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# THE ECONOMIC IMPACT OF ETHANOL PRODUCTION IN HALL COUNTY

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May 2007

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**INSTITUTE OF AGRICULTURE AND NATURAL RESOURCES**

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UNIVERSITY OF NEBRASKA EXTENSION

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Municipal Energy Agency of Nebraska*



# THE ECONOMIC IMPACT OF ETHANOL PRODUCTION IN HALL COUNTY

## EXECUTIVE SUMMARY

The construction of the ethanol plant generates 767 jobs and \$34.07 million in value added for Hall County. However, this impact is short-term lasting only one year.

In the first phase of operations (years 1-5), when debts are higher, the ethanol plant directly generates 285 jobs and \$34.29 million in value added each year in Hall County.

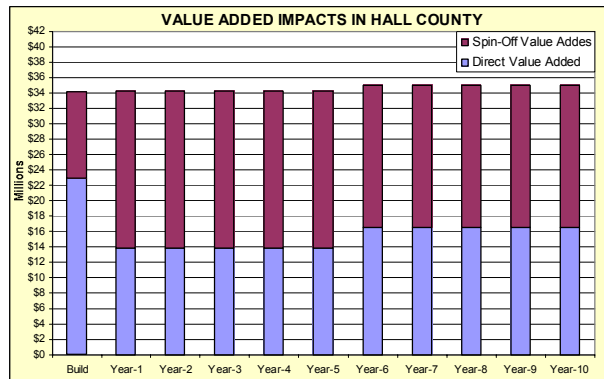
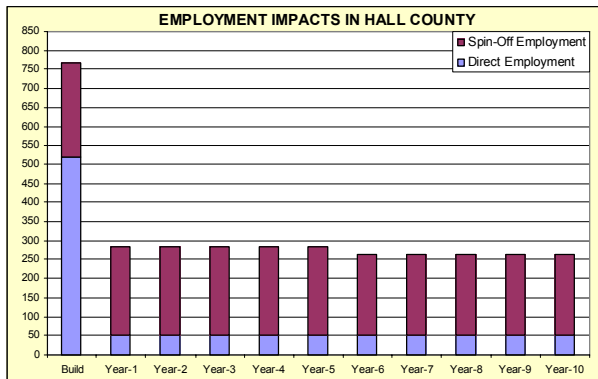
- Direct impacts account for 52 jobs and \$13.83 million in value added annually.
- Spin-off impacts account for 233 jobs and \$20.46 million annually in value added.

In the second phase of operation (years 6-10), when debts are lower, the ethanol plant directly generates 265 jobs and \$34.98 million in value added each year in Hall County.

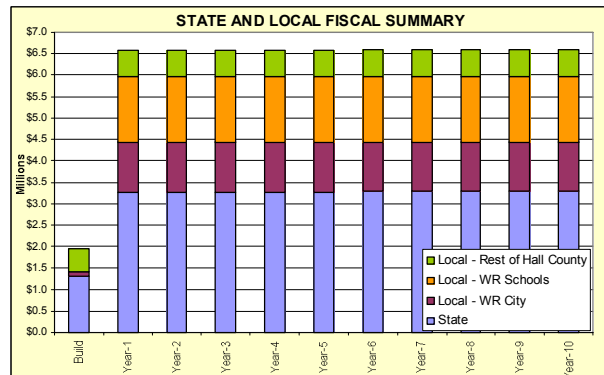
- Direct impacts account for 52 jobs and \$16.51 million in value added annually.
- Spin-off impacts account for 213 jobs and \$18.47 million annually in value added.

In both phases of operation, specific industries most impacted by the spin-off job effects in Hall County include:

- Rail transportation (30 jobs)
- Food services and drinking places (13 jobs)
- Natural gas distribution (13 jobs)
- Waste management and remediation (11 jobs)
- Commercial machinery maintenance and repair (10 jobs)
- Transportation support activities (9 jobs)
- Banking (8 jobs)



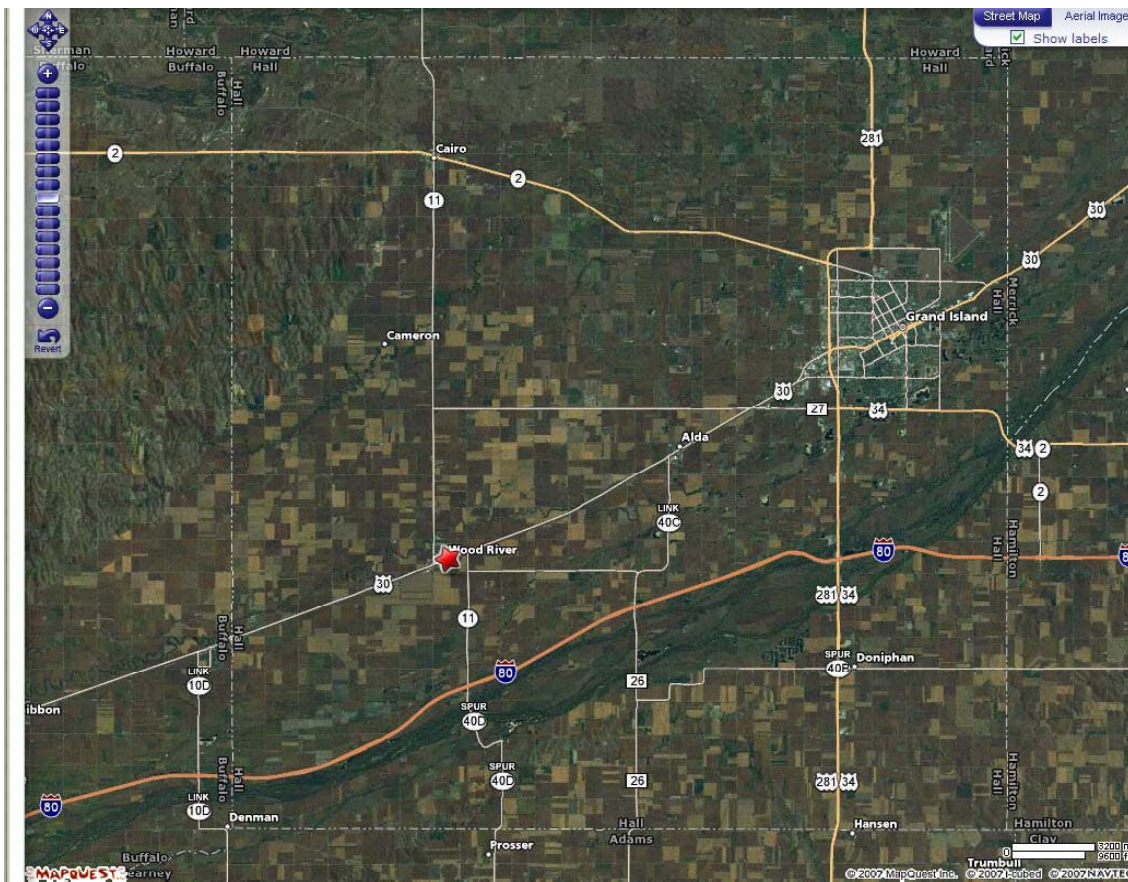
Local governments in Hall County are expected to receive \$641,800 in tax revenues during the construction phase and \$3.30 million annually during the operations phase. *This does not count the costs of local government incentives.* In addition, the model indicates the *possible* need for 72 more jobs in public education and 12 more in local government due to increased demand for public services.



