PETROLEUM WATCH
California Energy Commission
October 2017

Recent Petroleum News and Outside Analyses

Prices

- **Crude Oil Prices:** Brent and West Texas Intermediate crude prices closed at $57.02 and $51.67, respectively, on September 29 (**page 2**).
- **California Retail Gasoline Prices:** On the week of October 2, prices rose to $3.15, an increase of $0.10 since the end of August. Through September, California prices averaged $0.60 higher than the national average (**page 4**).
- **California Retail Diesel Prices:** On the week of October 4, prices reached $3.18, an increase of $0.04 from the end of August. Through September, California prices averaged $0.39 higher than the national average (**page 5**).

Refining News

- **Andeavor Carson Refinery:** The 43,000 barrels-per-day (bpd) distillate hydrocracker unit had an unplanned shutdown from September 20 through September 24, 2017.
- **Andeavor Martinez Refinery:** Unplanned repairs were conducted on the 73,000 bpd fluid catalytic cracker unit from September 4 through September 13, 2017.
- **PBF Torrance Refinery:** The crude atmospheric distillation unit at the 155,000 bpd Torrance refinery was forced to shut down from September 12 to September 13, 2017.
- **Phillips 66 Wilmington Refinery:** Phillips 66 had two unplanned shutdowns of the 15,600 bpd reformer unit and the 19,000 bpd reformer feed hydrotreater unit from September 22 through September 27.

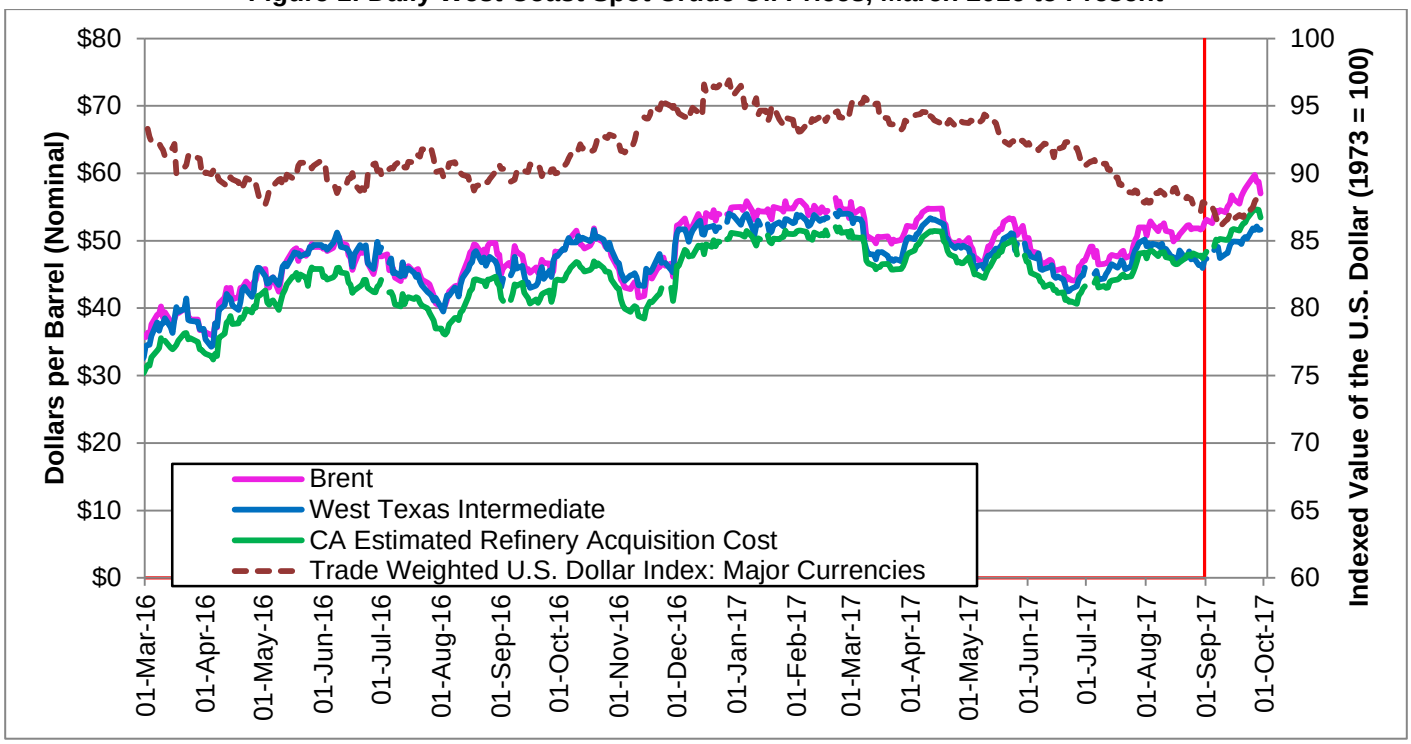
Hurricanes Harvey, Irma, and Maria

- **U.S. Gulf Coast:** On August 26, the landfall of Hurricane Harvey on the Texas Gulf Coast disrupted the area's refining activities. By September 8, Gulf Coast refineries recorded historically low utilization rates at 60.7 percent. Refinery utilization increased to 84.9 percent by September 22.
- **U.S. Southeastern Coast:** On September 10, Hurricane Irma made landfall on the lower Florida Keys as a Category 4 storm. Battering rains and the ensuing floods created massive power outages and affected major ports in Florida, Georgia, and South Carolina.
- **Puerto Rico:** On September 20, Hurricane Maria made landfall on Puerto Rico. The Department of Homeland Security issued Jones Act waivers on September 28 through October 10 to aid in recovery efforts. The waiver allows foreign-flagged vessels to transport merchandise between ports within U.S. waters.

Product of the Energy Assessments Division's Supply Analysis Office.

Crude Oil Prices

Figure 1: Daily West Coast Spot Crude Oil Prices, March 2016 to Present



Source: U.S. Energy Information Administration (EIA), Oil Price Information Service (OPIS), and Federal Reserve Bank of St. Louis.
Note: Red lines on all graphs indicate end of previous *Petroleum Watch* data. Areas to the right indicate new data since last month.

