Minnesota's Biofuels Programs: Economic & Environmental Impacts

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The Minnesota Ethanol Program: Economic & Environmental Impacts[1]

The Minnesota Ethanol Program was formed to build a new market for the state's largest crop, develop processing facilities in the state, and help meet EPA air quality standards set for the Twin Cities Area. Minnesota's ethanol industry is projected to contribute over $500 million in net annual benefit to the state.

Main Components

1. To ensure demand and reduce carbon monoxide pollution, an oxygenated fuel statute requires statewide ethanol use. It was changed in 2003 from 2.7% by weight to 10% by volume.
2. To ensure in-state production, a cents-per-gallon ethanol producer incentive provides payment for ethanol produced on up to 15 million gallons of ethanol per year for a maximum of 10 years. Originally 20¢/gallon, the incentive is now 13¢/gallon and expires in 2010. In addition,
    - $550 million was spent for total corn/ethanol plant construction and startup costs.
    - $370 million in private sector financing was contingent on local equity capitol.
    - $180 million in local equity capital was raised by over 8,000 farmer and business members.
    - Over $200 million worth of corn was committed for processing annually by local farmers.

Goals

1. To build a new market for the state's largest crop (corn).
2. To develop corn processing/ethanol production facilities in Minnesota.
3. To increase the number of New Generation Farmer Coops.
4. To replace 10% of imported petroleum Minnesota's uses for gasoline (over $100 million in annual savings).
5. To help the Twin City Area meet U.S. EPA standards for carbon monoxide.

Plants organized as New Generation Farmer Co-ops (NGCs) are generally designed to:

- be built by farmers and local businessmen to process member crops,
- return more cash to farmers than conventional markets would provide,
- be controlled by farmer/local board members so that member profits remain a top priority,
- create a stable source of local jobs and economic development.

[1] This section is derived primarily from the Minnesota Department of Agriculture's website: www.mda.state.mn.us/ethanol/about.htm

Results to Date

1. 150 million bushels of corn (15% of Minnesota crop) is made into ethanol, livestock feed and other products.
2. Minnesota's 13 plants can produce over 400 million gallons of ethanol/year.
3. Twelve of Minnesota's 13 ethanol plants were originally organized as NGCs.
4. Nearly 10% of Minnesota's gasoline is being replaced by ethanol each year.
5. The Twin Cities Area met EPA's carbon monoxide standard and has achieved "attainment" status. The continued use of ethanol helps keep emissions low.

Minnesota Ethanol Production -vs- Market Penetration

Minnesota's ethanol market is met by in-state production, and ethanol is exported out of the state.

Year	Production (mm = million)	Estimated Consumption	% Minnesota Ethanol Produced in Minnesota
1986	1 mm gal.	25 mm gal.	4% of total
1994	24 mm gal.	125 mm gal.	20% of total
2004	400 mm gal.	240+ mm gal.	167% of total

Processing corn products instead of exporting raw corn doubles the value of each bushel. In addition to fuel ethanol, corn plants produce over 1,400,000 tons of high protein livestock feed plus other products including: industrial and beverage ethanol, starch, sweeteners and carbon dioxide.

Conclusion

The 20¢ ethanol producer payment legislation initially provided the security required by lenders to invest in small farmer-owned ethanol facilities. In addition to opposition from the petroleum industry, bankers were concerned that these plants could not compete in the market with large agribusiness processors. At the time, most ethanol production occurred in large mills outside the state. Minnesota corn prices were among the lowest in the country, which was an advantage for local processing.

Although Minnesota's incentives have been successful to date, margins have been squeezed by periods of record high corn prices and low ethanol prices. Minnesota hopes that ten years of payments will allow plants to retire debt, increase efficiency and develop new products and markets so they can survive the competition and price fluctuations in agricultural and petroleum markets.

Since low farm commodity prices are common, corn-to-ethanol plants represent a new strategy for the long-range profitability of farmers and farm communities. Vertical integration from the bottom up allows farmers to participate in the more profitable end of agriculture. Minnesota hopes that such initiatives can reduce the need for continual funding of farm financial crisis measures allowing farmers to make it on their own.

The Minnesota Biodiesel Program: Preliminary Economic & Environmental Impacts[2]

In 2005, Minnesota will become the first state to utilize biodiesel fuel on a broad scale. Over 60 million gallons per year of biodiesel production capacity is poised to come online this summer in Minnesota—twice the production of the U.S. in 2004. One year ago, Minnesota produced almost no biodiesel. The recent state mandate requiring a 2% blend of biodiesel with petrodiesel has spurred unprecedented production. This massive economic transition will improve air quality in Minnesota, create new jobs in rural areas, and provide farmers with a new in-state value-added market for their crops without significant new costs to the state government.

Economic Development Impacts

> "...thousands of Minnesota farmers and businessmen have invested to build biodiesel production facilities, in part because of the mandate established in statute."[3]

Without a doubt, Minnesota's biodiesel mandate has caused economic development that would not have occurred otherwise.

New production investments have been dramatic. At this time, one new biodiesel production facility is in operation (annual capacity approximately 3 million gallons) and two more are in the late stages of construction (each 30 million gallon plants). One of these latter plants, in Albert Lea, is owned by a farmers' cooperative also engaged in ethanol production (www.soymor.com). The other large plant is on the site of a preexisting soy oil crushing facility (www.mnsoy.com/biodiesel.htm). The plant in operation today, the Farmers Union Marketing and Processing Association (FUMPA), is run in conjunction with an animal rendering plant and, in the next several years, will use animal waste products to create biodiesel. None of these plants existed when Minnesota passed its biodiesel law. Once in production, Minnesota will have tripled the annual U.S. production capacity of biodiesel and done so in less than three years.