## INTRODUCTION

This analysis estimates the economic impact of a 110 million gallon dry-mill ethanol plant in Hall County. The facility is operated by BioFuel Energy LLC and is currently under construction in Wood River. This analysis looks at both the construction and operation impacts of this facility.

Hall County, including Wood River, is part of the Grand Island Micropolitan Statistical Area. According to the U.S. Census Bureau, the county has over 55,000 residents, and has grown by nearly four percent in the last decade. Over 80 percent of the adult population has a high school education, and nearly 16 percent have a college education. Median household income in Hall County stood at \$40,000, which is right at the state average; and 12 percent of residents lived below the poverty line. In terms of employment, Hall County contains 4,700 firms which employed over 27,500 workers; and employment has only dropped by one percent in the last five years.

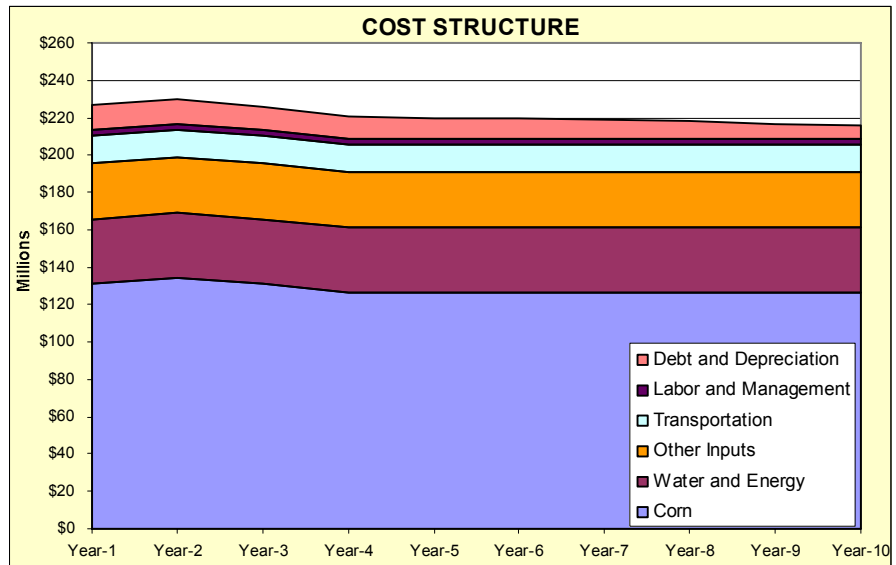


This research report has four main sections. The first section examines the profitability of the ethanol plant, looking at its cost and revenue structures. The second section estimates the economic impact from the construction of the ethanol plant. The third section estimates the operations impact of the ethanol plant. Lastly, the fourth section presents a government fiscal analysis of the construction and operation of the plant. A detailed discussion of the methodology and assumptions used in this analysis are presented in the Appendix.

## ETHANOL PLANT PROFITABILITY ANALYSIS

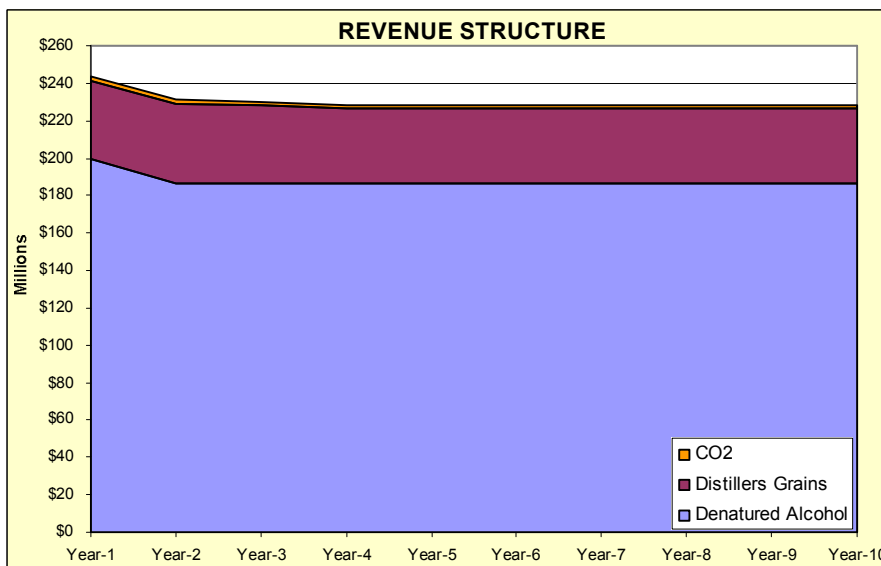
In this analysis, it is assumed that the 110 million gallon BioFuel Energy ethanol plant will operate at 90 percent of capacity. This will result in the production of 99 million gallons of denatured alcohol, 348,300 tons of distillers grains, and 320,800 tons of carbon dioxide.