Crude oil spot prices increased in September and set new highs for 2017 (**Figure 1**). Brent began September at $53.15, marked an annual high at $59.77 on September 26, and finished at $57.02 on September 29. Brent prices averaged a 9 percent increase over August. West Texas Intermediate (WTI) started September at $47.32 increased to $52.14 on September 27, and finished at $51.67 on September 29. Through September, WTI prices averaged 4 percent higher compared to last month. The California Estimated Refiner Acquisition Cost (CA-RAC)[1] touched a 2017 high at $54.67 on September 27 and finished at $53.45 on September 29, a 9 percent increase over August.

The regular price relationship between CA-RAC prices to Brent and WTI is still abnormal. Since the beginning of 2017, the CA-RAC price averaged about $1.50 lower than WTI and $3.50 below Brent. On August 21, the CA-RAC price increased above WTI. On September 26, the difference was greatest at $3.00, with WTI at $51.59 and CA-RAC prices at $54.59. On the same day, the difference between CA-RAC and Brent was $5.18, with Brent at $59.77 and CA-RAC at $54.59. U.S. Gulf Coast refineries are only utilizing 86 percent of capacity and are still recovering after Hurricane Harvey. This reduced demand for WTI allowing Brent to increase $8.18 above WTI, the largest spread since March 2015.

Crude Oil Prices

September 2017 vs 2016
(Percent Change)

Brent	**21% higher**
WTI	**10% higher**
CA-RAC	**23% higher**

September 2017 Averages

Brent	**$56.15**
WTI	**$49.82**
CA-RAC	**$51.82**

September 29, 2017

Brent	**$57.02**
WTI	**$51.67**
CA-RAC	**$53.45**

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

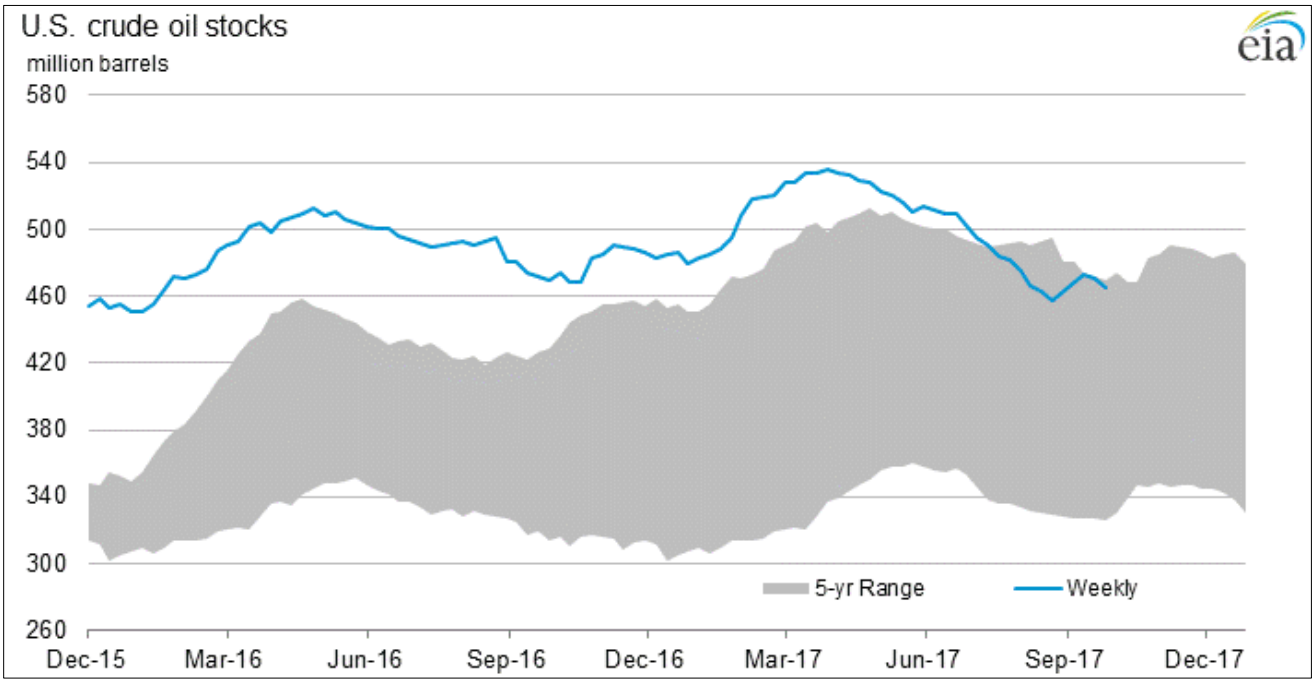
Crude Oil Production and Storage

Monthly refinery input and import levels decreased, while crude oil production and inventories increased since September's *Petroleum Watch* (**Figure 2**), as the U.S. Gulf Coast petroleum industry recovers from Hurricane Harvey.

- U.S. crude oil production for September was estimated at 9.49 million bpd, 162,000 bpd higher than August's monthly average of 9.33 million bpd. This is a 1 million bpd increase from a year ago when production levels were 8.49 million bpd.
- Crude oil imports fell 850,000 bpd to 7.1 million bpd in September. When compared to import levels from September 2016, this is a decrease of 850,000 bpd.
- U.S. crude oil refinery inputs sharply decreased by 1.44 million bpd since September's *Petroleum Watch*, finishing September at an average 15.3 million bpd. Refinery inputs are 1.1 million bpd lower than year-ago levels.
- Crude oil inventories in the United States increased by 2.6 million barrels during September to 465 million barrels. Current inventories are 4.1 million barrels lower than one year ago.

Refineries in the U.S. Gulf Coast are recovering from Hurricanes Harvey and Irma. Gulf Coast refinery utilization improved from 60.7 percent on September 8 to 85.6 percent on September 29 but still remains 10 percentage points below the 96 percent seen on August 25. Crude oil inventories increased during the flooding and fell after September 15, as refinery utilization increased.

