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Impact for the Nebraska 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 Nebraska lies in expanding demand by increasing use of higher blend levels. Most of the motor gasoline currently used in Nebraska contains a blend of 10 percent ethanol (E10). Transitioning to statewide use of 15 percent ethanol (E15) will increase ethanol demand and benefit Nebraska consumers and the state economy. This study examines the contribution to the Nebraska economy of replacing E10 with E15 on a year-round statewide basis.

According to the Nebraska Department of Environment and Energy Office (NDEE) and the Nebraska Ethanol Board (NEB) an estimated 835 million gallons of ethanol blended fuel (90.7 percent of all motor gasoline) was sold in 2022.[1] While the NDEE does not track consumption of individual ethanol blends, based on motor fuels utilization data the NEB estimates that ethanol blends account for more than 90 percent of Nebraska gasoline and that the majority of this (93 percent) is 10 percent ethanol (E10). Transitioning from E10 to E15 statewide would require an additional 41 million gallons of ethanol from Nebraska producers. Nebraska consumers would realize more than $50 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 Nebraska. Additionally, Nebraska fuel retailers will benefit from increased volume of ethanol-blended fuel caused by a statewide E15 standard. Lower prices for E15 are expected to increase consumption of all ethanol-blended fuels three percent, or 24 million gallons. The combination of consumer savings, the value of additional

[1] https://neo.ne.gov/programs/stats/inf/65a.html. Personal communication with Nebraska Ethanol Board

ethanol output, and retailer benefits will stimulate the Nebraska economy. Using 2022 volumes as a baseline, moving from E10 to E15 statewide would:

- add $138 million to Nebraska GDP,
- generate nearly $100 million in additional income for Nebraskans, and
- support nearly 3,500 jobs in all sectors of the Nebraska economy.

The economic contribution provided by increasing ethanol demand was estimated by applying economic impact multipliers to the expenditures on goods and services to produce the additional ethanol required to meet the transition from E10 to E15, the savings Nebraska consumers would realize from lower prices at the pump for E15 blends The value of ethanol industry output was estimated by using Omaha prices for ethanol reported by USDA. Motor gasoline and ethanol use was sourced from data published by the Nebraska Department of Environment and Energy and data received from the Nebraska Ethanol Board. Retail prices for E10 and E15 were sourced from the website E15prices.com published by the Renewable Fuels Association.

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Prepared by ABF Economics LLP

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

Methodology

Gasoline and Ethanol Blend Use

Increasing the blend level of ethanol from E10 to E15 in Nebraska will increase ethanol use and create a new market for Nebraska 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.[2] Moreover in May 2022 the U.S. Environmental Protection Agency issued an emergency waiver to allow year-round use of E15.

According to the Nebraska Department of Environment and Energy Office (NDEE) and the Nebraska Ethanol Board (NEB) an estimated 835 million gallons of ethanol blended fuel (90.7 percent of all motor gasoline) was sold in 2022. The NDEE does not track consumption of individual ethanol blends. However, based on motor fuels utilization data the Nebraska Ethanol Board estimates that ethanol blends account for more than 90 percent of Nebraska gasoline and that the majority of this (93 percent) is 10 percent ethanol (E10).[3] Nebraska has the

[2] "RFA: E15 Approved for Use in Nearly 90% of New 2018 Vehicles". Convenience Store News. 11/22/2017
[3] https://neo.ne.gov/programs/stats/inf/65a.html. Personal communication with Nebraska Ethanol Board

nation's second largest ethanol industry using corn and other feedstocks produced by Nebraska farmers. For this analysis we have calculated that an additional 41 million gallons of ethanol, the equivalent of 14.5 million bushels of corn, are needed to move from an E10 standard to E15. According to the Nebraska Department of Environment and Energy Office (NDEE) and the Nebraska Ethanol Board (NEB) an estimated 835 million gallons of ethanol blended fuel (90.7 percent of all motor gasoline) was sold in 2022. Moving from an E10 standard to E15 statewide would require an additional 41 million gallons of ethanol from Nebraska producers.

Most Nebraska ethanol is produced in dry mills that also produce distiller's dried grains (DDGS) and distiller's corn oil (DCO) as co-products. Corn wet mills produce corn gluten meal (CGM), corn gluten feed (CGF) and food-grade corn oil as co-products with ethanol. The value of the ethanol plant output was reached by multiplying the additional ethanol volume by the average price of ethanol at Nebraska ethanol plants and prices for DDGS, DCO, CGM and CGF reported by the Agricultural Marketing Service of USDA.

