

# PETROLEUM WATCH

CALIFORNIA ENERGY COMMISSION

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## REFINERY NEWS

- PBF Torrance:** On March 9, emergency flaring took place at the refinery for the fifth day in a row ([Cal OES](#)).
- Chevron Richmond:** On March 21, Chevron workers went on strike after the company and the United Steelworkers union failed to reach a contract agreement ([Wall Street Journal](#)).

## CALIFORNIA GASOLINE RETAIL PRICES BY BRAND

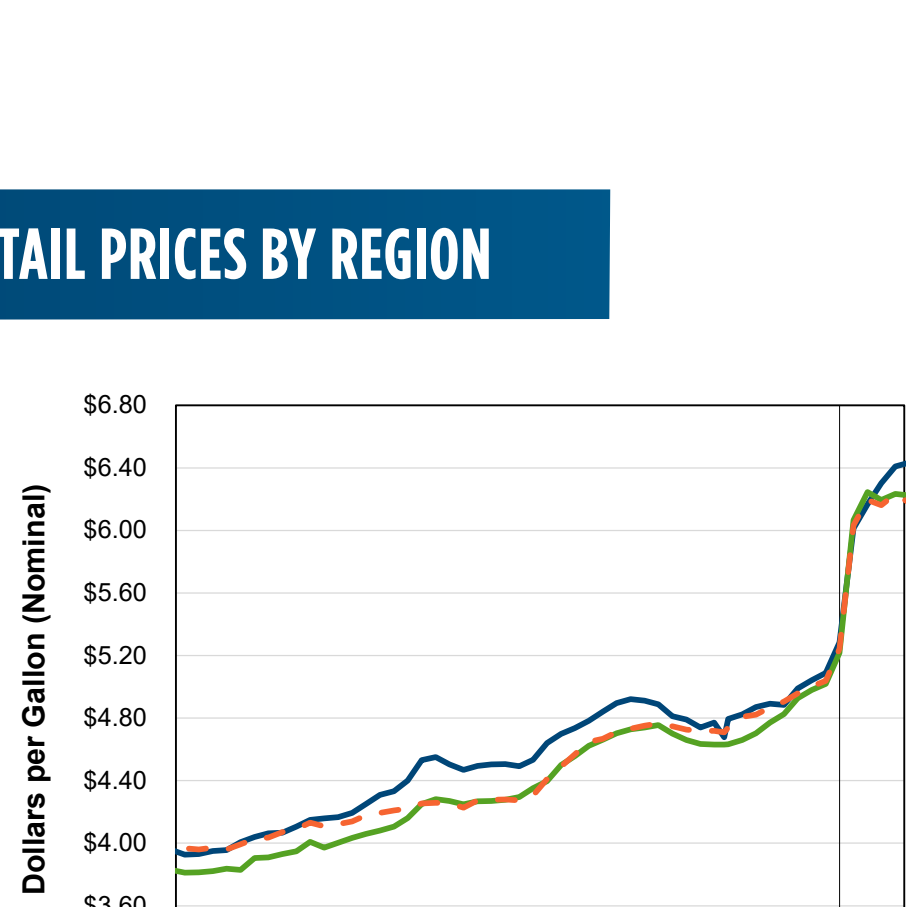
### March 2022 vs. 2021

(Percentage Change)

76	47% higher
ARCO	51% higher
Chevron	47% higher
Hypermart	50% higher
Shell	47% higher
Unbranded	49% higher
Valero	48% higher

### March 2022 Averages

76	\$5.73
ARCO	\$5.51
Chevron	\$5.88
Hypermart	\$5.28
Shell	\$5.81
Unbranded	\$5.51
Valero	\$5.60



Source: California Energy Commission (CEC) analysis of Oil Price Information Service (OPIS) data

