

## DOCKETED

<b>Docket Number:</b>	15-PMAC-01
<b>Project Title:</b>	Petroleum Market Advisory Committee
<b>TN #:</b>	220986
<b>Document Title:</b>	Petroleum Market Advisory Committee Final Report
<b>Description:</b>	N/A
<b>Filer:</b>	Harinder Kaur
<b>Organization:</b>	California Energy Commission
<b>Submitter Role:</b>	Commission Staff
<b>Submission Date:</b>	8/31/2017 5:15:19 PM
<b>Docketed Date:</b>	9/1/2017

# **Petroleum Market Advisory Committee Final Report**

## **December 2014 to November 2016**

Prepared for: **California Energy Commission**  
Prepared by: **Petroleum Market Advisory Committee**

**California Energy Commission**

Edmund G. Brown Jr., Governor

August 2017 | CEC-200-2017-007



# California Energy Commission

**Primary Author(s):**

Severin Borenstein  
Kathleen Foote  
Dave Hackett  
Amy Jaffe  
James Sweeney

**Prepared for:**

**California Energy Commission**

Ryan Eggers  
**Project Manager**

Marc Pryor (Acting)  
**Office Manager**  
**SUPPLY ANALYSIS OFFICE**

Sylvia Bender  
**Deputy Director**  
**ENERGY ASSESSMENTS DIVISION**

Robert P. Oglesby  
**Executive Director**

## **DISCLAIMER**

This report was prepared as the result of work sponsored by the California Energy Commission. It does not necessarily represent the views of the Energy Commission, its employees, or the State of California. The Energy Commission, the State of California, its employees, contractors, and subcontractors make no warrant, express or implied, and assume no legal liability for the information in this report; nor does any party represent that the uses of this information will not infringe upon privately owned rights. This report has not been approved or disapproved by the California Energy Commission nor has the California Energy Commission passed upon the accuracy or adequacy of the information in this report.

## **ACKNOWLEDGEMENTS**

The Petroleum Market Advisory Committee thanks those who provided information to its proceedings. These individuals include:

Bob van der Valk	Bakken Oil Business Journal
Edie Chang	California Air Resources Board
Sam Wade	California Air Resources Board
Jay McKeeman	California Independent Oil Marketers Association
Ryan Hanretty	California Independent Oil Marketers Association
Jamie Court	Consumer Watchdog
Douglas MacIntyre	Energy Information Administration
Lynn Westfall	Energy Information Administration
Johnny Thomasson	Kinder Morgan
John Faulstich	Member of the public
Simon Mui	Natural Resources Defense Council
Dolores Santos	Oil Price Information Service
Brad Lucas	Vitol
Skip York	Wood Mackenzie

Thanks to the Energy Commission staff members that provided information and support services:

Courtney Ward

Susan Ejlalmaneshan

Gordon Schremp

Alexander Wong

Foua Moua

Julio Gutierrez

Narayani Balakrishnan

## ABSTRACT

The California Energy Commission assembled the Petroleum Market Advisory Committee to help assess petroleum market issues of interest to the Commission. This report summarizes the activities, discussions, and observations of the committee during the December 2014 to November 2016 time frame. During this period, the committee explored and discussed the events following the February 18, 2015, Torrance Refinery explosion, its influence on the petroleum market, and market participant response to the event. Of primary concern were the three gasoline price spikes that occurred in the first half of 2015 and several policy options were discussed to lessen California's exposure to these types of events. Over the course of these meetings, the committee heard from several stakeholders within the gasoline market including government agencies, traders, retailers, distributors, environmental and consumer groups, news organizations, and market analysis firms. Refinery companies declined all requests for participation.

Meeting transcripts and materials can be found at [http://www.energy.ca.gov/assessments/petroleum\\_market/](http://www.energy.ca.gov/assessments/petroleum_market/). Additional records and public comments can also be found under Energy Commission Docket Number 15-PMAC-01.

**Keywords:** California Energy Commission, transportation, gasoline, petroleum, gasoline prices

Please cite this report as follows:

Borenstein, Severin, Kathleen Foote, Dave Hackett, Amy Jaffe, and James Sweeney. Petroleum Market Advisory Committee, 2017. ***Petroleum Market Advisory Committee Final Report, December 2014 to November 2016***. California Energy Commission.  
Publication Number: CEC-200-2017-007

# TABLE OF CONTENTS

	Page
<b>Acknowledgements</b> .....	i
<b>Abstract</b> .....	ii
<b>Table of Contents</b> .....	iii
<b>List of Figures</b> .....	iv
<b>List of Tables</b> .....	iv
<b>Executive Summary</b> .....	1
CHAPTER 1: Petroleum Market Advisory Committee Formation .....	3
CHAPTER 2: Cap-and-Trade and the Low Carbon Fuel Standard.....	5
CHAPTER 3: The Torrance Refinery Explosion and the Impact on Gasoline Prices .....	9
CHAPTER 4: California’s Petroleum Infrastructure .....	14
CHAPTER 5: Gasoline Price Volatility and Mitigation Policies.....	21
CHAPTER 6: California Retail Gasoline Sector and Prices.....	27
CHAPTER 7: Petroleum Market Advisory Committee Viewpoint.....	31
APPENDIX A: Acronyms/Abbreviations .....	A-1

## LIST OF FIGURES

	Page
Figure 1: CARB LCFS Compliance Curve and Projected Compliance .....	6
Figure 2: Weekly U.S. and California Regular Reformulated Retail Gasoline Prices With Brent Crude Oil Spot Prices, 2003 to February 2017.....	10
Figure 3: Daily LA Spot Differentials to New York Harbor and Gulf Coast Spot 2004 to 2017.....	10
Figure 4: Monthly Average Refiner and Retail Margins, 2008 to 2016 .....	11
Figure 5: 2015 California Production and Inventory Figures .....	12
Figure 6: California Consumption of Gasoline 2003 to 2016 .....	14
Figure 7: West Coast Petroleum Product Supply Map .....	15
Figure 8: California Gasoline Supply Chain.....	17
Figure 9: Kinder Morgan Pipeline Map.....	17
Figure 10: Gasoline Netback and Inflows to PADD V .....	19
Figure 11: U.S. EIA Estimates of Crude Oil Boiling Points Compared to API Gravity.....	20
Figure 12: Average Daily Marine Operating Costs by Vessel Type, 2010 .....	23
Figure 13: Los Angeles Average Gasoline Price, 2014 and 2015 .....	24
Figure 14: California Fuel Sales by Brand, 2015 .....	27
Figure 15: Average Retail California Regular Gasoline Prices by Branded and Unbranded Retail Sectors, 2007 to 2016 .....	28
Figure 16: Average California Retailer Margins by Branded and Unbranded Retail Sectors .....	29

## LIST OF TABLES

	Page
Table 1: CARB Assessment of Costs of the LCFS for Gasoline and Diesel .....	7

## **EXECUTIVE SUMMARY**

The California Energy Commission assembled the Petroleum Market Advisory Committee (PMAC) to help assess petroleum market issues of interest to the Commission. During the meetings, the PMAC heard from stakeholders within the gasoline market including government agencies, traders, retailers, distributors, environmental and consumer groups, news organizations, and market analysis firms. Refinery companies did not participate after declining all requests.

This report summarizes the activities, discussions, and observations of the committee from December 2014 to November 2016. During this period, the committee explored and discussed the events following the February 18, 2015, Torrance Refinery explosion, the influence on the petroleum market, and market participant response to the event.

Throughout these discussions, the committee found several gasoline market anomalies that appeared to be new trends in California. These include:

- Increasing retail margins for California gasoline.
- Increasing retail price differentials between the California and U.S. average.
- Increasing price differences among gasoline retail brands since 2012.
- Lessening gasoline spot market liquidity.
- Lessening direct retail station ownership by refinery operating companies.

During their meetings, committee members explored different policy options for addressing gasoline price volatility. These policy options were:

- Increasing refining and petroleum market data collection and transparency.
- Allowing a surcharge on non-CARB gasoline for price pressure relief value.
- Implementing an inventory requirement for gasoline sellers
- Establishing a California state strategic gasoline inventory.
- Establishing a State of California forward purchases plan for gasoline to reduce risk of importing fuel.
- Building new pipeline capacity from the Gulf Coast.
- Expanding the capacity of import terminals.
- Increasing refining capacity in state.



After exploring each topic, committee members did not reach agreement that any of these policy options would appropriately address price volatility in California.

Meeting transcripts and materials can be found at [http://www.energy.ca.gov/assessments/petroleum\\_market/](http://www.energy.ca.gov/assessments/petroleum_market/). Additional records and public comments can also be found under Energy Commission Docket Number 15-PMAC-01.

# **CHAPTER 1: Petroleum Market Advisory Committee Formation**

---

On December 16, 2014, the California Energy Commission formed an outside expert panel to review California's petroleum fuel market operations, the Petroleum Market Advisory Committee (PMAC). The PMAC was created to assist the Energy Commission in better understanding the factors and conditions related to petroleum price fluctuations and associated impacts, as well as policy options that may affect petroleum markets. With California refineries coming under California Air Resources Board's (CARB) Assembly Bill 32 cap-and-trade regulations at the beginning of 2015, this committee focused initially on monitoring the effects this regulation had on transportation fuel pricing. To monitor this transition, Energy Commission assembled experts in petroleum fuels markets, consumer protection, and petroleum industry practices to study the petroleum market and give the Energy Commission recommendations regarding:

- Existing and emerging petroleum market trends and factors that lead to price fluctuations, including local, regional, and global events and changes in state and federal policies that may affect prices for petroleum-based fuels.
- Impacts of significant and/or sudden price movements in petroleum fuels markets on market participants, California consumers, participants in interdependent energy markets, and vulnerable California economic sectors.
- Other petroleum fuels market issues the committee and/or the Energy Commission determines to be important.

The Energy Commission selected five members to review the market from various legal, industrial, and economic viewpoints. The members selected were:

- Severin Borenstein, Professor, Haas School of Business Economic Analysis and Policy Group at U.C. Berkeley.
- Kathleen Foote, Senior Assistant Attorney General and Antitrust Chief for the California Attorney General's Office.
- Dave Hackett, President, Stillwater Associates.
- Amy Jaffe, Executive Director of Energy and Sustainability at UC Davis.
- James Sweeney, Professor of Management Science and Engineering and Director of the Precourt Energy Efficiency Center at Stanford University.

PMAC member terms were set at three years with an option for members to be reappointed. The Chair of the Energy Commission was responsible for appointing the PMAC Chair, who then directed the priorities of the PMAC based on the needs and interests of the Energy Commission. Jim Sweeney served as the first chair of the PMAC and established general operating procedures, data needs, and the primary mission of the PMAC, transportation fuel price escalation. At the October 13, 2015, meeting, chairpersonship of the PMAC was transferred from Jim Sweeney to Severin Borenstein, with Sweeney remaining on the PMAC. All PMAC meetings were publicly noticed and conducted under Bagley-Keene rules.<sup>1</sup> From December 2014 to November 2016, the PMAC held nine meetings covering five major topics, which are covered in the following chapters:

Chapter 2: CARB's Cap-and-Trade and the Low Carbon Fuel Standard

Chapter 3: The Torrance Refinery Explosion and the Impact on Gasoline Prices

Chapter 4: Understanding California's Petroleum Infrastructure

Chapter 5: California's Petroleum Infrastructure

Chapter 6: California Retail Gasoline Sector and Prices

Chapter 7: Petroleum Market Advisory Committee Members Final Thoughts and Conclusions

Meetings were structured with presentations followed by a "question-and-answer" period between the presenter and the committee. Presenters for each meeting were announced with the public notice as part of the meeting agenda. A public comment period would then follow the presentations. PMAC member comments and discussion of the meeting and presentations would then follow. Meeting transcripts and materials can be found at [http://www.energy.ca.gov/assessments/petroleum\\_market/](http://www.energy.ca.gov/assessments/petroleum_market/). Additional records and public comments can be found under Energy Commission Docket Number 15-PMAC-01.

