THE BIOFUELS INDUSTRY IN WISCONSIN'S ECONOMY

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September 2009

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EXECUTIVE SUMMARY

Benefits

The nine ethanol facilities operating in Wisconsin in 2008 produced 462 million gallons of ethanol, 1.6 million tons of distilled grains, 289 thousand tons of CO2, 71 thousand tons of syrup, and lesser quantities of other by-products. Based on average prices prevailing for those commodities in 2008, total output of Wisconsin's ethanol facilities totaled an estimated $1.2 billion for the year. An estimated $823.8 million of this total was paid to corn growers, $22.2 million was paid to employees, and $2.4 million was paid in local property taxes.

The overall impact on Wisconsin's economy is magnified when indirect and induced benefits are included. Individuals and businesses benefit from outlays by Wisconsin's ethanol facilities for inputs into the production process. These increased incomes from sales to ethanol facilities benefit still other individuals and businesses when they are respent in the State. The respending cycles are known as the "multiplier process."

Applying the assumed output multiplier of 1.82 to the estimated $1.18 billion output of the nine ethanol facilities yields an estimated **$2.14 billion** contributed to Wisconsin's economy in 2008. Applying the assumed employment multiplier of 3.97 to the 420 full-time and nine part-time ethanol plant employees implies that the Wisconsin ethanol industry was either directly or indirectly responsible for an estimated **1,685 jobs** in the state during 2008.

Because of limited data available for biodiesel facilities, it is not possible to estimate with confidence their economic impact on Wisconsin's economy. However, if the seven biodiesel plants operating in 2008 had operated at their 51 million gallon capacity and sold their output at the $4.43 price per gallon, they would have directly contributed approximately $226 million to the State's economy, approximately one-fifth of the total for ethanol.

Costs

Whereas the value of biofuels presumably exceeds the direct costs of resources used in their production, their net value to society will be less (and possibly negative) if "neighborhood" costs are taken into consideration. Although such costs are difficult to assess, especially in quantitative terms, it is clear that they are perceived to exist. For example, a 2008 report indicated that six of Wisconsin's nine operating ethanol plants had been subject to DNR enforcement actions. Complaints ranged from excessive dust, odor, and noise, to unhealthful emissions.

Most of the perceived neighborhood effects attributed to Wisconsin's biofuels industry have arisen either during the construction phase or during the first year or two of operation. The high number of violations reported by DNR appears to owe in part to the newness of the industry, its rapid technological changes, and failure of regulators to keep up with the rapid pace of development.

The Recession's Impact

Because 2008 was a transition year for both the economy and for the bio-fuels industry, estimates presented here are not as high as they would have been had the study been completed a year earlier and not as low as if production and price data for 2009 had been used. Indeed, the recession beginning in 2008 has had devastating effects on Wisconsin's biofuels industry, but especially for bio-diesel production. Some facilities have cut production by as much as half, some filed for Chapter 11 reorganization, and others ceased operations entirely. As of mid-2009, one-third of the nine large-scale biodiesel facilities coming on-line in the preceding five years had ceased operation.

Concluding Comments

The biofuels industry has ebbed and flowed in Wisconsin as it has nationally, depending on the price of petroleum-based fuels. The current downturn is exacerbated by the global recession. Nonetheless, the industry generally, and ethanol production in particular, continues to have a sizeable impact on Wisconsin's economy. The impact is especially significant in the localities in which the facilities are located, providing increased net incomes to corn growers, increased employment opportunities to workers, increased property taxes to local governments, and increased profits to owners. These direct impacts are magnified through the multiplier process. Consequently, well over $2 billion is contributed to the State's economy annually, and nearly 1,700 jobs created, by ethanol facilities alone.

The study entitled "The Biofuels Industry in Wisconsin's Economy" was conducted during the last half of 2008 and first half of 2009, with attempts to survey all large-scale biofuels producers in Wisconsin. The principal investigators were John Simonson, emeritus professor of economics, and Terry Liska, professor of economics, both at UW-Platteville. They were assisted by UW-Platteville students, Derek Dietmeier and David Dregne. The research project was commissioned by the Consortium on Education and Research in Agriculture and Natural Resources, and conducted under auspices of the UW-Platteville Center for Applied Public Policy.

