Overview, Background, Methodologies and Outlook – Crude Oil & Pipeline Infrastructure

Joint Transportation and IEPR Committee Workshop

Transportation Fuel Infrastructure Issues

Sacramento, California

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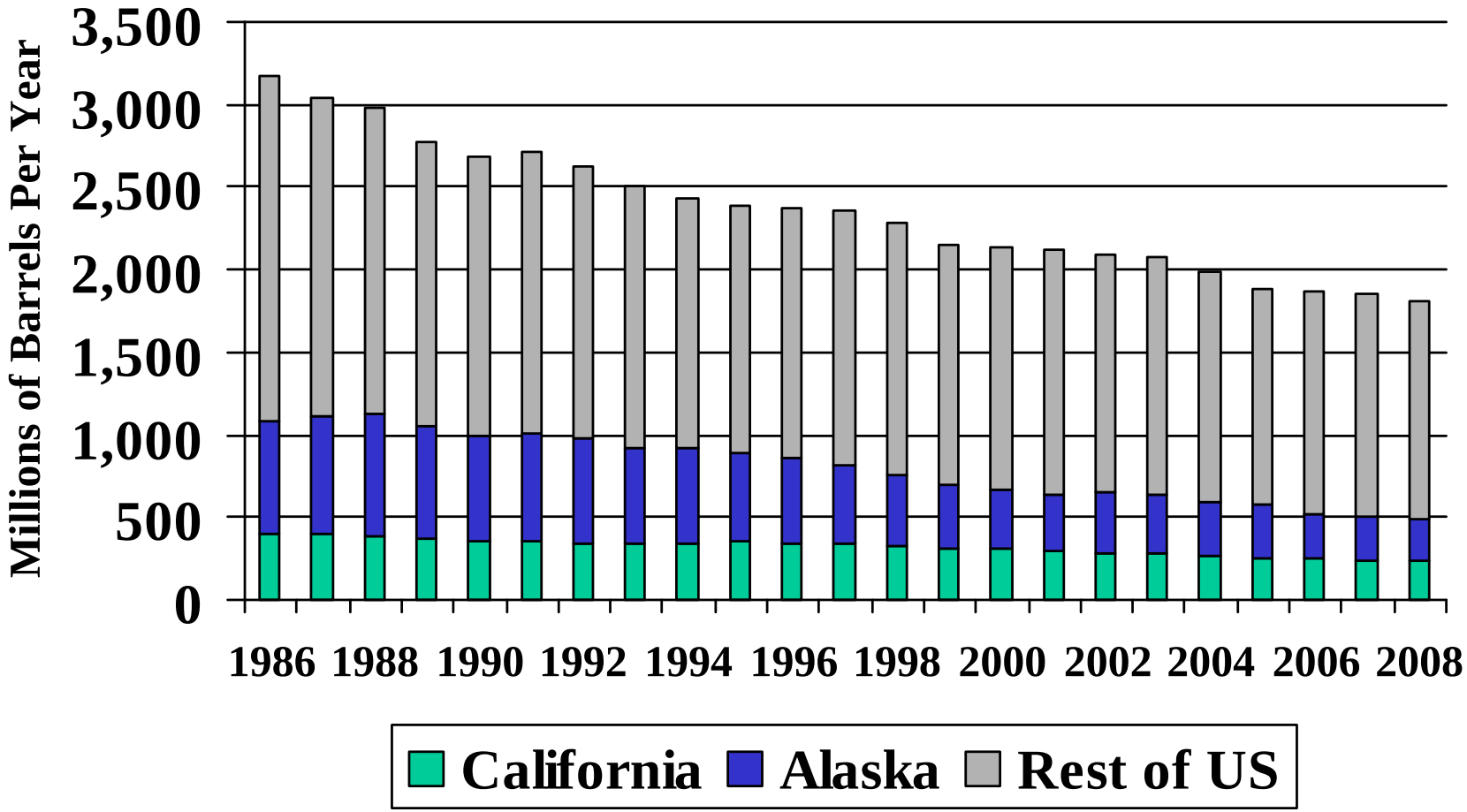
Fuels and Transportation Division

