November 2018

PETROLEUM WATCH

CALIFORNIA ENERGY COMMISSION

INSIDE

PETROLEUM NEWS

PRICES

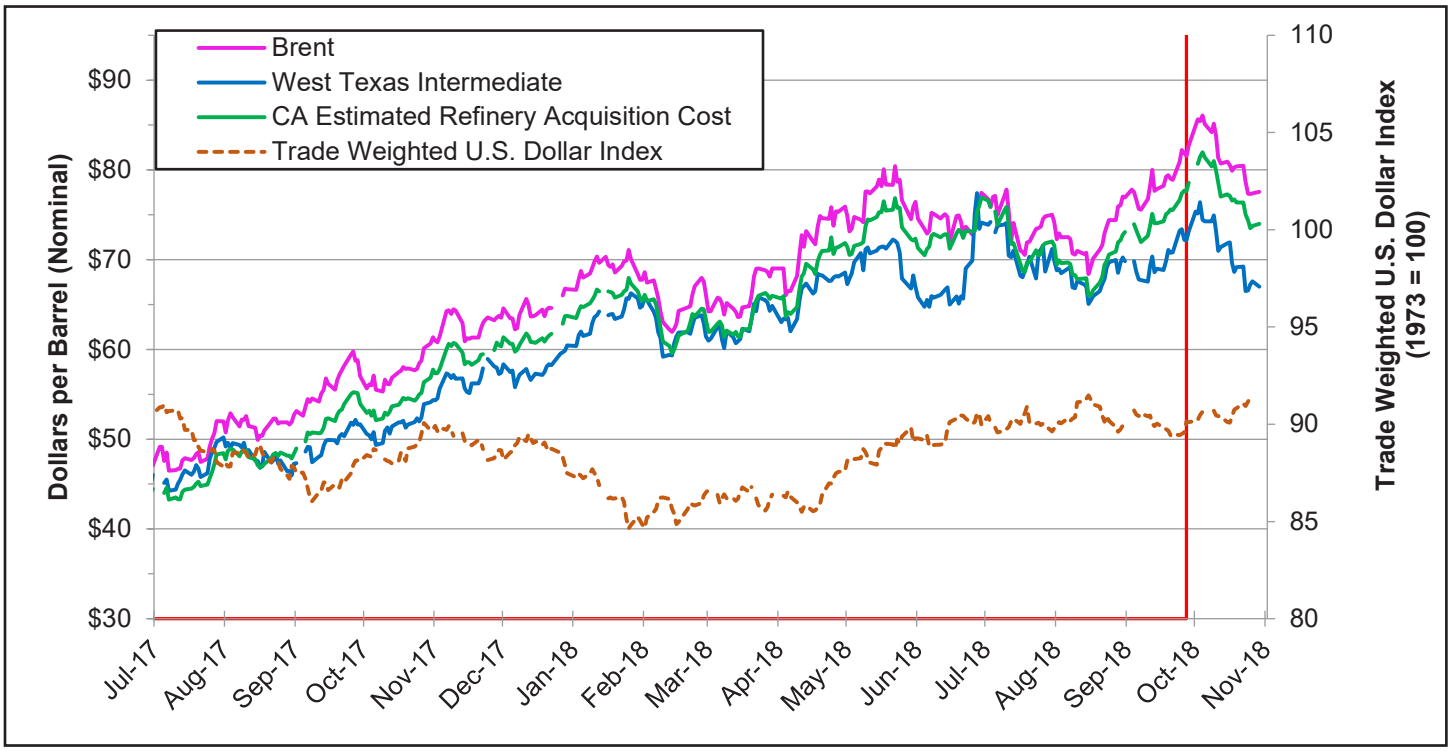
- Crude Oil Prices: On October 29, Brent and West Texas Intermediate (WTI) crude prices closed at $77.56 and $67.00, respectively (**page 2**).
- California Retail Gasoline Prices: On October 29, prices reached $3.68, an increase of $0.06 since the end of September. Through October, California prices averaged $0.83 higher than the national average (**page 4**).
- California Retail Diesel Prices: On October 29, prices reached $4.07. This was an increase of $0.03 from the end of September. Through October, California prices averaged $0.72 higher than the national average (**page 5**).

REFINING NEWS

- **Phillips 66 Carson**: On September 28, the refinery shut down a diesel hydrotreater and delayed coker for unplanned maintenance. Maintenance for the hydrotreater was completed October 14.
- **Marathon Petroleum Golden Eagle**: On October 5, the refinery began planned maintenance on a fluid catalytic cracking unit, diesel hydrotreater, and two atmospheric distillation units.

CRUDE OIL PRICES

Figure 1: Daily West Coast Spot Crude Oil Prices



Source: U.S. Energy Information Administration (EIA), Oil Price Information Service (OPIS) and Federal Reserve Bank of St. Louis.

CRUDE OIL PRICES

October 2018 vs 2017

(Percent Change)

Brent	42% higher
WTI	38% higher
CA-RAC	44% higher

October 2018 Averages

Brent	$81.58
WTI	$71.23
CA-RAC	$77.68

October 29, 2018

Brent	$77.56
WTI	$67.00
CA-RAC	$73.30

The news of export embargos on Iran pushed crude oil spot prices to annual peaks in early October (**Figure 1**). Spot prices for WTI peaked on October 3 at $76.40. Spot prices for Brent and California Estimated Refinery Acquisition Costs (CA-RAC) peaked on October 4 at $86.07 and $81.96, respectively.[1] By October 23, petroleum inventory increases in the United States and Saudi Arabia's indications that it would increase crude oil production soothed worries about supply.[2] By October 29, Brent, WTI, and CA-RAC closed at $77.56, $67.00, $74.00, respectively.

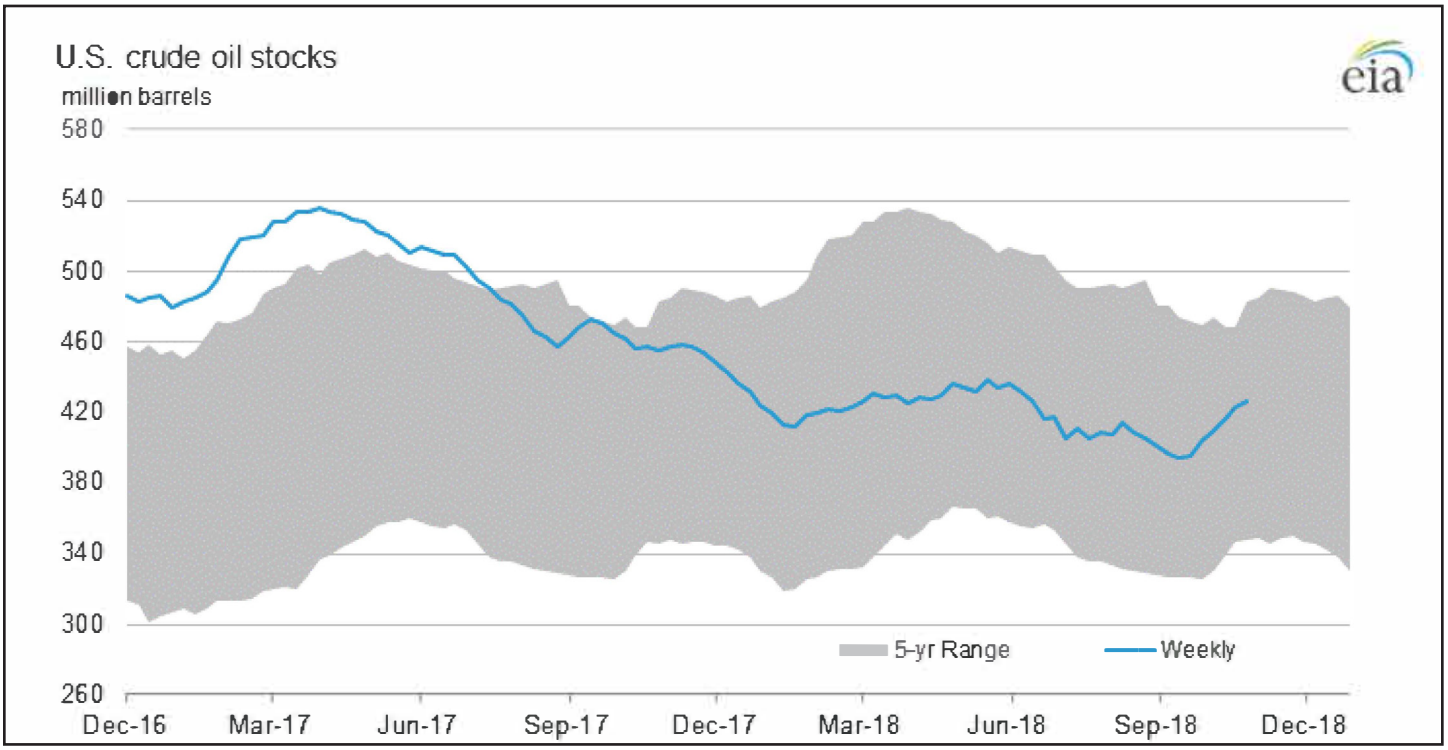
All grades of crude oil reached the highest spot prices of 2018 so far. Many spot prices reached highs not seen since 2014. The last time Brent spot prices averaged above $81 for a month (**sidebar**) was October 2014. WTI has not averaged over $71 since November 2014. CA-RAC has not averaged more than $77 since October 2014. The difference of Brent-minus-WTI has widened to 2014 levels as well. The Brent-minus-WTI spread averaged $10.40 in October 2018. This amount is nearly double the spread of $5.93 in October 2017. The persistence of the widened spread is because of the strong crude oil production in the United States and constant supply worries reported from Organization of Petroleum Exporting Countries (OPEC).

