

Life Without Ethanol

The Real Impact on California, New York and Connecticut Gasoline Supplies and Prices

Prepared by the Renewable Fuels Association
June 21, 2004

The Real Impact

If oxygenate waivers were granted for California, New York and Connecticut and ethanol was removed from the gasoline supply in those states, as some have called for, the result would be:

- higher retail pump prices for consumers
- reduced gasoline supplies
- greater reliance on imported gasoline and gasoline components
- greater use of expensive octane enhancers like alkylate and iso-octane
- increased air pollution and greenhouse gas emissions
- greater use of cancer-causing toxics in gasoline

Ethanol adds up to 10 percent additional domestic supply to the gasoline pool. Ethanol is less expensive than other oxygenates, octane enhancers and even conventional gasoline. Therefore, ethanol helps reduce the cost of gasoline for consumers. Without ethanol, retail gasoline prices will rise.

Background

Some politicians in New York and California and others have chosen to blame ethanol blending in their states for recent increases in gasoline prices despite all the facts to the contrary¹. They have repeatedly called for the U.S. Environmental Protection Agency (EPA) to grant Clean Air Act oxygenate waivers for their states, decisions which would allow refiners to blend gasoline without using ethanol. Those advocating for waivers mistakenly believe that removing ethanol would increase gasoline supplies and lower prices. Just the opposite would occur.

Faulty Logic

Waiver proponents have failed to consider the practical alternatives, or lack thereof, to ethanol.

They have fixated on a backward looking issue – the fact that the summer grade blendstock for ethanol is different than the summer grade blendstock for MTBE, which has been banned by the

¹ *Contra Costa Times*, “Oil Companies Profiting from California’s Gas Prices,” April 2, 2004
Fulton Valley News, “U.S. Senator Requests Ethanol Waiver,” April 17, 2004

three states. When using ethanol during the summer ozone season certain gasoline components (like butane and/or pentanes) that were used with MTBE must be removed to accommodate ethanol blending. These components must be replaced with increased use of more expensive, low volatility components, such as alkylate. Waiver proponents conclude that removing ethanol would allow the use of the original components and end the need for the use of additional alkylate, which is feared to be in short supply. Further, without the need for a “special” ethanol blendstock, gasoline supplies could more easily flow into the states.

This logic is flawed on every point. Waiver proponents ignore the fact that under their “no ethanol” scenario, they have failed to replace the volume, octane, and clean-burning characteristics of MTBE. Petroleum companies cannot simply replace MTBE with regular gasoline. The practical alternatives to ethanol are more expensive and require more imports.

The Requirements

If oxygenate waivers are granted and ethanol is removed from the gasoline, petroleum companies must still comply with numerous environmental and performance requirements in producing an oxy-free gasoline. To replace MTBE without ethanol, oil refiners must make up the lost volume while maintaining standards, such as:

Performance Standards:

- Minimum Octane (87, 89 and 91 octane grades)
- Drivability Index (DI) – ensures fuel will provide vehicle with adequate cold start and warm-up performance

Environmental Standards:

- Federal Reformulated Gasoline (RFG) requirements – the oxygenate standard is only one of several requirements that make RFG different from conventional gasoline. These additional requirements include setting specific limits on NOx emissions, toxics emissions, and benzene content.
- Mobile Source Air Toxic (MSAT) requirements – limits use of toxic petroleum components such as aromatics (e.g. benzene, toluene, etc. – which provide octane but are human carcinogens and ozone precursors).
- California Air Resources Board (CARB) Gasoline Standards – California uses a unique emissions model, which includes carbon monoxide when calculating ozone forming emissions. CARB also sets unique DI standards for gasoline and has lower limits for maximum sulfur content.

Clearly, not just any petroleum component can replace ethanol (and MTBE) while providing the necessary octane and not violating other environmental protections. In reality, the practical alternatives to ethanol are petroleum products – alkylate and iso-octane. They are both high in

octane (although not as high as ethanol)², have low volatility, and aid in compliance with environmental standards. However, both are expensive and in short supply.

The Problems with Ethanol-Free RFG

To replace ethanol with alkylate and iso-octane comes at a high monetary and environmental cost.