California Energy Commission

Crude Oil Outlook

United States Oil Production
1986 to 2008



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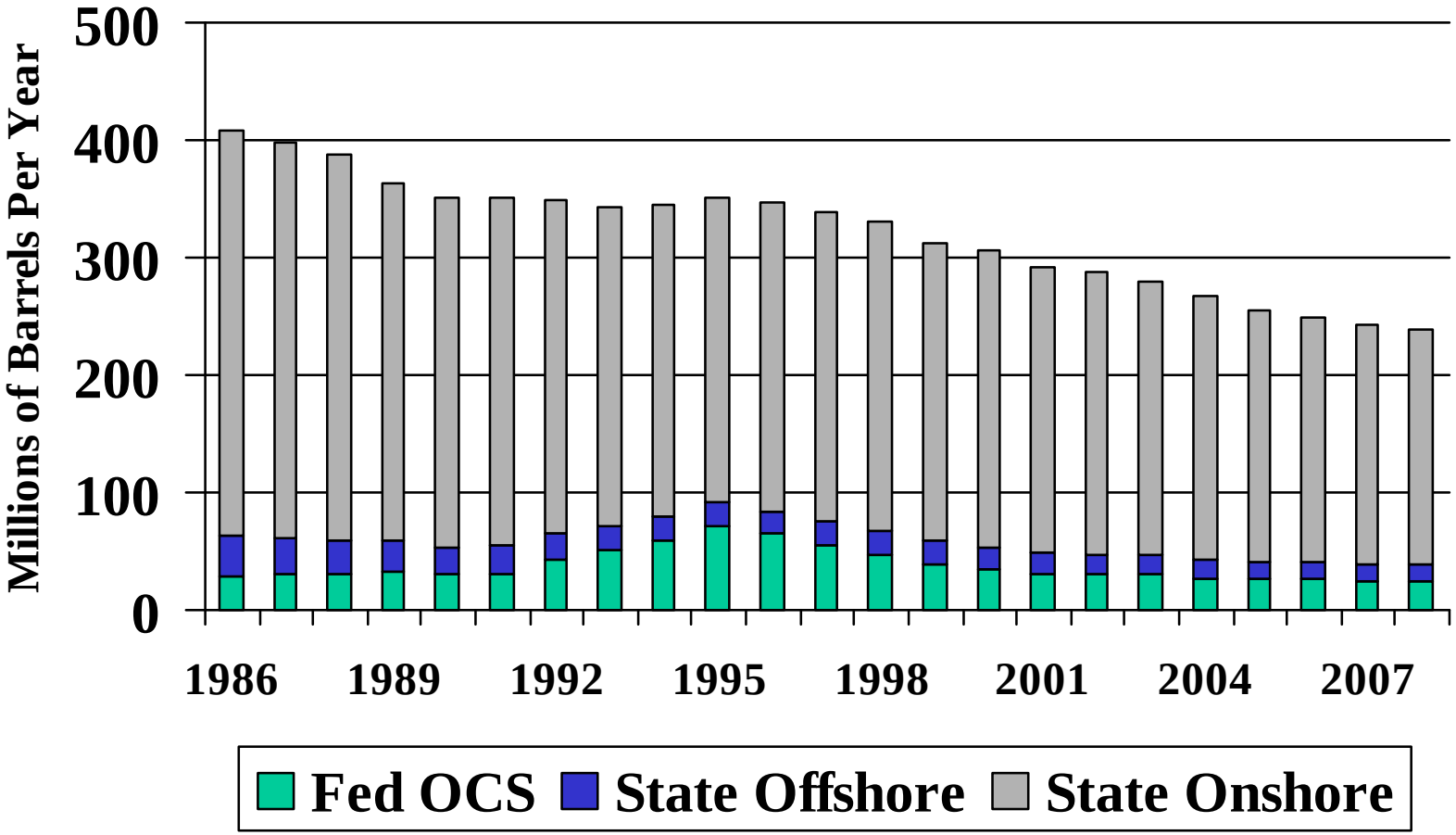
California Oil Production
1986 to 2008



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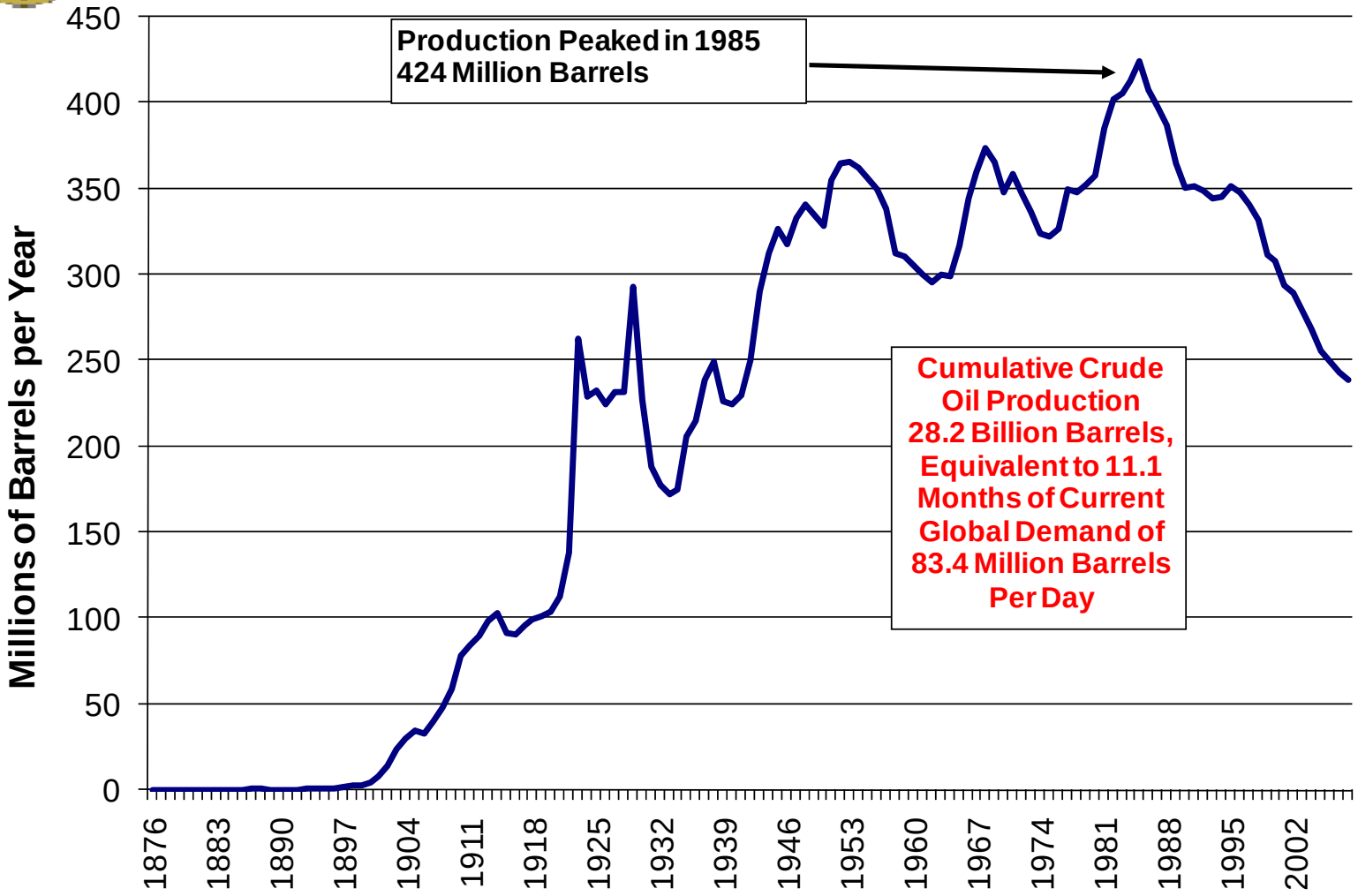
Historical California Oil Production 1876-2008



