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September 3, 2019

Byron J. Bunker
Compliance Division
Office of Transportation and Air Quality
U.S. Environmental Protection Agency
2565 Plymouth Road
Ann Arbor, MI 48105

F-Factor Guidance Request for MY 2020 and Later Flex Fuel Vehicles

Dear Mr. Bunker:

The Alliance of Automobile Manufacturers[1] ("Alliance") respectfully submits these comments on the need for an F-factor for model year (MY) 2020 and beyond gasoline-E85 Flex Fuel Vehicles (FFVs). The Alliance appreciates EPA extending the F-factor of 0.14 for MY 2016-2018 through MY 2019, but in order for manufacturers to have confidence that EPA will recognize the benefits of using E85, EPA should issue a new guidance letter to implement a F-factor for MY 2020 and beyond. This guidance should remain in place until the EPA establishes a new F-factor.

The Alliance brings to your attention newly released data that is pertinent to the generation of a new F-factor. The Energy Information Agency ("EIA") released the Annual Energy Outlook ("AEO") 2019 on January 24, 2019, that provides the necessary information to set a new F-factor for gasoline-E85 FFVs. Replicating EPA methodology for establishing the MY 2016-2018 F-factor with the updated AEO 2019 data, arrives at an F-factor of 0.21 for use with MY 2020 and future model year vehicles. This F-factor should remain valid until any new data is established.

An updated F-factor using this new data is needed for 2020 and beyond for manufacturers to calculate their compliance values for both the National Highway Traffic Safety Administration's ("NHTSA's") corporate average fuel economy ("CAFE") standards and the Environmental Protection Agency's ("EPA's") tailpipe carbon dioxide emissions ("GHG") standards. An industry wide F-factor is only possible through EPA written guidance, which is of

[1] The members of the Alliance are BMW Group, FCA US LLC, Ford Motor Company, General Motors Company, Jaguar Land Rover, Mazda, Mercedes-Benz USA, Mitsubishi Motors, Porsche Cars North America, Toyota, Volkswagen Group of America and Volvo Car USA. For more information, go to www.autoalliance.org.

vital importance to automakers. FFVs provide a key compliance flexibility by utilizing a proven technology to cost-effectively achieve real-world petroleum and GHG reductions. FFVs are highly versatile in that these vehicles are approved by original equipment manufacturers (OEMs) to utilize blends of ethanol and gasoline that range from 0-85% ethanol and are likewise federally certified to this range of fuel blends. The F-factor represents the percentage of time FFVs are deemed to use ethanol flex fuel versus gasoline over the lifetime of the FFV for crediting purposes.[2] The regulatory framework of the CAFE and GHG programs rely upon this F-factor to determine the CO_2 and fuel economy benefits that automakers receive for manufacturing and selling FFVs. Automakers make technology pathway decisions based on the relative value that EPA and NHTSA recognize and attribute to FFVs.[3]

EPA previously established an F-factor for model years 2016 through 2018[4], which was recently extended through MY 2019.[5] EPA set this F-factor at 0.14, meaning FFVs of these model years were projected to operate on E85 14% of the time over their useful life. Absent further action, the existing EPA regulations set the F-factor at zero starting after model year 2019.[6] In other words, starting in MY 2020 FFVs are currently assumed to never run on E85, and therefore would provide zero GHG and CAFE benefits. An F-factor of zero eliminates the regulatory incentive to manufacture FFVs under the CAFE and GHG programs and ignores the real-world CAFE and GHG benefits delivered by the use of E85 in FFVs. The absence of an F-factor for model year 2020 and thereafter could similarly constrain the potential for developing vehicles that utilize higher octane gasoline (such as from mid-level ethanol blends), an issue on which the SAFE rulemaking sought comment.[7]

By necessity, automakers are already evaluating vehicle compliance strategies through MY 2026. Expeditiously establishing an F-factor for model years 2020 and subsequent years based on the new EIA data would allow automakers to make appropriate vehicle production investments and decisions to support future compliance. A new F-factor determination is critical to supporting automaker compliance strategies. This is especially important given that model year 2020 has already started. Consistent with this, EPA has "initiated a forward-looking assessment based on real-world use for the 2020 and later model years with the goal of issuing a new determination expeditiously."[8] Further, EPA has recognized, "the F factor should be

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[2] See Letter of Byron J. Bunker, Director of Compliance Division, Office of Transportation and Air Quality, U.S. Environmental Protection Agency, "E85 Flexible Fuel Vehicle Weighting Factor for Model Year 2016-2018 Vehicles," (November 12, 2014) at https://iaspub.epa.gov/otaqpub/display_file.jsp?docid=33581&flag=1 (hereafter "EPA's 2014 F-factor Guidance," at p. 1, 4.

