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Impact of an Expanding Biodiesel Industry to the Iowa Economy

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EXECUTIVE SUMMARY

Biodiesel is a non-toxic, biodegradable diesel fuel made from soybean and other vegetable oils, animal fats, and used or recycled oils and fats. Responding to incentives provided by the Energy Policy Act of 2005 and various state incentives, national demand for biodiesel fuel is projected to increase from 30 million gallons in 2004 to more than 700 million gallons by 2012 as the nation's highway motor fuel supply incorporates renewable fuels. Iowa accounts for about 1.5 percent of all diesel fuel consumed in the U.S. with highway (on and off-road) and farm use dominating consumption. Assuming that Iowa diesel fuel use grows at the same rate as the nation as a whole, Iowa highway and farm use will grow from 752 million gallons in 2004 to 857 million gallons in 2012. The Federal incentives for biodiesel will accelerate growth in biodiesel use in Iowa. We expect biodiesel demand for on and off-highway and farm uses to increase from a negligible amount in 2004 to more than 35 million gallons by 2012.

The extent to which biodiesel developers invest in biodiesel production facilities in Iowa will depend in large part on the comparative advantage of Iowa in soybean production and processing. This will be affected by incentives provided by Iowa and neighboring states.

Currently Iowa has three existing plants with the capacity to produce 28.5 million gallons of biodiesel. Two additional plants with a combined capacity of 67.5 million gallons are under construction and expected to come on line in the spring of 2006. According to the Iowa Soybean Association 5 to 10 new 30 MGY biodiesel plants are in the various stages of planning and development. If these plants were built, Iowa would have 13 operating plants with the capacity to produce as much as 396 million gallons of biodiesel by 2010. It is this new capacity that will be impacted by the availability of production and tax incentives.

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Iowa farmers, consumers, and taxpayers will directly benefit from incentives that support the expansion of the biodiesel industry.

- The biodiesel fuels industry will invest more than $417 million (2005 dollars) in structures, machinery and equipment, and supplies needed to build new biodiesel production plants.

- Farmers will benefit from the development and steady growth of a significant base of domestic demand for soybeans to fuel biodiesel production. Iowa soybean farmers can expect average farm-level prices to increase an average of 9.5 cents per bushel over the next five years for an increase of $61 million (2005 dollars) in soybean cash receipts.

- The combination of increased new capital spending and construction activity, agricultural demand, and increased oilseed processing will add more than $3.6 billion (2005 dollars) to the Iowa economy between 2005 and 2010.

- Increased construction and production of biodiesel fuel in Iowa will create almost 13,800 new jobs in all sectors of the economy by 2010.

- The combination of increased output and job creation will generate an additional $1.3 billion (2005 dollars) of income for Iowa households between 2005 and 2010.

- The State of Iowa will realize more than $141 million (2005 dollars) of additional tax revenue of $46 million between 2005 and 2010 as a direct result of biodiesel. These new revenues provide a substantial cushion that will allow the development and implementation of biodiesel production and price incentives without jeopardizing fiscal discipline. These incentives would enhance Iowa's competitive position as a biodiesel producer relative to neighboring states.

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Biodiesel, a renewable fuel made from soybean oil and recycled cooking oils and grease, and animal fats, is beginning to capture the imagination of Americans concerned about soaring motor fuel prices. As the nation's largest soybean producer, Iowa is positioned to play a leading role in this rapidly developing market. The Energy Policy Act of 2005 (EPACT05) signed into law last August created a Renewable Fuels Standard (RFS) that requires at least 7.5 billion gallons of ethanol and biodiesel to be used in the nation's motor fuel by 2012. EPACT05 also provided important financial and other incentives for the biodiesel industry. Neighboring States have introduced additional incentives aimed at accelerating development of biodiesel production. The incentives provided by EPACT05 will expand biodiesel use in Iowa. However, the extent to which biodiesel developers expand new production capacity in Iowa will be determined by Iowa's relative competitive position compared to surrounding states. State-level incentives will enhance Iowa's position as the nation's leading soybean producer to attract this investment.