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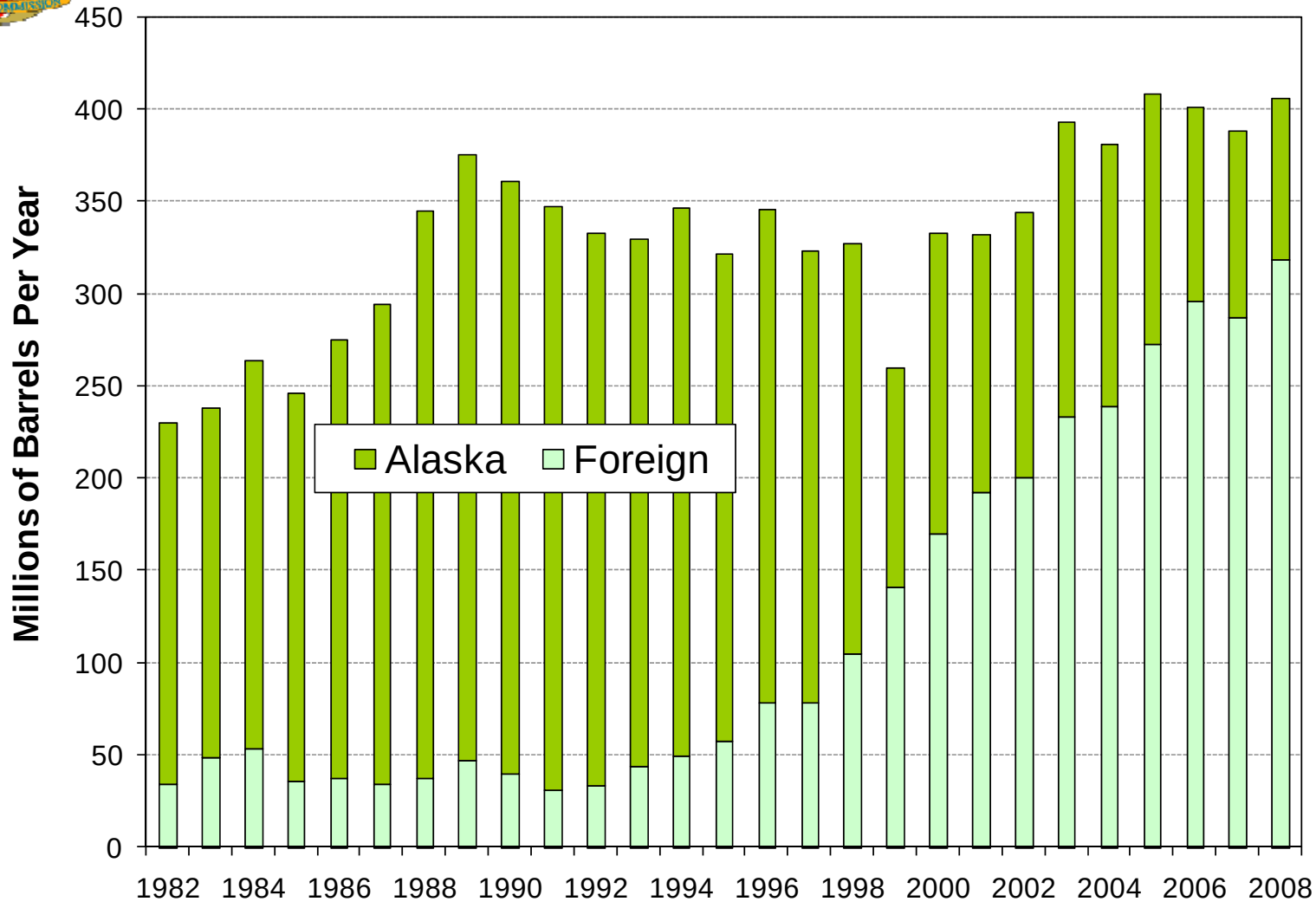
Recent Crude Oil Production Trends

- Global crude oil production 31.7 billion barrels in 2008, roughly 86.5 million barrels per day
- 2008 U.S. crude oil production 1.81 billion barrels or 4.96 million barrels per day
- CA crude oil production in 2008 was 239 million barrels or 652 thousand barrels per day
- California crude oil production has declined 41% since 1986, Alaska 63% and the rest of U.S. by 36%
- Crude oil production decline expected to continue, despite higher prices and significant drilling activity
- Rate of decline has eased over the last couple of years compared to longer trends for California
- Declining domestic oil production will need to be replaced with increased imports of crude oil from foreign sources

