



Crude Oil Import Forecast & HCICO Screening

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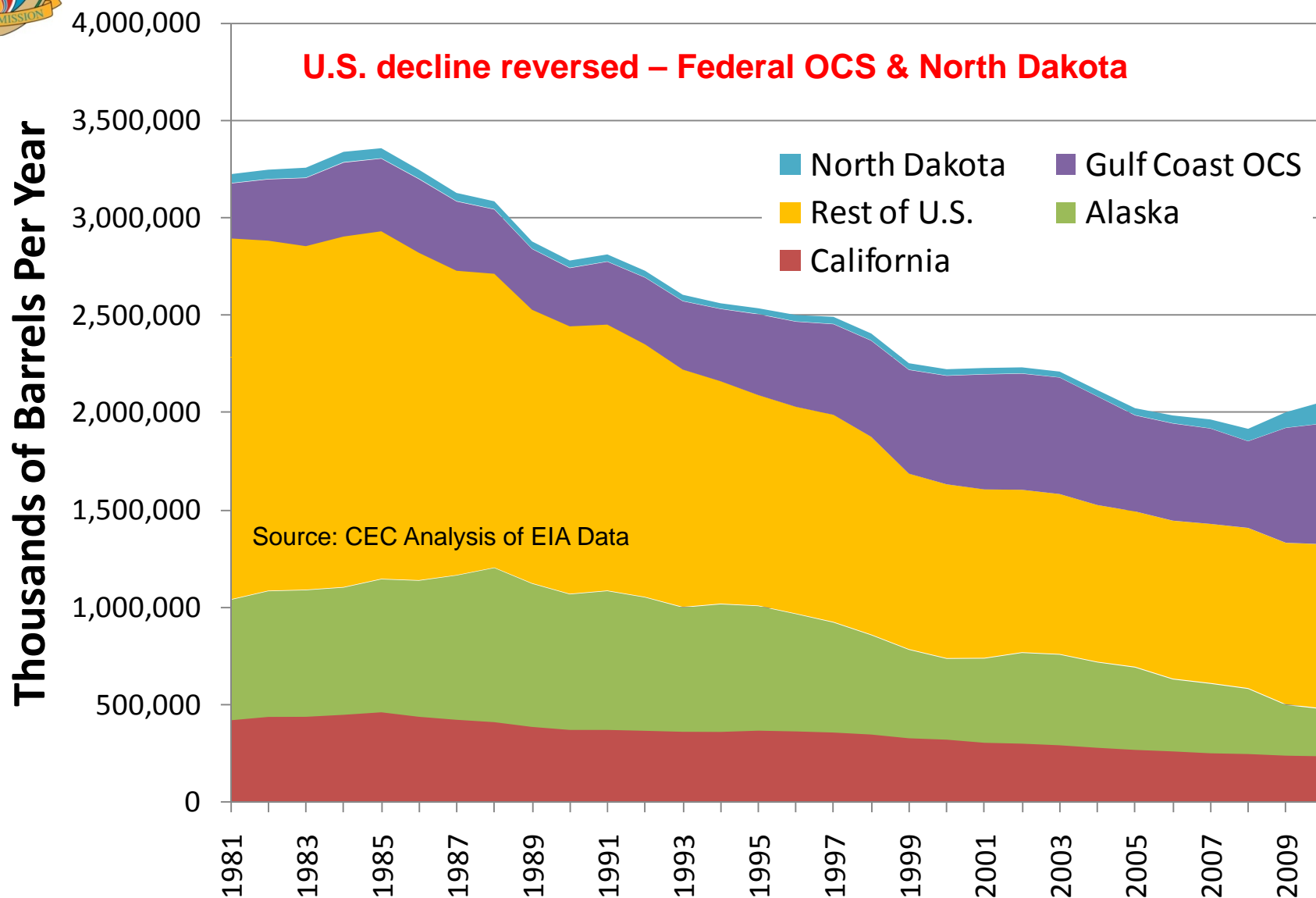