THE BIOFUELS INDUSTRY IN WISCONSIN'S ECONOMY

Instead of the impact of the bio-fuels industry on Wisconsin's economy, this might better be characterized as a study of the impact of the economy on Wisconsin's bio-fuels industry. Producers of ethanol and bio-diesel have been devastated by the depressed economy, some facilities cutting production by as much as half, others ceasing operations entirely. Nonetheless, transforming corn, soy beans, and other materials into fuel continues to have a sizeable economic impact on Wisconsin's economy. Production of biofuels accounted for over $2 billion in Wisconsin's economy in 2008, of which over one-fourth was value-added to the economy.

Economic impact analysis is a well-established technique for estimating the economic effects of an activity on a community, region, or nation in which it occurs. Substantial variation exists, however, in the way in which analyses are conducted, primarily because purposes of such analyses differ. In this study, we were guided by concerns that estimates be based on sufficiently rigorous and defensible estimation methods while also being readily interpretable. In brief, the objective is to express in common sense terms the annual benefits and costs accruing to Wisconsin as a result of operating ethanol and bio-diesel facilities in the State.

As with any impact analysis, we provide only a snapshot, not purporting to reflect the past nor portend the future with any degree of confidence. Data for the study are for 2008, a transition year for the U.S. economy as well as for the bio-fuels industry. Therefore, our economic impact estimates are not as high as they would have been had the study been completed a year earlier and probably not as low as if production and price data for 2009 had been used. Moreover, because of decimation of the bio-diesel industry and the difficulty of obtaining data, we provide order-of-magnitude estimates only of the value added by the ethanol industry to Wisconsin's economy in 2008 and of what it would have been had the average prices for ethanol and corn during the year been those prevailing in December. Value-added for 2008 is estimated to have totaled $354.5 million, and would have been over one-third less ($203 million) had December prices been the average for the year.[1]

[1] This study was commissioned by the UW-System Consortium on Education and Research in Agriculture and Natural Resources (CERANR) and conducted under auspices of the UW-Platteville Center for Applied Public Policy. Funding for student participation was provided by grants from CERANR and the UW-Platteville Pioneer Academic Center for Community Engagement (PACCE).

ETHANOL'S ECONOMIC IMPACT

Overview. Biomass energy is by no means a recent phenomenon, its use dating from the 19th Century. Henry Ford used ethanol to power one of his first automobiles in the 1880s, and in the 1930s more than 2,000 U.S. service stations sold "gasohol."

Production and use of biomass energy have ebbed and flowed, primarily in response to the relative price of petroleum-based fuels. The ethanol fuel industry basically closed down after WWII, for example, as abundant supplies of petroleum products came on the market at low prices. This cycle was repeated in the 1970s when gasoline and oil prices surged as a result of the creation of OPEC and its efforts to limit production of crude oil; economic viability of biomass energy then declined as gasoline and oil prices turned downward.

The surge in ethanol production during the first three-fourths of this decade predictably accompanied the rise in gasoline prices to historic highs, undoubtedly spurred as well by government subsidies and use mandates. The first large-scale ethanol plant in Wisconsin began operation in 2002. Since then, eight others have been constructed. The nine ethanol facilities operating in Wisconsin at the present include:

Facility	Capacity (mill. gals.)	Location
ACE Ethanol, LLC	41	Stanley
Badger State Ethanol, LLC	48	Monroe
Castle Rock Renewable Fuels, LLC	50	Necedah
Didion Ethanol	40	Cambria
Renew Energy	130	Jefferson Junction
United Ethanol	52	Milton
United Wisconsin Grain Producers, LLC	49	Friesland
Utica Energy, LLC	48	Oshkosh
Western Wisconsin Renewable Energy, LLC	40	Boyceville
Total	498 million gallons	

During 2008, these nine facilities reported producing 461.9 million gallons of ethanol, approximately 93 percent of their name-plate capacity of 498 million gallons. By-products totaled 1.032 million tons of dried distilled grain (DDG), 583,000 tons of wet distilled grain (WDG), 289,000 tons of CO_2, and 71,000 tons of syrup. Corn oil, fiber, germ, and other minor by-products were also produced at some facilities. Applying average market prices for ethanol and its main by-products, and summing, yields total estimated output of the ethanol facilities of nearly $1.2 billion in 2008:

Product	Output	Price	Value
Ethanol (gals.)	461,942,295	$2.14	$988,556,511
Dry DDG (tons)	1,032,497	147.00	151,777,059
Wet DDG (tons)	582,994	50.00	29,149,700
CO_2 (tons)	289,358	28.00	8,102,024
Syrup (tons)	70,829	10.00	708,290
		TOTAL	**$1,178,293,584**

The nine operating ethanol facilities reported using a total of 169,847,562 bushels of corn as inputs to their production process. At an average price of $4.85 per bushel, the corn feedstock cost ethanol facilities an estimated $823.8 million in 2008.

