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CONGRESSIONAL TESTIMONY

Examining the Renewable Fuel Standard

The House of Representatives Committee on Oversight and Government Reform Subcommittee on the Interior and the Subcommittee on Healthcare, Benefits, and Administrative Rules

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My name is Nick Loris. I am the Herbert & Joyce Morgan Fellow at The Heritage Foundation. The views I express in this testimony are my own, and should not be construed as representing any official position of The Heritage Foundation.

I want to thank the members of the Committee of Oversight and Government Reform Subcommittees on the Interior and on Healthcare, Benefits, and Administrative Rules for this opportunity to address the Renewable Fuel Standard.

The federal government provides a wide range of subsidies to boost the production and consumption of biofuels. Over several decades, Congress has enacted special tax breaks, direct grants, government-backed loans and loan guarantees to generate a larger biofuel and biodiesel market.[1] The main component of the U.S.'s biofuel policy is the Renewable Fuel Standard (RFS), created in 2005 through the Energy Policy Act of 2005, and expanded in the Energy Independence and Security Act of 2007, mandating billions of gallons of ethanol be blended into gasoline each year, with a peak of 36 billion gallons in 2022. After 2022, the Environmental Protection Agency (EPA) has discretion to set the limit (within certain limitations).[2]

To rationalize the RFS, policymakers promised reduced dependence on foreign oil, a new source of cleaner energy to lower gas prices, a stronger economy, and an improved environment. None of this has materialized. Instead, the quota caters to special interest groups and has adverse effects on the economy and the environment. Subsidizing biofuel production benefits a select few and spreads the costs amongst the rest of American families and businesses. Even within the agricultural community, biofuel handouts reward those connected to the policy and adversely affect large parts of rural America.

The problem with the RFS is not the use of biofuels themselves but rather a policy that mandates the production and consumption of the fuel. Having politicians centrally plan energy decisions best left for the private sector distorts markets and demonstrates the high costs and unintended consequences of government control. The RFS distorts commodity production and prices, artificially raises the price of fuel and food, and has adverse environmental effects. The alleged climate benefit increasing biofuel use is dubious at best. Even under the assumption that switching from oil to biofuel would reduce greenhouse gas emissions, the impact of the switch on the earth's temperature would be negligible.

Congress should not tinker around the edges with attempts to reform the RFS. Policymakers should recognize the mandate is a failure and the government has no legitimate place propping up one energy source or technology over another. Congress should eliminate the RFS entirely and empower free enterprise to drive fuel competition and choice.

The Renewable Fuel Standard

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[1]U.S. Department of Energy, Alternative Fuels Data Center "Federal Laws and Incentives for Biodiesel," http://www.afdc.energy.gov/fuels/laws/BIOD/US (accessed November 13, 2015).

[2]Energy Independence and Security Act of 2007, 110th Cong., 1st Sess., §202, https://www.govtrack.us/congress/bills/110/hr6/text (accessed January 22, 2016).

The Renewable Fuel Standard is one of the most egregious examples of government meddling in the energy economy. The Energy Policy Act of 2005 first mandated that renewable fuels be mixed into America's gasoline supply, primarily using corn-based ethanol. The Energy Independence and Security Act of 2007 significantly increased the quotas. By 2022, there must be 15 billion gallons (and no more) of corn-based ethanol and a total of 36 billion gallons of biofuels blended into the nation's fuel supply, including soybean-based biodiesel. The program does not end in 2022, however, but grants the EPA the authority to set yearly targets.[3]

The biofuels mandate gives preferential treatment to the production of corn and soybeans at the expense of other agricultural products and artificially eliminates the risk and competition necessary to drive innovation and economic growth. The economic and environmental problems caused by the RFS have resulted in a diverse group opposing the mandate including environmental organizations, world hunger activists, economists, energy companies, and many in the agricultural community. Within the agriculture community, the National Chicken Council, National Cattlemen's Beef Association, National Pork Producers Council, National Turkey Federation, Milk Producers Council, to name but a few,[4] have called on Congress to repeal the standard. Other prominent groups like the American Petroleum Institute, National Resource Defense Council, American Fuel and Petrochemical Manufacturers, Environmental Working Group, Oxfam, and the United Nations have decried preferential treatment for corn ethanol.[5]

Besides the near universal outcry, the policy itself is reaching a breaking point as basic assumptions about the future on which it was built, such as national gasoline consumption and the commercial viability of advanced biofuels, are crumbling. Yet powerful biofuel lobbies have thus far successfully wooed Congress to withhold action on the RFS and its destructive economic and environmental effects.

Free Markets vs. Government Intervention in Energy Policy

While the exact relationship between energy consumption and gross domestic product (GDP) can vary, it is clear that energy is important to a nation's economic growth. Studies have shown that a causal relationship exists between energy consumption in economic growth; that is, energy availability can influence increases in gross domestic product or that causality moves in both directions.[6] When the free market operates, resource extraction and production expands greatly,

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[3]Ibid.

[4]National Pork Producers Council et al, "Petition for Waiver or Partial Waiver of Applicable Volume of Renewable Fuel," letter to EPA Administrator Lisa Jackson, July 30, 2012, http://www.nppc.org/wp-content/uploads/20120730-mf-Final-RFS-Waiver-Petition.pdf (accessed October 1, 2015).