Crude Oil



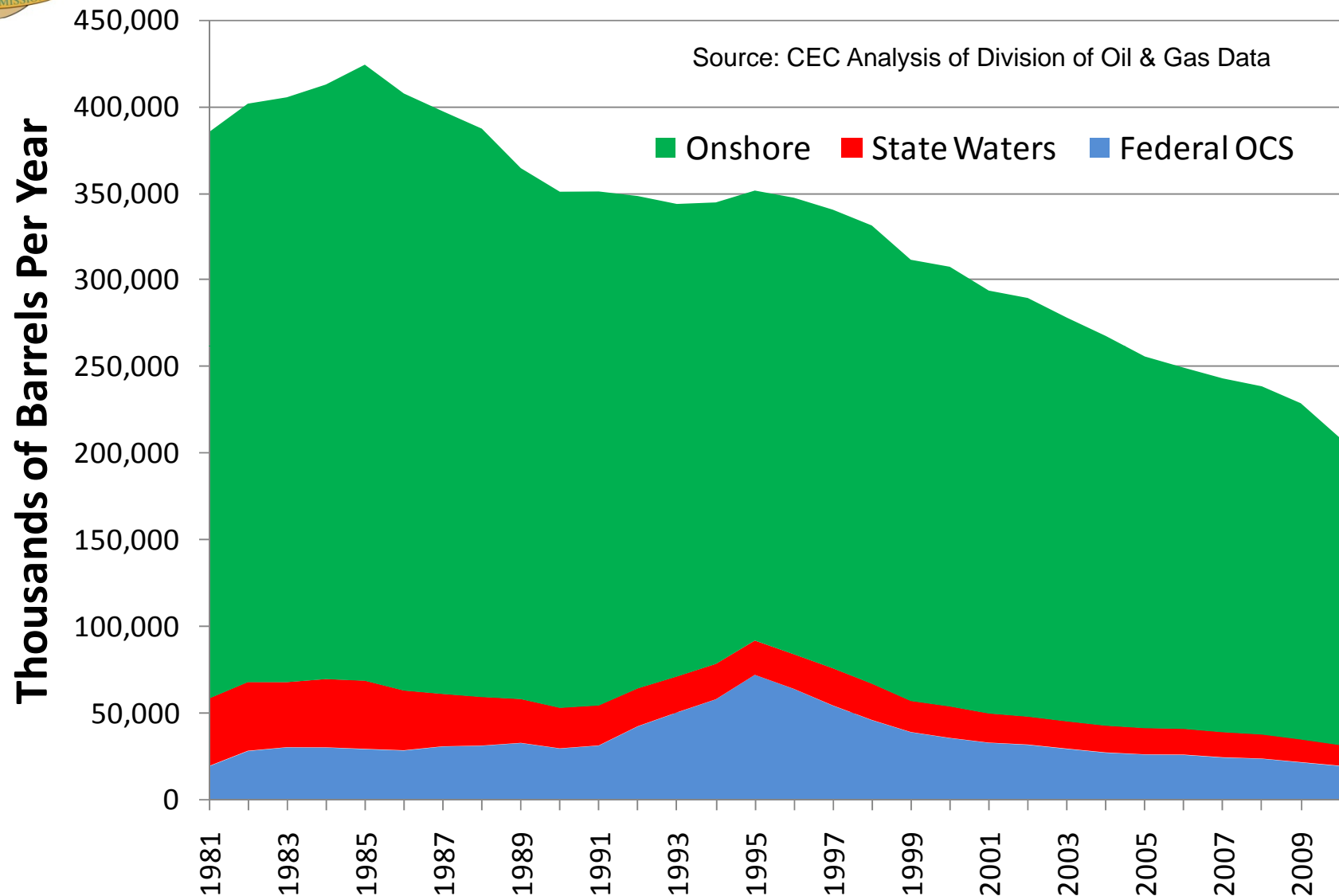


U.S. Oil Production 1981 to 2010



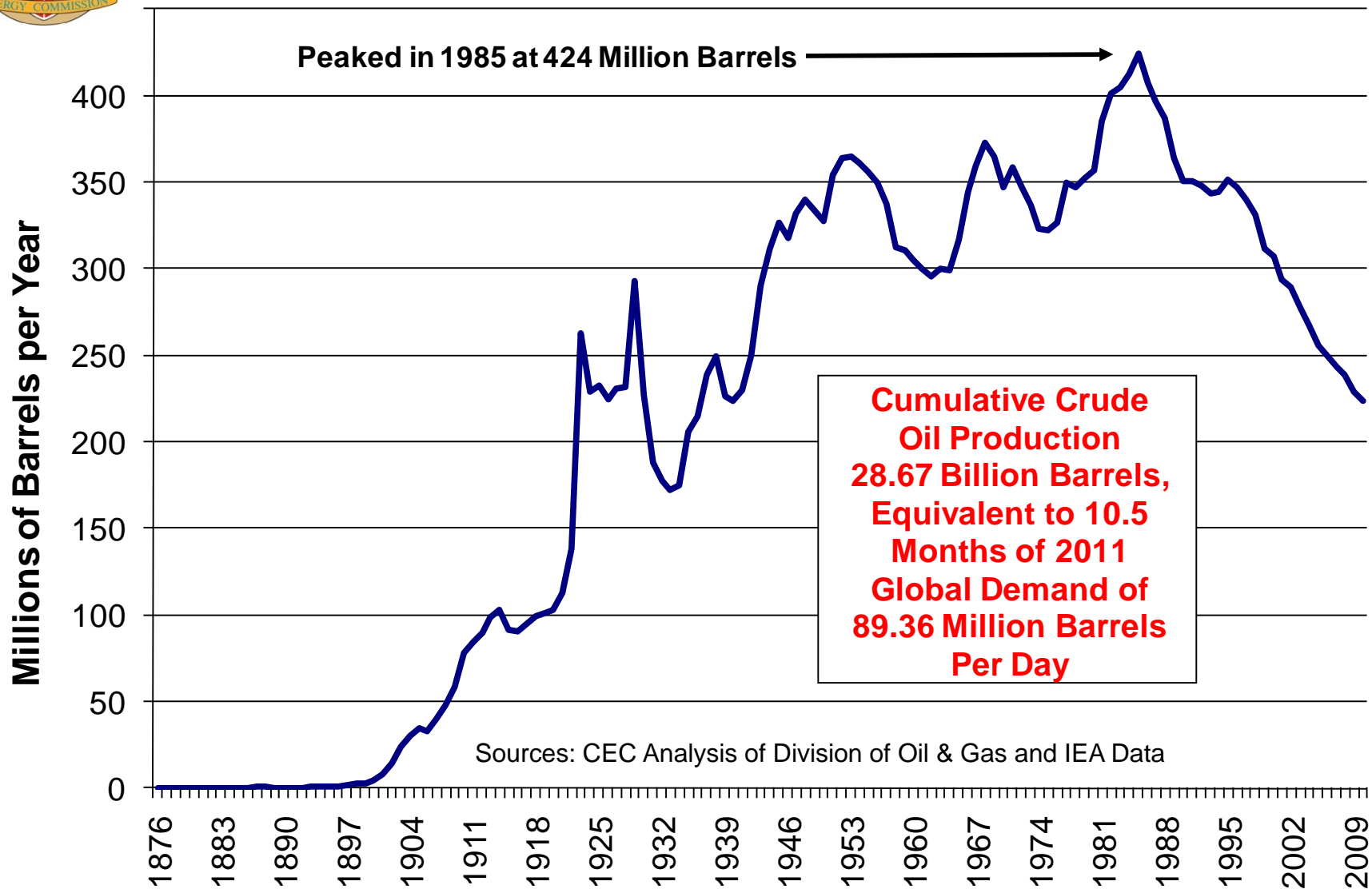


California Oil Production 1981 to 2010





California Oil Production 1876-2010



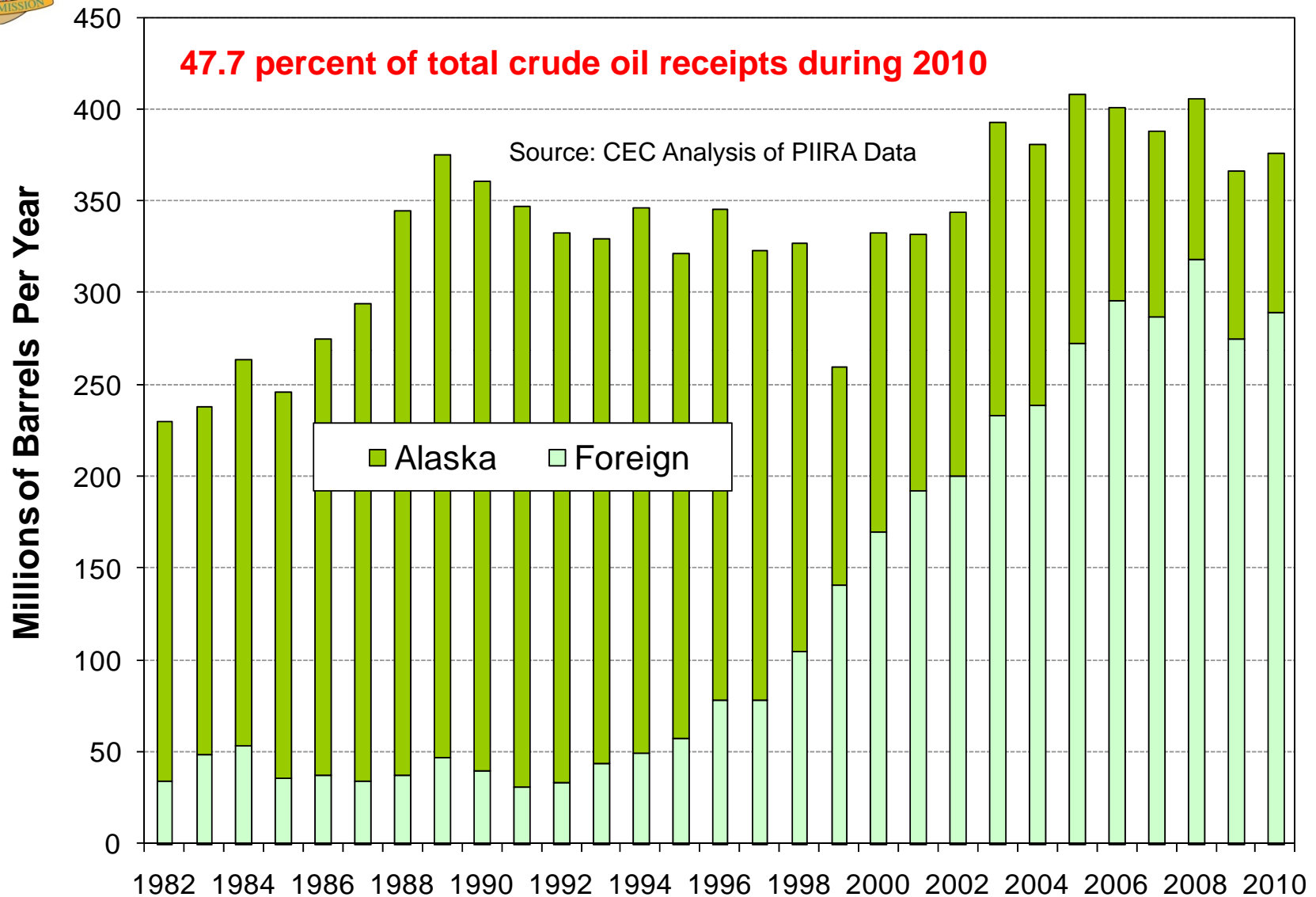


Recent Crude Oil Production Trends

- Global crude oil production 31.9 billion barrels in 2010 or 87.3 MM BPD – 77.9 MM BPD excl NGLs, processing gains & biofuels
- 2010 U.S. crude oil production 2.05 billion barrels or 5.63 million barrels per day – according to EIA
- CA crude oil production in 2010 was 223.9 million barrels or 613 thousand barrels per day – according to Div Oil & gas