Growing Volume of Foreign Imports



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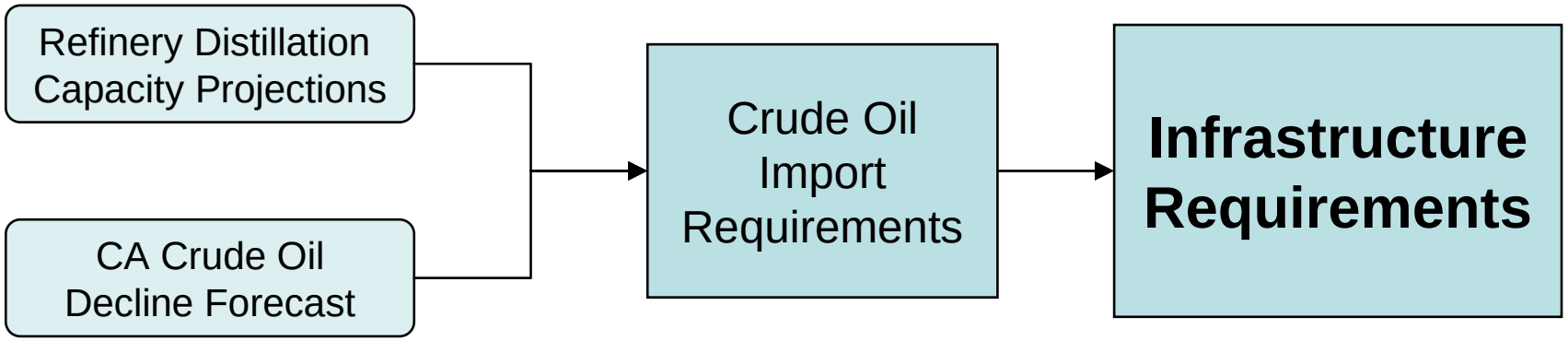
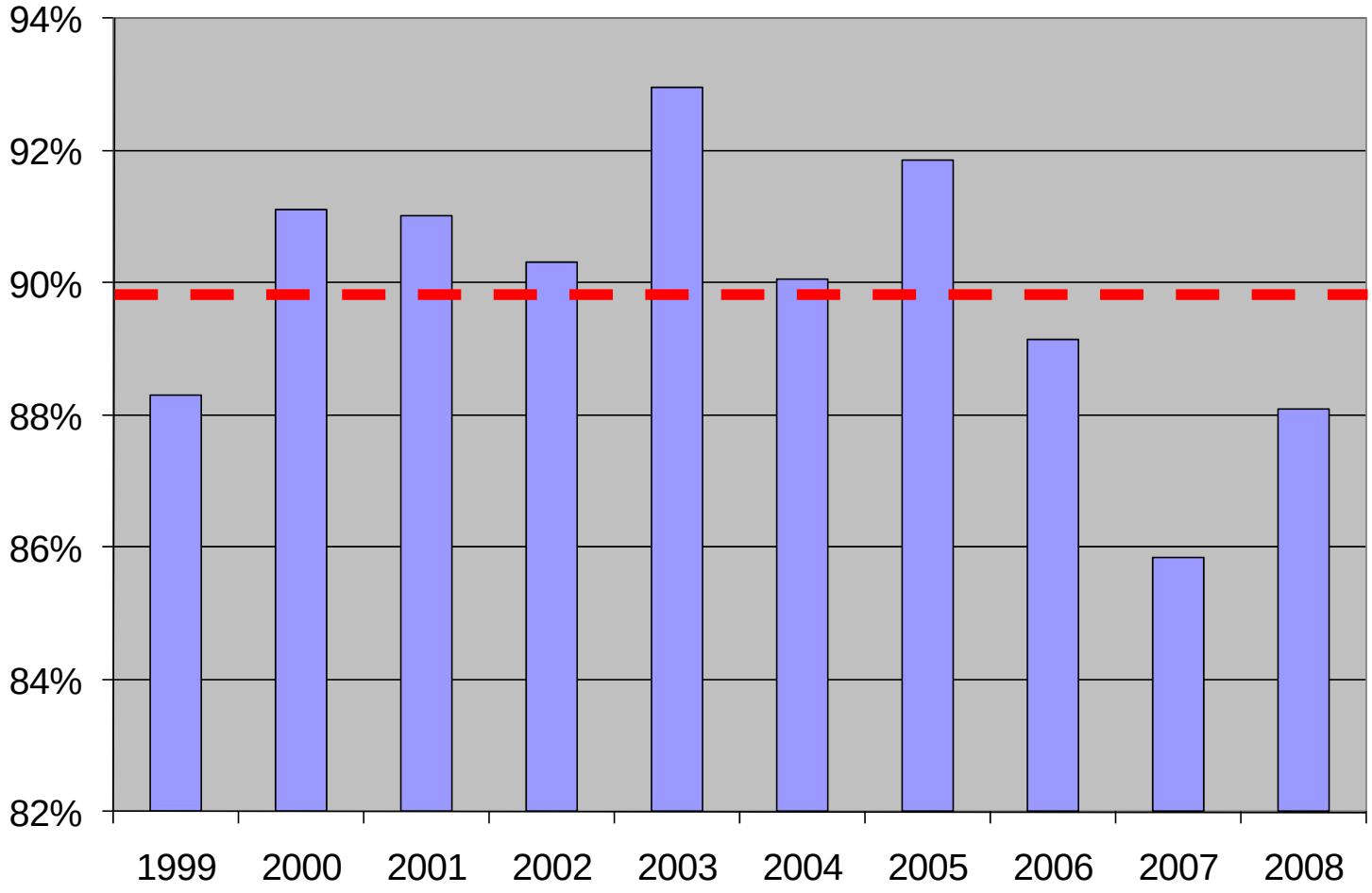
California Crude Oil Imports – Historical

- Imports of crude oil have increased as California crude production declined since the peak in 1985
- Total imports of crude oil from Alaska and foreign sources have increased 24% between 1998 and 2008
- Imports of Alaska crude oil declined a total of 60% between 1998 and 2008
- The largest increase has been for foreign crude oil imports
  - 11.7% per year increase
  - Over 3 times greater compared to levels of 1998
- What is the outlook for crude oil imports for California and what are the primary factors influencing the forecasts?

