

# **Estimated Economic Effects for The Nordic Biofuels Ethanol Plant in Ravenna, Nebraska**

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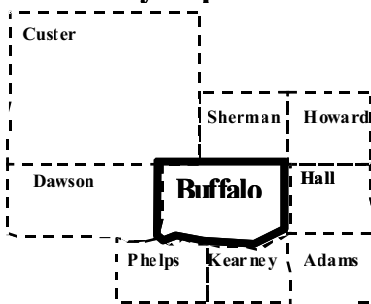
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# Estimated Economic Effects for The Nordic Biofuels Ethanol Plant in Ravenna, Nebraska

## Introduction

This report presents an analysis of the estimated employment and economic impacts that would be expected to be associated with operation of an ethanol processing facility located in Ravenna, Nebraska. The methodology employed to estimate the economic effects of the project utilizes a computerized input/output model constructed for a nine-county study area, including Buffalo County and the contiguous counties (Adams, Custer, Dawson, Hall, Howard, Kearney, Phelps and Sherman Counties - see Figure One). This model was developed with the 1999 Micro IMPLAN database. The IMPLAN database consists of 21 economic and demographic variables for 528 industrial sectors for each of the 3,000 counties in the United States. Some of these variables include employment, payments to labor (labor income), payments to other factors of production (i.e. property income), and output by industry sector, as well as government purchases and household purchases.

**Figure One**  
**The Nordic Biofuels Ethanol Project**  
**Primary Impact Area**



The IMPLAN database is used to build an input/output model for the primary impact area that identifies inter-industry linkages within the study area economy. From this model, multipliers are developed (employment, labor income, other property income and output) which can be applied to assess the anticipated economic and employment effects associated with the operation of the proposed ethanol facility.

Although the proposed ethanol project for which this impact analysis is undertaken will be located in Ravenna (Buffalo County), Nebraska, it is expected that the primary inputs (corn, labor and other inputs) for the ethanol project will be provided from the region surrounding Ravenna. Therefore the primary impact area used in this evaluation includes the multi-county region shown in Figure One.

## Direct Economic Effects

Information related to the operation of the Nordic Biofuels ethanol facility was obtained from Nordic Biofuels and the Buffalo County Economic Development Corporation. The analysis provided in this report assumes the plant will have the capacity to produce 80 million gallons of ethanol along with distiller's grains (wet and dry) and CO<sup>2</sup>. The plant is expected to provide 48 jobs, including production workers, supervisory and management staff, as well as maintenance and technical employees. The estimated payroll, including benefits and other add-ons, is estimated to be 2,580,500 annually.

It is expected that the facility will use a dry milling process to prepare the feedstock for conversion to ethanol and other products. Estimates of the direct economic effects associated with the operation of the Nordic Biofuels ethanol facility are presented in Table One. As the data in the table indicate, the total value of annual production for the facility is estimated at \$122,929,000, including \$96,000,000 for the ethanol and \$26,929,000 for the distiller (wet and dried) grains (DGS). The estimated direct addition to “Other Property Income” presented in Table One is estimated at 2,353,000 annually. Other Property Income is defined as payments for rents, royalties, and dividends. Payments to individuals in the form of rents received on property, royalties from contracts, and dividends paid by corporations are included here as well as profits earned by corporations. The Other Property Income used in this analysis was derived from the IMPLAN input/output model and database for the Nordic Biofuels project study area.

**Table One**  
**Estimated Direct Effects Associated with the Operation of the**  
**Nordic Biofuels Ethanol Facility in Ravenna, Nebraska**

Employees (F.T.E. Number)	48
Employee Payroll with Benefits	\$2,580,500
Other Property Income <sup>(a)</sup>	\$2,353,000
Total Labor & Other Property Income	\$4,933,500
Value of Plant Output	
Ethanol (80,000,000 Gal. @ \$1.20)	\$96,000,000
DDGS (Dried and Wet)	\$26,929,000
Total Value of Output	\$122,929,000
Indirect Business Taxes <sup>(b)</sup>	\$1,229,300

<sup>(a)</sup> Other Property Income consists of payments for rents, royalties, and dividends. Estimated from the IMPLAN Model and Database.

