

ENVIRONMENTAL AND ENERGY STUDY INSTITUTE

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Issue Summary

Enacting a Renewable Fuels Standard: Economic, Energy, and Environmental Implications

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Background

Both the House and the Senate have advanced Renewable Fuels Standard (RFS) proposals to address a variety of concerns surrounding water pollution, air quality and the growth of a biofuels market. Both proposals call for the circulation of 5 billion gallons of renewable fuels (i.e., ethanol and biodiesel) to be in the transportation fuels market by 2012 or 2015 and the elimination of the federal oxygenate requirement for reformulated gasoline.

Supporters of the RFS highlight the need to find renewable energy alternatives, as the United States currently imports over half of its petroleum, two-thirds of which is consumed in the transportation sector. Proponents of the RFS also emphasize the environmental benefits of biofuels, which are non-toxic and readily biodegradable. In addition, both ethanol and biodiesel have been shown to significantly reduce the emission of greenhouse gases when compared to petroleum fuels. Finally, many emphasize the economic development and job growth a strong biofuels industry could create.

Opponents of RFS legislation express concern over the effect the RFS could have on gasoline prices. Some have questioned whether ethanol can be cost competitive in regions of the country that lack locally based production facilities, and still others question the energy balance of producing biofuels. Others have raised concerns about the effect of ethanol's excise tax exemption on the Highway Trust Fund (HTF).

RFS Legislation

S. 791, the Senate's version of RFS legislation, is nearly identical to the fuels compromise that was part of last year's comprehensive energy bill, a bill that ultimately died in the Senate-House Conference Committee when Congress adjourned. S. 791, which was reported out of the Senate Environment and Public Works committee on April 9, 2003, has been offered as an amendment to the Senate Energy Policy Act of 2003 (S. 14) by Majority Leader Frist (R-TN) and Minority Leader Daschle (D-SD), and is pending action on the floor. It requires that 5 billion gallons of renewable fuel be used in the nation's fuel supply by 2012, establishes a national ban on MTBE, and eliminates the Clean Air Act's 2 percent oxygenate standard for reformulated fuels. S. 791 also creates a "safe harbor" provision for renewable fuels producers, which would exempt producers from certain product liability claims.

The House of Representatives passed its version of the Energy Policy Act of 2003 (H.R. 6) on April 11, which contains its own RFS legislation. Similar to its Senate counterpart, the House bill eliminates the oxygenate requirement of the 1990 Clean Air Act, but unlike the Senate bill it does

not ban MTBE and it sets the five billion gallon requirement at 2015. The House legislation would also extend the Senate's "safe harbor" provision to include MTBE producers, which is bound to be controversial in a House-Senate Conference committee.

MTBE

MTBE is an oxygenate that has been widely used since the passage of the 1990 Clean Air Act Amendments (CAAA) that created a 2 percent oxygenate requirement for reformulated fuels. While ethanol was used extensively in Midwest reformulated gasoline (RFG), MTBE was the oxygenate of choice in most regions and was used in about 85 percent of reformulated gasoline. Although MTBE has been used effectively to reduce smog and improve urban air quality, many states have moved toward banning it because of concerns over water contamination. Many wells around the country have been rendered undrinkable from MTBE that leaked into the ground water from underground storage tanks.

California, which was a major user of MTBE, moved to ban the fuel additive by the end of 2002. However, ethanol supply concerns prompted Governor Grey Davis to postpone the ban by one year. These concerns proved to be unfounded, as all major refiners in the state have already made the transition to ethanol well ahead of the new deadline. This is consistent with a California Energy Commission report that projected that the U.S. ethanol industry will "roughly double its production capacity over a four-year period, resulting in estimated industry-wide capacity of about 4.5 billion gallons per year by the end of 2005."^{i[i]} New York and Connecticut, also major MTBE markets, are moving to ban the fuel additive at the end of 2003.

Proponents of RFS legislation, including the American Petroleum Institute (API), point out that a repeal of the federal oxygenate requirement, coupled with the phaseout of the fuel additive MTBE, will allow for a coordinated transition away from the use of MTBE, thereby preventing price spikes. According to Dr. Edward Murphy, API's Downstream General Manager, the alternative is to allow individual states to determine what fuel blends to use, in which case "consumers will be subject to costs of uncoordinated state MTBE bans."^{ii[iii]}

Cellulosic Ethanol

Both S. 791 and H.R. 6 contain provisions allowing a gallon of ethanol derived from cellulosic biomass to be counted as 1.5 gallons of renewable fuel in order to spur the development of a cellulosic ethanol market. The advantage of cellulosic ethanol is that its production greatly reduces the emission of greenhouse gases on a lifecycle basis when compared to gasoline. As opposed to starch-based corn ethanol, cellulosic ethanol is derived generally from abundant waste products such as agricultural and forest wastes such as sugar cane bagasse, rice straw, corn stover and forest thinnings, municipal waste such as waste paper and yard waste, and industrial waste such as pulp/paper and sludge.