Expansion of the biodiesel industry in Iowa will provide significant economic benefits in terms of additional output (Gross State Product), household income, new jobs, and tax revenue for the State. Incentives designed to facilitate growth of the Iowa biodiesel industry will improve the State's competitive position as a producer of biodiesel from soybeans and will provide an incentive for increased demand, and are likely to more than pay for themselves.

Biodiesel is a non-toxic biodegradable diesel fuel made from soybean and other vegetable oils, animal fats, and used or recycled oils and fats. As shown in Table 1, national demand for biodiesel fuel is projected to increase from 30 million gallons in 2004 to more than 700 million gallons by 2012 as the nation's highway motor fuel supply incorporates renewable

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fuels. Transportation (on and off highway) accounts for about 70 percent of total U.S. diesel fuel use.

Table 1
U.S. Diesel Fuel and Biodiesel Assumptions

	EIA Total Diesel Use /1 (Quad btu)	EIA Total Diesel Use /2 (Bil gal)	Biodiesel Share (Pct)	B100 Volume (Bil gal)	Biodiesel from Soybeans (Pct)	Biodiesel From Soybeans (Bil gal)	Soybean Oil Equiv /3 (mil lb)	Soybean Equiv /4 (Mil Bu)
2004	8.710	62.802	0.05%	0.034	95.0%	0.032	242	21.2
2005	8.950	64.532	0.11%	0.069	94.0%	0.065	486	41.8
2006	8.920	64.316	0.32%	0.205	90.0%	0.185	1,384	123.5
2007	9.070	65.398	0.49%	0.318	86.0%	0.273	2,051	183.1
2008	9.220	66.479	0.58%	0.386	82.0%	0.317	2,374	212.0
2009	9.400	67.777	0.69%	0.469	78.0%	0.366	2,744	245.0
2010	9.570	69.003	0.80%	0.551	75.0%	0.413	3,099	276.7
2011	9.720	70.084	0.90%	0.634	71.0%	0.450	3,376	303.1
2012	9.860	71.094	1.01%	0.717	67.0%	0.480	3,603	323.4

NOTES:
1. Annual Energy Outlook 2006 (Early Release), Table 2. December 12, 2005.
2. Converted at 138,690 btu/gal (5.525 mil btu/bbl)
3. Converted using 7.5 lb soybean oil = 1 gal biodiesel
4. Converted at 11.2 lbs SBO per bu of soybeans

The main drivers for increased biodiesel demand through 2102 include projected high-energy prices and incentives provided by the EPACT05 and individual states. As indicated earlier, EPACT05 mandates that a minimum of 7.5 billion gallons of renewable fuels (ethanol and biodiesel) be used in the nation's motor fuel by 2012. The legislation provided other significant incentives, specifically:

- Extension of the biodiesel tax credit through 2008 at 1 cent/gal for agri biodiesel and ½ cent/gal for biodiesel from other sources such as recycled fats and oils.
- Credit for installation of alternative fuel refueling infrastructure (B20 minimum)

- Creation of a small agri-biodiesel producer tax credit of $0.10/gal up to 15 mil gal for producers up to 60 MGY.

- Provision of $5 mil/yr for research in testing biodiesel in advanced diesel engine fuel system technologies.

Iowa accounts for about 1.5 percent of all diesel fuel consumed in the U.S. with highway (on and off-road) and farm use dominating consumption. Assuming that Iowa diesel fuel use grows at the same rate as the nation as a whole, Iowa highway and farm use will grow from 752 million gallons in 2004 to 857 million gallons in 2012.