Value added to corn by transforming it into ethanol, distilled grains, syrup, CO_2 and other by-products is obviously an important contributor to Wisconsin's economy. However, ethanol production also has secondary and tertiary effects, both beneficial and detrimental, which must be taken into consideration in providing a meaningful estimate of its overall economic impact. It is also important to know who realizes the benefits and who bears the costs from ethanol production.

Direct Benefits accrue to owners of the ethanol production facilities in the form of profits, to employees in the form of wages and salaries, to corn growers in the form of increased net revenues, and to local communities through property taxes levied on the facilities. These direct benefits equal the value added to corn by the ethanol production process.

Handsome profits were realized by owners of the facilities that began operation during the first half of this decade. Some facilities reported net annual returns equaling as much as the cost of constructing the facilities. With corn prices rising above $7.00 per bushel and ethanol prices falling below $2.00 per gallon, profits evaporated during 2008. Indeed, negative profits averaging on the order of $0.30 per bushel nationally have been estimated in recent months.

But averages mask the considerable variation among individual facilities due to differences in production technology, by-products, contracted prices, and so forth.

Whereas some facilities have been forced into Chapter 11, others continue to show modest profits. As late as 2007, one facility reported earnings of $72 million, with half "distributed to members." Because Wisconsin's ethanol facilities are owned primarily by local residents, profits directly contribute to the State's economy. A recent study concluded that "none of Wisconsin's ethanol plants are owned by leading corn-ethanol producers. Most were initiated by local farming interests."[2]

Profit estimates are difficult to come by because break-even points differ among facilities, geographic locations, and production technology, as well as among other factors. When asked to estimate his break-even level, one Wisconsin ethanol producer said there are too many variables: "We are now grinding $3.65 corn contracts mixed in with $6.14 corn. With $1.75, $2.18, and $2.46 ethanol contracts; 2.8 gallon per bushel in a dry grind plant; $185 per ton distillers; $0.10 natural gas; and a spot price of $2.50 for ethanol, we make money."

<u>Employees</u> of ethanol plants obviously benefit, gaining some of the value added. A total of **$22,172,193** was paid to 420 full-time and nine part-time employees in 2008. If they would otherwise have been unemployed, employees' total pay would constitute a net gain to the State's economy. Likewise, if they were diverted from other jobs in the state, but were replaced by others who would otherwise have been unemployed, their entire pay would be a net addition. While 85 percent of the employees were thought to have been residents of the community, it is not known how many would have been otherwise employed nor who replaced them in their previous jobs.

The employees obviously gained from their employment at ethanol facilities, as evidenced by their voluntarily choosing to do so. The gain may have been in improved working conditions, in higher pay, or both. Based on responses from the surveyed ethanol facilities, their employees earned an average of $3.79 more per hour than they did in their previous jobs. Hence, at a minimum, an estimated $3.2 million additional income was earned by employees of Wisconsin's ethanol facilities in 2008.

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[2] Leann Tigges and Molly Noble, "Corn-Ethanol Production in Wisconsin," *Status of Wisconsin Agriculture, 2009,* An Annual Report by the University of Wisconsin-Madison Department of Agricultural and Applied Economics, and University of Wisconsin-Extension, p. 35.

Wisconsin corn growers received an estimated **$823.8** million from corn supplied to Wisconsin ethanol producers in 2008. They generally realized a larger net return than they would have had they sold their corn elsewhere. This is due in part to receiving a higher price for their corn, either because of increased local demand or because they raised a variety of corn higher in protein. One study reported corn prices rising from 5 cents to 19 cents per bushel in areas around newly opened ethanol plants.[3] Per bushel profits are also higher because of a lower cost of transporting corn to the nearby ethanol facility. Corn supplied to each of the Wisconsin ethanol facilities generally is grown within about 50 miles of the facilities, most within a three- or four-county region.

