis to provide supporting documentation under CEQA and NEPA for such an amendment to the MSHCP. It should be noted that this discussion pertains specifically to the analysis of consistency for Alternative 9 Temescal Wash Area Design Variation (TWS DV), which has been identified as the Locally Preferred Alternative. If a different alternative were to be pursued for coverage, additional CEQA/NEPA analysis may be needed.

Section 3.17 contains a detailed analysis of the effects of providing coverage of Alternative 9 TWS DV under the MSHCP, pursuant to the specific criteria identified in the MSHCP to demonstrate consistency. As noted in Section 3.17, a consistency determination is not being made at this time. However, the analysis contained in Section 3.17 provides a framework for consistency and identifies the environmental effects of MSHCP coverage for Alternative 9 TWS DV.

The analysis in the MSHCP EIR/EIS included consideration of the potential impacts on energy. The MSHCP EIR/EIS concluded that implementation of the MSHCP would not result in impacts related to energy because the MSHCP would neither require energy nor decrease the potential for energy conservation elsewhere. Based on the analysis of impacts of the MCP related to energy discussed above in this document, the impacts of the MCP would not affect the conclusions of the MSHCP EIR/EIS. Therefore, an amendment to the MSHCP to provide coverage for Alternative 9 TWS DV would not change the findings of the MSHCP EIR/EIS related to energy.

#### 3.16.3.3 Temporary Impacts

##### *Build Alternatives*

The construction of the proposed MCP project would likely involve the use of diesel-powered heavy equipment, portable diesel generators, and other battery-operated support equipment, as well as electricity from the existing grid. There would be an irreversible impact from the consumption of diesel fuel (and other fuels) related to these construction activities. However, similar to other recently completed major construction projects in southern California, it is unlikely that the increased energy demands of construction of the proposed MCP project would create a noticeable impact to regional energy consumption.

##### *No Build Alternatives*

Under the MCP No Build Alternatives, the temporary energy consumption discussed above for the MCP Build Alternatives would not occur for the MCP project itself, but temporary energy consumption would occur for the other transportation improvement projects included in the No Build Alternatives.

### 3.16.4 Global Climate Change

While climate change has been a concern since at least 1988, as evidenced by the establishment of the United Nations and World Meteorological Organization's Intergovernmental Panel on Climate Change (IPCC), the efforts devoted to greenhouse gas emissions reduction and climate change research and policy have increased dramatically in recent years. Greenhouse gases related to human activity include: carbon dioxide, methane, nitrous oxide, tetrafluoromethane, hexafluoroethane, sulfur hexafluoride, HFC-23, HFC-134a, and HFC-152a. In 2002, with the passage of Assembly Bill 1493 (AB 1493), California launched an innovative and proactive approach to dealing with greenhouse gas emissions and

climate change at the state level. AB 1493 requires the California Air Resources Board (ARB) to develop and implement regulations to reduce automobile and light truck greenhouse gas emissions; these regulations would apply to automobiles and light trucks beginning with the 2009 model year.

On June 1, 2005, Governor Arnold Schwarzenegger signed Executive Order S-3-05. The goal of this Executive Order is to reduce California's greenhouse gas emissions to: (1) 2000 levels by 2010, (2) 1990 levels by the 2020 and (3) 80 percent below the 1990 levels by the year 2050. In 2006, this goal was further reinforced with the passage of Assembly Bill 32 (AB 32), the Global Warming Solutions Act of 2006. AB 32 sets the same overall greenhouse gas emissions reduction goals while further mandating that the ARB create a plan, which includes market mechanisms, and implement rules to achieve "real, quantifiable, cost-effective reductions of greenhouse gases." Executive Order S-20-06 further directs state agencies to begin implementing AB 32, including the recommendations made by the state's Climate Action Team.

Climate change and greenhouse gas reduction is also a concern at the federal level; however, at this time, no federal legislation or regulations have been enacted specifically addressing greenhouse gas emissions reductions and climate change.

According to the IPCC report, *Climate Change 2007: The Physical Science Basis: Summary for Policymakers* (February 2007), there is no doubt that the climate system is warming. Global average air and ocean temperatures as well as the global average sea level are rising[1]. From 1995–2006, 11 of those 12 years have ranked as among the warmest on record since 1850[2]. While some of the increase is explained by natural occurrences, the 2007 report asserts that the increase in temperatures is very likely (>90 percent) due to human activity, most notably the burning of fossil fuels[3].

For California, similar effects are described in the California Climate Change Center report, *Our Changing Climate: Assessing the Risks to California* (July 2006). Based on projections using state-of-the-art climate modeling, the temperatures in California are expected to rise between 3 degrees Fahrenheit (°F) to 10.5°F by the end of the century depending on how much California is able to reduce its greenhouse gas

1 Intergovernmental Panel on Climate Change. Climate Change 2007: The Physical Science Basis: Summary for Policymakers (February 2007), p. 5.

2 Ibid., p. 5.

3 Ibid., p. 10.

emissions. The report states that these temperature increases would negatively impact public health, water supply, agriculture, plant and animal species, and the coastline[1].

According to a recent white paper by the Association of Environmental Professionals[2], "an individual project does not generate enough greenhouse gas emissions to significantly influence global climate change. Global climate change is a cumulative impact; a project participates in this potential impact through its incremental contribution combined with the cumulative increase of all other sources of greenhouse gases." Figure 3.16-1 shows all sources of greenhouse gas emissions in California from 1990–2004. The chart illustrates the complex and multifaceted nature of greenhouse gas emissions and climate change.