Consumer Savings

The second major step in the analysis was to estimate the savings Nebraska consumers would realize from lower prices for E15 blends at the pump. As indicated above, most Nebraskans already are buying E10. Prices at the pump for gasoline with higher blend levels of ethanol typically are below prices 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 e15prices.com. We extracted 2022 monthly prices for E10 and E15 in Nebraska from the RFA website, 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 E15prices.com the average retail price of E15 in Nebraska between January and December 2022 was $3.55 per gallon, $0.17 per gallon below the average price of E10. Applying this discount to the quantity of E15 that would be required to replace

[4] www.e15prices.com

E10 indicates that Nebraskans would save 55 million by moving to statewide E15 use. These savings are analogous to an increase in income that would stimulate consumption and additional economic activity.

Infrastructure for E15

Retail fuel stations that transition to E15 may have to upgrade tanks and pumps to accommodate higher concentrations of ethanol. Nebraska will benefit from increased expenditures on pumps and associated infrastructure to support statewide E15 use. The Nebraska Ethanol Board (NEB) estimates 1,382 gasoline stations that sell ethanol-blended fuels in Nebraska. Of these, 141 retail locations sell E15 and E85 so that the estimated number of retail stations that would be affected by a transition to statewide E15 is 1,236.[5]

The actual expenditures will depend on the scope of improvements required by individual stations and number of stations that require investment. Some stations may require relatively little in the way of upgrades while others may require substantial investment to accommodate E15. Given this uncertainty we are unable to estimate the level of expenditures with any degree of confidence. Consequently infrastructure expenditures have not been included in the calculations of economic impact in this study. Nonetheless, investment to improve fueling infrastructure will require expenditures on goods and services that will stimulate additional economic activity.

Impact on Gasoline Retailers

Lower prices for E15 relative to E10 are expected to increase consumption of ethanol-blended fuel. As discussed above, the average price of E15 in Nebraska in 2022 was $0.17 per gallon, or 4.5 percent, lower than E10. Gasoline is a relatively inelastic product. That is, the change in demand for gasoline is less than a change in price. Several studies have investigated the price elasticity of demand for gasoline. A typical long-run (greater than a year) elasticity for gasoline

[5]https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwj1ipbpwbP8AhVSFVkFHZxmDrgQFnoECBIQAQ&url=https%3A%2F%2Fafdc.energy.gov%2Ffiles%2Fu%2Fdata%2Fdata_source%2F10333%2F10333_gasoline_stations_year.xlsx&usg=AOvVaw25CGEENHg3tKWE7raD42w_

is -0.64 meaning that a 10 percent drop in gasoline prices would result in a 6.4 percent increase in consumption over a period of more than a year.[6] Applying this elasticity to the 4.5 percent lower price for E15 relative to E10 suggests that statewide use of E15 would result in a nearly three percent increase in consumption.

Retailers will benefit from higher volumes of ethanol-blended fuel. The size of this benefit will in large part determine the willingness of retailers to sell E15. The size of the benefit will depend on individual margins and competitive conditions and is difficult to estimate.

Several states are considering incentives to induce retailers to make the investment necessary to store and distribute E15 and higher blends of ethanol. In 2022 LB1261 was introduced and passed in the Nebraska Legislature to provide an incentive for gasoline retailers to sell E15 and higher blends of ethanol. LB1261 provides gasoline retailers with a five cents per gallon tax credit for every gallon of E15 sold and an eight cents per gallon tax credit for every gallon of E25 and higher ethanol content.[7]

The capped five cents per gallon tax credit for E15 provides Nebraska gasoline retailers with an estimated additional $16 million. Combined with an estimated $1.8 million in additional revenue from increased sales volume, statewide E15 would provide gasoline retailers with a gross benefit of $17.8 million.

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. The economic contribution provided by increasing ethanol demand was estimated by applying economic impact multipliers to the expenditures on goods and services

[6] Hughes, J., Knittel, C., Sperling, D., 2008. Evidence of a Shift in the Short-Run Price Elasticity of Gasoline Demand. The Energy Journal. 291, 93-114.
[7] Nebraska Higher Blend Tax Credit Act. LB1261 2022. LB1261 caps the maximum tax credit payment to $4 million annually

to produce the additional ethanol required to meet the transition from E10 to E15 and the savings Nebraska consumers would realize from lower prices at the pump for E15 blends.

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 by 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.

This study utilizes the IMPLAN (Impact Analysis for Planning) economic model to develop an understanding of the Nebraska 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 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 Nebraska economy was constructed using IMPLAN software and data to estimate economic impacts of the ethanol industry and consumer savings.[8]

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).

[8] Recently updated detailed industry multipliers based on 2021 regional data for Nebraska were provided by IMPLAN. These data reflect changes in the economy post-COVID.

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

- **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 because 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. Nebraska is the nation's second largest ethanol producer, with the capacity to produce nearly 2.3 billion gallons of ethanol. However, motor gasoline consumption in Nebraska is estimated at only 920 million gallons in 2022 with ethanol blends accounting for 835 million gallons. This requires less than 100 million gallons of ethanol. Statewide year-around use of E15 in Nebraska would require an additional 40.6 million gallons of ethanol, well within the capacity of Nebraska's ethanol industry.