On average, it costs \$220 million per year to produce these outputs. Corn comprises the largest cost component in the production process, accounting for roughly \$130 million of total costs. Water and energy inputs cost around \$35 million, with the majority of it spent on natural gas. Other inputs into the production process, such as chemicals and plant operations, cost \$30 million per year. Transportation costs account for \$15 million of the total, with almost all of it spent on rail transportation. Labor and management costs account for a little over \$3 million a year. Lastly, debt and depreciation consume over \$13 million in total costs in the first year of operation, but drop to a little over \$7 million by the tenth year of operation as debt is retired.



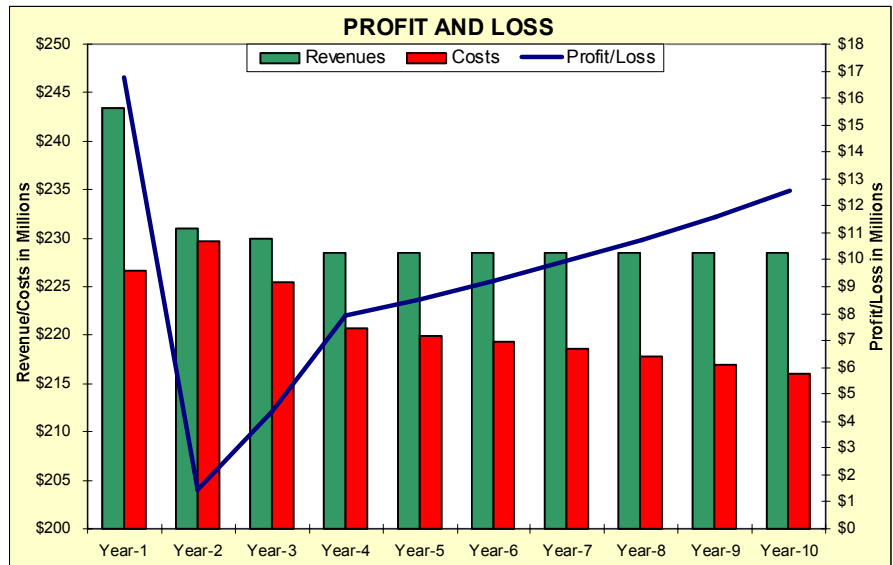
In terms of revenues, the plant is estimated to generate \$230 million in sales, with higher revenues forecast in the first two years of operation. The majority of these sales come from the production of denatured ethanol, which accounts for roughly \$190 million in sales.

Futures prices indicate that ethanol will sell for about \$1.90 per gallon over the next several years. Distillers grains generate about \$40 million in sales, and are estimated to work in tandem with corn prices. Carbon dioxide generates only \$1.6 million in sales.



Taking total costs and revenues, gross profits or losses of the ethanol plant can be estimated. In the first year of operation, the plant generates nearly \$17 million in gross profits due to higher ethanol prices in the first year. However, in the second year ethanol prices drop as corn prices increase, and the profit margin narrows considerably to only \$1.5 million.

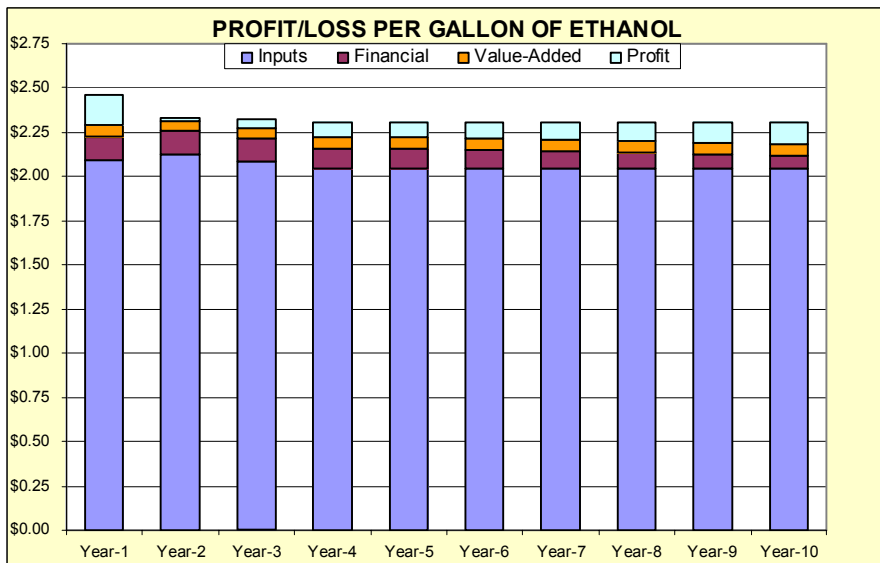
In the third year and beyond, revenues will exceed costs leading to a gross profit. On the cost side, corn prices are expected to drop slightly and stabilize, while financial costs are reduced as debt is retired. On the revenue side, ethanol prices will remain fairly stable, as will prices for distillers grains. By the tenth year, the plant is expected to gross over \$12 million in profit.



Another way to look at plant profitability is on a per gallon of ethanol produced basis. This approach allocates revenues to costs and profits per gallon of ethanol produced. Revenues are from all sources, including the sale of ethanol and its byproducts.

In the first year of operation, each gallon of ethanol produced generates \$2.46 in revenues for the plant, of which \$2.09 goes to inputs costs, \$0.13 to financial costs, \$0.07 to labor costs and taxes, and \$0.17 to profit. In the second year, total revenues fall to \$2.33 per gallon while input costs rise to \$2.12 per gallon, which leads to a profit of only \$0.01 per gallon.