Table 2
Iowa Diesel Fuel and Biodiesel Assumptions

	Highway Diesel (Mil Gal)	Highway Biodiesel Share	Farm Diesel (Mil Gal)	Farm Biodiesel Share	Highway Biodiesel (Mil Gal)	Farm Biodiesel (Mil Gal)	Total Biodiesel (Mil Gal)
2004	595.1	0.0%	157.1	0.0%	0.0	0.0	0.0
2005	604.2	0.1%	166.7	2.0%	0.6	3.3	3.9
2006	620.3	0.4%	151.2	4.0%	2.2	6.0	8.2
2007	639.4	0.6%	146.5	6.0%	3.8	8.8	12.6
2008	654.5	0.9%	144.7	8.0%	5.6	11.6	17.1
2009	670.6	1.1%	144.4	10.0%	7.4	14.4	21.8
2010	686.7	1.4%	143.8	12.0%	9.3	17.3	26.5
2011	703.9	1.6%	140.7	14.0%	11.3	19.7	31.0
2012	718.0	1.9%	139.4	16.0%	13.3	22.3	35.6

The Federal incentives for biodiesel will accelerate growth in biodiesel use in Iowa. We expect biodiesel demand for on and off-highway and farm uses to increase from a negligible amount in 2004 to more than 35 million gallons by 2012.

The extent to which biodiesel developers invest in biodiesel production facilities in Iowa will depend in large part on the comparative advantage of Iowa in soybean production and processing. This will be affected by incentives provided by Iowa and neighboring states.

Soybean production

Iowa's advantage as a soybean producer is approached only by Illinois. As shown in Table 3, Iowa is the nation's leading soybean producer, averaging 470.5 million bushels per year (15 percent of U.S. production) over the past five years. Soybeans generate more than $2.5 billion in revenue for Iowa farmers. Illinois is a close second soybean producer and has the advantage of a large and well-established soybean processing and fats and oils processing industry.

Table 3
Soybean Production and Value, Selected States

Production (Mil bu)

	2001	2002	2003	2004	2005	Average
IA	480.5	499.2	342.9	497.4	532.7	470.5
IL	477.9	453.7	379.6	495.0	444.2	450.1
MN	266.4	308.9	238.4	232.7	306.0	270.5
IN	273.9	239.5	204.1	284.3	263.6	253.1
NE	223.0	176.3	182.3	218.5	235.3	207.1
MO	186.2	170.0	146.0	223.2	183.5	181.8
OH	187.8	146.3	164.8	207.7	201.6	181.6
SD	143.0	126.8	115.5	140.1	138.6	132.8
ND	70.7	86.8	88.5	82.1	107.3	87.1
U.S.	2,890.7	2,749.3	2,417.6	2,453.7	3,123.7	3,086.4

Value of Production (Mil $)

	2001	2002	2003	2004	2005	Average
IA	$2,090.1	$2,765.6	$2,640.1	$2,511.6	NA	$2,501.9
IL	$2,174.4	$2,567.7	$2,850.9	$2,524.7	NA	$2,529.4
MN	$1,150.8	$1,673.9	$1,730.8	$1,263.5	NA	$1,454.8
IN	$1,210.7	$1,329.0	$1,565.1	$1,435.2	NA	$1,385.0
NE	$934.2	$957.8	$1,279.4	$1,115.4	NA	$1,071.7
MO	$804.4	$941.8	$1,098.1	$1,104.8	NA	$987.3
OH	$837.5	$844.3	$1,186.4	$1,069.9	NA	$984.5
SD	$590.8	$675.8	$803.9	$693.4	NA	$691.0
ND	$286.3	$461.7	$585.5	$439.3	NA	$443.2
U.S.	$12,605.7	$15,252.7	$18,013.8	$16,098.2	NA	$15,492.6

Source: USDA/NASS

Increased demand for soybeans to produce soybean oil to manufacture biodiesel will provide a significant benefit to Iowa soybean growers.

Biodiesel Incentives

Currently the only State-level incentive for biodiesel in Iowa is the biodiesel fuel revolving fund created in the state treasury. [1] The fund consists of money received from the sale of Energy Policy Act (EPAct) credits banked by the Iowa Department of Transportation (IDOT) as of April 19, 2001, and other money obtained or accepted by IDOT for deposit in the fund. The fund shall be used by IDOT for the purchase of biodiesel fuel for use in IDOT vehicles. An IDOT motor vehicle operating on biodiesel fuel shall be affixed with a brightly visible sticker that notifies the traveling public that the motor vehicle uses biodiesel fuel.