Using the 6.5 cents per bushel assumed for the Belmont BioAg study,[4] Wisconsin corn growers in Wisconsin earned approximately $11 million more from selling 170 million bushels to a local ethanol facility than elsewhere. In effect, **$11 million** of the value added to corn by ethanol facilities was realized by local corn growers.

Communities in which ethanol plants are located also directly benefit in the form of increased *property taxes.* The nine ethanol facilities operating in Wisconsin in 2008 paid their localities approximately **$2.4 million** in property taxes. This benefited all taxpayers in those communities either in a lower general real estate tax rate or in increased public services made possible by the increased tax revenue. One of the surveyed facilities reported that its property tax payments enabled the locality to reduce its general levy by eight percent.

Indirect and Induced Benefits also accrue to society from an ethanol facility's operation. Individuals and businesses in Wisconsin benefit from outlays by Wisconsin's ethanol facilities for goods and services required in the production process. They initially receive increased income from sales to the ethanol facilities, and then provide benefits to other individuals and businesses when they spend income received from the ethanol facilities. Spending of those incomes generate income for still others. These respending cycles are known as the "multiplier process."

Only one of the surveyed ethanol facilities reported having completed an economic impact study, results of which were deemed proprietary. A second-best approach is to review multipliers developed for four alternative studies—an economic impact model developed for a

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[3] Donis N. Petersan, "Estimated Economic Effects for the Husker Ag Ethanol Plant at Plainview, Nebraska," Economic Development Department, Nebraska Public Power District, Columbus NE (October 2003), p. A-1.

[4] John Simonson, "Estimated Economic Impact from Construction and Operation of Belmont Project, LLC," Project Report 05-03, Center for Applied Public Policy, University of Wisconsin-Platteville, September 2005.

hypothetical ethanol facility in Iowa, an economic impact model of an ethanol facility in Nebraska, estimates developed for a study of the impact of the ethanol industry on the United States, and an economic impact study of a proposed ethanol facility in Wisconsin. Multipliers estimated for each of these four studies are discussed in Appendix A.

The estimated multiplier used for this study ought to be smaller than the national estimate of 2.4 because it is for a smaller area, the State of Wisconsin rather than the U.S., but larger than those estimated in the three other studies cited which were for regions within states, i.e., 1.13, 1.27, and 1.34. To provide an order-of-magnitude estimate for the overall impact of Wisconsin's ethanol producers on the State economy, we assume an *output* multiplier of 1.82, the mean of the national and local multiplier estimates. The mean of the national and state *value-added* multipliers is 1.44. Similarly, we use the mean of the national and state estimates, 3.97, as the *employment* multiplier for the State of Wisconsin.

Applying the assumed output multiplier of 1.82 to the estimated $1.18 billion ethanol produced by the nine operating ethanol facilities, the Wisconsin ethanol industry could be said to have contributed **$2.14 billion** to the state's economy in 2008. Applying the assumed employment multiplier of 3.97 to the 420 full-time and nine part-time ethanol facility employees, the Wisconsin ethanol industry was responsible for an estimated **1,685 jobs** in the state during 2008.

This conventional approach to estimating the economic impact of a given economic activity rests on several critical assumptions. For one, it assumes the activity does not displace other activity. As noted previously, all the labor and other resources used to produce ethanol and its by-products surely were not idle. Nor is it likely that operation of ethanol facilities entirely displaced other productive activities. What is of interest is how much **value** was **added** to the Wisconsin economy in 2008 by operation of the nine ethanol facilities.

The largest resource input used in production of ethanol and its by-products is corn. And since it does not appear that development of the ethanol industry in Wisconsin significantly increased the State's corn production, we subtract the value of corn used in ethanol production ($823.8 million) from estimated total production by the ethanol plants ($1.18 billion) getting an estimated value added of **$354.5 million**. Applying the assumed value-added multiplier for Wisconsin (1.44) yields an estimated **$510.5 million** added to Wisconsin's economy by the nine ethanol facilities operating in 2008.

Whereas failure to account for other production displaced by ethanol production tends to overstate estimates of value added by the ethanol industry, other omissions bias our estimates downward. We have observed, for example, considerable vertical integration by some ethanol producers as well as development of complementary products. For example, some operators of ethanol facilities also grow corn, operate grain/ethanol transporting systems, operate E85 outlets, and so forth. It is unclear the extent to which the value added to Wisconsin's economy by these activities is captured by the standard multipliers used in this study.

