

Ethanol in California

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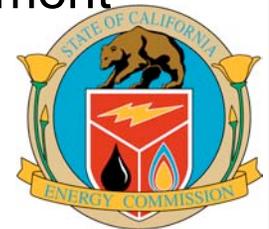
Presentation Topics

- Ethanol's History in California
- Recap of California's Transition from MTBE to Ethanol
- The Future for Ethanol in California – Possible Scenarios
- Ethanol Production in California – Plans and Prospects
- Remaining Issues for Ethanol in California's Energy Picture
- California's Evolving Ethanol Policy Climate
- Energy Commission's Review of U.S. Ethanol Incentives



History of California's Ethanol Fuel Programs

- 1970s First Alcohol/Gasoline Blend Testing (Ethanol & Methanol)
- 1980s Alcohol Vehicle Fleet Demonstrations (Ethanol & Methanol)
Alcohol Fueling Facilities (Ethanol & Methanol)
Ethanol Production Studies
- 1990s Commercial Flexible Fuel Vehicle Fleets
Heavy-Duty Alcohol Vehicle Fleets
Public Fueling Network (Methanol)
- 2000> Biomass-to-Ethanol Studies
MTBE Phaseout and Ethanol Substitution
Defining Ethanol's Potential for Petroleum Displacement

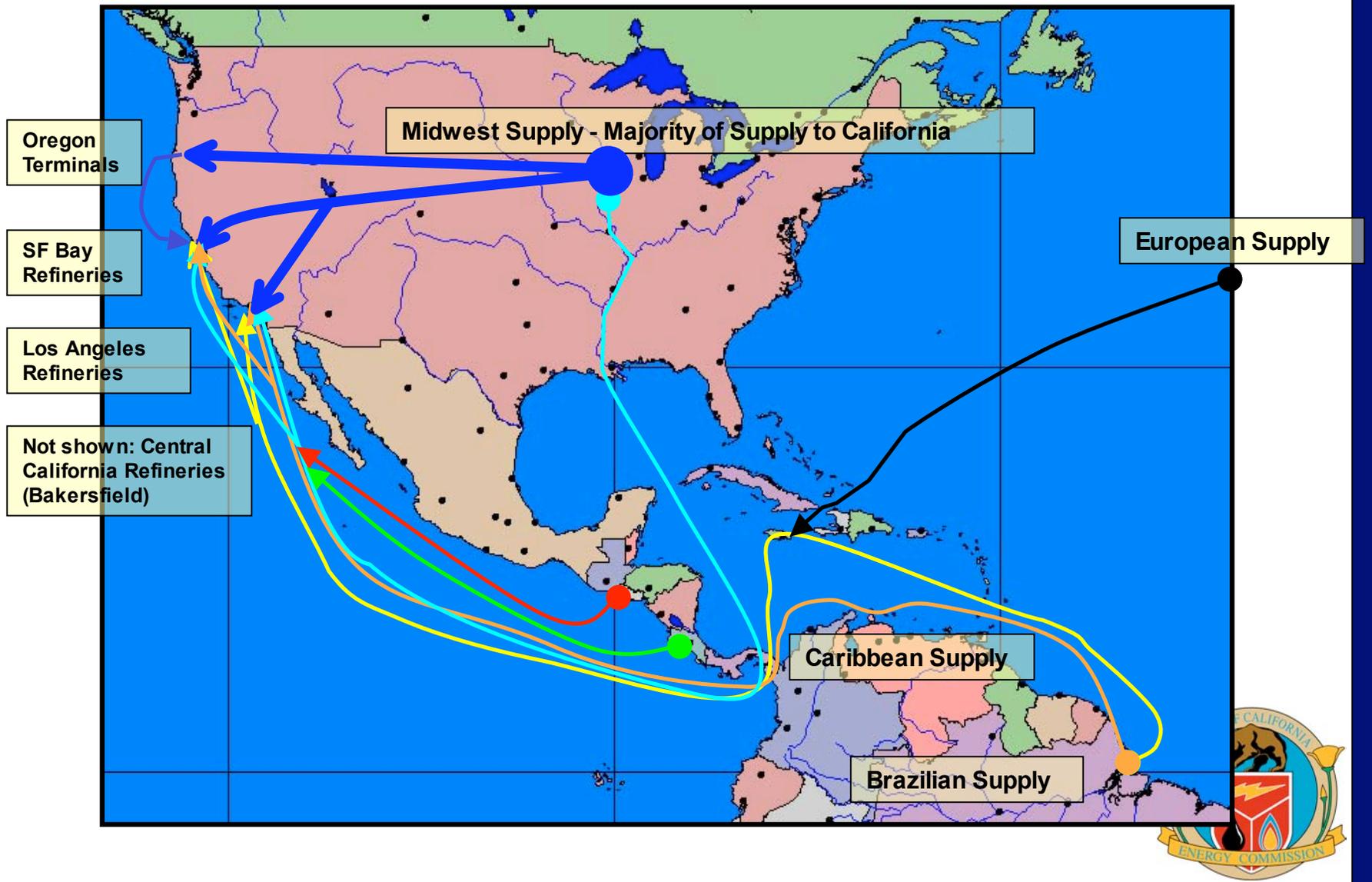


California's Transition from MTBE to Ethanol

- MTBE Detected in California Water Supplies (1995)
- MTBE Alternative Studies (late 1990s)
- MTBE Phaseout Order (Exec Order D-5-99, March 1999; Exec Order D-52-02, March 2002)
- Ethanol Evaluations (1999>)
- Ethanol Industry Expansion
- Gasoline Supply & Distribution System Changes
- Transition to Ethanol Completed (January 1, 2004)
- Continuing Ethanol Supply Evaluations
- California Oxygenate Waiver Request



California's Ethanol Flows



The Future for Ethanol in California: Possible Scenarios

Ethanol/Gasoline Blending

- Present: 5.7% blend in most gasoline (~ 900 million gal/yr)
- Near-term: w/removal of federal oxygenate mandate and/or enactment of a renewable fuels standard (<, >, or = today's volume)
- Longer-term: up to 10% blend in all gasoline (>1.5 billion gal/yr)
- Ultimate: >10% blend? (watching Minnesota's 20% blend initiative)



The Future for Ethanol in California: Possible Scenarios (cont.)

E85

- Present: 250,000 flexible fuel vehicles (FFVs) (~1% of on-road vehicles); 3 E85 fueling stations; negligible E85 use
- Near-term: maintain current rate of FFV sales and maximize E85 fueling – up to 1-2% of gasoline market
- Longer-Term: increase FFV market share (up to 100% ?) and make E85 widely available – (E85 directly competes for a share of the gasoline market, today at 16 billion gal/yr)



The Future for Ethanol in California: Possible Scenarios (cont.)

E-Diesel

- Under evaluation
- Limited demonstration fleet trials



California Ethanol Production Plans and Outlook

- Two small existing ethanol producers (<10 mill gal/yr from food/beverage industry residues)
- One new plant under construction (25 mill gal/yr from corn)
- Two additional plants in advanced planning (35-40 mill gal/yr each from corn)