---

<sup>1</sup> Defined in California Government State Code Sections 11120-11132

## **CHAPTER 2:**

# **Cap-and-Trade and the Low Carbon Fuel Standard**

---

The California Cap-and-Trade Program is an economywide limit on greenhouse gas (GHG) emissions enacted by the California Air Resources Board (CARB) as part of its *AB 32 Scoping Plan*. The Cap-and-Trade Program was designed to help California meet its goal of reducing GHG emissions to 1990 levels by 2020 and achieving an 80 percent reduction from 1990 levels by 2050. Under cap and trade, a statewide limit on GHG emissions is set with allowances issued to regulated entities. Regulated entities can then trade or bank those allowances. Starting January 1, 2015, the transportation sector began its inclusion into the Cap-and-Trade Program. The transportation sector represents the largest portion of California's GHG emissions, accounting for roughly 40 percent. The entity responsible for reporting and complying with cap and trade in the transportation sector would have custody of the fuel loaded onto the delivery truck that dispenses the fuel to the retailer that ultimately sells it to the end user.

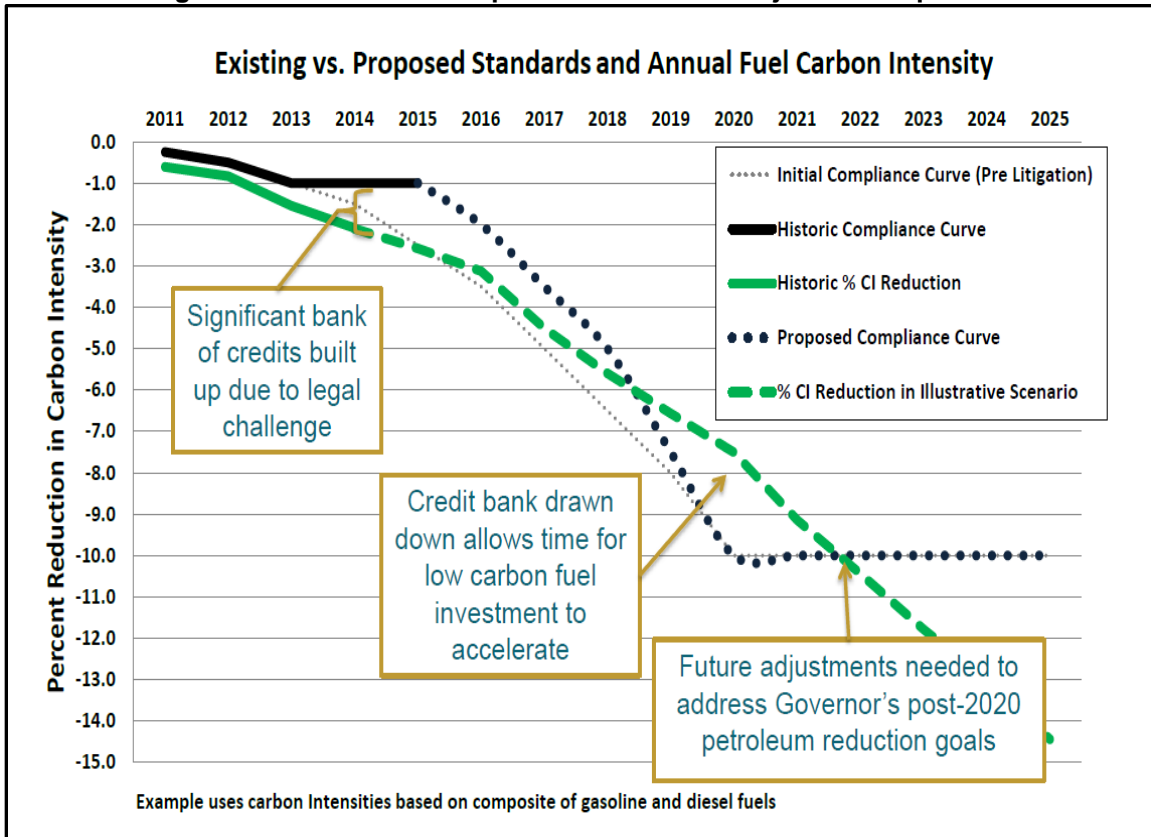
CARB staff representative Edie Chang participated in the first PMAC meeting in December 2014 to discuss the mechanisms by which the Cap-and-Trade Program would influence the petroleum market. ARB staff estimated that roughly 50 to 60 fuel providers would be covered under the rule. Surrender of allowances covering 30 percent of a firm's obligation occurs at the end of each year with the remaining obligation fulfilled after the end of each compliance period, which end in 2014, 2017, and 2020. CARB reports the results in the fall of the following year. During the PMAC conversation, committee members indicated that the cost of such a program would depend on how companies choose to comply with the regulation, as mitigation could be achieved by either purchasing allowances or by choosing less carbon-intensive fuel production methods. While cap and trade has many compliance scenarios, the PMAC generally agreed that the price of allowances would determine the overall price impact on gasoline.

Member Dave Hackett later provided additional information on the Cap-and-Trade Program, presenting the CARB's cap-and-trade calculator. This tool allows obligated parties to calculate their greenhouse gas (GHG) emissions in megatons of carbon dioxide equivalent, thereby determining the amount of credits to purchase or the amount of mitigation from other sources to produce for each source of GHG emissions. Furthermore, Hackett noted that fuel supplying companies were reacting to this new requirement in differing ways, with some trying to itemize this cost, while others embed the cost into the final price of the product. Hackett also stated that the actual cost of compliance was still unknown, due to the varying ways to comply, a general uncertainty on how to prove compliance, and the fact that no industry standard on how to communicate this additional cost had yet to emerge. Hackett did note, however, that the Oil Price Information Service (OPIS) publishes a daily "cap at the rack" index that indicates the price per gallon of compliance based on the most recent reported prices of cap-and-trade allowances. After

the presentations, PMAC Member Severin Borenstein suggested the committee focus more of its attention on the LCFS, as these pricing implications seemed less straightforward.

Further discussion of the LCFS program took place at the February 10 and June 30, 2015, meetings. CARB staff member Sam Wade provided the PMAC with additional information on this transportation fuel-specific regulation on February 10. The original regulation adoption occurred in 2009, but it was amended and readopted in 2011. While it is part of the larger California goal to reduce carbon emissions to 1990 levels by 2020, the LCFS is designed to reduce the carbon intensity of transportation fuel by 10 percent by 2020. It does this by requiring higher carbon intensity fuels to have a carbon offset, which would then reduce the overall carbon intensity of the transportation fuel supply. **Figure 1** shows CARB's latest compliance schedule, which indicated that transportation fuel providers were overcomplying in the early years of the program. Wade indicated that this "banking" of credits that could later be used to offset potential undersupply of low-carbon-intensity fuels in later years to achieve 2020 goals. At the time, most of the current credit generation occurred from ethanol used in gasoline and from biodiesel and renewable diesel used in the diesel fuel supply. While small at the time of the presentation, electric vehicle credit generation was seen as a likely compliance method on the light-duty side of the transportation fuel supply mix.

**Figure 1: CARB LCFS Compliance Curve and Projected Compliance**



Source: California Air Resources Board

CARB staff also discussed the cost implications of the LCFS. **Table 1** displays CARB estimates of the cost adder to a gallon of gasoline based on the price of LCFS credits at different price points.<sup>2</sup> CARB analysis assumes the full cost is passed through to consumers, but it does not account for potential changes in the marginal cost of fossil fuels because of this policy. Cost implications for the LCFS worked differently than for cap-and-trade carbon credits. LCFS credits are generated when the carbon intensity of a fuel is less than the standard set by CARB. These credits are used to offset LCFS deficits created from fuels with carbon intensities higher than the standard. In cap and trade, credits allow the emission of carbon or, more precisely, CO<sub>2</sub> equivalent (CO<sub>2</sub>e). Moreover, CARB staff indicated that the hard cap of LCFS credit prices at \$200 would prevent any price spiking in the petroleum fuels market and short-term market manipulation of the LCFS market. In the event of not enough fuel being available at a \$200 credit price level, CARB would likely evaluate the situation as a long-term supply issue for low-carbon-intensity fuels and adjust the compliance schedule accordingly.

**Table 1: CARB Assessment of Costs of the LCFS for Gasoline and Diesel**

Credit Price	Fuel	2016	2017	2018	2019	2020
\$25	Gasoline	\$0.009	\$0.013	\$0.017	\$0.024	\$0.030
	Diesel	\$0.007	\$0.012	\$0.017	\$0.026	\$0.035
\$57	Gasoline	\$0.021	\$0.030	\$0.039	\$0.054	\$0.068
	Diesel	\$0.016	\$0.027	\$0.039	\$0.059	\$0.079
\$100	Gasoline	\$ 0.036	\$ 0.052	\$ 0.068	\$ 0.094	\$ 0.120
	Diesel	\$ 0.028	\$ 0.048	\$ 0.069	\$ 0.104	\$ 0.139

Source: California Air Resources Board

During those same meetings, Energy Commission staff member Gordon Schremp presented information to the PMAC on metrics to track changes in California fuel prices from these regulations. Using data from 2009 and 2014 as a baseline, California regular gasoline averaged \$0.35 more than the average U.S. price for regular gasoline (all formulation and taxes included). During the February meeting, early 2015 pricing information showed that the difference between average California gasoline prices and average U.S prices had fallen. Yet, when compared to other western states, the California gasoline price difference to those other states had increased between 8.7 cents per gallon and 24.5 cents per gallon depending on the state. Similar results were seen in diesel prices, with California’s premium to other states increasing from 7.3 cents per gallon to 17.4 cents per gallon depending on the state. Schremp also outlined the Oil Price Information Service method to account for cap and trade in the pricing for California fuels, the OPIS cap-at-the-rack index. This method involves multiplying the carbon content of the base gasoline and ethanol blended into it, then multiplying it by the current carbon price of that fuel.

<sup>2</sup> Table shows that based on an assumed LCFS credit price in a given year, the price increase to a gallon of gasoline or diesel would be the matching value in the table. For example, a \$57 LCFS credit price in 2018 would lead to a \$0.039 increase in both gasoline and diesel.

For example, at a price of \$11.80 a metric ton, the calculation for the cost of compliance for summer blend gasoline would be  $((0.00893 \times 0.9) \times 11.80) + ((0.00022 \times 0.1) \times 11.80)) \times 100 = 9.510$  cents per gallon. In this calculation, 0.00893 represents the GHG emissions of gasoline, and 0.00022 represent the GHG emissions of ethanol.

Committee members expressed no disagreement with the price-impact estimation methods used by the CARB staff and the Energy Commission staff. Committee members agreed that estimates of price impacts of the Low Carbon Fuel Standard and the Cap-and-Trade Program, outlined above, were reasonable approximations of the actual price impacts of these programs.

# CHAPTER 3:

## The Torrance Refinery Explosion and the Impact on Gasoline Prices

---

The PMAC focus on retail gasoline price impacts of the LCFS and Cap-and-Trade Program shifted on February 18, 2015, when the Torrance Refinery (then owned by ExxonMobil) experienced a large explosion that injured two workers.<sup>3</sup> This explosion significantly damaged the refinery, and it was later determined by the U.S. Chemical Board to be caused by a series of events that led the electrostatic precipitator (or ESP) of the refinery to explode. While the surrounding area was not evacuated, ash was thrown into the air and heavily covered the explosion site.<sup>4</sup> This refinery produced roughly 10 percent of California's total gasoline supply<sup>5</sup> at the time and has a nameplate capacity of roughly 150,000 barrels per day of crude oil processing.

In the subsequent two weeks, the price differential between the California average reformulated regular retail gasoline price and the U.S. average reformulated regular retail gasoline rose from roughly \$0.44 on the week of February 9 to \$0.63 on the week of February 23 (**Figure 2**). While U.S. prices (green line) rose with international crude oil prices (orange line) in the first and second quarters of 2015, California prices saw larger price increases that spiked three times in March, May, and July 2015. Southern California was hardest hit by these price increases, with the average Los Angeles regular gasoline price (red dotted line) reaching a high of \$3.53 in March, \$3.99 in May, and \$4.31 in July. In San Francisco (black dotted line), the first two spikes were similar with a high of \$3.44 in March and \$3.73 in May, but in July a high of \$3.56 was on the downward trend from May.

