CALIFORNIA
ENERGY
COMMISSION

SPRING 2006 PETROLEUM FUELS PRICE SPIKE
REPORT TO THE GOVERNOR

AUGUST 2006
CEC-600-2006-012

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ACKNOWLEDGEMENTS

This report was prepared in collaboration with the staff of the California Energy Commission, including personnel from the California Board of Equalization. Many thanks are owed to the following individuals for their contributions and technical support to this report:

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Spring 2006 Petroleum Fuels Price Spike Report to Governor Schwarzenegger

Executive Summary

California motorists and businesses have witnessed short periods of rapid price increases for gasoline and diesel fuel many times during the last several years. The most recent price run up (spike) occurred in Spring 2006, pushing the average statewide retail gasoline price to an all-time high of $3.33.

On April 24, 2006, Governor Schwarzenegger directed the California Energy Commission (Energy Commission) to investigate the prices of gasoline and diesel fuels, with particular emphasis on retail motor fuel prices, significant changes in prices charged by the petroleum industry for gasoline sold in California, and the reasons for those changes. The Governor also requested the Energy Commission to investigate these issues as they relate to the wholesale market for petroleum products[1]. If evidence of market manipulation, price gouging, or unfair business practices was identified, the Governor directed the Energy Commission to turn the information over to the California Attorney General. Governor Schwarzenegger further asked the Energy Commission to identify any constraints to collecting detailed data to ensure that the state can effectively monitor the petroleum market.

On June 15, 2006, the Energy Commission provided an interim report to the Governor identifying a 3-week period from mid April to early May 2006, during which a rapid increase in wholesale and retail transportation fuel (gasoline and diesel fuel) prices occurred. Although prices rose nationwide in March and early April, the California region's fuel price spike from April 17 to May 8, 2006, was not experienced in other areas of the country.

In this report, the Energy Commission examines the factors identified in the June 15 interim report, discusses how those factors may have contributed to the regional price spike, and makes recommendations for further actions, including legislative changes to enhance the Energy Commission's data collection authority.

Rapid price increases, referred to as price spikes, are normally preceded by large jumps in wholesale fuel prices and are triggered by an event that temporarily reduces supply. Major unplanned outages at a refinery following a fire or mechanical failure are prime examples of events that can reduce refinery output and temporarily diminish supply of gasoline and diesel fuel. Price spikes in California are normally greater in magnitude and longer in duration compared to other regions of the United States due to the fact that alternative sources of supply are several weeks away by marine vessel. *But what triggers a price spike and what underlying market factors can exacerbate a price spike?* Refineries, pipelines, and distribution terminals operate in a near-continuous fashion designed to maintain an adequate supply of gasoline at service stations and diesel fuel at truck stops. When there is a problem at a refinery (such as a fire, pipeline leak, or unit

malfunction) and a process unit has to be shut down and repaired, production of gasoline or diesel fuel is usually disrupted.
Depending on the severity of the incident and the duration of time required to regain normal levels of operations, the refiner will need to compensate for the decreased output by removing product from inventory and obtaining additional supplies from other sources to meet contractual obligations for delivery of gasoline and diesel fuel. Demand does not diminish initially when production is disrupted, but will usually decline when prices stay at higher levels.

Refiners will usually obtain additional supplies from the following sources: inventories at their own refinery, purchases from other California refiners that can spare some additional supply, purchases from other market participants that have gasoline or diesel fuel in long-term storage (referred to as strategic inventories), or increased imports from refineries located outside the state.

The types of petroleum products that are produced by refineries are influenced by the fuel specifications, quality of the crude oil processed, complexity of the refinery, and supply/demand balance of the local petroleum markets.

Inventory levels for petroleum products and timing of disruptions are two important factors that can determine whether or not an unplanned refinery outage results in a minor or significant price spike.

Price spikes are exacerbated when inventory levels are unseasonably low
Conversely, price spikes are not nearly as severe when inventory levels are unseasonably high. If the market has unusually high levels of gasoline inventories when an unplanned refinery outage occurs, the impacted refiner is usually able to obtain alternative supplies to offset their reduced production more easily than when inventory of excess gasoline is scarce. Therefore, inventories are one of the factors analyzed during any price spike investigation.

California is the largest consumer of transportation fuels of any state in the United States. During 2005, consumers and businesses consumed 16 billion gallons of gasoline (including ethanol), nearly 3 billion gallons of diesel fuel, and about 3.7 billion gallons of jet fuel.

Key Findings about the Spring 2006 Price Spike

- Wholesale prices in California increased rapidly for a 3-week period. Retail prices have remained high for over *three months* when compared to prices at the same time last year. (See Figure 3-2.)

- This retail price spike cost California consumers over $1.3 billion more for gasoline and $170 million more for diesel from May 1 through July 31, after making adjustments for the differences in the cost of crude oil and increased sales taxes from the higher crude oil costs.

- Staff identified several factors which contributed to the gasoline price spike:
    - Refineries experienced significantly more unplanned outage days in the first six months of 2006 than there were during the first six months of 2005 (175 vs. 58) and the average unplanned outage lasted almost twice as long in the first six months of 2006 compared to the same time in 2005. In turn this contributed to three consecutive weeks of lower-than-normal gasoline production in California appears to have been a factor that contributed to the formation and magnitude of the April/May price spike for gasoline. Gasoline production in California was lower during this period than it had been in the 5 previous years because.
    - Because California is becoming more dependent on imports, increased congestion at California marine ports in late April resulted in delays in petroleum product delivery.
    - Pipeline exports of gasoline from California to Nevada and Arizona were at their highest level over the 5 previous years, while pipeline imports to western states from Texas were lower than they had been for the 5 previous years.
    - Alkylate is a key gasoline blending component for refiners. The transition away from MTBE in many other states increased the demand, and therefore the price, for alkylate. The price increased by about 75 cents per gallon since early April.
- Similar factors contributed to the diesel fuel price increase:
    - Refineries experienced slightly lower-than-normal production in March to mid April.
    - Exports of diesel fuel to Nevada and Arizona increased for four consecutive weeks.
    - The anticiapated transition to Ultra Low Sulfur Diesel (ULSD) scheduled for June 1, 2006, lead to a build-up of inventory levels held in reserve as a precaution in case of production problems.
- One factor was investigated which did not appear to have significantly influenced California prices: the March 2006 crude oil pipeline leak at Prudhoe Bay.

Key Observations about the Financial Performance of the Petroleum Industry

The Energy Commission's lack of sufficient California-specific information precludes comparative financial analysis of California petroleum company operations versus their national operations. The Energy Commission cannot currently provide an in-depth assessment of the financial performance of California refineries or how they contributed to the overall profitability of vertically integrated petroleum companies doing business in the state. The Energy Commission continues to seek the data necessary to make this assessment by the end of the year.

California Refineries

In general, California refineries have higher operating costs than in other regions of the nation. At the same time, refineries make higher profits in California compared to other areas of the nation.

Refinery profits are increasing over time as clearly illustrated during the first two quarters of 2006.

Industry Comparisons

The profitability of the petroleum industry is increasing over the past several years, using a number of financial metrics to assess profitability.

The majority of profits (net income) for the major integrated oil companies is from crude oil exploration and production and profit margins are significantly greater for exploration and production than for refining and marketing, both in the United States and worldwide.

Profit margins for exploration and production activities are higher than for other large manufacturing companies in the United States. Profit margins for integrated petroleum companies and refining and marketing operations are in the mid to lower end of the range.

Retail Operations

The profit margins of the petroleum industry's gasoline and diesel fuel retail outlets did not increase during the price spike, and in some instances were negative.

Recommendations for New and Clarified Data Collection Authority

The Energy Commission is recommending additional and clarified authority to collect data because of the information gaps identified in the course of this investigation. These modifications will require legislations and are:

- Modify Energy Commission data collection authority under the Petroleum Industry Information Reporting Act (PIIRA) to permit routine, on-going collection of:

    - *Financial Information*: authority to conduct a profitability analysis of the petroleum industry on an *ongoing basis*, including the profitability factors described under existing PIIRA regulation. This new legislative authority would direct the Energy Commission to routinely collect the financial information which is necessary to assess the state of petroleum industry in California as a whole, and of the individual business entities which, together, comprise that industry.

    - *Cost Data*: clear authority to *routinely* collect specific information on costs associated with various types of sales of refined petroleum products. Currently, only prices and quantities are being collected with respect to these sales. With price, quantities, **and** cost data, the Energy Commission will be able to determine profit margins for the sales of various refined petroleum products (such as various grades of gasoline, diesel fuel, kerosene, and finished aviation gasoline).

    - *Spot Market Trades*: authority to require refiners and petroleum market traders to *routinely* provide daily accounting of spot pipeline transactions. Currently, only spot prices for refined products are reported on a daily basis; the Energy Commission has no information as to the quantities and identity of the companies involved in these daily transactions. To better assess the potential severity of temporary market disruptions, closer monitoring of spot pipeline volumes associated with daily transactions would more accurately gauge the relative degree of supply problems. This information would also enable the Energy Commission to ascertain the relative importance of rapid price fluctuations.

    - *Marine Terminal Operations*: authority to collect information pertaining to marine infrastructure congestion and vessel traffic on an *ongoing basis.* Marine vessel traffic and other information which could indicate congestion at the petroleum berths in the Ports of San Pedro/Long Beach, and in the San Francisco/Oakland area is routinely collected by the Southern California Marine Exchange and the Marine Exchange of the San Francisco Bay Region, respectively. Congestion at these terminals may reduce the availability of crude oil for refinery operations, reducing transportation fuel supplies, exerting a significant influence on market prices. Moreover, the

perception that congestion is occurring, or will occur, also impacts spot market prices.

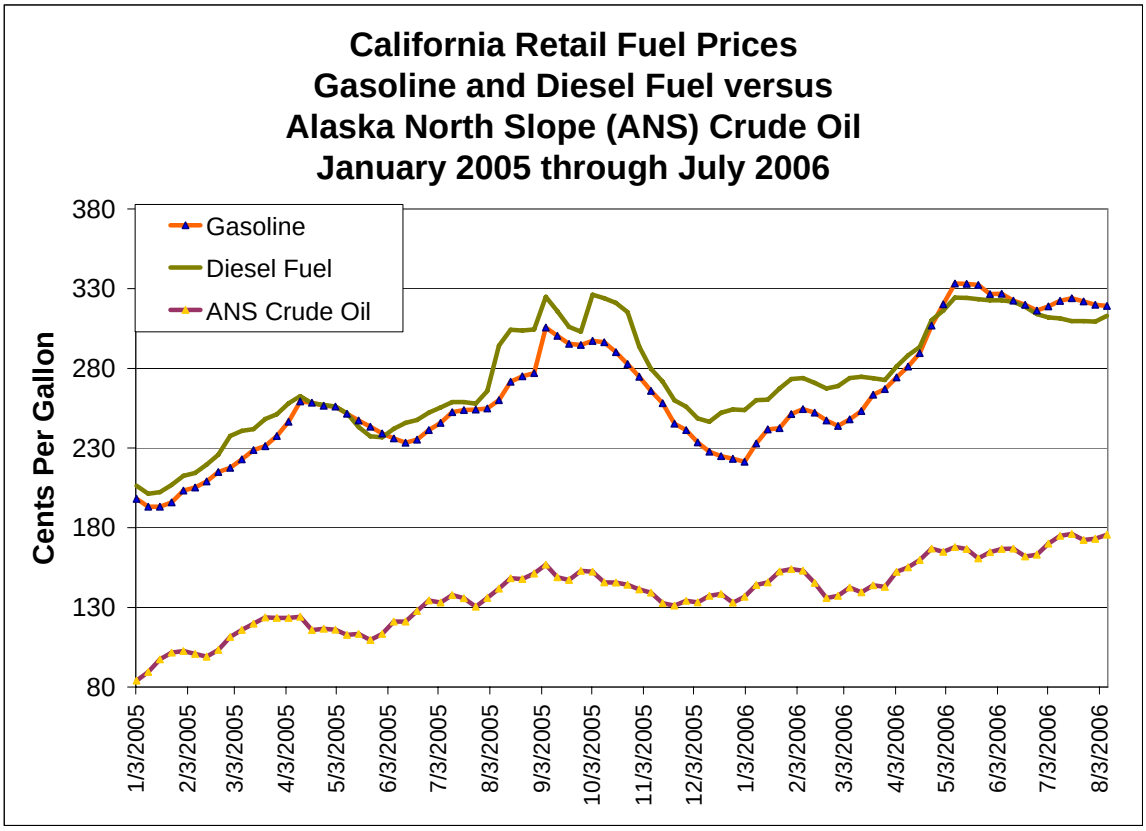
- *Confidentiality*: authority to share PIIRA information, on a confidential basis, with California's Attorney General. The Energy Commission is currently only allowed to share PIIRA data on a confidential basis with the California Air Resources Board. California electricity and natural gas markets have been subjected to various forms of actual and attempted manipulation, and it is important that confidentiality is not allowed to cloak possible improper conduct.

- Allow the California State Board of Equalization (BOE) to share their service station information, on a confidential basis, with the Energy Commission. This would allow the Energy Commission to conduct an ongoing retail service station profitability analysis which could extend to all relevant segments of the retail petroleum marketing sector. The Energy Commission does not possess an accurate or complete list of independent retail outlets and therefore cannot survey all service stations to determine if there are differences in profitability between refiner-owned and operated retail outlets, and independent retail outlets, and to determine the contribution of retail outlets to a major oil company's profitability. The BOE collects this information from retail outlet operators, including the names and addresses of retail outlet operators, but is generally prohibited from sharing it with other state agencies.

Chapter 1 – Price Spikes and the Petroleum Market

California motorists and businesses have witnessed short periods of rapid price increases for gasoline and diesel fuel many times during the last several years. Most recently, one of California's largest price spikes occurred between April 17 and May 8, 2006. Retail prices for gasoline and diesel fuel increased by 44 and 33 cents per gallon, respectively. Approximately 8 cents per gallon of these retail price increases was due to the rising cost of crude oil during this three-week period. **Figure 1-1** shows retail prices since January 2005 compared to crude oil prices.

Figure 1-1



Source: Energy Information Administration (EIA) – California retail prices.

Price Spikes

Rapid price increases, referred to as price spikes, are normally preceded by large jumps in wholesale fuel prices and are triggered by an event that temporarily reduces supply. Major unplanned outages at a refinery following a fire or mechanical failure are prime examples of events that can reduce refinery output and temporarily diminish supply of gasoline and diesel fuel. Price spikes in California are normally greater in magnitude and longer in duration compared to other regions of the United States due to the fact that alternative sources of supply are several weeks away by marine vessel. *But what triggers a price spike and what underlying market factors can exacerbate a price spike?*

Refineries, pipelines, and distribution terminals operate in a near-continuous fashion designed to maintain an adequate supply of gasoline at service stations and diesel fuel at truck stops. When there is a problem at a refinery (such as a fire, pipeline leak, or unit malfunction) and a process unit has to be shut down and repaired, production of gasoline or diesel fuel is usually disrupted. Depending on the severity of the incident and the duration of time required to regain normal levels of operations, the refiner will need to compensate for the decreased output by removing product from inventory and obtaining additional supplies from other sources to meet contractual obligations for delivery of gasoline and diesel fuel. Demand does not diminish initially when production is disrupted, but will usually decline when prices stay at higher levels.

Refiners will usually obtain additional supplies from the following sources: inventories at their own refinery, purchases from other California refiners that can spare some additional supply, purchases from other market participants that have gasoline or diesel fuel in long-term storage (referred to as strategic inventories), or increased imports from refineries located outside the state.

If the unplanned outage is relatively small, refiners are usually able to draw down their own inventory of blending components or finished products to compensate for the temporary reduction in output. Refiners may then arrange to import additional supplies at a later date to replenish their inventories that were temporarily depleted. Refinery outages that do not require additional supplies from outside the affected refinery do not normally result in a wholesale price spike that adversely impacts retail prices.

When a refinery outage can not be handled with inventories at the facility alone, the refiner must purchase additional supplies of transportation fuels from other sources in order to meet their contractual obligations to the service stations and truck stops that they normally supply. Other refiners will usually charge a higher price to relinquish some of their own inventory because there is a concern that decreasing their own stocks of gasoline or diesel fuel would put them in a potential supply disadvantage if they were to experience an unplanned refinery outage themselves.

Other market participants that do not operate refineries or have ongoing supply obligations, such as traders, are another potential source of additional transportation fuel supplies for a refiner who has experienced an unplanned outage. These market participants will likely command a higher price for their transportation fuels being held in

inventory, but for a slightly different reason. Traders do not normally have contractual arrangements to meet ongoing supply commitments nor are they at risk if they sell off all or most of their gasoline and diesel fuel supplies. But traders usually have to charge a sufficiently high price to recover the costs incurred to transport and store refined products over long periods of time (several months) and to make enough profit to justify holding several million dollars worth of refined petroleum products in storage. A trader who could make higher profits through alternative investment opportunities (such as real estate, financial markets, etc.) would withdraw from conducting business in the petroleum market. If the profits are sufficiently high and consistent over time, traders will continue to import transportation fuels and place them in storage awaiting the next major unplanned refinery outage.

Factors that Exacerbate Price Spikes

Inventory levels for petroleum products and timing of disruptions are two important factors that can determine whether or not an unplanned refinery outage results in a minor or significant price spike.

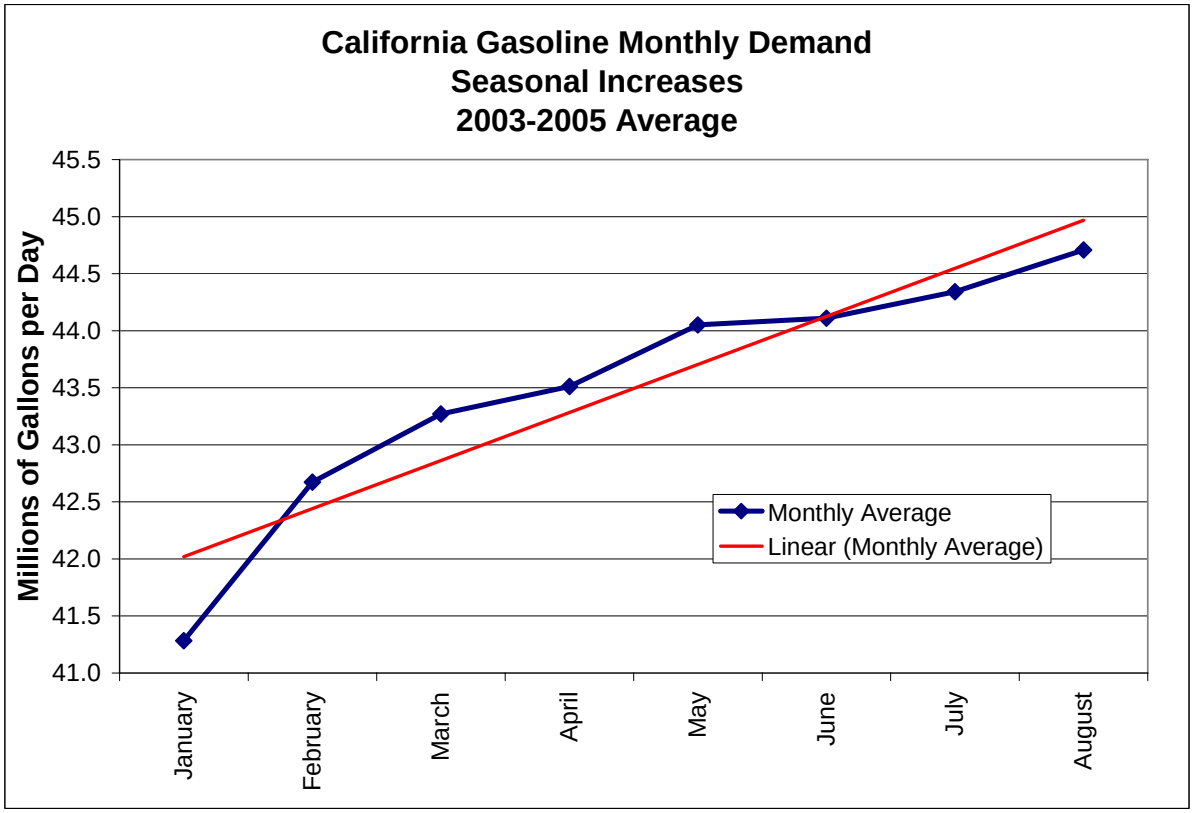
Price spikes are exacerbated when inventory levels are unseasonably low Conversely, price spikes are not nearly as severe when inventory levels are unseasonably high. If the market has unusually high levels of gasoline inventories when an unplanned refinery outage occurs, the impacted refiner is usually able to obtain alternative supplies to offset their reduced production more easily than when inventory of excess gasoline is scarce. Therefore, inventories are one of the factors analyzed during any price spike investigation.

When an unplanned refinery outage occurs, the time of year is an important factor. Is demand increasing or decreasing at the time of an event? Are refiners able to produce additional quantities of gasoline?

For example, unplanned refinery outages during the spring months usually have a greater impact on prices because demand for gasoline and diesel fuel is increasing at that time of year. This means that a refiner who experiences an unplanned outage must not only make up for the reduced production from the refinery, but also obtain additional supplies to meet growing demand over the next several weeks.

Figure 1-2 uses an average of the monthly gasoline demand figures for the years 2003 through 2005 to illustrate the seasonal increase. A trend line has been inserted to indicate the slope of the increase.

Figure 1-2

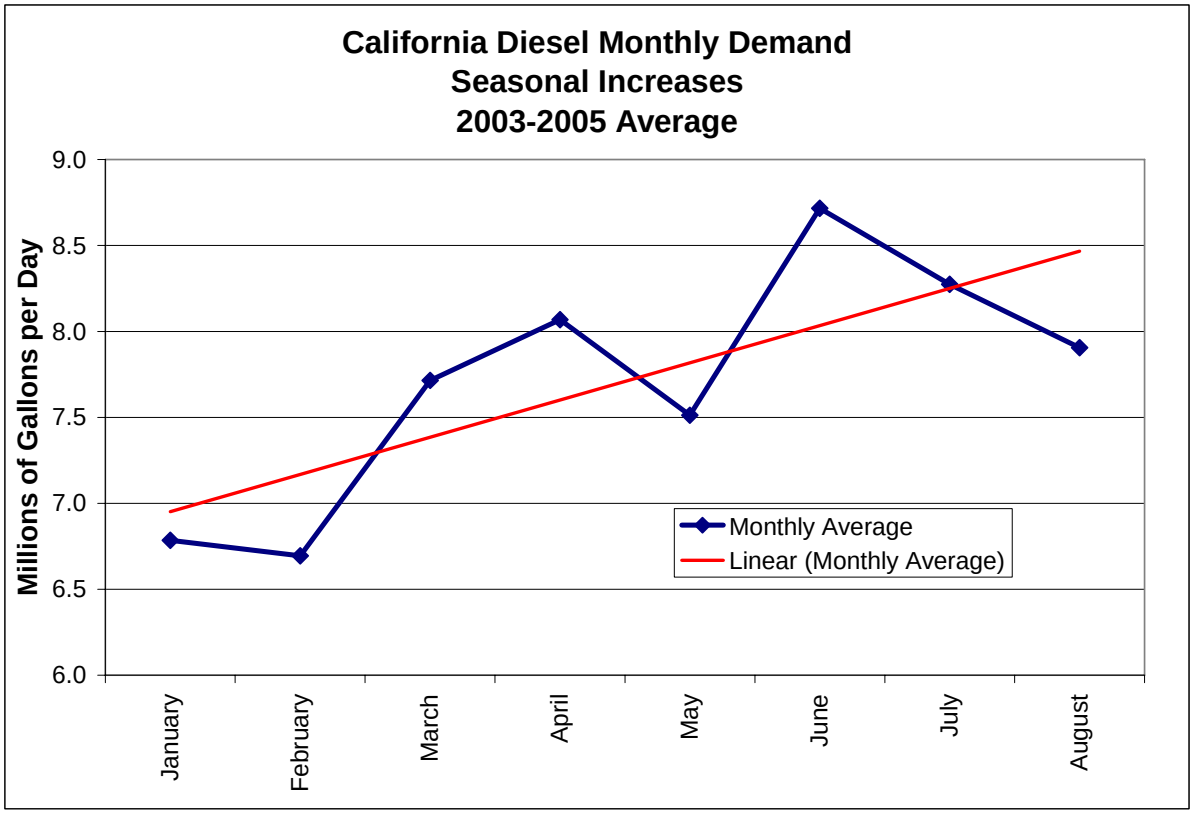


Source: Analysis of California State Board of Equalization taxable gasoline sales figures.

During the late winter months (mid February through mid March), refiners transition from producing winter grade gasoline to summer grade gasoline. After this transition, refiners' production of gasoline from crude oil decreases by 5 to 8 percent. The main reason for this reduction is that certain gasoline blending components, such as butane, are not suitable for use during the warmer months because these products evaporate too easily (higher volatility) and would increase air pollution. In the winter months these blending components are used and production increases by the same percentage.

Figure 1-3 shows that the seasonal demand trend for diesel fuel is not as dramatic as that of gasoline, but there is still an upward slope through the spring and into the summer months.

Figure 1-3



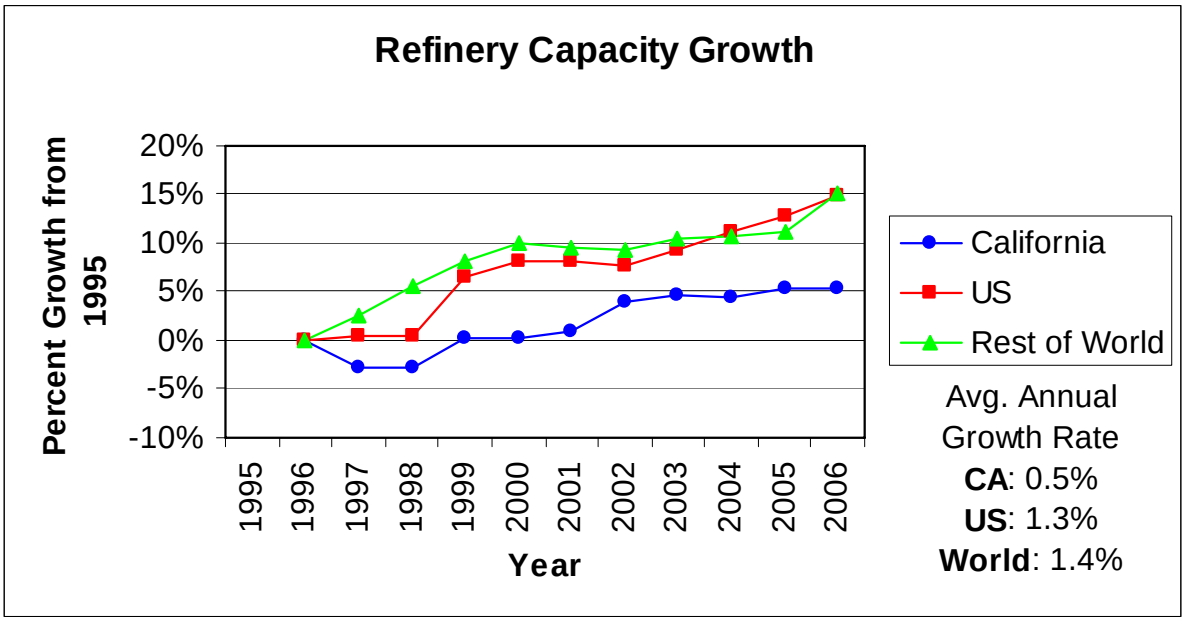
Source: Analysis of California State Board of Equalization taxable diesel fuel sales figures.

Trends in the Petroleum Industry – Global and Domestic

The Energy Commission conducted a rapid and thorough analysis of petroleum industry trends for this report. Much of the information, charts, and analysis associated with trends in the petroleum industry are provided by ICF International on behalf of the Energy Commission. The detailed ICF report is provided as an attachment in **Appendix A.**

As the demand for transportation fuels continues to increase throughout the world, refiners have responded by increasing the capacity to process crude oil. **Figure 1-4** illustrates that California refinery capacity is expanding at a slower rate than the United States or the Rest of the World.

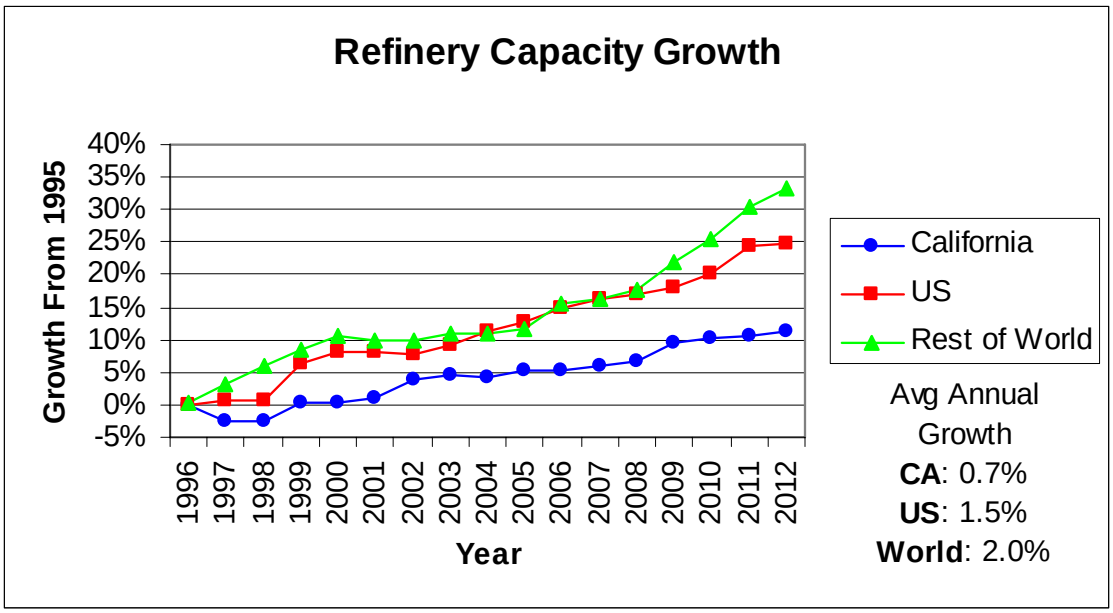
Figure 1-4



Sources: EIA Petroleum Supply Annual and EIA Refinery Capacity Report. Note that the EIA did not collect data for the years 1996 and 1998. The refinery counts and capacity for 1996 and 1998 have been estimated using the previous year's data. ICF graphic.

Based on announced projects, growth in refining capacity is expected to continue through 2012. **Figure 1-5** shows that the capacity in the Rest of the World will increase at a faster pace compared to the United States or California.

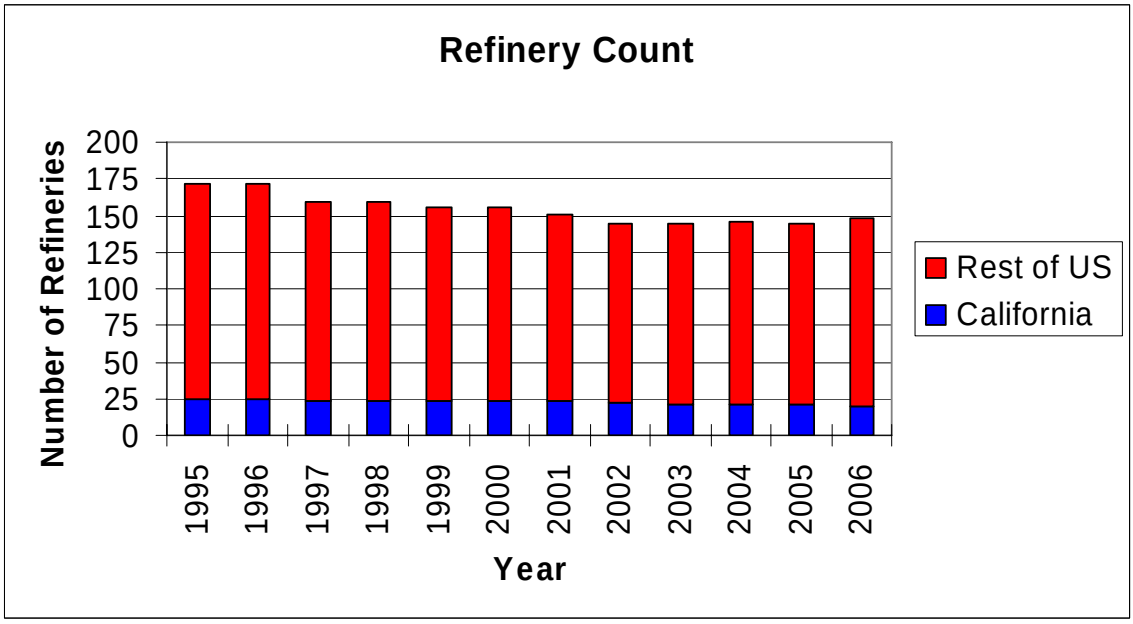
Figure 1-5



Sources: Historical: EIA Petroleum Supply Annual. EIA Refinery Capacity Report, and Oil and Gas Journal. Worldwide Refining Survey. Forecast based on ICF estimates. Note that the EIA did not collect data for the years 1996 and 1998. The refinery counts and capacity for 1996 and 1998 have been estimated using the previous year's data. ICF graphic.