[5]Carlton Carroll, "API and AFPM Tell EPA to Put Consumers First When Setting Ethanol Mandates," American Petroleum Institute July 27, 2015, http://www.api.org/news-and-media/news/newsitems/2015/july-2015/api-and-afpm-tell-epa-to-put-consumers-first-when-setting-ethanol-mandates (accessed November 12, 2015) . Natural Resources Defense Council, "Let the VEETC Expire: Save Billions in Tax Dollars Better Spent on Non-Polluting Energy Technologies," June 2010, http://www.nrdc.org/globalwarming/files/VEETCfs.pdf (accessed November 12, 2015). Sarah Kalloch, "Burning Down the House: Corn as Fuel, Not Food," Oxfam America, October 4, 2012, http://politicsofpoverty.oxfamamerica.org/2012/10/corn-as-fuel-not-food/ (accessed November 12, 2015). Environmental Working Group, "EPA's Biofuels Mandates are Unworkable," February 7, 2013, http://www.ewg.org/release/epa-s-proposed-biofuels-mandates-are-unworkable (accessed November 12, 2015).

[6]Ross McKitrick and Elmira Aliakbari, "Energy Abundance and Economic Growth: International and Canadian Evidence," Fraser Institute, May 15, 2014,

innovative technologies generate promising opportunities, and job creation and the economy grow robustly.

Over the years, federal policies have blocked access to opportunities, unnecessarily delayed projects, mandated expensive energy production, restricted choice, and given handouts to politically connected energy technologies. Politicians tout these programs as means to usher in new technologies that will provide jobs and stimulate the economy. The reality, however, is that these policies play favorites by allocating special benefits to the well-connected, rather than creating a playing field that provides opportunity for all to compete. The RFS is certainly an example of such favoritism.

Perhaps the most perverse part of these subsidies is that significantly obstruct the long-term success and viability of the technologies and energy sources they intend to promote. Instead of relying on a process that rewards competition, taxpayer subsidies prevent a company from truly understanding the price point at which the technology will be economically viable. When the government plays favorites, it traps valuable resources in unproductive places and allocates labor and capital away from other investments.

If biofuels are to succeed as a competitive transportation fuel, it will not be the result of any taxpayer-funded handout or government-imposed mandate. Whether the industry flourishes or fails, that is for private actors, using their own investment dollars, to determine. This holds true not just for biofuels, but for all energy resources and technologies. The U.S. has a robust, diverse energy market that can supply consumers with affordable and reliable energy without the taxpayers' help.

Evidence indicates that certain biofuels are cost-competitive with traditional fuels and make a useful addition to gasoline without special privileges from Washington. Before any subsidies and the current biofuels mandates were put in place, ethanol already served as a valuable additive to gasoline to oxygenate fuel to burn it more cleanly and efficiently.[7] The use of biofuels is not new and does not originate from any government policy jumpstarting an infant industry; in fact, Henry Ford originally planned for the Model T to run off ethanol and, in 1897, Rudolf Diesel showcased a diesel engine running on peanut oil.[8]

In the year before the federal government mandated the production of ethanol, the U.S. produced over 81 million barrels of ethanol.[9] A recent report by the University of Tennessee Institute of Agriculture estimates that in a market with no RFS and no ethanol tax credit, demand for corn

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https://www.fraserinstitute.org/sites/default/files/energy-abundance-and-economic-growth.pdf (accessed November 13, 2015).

[7]U.S. Energy Information Administration, "Petroleum & Other Liquids: Ethanol Oxygenate," September 30, 2015, http://www.eia.gov/dnav/pet/pet_pnp_oxy_dc_nus_mbbl_a.htm (accessed October 1, 2015). U.S. Geological Survey, "Fuel Oxygenates," August 4, 2015, http://toxics.usgs.gov/definitions/fuel_oxygenates.html (accessed November 13, 2015).

[8]"Biofuel Facts," Biofuel.org.uk, http://biofuel.org.uk/biofuel-facts.html (accessed November 13, 2015).

[9]U.S. Energy Information Administration, "Petroleum & Other Liquids: Ethanol Oxygenate.

ethanol as an oxygenate would be 4.34 billion gallons in 2014, or about 30 percent of corn ethanol production that year.[10]

By reducing government intervention in the biofuel sector and agricultural economy broadly, the most competitive elements of the biofuel industry could thrive in a free market. Competition driven by individuals will drive economic growth and benefit all of rural America—not just those special interest groups who are well-connected to Washington.

Private Benefits, Dispersed Costs

Despite the unique and diverse mix of organizations opposed to the ethanol mandate, the strong lobbying arm combined with the political importance of the geographic region where America produces corn make ethanol policy the perfect example of focusing on political profit as opposed to economic progress.

The RFS essentially mandates a market for corn, soybeans, and biofuels that eliminates much of the risk of investing in biofuels, risk which every industry manages as a matter of doing business and which ultimately is necessary for a healthy and growing economy. The mandate not only favors a select few commodities, but also benefits just a few states at the expense of the vast majority. Over 50 percent of ethanol production is concentrated in three states: Iowa, Nebraska, and Illinois.[11]

Importantly, the benefits enjoyed by biofuels interests are ultimately limited and do not help the industry in the long-run. The dependence on government to remain viable stunts the long-term growth of the industry by propping bioenergy up and distorting the true price point at which biofuels will be competitive in the market.

Addressing Chickens, Eggs and Market Barriers

One common justification for the Renewable Fuel Standard and complementary subsidies for biofuel refineries and fueling stations is that oil has a monopoly on the market and, without government intervention, the alternative market will break that barrier. Proponents of biofuel subsidies argue that even if biofuels are cost-competitive, no one will buy them because the infrastructure does not exist and—without subsidizing everything—a chicken-and-egg problem exists. The U.S. Department of Agriculture is spending $100 million on its Biofuels Infrastructure Partnership to build the blender pumps and necessary infrastructure to grow the biofuels market.[12]

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[10]Daniel De La Torre Ugarte and Burton English, "10-Year Review of the Renewable Fuel Standard: Impacts to the Environment, the Economy, and Advanced Biofuels Development," University of Tennessee Institute of Agriculture, October 14, 2015, http://accf.org/wp-content/uploads/2015/10/10-Year-Review-of-the-RFS.pdf (accessed November 13, 2015).