- California crude oil production has declined 47% since 1985, Alaska 65% and the rest of U.S. by 48% - according to EIA
- 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



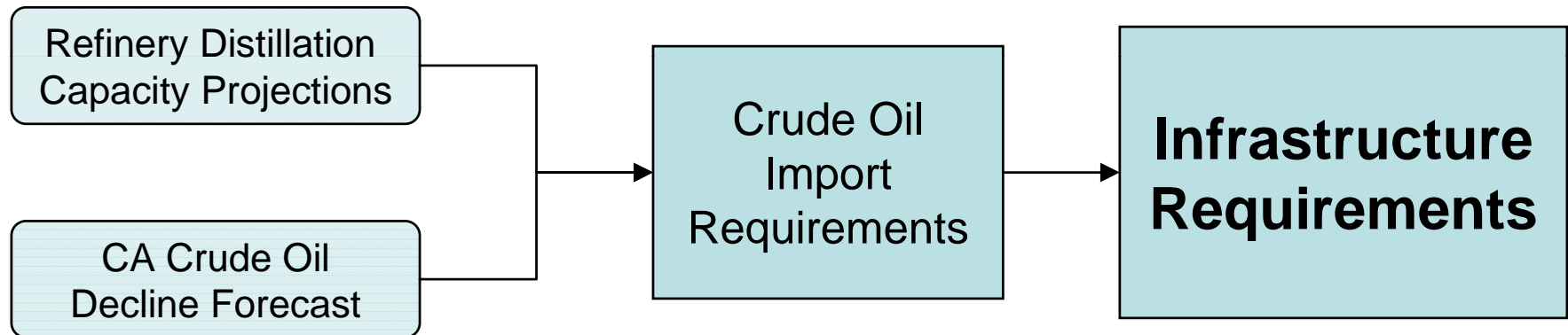


California Crude Oil Imports – Historical

- 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 13% between 2000 and 2010
- Imports of Alaska crude oil declined a total of 47% between 2000 and 2010
- The largest increase has been for foreign crude oil imports
 - 5.5% per year increase
 - Over 71% greater compared to levels of 2000
- What is the outlook for crude oil imports for California and what are the primary factors influencing the forecasts?