Over the last 10 years the number of refineries operating in the United States (including California) has declined from 171 to 148 as depicted in **Figure 1-6**. Over the same period, the number of California refineries has declined from 24 to 21.

Figure 1-6

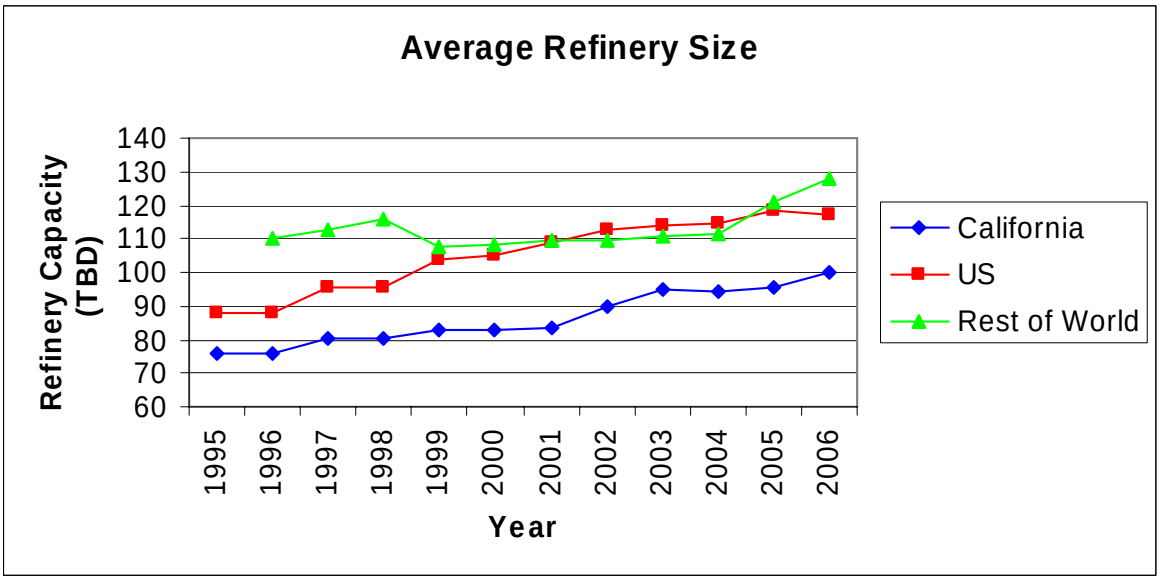


Sources: EIA Petroleum Supply Annual and EIA Refinery Capacity Report. ICF graphic.

For perspective, the number of refineries operating around the world has declined from 757 in 2000 to 679 in 2006. But if the number of refineries is declining, how is it possible that the total capacity to process crude oil continues to increase?

Figure 1-7 shows that the average size (measured as average daily capacity to process crude oil per refinery) has continued to increase as smaller, less economically efficient refineries have closed down and gradual expansion at existing facilities continues.

Figure 1-7

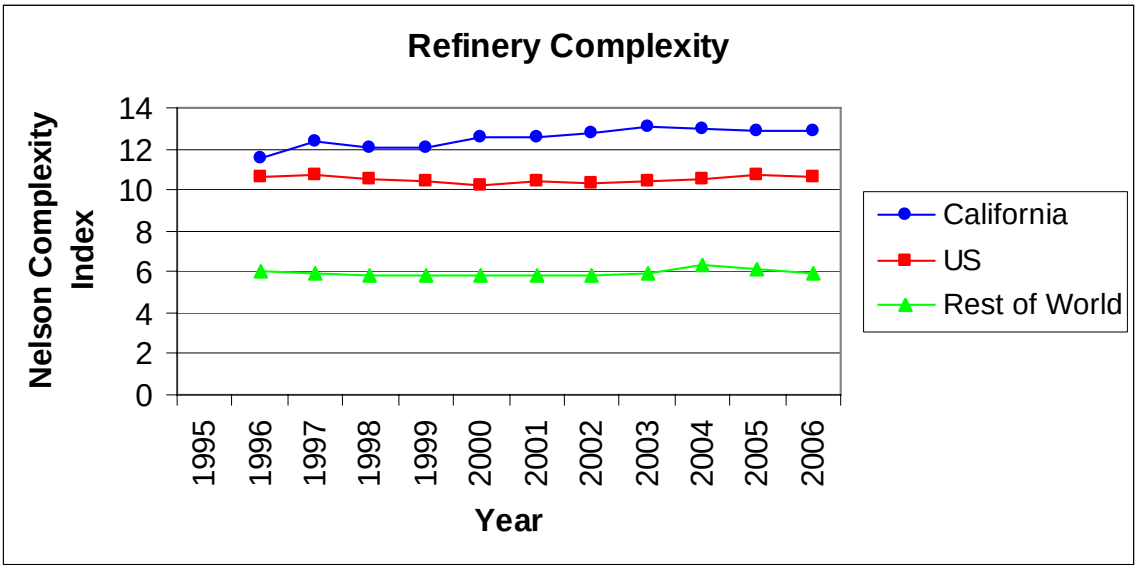


Sources: EIA Petroleum Supply Annual. EIA Refinery Capacity Report, and Oil and Gas Journal. Worldwide Refining Survey.[2] ICF graphic.

Capacity to process crude oil does not provide an accurate picture of a region's ability to produce cleaner burning transportation fuels that yield reduced levels of air pollution in conjunction with advanced vehicle technology. The higher the degree of "complexity," the greater the ability of a refinery to process heavier crude oil and produce cleaner burning gasoline and diesel fuel, virtually free of any sulfur.

Figure 1-8 uses the Nelson Complexity Index (measure of refinery sophistication) to compare refiners in different regions.

Figure 1-8

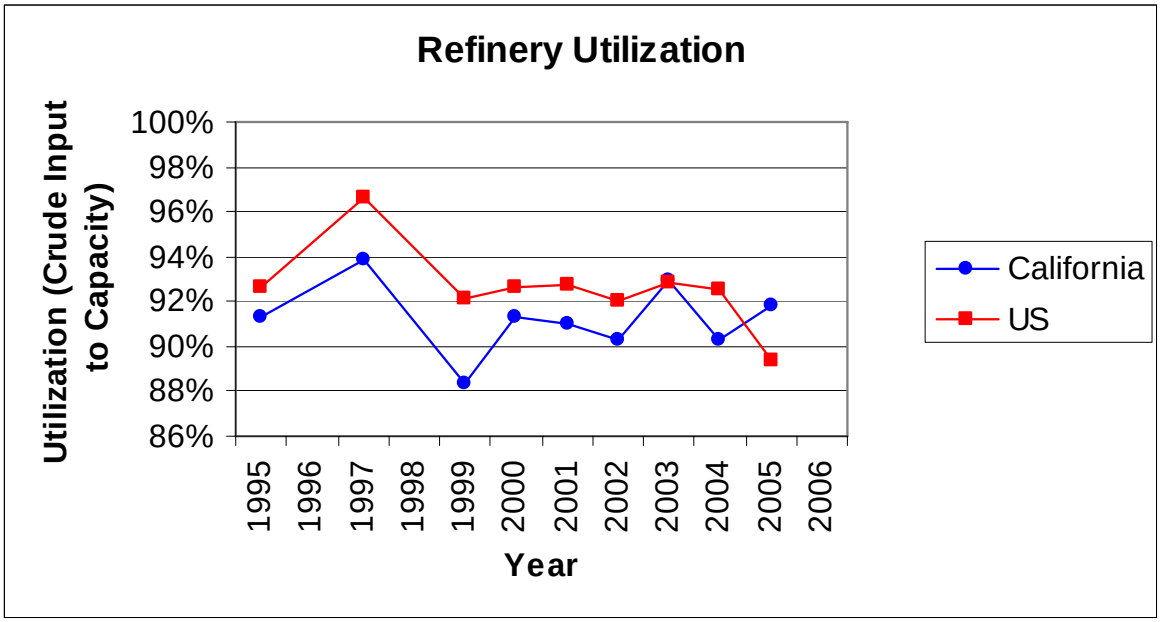


Source: Oil and Gas Journal Worldwide Refining Survey. ICF graphic.

As the chart indicates, California refineries, on average, are more complex than those in the United States and the Rest of the World. This is not a surprise since California refineries process crude oil that is thicker and contains higher amounts of sulfur relative to these other regions. California refineries are producing gasoline and diesel fuel to meet cleaner fuel standards, referred to as California Air Resources Board (CARB) reformulated gasoline and CARB Ultra Low Sulfur Diesel fuel (ULSD).

Another measure of refinery operations is the actual amount of crude oil that is processed compared to the theoretical capacity, referred to as refinery utilization. **Figure 1-9** depicts average utilization rates for California and U.S. refineries over the last 10 years.

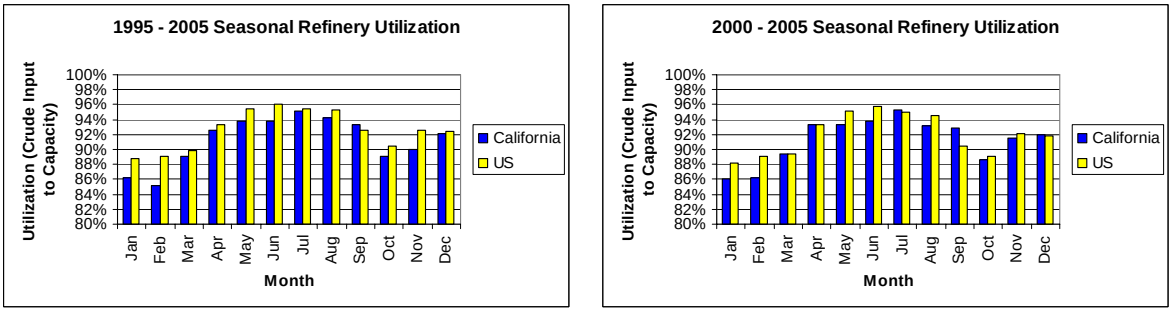
Figure 1-9



Sources: EIA Petroleum Supply Annual. EIA Refinery Capacity Report. ICF graphic.

Except for 1997, utilization rates for both the U.S. and California normally average less than 94 percent, a reflection that at least 6 percent of the time any given refinery is operating at less than full capacity due to planned maintenance or an unplanned outage. Only recently has the average utilization rate for California refineries exceeded those of the United States, due in large part to the damage inflicted on U.S. Gulf Coast refineries by Hurricanes Katrina and Rita during 2005. But refineries do not operate at the same level throughout the entire year. Rather, refineries normally schedule large maintenance projects (turnarounds) during times of the year that gasoline and diesel fuel demand are lower (the fall and winter months). **Figure 1-10** compares California and U.S. refinery utilization rates on a monthly basis to illustrate the seasonal operations over two different time periods. Over the last five years, the seasonal utilization rates have remained fairly constant compared to the 10-year average.

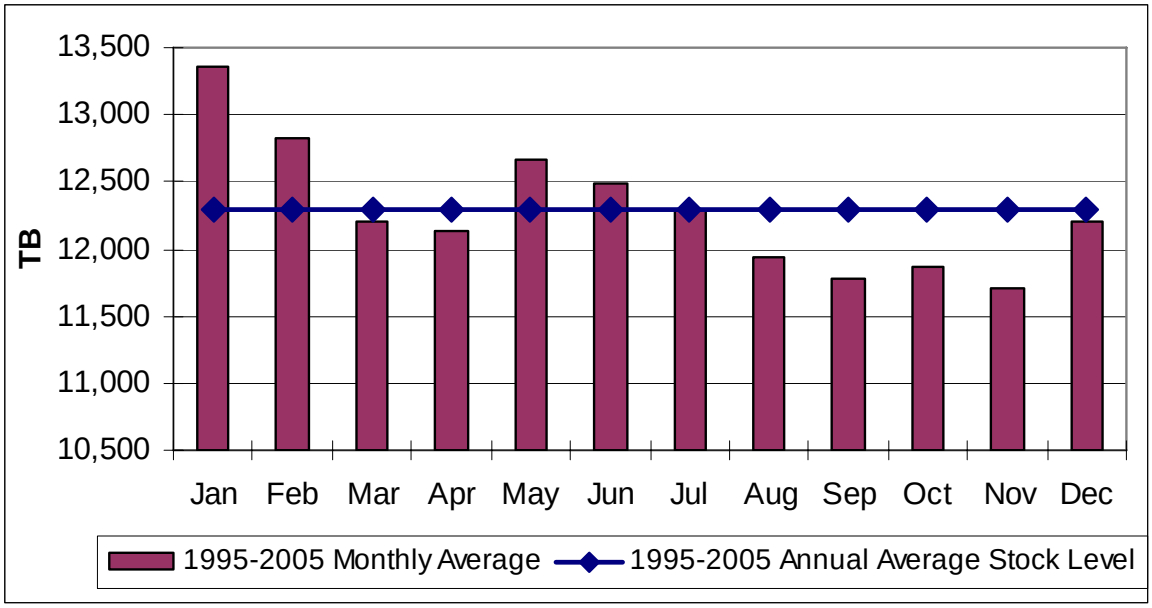
Figure 1-10
Seasonal Refinery Utilization



Sources: EIA Petroleum Supply Annual. EIA Refinery Capacity Report. ICF graphic.

To help compensate for times the refinery is not operating at full capacity, refiners will build up inventory levels in advance of the planned turnarounds that are conducted in February and March. These higher-than-normal inventory levels are then used to augment supply while the maintenance work is performed. Once the work is completed, refiners are able to rebuild inventories back up prior to the onset of the summer driving season. **Figure 1-11** depicts the seasonal inventory swings for gasoline compared to the annual average.

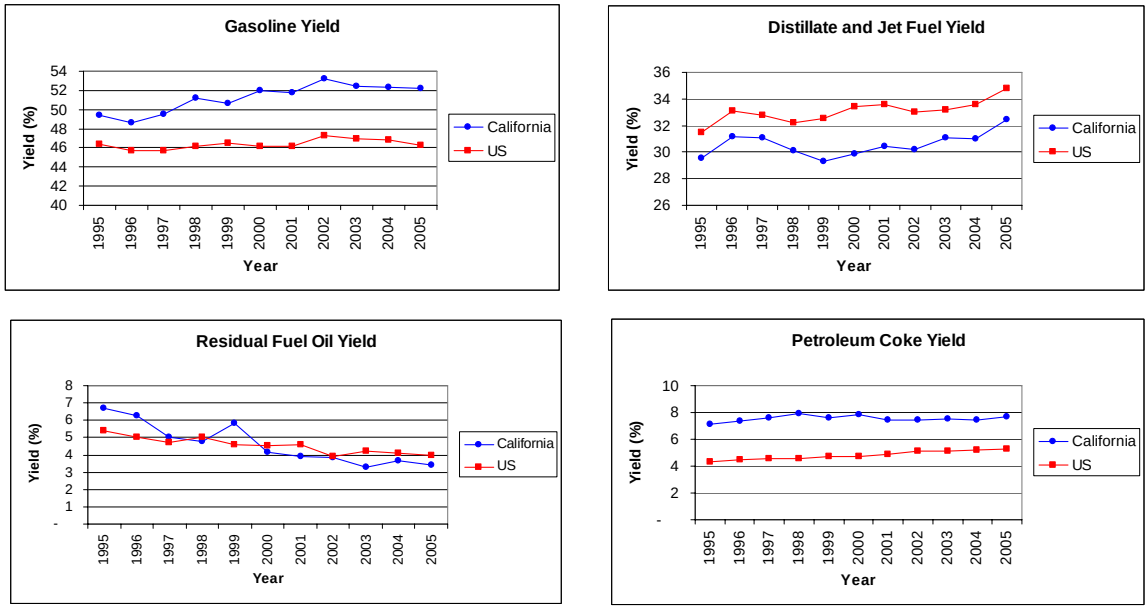
Figure 1-11
California Gasoline and Blendstock Inventories



Source: CEC Weekly Fuels Watch Report. ICFgraphic.

The types of petroleum products that are produced by refineries are influenced by the fuel specifications, quality of the crude oil processed, complexity of the refinery, and supply/demand balance of the local petroleum markets. **Figure 1-12** compares the yield of various types of petroleum products from refineries operating in California with those in the rest of the United States.

Figure 1-12
Petroleum Product Yields



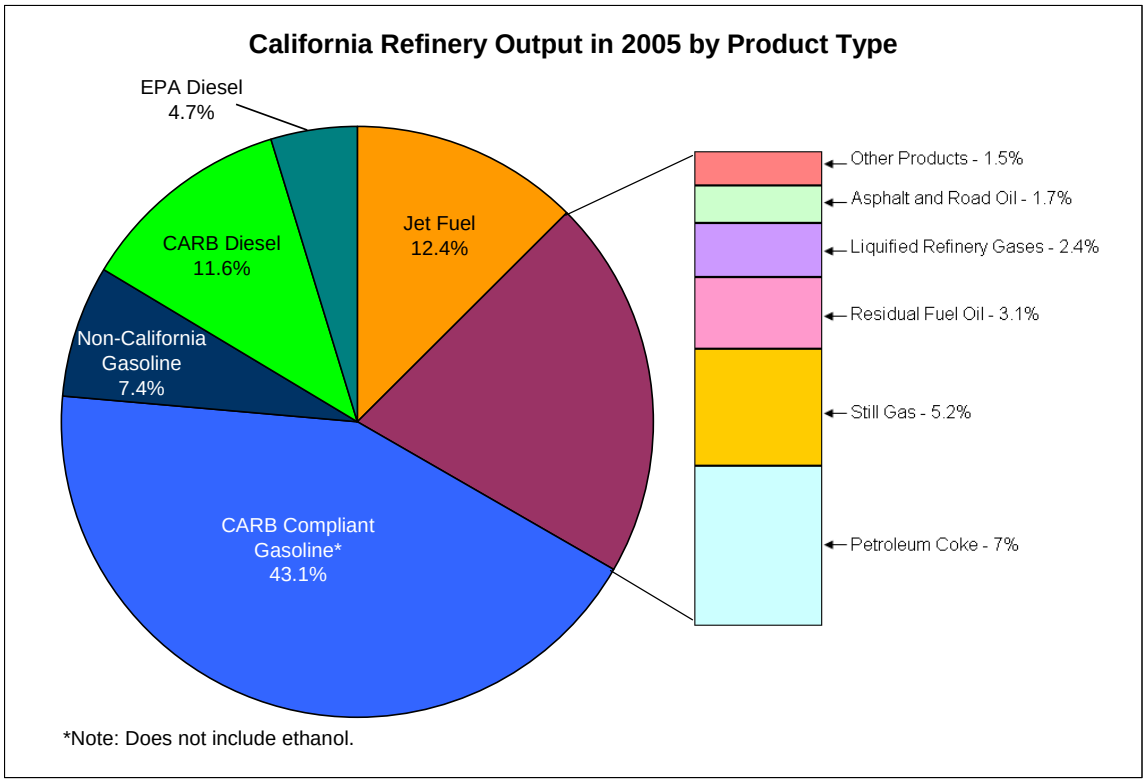
Sources: EIA Petroleum Navigator Refinery Yield, CEC CA Monthly Inputs and Outputs. ICF graphic.

On average, California refineries produce: a higher percentage of gasoline and petroleum coke; a lower percentage of diesel and jet fuel; and a similar portion of residual fuel oil compared to the rest of the U.S. **Figure 1-13** provides a breakdown of the various fuel types produced by California's refineries during 2005.

Over time, the yield of gasoline, diesel and jet fuel is increasing in response to growing demand for these transportation fuels as illustrated in **Figure 1-14**.

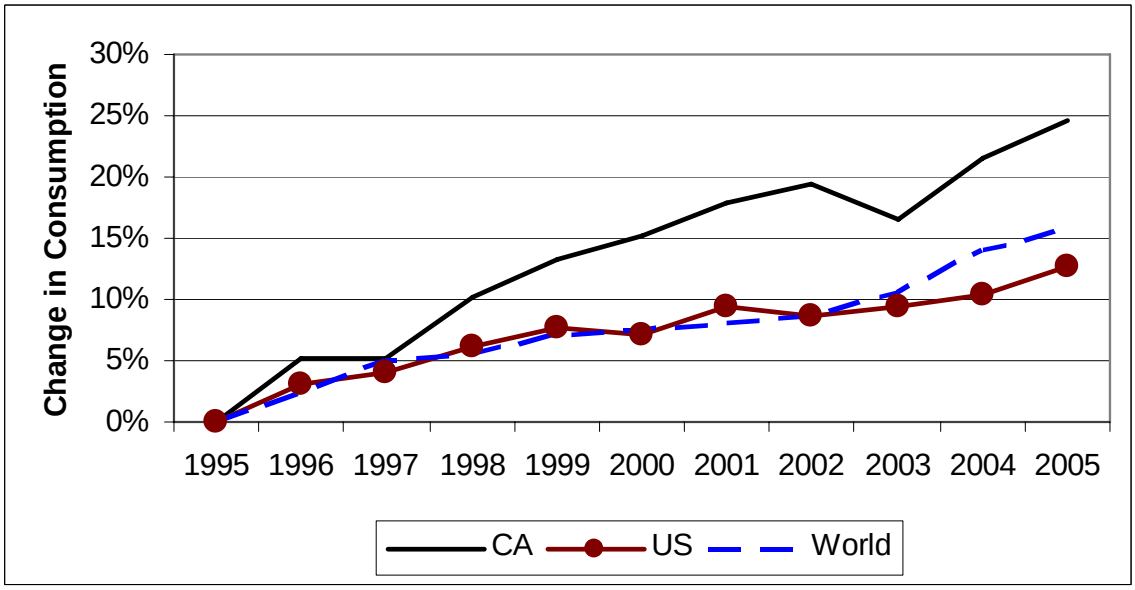
Over the last 10 years, California's demand for transportation fuels has been growing at a faster rate than the United States and the Rest of the World. Since 2002, the World's growth rate has exceeded that of the United States.

Figure 1-13



Source: CEC PIIRA Database

Figure 1-14
Change in Consumption of Gasoline, Diesel and Jet Fuel

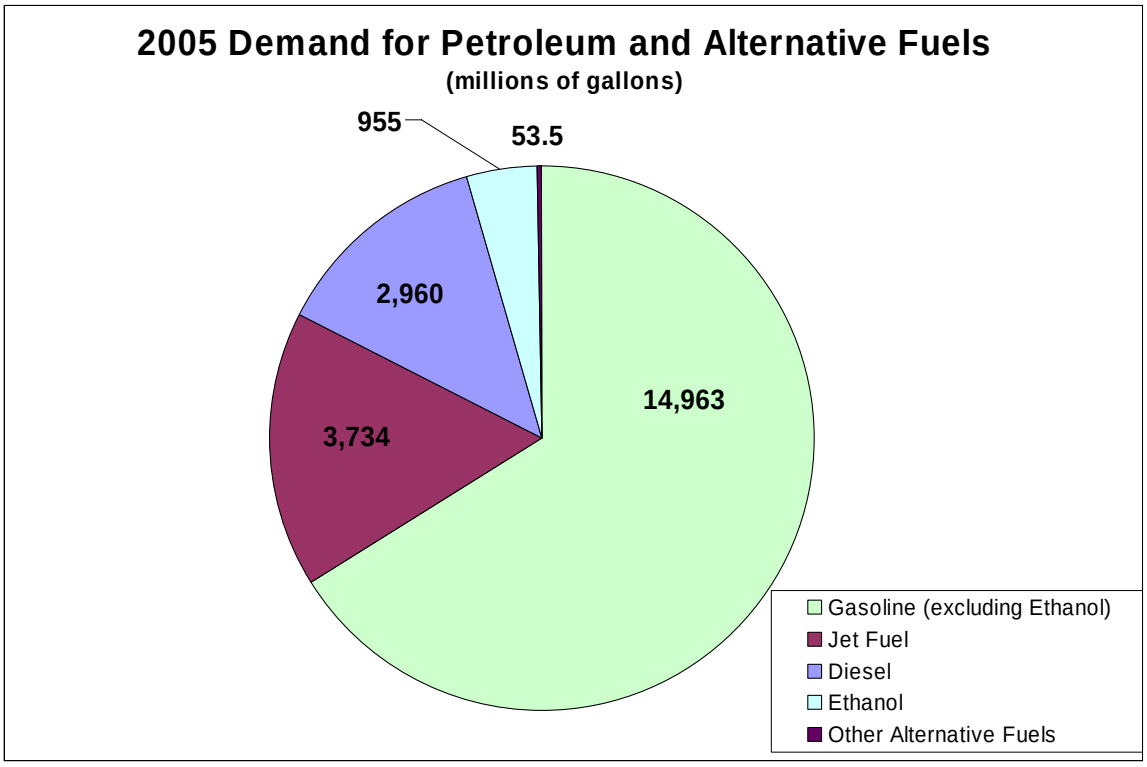


Sources: EIA Prime Supplier, CA Taxable Motor Gasoline Sales and BP Statistical Review of World Energy, June 2006. ICFgraphic.

California Petroleum Market - Demand for Transportation Fuels

California is the largest consumer of transportation fuels of any state in the United States. During 2005, consumers and businesses consumed 16 billion gallons of gasoline (including ethanol), nearly 3 billion gallons of diesel fuel, and about 3.7 billion gallons of jet fuel. **Figure 1-15** depicts the relative market shares for each of the petroleum and alternative fuels.

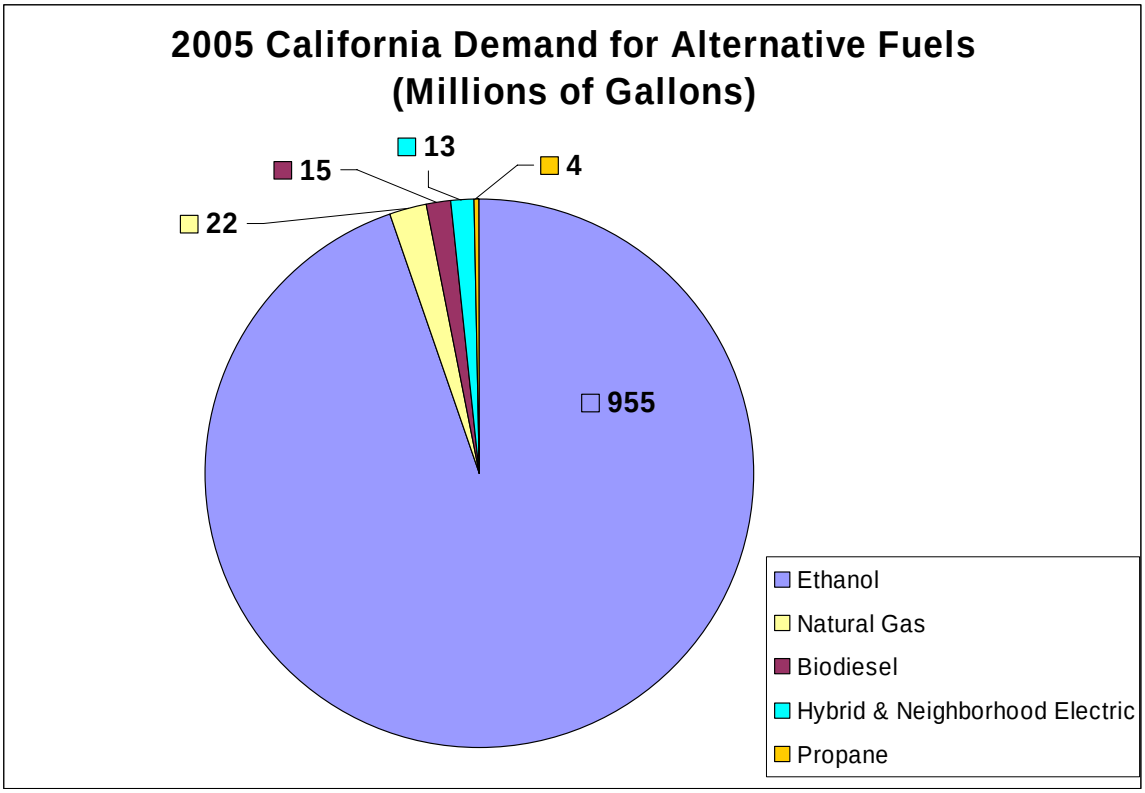
Figure 1-15



Sources: California State Board of Equalization Taxable Motor Fuel Sales, and CEC PIIRA database.

The majority of these refined petroleum products were produced by California's 21 refineries.[3] California is also the largest consumer of alternative transportation fuels in the U.S., ethanol being the primary alternative fuel. In 2005, nearly 1 billion gallons of ethanol were used in the transportation sector mainly as a blend in CARB gasoline. **Figure 1-16** depicts the relative volume of alternative fuels used by motor vehicles in the state during 2005.

Figure 1-16



Sources: Analysis of California State Board of Equalization taxable gasoline sales figures and CEC data.

California Petroleum Market - Imports of Refined Petroleum Products

California is not entirely self-sufficient with regard to their supply of transportation fuels from refineries located in the state. Besides importing over 90 percent of the ethanol the state uses, primarily from sources in the U.S. Midwest, refiners routinely import about 10 percent of their total gasoline and diesel fuel supplies from other domestic refineries located in Washington and the U.S. Gulf Coast, as well as foreign refineries in Canada, Europe, the Middle East, and Caribbean. The level of imports varies throughout the year.

Refiners conduct routine maintenance throughout the year to ensure continuous and safe operations. Large maintenance projects are normally scheduled for winter months when demand for transportation fuel is lower and the ability to produce gasoline is a bit higher.[4] In advance of maintenance projects, refiners will import extra quantities of feedstocks, gasoline, and diesel fuel that they stockpile in storage tanks to be drawn down when parts of the refinery are temporarily off-line for a maintenance project.

If a refiner has operational problems with a process unit, additional quantities of refined products are usually imported to restock depleted inventories. But this step usually requires several weeks to locate available supplies, schedule a ship for transportation, and traverse the distance between the originating port of the cargo and the destination

berth in California. Almost all of the refined product imports are brought in by marine vessel since there are no pipelines that connect refiners outside of the state to California. Only a small volume of gasoline blendstocks, excluding ethanol, is shipped to California by rail car. Over time, California imports of petroleum products will continue to increase and demands on the constrained petroleum infrastructure system will continue to grow.

Pipeline Exports to Neighboring States and Regional Petroleum Market – California, Arizona and Nevada

The neighboring states of Nevada and Arizona do not have any significant refining capacity and depend on imports to meet their demand for gasoline, diesel, and jet fuel. The majority of this supply originates in refineries located in California. During 2005, nearly 100 percent of the transportation fuels consumed in Nevada and approximately 62 percent consumed in Arizona were shipped from California on four petroleum product pipelines operated by the Kinder Morgan Pipeline Company.[5]

Since Nevada and Arizona depend on petroleum products that primarily originate in California, the three-state region acts more like a single supply region than three separate markets. As such, future demand growth for gasoline, diesel and jet fuel in Arizona and Nevada can place an additional burden on California's refineries and petroleum import infrastructure to meet these increasing demands. **Table 1-1** compares the historical and projected growth rates in each state and the United States for gasoline, diesel and jet fuel.

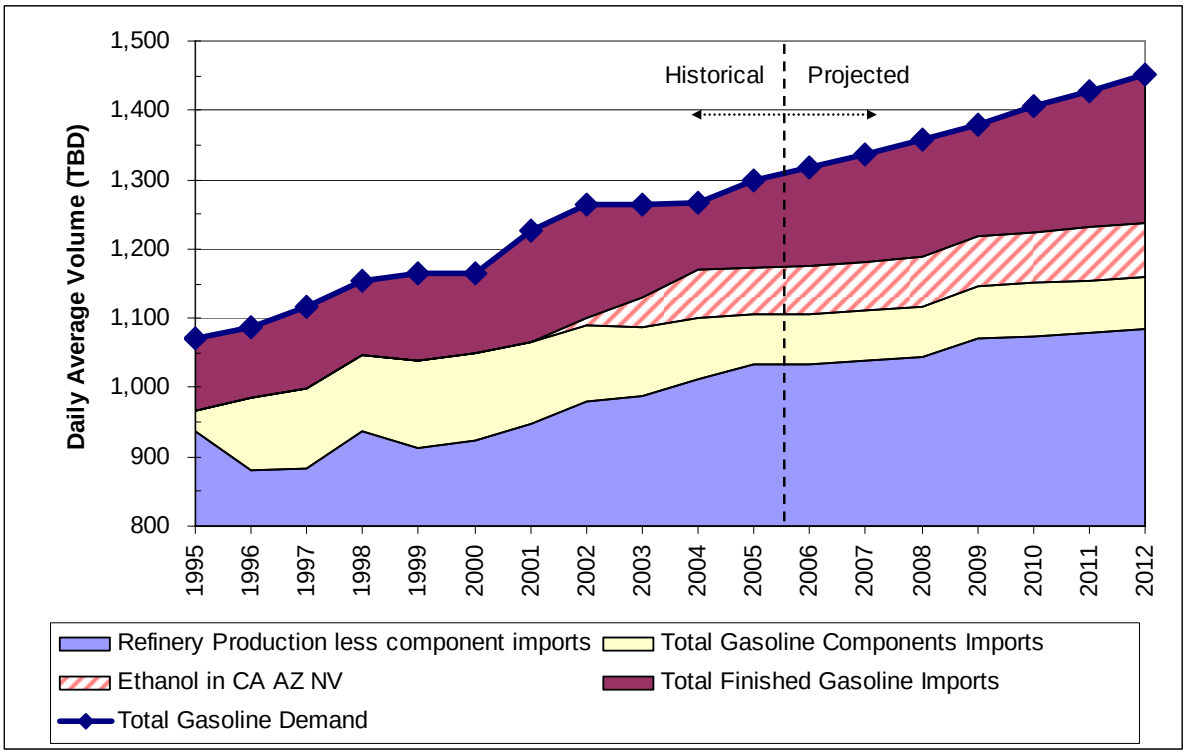
Table 1-1
Fuel Growth Rates

Product	Period	CA	AZ	NV	CA-AZ-NV	US
Gasoline	1995-2005	1.8%	3.8%	2.0%	2.0%	1.6%
	2005-2012	1.3%	3.5%	1.8%	1.3%	1.5%
Diesel Fuel	1995-2005	3.5%	5.6%	1.1%	3.6%	2.5%
	2005-2012	2.5%	3.3%	0.6%	2.8%	1.4%
Jet Fuel	1995-2005	2.3%	2.4%	2.2%	2.2%	0.9%
	2005-2012	3.7%	2.2%	2.0%	2.8%	2.9%

Sources: EIA Petroleum Navigator Prime Supplier Volumes, EIA Petroleum Navigator Product Supplied, CA BOE Taxable Fuel Sales Database, CEC, and EIA Annual Energy Outlook 2006. ICF graphic.