Figure 2: U.S. Crude Oil Inventories, December 2015 to Present



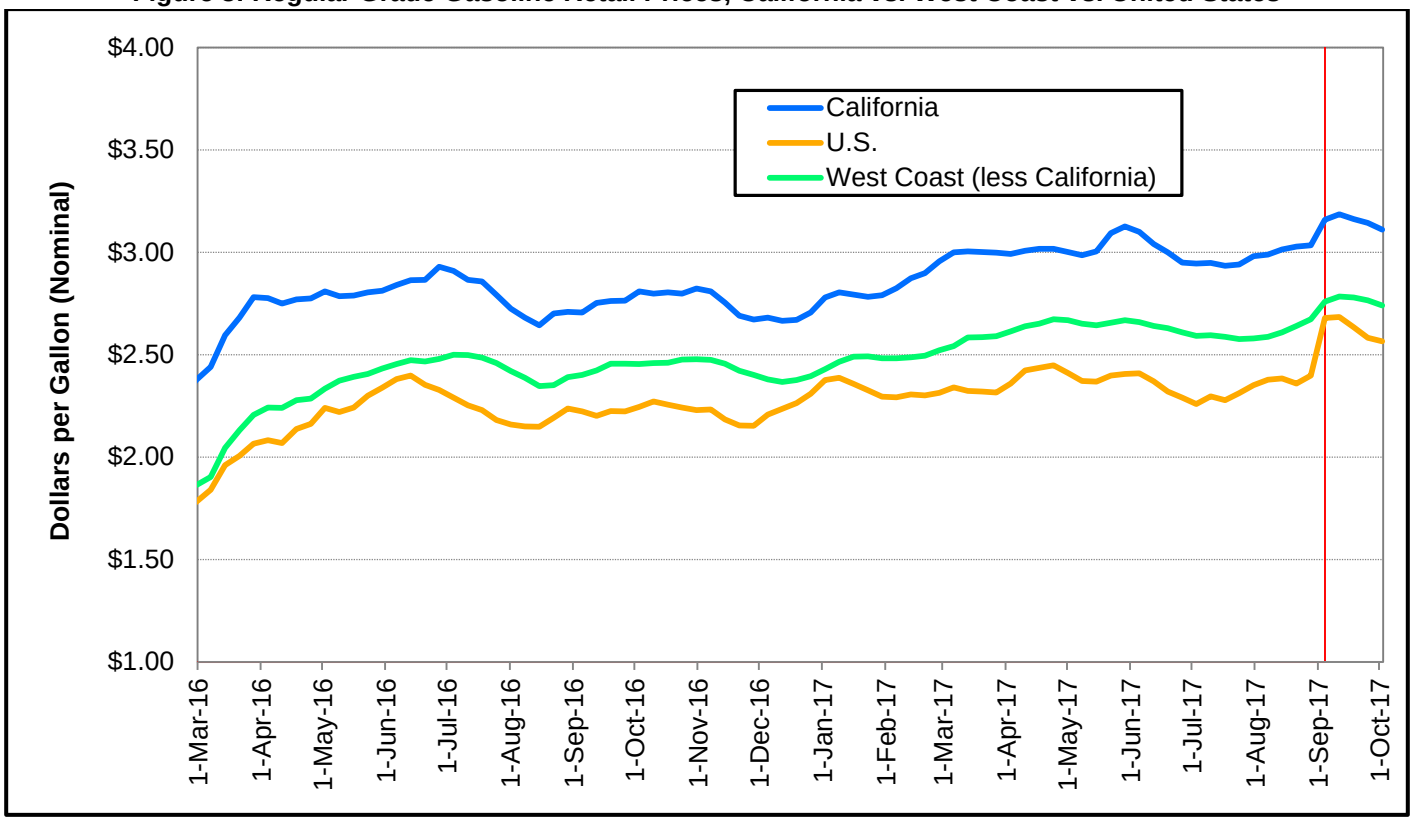
Source: U.S. EIA

- According to the Organization of the Petroleum Exporting Countries' (OPEC) September *Monthly Oil Market Report*, total August OPEC production decreased by 79,100 bpd to 32.7 million bpd. OPEC's target production set in November 2016 is 32.5 million bpd. OPEC increased its supply-and-demand balance forecast to 0.5 million bpd, 0.1 million bpd higher than the forecast reported in the previous *OPEC Monthly Report*.[2]

2 *OPEC September Monthly Report*, page i, page 59:
http://www.opec.org/opec_web/static_files_project/media/downloads/publications/MOMR%20September%202017.pdf.

Gasoline and Diesel Retail Prices

Figure 3: Regular Grade Gasoline Retail Prices, California vs. West Coast vs. United States



Source: U.S. EIA

In the aftermath of Hurricane Harvey, gasoline supplies were affected not just on the Gulf Coast, but all over the United States. This was compounded by the power outages caused by Hurricane Irma in Florida and Georgia (**page 1**) that affected fuel storage terminals, pipelines, and fuel supplies from ports. All three gasoline retail prices for California, United States (U.S.) and West Coast (less California) soared during the first two weeks up until September 11 (**Figure 3**). The prices gradually decreased the rest of September but were still above prehurricane prices.

All three gasoline prices were at the highest since the summer of 2015, with the exception of the week of May 29, 2017, in California. As a result, the average retail prices for September at $3.15, $2.63, and $2.77 are the highest since August 2015 (**sidebar**). They are $0.13, $0.25, and $0.14 above the August 2017 averages and 15, 19, and 14 percent above year-ago prices.

The aftermath of Hurricane Harvey depressed demand for gasoline beyond what was expected. Power outages and flood damage kept victims tending their homes and damaged property rather than driving on flooded roads. In response, U.S. gasoline prices fell much faster than the West Coast and California.