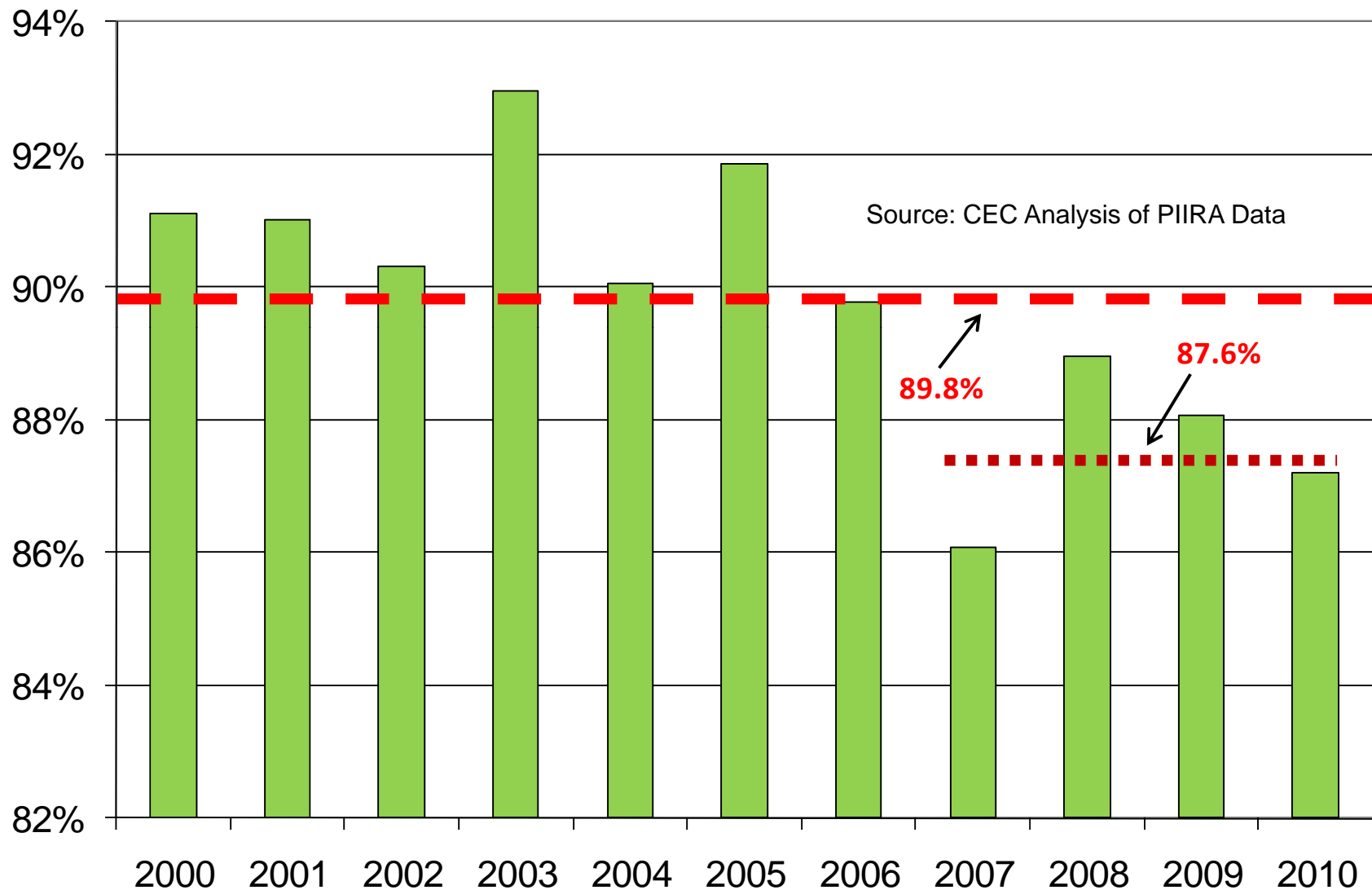


Crude Oil Import Forecast - Approach





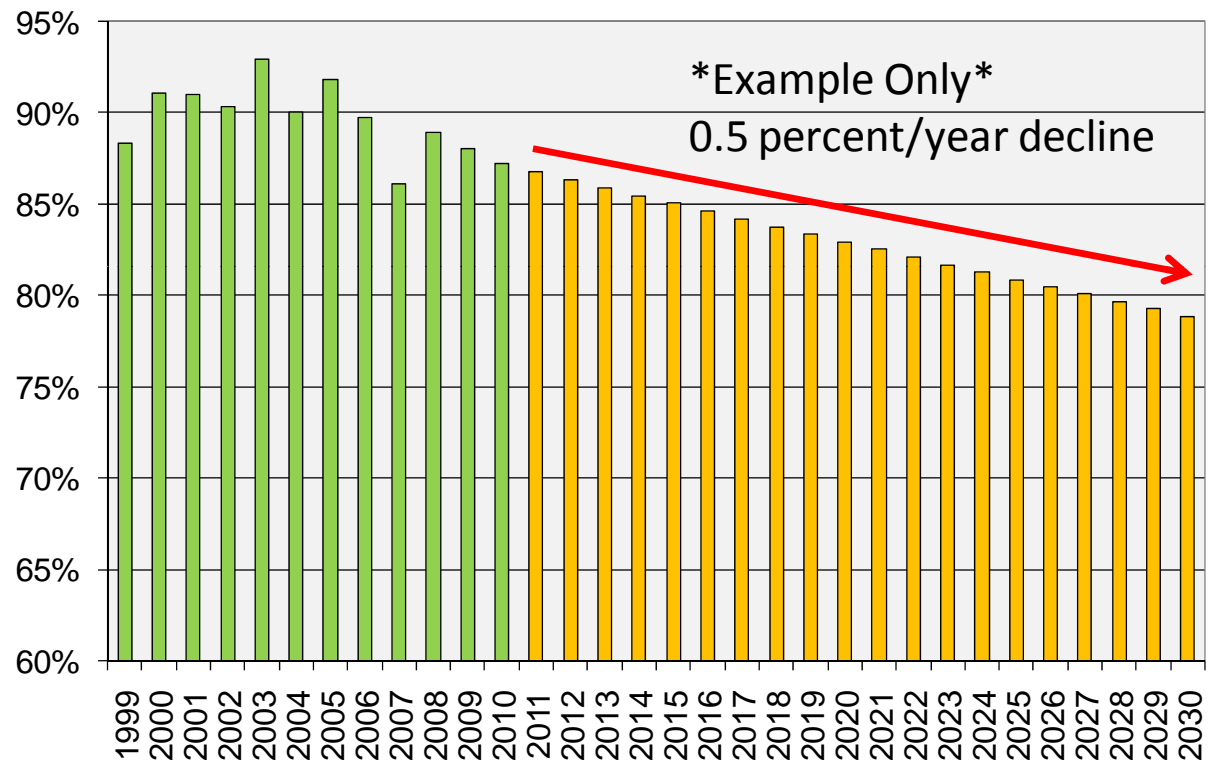
California Refinery Utilization Rates





California Refining Capacity Assumptions

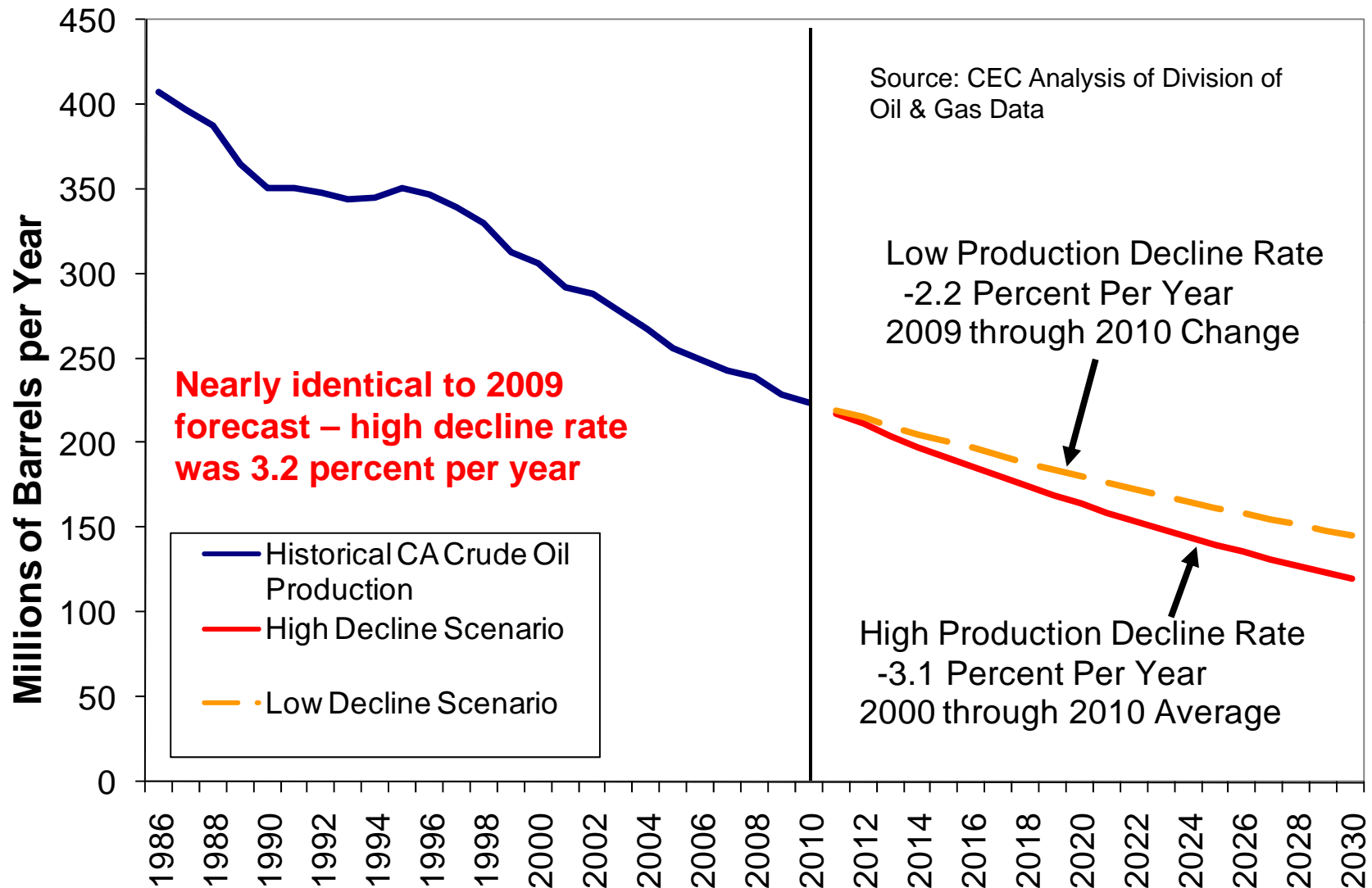
- Assumed level capacity as part of 2009 IEPR forecast analysis
- Will include a scenario of declining utilization or capacity for “Low Import” case in light of:
 - Increased use of renewable fuels
 - Higher CAFÉ standards
- Impacts
 - Will decrease crude oil import forecast relative to “High Import” case
 - Will increase transportation fuel import forecast