With PMAC attention now on the Torrance Refinery, Chair Sweeney and PMAC Member Borenstein jointly presented at the June 30, 2015, meeting. They pointed out recent significant price spikes in the differentials between the Los Angeles (LA) spot gasoline price and the New York Harbor and Gulf Coast spot prices (**Figure 3**). Spikes in the differentials that occurred in late February and mid-April were large in comparison to the previous year's averages and highs. While **Figure 3** has the same information included in the Sweeney and Borenstein presentation, it includes more data points that show spikes of those magnitudes that had not been seen since October 5, 2012 – a spike attributed to the Chevron Richmond fire and the ExxonMobil Torrance fluid catalytic cracking unit (FCCU) outage that occurred that year. Unlike the Richmond/Torrance Refinery event, the differentials in 2015 Torrance Refinery event did not spike just once, but three times, roughly corresponding to increases in retail gasoline prices in California.

---

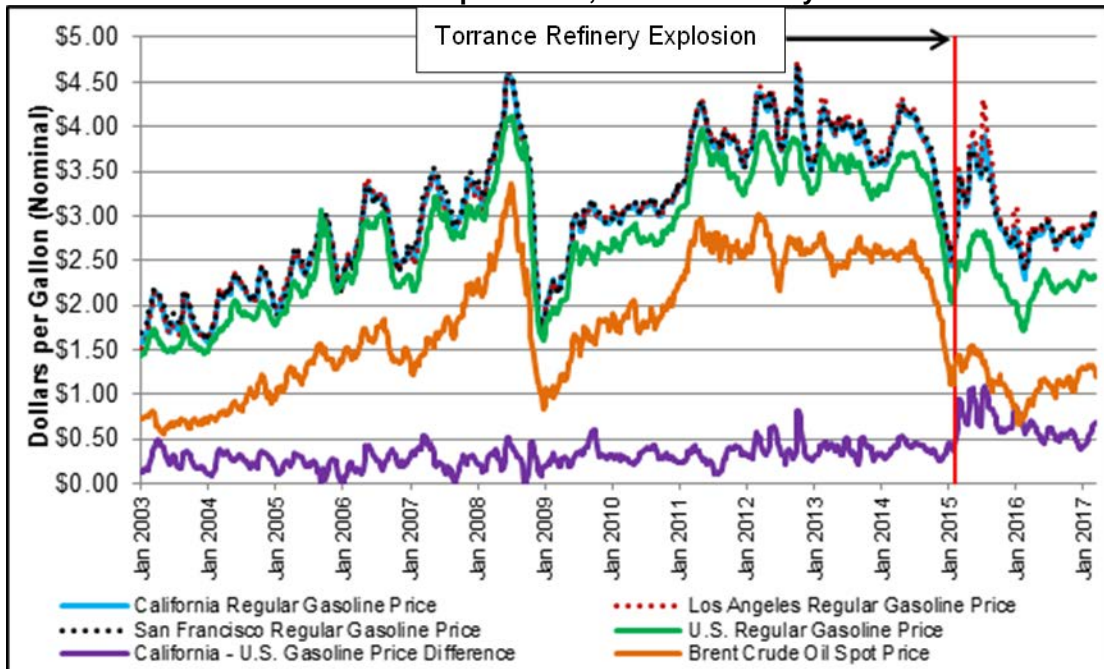
3 U.S. Chemical Board Media Room News: <http://www.csb.gov/us-chemical-safety-board-finds-multiple-safety-deficiencies-led-to-february-2015-explosion-and-serious-near-miss-at-the-exxon-mobil-refinery-in-torrance-california/>.

4 KTLA 5, February 18, 2015: <http://ktla.com/2015/02/18/residents-report-hearing-explosion-feeling-ground-shake-near-torrance-exxon-mobil-refinery/>.

5 Reuters, February 18, 2015: <http://www.reuters.com/article/us-california-fire-idUSKBN15X0MF>.

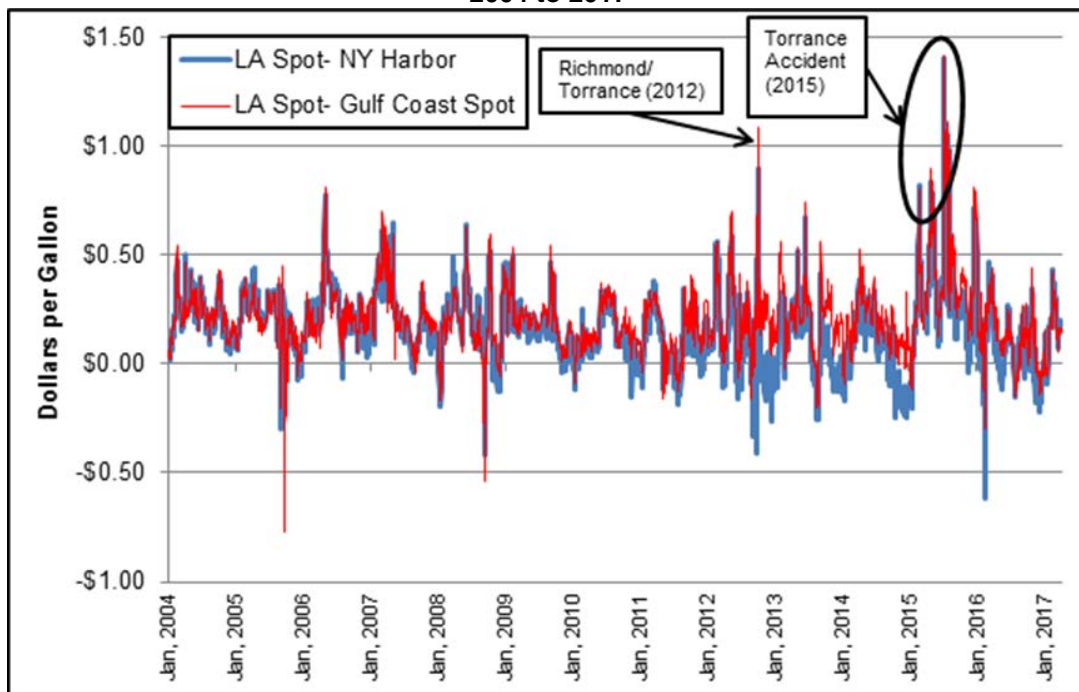


**Figure 2: Weekly U.S. and California Regular Reformulated Retail Gasoline Prices With Brent Crude Oil Spot Prices, 2003 to February 2017**



Source: U.S. Energy Information Administration

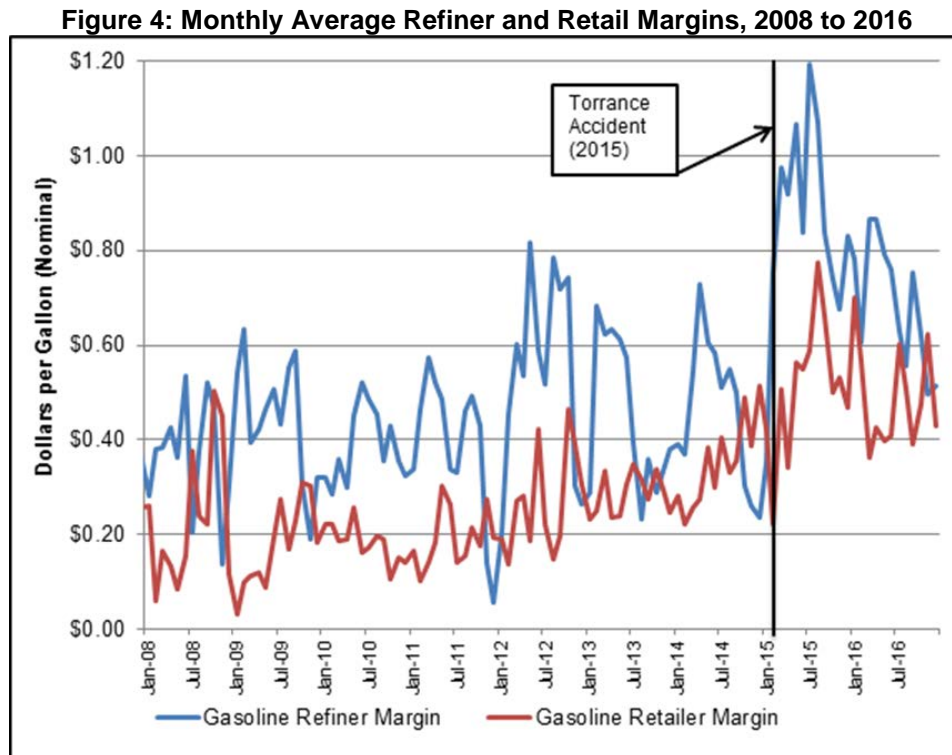
**Figure 3: Daily LA Spot Differentials to New York Harbor and Gulf Coast Spot 2004 to 2017**



Source: Energy Information Administration

Sweeney and Borenstein concluded that prices “increased throughout much of the supply chain, but the largest increase is in the difference between the crude oil price and the CARBOB price.”

This is seen in **Figure 4** as the blue line representing the gasoline refiner margin. The refiner margin is the difference between the U.S. refiner acquisition cost of crude oil (representing the average price of crude oil for refiners) and the wholesale “rack” price<sup>6</sup> of California gasoline. This refiner margin increased to close to \$1.00 per gallon in March 2015 and above \$1.00 in May and July 2015. Finally, they noted that the rack-to-retail margin (retail margin) also had been slowly increasing since early 2012.



Source: California Energy Commission analysis of Oil Price Information Service and U.S. EIA data

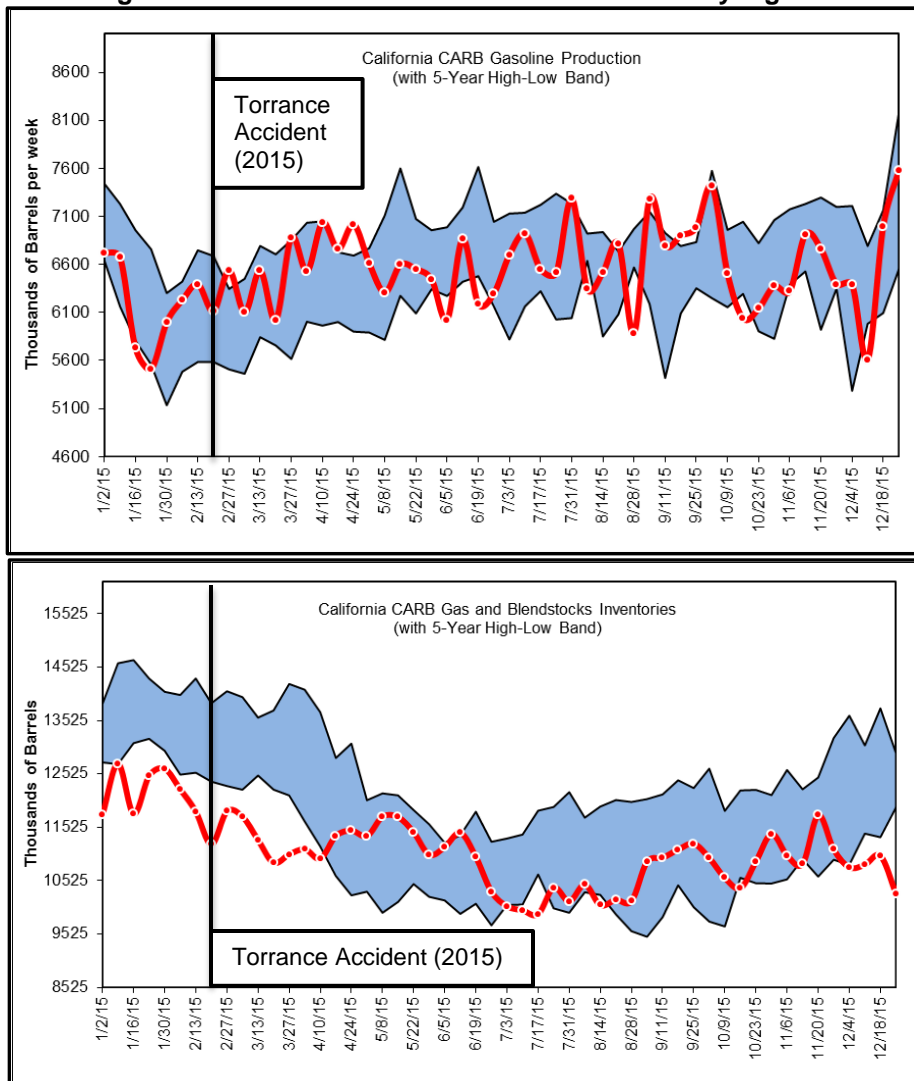
Energy Commission analysis further verified this conclusion, showing both the refiner margin and retail margin had increased. The refiner margin increased from \$0.62 on February 17, 2015, to \$1.35 on May 14, 2015. The retail margin went from \$0.16 to \$0.25 over the same period (increased to as high as \$0.43 on March 9, 2015). Concurrently California was experiencing multiple refinery issues beyond the Torrance problems, most appearing to be gasoline-related. Due to those issues, retail gasoline prices rapidly increased after the February 18, 2015, explosion at the Torrance Refinery.