Forecasted growth rates for the various transportation fuels in the three-state region are generally higher than the demand growth rates for the United States. The consequences of these strong demand growth rates are for increased gasoline imports into the region, as illustrated in **Figure 1-17**.

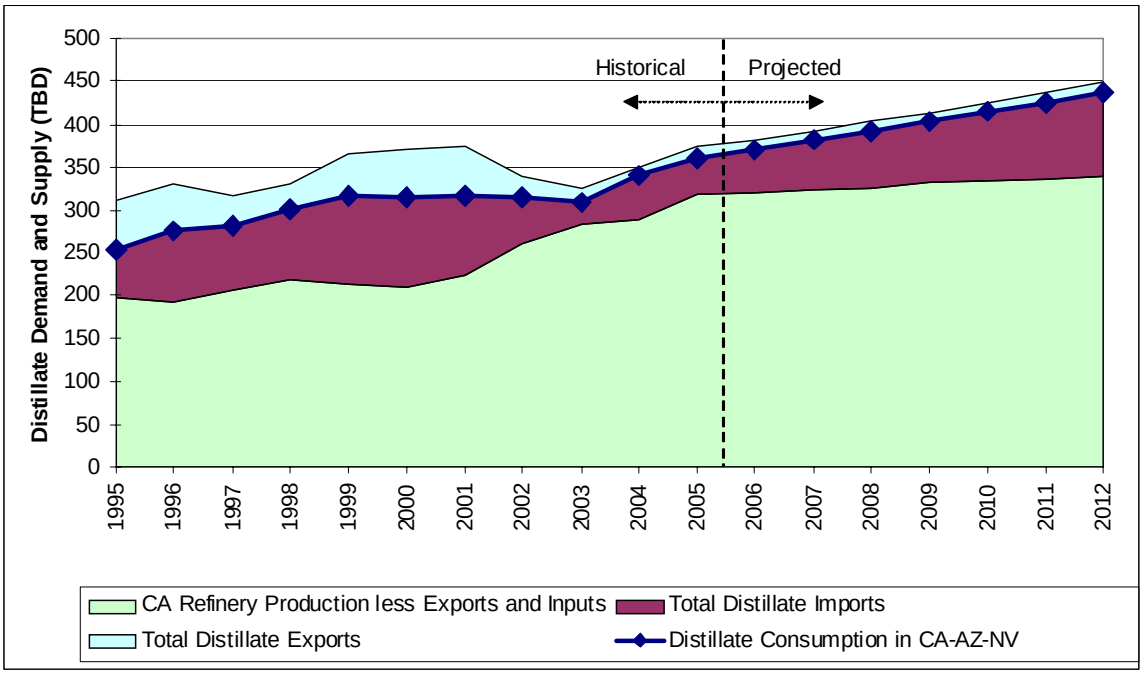
Figure 1-17
Regional Gasoline Supply/Demand
California, Arizona, and Nevada



Note: Gasoline demand includes the volume that is exported by California
Sources: CEC report: *Forecasts of California Transportation Energy Demand 2005-2025: In Support of the 2005 Integrated Energy Policy Report,* EIA Petroleum Navigator Prime Supplier Volumes, CA BOE Taxable Fuel Sales Database, EIA Annual Energy Outlook 2006, Kinder Morgan Pipeline Flows, Wilson Gillette & Co Jones Act Data, ICF Estimates, CEC California Monthly Inputs and Outputs, EIA Petroleum Navigator Refinery Yield. ICF graphic.

The combination of additional imports and increased refinery output of gasoline are forecast to meet the growing regional demand. **Figure 1-18** similarly illustrates the historical and projected regional supply/demand balances for diesel fuel and the growing dependence on imports.

Figure 1-18
Regional Diesel Supply/Demand
California, Arizona, and Nevada



Sources: CEC report: *Forecasts of California Transportation Energy Demand 2005-2025: In Support of the 2005 Integrated Energy Policy Report,* EIA Petroleum Navigator Prime Supplier Volumes, CA BOE Taxable Fuel Sales Database, EIA Annual Energy Outlook 2006, Kinder Morgan Pipeline Flows, Wilson Gillette & Co Jones Act Data, ICF Estimates, CEC California Monthly Inputs and Outputs, EIA Petroleum Navigator Refinery Yield. ICF graphic.

Chapter 2 – Market Operational Factors that Contributed to the Spring 2006 Price Spike

Operational issues may have impacted fuel prices and contributed to the price spike experienced in April and May 2006 include:

- Refinery unplanned outages and planned maintenance
- Refinery production of gasoline and diesel fuel
- Inventory levels for petroleum products
- Pipeline exports to Nevada and Arizona
- Congestion of marine infrastructure operations in Southern California
- March 2006 Alaska North Slope crude oil distribution system leak
- Transition to new fuel specifications

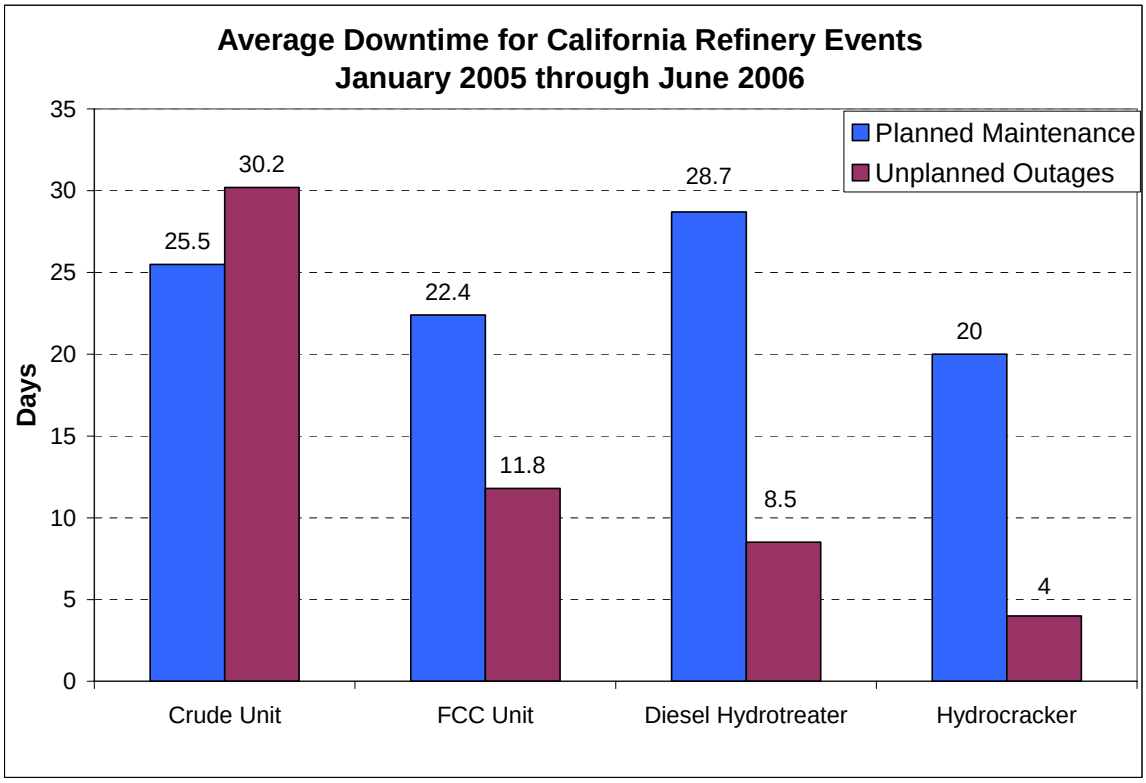
Planned Refinery Maintenance and Unplanned Outages

Unplanned outages at California refineries can result in a temporary decline in refinery output of gasoline and diesel fuel, tightening supply and placing upward pressure on wholesale and retail prices. More planned maintenance events and unplanned refinery outages occurred during the first six months of 2006, than in the first six months of 2005. This trend was consistent during April and May when wholesale prices increased rapidly.

Planned refinery maintenance rarely has a negative impact on the market in terms of contributing to or causing a price spike. Prior to a planned maintenance event, a refinery typically secures additional supplies or builds inventories in order to have a sufficient inventory of finished products on hand to meet contractual obligations. During unplanned events, a refinery must rely on existing surplus inventory and may also purchase additional supplies from other market participants on the spot market. The spot market provides near-immediate delivery or possession of a petroleum product for use in meeting contractual supply obligations.

The average downtime of some typical processing units at California refineries from January 2005 through June 2006 are displayed in **Figure 2-1**. Although the average number of days per unplanned event are less than that of the planned maintenance events, the impacts on the market for petroleum products is more severe because the unplanned incidents were not foreseen and no additional supplies were imported or added to refinery inventories prior to the event.

Figure 2-1



Source: CEC Petroleum Industry Information Reporting Act (PIIRA) database.

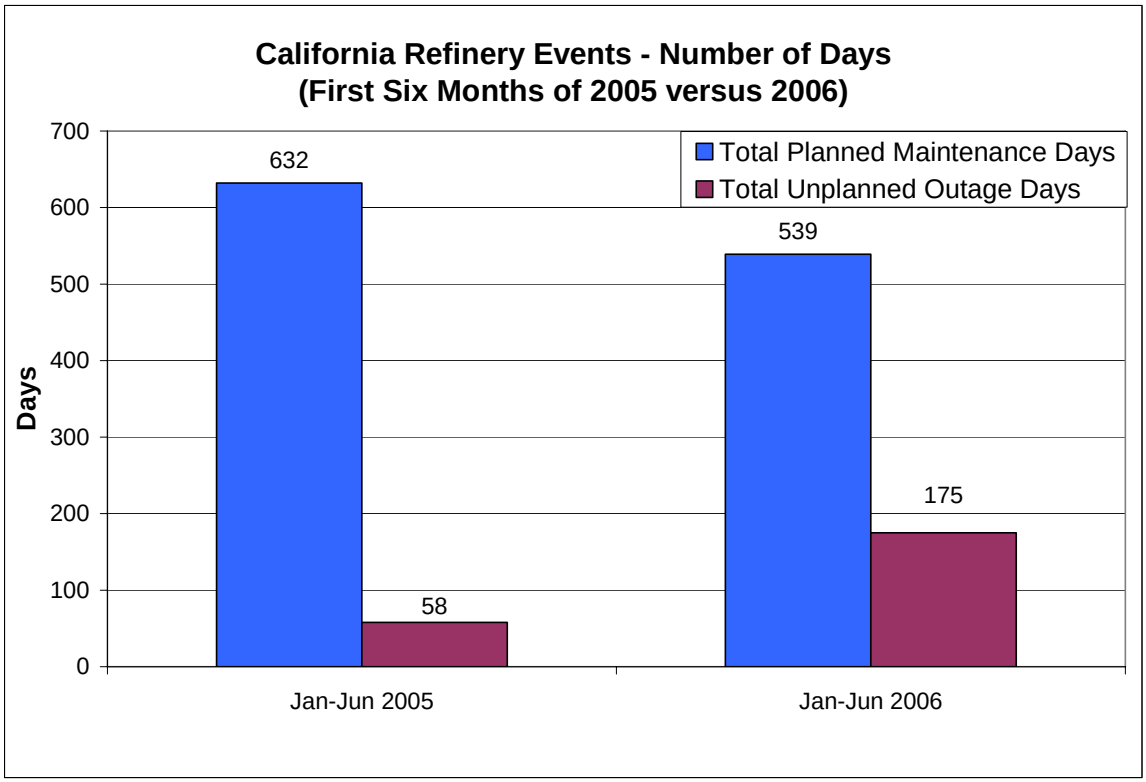
The duration of maintenance events can vary from a single day to as long as two months. Unplanned outage events tend to involve small components of a processing unit such as a pump or compressor. Leaking pipes also fall under this category. Planned maintenance often involves a more complex retrofit of a refinery processing unit as a whole. On average, planned maintenance events for fluid catalytic cracking (FCC) units, diesel hydrotreaters, and hydrocrackers last much longer than unplanned outages. However, planned maintenance on crude oil units has been observed to take less time than unplanned crude oil unit outages. A more detailed discussion of the individual processing units is presented in **Appendix B**.

In addition to physical failures of refinery process units, some outage events are due to electricity outages. While most of California's refineries have sufficient on-site electricity generation capabilities to essentially isolate them from the state's power grid, some refineries are still reliant upon at least a portion of their electricity supply being delivered by a major utility. For example, a power outage in Wilmington, California on September 12, 2005, caused disruptions at three refineries in that area. Finally, cogeneration units within the refinery can go offline unexpectedly, adversely affecting any associated refinery process unit.

Seasonal patterns of maintenance events cannot be determined from the 18 months of data available to the Energy Commission. More formal data collection on future events will improve our understanding of what seasonal patterns, if any, exist.

Figure 2-2 presents an estimate of the total number of days California's refineries were affected by both planned maintenance and unplanned outages during the first six months of 2005 and 2006.

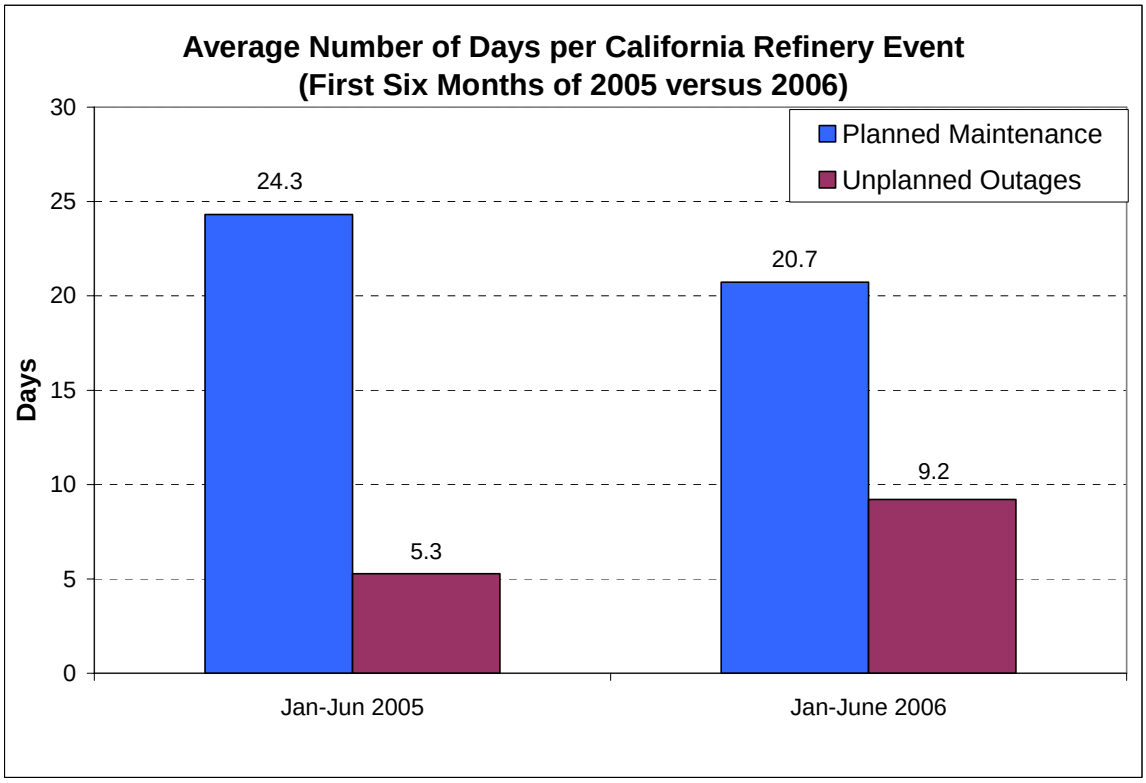
Figure 2-2



Source: CEC PIIRA database.

Significantly more unplanned refinery outages occurred in the first six months of 2006 compared to 2005. Additionally, it appears that the average duration of the unplanned events lasted significantly longer (nine days versus five days) in 2006 compared to the same period last year. A comparison of the average number of days for each outage in the first six months of 2005 and 2006 is presented in **Figure 2-3**.

Figure 2-3



Source: CEC PIIRA database.

Table 2-1 summarizes specific events that occurred for the 30-day period prior to the April 18 through May 8, 2006, timeframe. As the list indicates, many planned maintenance events and unplanned refinery outages occurred.

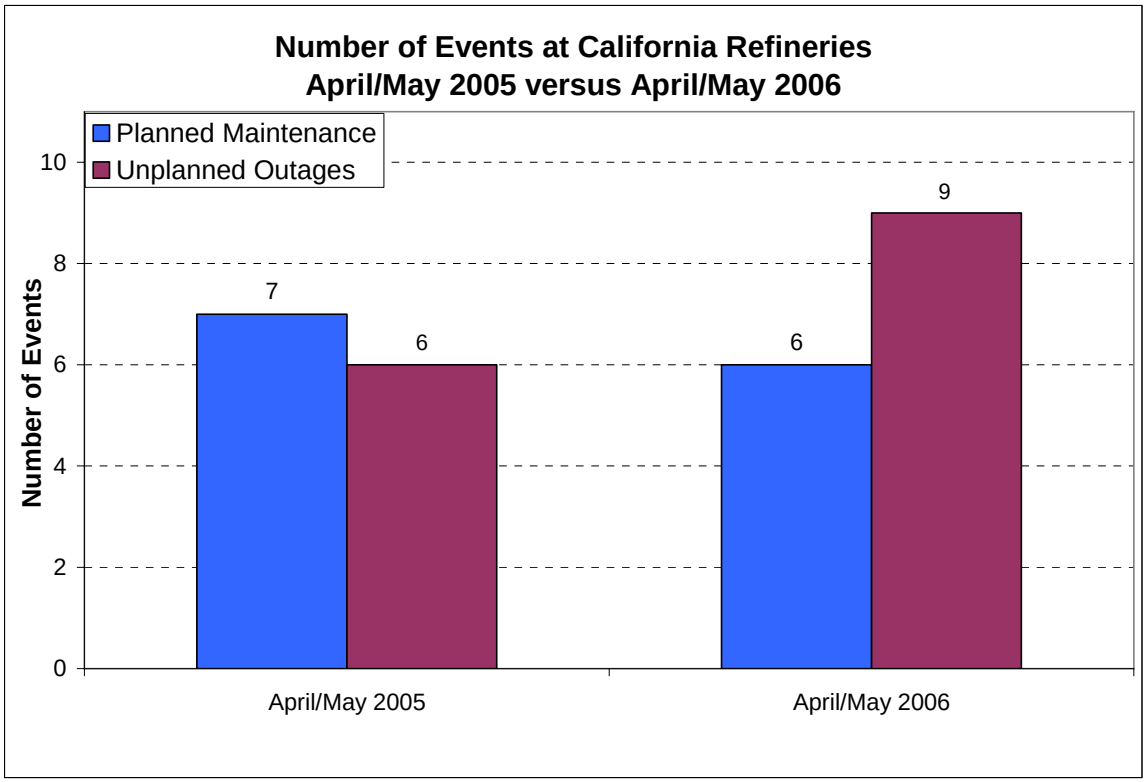
Table 2-1

Week Ending	Refinery Planned and Unplanned Outages
March 10, 2006	Three California refineries experienced planned and unplanned outages. At two refineries, diesel production was impacted. In addition, another refinery experienced an unplanned outage that impacted gasoline production.
March 24, 2006	A refinery underwent unplanned maintenance but continued operation at below normal rates. The unit returned to normal operating rates by March 31. The outage affected both gasoline and diesel production at the refinery. A planned maintenance event occurred at another refinery over this time period which impacted gasoline production for approximately 14 days and the refinery was at normal production rates by March 31.
March 31, 2006	A refiner experienced an unplanned outage that affected both gasoline and diesel production for approximately two weeks.
April 14, 2006	A refiner experienced an unplanned power outage that affected both gasoline and diesel production for one week.
April 21, 2006	No events reported.
April 28, 2006	No events reported.
May 1, 2006	A refinery experienced unplanned maintenance affecting gasoline production for the refinery for a period of one day. Separately, two other refiners experienced unplanned maintenance that lasted for a period of 5 days and 16 days each. This affected diesel fuel production and to a lesser extent gasoline production. Another refinery initiated planned maintenance for a 7 day period.
May 2006	One refinery underwent planned maintenance for a period of 26 days.

Source: CEC PIIRA database.

Comparing refinery operations in April and May 2006 to the previous year, the number of unplanned outages and the number of unplanned days were 50 percent higher in 2006 compared to the same period in 2005. **Figure 2-4** compares the number of planned and unplanned refinery events for these two time periods.

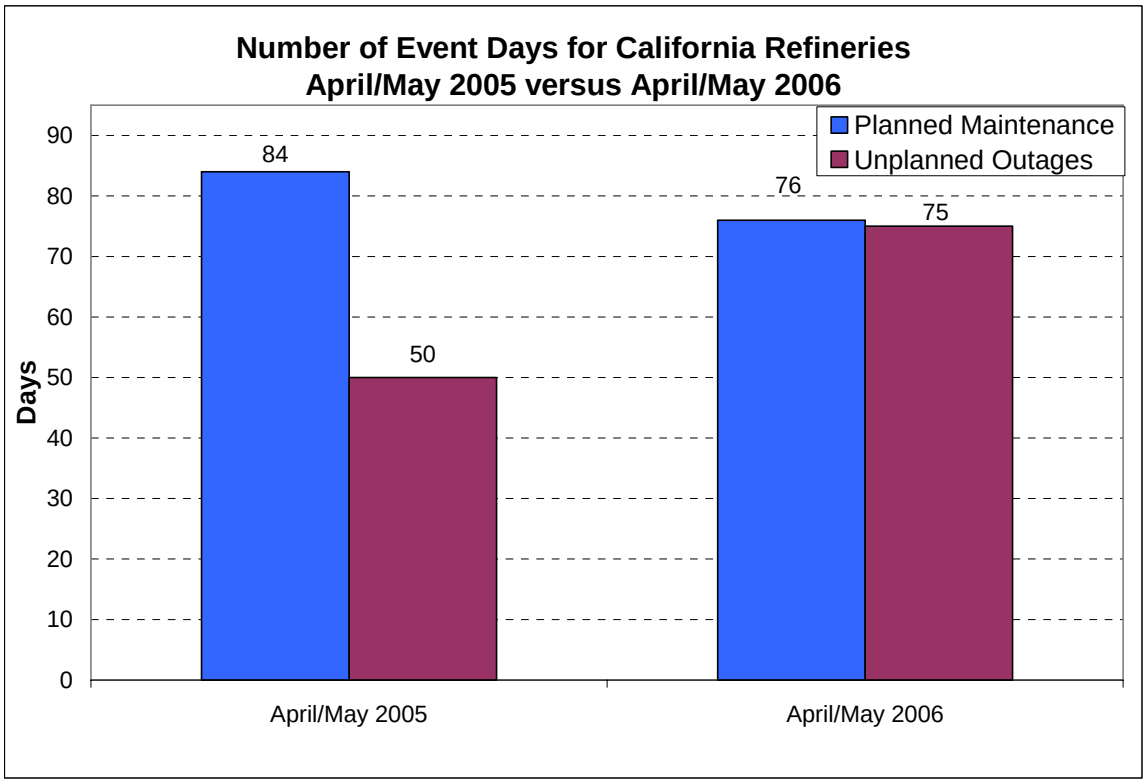
Figure 2-4



Source: CEC PIIRA database.

The total number of outage days was also higher in 2006 for the April and May time period compared to the previous year, as illustrated in **Figure 2-5**.

Figure 2-5



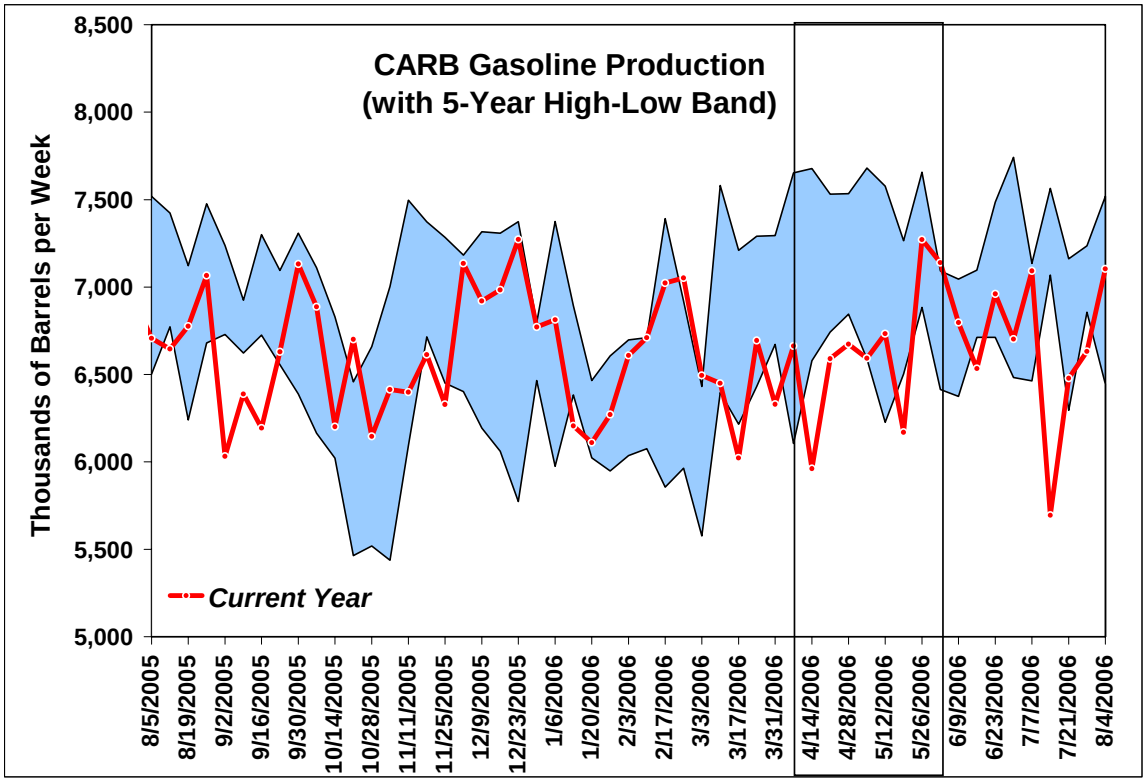
Source: CEC PIIRA database.

While it is apparent that there were a significant number of refinery planned maintenance and unplanned outage events in the first six months of 2006 and during the months of April and May, refinery production and inventory levels must be examined to determine to what extent the unusually high level of unplanned outages may have impacted supply of transportation fuels for the California market.

Refinery Production

Production of CARB gasoline was lower than normal for April. **Figure 2-6** depicts production of gasoline from California refineries over a 12-month period, including high and low range bands for production over the last five years. [This figure and the next seven figures show levels of production, inventory, and pipeline exports and imports. The current year is shown by a solid line and the 5-year high-low band is shown as a shaded area.]

Figure 2-6

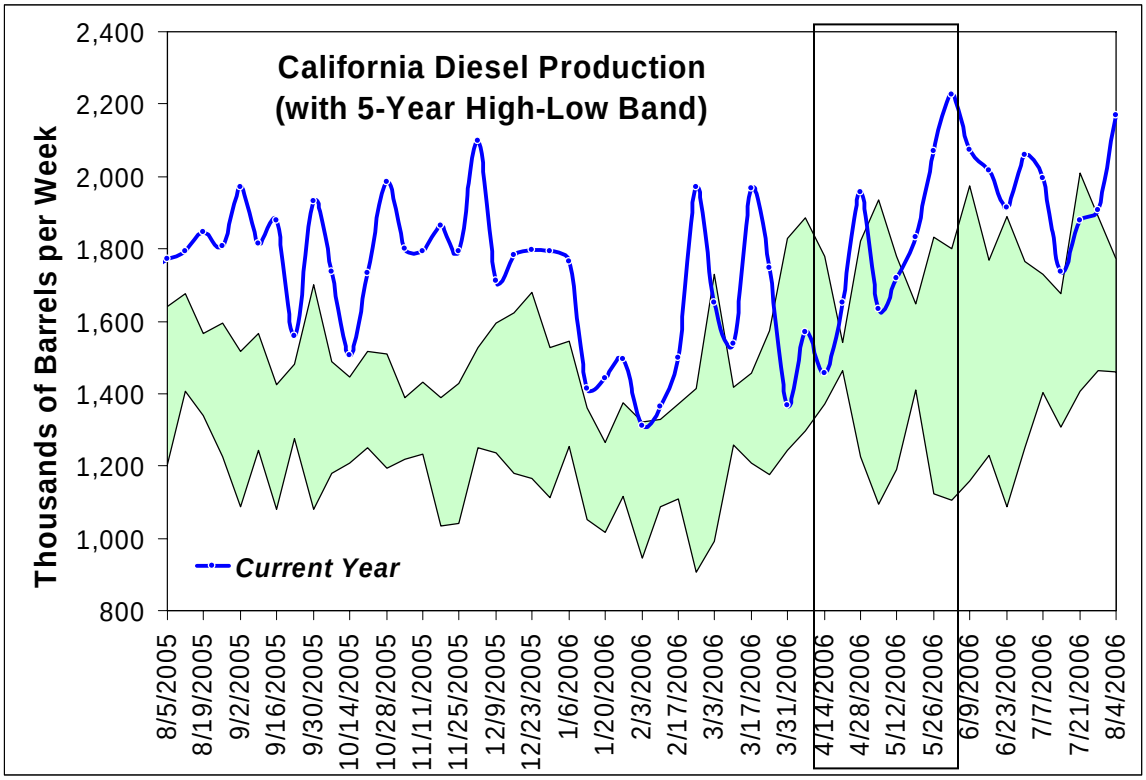


Source: CEC PIIRA database.

Figure 2-6 indicates that gasoline production was lower-than-normal for April 2006, compared to the 5-year high-low. In fact, gasoline production was well below the low range of the five-year band for the weeks ending April 14, 21, and 28. Spot prices for California gasoline peaked on May 2, 2006. Three consecutive weeks of lower-than-normal gasoline production appears to have been a factor that contributed to the formation and magnitude of the April/May price spike for gasoline.

Production of California diesel fuel was examined to determine if output was lower-than-normal. **Figure 2-7** depicts production of diesel fuel from California refineries over a 12-month period, including high and low range bands for production over the last five years. Output of diesel fuel from California refineries was slightly lower-than-normal from the end of March to mid April. Diesel production steadily increased through the rest of April and May 2006. The initial lower production level was likely a contributing factor to the supply of diesel fuel, but less in magnitude compared to that of gasoline.

