



## Commentary

Max Schulz

University of Minnesota Professor Douglas Tiffany's article (2009) provides a valuable treatment about the economics of ethanol production and use. The debates on biofuels in Washington in recent years have too often been focused on slogans and sentiment rather than facts and figures. Professor Tiffany's article brings very useful detail and expertise to a topic that touches on issues ranging from energy, the environment, and agriculture to national security and foreign relations.

While I take issue with some of his conclusions, Professor Tiffany is to be commended for addressing several of the alleged negative implications of federal ethanol mandates. At the same time, however, he doesn't adequately address the core concern that has compelled those mandates: namely, whether we can displace significant volumes of our national oil consumption with ethanol.

Although this conference takes place shortly after the election of a new president, it is a valuable exercise to review the recent history of ethanol policy under George W. Bush to provide insight for charting ethanol's future course. Conventions of public disclosure demand I note that I served for nearly five years in the George W. Bush administration at the U.S. Department of Energy (DOE). However, the policies discussed here began to be implemented largely at the end of my tenure at the DOE. Furthermore, it will be clear that my views represent no endorsement of the biofuels policy embarked on (with the president's support) in the

comprehensive energy legislation passed by Congress in 2005 and 2007.

The push to boost the share of ethanol in our fuel supply will go down as one of President Bush's legacies, albeit an unfortunate one. This development was a signature initiative of his second term. Ironically, Bush's first term, which placed a large focus on energy policy issues, did very little to encourage ethanol use and certainly didn't hint at the sort of mandated expansions that would occur in 2005 and 2007.

When President Bush took office in 2001, the country was dealing with the shocks of the California energy crisis. There were also signs that domestic natural gas production was plateauing; more and more holes were being drilled to produce the same amounts of gas. There were clear indications that global demand for oil would increase, while our capacity to develop it at home was hindered by regulations and moratoria on exploration.

Among the first orders of business for President Bush was to issue a comprehensive energy policy that encompassed a host of various possibilities (National Energy Policy Development Group, 2001). It encouraged the development of domestic oil and natural gas resources, as in Alaska's Arctic National Wildlife Refuge (ANWR). But the Bush energy plan was much more than that. Emphasizing that no one energy program or approach, including ANWR, was a silver bullet, the plan highlighted the necessity of a fully rounded energy policy.

The president's National Energy Policy (NEP) promoted a variety of energy technologies, fuels,

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Federal Reserve Bank of St. Louis *Regional Economic Development*, 2009, 5(1), pp. 59-64.

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and processes. It called for the expansion of nuclear power; renewable energy research for wind, solar, and biomass; energy efficiency and conservation; clean coal and carbon capture; building a twenty-first-century electricity grid; as well as investments in infrastructure upgrades from wires to pipelines to liquefied natural gas terminals and tankers.

In fact, despite political criticism that the president's plan focused solely on ANWR, it devoted as much (if not more) attention to efficiency and conservation as it did to expanded oil drilling in Alaska. But what was really curious was what the NEP did *not* emphasize: biofuels. Ethanol was mentioned only in a cursory fashion, essentially noting its role as an additive in gasoline. There was no indication in the president's comprehensive energy plan of the importance that he would later assign to it.

The overall theme of the president's sweeping plan was energy security. Far more than just considering energy as an economic or environmental matter, the NEP considered energy as a component of national security. Then came September 11, 2001, which put the energy security/national security nexus into sharper focus. It provided even more impetus for the notion that we must take a national security approach to our energy policy decisions. In the back of everyone's mind was the fact that the terrorists who perpetrated the 9/11 attacks and subsequent acts of violence were funded (indirectly, but funded nonetheless) through the revenues reaped by national oil companies in the Middle East. The Organization of the Petroleum Exporting Countries (OPEC) dictatorships got rich selling us the oil we use to power our transportation sector. In return, for instance, the Kingdom of Saudi Arabia used that money to establish the Wahhabi schools and mosques that supported the 9/11 bombers and other international terrorists.

Against this backdrop, consider the upward creep in oil prices over the past eight years. The wealth transfer to regimes in Saudi Arabia, Russia, Venezuela, and Nigeria was worrisome enough when oil was trading at \$35 per barrel. But as oil prices soared to well over \$100 last summer, the massive transfers of wealth lining the pockets of some very bad actors seemed particularly egregious. Even in the current economic environment, with

the price of oil having retreated considerably from its mid-summer highs, the national oil companies of OPEC (not to mention their like-minded allies in Moscow) are reaping huge sums from the global oil market that can be put to nefarious purposes.

It was in this context that the federal government took a significant policy leap with the 2005 and 2007 energy bills. We moved from a position where the government encouraged ethanol use as an additive to meet clean air goals to one where ethanol would be used to displace gasoline use and lower our consumption of foreign oil.

In 2005, the White House endorsed a renewable fuels standard that mandated the use of 7.5 billion gallons of ethanol and biodiesel in our fuel mix by 2012 (Public Law 109-58, 2005 [also known as the Energy Policy Act of 2005]). By the time of the 2007 legislation, President Bush was pushing even harder to expand that mandate nearly fivefold by 2022.