Source: CEC Analysis of PIIRA Data

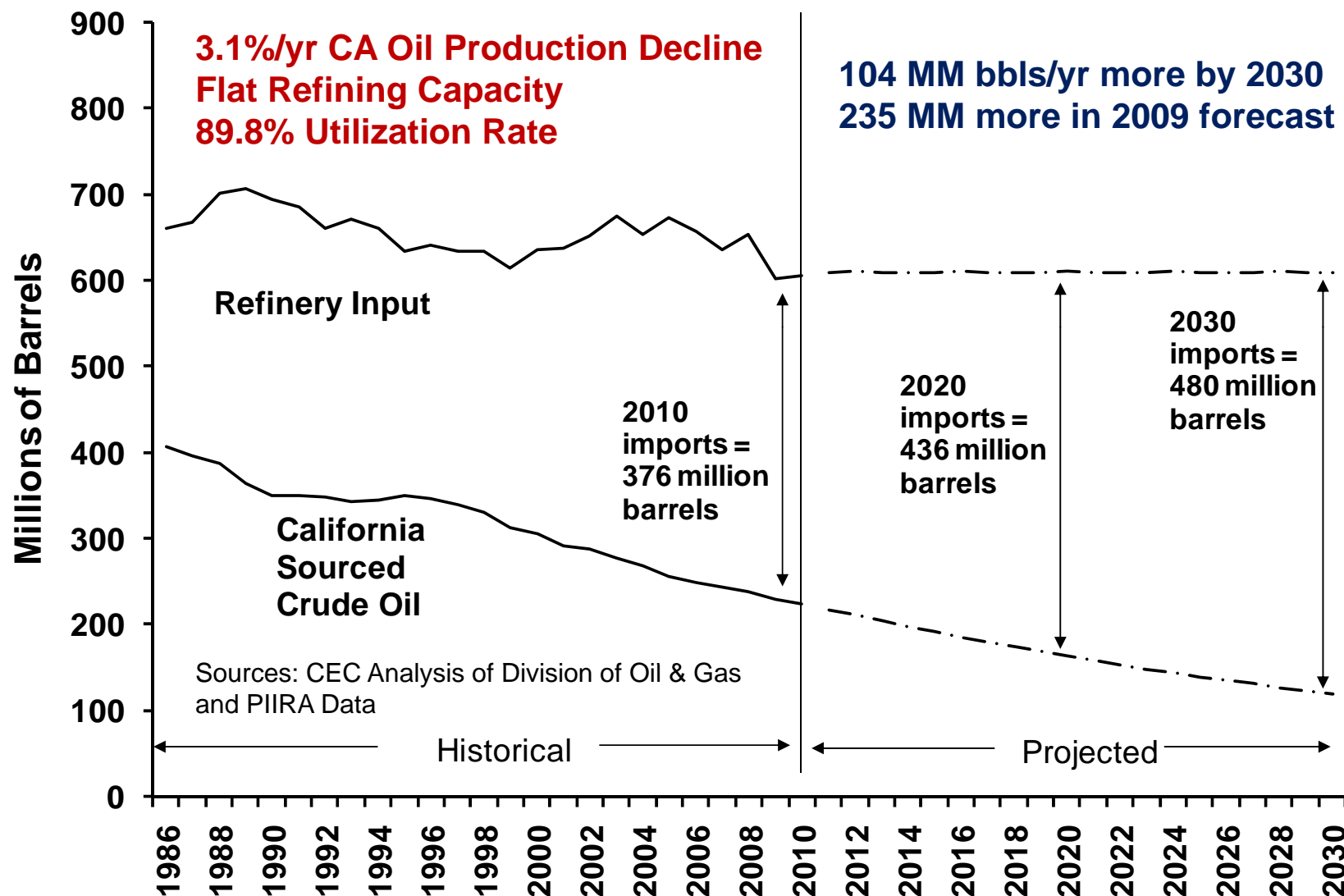


California Crude Oil Production Decline Forecast 2011-2030



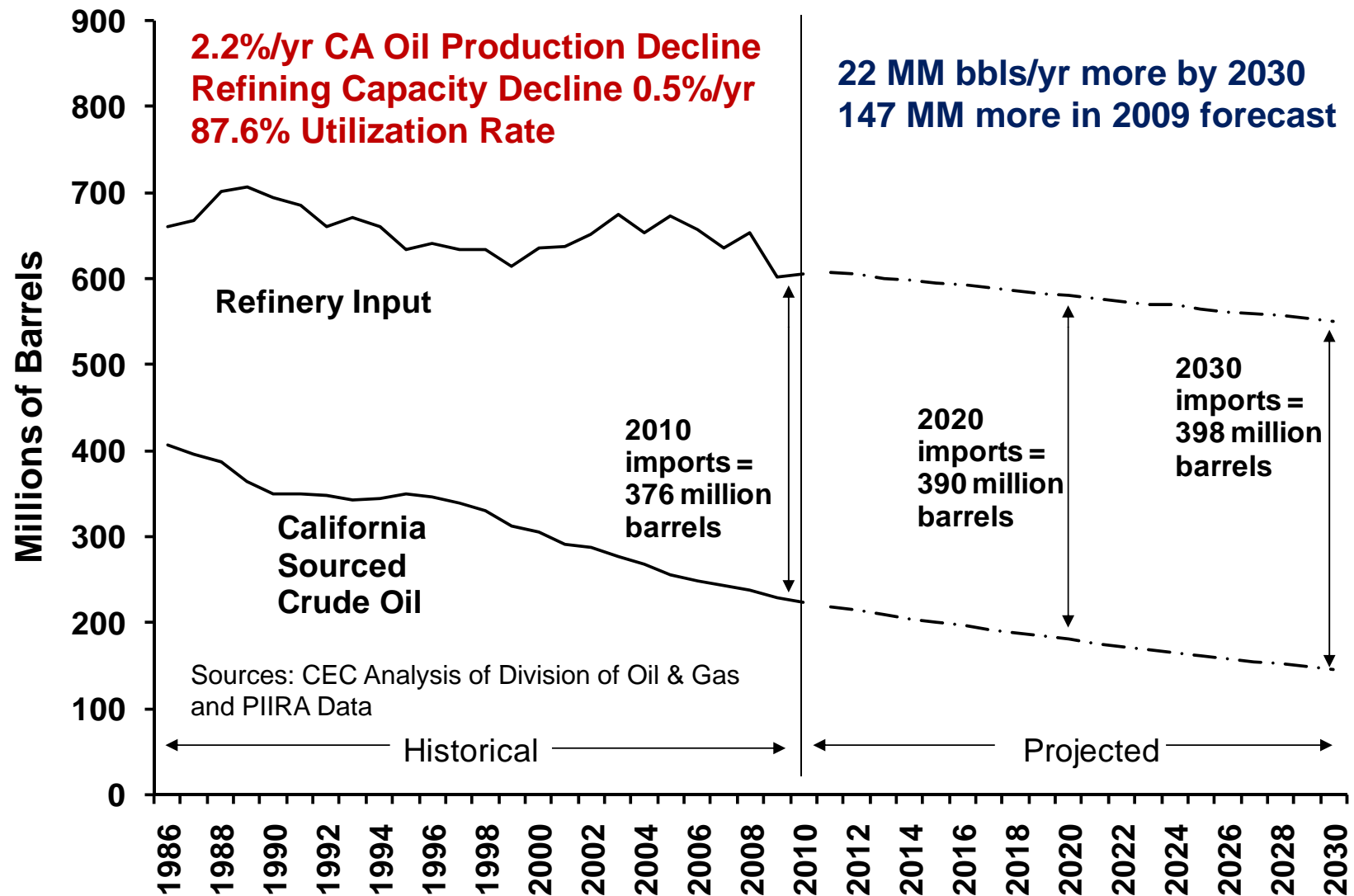


California Crude Oil Imports – **High** Forecast





California Crude Oil Imports – **Low** Forecast



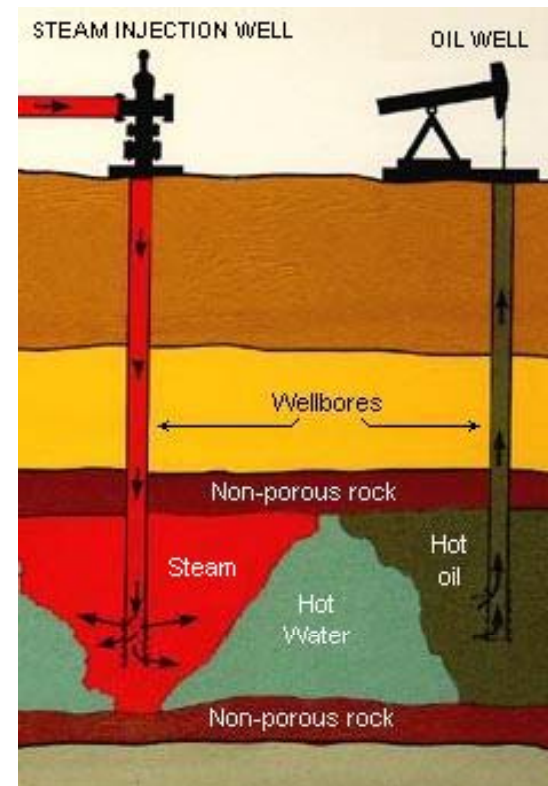
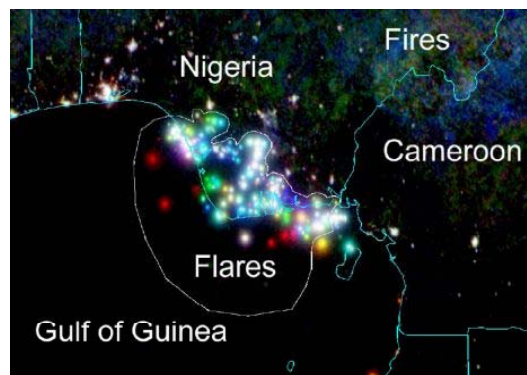
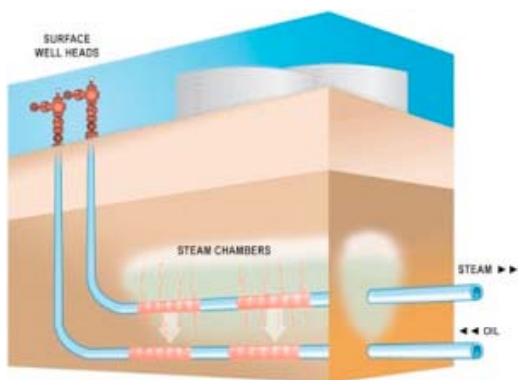


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High-Carbon Intensity Crude Oil





Objective & Background

- Apply ARB's potential High-Carbon Intensity Crude Oil (HCICO) screening process to list of Marketable Crude Oil Names (MCONs)
 - Sequential procedure to assign “pass” or “fail” based on:
 - Flaring intensity
 - Thermally enhanced oil recovery (TEOR)
 - Mining extraction of bitumen
 - Use of upgrading facilities to produce synthetic crude oils
- For a description of information resources, process and contents of the initial MCON list see CEC 9-10-10 presentation http://www.arb.ca.gov/fuels/lcfs/lcfs_meetings/090910cec.pdf
- Total number of MCONs – 251
 - 47 different countries, including the United States