1 CA-RAC is a weighted average of the prices of California (San Joaquin Valley) crude, Alaskan crude, and foreign crude.

2 "Oil slumps 5 percent as global equities tumble, Saudi supply assurances," Reuters, November 5, 2018
https://www.reuters.com/article/us-global-oil/oil-prices-fall-as-saudi-arabia-pledges-to-play-responsible-role-in-market-idUSKCN1MX046?il=0.

CRUDE OIL PRODUCTION & STORAGE

Figure 2: U.S. Crude Oil Inventories



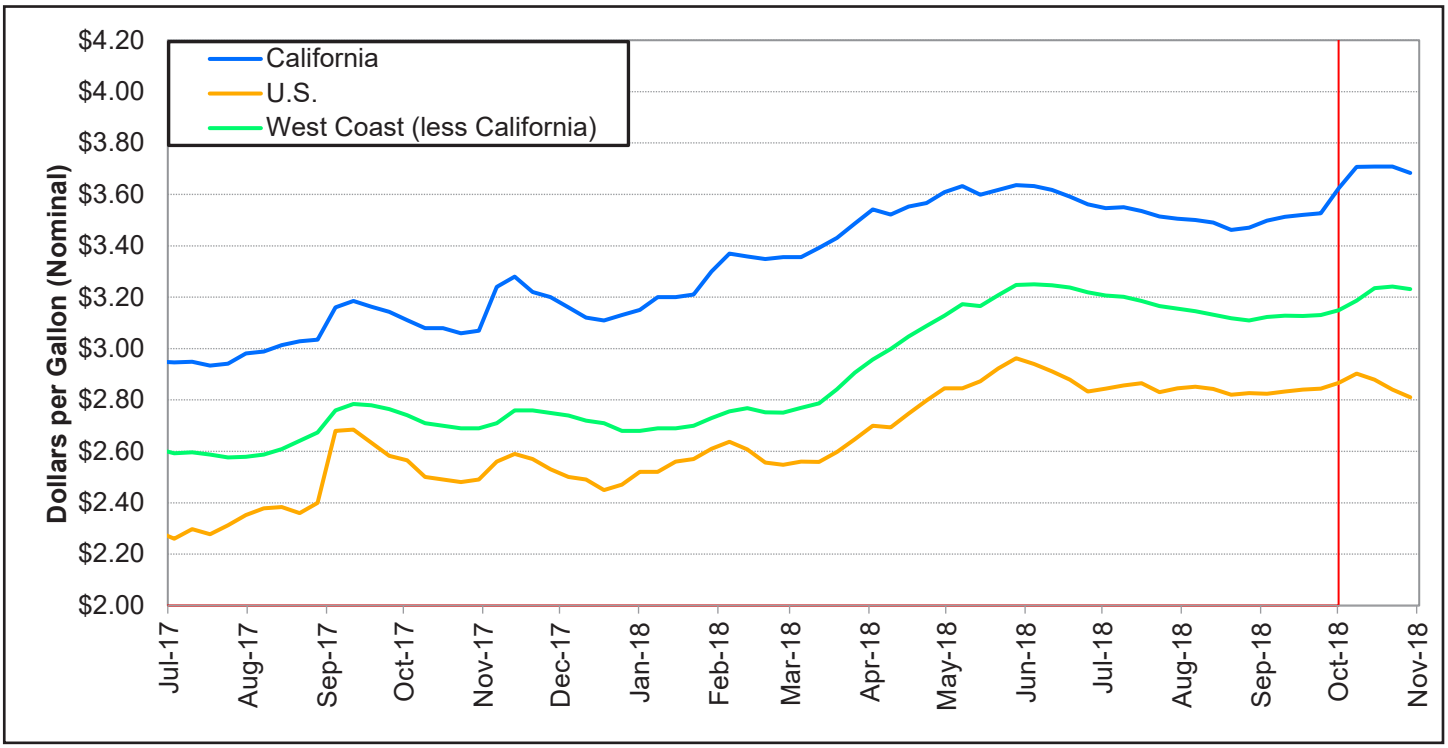
Source: U.S. Energy Information Administration

- October U.S. crude oil production and inventories increased over September 2018 averages. Refinery input levels fell, while imports decreased slightly (**Figure 2**).
- U.S. crude oil production for October averaged 11.05 million barrels per day (bpd). This is 25,000 bpd higher than September's average of 11.02 million bpd. This amount is a 1.81 million bpd increase from October 2017, when production was 9.24 million bpd.
- Crude oil imports decreased from September by 350,000 bpd to 7.51 million bpd in October. Compared to October 2017 imports, this is a decrease of 190,000 bpd.
- U.S. crude oil refinery inputs decreased by 79,000 bpd since September, finishing October at a four-week average of 16.31 million bpd. Refinery inputs are 376,000 bpd higher than a year ago.
- Average U.S. crude oil inventory in October slightly increased from September to 426 million barrels from 404 million barrels. Current inventories are 28.9 million barrels lower than one year ago.
- According to OPEC's October *Monthly Oil Market Report*, total September OPEC production increased by 132,000 bpd to 32.76 million bpd.[3] OPEC revised down its crude oil demand growth forecast for the rest of 2018, down 80,000 bpd to 1.54 million bpd, with total oil demand at 98.79 million bpd.

3 OPEC October *Monthly Oil Market Report*, page iii, page 57: http://www.opec.org/opec_web/en/publications/338.htm.

GASOLINE AND DIESEL RETAIL PRICES

Figure 3: Gasoline Retail Prices



Source: U.S. Energy Information Administration

GASOLINE PRICES

October 2018 vs 2017

(Percent Change)

California	20% higher
U.S.	14% higher
West Coast	19% higher

October 2018 Averages

California	$3.69
U.S.	$2.86
West Coast	$3.21

Week of October 29, 2018

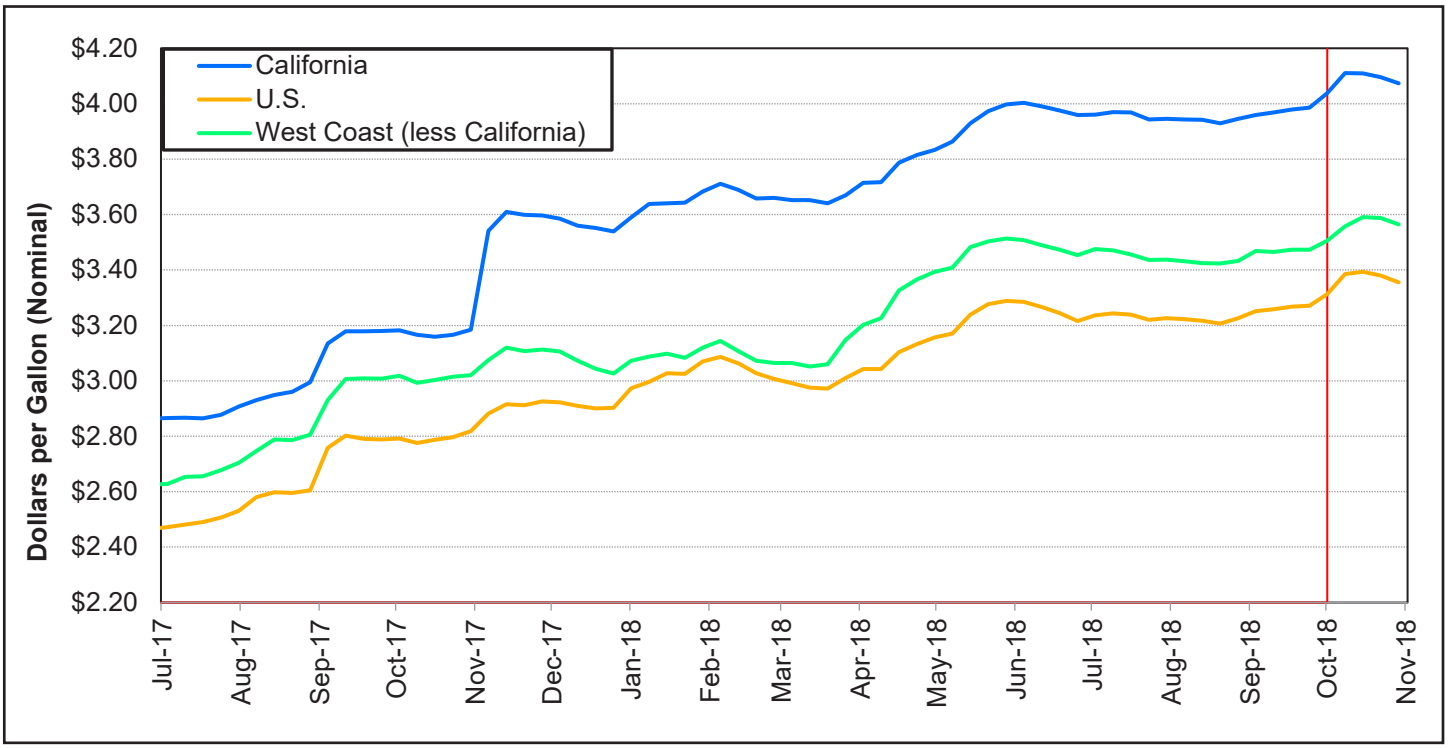
California	$3.68
U.S.	$2.81
West Coast	$3.23

October gasoline retail prices were higher on average compared to September. California's average price increased $0.18 from last month to $3.69 per gallon, up $0.61 from the same time last year. West Coast (less California) average price increased $0.08 to $3.21. The United States' average price as a whole increased $0.02 to $2.86. Although average prices increased for the month, gasoline prices began to decline across all regions by October 22 (**Figure 3**). California and the West Coast followed a similar trend, while the United States showed a faster decline. During the last three weeks of October, the United States dropped $0.09 by October 29, while California dropped only $0.03.