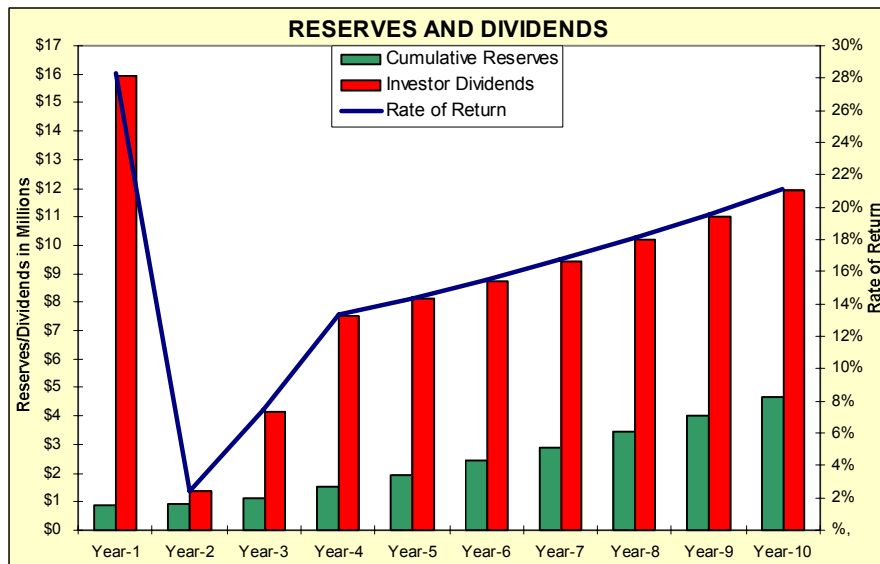
However, by the tenth year of operation the plant generates \$2.31 of total revenues per gallon of ethanol. Input costs account for \$2.04 of this amount, financial costs account for \$0.07, and labor and taxes account for another \$0.07. Taken together, this leads to a net profit of \$0.13 per gallon of ethanol produced.



Once gross profits have been determined, it is possible to model how these profits are distributed. In this analysis, it is assumed that the plant will direct 5 percent of gross revenues into a reserve fund, with the remaining profits distributed to investors. Thus, this analysis assumes that the plant is profit-maximizing, meaning that profits are mostly returned to investors rather than re-invested back into the facility.

In the first year of operation, nearly \$16 million in dividends are returned to investors, for a single year rate of return of 28 percent. As discussed earlier, the second year of operation generates very small profits, with only \$1.4 million returned to investors for a single year return of only 2 percent. However, in the third and beyond the plant regains profitability and investor returns grow. By the tenth year of operation, it is estimated that nearly \$12 million in dividends will be issued to investors, representing a single year rate of return of 21 percent.

Over a ten year period, the average rate of return for investors is 16 percent per annum. However, since this analysis assumes that there are no local investors in the ethanol plant, none of these dividends make their way into the Hall County economy.



## CONSTRUCTION IMPACTS

The construction of the 110 million gallon ethanol plant is disaggregated into three categories: land, engineering, and construction. Land acquisition costs total \$937,500, based on 125 acres of land sold at \$7,500 per acre. However, only 10 percent of this amount generates economic activity in Hall County, since it is assumed that proceeds from the sale of one capital asset would be reinvested in other capital assets. Engineering and architectural costs total \$21 million, of which 32 percent is estimated to be provided by local firms in Hall County. Construction costs total \$119.050 million, of which 25 percent is estimated to be provided by local firms. Ethanol plant construction is highly specialized, and local firms usually do not have the necessary experience.

This direct construction impact generates 519 jobs and \$22.91 million in value added to the Hall County economy. The construction sector gains 436 jobs and \$19.51 million in value added. The professional and scientific services industry gains 82 jobs and \$3.33 million in value added. However, the real estate and rental sector gains only one job and \$65,625 in value added.

This direct impact creates a spin-off effect caused by the spending of these firms and their associated workers in the local economy. Indirect, or business-to-business impacts, are goods and services purchased by these construction-related firms from other businesses in Hall County. These transactions add 59 jobs and \$2.50 million in value added to the local economy. Businesses that benefit the most include: employment services (10 jobs), architectural and engineering services (7 jobs), wholesale trade (4 jobs), nonstore retailers (3 jobs), and food services and drinking places (3 jobs).

Induced, or business-to-household impacts, are goods and services purchased by households that have one or more members employed in construction-related firms or in the indirect support industries. These transactions add 190 jobs and \$8.66 million in value added to the Hall County economy. Businesses that benefit the most include: food services and drinking places (25 jobs), hospitals (10 jobs), offices of physicians and dentists (10 jobs), social assistance services (9 jobs), and child day care services (8 jobs).

The total construction impact of the ethanol plant, including both direct and spin-off effects, generates 767 jobs and \$34.07 million in value added to the Hall County economy. This translates into a 1.9 percent growth in employment and a 1.7 percent growth in value-added across the county. For an employment multiplier, one job in ethanol construction generates an additional one-half job elsewhere in the local economy, for a total job multiplier of 1.48. For a value-added multiplier, one dollar of value added in ethanol construction generates nearly \$0.50 cents in value-added elsewhere in the local economy, for a total value-added multiplier of 1.49 in Hall County.

### **ECONOMIC DEFINITIONS**

*Employment* is by place of work and is not reported as full-time equivalent jobs.

*Value Added* is the value of the industry's output minus all of its inputs purchased from other firms, thus it is a measure of profits plus wages.

*Indirect* impacts represent business-to-business effects.

*Induced* impacts represent household spending effects.

*Multipliers* measure the total change in the economy due to a one unit change (usually in final demand) in a specific sector.