California MCON Imports

Country	2006	2007	2008	2009	2010	Country	2006	2007	2008	2009	2010
Algeria	1	1	1	1		Mexico	2	1	2	1	1
Angola	3	5	6	5	1	Neutral Zone*		1	1	1	2
Argentina	1	1	1	3	2	Nigeria	1	2	1		1
Australia			2	1	1	Norway	1	1	1		
Azerbaijan		1		1		Oman	1	1	1	1	1
Brazil	2	3	5	5	4	Peru	1	1	1	1	1
Cameroon	1			1	1	Russia		2			2
Canada	1	2	4	4	3	Saudi Arabia	3	3	3	3	2
Chad	1	1	1	1		Thailand				1	
Columbia	3	4	4	4	4	Trinidad & Tobago		1		1	1
Ecuador	2	2	2	2	2	UAE - Abu Dhabi		1	1	1	1
Equatorial Guinea	1					Venezuela	6	4	3	6	3
Indonesia	1	1				Vietnam	1				
Iraq	1	1	1	1	1	Yemen	1	1			
Malaysia	1					Totals	36	41	41	45	34

* Kuwait Portion

Between 22 & 28 additional MCONs imported from non-2006 Base Line countries

Source: CEC Analysis of PIERS Data

California Energy Commission

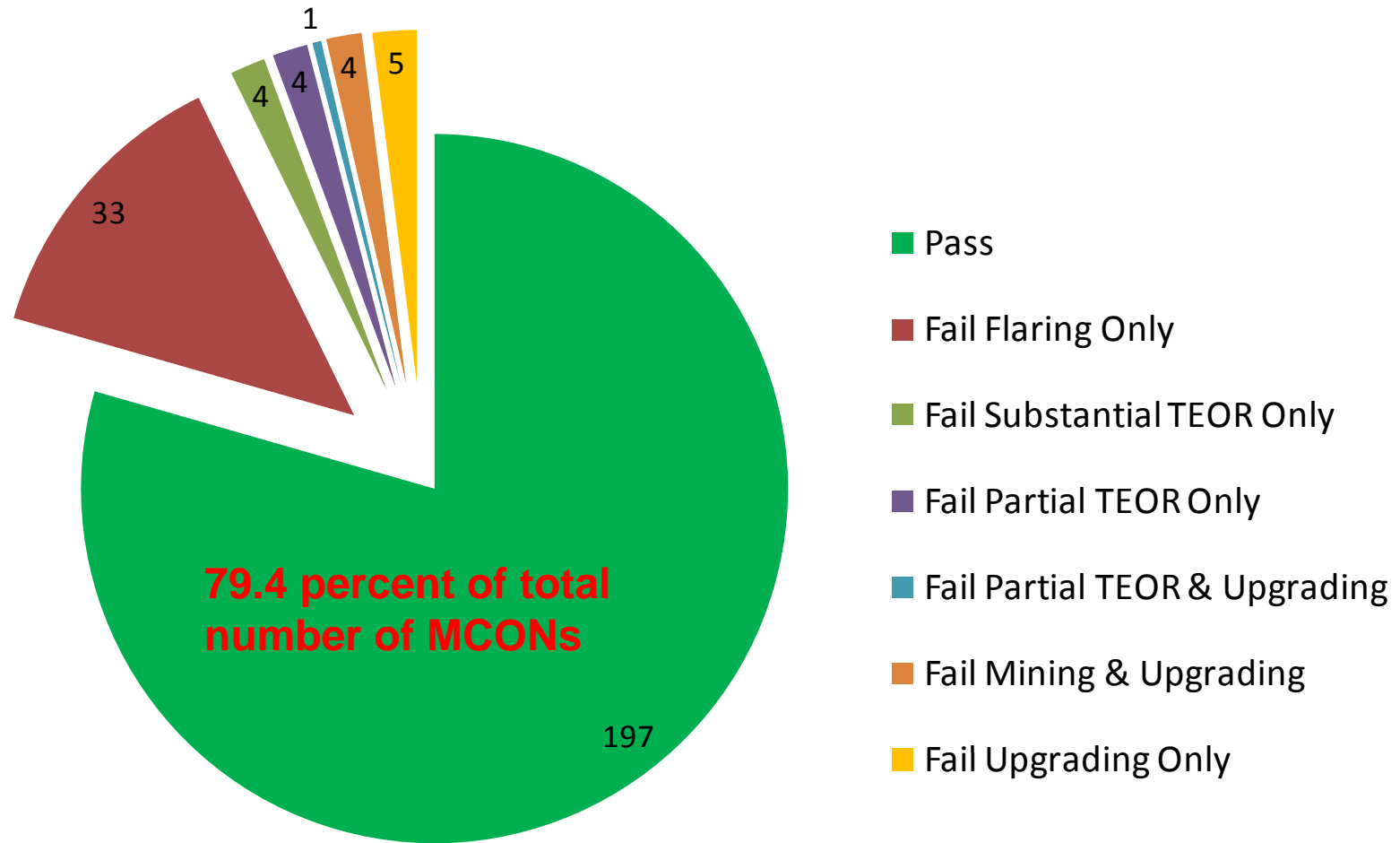


Potential HCICOs – Initial Screening Results

- 197 MCONs receive a “pass” – 32 from Base Line countries
 - **None** of the Base Line foreign country MCONs would have received a “fail”
 - Nearly 47 % of California MCONs would fail TEOR screen, as of 2008
- 51 MCONs receive a “fail” and are potential HCICOs
 - 8 of 45 import MCONs during 2009
- 45 MCONs exceed the 10.0 m³ per barrel limit – “fail” using the O&GJ crude oil production data for the intensity calculation
- 61 MCONs originate from countries that are listed in the Oil & Gas Enhanced Oil Recovery Survey in 2010
- 4 MCONs sourced from bitumen mines & “fail” screen
- 6 additional MCONs are processed by upgraders & “fail” screen