Gasoline Prices

September 2017 vs 2016
(Percent Change)

California	15% higher
U.S.	19% higher
West Coast	14% higher

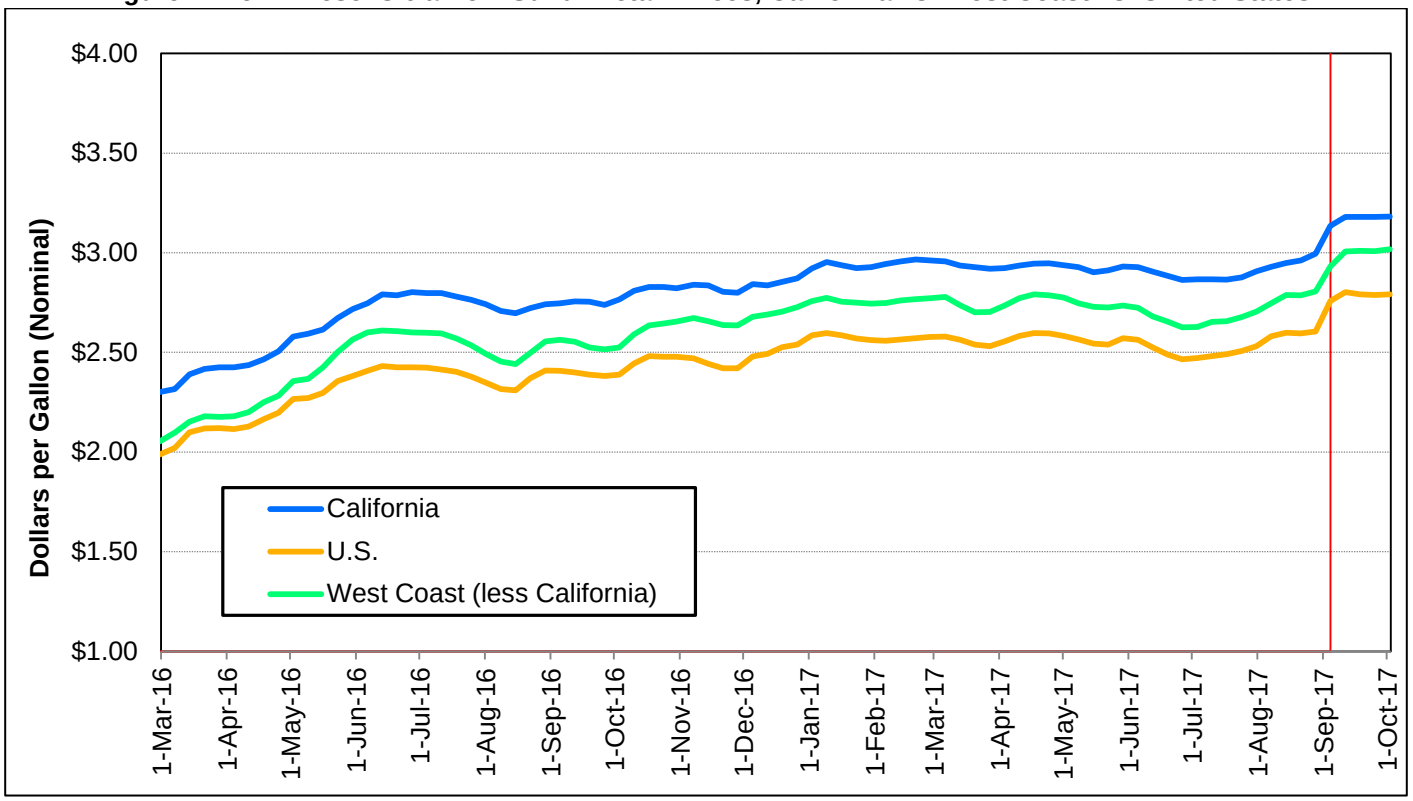
September 2017 Averages

California	$3.15
U.S.	$2.63
West Coast	$2.77

Week of October 2, 2017

California	$3.11
U.S.	$2.57
West Coast	$2.74

Figure 4: No. 2 Diesel Ultra-Low-Sulfur Retail Prices, California vs. West Coast vs. United States



Source: U.S. EIA

Retail diesel prices in California, the United States, and the West Coast (less California) peaked after Hurricane Irma hit Florida during the week of September 11. Diesel prices leveled off for the rest of September. The U.S. diesel price peaked at $2.80 on September 11 and decreased $0.01 to $2.79 remaining at that price until October 2 (**Figure 4**). The West Coast diesel price increased to $3.01 on September 11 and increased $0.01 on October 2 to $3.02. Overall, diesel prices across the United States in September were 7 percent higher when compared to the August 2017 diesel price.

California diesel retail price was $3.14 on September 4 and increased a total of $0.04 to $3.18 on September 11. Diesel price remained at $3.18 until October 2 while averaging $3.17 for September.

Meanwhile, California gasoline prices decreased after September 11, which made gasoline prices cheaper than diesel (**Figure 3**). September 18 marked the first week of 2017 that California drivers paid more for a gallon of diesel than gasoline. The California diesel price set a new high at $3.18 on September 11, the last time that this diesel price was higher was on June 8, 2015, at $3.22 per gallon.

Diesel Prices

September 2017 vs 2016
(Percent Change)

