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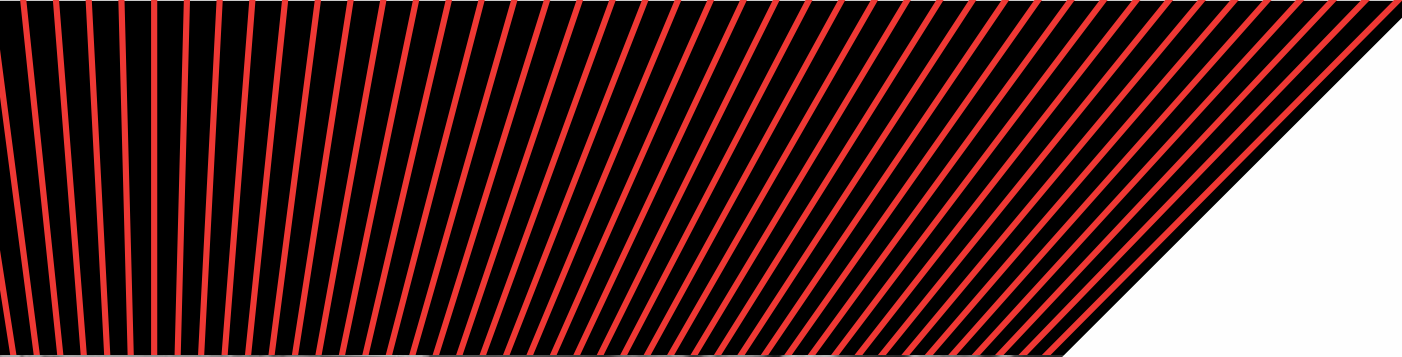
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**Solomon Report California Refiners' Cost and Margin Analysis,  
2000-2022**

Please see attached presentation.

*Additional submitted attachment is included below.*



# California Refiners' Cost and Margin Analysis, 2000–2022

Western States Petroleum Association

April 25, 2023

# Confidentiality Statement

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# Key Takeaways

- California (CA) Refiners have faced growing operating cost pressures since 2000
  - Personnel, maintenance, and materials costs have increased by 0.5 → 2x
- CA Refiners' margins – gross and net – have eroded since 2000 due to crude price and increased operating cost pressures
  - Crude market pricing impacts both refining margins and, depending on market dynamics, “pump prices” for consumers
- Crude is a global commodity and replacing CA crudes increases costs

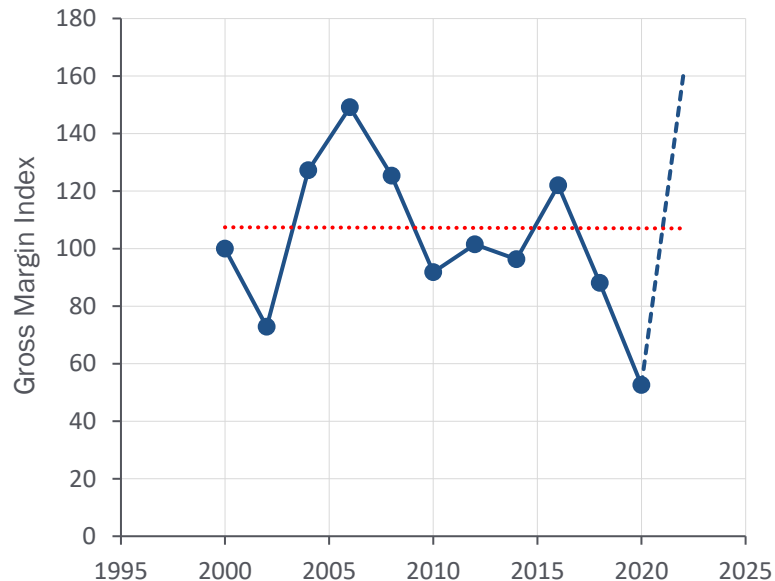
# About the Data

- Represents a composite of California refinery data from participants in the Solomon's Fuels Studies\*
- “Indexed” data = Composite Actuals in the study year divided by the Composite Actuals in 2000
- “Adjusted for Inflation” = Composite Actuals in each respective study year expressed in 2000 dollars using the US CPI data from:
  - <https://www.usinflationcalculator.com/inflation/consumer-price-index-and-annual-percent-changes-from-1913-to-2008/>
- Costs for blending ethanol and renewable diesel are not included as most of this blending is done outside the refinery gate
- The cost paid for raw materials includes delivery cost to the refinery
- The value received for products is determined as the products leave the refinery

