California Crude Oil Import & Infrastructure Forecast

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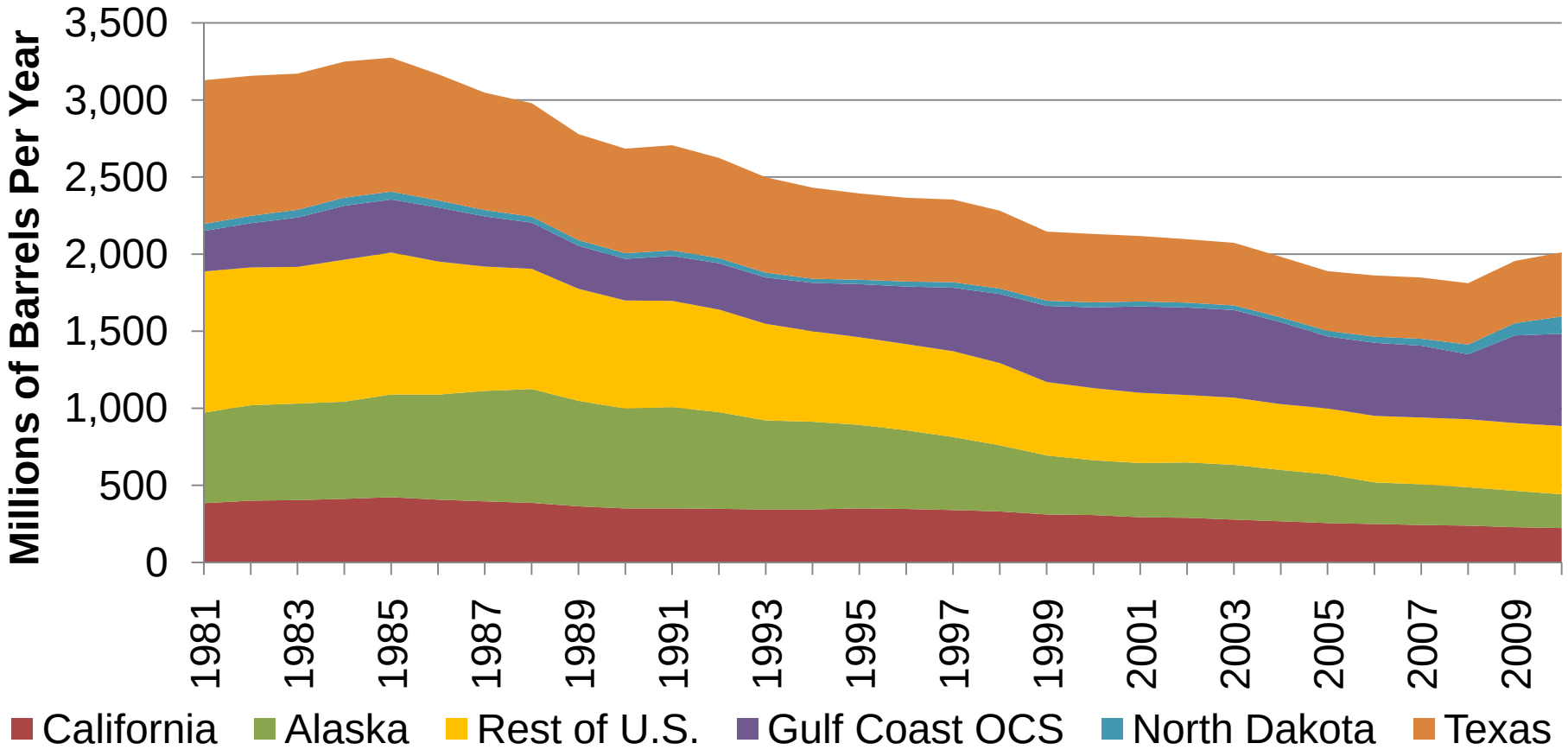
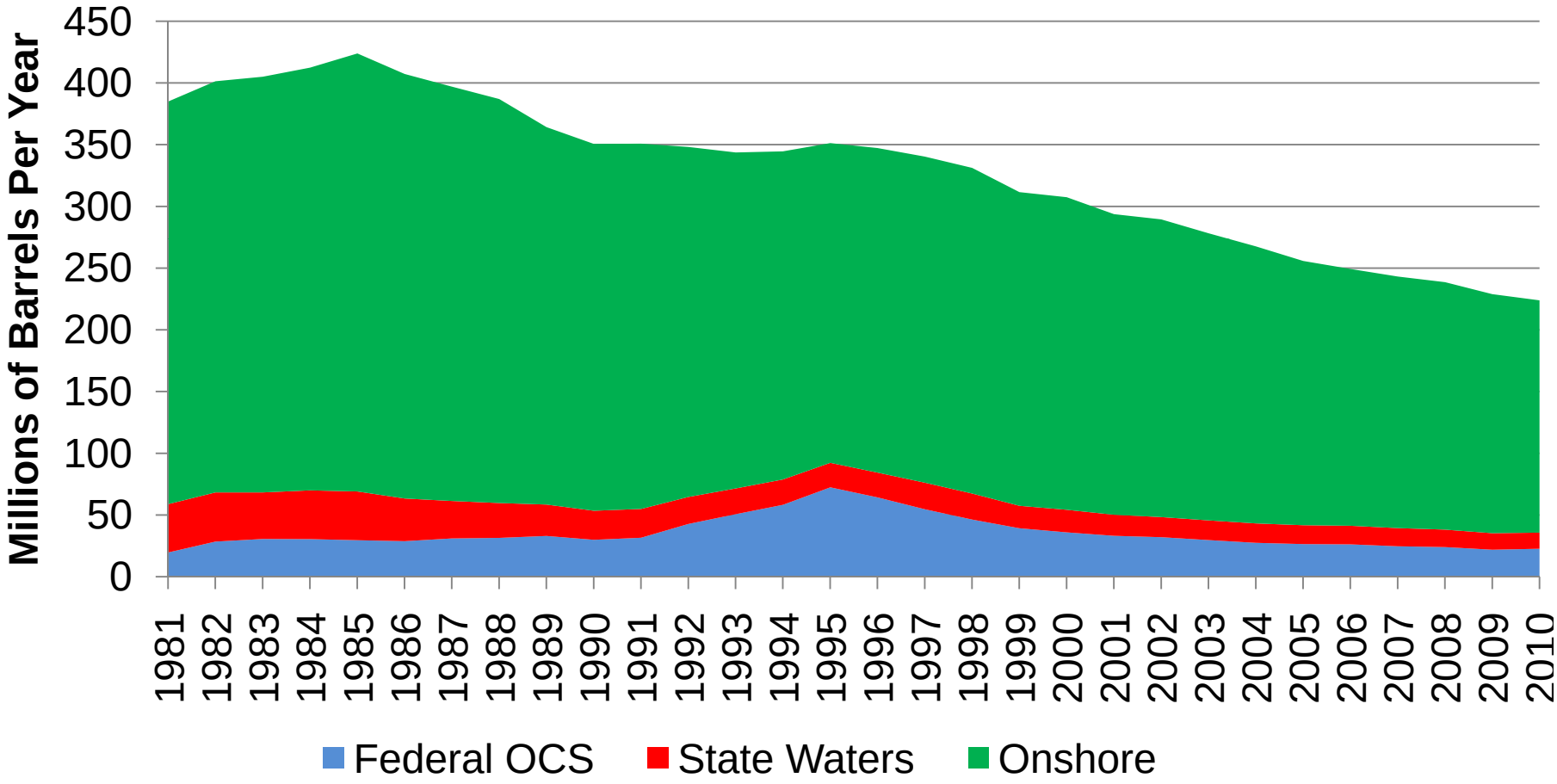
United States Crude Oil Production 1981 to 2010



