

CALIFORNIA  
ENERGY  
COMMISSION

# ETHANOL MARKET OUTLOOK FOR CALIFORNIA

**STAFF REPORT**

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# Executive Summary

## Introduction

The California Energy Commission (Energy Commission) recently conducted a survey of California refiners to quantify and assess their current and future ethanol use. Specifically, the survey was used to assess what impact, if any, the U.S. Energy Policy Act of 2005 (which gives refiners the option to alter their ethanol use) would have on the near-term use of ethanol and supply of gasoline in California. No refiner reported any plan to change their ethanol use.

## Ethanol Blending, Logistics and Supply

- The average daily gasoline production in California is made with about 6 percent ethanol by volume.
- California's estimated demand for ethanol in 2005 is 900 million gallons.
- Nearly a third of all California refiners are marketing a portion of their Phase 3 California Reformulated Gasoline (CaRFG3) production with ethanol at a concentration at or greater than 7.7 percent by volume.
- Ninety five percent of the ethanol delivered to California is transported via rail cars, and five percent is delivered to California via barge or marine tanker.
- Currently, 4.3 million gallons per year of ethanol are produced in state. A new facility is expected to open by the end of 2005 that would increase in-state ethanol production capacity by 25 million gallons per year.
- Approximately 87 percent of all ethanol used in California was procured under contract by California refiners. The remaining 13 percent was obtained on the spot market. The majority of the contracted ethanol (88 percent) was purchased at a fixed price.

## Potential for Increased or Decreased Use of Ethanol

- California refiners have no plans at this time to increase or decrease their current ethanol blending percentage in California's motor gasoline over the near term, due to: obligations to ethanol contracts that have not yet expired, lack of specificity for the credit trading provisions of the Renewable Fuels Standard (RFS), inadequate capability to segregate multiple types of gasoline with varying concentrations of

ethanol, and uncertainty regarding the final disposition of the revisions to the California Predictive Model regulations.

- In general, California refiners are not marketing non-oxygenated CaRFG3 anywhere in the state; nor do they plan to market non-oxygenated CaRFG3 in the near future.
- Many refiners reported that an ethanol ban during summer months would severely limit their ability to produce an adequate volume of gasoline that meets California Air Resource Board (CARB) requirements. One refiner reported that it would stop producing gasoline for use in California if ethanol were banned for use during the summer months.

## **E85 Marketing**

- E85 is 85 percent ethanol and 15 percent gasoline. Although none of the survey respondents indicated any programs to actively market E85 in California over the next five years, a California refiner and various stakeholders are currently examining this fuel marketing option.

## **Pentane Use**

- California refiners have adjusted their gasoline blending practices to decrease the concentration of high volatility components (such as butane and pentane) in California summer gasoline to enable the use of ethanol.
- California summer gasoline averages 5.2 percent pentane, California winter gasoline averages at 6.8 percent, and gasoline exported to neighboring states has the highest level of pentane at 13.6 percent.

# Ethanol Market Outlook

## Introduction

The California Public Resource Code Section 25356(b) directs the Energy Commission to analyze the impacts of state and federal policies and regulations on the supply and pricing of petroleum products. The Energy Commission recently conducted a survey of California refiners to quantify and assess their current and future ethanol use. Specifically, the survey was used to assess what impact, if any, the U.S. Energy Policy Act of 2005 would have on the near-term use of ethanol and supply of gasoline in California.

The authority to gather the information in this survey is outlined in the Petroleum Industry Information Reporting Act (PIIRA), Public Resources Code Sections 25350-25366. As specified in PIIRA, all proprietary information submitted to the Energy Commission will be held in confidence. To ensure confidentiality, information gathered from the survey and described in this report has been aggregated.

The following results are based on 12 responses out of 14 California refiners that currently produce reformulated gasoline for use in California and collectively represent 92 percent of the crude oil processing capacity.

## Background

The Energy Commission has conducted evaluations of the state's ethanol supply options and prospects since the 1999 Governor's Executive Order (D-5-99) directed the phase out of Methyl Tertiary Butyl Ether (MTBE). When MTBE was phased out of California gasoline, ethanol became the substitute oxygenate to meet federal air quality requirements.

The passage of the U.S. Energy Policy Act of 2005 established new laws affecting transportation fuels in California and the nation. These laws are summarized (staff comments are also included in this summary) in Appendix B.