Neighboring States provide a wider range of tax and other incentives for biodiesel use and production.

Illinois

- Partial Sales Tax Exemption for Biodiesel

  Sales and use taxes apply to 80% of the proceeds from the sale of biodiesel-blended fuels (containing between 1% and 10% biodiesel) made between July 1, 2003 and December 31, 2013. However, if these taxes are ever imposed at a rate of 1.25%, then the tax on these biodiesel blends will apply to 100% of the proceeds of sales. These taxes do not apply to the proceeds from the sale of biodiesel blends containing more than 10% biodiesel made. The taxes apply to 100% of the proceeds from sales made thereafter.

- Biodiesel (B2) Use Requirement

  Beginning July 1, 2006, the following entities are required to use a biodiesel blend that contains at least 2% biodiesel (B2) when refueling at a bulk central fueling facility: any diesel powered vehicle owned or operated by the state, county or local government, school district, community college or public college or university, or

[1] EIA Alternative Fuels Data Center. State and Federal Incentives and Laws. http://www.eere.energy.gov/afdc/progs/

mass transit agency. These entities are required to use B2 where available, unless the vehicle engine is designed or retrofitted to operate on a higher percentage of biodiesel or on ultra low sulfur fuel.

North Dakota

- Biodiesel Tax Reduction

  The state excise tax of $0.21 per gallon imposed on all special fuels sold or used in the state is reduced by $0.0105 per gallon for the sale or delivery of diesel fuel that contains at least 2% biodiesel fuel by weight. A special excise tax of 2% is imposed on the sale of all special fuels. This tax is reduced by 1.9% on all sales of diesel fuel containing 2% biodiesel by weight.

- Biodiesel Income Tax Credit

  A licensed fuel supplier who blends biodiesel into fuel which is then comprised of at least 5% biodiesel is entitled to an income tax credit in the amount of five cents per gallon [3.79 liters] of biodiesel fuel.

- Biodiesel Equipment Tax Credit

  The state of North Dakota offers a five-year corporate income tax credit for equipment that enables a facility to sell diesel fuel containing at least 2% biodiesel by volume. The tax credit is worth up to 10% per year, for up to five years, of the biodiesel seller's direct costs incurred after December 31, 2004, to adapt or add equipment to a facility. The credit is limited to fifty thousand dollars in the cumulative amount of credits for all taxable years.

- Biodiesel Loan Program

  A $1.2 million Biodiesel Partnership in Assisting Community Expansion (PACE) fund was established for the purpose of buying down the interest rate on loans made by a lead financial institution in participation with the Bank of North Dakota. The fund monies may be used to participate in an interest rate buydown on a loan to a

biodiesel production facility for the following eligible uses: purchase of real property and equipment; expansion of facilities; working capital; and inventory.

- Biodiesel Equipment Tax Exemption

  Equipment purchased by a facility to enable the sale of diesel fuel containing at least 2% biodiesel is exempt from sales tax.

South Dakota

- Reduced Biodiesel Tax

  Biodiesel and biodiesel blends are defined as 'special fuels' and are taxed at the special fuel excise tax rate of $0.22.

- Biodiesel Production Facility Tax Refund

  A tax refund is available for contractors' excise taxes and sales or use taxes paid for the construction of a new agricultural processing facility, which includes an expansion to an existing soybean processing facility if the expansion will be used for the production of biodiesel. The project cost must exceed $4.5 million in order to qualify for the refund.

Minnesota

- Biodiesel Blend Mandate

  All diesel fuel sold or offered for sale in the state for use in internal combustion engines must contain at least 2% biodiesel fuel by volume. This mandate will take effect by June 30, 2005 as long as one of the following conditions has been met: the state is able to produce more than eight million gallons of biodiesel fuel annually, or a federal action creates a $0.02 per gallon or greater reduction in the price of taxable fuel containing at least 2% biodiesel fuel sold in the state.