Figure 2-7

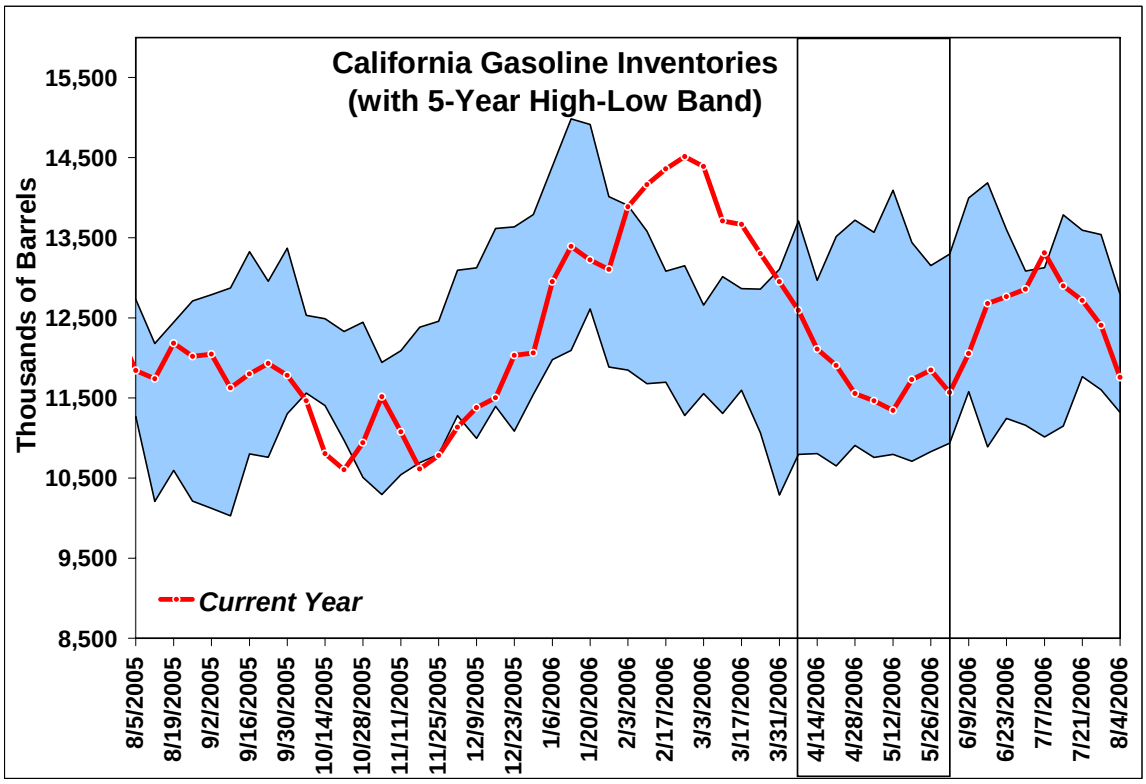


Source: CEC PIIRA database.

Inventories of Gasoline and Diesel Fuel

Inventory of gasoline and diesel fuel can be a contributing factor to price spikes if levels of these petroleum products are at unseasonably low levels or declining during periods of increasing demand. **Figure 2-8** tracks gasoline inventories (a combination of finished gasoline and gasoline blending components) over a 12-month period, including high and low range bands. Gasoline inventories declined through April and May, reaching a low point for the week ending May 12, 2006. Declining inventory levels during March and April are normal as refiners draw upon these inventories as an additional source of supply to compensate for reduced production resulting from planned maintenance. The combination of declining inventories and increasing gasoline demand in conjunction with unplanned outages may have placed additional upward pressure on prices during late April and early May 2006.

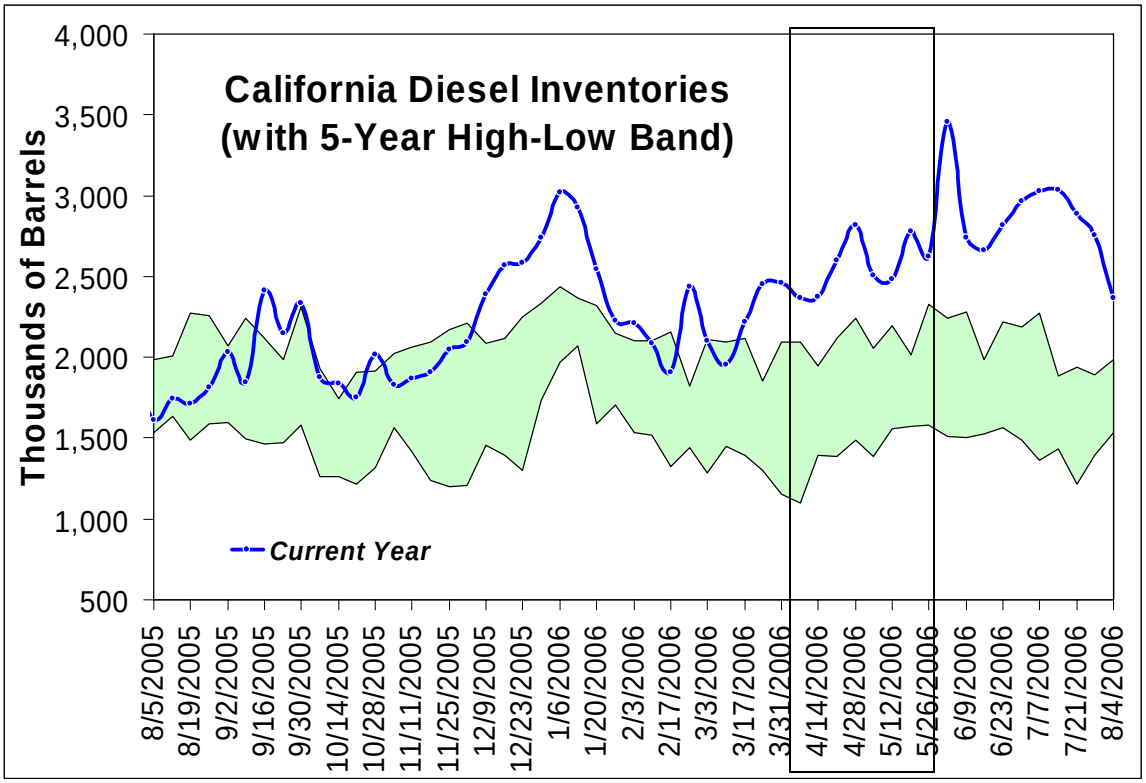
Figure 2-8



Source: CEC PIIRA database.

Unlike gasoline, California diesel fuel inventories showed a significantly different pattern, trending well above the top end of the 5-year high-low band (see **Figure 2-9**). These higher-than-normal inventories may have been the result of California refiners preparing to transition to the new diesel fuel specification (Ultra Low Sulfur Diesel) by June 1, 2006. Refiners may have added to their inventories in advance in case there were any problems with the new refinery equipment installed to help produce the new type of diesel fuel.

Figure 2-9



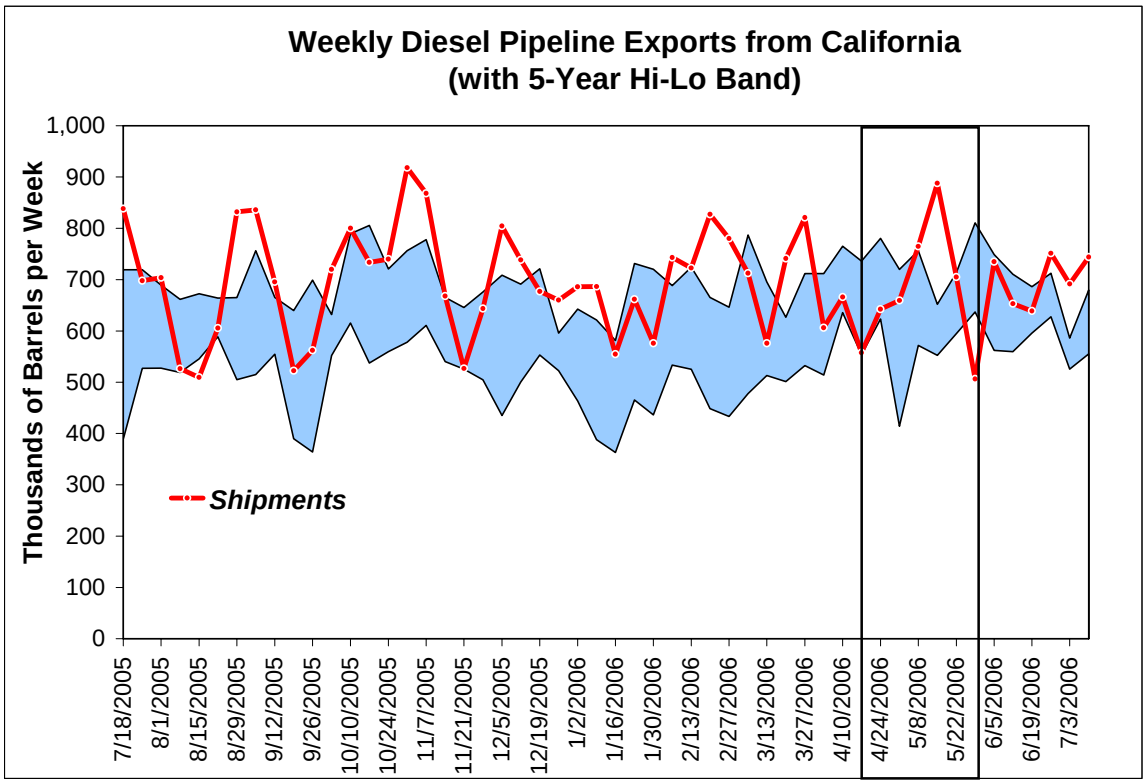
Source: CEC PIIRA database.

Pipeline Exports

Refineries in California produce gasoline and diesel fuel sold in the state and for export to Arizona and Nevada via a petroleum product pipeline operated by Kinder Morgan. Exports of transportation fuels to these two states were examined to determine if deliveries were higher than normal during the period of rapidly increasing California wholesale prices. Although gasoline specifications for California require cleaner fuel than sold in Arizona and Nevada, California refiners use similar types of blending components to produce the various types of gasoline. Therefore, increased pipeline exports of gasoline can contribute to a tighter supply of gasoline and place upward pressure on wholesale prices in California. Exports of gasoline and diesel fuel to these neighboring states were to meet contractual supply obligations.

Figure 2-10 details weekly gasoline exports via the Kinder Morgan pipeline systems to Nevada and Arizona. The weekly exports are depicted against a five-year band of historical flows for each week of current data.

Figure 2-10

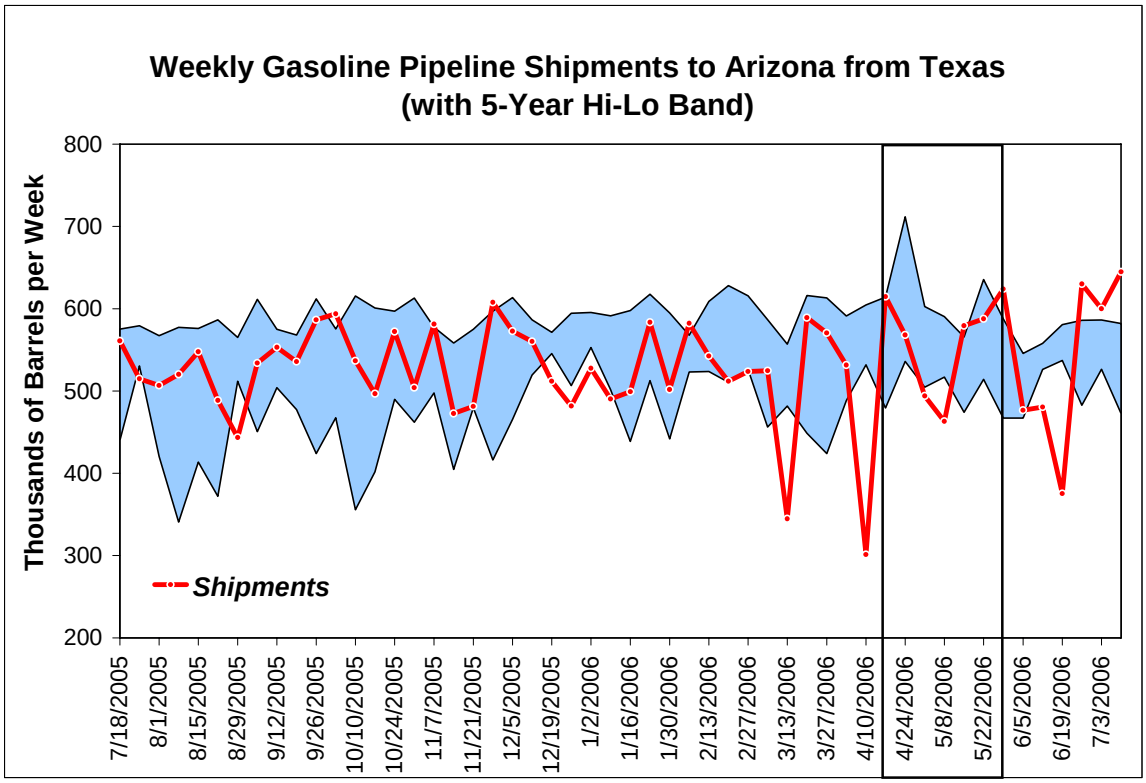


Source: CEC PIIRA database.

Gasoline shipments to Las Vegas, Reno, and Phoenix, from April 17 through May 8 were above the five-year historical maximum for that same time period. These higher-than-normal pipeline exports of gasoline appear to be a factor contributing to the wholesale price spike in April and May 2006.

Arizona also receives gasoline and diesel fuel from refineries in West Texas and New Mexico. **Figure 2-11** depicts pipeline shipments on Kinder Morgan's East Line. The gasoline shipments on the East Line declined through the last portion of April and into early May 2006.

Figure 2-11

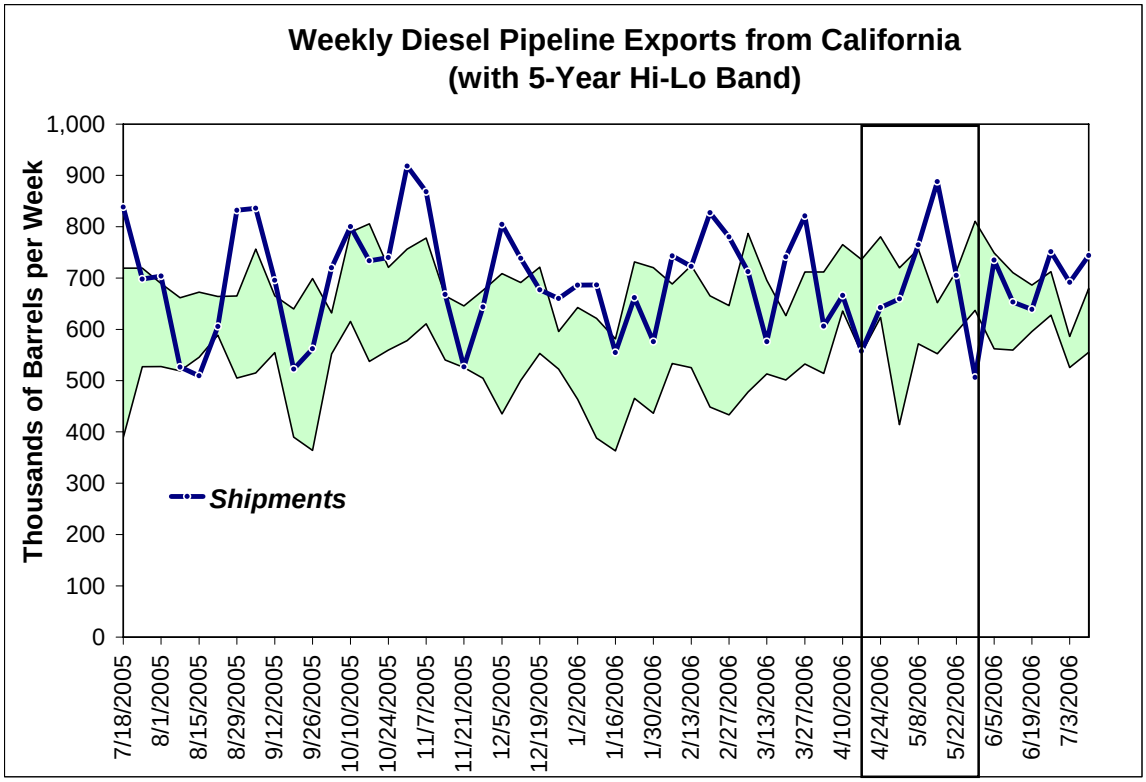


Source: CEC PIIRA database.

The reason for the decreasing gasoline shipments into Arizona from the East Line is unknown. It is possible that refineries operating in West Texas and New Mexico were undergoing planned maintenance or experienced an unplanned outage that reduced production. The Energy Commission does not have the authority to collect gasoline and diesel fuel production information from refineries operating in New Mexico and Western Texas.

Figure 2-12 details similar data for diesel fuel movements out of state. Similar to gasoline, diesel exports were higher than average and trended above the 5-year historical averages for 3 weeks in May 2006.

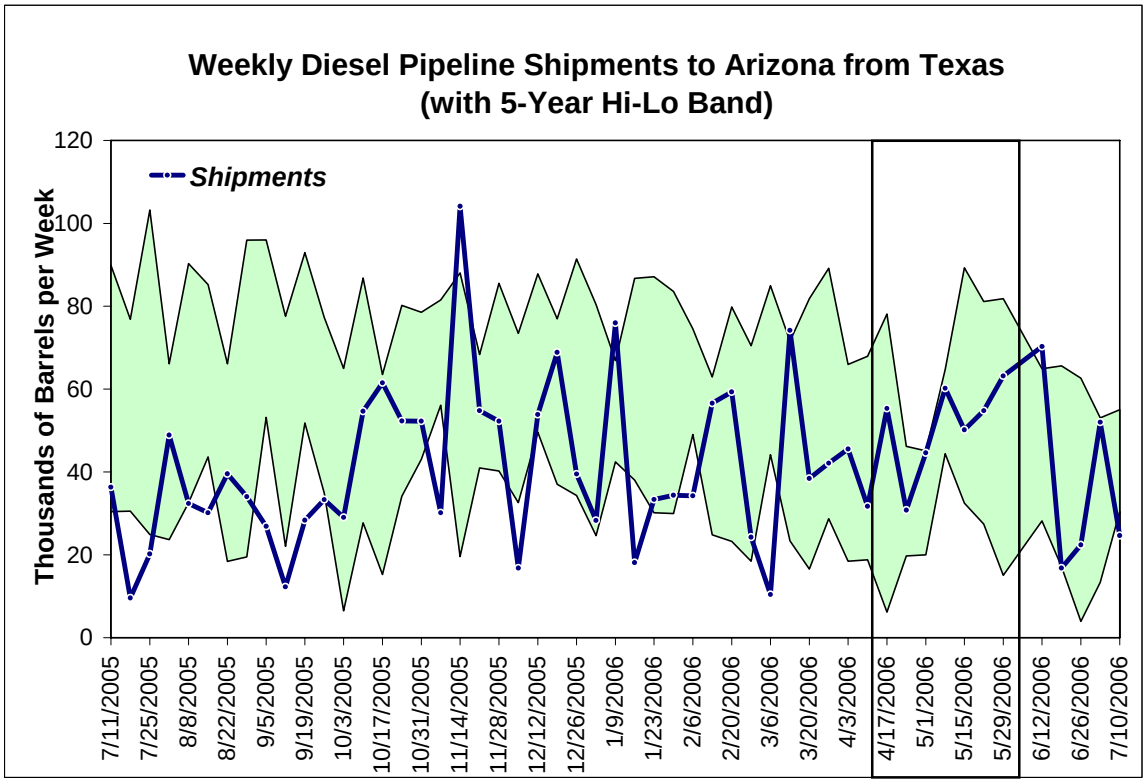
Figure 2-12



Source: CEC PIIRA database.

The higher-than-normal exports of diesel fuel to Arizona and Nevada during the latter portions of April, continuing into mid-May were a contributing factor to the wholesale price spike for diesel fuel. **Figure 2-13** tracks diesel fuel shipments into Arizona from the East Line. Since the average diesel shipments are usually small, large swings from one week to the next are far less significant when compared to gasoline shipments from the East Line. The reason for the decreased diesel shipments into Arizona from the East Line is unknown.

Figure 2-13



Source: CEC PIIRA database.

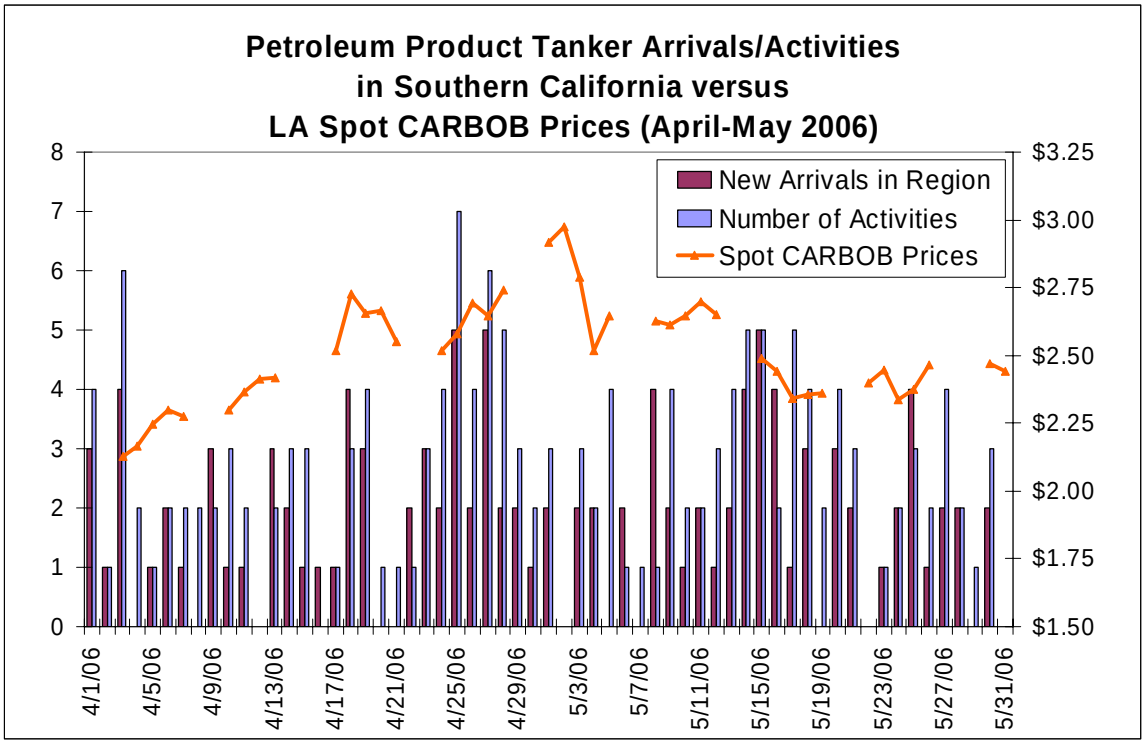
Port Congestion

California depends on imports of refined products to help balance out local production with demand since refiners do not produce enough gasoline and diesel fuel to be self-sufficient. The level of imports can vary from one month to the next depending on the scope of planned maintenance projects and the frequency of unplanned refinery outages. Regardless of the circumstances surrounding the need to import refined products into California, refiners and other importers require adequate petroleum infrastructure to accommodate their marine vessels (wharfs or berths) and sufficient time to dock and unload their cargo of gasoline or diesel fuel.

During certain periods of time, the activity at marine petroleum import facilities can increase, delaying the ability of an importer to deliver their refined product supplies. If this occurs, petroleum marketers who were depending on the cargo from the marine vessel to help meet some of their California contractual supply obligations must seek temporary supplies from other sources that can result in an increased level of spot pipeline purchasing activity. To analyze potential congestion of petroleum marine infrastructure, data on petroleum product tanker marine vessel arrivals and activities (discharging of petroleum cargoes) was compared to determine if increased activity levels could have temporarily congested marine terminal activity to the extent that spot prices for gasoline were impacted. **Figure 2-14** depicts activity in San Pedro Harbor for

deliveries of petroleum products during April and May 2006. Just before the peak spot price for gasoline, the marine berths experienced an increase in vessel activity. For example, the largest independent petroleum marine import terminal (Berth 118 operated by Kinder Morgan) was particularly congested during April 25 - April 29, receiving five different product tankers in five days. All of theses vessels were delivering gasoline and two of the vessels experienced unloading delays of two to three days each. This increased level of congestion in San Pedro Harbor is believed to have temporarily delayed the timely delivery of gasoline supplies for Southern California, placing upward pressure on wholesale gasoline prices. Increased port congestion in Southern California was a factor contributing to the price spike.

Figure 2-14



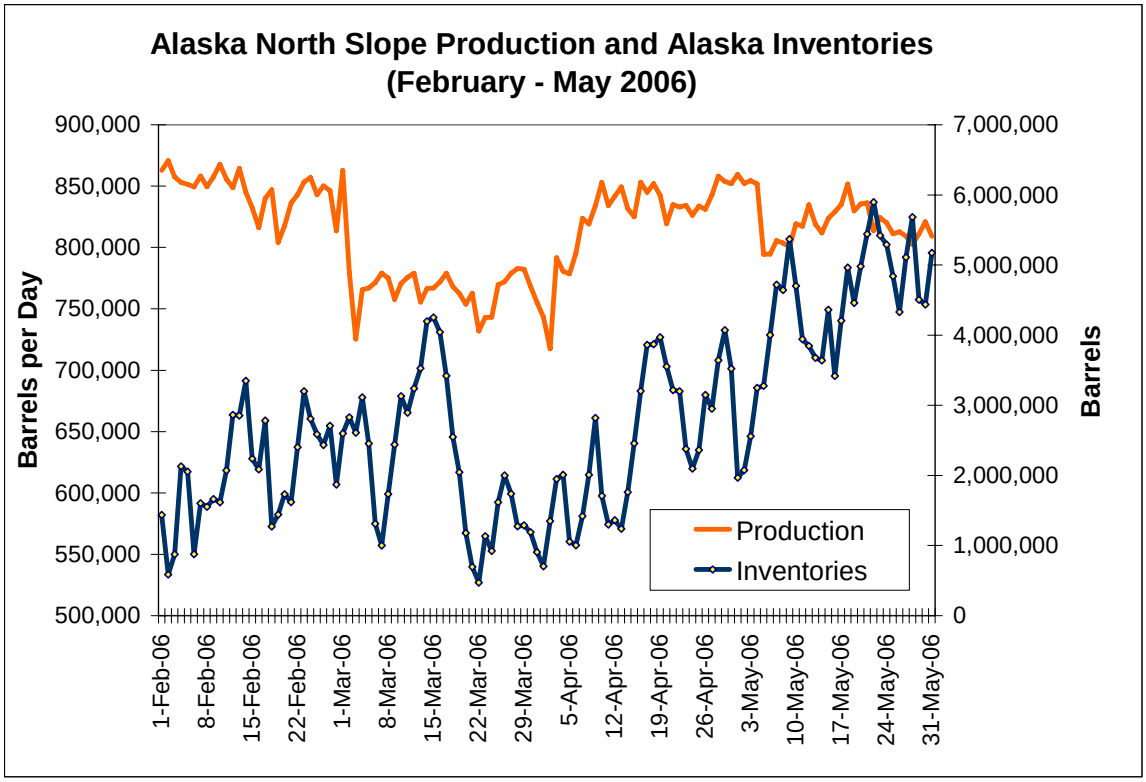
Source: CEC analysis of Marine Exchange of Southern California data.

Alaska North Slope Oil Pipeline Leak – March 2006

In early March 2006, production of crude oil in Greater Prudhoe Bay, Alaska was reduced by the temporary closure of a portion of the crude oil pipeline operated by BP Exploration. A spill of approximately 270,000 gallons of crude oil caused the temporary shut down. After a bypass of the leaking pipeline was completed, crude oil production was restored to normal levels.

Figure 2-15 shows the production and inventory levels for Alaska North Slope (ANS) crude oil from February through May 2006. The temporary decline in crude oil production was roughly 100,000 barrels per day for a period of five weeks.

Figure 2-15



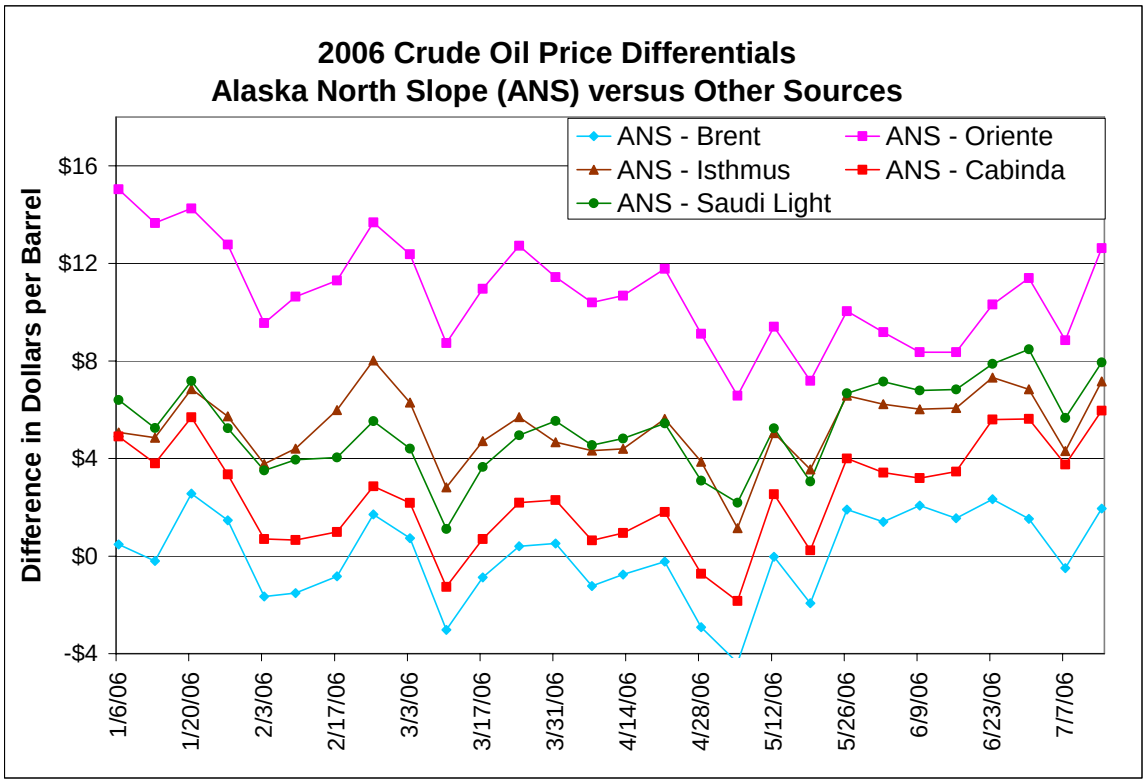
Source: Alaska Department of Revenue

[It should be noted that the August 2006 closure of a portion of the Greater Prudhoe Bay operations that has reduced crude oil production by approximately 200,000 barrels per day could not be a factor that contributed to the April/May price spike.]

A potential factor that may have contributed to the price spike was whether the temporary ANS crude oil production decline in March 2006 resulted in a loss of crude oil supply for California refineries that may have impacted their production of gasoline and diesel fuel. To determine if supplies of Alaska crude oil were temporarily constrained, the price of Alaska crude oil was compared to the prices of other crude oils to see if the ANS prices spiked for a significant period (several weeks or longer) of time. If so, a prolonged increase for ANS prices relative to other types of crude oils could be an indication of constrained Alaska supplies.

Figure 2-16 lists five alternative crude oil price differentials to ANS crude oil between January and July 2006.

Figure 2-16



Sources: Wall Street Journal for ANS prices, Platt's for other crude oil values.

There is only a one-week period in early March 2006 when ANS prices dropped by $4 per barrel relative to the other types of crude oils. Other than this minor and brief fluctuation, the temporary loss of crude oil production in Greater Prudhoe Bay during March 2006 does not appear to have increased prices of ANS crude oil or been a factor that contributed to the California price spike.

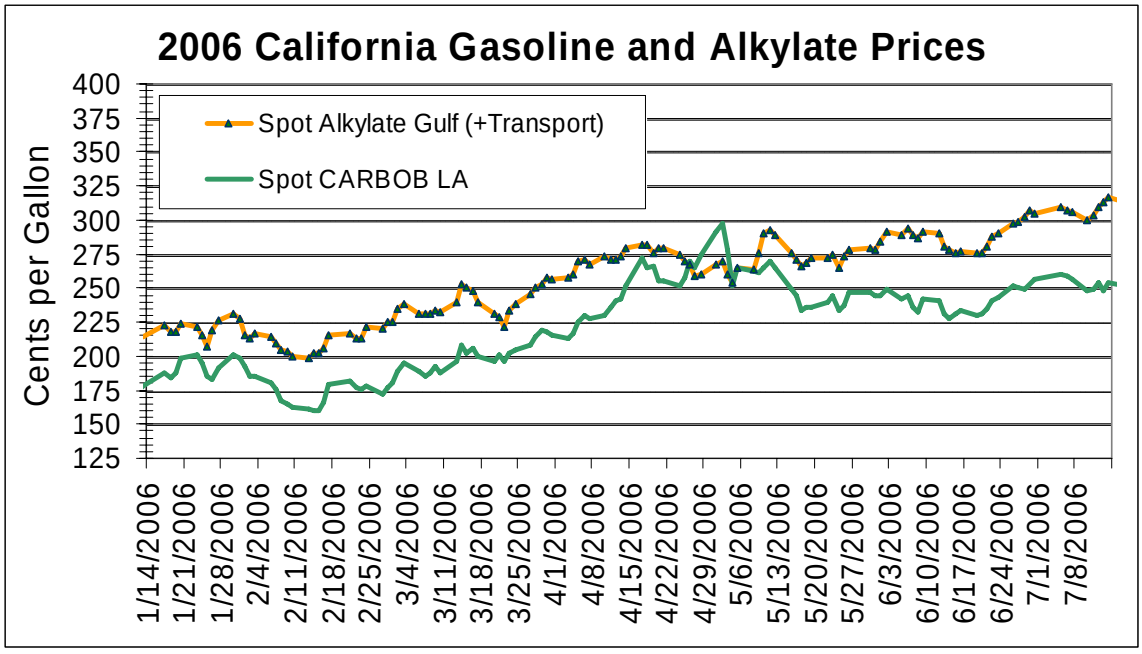
Transition to New Fuel Specifications

Another potential factor that may have contributed to the spring 2006 price spike was a transition to new fuel specifications that could have temporarily constrained supplies. Two fuel specification transitions occurred in early and late spring 2006. The first one occurred in other states. It was a reduction and elimination of a gasoline blending component (methyl tertiary butyl ether or MTBE) in favor of ethanol. The voluntary transition away from MTBE began in early April and resulted in a temporary jump in the demand for ethanol as a replacement for MTBE. Spot prices for ethanol spiked in the northeast United States and Texas as marketers scrambled to acquire sufficient ethanol supplies to meet their gasoline blending needs. Although California uses nearly one quarter of all the ethanol consumed in the United States, almost all of its ethanol supply is under long-term contracts (six months). Therefore it is unlikely that the recent spike in

spot ethanol prices had an appreciable impact on California gasoline prices since very little ethanol is purchased on the spot market for use in this state.

