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<tr>
<th><strong>Docket Number:</strong></th>
<th>22-IEPR-05</th>
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<tr>
<td><strong>Project Title:</strong></td>
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<td><strong>Document Title:</strong></td>
<td>Presentation - 2022 Gasoline Price Spike Overview</td>
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<tr>
<td><strong>Description:</strong></td>
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<td><strong>Filer:</strong></td>
<td>Donnie Cox</td>
</tr>
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<td><strong>Organization:</strong></td>
<td>California Energy Commission</td>
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<td><strong>Submitter Role:</strong></td>
<td>Commission Staff</td>
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<td><strong>Submission Date:</strong></td>
<td>11/23/2022 11:27:44 AM</td>
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<td><strong>Docketed Date:</strong></td>
<td>11/23/2022</td>
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</tbody>
</table>
California Gasoline Prices

California Energy Commission
Prepared by Energy Assessments Division Staff
Presentation Overview

• Purpose
  o Overview of recent fuel price trends
  o Factors contributing to elevated prices
• Transportation fuels market – California sources & geographic isolation
• More expensive gasoline – trends & reasons
• 2022 gasoline price spikes
• Factors contributing to elevated prices
  o Refinery operations, inventories, imports & exports
• Closing remarks
California Fuel Sources
Oil Refineries

11 refineries in three primary locations:

- Produce transportation fuels that meet California standards
- Provide majority of transportation fuels to neighboring states
- Process over 1.6 million barrels per day of crude oil
Crude Oil Sources for California Refineries

- Domestic Lower 48 Sources: 151.3 Million Barrels (28.9%)
- Alaska: 78.1 Million Barrels (14.9%)
- Foreign: 294.3 Million Barrels (56.2%)

Source: California Energy Commission.
California Fuel Sources – Local Refineries

California refineries produce refined transportation fuels for instate use and export to domestic & foreign destinations.

- **Gasoline - 2021**
  - 88 percent of production used in state – 314.0 million barrels or 13.2 billion gallons
  - 12 percent exported – 42.9 million barrels or 1.8 billion gallons

- **Diesel fuel - 2021**
  - 61 percent of production used in state – 65.2 million barrels or 2.7 billion gallons
  - 39 percent exported – 41.8 million barrels or 1.8 billion gallons

- **Jet fuel - 2019**
  - 80 percent of supply (production + imports) used in state – 104.1 million barrels or 4.4 billion gallons
  - 20 percent exported – 25.6 million barrels or 1.1 billion gallons
California import refined petroleum fuels for instate use and export to domestic destinations.

- Imports generally provide a smaller portion of overall supply
  - Less than 10 percent for gasoline and diesel fuel
  - More for jet fuel
- Gasoline - 2019
  - 4.5 percent of demand supplied from foreign refiners – 14.9 million barrels or 627 million gallons
  - 3.9 percent of demand supplied from domestic refiners – 12.8 million barrels or 538 million gallons
- Diesel fuel - 2019
  - 5.3 percent of demand supplied from foreign refiners – 4.7 million barrels or 199 million gallons
  - 4.8 percent of demand supplied from domestic refiners – 4.3 million barrels or 179 million gallons
- Jet fuel - 2019
  - 21.2 percent of demand supplied from foreign refiners – 20.5 million barrels or 861 million gallons
  - 1.3 percent of demand supplied from domestic refiners – 1.2 million barrels or 52 million gallons
Californians Consumed

13.82 Billion Gallons of finished gasoline in 2021

Demand for Base Gasoline

12.4 Billion Gallons during 2021 (declining since 2017)

Demand for Ethanol

1.4 Billion Gallons during 2021 (about 10%)
California’s Isolated Fuels Market
California market is isolated by time and distance from alternative sources of resupply to compensate for loss of output due to unplanned refinery outages.

California's transportation fuels market is nearly self-sufficient, so supplies of gasoline & diesel fuel from outside of CA are not routinely needed to balance out supply with demand.

Imports of gasoline and blending components account for only 3 to 7 percent of supply.

The California market is geographically isolated from other locations in the U.S. that produce refined products.

Pipelines connect California refining centers to distribution terminals in Nevada and Arizona, but these pipelines only operate in one direction, sending gasoline and other transportation fuels to these neighboring states.
Western States More Isolated than Rest of U.S.