California	**15% higher**
U.S.	**16% higher**
West Coast	**18% higher**

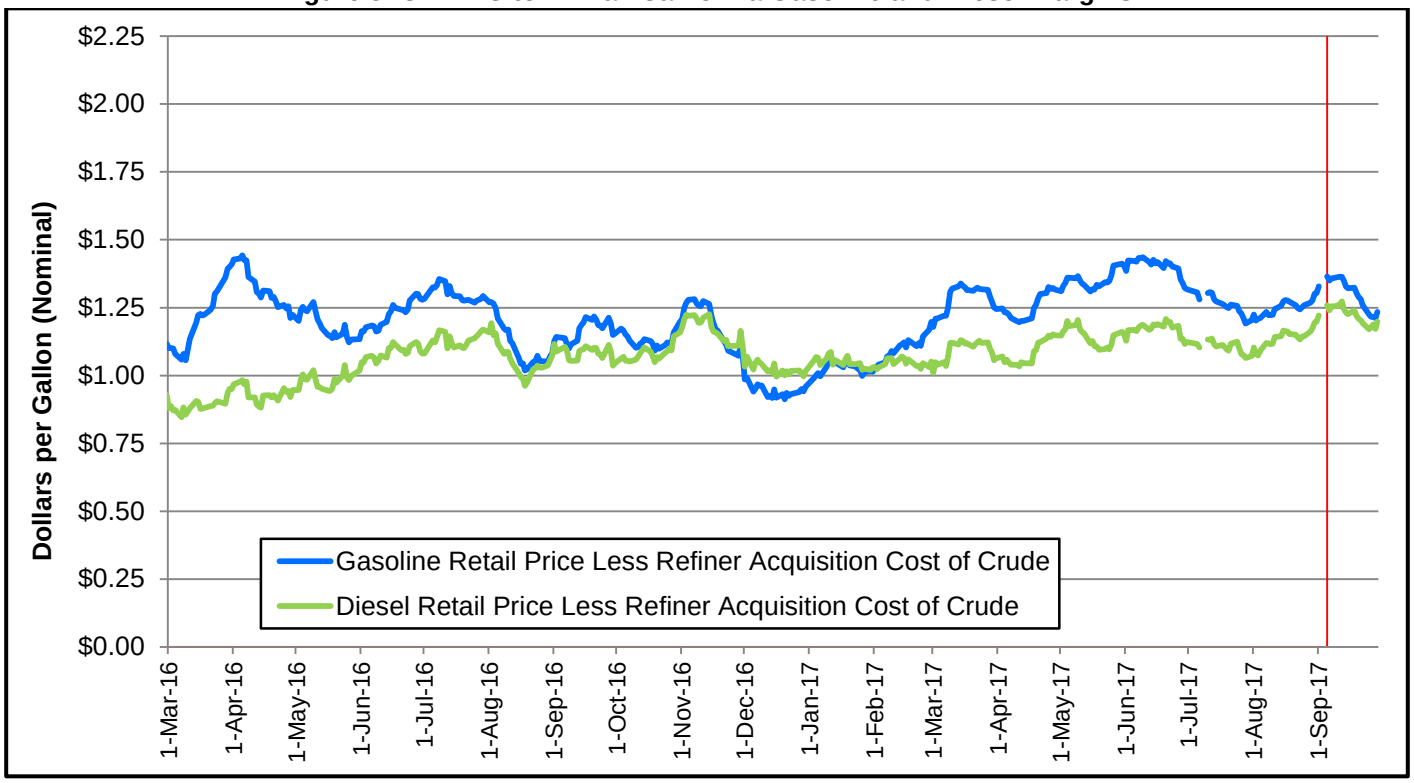
September 2017 Averages

California	**$3.17**
U.S.	**$2.78**
West Coast	**$2.99**

Week of October 2, 2017

California	**$3.18**
U.S.	**$2.79**
West Coast	**$3.02**

Figure 5: CA-RAC to Ex-Tax California Gasoline and Diesel Margins



Source: U.S. EIA and OPIS

CA-RAC-to-ex-tax retail gasoline and diesel margins peaked in the first week of September at $1.37 and $1.26, respectively (**Figure 5**). The gasoline margin began September at $1.33, increasing to $1.37, before finishing the month at $1.23. The diesel margin began September at $1.22, rose slightly to $1.26, before finishing the month at $1.20. Retail gasoline prices increased $0.10 in September while retail diesel prices increased $0.03 in September. Crude oil prices (CA-RAC) increased $0.12 outpacing California retail prices and shrinking both margins.

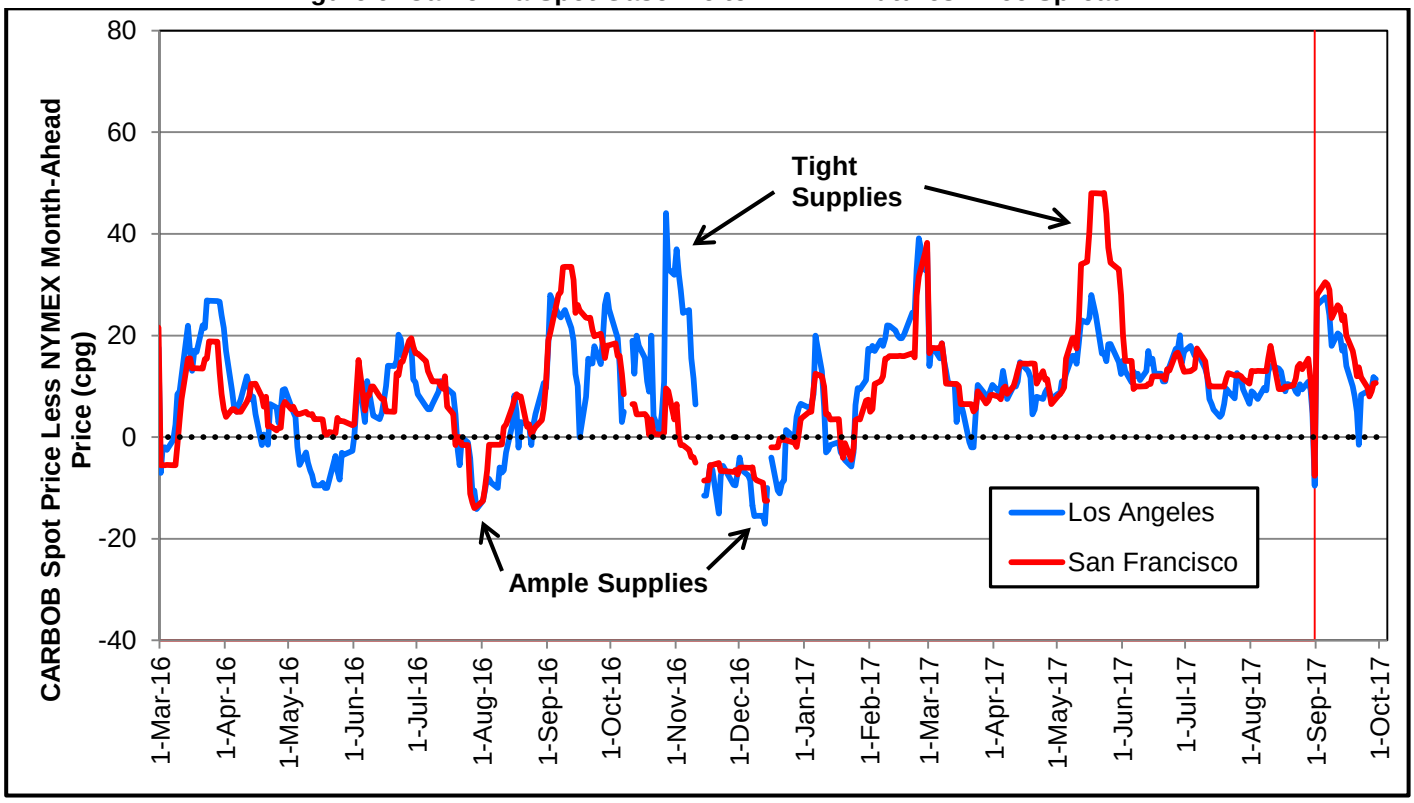
Both margins are 12 percent higher than September 2016 values and the gap between gasoline and diesel margins fell to below $0.04. This narrowing gap between the two margins occurred in 2016 as well. In 2016, from January to July the average difference between the gasoline and diesel margin was $0.26. The difference narrowed to $0.16 in July. For 2017, the January to July average difference was a smaller $0.14. In both 2016 and 2017, that difference shrunk to average of $0.08 and $0.03 respectively.