Masada Resources Group is working to perfect technology that converts municipal solid wastes into fuel ethanol and other byproducts on a commercial basis. Masada's conversion process would allow the conversion of over 90 percent of incoming municipal solid waste and sludge into ethanol, recyclables and other byproducts. Masada anticipates that its planned facility in Middletown, NY, will create up to 200 permanent jobs, 350 union construction jobs, and generate more than \$30 million per year in local contracts and salaries.

Iogen Corporation, a privately owned Canadian business, has recently announced that its demonstration facility in Ottawa, Canada is successfully processing 30 tons of wheat straw per week into fermentable sugar using an enzymatic process. It is on track to reach annual production of 320,000 liters (roughly 85,000 gallons) of cellulosic ethanol.

Energy Balance & Greenhouse Gas Reductions

In a study released August 2002, US Department of Agriculture (USDA) concludes that the

energy balance of corn ethanol – the ratio of energy put into the production of ethanol versus the amount put out – is 1:34:1. This means that ethanol “yields 34 percent more energy than it takes to produce it, including growing the corn, harvesting it, transporting it and distilling it into ethanol.”ⁱⁱⁱ[iii1] The positive ratio is due mostly to technological advances in the ethanol production process. Specifically, advances in the areas most critical in determining energy balance: corn yields, changes in agricultural practice and the ethanol production process. These data are consistent with a recent study by Professor Bruce Dale of Michigan State University and a 1999 study by Argonne National Laboratory. The Argonne National Laboratory study also found that ethanol provides substantial benefits in terms of lifecycle greenhouse gas (GHG) emissions: use of E85 (85 percent ethanol and 15 percent gasoline by volume) achieves 14–19 percent reduction in GHG emissions when compared to gasoline.^{iv}[iv1]

Biodiesel, a renewable fuel derived from animal fats and vegetable oils, is a diesel fuel substitute that can be used in heavy-duty diesel vehicles like trucks and buses with no engine modification. A 1998 joint study by the U.S. Department of Energy (DOE) and the U.S. Department of Agriculture (USDA) concluded that biodiesel yields 3.2 units of fuel product energy for every unit of fossil energy consumed in its life cycle: “The biodiesel life cycle produces more than three times as much energy in its final fuel product as it uses in fossil energy. Fossil energy used for the conversion step is almost twice that of its process energy consumption, making this stage of the life cycle the largest contributor to fossil energy demand. Because 90 percent of its feedstock requirements are renewable (that is, soybean oil), biodiesel’s fossil energy ratio is favorable.”^v[v1] The same study also found that B20, the most commonly used blend of biodiesel, provides a 15.66 percent reduction in CO₂ (the principal greenhouse gas) emissions, and that the overall life cycle emissions of CO₂ from B100 (100 percent biodiesel) are 78.45 percent lower than those of petroleum diesel.

Economic Development

A recent study released by USDA’s office of the Chief Economist concluded that the RFS provision that passed the Senate last year, and is virtually identical to the RFS currently under Senate consideration, would be positive on a variety of levels.^{vi}[vi1] The study stated that increased ethanol production would be followed by increased demand for corn and sorghum, and by 2011, “prices would be up about 13 cents per bushel or 5 percent.” The increased demand for ethanol would also impact net farm income. In the short-term (2002-05), the effects on farm income would be relatively small, but the period 2006-2011 would see net farm income rise “on average by \$0.7 billion a year.” The USDA study also found that the increasing size of the ethanol market would generate employment, creating an estimated 13,500 jobs in the United States economy. Over half of these new jobs would come from nonfood sectors, while the rest would come from the farming sector and the food processing sector.

Restructuring the Ethanol Tax Credit

Opponents of a RFS have long protested that increased ethanol production will further siphon funds from the Highway Trust Fund (HTF). As it stands now, regular gasoline is taxed at the rate of 18.4 cents per gallon, and ethanol-blended fuel is taxed at a much lower rate (5.2 cents on a 10 percent blend). Critics have argued that this results in less revenue going into the HTF, which is funded by fuel taxes. The Energy Tax Incentives Act of 2003 (S. 597), which was recently reported out of the Senate Finance Committee, restructures the ethanol excise tax exemption so that ethanol-blended fuels make the same contribution per gallon to the HTF as regular gasoline. As proposed, the 5.2 cent ethanol tax incentive would come directly from the federal government’s General Fund.

Much of the information in this document was taken from Congressional briefings organized by the Environmental and Energy Study Institute: “Enacting a Renewable Fuels Standard:

Economic, Energy, and Environmental Implications”(3/27/03) and “Environmental Qualities of Biofuels” (7/31/02). For information on the briefings, including presentations made by panelists, please visit <http://www.eesi.org/briefings/brief.htm>.

For further information, or to sign-up to receive EESI's ECO (Ethanol, Climate Protection, Oil Reduction) newsletter, please contact Josh Alban at 202-662-1885 or jalban@eesi.org.