## CALIFORNIA DIESEL RETAIL PRICES BY REGION

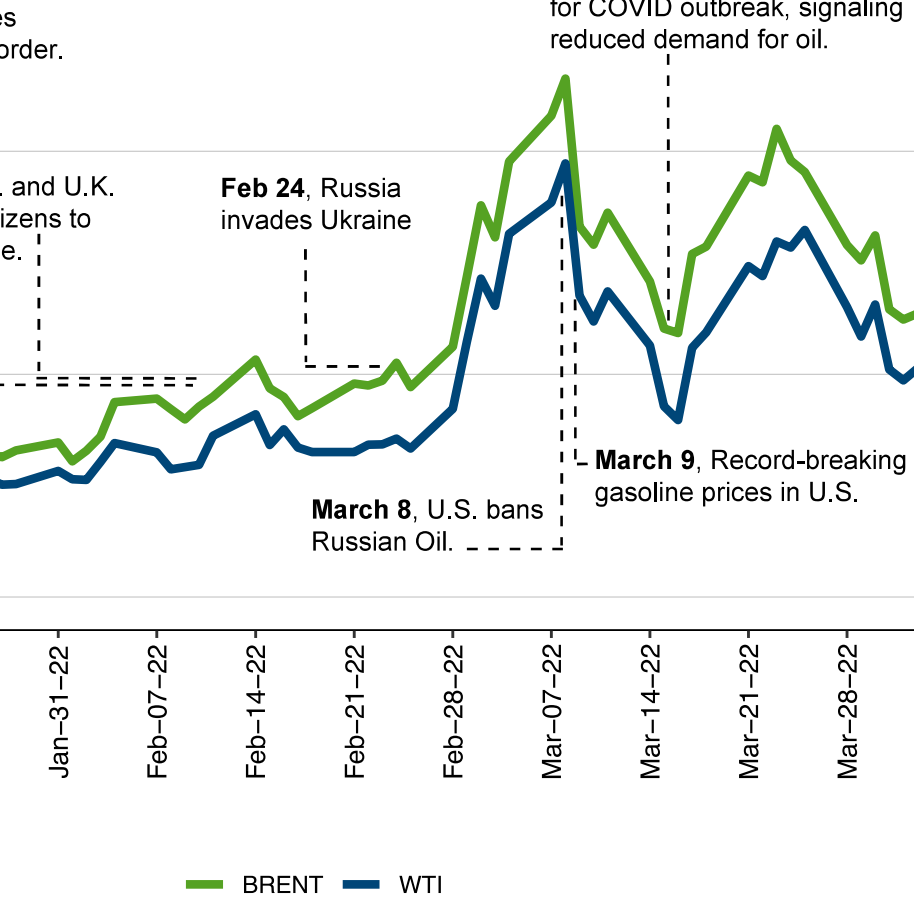
### March 2022 vs. 2021

(Percentage Change)

