Economics of Blending 10 Percent Corn Ethanol into Gasoline

United States Environmental Protection Agency

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Assessment and Standards Division
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Abstract

The increase in ethanol blended into U.S. gasoline is often attributed to the Renewable Fuels Program (RFS), however, other factors such as rising gasoline prices and the phase-out of MTBE were also factors driving ethanol demand at the same time that the RFS program was being implemented. This study conducts a detailed evaluation of ethanol's blending cost into E10 gasoline, including octane and volatility costs, production cost and spot prices, distribution costs, and federal and state subsidies, while omitting RIN values, to assess whether ethanol would have been economical to blend into gasoline regardless of the RFS program. Based on this analysis, economic factors alone were sufficient to cause the observed growth in ethanol use.

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Key Words

Renewable Fuels Standard
Ethanol Blending Cost
Ethanol Blending Value
Splash-Blending
Match-Blending
Blendwall
Octane Value

Introduction

Congress passed the Energy Policy Act of 2005 and Energy Independence and Security Act of 2007, which directed the Environmental Protection Agency (EPA) to expand the use of renewable fuels.[1] [2] EPA subsequently promulgated the Renewable Fuels Standard (RFS1 and RFS2) rulemakings which specified minimal renewable fuel volumes starting in 2006 (EPA 2007, EPA 2010). Some analyses have concluded that the RFS program forced ethanol into the gasoline pool causing an increase in gasoline prices and causing large increases in ethanol prices (GAO 2019; Christiane 2017). Another study attributed higher corn prices to the increased corn demand for corn ethanol production and concluded that these changes will increase the number of people at risk of hunger and poverty (Condon 2015). A second study also found that the increased corn demand for ethanol production increased corn prices, although for the most part, increased corn production satisfied corn ethanol plant corn demand rather than compete for food production (Wallander 2011).

Other studies have researched a wide range of environmental impacts associated with the increased use of corn ethanol. For example, life cycle analyses of corn ethawnol have estimated GHG emission reductions which ranged from 21 to potentially over 50 percent when compared to gasoline sourced from petroleum (Flugge 2017; Mueller 2016; CARB 2020). Others who have evaluated corn ethanol argue that when reviewed in total, including impacts on land use and biodiversity and increased water use and runoff pollution, ethanol does not provide a net positive environmental impact (Stecker 2014, Wardle 2018).

Several observations and past analyses of ethanol blending economics concluded that while increased corn ethanol use may have been controversial and may have led to many of these outcomes, it is unlikely that the RFS program caused this increased use of corn ethanol. The volume of corn ethanol blended into gasoline exceeded the RFS standards through 2012. In addition, despite small refineries being granted RFS exemptions, the gasoline produced by these small refineries receiving the exemptions still was blended with ethanol at 10 volume percent. These observations suggest that the RFS program was not binding during the rapid increase in ethanol consumption from 2004-2013. The economics of producing and using renewable fuels was evaluated by several analysts using the combination of an existing world model and a second model dedicated to the US market (Abbott 2008; Taheripour 2022). These analysts concluded that while economic factors were mostly responsible for causing the increase the increased blending of corn ethanol up to the E10 blendwall, the RFS program also played a role, despite the fact that very low Renewable Identification Numbers (RIN) prices suggested that the RFS program was not binding. A separate study of the RFS program in 2013 and 2014 based its review solely on RIN prices, however, since the RFS volume requirements exceeded the volume of ethanol that could be blended as E10 beginning in 2013, RIN prices have reflected the higher blending costs of higher ethanol blends and biodiesel/renewable diesel fuel, not ethanol's use as E10 (Stock 2015).

To shed light on this discussion, a retrospective and prospective ethanol blending cost analysis was conducted based on actual price data (retrospective) and projections (prospective) to assess the relative economics of blending corn ethanol into gasoline as a function of the key relevant economic factors, omitting the financial impacts of renewable Identification number (RIN) prices, to assess whether the RFS rulemakings or other economic factors led to the increase in blending of corn ethanol. A second analysis was conducted to evaluate the profitability of corn ethanol production to better understand the

[1] Energy Policy Act of 2005, https://www.congress.gov/bill/109th-congress/house-bill/6.
[2] Energy Independence and Security Act of 2007, https://www.congress.gov/bill/110th-congress/house-bill/6.

economic incentives that existed to expand corn ethanol plant capacity. This paper summarizes this corn ethanol blending cost and ethanol production profitability analyses for 10 percent ethanol blends.

