

BEFORE THE HOUSE SCIENCE COMMITTEE
SUBCOMMITTEE ON OVERSIGHT AND SUBCOMMITTEE ON ENVIRONMENT

HEARING ON:
RENEWABLE FUEL STANDARD
A TEN YEAR REVIEW OF COSTS AND BENEFITS

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TESTIMONY OF CHARLES DREVNA

INTRODUCTION

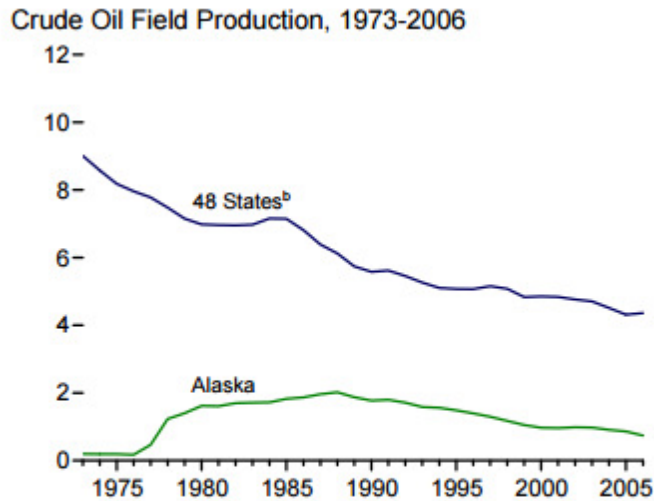
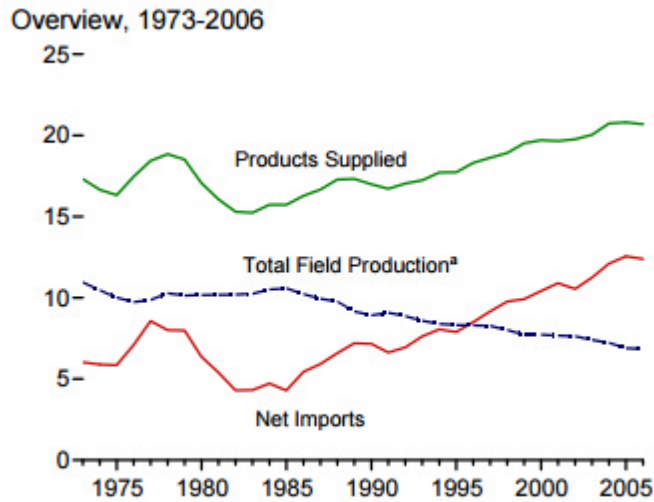
The Renewable Fuel Standard was based on incorrect assumptions about oil production and consumption, as well as the ability of Congress and the administration to mandate and create incentives for innovation and vast technological and economic leaps in biofuel production. The RFS was intended to create greater energy and economic security, but as Milton Friedman famously posited, “One of the great mistakes is to judge policies and programs by their intentions rather than their results.”

The results of the RFS are a failure for America. We have greater energy security today—not because of vast improvements in cellulosic biofuels as envisioned in 2007—but because of much greater domestic oil production coupled with a leveling off of demand. It is time we look at the actual results of the RFS and act accordingly. As a result, it is time to end the RFS and let American fuel producers focus on delivering the best products to American motorists.

HOW WE GOT HERE

In the mid 2000’s, U.S. oil consumption was increasing but U.S. oil production was decreasing. It seemed to many people that these trends would continue. The Renewable Fuel Standard in the Energy Independence and Security Act of 2007 was passed to reduce our dependence on foreign oil while providing development opportunities to rural America. To achieve this, the law mandated the use of billions of gallons of cellulosic ethanol under the assumption that the technology would soon be cost competitive, that Congress and the administration could correctly predict the future, and that Congress could mandate innovation. These assumptions were very, very wrong.

These two charts are the Energy Information Administration’s *Monthly Energy Review* for December 2007.¹ The point is clear—U.S. oil production was falling while consumption (essentially “Products Supplied”) was increasing. There was no end in sight for these trends.