Schremp also pointed out that Energy Commission *Weekly-Fuels-Watch Reports* (**Figure 5**) showed inventories in late 2014 into early 2015 were low compared to previous years, just before the Torrance explosion. Imports of gasoline picked up significantly at the end of March, from roughly 0 to 140,000 barrels per day (BPD) in the last week of March 27, 2017. Finally, Schremp reported a marine vessel, the *Historia Perla*, sat in Long Beach for five to six days and did not

<sup>6</sup> A “rack” is a terminal location that serves as a wholesale level purchasing area where final retainers purchase fuel for later resale.

discharge since spot market prices dropped rapidly from import availability. Even with the improved gasoline situation, foreign exports from California fell from 38,460 BPD in February to 21,200 BPD in March and 23,340 in April. Committee Member Foote pointed out that refinery inventories appeared low in late 2014 to the beginning of 2015, irrespective of the later product shortage. In subsequent meetings, PMAC members Borenstein, Sweeney, and Jaffe all asked why the *Weekly-Fuels-Watch Reports* showed little to no drop in production from the Torrance Refinery accident. Energy Commission staff noted that while the ESP tower and FCCU of the refinery remained off-line until June 2016, the refinery could still create finished gasoline from processed blending components, some of which may be imported. Production reports record finished product that leaves the refinery gate, regardless of whether it is produced with imported blending components or from refining.

**Figure 5: 2015 California Production and Inventory Figures**



Source: California Energy Commission

Furthermore, California's branded and unbranded rack price differences have historically averaged roughly \$0.05 for the State as a whole, but since the Torrance explosion, the difference

had been driven up to more than \$0.30 with branded rack prices forming most of the gains. Consumer Watchdog asserted that Californians have paid \$3 billion more for gasoline since the accident than they should have. To support this point, Consumer Watchdog brought up Chevron statements on refining margins stating, “West Coast refining margins are the biggest, Chevron says.” Furthermore Consumer Watchdog stated that “Tesoro and Valero are exploiting these West Coast refining margins.”

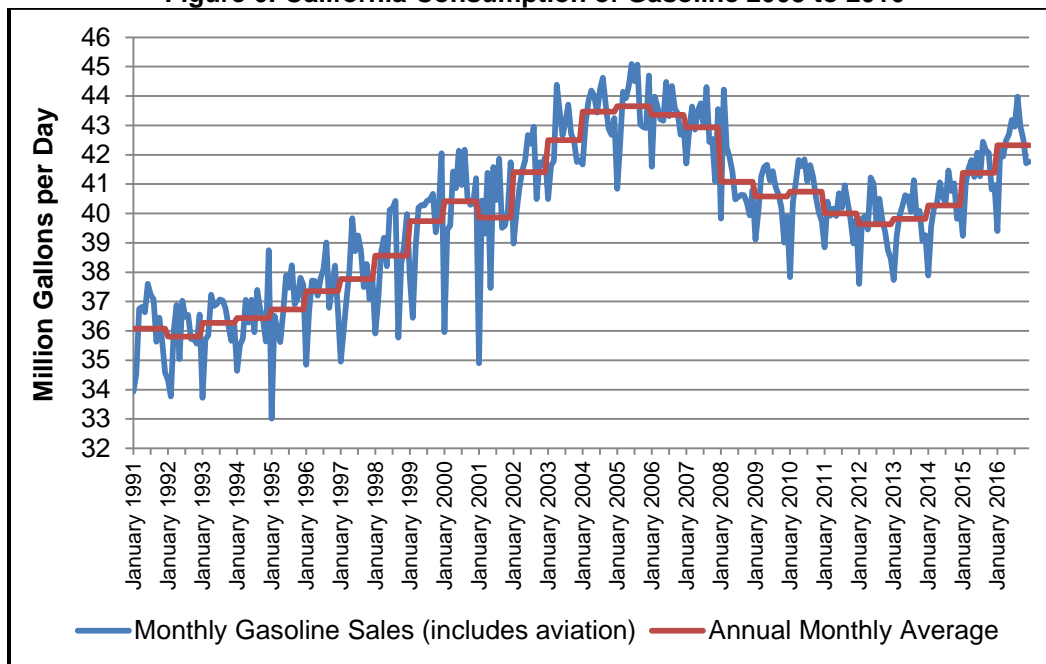
The June 30, 2015, meeting concluded with the PMAC’s discussion of the difficulties in obtaining detailed information for committee members to perform analysis. Commissioner Janea Scott of the Energy Commission offered staff assistance to analyze confidential information not available to the PMAC, but the committee did not see this as viable. The difficulties involved were best described by PMAC Chairman Sweeney: “Sometimes I work with research assistants, and then it’s a back and forth, continuing operation. It’s not – I give them the information and say, three months later, we get analysis. It’s an organic process and I’m just not smart enough to define this analysis and that analysis, as needed, and now do it and give us the result.”

Committee members agreed that the price data showed that California retailer margins had increased substantially since 2011 and that refiner margins had increased substantially after the Torrance accident and had remained elevated for an unexpectedly long time. Although there were many opinions expressed by meeting participants, committee members did not reach consensus as to why the retailer margins had increased over time or consensus as to why refiner margins remained elevated for so many months.

# CHAPTER 4: California's Petroleum Infrastructure

At the October 13, 2015, meeting, Commissioner Scott formally announced that the PMAC would look into the events that caused the 2015 rise in California retail gasoline prices. The Commissioner then introduced Severin Borenstein as the new Chairman of the PMAC, while Member Sweeney remained a member of the PMAC. Chairman Borenstein began the meeting recapping the increases in California gasoline prices and framed his exploration of this topic in terms of a “supply-and-demand” problem. Chairman Borenstein launched the discussion in terms of “what has impeded returning to the normal CA-US differential” (**Figure 2** and **Figure 3**), as most price spikes last only a few weeks, and this one lasted roughly seven months. Seen in **Figure 6** are California's gasoline consumption levels that, while trending up in 2015, were still largely below 2007 – 2008 highs and stood at levels roughly similar to 2002. This led to the observation that “demand” is not the issue driving prices, as California has dealt with these levels of consumption before. Based on this look into demand and the known issues occurring on the supply side, Chairman Borenstein announced future meetings would focus on supply issues facing the California gasoline market.

**Figure 6: California Consumption of Gasoline 2003 to 2016**

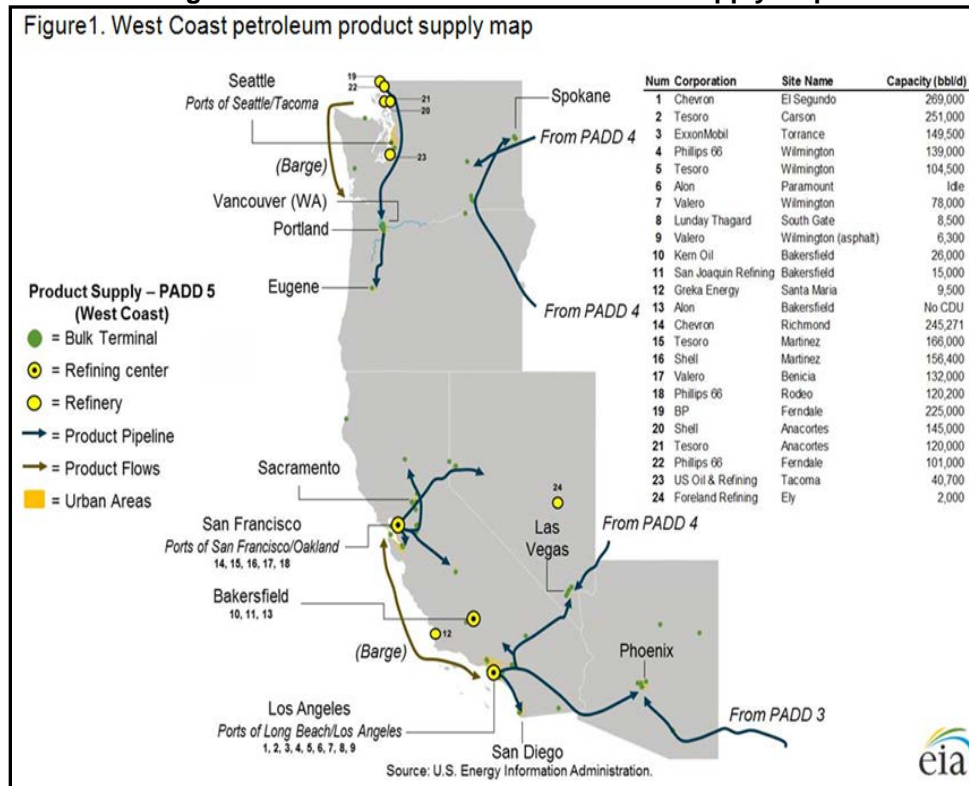


Source: California Board of Equalization

Committee Member Hackett then presented analysis of Petroleum Administration for Defense Districts (PADD) 5 petroleum supply flows. A map shows crude oil is transported into three interconnected processing hubs within the Los Angeles area, the San Francisco Bay Area, and the Washington Puget Sound Area (**Figure 7**). He explained how the finished product is then distributed to the local regions in which those hubs exist, along with demand centers in Oregon,

Nevada, and Arizona. Northern California and the Puget Sound Area tend to be long (produce more than they need) in finished product, while Southern California tends to be short (produces less than it needs). One reason is that making California-specification gasoline requires significant refining processes that not all refineries can perform. Even for refineries that are equipped to make large quantities of California-specification gasoline, it is often not cost-effective to meet the specification for all the gasoline they make. Fuel that does not meet the California specification, due to the cost needed to process further or lack of capability, but would meet requirements in other areas, is exported out of California.

**Figure 7: West Coast Petroleum Product Supply Map**



Source: Energy Information Administration.

During this part of the presentation, Commissioner Scott noted that Southern California gasoline production was depressed in early 2013, which should have led to a pricing effect. Hackett responded that refinery maintenance likely was the cause for that low production; the possibility of a pricing impact was unlikely since it was planned maintenance.

After the February Torrance Refinery explosion, imports increased into Southern California, with most of that foreign-nation import volume being blending components, like alkylate, that the refiners use to blend with other gasoline components, like naphtha, to make finished California-specification gasoline.

Hackett stated that Southern California had seen a reduction in the number of import traders in the area, reducing market liquidity and making it harder to import the additional product into Southern California. This situation reduced the liquidity in the gasoline import market and

increased price volatility, since there was less trading to discover a market price. When the West Coast gasoline market shifted from export to import, Southern California suddenly needed supply that could not be sourced from the Washington Puget Sound Area or Northern California. Hackett also stated that \$0.35 is roughly the difference between U.S. and California average regular retail prices that can be accounted for with extra taxes, fees, product quality, and transportation costs. He also noted that there is a real shortage of Jones Act vessels, limiting the potential for supply from U.S. refining centers, which is an issue to be considered.<sup>7</sup> Many of these vessels are already chartered, and a premium would need to be paid to redirect. Moreover, many of these vessels are shipping crude oil and would need to be cleaned to move finished product.

Selling gasoline production to consumers is the downstream component of the California gasoline product supply chain. The California Independent Oil Marketers Association (CIOMA) also describes this supply chain, which is summarized in **Figure 8**. Branded gasoline is gasoline dedicated to use for a particular oil company brand retail dealer (such as Chevron, Shell, or Exxon.), often containing proprietary additives exclusive to that dealer. Unbranded gasoline would be dedicated to any nonoil company affiliated dealer, often sold to large volume retailers (Costco, Safeway, Rotten Robbie, and so forth) or small “mom and pop” stores for later sale. In some cases, retail station owners could choose a particular brand to sell fuel under and forgo dealings with the rack locations. Under this arrangement, a station would enter a “dealer tank wagon” (DTW) contract with a refining company and have fuel transported directly to the station, with the price set by refiner, including delivery costs.