The transition away from MTBE throughout the rest of the United States had an impact on demand and prices for another type of gasoline blending component that is also used by California refiners, referred to as alkylate. **Figure 2-17** tracks alkylate and California gasoline prices during 2006. Since late March and early April, alkylate prices have increased by approximately 75 cents per gallon. These increased alkylate prices do not appear to have been a factor that contributed to the price spike, but the growing differential in California gasoline prices may be a factor that is placing upward pressure on gasoline import prices, helping to sustain this price spike over a longer period of time.

Figure 2-17



Sources: OPIS for spot CARBOB prices in Los Angeles and Platt's for Gulf Coast alkylate values.

The second fuel specification transition occurred during the late spring 2006. Refiners began producing a new type of diesel fuel on June 1, 2006. Referred to as Ultra Low Sulfur Diesel (ULSD), the new specifications required that the sulfur content of on-road diesel fuel not exceed a level of 15 parts per million (ppm). Even though the production of ULSD was not required until after the wholesale price spike had occurred, it is possible that the apparent high level of diesel fuel inventory in California was in large part stockpiled in advance of the transition to the ULSD and held in reserve by some refiners. The extra supply was insurance in case of a startup problem with the changes made to produce the ULSD.

The transition to ULSD and commensurate stockpiling of additional diesel inventories to be held in reserve may explain why the Energy Commission identified fewer factors

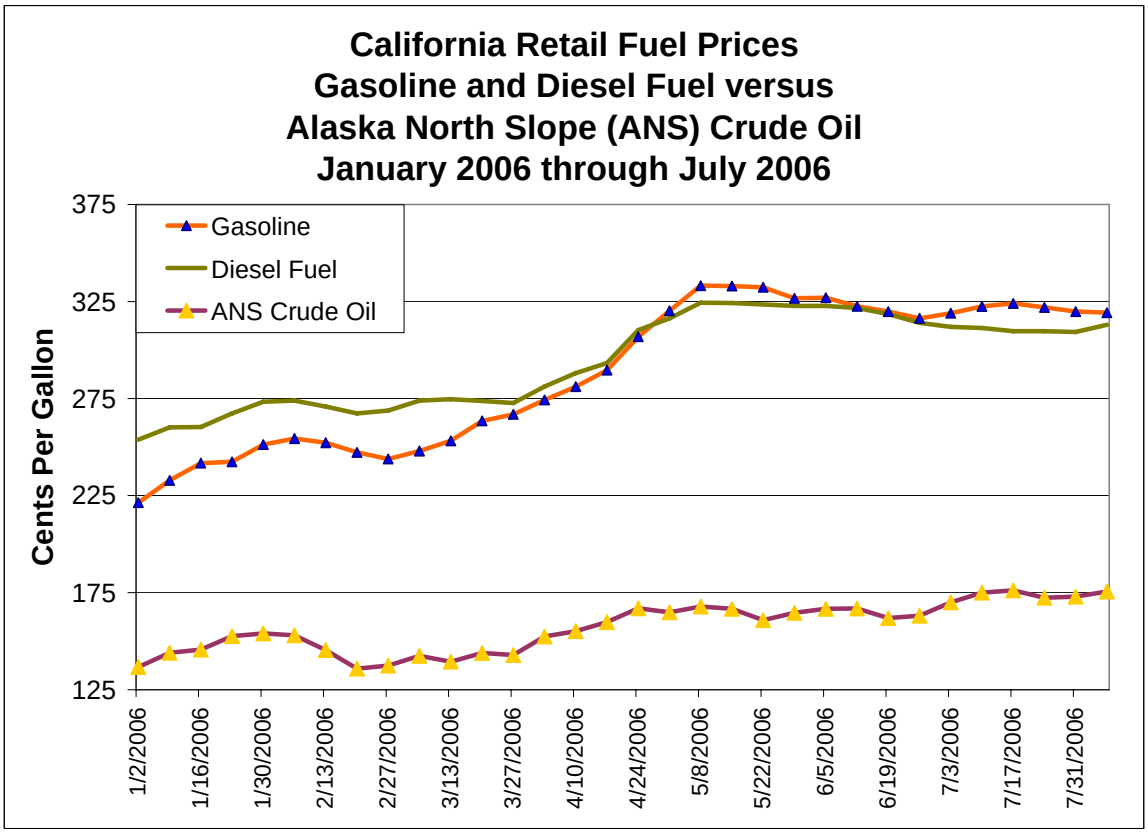
contributing to the price spike for diesel fuel in California when compared to gasoline. Unfortunately, no mechanism exists to verify to what extent California refiners held higher-than-normal inventories of diesel fuel as preparation for a possible supply problem during the transition to ULSD in early June.

Chapter 3 – Economic Impacts

Direct Economic Impact on California Consumers and Business

Between April 17 and May 8, 2006, the price spike in California increased retail prices for gasoline and diesel fuel by 44 and 33 cents per gallon, respectively. Approximately 8 cents per gallon of these retail price increases was due to the rising cost of crude oil during this three-week period. **Figure 3-1** depicts retail prices since the beginning of 2006 compared to crude oil prices.

Figure 3-1

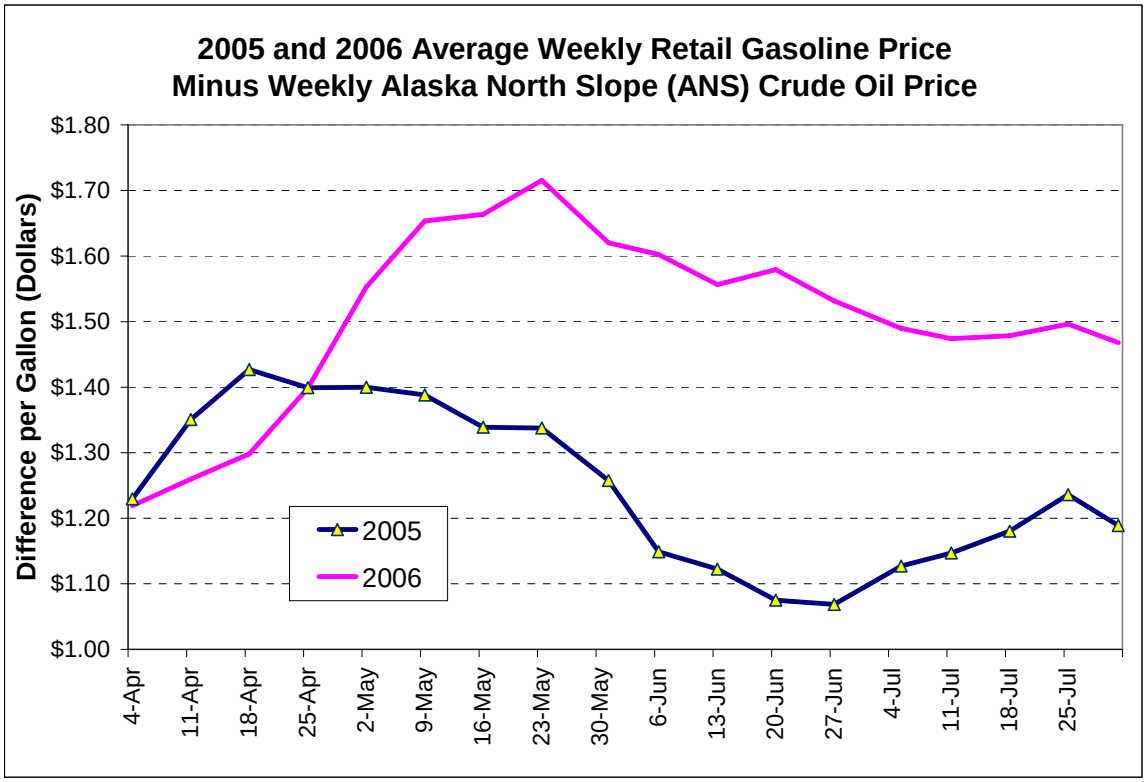


Source: Energy Information Administration (EIA) – California retail prices.

To estimate the primary economic impact on consumers, retail prices from late April through July 2006 were examined in relation to retail prices during the same time in 2005, and adjustments were made to reflect the differences in the cost of crude oil and increased sales taxes from increased crude oil prices.[6]

Figure 3-2 illustrates the retail prices (less crude oil cost) for the same four months of 2005 and 2006. The area between the 2006 and 2005 price lines is additional costs to consumers associated with the spring 2006 price spike. **California consumers paid over $1.3 billion more for gasoline from May 1 through July 31 as a result of the price spike**.

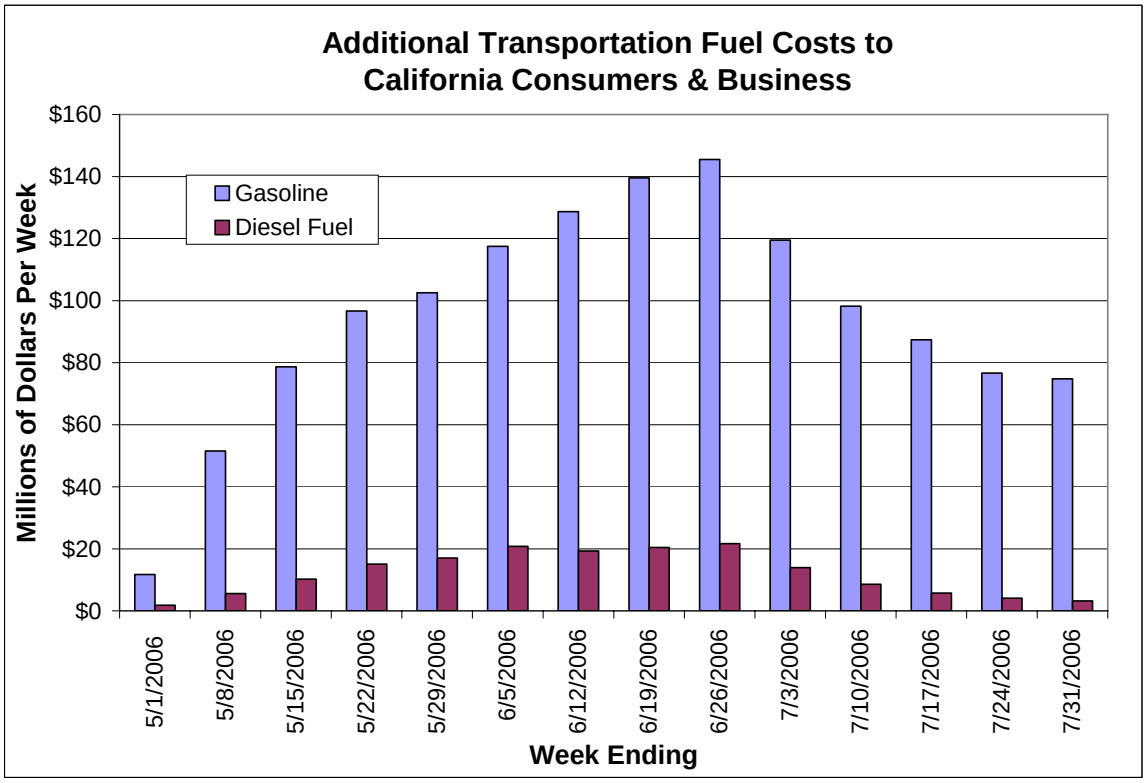
Figure 3-2



Sources: Energy Information Administration (EIA) – California retail prices. CA BOE – taxable gasoline fuel sales. Alaska crude oil prices – Wall Street Journal.

The same approach was used to estimate the additional cost of diesel fuel for farmers, truckers, and other businesses that depend on diesel fuel. These businesses are estimated to have paid **an additional $170 million for diesel fuel as a direct result of the price spike** in the spring of 2006. **Figure 3-3** depicts the weekly incremental costs to California consumers and businesses. The peak for gasoline was the week ending June 26, 2006, with an incremental cost of approximately $145 million for California's motorists.

Figure 3-3



Sources: Energy Information Administration (EIA) – California retail prices. CA BOE – taxable gasoline and diesel fuel sales. Alaska crude oil prices – Wall Street Journal.

No attempt was made to quantify secondary costs for the California economy as a whole that occur when increased transportation costs are passed to consumers in the form of higher priced goods and services. But the following section includes analysis of retail prices and their impacts on various income classes and types of businesses.

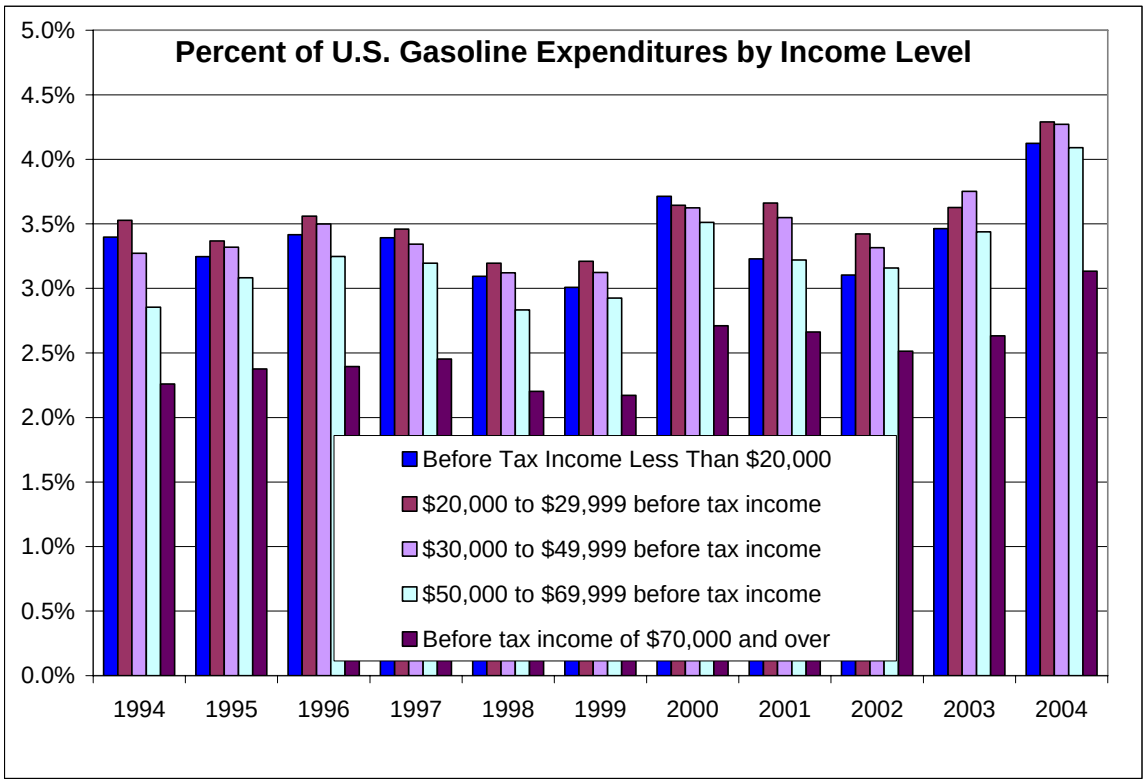
Impact of High Transportation Fuel Prices to California Consumers

The elevated retail gasoline prices seen between May 1 and July 31, 2006, impacted consumers and businesses in the state. The extent of the impact is dependent on many factors. Some of these factors include income, place of residence, proximity to work, age, family size and composition, type of commute vehicle, and availability of other affordable modes of travel.

The percentage of income spent on transportation costs rose substantially for low income families while high income families saw a relatively minor impact from the additional cost of fuel. These relative changes in consumer expenses represent varying degrees of economic difficulty experienced by California residents. As an example, in 2004, gasoline expenditures varied from 4.3 percent in low and medium income

households to 3.1 percent in high income households. **Figure 3-4** shows the breakdown of the percent of gasoline and motor oil expenditures in the U.S. by household income categories. This information is the most recent and complete set of data available to enable thorough analysis of increased fuel costs and impacts on various segments of the economy.

Figure 3-4



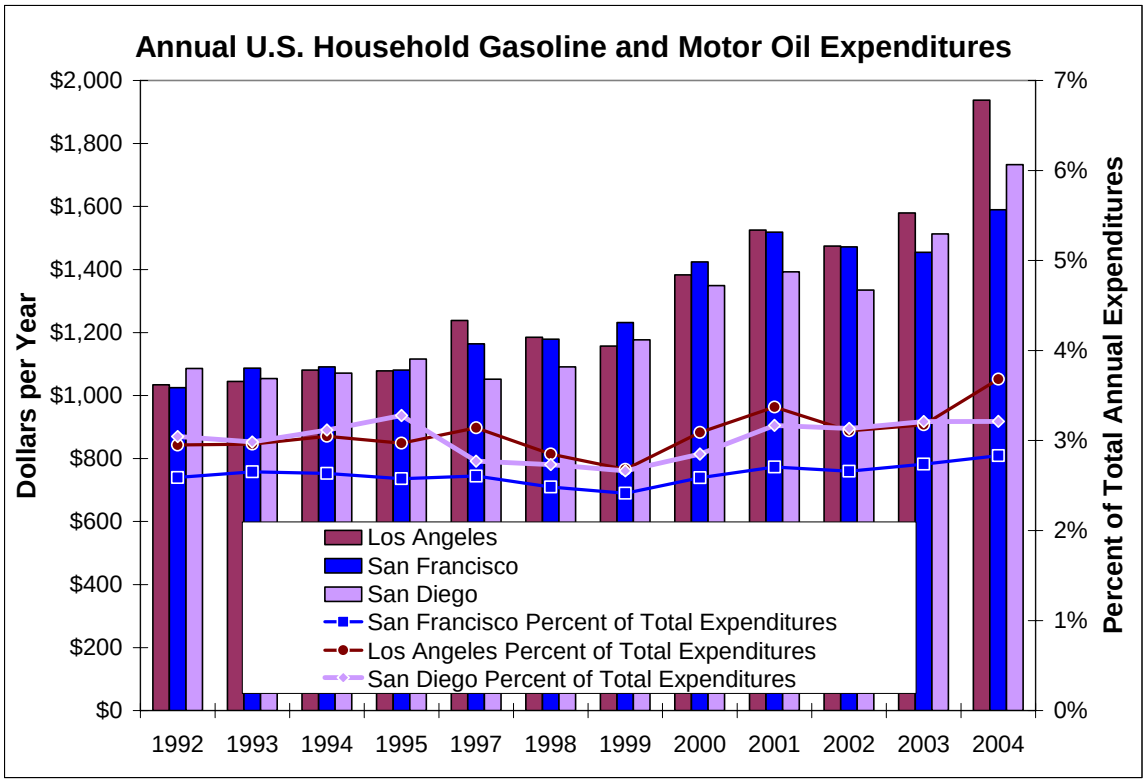
Sources: Bureau of Labor Statistics (BLS), Consumer Expenditure Survey, and Metropolitan Statistical Area Tables.

The annual average household expenditures exceed pre-tax income for all households with incomes less than $30,000 per year according to the 2004 Consumer Expenditure Reports from the Bureau of Labor Statistics. This indicates that the impact on low and moderate income households is much greater than the relative percentages shown in **Figure 3-4**. On average, each incremental increase in cost will increase debt, deplete savings, or require government assistance in these income groups.

Another factor in the variability of household expenditures is location. Total vehicle miles traveled (VMT) in rural areas tend to be higher than in urban areas. In 2004, the average annual rural VMT per capita was 21,400 miles versus 7,900 miles in urban areas.[7]

The density of population and the availability of public transit also greatly influence driving behavior. **Figure 3-5** shows the annual average gasoline expenditures and percent of spending for three major metropolitan statistical areas (MSAs) in California.

Figure 3-5



Sources: Energy Information Administration, National Household Transportation Survey, BLS, U.S. Census, California Board of Equalization, Motor Gasoline Taxable Sales Volumes.

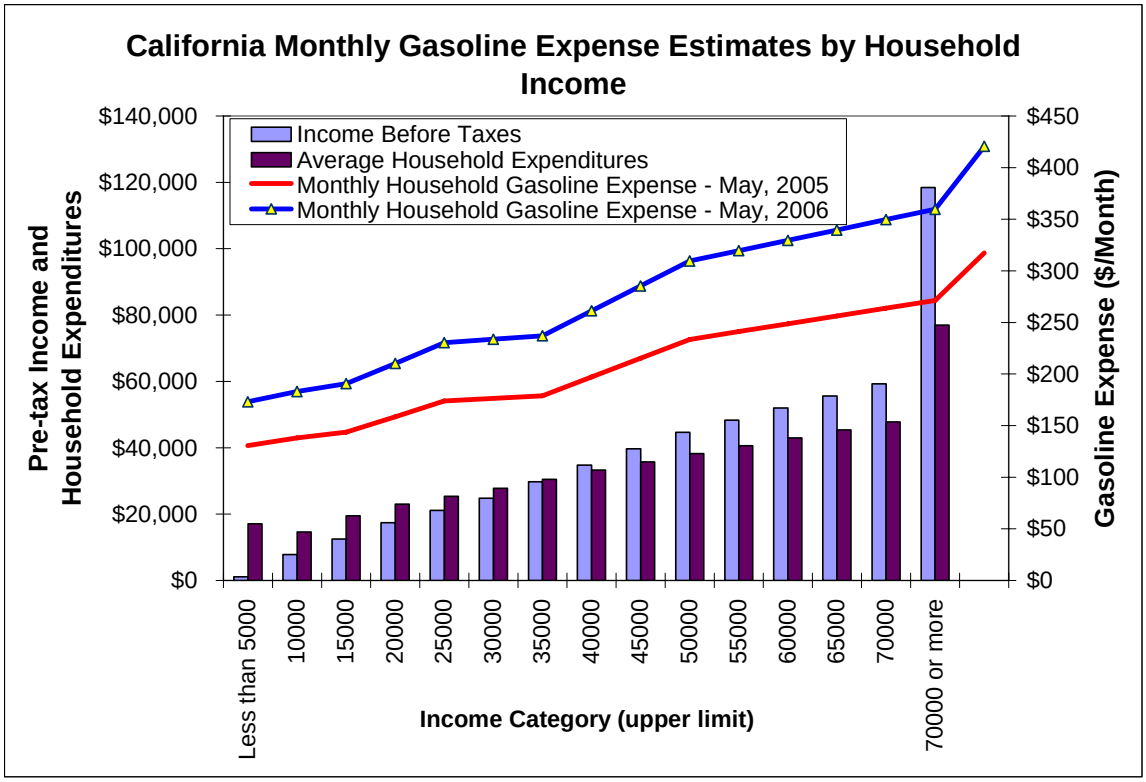
Census figures from 2000 list the population density of San Francisco as 16,634 people per square mile, second only to New York City.[8] San Francisco also has an extensive public transit infrastructure and is ranked 12th in the nation by the American Public Transportation Association (APTA).[9] Thus, the lower annual expenditure on gasoline can be expected in San Francisco. **Figure 3-4** also represents the Los Angeles MSA, which includes Los Angeles, Ventura, Riverside, and San Bernardino counties. Los Angeles has made significant improvements to public transit systems and urban planning, yet the area has a lower population density and public transit is not as available outside of the city boundaries. Thus, expenditures are higher in the Los Angeles MSA than in San Diego and San Francisco.

Although this report focuses on late April and early May 2006, retail prices in May remained elevated in California relative to U.S. prices. In May 2005, the monthly average retail price of regular gasoline was $2.48 per gallon as compared to $3.29 per gallon in May 2006, an increase of 81 cents.

This increase in gasoline expenditure should be displaced by a reduction in expenditures of other goods and services. This will typically come from discretionary income or savings in middle and higher income households. Families closer to the poverty level will need to reduce spending on essential product and services. The inability to afford commute costs will result in some loss of employment.

Figure 3-6 estimates monthly gasoline expenditures in May 2005 and 2006. Total pretax income and average yearly household expenditures are also shown to gain a sense of how gasoline expenditures factor into yearly household budgets.[10]

Figure 3-6

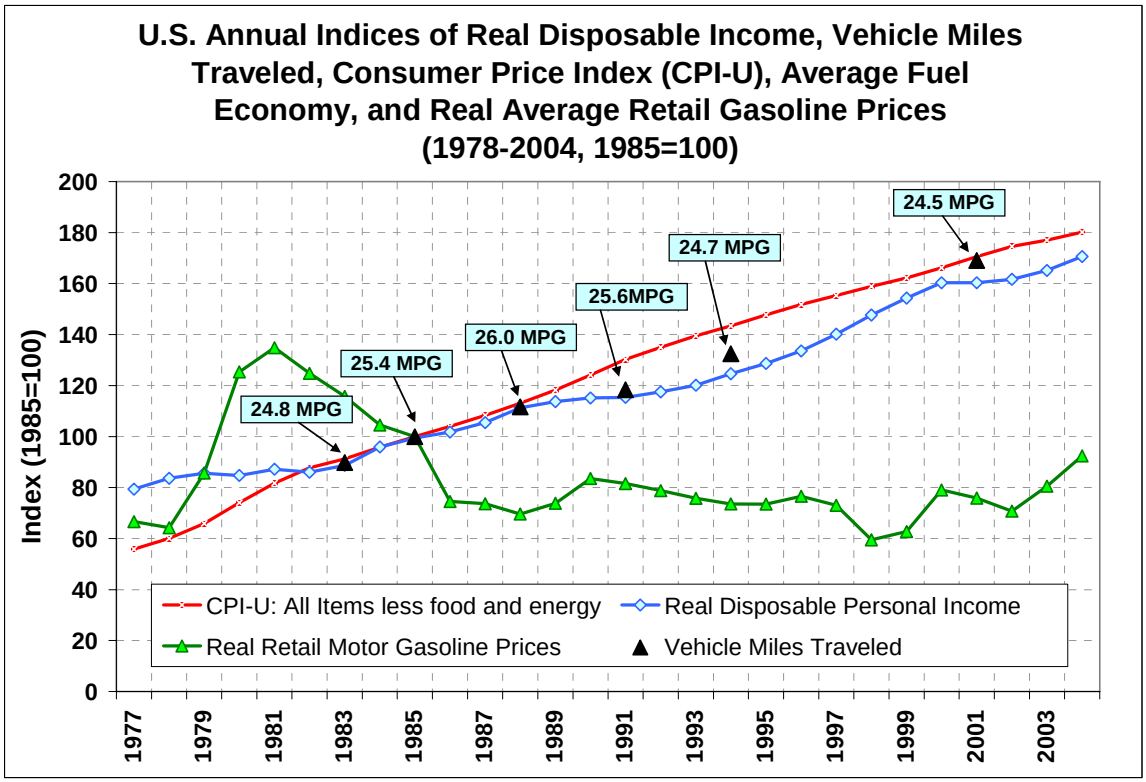


Source: Energy Information Administration (EIA), National Household Transportation Survey (NHTS), BLS, U.S. Census, California Board of Equalization, Motor Gasoline Taxable Sales Volumes.

In 2004, over 4 million households in California had an income levels less than $35,000 per year. These households, on average, have higher expenditures than income, so high fuel prices greatly impact their quality of life and monthly budgets.

The Energy Information Administration (EIA) asserts that 99 percent of the change in VMT in the United States can be attributed to changes in discretionary income. These two metrics have tracked very closely since 1978. **Figure 3-7** shows real disposable income, VMT, the consumer price index, and real average gasoline prices from 1978 through 2004.

Figure 3-7



Sources: Energy Information Administration (EIA), National Household Transportation Survey (NHTS), and Bureau of Labor Statistics (BLS).

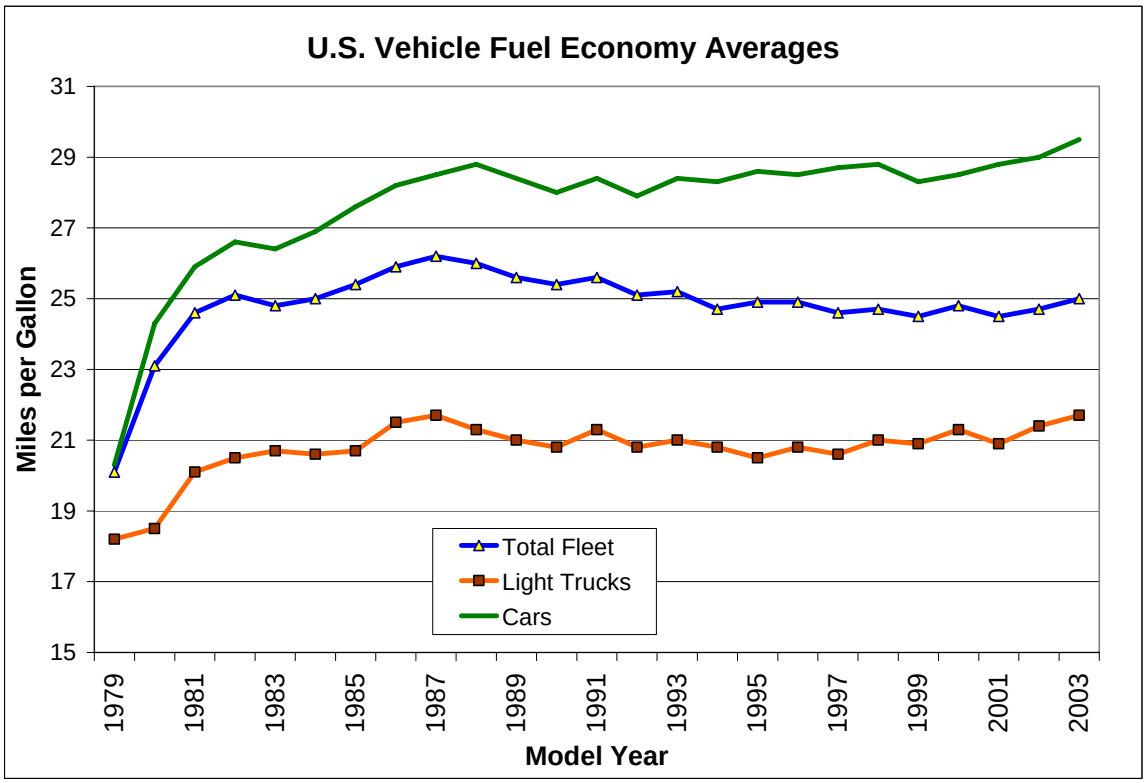
This correlation between VMT and disposable income indicates that other characteristics such as fuel prices, vehicle fuel economy, and vehicle ownership patterns are relatively insignificant in the short-term. These other factors tend to influence long-term trends. Vehicle purchases are spread across several years. Essential driving to work, school, and the grocery store tends to remain constant in the short-term. Essential driving comprised approximately 73 percent of total driving in the U.S in 2001. The amount of disposable income directly determines the additional VMT accrued by recreational or non-essential driving.

This correlation further indicates that recent trends toward increased Sport Utility Vehicles (SUVs) purchases reflect higher disposable income levels, making SUVs relatively affordable and reinforcing the market appeal of these higher cost vehicles.

The time period of study shown in **Figure 3-7** represents periods of increasing vehicle fuel economy seen in the early 1980s as well as periods of relatively flat or declining fuel efficiencies seen from 1987 to 2001 because of growing popularity of SUVs. Because fuel costs during this time period were below 4 percent of the total average expenditures per family, fuel price signals had little impact on consumer behavior.

Figure 3-8 shows the fuel economy of personal vehicles sold in the U. S. since 1979. The total fleet fuel economy is weighted by sales volumes of vehicle makes and models in each year.

