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June 26, 2003

MEMORANDUM FOR MEMBERS OF THE GOVERNMENT REFORM SUBCOMMITTEE ON ENERGY POLICY, NATURAL RESOURCES AND REGULATORY AFFAIRS

FROM: Doug Ose

SUBJECT: Briefing Memorandum for July 2, 2003 Field Hearing, "California Gasoline Markets: From MTBE to Ethanol"

On Wednesday, July 2, 2003, at 10:00 a.m., the Government Reform Subcommittee on Energy Policy, Natural Resources and Regulatory Affairs will hold a field hearing on California gasoline markets. It will be in the auditorium of the South Coast Air Quality Management District, which is located at 21865 E. Copley Drive, Diamond Bar, California. The hearing is entitled, "California Gasoline Markets: From MTBE to Ethanol."

In June 2001 and April 2002, the Subcommittee held hearings on gasoline markets, entitled "Gasoline Supply – Another Energy Crisis?" and "Fuel Markets: Unstable at Any Price?," respectively.

In 1998, the University of California issued a report, which concluded that Methyl Tertiary-Butyl Ether (MTBE) could pose serious risks and costs associated with groundwater contamination. In 1999, California Governor Gray Davis issued Executive Order D-5-99, which required that MTBE be completely removed from California gasoline by December 31, 2002. To conform to the MTBE ban but still abide by California's strict air standards, the California Air Resources Board (CARB) initiated a Phase 3 reformulated gasoline standard. The Board altered gasoline standards to account for the increased ozone-forming potential of ethanol, another gasoline additive. In a subsequent executive order in 2002, the Governor delayed the effective date of the MTBE ban by one year, i.e., to December 31, 2003.

The 1990 Clean Air Act requires that reformulated gasoline include 2 percent oxygenate by volume. Currently, MTBE and ethanol are the only two viable additives to fulfill this requirement. By banning MTBE, California is essentially mandating the use of ethanol in its gasoline. Subsequent to the Governor's 1999 Executive Order, California refineries began to phase-out MTBE and add ethanol to their product. In addition to this transition, refiners also needed to switch from winter blends to summer blends, which meet the more stringent ozone regulations, as required by the Clean Air Act.

From January 1, 2003 to March 17th, the retail price of regular gasoline in California increased 57 cents, setting gasoline prices at a record $2.15 a gallon in some areas. Given that Californians consume nearly 1.1 billion gallons of gasoline each month, this increase translates into an additional $20 million a day spent on gasoline. After a slight decline in prices, gasoline prices are once again on the rise, averaging about $1.79 last week.

Crude Oil Markets

The current increase in California's fuel prices can be partly attributed to the high cost of crude oil on the world market. A low inventory of crude oil, the war in Iraq, a labor strike in Venezuela, and an unusually cold winter in the Eastern U.S. have contributed to the decrease in availability of crude oil and the increase in world oil prices.

According to the California Energy Commission (CEC), the price of Alaskan North Slope oil, a benchmark of crude oil prices, increased from $18.36 a barrel on January 2, 2002, to $37.48 a barrel on March 12, 2003. This price increase in crude oil, however, only accounts for part of the price increase in gasoline and does not explain why California has experienced greater price spikes then the rest of the country.

California: A Gasoline Island

Due to overlapping Federal, State, and local air quality programs, and local refining and marketing decisions, today's gasoline market is comprised of many types of gasoline that serve different regional markets. These specialized fuel formulations, also known as "boutique" fuels, add a level of complexity to the production, distribution, and storage of gasoline.

In California and the Chicago/Milwaukee area, which have the most stringent air quality regulations in the country, the proliferation of boutique fuels has limited the number of refiners that have the technology and knowledge to create the compliant fuel blends for their specialized fuel markets. As a result, small disruptions in production, such as refinery outages or pipeline ruptures, can severely limit the supply of gasoline in these areas and cause sharp price spikes.

In California, in March 1999, a fire at the Richmond Chevron refinery and an explosion at Tosco's Martinez refinery forced gasoline prices up 50 percent, causing San Francisco to have the most expensive gasoline in the country in April 1999. Similarly, in the Chicago/Milwaukee area, pipeline ruptures and production shortfalls in 2000 decreased the gasoline pool about 2 to 3 percent and caused a 50-cent difference between regional and national gasoline prices.

As more regulations are added and blending options are regionally limited, particularly in terms of what oxygenate can or cannot be used, the ability to move gasoline from one area of the country to another (i.e., the fungibility of gasoline) will be greatly reduced. The result will be supply shortages and price increases that occur more frequently and last for longer periods of time.