^aCrude oil and natural gas plant liquids field production.
^bUnited States excluding Alaska and Hawaii.
 Note: Because vertical scales differ, graphs should not be compared.

The RFS was seen as a way to increase domestic fuel production, and people thought that cellulosic and other exotic biofuels could be cost effective. Unfortunately, Congress and the administration believed the hype that cost-effective cellulosic ethanol was “just around the corner.”

¹ Energy Information Administration, *Monthly Energy Review*, December 2007, p. 42, <http://www.eia.gov/totalenergy/data/monthly/archive/00350712.pdf>

CELLULOSIC HYPE

In 2006, the Worldwatch Institute opined the cellulosic and other biofuels would compete in the “medium term” with oil:²

The long-term potential of biofuels is in the use of non-food feedstock that include agricultural, municipal, and forestry wastes as well as fast-growing, cellulose-rich energy crops such as switchgrass. It is expected that the combination of cellulosic biomass resources and “next-generation” biofuel conversion technologies—including ethanol production using enzymes and synthetic diesel production via gasification/Fischer-Tropsch synthesis—will compete with conventional gasoline and diesel fuel without subsidies in the medium term.

In 2007, Bob Dinneen, the head of the Renewable Fuels Association, said that within 3 years cellulosic would be cost competitive. He said, “I don't think anybody knows if it's going to be 18 months, or two years or three years before you see the first commercially viable plant.”³

Also in 2007, the Department of Energy announced \$385 million in federal funding for six cellulosic plants. The DOE stated, “When fully operational, the biorefineries are expected to produce more than 130 million gallons of cellulosic ethanol per year. This production will help further President Bush's goal of making cellulosic ethanol cost-competitive with gasoline by 2012.”⁴ (The reality is that in 2012, cellulosic producers only produced 20,069 gallons of cellulosic biofuel.)

After EISA passed in 2007, investor Vinod Khosla said that the goals were not ambitious enough. He stated, “We can do substantially better than what's in the energy bill.”⁵

Within a couple years of the passage of the amendments to the RFS, the renewable fuels industry was claiming that cellulosic had arrived. Bob Dineen testified before Congress in May 2009, “It is important to understand that cellulosic ethanol and other advanced biofuels are no longer “just around the corner” or “just over the horizon” — they are here today.”⁶

Dineen was not alone in the ethanol industry. An Issue Brief from Ethanol Across America in fall 2009 claimed, “we are fast approaching warp speed and meeting the cellulosic ethanol targets in the nation's Renewable Fuel Standard (RFS) appears to be reachable.”⁷

² Report: Biofuels Poised to Displace Oil, Worldwatch Institute, June 2006, <http://www.worldwatch.org/report-biofuels-poised-displace-oil>

³ *Bush's ambitious biofuels goals hinge on cellulosic ethanol*, E85 - E&E News, January 24, 2007 <http://www.eenews.net/greenwire/stories/50974/>.

⁴ <https://web.archive.org/web/20070304091902/http://www.doe.gov/news/4827.htm>

⁵ Congress places a big bet on cellulosic ethanol - E&E News, December 14, 2007 <http://www.eenews.net/greenwire/stories/59894/>

⁶ Bob Dineen, Testimony before the House Agriculture Committee - May 21, 2009 http://ethanolrfa.3cdn.net/5dc24f732b2e86d45d_lym6bjcx.pdf