**Construction Impacts of a 110 MGY Ethanol Plant  
in Hall County**

<b>INDUSTRY</b>	<b>EMPLOYMENT IMPACTS</b>			<b>VALUE-ADDED IMPACTS</b>		
	<i>Direct</i>	<i>Indirect &amp; Induced</i>	<i>TOTAL</i>	<i>Direct</i>	<i>Indirect &amp; Induced</i>	<i>TOTAL</i>
Agriculture	0	1	1	\$0	\$19,732	\$19,731
Mining	0	0	0	\$0	\$93	\$92
Utilities	0	0	0	\$0	\$27,917	\$27,916
Construction	436	2	438	\$19,512,378	\$69,305	\$19,581,684
Manufacturing	0	4	4	\$0	\$292,170	\$292,170
Wholesale Trade	0	11	11	\$0	\$946,239	\$946,239
Transportation & Warehousing	0	9	9	\$0	\$503,135	\$503,135
Retail Trade	0	56	56	\$0	\$1,640,215	\$1,640,215
Information	0	3	3	\$0	\$261,661	\$261,661
Finance & Insurance	0	11	11	\$0	\$888,770	\$888,770
Real Estate & Rental	1	4	5	\$65,625	\$305,473	\$371,097
Professional & Scientific Services	82	14	96	\$3,329,386	\$638,323	\$3,967,709
Management of Companies	0	1	1	\$0	\$68,511	\$68,511
Administrative & Waste Services	0	21	21	\$0	\$439,281	\$439,281
Educational Services	0	2	2	\$0	\$36,466	\$36,466
Health & Social Services	0	49	49	\$0	\$1,655,679	\$1,655,679
Arts, Entertainment, & Recreation	0	6	6	\$0	\$124,270	\$124,270
Accommodation & Food Services	0	32	32	\$0	\$582,426	\$582,426
Other Services	0	21	21	\$0	\$480,771	\$480,770
Public Administration & Other	0	2	2	\$0	\$2,178,085	\$2,178,085
<b>TOTAL</b>	<b>519</b>	<b>248</b>	<b>767</b>	<b>\$22,907,388</b>	<b>\$11,158,520</b>	<b>\$34,065,909</b>

NOTE: Impacts generated using Type II multipliers from IMPLAN.  
ANALYSIS: Department of Agricultural Economics, University of Nebraska-Lincoln.

## OPERATIONS IMPACTS

Employment and increased corn prices are the two components used to estimate the operational impacts of the ethanol plant. In terms of employment, the plant will employ 50 workers earning \$45,000 in wages. It is estimated that all jobs are net new to the local economy, and that 93 percent of these workers will reside in Hall County. In terms of increased corn prices, the premium paid to local corn growers is estimated at \$0.05 per bushel. Although some have claimed a bump of \$0.10 to \$0.12 per bushel, current research indicates that a \$0.05 premium is most common (Swenson 2006). This extra farm income is allocated equally between debt reduction, on-farm improvements, and household expenditures.

The operations impacts are estimated in two phases, with the first phase (years 1-5) representing operations under large debt, and the second phase representing operations under small debt. In the first five years of operation, the direct operation of the ethanol plant generates 52 jobs and \$13.83 million annually in value added to the Hall County economy. In the second phase of operations, when debt costs are lower, the ethanol plant still generates 52 jobs but value added increases to \$16.51 million annually.

The direct impact of ethanol manufacturing creates a sizable spin-off effect in the local economy. Indirect, or business-to-business impacts, are goods and services purchased by the ethanol plant and its suppliers from other businesses in Hall County. In the first phase, these transactions add 137 jobs and \$16.11 million in value added annually to the local economy. By the second phase, the indirect impact drops slightly to 123 jobs and \$14.36 million in value added annually. Businesses that benefit the most include: rail transportation (30 jobs), natural gas distribution (13 jobs), waste management (10 jobs), commercial machinery repair and maintenance (10 jobs), and transportation support services (9 jobs). The banking sector adds 19 jobs in the first phase of operations, but this impact is reduced to only 7 jobs during the second phase.

Induced, or business-to-household impacts, are goods and services purchased by households that have one or more members employed by the ethanol plant or its supplier firms. In the first five years of operation, these transactions add 96 jobs and \$4.35 million in value added annually to the local economy. In the next five years of operation, this impact drops slightly to 90 jobs and \$4.10 million in value added each year. Businesses that benefit the most include: food services and drinking places (13 jobs), hospitals (6 jobs), offices of physicians and dentists (5 jobs), social assistance services (4 jobs), and child day care services (4 jobs).

In total counting both direct and spin-off effects, the first phase of operation the ethanol plant contributes 285 jobs and \$34.29 million in value added annually to the Hall County economy. This accounts for a 0.7 percent growth in employment and a 1.7 percent growth in value added across Hall County. For an employment multiplier, one direct job in ethanol plant operations generates over five additional jobs elsewhere in the local economy, for a total job multiplier of 5.48.

### **ECONOMIC DEFINITIONS**

*Employment* is by place of work and is not reported as full-time equivalent jobs.

*Value Added* is the value of the industry's output minus all of its inputs purchased from other firms, thus it is a measure of profits plus wages.