[11]Schnepf, "Agriculture-Based Biofuels."

[12] Press Release, "USDA to Invest Up to $100 Million to Boost Infrastructure for Renewable Fuel Use, Seeking to Double Number of Higher Blend Renewable Fuel Pumps," United States Department of Agriculture, May 29, 2015, http://www.usda.gov/wps/portal/usda/usdahome?contentid=2015/05/0156.xml (accessed March 9, 2016).

Good ideas overcome the chicken-and-egg program all the time without government assistance. It does not matter how many cell phones there are if there is no place to obtain a signal. But producers built cell phone towers and sold cell phones without a massive subsidy or government bureaucrats mandating its use. The same can happen with biofuels if they are economically viable ideas that meet real market needs. American households spend $2,000 to $2,500 a year on gasoline.[13] Globally, the transportation fuels market is a multi-trillion dollar opportunity. Any technology or fuel source that can capture just a sliver of that market will stand to benefit tremendously.

The Unintended Consequences of Biofuels Policy

The U.S.'s biofuels policy is a case study in the unintended consequences of government intervention. In contrast to what politicians and special interest groups promised, the RFS has cost taxpayers and drivers, had little to no impact on fuel prices, hurt rural economies, and had unforeseen environmental costs.

Biofuels Costs American Taxpayers and Drivers

Biofuel policies have cost Americans both as drivers and as taxpayers. Federal biofuel policies cost taxpayers $7.7 billion in 2011 and $1.3 billion in 2012 after the expiration of ethanol blenders tax credit, a 45-cent per gallon tax credit for blending ethanol into gasoline.[14] Over a 30-year timeframe ethanol subsidies have diverted $45 billion for ethanol.[15]

Furthermore, ethanol has had little to no effect on keeping fuel prices down, as proponents first argued,[16] or in achieving the nebulous goal of independence from foreign oil. Even though ethanol production has increased as mandated and has accounted for nearly one-third of the increase in domestic fuel production over the past few years, biofuels still constitute a small overall percentage in domestic gasoline consumption while costing consumers more in the end.

By its very nature, ethanol is not a perfect substitute for oil. Ethanol has only-two thirds the energy content of petroleum-based gasoline, and while biodiesel is closer to an even exchange at 92 percent the energy content of regular diesel, it is more expensive to fabricate.[17] During times of high gas prices, ethanol may appear less expensive, but after adjusting for the energy content

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[13]U.S. Energy Information Administration, "U.S. Household Gasoline Expenditures in 2015 on Track to Be the Lowest in 11 Years," December 16, 2014, http://www.eia.gov/todayinenergy/detail.cfm?id=19211 (accessed October 1, 2015).

[14] Schnepf, "Agriculture-Based Biofuels," pg 29.

[15] Nicolas Loris, "Congress Should Scale Back the Renewable Fuel Standard—to Zero," Heritage Foundation Issue Brief No 4012, August 13, 2013, http://www.heritage.org/research/reports/2013/08/renewable-fuel-standard-congress-should-scale-back-to-zero#_ftn5 .

[16] Christopher R. Knittel and Aaron Smith, "Ethanol Production and Gasoline Prices:

A Spurious Correlation," July 12, 2012, http://web.mit.edu/knittel/www/papers/knittelsmith_latest.pdf (accessed October 1, 2015).

[17] U.S. Department of Energy Office of Energy Efficiency and Renewable Energy, "Ethanol," https://www.fueleconomy.gov/feg/ethanol.shtml (accessed November 13, 2015). Dan Edmunds and Philip Reed, "E85 vs. Gasoline Comparison Test," Edmunds.com, April 29, 2009, http://www.edmunds.com/fuel-economy/e85-vs-gasoline-comparison-test.html (accessed October 1, 2015).

difference, higher concentrations of ethanol fuels are pricier. For instance, as of January 2016, the current national average price of regular gasoline is $1.86 per gallon and E85 is $1.60 per gallon.[18] Adjusting for the E85's weaker energy density, however, pushes the price to $2.10 per gallon.[19] The Energy Information Administration (EIA) estimates that the energy content of gasoline has decreased three percent from 1993–2013 as ethanol use has increased due to federal mandates.[20]

The EPA and U.S. Department of Energy's (DOE) joint web site, fueleconomy.gov, provides eye-popping documentation of these costs to drivers. The size of the additional costs varies depending on ethanol and gasoline prices, but the big picture is always the same: the higher the ethanol content, the worse a car's gas mileage and the more drivers have to spend to go the same distance. As of September 2015, depending on make and model, the typical motorist could spend as much as an additional $450 per year to run his flex fuel vehicle on E85 rather than regular gasoline blended with E10.[21] Even when vehicles use premium gasoline, E85 is more expensive for drivers.

Biofuel Policies Fail to Deliver on Promise to Reduce Dependence on Oil

In addition to forcing drivers to pay for a less efficient fuel, the RFS has not delivered on the promise of reducing dependence on oil and protection from high prices. Because ethanol contributes such a small percentage of the overall transportation fuel market (a mere 5 percent in 2014), ethanol failed to tamp down prices which mostly continued to climb from 2002 to 2012, despite increased mandated ethanol use and high oil prices allegedly making ethanol more competitive.[22] Conversely, ethanol production has had little to do with the dramatic decrease in fuel prices starting in 2013 as a result of access to vast oil supplies in the U.S. and around the world, making the disparity between the cost and efficiency of ethanol versus petroleum-based fuel more apparent.