\*Worldwide Fuels Refinery Performance Analysis (Fuels Study)

# CA Refiners' Gross Margin

Value of All Products Less Cost of Raw Materials

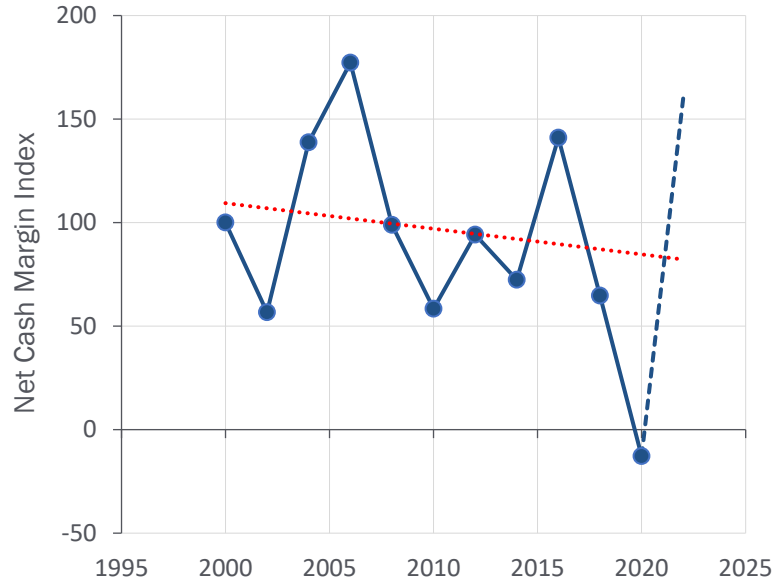


- CA Refiners' Gross Margin trend (red dashed line) is flat from 2000 → 2022
- Benefits in “up years” have been offset in the '10s by lower margins in subsequent years
- Some of the reasons “why” are described in the following slides

Gross Margin Index = Gross Margin in Year/Gross Margin in 2000, adjusted for inflation  
Blue Dashed line indicates preliminary 2022 value

# CA Refiners' Net Margin

Revenue Less Raw Materials' Costs and Total Operating Expense



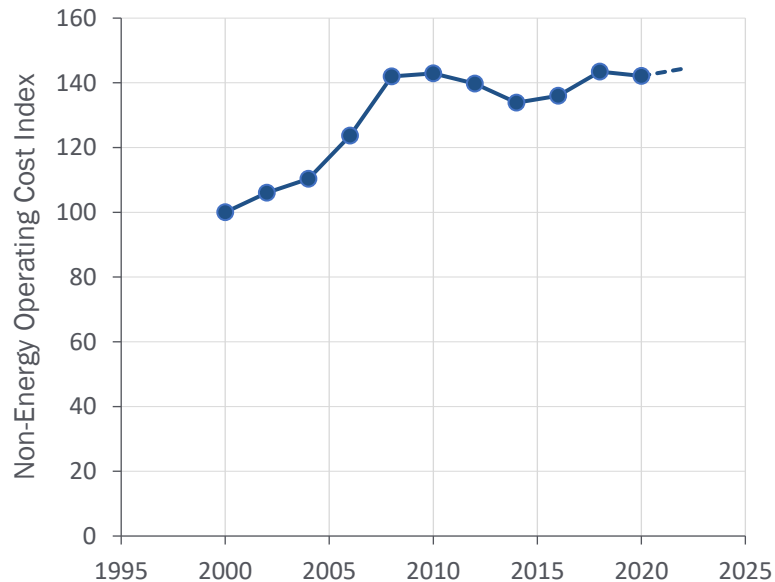
- CA Refiners' Net Margin trend (red dashed line) has declined from 2000 → 2022
- In 7 of 12 studies since 2000, Net Margin was less than 2000's Net Margin
- Net Margin was negative in 2020, before rebounding in 2022

Net Margin = NCM Index - NCM in Year/NCM in 2000, adjusted for inflation  
Blue Dashed line indicates preliminary 2022 value