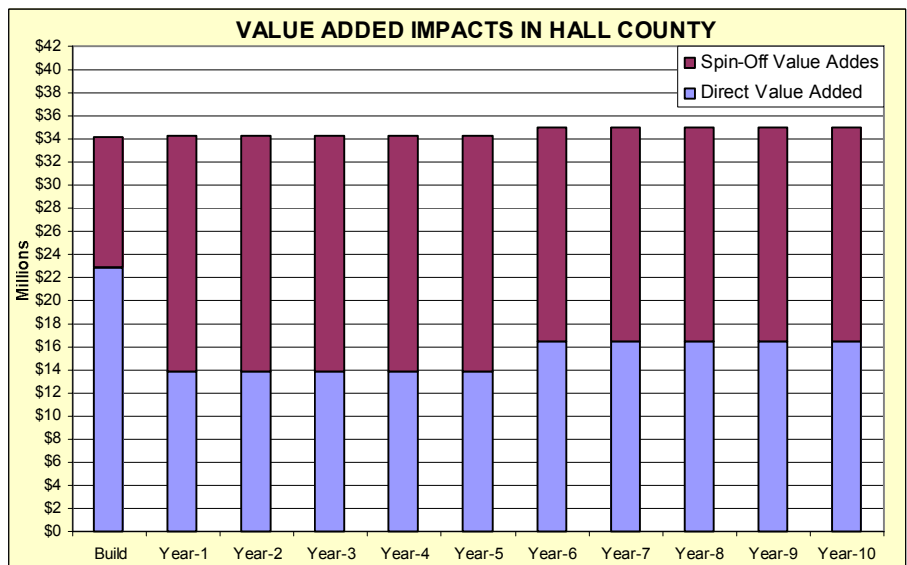
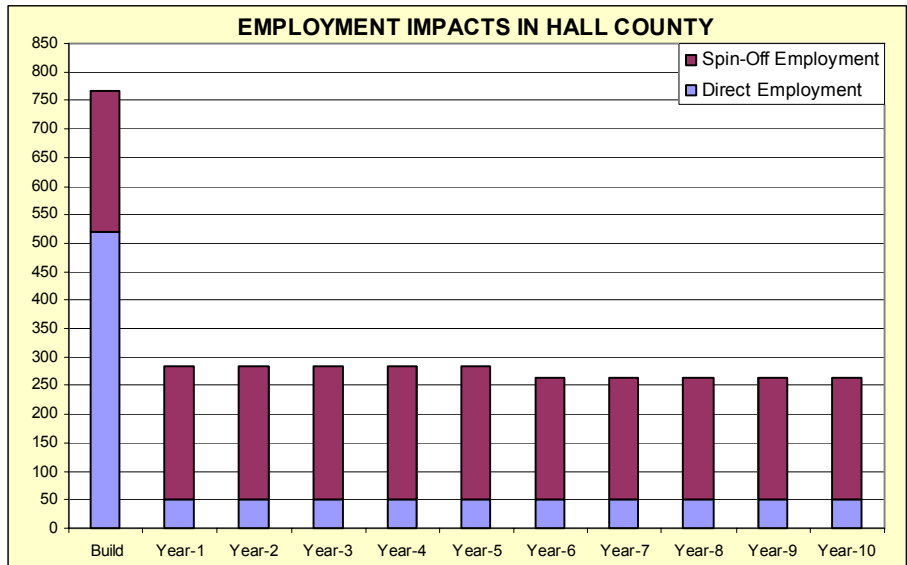
*Indirect* impacts represent business-to-business effects.

*Induced* impacts represent household spending effects.

*Multipliers* measure the total change in the economy due to a one unit change (usually in final demand) in a specific sector.

However, the value added multiplier is much lower, where one dollar of value added in ethanol operations generates nearly \$1.50 more in value-added elsewhere in the local economy, for a total value-added multiplier of 2.48 in Hall County. The jobs multiplier is higher because it includes industries that employ many part-time workers.

The second phase of operations results in a slight drop in employment, yet a modest gain in value added. In this later phase, ethanol operations generate 265 total new jobs and \$34.98 million in new value added to the local economy. However, the multiliers for both drop slightly in this later phase, with employment multipliers dropping to 5.10 and value added multipliers dropping to 2.12.



**Phase One – Annual Operations Impacts (Years 1-5) of a 110 MGY Ethanol Plant  
in Hall County**

INDUSTRY	EMPLOYMENT IMPACTS			VALUE-ADDED IMPACTS		
	Direct	Indirect & Induced	TOTAL	Direct	Indirect & Induced	TOTAL
Agriculture	1	0	2	\$18,685	\$11,381	\$30,066
Mining	0	0	0	\$0	\$19	\$19
Utilities	0	13	13	\$210	\$1,631,389	\$1,631,600
Construction	0	2	2	\$313	\$95,965	\$96,278
Manufacturing	47	7	54	\$13,641,373	\$629,537	\$14,270,910
Wholesale Trade	0	6	6	\$17,066	\$520,451	\$537,517
Transportation & Warehousing	0	43	43	\$4,767	\$6,013,028	\$6,017,794
Retail Trade	1	25	26	\$29,040	\$743,219	\$772,260
Information	0	2	2	\$2,052	\$139,887	\$141,938
Finance & Insurance	0	24	24	\$13,811	\$2,985,357	\$2,999,168
Real Estate & Rental	0	3	3	\$5,465	\$242,678	\$248,143
Professional & Scientific Services	0	7	7	\$1,807	\$355,972	\$357,779
Management of Companies	0	1	1	\$0	\$101,407	\$101,407
Administrative & Waste Services	0	24	24	\$599	\$1,675,322	\$1,675,921
Educational Services	0	1	1	\$591	\$18,634	\$19,225
Health & Social Services	1	25	26	\$33,059	\$836,662	\$869,722
Arts, Entertainment, & Recreation	0	3	3	\$2,088	\$63,232	\$65,320
Accommodation & Food Services	1	17	17	\$10,485	\$308,121	\$318,606
Other Services	0	20	21	\$7,926	\$794,375	\$802,301
Public Administration & Other	0	10	11	\$42,565	\$3,291,272	\$3,333,837
<b>TOTAL</b>	<b>52</b>	<b>233</b>	<b>285</b>	<b>\$13,831,900</b>	<b>\$20,457,907</b>	<b>\$34,289,807</b>

NOTE: Impacts generated using Type II multipliers from IMPLAN.

For a conservative estimate using marginal increases in transportation and utilities, the impacts are adjusted to the following, with all other impacts remaining constant:

INDUSTRY	EMPLOYMENT			VALUE ADDED		
	Direct	Indirect & Induced	TOTAL	Direct	Indirect & Induced	TOTAL
Utilities	0	0	0	\$210	\$6,515	\$6,725
Transportation & Warehousing	0	13	13	\$4,767	\$825,786	\$830,553
Public Administration & Other	0	5	5	\$42,565	\$1,375,222	\$1,417,787
<b>TOTAL</b>	<b>52</b>	<b>184</b>	<b>236</b>	<b>\$13,831,900</b>	<b>\$11,729,741</b>	<b>\$25,561,641</b>

ANALYSIS: Department of Agricultural Economics, University of Nebraska-Lincoln.