## Goals of the Survey

Provisions of the U.S. Energy Policy Act of 2005 allow California refiners flexibility to decrease the amount of ethanol blended into gasoline. If the amount of ethanol blended into gasoline decreased, the State's overall gasoline supply would decrease absent a combination of significant refinery modifications and increased imports of key gasoline blending components. This survey was used to assess what impact, if any, the U.S. Energy Policy Act of 2005 would have on the use of ethanol and supply of

gasoline in California. In addition, the survey was used to assess whether there would be any impact to gasoline supply if ethanol use in gasoline was prohibited during the summer driving season in California. Specifically, the survey was used to:

- Determine the level of ethanol that is currently used in gasoline production.
- Collect data on plans for changing ethanol blending percentage in the near term.
- Identify challenges that could arise if ethanol levels were either increased or decreased.
- Determine the oil industry's plans to market E85.
- Collect data on surcharges (applied to purchasers or sellers) on the use of ethanol.
- Collect data on typical procurement methods used to acquire ethanol and identify any supply issues.
- Determine the extent to which gasoline is supplied without oxygenates in California.
- Assess future marketing plans, if any, concerning non-oxygenated fuels.
- Collect data on challenges or barriers to marketing greater volumes of non-oxygenated fuels.
- Determine what effect, if any, that an ethanol prohibition during the summer season would have on fuel supplies.
- Quantify how much pentane is being used in California refineries.

## **Survey Approach and Process**

The Energy Commission staff developed a survey questionnaire in the summer of 2005 and distributed it to all refiners in California. Refining companies owning multiple refineries in California were asked to submit specific information for each refinery. The 2005 California Refiners and Ethanol-Related Issues Survey questionnaire is provided in Appendix A.

Surveys were submitted to the Energy Commission by fax, mail, or electronic mail. All companies were given approximately one month to complete the survey, although the Energy Commission granted extensions that were requested by some refiners. These extensions were requested (and granted) by refiners impacted by Hurricanes Katrina and Rita.

All data submitted pertains to the time period of July 1, 2004, through June 30, 2005, unless otherwise specified in this report. Information provided by each California refiner is held in confidence by the Energy Commission in accordance with provisions of PIIRA.

## **Survey Results**

The survey resulted in findings in four areas:

- Ethanol blending, logistics and supply
- Plans to change the current volume content of ethanol in gasoline
- E85 marketing
- Pentane disposition

### **Ethanol Blending, Logistics, and Supply**

Ethanol is the only oxygenate approved for use in California. Previous federal air quality standards required gasoline sold in all severe or extreme ozone nonattainment regions of the country to contain at least 2 percent oxygen by weight. Due to the oxygen content of ethanol, this requirement resulted in a minimum of 5.7 percent ethanol blend by volume.

Ethanol has been used as a blending component in gasoline to increase octane levels for engine performance and to meet air quality regulations. Unfinished gasoline is shipped to terminals via pipelines. At the terminal, ethanol is added to the unfinished gasoline during truck loading. As a result, the percentage of ethanol added to the unfinished gasoline has a direct and quantifiable effect on the total volume of gasoline produced in California.

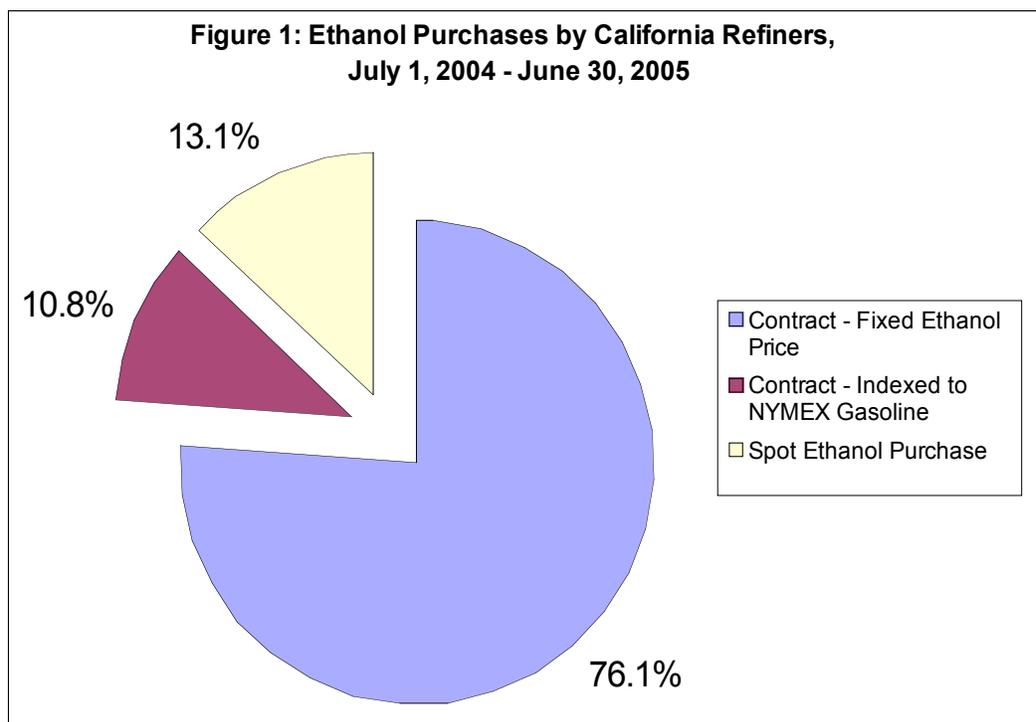
The average daily gasoline production in California is made with about 6 percent ethanol by volume. Survey results show that approximately one third of all California refiners blend a portion of the gasoline production at or above an ethanol concentration of 7.7 percent by volume. California refiners usually produce more than 970,000 barrels of gasoline daily. Five percent of all fuel produced daily is at an ethanol concentration of 7.7 percent or greater (50,000 barrels per day). Of the refiners that produce a portion of their gasoline with higher than 5.7 percent ethanol, that gasoline tends to be between 7.7 percent to 10 percent ethanol. The majority of California refiners that produce a portion of their gasoline production at a higher ethanol concentration use 7.7 percent ethanol as their blending percentage.