[3] See 40 CFR 600.510-12(c)(2)(v)(regarding CAFE) and (j)(2)(vi)(regarding vehicle GHG compliance).

[4] See 2014 F-factor Guidance, *supra*.

[5] See Letter of Byron J. Bunker, Director of Compliance Division, Office of Transportation and Air Quality, U.S. Environmental Protection Agency, "E85 Flexible Fuel Vehicle Weighting Factor for Model Year 2019 Vehicles," (August 26, 2019) at https://iaspub.epa.gov/otaqpub/display_file.jsp?docid=47440&flag=1 (hereafter "EPA's 2019 F-Factor Guidance").

[6] 40 CFR 600.510-12(c)(2)(v)(regarding CAFE) and (j)(2)(vi)(regarding vehicle GHG compliance).

[7] See e.g., SAFE proposed rule at 83 Fed. Reg. 42,986, 43,446 (August 24, 2018). Comment was also more broadly sought on compliance levels, flexibilities and approaches to automakers achieving compliance with the applicable standards. In response, Pearson Fuels and other entities commented that an appropriate F-factor should be established for Model Year 2019 and onward. See e.g., Pearson Fuels SAFE Comment, *supra* at 8-12.

[8] See 2019 F-factor Guidance, *supra*.

locked-in as far out as possible … to provide manufacturers with as much certainty as possible."[9]

Multiple new sources of empirical data can be used to set a new F-factor. Most importantly, EIA just published data projecting E85 use with values beginning at 0.04 quads in 2019 rising to 0.14 quads in 2025 in its Annual Energy Outlook.[10] An analysis of this EIA data was conducted by Air Improvement Resources ("AIR") using a methodology consistent with the established EPA methodology for determining an F-factor across several model years.[11] A copy of the technical AIR report is included as Exhibit A and demonstrates that the EIA data supports an F-factor of at least 0.21 for MY 2020 through 2025, based on an average across those model years. Alternatively, EPA could establish specific F-factors for each model year from 2020 per the values noted in Table 1 of the report. These individual F values increase each year from 2020 through 2025, and when averaged equate to 0.21.[12]

Consistent with the EIA data, a recent analysis conducted by Professor Scott H. Irwin, of the University of Illinois, found significant increases in ethanol use at both the federal and state level.[13] The analysis derived from public data on E85 use showed a consistent *upward* trend in consumption over the review period. Further, the analyses showed double-digit increases in E85 use over the period December 2017 through October 2018. In particular, E85 use was up 32 percent for December 2017 through October 2018 compared to the same period a year earlier for both national and state-level data.

The EIA data and the state-level data sources are consistent with the data that the California Air Resources Board has gathered showing a rapid growth trend in E85 usage in FFVs of 30% per year in the last several years.[14]

EPA recognition of real-world E85 usage through the publication of an updated F-factor would enable automakers that manufacture gasoline-E85 FFVs to appropriately weight the contribution of fuel economy/GHG emissions in the CAFE and GHG programs. Rather than defaulting to zero, establishing an F-factor for MY 2020 and subsequent years would provide commensurate credits for the fuel economy and GHG benefits of FFVs utilizing E85.

Given the strength of the EIA data in establishing robust and growing real-world E85 usage in FFVs, the Alliance urges EPA to expeditiously establish an F-factor for MY 2020 and

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[9] 2014 F-factor Guidance, *supra* at p. 24-25. EPA had previously issued a multi-year F-factor to provide "to provide manufacturers with as much lead time and certainty as possible." *Id.* at 8.

[10] Energy Information Agency, Annual Energy Outlook 2019, January 24, 2019, at https://www.eia.gov/outlooks/aeo/, and supplemental data for Table 38, "Light-Duty Vehicle Energy Consumption by Technology and Fuel Type" at https://www.eia.gov/outlooks/aeo/tables_ref.php.