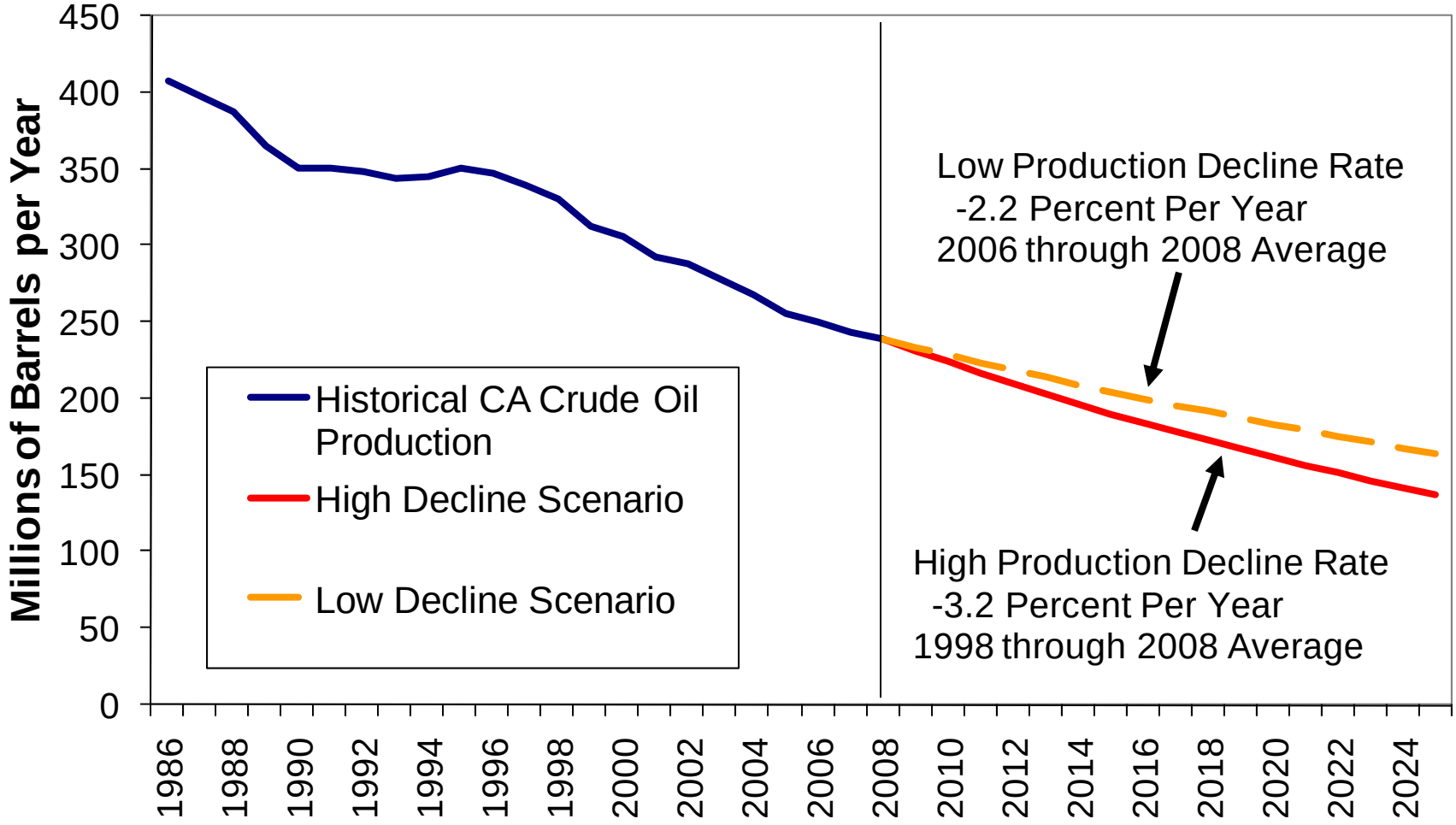
Crude Oil Import Forecast - Approach



California Refinery Utilization Rates



California Crude Oil Production Decline Forecast 2009-2028



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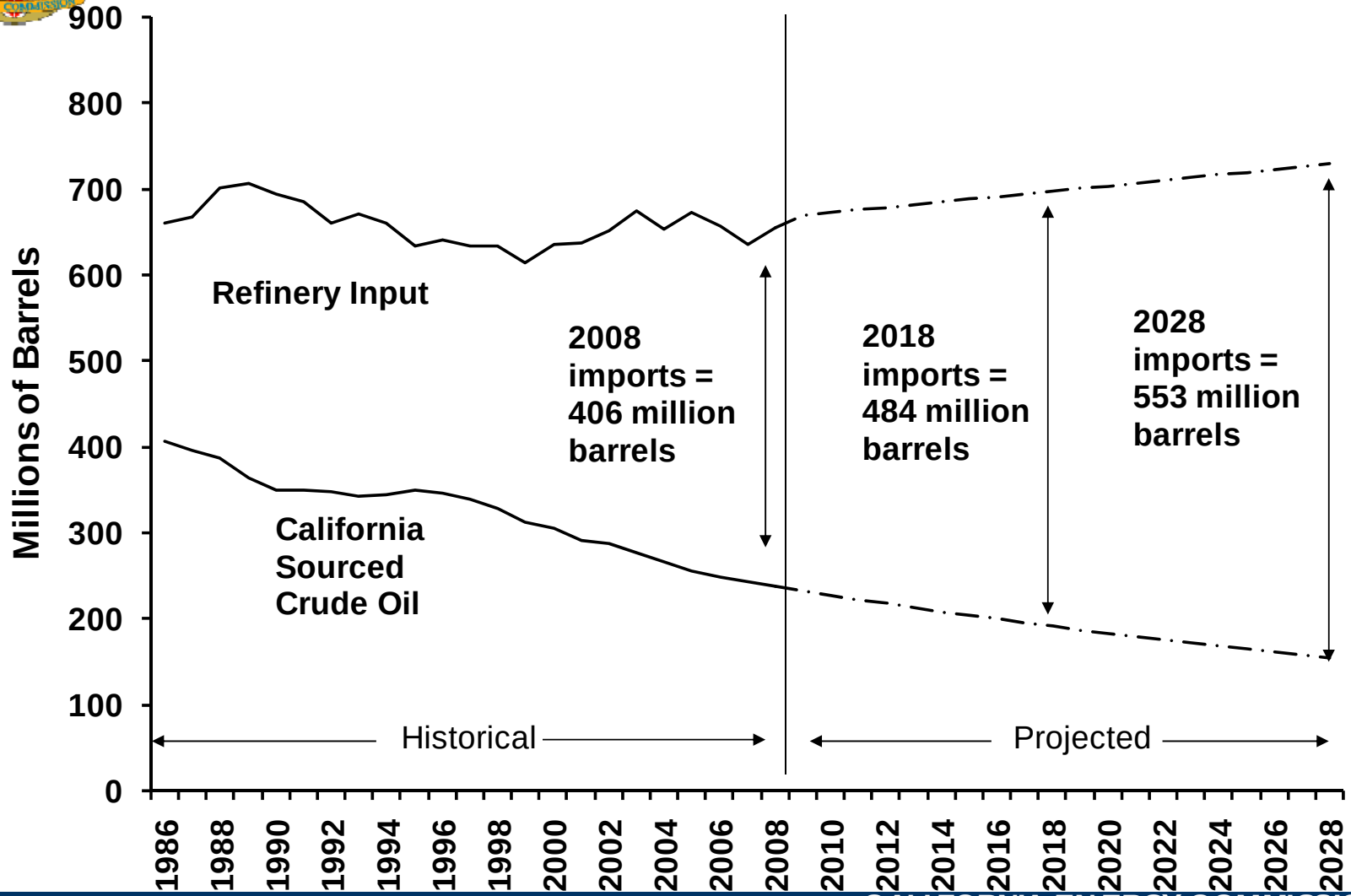
California Crude Oil Imports – Low Forecast