Figure 1. West Coast petroleum product supply map

Source: U.S. Energy Information Administration.
Balance of Other Regions Varies

- California is nearly self-sufficient
  - Primary sources originate *inside* the state
  - More susceptible to price spikes following unplanned outages
- Other regions less prone to price spikes
  - Price spikes following significant unplanned refinery outages less common
Trends & Reasons Related to More Expensive Gasoline
California Gasoline Market – More Expensive

- Market is usually the highest retail gasoline price in U.S.
  - Greater tax burden – state excise and sales tax
  - Higher gasoline production costs
  - Environmental program costs
  - Price spikes associated with an isolated market
  - More expensive crude oil for California refiners
  - Increasing retail margins for more expensive gasoline brands
California Less U.S. Retail Gasoline Price

Annual Differences
2014 - 40.8 cpg
2015 - 76.4
2016 - 60.1
2017 - 61.8
2018 - 83.7
2019 - 110.5
2020 - 100.0
2021 - 114.1
2022 Y-T-D - 154.4
Thru 11/14/2022

Record difference of $2.60 per gallon on October 4, 2022

Source: California Energy Commission staff analysis of AAA daily retail prices of regular grade gasoline.
Differences in average gasoline retail prices are shown below for each year. Calculated as the AAA price less the Energy Information Administration price.

Note that the differences have been very small over time, no more than 3 cents per gallon.

Source: Energy Commission analysis of AAA & EIA retail gasoline price data.

2022 Y-T-D data through 11/14/2022.
Differences in average gasoline retail prices are shown below for each year. Calculated as the AAA price less the Energy Information Administration price. **Note that the differences were very small through 2017, but have increased significantly between 2018 and 2022.**

Source: Energy Commission analysis of AAA & EIA retail gasoline price data.

2022 Y-T-D data through 11/14/2022.
CA Difference Factors Using EIA Data

Sources: California Energy Commission analysis of OPIS, EIA, API, and AAA data.

* Increased retail margin for premium brand gas stations, and potential other factors not yet identified.

Y-T-D 2022 covers the period January 1 through November 14, 2022.
CA Difference Factors Using AAA Data

Sources: California Energy Commission analysis of OPIS, EIA, API, and AAA data.

* Increased retail margin for premium brand gas stations and potential other factors not yet identified.

Y-T-D 2022 covers the period January 1 through November 14, 2022.
2022 Gasoline Price Spikes
Gasoline Price Spikes

Gas prices rise for a variety of reasons:

- Geopolitical Issues
- Rise in Seasonal Demand
- Shift From Winter to Summer Gas Recipe
- Isolated Market and Localized refinery issues
  - California market is isolated by time and distance from alternative sources to resupply during unplanned refinery outages
  - Price spikes in California can last longer than other places because it takes longer to resupply and at a higher cost
2022 – Multiple & Record Gasoline Price Spikes

Source: AAA retail gasoline - regular grade prices.

Retail gasoline prices through 11/21/2022.
Crude oil cost estimates through 11/18/2022.
Retail Gasoline Prices Continue Declining

California Average Prices

Prices updated as of 11/21/2022

<table>
<thead>
<tr>
<th></th>
<th>Regular</th>
<th>Mid</th>
<th>Premium</th>
<th>Diesel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Avg.</td>
<td>$5.252</td>
<td>$5.459</td>
<td>$5.608</td>
<td>$6.184</td>
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<tr>
<td>Yesterday Avg.</td>
<td>$5.269</td>
<td>$5.489</td>
<td>$5.627</td>
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<td>Week Ago Avg.</td>
<td>$5.433</td>
<td>$5.630</td>
<td>$5.785</td>
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<td>Month Ago Avg.</td>
<td>$5.832</td>
<td>$6.072</td>
<td>$6.208</td>
<td>$6.522</td>
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<td>Year Ago Avg.</td>
<td>$4.704</td>
<td>$4.889</td>
<td>$5.018</td>
<td>$4.838</td>
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</table>

California retail gasoline price decline has resumed after a brief pause

- Down 18.1 cpg since last week
- Down 58.0 cpg since last month
- Up 54.8 cpg since last year

National Average Prices

Prices updated as of 11/21/2022

<table>
<thead>
<tr>
<th></th>
<th>Regular</th>
<th>Mid</th>
<th>Premium</th>
<th>Diesel</th>
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</thead>
<tbody>
<tr>
<td>Current Avg.</td>
<td>$3.662</td>
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<td>Yesterday Avg.</td>
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<td>Week Ago Avg.</td>
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<td>Month Ago Avg.</td>
<td>$3.820</td>
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<td>Year Ago Avg.</td>
<td>$3.408</td>
<td>$3.763</td>
<td>$4.036</td>
<td>$3.645</td>
</tr>
</tbody>
</table>

National retail gasoline prices continue lower

- Down 11.1 cpg since last week
- Down 15.8 cpg since last month
- Up 25.4 cpg since last year

California retail prices are expected to continue downward, absent any significant unplanned refinery outages.
Retail Gasoline Price & Crude Oil Costs