<sup>(b)</sup> Indirect Business Taxes include property and other taxes and fees, except taxes on profits or income. Estimated from data provided and from the IMPLAN Model and Database.

Source: Basic data on the operation of the facility provided by Nordic Biofuels. Other data derived from the IMPLAN Model and Database, where noted.

Data provided by the project sponsors indicate that the property tax for the Nordic Biofuels ethanol project is estimated at \$887,800 annually. The estimated indirect business taxes (\$1,229,300) shown in Table One includes the estimated amount for property taxes, as well as additional amounts for other indirect business taxes, including excise taxes, additional property taxes, fees, licenses, sales and payroll taxes paid during the normal operation of a business. It is important to recognize, however, that these indirect business taxes do not include taxes on profits or income. It is also important to note that these indirect business taxes include taxes paid to local governing bodies as well as taxes paid to higher levels (state and federal) of government.

### **Economic Impact Analysis**

In analyzing the potential economic effects associated with the operation of the Nordic Biofuels ethanol facility, it is noted that the study area defined for the analysis (Buffalo County and the

contiguous counties) does not currently have any facilities producing a similar product at the scale envisioned by the Nordic Biofuels project. Therefore, the economic (input/output) model constructed for the study area does not include a representative ethanol production sector.

To overcome this deficiency, an IMPLAN input/output model was constructed for the non-metropolitan area of Nebraska (The Nebraska counties except, Cass, Douglas, Lancaster, Sarpy and Washington Counties). Utilizing that model, an economic sector combining the wet milling production sector (Sector 76, “Wet Milling,”) and the dry-mill ethanol production facilities (Sector 190, “Cyclic Crudes, Intermediate & Industrial Organic Chemicals) was constructed and imported into the IMPLAN Model for specified study area. This import function essentially constructs a final demand vector by adjusting the direct requirements vector for the created ethanol sector by the level of output anticipated for the ethanol processing facility (\$122,929,000). This adjustment results in an estimate of the increase in the demand for goods and services in the study area economy that will be generated by the operation of the ethanol plant.

An estimate of the indirect economic effects results from an evaluation of the capacity of the study area economy to supply the increased demand for goods and services resulting from the operation of the ethanol facility. In the case of the study area economy (Buffalo County and contiguous counties) much of the project-dependent local demand for corn will be provided from the study area. In this analysis, however, it is assumed that the existence of this facility will not result in the production of additional agriculture products within the study area. Therefore, the input/output model was adjusted to restrict agricultural production in the study area to its current level. In the case of the increased demand for other goods and services resulting from the operation of the ethanol plant, a portion will be provided by the local economy and a portion will be need to be imported from outside of the area.

The analysis of the indirect economic effects associated with the operation of the Nordic Biofuels ethanol facility, utilizing the newly defined ethanol production sector that was imported into the study area input/output model, does not include the positive economic effects associated with the direct payments to labor (households). As previously noted, it is assumed that the payroll, including benefits and other add-ons, for the 48 workers at the ethanol facility will be \$2,580,500 million annually. The disposable income component of this payroll is used by the workers and their families to purchase goods and services. There will be further positive economic effects in the study area associated with these expenditures. The economic effects that follow from the increased demand for goods and services created by the household income associated with the plant payroll are referred to as the “induced by effects.”

To estimate the induced economic effects, the expected increase in the demand for goods and services resulting from the plant payroll is estimated by creating another final demand vector reflecting the expected increase in household income and expenditure patterns of, in this case, households with incomes in the \$40,000 to \$49,000 range. This final demand vector estimates the increased household demand for goods and services resulting from the plant payroll. For the purposes of this analysis, the disposable income component of the payments to labor is assumed to be 75 percent of the \$1,985,000 payroll (excluding benefits and other add-ons) or \$1,488,750. Similar to the process of estimating the indirect economic effects, the estimation of the induced economic effects results from increased demand for goods and services will be supplied by establishments within the study area and by imports from establishments outside of the area. The size of the induced effects is deter-

mined, in part, by how much of the increased household demand is supplied locally.