Missouri

- Alternative Fuel Tax

The $0.17 per gallon motor fuel tax does not apply to passenger motor vehicles, certain buses or commercial motor vehicles that are powered by an alternative fuel. Instead, the owners or operators of such vehicles shall pay an annual alternative fuel decal fee.

- Biodiesel Producer Incentive

  The Missouri Qualified Biodiesel Producer Incentive Fund provides a monthly grant to qualified Missouri biodiesel producers, provided that 51% of the feedstock originates in Missouri and 100% originates in the U.S. The value of the grant is $0.30 per gallon for the first 15 million gallons produced in a fiscal year and $0.10 per gallon for the next 15 million gallons produced in a fiscal year, up to a total of 30 million gallons and for 60 months maximum per producer. This fund is administered by the Department of Agriculture. Biodiesel is fuel as defined in ASTM Standard D-6751 or its subsequent standard specifications for biodiesel fuel (B100) blend stock for distillate fuels.

- Biodiesel Fuel Use Incentive

  Through the 2011-12 school year, school districts are allowed to establish contracts with nonprofit, farmer-owned new generation cooperatives to purchase biodiesel blends of 20% biodiesel (B20) or higher for use as bus fuel. Every school district that contracts with an eligible new generation cooperative for biodiesel will receive an additional payment through its state transportation aid payment, to offset the incremental cost of purchasing the biodiesel.

Iowa Biodiesel Production

Currently Iowa has three existing plants with the capacity to produce 28.5 million gallons of biodiesel. Two additional plants with a combined capacity of 67.5 million gallons are under construction and expected to come on line in the spring of 2006. At that time, Iowa will have the capacity to produce 96 million gallons of biodiesel.

According to the Iowa Soybean Association 5 to 10 new 30 MGY biodiesel plants are in the various stages of planning and development. If these plants were built, Iowa would have 13 operating plants with the capacity to produce as much as 396 million gallons of biodiesel by 2010. It is this new capacity that will be impacted by the availability of production and tax incentives.

Table 4 details the potential expansion of biodiesel production capacity in Iowa and implications of increased production of biodiesel on the Iowa soybean sector. The expansion described above will result in additional demand of nearly 1.9 billion pounds of soybean oil by 2010, or the equivalent of 169 million bushels of soybeans.

Table 4
Iowa Biodiesel and Soybeans

	Iowa Biodiesel Use (Mil gal)	Iowa Operating Plants (Number)	Iowa Biodiesel Capacity (Mil gal)	Biodiesel from Soybeans (Pct)	Soybean Oil Equiv /1 (mil lb)	Soybean Equiv (Mil Bu)
2005	3.9	3.0	28.5	94.0%	171	15
2006	8.2	8.0	96.0	90.0%	551	49
2007	12.6	10.0	246.0	86.0%	1,349	120
2008	17.1	12.0	306.0	82.0%	1,600	143
2009	21.8	13.0	366.0	78.0%	1,820	162
2010	26.5	13.0	396.0	75.0%	1,893	169

1. Assumes a capacity utilization of 85%

This expansion of biodiesel demand will have several direct impacts on the Iowa economy:

- The biodiesel fuels industry will invest more than $417 million (2005 dollars) in structures, machinery and equipment, and supplies needed to build the 367 million gallons of new biodiesel production capacity between 2005 and 2010.

- The additional demand for soybean oil used to produce biodiesel will stimulate demand and production of soybeans and will increase commodity prices. Consequently, the value of agricultural final demand will increase thereby stimulating the demand for goods and services produced by other sectors of the

economy. Based on analysis conducted by USDA, Iowa soybean farmers can expect average farm-level prices to increase 9.5 cents per bushel as a result of increased demand for soybeans to produce soybean oil and biodiesel.[2] When multiplied by the 644 million bushels of additional soybeans that would be required to produce biodiesel between 2006 and 2010 Iowa soybean farmers will realize an additional $61 million (2005 dollars) in cash receipts over the next five years.

