

IMPACT OF EXPANSION OF THE RENEWABLE FUELS INDUSTRY ON THE ECONOMY OF IOWA

Prepared for the Iowa Renewable Fuels Association

John M. Urbanchuk
Managing Partner

October 17, 2017

Iowa is the nation's largest producer of renewable fuels. In 2016 Iowa's ethanol plants produced a record 4.1 billion gallons,¹ leading the nation and accounting for 26 percent of U.S. capacity. Iowa also is the nation's leading biodiesel manufacturer, accounting for more than 13 percent of total U.S. production with a record 297 million gallons in 2016.² Supported by Iowa's stable policy environment, including Iowa's seven-year extension of renewable fuels tax credits in 2016, Iowa biodiesel and ethanol producers commenced a historic level of investment and capital expenditures to expand production capacity. This expansion marks the single largest building boom since the historic expansion of the industry in the early 2000's.

The purpose of this study is to update an earlier analysis of the contribution of the renewable fuels industry to the Iowa economy to reflect this expansion.³

Industry Expansion

At the beginning of 2017 Iowa's 43 ethanol plants had 4,029 million gallons of conventional ethanol capacity and 52 million gallons of cellulosic and advanced biofuels capacity.⁴ The Iowa Renewable Fuels Association (IRFA) reports that industry participants are adding 511 million gallons of conventional ethanol and 22 million gallons of new cellulosic and advanced biofuels capacity for a total of 533 million new gallons. This represents a 13 percent increase in productive capacity.

¹ <http://iowarfa.org/2016/12/iowa-produces-record-4-1-billion-gallons-of-ethanol-in-2016/>

² <http://iowarfa.org/2016/12/iowa-biodiesel-production-smashes-record-in-2016/>

³ "Contribution of the Renewable Fuels Industry to the Economy of Iowa". ABF Economics January 26, 2017

⁴ <http://iowarfa.org/ethanol-center/ethanol-biorefineries/>

The IRFA also reports that the biodiesel industry is expanding by nearly a third above 2016 production by adding 78 million gallons of production capacity, bringing Iowa's potential biodiesel capacity to 375 million gallons.

These increased capacities for both ethanol and biodiesel reflect expansions that have either taken place or are scheduled to take place by the end of 2018. While not all of the capacity expansions have been completed, we have reflected the associated capital investment in order to reflect their economic impact. The projected increase in capacity is summarized in Table 1.

Table 1
Iowa Renewable Fuel Capacity
Potential 2018 versus 2016

Capacity/Production	2016 (Mil Gal)	Potential 2018 (Mil Gal)	Percent Change
Ethanol	4,081	4,614	13.1%
Conventional	4,029	4,540	12.7%
Advanced & Cellulosic	52	74	42.3%
Biodiesel	297	375	26.3%

Iowa's vast availability of feedstocks, exceptional infrastructure and high-quality workforce position the state well to be the nation's renewable fuels leader. Those factors in combination with Iowa's stable policy environment and aggressive action in extending renewable fuels tax credits make Iowa the most attractive place in the U.S. to expand. Regarding the availability of feedstocks, the additional 533 million gallons of ethanol will require the equivalent of 190 million bushels of corn. While USDA is projecting a nearly six percent smaller corn harvest this fall, carryover stocks which reflect both supply and demand are projected to increase to the highest level in nearly three decades. Iowa also remains the nation's largest corn producer.

Methodology

The spending associated with renewable fuels production, construction, and R&D circulates throughout the entire Iowa economy several-fold. Consequently, this spending stimulates aggregate demand, supports the creation of new jobs, generates additional household income, and provides tax revenue for

state and local governments. We estimate the economic impact of the expansion of the Iowa renewable fuels industry using the same methodology as in our 2016 analysis: that is, by applying expenditures by the relevant supplying industry to appropriate final demand multipliers for value added output, earnings, and employment. The economic impact multipliers for all activities except exports were developed from a model for the Iowa economy that was constructed using the most recent IMPLAN (Impact Analysis for Planning) software and data for Iowa.

In addition to using the IMPLAN multipliers, we continue to recognize the impact of income generated by locally-owned renewable fuels firms. The earnings of locally-owned firms are treated as an addition to the household sector since the income is paid to Iowans and their impact is estimated using multipliers for the household sector. The earnings by firms domiciled outside of Iowa are treated as direct additions to GDP.

We also reflected growth in exports of ethanol and DDGS by applying USDA Agricultural Trade multipliers for output and employment to the estimated value of exports.⁵ Since Iowa is the nation's largest ethanol producer the Iowa industry participates in the export market. Reflecting this we applied Iowa's share of total production to the total national export impact.

Results

The renewable fuels industry is multifaceted. Ethanol and biodiesel producers are part of a manufacturing sector that adds substantial value to agricultural commodities produced in Iowa. The first and second-generation feedstocks used to produce renewable fuels are produced primarily by Iowa farmers, and the R&D expenditures for renewable fuels provide important support for Iowa's universities. Combined, these activities make a significant contribution to the Iowa economy. Table 2 summarizes the impact of the expansion discussed above on the Iowa economy compared to 2016.

⁵ Export values for the first eight months of 2017 reported by USITC Interactive Tariff and Trade DataWeb (dataweb.usitc.gov) were annualized for the analysis.