### **Estimated Economic Effects Associated with the Nordic Biofuels Ethanol Facility**

As the data provided in Table One indicated, the analysis of the economic effects associated with the operation of the Nordic Biofuels ethanol facility begins with the direct employment, output, and labor income and other payments to the factors of production that this facility is estimated to generate. The data presented in Table One provided basic data on the direct employment, labor and other property income, the value of output, and indirect business taxes associated with the operation of the Nordic Biofuels ethanol facility. Using these estimates, in conjunction with the multiplier values derived from the IMPLAN input/output model, estimates of the indirect and total employment and other economic effects associated with the operation of the prospective ethanol facility have been made. The estimates of the secondary (indirect and induced) and total economic and employment effects associated with the ethanol facility are presented in Table Two.

#### **- Employment Effects**

As indicated by the data presented in Table One, the annual employment directly related to the operation of the Nordic Biofuels ethanol production facility is expected to be 48 employees (FTEs). The direct, secondary (indirect and induced), and total employment effects resulting from the increase in economic activity associated with the operation of the facility are presented in Table Two. As these data indicate, the total employment effects for the Nordic Biofuels (Ravenna) multi-county impact area are estimated to be 163 jobs (48 direct F.T.E.s and 115 secondary, or 81 indirect and 34 induced jobs).

**Table Two**

**Estimated Employment, Personal Income and Output and Related Tax Effects  
Associated with the Nordic Biofuels Ethanol Facility in Ravenna, Nebraska  
(Annual Estimates)**

<b>Employment Effects</b>	<b>Ethanol Project</b>	<b>Households</b>	<b>Total</b>
Direct Employment (FTE)	48	0	48
Indirect (1.6833 of Direct)	81	0	81
Induced (0.7104 of Direct)	0	34	34
<b>Total Employment (FTE)</b>	<b>129</b>	<b>34</b>	<b>163</b>
<b>Personal &amp; Other Property Income Effects</b>			
Direct Personal & Property Income	\$2,353,000	\$2,580,500	\$4,933,500
Indir. Pers. & Prop. Inc. (0.6172 of Direct)	\$3,044,911	\$0	\$3,044,911
Induced Pers. & Prop. Inc. (0.2015 of Direct)	\$0	\$993,856	\$993,856
<b>Total Personal &amp; Other Property Income</b>	<b>\$5,397,911</b>	<b>\$3,574,356</b>	<b>\$8,972,267</b>
<b>Indirect Business Taxes Effects</b>			
[Direct] Indirect Business Taxes	\$1,229,300	\$0	\$1,229,300
[Indirect] Indirect Bus. Taxes (0.3221 of Dir.)	\$395,960	\$0	\$395,960
[Induced] Indirect Bus. Taxes (0.1048 of Dir.)	\$0	\$128,859	\$128,859
<b>Total Indirect Business Taxes</b>	<b>\$1,625,260</b>	<b>\$128,859</b>	<b>\$1,754,119</b>
<b>Output Effects</b>			
Direct Output	\$122,929,000	\$0	\$122,929,000
Indirect Output (0.2756 of Direct)	\$33,875,300	\$0	\$33,875,300
Induced Output (0.0305 of Direct)	\$0	\$3,744,210	\$3,744,210
<b>Total Output</b>	<b>\$156,804,300</b>	<b>\$3,744,210</b>	<b>\$160,548,510</b>

Source: Computed from the data presented in Table One and from the IMPLAN Input/Output Model constructed for the Nordic Biofuels Project Study Area economy (see text).

### **- Labor and Other Income Effects**

The employment and economic activity generated by the operation of the Nordic Biofuels prospective Ravenna ethanol facility will add a significant amount of labor and other property type income to the economy of the primary impact area. The estimate of the direct effects on total employment and labor income were obtained from the project sponsors and, in the case of a portion of the other property-type income, from the Micro IMPLAN database (See Table One and preceding text). As the data presented in Table Two indicate, the direct employment in the prospective ethanol facility will result an estimated direct addition of \$2,580,500 in labor income to the economy of the project (Ravenna) study area. Additionally, it is estimated the project will create property income estimated at \$2,353,000, some of which will be paid to households and businesses located within the study area. In the case of the other property-type income, this consists of payments for rents, royalties, and dividends. Utilizing the multiplier values from the IMPLAN input/output model constructed for the Nordic Biofuels project study area, the total income effects for the prospective ethanol facility are estimated to be \$8,972,267. This represents the estimate of the annual income effects associated with the facility, stated in constant dollars.