Refiners did report that there are some periodic challenges to consistent ethanol delivery logistics. Most California refiners reported logistical difficulties associated with intra-state movement of rail cars, causing delays in delivery that, at times, result in

operating difficulties. Ethanol has additional handling costs because it must be delivered to most terminals in a tanker truck coming from another distribution hub in California. The range of these costs could not be aggregated for this report. To manage supply and demand imbalances, some refiners used marine vessels to deliver ethanol in 2004 and 2005.

Approximately half of all California refiners must pay surcharges for ethanol blending as fuel purchasers. Rail terminals assess fees for offloading ethanol. Refiners are also assessed fees for trucking ethanol to gasoline distribution terminals. Terminal fees (also called blending/ethanol injection fees) are also often charged. Not all refiners reported the amount of these fees. Furthermore, many refiners incurred their surcharges at varying material handling points. These refiners reported that they did not expect the “per unit” fees to increase if the total volume or blending percentage of ethanol were to increase.

Refiners also reported on the procurement arrangements they use to secure sufficient quantities of ethanol (see **Figure 1**). Roughly 87 percent of all ethanol that is used by California refiners is purchased via contracts. The remaining 13 percent is purchased on the spot market. Most of the contracts are six months or longer. Of the contracted portion, 88 percent is based on a fixed price, with the remaining 12 percent based on an indexed price usually linked to the NYMEX unleaded gasoline price.



According to the refiners’ responses, approximately 1.1 million barrels of foreign ethanol were imported from July 1, 2004, to June 30, 2005. These imports are

predominately delivered via the Caribbean Basin, which has special relief from the U.S. ethanol import tariff as a result of the U.S. Caribbean Basin Initiative. This initiative was signed into law as part of Caribbean Trade Partnership Act of 2000 and allows ethanol to enter the United States duty free (avoiding the 54 cent-per-gallon import tariff) from Caribbean countries.

## **Plans to Decrease Current Volume Content of Ethanol in Gasoline**

Until recently, all gasoline sold in areas of California that did not meet federal air quality ozone attainment requirements was required to include oxygenates. In 1999, Governor Davis' Executive Order (D-5-99) directed the phase-out of Methyl Tertiary Butyl Ether (MTBE). In 2000, ethanol became the only oxygenate that could be used in California gasoline after it was found to be safe for the environment and public health. The phase out of MTBE and the transition to increased use of ethanol in California's gasoline was primarily initiated in January 2003 when more than half of the refiners completed the transition. Prior to that time, a smaller portion of the state's gasoline had already been blended with ethanol or was produced without the use of any oxygenates. By January 2004, the transition to ethanol was complete.

Under the current provisions of the U.S. Energy Policy Act of 2005, oxygenates are no longer required in gasoline in California except for carbon monoxide non-attainment areas. In the Energy Commission survey, refiners were asked to provide information on their use of ethanol. None of the refiners indicated that they would alter their current ethanol blending practices over the near-term as a result of these provisions. In fact, many of the refiners indicated that they would either stay at current ethanol levels or possibly consider a higher percentage of ethanol content in the future.

Even though the federal oxygenate requirement has been eliminated, there is a pending issue involving California's own air quality regulations. California regulations allow refiners to use the California Air Resources Board's (ARB) Predictive Model to specify fuel formulations to address emissions. The Predictive Model is a set of mathematical equations that relate emission rates to the values of the eight regulated gasoline properties and is credited with increasing the flexibility of gasoline blending in California. ARB has initiated a process to update this model to include new automobile emissions testing information.

In September 2004, the ARB published the results of its permeation study, which found that evaporative emissions from vehicles increased with the use of ethanol. A new study is underway. The ARB is conducting analysis to quantify the additional air pollution that will need to be offset through revisions to existing air quality regulations. Since all of this work has not been completed, uncertainty remains regarding the ultimate outcome of both the revision of the current Predictive Model and the mitigation of ethanol permeation emissions. Therefore, it is too early to tell if the future use of ethanol as a gasoline blending component will be easier or more difficult until these revisions have been completed.