[11] See EPA's 2014 F-factor Guidance, *supra,* which established a single F-factor for model years 2016-2018.

[12] While the AIR analysis goes through MY 2025, the Alliance requests an F-factor be in place through MY 2026 so as to align with the SAFE Rulemaking.

[13] Irwin, S. "Small Refinery Exemptions and E85 Demand Destruction," farmdoc daily (9):8, Department of Agricultural and Consumer Economics, University of Illinois at Urbana-Champaign, January 16, 2019; at https://farmdocdaily.illinois.edu/2019/01/small-refinery-exemptions-and-e85-demand-destruction.html. For a further examination of this data, see also, Irwin, S. "What's Behind Rising E85 Use?" in farmdoc daily (9):13, January 24, 2019, at https://farmdocdaily.illinois.edu/2019/01/whats-behind-rising-e85-use.html.

[14] See Pearson Fuels SAFE Comment (*supra* footnote 1), at 11 and Exhibit 1.

beyond at 0.21. An F-factor should not be zero as a result of inaction, and as such, keeping an F-factor in place until new guidance is released is appropriate. Doing so would enhance regulatory predictability, inform automaker production planning, enhance regulatory compliance, increase efficiency, and reduce GHG emissions from the transportation sector.

In summary, the Alliance respectfully requests that EPA expeditiously issue a guidance letter that uses EIA data and prior EPA procedures setting the F-factor equal to 0.21 for MY 2020 and future model years for both CAFE and GHG programs. This guidance should also clarify that an F-factor is valid until the EPA determines a new value; F-factors are not assumed to be zero if new guidance has not been written to cover new model years.

Thank you for consideration. If you have any questions, please contact Dan Bowerson at dbowerson@autoalliance.org or 248-327-1777.

Sincerely,

Dan Bowerson
Director, Vehicle Electrification & Fuels

Exhibit A

"F" Factor Developed from Energy Information Agency (EIA) Fuel Consumption Projections

Air Improvement Resource, Inc.
February 1, 2019

Introduction

The "F" factor for a flexible fuel vehicle is the ratio of its fuel consumption on E85 to the total fuel consumption, over the vehicle life. EPA requires the "F" factor to be used in estimating GHG emissions of FFVs.[15]

EPA estimated the "F" factor for FFVs in model years 2016-2018 as 0.14.[16] EPA used FFV sales projections, ethanol volume projections, and E15 use projections from the Energy Information Agency AEO2014 in developing this estimate. Developing "F" factors by model year requires projecting the amount of E85 use into the future for each model year, and a number of factors beyond the control of the automakers influence this use.

The Energy Information Agency projects both E85 use and total fuel consumption for FFVs. This report calculates "F" factors from EIA fuel consumption projections for model years including 2019 through 2025 based on the AEO2019 projection. Calculations were prepared for two alternative assumptions on assumed vehicle life (15 and 20 years) and were weighted based on projected vehicle miles travelled over the vehicle life. Alternative calculations using a simple average of annual "F" factors (rather than a weighted average based on vehicles miles travelled) were also prepared. Calculated "F" factors are shown in Table 1.

Table 1. "F" Factor calculations

Model Year	20-year vehicle life		15-year vehicle life	
	VMT weighted avg over 20 yrs	Simple avg over 20 yrs	VMT weighted avg over 15 yrs	Simple avg over 15 yrs
2019	16.53%	18.19%	13.80%	14.34%
2020	17.91%	19.56%	15.40%	15.99%
2021	19.26%	20.88%	17.05%	17.66%
2022	20.56%	22.08%	18.71%	19.33%
2023	21.79%	23.18%	20.38%	20.99%
2024	22.98%	24.16%	22.03%	22.62%
2025	23.99%	24.95%	23.50%	24.06%
Mean across MYs 2019-2025	20.43%	21.86%	18.70%	19.29%

[15] EPA CD-14-18 (LDV/LDT/ICI/LIMO), E85 Flexible Fuel Vehicle Weighting Factor for Model Year 2016-2018 Vehicles, November 12, 2014.
[16] *Id*. at p. 1.