CIOMA representative Jay McKeeman described how supply shortages impact unbranded market participants. He pointed out that a wholesaler has two decisions to make in that type of situation, choosing to either begin allocating product (many unbranded retail locations do not have supply obligation contracts) or begin increasing prices to lessen demand. Moreover, McKeeman stated that underground storage regulations have reduced the amount of bulk storage capacity at the wholesale level, which has reduced wholesalers’ ability to help with shortage problems.

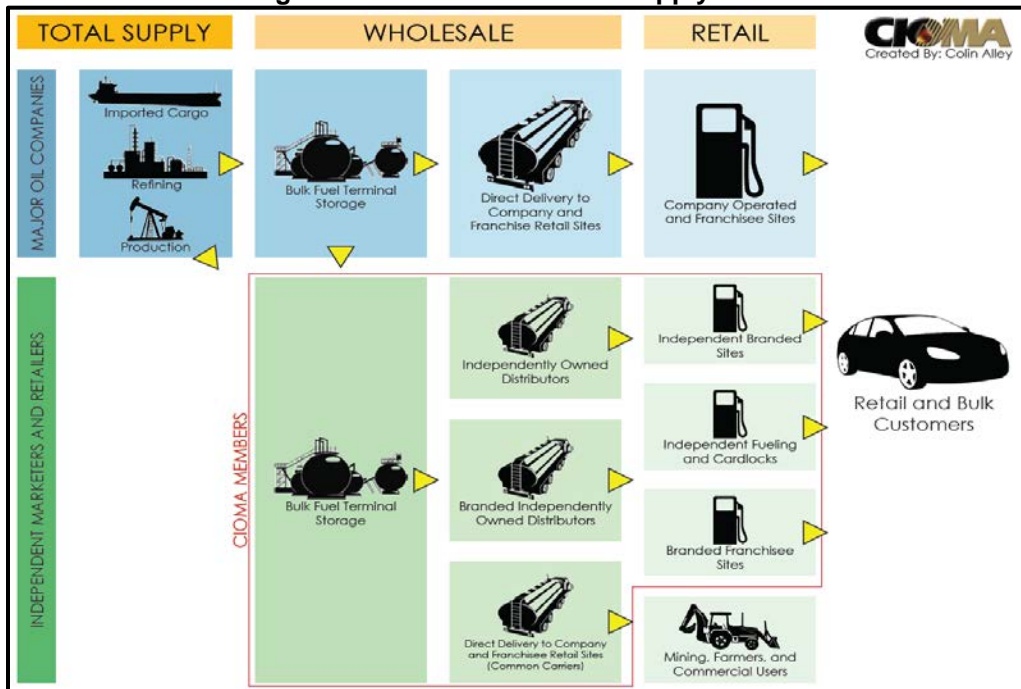
Continuing the discussion on California’s petroleum supply network, Kinder Morgan, California’s largest independent oil pipeline operator, discussed its operations within the state. **Figure 9** displays Kinder Morgan’s pipeline infrastructure, which shows its large presence in California. Gasoline pipelines are defined as “products pipelines” in the above figure. Two pipeline systems are seen within California, a northern system and a southern system, with the Tehachapi Mountains forming the barrier between the two. The northern system is utilized to supply Northern and Central California, along with Reno and portions of northern Nevada. The southern system supplies Southern California, western Arizona into Phoenix, and southern Nevada with a focus on the Las Vegas area.

---

<sup>7</sup> Jones Act vessels are required to move any commodity from one U.S. port to another U.S. port. These vessels are required to be made in the United States, owned by U.S. citizens, flagged U.S., and crewed by at least 75 percent U.S. citizens.



**Figure 8: California Gasoline Supply Chain**



Source: California Independent Oil Marketers Association

**Figure 9: Kinder Morgan Pipeline Map**



Source: Kinder Morgan

Johnny Thomasson described operations of the Kinder Morgan pipeline system as a “toll road.” Kinder Morgan owns a highway specifically designed to transport finished petroleum products,



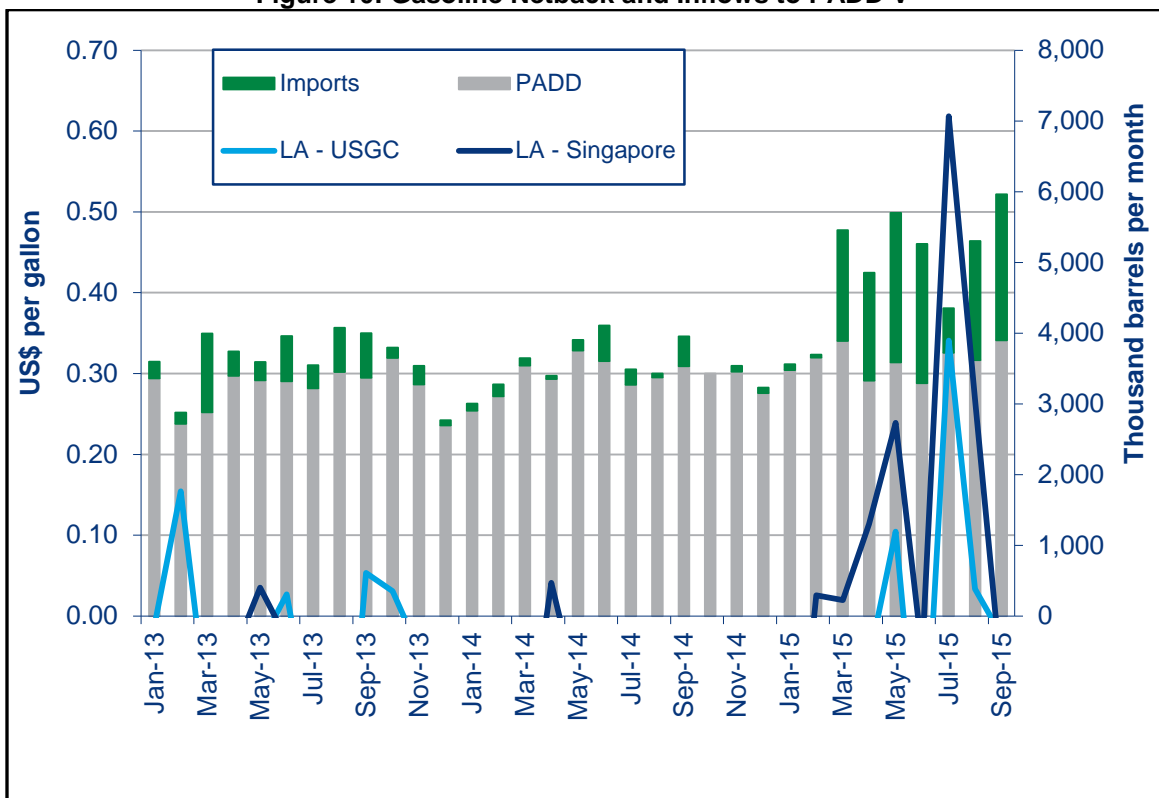
which it charges a fee to use but never owns the product on that system. Fees charged for use are regulated by the Federal Energy Regulatory Committee for interstate lines and the California Public Utilities Commission for strictly in-state lines, meaning Kinder Morgan has no discretionary power in charging prices for use. The pipeline system typically has five to seven days' worth of supply and typically can cover a short-term unplanned refinery outage. When asked by PMAC Member Sweeney whether any supply constraints were experienced in 2015, Thomasson answered that "no proration" (Kinder Morgan's allocation process for shippers) occurred in 2015.

In December 2015, the Western States Petroleum Associate (WSPA) provided a statement regarding its position on the gasoline price increases in California. The WSPA representative stated that the organization could not comment on pricing discussions, due to antitrust concerns, but recommended that the PMAC look at the "accumulation of regulations that have occurred in California" and the region's location as a major factor in California's high gasoline prices. Skip York from Wood Mackenzie was introduced as an expert consultant, secured by WSPA, who could comment on the recent pricing events. York's presentation showed margins between California and the rest of the world have "indeed been high." His presentation showed Los Angeles spot gasoline prices have been \$0.20 more than Gulf Coast and Singapore spot gasoline prices since the beginning of 2015. While accounting for transportation costs and other logistic considerations, he stated that the "arbitrage window"<sup>8</sup> for importing product from Singapore did not open until late March 2015 and does not open for the Gulf Coast until beginning of May 2015 (**Figure 10**). Wood Mackenzie analysis suggested that while the Gulf Coast has a distance advantage over Singapore, Gulf Coast refiners actually face a higher shipping cost due to needing a Jones Act vessel to ship product and needing to pay the Panama Canal fee. York estimated that the cost for shipping gasoline from the Gulf Coast was roughly \$0.25 per gallon and \$0.15 per gallon for Singapore. Finally, he informed the PMAC there were no congestion problems at the Panama Canal in 2015, and the year marked a historically strong growth year for gasoline worldwide.

---

<sup>8</sup> An "arbitrage window" is a transaction that profits a trader of a particular commodity or financial instruments such that it exploits the price differences of that same item in different market.

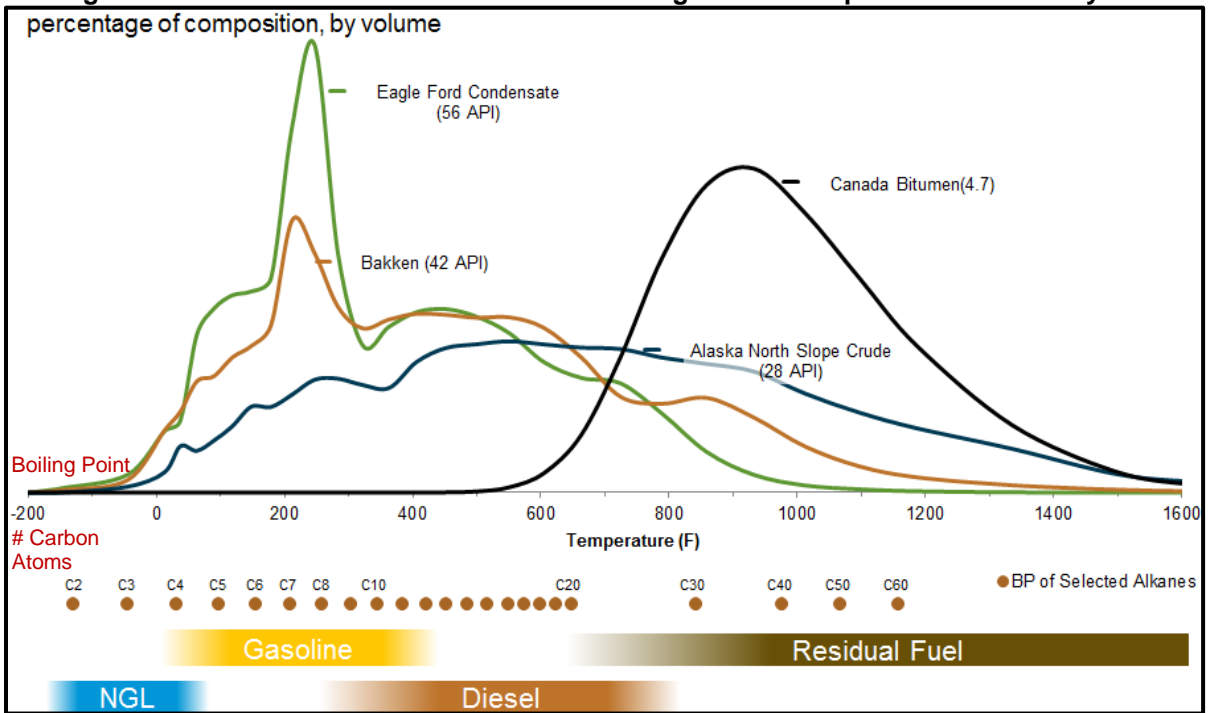
Figure 10: Gasoline Netback and Inflows to PADD V



Source: Wood Mackenzie

During the same December meeting, the U.S Energy Information Administration’s (EIA) Lynn Westfall provided insights regarding refinery operations in the United States and California. Not all crude oils are similar, and heavier crudes often require more processing to remove carbon atoms from the mixture to create gasoline material (**Figure 11**). Analysis of California refineries from U.S. EIA data shows that California refineries utilized several different crudes, both foreign and domestic, with American Petroleum Institute (API) gravity weights ranging from just above 14 degrees to just under 40 degrees (lower number equals heavier, more carbon atom-intensive material). Lighter crudes around the 40 degree mark would compare to the Bakken crude oil composition seen in **Figure 11**, yielding higher amounts of gasoline (but not as much as 56 API Eagle Ford). Heavier crudes would compare to Alaska North Slope crude, which would contain more diesel and residual fuel. Based on the mixes presented, California refiners tended to need more refining to change material into gasoline due to using heavier crudes. While California refiners have the complex systems to break compounds down into other materials, a refinery product slate could only be shifted between gasoline and diesel by roughly 10 percent and shifted between diesel and jet fuel roughly 15 percent. Westfall finished by providing U.S. EIA analysis indicating that most imports into California are blending components to be further refined to CARB specifications. The reasons for this include strict CARB requirements on items like sulfur, meaning that a product could test as compliant in one port but noncompliant by the time it reaches California. This leads to finished product being rarely directly imported into the area from non-West Coast-based refineries.