Refiners reported that they are not likely to produce additional quantities of non-oxygenated gasoline over the near term because non-oxygenated gasoline is not fungible with products containing ethanol and would create logistical and storage issues. Furthermore, many survey respondents indicated that it is difficult to meet state air quality regulations without oxygenates. Ethanol is a key blending component used for meeting specific octane levels. Eliminating the use of ethanol, without increasing imports of certain types of gasoline blendstocks and completing lengthy modifications to refinery process units, would reduce gasoline production capability.

Not being able to use ethanol in summer gasoline formulations would present many challenges to California refiners. One refiner reported that a summer ethanol prohibition would cause their refinery to close. Another refiner reported that an ethanol ban in summer months would severely limit their ability to produce adequate volumes of CARB compliant gasoline. Overall, a prohibition of ethanol use during the summer months would decrease gasoline production by a minimum of 10 percent for most refiners.

## **Plans to Increase Current Volume Content of Ethanol in Gasoline**

Currently, no California refinery reported plans to blend ethanol above their current blending levels for CaRFG3. It should be noted that a switch from 5.7 to 7.7 percent by volume ethanol would enable most producers to expand their gasoline production capability by more than the two percent volume provided by the additional quantity of ethanol. Expanded gasoline output can be accomplished by introducing additional quantities of different gasoline blending components that refiners could use if the amount of ethanol was increased. Although the range of “gasoline pool swelling” was not quantified in this survey, comments from various refiners during follow-up conversations indicated that the total gasoline production could increase by more than 4 percent. If refiners did pursue higher ethanol content in gasoline, a variety of issues would have to be addressed to accommodate this change. For example:

- Increased ethanol content could exacerbate problems associated with a constrained infrastructure. More railcars, trucks and storage tanks would be needed to handle the increased volumes of ethanol.
- Increased ethanol content would increase demand by up to 35 percent, compared to current levels, potentially resulting in temporary ethanol supply challenges.
- Unfinished gasoline is shipped to distribution terminals via pipeline. Gasoline is held in common tanks from various refiners and is fungible. Product fungibility could be a logistical problem if refiners produce gasoline intended for blending with different amounts of ethanol.

- Changes in air quality regulations could make it more difficult to blend ethanol at higher percentages. In particular, higher oxides of nitrogen (NO<sub>x</sub>) emissions associated with increasing ethanol concentrations would have to be offset with lower sulfur levels in gasoline to ensure compliance with state air quality regulations. For some refiners that are already producing gasoline with low sulfur concentrations, increasing the use of ethanol could be more difficult.

## **E85 Marketing**

E85 is a fuel that can be used as an alternative to gasoline in motor vehicles that are specifically designed to operate on the two fuels. E85 is 85 percent ethanol and 15 percent gasoline. Many vehicles sold in California are “E85” ready – allowing consumers to switch to E85 and use less gasoline without changing the type of vehicle they are accustomed to driving. Although none of the survey respondents indicated any programs to actively market E85 in California over the next five years, there are some ongoing discussions involving a California refiner and various stakeholders examining this fuel marketing option. Logistical issues similar to those described for increased ethanol content in gasoline apply to E85 as well.

According to survey respondents, the capital investment to make these changes would be substantial. The actual costs of these estimated investments were not included in the refiners’ responses. In addition to the capital expenditures, the following were identified as issues that would need to be resolved before significant consideration of E85 marketing could be pursued:

- Will the ethanol portion of the E85 be considered part of a company’s “fair share” portion of the Renewable Fuel Standard obligation?
- What dispensing standards for service station distribution of E85 need to be resolved?
- What precautions can be undertaken to ensure that consumers do not fuel their gasoline-only vehicles with E85 (a violation of most vehicle manufacturer’s warranties)?
- Will ethanol’s value relative to gasoline remain at a discount that is sufficient to offset the fuel economy penalty of E85?