- Alkylate and iso-octane are MORE expensive than ethanol.³ According to recent spot prices, the net cost to a refiner for alkylate is at least 20 cents MORE per gallon than ethanol. Iso-octane is in such limited supply that spot prices aren't available, but it is more expensive than alkylate.
- There may not be enough alkylate and iso-octane available to replace ethanol.⁴ The EIA has noted that supplies of alkylate and iso-octane are very limited. In fact, some waiver proponents worried there wouldn't be enough alkylate to blend with ethanol as an MTBE replacement. However, without ethanol the demand for alkylate and iso-octane to replace ethanol (and MTBE) would more than double.
- Given the supply constraints, using alkylate and iso-octane to replace 1.5 billion gallons of ethanol would cause their prices to spike to record levels.
- Blending 11% of alkylate and iso-octane (to replace lost MTBE volume) into a gallon of RFG still leaves an octane deficit.⁵ Refiners would have to either increase the octane of their base gasoline by increasing reformer severity (which reduces production yields and increases cancer-causing toxics⁶) or, more likely, remove some percentage of the base gasoline to allow for increased use of alkylate and iso-octane. Either option reduces the gasoline supply and increases costs.
- More expensive imports of finished gasoline and gasoline components would be needed. Removing MTBE and ethanol from gasoline in CA, NY and CT would require replacement with more costly petroleum components. With U.S.

²The (R+M)/2 octane rating for MTBE = 111, ethanol = 113, alkylate = 94, and iso-octane = 100. Source: Downstream Alternatives, Inc.

³ Jim Jordan & Associates' Fuels Blendstock Report, June 18, 2004

⁴ Energy Information Administration, "Supply Impacts of an MTBE Ban," September 2002

⁵ Downstream Alternatives, Inc., "Replacing the Volume & Octane Loss of Removing MTBE for Reformulated Gasoline," May 2004

⁶Using oxygenates like ethanol displaces toxic components like aromatics and results in over-compliance with the RFG toxics limits. Without oxygenates, refiners would likely increase aromatic use to enhance octane. While the fuel may still be in compliance with the RFG toxics cap, the real world impact would be increased toxic emissions. In fact, in recognition of the potential octane shortfall without oxygenates, California increased its aromatic cap in order to accommodate the "non-oxy" RFG they are petitioning EPA for approval to use. Aromatics (benzene, toluene and xylene) are the major contributors to toxic emissions from gasoline.

www.arb.ca.gov/fuels/gasoline/050103carfg3reg.pdf

refineries already operating at full capacity, the additional finished gasoline and/or components would have to be imported.

- Switching to “non-oxy” RFG in these states creates a new boutique fuel. Ethanol-blended RFG is the second most common fuel in the U.S. behind only conventional gasoline. Refineries in the west coast, gulf coast, east coast, Canada, Europe, Venezuela, and the Virgin Islands, among others, routinely produce the base gasoline (RBOB) used for blending with ethanol. “Non-oxy” RFG would be a new fuel formulation not currently used anywhere in the world. Switching to “non-oxy” RFG would put CA, NY, and CT on a gasoline island unable to access supply from other regions if necessary.
- Smog-forming emissions would increase. Ethanol use helps RFG “over-comply” with the RFG performance standards. The only real world test between a “non-oxy” RFG and ethanol-blended RFG showed that ethanol use reduces NO_x, VOC, and CO emissions (all smog precursors) compared to the “non-oxy” fuel.⁷ Therefore, even when refiners comply with the other RFG standards, a real world increase in harmful emissions would result.
- Greenhouse gas (GHG) emissions would increase. As states take a proactive approach to reducing GHG emissions from vehicles, the use of a renewable, low-carbon fuel component like ethanol is an obvious choice. In fact, the Pew Center on Global Climate Changes states: “Ethanol and other fuels that can be blended with petroleum offer the greatest promise for reducing transportation GHG emissions during the next 15 years.”⁸ Replacing ethanol with petroleum components will increase greenhouse gas emissions in CA, NY and CT.

Conclusion

When CA, NY and CT decided to ban MTBE, the states recognized the costs associated with the removal of MTBE from gasoline were a reasonable tradeoff to protect drinking water.

- **Ethanol blends are the most affordable way to replace the volume, octane, and clean-burning benefits previously provided by MTBE.**
- **In every instance, ethanol reduces the need for expensive high octane gasoline components that are in limited supply.** While the amount can vary depending on the ethanol blend level and time of year, ethanol always provides a net positive impact on gasoline volume. Increasing supply reduces consumer prices.

⁷ Automobile Alliance Report to California Air Resources Board, September 17, 2001, www.arb.ca.gov/fuels/gasoline/meeting/2001/AlliancePrestn.pdf

⁸ Pew Center on Global Climate Change, *Reducing Greenhouse Gas Emissions From U.S. Transportation*, May 2003, www.pewclimate.org/global-warming-in-depth/all_reports/reduce_ghg_from_transportation/index.cfm

- **Without ethanol, RFG in CA, NY and CT would be more expensive to produce,** raising prices at the pump for consumers.
- **Without ethanol, more of the gasoline supply would have to be imported,** raising prices at the pump for consumers.
- **Without ethanol, smog-forming emissions and greenhouse gas emissions would increase.**



For more information, contact:

Monte Shaw
202-289-3835
mshaw@ethanolRFA.org
www.ethanolRFA.org