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

Table 1
Assumptions: Implementing Nebraska Statewide E15 Use

	Current (Mil Gal)	Statewide E15 (Mil Gal)
Ethanol		
Total Gas Use	920.7	920.7
Ethanol Share	90.7%	93.3%
Gas Ethanol Blends	835	859
E10 Share	93.0%	5.0%
E15 Share	5.0%	93.0%
Higher Blends	2.0%	2.0%
E10	776.4	42.9
E15	41.7	798.8
Higher Blends	16.7	17.2
E15 Potential	41.7	798.8
Total Ethanol Content*	98.1	138.7
Additional Ethanol Required		40.6
Additional Corn (Mil bu)		14.5
Consumer Expenditures		
Ethanol Gallons (Mil)	818	842
Retail Price ($/gal)	$3.72	$3.55
Expenditures (Mil $)	$3,039	$2,984
Consumer Savings (Mil $)		$55.1
Ethanol Industry		
Ethanol Price, Omaha Rack ($/gal)	$2.63	$2.63
Ethanol Value (Mil $)	$258.0	$364.8
DDGS Value (Mil $)	$59.2	$83.7
DCO (Mil $)	$17.0	$24.0
Corn Gluten Meal (Mil $)	$1.2	$1.7
Corn Gluten Feed (Mil $)	$1.9	$2.7
Total Output Value (Mil $)	$337.2	$476.9

Several points regarding the assumptions underlying the analysis should be noted.

- As pointed out earlier, the NDEE reports consumption of all ethanol blends and does not break out consumption of E10, E15, or higher blends.
- Based on information provided by the Nebraska Ethanol Board, we have assumed the E10 accounts for 93 percent of ethanol blends in Nebraska while E15 and higher blends (mostly E85) each account for five and two percent, respectively.[9]
- We assume that Statewide E15 would not completely replace E10 use.
- We have not included the potential economic impacts from expenditures to improve fueling infrastructure.

The combination of additional ethanol and co-products produced by Nebraska's ethanol plants brings the total value of output of Nebraska's ethanol industry created by converting from E10 to E15 statewide to nearly $140 million.

The economic activity generated by statewide E15 use would add $143.7 million to Nebraska GDP, generate $104.2 millions of household income, and support more than 3,000 jobs in all sectors of the Nebraska economy.

It is interesting to note that the largest contribution for Nebraska'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.

Table 2 summarizes the economic impact of transitioning from E10 to E15 statewide.

[9] It is interesting to note that about eight percent of Nebraska gasoline stations offer E15 and nine percent offer E85. Moreover, flex-fuel vehicles (that can use E85) account for about 12 percent of vehicles registered in Nebraska. Our assumption of five percent of ethanol blends accounted for by E15 and two percent for E85 reflects the observation that not everyone who can use something does.

Table 2
Economic Impact of Nebraska Statewide E15 Use

	GDP (Mil 2022$)	Jobs (FTE)	Income (Mil 2022$)
Ethanol Manufacturing			
Direct	$15.5	51	$6.5
Indirect	$14.8	114	$8.5
Induced	$6.5	66	$3.6
Subtotal	**$36.8**	**231**	**$18.6**
Agriculture			
Direct	$9.6	63	$7.3
Indirect	$11.0	95	$6.0
Induced	$5.8	52	$3.2
Subtotal	**$26.5**	**210**	**$16.5**
Consumer			
Direct	$55.1	2,420	$55.1
Indirect	$0.0	0	$0.0
Induced	$23.6	206	$13.1
Subtotal	**$78.7**	**2,625**	**$68.2**
Gasoline Retailers			
Direct	$0.9	12	$0.4
Indirect	$0.5	5	$0.3
Induced	$0.3	3	$0.2
Subtotal	**$1.7**	**19**	**$0.9**
Total			
Direct	$81.2	$2,545.0	$69.4
Indirect	$26.3	$213.7	$14.8
Induced	$36.2	$326.9	$20.0
Grand Total	**$143.7**	**3,086**	**$104.2**

Conclusion

Increasing ethanol use by replacing E10 with E15 statewide will create substantial benefits the Nebraska economy, ethanol producers, corn growers, fuel retailers, and consumers. These benefits include increased consumption of ethanol blended fuels, expanded economic activity measured by GDP, support for additional jobs in all sectors of the Nebraska economy, and increased household income.

Converting from E10 to an E15 statewide standard in Nebraska will be facilitated by the recently passed Nebraska Higher Blend Tax Credit Act, LB1261, that provides an important incentive for the gasoline retailing industry to make E15 available for all Nebraska consumers.