

The Time to Reform US Biofuels Policy Is Now

Kimberly Ann Elliott

Even as Congress was mandating large increases in the consumption of biofuels a decade ago, the world was changing. In the early 2000s, replacing fossil fuels with biofuels made from corn, sugar, or oilseeds seemed like a good idea. Increased crop demand would prop up prices for farmers, and replacing petroleum with renewable energy would reduce greenhouse gas (GHG) emissions and promote energy independence. Then in 2007–08, partly as a result of biofuel demand, food prices spiked. Higher agricultural prices created incentives to plow up virgin land and cut down forests to increase crop production. Although higher prices were good for farmers, including those in developing countries, they increased food insecurity for poor consumers in the short run and undermined efforts to mitigate climate change.

How to Fix the RFS:

1. Eliminate the current volume-based targets and set an overall 10 percent blend target for renewable fuels.
2. Refuse to renew biodiesel tax credits.
3. Encourage cellulosic biofuels within the 10 percent target.
4. Give higher priority to food security concerns by making it easier for the Environmental Protection Agency to waive the mandate when prices spike.

In addition to not achieving Congress's energy security or environmental goals, implementing the Renewable Fuel Standard (RFS) is becoming ever more complex. On the supply side, advanced biofuels that do not use food crops and are more climate friendly have not been developed as expected. Thus, refiners cannot blend fuel that does not exist. On the demand side, the bulk of the US automobile fleet cannot safely use gasoline with more ethanol. So the overall mandate target cannot be met. The assumptions undergirding US biofuel policy have not held. Now Congress needs to fix it, either by eliminating the RFS or, if that's not possible, by acting to simplify the policy, making it more flexible and less costly.

Global Spillovers from US Biofuels

In 2000, global consumption of biofuels was less than five billion gallons, with most of that consumption in Brazil and the United States. A decade later, biofuel use was five times greater, and European consumption, which had barely registered in 2000, had caught up with that of Brazil. US consumption eclipsed that of Brazil in the mid-2000s and now accounts for half of the world's total. This rapid global increase, driven by inflexible government mandates, had a number of unintended consequences.

When food prices spiked in 2007–08, biofuels were not the only cause. However, the decision to ramp up support for biofuels in the mid-2000s could not have come at a worse time for global food security. Biofuel mandates added a relatively large and inelastic source of demand for food and feed crops at a time when prices were

already rising due not only to structural changes in demand in developing countries but also to the short-run effects of weather and financial markets. While higher farm gate prices yielded benefits for producers in developing countries, the volatility induced by biofuel mandates created problems for producers and consumers alike. Although food prices have softened recently, they remain well above the levels of the mid-2000s, and demand created by biofuel mandates continues to be a factor.

In addition to growing concerns about food security, there has been reason to reassess the role of biofuels in climate change mitigation. The transportation sector is responsible for 14 percent of global GHG emissions, more than two-thirds of which are from road transport. Reducing GHG emissions was among the key reasons cited for passage of the RFS. However, advanced biofuels have been slow to come online, and there are ever more questions about the net GHG emissions of first-generation biofuels.

Estimates of GHG emissions over the full life cycle of today's food-based biofuels vary widely, depending on how and where the crops are grown and how they are processed. Even when biofuel production is efficient, however, the net effect on climate change can be negative if it leads to direct or indirect land use changes. Thus, if producers chop down tropical forests in Brazil, Argentina, or Indonesia to grow sugar, soybeans, or oil palm to make biofuels, then the GHG emissions associated with the resulting fuels could well be higher than those of gasoline or diesel.

In addition, to make up for the food and feed crops going into fuel tanks, either people must eat less or farmers must produce more.¹ Some increased production could come from using existing farmland more productively. But if farmers respond to higher prices by cultivating virgin lands or converting forests, then those indirect land use changes will create additional GHG emissions that further undermine the case for biofuels.

1. For more on these trade-offs, see T. Searchinger, et al., 2015, "Do Biofuel Policies Seek to Cut Emissions by Cutting Food?" *Science* 347, no. 6229 (March 27): 1420–22. In the article, which was published after my paper on biofuel policies was finished, researchers calculated the degree to which the estimates in general equilibrium models of lower net emissions from biofuel use depend on lower demand for food as a result of higher commodity prices.