Figure 3-8

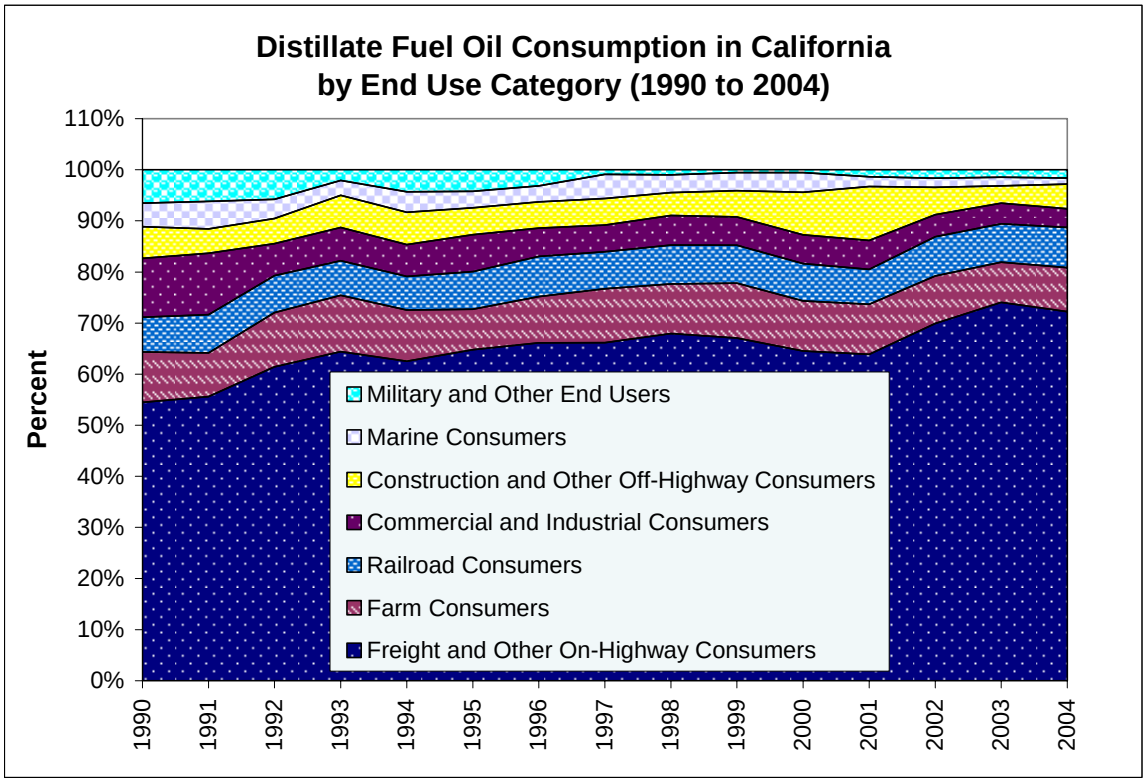


Source: U.S. Department of Transportation, National Highway Traffic Safety Administration.

Impact of High Transportation Fuel Prices to California Businesses

While freight fuel consumption comprises approximately 72 percent of diesel use in the state, other industries such as farming and construction are also impacted by higher fuel prices. **Figure 3-9** shows the percent of diesel consumption in California by end use category from 1990 to 2004.

Figure 3-9



Source: Energy Information Administration (EIA), Sale of Distillate Fuel by End Use.

The high gasoline, diesel and jet fuel prices seen in the spring of 2006 as well as rising prices over the last three years have impacted businesses in the state. Businesses involved in the transport of people and goods have experienced the greatest increases in operating costs. The American Trucking Association estimates that fuel cost can comprise as much as 25 percent of the total operating cost of a heavy duty freight hauler.[11] Independent trucking companies have experienced the most severe impact from high fuel price. According to the Owner-Operator Independent Drivers Association, independent truckers are less able than large carrier companies to impose fuel surcharges. They also do not get the benefit of large volume diesel discount contracts. The rise in diesel prices over the last few years directly correlates with the number of heavy-duty truck repossessions. The independent trucker who cannot absorb additional fuel costs will either go out of business or lease their services to the large carrier companies.[12]

Many California businesses try to offset increasing fuel costs with fuel surcharges or increases in the final price of their services. As an example, FedEx adds a surcharge of 20.9 percent for loads of less than 20,000 pounds with a diesel price of $3.00/gallon. For every 2 cent increase in the price of diesel, the surcharge is increased by 0.2 percent.[13] Many of these additional costs to shipping and transit can be passed on to the consumer in the form of higher prices. The overall magnitude of these price increases is reflected in the consumer price index (CPI). The weight of transportation fuel on the CPI as of 2004 is 3.969.[14]

In 2002, California's 79 thousand farms and ranches had an estimated market value of products of over $25 billion, accounting for 12.8 percent of the total value of products in the U.S.[15] The cost of production and distribution of farm products represents a significant component of California's economy. In 2002, fuel costs on average accounted for 3 percent of the total operating cost for farms in the state. The percent of fuel use by individual farms varies according to the planting, irrigation, and harvesting practices required for the individual crop. The percentage of the total operating cost attributed to fuel consumption on farms has increased since 2002. This cost continues to be a concern to farmers and ranchers throughout the state.

Another fuel intensive industry in the state is passenger airlines and air freight services. Jet fuel prices have increased along with gasoline and diesel prices over the last few years. As a result, airfares and air freight surcharges have increased throughout the industry.

While transportation fuel costs account for a small percent of overall economic indicators, rising prices have affected the operating cost of many essential businesses in the state.

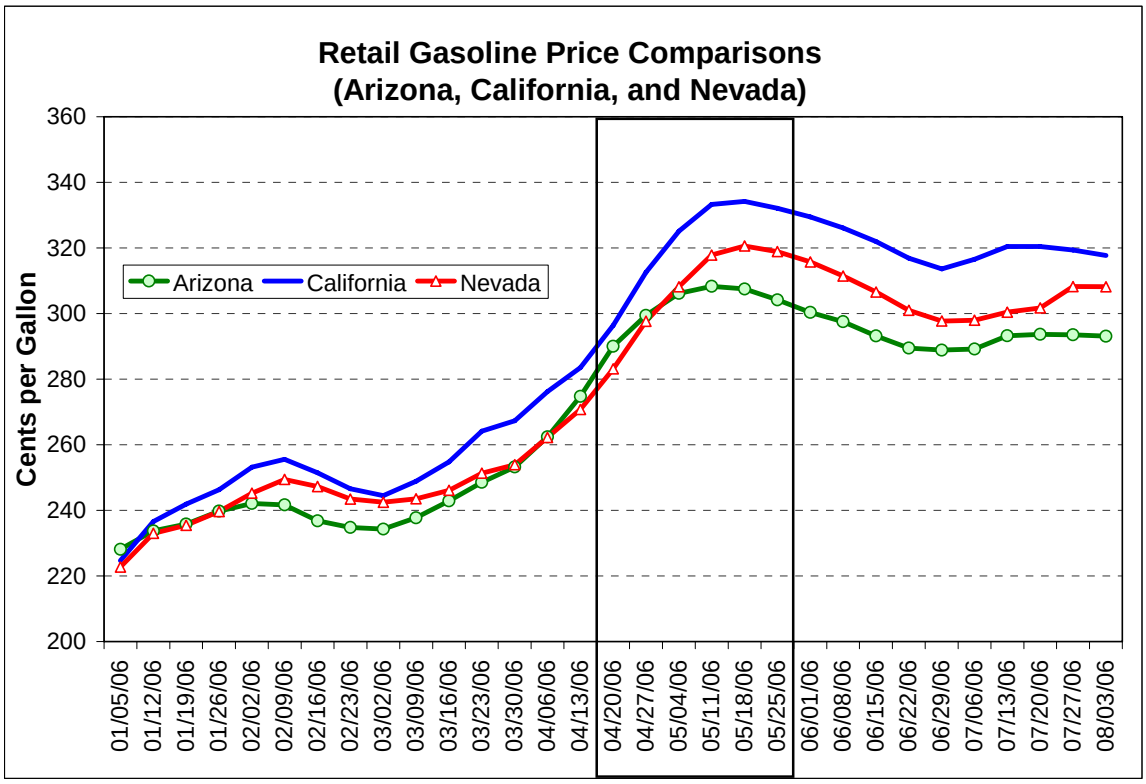
Chapter 4 – Regional Extent of the Spring Price Spike

Regional Price Comparison – Western States

The Energy Commission analyzed gasoline prices for 12 western states to examine if the high prices experienced in late April 2006 were isolated to California. (The states also included Montana, Colorado, Hawaii, and Alaska). The Energy Commission relied on weekly wholesale and retail price data purchased from the Oil Price Information Service (OPIS). The Energy Commission does not have access to similar data concerning diesel fuel prices for the western states. As a consequence, regional diesel fuel price comparison analysis was not performed as part of this report.

After reviewing the gasoline pricing information from April 20 through May 8, it was determined that all 12 states had elevated retail gasoline prices over that time. But the states that have a greater dependence on supplies from California refineries exhibit a closer price relationship. The first comparison involves Arizona and Nevada that are primarily supplied by refineries located in California. **Figure 4-1** illustrates the average gasoline retail prices in Arizona, California, and Nevada.

Figure 4-1



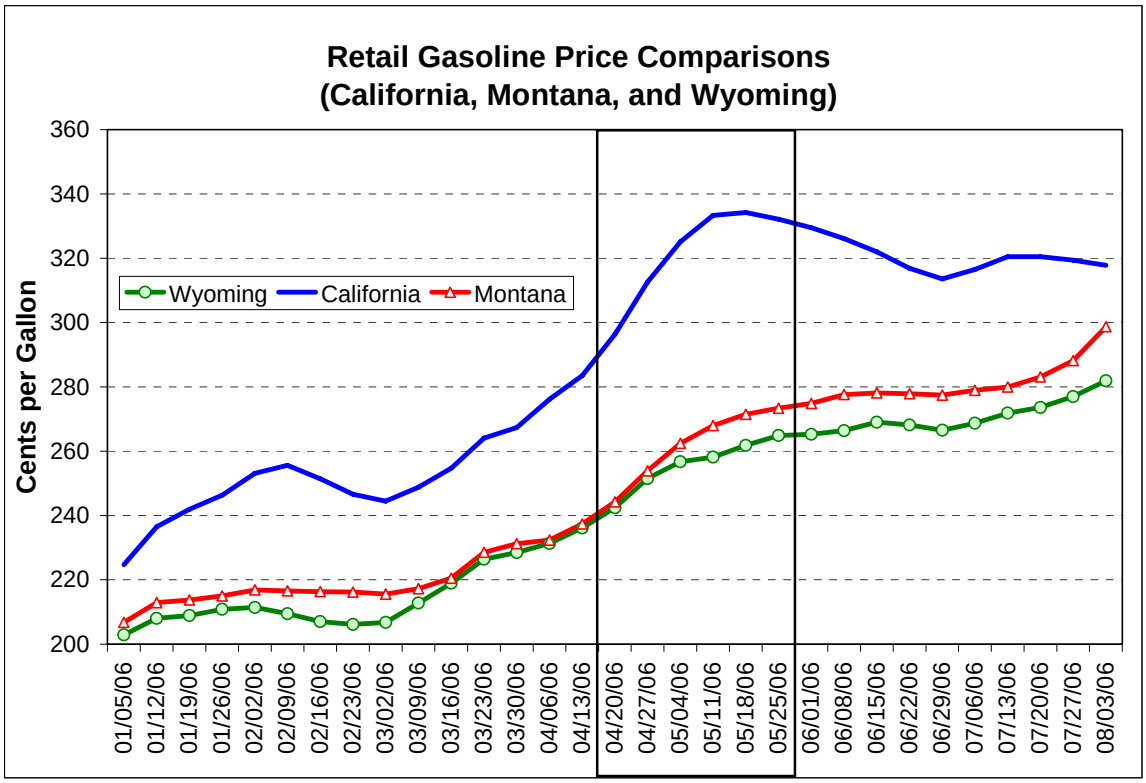
Source: Oil Price Information Service (OPIS).

As the chart indicates, a strong relationship appears between retail prices for this three-state region. Nevada retail prices track California prices more closely than do Arizona prices. This is not a surprise considering Nevada depends on California for nearly 100

percent of its gasoline supply. Arizona prices exhibit similar behavior but peak sooner than California and Nevada. One possible explanation is that Arizona is also supplied from refineries in Western Texas and New Mexico. Although the graphic illustrates a widening gap between California and the other two states, the growing difference is the result of higher amount of taxes for California fuels. The higher total taxes are from the application of sales tax for California gasoline that accounts for an additional 6 cents per gallon at the height of the price spike. Arizona and Nevada do not apply sales tax to retail gasoline.

Figure 4-2 shows that when California retail gasoline prices are compared to retail prices in states supplied from supply sources independent from California, the correlation is less evident. As the chart indicates, retail gasoline prices in Montana and Wyoming do not track closely with California.

Figure 4-2

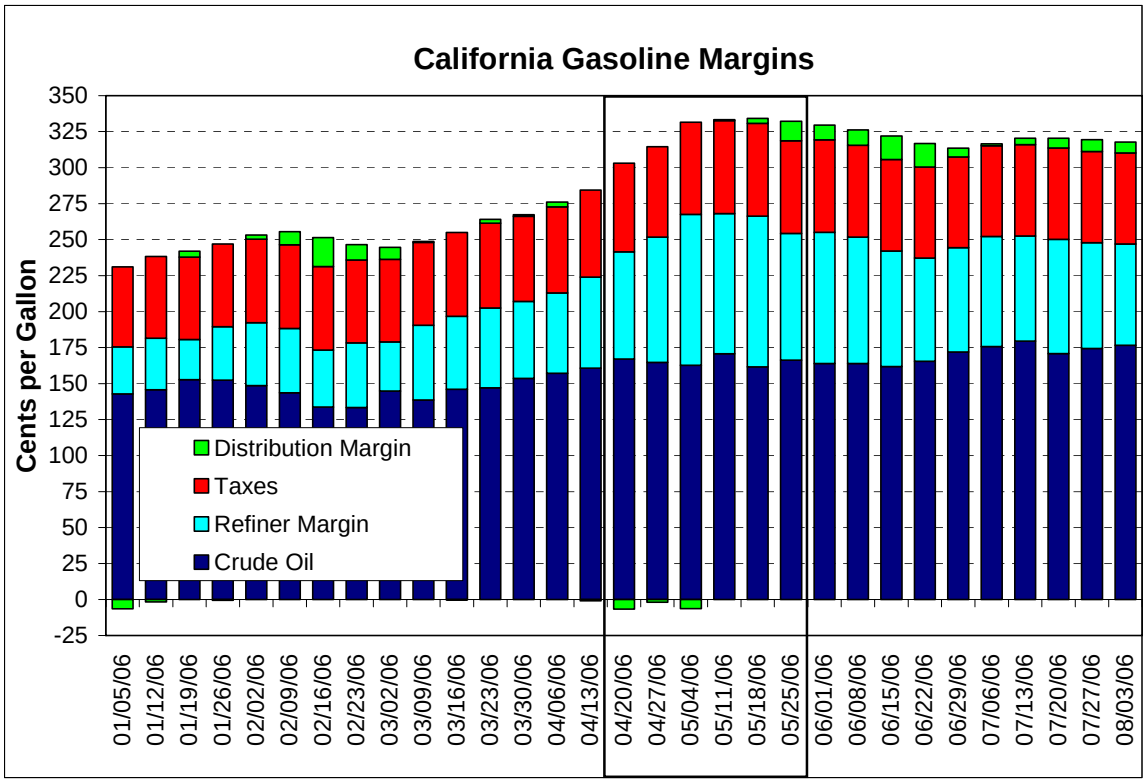


Source: Oil Price Information Service (OPIS).

When wholesale prices increase rapidly, service station operators usually do not completely pass on the entire price increase. This is because retail price increases that are excessively high compared to their nearest competition normally results in fewer customers. This is why retail dealer margins normally shrink and even become negative during a wholesale price spike. After prices normalize at a higher level and the wholesale prices decline, the station operators are able to recoup some of their “losses” and usually see their margins improve.

Figure 4-3 below illustrates this trend in retail dealer margins (referred to as a distribution margin) and highlights the other cost components of California's retail gasoline price. (**Appendix C** presents figures detailing costs components for all states analyzed and definitions for the chart components).

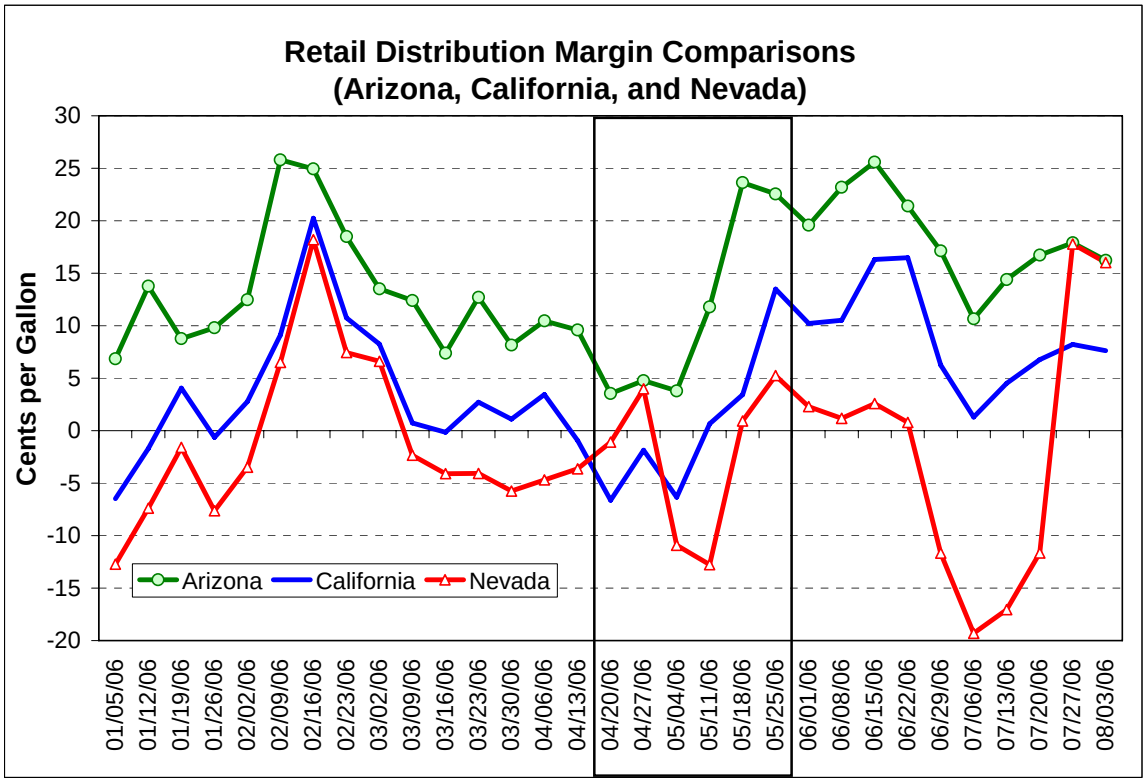
Figure 4-3



Source: CEC staff analysis of Oil Price Information Service (OPIS) data.

Figure 4-4 illustrates the retail distribution margins facing retailers of gasoline in Arizona, California, and Nevada. This chart illustrates how dealer margins normally decline as wholesale prices rise and even become negative for a short period of time. After the wholesale price spike has peaked, dealer margins increase and return to more normal levels of profitability. The data is suggestive that retailers experienced cyclic periods of positive and negative margins over the seven months of 2006.

Figure 4-4



Source: CEC staff analysis of Oil Price Information Service (OPIS) data.

California and Nevada showed the lowest average distribution margins and in some cases, showed negative margins. Negative distribution margins indicate that retailers were not covering their costs on the sale of gasoline. However, some gasoline retailers may have fuel supply agreements (for example, discounts for volume purchases) that help offset negative margins. Additionally, gasoline retailers with convenience store sales or big-box store sales (in the case of Costco or Safeway), or amenities such as an on-site car wash may be able to compensate for lower retail gasoline margins through higher margins from the other products they sell.

Retail Gasoline Price Variability – California

The analysis of gasoline prices over four time periods investigated patterns in retail prices, and, to the extent possible, identified reasons for those patterns.

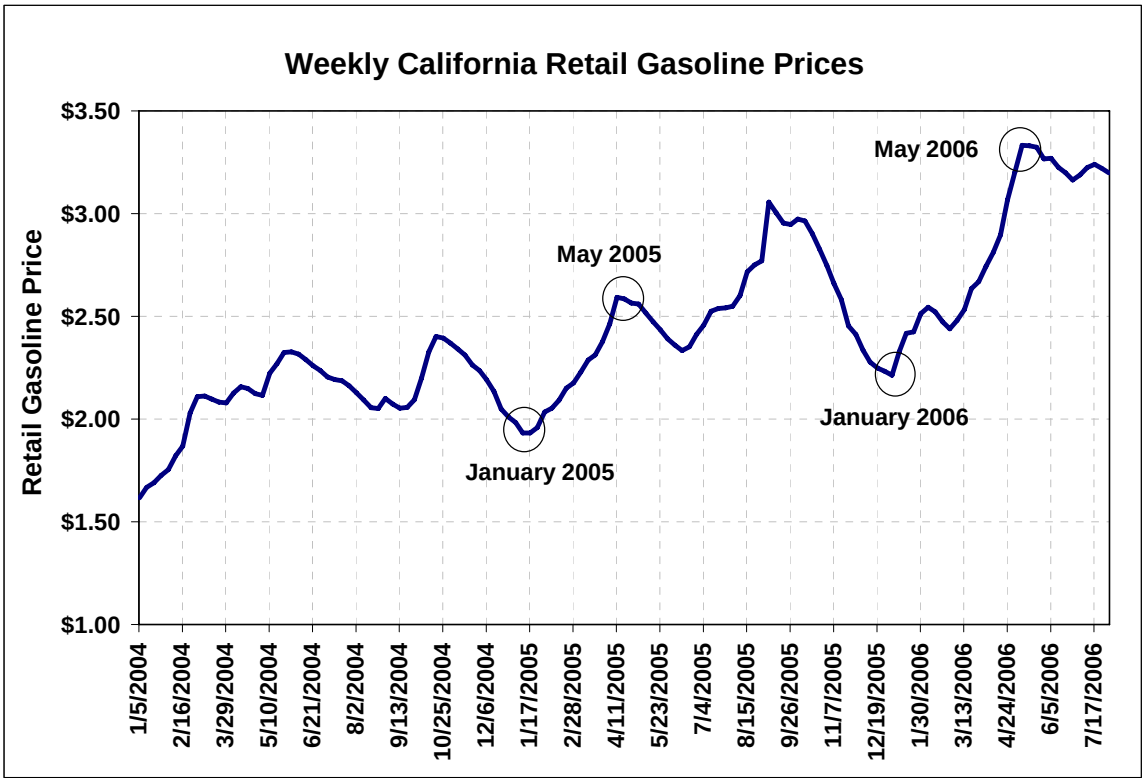
Approximately 10,000 retail fueling stations operate in California. Using data purchased from the Oil Price Information Service (OPIS), the Energy Commission analyzed daily purchase transactions at more than 7,000 stations. The OPIS data is based on records from a fleet card service provider. The OPIS retail price data includes the actual date of the transaction but does not include volumetric information. Not all stations have daily

fleet card purchase transactions. In fact, very few stations of the more than 7,000 locations have complete daily data for each day of the year.

The daily records were filtered to capture data for those stations that had more than 15 transactions in a month. Stations with fewer than 15 observations per month were not used because it provides data that does not adequately or accurately price variability. The total number of stations used in the following analysis ranged from 3,747 to 4,100, depending upon the month. This reduced the total number of cities from 771 to approximately 630 throughout California.

Figure 4-5 shows the weekly average retail price for gasoline in California from January 2004 through July 2006. The circles indicate the months used for the analysis. January 2005 represented a period of low retail gasoline prices and May 2006 experienced historically high retail gasoline prices.

Figure 4-5
Retail Gasoline Prices: January 2004 through July 2006



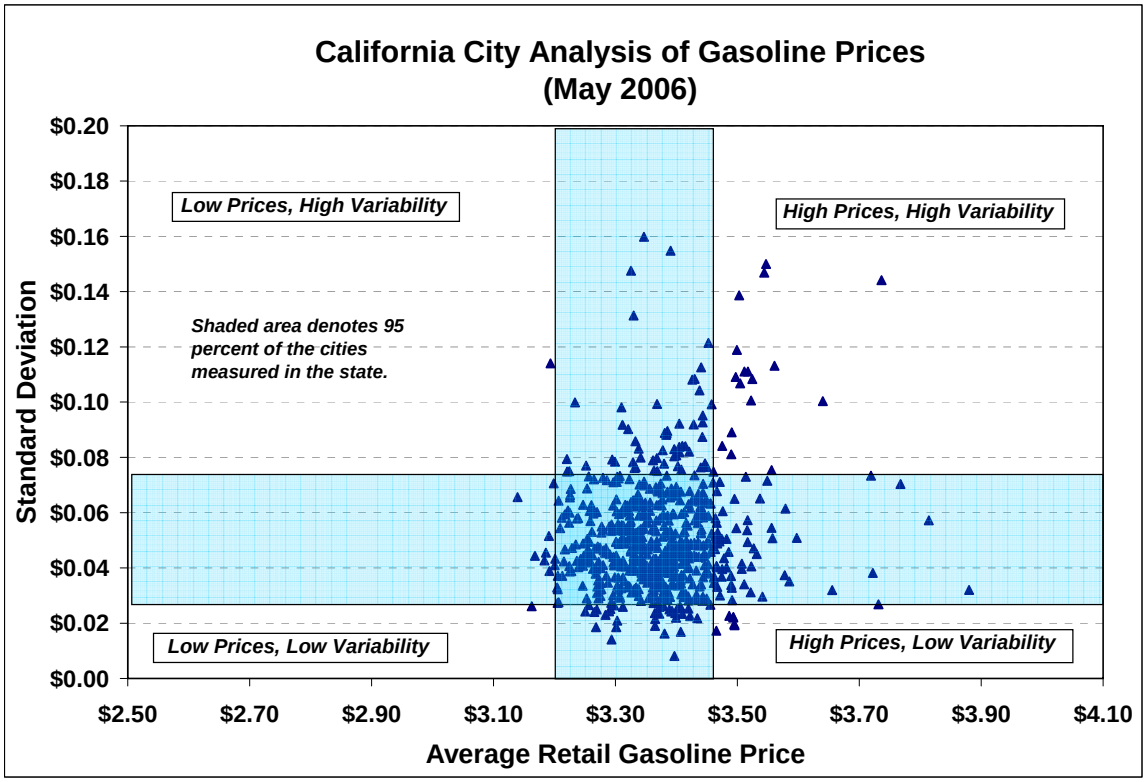
Source: CEC staff analysis of Oil Price Information Service (OPIS) data.

Underlying the average retail prices are significant regional differences in fuel prices, which cannot be observed in **Figure 4-5**. Analysis of prices and price variability were examined extensively, as described in **Appendix D**, to determine if there were any regional price patterns. **Figure 4-6** depicts retail prices throughout California for May 2006. The shaded areas in the figure represent 95 percent of all cities in the dataset. The remaining cities exhibited large enough price differences to fall outside the statistically "normal" distribution. They were grouped into one of four categories:

- low prices, high price variability
- high prices, high price variability
- low prices, low price variability
- high prices, low price variability

From this analysis the most apparent finding is that **geography plays a major role in California's retail gasoline prices**. Cities fell into one of four patterns, as seen in **Table 4-1**.

Figure 4-6



Source: CEC staff analysis of Oil Price Information Service (OPIS) data.

Table 4-1
Price Behavior Categories

Low Prices, High Variability Cities include Buttonwillow, Concord, Dixon, Marysville, Novato, Suisun City and Woodland. These cities tend to be near major roadways, and the stations can be characterized as having increased sales volumes and possibly increased competition.	**High Prices, High Variability** Cities such as Beverly Hills, Mill Valley, San Francisco, and South Lake Tahoe fall into this category. These cities can be characterized as having above-average land values that may affect the retail price.
Low Prices, Low Variability Very few areas of the state fall into the low-price, low-variability category. Cities such as Antelope, Hilmar, Frazier Park, Foresthill, and Shingle Springs fall into this category. These places may be categorized as being close to major roadways, but not directly accessible.	**High Prices, Low Variability** Cities in more remote regions of the state tend to have above-average prices combined with lower variability. These cities are characterized by having fewer retail outlets, lower volume sales, and higher fuel delivery costs. In some cases, these cities may have only one retail outlet. This high-price, low variability category includes such cities as Baker, Big Bear City, Mount Shasta, and Soledad.

Increasing Variability ↑

→ **Increasing Retail Price**

Chapter 5 – Petroleum Industry Profitability

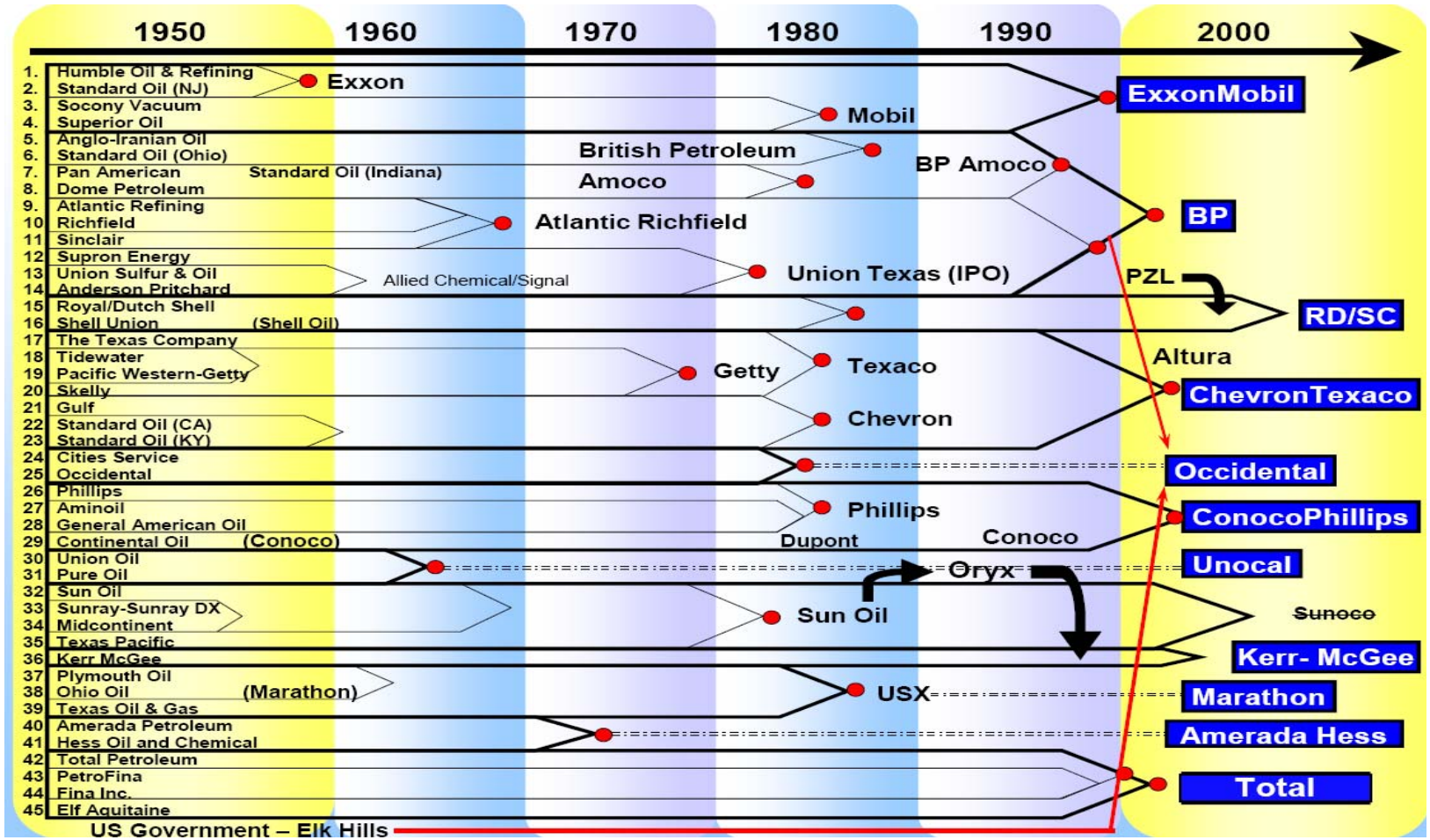
The all-time high profits of certain companies in the petroleum industry have recently received much media attention

Financial information was analyzed to assess the profitability of the major petroleum companies conducting business in California. Several measures of profitability were used to compare major oil companies with other integrated oil companies on an international level. Sources of net income were also compared to identify the most profitable segment of the petroleum industry and the most profitable geographic region. Specific increases in refining profits were a result of temporary supply constraints and the associated rise in wholesale and retail prices, and not the cause of the price spike.

The Energy Commission examined data for seven petroleum companies from two primary sources: the proprietary database of John S. Herold, Incorporated and public filings with the Securities and Exchange Commission (SEC). Due to a significant amount of consolidation in the industry since the 1950s (**Figure 5-1**), these small number of companies now represent a significant majority of the U.S. petroleum-related business activity.

The companies in the petroleum industry can be grouped into the following categories: exploration & production (E&P), integrated, and refining & marketing (R&M). E&P companies are mainly involved in the exploration for and production of natural gas and crude oil, commonly referred to as upstream companies. R&M companies are primarily involved in the refinery production and marketing of transportation fuels, or downstream companies. Integrated petroleum companies usually perform all activities associated with both upstream and downstream business activities.

Figure 5-1
Petroleum Industry Consolidation History



Source: Used with the written permission of John S. Herold, Inc.

The seven companies examined profitability conduct business in California and are listed in **Figure 5-2**. These seven firms represent approximately 90 percent of refining capacity and 89 percent of the taxable gasoline sales in California.[16] They also have significant distribution and retailing assets. In addition, there are three other refining and marketing companies that have not been included in the profitability analysis (Big West Refining, Kern Oil, and Powerine).