# CA Refiners' Non-Energy Operating Costs

Total Operating Costs, Excluding Energy

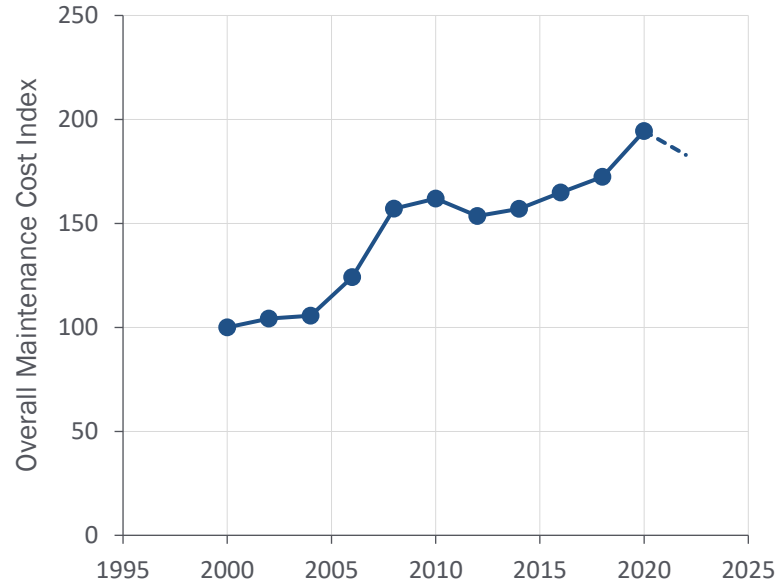


- Even after eliminating inflation, CA Refiners' Non-Energy Operating Costs have increased more than 40% since 2000
- Main cost elements include personnel, maintenance, taxes, chemicals and catalyst

Non-Energy Operating Cost Index = Non-Energy Operating Cost in Year/Non-Energy Operating Cost in 2000, adjusted for inflation  
Blue Dashed line indicates preliminary 2022 value

# CA Refiners' Maintenance Costs

## Maintenance Costs, Personnel and Materials

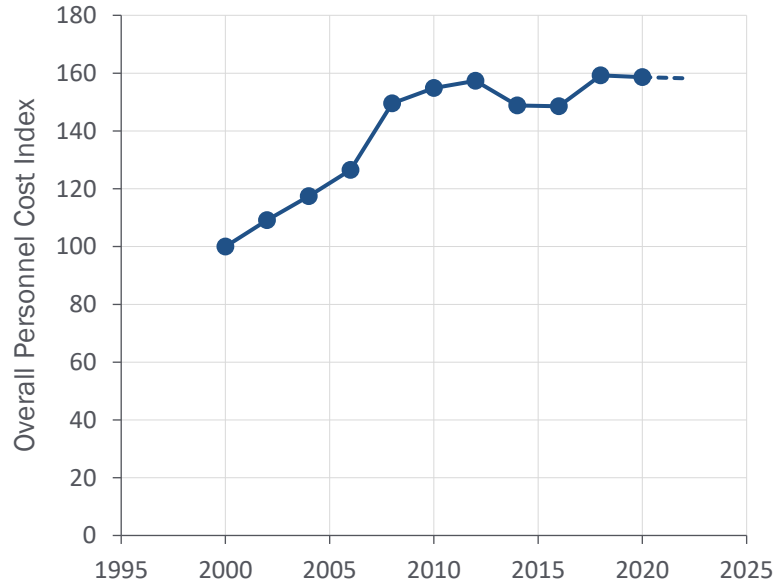


- Maintenance costs are a subset of the prior-slide's Non-Energy Operating Cost
- Even after eliminating inflation, Refinery maintenance costs have nearly doubled since 2000
- This cost includes the personnel and materials needed to inspect, repair, and replace equipment

Overall Maintenance Cost Index = Annualized Maintenance Costs in Year/Annualized Maintenance Cost in 2000, adjusted for inflation  
Blue Dashed line indicates preliminary 2022 value