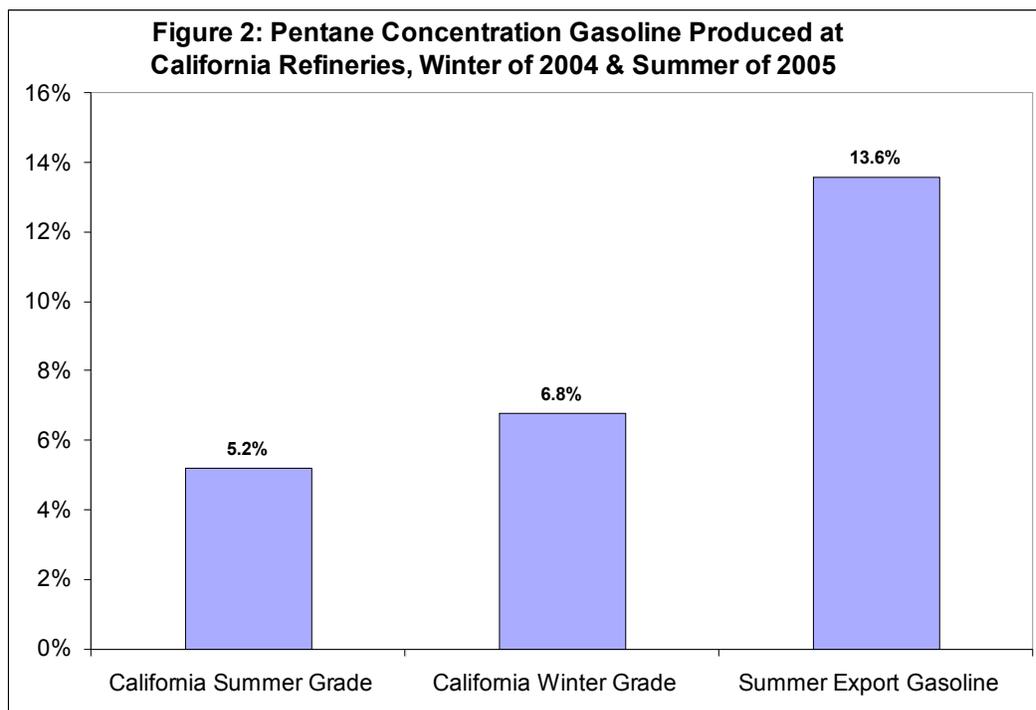
## **Pentane Use**

The Energy Commission surveyed refiners on pentane diversion and uses in California to more accurately quantify the disposition of pentane in CaRFG3 and other gasoline produced for export.

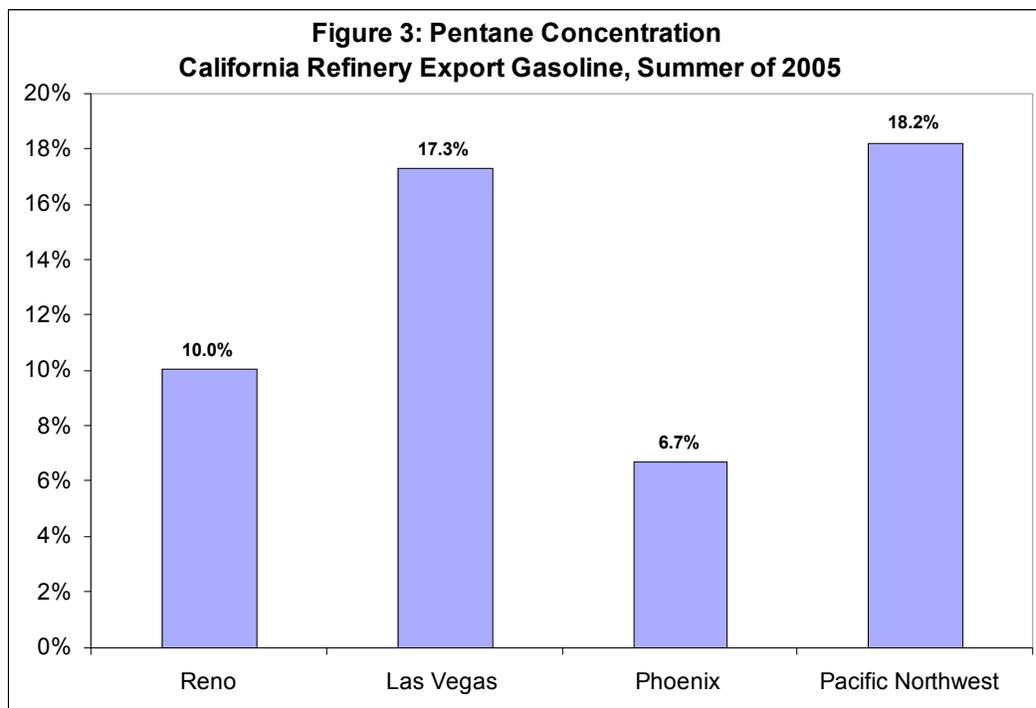
Pentane is a naturally-occurring liquid hydrocarbon associated with crude oil processing. During the refining process, refiners adjust their gasoline blending practices to decrease the concentration of high volatility components (such as butane and pentane) in California summer gasoline to facilitate the use of ethanol. During the summer months, air quality requirements establish a more stringent Reid Vapor Pressure (RVP) limit on all California reformulated gasoline. When ethanol is added to gasoline, the RVP increases. To bring the gasoline back within acceptable RVP limits, the concentration of pentane is reduced.