- Several additional corn-to-ethanol projects under consideration
- Sugarcane-to-ethanol projects in planning
- Biomass-to-ethanol projects being studied



Status of Biomass-to-Ethanol Development

- Past R&D projects: ethanol from rice straw, wood waste
- Studies of resource potential, economic feasibility
- Ongoing enzyme R&D
- Evolution of competing biochemical and thermochemical technology approaches
- Two dozen active process developers in U.S. and Canada
- California process developers and prospective projects



Remaining Issues for Ethanol in California's Energy Picture

- CA Air Resources Board regulations affecting ethanol/gasoline blending
- Fate of federal oxygenated fuel requirement
- CA market uncertainty under a potential national Renewable Fuel Standard
- Future of FFVs and E85
- CA ethanol production industry development
- Progress of biomass-to-ethanol technology



California's Evolving Ethanol Policy Climate

- Governor Schwarzenegger's Jan. 2004 reiteration of oxygenate waiver request stated:

"I recognize the benefit of one aspect of the Clean Air Act (CAA) oxygen requirement — the dramatically increased use of ethanol. However, due to the ban on MTBE use, there will be a very large ethanol market in California even without the CAA oxygen mandate. California is also considering various mechanisms to spur-in-state ethanol production so that our citizens and our economy benefit directly from the State's increased use of ethanol as a gasoline blending component."



California's Evolving Ethanol Policy Climate (cont.)

- New Interagency Biomass Working Group
Being formed to address issues and problems associated with use of California's biomass resources for energy production, develop policy and program recommendations and legislative needs.

Participating state agencies:

Energy Commission
Air Resources Board
Department of Food and Agriculture
Public Utilities Commission
Environmental Protection Agency
Integrated Waste Management Board
Department of Forestry and Fire Protection
State Water Resources Control Board



Energy Commission's Review of U.S. Ethanol Incentives

Among the Conclusions

- State ethanol production incentives in 22 states are having an important bearing on new and planned ethanol production in those states.
- Of 32 states with market incentives for ethanol use, only in Minnesota does there appear to be a strong correlation between the state incentive and in-state ethanol consumption.
- The federal ethanol fuel incentive (of \$0.51 per gallon) is the most significant single inducement to ethanol production and use in the U.S.
- Production of ethanol from biomass wastes and residues remains a goal of federal research and development programs, but is not being fostered by current federal and state ethanol incentives.



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