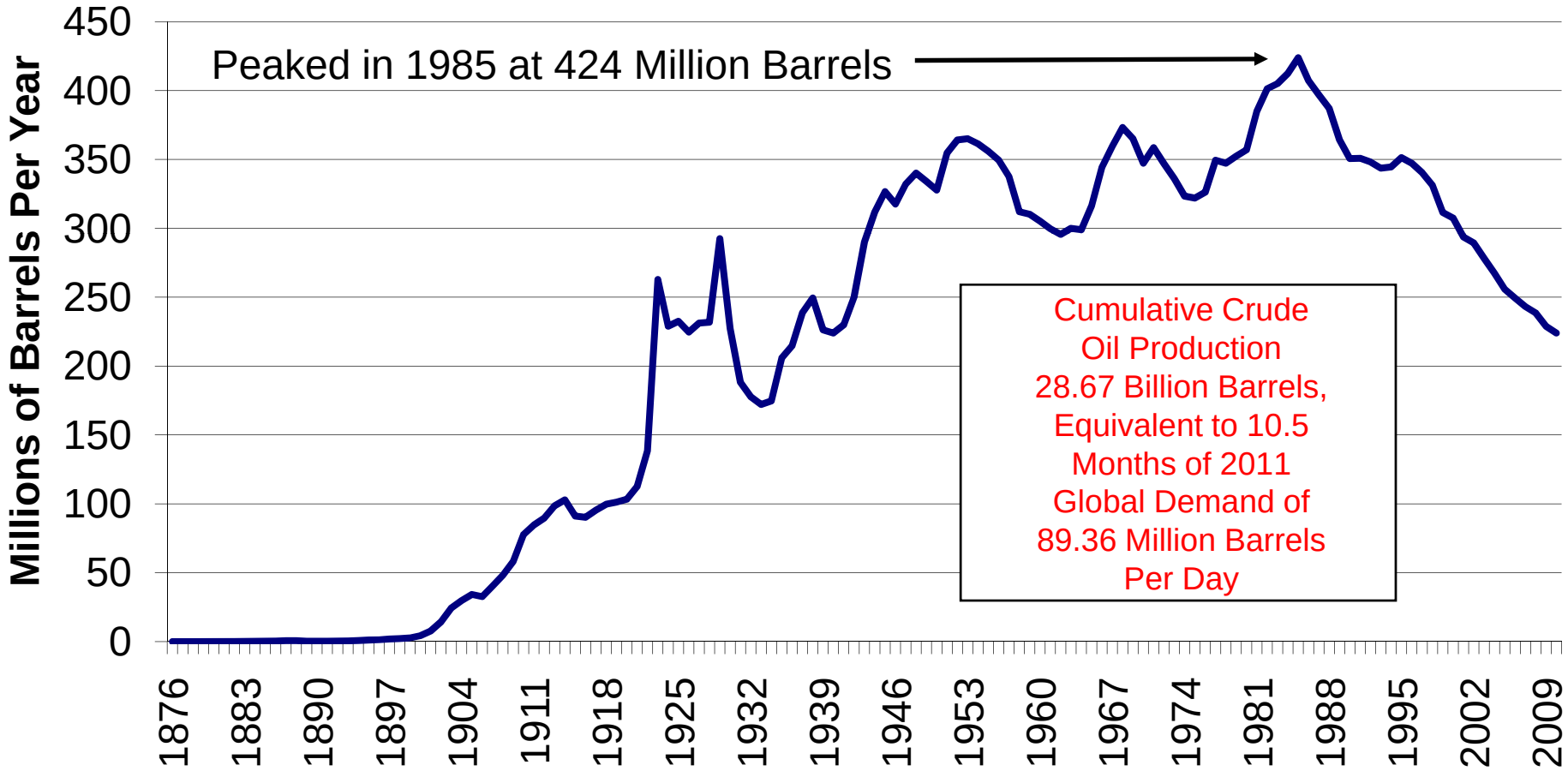
Source: Source: California Division of Oil, Gas, and Geothermal Resources, Alaska Department of Revenue, and EIA