Declining gasoline prices in October are an effect of decreasing crude oil prices (**Figure 1**). However, the average gasoline price for the United States dropped $0.06 more than California in the same period. This difference suggests that there is higher demand in California as the prices should decline at the same rate if crude oil prices were the only factor. In November refineries will switch to winter-blend gasoline. This blend is less expensive and should contribute to lower prices next month.

GASOLINE AND DIESEL RETAIL PRICES

Figure 4: Diesel Retail Prices



Source: U.S. Energy Information Administration

DIESEL PRICES

October 2018 vs 2017

(Percent Change)

California	29% higher
U.S.	20% higher
West Coast	18% higher

October 2018 Averages

California	$4.09
U.S.	$3.37
West Coast	$3.56

Week of October 29, 2018

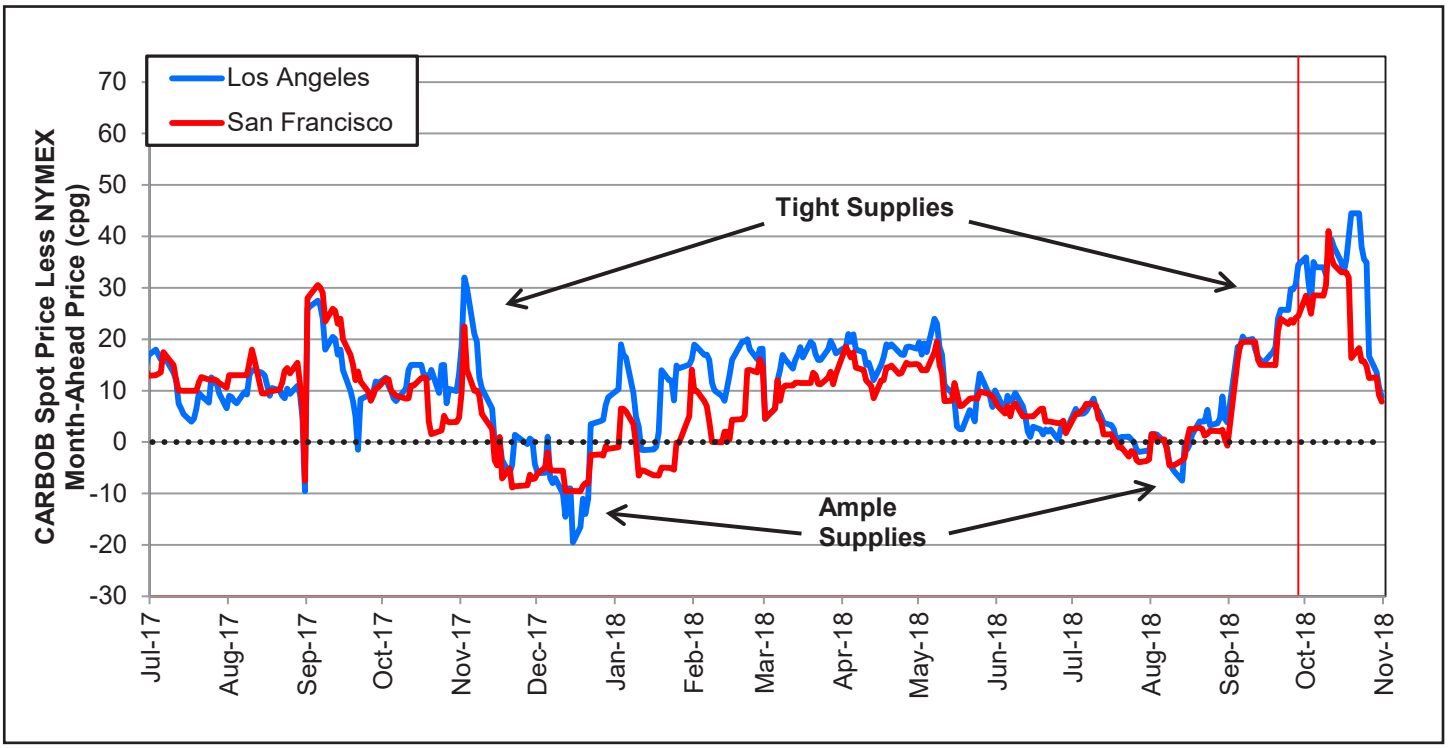
California	$4.07
U.S.	$3.36
West Coast	$3.56

Retail diesel prices throughout the United States continued to rise through the first week of October (**Figure 4**). On October 8, California diesel prices reached $4.11, the highest price since July 2014. This price held through October 15 before falling. The average price in California for October was $4.09 (**sidebar**), $0.12 higher than the September average of $3.97. The United States monthly average increased $0.11 to $3.37. The West Coast (less California) average increased $0.09 to $3.56.

Crude oil prices decreased (**Figure 1**), while inventories increased during October (**Figure 2**). These events helped bring down retail diesel prices.