The Transition from MTBE to Ethanol

In addition to the tight crude oil market and the balkanization of the gasoline market, the mandatory transition from MTBE to ethanol in California has also decreased supply and increased fuel prices in California. MTBE is blended with gasoline at a concentration of 11 percent by volume to meet Clean Air Act standards. Ethanol typically composes only 6 percent of gasoline by volume. To compensate for this 5 percent loss, additional crude oil or specialty blending products must be added to the fuel mixture. Many refineries, however, are unable to recover the lost volume because they are running at or near full capacity and cannot process additional crude oil. As a result, refiners will have to import more finished products from other areas of the U.S. or abroad.

Supply reductions can also be attributed to the complexity of making gasoline blended with ethanol and continuing to meet California's strict air standards. Refiners must remove pentane, a light hydrocarbon, from crude oil before gasoline is produced. This is necessary given ethanol's propensity to evaporate and combine with other molecules in ambient air to create air pollution. If pentane is not extracted, ethanol blended gasoline emits high levels of ozone precursors known as volatile organic compounds (VOCs). However, removing pentane decreases the volume of gasoline that is produced from each barrel of crude and raises economic and environmental issues over the use, disposal, or storage of unutilized pentane. The volume loss associated with ethanol use, and pentane removal results in a 10 percent decrease in gasoline supply and a net increase of foreign oil imports to California.[1]

According to a June 2003 draft report produced by Professor Tad W. Patzek of the University of California at Berkeley, when all energy inputs are considered, producing one gallon of ethanol requires the use of one gallon of fossil fuel equivalent. In other words, using fuel with ethanol results in a net energy loss, not a net gain. Another study, produced by the Congressional Research Service, reported that, on average, ethanol attributes a 3 percent decrease in miles-per-gallon vehicle fuel economy. Altogether, this means that Californians will need more gasoline than they needed in the past to travel the same distance. Thus, California's gasoline market will tighten further, and prices will increase.

California's refineries have experienced difficulties in blending ethanol with gasoline, resulting in supply shortages and price increases this year. On April 29, 2003, the LA Times reported that 420,000 gallons of regular gasoline distributed from Arco's terminal in San Diego lacked the required ethanol and needed to be retrieved from 59 stations and re-blended, "leaving some stations without regular gasoline for days." This outage was one of the 12 outages that plagued California refineries in the past six months. More outages are likely, as the Energy Information Agency (EIA) notes that retooling refineries to use ethanol requires additional refinery maintenance. As the summer driving season approaches, decreased fuel supply and increased outages will significantly increase prices at the gas pumps.

[1] The Jones Act of 1920 requires that goods or passengers transported from one domestic port to another must be on a vessel that is constructed in a U.S. shipyard, U.S. owned and crewed, and registered as a U.S. flagship. To avoid additional costs, many refiners choose to use international oil instead of domestic supplies.

To date, 16 States have MTBE bans in place, eight States have MTBE bans under consideration, and two States have goals to establish an MTBE ban in the future (see attached chart). Considering that half of the country has or will ban MTBE, and the likelihood that Congress will mandate ethanol usage, one can conclude that many other States will experience gasoline supply shortages and price spikes similar to those of California.

Fuel Markets Under the Energy Bill Passed by the House (H.R. 6)

The difficulties incurred by the California fuel market are more pertinent than ever, given the likelihood that Congress will pass comprehensive energy legislation in the 108th Congress. The House of Representatives has already approved H.R. 6, a bill that mandates the use of five billion gallons of ethanol nationwide by 2015.

At the Subcommittee's April 2002 hearing, Nicholas Economides, Director, Hart Downstream Energy Services, testified that gasoline prices could increase by up to 9.75 cents per gallon under Senate bill 517 (S. 517), which had a similar ethanol mandate. This figure, however, does not consider price spikes due to production or delivery problems that are likely under such fuel provisions. Hence, national gasoline prices could increase significantly under a new ethanol mandate.