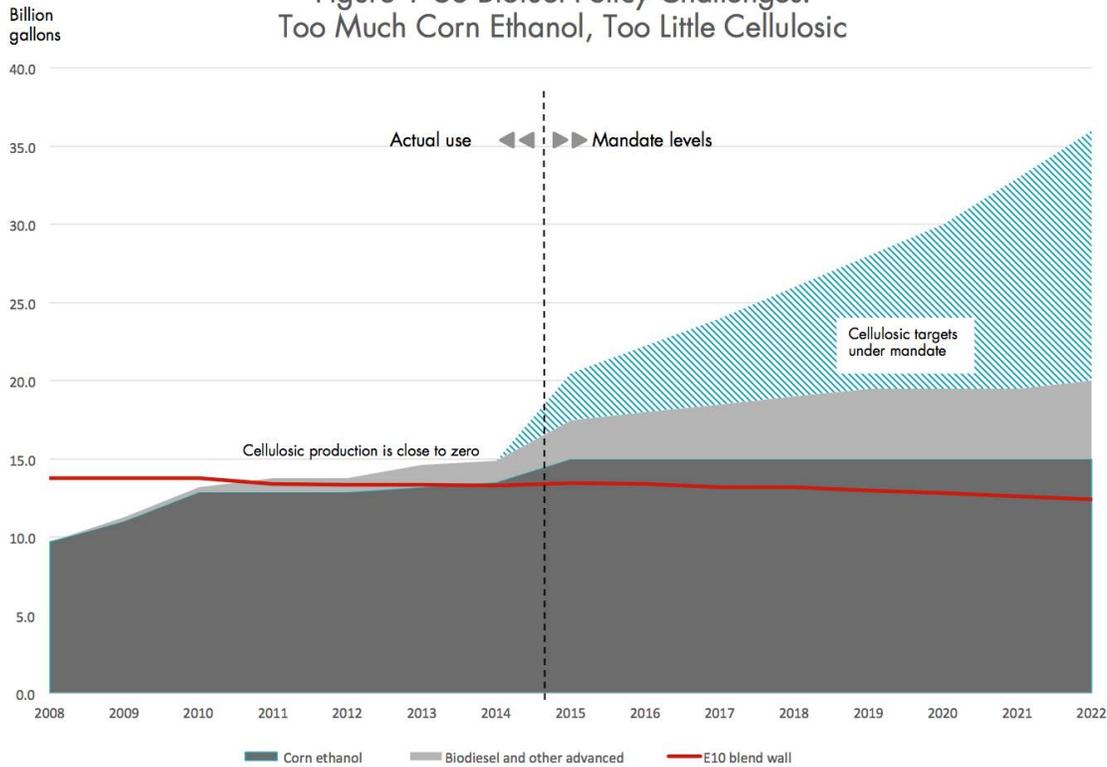
US Policy Runs into the Blend Wall

In addition to misjudging food price trends, Congress made two other miscalculations when it expanded the RFS in 2007. The original RFS, passed in 2005, mandated the blending with gasoline of relatively modest amounts of ethanol, mainly produced from corn. The revised RFS mandate sharply increased the overall mandate level and added targets for cellulosic and other advanced biofuels. The first error was in being overly optimistic about the development of cellulosic biofuels. The second was in defining targets that proved difficult to reach when gasoline consumption unexpectedly fell.

Today there are growing gaps between the expanded RFS targets and what the markets are able to supply, in the case of cellulosic biofuels, or absorb, in the case of corn-based ethanol (Figure 1). The Environmental Protection Agency (EPA), the agency charged with RFS implementation, has repeatedly waived most of the cellulosic biofuel mandate due to insufficient supply. Yet, in order to maintain incentives to develop the industry, the agency did not eliminate the target. After being forced to pay \$7 million in penalties for failing to blend cellulosic biofuels that did not exist, oil companies sued the EPA over its RFS implementation and won. Since then, the EPA has set the target for cellulosic biofuel close to expected production levels. In 2015, plants capable of producing a total of roughly 75 million gallons are expected to be online, though the distance between production volumes and statutory RFS targets—3 billion gallons this year and 16 billion gallons by 2022—continues to grow exponentially.

The EPA also faces another major challenge. Just as a few cellulosic ethanol plants are coming online, the ethanol market is becoming saturated, and the industry is running into a "blend wall." Ethanol is corrosive; therefore, until recently, EPA regulations limited the ethanol content in gasoline to 10 percent (E10) for use in unmodified automobiles and small engines, such as those used for recreational boats, lawn mowers, and leaf blowers. When Congress expanded the RFS target for conventional ethanol to 15 billion gallons by 2015, gasoline use in the United States was projected to rise to around 150

Figure 1 US Biofuel Policy Challenges:
Too Much Corn Ethanol, Too Little Cellulosic



billion gallons and there was little concern about hitting the blend wall.