Costs involved with the production of ethanol and biodiesel are of two types—those borne by the producers and those borne by the public-at-large. Whereas the value of biofuels presumably exceeds the direct costs of resources used in their production, their net value to society will not necessarily be positive if "external" costs are taken into consideration.

External costs may take several forms—pollution of natural resources (air, land, water), noise, visual blight, or other quality-of-life impacts. A 2008 report indicated that six of Wisconsin's nine operating ethanol plants had been subject to DNR enforcement actions. Complaints ranged from excessive dust, odor, and noise, to unhealthful emissions. The high number of violations appears to owe in part to the newness of the industry, its rapid technological changes, and failure of regulators to keep up with the rapid pace of development.[5]

Most of the perceived "neighborhood effects" attributed to Wisconsin's biofuels industry have arisen either during the construction phase or during the first year or two of operation. Therefore, few external costs continue to be observed among those facilities currently operating, but that is not to say they do not exist nor that they are unsubstantial for some in the community.

A biofuels facility can drastically change the character of a rural community in which it is located. For example, in urging the county zoning commission to block an ethanol plant's construction a neighbor of the proposed plant lamented the anticipated increase in traffic: "Now, when someone drives down the road in front of our house, I look out to see who it is."

It has been argued that production of biofuels indirectly, and adversely, affects society-at-large by increasing the demand for feedstocks which, in turn, increases the cost of human foods. This would not ordinarily be considered an "external" cost because biofuels producers must bear this cost as they bid corn, soybeans, and other crops away from alternative uses, just as labor and other resources employed in biofuels production must be bid away from competing uses.

[5] Stacy Vogel, "More Than Half of Wisconsin Ethanol Plants Face Violations," *Gazette Xtra*, (October 12, 2008).

It is useful nonetheless to consider the extent to which biofuels production in Wisconsin may adversely affect consumers in Wisconsin by increasing the cost of foods. While it is true that growth of the biofuels industry coincided with a dramatic increase in the price of corn, one must be wary of attributing causality to this relationship. Isolating the effect on food prices from diversion of corn to ethanol is by no means simple. It is fallacious, for example, to assume each bushel of corn used to make ethanol displaces one bushel of cattle feed because one-third or more of each bushel of corn used in ethanol production is a by-product used for cattle feed.

It is estimated that each one percent increase in ethanol production increases corn price by less than one-half percent,[6] and commodity prices typically comprise only about one-fifth of the cost of food to consumers. Then, since Wisconsin's facilities produce less than five percent of the nation's total biofuels, their impact on food prices paid by Wisconsin's residents must be trivial, at best.

BIODIESEL'S ECONOMIC IMPACT

Overview. Biodiesel is an alternative to petroleum-based diesel fuel. Biodiesel is variously made from animal fats vegetable oils, or soybeans. Wisconsin's first large-scale biodiesel refining facility began production in 2004, with eight others subsequently coming on line. Production by those facilities totaled an estimated 7.5 million gallons in 2008, less than two percent of ethanol's total output.[7] However, as of mid-2009, three facilities had ceased operation. The price of petroleum-based diesel, with which biodiesel must compete, dropped by over half in the last year, its price averaging $4.43 in May 2008 and $2.02 in March 2009.

Since data are available for only two of the surviving biodiesel facilities, it is not possible to provide estimates of the industry's impact on the Wisconsin economy. However, if the seven biodiesel plants had operated at their 51 million gallon capacity level and sold their output at the $4.43 price per gallon, they would have directly contributed approximately $226 million to the State's economy, approximately one-fifth of the total for ethanol.

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[6] T. Randall Fortenberry and Hwanil Park, "Is Ethanol to Blame for High Food Prices?" *Status of Wisconsin Agriculture 2009*, Department of Agricultural and Applied Economics, College of Agriculture and Life Sciences, and Cooperative Extension, University of Wisconsin-Madison, pp. 33-34.

[7] Another 25 small-scale biodiesel facilities around the state produce less than one million gallons annually. Wisconsin Office of Energy Independence, EnergyIndependence.wi.gov, July 21, 2009.

IMPACT OF THE RECESSION ON WISCONSIN'S BIO-FUELS INDUSTRY

As indicated in the introduction, this subtitle might well have been the title of the report. To say the current recession has had devastating effects on both the ethanol and bio-diesel industries, in Wisconsin as well as nationally, is by no means an overstatement. Some facilities have cut production by as much as half, some filed for Chapter 11 reorganization, and others ceased operations entirely.