SPOT MARKET SPREADS

Figure 5: California Spot Gasoline to NYMEX Futures Price Spread



Source: U.S. Energy Information Administration and OPIS

GASOLINE SPOT - FUTURES SPREAD

October 2018 vs 2017

Los Angeles	20¢ higher
San Francisco	16¢ higher

October 2018 Averages

Los Angeles	32¢
San Francisco	24¢

October 31, 2018

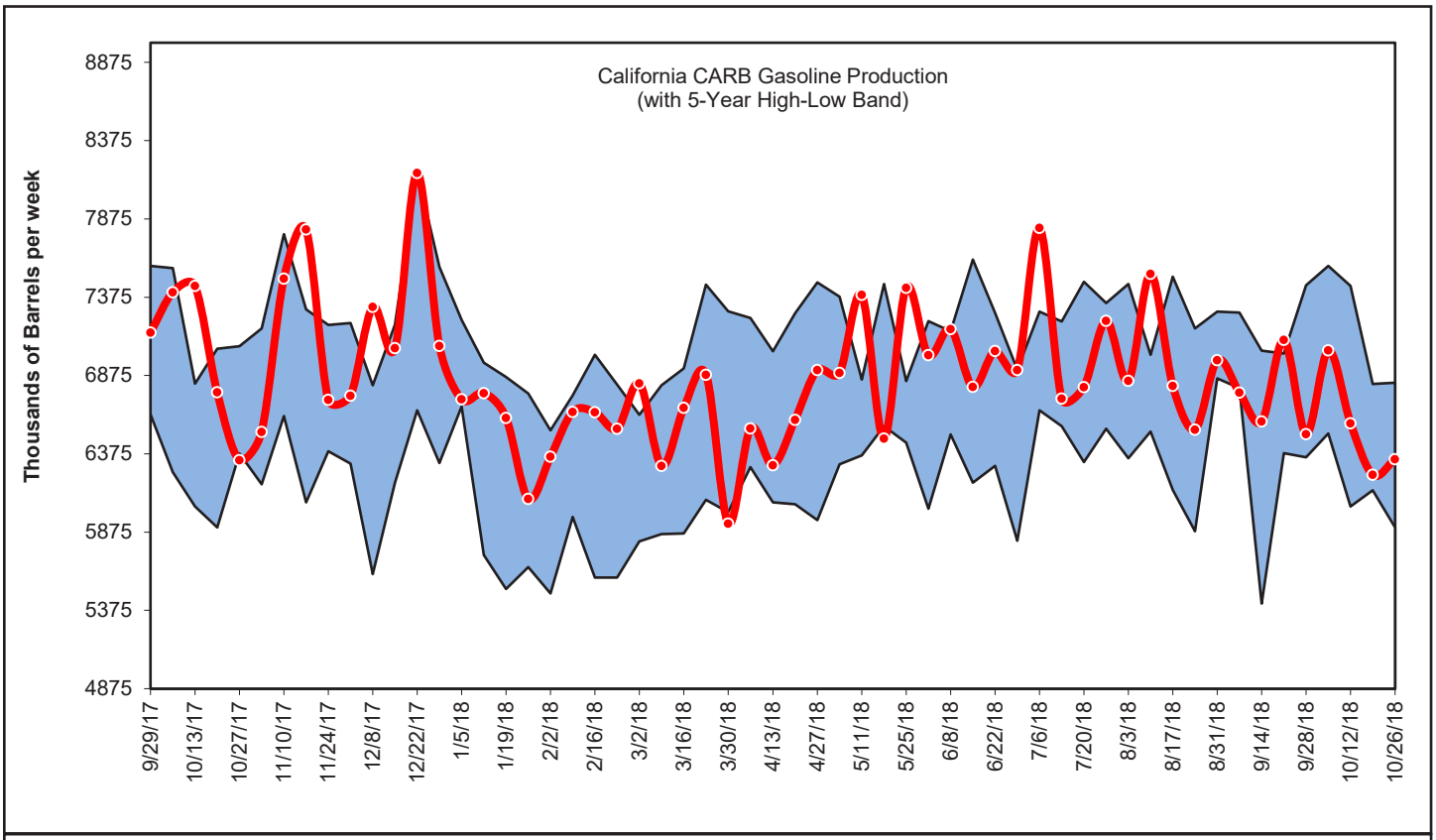
Los Angeles	9¢
San Francisco	8¢

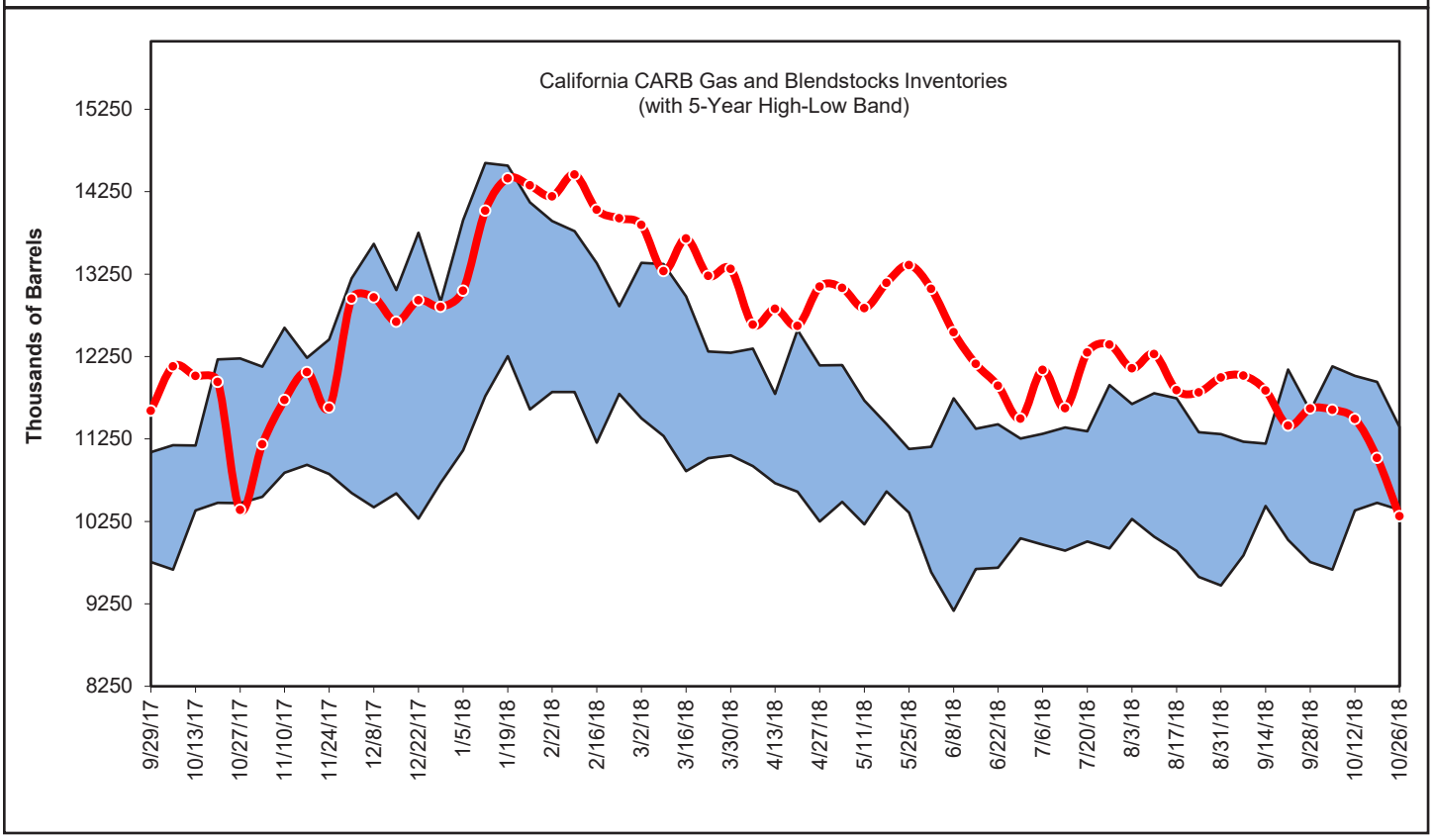
The Los Angeles (LA) and San Francisco (SF) gasoline spot less New York Mercantile Exchanges (NYMEX) futures spreads in October increased $0.10 and $0.05 from September averages to $0.32 and $0.24, respectively (Figure 5). These are the highest year-to-date spot prices. On October 1, the LA spread begin at $0.36 and increased $0.09 to $0.45 on October 19. The price then decreased to $0.09 on October 31. The SF spread followed same trend and started at $0.28 on October 1 and increased to $0.41 on October 10. The spread then decreased to $0.08 on October 31 (**sidebar**).

As California refineries prepare to switch to winter-blend gasoline, the SF and LA spot prices fell sharply at the end of October. The SF spread decreased $0.16 from $0.32 on October 18 to $0.16 on October 19. The LA spread decreased $0.18 from $0.35 on October 25 to $0.17 on October 26 (**Figure 5**). Historically, the change to winter blend gasoline causes the spread prices to drop for the rest of the year.

California gasoline production during October remained within the five-year high-low band. Production decreased from 7.0 million to 6.2 million barrels per week (bpw) between October 5 and October 19. California gasoline inventory fell below the five-year high-low band from 11.6 million barrels on October 5 to 10.3 million barrels on October 26. Inventory has not been below the five-year band since October 2017 (**Figure 6**).

