4.9 ENERGY

This section describes the energy environmental setting, the Chevron El Segundo Marine Terminal Lease Renewal Project (Project) impacts, the impacts of alternatives, and the cumulative impacts. The environmental setting addresses current activities related to importing, refining, and transporting crude oil and petroleum products in the Los Angeles area and the energy use of the Marine Terminal. Potential project- and alternatives-related impacts are evaluated based on their impacts to the environmental setting and the significance criteria.

Data used for this section were obtained from various sources, including the California Energy Commission (CEC) and United States Department of Energy (DOE). Information has also been used when appropriate from previous environmental documents, including the Environmental Impact Report (EIR) for the previous lease (CSLC 1996).

4.9.1 Environmental Setting

The types of energy used in California include electricity, natural gas, and petroleum-based fuels. Table 4.9-1 summarizes energy consumption within California in the baseline year 2006.

Table 4.9-1
Annual California Energy Consumption 2006

Type of Energy Source	Produced In-State, Percentage of Total	Imported[1], Percentage of Total	Total Consumed (100%)
Electricity terawatt-hours	226, 78.3%	64, 21.7%	288
Natural Gas billion ft^3 (billion m^3)	319 (9.0), 15.0%	1,829 (51.8), 85.0%	2,148 (60.8)
Crude Oil million bbl (million m^3)	266 (42), 37.2%	393 (61), 62.8%	647 (103)
Gasoline billion gal (million m^3)	13.5 (51.2), 85%	2.4 (9), 15%	15.9 (60.2)
Diesel billion gal (million m^3)	2.7 (10.4), 95%	0.15 (0.55), 5%	2.9 (11)

[1] Imported from other US states and foreign sources.
Notes: ft^3 = cubic feet; m^3 = cubic meters; bbl = barrels; gal = gallons.
Source: CEC 2006a, aggregated from Petroleum Industry Information Reporting Act data.

California Petroleum Products Consumption

Californians consume nearly 16 billion gallons of gasoline and 3 billion gallons of diesel fuel every year. Total transportation fuel demand is expected to increase approximately 1.9 percent on average until 2020. Traditional gasoline and diesel powered vehicles currently make up 97 percent of total vehicle population; this may be lowered to 89 percent by alternative fuel vehicles by 2020 (USDOE 2005). Dependence on gasoline imports will increase from 18.3 percent in 2005 to 22.1 percent in 2012, an increase of 82,000 barrels (bbl) per day (CEC 2006b). However, the fuel and crude oil markets are volatile, evidenced by price fluctuations in the past year, and predictions of future consumption is strongly dependant on market conditions and regulatory priorities.

California Crude Oil Production

California is currently ranked fourth in the nation among oil producing states, behind Louisiana, Texas, and Alaska, respectively. California produced 266 million bbl of crude oil in 2006, a decline of 2.5 percent from 2005. The majority, nearly 83 percent, of this crude oil comes from onshore sources. Statewide oil production has declined since 1986, when production peaked at slightly more than 400 million barrels. California production has declined at an average of 2.6 percent annually over the last ten years (DOGGR 2008).

Crude Oil and Product Shipment and Marine Terminal Capacities

In 2005, 700 million bbl of crude oil was delivered to California refineries. Of this, about 37 percent came was produced in state, 21 percent came from Alaska, and 42 percent came from foreign sources (CEC 2006a). Approximately half of the 700 million bbl amount was received by Los Angeles-area refineries.

Crude oil production in California has been decreasing and supplies of Alaskan North Slope crude have been declining, necessitating additional imports of crude oil from foreign sources (Baker & O'Brien 2005). Starting in 1994, California refineries received more crude oil from imported sources than from in-state sources.

California Electricity Consumption

Electricity use is measured both in watts and watt-hours (or their equivalent). A watt is a measure of the rate of doing work, or electrical use or generation, and is defined as a unit amount of energy (a joule) produced in a second. One joule is approximately the energy required to heat one gram of dry, cool air by one degree Celsius.

Watts are used to measure the rate at which an electrical device uses energy (the amount of energy used in a given time) or the amount of energy a generator produces in a given time. A kilowatt is 1,000 watts, a megawatt is one million watts and a gigawatt is one billion watts (or 1,000 megawatts). Power plants are generally measured by the rate at which they produce electricity. The San Onofre nuclear power plant is rated at 2,254 megawatts of power (2.2 gigawatts), which is enough power to supply approximately 2.75 million households.