Northern CA	54% higher
Central CA	60% higher
Southern CA	53% higher

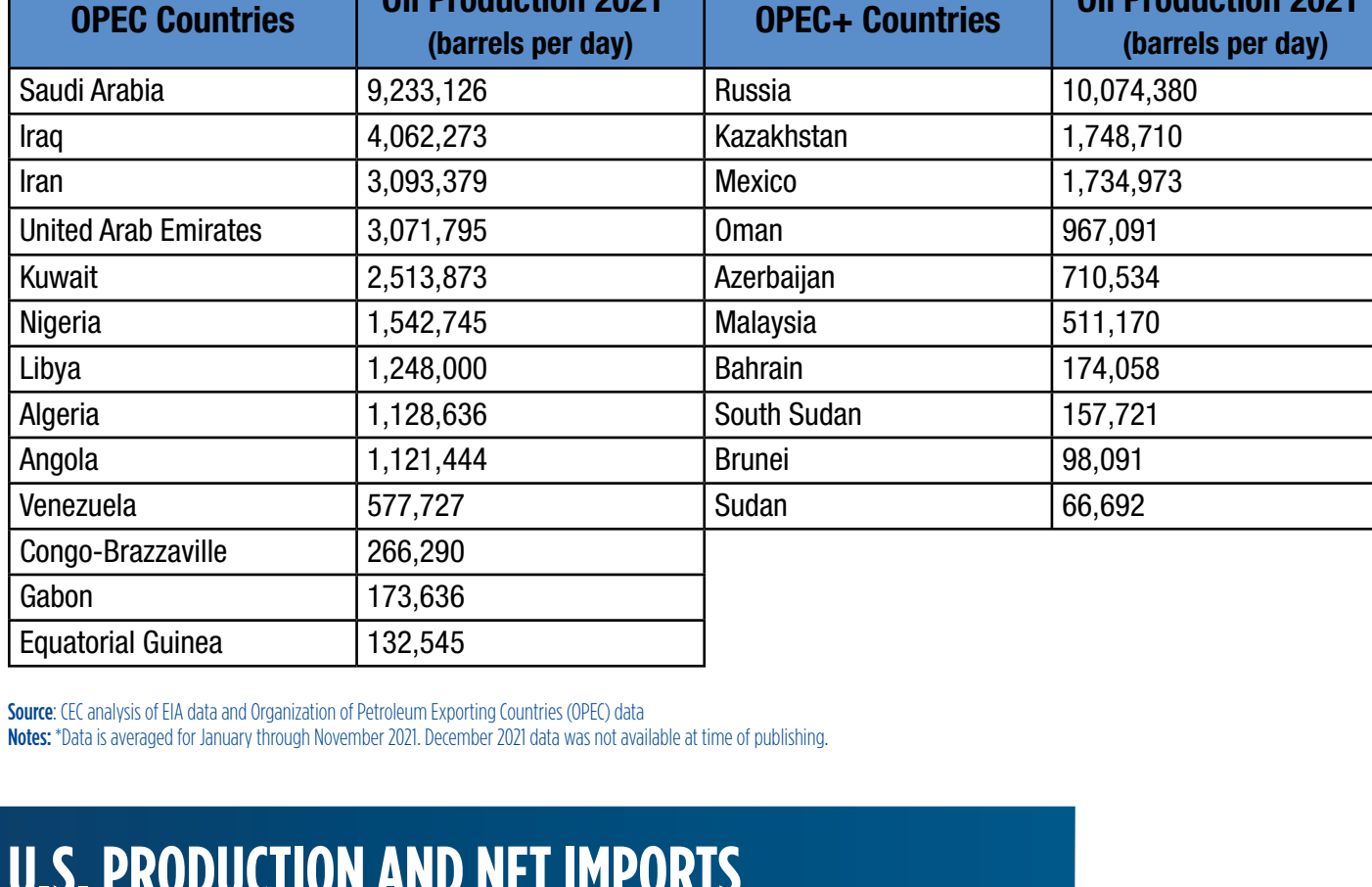
### March 2022 Averages

Northern CA	\$6.08
Central CA	\$6.04
Southern CA	\$6.02



Source: CEC analysis of OPIS data

## CRUDE OIL PRICE TIMELINE



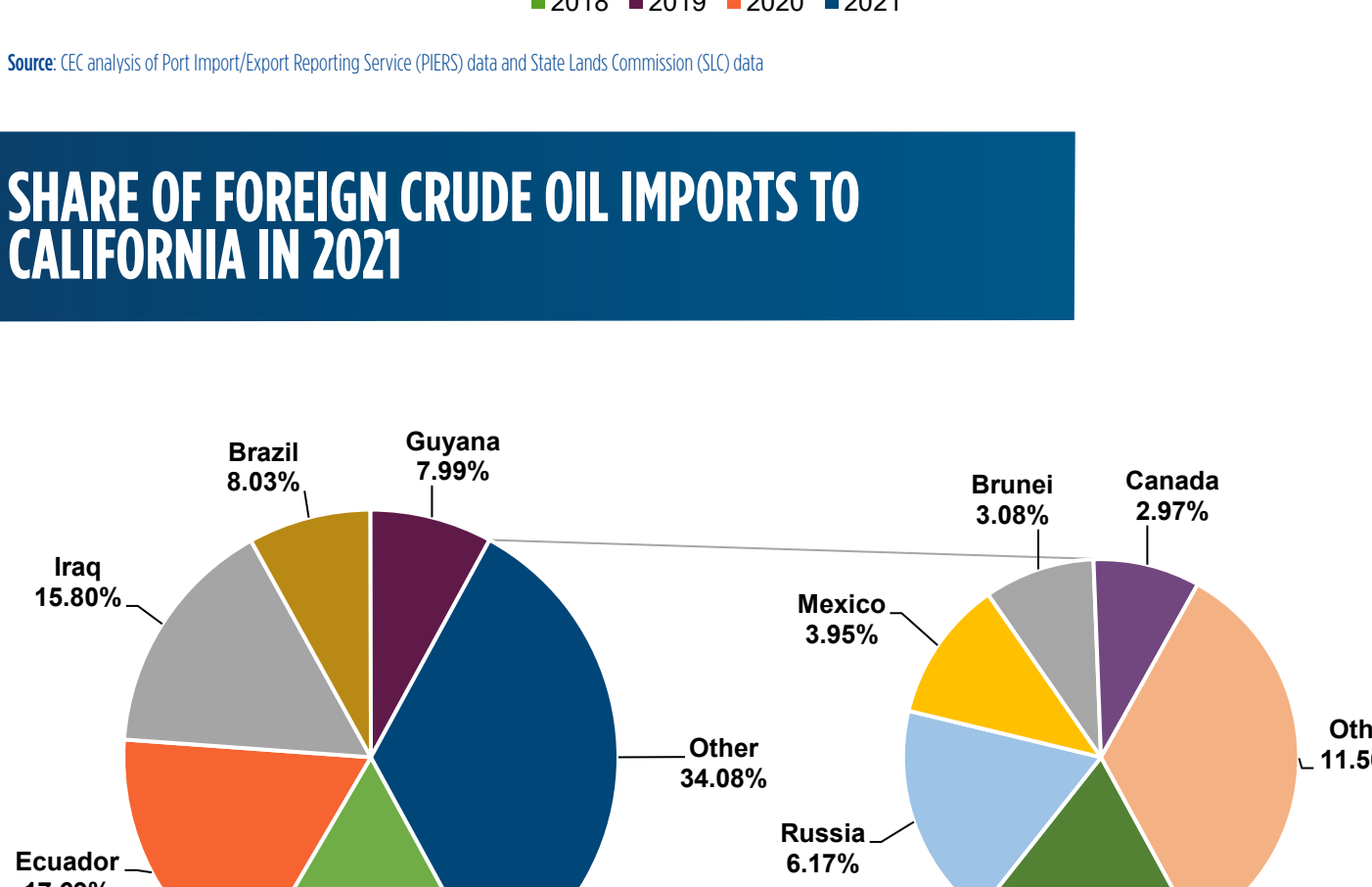
Source: CEC analysis of Energy Information Administration (EIA) data. Notes: Prices shown are for Brent crude oil and West Texas Intermediate (WTI) crude oil.