Figure 6: Gasoline Production and Inventories

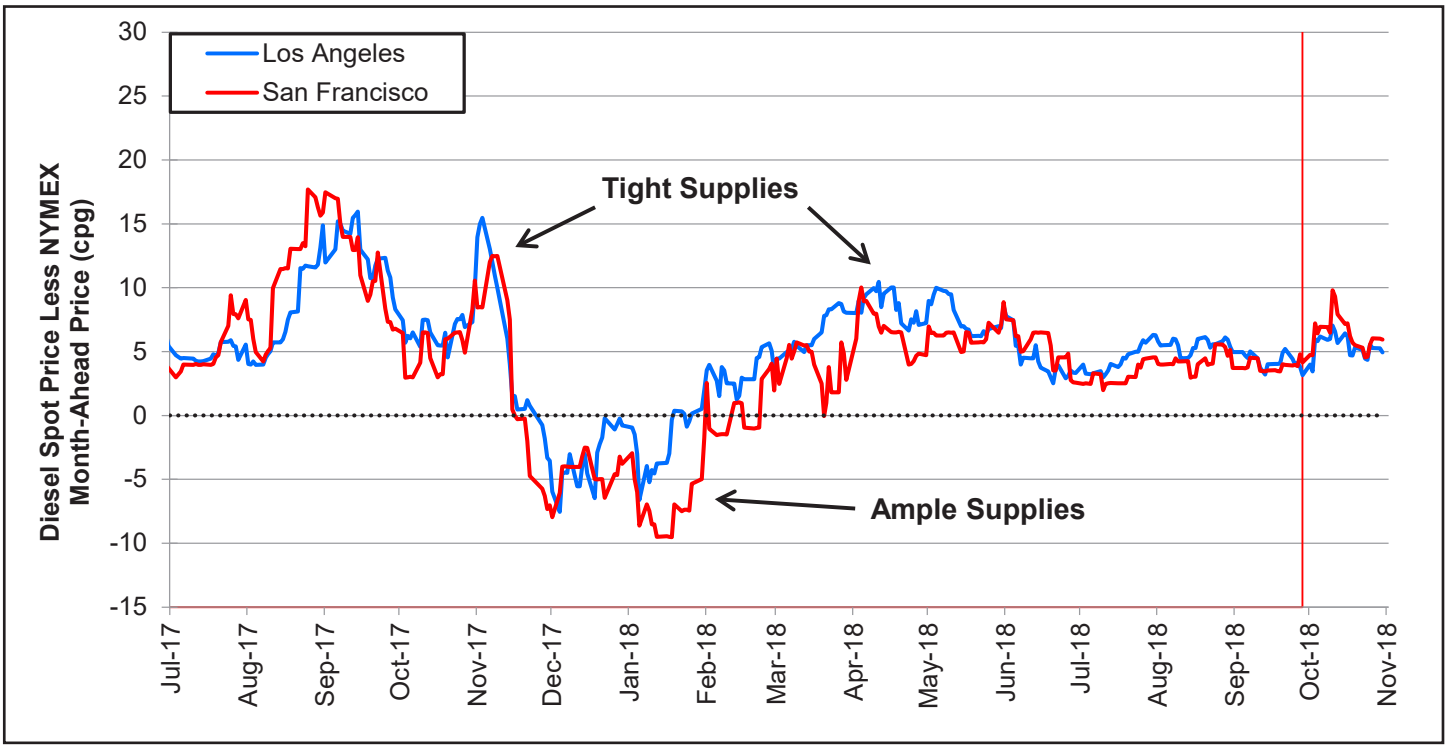




Source: California Energy Commission PIIRA data

SPOT MARKET SPREADS

Figure 7: California Spot Diesel to NYMEX Futures Price Spread



Source: U.S. Energy Information Administration and OPIS

DIESEL SPOT - FUTURES SPREAD

October 2018 vs 2017

Los Angeles	2¢ higher
San Francisco	1¢ higher

October 2018 Averages

Los Angeles	5¢
San Francisco	6¢

October 31, 2018

Los Angeles	4¢
San Francisco	5¢

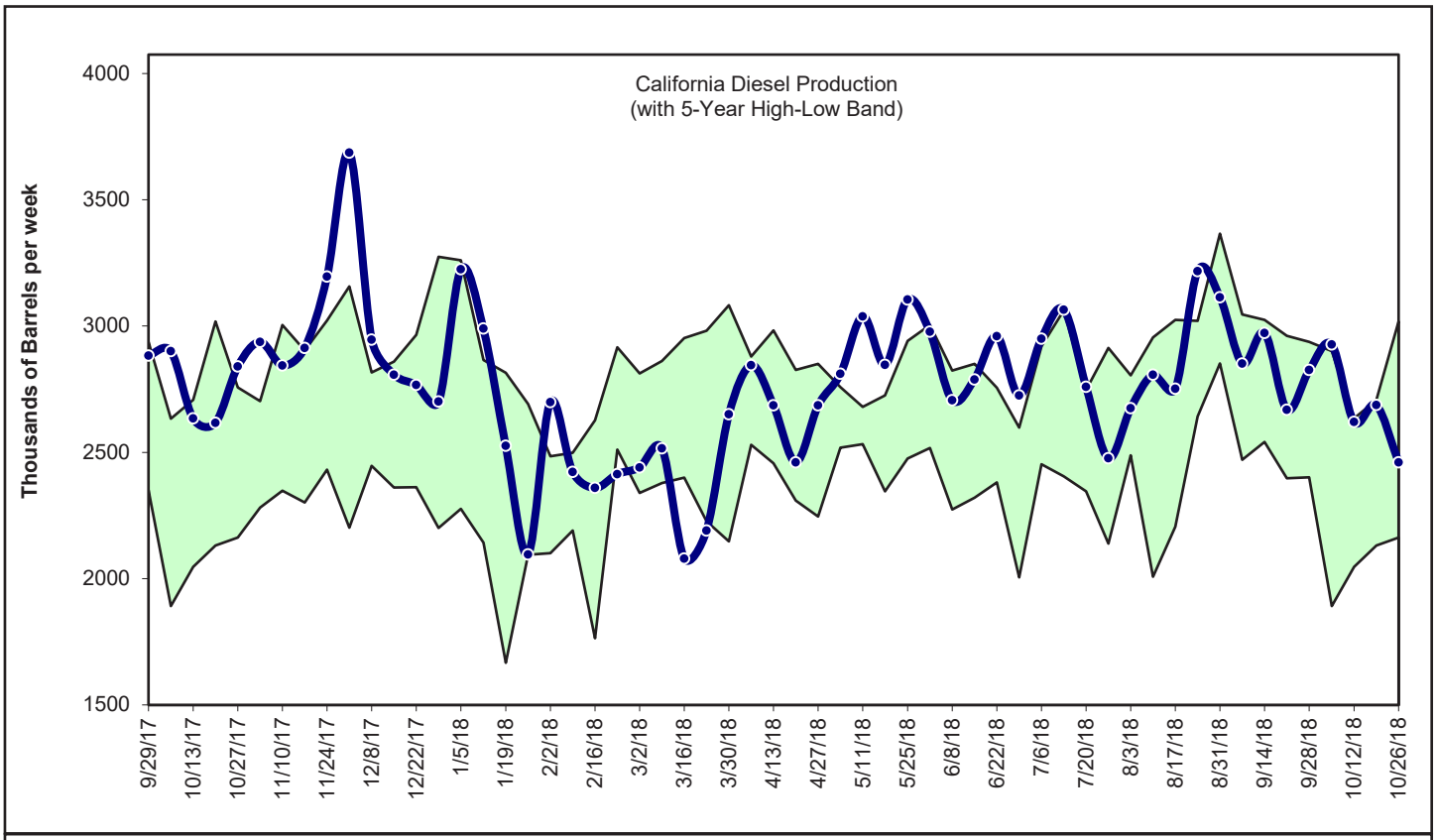
The SF diesel spread overtook LA and was higher throughout October (**Figure 7**). The LA and SF spreads started at $0.04 and moved apart on October 2 to $0.03 and $0.05 for LA and SF, respectively. The spot prices peaked on October 10 with LA and SF at $0.07 and $0.10, respectively. The prices hit a floor on October 23 with LA at $0.04 and SF at $0.05. The prices began climbing and ended the month with LA at $0.05 and SF at $0.06 (**sidebar**).

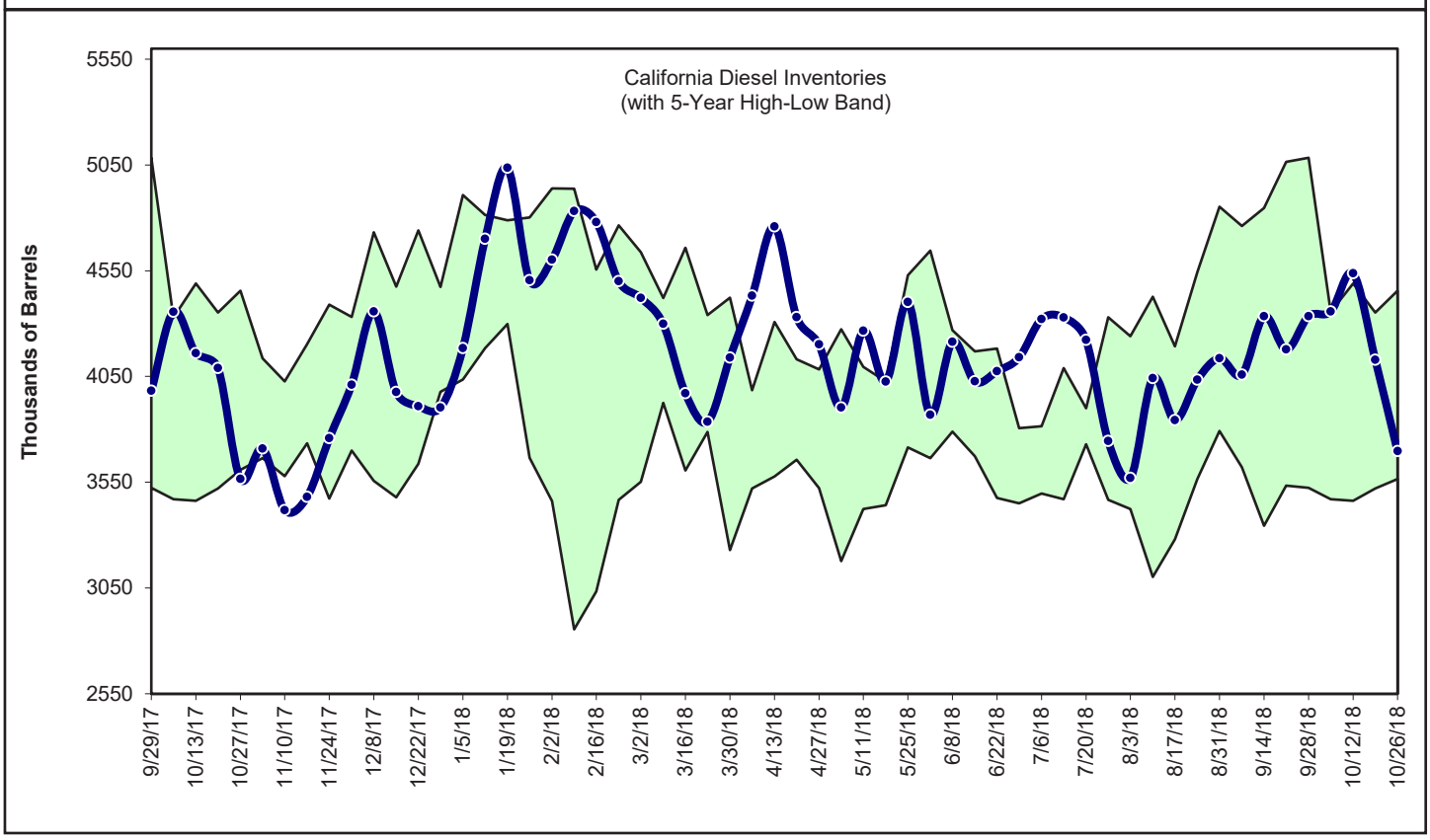
The LA and SF spot prices averaged $0.05 and $0.06, respectively. On October 10, the SF price spiked to $0.10 after a gas pipeline explosion in British Columbia. The spike was caused by fears of a feedstock shortage. The explosion had a small effect on production that did not sway the spread. Moving into November, U.S. EIA forecasts higher-than-average demand for heating oil.[4] This demand will create upward pressure on the NYMEX price.