California Crude Oil Production 1981 to 2010



Source: Source: California Division of Oil, Gas, and Geothermal Resources

California Crude Oil Production 1876-2010

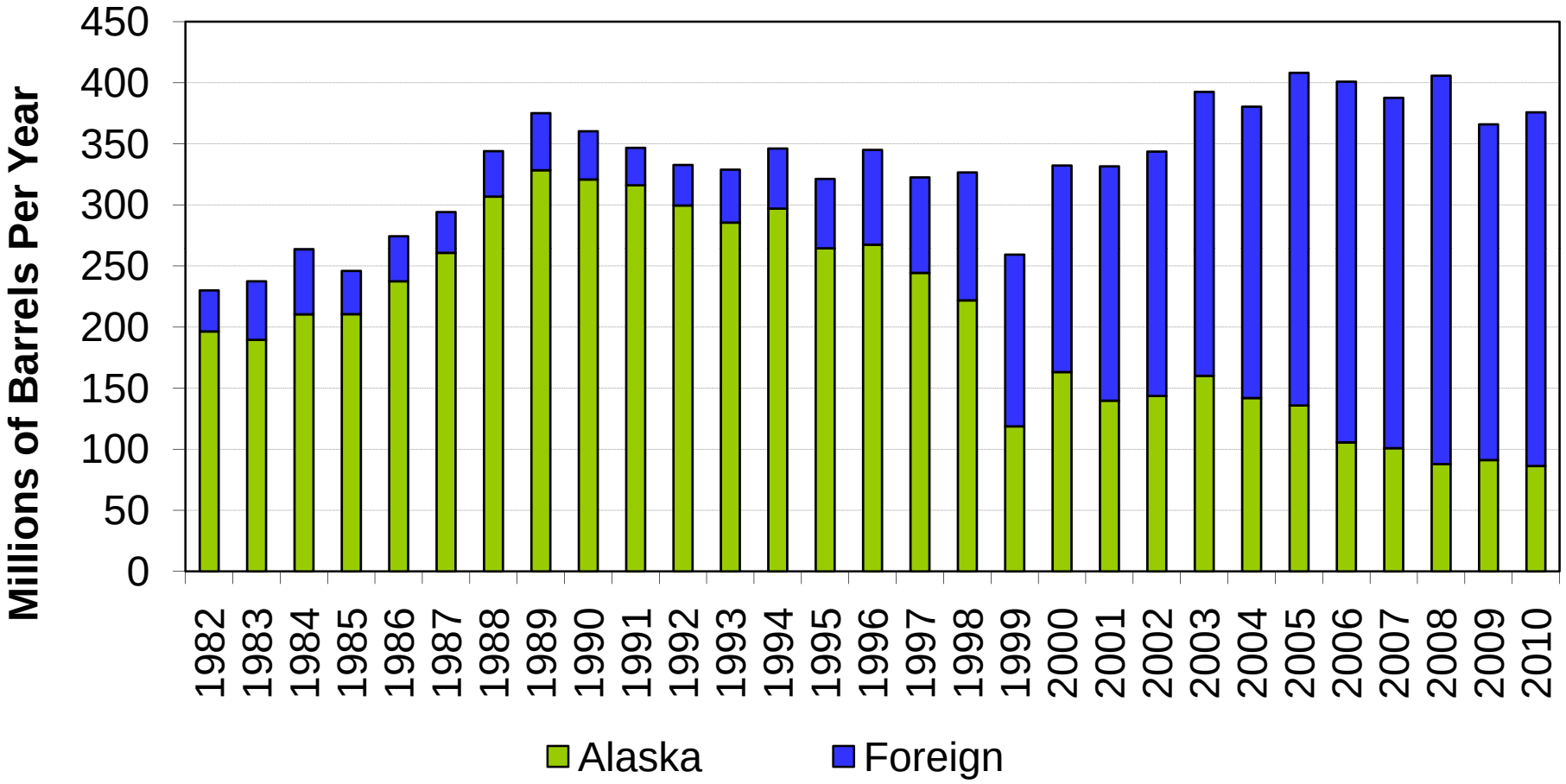


Source: California Division of Oil, Gas, and Geothermal Resources and California Energy Commission

Crude Oil Production Trends

- Global crude oil production 2010 averaged roughly 86.1 million barrels per day.
- 2010 U.S. crude oil production was roughly 2 billion barrels or 5.51 million barrels per day.
- CA crude oil production in 2010 was 223.92 million barrels or 613 thousand barrels per day.
- California crude oil production is expected to continue to decline, despite higher prices and increases in drilling activity.
- U.S. domestic oil production has increased the last two years, but staff believes increased imports of crude oil from foreign sources will be necessary to meet domestic demand.