The conclusions reached from this analysis have important implications for multiple issues associated with the Renewable Fuels Program. For that reason, the report and the underlying analysis which the report is based on were subjected to three independent peer reviews. The peer reviewers largely supported the analysis and associated draft report, but they also contributed to some minor improvements to the report, although the principal report conclusions remain unchanged. The peer reviews and our analysis of those peer reviews are contained in the Appendix along with supporting information for of this report.

Methods

This retrospective corn ethanol economic blending analysis was conducted each year from 2000 to 2020 and only assessed the economics for blending or replacing ethanol at 10 volume percent. The most relevant period occurred from 2005 to 2013 when ethanol use in gasoline ramped up from low volumes to nationwide E10. An additional analysis was conducted for future years using projections for future year ethanol and gasoline prices. These analyses focus solely on the blending economics of corn ethanol, not cellulosic or sugar cane ethanol. In all cases the use of the term ethanol means denatured ethanol. All prices are reported in nominal dollars.

Ethanol Blending Economics Equation

A number of key factors must be considered when evaluating the relative economics of blending corn ethanol into gasoline. These factors depend on the point in the ethanol production and distribution system at which the economics of ethanol and gasoline are compared, the type of gasoline the ethanol is blended into, the season or year, and tax policies. Since ethanol is blended into gasoline at the gasoline distribution terminal, it is most straightforward to consider those factors that come into play at that point. From that vantage point, the relative economics of blending ethanol into gasoline, or value of replacing ethanol in gasoline with other components, can be summarized by the equation below. This equation allows us to break down these factors by year, by state and by gasoline type, enabling a detailed assessment of the relative blending economics of corn ethanol to gasoline over time and by location. If the resulting ethanol blending cost is less than zero it is assumed to be cost-effective to blend ethanol. Gasoline is marketed based on volume, not energy content. E10 gasoline contains about 3% less energy content than E0 gasoline, and the cost of lower energy dense gasoline is paid by consumers through lower fuel economy and more frequent refueling. Since this small change in energy content is largely imperceptible to consumers, refiners are able to price ethanol based on its volume (unlike E85 which must be priced lower at retail due to its lower energy density). Thus, energy density is not a factor in this blending cost equation for E10.

Ethanol Blending Cost Equation:

EBC = (ESP + EDC – ERV – FETS – SETS) - GTP

Where EBC is ethanol blending cost; ESP is ethanol plant gate spot price; EDC is ethanol distribution cost; ERV is ethanol replacement value; FETS is federal ethanol tax subsidy; SETS is state ethanol tax subsidy; and GTP is gasoline terminal price; all are in dollars per gallon.

The terms used in the equation are defined as:

Ethanol Plant Gate Spot Price (ESP) – The United States Department of Agriculture (USDA) collects corn ethanol plant gate pricing data which is the price paid to corn ethanol producers when they sell their ethanol.[3] This spot price generally represents the production cost for corn ethanol plus some profit margin. It also captures price anomalies associated with market factors, such as high demand relative to supply, which could increase the price above the production cost and would factor into real-time decisions of whether to blend ethanol. Ethanol's spot prices over the analysis period ranged from $1.12 to $2.70 per gallon and tended to be higher when crude oil prices were high.

Ethanol Distribution Cost (EDC) – This factor represents the added cost of moving the corn ethanol from the production plants to gasoline distribution terminals, reflecting its different modes of transport. Because corn ethanol is primarily produced in the Midwest and distributed longer distances to the rest of the country, the terminal price of corn ethanol is usually lower in the Midwest than other parts of the country. Ethanol distribution costs were estimated for EPA on a regional basis, and these costs were interpolated or extrapolated to estimate the costs on a state-by-state basis (ICF 2018). Additional per-gallon capital costs of up to 6.5 cents per gallon (c/gal) were added through 2014 to account for building the ethanol distribution infrastructure (EPA 2010). Ethanol's estimated distribution costs ranged from 11 c/gal in the Midwest to 29 c/gal when moved to the furthest distances to the U.S. East and West coast, and nearly 51 c/gal when shipped to Alaska and Hawaii.