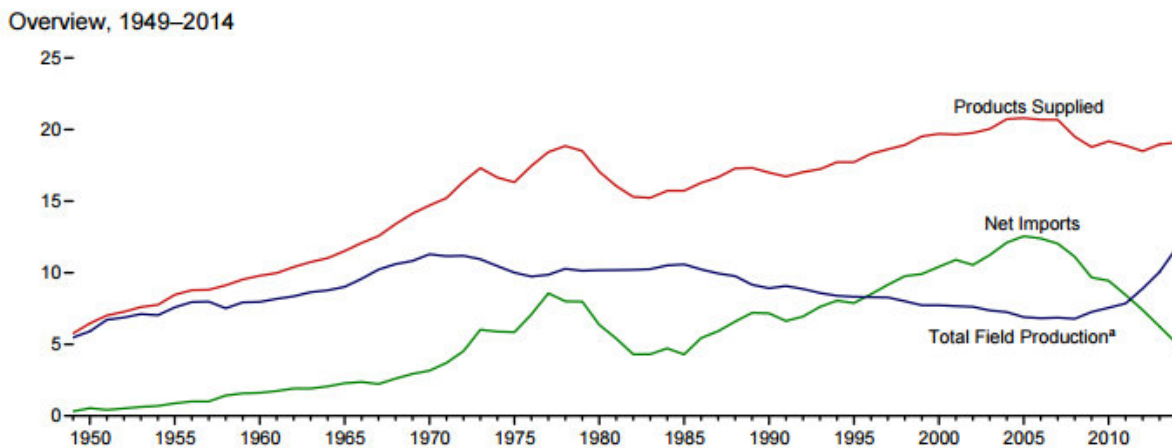
⁷ Ethanol Across America Issue Brief, Fall 2009 <http://www.cleanfuelsdc.org/pubs/documents/CellulosicEthanolIssueBrief11109.pdf>

CELLULOSIC REALITY

The fuel future that Congress and President Bush envisioned in 2007 has not come to pass. U.S. oil production has dramatically increased and oil consumption has leveled off. Furthermore, the cellulosic ethanol revolution has not happened. The RFS requires the production of 3 billion gallons of cellulosic ethanol in 2015. So far this year, only 1.6 million gallons of cellulosic ethanol have been produced.⁸ That is a mere 0.06 percent of the mandated volume.

The predictions made in the mid-2000s about oil production continuing to decline and oil consumption continuing to increase have also proven incorrect. The following chart from EIA shows what has happened with petroleum use (ie. products supplied), domestic production, and imports.⁹ None of these changes were foreseen by the architects of the RFS.

Figure 3.1 Petroleum Overview
(Million Barrels per Day)

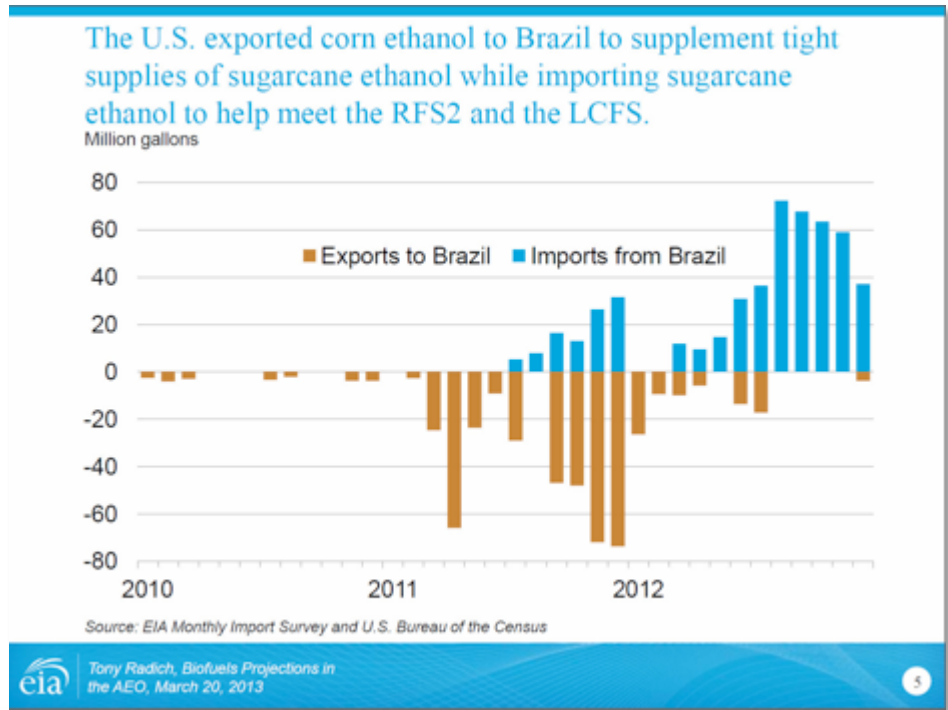


THE RFS WAS SUPPOSED TO BE ABOUT ENERGY SECURITY, SO WHY ARE WE IMPORTING ETHANOL FROM BRAZIL?