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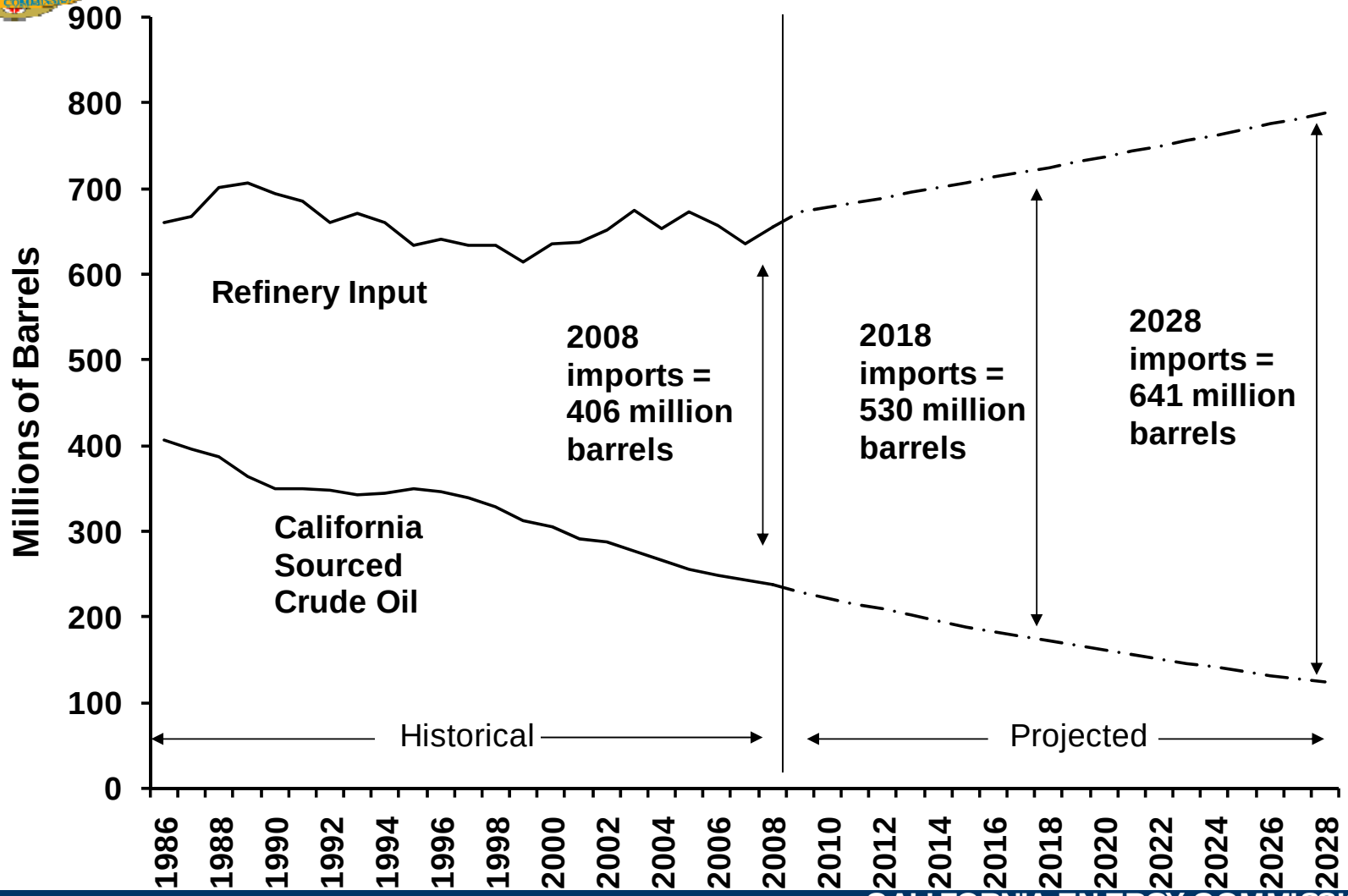
California Crude Oil Imports – High Forecast