## OPEC COUNTRIES BY CRUDE OIL PRODUCTION

OPEC Countries	Oil Production 2021* (barrels per day)	OPEC+ Countries	Oil Production 2021* (barrels per day)
Saudi Arabia	9,233,126	Russia	10,074,380
Iraq	4,062,273	Kazakhstan	1,748,710
Iran	3,093,379	Mexico	1,734,973
United Arab Emirates	3,071,795	Oman	967,091
Kuwait	2,513,873	Azerbaijan	710,534
Nigeria	1,542,745	Malaysia	511,170
Libya	1,248,000	Bahrain	174,058
Algeria	1,128,636	South Sudan	157,721
Angola	1,121,444	Brunei	98,091
Venezuela	577,727	Sudan	66,692
Congo-Brazzaville	266,290		
Gabon	173,636		
Equatorial Guinea	132,545		

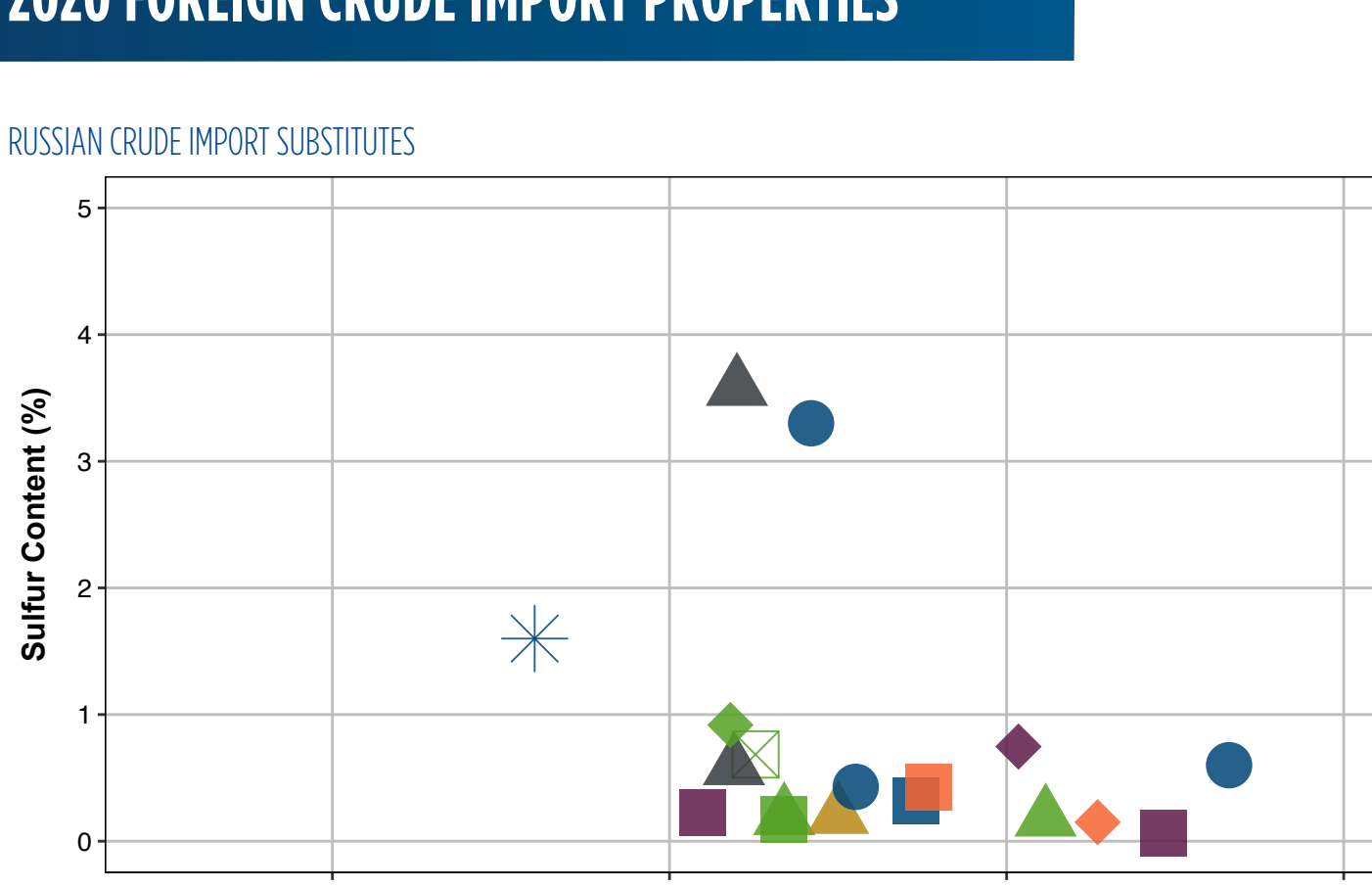
Source: CEC analysis of EIA data and Organization of Petroleum Exporting Countries (OPEC) data. Notes: \*Data is averaged for January through November 2021. December 2021 data was not available at time of publishing.