California Crude Oil Imports 1982 to 2010

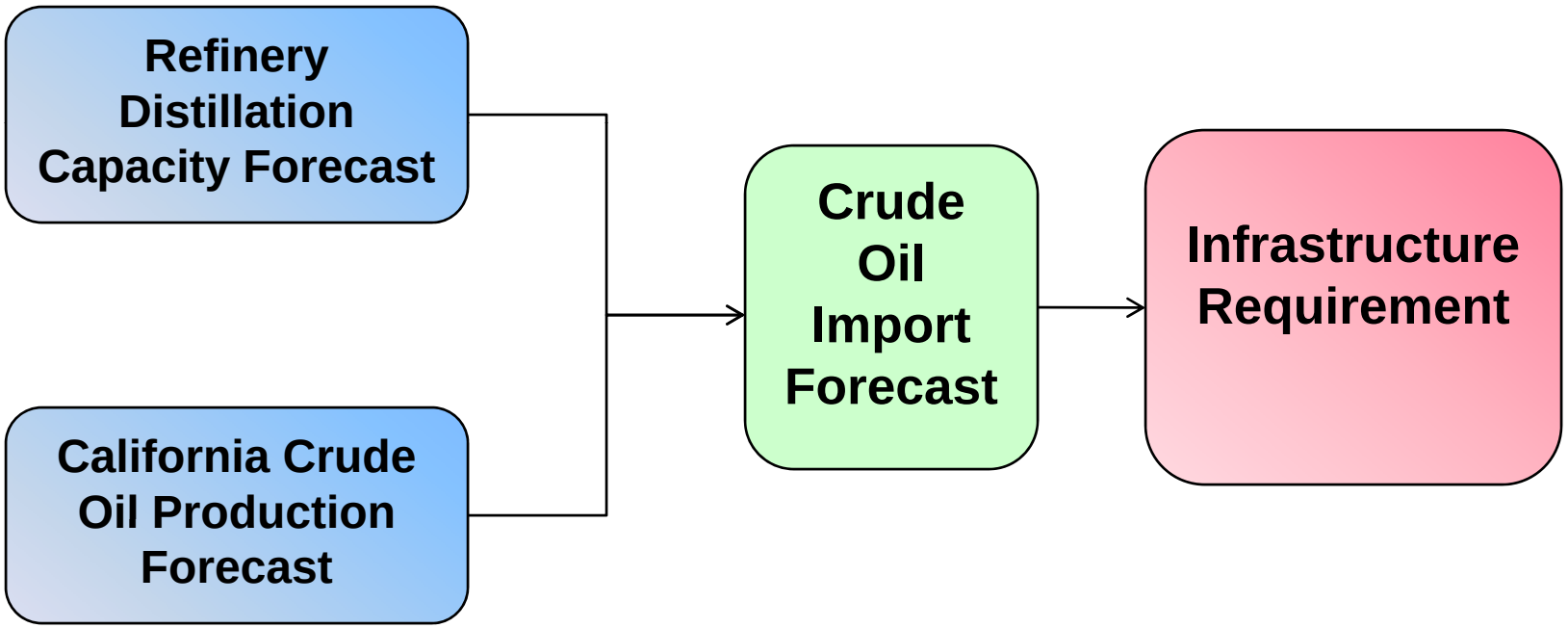


Source: Annual crude oil supply data from the PIIRA database

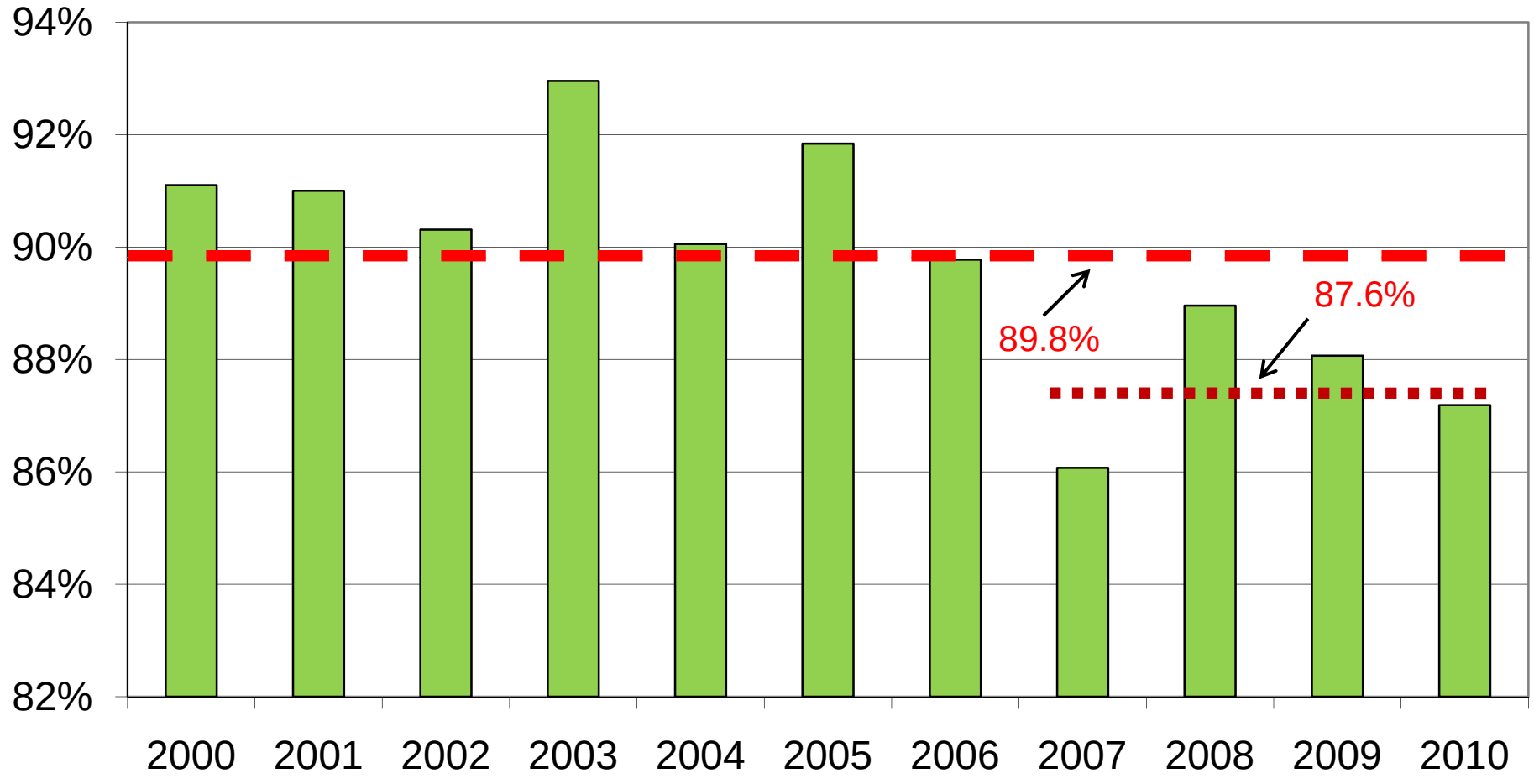
California Crude Oil Imports – Historical Trends