Figure 5-2

Company	Type	Number of Calif. Refineries	U.S. Based Company	Foreign Based Company
BP	Integrated	1		✓
Chevron	Integrated	2	✓	
ConocoPhillips	Integrated	2	✓	
ExxonMobil	Integrated	1	✓	
Royal Dutch Shell	Integrated	2		✓
Tesoro	R&M	1	✓	
Valero	R&M	2	✓	

Source: CEC PIIRA database.

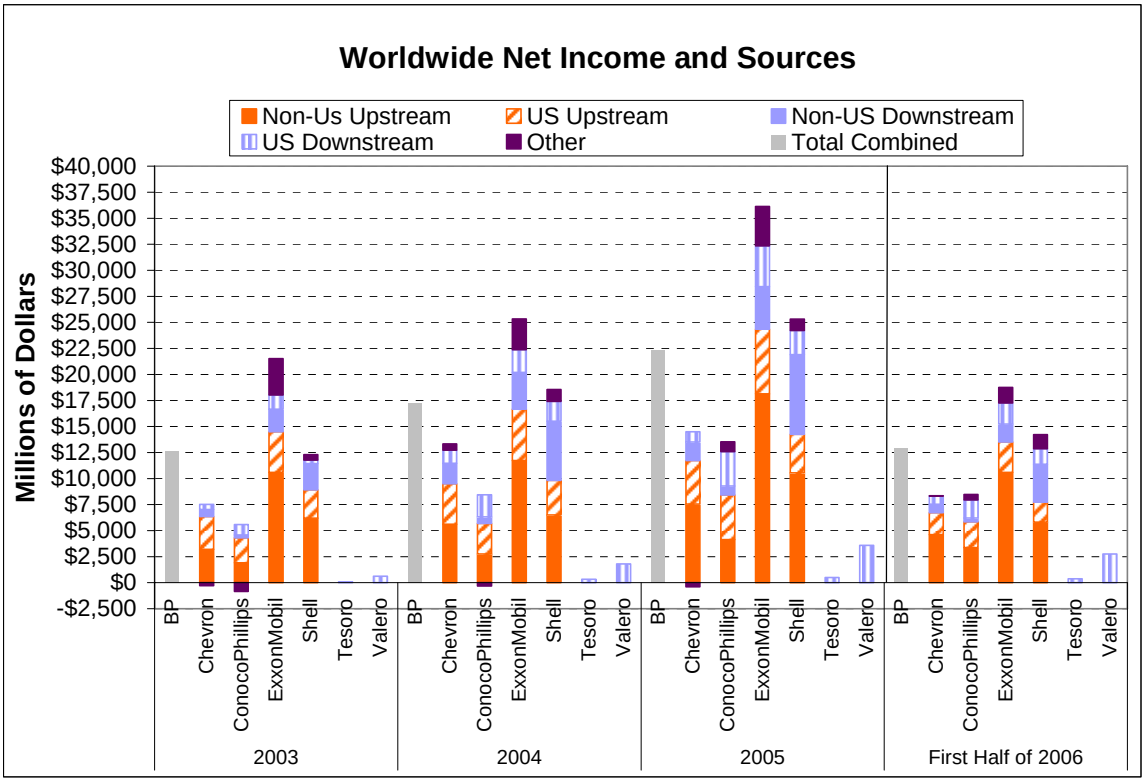
Profitability Comparisons

There are several measures of profitability that can be used to compare petroleum and non-petroleum businesses. The intent of this analysis was to examine total profits, identify sources of profits by business segment (upstream or downstream) and geography (U.S. or non U.S.), compare California profits to the rest of the United States (to the extent the information was available), and compare profits to other types of non-petroleum businesses. One major difficulty encountered was a lack of consistency in the specificity of financial information provided by the foreign-based companies compared to the U.S. based companies. The financial information filed with the SEC by the U.S. based companies on a quarterly (10-Q filing) or annual (10-K filing) basis was sufficiently detailed to extract U.S. and non-U.S. revenue and expense data. However, the financial information provided to the SEC (annual 20-F filings) by the foreign-based companies was not detailed to allow similar profitability comparisons. Because of this inconsistency, some of the information presented in this chapter does not include data for BP or Royal Dutch Shell (Shell).

Total Profits

Figure 5-3 compares the seven major oil companies that conduct operations in California by total net income (profits after taxes) broken down by type of business activity (Upstream - exploration & production versus Downstream – refining & marketing) and geography (U.S. versus Non-U.S.). “Other” includes chemical, power, midstream, and other business activities. BP is shown with total combined net income due to a lack of sufficient information.

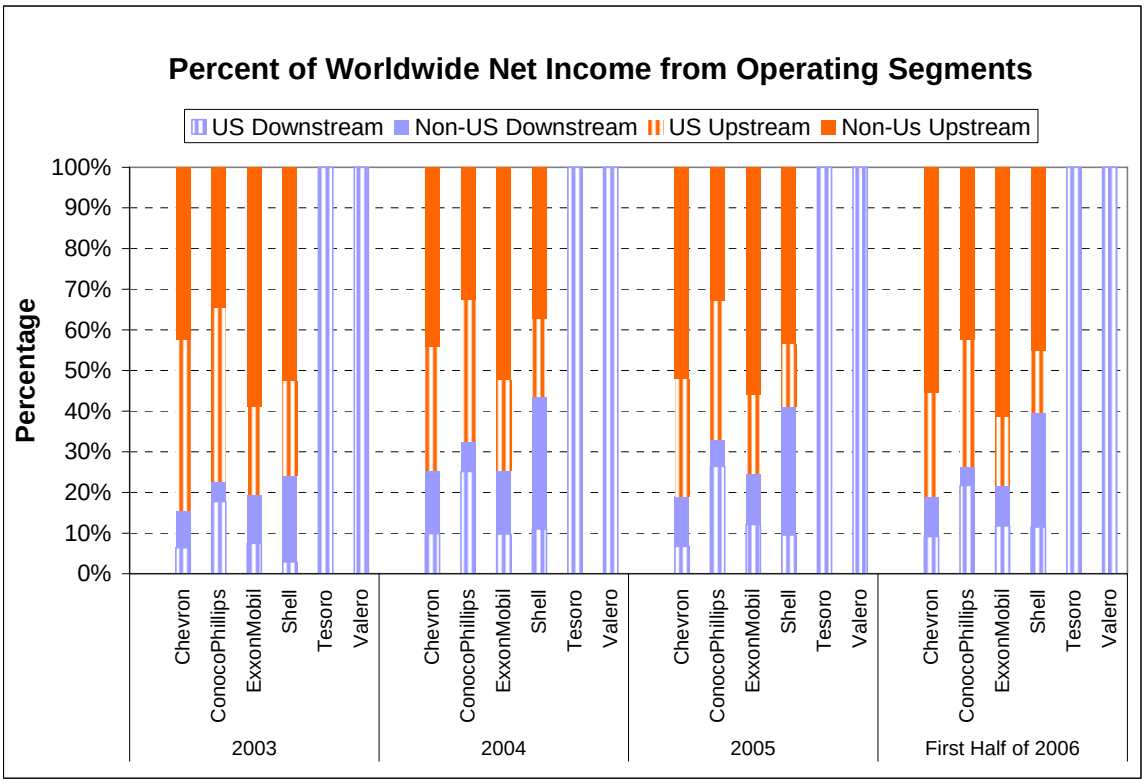
Figure 5-3



Source: CEC analysis of company management reports, SEC 10-K, 10-Q, 20-F, and 6-K filings.

The majority of worldwide profits are from exploration and production (E&P) of crude oil. On average, a greater amount of E&P profit is obtained from non-U.S. operations. On the refining and marketing (R&M) side of the business, the majority of the profits for most of the companies are from operations outside the United States. Tesoro and Valero do not have any E&P operations and therefore no profits from this type of business activity. Over the last three years, the profits from crude oil and refining have continued to increase in line with rising prices for both crude oil and transportation fuels. **Figure 5-4** depicts the same information on a percentage basis. BP's total profits are excluded from both of these figures due to lack of sufficient information.

Figure 5-4



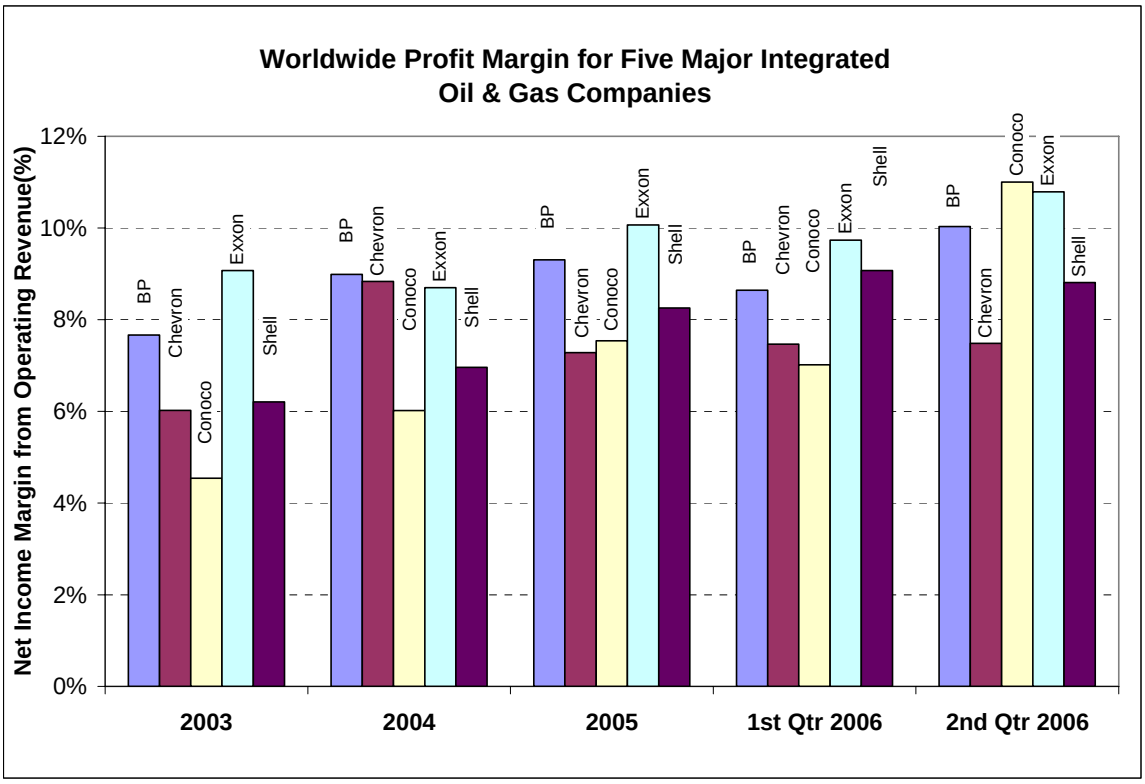
Source: CEC analysis of company management reports, SEC 10-K, 10-Q, 20-F, and 6-K filings.

Profit Margins

Another way to decipher and compare profits of the oil companies is to examine the amount of net income (profits after taxes) in relation to total revenues. In other words, did the companies make a lot of money because they have extensive worldwide operations with high total revenue or because their profit margin was significantly higher than other types of businesses?

Figure 5-5 compares the five major integrated oil companies with operations in California on the basis of profit margin. The integrated oil industry has increased from an average profit margin of a little over 6 percent in 2003 to nearly 10 percent in the second quarter of 2006.

Figure 5-5

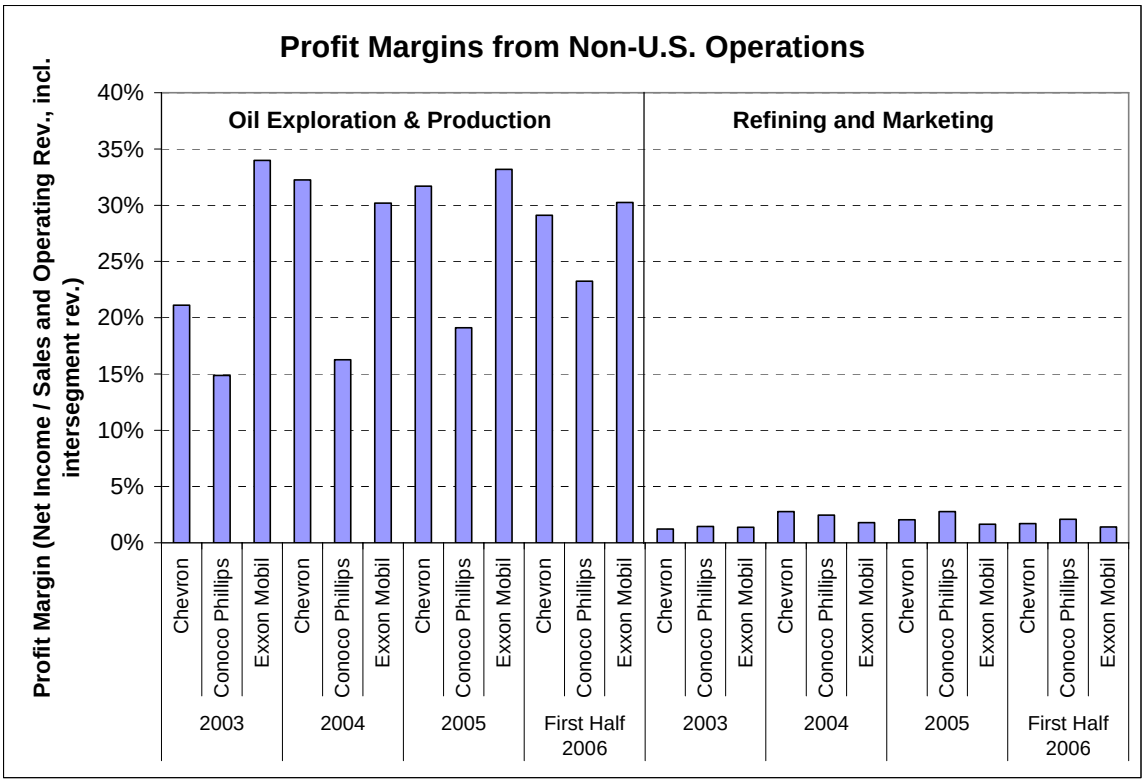


Source: CEC analysis of John S. Herold, Incorporated database, company management reports, SEC 10-K, 10-Q, 20-F, and 6-K filings.
Note: Each of these five integrated oil and gas companies has a major presence in California. "Net Income Margin" is calculated from net income divided by sales & operating revenue.

Profit Margins by Segment of the Petroleum Business

Another way to compare profitability is to review what the relative sizes of profit margins are for the upstream and downstream sides of the business. **Figure 5-6** illustrates that the profit margins for oil exploration and production are significantly higher when compared to the profit margins for refining and marketing (downstream) operations outside the United States. BP and Shell are excluded due to lack of sufficient information. Tesoro and Valero are excluded because they are primarily U.S. refiners and marketers.

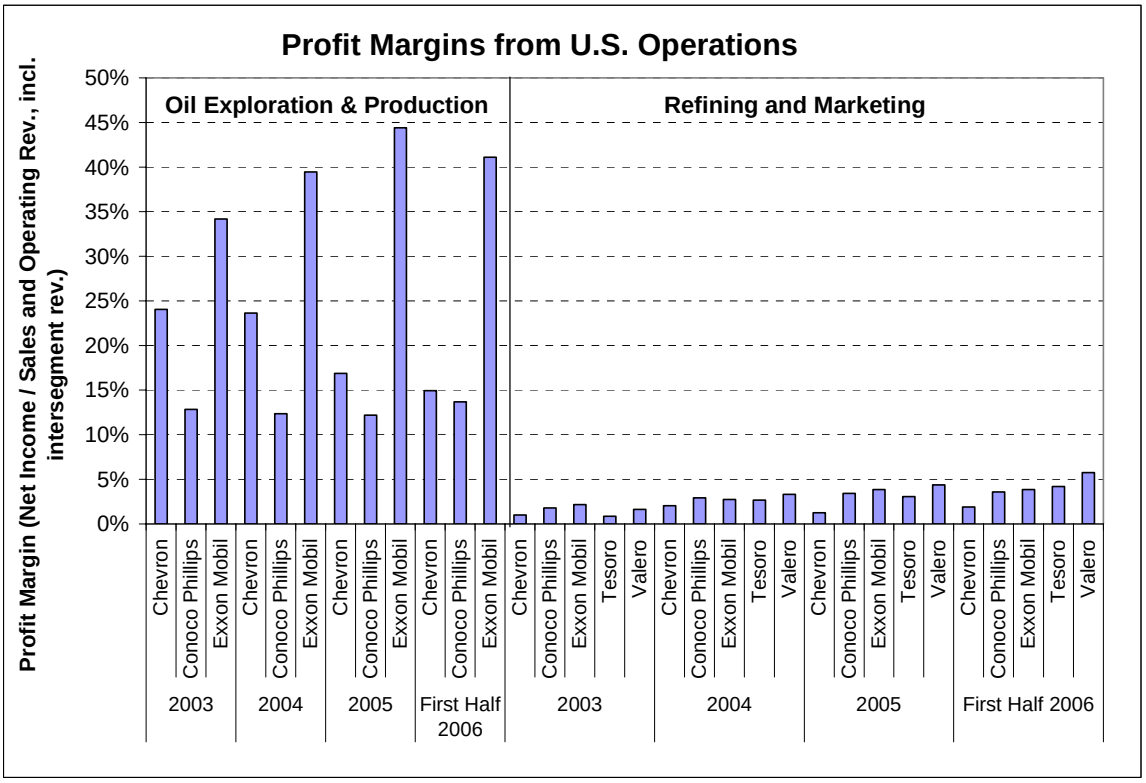
Figure 5-6



Source: CEC analysis of company management reports, SEC 10-K, 10-Q, 20-F, and 6-K filings.

Figure 5-7 is a similar comparison of U.S. operations. The relative difference in profit margins between the E&P and R&M is similar to that of the Non U.S. comparison. BP and Shell are excluded from this figure due to lack of sufficient information. Tesoro and Valero are excluded from the oil and exploration portion of the chart because they are not integrated oil companies.

Figure 5-7



Source: CEC analysis of company management reports, SEC 10-K, 10-Q, 20-F, and 6-K filings.

Profitability of California Refining and Marketing Operations

How do California refining and marketing operations compare to other regions of the United States? One way to compare refining operations profitability for different regions of the U.S. is to examine the Securities and Exchange Commission financial information for companies that break out California refinery operations from other regions of the United States. The only two companies that provide some limited information concerning California-specific profitability are Tesoro and Valero.

Based on the information provided by these two companies, net refining margins are higher in California when compared to other regions of the United States and are increasing in size over time. Similar geographical breakdown of information is not available from the public information filed with SEC by the five major integrated oil companies. With regard to profitability of retail operations, none of

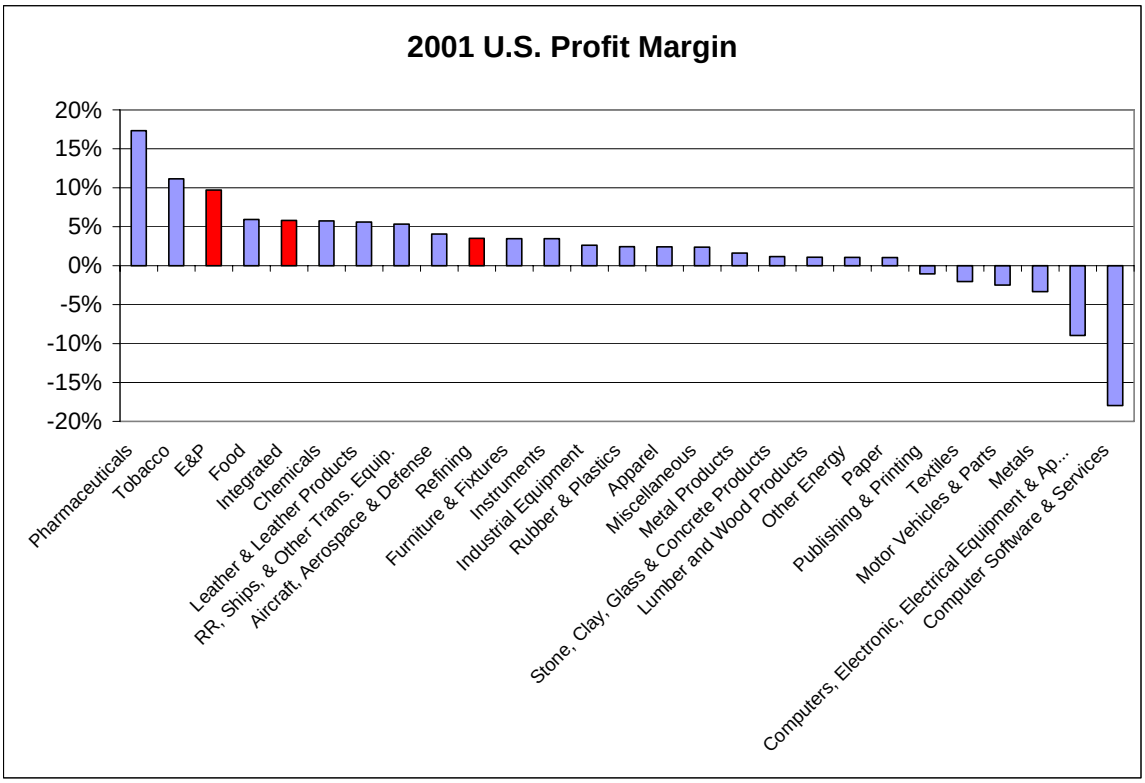
the seven companies included in the financial analysis break out their retail operations for California.

As a consequence of this lack of California specificity, the Energy Commission will be conducting a confidential survey of the major oil companies that have refinery and retail operations in the state. This survey will be used to obtain a detailed breakdown of revenues and expenses that measure profitability for each refinery, statewide supply and marketing group, and statewide retail operations.

Profit Margins – Petroleum versus Other Types of Business

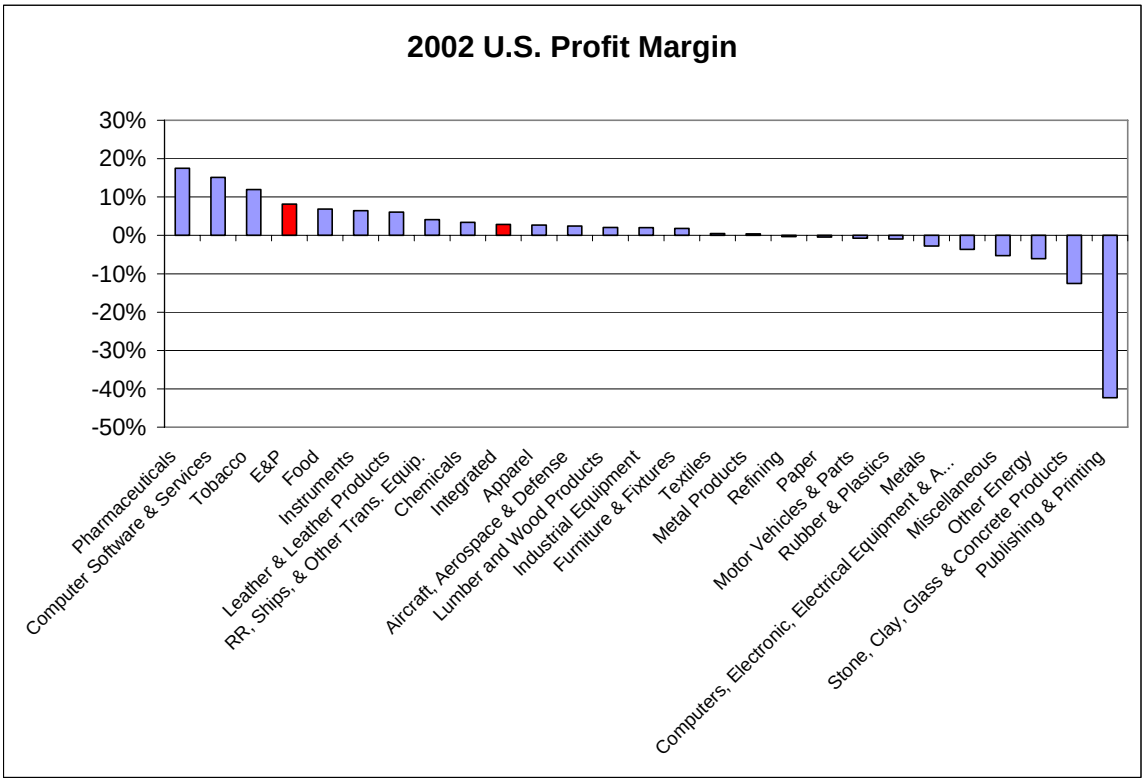
But how do these companies compare to other types of U.S. manufacturing businesses? **Figures 5-8** through **5-12** rank U.S. manufacturing companies by business classification from 2001 through 2005. As these charts illustrate, profit margins of petroleum-related businesses have improved since 2001, placing these types of companies at the upper end of the rankings for the last couple of years.

Figure 5-8



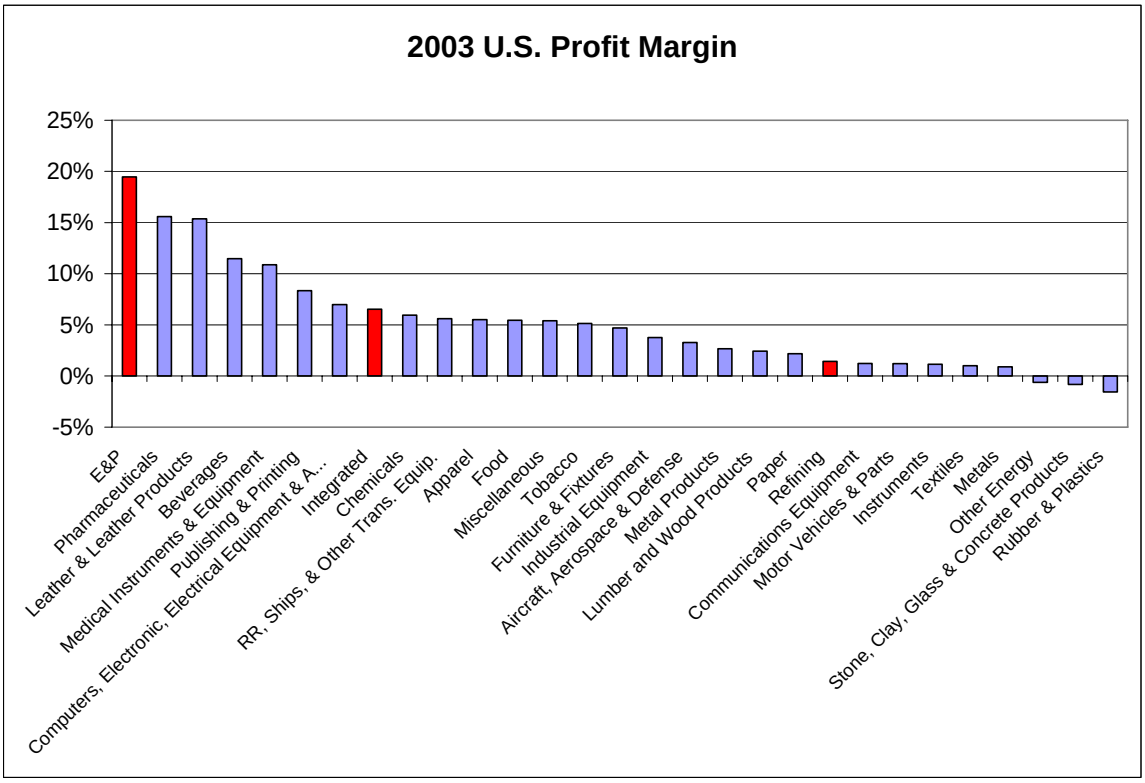
Source: CEC analysis of Industry Week's U.S. 500 database.

Figure 5-9



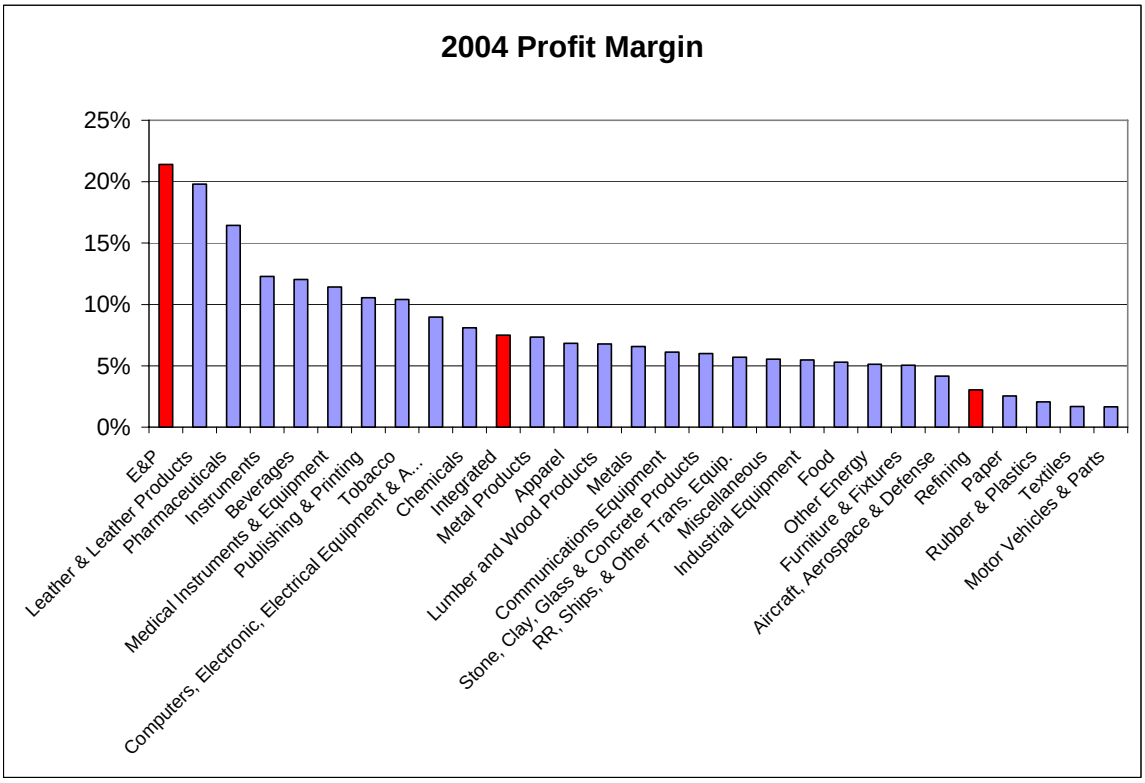
Source: CEC analysis of Industry Week's U.S. 500 database.

Figure 5-10



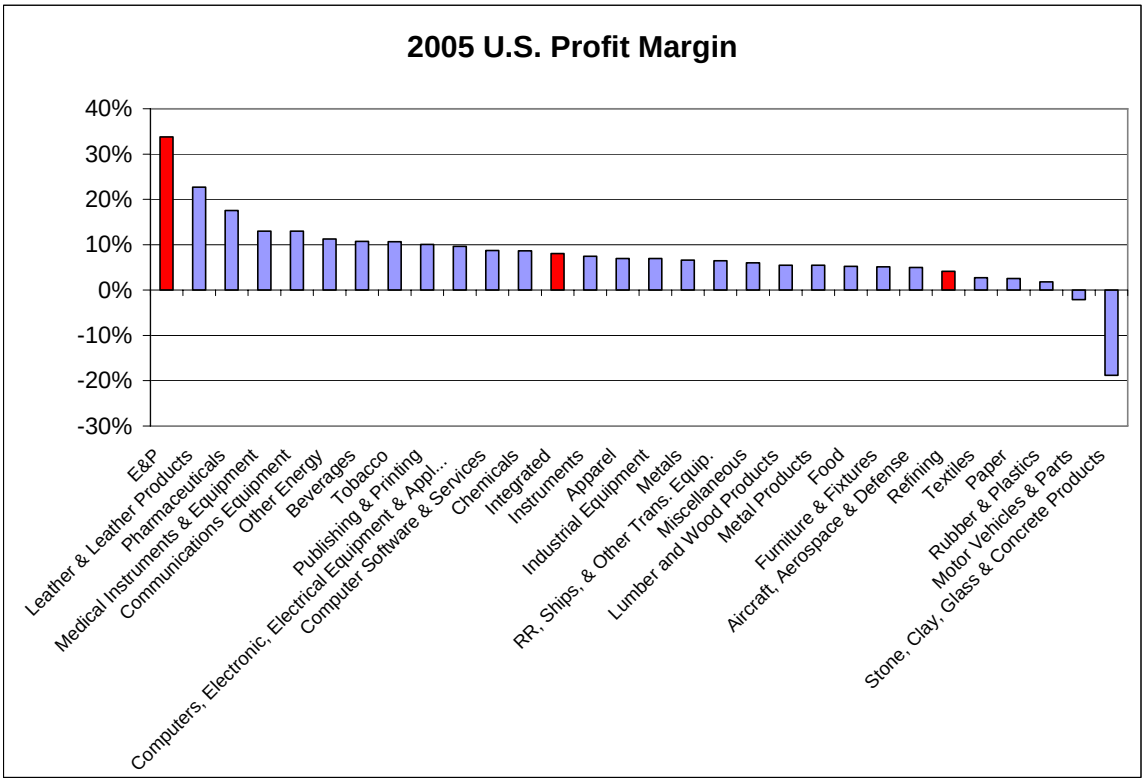
Source: CEC analysis of Industry Week's U.S. 500 database.