The large majority of transportation fuel has come from petroleum; even the relative explosion of growth in biofuels as a result of the mandate is dwarfed by the actual demand for fuel. Conversely, ethanol consumes a large share of the corn crop and diverts valuable crop land away from other agricultural products so while the impact of biofuels on fuel consumption are small the impacts on agriculture are large. The problem is that the land diversion was a result of the mandates and subsidies. Market forces may very well have moved farmers into this direction,

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[18] AAA Daily Fuel Gauge Report, "National Average Prices," AAA.com, http://fuelgaugereport.aaa.com/todays-gas-prices/ (accessed November 12, 2015).

[19] Ibid.

[20] U.S. Energy Information Administration, "Increasing Ethanol Use Has Reduced the Average Energy Content of Retail Motor Gasoline," October 27, 2014, http://www.eia.gov/todayinenergy/detail.cfm?id=18551 (accessed October 1, 2015).

[21] U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, "New Flex-Fuel Vehicles," http://www.fueleconomy.gov/feg/PowerSearch.do?action=noform&path=1&year1=2014&year2=2015&vtype=E85&srchtyp=newAfv (accessed November 13, 2015).

[22] U.S. Energy Information Administration, "U.S. Regular All Formulations Retail Gasoline Prices (Dollars per Gallon)," September 28, 2015, http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=EMM_EPMR_PTE_NUS_DPG&f=A (accessed October 1, 2015).

although not likely to such an extent. Nevertheless, the private sector is best suited to allocate those resources most efficiently.

The Negative Consequences when Government Policy Diverts Food to Fuel

The federal government's biofuels policy has diverted food away for fuel, increasing the cost of corn, soybeans, feedstocks, and overall food prices. This has hurt rural America and also the world's poorest citizens.

From 2010–2012, 49 percent of the U.S. corn crop was used in the food industry and feed for livestock; another 12 percent was exported. Over 40 percent was used to fabricate ethanol fuel to meet the RFS standard.[23] In 2012, the amount of corn used to produce ethanol in the U.S. exceeded the entire corn consumption of the continent of Africa and in any single country with the exception of China.[24] While the majority of biofuel-related food price increases have resulted from diverting corn to fuel, soybean crop diversion to biodiesel is similar.

Pressure on the price of corn is exacerbated by the mandate, which requires the use of ethanol or available credits (called RIN credits) *regardless of cost*, while ranchers, farmers, the food industry, and motorists must take increased corn prices into account. Those who perhaps most proportionally bear the costs of increased corn prices are farmers and ranchers using corn for feed, and countries importing corn from American, which accounts for over 50 percent of the world's corn exports.[25]

The inflated demand for corn created by the RFS and subsequent higher prices have incentivized farmers to grow more corn either by adding acreage, increasing productivity, or devoting less existing farmland to other crops. Increasing supply to meet higher demand, however, has had its own costs. The U.S. Department of Agriculture's (USDA) Economic Research Service notes that "increased corn prices draw land away from competing crops, raise input prices for livestock producers, and put moderate upward pressure on retail food prices."[26] This was no more acutely apparent than during the 2012 drought.

The 2012 summer drought in the United States destroyed a significant amount of crops, drove corn prices up 33 percent, and heightened concerns that the RFS and existing subsidies were needlessly diverting food to fuel.[27] Since corn is a staple ingredient for many foods and an

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[23]Randy Schnepf , "Agriculture-Based Biofuels: Overview and Emerging Issues," *Congressional Research Service Report* No. 41282, May 1, 2013, http://nationalaglawcenter.org/wp-content/uploads/assets/crs/R41282.pdf (accessed November 13, 2015).

[24]Colin Carter, Gordon Rausser, and Aaron Smith, "Commodity Storage and the Market Effects of Biofuel Policies," University of California–Davis, Department of Agricultural and Resource Economics, http://arefiles.ucdavis.edu/uploads/filer_public/81/ba/81ba961d-fe7b-4629-8511-1b78fdf3b527/carter_rausser_smith.pdf (accessed October 1, 2015).

[25]U.S. Census Bureau, "Statistical Abstract of the United States: 2012 Selected Farm Products—U.S. and World Production and Exports: 2000 to 2010," Table 852, https://www.census.gov/prod/2011pubs/12statab/agricult.pdf (accessed November 13, 2015).

[26]U.S. Department of Agriculture, Economic Research Service, "Bioenergy: Findings," March 11, 2014, http://www.ers.usda.gov/topics/farm-economy/bioenergy/findings.aspx (accessed November 13, 2015).

[27]Steve Hargreaves, "Calls to Scrap Ethanol Mandate Intensify with Drought," CNN Money, August 6, 2012, http://money.cnn.com/2012/08/06/news/economy/ethanol-drought/ (accessed November 13, 2015).

important feedstock for animals, many in the food industry (from cattle and chicken farmers to restaurant associations) expressed concern regarding the mandate's effect on food prices. Rather than going to where market demand valued corn most highly, roughly 40 percent of the corn crop in 2012 was used to create 12.98 billion gallons of corn-based biofuels, or 95 percent of the mandate.[28]

Between July and August 2012 governors from Arkansas, Delaware, Georgia, Maryland, New Mexico, North Carolina, Texas, Utah, Virginia, Wyoming, and Florida petitioned the EPA for a waiver of the RFS standards, which the EPA denied.[29] According to a recent study by economists from the University of Nebraska–Lincoln, "the drought's impact on corn prices could have been "fully negated" by reducing the Renewable Fuel Standard by 23 percent that year."[30]