The chief impetus for President Bush and for allies in Congress was a stated desire to displace foreign oil imports. The environmental goals or the goals of helping the economies of Midwestern states, to the extent these goals were discussed, were far less important than the energy independence angle. Even so, the environmental argument still has its champions. Green groups have advocated increased biofuel usage for years. But without the Bush administration driving the issue from a national security angle, we simply would not have seen the extreme mandate for biofuels that was passed in the 2007 legislation.

What is striking at a conference dedicated to discussing the various economic and environmental consequences of ethanol is to consider that Congress and the Bush administration originally paid so little heed to what those consequences might be. Goals certainly were discussed—from energy independence and energy security to the hope we might produce fuel at home instead of buying from Middle Eastern sheiks. However, discussion of the practical consequences of such a fairly dramatic policy shift was sorely lacking.

Washington's ethanol debates were carried out largely by reference to the legislation's goals, not its likely ramifications. Little thought was given to consequences for consumers. Not considered

was how a law mandating ethanol usage might affect farmers' choices of crops to plant, or what it might do to world food markets given that the United States produces 40 percent of the global corn supply and is responsible for more than two-thirds of the world's corn exports (U.S. Department of Agriculture, 2009). What the legislation might mean for the environment was barely discussed, other than the occasional broad platitude that use of renewable ethanol instead of gasoline would cut emissions.

The rush to mandate ethanol's usage in our fuel mix in 2005, and then to supersize that policy in the subsequent 2007 energy bill (Energy Information Agency, 2007), was much like taking a running jump off the diving board without checking to see if there's water in the pool. It turns out there wasn't much water in the pool. The near-term consequences so far have been, simply, unfortunate for everyone but certain groups of farmers and agribusiness concerns.

The global increase in food prices tops the list of unfortunate consequences. Professor Tiffany addresses this issue somewhat in his article, noting the record prices for corn brought on partly because of Washington's ethanol mandate. He correctly notes that the values of crops represent only a portion of the cost of food. "Up to this time," Professor Tiffany writes, "corn ethanol's effect on food prices has been minimal." He cites consumer price index (CPI) numbers, noting that 2007 U.S. retail food prices rose 4 percent over 2006 levels.

Our ethanol policies seem to have had a more harmful effect than Professor Tiffany allows. For one thing, he could have noted the continued increase in the CPI for retail food prices throughout the course of 2008. With six weeks left in the year, it looks as if the CPI will show a 5 percent to 6 percent increase over last year's prices, meaning an overall increase of nearly 10 percent over 2006 prices.<sup>1</sup> That's a significant rise.

The jump in crop prices has been dramatic, as well, at least before the recent economic downturn. In early 2008, corn prices were basically double from the previous year. Not just corn has been

affected. One consequence of the federal government's varied efforts to prop up the price of corn (to increase the use of biofuels) has been farmers choosing to plant corn in place of other crops. So with land for other crops moved to corn production, the prices of those displaced crops have increased. Earlier this year, the price of wheat was triple what it sold for the year before. Soybean prices doubled, as did the price of rice.

One can argue about the effect of such dramatic increases in crop prices on the retail cost of food. But what cannot be argued is that food prices have indeed increased over the past two years. Their effect on the American economy may be said to have been relatively minimal—but that has to do with the fact we are a wealthy country. If the problems with our financial system and our monetary policies are put aside, the economy is fundamentally sound.

That is to say, we are a productive nation. We have created great stores of wealth for the vast majority of Americans. As such, we have been able to weather the effects of any number of troubling developments in recent years: 9/11, corporate scandals at Enron and WorldCom, Hurricanes Katrina and Rita, the 2005 blackout in the Northeast, flooding here in the Midwest, and rising energy prices, not to mention the spike in food prices. These events all have taken some toll, but generally our economy has proven pretty resilient.

Citizens of poorer nations are not as capable of taking an economic punch as are we. As a result, riots over spiking prices for food have erupted in Egypt, Haiti, Mexico, Indonesia, and elsewhere. The effect of U.S. and European biofuels mandates on other nations as prices for crops have skyrocketed is one that perhaps could have been explored by Professor Tiffany in what is a fairly laudatory article about ethanol.

Fortunately, the alarms over biofuels' effect on global food prices are being raised again and again. This fall, the Food and Agricultural Organization of the United Nations (2008) called for a review of biofuels subsidies and mandates because of their contribution to rising food prices.

The International Food Policy Research Institute similarly voiced concerns (von Braun, 2008), as did the Organisation for Economic Co-operation

<sup>1</sup> The year-end figure was 5.5 percent for 2008, so the overall increase was 9.72 percent, or roughly 10 percent.

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and Development (2008), which wonders if the “cure” of biofuels is worse than the diseases it is supposed to address.

In July, the World Bank suggested that biofuel policies were responsible for nearly three-quarters of the increase in global food prices, with higher energy costs, the weak U.S. dollar, and increased transportation and fertilizer costs making up the difference (Chakraborty, 2008). The World Bank study seemed to confirm an earlier International Monetary Fund report making similar claims (Mercer-Blackman, Samiei, and Cheng, 2007).

