Potential Increased Ethanol Sales through E85 for the 2019 RFS

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Growth Energy

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Executive Summary

This analysis was conducted to examine the feasibility of increasing ethanol consumption through E85 by an additional 0.38 bg by 2019, an annual rate that if continued through 2022 will increase ethanol consumption through E85 by 1.5 bg. The analysis reviews and updates Stillwater's July 11, 2016 evaluation which examined the potential for E85 and E15 sales increases. This updated analysis finds that by the end of 2018, 1,500 new E85 stations will have been built since 2016. This number, added to the 3,000 E85 stations that were in place at the time of our 2016 analysis becomes a total of 4,500 stations, which is sufficient to handle a 0.38-billion-gallons (bg) increase in sales of ethanol in 2019 through the new sales of 0.57 bgy of E85. E85 dispenser utilization for these sales will increase to 21%. Achieving these additional sales requires the federal renewable fuel standard's (RFS) D6 renewable identification numbers (RINs) price to be high enough to encourage consumers to make these purchases.

1 Introduction

This analysis was conducted to examine the 2019 impacts of increasing ethanol consumption through E85 by an additional 1.5 billion gallons (bg) by 2022. E85 offers the biggest increase of new ethanol used per gallon of fuels sold, so new E85 sales will be the primary route to increased ethanol usage.

2 Potential New E85 Sales

The E85 portion of this analysis examines the volumes that, given sufficient yet reasonable financial incentives, can increase ethanol by 1.5 bg in 2022 from increased E85 sales. Given a steady rate of increase in E85 sales through 2022, the 2019 increase in ethanol consumed would be 0.38 bg of E85. First, we quantify the E85 and ethanol volumes required in addition to the 350 million gallons per year (mgy) in existing E85 sales for 2017 and predicted by the U.S. Environmental Protection Agency (EPA) for 2018.[1] In order to reach a targeted 0.38 bg increase in ethanol usage in 2019, E85 sales need to increase by 0.57 billion gallons per year (bgy). This addition of new E85 sales in 2019 is shown in Table 1 below. The conversion of the increased annual ethanol volumes into E85 gallons was calculated using a factor of 1.51 gallons of E85 necessary to consume one (1) gallon of incremental ethanol (i.e. additional ethanol over the ethanol in the displaced E10).[2] Finally, the new E85 requirements are added to the existing E85 sales to determine the new E85 sales target for 2019. The result is that 0.92 bg of total E85 needs to be sold in order to consume an additional 0.38 bg of ethanol.

Table 1. Ethanol and E85 Sales Targets for 2019

	2017	2018	2019
Current E85 Sales, bgy	0.35	0.35	0.35
New E85 Sales, bgy			0.57
new Ethanol sold, bgy			0.38
Total E85, bgy	0.35	0.35	0.92

Next, we determine the number of E85 dispensers needed in place each year to accommodate the increased volumes. According to EPA there will be an estimated 4,535 E85 stations by the end of 2018.In older stations, the E85 dispensers were standalone units; stations built or rebuilt since 2016, however, use E85 blender pump dispensers, and these dispensers can also dispense E15. The result is that for 2018 and beyond there are at least 4,500 E85 stations.[3] Undoubtedly, with sufficient financial drivers, many more E85 stations could be added from 2019-2022, but this analysis is just using the E85 stations expected to be in place by the end of 2018.

While not much is known about the number of E85 dispensers in older E85 stations, newer E85 stations in the BIP have 3.3 dispensers on average.[4] For the purposes of this analysis, we have conservatively assumed only 1.0 E85 dispenser per station for the 3,000 pre-2016 E85 stations and 3.3 dispensers per E85 station for the 1,500 2016-and-newer stations. As shown in Table 2, the result is an average of 1.8 dispensers per E85 station in 2018-and-beyond which results in a minimum of 7,950 E85 dispensers for 2018-and-beyond.

[1] U.S. Environmental Protection Agency. Renewable Fuel Standard Program: Proposed Standards for 2018 and Biomass-Based Diesel Volume for 2019. July 21, 2017. Page 34235 column 3. https://www.gpo.gov/fdsys/pkg/FR-2017-07-21/pdf/2017-14632.pdf

[2] This factor was documented in the Stillwater report: Infrastructure Changes and Cost to Increase Consumption of E85 and E15 in 2017. July 11, 2016, p. 4

[3] David Korotney, "Market Impacts of biofuels in 2019," (June 26, 2018), EPA-HQ-OAR-2018-0167-0025. EPA bases its estimate on an assumption that there were 3,571 E85 stations as of June 2018. We note that, according to the NACS 2017 Retail Fueling Report there were 4,300 E85 stations in 2017, so EPA's data may be conservative.