Sources: California Energy Commission staff analysis of AAA daily retail prices of regular grade gasoline and Oil Price Information Service (OPIS) crude oil prices.
Governor Newsom’s executive order for early transition to winter gasoline was primary factor resulting in record one-day declines for refinery & distribution terminal wholesale gasoline prices.
<table>
<thead>
<tr>
<th>Date</th>
<th>Distribution Costs, Marketing Costs and Profits</th>
<th>State and Local Sales Tax</th>
<th>State Excise Tax (53.9 cpg)</th>
<th>Federal Excise Tax (18.4 cpg)</th>
<th>State Underground Storage Tank Fee (2.0 cpg)</th>
<th>Environmental Programs (LCFS + Cap &amp; Trade)</th>
<th>Refinery Cost and Profit</th>
<th>Crude Oil Costs</th>
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<tr>
<td>8/29</td>
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<td>106</td>
<td>136</td>
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<tr>
<td>9/26</td>
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<td>136</td>
<td>139</td>
<td>138</td>
<td>111</td>
<td>99</td>
<td>67</td>
</tr>
</tbody>
</table>
Factors Contributing to Spikes
Crude Oil Price Impacts

- Changes in crude oil prices impact transportation fuel prices
- Crude oil is a global commodity. Prices fluctuate due to:
  - Increasing supply from non-OPEC countries
  - Geopolitical events increase risk of supply disruption
  - Changing global demand for oil
  - Heightened activity in futures market as alternative investment opportunity
  - Value of U.S. dollar to other currencies, a stronger dollar will place downward pressure on global crude oil prices
Wholesale Price Impacts

• Changes in wholesale prices impact transportation fuel prices, factors include:
  ↑ Unplanned refinery outages
  ↑ Refinery closures
  ↑ Return-to-service delays by refineries undergoing planned maintenance
  ↑ Transition from winter to summer gasoline recipe decreases refinery production capability
  ↑ Introduction of new environmental fees
  ↑ Changes in fuel regulations, such as reformulated gasoline and transition away from MTBE
  ↓ Changes in futures contract prices linked to wholesale prices
  ↓ Unusually high or low fluctuations of fuel inventory levels
  ↓ Marine imports that are either higher-than-normal or lower-than-normal
  ↑ Changes in the level of taxes on fuels
  ↓ Transition from summer to winter gasoline recipe increases refinery production capability
  ↓ Resumption of operations by temporarily idled refineries
Loss of Refining Capacity 2022 vs. 2019
California and the Rest of the U.S.

Source: CEC analysis of EIA refinery capacity report information.

- California: 171,900 barrels per calendar day (9.8% of total)
- Rest of U.S.: 726,325 barrels per calendar day (4.3% of total)
Refinery Maintenance

• Puts upward pressure on wholesale fuel prices
  • Especially unplanned or longer than expected maintenance
• Maintenance limits refiner’s ability to increase gasoline output when higher price signals beyond planned rates
• Refiners do not report planned maintenance schedule to CEC
• CEC relies on inconsistent proprietary reports for information on planned and unplanned maintenance
  • Limits CEC’s ability to foresee impacts on gasoline output
Refinery Maintenance Price Impacts

• In September and October 2022, four California refiners conducted planned maintenance
• Decreased gasoline production capability by approximately 55 thousand barrels per day, or 6 percent of estimated statewide gasoline demand
• Loss of gasoline production helped push California U.S. price difference up 85 cents per gallon, new record differential of $2.61 per gallon
### California Retail Gasoline

#### Some of Highest Weekly Price Spikes

<table>
<thead>
<tr>
<th>Date Range</th>
<th>Percentage Increase</th>
<th>Source Comment</th>
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<tbody>
<tr>
<td>Feb 20 - Feb 27, 2012</td>
<td>25.7%</td>
<td>BP - Cherry Point</td>
</tr>
<tr>
<td>Feb 6 - Feb 13, 2012</td>
<td>22.8%</td>
<td>6% BP - Cherry Point</td>
</tr>
<tr>
<td>Aug 18 - Aug 25, 2003</td>
<td>28.6%</td>
<td>Hurricane Katrina</td>
</tr>
<tr>
<td>Mar 22 - Mar 29, 1999</td>
<td>22.8%</td>
<td>PBF Energy - Torrance</td>
</tr>
</tbody>
</table>

Red values are the percentage increase in weekly gasoline retail price.

Sources: EIA weekly retail gasoline prices, OPIS alerts, and AAA daily retail prices.

**Note:**
- **Tosco - Golden Eagle**
- **Tucson Pipeline**
- **Hurricane Katrina**
- **BP - Cherry Point**
- **Chevron - Richmond**
- **ExxonMobil - Torrance**
- **ExxonMobil - Torrance**
- **Tosco - Spike**
- **Unpl. Outages - 5 Refineries**
- **Russia Invades Ukraine**
- **Low Inventories. Refinery Work**
- **Low Inventories. Refinery Work**
- **Low Inventories. Refinery Work**

---

11/21/2022
California gasoline production stayed below the bottom of the five-year high-low historical range from the beginning of July until the start of October.