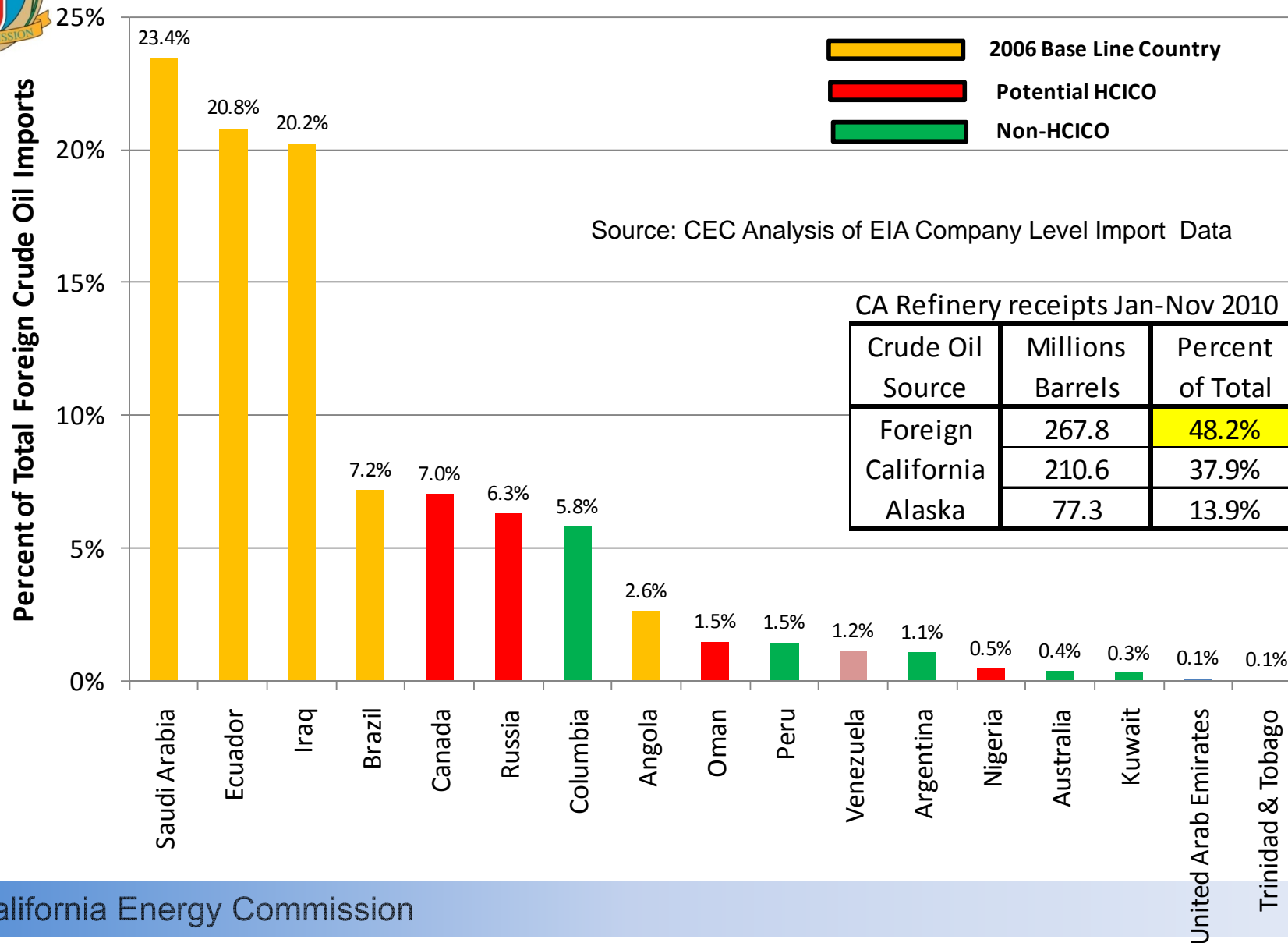


Summary of Screening Results





2010 Calif. Foreign Import Sources (Jan-Nov)



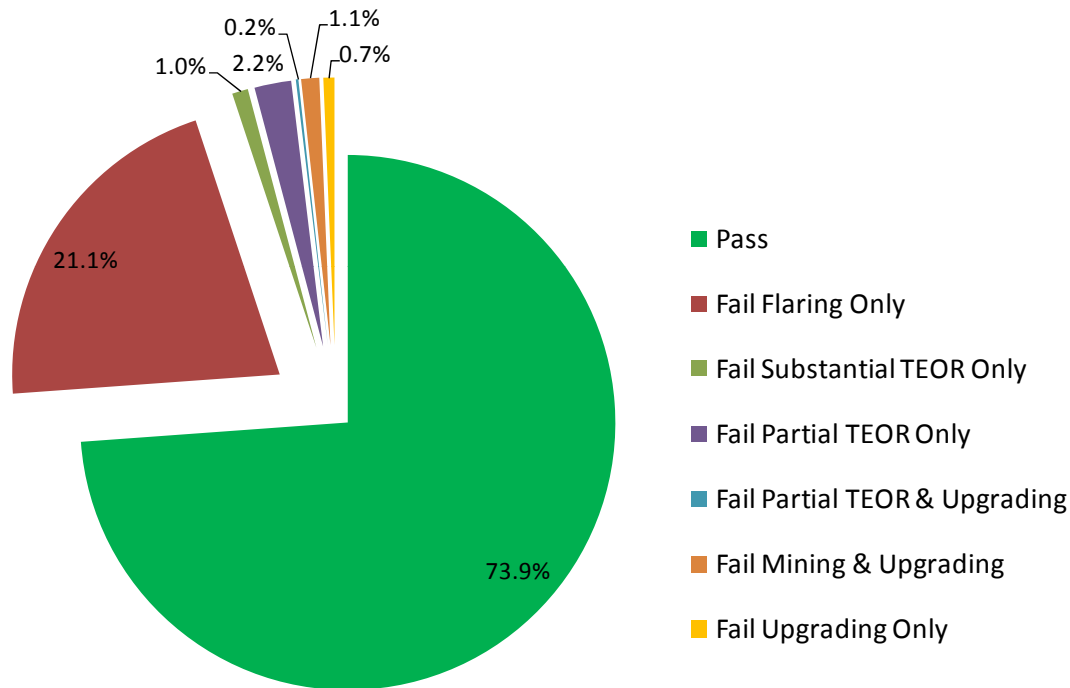


HCICO – Potential Offsets

- Refiners can use HCICOs, but need to offset the incremental carbon debt
- If refiners used a quantity of potential HCICOs similar to 2010 (roughly 8 percent), they would need to use ethanol from California & Brazil in all of the gasoline they produce – beginning this year
- Even if refiners were to use as little as 2 percent HCICOs in their mix of crude oil, use of ethanol from the Midwest would be effectively infeasible by 2013
- In fact, there are no sources of commercially available ethanol available that could completely offset the incremental carbon debt of using 2 percent HCICOs by 2016
- It is therefore assumed by staff that potential HCICOs would be unavailable for use in California



Screening Results – Volume Weighted



Source: Energy Commission analysis.

- The increasing difficulty of using HCICOs will potentially result in a decreased availability of crude oil sources for California refiners
- 26 percent of foreign crude oils are potential HCICOs
- Altered crude oil purchasing decisions can increase costs that will be passed through to consumers over the long-term
- Inability to purchase crude oil from stable & reliable locations has energy security implications



Additional Q & A



Sunrise at Badwater Salt Flats – Death Valley NP, California 3-31-2011