The impact of the ten potential four new biodiesel plants on the Iowa economy will come from the direct effects of annual expenditures on soybean oil, other inputs, natural gas and other utilities, and labor to produce biodiesel. Spending for these goods and services represents the purchase of output of other industries. In addition, the construction of new biodiesel plants results in spending for a wide range of goods and services.

The spending associated with ongoing biodiesel production and investment spending on new plant capacity will circulate throughout the entire State economy several fold. Consequently this spending will stimulate aggregate demand, support the creation of new jobs, generate additional household income, and provide tax revenue for government at all levels.

The impact of the biodiesel industry on the Iowa economy was estimated by applying the appropriate final demand multipliers for output, earnings, and employment for the relevant supplying industry calculated by the U.S. Bureau of Economic Analysis (BEA) to the estimates of spending described above.[3] The final demand multipliers for output, earnings, and employment for the selected industries are shown in Table 5.

[2] See "Effects on the Farm Economy of a Renewable Fuels Standard for Motor Vehicle Fuel" USDA Office of the Chief Economist. August 2002 and Raneses, Anton R. et. Al. "Potential Niche Fuel Markets for Biodiesel and Their Effects on Agriculture". USDA/ERS Industrial Uses/IUS-6/September 2006.

[3] The multipliers used in this analysis are the detailed industry RIMS II multipliers for Iowa prepared by the Regional Economic Analysis Division, Bureau of Economic Analysis, U.S. Department of Commerce.

Table 5
Iowa Final Demand Multipliers

	Output (Mil 2005$)	Earnings (Mil 2005$)	Employment (Jobs)
New Construction	2.1441	0.6438	25.3
Feedstock (SBO)	2.9178	0.5276	21.5
Industrial chemicals	1.7698	0.3864	12.3
Electricity	1.5732	0.2987	9.7
Natural gas	1.6371	0.2206	7.3
Water	2.1106	0.5250	20.9
Business Services	1.8966	0.6815	34.5
Households	1.2728	0.3622	18.1

The estimates summarized below result from a static analysis of the impact of increasing biodiesel fuels demand and production on the Iowa economy. That is, they reflect the combination of a series of snapshots of the economy rather than a dynamic flow analysis.

Temporary impacts from construction

The Iowa economy will benefit from the expenditures on materials, goods, and services required to build new biodiesel plants. USDA/ARS estimates the capital costs for building a new 10 MGY biodiesel plant average at $1.135 per gallon. Capital expenditures to build ten new biodiesel plants that will add 367.5 MGY of capacity will total $417.3 million (2005 dollars) between 2005 and 2010.

The impact of construction is transitory. The economic activity ends when construction is completed. However, construction of ten new biodiesel plants in Iowa will increase gross output an estimated $895 million (2005 dollars) between 2005 and 2010. Gross output represents the market value of an industry's production, including commodity taxes, and it differs from GDP (or GSP – Gross State Product).[4] Generally speaking, Gross Output is larger than GDP since it includes the value of intermediate goods and services, which are "netted out" of GDP. According to BEA accounts, GDP was 55 percent of gross output in 2004. Applying this adjustment to the gross output generated by construction suggests that building ten new biodiesel plants will increase the Iowa economy, measured by GSP, by

[4] BEA description of Gross Output taken from www.bea.doc.gov/bea/dn2/readgo.htm. According to BEA accounts GDP was 55% of the value total gross output in 2004.

$492 million (2005 dollars) between 2005 and 2010. The economic impacts of new biodiesel construction for Iowa are outlined in Table 6.

Table 6
Economic Impact for Iowa of Building 10 New Biodiesel Plants
with 367.7 MGY of Capacity

	New Capacity (Mil gal)	Expenditures (Mil 2005$)	Impact		
			Output (Mil 2005$)	Earnings (Mil 2005$)	Employment (Jobs)
2005	67.7	$76.8	$164.8	$49.5	1,657
2006	150.0	$170.3	$365.0	$109.6	3,672
2007	60.0	$68.1	$146.0	$43.8	1,469
2008	60.0	$68.1	$146.0	$43.8	1,469
2009	30.0	$34.1	$73.0	$21.9	734
2010	0.0	$0.0	$0.0	$0.0	0
2005-10	367.7	$417.3	$894.8	$268.7	

Iowa households will benefit from increased income as the dollars spent on construction circulate throughout the State economy and support new jobs. Household income in Iowa is expected to expand by $269 million (2005 dollars) between 2005 and 2010 due to construction activity.

