

Impact for Consumers and the Iowa Economy of Statewide E15 Use

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Executive Summary

One of the most significant challenges and opportunities for the ethanol industry both nationally and in Iowa lies in expanding demand by increasing use of higher blend levels. Most of the motor gasoline currently used in Iowa contains a blend of 10 percent ethanol (E10). Switching to statewide use of 15 percent ethanol (E15) will increase ethanol demand and benefit Iowa consumers and the state economy. This study examines the contribution to the Iowa economy of replacing E10 with E15 on a statewide basis.

According to the Iowa Department of Revenue, nearly 1,284 million gallons of ethanol blended fuel (86 percent of all motor gasoline) were sold on average over the three-year 2018 to 2020 period. Gasoline blended with 10 percent ethanol (E10) accounted for nearly 82 percent of Iowa gasoline use, or 1,216 million gallons. Moving from E10 to E15 statewide would require an additional 60.8 million gallons of ethanol from Iowa producers. Iowa consumers would realize nearly \$134 million in savings from lower prices for E15 at the pump. These savings are equivalent to an increase in household income that will stimulate consumption of goods and services produced and supplied in Iowa. The combination of consumer savings and value of additional ethanol production will stimulate the Iowa economy. Using 2018 to 2020 as a baseline, moving from E10 to E15 statewide would:

- add \$95.4 million to Iowa GDP,
- generate an additional \$73 million in income for Iowa households, and
- support more than 3,800 jobs in all sectors of the Iowa economy.

The economic contribution provided by increasing ethanol demand was estimated by applying economic impact multipliers to the value of ethanol industry output associated with the additional ethanol demand and the savings Iowa consumers would realize from lower prices at the pump for E15 blends. The value of ethanol industry output was estimated by using Iowa prices for ethanol reported by USDA. Motor gasoline and ethanol use was sourced from data published by the Iowa Department of Revenue.

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Prepared by ABF Economics LLP

ABF Economics was asked by the Iowa Renewable Fuels Association to examine the economic implications of expanding E15 use statewide in Iowa. The objective of this study is to estimate the economic impact of statewide use of E15 on consumers and the Iowa economy.

Methodology

Gasoline and Ethanol Blend Use

Increasing the blend level of ethanol from E10 to E15 in Iowa will increase ethanol use and create a new market for Iowa ethanol producers. In 2011 the U.S. EPA approved E15 for use in model year 2001 and newer cars, light-duty trucks, medium-duty passenger vehicles (SUVs), and all flex-fuel vehicles (FFVs). According to the Renewable Fuels Association in Washington, DC, more than 95 percent of vehicles on the road were made in 2001 or newer and are approved by EPA to use E15.¹

The Iowa Department of Revenue publishes gasoline and ethanol blended fuel use annually.² Between 2018 and 2020 an average of 1,284 million gallons of ethanol blended fuel were sold in Iowa.³ Gasoline blended with 10 percent ethanol (E10) accounted for nearly 82 percent of Iowa gasoline use, or 1,216 million gallons. Moving from E10 to E15 statewide would require 60.8 million gallons of ethanol from Iowa producers. Most Iowa ethanol is produced in dry mills that also produce Distiller's dried grains (DDGS) and Distiller's corn oil (DCO) as co-products. The value of the ethanol plant output was reached by multiplying the additional ethanol

¹ "RFA: E15 Approved for Use in Nearly 90% of New 2018 Vehicles". Convenience Store News. 11/22/2017

² Retailers Fuel Gallons Annual Report, Iowa Department of Revenue. Various years.

³ The three-year 2018-2020 period was selected as the base for analysis to average out the impact on gasoline and ethanol use resulting from the economy-wide shutdowns associated with COVID during 2020, and 2021 data is not yet available.

volume by the three-year average price of ethanol at Iowa ethanol plants and prices for DDGS and DCO reported by the Agricultural Marketing Service of USDA.