## U.S. PRODUCTION AND NET IMPORTS OF CRUDE OIL



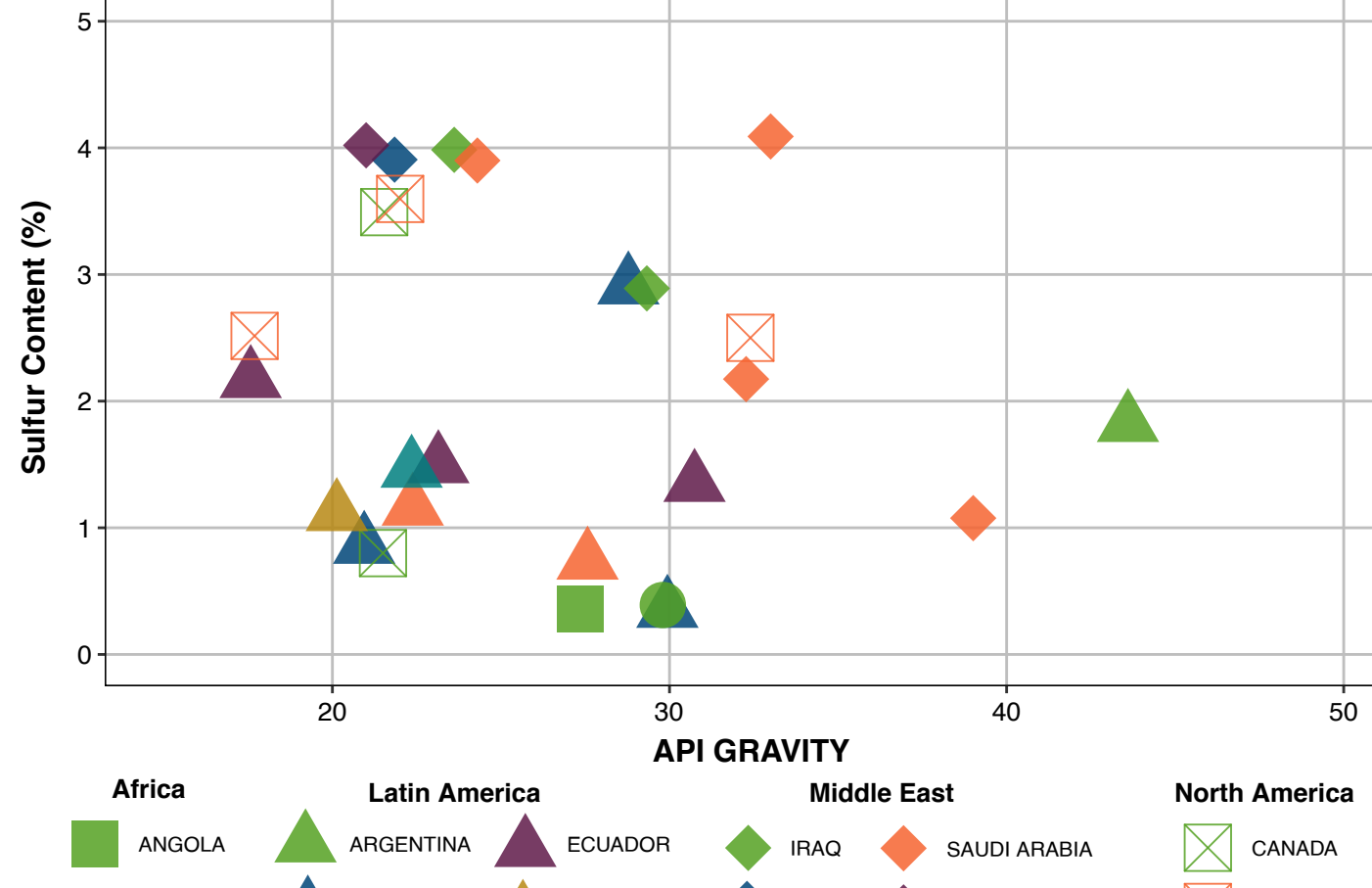
Source: CEC analysis of EIA data

## FOREIGN CRUDE OIL IMPORTS TO CALIFORNIA 2018-2021 (Q1-Q3)



Source: CEC analysis of Port Import/Export Reporting Service (PIERS) data and State Lands Commission (SLC) data