Environmental Implications

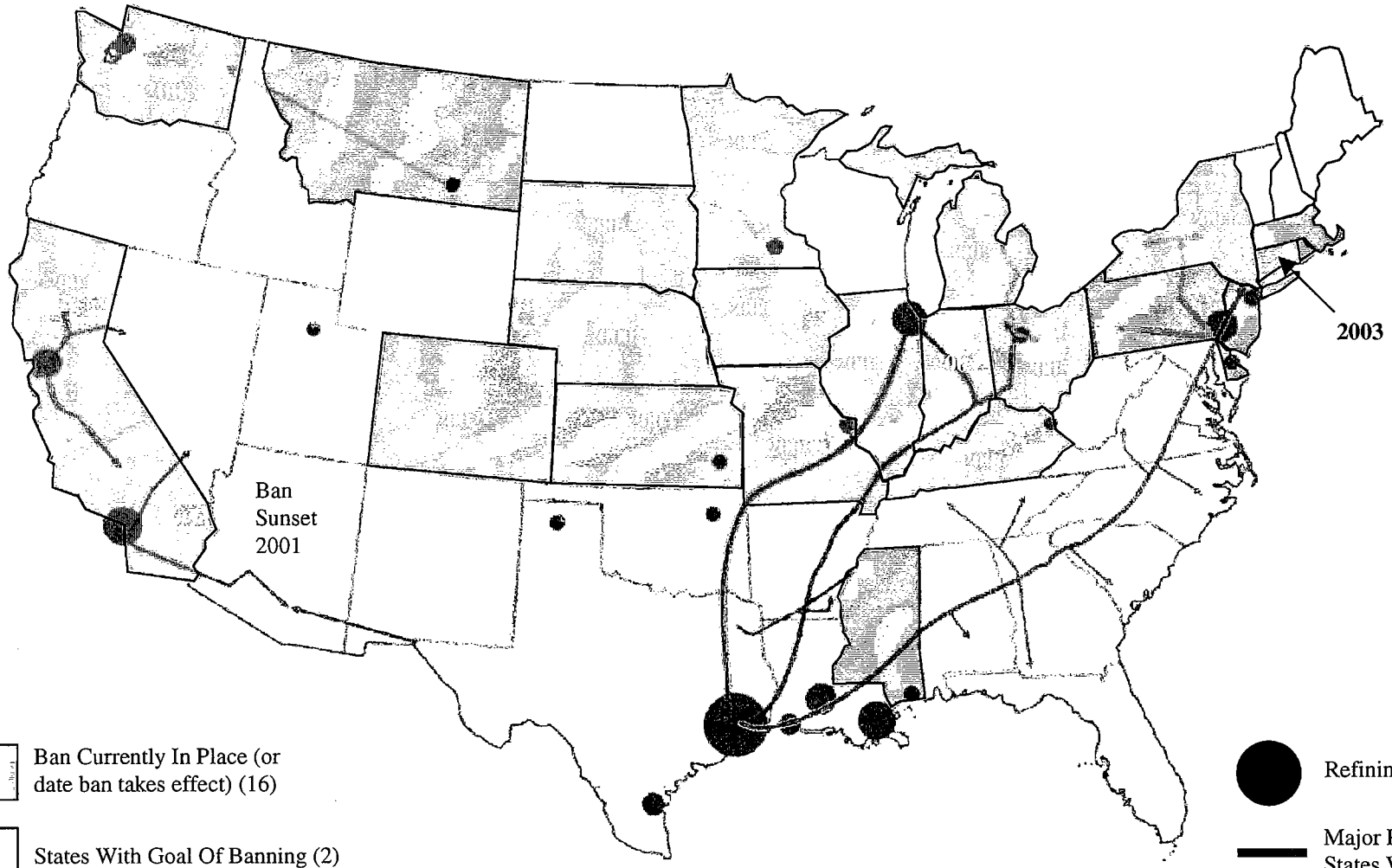
In addition to economic concerns, the transition from MTBE to ethanol also raises issues about water and air pollution. Given ethanol's propensity to evaporate and form ozone precursors, it may do more harm than good to the environment. In June 2000, before the Senate Environment and Public Works Subcommittee on Clean Air, Wetlands, Private Property and Nuclear Safety, A. Blakeman Early, environmental consultant to the American Lung Association, testified, "The volatility increases that ethanol causes in summertime can overwhelm any benefit it provides in reducing carbon monoxide (CO) tailpipe emissions, sulfur dilution or aromatics dilution ... The bottom line: the reduction in CO tailpipe emissions obtained by using ethanol in summertime gasoline are not worth the increase in evaporation and the increases in NOx [nitrogen oxide] tailpipe emissions from a smog contribution point of view." Similarly, carbon monoxide, methanol, and some carcinogenic emissions from factories that produce ethanol have added to air pollution in concentrations greater than originally promised by the industry.

In terms of water pollution, when ethanol-blended gasoline is leaked from underground tanks, soil bacteria metabolize ethanol before other gasoline components, allowing carcinogenic benzene plumes to travel further and pollute water wells. Also, increased corn production, which will be necessary to make an adequate amount of ethanol, will result in greater nitrate and agriculture chemical run-off, causing pollution in nearby streams, rivers, and aquifers.

Invited Witnesses: Guy F. Caruso, Administrator, EIA, Department of Energy; William J. Keese, Chair, CEC; Joe Sparano, President, Western States Petroleum Association; L. Lynne Kiesling, Director of Economic Policy, Reason Public Policy Institute; and Bob Gregory, Vice President and General Manager of Valero's Wilmington, California Refinery.

Attachment

STATE MTBE BANS



Ban Currently In Place (or date ban takes effect) (16)

States With Goal Of Banning (2)

Ban Considered In 2003 (8) (Including Hawaii)

Refining Centers

Major Pipelines Into States With Bans

Source: Turner, Mason & Company, Feb. 2000.
Updated: March 2003