And what of the environmental impact on the developing world’s biofuel policies—specifically, the demands for land? U.S. farmers planted a record 94 million acres in corn in 2007, yielding a record 13 billion bushels. And for all that, it displaced just 3 percent of our total oil consumption (Tucker, 2008).

It isn’t that difficult to imagine what would be required to make a truly significant dent in our oil consumption. Two researchers at the Polytechnic University of New York did just that in a 2006 *Washington Post* op-ed article. James Jordan and James Power came to the conclusion that “Using the entire 300 million acres of U.S. cropland for corn-based ethanol production would meet about 15 percent of the demand” (Jordan and Powell, 2006, p. B07).

That’s a theoretical figure, to be sure. But to date, I haven’t seen credible numbers suggesting we can produce enough biofuels to make a worthwhile dent in our oil demand while also growing the crops used for traditional uses.

If it’s theoretical to us in the United States, however, in other parts of the world the clearing of land for biofuels production is causing significant environmental damage. In Indonesia, forestland is being cleared at alarming rates to plant palm oil crops to cash in on the artificial demand for biofuels. The result is a massacre for many endangered animals, such as the orangutan.

Perhaps worse, depending on one’s view on global warming, is that the land-clearing aspects of biofuel production arguably increase greenhouse gas emissions. That was the conclusion of two reports in *Science* magazine. One article noted that growing biofuels necessarily leads to deforestation, which eliminates some of the planet’s most effective

carbon sinks (Searchinger et al., 2008). In the other article, lead researcher Joseph Fargione claimed that even though biofuels are a potential low-carbon energy source, land clearing sped up carbon emissions and that “for the next 93 years you’re making climate change worse” (Rosenthal, 2008).

It isn’t just the land that is being affected. The National Oceanic and Atmospheric Administration (NOAA), in conjunction with Louisiana State University, has sounded the alarm about a growing dead zone in the Gulf of Mexico, an algae-filled area with oxygen levels too low to maintain marine life. Since 1990 this dead zone has averaged about 4,800 square miles. NOAA warns it could expand to 8,800 square miles, largely because the recent flooding in the Midwest and the increased use of fertilizers to grow more corn have washed nitrogen and phosphorus downstream into the Gulf (NOAA, 2008).

In his paper, Professor Tiffany notes that “it is difficult to describe a perfect fuel that produces no adverse impacts during its production or use.” Quite right. Such a characterization applies to every fuel and energy technology we use, each of which has some drawbacks or dangers. Coal has to be dug out of the ground in a laborious process and transported—often hundreds of miles—to be incinerated, which is a dirty process. Our nuclear fuel cycle leaves the problem of radioactive waste. Our oil use enmeshes us in foreign entanglements, not to mention that burning it emits pollutants as well as greenhouse gases. Wind turbines require huge tracts of land and pose serious aesthetic considerations. The manufacture of solar panels requires the use of highly toxic chemicals, and using the panels also requires large amounts of land for solar farms and other optimal conditions. Hydropower distorts landscapes and natural environments.

The question we must ask with all of these energy options is whether it is worth putting up with the hassles involved for what we get out of them. The risks and environmental impacts associated with nuclear power and coal are of a far greater scale than those for windmills, but they also are capable of generating vastly greater amounts of reliable power than windmills. Over the course of a century, we developed the production, delivery, and refining system for petroleum because, in the

end, gasoline has proven to be the best, most durable, most available, most flexible fuel for powering our transportation sector.

By and large these things occurred because of decisions made by the market, not by government. Certainly there have been government involvement and distortions in energy markets since shortly after the gusher at Spindletop, yet the energy system that has matured to service the internal combustion engine has done so organically.

For all the benefits of ethanol, many spelled out by Professor Tiffany, those benefits cannot make ethanol economically viable without explicit government sponsorship. Such sponsorship takes many forms—from direct and indirect subsidies to tariff protection to mandates ordering its use. One certainly can argue over the magnitude of our biofuel policy's effects: Did prices rise this much or only that much? Was the environmental insult this large or slightly smaller? Much harder to contest is the notion that with just about any calculation, corn-based ethanol forever will be incapable of supplanting a significant amount of our oil consumption.

Cellulosic ethanol holds promise and will not carry the baggage associated with corn-based ethanol. But it's far less evolved technologically than corn-based ethanol at this point.

Following the road set by President Bush and Congress, we should see continued adverse economic and environmental impacts. This will certainly be the case in the near term until a workable process for cellulosic ethanol is invented. Even if that happens (a questionable proposition), it is worth considering that there likely will be other similar, unforeseen adverse consequences if technology advances allow the United States to ramp up cellulosic ethanol production.

Barring an unlikely change of heart by policymakers in Washington, we should expect our economy, not to mention consumers in other, poorer regions of the world, to continue weathering these assaults. And for what? To displace negligible amounts of America's oil consumption.

At some point, we should ask ourselves if the benefits of our ethanol policies are worth the disruption and economic pain they cause. Given ethanol's inability to substitute in any meaningful way for our current oil consumption, I would argue they are not.

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