A kilowatt-hour (kWh) measures the amount of total energy used by a device or produced by a generator. For example, if a 100-watt light bulb is left on for five hours, it would use 500 watt-hours of electricity, or 0.5 kWh. A two-megawatt generator produces 48 megawatt-hours (MWh) of electricity per day (24 hours).

Electricity production in California is mostly fueled by natural gas, hydropower, and nuclear energy. Other energy sources that produce electricity include coal, solar and wind power, biomass and waste, and geothermal energy.

Table 4.9-1 shows electrical consumption in California. The majority of the electricity consumed in California is produced in-state.

California Natural Gas Consumption

Natural gas use is defined by the volume of gas used, normally expressed in standard cubic feet (ft^3), the amount of space the gas would occupy at standard temperature (60 degrees Fahrenheit) and pressure (1 atmosphere pressure). Table 4.9.1 also shows natural gas consumption levels. The majority of natural gas consumed in California is imported from other states and Canada.

Los Angeles Region Refining Capacity

Total Los Angeles-area refining capacity is approximately one million barrels per day (bpd). Since the total state daily refining capacity is approximately two million bpd (CEC 2006a), the Los Angeles region is responsible for roughly one-half of the state's refining capacity. This capacity is expected to increase by about 50,000 bpd annually (Baker and O'Brien 2005).

The Chevron Refinery contributes approximately 24 percent of Refinery capacity in the Los Angeles region. The Chevron Refinery in El Segundo and the British Petroleum Refinery in Carson are the largest refineries in the Los Angeles area, each with a

capacity of more than 260,000 bpd. Table 4.9-1 illustrates the daily throughput capacity for individual Los Angeles area refineries.

Table 4.9-1
Summary of Los Angeles Area Crude Oil Refining Capacity

Refinery, Location	bpd
Valero (Ultramar Inc.) Wilmington Refinery, Los Angeles	80,887
BP West Coast Products LLC, Carson	260,000
ExxonMobil Refining and Supply Co., Torrance	149,500
Chevron USA, El Segundo	260,000
Shell Oil Products US, Wilmington	98,500
Edgington Oil Company, Long Beach	26,000
ConocoPhillips, Wilmington	139,000
Lunday Thagard, South Gate	8,500
Paramount Petroleum, Paramount	50,000
Total	**1,072,387**

Source: CEC 2006a

Los Angeles Area Marine Terminals

The Marine Terminal, which is geographically isolated from other marine terminals in the Los Angeles area, receives approximately 220,000 bpd, 12.5 percent of the crude oil shipped into the Los Angeles area. All other major petroleum terminals are located in the Port of Los Angeles (POLA) and the Port of Long Beach (POLB) and are operated by other petroleum companies. Together, these are the only marine terminals in southern California and, aside from in-state or federal outer continental shelf (OCS) production delivered by pipeline, the only sources of crude oil to area refineries. No interstate crude oil pipelines serve California. Table 4.9-2 summarizes the approximate capacities of the Los Angeles-area marine terminals. Note that the capacities of the marine terminals are measured by peak throughput, which is much greater than Refinery capacities because of the non-continuous nature of cargo deliveries from vessels.

Table 4.9-2
Total Capacity of Los Angeles Basin Marine Terminals

General Terminal Locations	Peak bpd
Port of Los Angeles	6,000,000
Port of Long Beach	4,640,000
Chevron Marine Terminal	700,000
Total	**11,340,000**

Source: Chevron 2005.

El Segundo Marine Terminal Energy Consumption

Electricity Consumption at the Marine Terminal

The Marine Terminal receives electricity from the El Segundo Power Generating Station. Pumps at the Marine Terminal are the primary consumers of electricity. These pumps, in conjunction with on-board ship pumps, convey petroleum products to and from the Marine Terminal. Electricity is also consumed for building heating and air conditioning and facility lighting. The current electric energy use at the Marine Terminal averages approximately 18,460 kWh per day.

Employee Vehicle Gasoline Consumption

Currently a minimum of three employees are on duty at the Marine Terminal during loading and discharging operations. Assuming that each of these employees travels an average of 50 miles daily and average fuel economy of 22.5 miles per gallon, the 450 miles driven daily (3 shifts) would require approximately 7,300 gallons (gal) of fuel annually.

Vessel Energy Consumption

The facility can accommodate two tankers simultaneously, one at each berth. Annual energy use is based on kWh energy calculations for the marine main engines and auxiliary engines as presented in Appendix E, Air, and Section 4.4, Air Quality. Approximately two million gal of diesel fuel are consumed annually within the South Coast Air Basin (SCAB) with current operations of marine vessels transiting, maneuvering, hoteling, loading, and offloading.