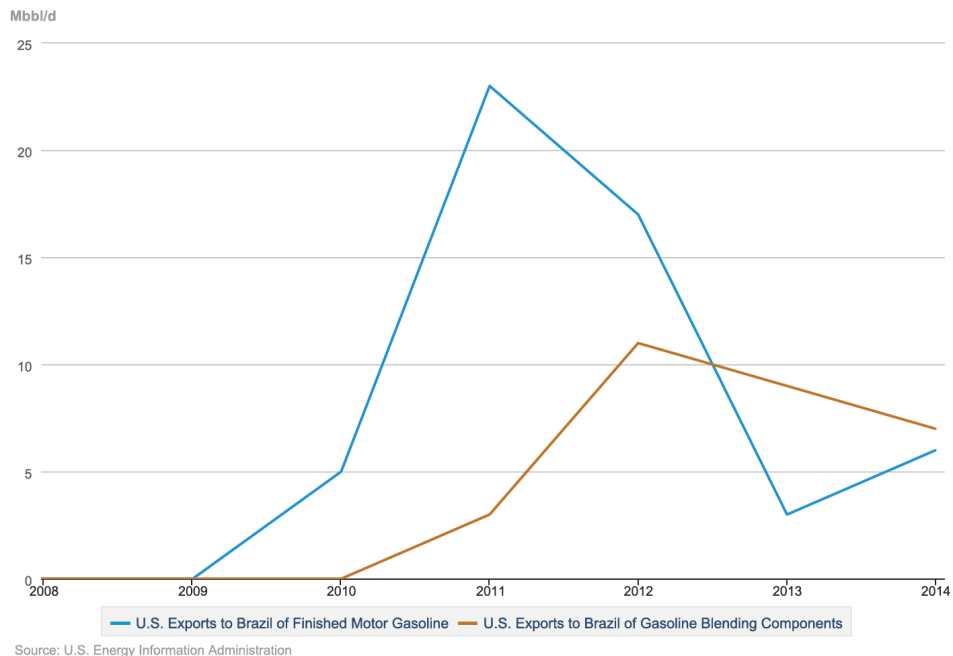
In 2007, Congress defined “advanced biofuel” in the RFS as biofuel other than ethanol derived from corn starch (ie. corn kernels) which EPA deems to have 50 percent lower lifecycle greenhouse gas emissions relative to gasoline. Currently, sugarcane ethanol is the only mass-produced product which EPA has certified that meets the definition of “advanced” biofuel. Sugarcane ethanol is also disproportionately used in the state of California for purposes of compliance with California’s Low Carbon Fuel Standard. As a result, we have an absurd situation where the U.S. imports sugarcane ethanol from Brazil and exports corn ethanol or gasoline to Brazil as these charts from the EIA show:

⁸ EPA, 2015 Renewable Fuel Standard data, Oct. 15, 2015, <http://www2.epa.gov/fuels-registration-reporting-and-compliance-help/2015-renewable-fuel-standard-data>. EPA also deems an additional 87 million gallons of fuel as cellulosic ethanol by counting some renewable compressed natural gas and renewable liquefied natural gas as cellulosic ethanol for purposes of the RFS.