### **- Total Output Effects**

Total output (value of output) directly associated with the operation of the Nordic Biofuels facility was estimated at \$122,929,000 annually (See Table One). Using this as the direct output component, the total output effects associated with the prospective ethanol facility shown in Table Two, including the direct and secondary effects, are estimated to be \$160,548,510.

### **- Indirect Business Taxes Effect**

Indirect business taxes (IBT) expected to be paid by the prospective ethanol facility are estimated to be \$1,229,300 (see Table One), and include an estimated \$887,825 of local property taxes on the production facility. This category of value added consists of property taxes, excise taxes, fees, licenses and sales and payroll taxes, and includes taxes that occur during the normal operation of businesses, but does not include taxes on profits or income. As the data presented in Table Two indicate, the total indirect taxes estimated for the facility are \$1,754,100 annually, including the direct and secondary indirect business taxes effects.

### **- Retail Sales Effects**

Among the significant economic impacts that the operation of the Nordic Biofuels ethanol facility will have on the local economy are positive effects on assessed property valuation, in addition to the increased assessed valuation associated with the facility itself, associated growth in property tax revenues, and an increase in retail sales in the area and in sales tax revenues. While this analysis has captured a portion of these positive tax effects, in terms of the indirect business taxes, this section considers the probable positive effects of the facility on retail sales in the project (Ravenna) study area.

Table Three presents data on total personal income and retail sales for primary impact area (Buffalo County and the contiguous counties) for the period, 1990-1999. As these data indicate, retail sales in the area have averaged 45.6 percent of total personal income during this period.

Given these data, the derivation of an estimate of the retail sales impact associated with the operation of the prospective Nordic Biofuels (Ravenna) ethanol facility is made by assuming that retail sales generated by the economic activity associated with the facility would equal 45.6 percent of the

increase in personal income associated with the prospective facility. For the purposes of this analysis, we assume that the personal income associated with the operation of the ethanol facility will equal the total labor income associated with the labor income for the facility of \$5,412,600 and 50 percent of the total other property-type income (.5 x \$3,560,500= \$1,780,000) for a total of \$7,192,600. Given the estimated addition to personal income in the study area, the retail sales associated with the Nordic Biofuels ethanol facility are estimated to be \$3,279,800 annually (45.6% x \$7,192,600).

**Table Three**  
**Total Personal Income and Retail Sales,**  
**Nordic Biofuels Project (Ravenna) Impact Area<sup>(a)</sup>, 1990-2000**

Year	Total Personal Income (\$1,000)	Total Retail Sales (\$1,000)	Retail Sales as % of T.P.I. (%)
1990	2,914,093	1,370,885	47.0
1991	3,093,363	1,401,588	45.3
1992	3,217,972	1,475,627	45.9
1993	3,319,011	1,545,371	46.6
1994	3,514,093	1,640,395	46.7
1995	3,687,699	1,690,495	45.8
1996	3,991,905	1,748,483	43.8
1997	4,051,108	1,821,998	45.0
1998	4,250,824	1,913,947	45.0
1999	4,405,984	1,958,863	44.5
<b>Average, 1990-1999</b>			<b>45.6</b>

N/A -- Not Available

<sup>(a)</sup> Project Primary Impact Area includes Buffalo County and the contiguous counties (Adams, Custer, Dawson, Hall, Howard, Kearney, Phelps and Sherman Counties).

Sources: Total personal income: U.S. Dept. of Commerce, Bureau of Economic Analysis.

Retail sales data: Nebraska Dept. of Revenue.

**If further information about this analysis is desired or if the reader has questions about any aspect of this report, please contact:**

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