Tugs that assist in maneuvering the vessels use an additional 450,000 gal of diesel fuel annually. See Appendix E, Air, for calculations.

4.9.2 Regulatory Setting

Federal

Title 10 of the Code of Federal Regulations (CFR) addresses energy consumption and establishes the Department of Energy. Relevant issues addressed by Title 10 include:

- State energy programs;
- Energy conservation programs;
- Energy efficiency of industrial and commercial products;
- Alternative fueled vehicles; and
- Department of Energy provisions.

Title 18 of the CFR addresses the Federal Energy Regulatory Commission, which handles issues related to natural gas and oil transportation, provisions, and tariffs. Title 30 of the CFR establishes the Bureau of Ocean Energy Management, Regulation, and Enforcement, which manages energy resources in the Federal OCS.

State

State agencies involved in energy policy and supply issues include the California Energy Commission and the California Public Utilities Commission (CPUC).

California Energy Commission

The CEC is the state's primary energy policy and planning agency. Created by the Legislature in 1974 and located in Sacramento, the CEC's responsibility relative to marine terminals includes forecasting future energy needs and maintaining historical energy data.

The CEC, in an advisory role, actively monitors the capabilities and throughput of state petroleum infrastructure and issues an annual forecast of energy utilization, as well as specialized reports such as "An Assessment of Petroleum Infrastructure Needs – April, 2005" which addresses present and future capacity and siting issues of state petroleum marine terminals, refineries, and pipeline networks.

The CEC also works with representatives of the petroleum industry and permitting agencies to develop a "best permitting practices" guideline to streamline and coordinate the permitting process for new petroleum infrastructure.

California Public Utilities Commission

The CPUC does not directly regulate petroleum marine terminals, but it does have authority over some petroleum operations associated with marine terminals. The CPUC Energy Division staff assists the Commission in regulating four types of investor-owned utilities (IOU): Electric, Natural Gas, Steam, and Petroleum Pipeline Companies. The Energy Division maintains commission-approved tariffs (official rates and terms of service) for these four types of IOU.

In pursuing these goals, the role of the CPUC relative to petroleum facility includes:

- Establishing service standards and safety rules, authorizing utility rate changes, and monitoring the safety of utility and transportation operations;
- Overseeing markets to inhibit anti-competitive activity; and
- Working with other state and federal agencies to promote water quality, environmental protection, and safety.

Acts and Regulations

In addition to these state agencies, several acts and regulations govern energy production, utilization, conservation, and development of new energy sources in the California.

The California legislature adopted the Warren-Alquist Act in the 1970s to encourage conservation of non-renewable energy resources. The Act, which created the CEC, is codified in the Public Resources Code, Division 15, Energy Conservation and Development.

Other state statutes related to efficient utilization of energy resources and energy conservation and this Project include:

Financial Code – Division 15.5, Section 32000 et seq., State Assistance Fund for Energy, California Business and Industrial Corporation;

Government Code – Title 2:

- Section 14450 et seq., Part 5, Chapter 4 – California Transportation Research and Innovation Program;
- Section 15814.10 et seq., Part 10b, Chapter 2 – Energy Conservation in Public Buildings; and
- Section 15814.30 et seq., Part 10b, Chapter 2.8 – Energy Efficiency in Public Buildings.

Public Resources Code:

- Division 3, Section 6801 et seq., Part 2, Chapter 3 – Oil and Gas and Mineral Leases;
- Division 16, Section 26000 et seq. – California Alternative Energy Source and Advanced Transportation Authority Act; and
- Division 16.5, Section 26400 et seq. – Energy and Resources Fund.

Public Utilities Code – Division 1:

- Section 330 et seq., Part 1, Chapter 2.3 – Electrical Restructuring;
- Section 445 et seq., Part 1, Chapter 2.5 – Public Utilities Commission Reimbursement Fees;
- Section 701 et seq., Part 1, Chapter 4 – Regulation of Public Utilities;
- Section 1001 et seq., Part 1, Chapter 5 – Certificates of Public Convenience and Necessity; and
- Section 2801 et seq., Part 2, Chapter 7 – Private Energy Producers.

Revenue and Taxation Code – Division 2, Section 40001 et seq., Part 19 – Energy Resources Surcharge Law:

Vehicle Code:

- Division 3, Sections 5205.5 and 21655.9 et seq.; and
- Division 12, Section 28110 et seq. – Chapter 5, Article 16 – Methanol or Ethanol Fueled Vehicles.