Analysis

EIA assembles an Annual Energy Outlook (AEO) every year. The most recent one is AEO2019.[17] The data includes fuel consumption by many different vehicle types – gas, diesel, FFVs, etc. AEO2019 contains total fuel consumption in BTU by FFVs, and E85 fuel consumption in BTU.[18] The model also contains FFV sales and vehicle stock projections. An "annual" "F" factor (e.g., before weighting for miles travelled across the vehicle lifetime of a particular model year) can be estimated from AEO2019 data as the ratio of the E85 fuel projection divided by the projection of total fuel consumed by FFVs in each projection year. However, this annual ratio is not the same thing as EPA's "F" factor. EPA's "F" factor is model year or model year group specific. Model year specific "F" factors that are comparable to EPA's can be calculated by weighting the annual ratios (of E85 and total FFV use) by "vehicle miles traveled" (VMT) weighting factors developed from EPA's MOVES model.

FFV sales by car and LDT, FFV vehicle stock by car and LDT, and E85 fuel consumption and total fuel consumption by FFVs from AEO2019 are shown in Attachment 1. Also shown in the attachment is the annual ratio of E85 to total FFV fuel use. Figure 1 shows this ratio between the 2017 and 2050 calendar years. The ratio climbs to 30.97% by 2038 (and thereafter declines somewhat).

EIA's projections of ethanol used in E85 increase from 0.03 quads in 2019 to 0.09 quads by 2025, while total ethanol volumes are relatively flat over that time period (shown in Attachment 2). EIA projects ethanol used in E85 to continue to increase to 0.17 quads by 2038.

Travel fractions by age from MOVES2014 are shown in Figure 2. These travel fractions are shown for two periods – 15 years and 20 years.[19] Since most of the FFVs are LDTs, this analysis has applied the MOVES LDT travel fractions by age to both cars and LDTs.

Using the annual ratios of E85 to total FFV fuel use and the travel fractions, the resulting model year specific "F" factors are shown in Figure 3.[20] The 20-year results are comparable to EPA's results for 2016-2018. The "F" factor is approximately 17% for model year 2019 and climbs to 24% by model year 2025. Although EPA used a 15-year period in their prior analysis of the "F" factor, data supports using a 20-year assumed vehicle life, which yields a slightly higher "F" factor in the early years of this range of model years (as shown in Figure 3).

[17] Annual Energy Outlook 2019, With Projections to 2050, January 24, 2019, https://www.eia.gov/outlooks/aeo/.
[18] See Tables 37 and 38 in AEO2019, https://www.eia.gov/outlooks/aeo/tables_ref.php.
[19] In each case, the travel fractions add to 100%.
[20] The travel fractions are multiplied by the annual "F" factors and summed over each period of analysis. For example, for 2016 model year vehicles, the 2016 annual "F" factor is multiplied by the age 0 travel fraction, the 2017 annual "F" factor is multiplied by the age 1 travel fraction, and so on, until the end of period is reached.