Because climate change is a newly emerging topic in environmental documents and general plans, data on greenhouse gas emissions is largely unavailable or newly emerging. The California Energy Commission's Greenhouse Gas Inventory[3] represents the best currently available data on greenhouse gas emissions in California. In 2006, the Energy Commission began proceedings on updating the inventory. When finalized, the update of the greenhouse gas emission inventory would include projections on greenhouse gas emissions for 2010 and 2020. The 1990–2004 inventory does include a very rough projection of total greenhouse gas emissions based on a "business-as-usual" trend; this approach does not take into account voluntary and mandated greenhouse gas emission reduction strategies. The projection shows an estimated increase of approximately 130 million metric tons carbon dioxide equivalent (from approximately 460 to 590 million metric tons carbon dioxide equivalent)[4].

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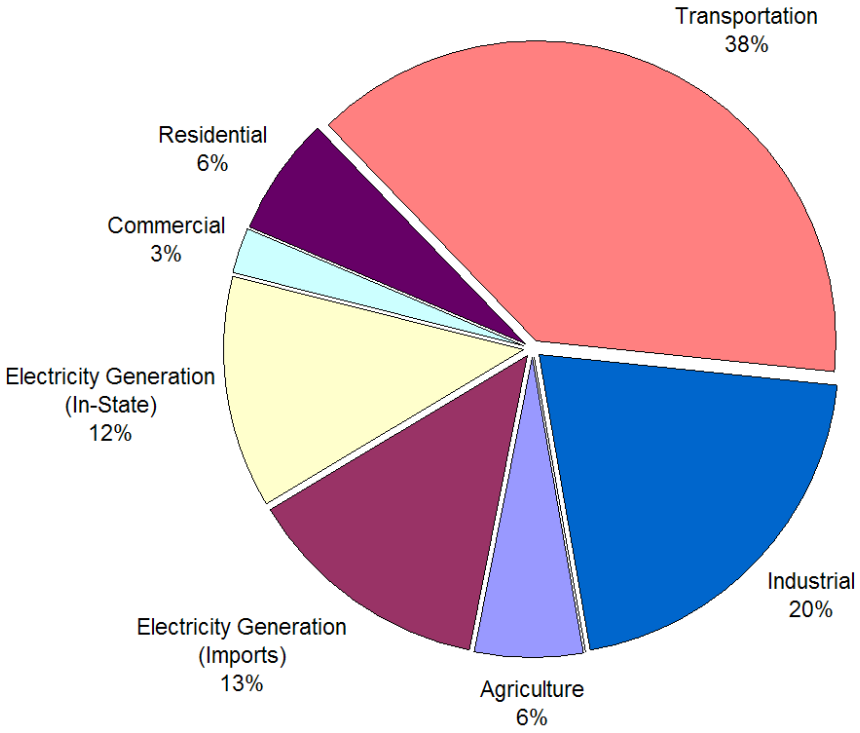
1 California Climate Change Center, *Our Changing Climate: Assessing the Risks to California* (July 2006), p. 1.

2 Hendrix, Michael and Wilson, Cori. Recommendations by the Association of Environmental Professionals (AEP) on How to Analyze Greenhouse Gas Emissions and Global Climate Change in CEQA Documents (March 5, 2007), p. 2.

3 California Energy Commission. Staff Final Report: Inventory of California Greenhouse Gas Emissions and Sinks: 1990–2004 (December 2006).

4 Ibid., Figure 12, p. 22.




*NOTE: Percents do not total 100%. Roughly 3% of the inventory is due to unspecified fuel combustion and ozone depleting substance substitute use, which is not attributed to an individual sector (16.0 MMTCO$_2$eq. in 2004).*

**Figure 3.16-1: 2004 Greenhouse Gas Emissions by Sector (480 MMTCO$_2$eq. Net Emissions)**

There is currently no mandatory reporting of greenhouse gas emissions and most environmental and planning documents are only just beginning to consider even a qualitative approach to greenhouse gas emissions and climate change. Caltrans and its parent agency (i.e., the Business, Transportation, and Housing Agency) have taken an active role in addressing greenhouse gas emission reduction and climate change. Recognizing that 98 percent of California's greenhouse gas emissions are from the burning of fossil fuels and 40 percent of all human-made greenhouse gas emissions are from transportation, Caltrans has created and is implementing the Climate Action Program (December 2006) .

In Caltrans Climate Action Program, one of the main strategies employed to reduce greenhouse gas emissions is to make California's transportation system more efficient. The highest levels of carbon dioxide from mobile sources, such as automobiles, occur at stop-and-go speeds (0–25 miles per hour [mph]) and speeds over 55 mph. Relieving congestion by enhancing operations and improving travel

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times in highly congested travel corridors would lead to an overall reduction in greenhouse gas emissions.

As a project in southern California's Regional Transportation Plan, the MCP project contributes to the strategy of congestion relief.

### 3.16.5 Avoidance, Minimization, and/or Mitigation Measures

The MCP project would result in a nominal (maximum of 0.03 percent) increase in regional energy consumption compared to the No Build Alternatives due to project operation as a result of increased vehicle miles traveled. Mitigation Measures AQ-1 through AQ-8, AQ-11, and AQ-12 discussed in Section 3.14 will reduce impacts related to increased energy consumption and global climate change.

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