During the winter months, the RVP limit is substantially higher and the concentration of pentane (as well as butane) in the gasoline can rise. Refiners who store pentane, or intentionally alter their blending practices to minimize the concentration of pentane in their gasoline, directly input additional pentane or allow higher concentrations of pentane-rich gasoline process streams to be blended back into the winter gasoline. The majority (two-thirds) of the pentane is stored locally in rail cars and storage tanks, while the remainder is temporarily stored outside the state.

Some refiners don't appreciably alter their pentane concentration when they transition to winter gasoline blends; instead they increase the concentration of butane in their winter gasoline to help achieve the higher RVP standards. In these cases, the actual concentration of pentane in winter gasoline is lower due to the increased quantity of butane. Overall, the concentration of pentane in California's gasoline is lower during the summer season (5.2 percent by volume), higher in the winter season (6.8 percent by volume), and highest for the average summer grade of gasoline exported to neighboring states (13.6 percent by volume). **Figure 2** provides a comparison.



California refiners also produce gasoline for other states, including Arizona, Nevada and the Pacific Northwest (primarily Oregon). These other states have their own air quality requirements and gasoline fuel property specifications that differ from California's. As a result, the concentration of pentane in gasoline produced for these states is usually higher than the concentration in California gasoline. This allows refiners to continue using the pentane as a gasoline blending component, maintaining or even slightly expanding their export gasoline production capability. **Figure 3** summarizes those differences.



California refiners have limited alternative uses for pentane when not blending it into gasoline. In some instances, the pentane can be burned as a fuel for refinery processes or used as a feedstock for hydrogen production. Nevertheless, the higher value use of pentane as a gasoline blendstock is usually the most common California refiner practice.

## Conclusions

California refiners reported that they intend to maintain current levels of ethanol usage in California gasoline. The U.S. Energy Policy Act of 2005 gives California refiners the option to alter their ethanol use, but none of the refiners responding to the survey plans to immediately act on that flexibility. The primary reasons include: obligations to ethanol contracts that have not yet expired; lack of specificity for the credit trading provisions of the Renewable Fuels Standard (timetable yet to be determined); inadequate capability to segregate multiple types of gasoline with varying

concentrations of ethanol; and uncertainty regarding the final disposition of the revisions to the California Predictive Model regulations.

In the event that California refiners elected to increase their ethanol use by volume, many infrastructure issues will need to be addressed. Modifications and/or expansions to the existing distribution infrastructure will be needed to allow for the movement and storage of additional quantities of ethanol. This could mean more storage tanks, trucks, and rail cars dedicated to ethanol. Increased ethanol use could also mean more deliveries via marine vessel. In this case, the already impacted marine ports may need to be expanded, if the portion of ethanol imported from abroad grows.

California refiners do not plan to market additional non-oxygenated gasolines in the near future. However, should there be an ethanol prohibition during the summer driving months, many refiners reported that production rates would be severely reduced – and possibly more if refinery closures occur. Increased distribution of non-oxygenated gasoline could cause logistical difficulties in the petroleum product infrastructure during the summer driving season because there is inadequate segregation storage capability to handle both types (ethanol and non-oxygenated) of gasoline. The inability to blend the two types of gasoline together during the summertime would also diminish flexibility of the fuel marketers to adequately supply California's consumers.

# Appendix A: Survey of California Refiners on Ethanol

## Ethanol Blending, Logistics and Supply Questions

1. Do you currently market any Phase 3 California Reformulated Gasoline (CARFG) with ethanol at a concentration above 6% by volume?  
 Yes, continue to question 1.1  
 No, continue to question 2  
  - 1.1. If so, at what locations, ethanol concentration, and approximate daily volumes (in thousands of barrels per day - TBD) are these fuels being dispensed?
2. Do you plan to increase your ethanol-blending percentage above 5.7 percent for Phase 3 CARFG?  
 Yes, continue to question 2.1  
 No, continue to question 3  
  - 2.1. If yes, what is your target blending percentage? When and where do you plan to implement this new blending percentage?
3. What changes (if any) are required to blend ethanol at a higher percentage? Please describe any processing changes or infrastructure requirements as a result of a new blending percentage.
4. Do you face or charge any surcharges related to blending ethanol, either as a purchaser or as a seller?  
 Yes, continue to question 4.1  
 No, continue to question 5  
  - 4.1. Describe the current surcharges. Will these surcharges change as a result of a change in the blending percentage? If so, describe.
5. What are the limiting factors or considerations that may affect the ability to blend ethanol with California Air Resource Board Oxygenate Blend (CARBOB) at higher concentrations than 5.7 percent by volume?
6. How is ethanol initially supplied to California for your operations? Please provide a separate volume breakdown (TBD) for rail and marine vessel deliveries. Volume calculations should include all of the ethanol delivered between July 1, 2004 and June 30, 2005.
7. Have you experienced any logistical difficulties associated with these recent ethanol movements?  
 Yes, continue to question 7.1  
 No, continue to question 8  
  - 7.1. If so, please detail these difficulties.
  - 7.2. Describe potential solutions your company or other entities could take to lessen or fully resolve these logistical difficulties.
8. What average daily volume (TBD) of your ethanol was contracted (6 months or longer) and what average daily volume (TBD) was purchased on the spot market (between July 1, 2004, and June 30, 2005) for use in California? Of the contracted portion, what percentage is at a fixed price versus