[4] U.S. Department of Agriculture. Biofuel Infrastructure Partnership: List of States Receiving BIP Grants. Accessed July 5, 2018. https://www.fsa.usda.gov/programs-and-services/energy-programs/bip/index

Table 2. E85 Stations and Dispensers

	2017	2018	2019
Pre-2016 E85 Stations	3,000	3,000	3,000
2016-2017 E85 Stations	800	800	800
New 2018 BIP Stations	-	700	700
New Non-BIP Stations	-	-	0
Total E85 Stations	3,800	4,500	4,500
Dispensers/Station	1.5	1.8	1.8
Total E85 Dispensers	**5,640**	**7,950**	**7,950**

Finally, we examine the E85 sales volumes per dispenser to determine dispenser utilization rates. Table 3 shows the results of dividing the total gallons of E85 which must be sold each year by the available E85 dispensers. The result is a fairly low E85 volume per dispenser. This point is made clearest in the bottom line in the table which shows the average percent utilization of E85 dispensers. This utilization percentage was determined by using a typical dispenser rate of 45,000 gallons per month.[5] The result is that in 2019, using existing stations and dispensers, just 21% of the average dispenser's capabilities will need to be used for dispensing 0.92 bg of E85 in order to use an additional 0.38 bgy of ethanol.[6] Thus, new E85 sales projected in Table 1 can be achieved without requiring any new E85 infrastructure. Note that if utilization were to increase to 31%, that could result in sales of 1bg of E85 or 670mg of incremental ethanol. The only requirement is that E85 (plus the RIN value) be priced as necessary to create these sales volumes.

Table 3. E85 Dispenser Utilization

	2017	2018	2019
Total E85 (bgy)	0.35	0.35	0.92
Total E85 Dispensers	5640	7950	7950
Average E85 per Dispenser (mgy)	0.062	0.044	0.115
Average Dispenser Utilization	11%	8%	21%

2.1 Flexible-Fuel Vehicle (FFV) Usage of E85

One of the potential limiting factors for the growth of E85 is the fact that this fuel can only be used in FFVs. Currently, there are about 21 million FFVs in the U.S. vehicle fleet.[7] If the 0.92 bg of E85 (.35 bg of existing sales plus 0.57 bg of new sales) used in this analysis for 2019 is spread across the 21million FFV fleet, it would mean that, on average, all FFVs in 2019 will have to be filled with E85 about 8%[8] of the time. In addition, as we explained in a prior report, work by Bruce Babcock and Sebastian Pouliot used detailed data regarding the geographic distribution of FFVs and E85 stations to demonstrate that there are sufficient FFVs near E85 stations to consume volumes of E85 of 1.2-1.3 billion gallons of E85.[9] Since the Babcock analysis, the number of FFVs and E85 stations have grown. Thus, FFV numbers should place no limitations on the sales of E85.

[5] This factor was documented in the Stillwater report: Infrastructure Changes and Cost to Increase Consumption of E85 and E15 in 2017. July 11, 2016. p.3.
[6] Note that this utilization would only have to increase slightly if there was less E85 station growth than EPA anticipated by the end of 2018.
[7] Air Improvement Resource, Inc. Analysis of Ethanol-Compatible Fleet for Calendar Year 2019. Prepared for Growth Energy. August 16, 2018.
[8] Assuming an average of 12,000 miles per year and an average FFV fuel economy of 24.0 miles per gallon.
[9] Stillwater report: Infrastructure Changes and Cost to Increase Consumption of E85 and E15 in 2017. July 11, 2016. p.4.

3 Conclusions Regarding Potential E85 Sales in 2019

1. Existing E85 stations at the end of 2018 will be sufficient to support the sale of 0.57 bg of new E85 and total E85 sales of 0.92 bg. This will result in the usage of 0.38 bg of new ethanol and total ethanol of 0.61 in 2019.
2. At these E85 sales volumes, the stations and dispensers will only be 21% utilized in 2019.