

Biofuels: What's in it for Farmers and Rural America?

David Morris

Vice President

Institute for Local Self-Reliance

dmorris@ilsr.org

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Policies designed to promote biofuels must take into account two key differences between biomass and other forms of renewable energy.

One difference is that the wind blows and the sun shines whether we like it or not. That allows us to design policies and focus resources on developing technologies that harness wind and sunshine. Plant matter, on the other hand, will be available in sufficient quantities only if farmers choose to cultivate and harvest it. Therefore, biomass policies need to focus not only on improving the conversion of crops to fuels but also on persuading farmers to cultivate the crops.

The second difference between biomass and other renewable resources is that wind and sunlight can be used only to generate some form of energy—mechanical, thermal, electrical. Biomass, on the other hand, has many possible markets: food, feed, textiles, chemicals, fuels, construction materials, and medicines. Therefore biomass-related policies need to take into account the impact of subsidizing the redirection of a feedstock from one end market to another.

A Tale of Two Policies

Let me use my home state of Minnesota to offer an example of a policy that took account of these differences, and one that did not.

Accentuating the positive first, in the early 1980s, Minnesota adopted a state ethanol incentive that mirrored the federal incentive. Sellers of ethanol received a partial exemption from the state gasoline tax. The incentive worked. Ethanol sales rose. But none of the ethanol was produced in the state.

Minnesota farmers insisted that if state money were involved, a state economic benefit should result. They convinced the legislature to convert the pump credit into a producer

payment. Each ethanol producer received a direct payment of 20 cents per gallon, with three conditions.

First, the ethanol had to be produced inside the state. This tied the incentive to Minnesota rural development.

Second, the incentive only applied to the first 15 million gallons produced. This encouraged smaller facilities, which in turn enabled farmers to become owners.

Third, no plant could receive the incentive for more than ten years. The incentive would not become an open ended drain on the state treasury.

The result came to be known as the Minnesota model. Twelve of 15 ethanol plants operating as of 2002 were farmer owned. Thirty percent of all full time grain farmers in Minnesota owned a share in at least one ethanol facility.

Now a word about a poorly designed policy. In the late 1990s, Minnesota provided a huge incentive, over \$100 million, to encourage the generation of electricity from poultry manure. Sometime in 2007 or 2008, almost two-thirds of all turkey manure in the state will be incinerated to generate electricity. Even as it debated the subsidy, Minnesota ignored the fact that this dry manure already had a healthy and growing unsubsidized market as a nitrogen rich fertilizer.

Soon, even as the demand for organic agriculture continues to soar, a demand that can be legally satisfied only if a farmer uses natural fertilizers, Minnesota farmers will have to purchase more natural gas based fertilizers. Adding insult to injury, since the manure-into-kilowatt-hours subsidy was adopted, the price of nitrogen fertilizer has more than doubled.

Maximizing Benefits to Farmers and Rural Communities

Today biofuels is front-page news, not only in farm journals but also in Forbes and the Wall Street Journal. Production has doubled in the last three years, from 2.3 billion gallons to 4.6 billion gallons, and promises to double again in the next two years. Bills in Congress call for a national mandate as high as 60 billion gallons a year.

When demand rises much above 10 billion gallons a year, cellulosic ethanol will begin to meet additional demand, in part because that level of demand may significantly raise the price of corn. We should also remember that the Energy Policy Act of 2005 contains a federal mandate of 250 million gallons of cellulosic ethanol by 2013. That alone will probably result in at least 6 and possibly as many as 10 commercial cellulosic ethanol plants operating as early as 2012.

Increased national demand for biofuels will certainly benefit farmers who supply the feedstock, whether it is grains or oilseeds or cellulosic crops. But that increased demand will not benefit farmers very much, nor will it maximize the benefit to rural communities.

Farmers know from a century of bitter experience that increased demand for their crops only rarely translates into increased prices for their crops.

Surprisingly, the price of corn has not increased much, if at all since 2002, even though demand for corn-derived ethanol has doubled. The price has increased in areas near ethanol plants, in large part because of farmers' decreased transportation costs. Most studies peg that benefit at about 10 cents per bushel.

However, when farmers own a piece of the ethanol facility, they receive far larger benefits. On average, over the last 15 years, their annual return on investment has been 15-20 percent. Their dividends at the end of each year are between 40-80 cents a bushel.

What does this mean? The benefit to farmers of a 40 million gallon ethanol plant will be about \$1.5 million a year if the facility is absentee owned, but will soar to \$6-12 million a year if the farmers own it.

Of course, farmers can also lose money on their investment. No investment is guaranteed. But if this does occur, usually it is because the price of their crop has soared, which brings them more revenue on that side of the household ledger. Thus an ethanol plant investment becomes a real hedge for the farmer. If the price of the crop declines, revenue from the sale of the crop declines. But, all other things being equal, production costs of the ethanol facility also decline, and profits and dividends go up. And vice versa.

Farmers are not the only ones to benefit from a locally owned facility. Rural areas do as well, especially if the debt as well as equity financing is local. Two economists at Iowa State University, David Swenson and Liesl Eathington, using a very sophisticated analysis, concluded that a locally owned and locally financed plant could provide value added and jobs as much as 5 times greater than an absentee owned and absentee financed plant.

Another economist, John Urbanchuck, found that a 50 million gallon locally owned plant could double the amount of household income generated by an absentee owned plant, and could boost by 60 percent the benefits of the plant to the overall state economy.

Looking at the economic impact issue another way, our own analysis found that in Minnesota, roughly 75 cents on the dollar spent on gasoline leaves the state, even though the crude oil is actually refined inside of the state. Roughly 75 cents on the dollar spent on ethanol stays inside the state, if the ethanol is produced in state and under local ownership.

A cellulosic ethanol industry in Oklahoma based on farmer and local ownership could generate an enormous beneficial impact on the state economy. Currently the state is home to 83,000 farms cultivating over 33 million acres. Over 6,000 farmers have sales over \$100,000 a year.

If 5 million acres, about the same acreage currently planted in winter wheat, were planted in cellulosic crops like switchgrass or fast growing trees, Oklahoma could produce as much as 4 billion gallons of ethanol a year in 40-80 plants. In theory, every one of Oklahoma's larger farm owners could become a shareholder.

Federal policy and farmer ownership

In the next few months, we may test of the federal commitment to farmer ownership and rural development. The Energy Policy Act of 2005 authorized more than \$2 billion in incentives for the Department of Energy to accelerate the commercialization of cellulosic ethanol. Later this year, Congress will debate the level of appropriations it will provide. Part of that debate should be to what extent the Department of Energy (and the Department of Agriculture) uses the money to maximize local and state economic benefits.

Currently the Department of Energy is focusing almost exclusively on achieving the Act's quantitative goals by maximizing production. But the Act also requires the Department to give a priority to strategies that benefit farmers and rural communities. Given the 2013 cellulosic ethanol mandate, it is doubtful that expenditures by DOE will achieve commercialization significantly sooner. On the other hand, the way DOE designs its commercialization spending can have a very significant impact on whether the coming of a cellulosic ethanol industry maximizes the benefit to farmers and rural areas.

We live in a time of great and often tumultuous change. But we should keep in mind the distinction between change and progress. As Bertrand Russell describes it, change is inevitable while progress is problematic. Change is scientific while progress is ethical. We will have change whether we will it or not. But we will have progress only if we develop the rules that channel investment capital, scientific ingenuity and entrepreneurial energies into developing technologies and ownership forms that are compatible with our deepest held values.