**Phase Two – Annual Operations Impacts (Years 6-10) of a 110 MGY Ethanol Plant  
in Hall County**

INDUSTRY	EMPLOYMENT IMPACTS			VALUE-ADDED IMPACTS		
	Direct	Indirect & Induced	TOTAL	Direct	Indirect & Induced	TOTAL
Agriculture	1	0	2	\$18,687	\$10,844	\$29,531
Mining	0	0	0	\$0	\$19	\$19
Utilities	0	13	13	\$210	\$1,631,444	\$1,631,653
Construction	0	2	2	\$313	\$91,316	\$91,629
Manufacturing	47	6	54	\$16,320,409	\$641,260	\$16,961,670
Wholesale Trade	0	6	6	\$17,066	\$501,050	\$518,116
Transportation & Warehousing	0	43	43	\$4,767	\$5,996,525	\$6,001,292
Retail Trade	1	24	25	\$29,040	\$701,656	\$730,696
Information	0	1	1	\$2,052	\$129,955	\$132,006
Finance & Insurance	0	11	11	\$13,811	\$1,291,018	\$1,304,829
Real Estate & Rental	0	3	3	\$5,465	\$227,926	\$233,390
Professional & Scientific Services	0	6	6	\$1,807	\$322,679	\$324,486
Management of Companies	0	1	1	\$0	\$97,959	\$97,960
Administrative & Waste Services	0	24	24	\$599	\$1,669,273	\$1,669,871
Educational Services	0	1	1	\$591	\$17,543	\$18,134
Health & Social Services	1	24	24	\$33,059	\$789,923	\$822,982
Arts, Entertainment, & Recreation	0	3	3	\$2,088	\$59,392	\$61,481
Accommodation & Food Services	1	15	16	\$10,485	\$281,534	\$292,018
Other Services	0	20	20	\$7,926	\$780,730	\$788,656
Public Administration & Other	0	10	10	\$42,566	\$3,224,511	\$3,267,078
<b>TOTAL</b>	<b>52</b>	<b>213</b>	<b>265</b>	<b>\$16,510,939</b>	<b>\$18,466,555</b>	<b>\$34,977,496</b>

NOTE: Impacts generated using Type II multipliers from IMPLAN.

For a conservative estimate using marginal increases in transportation and utilities, the impacts are adjusted to the following, with all other remaining constant:

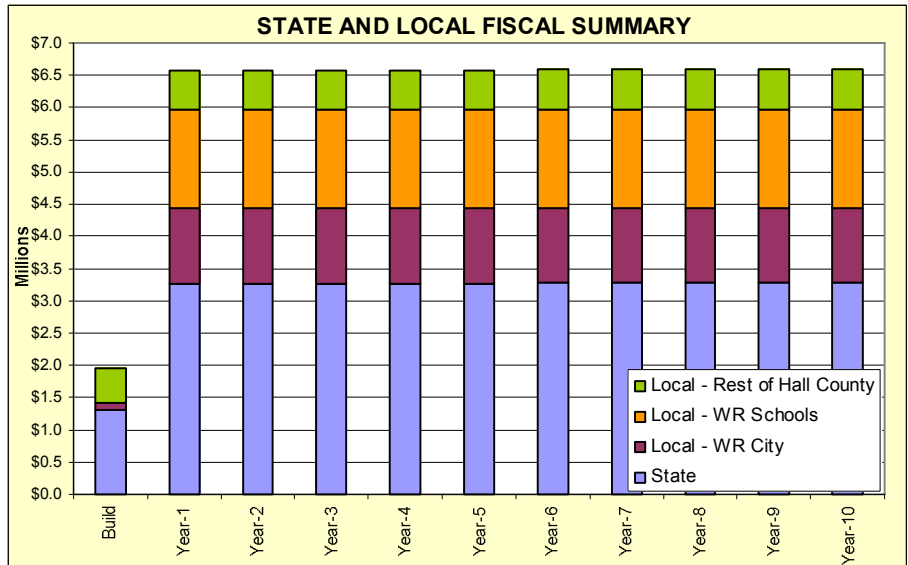
INDUSTRY	EMPLOYMENT			VALUE ADDED		
	Direct	Indirect & Induced	TOTAL	Direct	Indirect & Induced	TOTAL
Utilities	0	0	0	\$210	\$6,202	\$6,412
Transportation & Warehousing	0	13	13	\$4,767	\$807,477	\$812,244
Public Administration & Other	0	4	4	\$42,566	\$1,312,715	\$1,355,281
<b>TOTAL</b>	<b>52</b>	<b>164</b>	<b>216</b>	<b>\$16,510,939</b>	<b>\$9,740,469</b>	<b>\$26,251,410</b>

ANALYSIS: Department of Agricultural Economics, University of Nebraska-Lincoln.

## GOVERNMENT FISCAL IMPACTS

For the State of Nebraska, construction and operation of the ethanol plant in Wood River will generate \$50.46 million in state tax revenues over 10 years, **not counting state incentives**.

- The construction phase will generate \$1.31 million in tax revenues, with the majority coming from income taxes (\$505,200) and state sales taxes (\$504,200).
- The first phase of operations will generate \$3.27 million annually in state revenues, mainly coming from state sales taxes (\$2.14 million), corporate profits and dividends (\$430,800), and income taxes (\$324,700).
- The second phase of operations will generate \$3.28 million in state revenues annually, again with most coming from state sales taxes (\$2.13 million), corporate profits and dividends taxes (\$467,300), and income taxes (\$313,100).