Diesel production steadily declined in October. Production remained near the top of the five-year band, averaging 2.7 million barrels per week. California reached a monthly inventory high of 4.5 million barrels on October 12. Inventory then decreased by 800 million barrels to 3.7 million barrels on October 26.

4 *This Week in Petroleum*, U.S. EIA, October 17, 2018: https://www.eia.gov/petroleum/weekly/archive/2018/181017/includes/analysis_print.php.

Figure 8: Diesel Production and Inventories

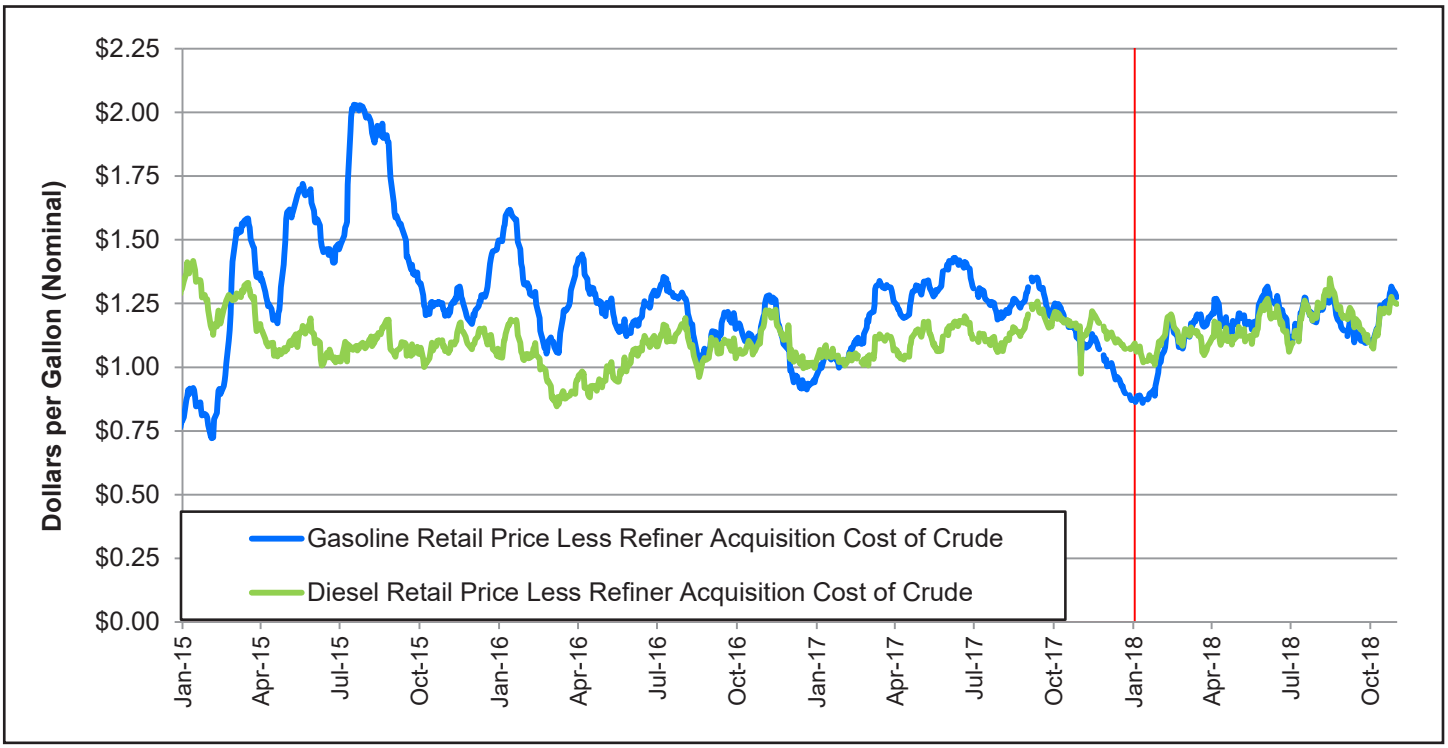




Source: California Energy Commission PIIRA data

GROSS MARGINS

Figure 9: Gross California Gasoline and Diesel Margins



Source: U.S. Energy Information Administration and OPIS

CRUDE TO RETAIL MARGINS

October 2018 vs 2017

Gasoline	3% higher
Diesel	1% higher

October 2018 Averages

Gasoline	$1.22
Diesel	$1.20

October 3, 2018

Gasoline	$1.27
Diesel	$1.25

Gross margins can be used to gauge supply and demand. Staff calculated gross margins for gasoline and diesel as the per-gallon ex-tax retail gasoline and diesel price minus the Energy Commission CA-RAC per gallon price (**page 2**). These margins estimate the added cost of refining and distributing to consumers in California. Higher margins are created by greater demand or restricted supply of product. Lower margins signal the opposite.

Since the February 2015 Torrance refinery explosion, 2018 became the first quiet year for the gross gasoline margin. The margin started the year below $1.00. The margin then increased to match the gross diesel margin in late January. Since February 2018, both margins have maintained similar values. Occasionally, the margins increased above $1.25 in higher-demand summer months before decreasing. Year-to-date, both margins have averaged $1.16. This is an elevated price relative to pre-2015 numbers. Before 2013, margins routinely averaged less than $1.00 a gallon.[5]

5 Transportation Fuel Price Cases for the 2013 IEPR:
https://www.energyarchive.ca.gov/2013_energypolicy/documents/2013-06-26_workshop/presentations/04_Price_Forecasts-Ryan_RAS_21Jun2013.pdf.

The November 2017 *Petroleum Watch*[6] highlighted the changing relationship among California retail gasoline prices by brand. This analysis showed that the average difference between the price of Chevron and ARCO brands of gasoline moved from $0.18 in 2010 to $0.37 in 2017 (year-to-date at the time). The average price difference between Chevron brand and hypermart[7] gasoline grew even more from $0.19 in 2010 to $0.44 in 2017. This separation was not unique to Chevron. The analysis also showed that Shell and 76 brands of gasoline kept pace with the average Chevron price. The Chevron-to-Shell price difference grew $0.03 from 2010 to 2017. The Chevron to 76 price difference grew $0.02 over that same time. Overall, Energy Commission staff identified that gasoline prices in California appeared to be separating into two pricing groups. Chevron, Shell, and 76 formed a high-price group, and hypermarts, ARCO, and unbranded gasoline formed a low-price group.

It has been one year since that analysis was published. Energy Commission staff has updated the figures and charts in the Hot Topic Supplement to see if the relationships have changed. **Table 1** shows the increase in the brand price differentials in annual terms with the addition of the year-to-date (January to September) 2018 total. A new section was added to **Table 1**, which puts these prices into 2010 real dollars.[8] Values for 2017 remain roughly the same as the previous values. Small changes reflect the values moving from a year-to-date (January to August) 2017 value to a full 2017 calendar value. Regardless of the table used, the price separation between the high-price group and the low-price group is maintained and is increasing in some cases. Like in 2017, the average California consumer of Chevron gasoline is paying an additional $0.38 and $0.45 per gallon more than the average ARCO and hypermart consumer, respectively. Even in real 2010 dollars, that is a doubling of that price difference between Chevron and hypermart over eight years, most of the change occurring 2014 to 2016.

Table 1: California Average Retail Gasoline Price Difference by Brand (Jan. 2010 to Sept. 2018)

Annual Average Differential (Nominal)						Annual Average Differential ($2010)					
Year	Chevron - ARCO	Chevron - Hypermart	Chevron - Unbranded	Chevron - Shell	Chevron - 76	Year	Chevron - ARCO	Chevron - Hypermart	Chevron - Unbranded	Chevron - Shell	Chevron - 76
2010	$0.18	$0.19	$0.10	$0.01	$0.03	2010	$0.18	$0.19	$0.10	$0.01	$0.03
2011	$0.17	$0.20	$0.10	$0.02	$0.03	2011	$0.17	$0.20	$0.10	$0.01	$0.03
2012	$0.20	$0.24	$0.12	$0.02	$0.03	2012	$0.19	$0.23	$0.11	$0.02	$0.02
2013	$0.21	$0.25	$0.14	$0.02	$0.02	2013	$0.20	$0.23	$0.13	$0.02	$0.02
2014	$0.25	$0.29	$0.16	$0.02	$0.03	2014	$0.23	$0.26	$0.15	$0.02	$0.02
2015	$0.29	$0.39	$0.22	$0.02	$0.01	2015	$0.26	$0.36	$0.20	$0.02	$0.00
2016	$0.35	$0.43	$0.26	$0.03	$0.03	2016	$0.31	$0.39	$0.24	$0.03	$0.03
2017	$0.37	$0.44	$0.27	$0.04	$0.05	2017	$0.33	$0.39	$0.24	$0.03	$0.04
2018	$0.38	$0.45	$0.29	$0.05	$0.07	2018	$0.33	$0.39	$0.25	$0.04	$0.06

Source: California Energy Commission analysis of Oil Price Information Service retail price data