⁹ EIA, Monthly Energy Review, <http://www.eia.gov/totalenergy/data/monthly/pdf/sec3.pdf>



Exports by Destination



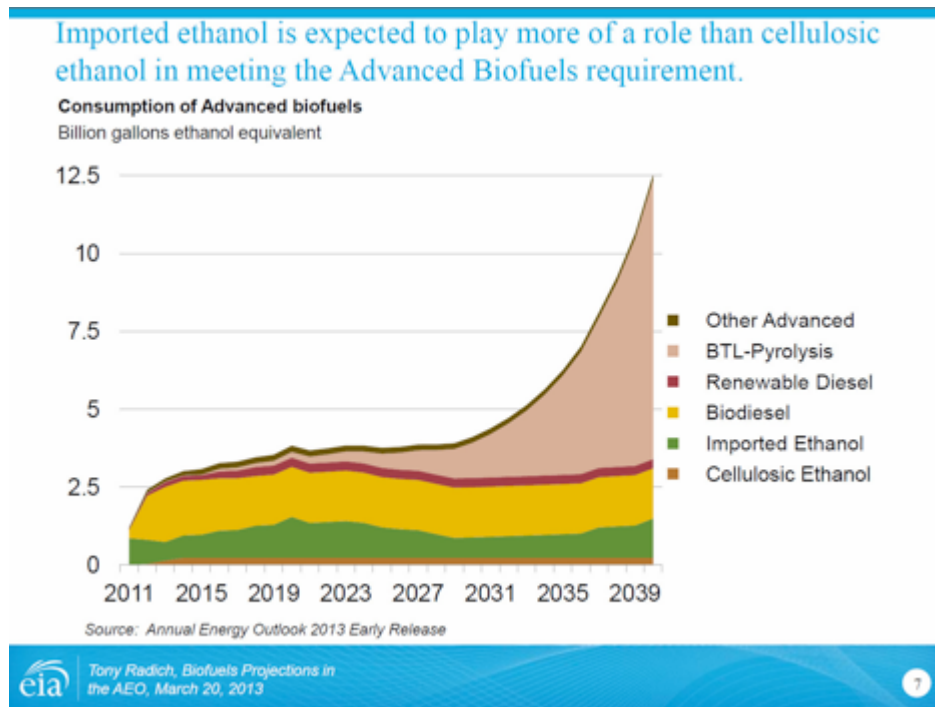
As EIA explains, “U.S. obligated parties [ie. U.S. refiners] prefer sugarcane ethanol over corn ethanol” because “sugarcane ethanol counts toward the RFS advanced requirement.”¹⁰ Brazilian ethanol users do not have a preference between corn ethanol and sugarcane ethanol.

¹⁰ <http://www.eia.gov/biofuels/workshop/presentations/2013/pdf/presentation-06-032013.pdf>

This situation is completely absurd. First, sugarcane ethanol is not technologically “advanced.” Sugarcane has been used to make ethanol in Brazil since the late 1920s.¹¹ The only reason sugarcane is deemed to be “advanced” is because EPA believes it has 50 percent lower lifecycle greenhouse gas emissions than gasoline. The Renewable Fuels Association, however, does not agree with EPA’s assessment of 50 percent lower lifecycle greenhouse gas emissions from sugarcane ethanol.¹²

Second, while sugarcane ethanol may have lower lifecycle greenhouse gas emissions, any reductions are wiped out by what happens with sugarcane ethanol in the real world. The preference that EISA sets up for sugarcane ethanol means that not only is sugarcane ethanol imported to the U.S., increasing its lifecycle greenhouse gas emissions, but corn ethanol or gasoline is then exported from the United States to Brazil to replace the fuel that was sent to the United States, further increasing the true lifecycle greenhouse gas emissions of sugarcane ethanol. When EPA deems sugarcane ethanol an advanced biofuel, they have to consider its true lifecycle greenhouse gas emissions, not only the greenhouse gas emissions required to get the sugarcane ethanol to the U.S., but also what replaces that ethanol in Brazil. Swapping Brazilian sugarcane ethanol with U.S. corn ethanol or gasoline simply wastes the energy used in transportation that would not occur in the absence of a mandate.

EIA believes that this absurd trade in ethanol will continue for the next 30 years, with imported ethanol expected to play a much more important role than cellulosic ethanol.