**Figure 11: U.S. EIA Estimates of Crude Oil Boiling Points Compared to API Gravity**  
percentage of composition, by volume



Source: Energy Information Administration

# CHAPTER 5:

## Gasoline Price Volatility and Mitigation Policies

---

With volatile gasoline prices in California continuing to be a concern, the PMAC focused on proposed policy options suggested to potentially curb California price spikes. Many of these potential policy options were developed for the California Attorney General Gasoline Task Force (2000) as possible price spike mitigation:

- Increased refining and petroleum market data collection and transparency
- Price pressure relief value allowing non-CARB gasoline with a surcharge
- Inventory requirement for gasoline sellers
- State of California strategic fuel reserve
- State of California forward purchasing plan for CARB gasoline to reduce risk of import shipments
- Building new pipeline capacity from the Gulf Coast
- Expanding capacity of import terminals
- Increasing refining capacity in state

After an additional information gathering meeting in February 2016, the PMAC reconvened on April 22, 2016, to discuss the option of increased data collection and transparency. U.S. EIA's Douglas MacIntyre described U.S. EIA's petroleum sector data collection, stating that all U.S. EIA data collection must be approved by the Office of Management and Budget in no more than a 3-year cycle, and adjusting data collection activity was a slow process. On the other hand, U.S. EIA was starting to provide more detailed reports of what is actually happening in the PADDs. U.S. EIA had released a PADD 5 Transportation Market Study,<sup>9</sup> which broke PADD 5 into six sub-regions with more geographic details on market operations, flows through those locations, and key issues in the area. U.S. EIA also releases a refinery outage report twice a year, in the winter and fall, which estimates planned refinery outages. MacIntyre indicated that refinery-specific information was not publicly available nor does U.S. EIA typically grant access. Energy Commission staff would later note that its own refinery data collection uses U.S. EIA reports as a basis for its own petroleum sector data collection activities, with the Energy Commission requiring some additional California-specific information as part of its Petroleum Industry Information Reporting Act (PIIRA) activities.

---

<sup>9</sup> U.S. EIA September 2015, *West Coast Transportation Fuels Markets*:  
[https://www.eia.gov/analysis/transportationfuels/padd5/pdf/transportation\\_fuels.pdf](https://www.eia.gov/analysis/transportationfuels/padd5/pdf/transportation_fuels.pdf).

Consumer Watchdog’s Jamie Court gave thoughts on how to address the price spike difficulties. Court pointed out that four refining companies produce 80 percent of California’s gasoline and “they do know a lot about this market.” Consumer Watchdog contended that additional data reporting requirements with more public disclosure would increase the number of participants in the market by giving them the information they needed to participate. His organization believes the lack of information on refinery behavior allows refiners to hide and misinform the public on the true supply situation in California to later manipulate the pricing signals and prevent competitive pricing. In response to the Consumer Watchdog presentation, Committee Member Sweeney asked, “Why would data on exchanges of oil or gasoline products reduce volatility in the market? I don’t get that.” Sweeney pointed out, “I don’t see how data on forward-looking statements on the expectations of the supply of various companies has ever been proved to reduce prices, (or) volatility, but typically has been seen as something that could in fact increase collusion amongst companies.” Court responded that information on what was really happening with ExxonMobil would have allowed “the proper import response to that supply shortage.” Sweeney responded, “The data on ExxonMobil is that they have to get regulatory approval, which I guess would be new data. But most people would know that if they’re involved in it.”

John Faulstich, self-identified as a former ExxonMobil employee, presented information to the committee on “Refinery Turnaround Planning and Data Transparency.”<sup>10</sup> Faulstich noted that publicizing planned outages ahead of time is contrary to the legal advice given during his employment and increases the number of entities that can potentially take actions to profit from the loss of production. By knowing a competitor is short on product, it would allow other producers to know that they face less competition in the market and thus could raise prices, knowing there would be less competition to undercut those higher prices. He was also questioned about ExxonMobil’s linear programming model used to determine crude oil input quantities and product mix output quantities. He stated that crude oil prices, feedstock prices, and product prices are some of the model inputs. Several PMAC members observed that increased data would allow producers

### **Emergency Fuel Shortage Discussion**

During her December 16, 2015, presentation on national emergency preparedness for National Petroleum Council, PMAC Member Amy Jaffe explained how natural disaster shortages are dealt with and possible lessons that could be applied to price spikes. She explained that locational “swaps” were a long standing practice in supply shortage situation. One of the key findings by the Council was that in an emergency situation these swaps would need to be coordinated with local governments to ensure fuel availability and make sure industry has the proper waivers to make the swaps. Member Jaffe asked if California had any programs or even an agency responsible for coordinating such efforts.

At the next meeting (February 8, 2016), Energy Commission staff outlined the state’s methods for dealing with energy emergencies. In the event of a catastrophic disaster, California Office of Emergency Services becomes the lead agency, directing other agencies in their emergency responsibilities. The Energy Commission is the state’s lead energy analysis agency and has mostly an analysis role in emergency response, with the exception of petroleum. To handle petroleum shortages, the Energy Commission, in coordination with the Office of Emergency Services, uses its Fuel-Set-Aside program to redirect fuel to appropriate locations to ensure fuel for emergency services. This program is not fully implemented until specific direction from the Governor is received, under the Governor’s emergency powers.

---

<sup>10</sup> *Refinery Turnaround Planning and Data Transparency*, John Faulstich, April 22, 2016. [http://www.energy.ca.gov/assessments/petroleum\\_market/2016-04-22/presentations/John\\_Faulstich\\_April\\_PMAC\\_Presentation.pdf](http://www.energy.ca.gov/assessments/petroleum_market/2016-04-22/presentations/John_Faulstich_April_PMAC_Presentation.pdf)

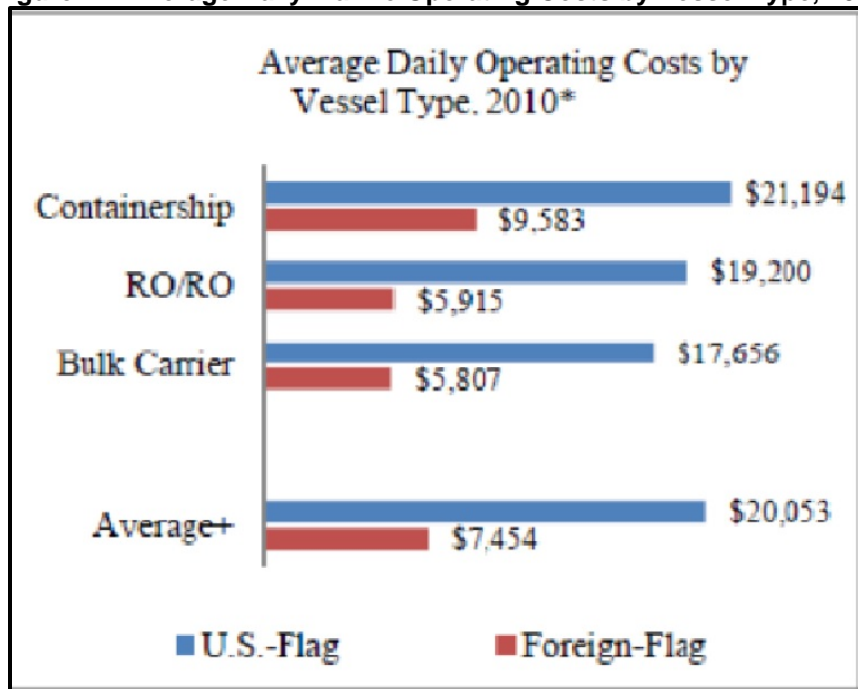
greater understanding of product demand elasticity. They opined that this information could potentially improve refiner abilities to manipulate the gasoline markets.

The PMAC then used the August 16, 2016, meeting to discuss three policies that could potentially affect and reduce price spikes in California gasoline:

- “Price pressure relief valve” from CARB gasoline requirements
- California inventory requirement for gasoline sellers
- Forward purchases by the State of CARB gasoline to increase market liquidity

Representatives from CARB, U.S. EIA, the Natural Resources Defense Council (NRDC), Kinder Morgan, Vitol, Consumer Watchdog, and Wood Mackenzie all gave presentations on the subject, with the Low Carbon Fuels Coalition providing comments during the public comment section. Energy Commission staff pointed out that spot market price spikes are usually over before a cargo can be delivered, since available product can be shifted from north to south and vice versa through marine tanker movements (**Figure 7**), and foreign supply is often a month or more away in shipping time. Echoing comments made by PMAC Member Hackett in earlier meetings, Energy Commission staff agreed that chartering Jones Act vessels is difficult and provided information showing these vessels shipping rates tended to be more than twice as expensive as foreign-flagged vessels (**Figure 12**). Energy Commission staff then suggested that minimum storage requirements may reduce tank farm working storage capacities needed for the pipeline infrastructure to maintain its normal seven-day cycle operations. Furthermore, the State buys only about 1 to 2 percent of California’s gasoline for a state purchasing program, which appears to be too small an amount to influence market operations.

**Figure 12: Average Daily Marine Operating Costs by Vessel Type, 2010**



Source: US DOT Maritime Administration, September 2011, page 4.

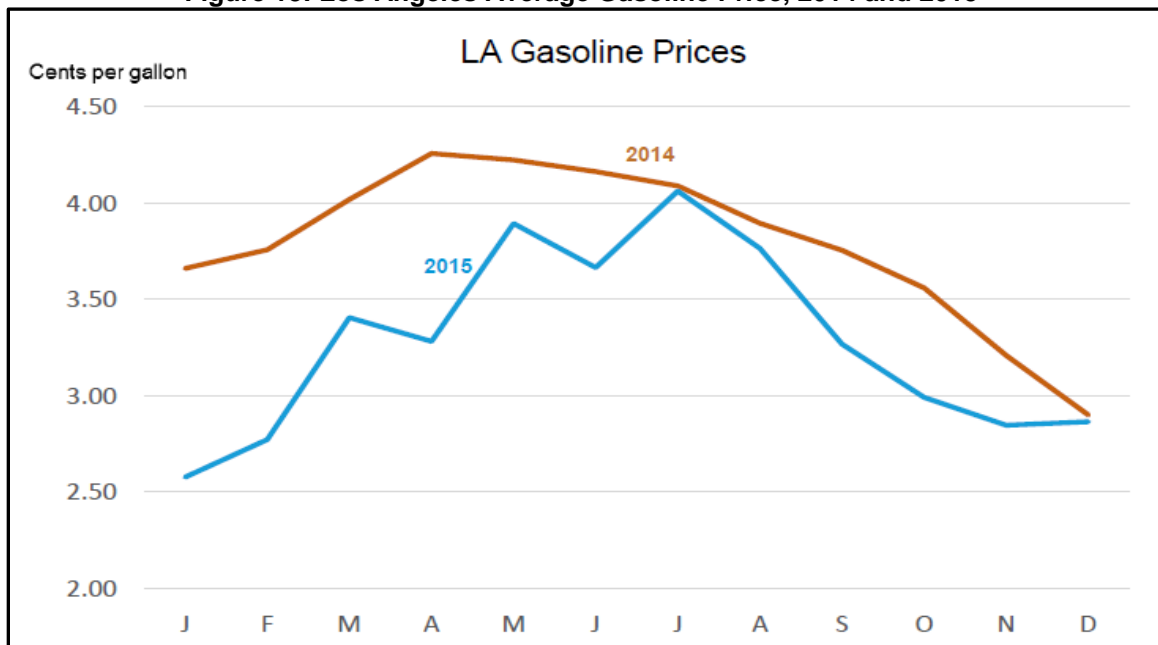
\*U.S. Flag costs are weighted by the number of vessels in each operator's U.S.-flag fleet.