This is a possible signal of either increasing demand for diesel relative to gasoline, decreasing demand for gasoline relative to diesel, or a combination of both. Given that both gasoline and diesel rose in response to increasing crude oil prices, it does appear that the 2017 narrowing of the margin difference is due to increasing demand for diesel relative to gasoline.

Crude to Retail Margins

September 2017 vs 2016	
(Percent Change)	
Gasoline	**12% higher**
Diesel	**7% higher**
September 2017 Averages	
Gasoline	**$1.25**
Diesel	**$1.14**
September 29, 2017	
Gasoline	**$1.23**
Diesel	**$1.20**

Figure 6: California Spot Gasoline to NYMEX Futures Price Spread



Source: U.S. EIA and OPIS

Hurricane Harvey drove the Los Angeles (LA) and San Francisco (SF) spot-less-New York Mercantile Exchange future (NYMEX) price differentials to high levels during the first week of September (**Figure 6**). The spot prices increased based on anticipation of California refineries supporting the loss Gulf Coast production following Hurricane Harvey's devastation. But the markets overestimated the aftermath, demand for exports to the Gulf Coast were slim, while most California refineries ran without a major interruption. With gasoline inventories close to the high end of five-year band (**Figure 8**), both LA and SF spot differentials narrowed for the rest of September.

The LA spot price fell steadily from $0.28 above NYMEX on September 5 to $0.02 below NYMEX on September 21, with a short-term increase to $0.20 with news of an unplanned shutdown of PBF Torrance refinery (**page 1**). Subsequent upsets at the Andeavor Carson and Phillips 66 Wilmington refineries drove the LA spot differential back up to $0.11 by September 29. The SF spot differential on the other hand, fell gradually from $0.31 on September 5 to $0.24 on September 14 when Andeavor Martinez refinery restarted, and then fell steadily to $0.11 on September 29, 2017. When compared to September 2016 averages, the LA and SF spot differentials are $0.04 and $0.05 lower (**sidebar**) in spite of both average spot prices being $0.23 higher, because NYMEX average was $0.27 higher as well.