the percentage that is at an indexed price? What is the reference used for the indexed contracts (Oil Price Information Service (OPIS) CARFG spot price, etc.)? What portion (volume in barrels) of your ethanol supply was from foreign sources (between July 1, 2004, and June 30, 2005)? If foreign sources were a portion of your overall supply, what total volume was imported under the Caribbean Basin Initiative (CBI) during the same time period?

9. Does your company plan on marketing any E85 in California over the next five years?

- Yes, continue to question 9.1
- No, continue to question 10

9.1. If so, what are the targeted sales volumes (TBD) and locations?

10. What type of modifications, if any, would need to be made to market E85 at an existing or new retail outlet? What are the estimated costs per retail outlet to make these modifications?

### **Oxygen Waiver Questions**

11. Is your company currently marketing non-oxygenated Phase 3 CARFG in the San Francisco Bay Area or any other region of the state?

- Yes, continue to question 11.1
- No, continue to question 12

11.1. If so, what are the current average volumes (TBD) of non-oxygenated CARFG production at each of your refineries? Are there any logistics issues related to this distribution?

12. Since the Energy Policy Act of 2005 allows refiners and other blenders to market reformulated gasoline in California without any oxygenates, will your company market a greater percentage of non-oxygenated RFG?

- Yes, continue to question 12.1
- No, continue to question 13

12.1. If so, what quantity (TBD), what regions of the State, and what timing? What is the maximum production capability for non-oxygenated gasoline at each of your refinery locations for summer and winter grades of Phase 3 CARFG, respectively?

13. Are there factors that limit your ability to market greater quantities of non-oxygenated RFG?

- Yes, continue to question 13.1
- No, continue to question 14

13.1. If so what are these factors (octane short, lack of segregated storage capacity, lack of fungibility, loss of dilution benefit, etc.)?

14. Would an ethanol prohibition during the eight summer months in California, beginning in 2006, result in octane replacement challenges or supply difficulties? What approximate quantity (TBD) of complying Phase 3 CARFG could you produce at each of your refineries during the summer months without the use of ethanol (assuming no capital expenditures for new or modified process units)?

**Pentane Disposition Questions** (please provide responses to questions 16 through 21 for each of your refineries operating in California)

15. What average quantity (TBD) of pentanes was stripped out from your refinery's gasoline pool during the summer months (April 1 through June 30, 2005)?

16. What average volume of pentanes (TBD) was blended into summer grade California RFG during this same period? What percentage does this represent for finished CARFG?
17. What average volume of pentanes (TBD) was blended into summer grade gasoline for export during this same period? What concentration of pentane (volume percentage) was contained in the finished gasoline exported to Reno, Las Vegas, and Phoenix, respectively?
18. Please quantify the uses (TBD) for pentanes produced at your refinery when it was not blended into gasoline during the summer months (April 1 through June 30, 2005)? Quantify each that applies to your refinery below:
  - a. Feedstock for hydrogen production
  - b. Feedstock for other process units (please specify which units)
  - c. Export from California (neat pentanes in rail car or marine vessel), not for purposes of storage
  - d. Other (please specify)
19. What volume of pentanes (TBD) is currently being placed into storage for later use (during the winter months)? Provide the storage breakdown by the following:
  - a. Rail cars stored in California
  - b. Rail cars stored outside of California
  - c. Temporary underground storage outside California
  - d. Other (please specify)
20. What volume of pentanes (TBD) was blended in winter-grade California RFG (November 1, 2004 through February 28, 2005)? What concentration of pentane (volume percentage) is contained in a typical gallon of winter-grade California RFG?

## Appendix B: Summary of ENERGY POLICY ACT OF 2005

### TITLE XV – ETHANOL AND MOTOR FUELS

Notable items in the Energy Policy Act of 2005 include a renewable fuels standard that mandates an increase in the use of fuels such as ethanol and biodiesel to 7.5 billion gallons by 2012 and the repealing of the Clean Air Act's requirement that reformulated gasoline contain 2 percent oxygen by weight.