# CA Refiners' Personnel Costs

## Total Personnel Costs

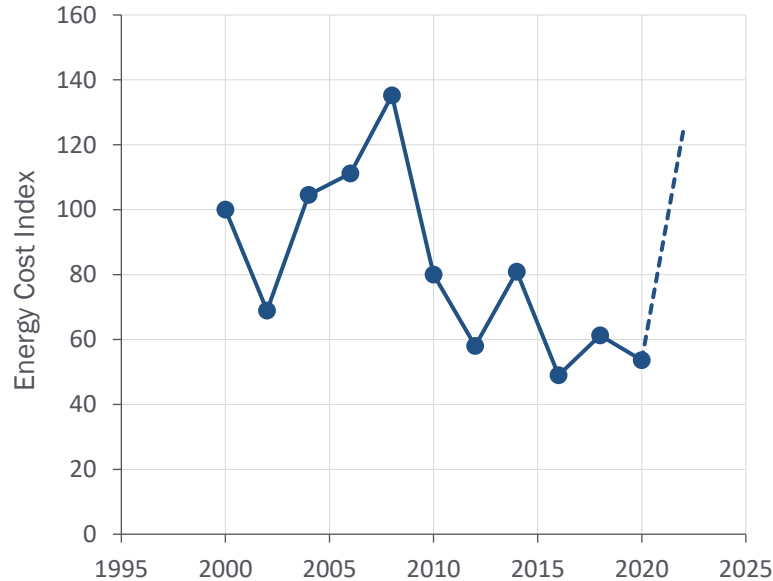


- Personnel costs are also a subset of Non-Energy Operating Cost
- Even after eliminating inflation, refinery personnel costs have increased by ~60% since 2000
- This cost includes company and contract personnel costs

Overall Personnel Cost Index = Personnel Cost in Year/Personnel Cost in 2000, adjusted for inflation  
Blue Dashed line indicates preliminary 2022 value

# CA Refiners' Energy Costs

## Natural Gas and Electricity Needed to Operate Refineries

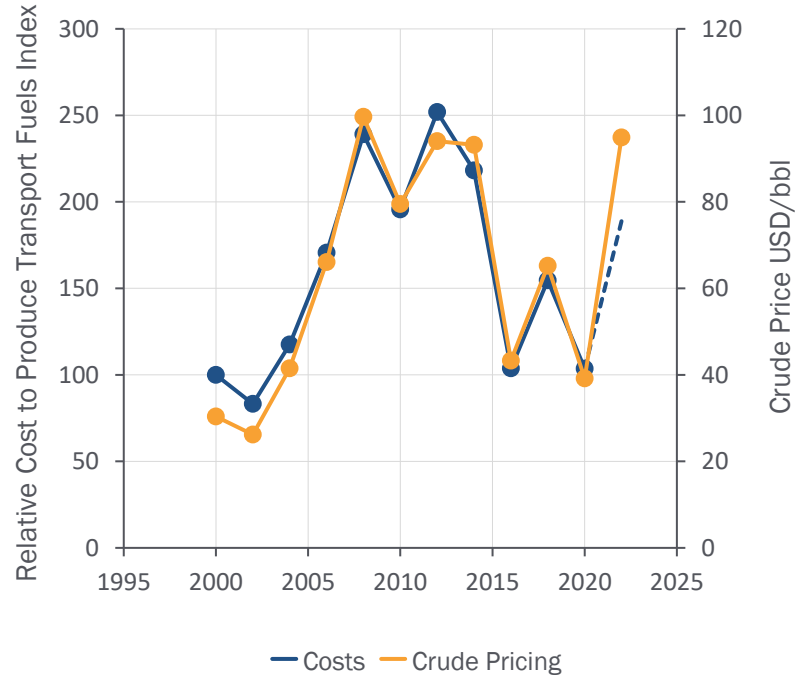


- With inflation's impacts excluded, energy costs are the one category of refinery operating expense that has not increased since 2000
- Refiners' have invested to improve energy efficiency
- This investment helped offset a portion of the non-energy cost increases

Energy Cost Index - Total Energy Costs in Year/Total Energy Cost in 2000, adjusted for inflation  
Blue Dashed line indicates preliminary 2022 value