Finally, the new economic activity generated by construction will support the creation of as many as 3,672 new jobs in all sectors of the Iowa.

Permanent impacts from ongoing operations

The most significant impact for the Iowa economy will be provided by the ongoing annual operations of the biodiesel plants. The economic impact will be staggered as the ten new plants come on line and begin operations. The annual expenditures for biodiesel were estimated by multiplying the average cost per gallon for each expenditure category by the potential number of gallons of production by year described in Table 4 above. The only modifying assumption we made was to assume an annual average capacity utilization rate of 85 percent. The estimated costs to produce biodiesel are based on the results of a

process model for a new 10 million gallon plant developed by USDA/ARS and are detailed in Table 7.[5]

Table 7
Annual Operating Costs for Biodiesel from Soybean Oil

	Units	Units Per Gal	10-yr Avg $/Unit	Cost Mil $/yr	Cost $/gal
Raw Materials					
Soybean oil	lb	7.420	$0.23	$17.066	$1.707
Methanol	lb	0.742	$0.13	$0.965	$0.096
Sodium methoxide	lb	0.093	$0.44	$0.408	$0.041
Hydrochloric acid	lb	0.053	$0.17	$0.090	$0.009
Sodium hydroxide	lb	0.037	$0.28	$0.103	$0.010
Electricity	kWH	0.101	$0.05	$0.045	$0.005
Natural Gas	MCF	0.007	$7.50	$0.524	$0.052
Water	ThouGal	0.028	$0.15	$0.042	$0.004
Wastewater treatment				$0.050	$0.005
Subtotal				$19.293	$1.929
Fixed Costs					
Direct labor		$/Hr		$0.689	$0.069
Plant Manager	1	$39.70	$82,576	$0.083	$0.008
Shift Operators (3)	3	$20.91	$130,478	$0.391	$0.039
Lab. Person (1)	1	$20.03	$41,662	$0.042	$0.004
Material Handler (3)	2	$14.69	$61,110	$0.122	$0.012
Computer Operator	1	$13.51	$28,101	$0.028	$0.003
Office person	1	$10.88	$22,630	$0.023	$0.002
Supplies				$0.153	$0.015
Ins & Taxes				$0.067	$0.007
GS&A				$0.057	$0.006
Depreciation				$1.135	$0.114
Subtotal				$2.101	$0.210
TOTAL OPER COSTS				**$21.394**	**$2.139**

As shown in Table 7, feedstock costs (soybean oil) are the largest component of operating costs, accounting for about 80 percent of production costs. We assume that all of the soybean oil used as feedstock will come from Iowa processing facilities that crush Iowa soybeans.

[5] Haas, Michael J., Andrew J. McAloon, Winnie C. Yee, and Thomas A. Foglia. " A process model to estimate biodiesel production costs". *Bioresource Technology.* 2005.

Two new biodiesel plants with a combined annual capacity of 67.5 MGY are expected to be completed and begin production in spring 2006. Along with the existing operations, Iowa biodiesel plants will spend $165 million (2005 dollars) on goods and services in 2006. As the new plants come on line, annual expenditures will increase to $681 million (2005 dollars) by 2010.

- These expenditures will add $5.7 billion (2005$) to the Iowa gross output between 2005 and 2010. As indicated earlier gross output represents the market value of an industry's production, including commodity taxes, and it differs from GSP. When the value of intermediate goods and services are "netted out" of gross output, biodiesel production will add nearly $3.2 billion (2005$) to Iowa State Gross Product between 2005 and 2010. In other words, the Kansas economy will be $3.2 billion larger by 2010 than would be the case if the investment in biodiesel did not take place. The annual impact of the potential biodiesel production on the Iowa economy is summarized in Table 8.