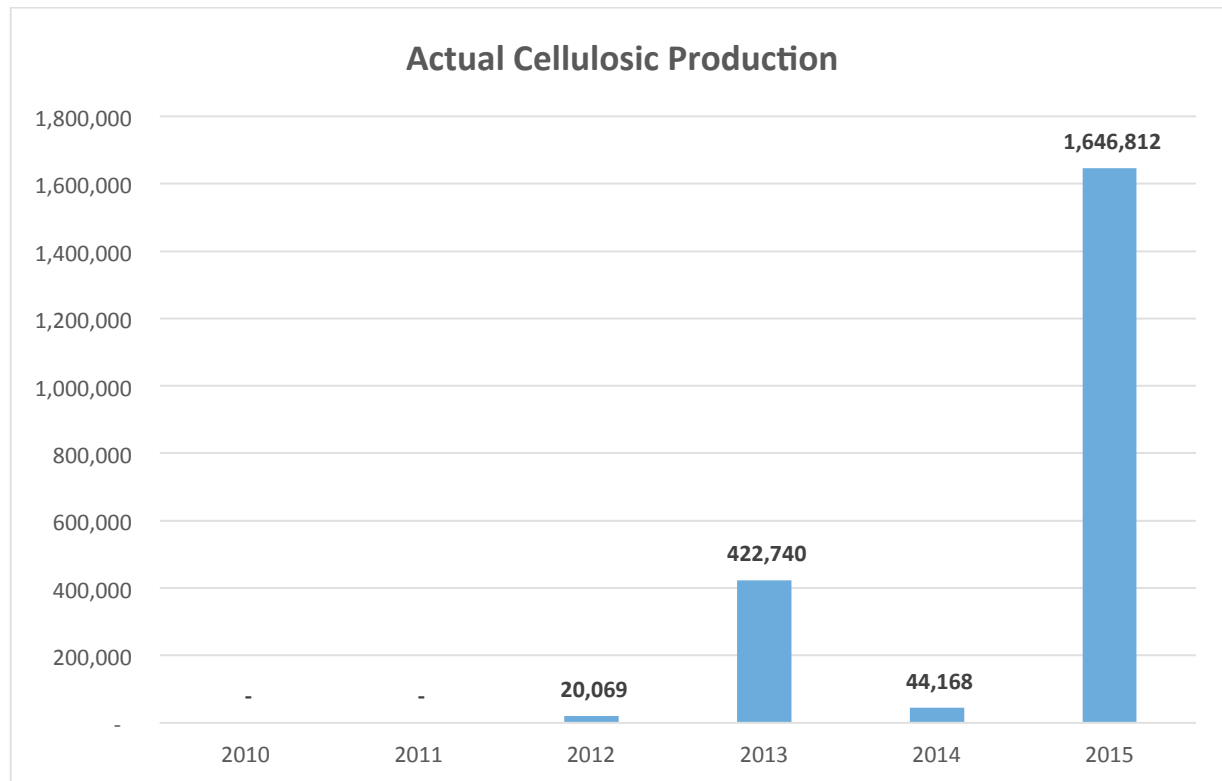


¹¹ USGA: Em 1927, O Primeiro Grande Empreendimento Brasileiro em Alcool Combustivel, <http://web.archive.org/web/20080319112800/http://www.aondevamos.eng.br/boletins/edicao07.htm>.

¹² <http://www.ethanolrfa.org/news/entry/rfa-to-epa-time-is-now-to-revise-lifecycle-ghg-analyses-of-corn-and-sugarca/>