While Wisconsin does not compile E85 sales statistics, neighboring states do, and from them it is clear how greatly the economic downturn has affected the ethanol industry. Minnesota's E85 sales fell 52 percent from May 2008 to May 2009; Illinois' E85 sales plummeted by 89 percent during the last seven months of 2008.[8] Because E85 constitutes a smaller share of Wisconsin's ethanol use and with E10 having a less dramatic decline in demand, Wisconsin's ethanol producers were not forced to cut back production as much as were their counterparts in other states.

Only two of the nine ethanol plants currently operating in Wisconsin indicated that they have reduced production, but three indicated that they have had to sell at a lower price. As a result, Wisconsin's ethanol facilities are currently producing at an annual rate of some $646.7 million, with a value added of $21.7 million. Those represent decreases of 45 percent, and 94 percent, respectively. Applying the output and value-added multipliers, the recession has resulted in the industry contributing nearly a billion dollars less to Wisconsin's overall economy, and nearly a half billion dollars less value added.

Given the depressed ethanol market and firms struggling to stay afloat, it is not surprising that large firms are venturing into alternative energy markets, including ethanol. Oil companies are notably active in this regard. Over the last couple of years, Marathon Oil Corporation has acquired large holdings in ethanol plants in Illinois and Ohio. And the pace is accelerating. In April of this year, Valero Energy Corporation, the nation's largest independent oil refiner bought seven large Midwest ethanol plants for $477 million. A month later, Sunoco bought a $200 million ethanol plant for $8.5 million.[9] There is no evidence as yet of out-of-state firms becoming owners of Wisconsin ethanol facilities, although chapter 11 and other financial reorganizations have in some cases resulted in changed partial ownership.

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[8] Steve Karnowski, "Gas Price Drop a Blow to Ethanol Makers," *The Wisconsin State Journal*, (July 19, 2009), p. C9.

[9] William Kates, "Oil Refineries Buy into Ethanol Market," *The Wisconsin State Journal*, (June 19, 2009), p. A9.

The recession has been nothing short of devastating for Wisconsin's biodiesel industry, with a third of the facilities currently idle. One indication of the economy's impact on this industry is to compare current production with projected levels. Biodiesel production was expected to reach some 50 million gallons by the end of this year (2009), but is currently only about 15 percent of that level.

The recent closing of the Sanimax facility in DeForest, the largest biodiesel plant in Wisconsin, is instructive. At the time the facility was closed in early June, the cost of biodiesel was \$3.90 per gallon, but competing oil-based diesel retailed for as low as \$2.39 per gallon.[10]

CONCLUDING COMMENTS

Nine ethanol facilities and six biodiesel plants are currently operating in Wisconsin. Ethanol production, by far the larger of the two biofuels industries, accounted for over \$2 billion in Wisconsin's economy in 2008, of which over one-fourth was value-added. Either directly or indirectly the ethanol facilities accounted for nearly 1,700 jobs. Corn growers realized an estimated \$11 million in additional net revenue from corn sold to ethanol plants, and ethanol facilities paid some \$2.4 million in local property taxes in 2008.

Instead of the impact of the bio-fuels industry on Wisconsin's economy, this might better be characterized as a study of the impact of the economy on Wisconsin's bio-fuels industry. Producers of ethanol and bio-diesel have been seriously affected by the depressed economy, some facilities cutting production by as much as half, others ceasing operations entirely. The contribution of ethanol production to Wisconsin's economy has decreased by nearly half from last year to this, and its value added dropping by over 90 percent.

The sizeable boom and bust cycle of this decade is only the latest iteration of those occurring earlier in the 1940s and 1970s. While government subsidies, mandates, and other policies will continue to influence the viability of Wisconsin's biofuels industry, it is the price of petroleum-based fuels that will be determinative in the future as it has in the past.

[10] "DeForest Biodiesel Plant Goes Idle," WKOWTV.com, June 5, 2009.

APPENDIX A

Alternative Economic Impact Multipliers

A study by Dave Swenson, an Iowa State University economist, provides a useful template for economic impact studies of ethanol production.[11] Professor Swenson is highly critical of past studies: "The gap between sensible analysis and outright nonsense is large." He cites previous studies, for example, which show jobs multipliers as high as 51, whereas he concludes each job in an ethanol facility generates fewer than three additional jobs elsewhere in the community.