Table 8
Economic Impact of Ten New Biodiesel Plants in Iowa

	Biodiesel Capacity (Mil gal)	Biodiesel Production (Mil gal)	New Spending (Mil 2005$)	Output Impact (Mil 2005$)	Earnings Impact (Mil 2005$)	Empl Impact Jobs
2005	28.5	24.2	$49.0	$113.4	$21.1	727
2006	96.0	81.6	$165.0	$382.1	$70.9	2,450
2007	246.0	209.1	$422.9	$979.2	$181.7	6,279
2008	306.0	260.1	$526.1	$1,218.0	$226.1	7,810
2009	366.0	311.1	$629.2	$1,456.8	$270.4	9,342
2010	396.0	336.6	$680.8	$1,576.2	$292.5	10,107
2005-2010		1,222.7	$2,473.1	$5,725.8	$1,062.7	

- Biodiesel will create permanent new jobs for Iowans. The increase in gross output (final demand) resulting from ongoing biodiesel production will support the creation of as many as 10,107 permanent jobs in all sectors of the Iowa by 2010.

- Increased economic activity and new jobs result in higher levels of income for Iowans. The ongoing production of biodiesel consistent with the projected expansion of the industry will put an additional $177 million (2005 dollars) into the pockets of Iowa's households each year for a total impact of $1.1 billion between 2005 and 2010.

Fiscal Impacts

The Iowa Treasury also will benefit from an expanded biodiesel industry as revenues from sales and use taxes and corporate income taxes increase in line with higher output levels and larger GSP. Revenues from personal income taxes and motor fuel excise taxes also will increase. Expansion of the Iowa biodiesel industry as described above can be expected to generate an estimated $141 million (2005 dollars) of additional tax revenue -- nearly $24 million per year – between 2005 and 2010.

- Profitable operations by Iowa's 13 biodiesel plants between 2005 and 2010 are expected to generate $275 million (2005 dollars) of taxable corporate profits. At an average rate of 9 percent (the range is 6 percent to 12 percent), this will generate $24.7 million (2005 dollars) in corporate income taxes between 2005 and 2010.

- Iowa has a 5 percent sales and use tax on purchases of tangible property. Considering that personal consumption of durable and non-durable goods averages 30 percent of GDP, the Iowa biodiesel industry will support nearly $1.1 billion (2005 dollars) in taxable spending and generate nearly $54 million (2005 dollars) of additional sales and use taxes.

- Increased household income will result in nearly $55 million (2005 dollars) of additional personal income tax revenue for Iowa between 2005 and 2010.

Conclusion

Iowa farmers, consumers, and taxpayers will directly benefit from incentives that support the expansion of the biodiesel industry.

- The biodiesel fuels industry will invest more than $417 million (2005 dollars) in structures, machinery and equipment, and supplies needed to build new biodiesel production plants.

- Farmers will benefit from the development and steady growth of a significant base of domestic demand for soybeans to fuel biodiesel production. Iowa soybean farmers can expect average farm-level prices to increase an average of 9.5 cents per bushel over the next five years for an increase of $61 million (2005 dollars) in soybean cash receipts.

- The combination of increased new capital spending and construction activity, agricultural demand, and increased oilseed processing will add more than $3.6 billion (2005 dollars) to the Iowa economy between 2005 and 2010.

- Increased construction and production of biodiesel fuel in Iowa will create almost 13,800 new jobs in all sectors of the economy by 2010.

- The combination of increased output and job creation will generate an additional $1.3 billion (2005 dollars) of income for Iowa households between 2005 and 2010.

- The State of Iowa will realize more than $141 million (2005 dollars) of additional tax revenue of $46 million between 2005 and 2010 as a direct result of biodiesel. These new revenues provide a substantial cushion that will allow the development and implementation of biodiesel production and price incentives without jeopardizing fiscal discipline. These incentives would enhance Iowa's competitive position as a biodiesel producer relative to neighboring states.