MORE REALITIES OF CELLULOSIC BIOFUEL PRODUCTION

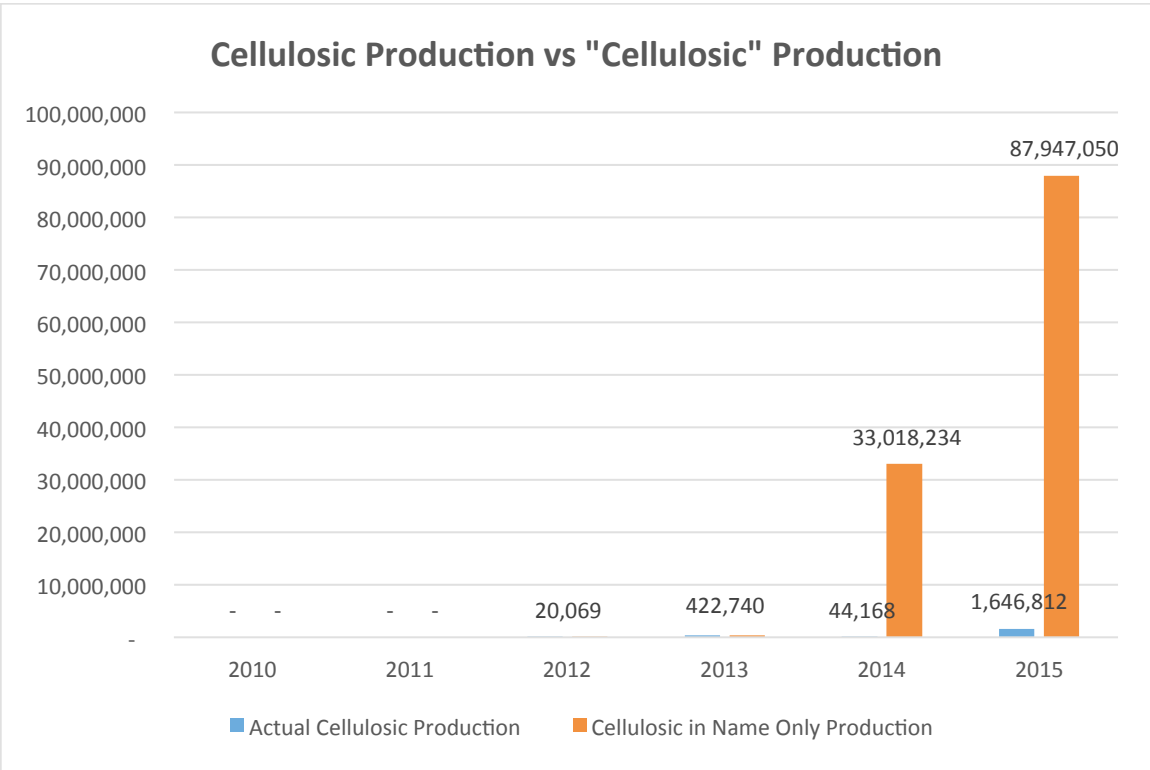
The following chart shows cellulosic ethanol production and the mandated amount of cellulosic production in the RFS. The first chart shows actual cellulosic ethanol production.¹³ We were told in 2006 and 2007 that cellulosic just needed a little help and that it would be cost effective. But by 2015, we only had 1.6 million gallons of cellulosic ethanol produced.