The second major step in the analysis was to estimate the savings Iowa consumers would realize from lower prices for E15 blends at the pump. As indicated above, most Iowans already are buying E10. Generally speaking, prices at the pump for gasoline with higher blend levels of ethanol are below that for lower blend levels. The U.S. Energy Information Agency (EIA) currently does not track or report retail prices for various ethanol blends. However, the Renewable Fuels Association (RFA) surveys retailers to determine prices of ethanol blends by state and publishes these data on the website e85prices.com. We extracted monthly prices for E10 and E15 in Iowa from the RFA website for the two-year 2020-21 period, calculated the “discount” for E15 relative to E10, and applied this discount to the quantity of E15 that would result from statewide use.⁴ According to e85prices.com the average price of E15 in Iowa between January 2020 and December 2021 was \$2.29 per gallon, \$0.11 per gallon below the average price of E10. Applying this discount to the 1,216 million gallons of E15 indicates that Iowans would save nearly \$134 million by moving to statewide E15 use. These savings are the equivalent of an increase in income that would stimulate consumption and additional economic activity.

The last step in our analysis involved estimating the contribution to the Iowa economy provided by producing the additional ethanol created by statewide E15 use and the stimulus to consumers provided by savings at the pump. Iowa has the nation’s largest ethanol industry using corn and other feedstocks produced by Iowa farmers. For this analysis we have calculated that an additional 61 million gallons of ethanol are needed to transition from E10 to E15.

⁴ www.e85prices.com. The 2020-21 period was selected as representative of the entire period of analysis and to reflect sparse data collected in 2019.

Economic Impact

Economic impact analysis measures the effects of economic activity in a specific geographic area. For example, policy makers or business leaders may want to know how much a specific manufacturing facility or industry contributes to a regional economy. Economic impact analysis is an important tool that can quantify the economic impact or contribution of an industry such as ethanol production.

Economic impact models used for this type of analysis are accounting frameworks for a predefined geographic area that measures how goods and services flow through different economic sectors including industries, households, and governments. The economic contribution can be estimated in one of two ways:

- Applying industry level final demand multipliers for value added output, earnings, and employment impact to the value of industry output.⁵
- Applying final demand multipliers for specific industries that supply goods and services (inputs) to the ethanol industry. This is known as a “bill-of-goods” approach.

Results of the two approaches are similar.

In this study, ABF used the first approach and applied the state-level economic impact multipliers for the other basic organic chemical manufacturing industry (NAICS 325190) to the gross value of output of the additional ethanol and co-products, Distiller’s dried grains (DDGS) and Distiller’s corn oil (DCO), created by statewide E15 use. The value of ethanol industry output was estimated by using state level prices for ethanol reported by USDA. This study utilizes the IMPLAN (Impact Analysis for Planning) economic model to develop this understanding of the economy, including the sectors that support the ethanol industry, the links between them, and the level of economic activity. IMPLAN is a commonly used economic input-output (I-O) model. I-O models are constructed based on the concept that all industries within an economy are linked together; the output of one industry becomes the input of

⁵ Ethanol production is part of the Other basic organic chemical manufacturing industry, NAICS 325190

another industry until all final goods and services are produced. I-O models can be used both to analyze the structure of the economy and to estimate the total economic impact of projects or policies. For this analysis, a model for the Iowa economy was constructed using IMPLAN software and data to estimate economic impacts of the ethanol industry and consumer savings.

Multipliers measure three types of impacts: direct, indirect, and induced impacts:

- Direct effects are the known changes in the economy.
- Indirect effects are the business-to-business transactions required to produce direct effects (i.e., increased output from businesses providing intermediate inputs).
- Induced effects are derived from spending on goods and services by people working to satisfy direct and indirect effects (i.e., increased household spending resulting from higher income).

IMPLAN multipliers generate economic indicators that describe an economy. The indicators most commonly used are gross output (business revenues), value added (GDP), income (household earnings), and employment:

- **Gross Output** is the value of production measured by gross sales revenues (i.e., business sales revenues).
- **Value added** is the total value of goods and services produced by businesses in an economy. Generally referred to as Gross Domestic Product (GDP), it is the sum of labor income, taxes paid by industries and households, and other property type income such as corporate profits. Value added represents the net economic benefit that accrues to an economy as a result of increased economic output.
- **Household Earnings** is the sum of employee compensation (including all payroll and benefits) and proprietor income (income for self-employed work).
- **Employment** reflects the full-time equivalent jobs that are supported by the gross output and value-added economic activity in all sectors of the economy.