- Total imports of crude oil have increased by 13% between 2000 and 2010, at an annual rate of 1.2%.
- Imports of Alaska crude oil declined a total of 47% between 2000 and 2010, at an annual rate of 6.2%.
- Foreign crude oil has substituted for lower CA and Alaskan production
  - 71% increase between 2000 and 2010, at an annual rate of 5.5%
  - Foreign imports peaked in 2008 at 318 million barrels
  - In 2010, foreign imports totaled 289 million barrels

Crude Oil Import Forecast – Approach

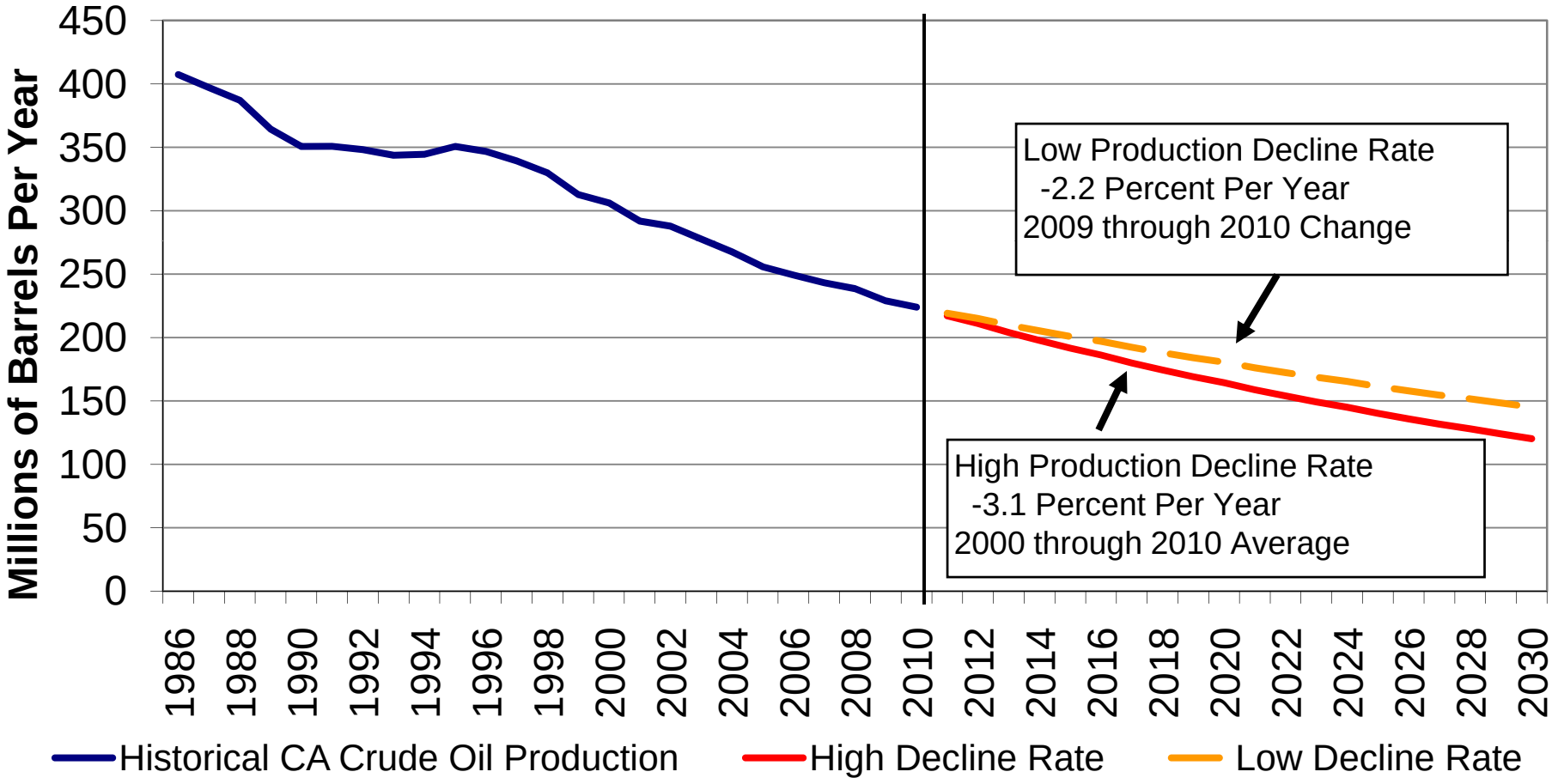


California Refinery Utilization Rates 2000 - 2010



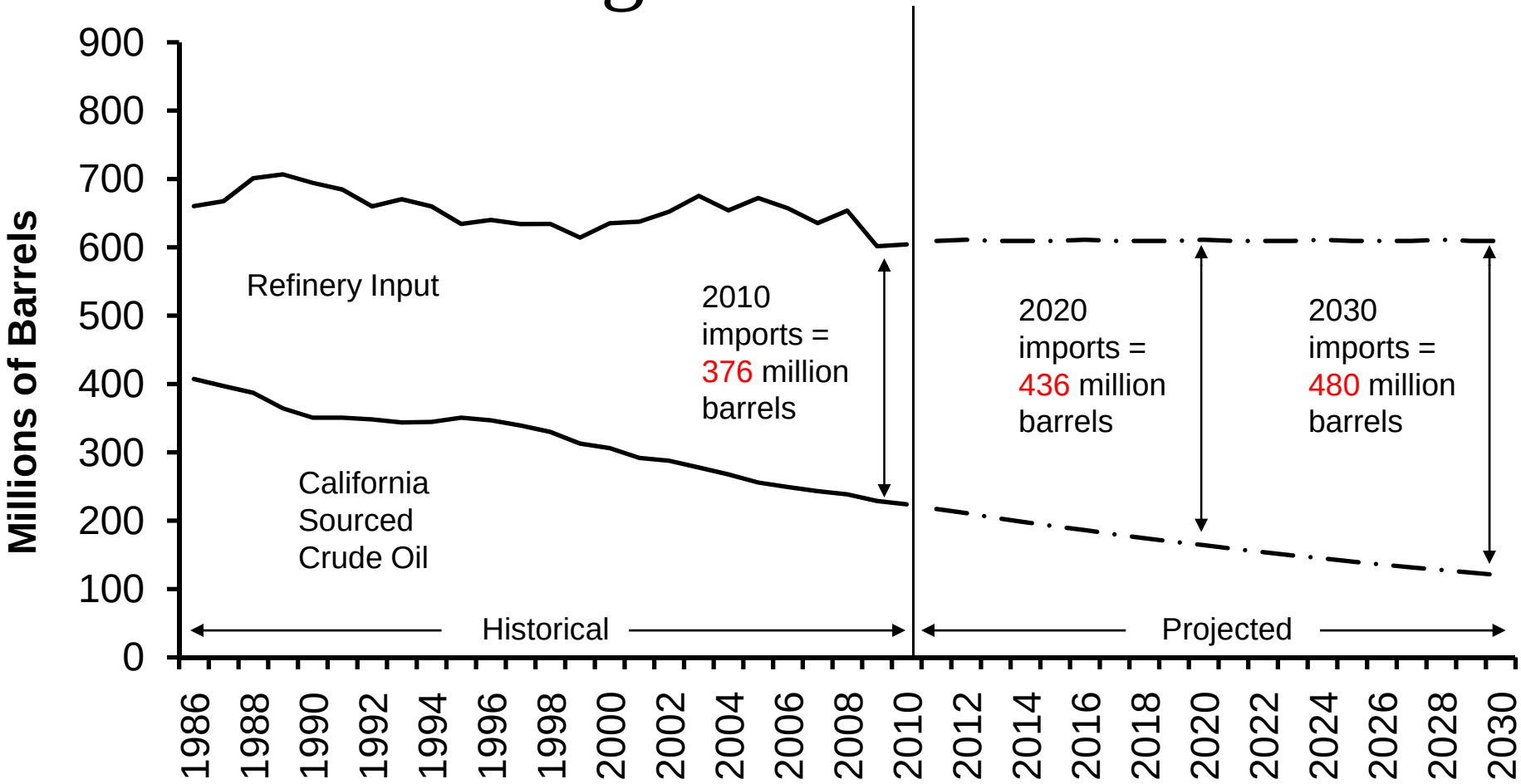
Source: EIA, PIIRA Database, and California Energy Commission analysis