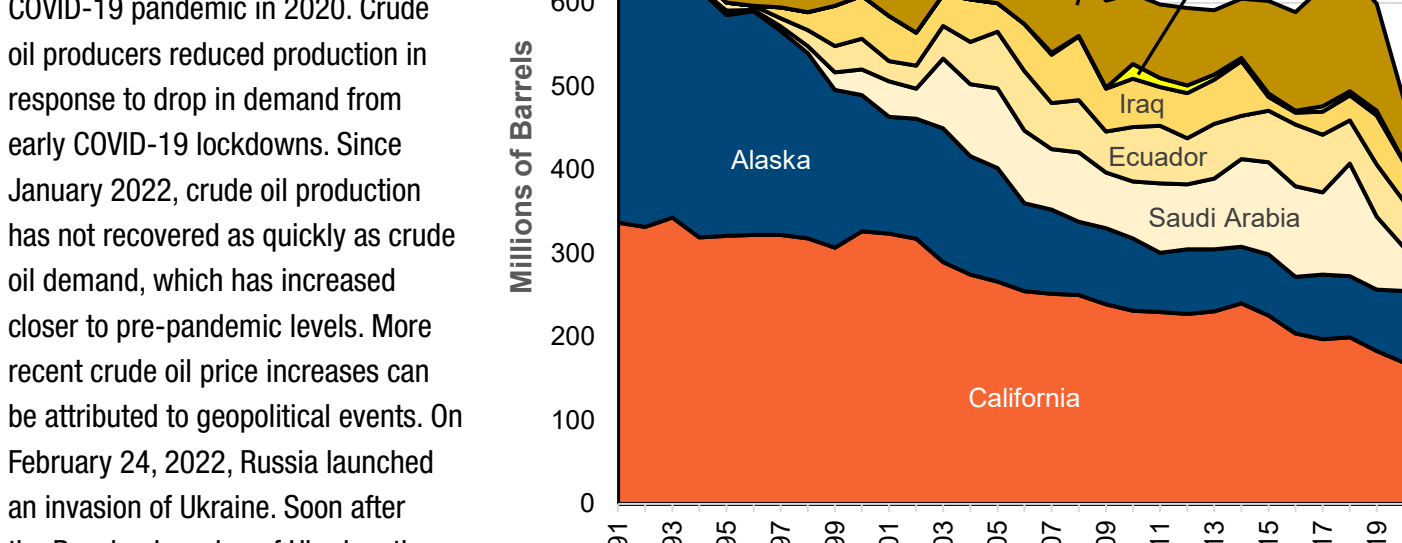
## SHARE OF FOREIGN CRUDE OIL IMPORTS TO CALIFORNIA IN 2021



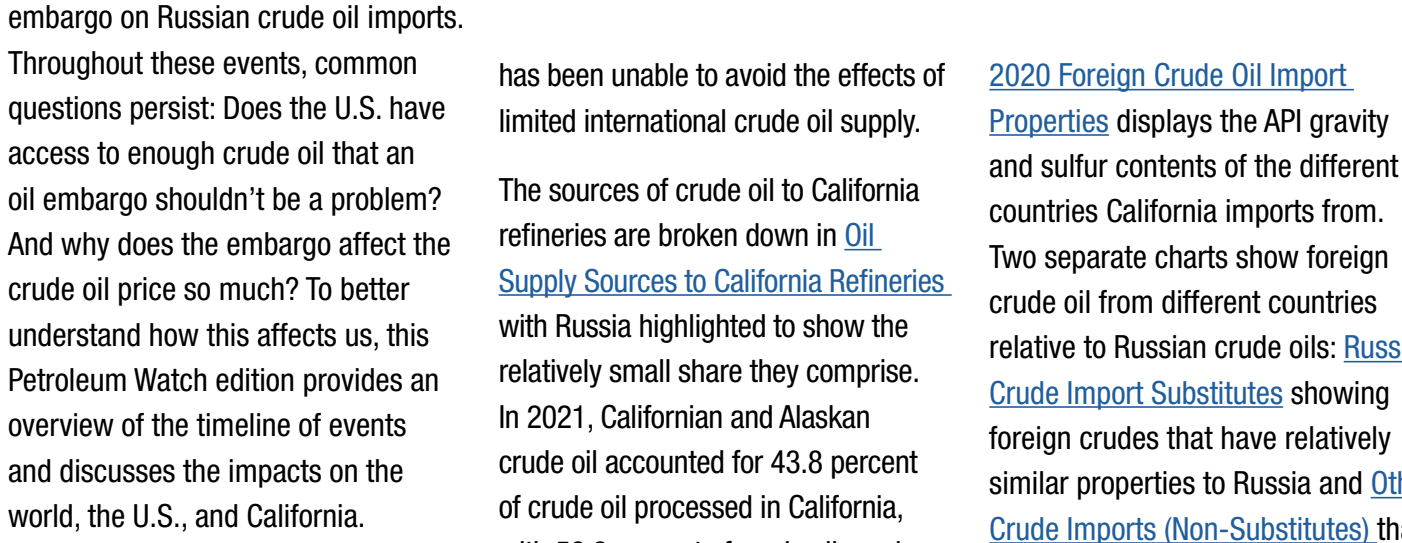
Source: CEC analysis of PIERS data and SLC data