Higher prices resulting from government-created market distortions have consequences that ripple well beyond the U.S. A number of organizations have demonstrated a link between biofuels policies and food prices and the adverse consequences these policies have on the world's poorest citizens. The Food and Agriculture Organization of the United Nations, ActionAid, World Resources Institute, Organization for Economic Co-operation and Development and The World Bank have all listed higher food prices as a concern of the quota.[31]

The full magnitude of the ethanol mandate's effect on corn prices and overall agricultural products is difficult to determine—in part because estimates are uncertain regarding how much ethanol would be used for fuel absent a mandate, the price impacts of other factors affecting the price of corn, and what other agricultural products farmers would grow absent the mandate. While the magnitude of the mandate's impact on corn prices may not be certain, the direction is clear: The RFS has increased demand for corn and consequently increased prices. According to

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[28]U.S. Department of Agriculture, Economic Research Service, "U.S. Bioenergy Statistics," Table 5, http://www.ers.usda.gov/data-products/us-bioenergy-statistics.aspx, and U.S. Environmental Protection Agency, "Fuels Registration, Reporting, and Compliance Help," September 28, 2015, http://www.epa.gov/otaq/fuels/rfsdata/2012emts.htm (accessed October 1, 2015).

[29]National Pork Producers Council et al, "Petition for Waiver or Partial Waiver of Applicable Volume of Renewable Fuel."

[30]Sunil Dhoubhadel, Azzeddine Azzam, and Matthew Stockton, "The Impact of Biofuels Policy and Drought on the U.S. Grain and Livestock Markets," *Journal of Agricultural and Applied Economics*, Vol. 47, No. 1 (2015), pp. 77–103, http://journals.cambridge.org/download.php?file=%2F8525_9D6722650751042F2D7DB0A810DBD0D5_journals_AAE_AAE47_01_S1074070814000066a.pdf&cover=Y&code=868fed2c0e9a45018eb4aa14d4bda045 (accessed November 13, 2015).

[31]See, for instance, Aziz Elbehri, Anna Segerstedt, and Pascal Liu, "Biofuels and the Sustainability Challenge: A Global Assessment of Sustainability Issues, Trends and Policies for Biofuels and Related Feedstocks," Trade and Markets Division, Food and Agriculture Organization of the United Nations, 2013, http://www.fao.org/docrep/017/i3126e/i3126e.pdf, Tim Searchinger (accessed November 13, 2015). Ralph Heimlich, "Avoiding Bioenergy Competition for Food Crops and Land," World Resources Institute, January 2015, http://www.wri.org/publication/avoiding-bioenergy-competition-food-crops-and-land, (accessed November 13, 2015). Richard Doornbosch and Ronald Steenblik, "Biofuels: Is the Cure Worse Than the Disease?" Organisation for Economic Co-operation and Development, September 2007, http://www.oecd.org/sd-roundtable/39411732.pdf (accessed November 13, 2015). "How Global Biofuel Expansion Could Affect the Economy, Environment and Food Supply," The World Bank, June 27, 2011, http://econ.worldbank.org/WBSITE/EXTERNAL/EXTDEC/0,,contentMDK:22946809~pagePK:64165401~piPK:64165026~theSitePK:469372,00.html (accessed November 13, 2015).

separate analyses, one by University of California–Davis economists and another by a Heritage Foundation economist, the mandate accounts for an increase in corn prices by 30 percent or even as much as 68 percent, respectively.[32] Though there are other factors at work in the price of corn —weather, global markets, and changing food choice preferences for instance—the RFS has certainly contributed to increased prices.[33]

Proponents of the RFS and preferential treatment for biofuels sold the policies as a way to support economic growth in rural communities. Rather than supporting rural communities however, the federal government has supported corn growers at the expense of livestock producers and diverted resources to an industry that is not self-sustaining. Taking such a crutch away will be painful for farmers.

Because of the RFS, fuel is now an indirect competitor with corn producers.[34] This connection is not insignificant: some 41 percent of the U.S. corn crop was dedicated to ethanol production in 2010–2012, compared to 14 percent when Congress mandated the original quota in 2005.[35] Without the mandate, ethanol and thus corn-for-fuel becomes less competitive, especially if more energy efficient gasoline remains inexpensive.

Ethanol consumption is currently at historic highs simply because the federal government mandates its consumption. As the Institute for Energy Research wrote: "If someone forces vegetarians to buy hamburgers, or non-smokers to buy cigarettes, that might look like 'economic growth' and 'job creation' but it doesn't actually make Americans better off. By the same token, if the government forces people to use ethanol, that's not genuine prosperity."[36] The fact that EPA can use its own discretion to set biofuel targets after 2022 is all the more reason for Congress to act now.

Ultimately, the RFS has less to do with price or customer choice and much more to do with meeting a government quota regardless of costs. While it may someday be that biofuel technologies will prove to be a preferred fuel choice by Americans, biofuels have proved to be expensive to produce and less energy dense than gasoline and diesel. Federal subsidies and mandates have shifted those costs to motorists, the food industry, and sectors of the agriculture

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[32]Colin A. Carter and K. Aleks Schaefer, "U.S. Biofuels Policy, Global Food Prices, and International Trade Obligations," American Enterprise Institute, May 2015, https://www.aei.org/wp-content/uploads/2015/05/US-biofuels-policy.pdf (accessed November 13, 2015). David W. Kreutzer, "Renewable Fuel Standard, Ethanol Use, and Corn Prices," Heritage Foundation *Backgrounder* No. 2727, September 17, 2012, http://www.heritage.org/research/reports/2012/09/the-renewable-fuel-standard-ethanol-use-and-corn-prices.