Figure 1

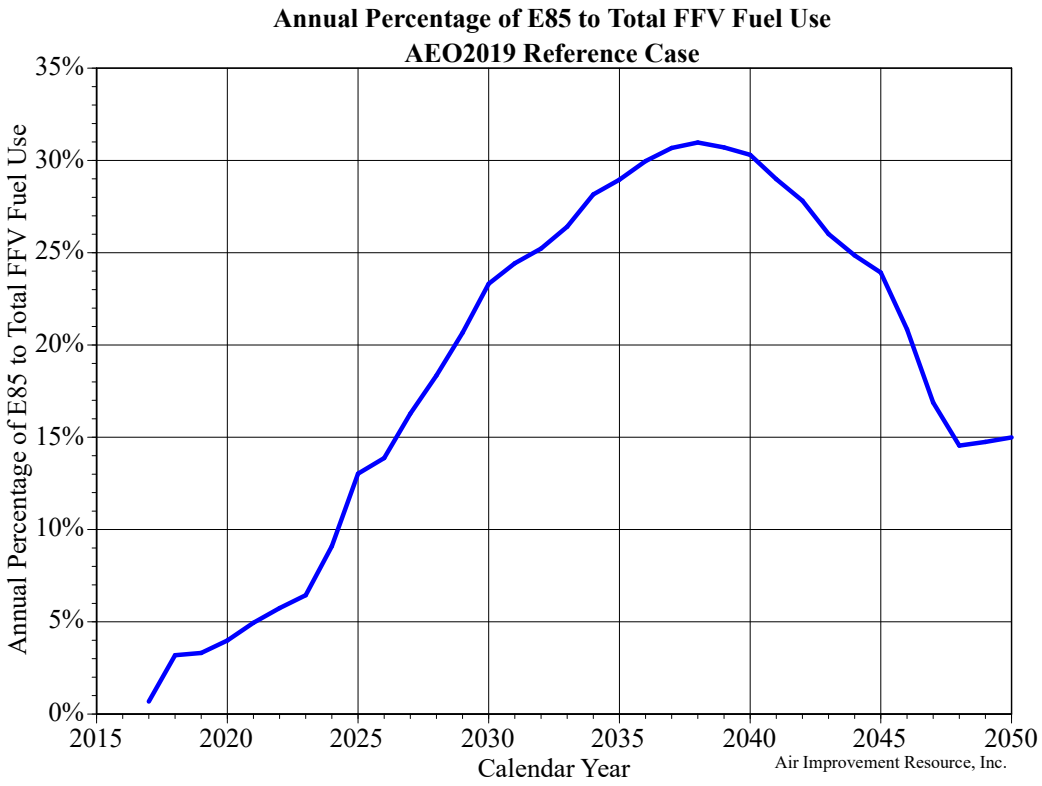

Annual Percentage of E85 to Total FFV Fuel Use
AEO2019 Reference Case
Annual Percentage of E85 to Total FFV Fuel Use
35%
30%
25%
20%
15%
10%
5%
0%
2015
2020
2025
2030
2035
2040
2045
2050
Calendar Year
Air Improvement Resource, Inc.