## 2020 FOREIGN CRUDE IMPORT PROPERTIES

### RUSSIAN CRUDE IMPORT SUBSTITUTES



### OTHER CRUDE IMPORTS (NON-SUBSTITUTES)



Source: CEC analysis of EIA data. Notes: Import data is provided monthly. Each country's data point is a weighted average of that year's API gravity and sulfur content (weighted by quantity imported). Some countries have multiple points to represent the different types of crude oils they export (heavy and light API gravity, low-sulfur and high-sulfur content).

## FEATURED TOPIC

### CRUDE OIL MARKET UPDATE

Crude oil markets have been volatile across the globe since the start of the COVID-19 pandemic in 2020. Crude oil producers reduced production in response to drop in demand from early COVID-19 lockdowns. Since January 2022, crude oil production has not recovered as quickly as crude oil demand, which has increased closer to pre-pandemic levels. More recent crude oil price increases can be attributed to geopolitical events. On February 24, 2022, Russia launched an invasion of Ukraine. Soon after the Russian invasion of Ukraine, the United States (U.S.) and the United Kingdom (U.K.) announced an oil embargo on Russian crude oil imports. Throughout these events, common questions persist: Does the U.S. have access to enough crude oil that an oil embargo shouldn't be a problem? And why does the embargo affect the crude oil price so much? To better understand how this affects us, this Petroleum Watch edition provides an overview of the timeline of events and discusses the impacts on the world, the U.S., and California.

The [Crude Oil Price Timeline](#) shows the price of Brent and WTI crude oils with major events noted to reveal their effects on crude prices. On February 11, 2022, the U.S. and U.K. urged their citizens to leave Ukraine following their Russian and Belarusian military exercises. On February 24, Russia started an invasion of Ukraine. In response, the U.S. banned Russian crude oil imports on March 8. The price of crude oil spiked with the ban on Russian crude oil imports in effect, and on March 9, gasoline prices began to rise. According to the EIA, 61 percent of the cost of gasoline is determined by crude oil prices. On March 15, crude oil prices dipped due to a COVID-19 lockdown in China, signaling an anticipated reduction in the demand for transportation fuels and, therefore, crude oil.

The price of crude oil drops when supplies are abundant and accessible to all parties. If crude oil supplies are scarce, or limited in availability, prices will increase. By banning Russian crude oil imports, the U.S. is limiting a large supply of crude oil. Thus, increasing the price of crude oil.

The Organization of the Petroleum Exporting Countries (OPEC) and OPEC+ control most of the oil production in the world (for more information on OPEC, see [September 2021 Petroleum Watch](#)). The [OPEC Countries by Crude Oil Production](#) table lists the OPEC and OPEC+ countries descending by daily average crude oil production in 2021. Russia is the largest producer in OPEC+. Saudi Arabia averaged a slightly lower amount of crude oil production compared to Russia, differing by an average of 840,000 barrels per day. OPEC+ also has an agreement in place to conservatively increase crude oil production by 400,000 barrels per day in April 2022 and has resisted calls to deviate from this plan. Even with this addition, it will not make up for the restrictions on Russian crude.

The top three global crude oil producers are shown in the [U.S. Production and Net Imports of Crude Oil](#) graph. In 2018, the U.S. became the top crude oil producer, averaging 10.9 million barrels per day. For January through November 2021, Russia was the second highest producer averaging 10 million barrels per day and Saudi Arabia the third highest averaging 9.2 million barrels per day. While the U.S. has a crude oil reserve, oil drilling companies have resisted making additional investments to increase production. The U.S. has reduced imports of crude oil, going from a peak of 10.6 million barrels per day in September 2006 to an average of 3 million barrels per day in 2021. Even with high production, the U.S.