Swenson modeled a hypothetical facility with output totaling $118.6 million, adding $18.4 million to the value of corn, and employing 35 workers. An additional $14.8 million in either indirect or induced production is also attributable to ethanol production, implying an output multiplier of 1.13. Additional value added totaling $7.0 million is also attributable to ethanol production either indirectly or induced, thereby implying a value-added multiplier of 1.38. The 98 additional jobs, either indirect or induced, imply an employment multiplier of 3.80.

A study of the economic impact on a seven-county area in Nebraska from operating an ethanol plant yielded multipliers comparable with Swenson's.[12] The researcher, Donis Petersan, estimated the output multiplier at 1.34, and the employment multiplier at 4.25.

The only available economic impact study of an ethanol facility operating in Wisconsin is by one of the authors of this study.[13] Using the IMPLAN model, he estimated that operation of the proposed Belmont BioAg ethanol facility would provide direct benefits to residents in a three-county area in Wisconsin totaling $53.2 million per year, with an additional $14.6 million in indirect and induced benefits. This implies an output multiplier of 1.27.

A more recent study by John Urbanchuk estimated the impact of the ethanol industry on the U.S. economy. Including production of ethanol and other by-products, he estimated that

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[11] Dave Swenson, "Input-Outrageous: The Economic Impacts of Modern Biofuels Production," Mid-Continent Regional Science Association and the Biennial Implan National Users Conference, Indianapolis, IN. (June 8-10, 2006).

[12] Donis N. Petersan, "Estimated Economic Effects for The Husker Ag Ethanol Plant at Plainview, Nebraska," Economic Development Department, Nebraska Public Power District; Columbus, Nebraska (October 2003).

[13] John Simonson, "Estimated Economic Impact from Construction and Operation of Belmont Project, LLC," Project Report 05-03, Center for Applied Public Policy, University of Wisconsin-Platteville, (September 2005).

$24.5 billion in outlays by the industry generated an additional $34.3 billion, or some $58.8 billion GDP in total, an implicit output multiplier of 2.4.[14]

[14] John M. Urbanchuk, "Contribution of the Ethanol Industry to the Economy of the United States," Prepared for the Renewable Fuels Association (February 23, 2009), Table 1, p. 5.

APPENDIX B

BIO-FUEL FACILITY QUESTIONNAIRE

1. Have any benefit-cost or economic impact-type studies been conducted for this facility? ___ (If so, may I have a copy?)

2. Level of production for most recent (calendar/fiscal) year 200_

Ethanol/Bio-diesel (gallons)______
By-products:
- ** DDG, wet (tons)______
- ** DDG, dry (tons)_______
- ** CO2 (gallons)_______
- ** Syrup (gallons)_______
- ** Other (identify, units)______
  (identify, units)______

Feedstocks used:
- ** Corn (bushels/tons)______
- ** Soybeans (bushels/tons)_______
- ** Other (identify, bushels/tons)______
  (identify, bushels/tons)______

3. Number of employees Full-time_____
Part-time_____

4. Total Payroll $_________

5. What can you tell me about your employees?
   A. How many came from this community?_______

   B. Are they earning more now?____ If so, how much more would you guess, on average?______

6. What do you see as primary impacts this facility has had on the community/region?
   A. Positive/Beneficial?____
      ** Has net income been increased for local feedstock producers?_____ If so, by how much?______ Why? (e.g., reduced transportation cost? higher price?)
      ** How much property taxes did your facility pay last year?_________

   B. Negative/Costly?
      For example, have there been objections to the facility?_____ If so, what were they?_______ Who made them?______

7. How has the current recession affected your operations?
   A. Production level?____________________
   B. Prices/availability of products?___________ Feedstocks_______________
   C. Other?_________

BIOFUEL FACILITY COMMUNITY QUESTIONNAIRE

1. Name and Organization of respondent ________________________________

2. What do you see as primary impacts this facility has had on the community/region?

   A. Positive/Beneficial?____

      Examples: employment and income, property tax revenue, farmer income, other businesses.

   B. Negative/Costly?____

      Examples: noise, congestion, dust, odor, changed way of life, esthetics….

   C. Are you aware of any way we might measure any of these community effects, even crudely? For example, did opponents bear any significant costs, such as adds, hiring an attorney, etc.?____

3. Did zoning/permitting minimize adverse effects?