Figure 2

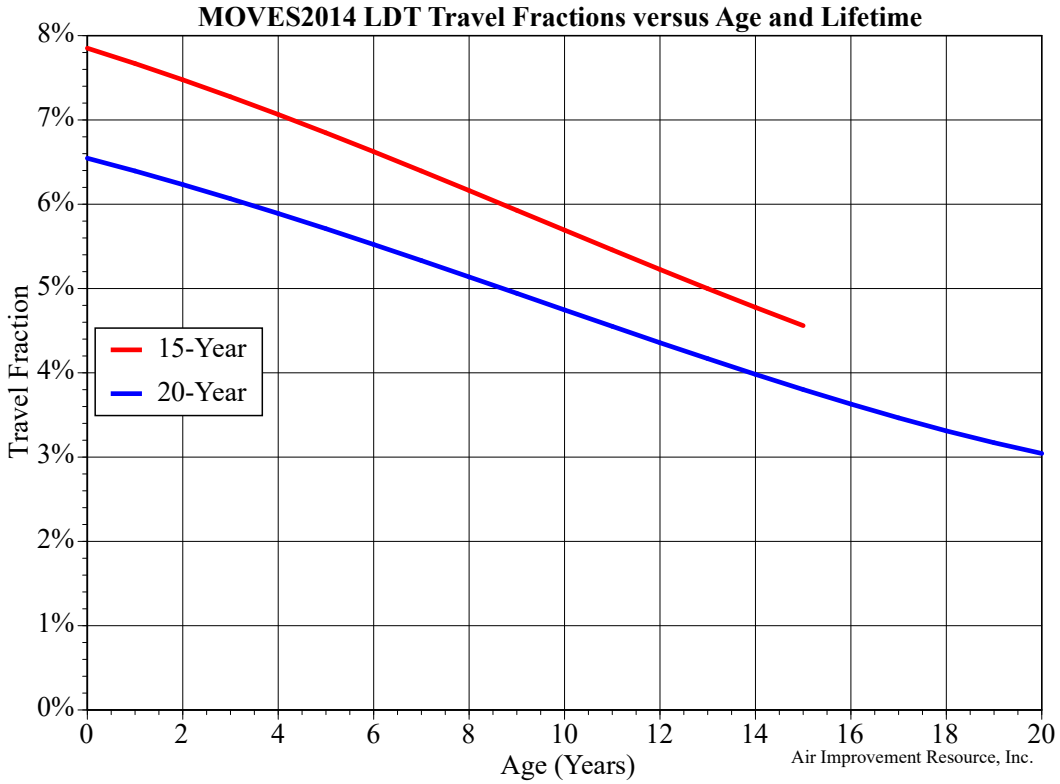
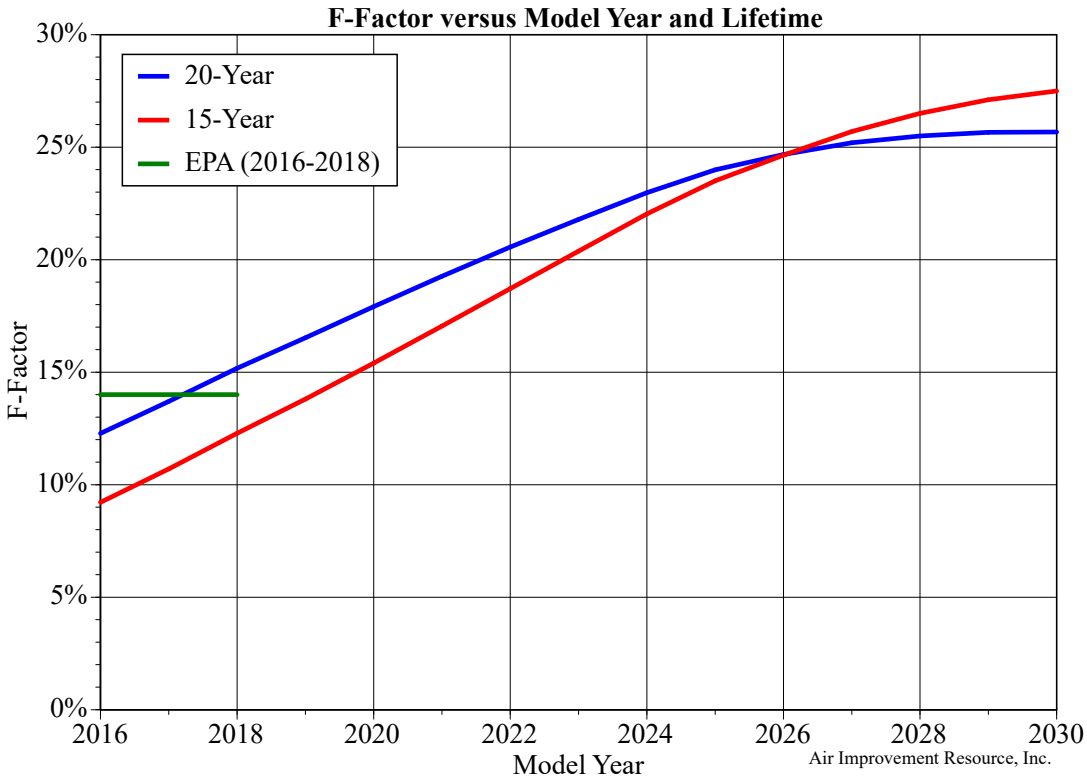


