



## **CONTRIBUTION OF THE ETHANOL INDUSTRY TO THE ECONOMY OF THE UNITED STATES**

Prepared for the Renewable Fuels Association by

John M. Urbanchuk

Director, LECG LLC

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The ethanol industry is one of the most significant success stories in American manufacturing over the past quarter-century. From a cottage industry that produced 175 million gallons in 1980, the American ethanol industry has grown to include 113 manufacturing facilities with an annual capacity of nearly 5.6 billion gallons. Renewable fuels have captured the public imagination as a consequence of continued high petroleum prices, voluntary removal of MTBE from the nation's motor fuel supply, and efforts by the auto industry to increase the supply of flexible fuel vehicles. These developments have spurred a surge in ethanol plant investment and development. According to the Renewable Fuels Association 78 new plants and 7 major plant expansions representing an additional 6.2 billion gallons of capacity currently are under construction and more are planned. Total ethanol production for 2006 is estimated at nearly five billion gallons on a year-end capacity base of 5.5 billion gallons.

This study estimates the contribution of the ethanol industry to the American economy in 2006.

### **Contribution of the Ethanol Industry in 2006**

The ethanol industry provides a significant contribution to the American economy. The industry spent \$6.7 billion on raw materials, other inputs, goods and services to produce an estimated 4.9 billion gallons of ethanol during 2006. An additional \$410 million was spent to transport ethanol from the plant to the terminal where it is blended with gasoline. The largest share of this spending was for corn and other grains used as the raw material to make ethanol. The ethanol industry used more than 1.8 billion bushels of corn in 2006, valued at \$4.1 billion. Ethanol production represents the third largest component of corn demand after feed use and exports and will account for 17 percent of total corn utilization this marketing season. In addition to providing a growing and



reliable domestic market for American farmers, the ethanol industry also provides the opportunity for farmers to enjoy some of the value added to their commodity by further processing. Farmer-owned ethanol plants account for half of U.S. fuel ethanol plants and almost 40 percent of industry capacity.

The remainder of the spending by the ethanol industry is for a wide range of inputs such as industrial chemicals; electricity, natural gas, and water; labor; and services such as maintenance, insurance, and general overhead. Spending for these goods and services represents the purchase of output of other industries.<sup>1</sup> In addition, the construction of new ethanol plants results in spending for a wide range of goods and services. At an estimated construction cost of \$1.75 per gallon for a new dry mill ethanol plant, the new capacity brought on line during 2006 represented the expenditure of an additional \$2.1 billion by the ethanol industry.

The spending associated with current ethanol production and investment spending on new plant capacity will circulate throughout the entire 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 ethanol industry on the American 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.<sup>2</sup> The final demand multipliers for output, earnings, and employment for the selected industries are shown in Appendix Table 1.

The following summarizes the economic contribution of the American ethanol industry. These impacts are detailed by industry segment in Appendix Table 2.

- The combination of spending for annual operations, ethanol transportation, and capital spending for new plants under construction added \$41.9 billion of gross output to the American economy in 2006. Gross output represents the market value of an industry's

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<sup>1</sup> Expenditures for feedstock and energy were estimated using 2006 calendar year average prices. Revenues were estimated using 2006 calendar year average prices for Chicago ethanol, DDG, corn gluten feed and meal, and corn oil. Prices were sourced from USDA/ERS, EIA, and OPIS.

<sup>2</sup> The multipliers used in this analysis are the detailed industry RIMS II multipliers for the United States estimated by the Bureau of Economic Analysis, U.S. Department of Commerce.

production, including commodity taxes, and it differs from GDP.<sup>3</sup> Generally speaking, Gross Output is larger than GDP since it includes the value of intermediate goods and services, which are “netted out” of GDP. Reflecting this difference, the ethanol industry added \$23.1 billion to the nation’s Gross Domestic Product in 2006.