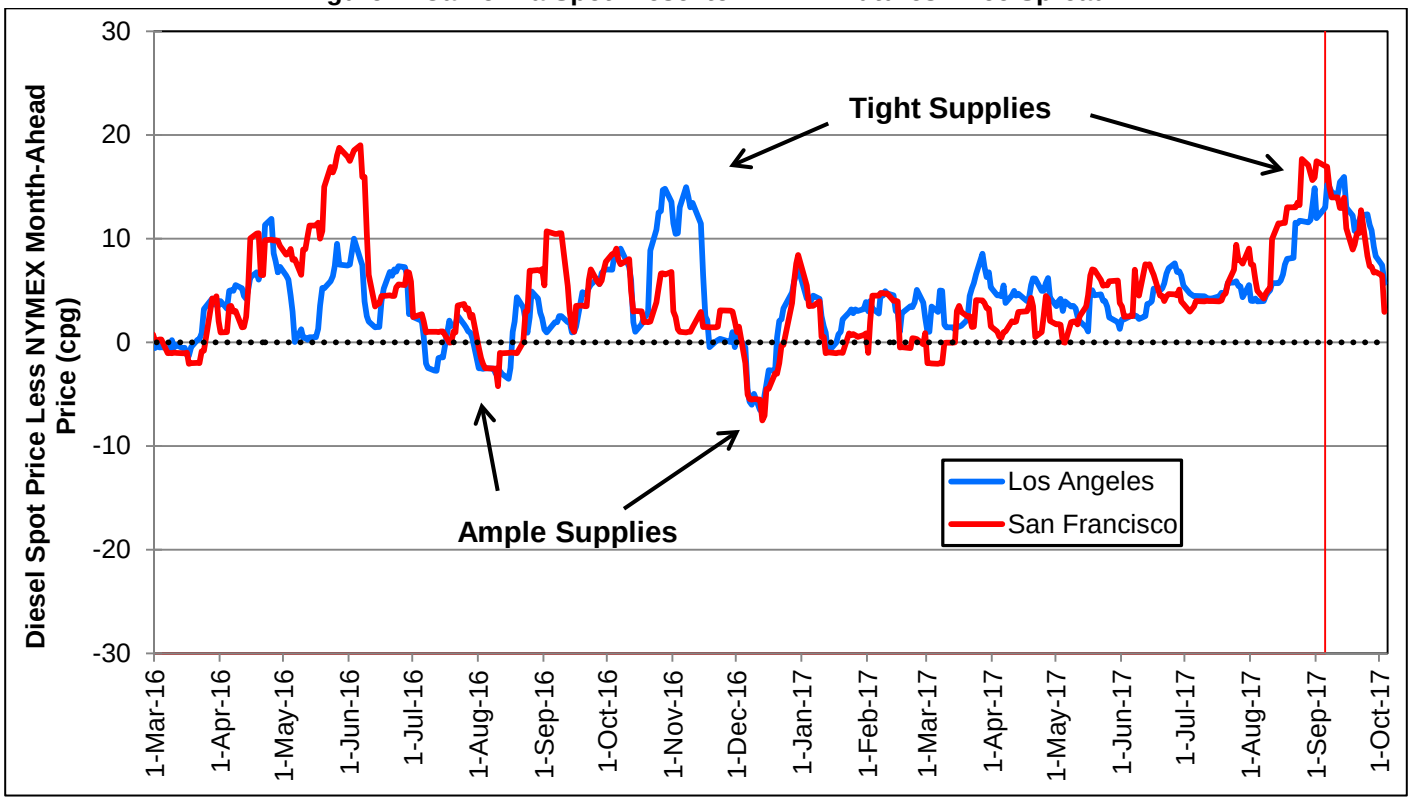
Gasoline Spot–Futures Spread

September 2017 vs 2016	
Los Angeles	4¢ lower
San Francisco	5¢ lower

September 2017 Averages	
Los Angeles	15¢
San Francisco	19¢

September 29, 2017	
Los Angeles	11¢
San Francisco	11¢

Figure 7: California Spot Diesel to NYMEX Futures Price Spread



Source: U.S. EIA and OPIS

The SF less-NYMEX diesel differential price of $0.18 on August 25 was the highest diesel differential price for either San Francisco or Los Angeles. Both LA and SF less-NYMEX diesel differential prices have been decreasing since August 25 to end September 29 at $0.08 and $0.07, respectively. Nevertheless, the LA less-NYMEX differential price did increase to $0.16 on September 14 to mark the highest since capping at $0.15 on November 7, 2016 (**Figure 7**). California spot diesel to NYMEX futures prices spread continued to decrease to $0.06 for LA and 0.03 for SF beginning October 3.

The LA less-NYMEX diesel differential price decreased $0.05 from September 5 at $0.13 to $0.08 on September 29. Although the LA spread decreased at the end of the month, the September spread averaged at 63 percent or higher when compared to other monthly averages for 2017. This trend continues into the fourth quarter as the LA spread started October 3 at $0.06, $0.01 above the year-to-date average of $0.05.

Through June 2017, SF diesel differential averaged $0.01 lower than the LA spread. Since January 2017, the SF less-NYMEX diesel differential price and the LA diesel differential price averaged $0.05 each. On October 3, the SF diesel differential spread fell below the 2017 average of $0.05 to a $0.03 spread.

Diesel Spot–Futures Spread

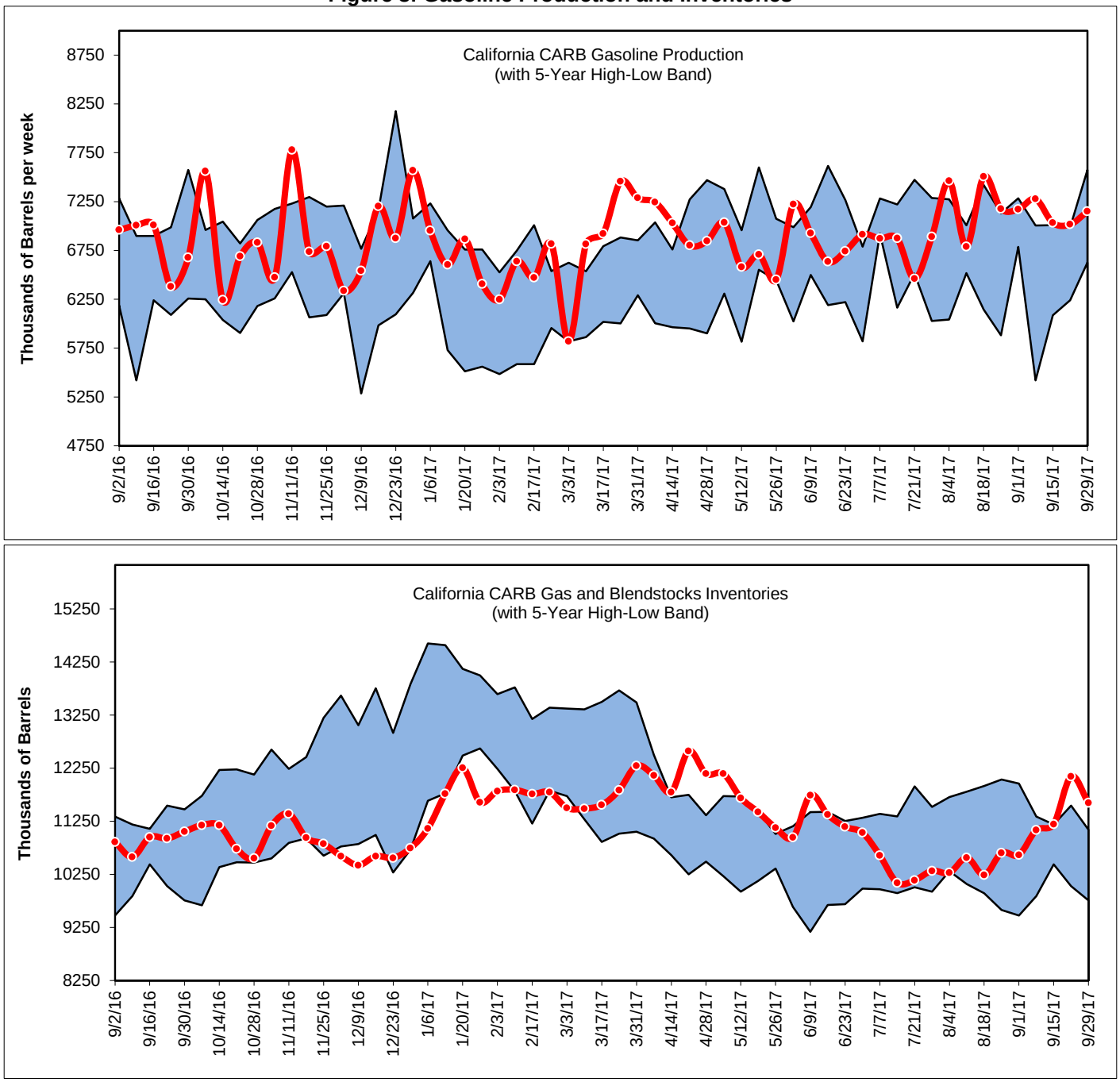
September 2017 vs 2016	
Los Angeles	9¢ higher
San Francisco	6¢ higher