Figure 5-11



Source: CEC analysis of Industry Week's U.S. 500 database.

Figure 5-12



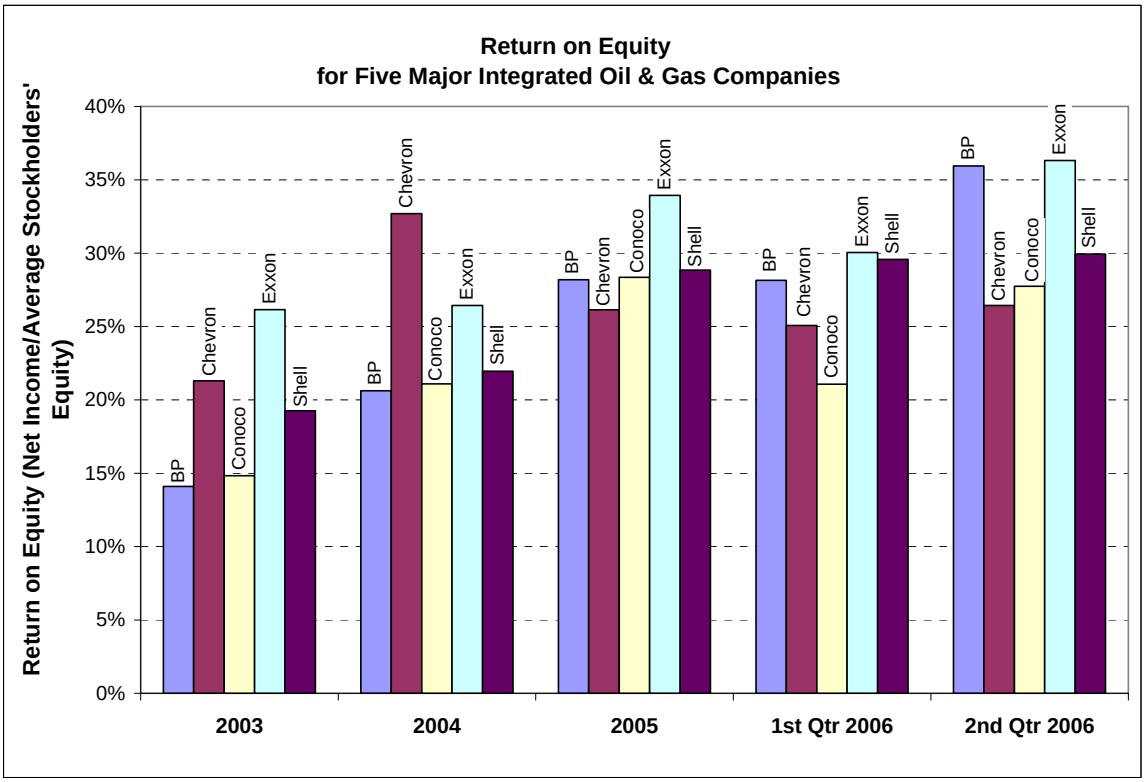
Source: CEC analysis of Industry Week's U.S. 500 database.

Throughout this entire time period (2001 to 2005), profit margins for E&P companies were consistently higher than Integrated Oil companies who were consistently higher than Refining & Marketing companies. From 2002 through 2005, profit margins for Integrated Oil and Refining & Marketing companies ranked in the middle to lower portion of the U.S. manufacturing categories.

Profitability – Return on Equity

Figure 5-13 compares the five major integrated oil companies that conduct operations in California on the basis of Return on Equity, a measure of how well a company used reinvested earnings to generate additional income.

Figure 5-13

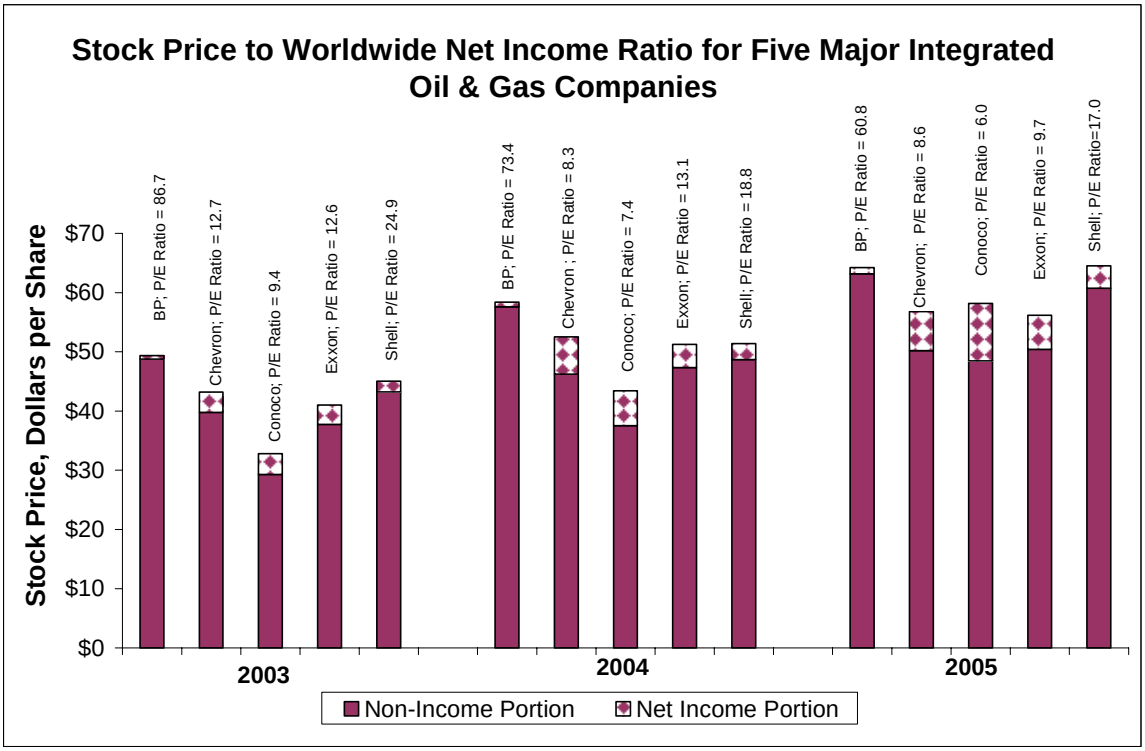


Source: CEC analysis of John S. Herold, Incorporated database, company management reports, SEC 10-K, 10-Q, 20-F, and 6-K filings.
Note: Each of these five integrated oil and gas companies has a major presence in California.
"Return on Equity" is calculated as net income divided by average stockholders' equity.

Profitability – Price to Earnings Ratio

Another way to measure profitability or value is to compare stock prices relative to the net income (profits) generated for the company. **Figure 5-14** also includes the price-to-earnings ratio (P/E) for each of the five major integrated oil companies that conduct operations in California with a peer group of other international integrated companies. The P/E is a measure of how much investors are willing to pay for the company's stock per dollar of return.

Figure 5-14

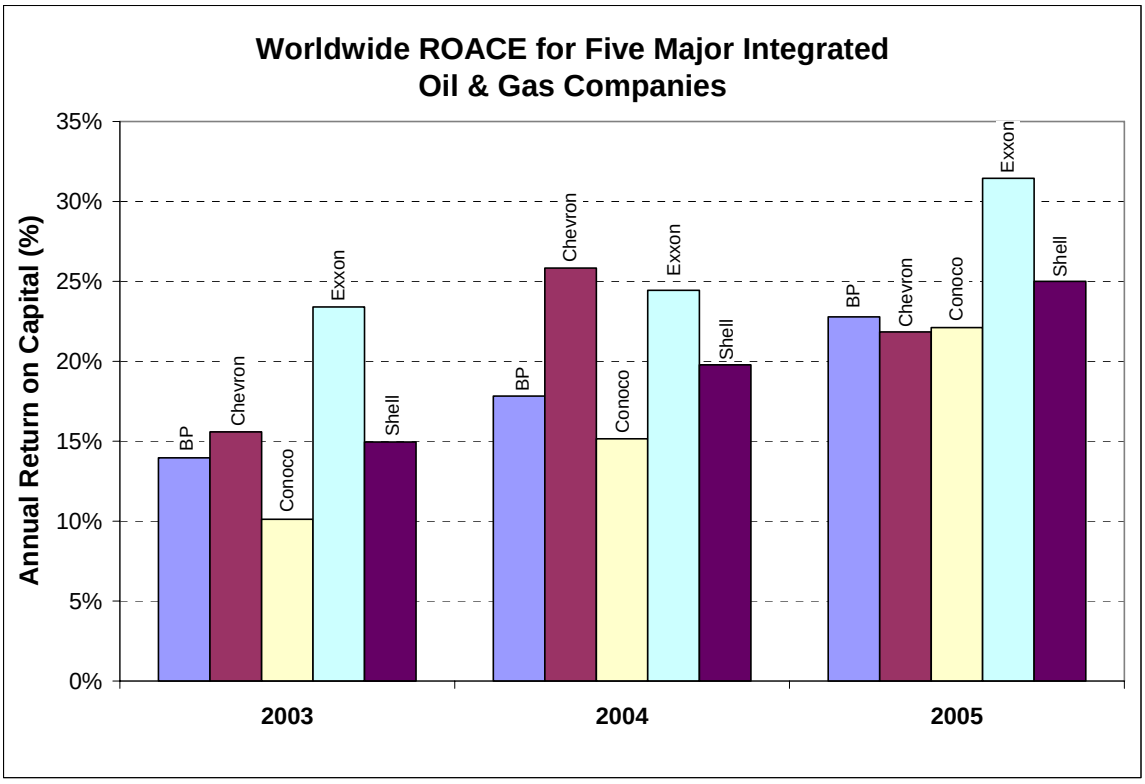


Source: CEC analysis of John S. Herold, Incorporated database, company management reports, Yahoo Finance, SEC 10-K, 10-Q, 20-F, and 6-K filings.
Note: Each of these five integrated oil and gas companies has a major presence in California.

Profitability – Return on Average Capital Employed (ROACE)

A final measure of profitability of the petroleum industry is the comparison of the five major integrated oil companies that conduct operations in California on the basis of Return on Average Capital Employed (ROACE). ICF International has conducted a similar analysis of the petroleum industry over a longer period of time to capture the natural business cycle that occurs in the petroleum industry. That report is included in **Appendix A**. **Figure 5-15** illustrates this measure of how efficient a company is regarding its use of earnings over time.

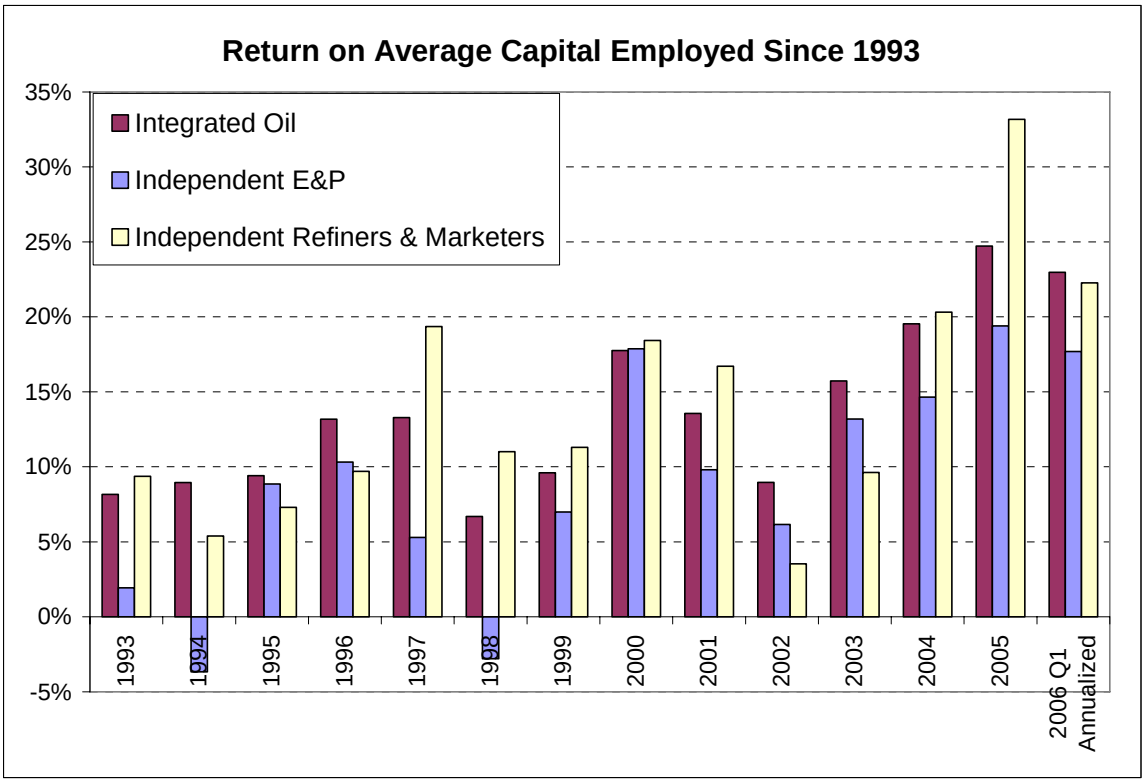
Figure 5-15



Source: CEC analysis of John S. Herold, Incorporated database, company management reports, SEC 10-K, 10-Q, 20-F, and 6-K filings.
Note: Each of these five integrated oil and gas companies has a major presence in California.

Figure 5-16 uses ROACE to compare the three categories of petroleum related businesses (E&P, Integrated, and R&M) over a longer period of time and includes companies from the United States and Canada only. As the chart shows, this measure of profitability appears to be increasing over time.

Figure 5-16



Source: CEC analysis of John S. Herold, Incorporated database.

Profitability – Reinvestment of Earnings

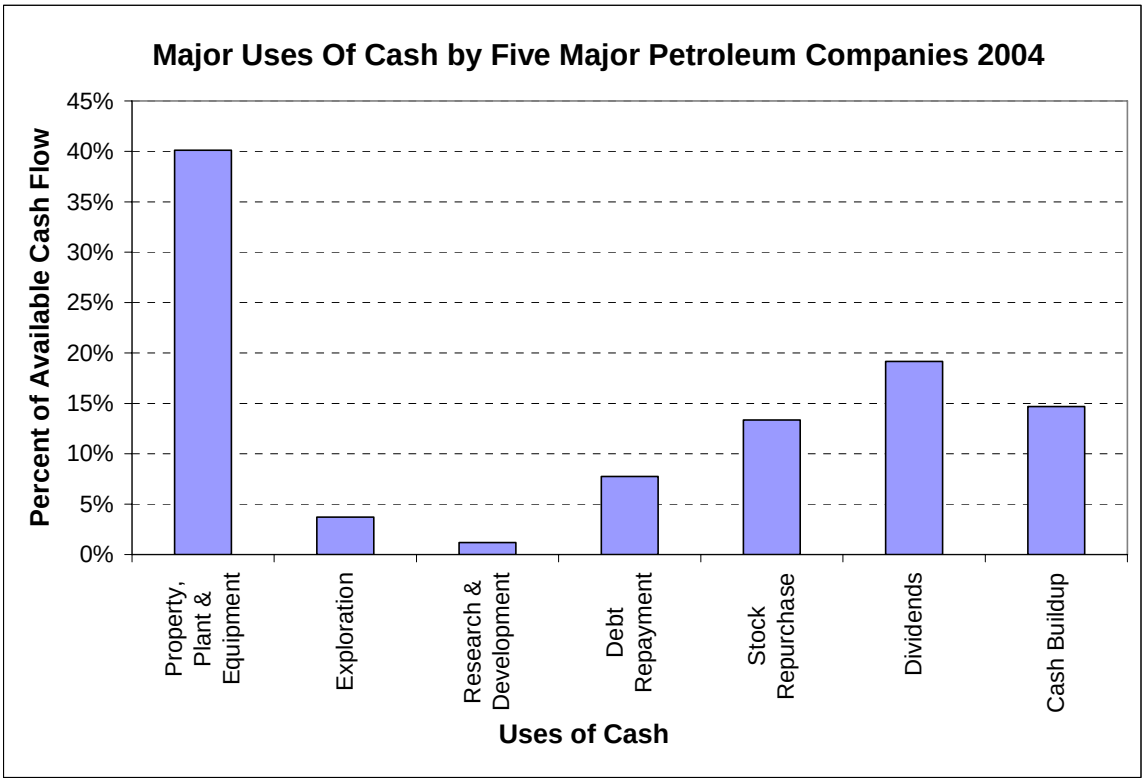
A complete examination of the investment strategies of the oil industry is beyond the scope of this report. A study published earlier this year, commissioned by API (American Petroleum Institute) and prepared by Ernst & Young, examined the petroleum industry's investments and uses of earnings. The study showed the industry invested $1.04 trillion between 1992 and the third quarter of 2005. This was compared to net income of $682 billion and cash flows of $1.45 trillion. With the increased price of crude oil, the industry's cash flow has increased over the level of current investments.

In addition to new investments, uses of earnings have funded:

- Debt repayment
- Repurchase of outstanding stock
- Dividends
- Increased cash holdings for future investments

The report included expenditures on these activities in 2004. **Figure 5-17** is based on information the API / Ernst & Young data.

Figure 5-17



The report points out that though profits have increased for the industry, opportunities for investment face several constraints. These include risk from the long lived nature of the investments, volatility of oil prices, the rising recovery cost of oil, and the sharp increases in drilling costs driven by competition.

Financial Terms

Net Income
Net income is what remains after subtracting all the costs from a company's revenues. It is sometimes called earnings or net profit.

Shareholder Equity
Shareholder equity is used in this report to mean the value of total assets less total liabilities. It is sometimes called book value. It is an estimate of the value of a liquidated firm.

Average Shareholder Equity
Average shareholder equity is the average of beginning and ending shareholder equity for the period.

Return on Equity
Return on equity is net income per dollar of average shareholder equity. It is a measure of profit as a ratio to net book value of the firm.

Profit Margin
Profit Margin is net income per dollar of sales and operating revenue. Non-operating revenues, such as interest income, are excluded because they can obscure that profits are being or not being derived from operations. For calculation of the profit margin for the exploration and production segment and refining and marketing segment the same definition was used, except that intersegment revenue was also included with the sales and operating revenue received from third parties.

Capital Employed
Capital employed is the value of capital used in the firm.

Average Capital Employed
Average Capital Employed is the average of capital employed at the beginning and of capital employed at the end of the period.

ROACE or Return on Average Capital Employed
ROACE is a measure of the efficiency with which a firm uses capital. It is a rather complicated ratio to allow the comparison of firms within and across industries. We calculated it as the sum of adjusted net income, dividends on preferred stock, minority interest expense plus (net interest multiplied by (one minus [total income tax expense divided by earnings before taxes]) divided by average capital employed.

Chapter 6 – Information Collection and Authority

In April 2006, Governor Schwarzenegger directed the Energy Commission to investigate the prices of gasoline and diesel fuels and to identify any legal constraints to collecting detailed data to ensure that the state has every tool available to monitor the gasoline market. The following recommendations respond to the directive related to data collection and sharing critical confidential information among state agencies.

Current data collection activity and authority

The Energy Commission currently collects information from California petroleum refiners, marketers, retailers, importers, exporters, terminal operators, and pipeline companies. Data is collected on weekly, monthly, and annual frequencies. The statutory authority to collect this information is provided by the Petroleum Industry Information Reporting Act (PIIRA) (Cal. Public Resources Code sections 25350 – 25366).[17]

PIIRA's data collection provisions[18] and the Energy Commission's implementing regulations[19] focus primarily on operational and supply-related data. For example, information is collected on infrastructure[20] description, capacities, inventories, and utilization; imports, exports and intrastate movement of crude oil and various refined petroleum products and their blending components; and crude oil and natural gas used as fuel for in-state thermally enhanced oil recovery production.

Although financial data is obtained under PIIRA, PIIRA collection authority explicit to financial data is extremely limited and excludes cost information. Presently, the Energy Commission is only collecting copies of Securities and Exchange Commission filings (Title 20, Cal. Code of Regulations, section 1368.1) and price data for various refined petroleum products (Title 20, Cal. Code of Regulations, section 1366 at Appendix A, subsection IV and Appendix B, subsection V.)

This information is used in a variety of applications such as:

- basis for analysis associated with development of the Integrated Energy Policy Report
- development of transportation fuel price forecasts
- responses to information inquiries from the Governor, Legislature, or the public
- assessment of market supply implications resulting from unplanned refinery outages and pipeline disruptions
- preparation of specialty reports

- publication of petroleum and transportation fuel-related statistics on our web site[21]

For this report, the Governor directed the Energy Commission to "conduct a thorough examination of the profits" of the petroleum industry. This includes examining the profitability of both the wholesale and retail activities of the industry. To accomplish this, the Energy Commission began an iterative process with industry participants to design a cost and revenue survey through which it will obtain vital financial data, including cost data that it currently lacks. This survey data will be collected under the Energy Commission's general data collection authority under PIIRA (Cal. Public Resources Code section 25354(f).) In addition, the Energy Commission has turned to other public and private sources of information. These included the John S. Herald, Inc., a private database of petroleum industry financial information, the Security and Exchange Commission's "EDGAR" database of corporate filings (such as 10q,10k and 20f financial reports), and the work of ICF, International, a consulting firm.

Based on its analysis of the information obtained in the course of the present investigation, the Energy Commission is persuaded that its routine collection and reporting upon information pertaining to the petroleum industry's profitability will provide an important contribution to the state's ability to develop and administer energy policy. In this regard, when adopting PIIRA the Legislature found that information and data concerning all aspects of the petroleum industry is essential for the state to develop and administer energy policies that are in the interest of the state's economy and the public's well-being.[22]

Although it is clear that Cal. Public Resources Code section 25254(f) and other statutes, including Cal. Govt. Code sections 11180, *et seq*., provide the Energy Commission with authority to investigate the industry's profitability on an *ad hoc* basis, it is not clear that the Energy Commission has authority under PIIRA to collect data on the petroleum industry's profitability on a routine basis, and apart from an investigation. Given the value of this information for the purposes served by PIIRA, the Energy Commission recommends that its data collection authority under PIIRA be clarified and amended in the manner described below. Complementary changes in the Information Practices Act are also recommended below, in order to allow the Energy Commission to routinely collect financial information from all gasoline and diesel fuel retail outlets in the state.

New authority requirements

In the narrative which follows, each recommended area of statutory change is separately described according to subject matter. Suggested statutory language is provided in Appendix E.

Financial Information Generally: In order to conduct a profitability analysis of the petroleum industry on an ongoing basis, including the profitability factors

described under existing PIIRA regulation,[23] the Energy Commission seeks new legislative language explicitly authorizing the Energy Commission, by order or rule, to collect the financial information which is necessary to assess the state of California's petroleum industry as a whole, and of the individual business entities which, together, comprise that industry.

Cost Data: In order to conduct a profitability analysis of the petroleum industry on an ongoing basis, new legislative language clarifying the Energy Commission's data collection authority under Cal. Pub. Resources Code section 25354(f) is desirable in order to enable the Energy Commission to routinely collect specific information on costs associated with various types of sales of refined petroleum products. Currently, only prices and quantities are being collected with respect to these sales, reported on a weekly and monthly basis. With price, quantities AND cost data, the Energy Commission will be able to arrive at profit margins for the reported sales of various refined petroleum products *(i.e.*,, sales of various grades of gasoline, diesel fuel, kerosene, finished aviation gasoline, etc.)

Spot Market Trades: It is not clear that the Energy Commission currently has statutory authority to compel refiners and petroleum market traders to routinely provide daily accounting of spot pipeline transactions. To better assess the potential severity of temporary market disruptions, closer monitoring of spot pipeline volumes associated with daily transactions would more accurately gauge the relative degree of supply problems. Currently, only spot prices for refined products are reported on a daily basis; the Energy Commission has no information as to the quantities and identity of the companies involved in these daily transactions. Access to this type of information on a routine basis would enable the Energy Commission to monitor the change in spot activity (volume) to ascertain the relative importance of rapid price fluctuations. Amendments to the current Petroleum Industry Information Reporting Act data collection statute (Cal. Pub. Resources Code section 25354) could provide the necessary authority to conduct this work.

Marine Terminal Operations: The Energy Commission's June 2006 *Interim Report to the Governor: Spring 2006 Petroleum Fuels Price Spike* concluded that for three weeks, from April 18 until May 9, 2006, California fuel prices spiked and Californians paid $122 million more for retail gasoline and diesel fuel than normal. This June 2006 report described that the Energy Commission would, in preparation of the instant report, examine a number of factors which may have contributed to this price spike, including marine infrastructure congestion. PIIRA presently contains no provision explicitly authorizing the Energy Commission to collect information pertaining to marine infrastructure congestion on an ongoing basis. Thus, the Energy Commission's PIIRA records lack historic or current data on this subject.

Marine vessel traffic and other information which could indicate congestion at the petroleum berths in the Ports of San Pedro/Long Beach, and in the San

Francisco/Oakland area is routinely collected by the Southern California Marine Exchange and the Marine Exchange of the San Francisco Bay Region, respectively. The Energy Commission accessed vessel traffic data through these exchanges, on a short-term subscription basis, as part of its present analysis.

In terms of petroleum, as an “energy island” California is dependent upon oil imports at marine terminals to maintain refinery utilization at levels sufficient to meet market needs. Congestion at these terminals reduces the availability of crude oil for refinery operations, diminishing the supply of transportation fuels. Moreover, the perception that congestion is occurring, or will occur, could have an adverse impact on spot market prices. Collecting information on the capacities and utilization of marine terminal offloading, storage and re-delivery facilities provides important information on a factor exerting a significant influence on market prices. For these reasons, the Energy Commission suggests the Legislature enact the statutory language amending PIIRA to explicitly authorize the Energy Commission’s ongoing collection of marine infrastructure and vessel traffic information, either from the marine exchanges directly or the owners or operators of marine vessels transporting petroleum products, and owners and operators of the associated marine terminals.

Confidentiality: The confidentiality provisions of PIIRA (Public Resources Code section 25364) are a vital, if not pivotal, contributor to the petroleum industry’s willingness to provide survey data on a voluntary basis. Scarce time and valuable resources of the Energy Commission and industry participants were conserved during the preparation of this report because it was not necessary to resort to formal legal discovery through interrogatories and subpoenas. This reflects the longstanding contribution of these confidentiality provisions towards the success of the PIIRA program. The Energy Commission strongly supports the continuation of confidentiality for competitively sensitive or proprietary information that is sought under its PIIRA data collection.

Nevertheless, in the dynamics of the modern market place, where it has been shown that California markets in electricity and natural gas have been subjected to various forms of actual and attempted manipulation, it is important that confidentiality not serve as a cloak to possible improper conduct. The Energy Commission recommends that the Legislature adopt statutory language permitting it to share PIIRA information, on a confidential basis, with California’s Attorney General, similar to the statutory exception permitting the Energy Commission to share PIIRA data on a confidential basis with the California Air Resources Board. This would be an efficient use of resources and reduce the burden on the petroleum industry by obviating the need, by the Attorney General, to issue subpoenas to particular companies for data that is duplicative of what the companies have previously provided to the Energy Commission under PIIRA.

To illustrate, during the course of the Attorney General’s similar, but not identical, investigation of the oil companies doing business in California, the Energy

Commission was approached by various petroleum companies with the request that we share their PIIRA data with the Attorney General's Office. Due to the confidentiality provisions of PIIRA, the Energy Commission was legally prohibited from doing so. Instead, the Energy Commission made copies of certain PIIRA data in its possession and provided the data to the supplying company, for that company's subsequent delivery of the data to the Attorney General's Office.

> For these reasons, the Energy Commission seeks an additional exception to PIIRA confidentiality so that it might facilitate ongoing investigations by California's Attorney General by sharing PIIRA data, on a confidential basis, upon the Attorney General's written request (without resort to formal subpoena.)

Retail Service Stations: With regard to retail service station costs and profits, the Energy Commission does not possess an accurate or complete list of independent retail outlets. To determine if there are differences in profitability between refiner-owned and operated retail outlets, and independent retail outlets, and to determine the contribution of retail outlets to a major oil company's profitability, the Energy Commission has newly adopted the California Retail Fuel Outlet Survey Annual Report (Title 20, Cal. Code of Regulations, section 1366, Appendix C, Section VI. This first such survey will occur in 2007, reporting upon 2006 business information. The effectiveness of this survey, in 2007 and subsequent years, will be limited, however, because the Energy Commission lacks the identifying information necessary to deliver this survey to <u>all</u> of the state's retail fuel outlets, particularly the independent retail outlets.

The California State Board of Equalization (BOE) has statutory authority to collect taxes and business information from retail outlet operators, including the names and addresses of retail outlet operators, but is generally prohibited under the Information Practices Act (see Cal. Civil Code sections 1798.24 and 1798.69) from sharing this identifying information with other state agencies or members of the public. If the prohibitions contained under the Information Practices Act are amended to permit BOE to share their service station information, on a confidential basis, with the Energy Commission, the Energy Commission would be able to conduct an ongoing retail service station profitability analysis which could extend to all relevant segments of the retail petroleum marketing sector. For this purpose, the Energy Commission suggests amending existing language under the Information Practices Act which is directed towards the BOE's authority to release names and addresses.

Endnotes

[1] Governor Arnold Schwarzenegger's April 24, 2006, letter to the California Energy Commission.

[2] Source: Energy Information Administration, *EIA 2006 Refinery Capacity, Table 4*

[3] A list of all of the refineries operating in California can be located at the following link: http://www.energy.ca.gov/oil/refineries.html

[4] Refiners are able to increase production of gasoline during the winter months because they are able to use certain types of gasoline blendstocks (such as butane) that cannot be blended into gasoline during the summer months due to air quality volatility regulations.

[5] 2005 pipeline shipments to Arizona from California averaged 145 thousand barrels per day (TBD) for all fuel types. Pipeline shipments to Nevada from California averaged 164 TBD for all fuel types for 2005.

[6] The sales tax adjustment consisted of calculating the difference in price between crude oil values for 2006 compared to 2005 and applying a sales tax rate of 7.9 percent to that crude oil difference. Higher crude oil prices are not part of the increased cost of fuel that can be directly attributed to other factors that can increase the wholesale and retail price of transportation fuels. Over the period of May 1 through July 31, 2006, the incremental sales tax due solely to increased crude oil values relative to the previous year were calculated at $150 million for gasoline and $28 million for diesel fuel. These values were not included in the calculated costs to consumers as a result of the price spike.

[7] Bureau of Transportation Statistics, National Household Travel Survey, http://www.bts.gov/publications/highlights_of_the_2001_national_household_travel_survey/pdf/entire.pdf

[8] U.S. Census Bureau, The 2006 Statistical Abstract, http://www.census.gov/compendia/statab/population/estimates_and_projectionsstates_metropolitan_areas_cities/

[9] American Public Transportation Association, http://www.apta.com/research/stats/ridershp/uzapmiles.cfm

[10] This estimate is based on gasoline consumption statistics from the National Household Transportation Survey conducted by the Energy Information Administration branch of the Department of Energy for the Pacific West region. California population and consumption statistics are used to distribute total non-commercial gasoline sales along income categories. A short-term regression forecast of California consumption was used to obtain expenditure estimates for May of 2006. See Appendix A for details.

[11] American Trucking Association, "ATA Revises Diesel Fuel Cost Estimate for 2006", http://www.truckline.com/NR/exeres/006D04AC-C3A4-4E37-A97D-98E9D51E5311.htm

[12] Interview with John Seibert, Project Lead, Owner-Operator Independent Drivers Association

[13] FedEx, http://www.fedex.com/us/services/fuelsurcharge.html?link=4#jan0206

[14] Bureau of Labor Statistics, http://www.bls.gov/cpi/cpigasfac.htm

[15] United States Department of Agriculture, Census of Agriculture, http://www.nass.usda.gov/Census_of_Agriculture/index.asp

[16] This estimate is based on taxable gasoline sales figures for March 2006 from the California State Board of Equalization. A link can be found at: http://www.boe.ca.gov/sptaxprog/reports/mar06.xls

[17] A history of PIIRA, the relevant statutes, detailed description of information collected, and examples of data collection forms is located at the following link: http://www.energy.ca.gov/oil/piira/index.html

[18] Cal. Public Resources Code section 25354.

[19] Title 20, Cal. Code of Regulations, sections 1365.2, 1366 (including Appendices A – C), and 1368.1.

[20] "Infrastructure" in this context means the physical means of obtain, storing, processing, and distributing crude oil and refined petroleum products. This would include facilities located at marine terminals and refineries, plus transportation pipelines, tanker-trucks, and storage tanks.

[21] Oil and petroleum statistics, along with related reports, may be accessed from the following link: http://www.energy.ca.gov/oil/index.html

[22] See Cal. Public Resources Code section 25350(c).

[23] Cal. Public Resources Code section 25356(a)(5) describes that the Energy Commission's analysis of data submitted to it under PIIRA and from other sources extends to examining "The profits, both before and after taxes, of the industry as a whole and of major firms within it, including a comparison with other major industry groups and major firms within them as to profits, return on equity and capital, and price-earnings ratio."