California Crude Oil Production Forecast 2011-2030



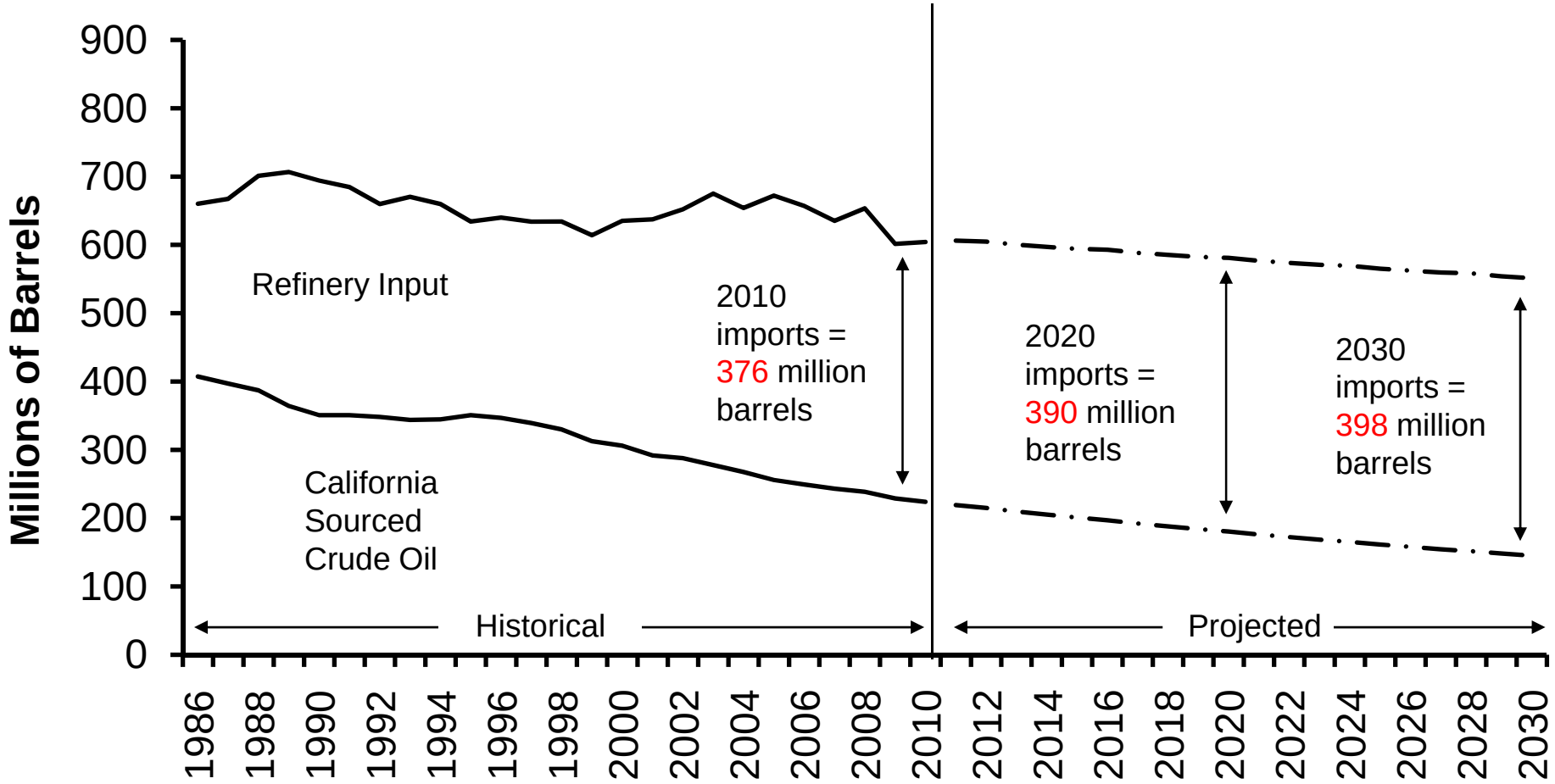
Source: California Energy Commission

California Crude Oil Imports – High Forecast



Source: California Energy Commission

California Crude Oil Imports – Low Forecast



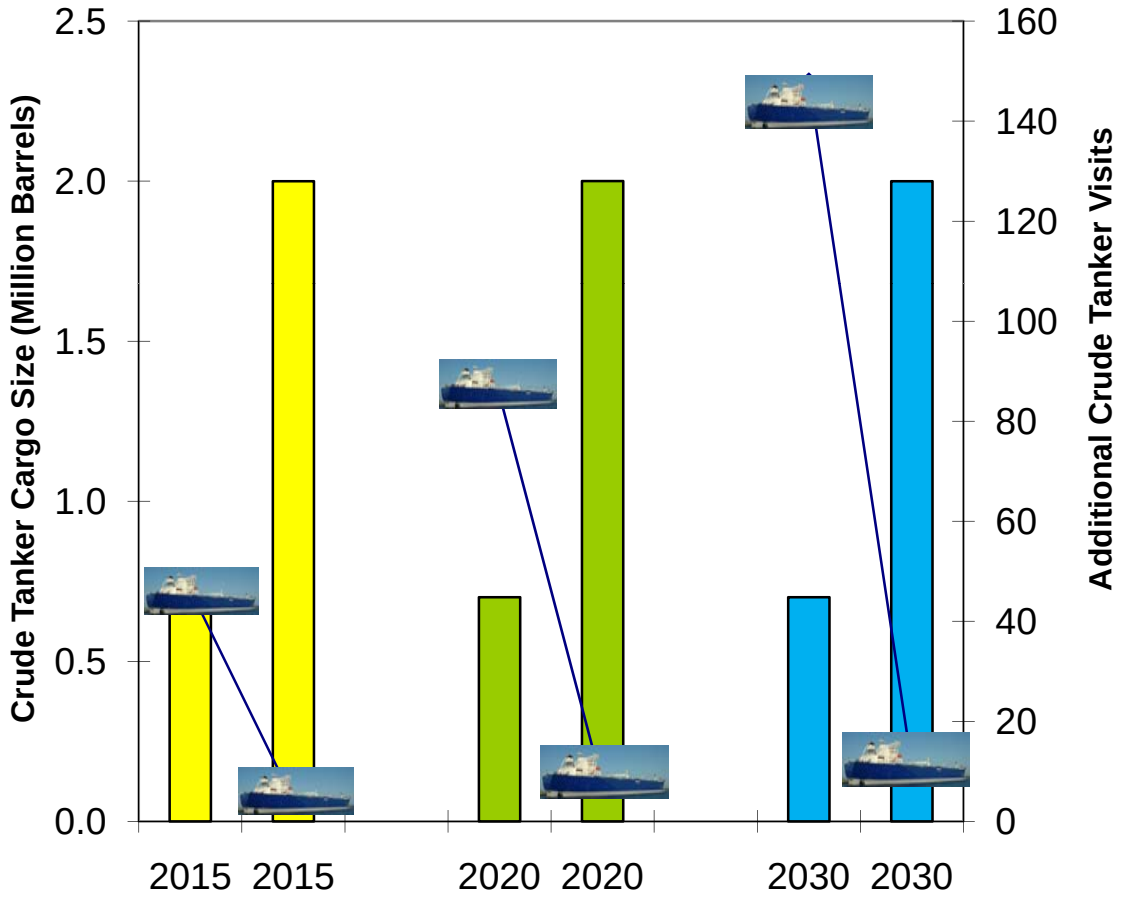
Source: California Energy Commission

California Crude Oil Imports – Forecast

- Crude oil imports are projected to increase in California due to:
  - Continuing decline of California crude oil production
- The lower estimate for increased crude oil imports assumes that crude oil production declines by 2.2% per year and an annual reduction of 0.5% in refinery capacity.
- The larger estimate for incremental crude oil imports assumes that crude oil production declines by 3.2% per year and no increases in refinery capacity.