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California Oil Imports – Preliminary Forecast

- Crude oil imports are forecast to increase in California due to:
  - Continuing decline of local crude oil production
  - Gradual expansion of the capacity of California refineries to process crude oil – referred to as "refinery creep"
- The lower estimate for increased crude oil imports assumes that crude oil production declines at a slower pace (2.2% per year) & expansion of distillation capacity is at a smaller rate (0.45% per year)
- The higher estimate for incremental crude oil imports assumes that the production of California crude oil declines at a steeper pace (3.2% per year), while refiners expand distillation capacity at a higher rate (nearly 0.84% per year)

Crude Oil Imports – Entire State

Incremental California Crude Oil Imports - Millions of Barrels				
Distillation Capacity Growth Rate	Low Rate of Crude Oil Decline - 2.2%		High Rate of Crude Oil Decline - 3.2%	
	2018	2028	2018	2028
0.45 Percent	78	147	97	176
0.84 Percent	106	206	125	236

- Waterborne crude oil imports forecast to increase by 19 to 31% by 2018 & 36 to 58% by 2028, compared to 2008
- Southern California is forecast to receive 60% of the oil imports
- Even if refinery capacity remained fixed, oil imports would increase by 12 to 16% by 2018 and 21 to 28% by 2028 due to declining crude oil production in California

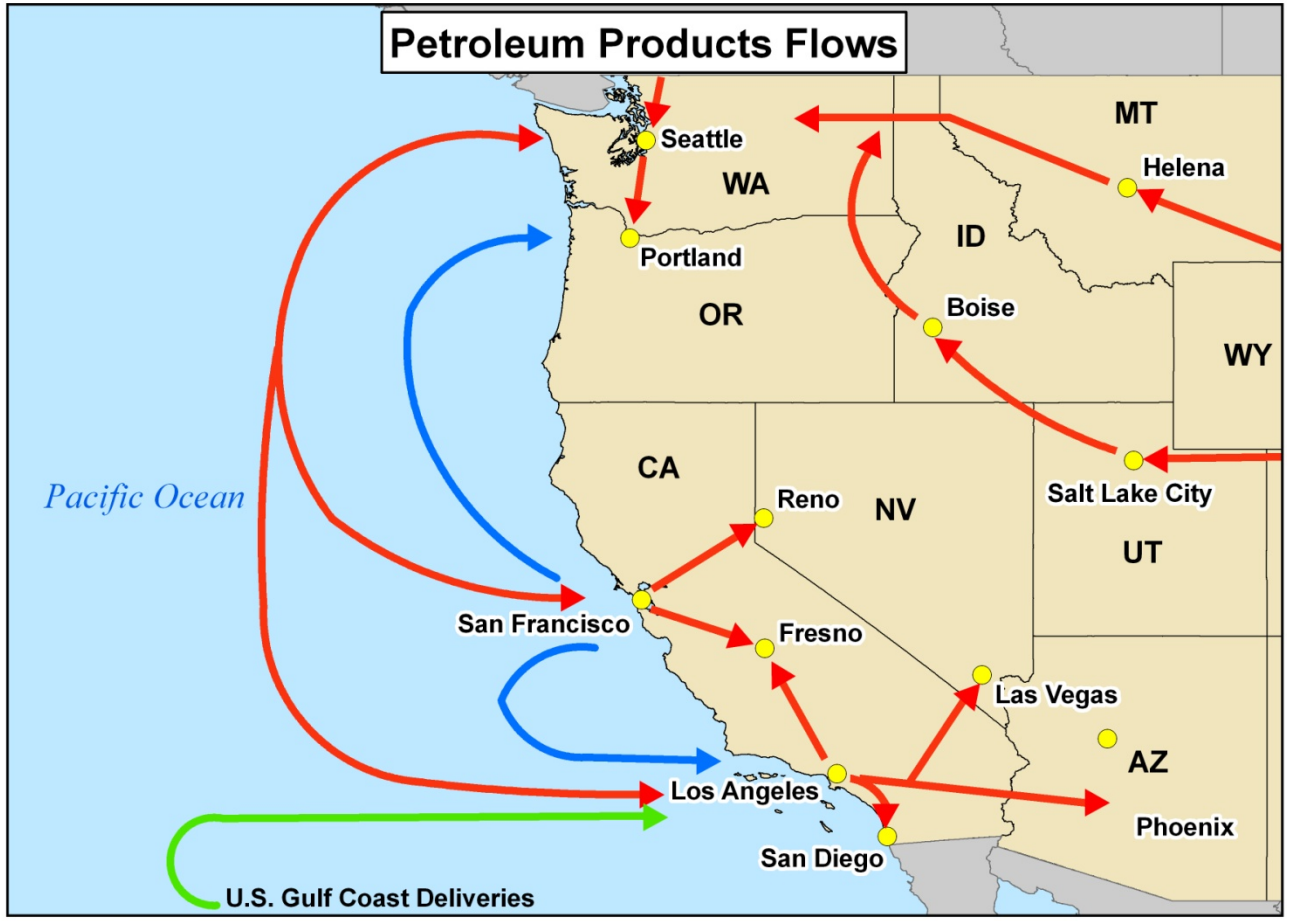
Crude Oil Issues

- Will crude oil production decline be halted or even reversed due to technology advances or expanded access to offshore reserves?
- Will the crude oil production decline rate accelerate due to operational changes from new regulations such as AB32?
- Will new crude oil import facilities be completed in time to maintain an adequate supply of crude oil to California's refineries?
- Will refinery expansion of distillation capacity continue or will CA refining capacity decline due to changes in demand and imposition of new regulations?