[33]The Congressional Research Service reports that "most economists and market analysts…also are nearly universally agreed that the strong, steady growth in ethanol demand for corn has had an important and sustained upward price effect, not just on the price of corn, but in other agricultural markets including food, feed, fuel, and land." Schnepf, "Agriculture-Based Biofuels."

[34] U.S. Department of Agriculture, Economic Research Service, "Bioenergy: Findings," http://www.ers.usda.gov/topics/farm-economy/bioenergy/findings.aspx (accessed November 13, 2015).

[35]Schnepf , "Agriculture-Based Biofuels." Carter, Rausser, and Smith, "Commodity Storage and the Market Effects of Biofuel Policies."

[36]Institute for Energy Research, "How Big Ethanol Hopes You're a Dope," September 3, 2013, http://instituteforenergyresearch.org/analysis/how-big-ethanol-hopes-youre-a-dope-2/ (accessed October 2, 2015).

community depending on corn and soy for feed, while benefits are concentrated with a select few.

Ethanol and Price Volatility

Price volatility in and of itself is no reason to stop using biofuels in transportation fuel. However, proponents of alternative fuel use have used the volatility of oil markets to champion the government's use of biofuels. Yet ethanol has been subject to its own price volatility, especially since the passage of RFS and had done little to curb the effects of oil price volatility. Most importantly, although agricultural commodities have much lower price volatility than other commodities, markets free of government intervention can best respond to any price volatility, large or small.

Corn prices reached record highs in 2008 only to freefall during the financial crisis. Again in 2012, drought in the U.S. caused corn prices to rise steeply and the first decline in US ethanol production since 1996 as ethanol producers stalled plants.[37] As the Congressional Research Service (CRS) notes of the 2008 price spike, "The experience of $7.00-per-bushel corn, albeit temporary, shattered the idea that biofuels were a panacea for solving the nation's energy security problems and left concerns about the potential for unintended consequences from future biofuels expansion."[38]

Unintended Adverse Environmental Consequences

Policymakers sold biofuel programs and the RFS in part on the purported environmental benefits of improving the environment with a cleaner fuel and reducing greenhouse emissions that allegedly contribute to climate change. Regardless of the merits of such a goal, the contribution of biofuels, and particularly ethanol, to improving the environment and reducing greenhouse gas emissions has been unclear and controversial at best.

According to the EIA, biofuel carbon dioxide emissions are "considered to be part of the natural carbon cycle."[39] However, this assumption may be too broad.

After accounting for land-use conversion, the use of fertilizers, insecticides, and pesticides, as well as the fossil fuels used for production and distribution, biofuel production is quite carbon-intensive.[40] The growing popularity of biofuel policies led the U.N.'s Food and Agriculture Organization (FAO) to focus on the issue in the 2008 Food and Agriculture Report. Citing several studies published in *Science*, the FAO reported that converting non-cropland to produce corn ethanol released at least 17 times more emissions than what is cut in carbon dioxide

[37]Schnepf , "Agriculture-Based Biofuels."

[38]Ibid.

[39]U.S. Energy Information Administration, "Emissions of Greenhouse Gases in the U. S." March 31, 2011 http://www.eia.gov/environment/emissions/ghg_report/ghg_overview.cfm (accessed October 2, 2015).

[40]James A. Baker III, "Fundamentals of a Sustainable U.S. Biofuels Policy," Rice University, Institute for Public Policy, January 2010, http://www.bakerinstitute.org/publications/EF-pub-BioFuelsWhitePaper-010510.pdf and Adam J. Liska et al, "Biofuels from Crop Residue Can Reduce Soil Carbon and Increase CO2 Emissions," *Nature Climate Change* 4, 2014, pp. 398–401, http://www.nature.com/nclimate/journal/v4/n5/full/nclimate2187.html (accessed November 13, 2015).

emissions by using biofuels, or a "carbon debt" of 48 years.[41] Once hailing biofuels as an important tool to mitigate climate change, the U.N.'s 2007 Intergovernmental Panel on Climate Change's report acknowledged that biofuel policy negatively impacts the lives of the poor, diverts land to produce biofuels, has adverse environmental and climate consequences.[42]

Meanwhile, Congress has seemingly ignored apparent increases in real pollutants attributed to the RFS. Ethanol does have some benefits as a fuel additive that helps gasoline burn more cleanly and efficiently. But, in its first of three reports to Congress, the EPA projected that nitrous oxides, hydrocarbons, sulfur dioxide, particulate matter, ground level ozone, and ethanol vapor emissions, among other air pollutants, would increase at different points in the production and use of ethanol.[43] A study by Iowa State University researchers concluded that incentivizing more biofuel production with government policies leads to more adverse environmental consequences caused by farming, the use of fertilizers, and land-use conversion for agricultural production, resulting in increased soil erosion, sedimentation, and nitrogen and phosphorous runoff into lakes and streams.[44]

The unwanted environmental costs from agricultural production are a solvable problem. Almost all industrial output has unwanted byproducts, whether it is air pollutants, or run off and discharge from the use of fertilizers. These are not necessarily a reason to eliminate an activity; doing so could reverse prosperity and progress. The real problem is that biofuels have been sold to policymakers and the public as "green" fuels whereas, in fact, they can be more environmentally-damaging than petroleum-based fuels

Renewable Fuel Standard: The Folly of Central Planning

The RFS mandate demonstrates just how bad the government is at understanding what the market can bear in terms of production and consumption. Austrian economist F.A. Hayek famously said, "The curious task of economics is to demonstrate to men how little they know

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[41]U.N. Food and Agriculture Organization, *The State of Food and Agriculture, 2008* (Rome, Italy: Food and Agriculture Organization, 2008), pp. 55–59, http://www.fao.org/3/a-i0100e.pdf (accessed November 18, 2015).