4.9.3 Significance Criteria

Impacts to energy use and supplies are considered significant if the proposed Project causes any of the following conditions:

- A reduction in refining capacity or availability of refined product in the Los Angeles area;
- A temporary or permanent disruption in energy supply to the Los Angeles area;
- Disruptive changes to the Los Angeles area's present refining and product transportation system; or
- Project-related energy demand that consumes a large portion of existing supplies or reduces the level of service to other users, thereby requiring the development of new facilities or sources of energy, in excess of those already planned.

4.9.4 Impact Analysis and Mitigation

This section addresses the potential impacts of the proposed Project and alternatives on energy use and supply in the Los Angeles area. The discussion focuses on energy consumption as a result of the Project and alternatives, and the resulting supply of crude oil, changes in overall refining capacity, and shipment of products.

Energy consumption at the Marine Terminal and Refinery under the proposed 30-year lease extension would increase as described in Section 2.0, Project Description. Future vessel calls at the Marine Terminal could increase and therefore increase Marine Terminal electrical use and associated vessel fuel use. Maximum daily energy use would not change, since no new facilities would be built and maximum daily throughput would not increase.

Electrical consumption at the Marine Terminal onshore facility would increase from the current level of 18,420 kWh per day to an estimated average 25,908 kWh per day due to increased pumping requirements associated with an increase in vessel visits.

Gasoline use by employees would remain the same since there is no anticipated increase in the number of employees at the Marine Terminal.

Vessel fuel use within the SCAB would increase from about two million gal of diesel fuel annually to approximately 3.1 million gal annually. Fuel use by tugs would increase to approximately 640,000 gal annually.

Since maximum daily electricity demand would not change, any increase in energy consumption during the lease term would not be expected to require new supplies of electrical energy or new transmission facilities. Impacts would be less than significant.

The proposed Project would also increase crude oil deliveries and production of refined products, including diesel fuel. Therefore, the proposed Project's increased use of diesel fuel would be more than offset by the increase in refining capacity. Therefore, the proposed Project is not expected to have a significant adverse energy impact with respect to existing energy usage or demand.

The proposed Project would not change any Refinery capacity, disrupt energy supplies to the region, or create changes that would decrease the capacity of the crude oil and product transportation system. Therefore, the proposed Project would have less than significant impacts.

4.9.5 Impacts of Alternatives

This section addresses the impacts on energy supplies and use at the Marine Terminal under the alternatives to the proposed Project.

No Project Alternative

Under this alternative, Chevron would close the Marine Terminal and deliver crude to the Refinery through alternative transportation, including pipeline, truck, rail, or other marine terminals located in the POLA/POLB.

Since the Marine Terminal would be abandoned, it would no longer consume energy and vessels would no longer visit the Marine Terminal and consume fuel. However, the reduction in electricity and fuel consumption at the Marine Terminal would be partially or completely offset by an increase in electricity and fuel use associated with other delivery methods. If the crude oil is supplied through the POLA/POLB, vessels would still visit the area and offload crude oil; the amount of energy consumed by the vessels, tugs, and pumps would be similar to the proposed project.

As part of the preparation for Marine Terminal abandonment, Chevron would develop plans for supplying crude oil to the Refinery, including developing additional infrastructure, such as pipelines, and modifying existing infrastructure. These would most likely involve construction activities. However, fuel consumption by construction equipment would not consume a large portion of existing supplies nor would it reduce

the level of service to other users, thereby requiring the development of new facilities or sources of energy. This would be considered a less than significant impact.

Before abandoning the Marine Terminal, the ability of the Refinery to obtain crude oil from different sources would have to be established, including potential modifications and pipeline construction for connections to the POLA/POLB. However, it is possible that crude feed to the Refinery would be reduced and, consequently, the production of refined products would decrease, at least temporarily. That would be a significant impact.

As there are only three locations in the Southern California area that receive crude oil and ensure the supply of crude oil to area refineries (the Marine Terminal, the POLA and POLB), the abandonment of the Marine Terminal and a subsequent closure at either the POLA or the POLB could more seriously disrupt the supply of energy or refined product to the Los Angeles and Southern California area than closure of one of the facilities if the Marine Terminal was still operational. A closure could be caused by a vessel accident within the ports or terrorist action within the ports. This would be considered a significant impact.