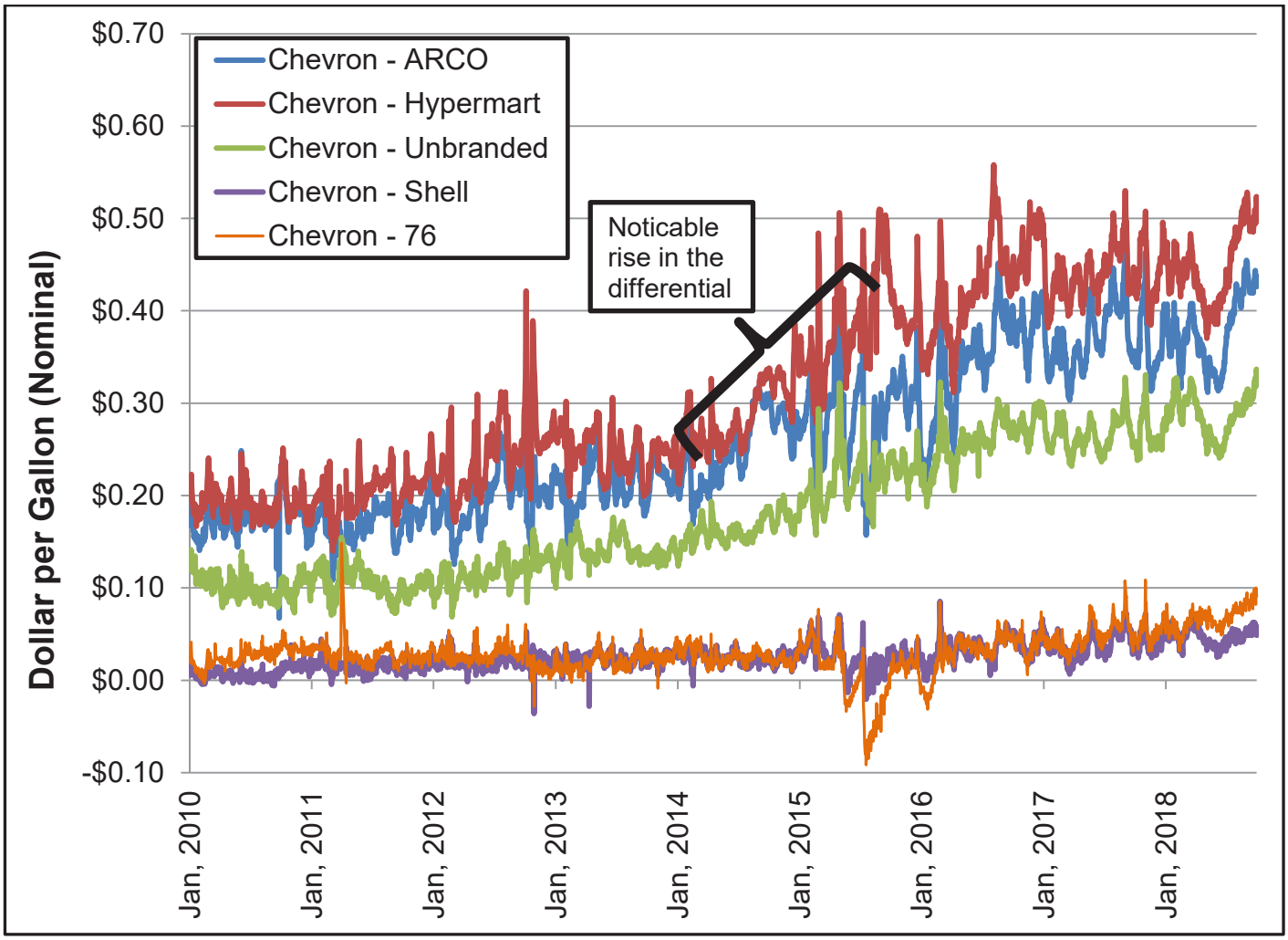
6 https://www.energy.ca.gov/almanac/petroleum_data/petroleum_watch/2017_Petroleum_Watch/2017-11_Petroleum_Watch.pdf.

7 *Hypermart* is defined in this document as a combination department store and supermarket retailer that sells gasoline to an end user of that product. Examples of hypermarts in this analysis include (but are not limited to) Costco, Safeway, Vons, Ralphs, and Sam's Club.

8 Staff used the St. Louis Federal Reserve Bank Economic Database (FRED) Consumer Price Index for All Urban Consumers: All Items: https://fred.stlouisfed.org/series/CPIAUCSL.

Figure 10 shows the average daily California retail gasoline price differences by brand. Compared to **Table 1**, **Figure 10** shows more clearly how the Chevron-to-ARCO and the Chevron-to-hypermart price differences increased between January 2014 and the second quarter of 2015 before the February 18, 2015, explosion of the Torrance Refinery. In 2018, the new norm of the Chevron price being $0.38 and $0.45 per gallon more than the average ARCO and hypermart price seemed to hold in the first quarter of the year. In spring 2018, the price differences fell to roughly $0.32 and $0.40 per gallon for the Chevron-minus-ARCO and Chevron-minus-hypermart differentials, respectively. Then as summer started, the price differences increased to roughly $0.44 and $0.52 per gallon for the Chevron-minus-ARCO and Chevron-minus-hypermart differentials, respectively.

Figure 10: California Average Daily Retail Gasoline Price Difference by Brand (Jan. 2010 to Sept. 2018)



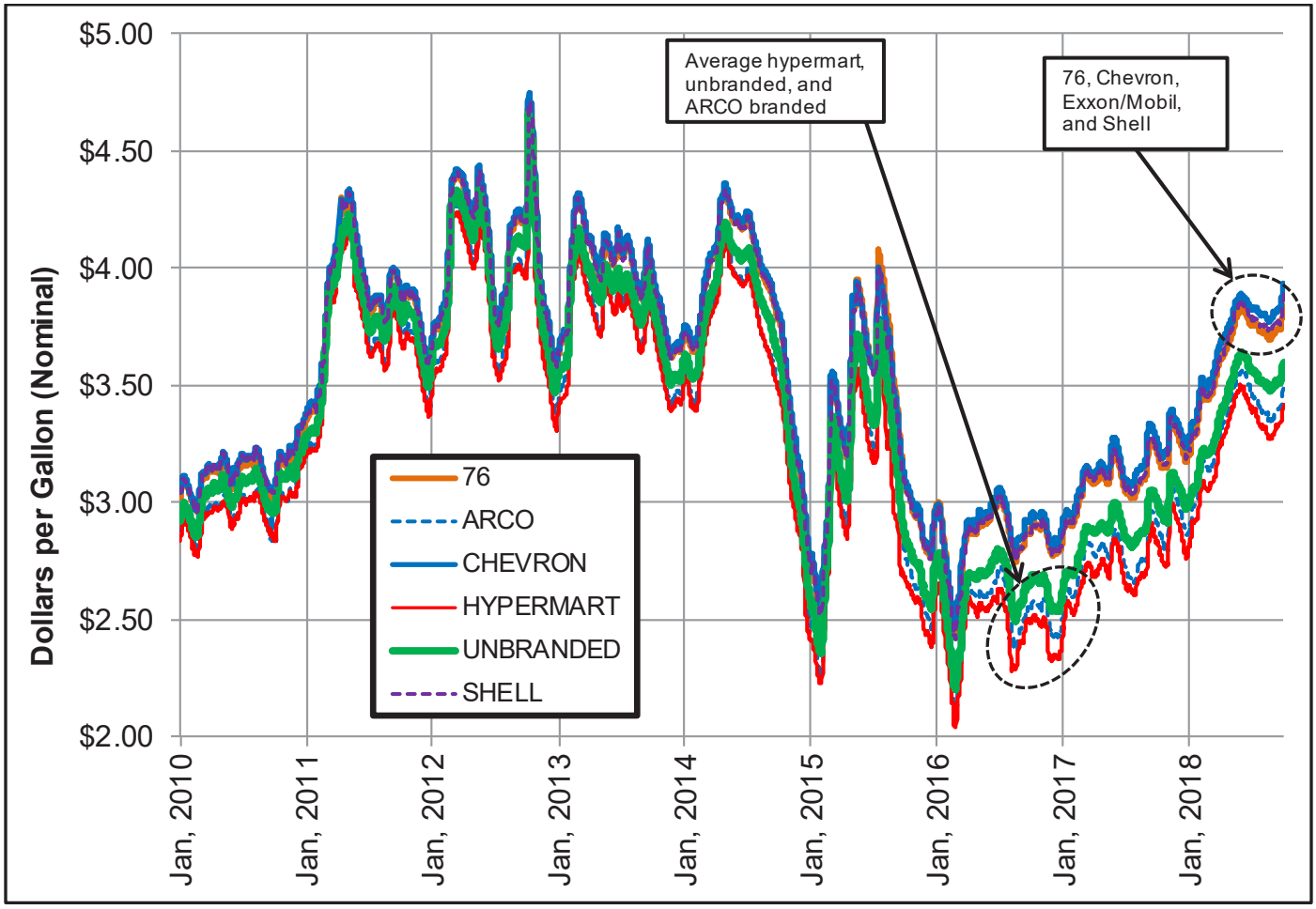
Source: Energy Commission analysis of Oil Price Information Service retail price data

Figure 11 shows daily average retail gasoline prices by brand. Unlike **Figure 10**, the price gap in **Figure 11** is not noticeable until after 2016. This situation is due to volatile price fluctuations in 2014 and 2015 that masked the growing difference. For year-to-date 2018, the average California Chevron price has been about $3.70, while the average hypermart price has been $3.25. This means the average Chevron consumer pays roughly $55.50 to fill a 15-gallon tank of gasoline, while the average hypermart consumer pays $48.75 to fill that same tank. If a consumer fills his or her tank once a week, that difference of $6.75 equates to an extra $351 per year spent on fuel.