Instead of rising, however, US gasoline consumption fell to between 130 billion and 135 billion gallons, with projections for further decline to 125 billion gallons in 2022. To try and get around the blend wall problem, at least temporarily, the EPA raised the allowable level of ethanol in gasoline to 15 percent (E15) for vehicles built in 2001 or later. But automobile manufacturers disagreed about the safety of higher blends and warned they would only honor warranties for models from 2013 or later if ethanol caused damage. Meanwhile, gasoline retailers have shown little interest in investing in the additional pumps and storage tanks that would be needed to offer different blends for different year models.

The EPA now finds itself the subject of complaints and legal challenges from all sides. The development community and environmental advocates remain concerned about the negative impact of biofuels on food security and forests. In 2008 and again

in 2012, governors from large livestock producing states petitioned the EPA to waive the mandate in the face of spiking feed prices. The EPA declined both requests on the grounds that other factors contributed to the price spikes and the RFS was not causing "severe harm" to those states. In 2013, the American Petroleum Institute filed a petition asking the EPA to waive the mandate for cellulosic biofuels and partially waive the conventional ethanol target because of the blend wall.

Because of the difficulties posed by the blend wall, lagging cellulosic production, and the ongoing threat of litigation, the EPA has yet to set the mandate target for 2014, which was due in November 2013, or 2015, which was due in November 2014. The ethanol market is saturated and the oil industry and retailers do not want to bear the investment costs of making E15 available, which would have the effect of expanding the market past the E10 blend wall. And there remain too few flex fuel vehicles, consuming the E85 blend, to meet the statutory mandate levels. But it is unclear how far EPA's authority to reduce the



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mandate levels to accommodate the blend wall extends, and any decision promises litigation from one side or the other.

Finally, the biodiesel target has gotten less attention than it should, given the economic and environmental costs. Biodiesel is more expensive to produce than corn ethanol and it has only been competitive when taxpayers subsidize it with a tax credit of \$1 per gallon. More concerning, the diversion of soybean oil for biodiesel increases the demand for palm oil imports and that threatens the tropical forests of Indonesia and Malaysia.

Reforming US Biofuel Policy

The RFS succeeded in boosting prices for American corn and soy growers, but at a high cost to livestock producers and poor consumers in developing countries. And the 2014 farm bill introduced an array of new programs to shelter farmers from market shocks, reducing the need for price support from the RFS. With respect to the other goals of US biofuel policy—to increase energy independence and reduce GHG emissions—there are far more cost-effective ways to achieve them.

There are bills pending in both houses of Congress to modify the RFS, but neither would fix all the problems with the mandate. Both would eliminate the corn-based ethanol mandate, while leaving the mandate for biodiesel and cellulosic and other advanced biofuels in place. These bills would retain much of the complexity of the RFS and could create new unintended consequences. The EPA would still face the challenge of setting the mandate each year to provide some incentive for the development of advanced biofuels, while accommodating production and feedstock shortfalls to keep the costs of the policy reasonable.

If elimination of the RFS is not possible, Congress should focus on other ways to minimize the high costs and unintended consequences of the RFS. Key changes that Congress should make to simplify the policy and make it more flexible include the following:

1. Eliminate the current volume-based targets under the mandate and set an overall 10 percent blend target for renewable fuels.
2. Do not renew the biodiesel tax credit.
3. Encourage cellulosic biofuels within the 10 percent target by giving them two or three times the weight of conventional ethanol when counting them against the mandate.
4. Give a higher priority to food security concerns by making it easier for the EPA to waive the mandate when prices spike.

The proposed incentive for cellulosic biofuels is modest because it remains unclear whether these fuels can be cost-effective or whether they can really avoid the trade-offs of the current generation when it comes to food security and climate change mitigation. Until there is more evidence on that, Congress should avoid using subsidies or mandates to expand the market for E85 and to get around the blend wall. Congress should instead look to the array of policies that we know can promote energy independence and mitigate climate change economically and effectively: conservation measures, reduced fossil fuel subsidies, higher fuel taxes, and financial and other support to reduce tropical deforestation.

This brief is based on Kimberly Ann Elliott, *Biofuel Policies: Fuel versus Food, Forests, and Climate*, CGD Policy Paper 051, January 2015.



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