+Tanker costs omitted to protect operator confidentiality.

RO/RO stands for Roll-On, Roll-Off shipping.

Following Energy Commission staff, U.S. EIA representative Lynn Westfall noted California's "biggest source of incremental supply and imports was the Far East and Europe. In the Far East, you are looking at imports primarily from Japan, Korea, Singapore, and India. And imports in Europe came primarily from the United Kingdom, France, Italy, and the Netherlands." None of these sources could be shipped to California quickly. U.S. EIA also noted that most price spikes in California occurred in the second quarter, because California's refining industry is at its tightest.<sup>11</sup> While the 2015 price spikes increased the differential price levels between California and United States, the actual price levels were much lower in relation to 2013 and 2014 due to lower crude oil prices (**Figure 13**), which likely contributed to a California gasoline demand increase (later confirmed by Board of Equalization reports).

**Figure 13: Los Angeles Average Gasoline Price, 2014 and 2015**



Source: U.S. Energy Information Administration

CARB and NRDC outlined public health concerns with using noncompliant fuel as a price pressure relief valve. Specifically, if a fee were to be used to procure mitigation later, it would not reduce the health impact at the time it is needed. Chairman Borenstein questioned whether there is reliable information on the variation over time in the benefits from the reduction of tailpipe emissions due to use of CARB gasoline, and evidence that time-shifting emissions reductions

<sup>11</sup> Reasons for market tightness are due to the change in Reid vapor pressure (RVP) standards and refinery maintenance patterns. Reduction of RVP in gasoline helps prevent engine vapor lock on hot summer days but reduces the product available to produce gasoline. Refinery maintenance typically happens in the first and early second quarter of a year since RVP standards are still high, giving refiners more product to work with, and demand for gasoline tends to be lower.

would be harmful. Moreover, CARB staff stated that the waiver to sell the fuel would require gaining approval from the U.S. Environment Protection Agency (EPA) for using noncompliant fuels to maintain compliance with the federal State Implementation Plan (or SIP). Edie Chang of CARB stated that the California Legislature has already set limits on when noncompliant gasoline would be allowed. She concluded that CARB is concerned with the length and magnitude of the gasoline price differentials, and it is not sure that the concept of using noncompliant gasoline would provide benefits without compromising the health benefits currently received from cleaner-burning gasoline. NRDC raised concerns regarding the fairness and cost of the solutions, especially for the local communities and disadvantaged groups. In response, Borenstein assured NRDC that peoples' health does matter, and the proposals do not suggest sacrificing peoples' health, but it "shouldn't be a barrier to thinking about what we might do." Low Carbon Fuels Coalition spokesperson Graham Noyes echoed NRDC statements but added that the Low Carbon Fuels Coalition believed that introducing low-carbon fuel suppliers into the market would be the best way to drive prices down. He explained that the introduction of cheaper low-carbon fuels would provide additional competition in the market, which he asserted has too little.

Kinder Morgan's Johnny Thomasson and Vitol's Brad Lucas provided industry's interpretations of the policies. Thomasson pointed out that for a non-CARB gasoline to serve as a price pressure relief valve policy, an ongoing EPA waiver would be required to allow quick entry into the market. He pointed out that this concept is typically used for emergencies and not as a price control measure. Other potential regulatory waivers, such as local facility air district permits, could be required as well, which would have to be in hand ahead of the supply shortage. For Vitol, Lucas indicated that the price pressure relief valve would limit price volatility but expressed concern at fully removing noncompliant product from California storage tanks to comply with product specification standards. Lucas also expressed concern regarding an inventory requirement policy proposal, indicating that traders without storage tanks would likely drop out of the market, as obtaining additional storage tank capacity in California is difficult. This reduces the number of traders in the market, decreases market liquidity, and increases risk premiums, which then causes more price volatility. He explained that for the forward purchase of gasoline proposal, Vitol has a program that helps address price risks that could be used if the State chooses.

In closing comments on price volatility, the PMAC members made the following observations in August 2016:

**Committee Member Sweeney** pointed out, "We've been at such a broad conceptual level with so little specificity, it's really hard for people (not) to be all arguing at cross purposes because they're all making different assumptions about what we're talking about." He stated that to move forward, the PMAC is going to need more detailed information and specifics regarding policy mechanics. His second comment outlined his concern that any new policy mechanism will likely have unintended consequences that should be minimized.

**Committee Member Foote** stated that her comments would reflect her own opinion, not necessarily the views of the California Attorney General. The most consistent point she has heard is that "uncertainty" is a significant contributor to price spikes. She noted, "(I) have looked at many other industries where risk is a factor. And risk always enormously increases



prices.” Foote also stated that she has consistently heard that industry has a “lack of will” to invest in the kind of infrastructure needed to promptly address spikes as they occur. She continued that this industry (petroleum refining) has the “hallmarks of an oligopolistic industry,” where the best way to address its problem may be to increase its risk pool (participants).

**Committee Member Hackett** stated that he did not see any of the proposals reducing price spikes in California. In the case of the State as a forward purchaser of CARB gasoline, suppliers to the state could buy from local refiners or from imports, but it is unclear how this concept would reduce volatility. For inventory requirements, Hackett said that increased costs of business would increase the barriers to market entry. For the price pressure relief valve idea, Hackett stated that PADD 5 appears to have the ability make additional gasoline for export that does not meet CARB specifications that could be available. However, one constraint is the current lack of spare U.S. flagshipping capacity. Hackett remains a proponent of the “Gasoline Bank of California” concept that was proposed in the Energy Commission’s *Strategic Fuel Reserve* study.<sup>12</sup> Hackett also thanked Vitol for importing gasoline to California and for testifying about the market.

**Committee Member Jaffe** pointed out that the U.S. Department of Energy is studying the concept of where to put strategic gasoline inventories. She continued that California could partner in that work, thus reducing the costs of increased infrastructure. Based on her academic work, Jaffe noted that these supply constraint concerns appear to be getting worse due to a variety of factors. She echoed Noyes’ comments that alternative fuels would, long-term, help address this issue. She also thanked Vitol for its comments as it opened her eyes to the possibility of traders “betting against the State” in the case of forward pricing, which could make matters worse in the market.

**Chairman Borenstein** first pointed out that there were mixed messages in the current gasoline market. On one side is the need to invest in infrastructure, while on the other side there is an active movement to “kill your industry.” This situation did not make him optimistic for continued investment, but there is a need to study the market during that transition. Borenstein commented that he had always been “bullish” on the price pressure relief valve and forward purchasing policy suggestions but conceded that both ideas required more thought. He concluded that the retail sector requires more inspection, and just because the refineries did not own the stations, it did not mean they could not be exerting influence over their prices.

Overall, after hearing from all the stakeholders, PMAC members remained unconvinced as a body that any explanations of events that they heard fully and accurately explained the price spike events of 2015 and further explanation, data, and examination were needed.

---

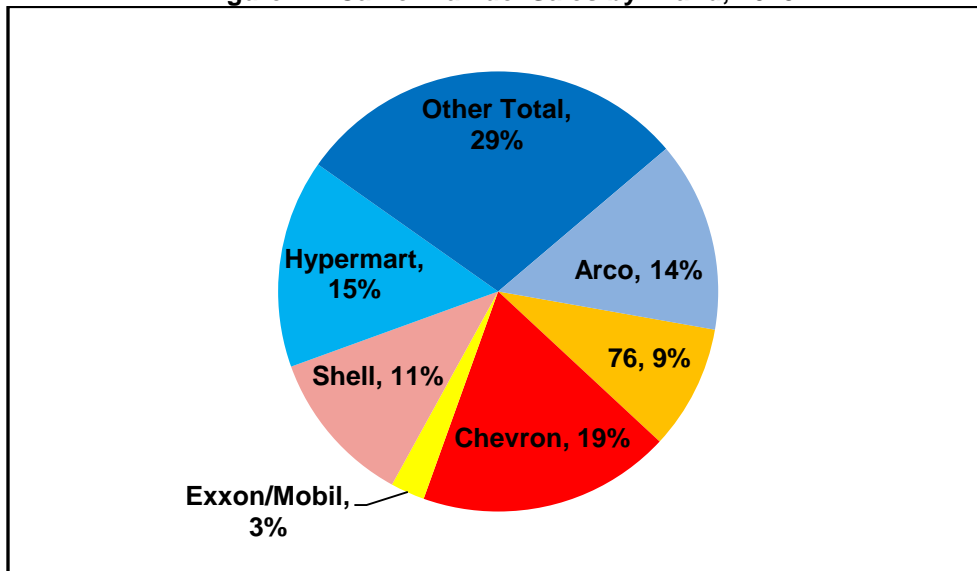
<sup>12</sup> *California Strategic Fuels Reserve*, July 2002, P600-02-017D, <http://www.energy.ca.gov/2002publications/P600-02-017D.pdf>.

# CHAPTER 6: California Retail Gasoline Sector and Prices

---

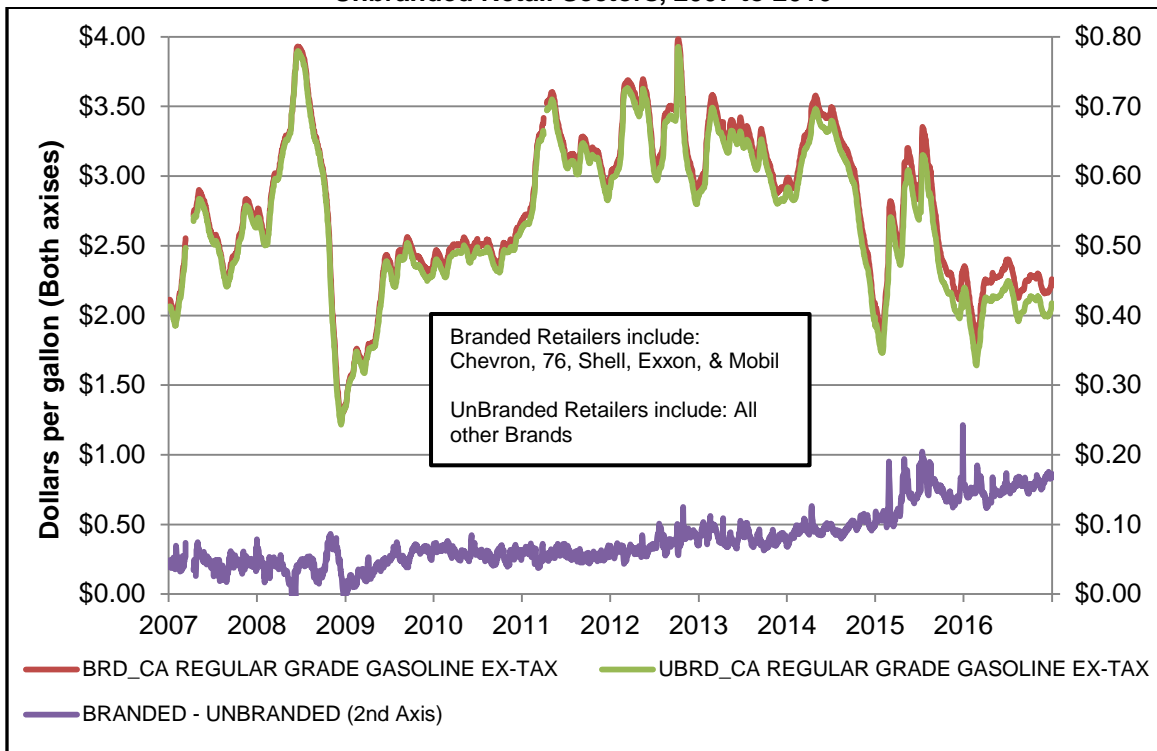
Following up on PMAC Chair Borenstein’s request to look more closely at the retail gasoline sector, a November 2016 meeting was scheduled with presentations from Energy Commission staff, Consumer Watchdog, and the California Independent Oil Marketing Association (CIOMA). Energy Commission staff member Ryan Eggers presented material on price differences between branded and unbranded gasoline at retail stations. The Energy Commission’s analysis of information obtained through the PIIRA form CEC-A15 showed that roughly 58 percent of gasoline sales in California tend to be through lower-priced retail outlets. (See **Figure 14**, Arco, Hypermarts, and Other.) Using Oil Price Information Service (OPIS) data to compare Arco (lower price outlet) and Chevron (higher price outlet) prices, data showed that for 2010 to 2014, there was roughly a \$0.22 difference between the two. In 2015, that difference increased to \$0.34. Data showed that retail prices vary by brand, but the associated “orbits” (or the positional relationships to each other) remained consistent throughout the entire price series and by California region. Based on this information, PMAC members asked for a longer run of this information. The results of that request is **Figure 15**, which shows retail California regular gasoline prices from 2007 to 2016 by unbranded (lower price outlets) and branded (higher price outlets) retailers. From 2007 to 2011 the difference between the two appeared roughly constant (purple line). From 2012 on, this difference has been steadily growing, staying above \$0.10 for most of 2015.