# CA Refiners' Costs to Produce Transportation Fuels (Costs)

Costs to Produce Gasoline, Jet & Diesel

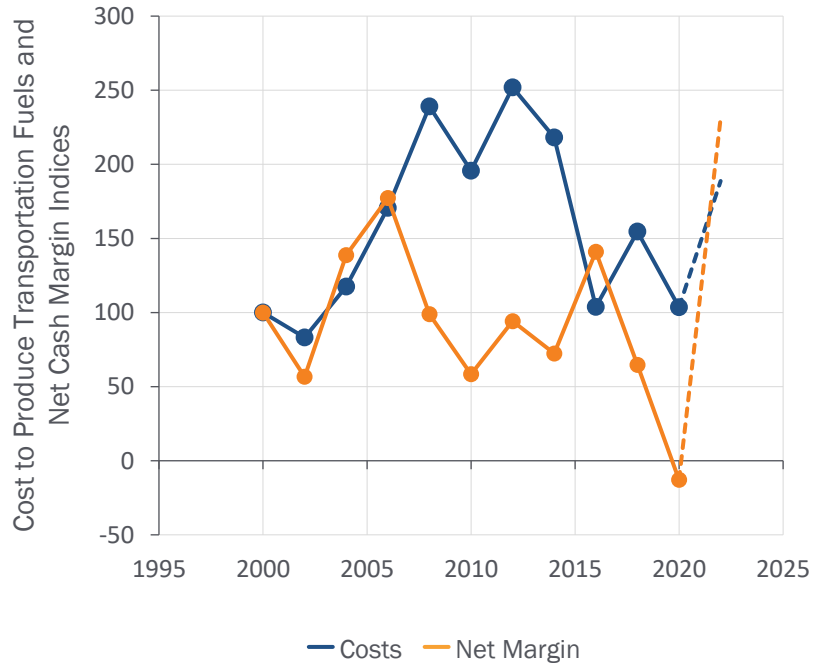


- Both crude pricing and operating costs impact a refiners' Costs
- This chart compares crude pricing to refiners' Costs, with inflation's impacts excluded
- Changes to refiners' Costs track closely with the industry standard crude pricing

Relative Cost to Produce Transport Fuels Index = Cost to Produce Transport Fuels in year/Cost to Product Transport Fuels in 2000, adjusted for inflation  
USD/bbl (United States dollars per barrel)  
Crude = West Texas Intermediate  
Blue Dashed line indicates preliminary 2022 value

# CA Refiners' Inability to Recoup Increases in Costs

Net Margins vs Costs to Produce Transportation Fuels (Costs)

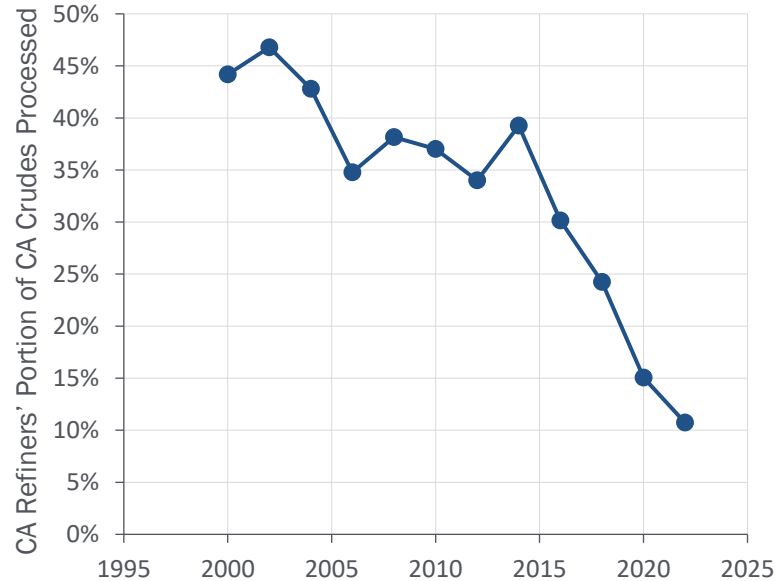


- Refiners are often unable to recoup the increases in their Costs
- For example, margins remained low from 2008–2014 as crude prices were consistently high (prior slide)
- The 2016 margin improvement was linked directly with the steep crude price decline
- 2020's Net Margins were negative despite the Costs being at ~parity with 2000's costs
- Costs and margins rebounded in 2022

Values are indexed to NCM and Costs to Produce Transport Fuels in 2000 and adjusted for inflation

# California Crudes' Utilization has Declined

Portion of Crudes Processed that were Produced in California



- The portion of CA crudes processed by CA refiners has declined from ~45% in the early 2000's to ~10% in 2022
- Crude quality impacts aside, Costs will tend to increase when importing more crudes to replace domestic California crude (see next slide for explanation)

# Imported Versus California Crudes

- Crude is a global commodity but importing crude increases costs
- For example, a California refiner may be able to source a similar-quality barrel of crude from other parts of the world to replace San Joaquin Valley (SJV)
- While the price of crude in these other locations may be ~ the same as SJV in California, the logistics costs are very different\*
  - SJV via pipeline to California refiners is ~1 USD/bbl (lowest costs & risk vs waterborne)
  - Crude from the North Slope of Alaska ~5 USD/bbl
  - Crude from Brazil via ship ~4–5 USD/bbl
  - Crude from the Middle East via ship ~5–6 USD/bbl
- Importing replacement crudes increases inbound logistics costs and generally increases refiners' costs

\* Based on industry general marine freight costs



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  - Crude market pricing impacts both refining margins and, depending on market dynamics, “pump prices” for consumers
- Crude is a global commodity and replacing CA crudes increases costs

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