[42]Intergovernmental Panel on Climate Change, Working Group II, "Livelihoods and Poverty," March 31, 2014, http://ipcc-wg2.gov/AR5/images/uploads/WGIIAR5-Chap13_FGDall.pdf (accessed November 13, 2015).

[43]For example, Environmental Protection Agency, "Biofuels and the Environment: The First Triennial Report to Congress," 2011, http://cfpub.epa.gov/ncea/biofuels/recordisplay.cfm?deid=235881 (accessed November 13, 2015). Other studies have examined the impact of increased corn or cellulosic ethanol (independent of the mandate) on individual air pollutants like particulate matter or ozone. Jason Hill et al., "Climate change and Health Costs of Air Emissions from Biofuels and Gasoline," Proceedings of the National Academy of the Sciences of America, December 16, 2008, http://www.pnas.org/content/106/6/2077.full.pdf+html (accessed November 13, 2015). Diana L. Ginnebaugh and Mark Z. Jacobson, "Examining the Impacts of Ethanol (E85) Versus Gasoline Photochemical Production of Smog in a Fog Using Near Explicit Gas- and Aqueous-Chemistry Mechanisms," *Environmental Research Letters*, Vol. 7, No. 4 (November 6, 2012), http://iopscience.iop.org/article/10.1088/1748-9326/7/4/045901/pdf (accessed November 13, 2015).

[44]Amani Elobeid et al, "Greenhouse Gas and Nitrogen Fertilizer Scenarios for U.S. Agriculture and Global Biofuels," Iowa State University, Center for Agricultural and Rural Development, June 2011, http://ageconsearch.umn.edu/bitstream/107043/2/11-WP_524.Jun6Revise.pdf (accessed November 13, 2015).

about what they imagine they can design."[45] Politicians and bureaucrats, no matter how brilliant or well-informed with data, cannot plan markets and consumer needs. Basic assumptions about the RFS have proved to be shortsighted, revealing the inability of government to centrally plan energy markets.

The Blend Wall

As the RFS has reached the mid-point to its final target in 2022, petroleum refiners have come up against what is known as the "blend wall." Because overall gasoline consumption has leveled off from a slower economy and increased fuel efficiency, and because the RFS mandates ever-increasing amounts of ethanol, continued compliance with the RFS would force refiners to blend more ethanol than the market would bear.

According to the RFS, each refiner in the United States has to meet a requirement that a certain percentage of domestic sales contain blended ethanol, called a renewable volume obligation (RVO).[46] Refiners have an option to meet part of their requirement by buying credits rather than blending more ethanol. In order to track the renewable fuel quotas, the EPA requires a renewable identification number (RIN) to track the amount of biofuel reaching the market and to hold refiners accountable for blending enough ethanol. Refiners can hold on to these credits and meet up to 20 percent of the RFS requirement in RIN credits, or refiners can purchase RIN credits from other refiners when they fail to meet the requirement. Different RIN prices exist for different forms of biofuels.

The RIN trading system has resulted in fraud where refineries bought fake credits with made-up RIN numbers for millions of dollars. Since refineries now face the blend wall, increased trading for RIN credits has driven up the price of the credit from pennies to over a dollar in 2013.[47] Bloomberg projects that over-mandating—requiring the use of more ethanol than can be blended—and forcing the purchase of RINs, could cost consumers an additional $13 billion at the pump—an artificial increase of 10 cents per gallon, if RIN credit prices stay above one dollar.[48] Even if the price of RIN credits falls to 50 cents per credit, however, the cost to consumers is a multi-billion dollar price tag. Corn-based ethanol RIN prices were more than 70 cents in April 2015 but have fallen to approximately 40 cents in November 2015.[49]

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[45]Friedrich Hayek, *The Fatal Conceit: Errors of Socialism*, vol. 1 of *The Collected Works of Friedrich August Hayek*, ed. W.W. Bartley III (London: Routledge, 1988), p. 76, http://www.libertarianismo.org/livros/fahtfc.pdf (accessed November 13, 2015).

[46]U.S. Energy Information Administration, "RINs and RVOs Are Used to Implement the Renewable Fuel Standard," June 3, 2013, http://www.eia.gov/todayinenergy/detail.cfm?id=11511 (accessed November 12, 2015).

[47]U.S. Energy Information Administration, "What Caused the Run-up in Ethanol RIN Prices During Early 2013?" June 13, 2013, http://www.eia.gov/todayinenergy/detail.cfm?id=11671 (accessed October 2, 2015).

[48]Bradley Olson and Dan Murtaugh, "Ethanol Upending Refiners Pushes $13 Billion on U.S. Drivers," Bloomberg, March 19, 2013, http://www.bloomberg.com/news/2013-03-18/refiners-pay-price-as-traders-hoard-ethanol-credits-valero-says.html (accessed November 13, 2015).

[49]Progressive Fuels Limited, "PFL Weekly RIN Recap," http://www.progressivefuelslimited.com/web_data/PFL_RIN_Recap.pdf (accessed November 12, 2015).