**Figure 14: California Fuel Sales by Brand, 2015**



Source: California Energy Commission

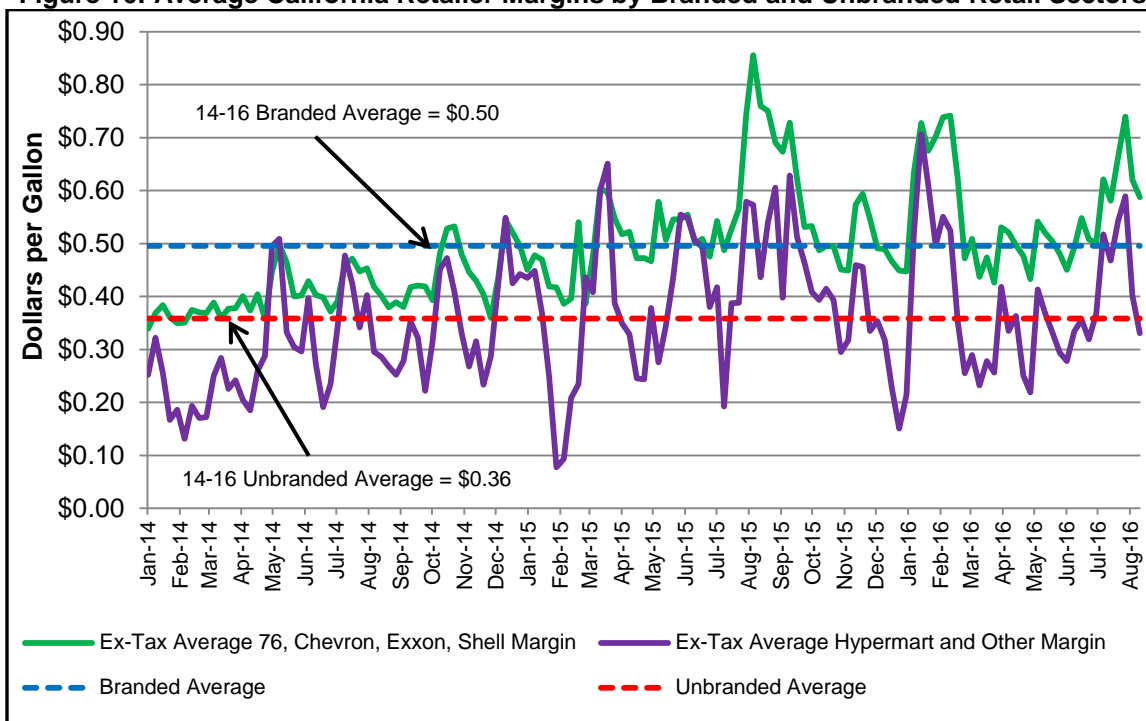
**Figure 15: Average Retail California Regular Gasoline Prices by Branded and Unbranded Retail Sectors, 2007 to 2016**



Source: California Energy Commission analysis of OPIS information

Eggers provided additional information on California margin calculations found in the petroleum section of the Energy Commission website. With caveats specific to that information, he showed that comparing the retail margins, both branded and unbranded, to each other in absolute terms was misleading since both used the same final retail price to calculate that figure. To provide the PMAC a more accurate picture of the retailer margin, the unbranded and branded price series shown in **Figure 15** were used to create the retail margins shown in **Figure 16**. This chart shows the unbranded retailer margin (purple line) and branded retailer margin (green line) and the respective averages from 2014 to 2016 (red and blue dotted line respectively). This chart shows that branded retail margins tended to always be higher than unbranded, even during the 2015 period. PMAC Member Sweeney observed that both lines displayed an upward trend (the margin seemed to be increasing) and requested further investigation. Further staff analysis confirmed that this appears to be part of a longer-term trend that started in 2010.

**Figure 16: Average California Retailer Margins by Branded and Unbranded Retail Sectors**



Source: California Energy Commission analysis of OPIS information

Consumer Watchdog’s Jaime Court asserted California drivers are paying a premium for gasoline due to refinery market power as they cut back on production. He observed that historically, according to U.S. EIA data from 2003 to 2014, the gap between the California spot and retail price is \$0.86, but in 2015 and 2016 it is about \$0.60 more than that (\$1.46). Court added that during Labor Day weekend 2016, Tesoro and PBF cornered the market and the spot prices jumped \$0.23. Around July 4, 2015, Chevron and Tesoro bought every barrel on the spot market and the spot price increased \$1.06 overnight. Because roughly 80 percent of the stations in Southern California are branded stations,<sup>13</sup> refiners are able to control the price charged to these station owners through their contractual arrangements (either through DTW pricing or rack pricing). Consumer Watchdog then reiterated its recommendation for transparency of dealer tank wagon prices (including publishing), greater monitoring of the spot market, reporting when refiners corner the market, and limiting of further consolidation of the market.

CIOMA’s Ryan Hanretty presented CIOMA’s views about the gasoline retail sector in California. CIOMA members have been in business for as long as 80 years, with the contractual side of the sector changing consistently during that time. CIOMA members tend to own individual stations and, due to their lack of vertical integration in the case of gasoline, are focused on moving product. When questioned by Sweeney about how branded stations price their gasoline (“is price set by the refineries?”), Hanretty responded that each member negotiates his/her own contract terms with providers. There typically is no limit to the price retailers could charge for the fuel, but retailers have little control over the price at which they could buy the fuel. Public comments from

<sup>13</sup> Branded station definition used by Court was not verified to be the same as Eggers’ definition.

John Faulstich pointed out that ExxonMobil no longer directly owns retail stations in California. To sell ExxonMobil gasoline, stations had to purchase gasoline meeting ExxonMobil specifications, but ExxonMobil would not directly control those stations.

Committee Member Dave Hackett made final comments, stating that the volatility of the spot market and unprecedented problems with refining created the price spikes and there was insufficient competition to force the prices spikes down quickly. He stressed that lack of liquidity in the spot market is the main issue, as there are not enough market participants in the market in contrast to a few years ago. In conclusion, he saw the “Gasoline Bank of California” as a way to provide the liquidity.

Even with the additional information on prices, PMAC members were left with additional questions on industry behavior that required exploration. Greater attention and analysis in competition policy for both the retail and production sectors of this industry would be needed moving forward. PMAC Chair Borenstein remarked on the subject, stating, “I have done work, for instance, with the U.S. Department of Justice, and with the U.S. Federal Trade Commission, and they have, each of them, employ 80 Ph.D. economists, plus, who are doing complex empirical work with confidential data. And that’s just not something that the PMAC has access to.” While PMAC members expressed general satisfaction with staff support, given its limitations, overall this endeavor required greatly increased resources to satisfactorily explain price pattern.

# CHAPTER 7: Petroleum Market Advisory Committee Viewpoint

---

During 10 meetings, from December 2014 through the end of 2016, the PMAC heard from Energy Commission staff, industry participants, and consumer advocates about the operation of California's gasoline market and the possible causes of the state's high prices. Committee members questioned the speakers in detail and had extensive discussions among themselves. While prior to the February 18, 2015, fire at the Torrance Exxon Refinery, the California gasoline market had experienced occasional price spikes of 1 – 2 months following supply disruptions, Committee members noted that the price spike after the 2015 fire has lasted much longer and been much more costly to consumers than previous spikes. In fact, even after adjusting for cost factors—California's higher-than-average gasoline taxes, the higher cost of producing CARB gasoline, and programs to reduce greenhouse gas emissions (cap-and-trade and the low carbon fuel standard) – California's gasoline prices since February 2015 have exhibited a continuous and significant unexplained differential compared to the rest of the country.

From 2000 through January 2015, the average differential between California and US average gasoline prices was approximately equal to these costs differentials. Since the Torrance refinery fire, however, the state has seen price differentials 10-70 cents higher than could be explained by these cost factors, averaging 33 cents higher. As of June 2017, these factors explained approximately a 39 cent differential, about 15 cents from taxes, 14 cents from GHG costs, and 10 cents for the long-run additional cost of making CARB gasoline. But retail gasoline prices in California remained more about 75 cents above national average.<sup>14</sup> The unexplained differential since the February 2015 fire implies that Californians have paid over \$12 billion more than they would have had the price differential reflected only taxes, GHG programs, and the extra cost of producing CARB gasoline.

The committee members agreed that this differential alone does not imply that any market participants have acted illegally or even that the market is less than highly competitive. Numerous speakers at committee meetings highlighted plausible logistical issues that might impede competitive supply response to the high margins in California. Other speakers, however, presented plausible arguments that some firms might be able to act in ways that raise price above competitive levels.

After 10 meetings, however, the PMAC has concluded that the structure of the committee and resources available to it are very unlikely to allow the committee to reach clear conclusions about the cause of elevated California gasoline prices and the best remedies. The committee members reached this conclusion for a number of reasons:

---

<sup>14</sup> <http://www.api.org/~media/Files/Statistics/Gasoline-Tax-Map.pdf>

1. Due to severe resource constraints, the Energy Commission has not been able to provide the level of staffing one would need to carry out detailed investigations of the possible causes of high gasoline prices. The committee has worked with capable staff members but has had well below one full-time equivalent staff member support throughout its operation. Furthermore, Energy Commission staff does not have the expertise in competition policy, analysis of competition in this industry, and statistical analysis that one would need to carry out the studies that the committee would need to produce.
2. The committee does not have any power to compel participation by industry decision makers who could shed light on the drivers of firm behavior.
3. The committee consists of five members who have full-time jobs in disparate locations (Irvine, Stanford, Berkeley, San Francisco, and Davis). Furthermore, they have not received reimbursement from the Energy Commission for travel or other expenses. This has made regular in-person meetings very difficult to schedule.
4. California's Bagley-Keane open meeting rules have greatly impeded committee discussions. The committee has been informed by Energy Commission attorneys that online discussions, even in a forum open to the public for both observation and comment, are not acceptable under Bagley-Keane. Also, the committee was told that meetings by conference call would require that the room from which each committee member is participating be made open to the public. The result of these restrictions has been that committee members have participated in meetings only when they were physically at the location of the meeting. Combined with the members' distant locations and other commitments, this has led to meetings only occurring roughly quarterly, even after the state's gas prices remained elevated for more than a year.

While the authors do not believe the committee operating with its current structure and support resources would be able to reach useful conclusions with regard to the cause of California's high gasoline prices, the authors strongly urge the State to establish an organizational structure and to commit resources that would permit such in-depth analysis and conclusions. The Committee's work has laid a solid informational foundation for further investigation. Nonetheless, Californians continue to pay more than \$3 billion per year for gasoline above the levels that could be explained by standard cost analysis. Whether the cause of these excess payments is insufficient competition or logistical impediments, or some combination of these factors, the magnitude of the loss justifies a very significant effort to diagnose its causes and remedy the situation.

# **APPENDIX A:**

## **Acronyms/Abbreviations**

---

BPD	barrels per day
CARB	California Air Resource Board
CIOMA	California Independent Oil Marketers Association
EPA	Environment Protection Agency
ESP	electrostatic precipitator
FCCU	fluid catalytic cracking unit
GHG	greenhouse gas
LA	Los Angeles
LCFS	Low Carbon Fuel Standard
NRDC	Natural Resources Defense Council
OPIS	Oil Price Information Service
PIIRA	Petroleum Industry Information Reporting Act
PMAC	Petroleum Market Advisory Committee
SIP	State Implementation Plan
U.S. EIA	U.S. Energy Information Administration
WSPA	Western States Petroleum Association