September 2017 Averages	
Los Angeles	13¢
San Francisco	12¢

September 29, 2017	
Los Angeles	8¢
San Francisco	7¢

California Gasoline and Diesel Production and Inventories

Figure 8: Gasoline Production and Inventories

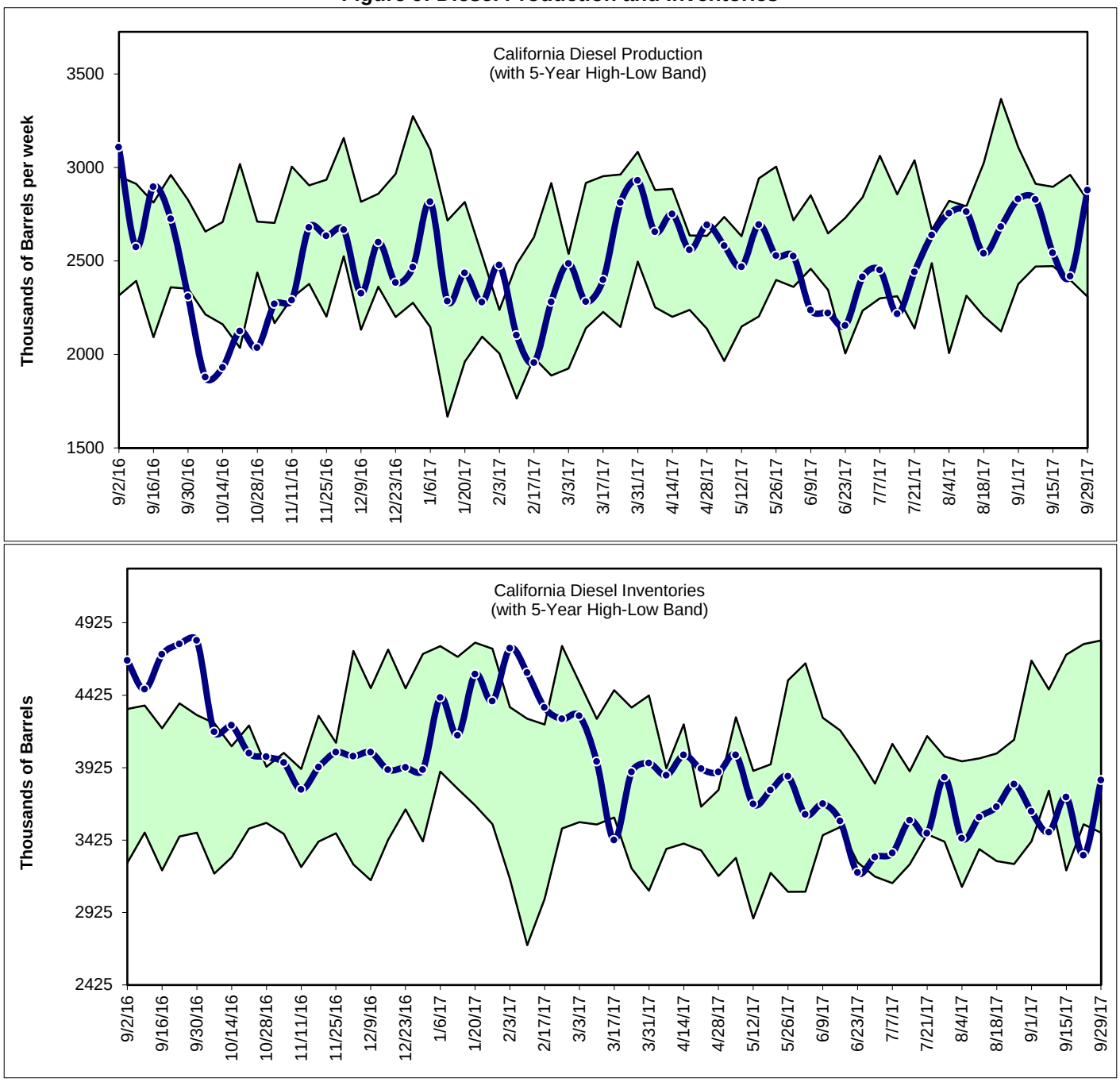


Source: PIIRA data

California gasoline production peaked in the beginning of the month producing 7.2 million barrels per week (bpw) on September 8. Production fell to 7.0 million bpw on the weeks of September 15 and September 22 before climbing back to 7.1 million bpw for September 29. California gasoline production remained high for September, averaging 300,000 bpw more than the same period in 2016.

California gasoline inventories added 900,000 barrels in September. Inventories increased to 12 million barrels on September 22 before dropping to 11.5 million barrels on September 29 (**Figure 8**). Inventories are at the highest level since June.

Figure 9: Diesel Production and Inventories



Source: PIIRA data

California diesel production steadily decreased, hitting a low of 2.4 million bpw on September 22, before increasing to 2.9 million bpw on September 29. Diesel production ended September at the top of the five-year band (**Figure 9**). Diesel production remained consistent with the production from September 2016, averaging 2.6 million bpw.

California diesel inventories increased in September. Inventories reached a low point of 3.3 million barrels on September 22 before reaching a high point of 3.8 million barrels on September 29. California added 400,000 barrels to inventory in September, but inventory levels ended the month 1 million barrels less than inventory levels from September 2016.