The economic consulting firm NERA warns that attempting to ramp up requirements to where the targets were originally set in the Energy Independence and Security Act of 2007 would result in intensified economic damage:

> When the required biofuel volume standards are too severe, as with the statute scenario, the market becomes disrupted because there are an insufficient number of RINs to allow compliance. "Forcing" additional volumes of biofuels into the market beyond those that would be "absorbed" by the market based on economics alone at the levels required by the statute scenario will result in severe economic harm.[50]

The possibility of "too much" ethanol creates an economic problem for ethanol producers that will become more pressing as corn based ethanol reaches the statutory cap of 15 billion gallons and if gas prices remain low. As the CRS states:

> "In volumes above the RFS total renewable mandate, biofuels use is no longer obligatory and it must compete directly in the marketplace with its petroleum-based counterpart. As a result, once they have met their RFS blending mandates, fuel blenders, seeking to maximize their profits, are very sensitive to price relationships between petroleum-based fuels and biofuels. This is particularly important for ethanol since it contains only about 68% of the energy content of gasoline. As a result, value-conscious consumers could be expected to willingly pay only about 68% of the price of gasoline for ethanol."

Higher economic growth and therefore higher fuel consumption could alleviate some blend wall concerns, however increased fuel efficiency standards and higher volume targets for biofuels could result in the blend wall problem persisting. Flex fuel vehicles capable of using E85 offer little economic relief for the blend wall Demand for these vehicles is very low[51] and drivers who own flex-fuel vehicles often fill their tanks with E10 as opposed to E85 because the energy content in E85 is lower. Adjusted for energy content, E10 makes more financial sense than E85. Most importantly, the future is uncertain for economic growth and fuel consumption, which is why the government should not predict what markets will bear in 2022 with a law passed in in 2005.

Problems with Advanced Biofuels

While corn-based ethanol has outpaced the "blend wall," the production of other biofuels to meet the RFS mandate have woefully underperformed.[52] The production of cellulosic ethanol, made from non-food sources, is nowhere near to meeting its targets, even though the RFS mandates 16 billion gallons to be used by 2022. High capital costs and difficulty scaling up cellulosic biofuel

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[50]Nera Economic Consulting, "Economic Impacts Resulting from Implementation of the RFS2 Program," prepared for the American Petroleum Institute, July 27, 2015, http://www.nera.com/content/dam/nera/publications/2015/NERA_FINAL_API_RFS2_July27.pdf (accessed November 13, 2015).

[52]One of the purported reasons Congress capped corn-based ethanol targets at 15 billion gallons annually was to address concerns that the mandate would divert corn used for fuel. Consequently, cellulosic biofuels were introduced into the mandate.

conversion plants to meet largescale demand have prevented non-food-sourced ethanol from being an economically viable option.

The EPA, which administers the RFS, has reduced Congress' original annual quotas for cellulosic ethanol every year, as required by the mandate, because not enough was available on the market. EPA adjusted Congress' first cellulosic target from 100 million gallons in 2010 to just 6.5 million. However, even the adjusted mandate was a stretch compared with reality; in fact, zero gallons were produced that year and the following year.[53]

Consequently, refiners had to pay millions of dollars in waiver credits or surcharges for failure to comply with the EPA's minimum volume requirements. Refiners necessarily passed those costs on to the consumer. In January 2013, the D.C. Circuit Court of Appeals ruled that EPA "let its aspirations for a self-fulfilling prophecy divert it from a neutral methodology" and that the target was an "unreasonable exercise of agency discretion."[54] It vacated the cellulosic ethanol requirement required by the RFS for the year 2012. The EPA has since proposed cellulosic mandates for 2014-2016 that are equally as out of touch with market realities.

Conclusion

Longtime proponents of the ethanol mandate have since recognized the problems corn-based ethanol. In fact, several Members of Congress have introduced legislation to repeal only the corn requirement of the Renewable Fuel Standard.[55] Removing corn's share of the requirement, perhaps the most economically viable part of the mandate, is problematic for several reasons. Biodiesel generated from soybeans presents the same food-for-fuel problem that the corn ethanol mandate does. Advanced biofuels from non-food based sources are the least economically competitive and demonstrate just how incompetent the federal government is at centrally planning what the market can bear. Furthermore, each part of the Renewable Fuel Standard and the federal government's promotion of biofuels create unintended environmental concerns.

Congress should repeal the ethanol mandate in its entirety and allow consumers a choice at the pump. Biofuels have existed long before the Renewable Fuel Standard and if economically competitive, will remain long after it. Removing the mandate will spur a healthier market that promotes risk taking and entrepreneurial activity rather than government dependence for near-term survival through favorable policies and tax treatment. Importantly, policymakers should not just repeal the corn-based part of the ethanol mandate, leaving the least competitive part, the cellulosic requirement.

Furthermore, Congress should use the repeal of the mandate as momentum for greater reform in the energy sector that further levels the playing field for all energy companies and technologies.

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[53]U.S. Environmental Protection Agency, "Fuels Registration, Reporting, and Compliance Help," September 28, 2015, http://www.epa.gov/otaq/fuels/rfsdata/2010emts.htm (accessed November 13, 2015).

[54]U.S. Court of Appeals for the District of Columbia Circuit, *American Petroleum Institute vs. Environmental Protection Agency*, January 25, 2013, http://www.cadc.uscourts.gov/internet/opinions.nsf/A57AB46B228054BD85257AFE00556B45/$file/12-1139-1417101.pdf

[55]Press release, "Toomey, Feinstein Introduce Bill to Repeal Ethanol Mandate," February 26, 2015, http://www.toomey.senate.gov/?p=news&id=1496 (accessed October 2, 2015).

Congress should remove preferential treatment for all transportation fuels and technologies. America needs policies that open access to markets, eliminate preferential treatment for all energy sources, and reduce the regulatory burden that chokes investment and innovation.

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