The Minnesota Department of Agriculture estimates that at a 2% blend, biodiesel will cause the following:[4]

- Soybean revenue of $56 million to farmers
- A 12% increase in in-state soybean processing capacity (soybeans are Minnesota's 2nd biggest crop, but it is a small *processor* of soy), adding $22 million in value
- Production of soybean meal, a by-product of soy oil production and a livestock feed, valued at $43 million
- Total economic activity of $206 million
- Total new jobs: 973

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[2] Original research by John Stambaugh for the Oregon Environmental Council. A variety of Minnesota biodiesel reports are available at: www.mda.state.mn.us/ams/biodiesel/default.htm

[3] Biodiesel Task Force, meeting minutes, November 1, 2004: www.mda.state.mn.us/ams/biodiesel/taskforce.htm

[4] "Economic Impact of Soy Diesel in Minnesota," Su Ye

This economic activity is primarily rural, with money staying in local agricultural communities.

Consumer Impacts

By statute, Minnesota's biodiesel requirement will not take effect until 8 million gallons of production capacity are certified. This is approximately half the amount required for 2% of all diesel fuel consumed in the state each year to be biodiesel, assuming no changes in demanded quantity. This production capacity will likely be reached this spring or summer. Until that time, there will be no observable impacts on consumers.

Possible impacts include higher prices, fuel supply shortages or inconsistencies, and changes in vehicle performance. However, federal tax credits (in effect, in all states, as of January 1, 2005) should make biodiesel economically competitive with petrodiesel. Given these tax credits, consumer prices changes are likely to be small or non-existent. In addition, when federally-mandated ultra-low sulfur diesel (ULSD) comes on line in 2006. a biodiesel blend of 2% (B2) could serve as the needed lubricity agent, lowering maintenance costs and prolonging engine life.

Environmental Impacts

At a 2% blend, biodiesel will have negligible air quality benefits. But gallon for gallon, biodiesel production and combustion creates fewer greenhouse gas emissions compared to petroleum diesel. And the greater availability of biodiesel should result in additional markets for B20 and higher blends, with significant air quality benefits. Other environmental benefits will include reduced transportation of feedstock crops to out-of-state markets (assuming in-state soy is used for in-state biodiesel production, as current trends indicate). Long-term, it is possible new land will be brought into production to grow feedstock for biodiesel production, but given that Minnesota exports 59% of its current soy crop and transportation costs associated with Minnesota soy conspire to drive the commodity price received by the state's farmers down, it is unlikely. Using 2002 consumption levels, B2 would use roughly 4% of Minnesota's annual soy crop.

Transitional Impacts and Costs of Implementation

This new economic activity did not occur without some effort or without solving some dilemmas. Several of these are outlined below.

Given Minnesota's cold climate, technical concerns about Cold Blending of biodiesel have been raised. In response the "Biodiesel Cold Flow Blending Consortium" was organized to research and disseminate information on the subject.

As with all new market investment, those involved in biodiesel production face risks. The Minnesota legislation has a provision to (partially) reimburse distributors that made investments in equipment in response to the biodiesel law if it is repealed within eight years of its effective date. The State made no appropriation to guarantee funds for such reimbursement, but the proviso was viewed as a governmental assurance of seriousness and that private investors could expect a consistent, predictable regulatory environment. Likewise, local and state authorities extended the JOBS zone tax credit to biodiesel producers. Beneficiaries receive deferred tax bills.

Lastly, state administration of the biodiesel standard (conducted by the Department of Commerce, Division of Weights and Measures) was greatly informed by ethanol experiences. This administrative history has allowed Minnesota to govern biodiesel without initial growing pains.

Conclusion

Minnesota is poised to become the national leader in biodiesel. Using "surplus" crops already grown in the state, the government's enactment of a biodiesel mandate will create new value-added industries. These new markets will give farmers better crop prices and economic empowerment unlike what they currently have on the commodity's market. Further, the state will have pre-empted the necessity of harsh chemical lubricity fuel additives when new EPA ULSD rules go into effect in 2006.

Federal tax incentives that are available in all states have been essential to these developments. However, several factors have contributed importantly to Minnesota's leadership in biodiesel promotion. First, the state is already a large producer of feedstock (soybeans) that can be used for producing biodiesel. Yet, because the state is comparatively isolated and has few soybean refiners given its crop production (Illinois is the country's largest producer and refiner of soybeans), Minnesota soy farmers command one of the lowest commodity prices for their crops in the country. Second, the state has significant experience with another biofuel—ethanol—and has been able to leverage that experience in a number of ways in the biodiesel context. Legislatively, it emboldened lawmakers and, once the law was enacted, farmers and investors were already organized and engaged in biofuels production. The new mandate allowed them to extend their current ethanol activities into a new context, but did not require them to reinvent their business model.

At this point, Minnesota's story appears to be a success when measured on rural economic development grounds. The ultimate environmental and consumer impacts are likely to be positive as well. No definitive data is available yet, nor does this overview assert the overall costs and benefits of the program (federal tax credits are not free, of course). However, as one government official explains it, for Minnesota "The cost of doing nothing exceeds the costs of doing something."[5]

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[5] Telephone interview with Ralph Groschen, Minnesota Department of Agriculture, with author, February 10, 2005