With these growing differences, a typical economist could assume that some change in the market share of gasoline sales would occur. This is because the economist would expect consumers to switch to a less expensive brand to save money. This analysis was discussed in the previous Hot Topic. Energy Commission staff recently completed reviewing the 2017 CEC-A15 California Retail Fuel Outlet Annual Report filings and updated this analysis. **Figure 12** shows the 2010 and 2017 estimates of California retail market share of gasoline sales. **Figure 12** also shows the full 2010-2017 estimates through time. Interestingly, Chevron, with its high price postings, has not seen any change in market share from 2010 to 2017. In every reporting year, combined Chevron-branded stations report gasoline sales totals equating to roughly 18 to 19 percent of the total reported sales from all stations. Exxon/Mobil and 76 stations each lost 2 percentage points of their market shares. Those losses were absorbed as gains to hypermart sales. Unbranded gasoline sales increased 2 percentage points as well, while ARCO sales remained flat. Yet, as mentioned in the previous Hot Topic analysis,

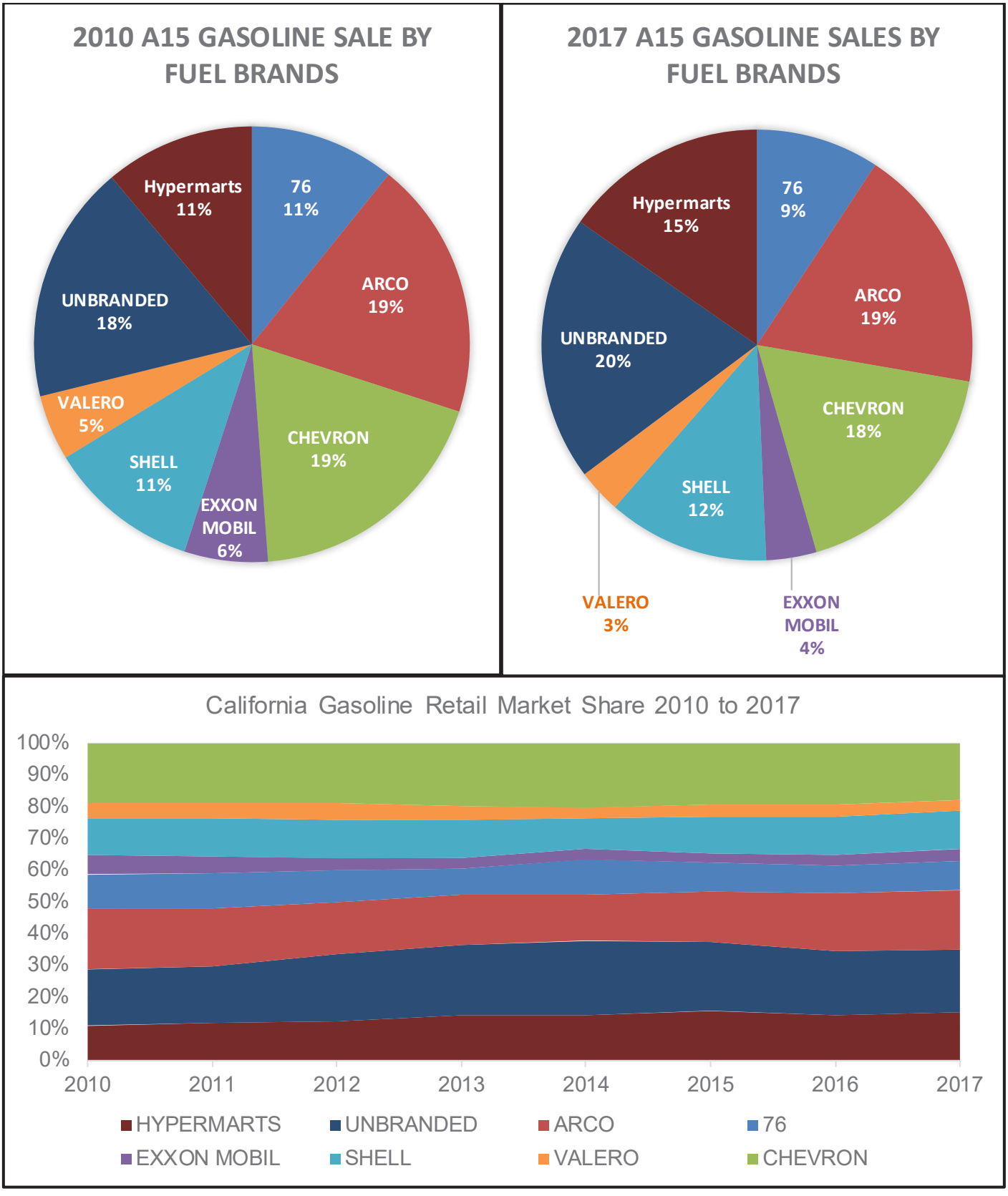
> *"3) Many gasoline brands now have their own credit cards that offer discounts on gasoline purchases, which may be hiding the true cost of the fuel."*

Figure 11: California Average Retail Gasoline Price by Brand (Jan. 2010 to Sept. 2018)



Source: California Energy Commission analysis of Oil Price Information Service retail price data

Figure 12: California Retail Market Share of Gasoline Sales by Brand



Source: California Energy Commission

To explore how gasoline brand-tied credit cards influence the price consumers actually pay for gasoline, Energy Commission staff surveyed the different retail brand websites for credit cards offers.[9] Here is some of the information found:

1. The Shell card provides a flat $0.10 per gallon reduction in the price of fuel for every fill-up, up to 20 gallons. Shell offers additional rebates on other purchases used with the card, which may also factor into consumer behavior.
2. The Chevron Visa card provides a flat $0.03 per gallon reduction in the price of fuel at every Chevron and Texaco station, no limits. When $300 is spent on nonfuel purchases in a month, the card reduces the price of fuel another $0.10 to $0.13. If $1,000 is spent on nonfuel purchases in a month, the reduction increases to $0.20 for a total reduction of $0.23.
3. The brand 76 appears to provide only a fleet card. This card provides up to a $0.04 reduction in the price of fuel. The amount of the reduction depends on the amount of fuel purchased during a month. To receive a $0.01 per gallon reduction, a minimum of 1,000 gallons must be purchased in a month.
4. The Costco card (hypermart) offers a 4 percent reduction in the price of fuel, up to the first $7,000 of fuel purchased per year. At $3.25 per gallon (2018 hypermart average), that works out to a $0.13-per-gallon reduction in the price of fuel. After that, it is a 1-percent reduction, which is $0.03 per gallon. It is unclear if the reduced price or the full price is used to calculate the $7,000 in fuel purchases. If the unmodified price is used ($3.25), then the first $7,000 works out to roughly 2,154 gallons of fuel a year or 41 gallons a week. Like Shell, Costco also provides percentage rewards for other purchases.
5. The Sam's Club card (hypermart) offers a 5 percent reduction in the price of fuel, up to the first $6,000 of fuel purchased per year. At $3.25 per gallon (2018 hypermart average), that works out to a $0.16-per-gallon reduction in the price of fuel. After that, it is a 1-percent reduction, which is $0.03 per gallon. It is unclear if the reduced price or the full price is used to calculate the $6,000 in fuel purchases. If the unmodified price is used ($3.25), then the first $6,000 works out to roughly 1,846 gallons of fuel a year or 35.5 gallons a week. Like Shell and Costco, Sam's Club provides percentage rewards for other purchases.
6. The Safeway card (hypermart) is unique in that it is not a credit card; it is a loyalty card. Based on a points scheme, for every 100 points gathered, a $0.10 per gallon reduction in the price of fuel is available, up to 25 gallons. The $0.10 per gallon reductions can be combined for a maximum of a $1.00 per gallon reduction. The price reduction can also be used at Chevron and Texaco stations for up to a maximum reduction of $0.20 per gallon.

At first glance, Chevron's $0.13 per gallon reduction brings it into virtual price parity with Shell's price when the $0.10 Shell reduction is applied. It also accounts for $0.13 of the now $0.20 increase in the difference between ARCO and Chevron prices that has occurred since 2010. Even with Chevron and Shell's credit card price reductions, Costco and Sam's Club reductions are about the same, meaning the roughly $0.25 increase in the price difference is maintained. This helps explain why the biggest increase in gasoline retail market share in California has been hypermarts over the last eight years. It also explains why ARCO has not seen an increase in sales even though its posted retail prices are roughly the same as the hypermart averages. More than anything, it is clear that calculating the true price of a gallon of gasoline in California has become very difficult and that a Californian's fuel purchase is tied to much more than the direct posted price.

9 ARCO does not offer a brand-tied credit card.