#### **Subtitle A – General Provisions**

##### Section 1501 – Renewable content of gasoline

This section adds a provision to the federal Clean Air Act requiring that gasoline sold in the 48 contiguous states contain specified volumes of renewable fuel, starting with 4 billion gallons per year in 2006 and increasing to 7.5 billion gallons per year by 2012. For 2013 and beyond, the US EPA Administrator, in coordination with the Secretaries of Agriculture and Energy, will determine the applicable volumes of renewable fuel to be used. Biodiesel use can be also counted toward meeting the renewable fuel volume requirement. Any ethanol volumes derived from cellulosic sources (such as wood products) count extra by a ratio of 2.5:1 until 2013, when minimum volumes of cellulosic-derived renewable fuel are required to be used. The renewable fuel content requirement is applicable to “refiners, blenders, and importers, as appropriate” and includes provisions for credit trading between those using greater and lesser shares of the required volumes of renewable fuels.

The EPA Administrator is authorized to reduce the required volume of renewable fuel based on determination of inadequate supply or economic or environmental harm. Small refineries are exempted until 2011 and can be further exempted by a decision of the Secretary of Energy. Individual states may petition for waivers from applicability of the renewable fuel requirements. After 2006, the EPA Administrator is required to determine if there are “excessive seasonal variations in the use of renewable fuel” and, if necessary, promulgate regulations to assure that not less than 25 percent of the annual volume requirements are met in specified six-month (generally summer and winter) periods. However, California and adjacent state markets served by California are apparently excluded from this determination and any seasonality regulations that result. The EPA Administrator is required to develop implementing regulations and perform various surveys and studies related to the renewable fuel content requirement.

Effective in calendar year 2006, new federal renewable fuel content requirements will take effect amounting to a much different type of prescription for use of ethanol and other renewable fuels than the previous air quality-based oxygenated gasoline requirement. California's future use of renewable motor fuels, including changes in current levels of ethanol use (roughly 6 percent of the gasoline market), is left largely to be determined in the marketplace.

California's portion of the 7.5 billion gallon annual national renewable fuel content requirement in 2012 is close to the 900 million gallons of ethanol currently used in the state. The 7.5 billion gallons per year requirement in 2012 will represent only about 5 percent of the U.S. gasoline market, only one-half the potential national market for ethanol/gasoline blending, and perhaps only one-half the gasoline market growth over the intervening years. Adding in the market potential for biodiesel, it seems apparent that this national renewable fuel requirement should be readily attainable with or without California's participation.

Section 1504 – Elimination of oxygen content requirement for reformulated gasoline

This section eliminates the federal Clean Air Act requirement for oxygenated gasoline in ozone non-attainment areas of the country, effective immediately in California and after 270 days elsewhere. Oxygenated fuel requirements for carbon monoxide non-attainment areas are unaffected.

Section 1510 – Commercial byproducts from municipal solid waste and cellulosic biomass loan guarantee loan

This section establishes a U.S. Department of Energy program to provide guarantees of loans by private institutions for the construction of facilities for the processing and conversion of municipal solid waste and cellulosic biomass into fuel ethanol and other commercial byproducts.

Section 1511 – Renewable fuel and Section 1512 – Conversion assistance for cellulosic biomass, waste-derived ethanol, approved renewable fuels

These sections amend the federal Clean Air Act, creating new grant and loan guarantee programs, including a "Cellulosic Ethanol and Municipal Waste Loan Guarantee Program" to guarantee loans for commercial demonstration projects for cellulosic biomass and sucrose-derived ethanol. Federal grants are also authorized to academic institutions and consortia for renewable fuel production research and development. \$25 million per year is appropriated in fiscal years 2006 through 2010 for this program. Other provisions create a "Cellulosic Biomass Ethanol Conversion Assistance Program," providing grant authorization of \$250 million in 2006 and \$400 million in 2007 to merchant producers of cellulosic biomass ethanol. This is done to assist in building production facilities. A grant of \$4 million per year in fiscal years 2005 through 2007 is intended to develop biomass-to-ethanol technology at the Center for Biomass-Based Energy at Mississippi State University and Oklahoma State University. A "Conversion Assistance for Cellulosic Biomass, Waste-Derived Ethanol, and Approved Renewable Fuels" program is also authorized, with appropriation of \$100 million in 2006, \$250 million in 2007, and \$400 million in 2008.

Section 1513 – Blending of compliant reformulated gasolines

This section amends the federal Clean Air Act by instituting a prohibition against blending of batches of ethanol-blended and non-ethanol blended gasolines by fuel retailers.

Section 1514 – Advanced biofuels technologies program

This section establishes a program to demonstrate advanced technologies for the production of alternative transportation fuels, with authorization of \$100 million per year in fiscal years 2005 through 2009.

Section 1515 – Waste-derived ethanol and biodiesel

This section amends the Federal Energy Policy Act of 1992 (EPact) by revising the definition of biodiesel for EPact purposes.

Section 1516 – Sugar ethanol loan guarantee program

This section provides for loan guarantees for projects to demonstrate the commercial feasibility of producing ethanol using sugarcane and sugarcane byproducts as a feedstock.