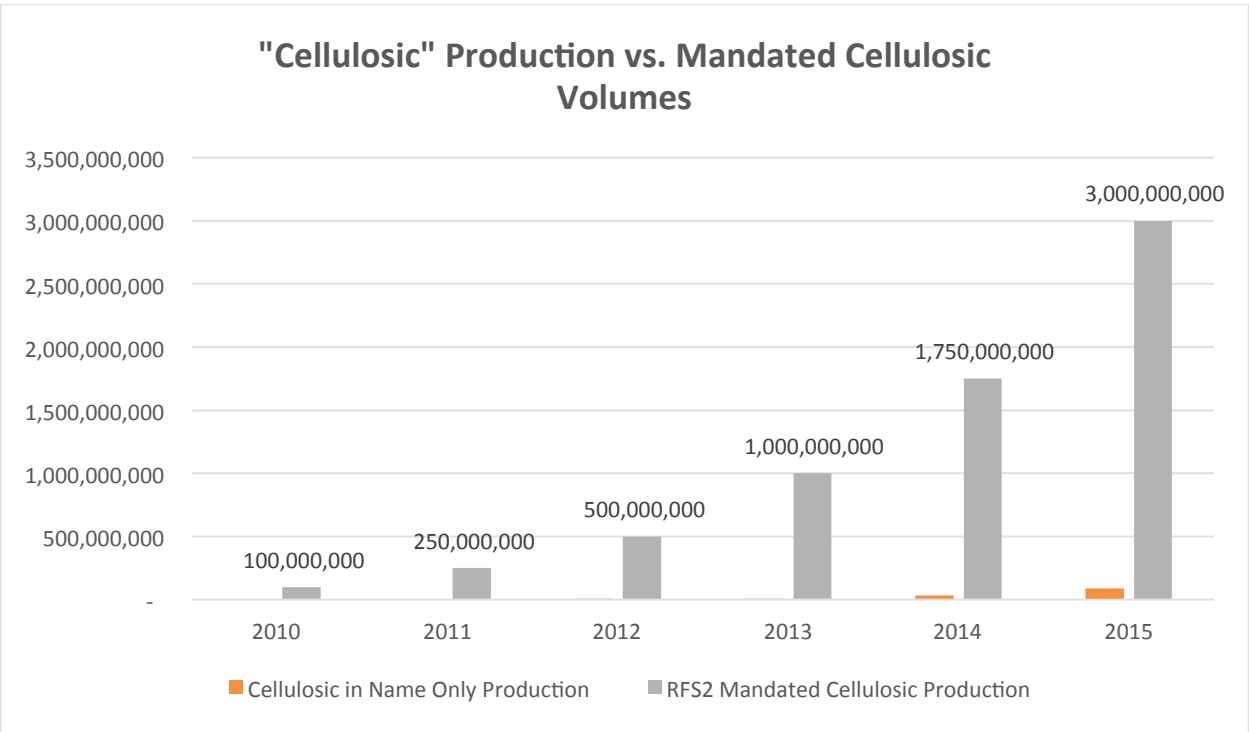
Why has production of cellulosic and advanced ethanol lagged? The answer is cost. The closing price on October 29 for November gasoline on the New York Merchantile Exchange was \$1.35 per gallon. The closing price for ethanol on that same date was \$1.59 per gallon. The cost of producing cellulosic ethanol is estimated to be in the range of \$6.50 per gallon. Since sugarcane ethanol from Brazil is the only mass produced advanced ethanol available today, and Brazil is net short of energy, imports from Brazil have the added cost of not only transporting the sugarcane ethanol from Brazil, but of transporting corn ethanol or gasoline back to Brazil from the United States. The mandate is being filled by and large with the most economical alternative, and that is neither cellulosic nor advanced ethanol.

Because actual cellulosic production has lagged, EPA changed the definition of what constitutes cellulosic ethanol to include some renewable compressed natural gas and renewable liquefied natural gas. As a result, there are now millions of gallons of “cellulosic” biofuel being produced, even though this isn’t what the drafter of the RFS had in mind.

¹³ <http://www2.epa.gov/fuels-registration-reporting-and-compliance-help/2015-renewable-fuel-standard-data>



Even with EPA’s redefinition of “cellulosic” biofuel, production is far from the volumes mandated by the RFS. As of October, EPA reports that 88 million gallons of “cellulosic” biofuel has been produced so far this year. The RFS, however, calls for 3 billion gallons to be produced this year.



CONCLUSION

The RFS has not worked as planned for a number of reasons. First, the assumptions made about U.S. oil production and consumption were wrong. Many in Congress and the Bush administration did not consider that the U.S. could and would increase oil production. Second, oil consumption has leveled off as the economy has cooled since the mid-2000s and people are driving more fuel efficient cars. Third, Congress cannot mandate innovation. Too many in Congress and the Bush administration listened to trumped up claims from the ethanol industry and people like Vinod Khosla who wanted public money to finance their products.

The RFS is based on incorrect assumptions. It is time we repeal it and let fuel producers concentrate on fulfilling the needs of American motorists instead of bureaucrats administering a fatally flawed program.