### OIL SUPPLY SOURCES TO CALIFORNIA REFINERIES



Source: CEC analysis of EEC data, PIERS data, and SLC data

has been unable to avoid the effects of limited international crude oil supply. The sources of crude oil to California refineries are broken down in [Oil Supply Sources to California Refineries](#), with Russia highlighted to show the relatively small share they comprise. In 2021, California and Alaskan crude oil accounted for 43.8 percent of crude oil processed in California, with 56.2 percent of crude oil coming from foreign nations. Foreign crude oil imports have become a larger share of the overall crude oil mix because California and Alaskan crude oil fields are older and less productive. [Foreign Crude Oil Imports to California 2018-2021](#) shows the monthly foreign crude oil imports into California from 2018 to 2021 (fourth quarter 2021 data is still being analyzed and is omitted from the chart). COVID-19 had a significant impact on the refining industry with 2020 crude oil imports being the smallest of the four years. The first three quarters of 2021 illustrate that California is close to 2019 levels, which indicates a return to historical levels. As oil consumption continues toward pre-COVID levels, staff expects foreign crude oil imports into California to increase. [Share of Foreign Crude Oil Imports to California in 2021](#) shows which foreign countries California imports crude oil from. The vast majority comes from the Middle East, with Iraq and Saudi Arabia accounting for 32.2 percent. The second largest region is South America, with Ecuador, Brazil, and Colombia accounting for 32 percent of its foreign imports (3.5 percent of total crude oil sourced to California refineries in 2021), but this could potentially be replaced by crude oil from other regions.

### CRUDE REPLACEMENT FOR RUSSIAN CRUDE OIL IMPORTS TO CALIFORNIA

The characteristics of the various crude oils imported to California are just as important as the quantity of imports. American Petroleum Institute (API) gravity and sulfur content are the two primary characteristics that refiners use to assess crude oil (for more information on API gravity and sulfur content of crude oil, see [February 2020 Petroleum Watch](#)). The heavier, more viscous crudes have a lower API gravity (10 to 22 degrees) and lighter crudes have a higher API gravity (greater than 30 degrees), with medium density crudes somewhere in between. Refined products (gasoline, diesel, jet fuel) require low quantities of sulfur to limit the amount of sulfur oxide formed when burned. Generally, refiners look for crude oils with lower sulfur content since they require less cleaning of the sulfur as the natural corrosive properties of sulfur can be harmful to refinery equipment.

California uses a mix of crude oils to get the specifications best suited for the equipment at local refineries (for more information on refining operations, see the [May 2020 Petroleum Watch](#)).

### 2020 Foreign Crude Oil Import Properties

[Properties](#) displays the API gravity and sulfur contents of the different countries California imports from. Two separate charts show foreign crude oil from different countries relative to Russian crude oils: [Russian Crude Import Substitutes](#) showing foreign crudes that have relatively similar properties to Russia and [Other Crude Imports \(Non-Substitutes\)](#) that are crudes dissimilar to Russia.

Due to geological variations, there are three different specifications of Russian crude oil to compare across. "Sour Russian Crude" is the point with 34.2 degrees API gravity and 3.3 percent sulfur content. There are also two types of "Sweet Russian Crude" that California imports, both with sulfur content below one percent. All three variations are above 30 degrees API gravity, putting them in the "light" crude oil category. This means that California refineries would need to source their crude oil from countries that are near these three specs. Out of South America, it is possible to substitute both the Sour and Sweet Russian crude variants from Guyana (a new player in the global crude market). Crude oil from Argentina and Peru could replace some of the lighter, low-sulfur crudes as well. There are also possible other low-sulfur substitutes from a handful of African countries such as Ghana, Nigeria, Libya, and Angola.

Domestic oil developers could also boost in-state production to rely more on California's natural oil reserves. However, this is not as viable of a substitute since the crude oil in California is noticeably heavier and more "sour" than what would be needed to replace Russian crude oil, as illustrated on [Russian Crude Import Substitutes](#). While there are some California oil fields that have lighter, sweeter crudes, bumping up production in fields like Lost Hills or Rio Bravo (located in Kern County) or even Ojai (located in Ventura County), may not be as economically feasible due to costs associated with increasing production.

Crude oil prices will likely remain elevated as the war in Ukraine continues. The European Union (EU) continues to debate its own ban on Russian crude oil imports. If an EU ban were to be applied, this will have a much larger impact on international crude oil supplies as Russian crude oil accounts for 25 percent of imports into the EU. This shift may be permanent as many crude oil companies are voluntarily moving away from Russian crude oil. OPEC+ is unmoved by rising prices of crude oil and will continue their agreed upon plan of a monthly increase in crude oil production by 400,000 barrels per day.

The U.S. produces most of its crude oil domestically and can substitute Russian crude oil from other countries. Crude oil prices will likely remain high because of increased competition to acquire international supply.

Visit our website for more information about [California's Petroleum Market](#).