Impact ENE-1: Loss of Petroleum Refining Capacity or an Increase in Energy Supply Disruptions in Southern California

Without a new lease, Chevron's Refinery would have to obtain crude oil from other sources, resulting in at least a temporary loss of petroleum refining capacity in the southern California region and a potential increase in the level of energy supply disruptions (Potentially Significant, Class I).

Impact Discussion

Cessation of Marine Terminal operations would force Chevron's Refinery to obtain crude oil from other sources and to utilize other means of transporting product that is currently shipped by vessel. Over time, the level of crude oil supplied to the Refinery could return to current levels after the development of additional pipelines and POLA/POLB terminal capacity, particularly with the implementation of the POLA Pier 400 project for importing crude oil. However, there would be a substantial period of reduced crude oil inputs to the Refinery and a corresponding reduction in Refinery utilization. This would be a significant Impact.

In addition, the abandonment of one of the three locations in the Southern California area that receives crude oil would increase the level of energy supply disruptions. This would be a significant Impact.

Mitigation Measures

A number of mitigation measures, including expanding pipeline facilities to and from the ports, would require several years and involve numerous jurisdictions.

Residual Impacts

Impacts associated with closing the Marine Terminal would not be able to be reduced to a less than significant and would therefore be Potentially Significant (Class I)

CBM Relocation into State Waters for Crude Only

Under the conventional buoy mooring (CBM) relocation alternative, the number of vessels that load and unload at the Marine Terminal would decrease because very large crude carriers (VLCC) could moor directly at the Marine Terminal. Fuel use within the SCAB by vessels and tugs would also decrease (approximately 2.5 million gal for vessels and 550,000 gal for tugs).

Gasoline use by employees would remain the same or decrease since there is no proposed increase in the number of employees at the Marine Terminal

Electrical consumption would be similar to the proposed Project since the same amount of crude oil would be unloaded. This would be a less than significant impact.

Since maximum daily electricity demand would not change, any increase in energy consumption during the lease term would not be expected to require new supplies of electrical energy or new transmission facilities. Impacts would be less than significant.

Although some construction activities would be associated with the installation of the CBM berth, the fuel consumption would not consume a large portion of existing supplies nor would it reduce the level of service to other users, thereby requiring the development of new facilities or sources of energy. This would be a less than significant impact.

SPM Replacement into State Waters for Crude Only

The single point mooring (SPM) alternative would have the same operational and construction impacts as the CBM alternative, which would be less than significant. To maintain the more complex equipment represented by the SPM, one additional full time employee and a doubling of maintenance activities are expected. The additional staff and maintenance would consume additional fuel. However, no major increase in fuel use would occur, so this impact would be less than significant.

VLCC Use of Pier 400

Under this alternative, operations at the Marine Terminal and onshore facilities would be reduced because less crude oil would be transferred through the Terminal. Fuel use by vessels would be similar to the CBM and SPM alternatives discussed above as fewer vessels would be visiting the Marine Terminal since no lightering related to Marine Terminal operations would be required.

Electrical consumption would be similar to the proposed Project since the same amount of crude oil would be unloaded, both at the Marine Terminal and Pier 400. This would be a less than significant impact.

Since maximum daily electricity demand would not change, any increase in energy consumption during the lease term would not be expected to require new supplies of electrical energy or new transmission facilities. Impacts would be less than significant.

Under this alternative, the Marine Terminal would continue to be able to receive light crude oil through lightering with the VLCC vessels in an emergency. Therefore, there would not be impacts (Impact **ENE-1**) associated with a loss of port availability and the disruption of energy supplies.

4.9.6 Cumulative Projects Impact Analysis

The proposed Project could increase annual energy use by Marine Terminal equipment over the lease term but daily energy use would not increase.

The proposed modifications to the Chevron Refinery may increase energy use. However, modifications to the Refinery would also produce additional refined products. Increases in electrical demand at the Refinery would not impact the community since the Refinery also produces electricity.

Modifications to the Hyperion Wastewater Treatment Plant, the Santa Monica Bay Restoration Plan, the Marina Del Rey and Ballona Creek Sediment Control Management Plan, the Ballona Wetlands Restoration, and the Beach Improvements/Capital Projects would not increase energy use in the area and would therefore not constitute a cumulatively significant impact with the proposed Project or alternatives.

The POLA/POLB projects would require energy and fuel during construction, but may provide for a decrease in regional energy use by allowing VLCC to unload directly at berths as opposed to lightering with multiple vessels. POLA/POLB projects would also increase efficiency by preferring railroad transport over trucks, which is more efficient and would use less fuel. Therefore, these projects would not constitute a cumulative impact.