For local governments in Hall County, construction and operation of the ethanol plant in Wood River will generate \$33.75 million in local tax revenues over 10 years. Local governments include the county, cities, school districts, and other local taxing authorities – including Wood River. **This does not count the costs of local government incentives.**

- The construction phase will generate \$641,800 in tax revenues, with the majority coming from property taxes (\$419,300), miscellaneous non-tax charges (\$122,600), and local sales taxes (\$56,000).
- The first phase of operations will generate \$3.31 million in revenues annually, with most coming from property taxes (\$2.51 million), miscellaneous non-tax charges (\$521,100), and local sales taxes (\$238,100).
- The second phase of operations will also generate \$3.30 million in revenues annually, with most coming from property taxes (\$2.51 million), miscellaneous non-tax charges (\$517,200), and local sales taxes (\$236,300).

However, one should be cautious when looking at net government revenues because they do not include the increased demand for public services. According to the economic impact analysis, local schools districts in Hall County would need to add 72 additional workers to meet the increased demands for public services, while other units of local government would need to add 12 new employees. Without access to local government staffing and budget data it is impossible to determine the exact impact. Local officials need to estimate their capacity to absorb additional demands for public services and how it may impact their budgets.

## **APPENDIX METHODOLOGY AND ASSUMPTIONS**

### *Social Accounting Methodology*

Economic and fiscal impacts are assessed an input-output model, which employs a regional social accounting methodology which can be used to generate a set of balanced economic/social accounts and multipliers. Different industries/sectors within an economy are interdependent because of the trade flows of goods and services among them. An increase in the final demand for an existing sector's output will result in increased output, income and employment in many other sectors of the economy. These impacts are captured by direct, indirect and induced affects by calculating input-output multipliers. So this model can be used for predictive purposes, by providing estimates of multipliers. Multipliers measure the response of the economy to a change in demand or production. Multiplier analysis generally focuses on the impacts of exogenous changes on: a) output of the sectors in the economy, b) income earned by households because of new outputs, and c) jobs that are expected to be generated because of the new outputs. IMPLAN is used to generate the social accounts.

*The following assumptions are used to model ethanol plant operations:*

- Total construction and investment costs are financed through 60 percent debt and 40 percent equity. Debt is financed at 8 percent per annum for 10 years. Equity returns are estimated at 95 percent of gross profit, with the remaining 5 percent going to reserves. (Source: Swenson 2006)
- The 110 million gallon plant will operate at 90 percent capacity each year, requiring 36.66 million bushels of corns, 383.33 million gallons of water, 108.90 kilowatt hours of electricity, and 3.47 million BTUs of natural gas. (Source: Tiffany and Eidman 2003)
- Per bushel of corn, the plant will yield 2.7 gallons of denatured alcohol, 19.0 pounds of distillers grains, and 17.5 pounds of carbon dioxide. (Source: Tiffany and Eidman 2003)
- Futures and spot prices for corn are used to estimate corn costs. (Source: Peters 2007; Chicago Board of Trade 2007).
- Energy and water costs are estimated at state average rates. (Source: US Department of Energy 2005; Nebraska DNR 2006)
- Depreciation and cost of capital is estimated over 15 years with a 25 percent salvage value. (Source: Peters 2007)
- All other cost structures and prices are taken from a survey of ethanol plants completed by the University of Minnesota. (Source: Tiffany and Eidman 2003)
- Futures prices are used to estimate anticipated ethanol sales. (Source: Chicago Board of Trade 2007)
- Prices for distillers grains are estimated at 95 percent of corn prices, adjusted for water content. (Source: Peters 2007).

*The following assumptions are used in the construction impact scenario:*

- \$937,500 in land acquisition costs based on 125 acres purchased at \$7,500 per acre, of which 10 percent is considered local economic activity associated with real estate transactions. (Source: Wood River NE 2007)
- \$21,000,000 in engineering and architectural costs, of which 32 percent are provided by local firms. (Source: Tiffany and Eidman 2003; IMPLAN 2004; Wood River NE 2007)
- \$119,050,000 in construction costs, of which 25 percent are provided by local firms. (Source: Tiffany and Eidman 2003; IMPLAN 2004; Wood River NE 2007)

*The following assumptions are used in the operations impact scenario:*

- Economic impacts are estimated using the IMPLAN input-output model. To run the analysis, an ethanol manufacturing industry was created in Hall County since one did not exist previously. Industry characteristics, production functions, and byproduct functions were created using information generated by the ethanol plant profitability model. (Source: Peters 2007)
- Plant will employ 50 workers at \$45,000 per annum in wages, plus 25 percent in fringe benefits. All jobs are assumed to be net new to the county, and 93 percent of workers will reside in the county. (Source: Wood River NE 2007; IMPLAN 2004; Peters 2007)
- There are no local investors. (Source: Wood River NE 2007)
- Increases in prices for corn due to the ethanol plant are estimated at \$0.05 per bushel, which is spent equally between debt reduction, capital investment, and household income. (Source: Swenson 2006; Swenson and Eathington 2007).
- Analysis assumes no additional corn production in Hall County, and that current production is directed to the ethanol plant with the remainder exported. (Source: Peters 2007)
- Operations impacts may be overstated in the utilities and transportation sectors. Some regional economists argue that these cost-declining industries do not yield average increases in outputs, but rather yield only marginal increases which are nearly zero. If users of this report wish to correct for this they should refer to the notes in the operations impact tables.

*The following assumptions are used in the government fiscal impact scenario:*

- Property taxes are estimated at 90 percent of total construction costs times the levy for each taxing authority. (Source: Nebraska Department of Property Assessment and Taxation 2006)
- Other state and local taxes are estimated at industry average rates for the county. (Source: IMPLAN 2004)



## **FOR MORE INFORMATION**

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The Municipal Energy Agency of Nebraska (MEAN) is the wholesale electricity supply organization of NMPP Energy. Created in 1981, MEAN provides power supply, transmission and related services to more than 60 communities, one public power district and one joint-action agency in five states: Colorado, Iowa, Kansas, Nebraska and Wyoming. MEAN member communities benefit from local control over power supply options. Each MEAN member community has a voting representative and works cooperatively to provide the lowest possible rates and achieve the highest quality of service to their respective end-use customers. MEAN's consistent growth and stable rates are proof of its history and reputation for successfully serving its members' needs with reliable, affordable electricity and related services.

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