Figure 3



Attachment 1

AEO2019 Reference Case

Calendar Year	LDV Energy Consumption and Ratio of E85 to Total FFV Energy Use (Trillion Btu)			FFV Stock (Millions)			FFV Sales (Millions)		
	FFV	E85	Ratio E85/FFV Btu	Car	LDT	Total	Car	LDT	Total
2017	1,349.82	9.16	0.68%	4.81	14.63	19.44	0.233	0.689	0.922
2018	1,347.08	43.01	3.19%	4.93	14.80	19.73	0.221	0.665	0.886
2019	1,336.71	44.30	3.31%	5.02	14.93	19.95	0.213	0.663	0.876
2020	1,315.39	52.47	3.99%	5.09	15.00	20.09	0.210	0.651	0.861
2021	1,284.24	63.49	4.94%	5.13	15.01	20.14	0.207	0.647	0.855
2022	1,246.10	71.58	5.74%	5.15	14.94	20.08	0.203	0.628	0.831
2023	1,201.55	77.36	6.44%	5.14	14.81	19.95	0.204	0.623	0.827
2024	1,152.75	104.88	9.10%	5.11	14.63	19.74	0.206	0.616	0.821
2025	1,101.25	143.48	13.03%	5.06	14.40	19.46	0.207	0.609	0.816
2026	1,054.70	146.33	13.87%	4.98	14.15	19.13	0.209	0.608	0.817
2027	1,011.92	164.74	16.28%	4.89	13.90	18.79	0.218	0.616	0.834
2028	974.38	178.72	18.34%	4.79	13.68	18.46	0.231	0.641	0.872
2029	940.43	194.29	20.66%	4.69	13.48	18.17	0.244	0.655	0.899
2030	912.84	212.84	23.32%	4.60	13.33	17.94	0.260	0.689	0.949
2031	888.57	217.03	24.42%	4.54	13.21	17.75	0.270	0.698	0.968
2032	867.10	218.71	25.22%	4.49	13.09	17.58	0.274	0.697	0.972
2033	848.79	224.13	26.41%	4.46	12.99	17.45	0.282	0.707	0.989
2034	834.81	235.04	28.16%	4.45	12.93	17.38	0.293	0.728	1.021
2035	823.52	238.42	28.95%	4.47	12.88	17.35	0.297	0.730	1.027
2036	816.88	244.75	29.96%	4.50	12.85	17.35	0.302	0.733	1.035
2037	813.80	249.61	30.67%	4.55	12.85	17.40	0.306	0.738	1.043
2038	812.58	251.69	30.97%	4.61	12.86	17.47	0.307	0.734	1.041
2039	812.27	249.42	30.71%	4.67	12.87	17.55	0.304	0.719	1.023
2040	812.24	246.15	30.30%	4.74	12.88	17.62	0.301	0.703	1.004
2041	810.74	234.97	28.98%	4.80	12.87	17.67	0.293	0.676	0.969
2042	807.79	224.71	27.82%	4.85	12.83	17.68	0.285	0.648	0.933
2043	802.88	208.84	26.01%	4.88	12.76	17.64	0.274	0.615	0.889
2044	796.79	198.04	24.86%	4.91	12.66	17.57	0.268	0.597	0.865
2045	789.39	188.87	23.93%	4.92	12.55	17.47	0.262	0.579	0.842
2046	779.06	162.44	20.85%	4.91	12.39	17.30	0.246	0.538	0.785
2047	767.76	129.59	16.88%	4.89	12.21	17.10	0.238	0.519	0.757
2048	756.14	109.99	14.55%	4.86	12.02	16.88	0.234	0.510	0.744
2049	744.94	109.86	14.75%	4.83	11.83	16.65	0.233	0.508	0.742
2050	734.04	110.02	14.99%	4.78	11.63	16.42	0.232	0.507	0.739

Attachment 2

AEO2019 Reference Case				
Calendar Year	Quadrillion BTU			Billion Gallons
	Ethanol Used in E85	Ethanol Used in Gasoline Blending	Total	Ethanol
2017	0.01	1.19	1.20	12.60
2018	0.03	1.16	1.19	12.50
2019	0.03	1.17	1.19	12.56
2020	0.03	1.16	1.19	12.58
2021	0.04	1.15	1.19	12.50
2022	0.04	1.14	1.18	12.46
2023	0.05	1.13	1.18	12.39
2024	0.07	1.10	1.17	12.31
2025	0.09	1.08	1.17	12.28
2026	0.09	1.06	1.15	12.09
2027	0.10	1.04	1.14	12.02
2028	0.11	1.02	1.13	11.94
2029	0.12	1.00	1.13	11.85
2030	0.14	0.98	1.12	11.78
2031	0.14	0.97	1.11	11.67
2032	0.14	0.95	1.09	11.50
2033	0.15	0.93	1.08	11.35
2034	0.15	0.92	1.07	11.31
2035	0.16	0.91	1.07	11.26
2036	0.16	0.91	1.07	11.25
2037	0.16	0.91	1.07	11.26
2038	0.17	0.91	1.07	11.28
2039	0.16	0.91	1.07	11.29
2040	0.16	0.91	1.07	11.31
2041	0.15	0.92	1.07	11.31
2042	0.15	0.93	1.08	11.33
2043	0.14	0.94	1.08	11.34
2044	0.13	0.96	1.09	11.45
2045	0.12	0.98	1.10	11.62
2046	0.11	1.00	1.10	11.62
2047	0.09	1.02	1.10	11.62
2048	0.07	1.04	1.11	11.70
2049	0.07	1.06	1.13	11.90
2050	0.07	1.06	1.13	11.94