Crude Oil Infrastructure Speakers

- Dileep Sirur - Baker & O'Brien
- Bob Poole - Western States Petroleum Association (WSPA)
- Evelyn Kahl - Alcantar & Kahl, LLP
- Rock Zierman - CA Independent Producers Assoc. (CIPA)
- Dominic Ferrari - Plains All American
- Seth Jacobson - Center for Advanced Studies on Terrorism

Interstate Dependence for Transportation Fuel Supply



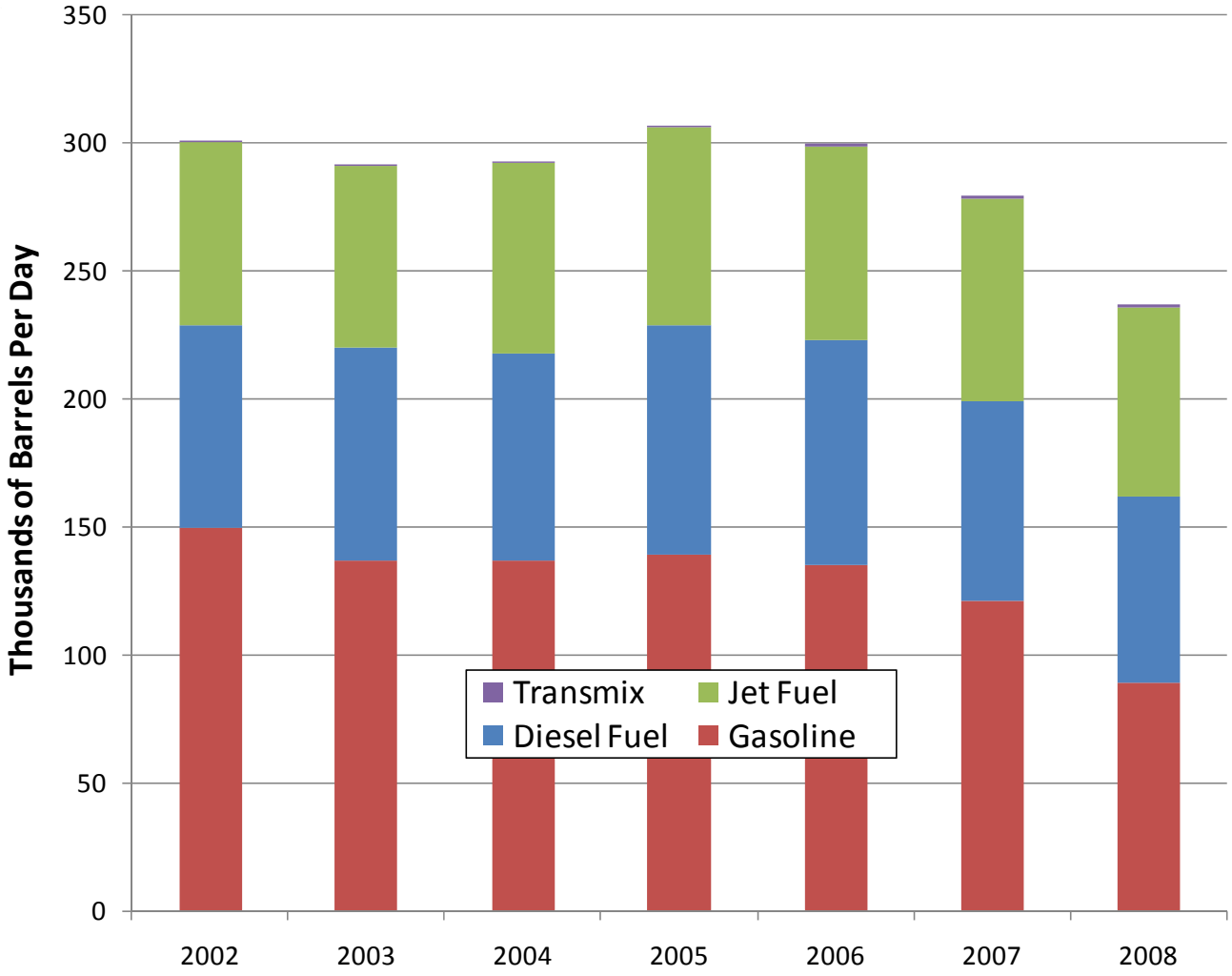
Source: Argonne National Laboratory

Southwest Regional Fuel Market

Factors - Demand Growth In AZ and NV

- Although the demand for transportation fuels in Arizona and Nevada is less than that of California, the growth rates over the last couple of years had been higher – until recent demand growth declines
- Nevada receives nearly 100 percent of its fuel via petroleum product pipelines originating in California
- Arizona currently receives less than 35 percent of their fuel from California, down from 62 percent in 2002
- Regional drop in transportation fuel demand also resulted in lower pipeline export volumes

Increased Indirect Supply for California



Growth of Pipeline Exports

- Future demand resurgence and growth in AZ and NV will be achieved primarily through increased quantities of pipeline exports
- The quantity of additional pipeline exports of transportation fuels will vary for Arizona depending on the portion of incremental supplies that originate from refineries in West Texas
  - Current ratio of transportation fuels exported to AZ from West Line assumed constant over the forecast period
- The construction of a new petroleum product pipeline from Utah to Las Vegas will be assessed – could reduce imports through California

Petroleum Pipelines & Renewable Fuel

- Kinder Morgan moves ethanol and biodiesel through some portions of their common carrier systems, outside of CA
- Ability to transport renewable fuels in mixed petroleum product pipeline systems has potential to decrease requirements for additional terminal infrastructure
- However, opportunities for renewable fuel shipments through petroleum product pipeline systems in California may be less likely due to:
  - Potential corrosion & contamination issues for ethanol
  - Potential contamination of jet fuel from biodiesel

Petroleum & Renewable Pipeline Speakers

- Duane Yantorno - AZ Department of Weights & Measures
- Steve Sokolsky - CalStart