Incremental Crude Oil Tanker Visits

- Both High and Low projection result in increased tanker visits.
- Staff is projecting 12 to 149 additional tanker visits to California by 2030.
- High variability in the number of visits is due to storage capacity differences between VLCC and Aframax tankers, as well as import differences between projections.



Source: California Energy Commission

Crude Oil Storage Capacity

- Storage capacity forecasts are dependent on cycling rates:
  - The higher cycling rate assumes a rate of 1 million barrels of storage per 23 million barrels of import
  - The lower cycling rate assumes a rate of 1 million barrels of storage per 12 million barrels of import
- Staff forecasts additional storage tank capacity requirements in the range of 0.6 to 5 million barrels by 2020, and 1 to 8.6 million barrels by 2030.
- Staff estimates the 60% of this storage will need to be built in Southern California.
- The Low Case projection could be accommodated by existing infrastructure, barring any storage facility closures.

Sources of Uncertainty in the Forecasts

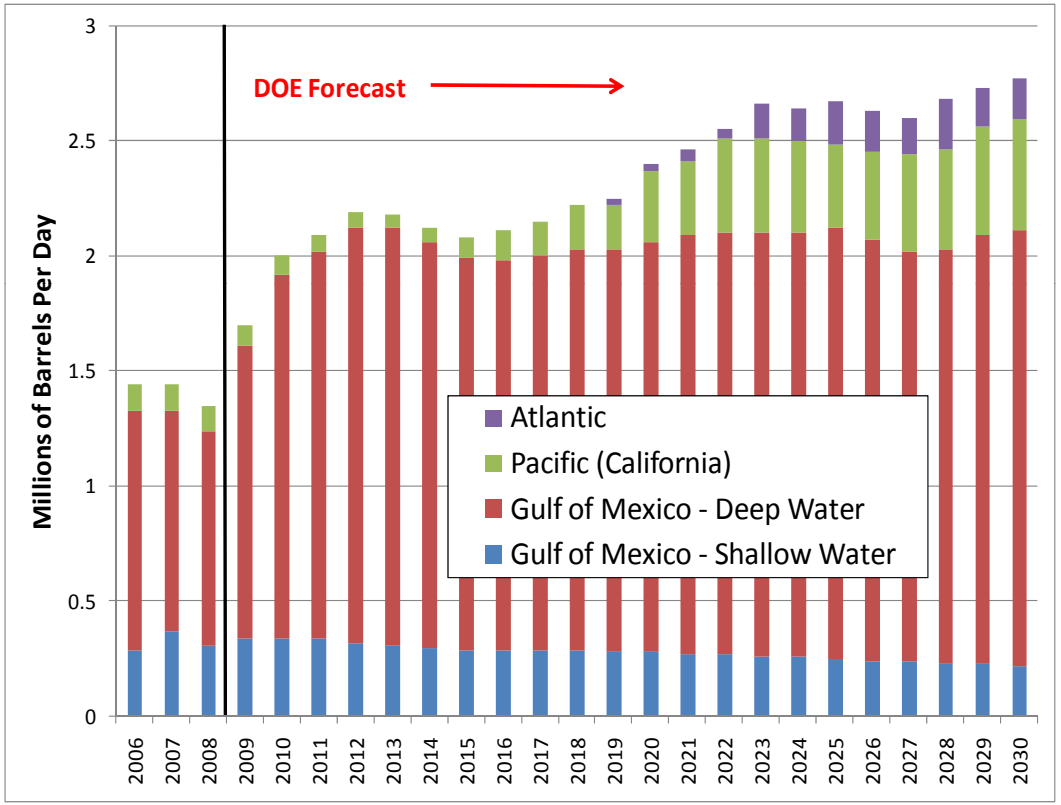
- Can technological advances and/or expanded access to offshore reserves slow or halt the decline in Californian crude oil production?
    - For example: California shale oil reserves estimated at 15.42 billion gallons
- Will new crude oil import facilities be completed in time to maintain an adequate supply of crude oil to California's refineries?

Federal OCS Drilling Scenario

- An estimated 5.8 to 15.8 billion barrels of Undiscovered Technically Recoverable Resources (UTRR) crude oil exist off the shore of California, over half in federal OCS.
- Mineral Management Services (MMS) estimate that 53% to 78% of those resources are economically recoverable based on crude oil prices between $60 to $160 per barrel.

- Possible constraints to moving forward:
  - Macondo crude oil spill in the Gulf of Mexico
  - New infrastructure required to develop these areas

OCS Crude Oil Production Forecast No Moratoria



Source: United States Department of Energy

- DOE estimates new production associated with the moratoria areas to begin 2015.
- 74% of this increased production is forecasted to originate from the California OCS area.
- This increased production has the potential of reducing crude oil imports to levels below 2011 totals under both cases.

Questions and Comments

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