- The decreased output was a reflection of refinery maintenance during that period and appears to have been a factor contributing to the October 2022 price spike.

Data through week ending 11/11/2022.

### Comparison Table

<table>
<thead>
<tr>
<th></th>
<th>2 Years Previous</th>
<th>1 Year Previous</th>
<th>2 Weeks Previous</th>
<th>Previous Week</th>
<th>Latest Date in Range</th>
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</thead>
<tbody>
<tr>
<td>CARB Reformulated Gasoline</td>
<td>5,871</td>
<td>6,039</td>
<td>5,542</td>
<td>6,421</td>
<td>6,560</td>
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<tr>
<td>Non-California Gasoline</td>
<td>725</td>
<td>725</td>
<td>834</td>
<td>714</td>
<td>573</td>
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<tr>
<td>Grand Total</td>
<td>6,596</td>
<td>6,764</td>
<td>6,376</td>
<td>7,135</td>
<td>7,133</td>
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</table>

For additional information about the data and how to cite this visualization, see Weekly Fuels Watch Refinery Inputs and Production.
Gasoline blending components, the ingredients to create CARB gasoline, have stayed below the bottom of the five-year high-low historical range since the week ending August 12.

- Reduced availability of gasoline components puts upward pressure on wholesale prices and appear to have been a factor contributing to the October 2022 price spike.
Gasoline inventories have been at their lowest levels in a decade.

Data source: U.S. Energy Information Administration
Gasoline Inventories – CA & West Coast

Compared to last month
• CA up 0.9 million barrels or 8.5 percent
• West Coast up 2.1 million barrels or 8.1 percent

Compared to last year
• CA up 1.2 million barrels or 12.0 percent
• West Coast up 0.3 million barrels or 1.2 percent

Lower-than-normal inventory levels put upward pressure on prices.
• Data for the week ending 11/11/2022.

Gasoline inventories continue improving and are now above year-ago levels in California and the West Coast.
West Coast Foreign Gasoline Imports

Source: California Energy Commission analysis of weekly import data from the Energy Information Administration.

75 percent lower than 2021

Thousands of Barrels Per Day

2022 Gasoline Imports

2021 Gasoline Imports
Gasoline Price Signals and Import Response

Sources: CEC analysis of weekly import data from the Energy Information Administration and Los Angeles spot pipeline price for CARBOB gasoline from OPIS.

Prices shifted left 3 weeks to account for transport time.
Higher Product Tanker Costs

South Korea to Singapore, to USWC and to Australia TCE rates & South Korea VLSFO bunker rates

- Fuel oil bunker 0.5%S 380cst South Korea
- Tanker clean Yeosu to Singapore 35kt TCE non-scrubber USD/day
- Tanker clean Yeosu to Los Angeles 35kt TCE non-scrubber USD/day
- Tanker clean Daesan to Port Botany 35kt TCE non-scrubber USD/day

11/21/2022
California Foreign Gasoline Exports

Closing Remarks
### 2022 Gasoline Price Spikes - Factors

<table>
<thead>
<tr>
<th>Upward Pressure on Prices</th>
<th>Downward Pressure on Prices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Winter to summer gasoline transition</td>
<td>X Summer to winter gasoline transition</td>
</tr>
<tr>
<td>Lower-than-normal inventories</td>
<td>Higher-than-normal inventories</td>
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<tr>
<td>Lower-than-normal fuel imports</td>
<td>X Marine imports of fuel</td>
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<tr>
<td>Reduced refinery capacity</td>
<td>Decrease in fuel taxes</td>
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<tr>
<td>Unplanned refinery outages</td>
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<td>Planned maintenance delays</td>
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<td>New environmental fees</td>
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<td>Increase in fuel taxes</td>
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<tr>
<td>Changes in fuel regulations</td>
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</tbody>
</table>
Additional Information
California Station Counts by Ownership

- Independently Owned & Operated
- Franchisee/Leasee Owned & Operated
- Company Owned & Operated
- Hypermart
- Hypermart Fuel Sales

Source: CEC analysis of PIIRA data
U.S. Gasoline Sales Breakdown

Source: California Energy Commission analysis of Energy Information Administration data.

Dominated by rack sales.
- Declining DTW portion over time
California Gasoline Sales Breakdown

Source: California Energy Commission analysis of Energy Information Administration data.

DTW sales portion in California more than 5 times greater than U.S. average.
- Allows refiners to more directly control retail pricing
California Gasoline Market - Taxes

GASOLINE MOTOR FUEL TAXES BY STATE
(cents per gallon)

[Bar chart showing gasoline taxes by state as of January 1, 2022]

As of January 1, 2022
Thank You!