Table 2
Total Economic Impact of Expansion of the Iowa Renewable Fuels Industry

	2016	Potential 2018	Impact of Expansion	Percent Change
Ethanol				
Capacity (MGY)	4,081	4,614	533	13.1%
Expenditures (Mil \$)	\$6,488	\$7,369	\$882	13.6%
GDP (Mil \$)	\$4,249	\$5,033	\$783	18.4%
Household Earnings (Mil \$)	\$2,000	\$2,485	\$485	24.2%
Employment (Jobs)	38,563	48,278	9,715	25.2%
Biodiesel				
Capacity (MGY)	297	375	78	26.3%
Expenditures (Mil \$)	\$865	\$1,118	\$253	29.3%
GDP (Mil \$)	\$477	\$597	\$120	25.3%
Household Earnings (Mil \$)	\$303	\$362	\$59	19.4%
Employment (Jobs)	3,856	4,933	1,078	27.9%
TOTAL				
Capacity (MGY)	4,378	4,989	611	14.0%
Expenditures (Mil \$)	\$7,352	\$8,487	\$1,135	15.4%
GDP (Mil \$)	\$4,726	\$5,630	\$904	19.1%
Household Earnings (Mil \$)	\$2,303	\$2,847	\$544	23.6%
Employment (Jobs)	42,419	53,212	10,793	25.4%

Reflecting the expansion of capacity discussed above, the renewable fuels industry provides the following contribution to Iowa's economy.

- ❖ Ethanol producers will spend an estimated \$882 million at current prices to produce an additional 533 million gallons for a total of \$7.4 billion.⁶ The majority of these expenditures (73 percent) are for corn and other feedstocks. Biodiesel producers will spend an additional 29 percent to produce 375 million gallons.
- ❖ Expansion of renewable fuels capacity will generate an additional \$904 million to Iowa's GDP for a total contribution of over \$5.6 billion.

⁶ Year-to-date prices for ethanol and biodiesel feedstocks were used to estimate expenditures.

- The ethanol industry (including production, new construction, R&D, and exports) will account for \$783 million of the increase for a total impact on GDP of more than \$5 billion.
- Expansion of biodiesel capacity will add \$120 million to GDP for a total impact of \$597 million.
- ❖ The economic activity generated by expansion will support nearly 10,800 additional jobs through the entire Iowa economy for a total impact of 53,212 jobs. The ethanol industry will account for 9,715 of the new jobs while biodiesel will support an additional 1,078 jobs. The sharp increase in jobs is largely attributable to new construction activity. While the construction impacts of this expansion boom are temporary, the increased capacity of Iowa ethanol and biodiesel plants will have a significantly positive economic impact over the long term.
- ❖ Expansion of the renewable fuels industry also will put more money in the pockets of Iowa households. The additional economic activity and jobs will generate an additional \$544 million in household income for a total of \$2.8 billion.

The contribution of the renewable fuels industry to the economy of Iowa is detailed in Table 3. The ethanol industry provides a significant contribution to the Iowa economy, spending \$7.4 billion on raw materials, other inputs, goods and services to produce over 4.6 billion gallons of ethanol. The largest share of this spending (\$5.4 billion) is for corn and feedstocks used as the raw material to make ethanol, distillers grains and distillers corn oil.

The Iowa biodiesel industry will spend an estimated \$1.1 billion at current prices on raw materials, other inputs, goods and services, 29 percent more than in 2016. The largest share of this spending is for fats and oils used as the raw material to make biodiesel. The Iowa biodiesel industry will use 1.9 billion pounds of soybean oil to produce biodiesel totaling two-thirds of total feedstock use. In addition, Iowa biodiesel producers will use nearly 400 million pounds of animal fats, 270 million pounds of distillers corn oil (supplied largely by Iowa ethanol producers), 212 million pounds of canola and 85 million pounds of used cooking oil.

Table 3
 Contribution of the Renewable Fuels Industry to Iowa Including Expansion

	GDP (Mil 2017\$)	Jobs (Thou)	Income (Mil 2017\$)
Ethanol Manufacturing	\$2,045	13,500	\$1,010
Biodiesel Manufacturing	\$597	4,933	\$362
Agriculture	\$2,201	24,283	\$924
New Construction	\$378	5,237	\$289
R&D	\$298	3,777	\$205
Exports	\$110	1,481	\$58
Grand Total	\$5,630	53,212	\$2,847
Change from 2016	19.1%	25.4%	23.6%

The majority of the raw material for biofuels production in Iowa is procured locally. The remainder of the spending is for a wide range of inputs such as industrial chemicals, electricity, natural gas, water, labor, and services such as maintenance, insurance, and general overhead. The spending for these goods and services represents the purchase of output of other industries.

Conclusion

The renewable fuels industry continues to make a significant contribution to the Iowa economy in terms of job creation, generation of household income, and displacement of imported crude oil and petroleum products. The importance of the ethanol and biodiesel industries to agriculture and rural economies is particularly notable. With farm income projected to decline, renewable fuels growth is playing a key role in helping to keep the rural economy afloat. Expansion of the Iowa renewable fuels industry through 533 million gallons of new ethanol production capacity and 78 million gallons of new biodiesel production capacity by the end of 2018 will provide a significant boost to this already significant economic contribution. Maintaining Iowa's advantageous position in terms of policy stability, feedstock availability, infrastructure sufficiency, and workforce quality will be vital to realizing the full benefits—including economic gains and new jobs—of these capacity expansions.

Continued growth and expansion of the renewable fuels industry through new technologies and feedstocks will enhance the industry's position as the original creator of green jobs. However, recent uncertainty regarding the implementation of the federal Renewable Fuel Standard (RFS) could jeopardize not only future investments in new capacity and technology, but also the investments made over the last two years. If federal policy shifts lead to stagnant or reduced renewable fuels demand, nearly 11,000 jobs in Iowa alone will be put at risk.