- New jobs are created as a consequence of increased economic activity caused by ethanol production. The increase in gross output (final demand) resulting from ongoing production and construction of new capacity supported the creation of 163,034 jobs in all sectors of the economy during 2006. These include more than 20,000 jobs in America’s manufacturing sector -- American jobs making ethanol from grain produced by American farmers.
- Increased economic activity and new jobs result in higher levels of income for American households. The production of ethanol will put an additional \$6.7 billion into the pockets of American consumers this year.
- The ethanol industry will more than pay for itself in 2006. The combination of increased output and GDP and higher income generates tax revenue for government at all levels. The full impact of the annual operations of the ethanol industry and spending for new construction will generate about \$2.7 billion of tax revenue for the Federal government. The estimated cost of the VEETC for 2006, assuming that all 4.9 billion gallons of ethanol produced are blended, is \$2.5 billion. In addition the ethanol industry will generate nearly \$2.2 billion of additional tax revenue for State and Local governments.
- Ethanol reduces our dependence on imported oil and reduces the U.S. trade deficit. The production and use of ethanol displaces crude oil needed to manufacture gasoline. According to the Energy Information Administration imports account for 65 percent of our crude oil supplies and oil imports are the largest component of the expanding U.S. trade deficit. The production of nearly five billion gallons of ethanol means that the U.S. needed to import 206 million fewer barrels of oil in 2006, valued at \$11.2 billion. This is money that stayed in the American economy.

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<sup>3</sup> BEA description of Gross Output taken from [www.bea.doc.gov/bea/dn2/readgo.htm](http://www.bea.doc.gov/bea/dn2/readgo.htm). According to BEA accounts GDP was 55% of the value total gross output in 2004.

**Appendix Table 1**

**BEA RIMS II Final Demand Multipliers, U.S.<sup>4</sup>**

	<b>Output</b>	<b>Earnings</b>	<b>Employment (Jobs)</b>
<b>Construction</b>	3.4464	1.0587	27.5088
<b>Annual Operations</b>			
Feed Grains (Corn)	2.7762	0.5310	16.1423
Other basic organic chemicals	3.3677	0.7145	15.2956
Petroleum refineries	2.7456	0.5419	10.6803
Power generation and supply	2.4766	0.5980	12.2665
Natural gas distribution	3.0580	0.6539	13.2728
Water, sewage	2.6056	0.7112	17.0152
Facilities support services	2.6713	0.9481	27.4222
Office administrative services	2.8582	1.0071	24.2376
Households	2.3688	0.6611	18.8356
Rail Transportation	2.8547	0.7850	17.1281
Water Transportation	3.2566	0.8156	18.7806
Truck Transportation	3.0950	0.8617	22.7736

*Source: Regional Input-Output Modeling System (RIMS II)*

*Regional Economic Analysis Division, BEA.*

*Multipliers based on 1997 Benchmark I-O Table; 2004 regional data.*

<sup>4</sup> The multipliers represent the effect on output, income and employment of every \$1 million of expenditures.

**Appendix Table 2  
Economic Contribution of the Ethanol Industry: 2006**

			<b>Impact</b>	
<b>Industry</b>	<b>Spending (Mil 2005\$)</b>	<b>Output (Mil 2005\$)</b>	<b>Earnings (Mil 2005\$)</b>	<b>Employment (Jobs)</b>
<b>Construction</b>	\$2,100.0	\$7,237.4	\$2,223.3	54,861
Plus initial changes		\$2,100.0		
<b>Total</b>		<b>\$9,337.4</b>	<b>\$2,223.3</b>	<b>54,861</b>
<b>Annual Operations</b>				
Farm Products/Agriculture	\$4,062.5	\$11,278.4	\$2,157.2	62,278
Industrial chemicals	\$299.8	\$1,009.6	\$214.2	4,355
Petroleum refineries	\$181.3	\$497.8	\$98.2	1,839
Electric, nat gas, water	\$1,570.4	\$4,655.6	\$1,016.5	19,712
Maintenance and repair	\$127.4	\$340.3	\$120.8	3,318
Business Services	\$294.0	\$840.3	\$222.1	5,075
Earnings paid to households	\$156.8	\$371.4	\$103.7	2,805
Rail, truck, barge	\$409.8	\$1,196.0	\$328.1	7,100
<b>Subtotal</b>	<b>\$7,102.1</b>	<b>\$20,189.5</b>	<b>\$4,334.8</b>	<b>108,173</b>
Plus initial changes:				
Value of ethanol production		\$10,795.0	\$156.8	
Value of co-products		\$1,595.9		
<b>Total Annual Operations</b>		<b>\$32,580.4</b>	<b>\$4,491.6</b>	<b>108,173</b>
<b>Grand Total</b>		<b>\$41,917.9</b>	<b>\$6,714.8</b>	<b>163,034</b>