Results of Statewide E15 Use

Statewide use of E15 will increase ethanol demand. Iowa is the nation’s largest ethanol producer, with the capacity to produce 4.5 billion gallons of ethanol. However, motor gasoline consumption in Iowa averaged only 1.4 billion gallons over the past three years with E10 accounting for 1.2 billion gallons. This requires about of 122 million gallons of ethanol. If Iowa utilized E15 statewide, ethanol use in Iowa would increase an additional 61 million gallons.

Table 1 summarizes the data underlying the economic impact of Iowa statewide E15 use.

Table 1
Assumptions: Implementing Iowa Statewide E15 Use
(2018-2020 Baseline)

	2018	2019	2020	2018-20
	Mil Gal	Mil Gal	Mil Gal	Mil Gal
Gasoline (non-ethanol)	202.3	211.5	199.5	204.5
Total Ethanol Blends	1,356.7	1,353.4	1,141.1	1,283.7
E10	1,300.1	1,284.3	1,064.5	1,216.3
E15 Registered	34.1	47.4	59.7	47.1
E15 Flex Fuel	1.3	1.5	0.9	1.2
E20	1.0	1.1	1.1	1.1
E 85	20.2	19.0	14.8	18.0
Total Gasoline	1,559.0	1,564.9	1,340.6	1,488.2
E15 Discount vs E10 (cpg)				\$0.11
Addl Statewide E15 (Mil Gal)	1,300.1	1,284.3	1,064.5	1,216.3
E15 Consumer savings (Mil \$)				\$133.8
E10 ethanol content	130.0	128.4	106.4	121.6
E15 content (Mil gal)	195.0	192.6	159.7	182.4
Additional ethanol (Mil gal)	65.0	64.2	53.2	60.8
Iowa EtOH Price (\$/gal)	\$1.32	\$1.34	\$1.19	\$1.28
EtOH Value (Mil \$)	\$85.8	\$86.1	\$63.3	\$78.0
DDGS Value (Mil \$)	\$30.0	\$23.6	\$22.7	\$25.5
DCO (Mil \$)	\$3.4	\$3.9	\$3.8	\$3.7
Total Output Value (Mil \$)	\$119.3	\$113.6	\$89.8	\$107.6

Source: Iowa Department of Revenue

Pump Price for ethanol blends from RFA e85prices.com

The combination of additional ethanol and co-products DDGS and DCO produced by Iowa's dry mills brings the total value of output created by transitioning to E15 to nearly \$108 million.

Table 2 summarizes the economic impact of transitioning to E15 statewide. The direct represent the impacts of ethanol and co-product production and the impact of consumption resulting from consumer savings. The indirect and induced effects were calculated by applying IMPLAN multipliers to the data presented in Table 1.

The economic activity generated by transitioning to E15 statewide would add \$95.4 million to Iowa GDP, generate nearly \$73 million of household income, and support more than 3,800 jobs in all sectors of the economy.

Table 2
Economic Impact of Implementing Iowa Statewide E15 Use
(2018-2020 Baseline)

	Output (Mil \$)	GDP (Mil \$)	Employment (FTE Jobs)	Income (Mil \$)
Consumer Savings				
Direct	\$33.4	\$33.4	3,202	\$33.4
Indirect	\$0.0	\$0.0	0	\$0.0
Induced	\$31.1	\$17.8	223	\$10.6
Total Consumer	\$64.6	\$51.2	3,425	\$44.1
Ethanol Production				
Direct	\$107.6	\$13.3	69	\$9.2
Indirect	\$38.8	\$19.4	177	\$12.4
Induced	\$20.0	\$11.4	143	\$6.8
Total Ethanol	\$166.4	\$44.1	389	\$28.4
Total				
Direct	\$141.0	\$46.7	3,271	\$42.6
Indirect	\$38.8	\$19.4	177	\$12.4
Induced	\$51.2	\$29.2	366	\$17.5
Total E15	\$231.0	\$95.4	3,814	\$72.5

It is interesting to note that the largest contribution for Iowa's economy from transitioning to statewide E15 use is generated by the savings consumers will realize from lower pump prices for E15 relative to E10. As pointed out above, we expect these savings to stimulate consumption of goods and services that will support additional economic activity.