Ethanol Replacement Value (ERV) – Ethanol has properties which provide value (primarily octane) or cost (vapor pressure impacts) when it is blended into gasoline. We use the term "ethanol replacement value" to refer to the sum of the costs due to these properties, including properties that increase and decrease ethanol's blending value. Depending on where and when the ethanol is used, the ethanol blending value is an important consideration when gasoline production is modified to take into account the subsequent addition, or potential removal, of ethanol. For the early years covered by this analysis ethanol was "splash-blended" into conventional gasoline, meaning that terminals blended the ethanol into already finished gasoline. This resulted in the final blend being higher than the minimum octane requirements. This also resulted in a nominal 1 psi Reid Vapor Pressure (RVP) increase in the resulting ethanol-gasoline blend which must be offset by blending the ethanol into lower vapor pressure gasoline in some seasons and regions, increasing refining costs. When ethanol is splash-blended into gasoline, ethanol's blending value does not apply.

Essentially all E10 blending in the U.S. now occurs by "match-blending" where the base gasoline is modified to account for the subsequent addition of ethanol. In this case ethanol's blending value is important. When ethanol is being blended into reformulated gasoline (RFG), the refiner produces a blendstock (called a Reformulated Blendstock for Oxygenate Blending or RBOB) which has both a lower

[3] USDA Economic Research Service; US Bioenergy Statistics. 2019. Table 14 Fuel ethanol, corn and gasoline prices by month.

octane and lower RVP tailored to still meet the RFG standards after the addition of ethanol. This has been typical for ethanol-blended RFG since the mid-1990s. As ethanol's use expanded into the conventional gasoline market, a similar match-blending process began to be used there as well, replacing splash-blending. A Conventional Blendstock for Oxygenate Blending (CBOB) is now produced by refiners for match-blending with ethanol to make conventional gasoline. Conventional gasoline is now also adjusted to account for ethanol's octane, but unlike RFG, most is not adjusted for RVP due to an RVP waiver provided for ethanol blends in most locations. When RBOB and CBOB are produced, the refiner makes the decision that ethanol will be blended into their gasoline since the BOBs cannot be sold as gasoline without adding 10 percent ethanol, but the ethanol is still blended into the gasoline at the terminal. It is likely that refiners base their decision on producing BOBs based on the economics of producing finished gasoline at terminals. In the case of such match blends, the economic value of ethanol relative to gasoline includes a consideration of not only its value on a volumetric basis as a substitute for gasoline volume, but also the blending value of ethanol resulting from its higher octane, low sulfur and benzene, and in some cases, its impact on volatility.

Ethanol's full value is best reflected by the cost associated with meeting all of the gasoline standards and requirements through some means other than blending ethanol, including any capital costs to produce ethanol's replacements. To assess this, ICF conducted refinery modeling for EPA for removing ethanol from the gasoline pool (ICF 2019). After aggregating the ICF refinery cost modeling output, ethanol's replacement cost in regular grade conventional and reformulated gasoline is estimated to be 100 to 165 c/gal to refiners in the summer and 51 to 67 c/gal during the winter. The analysis results reported below rely on ethanol's replacement costs which applies to reformulated gasoline and conventional gasoline match-blended with ethanol.

The ethanol replacement costs were estimated based on ICF modeling of a certain set of conditions (year 2020 gasoline production with crude oil priced $72/bbl). The economics for replacing ethanol, however, would be expected to vary over time based on changing market factors such as the market value for RVP control costs, crude oil prices, and particularly the market value for octane. Since octane is ethanol's most valuable property, the ICF ethanol replacement cost results were adjusted for different years based on the historical premium-regular grade gasoline bulk price differential. It likely provides a reasonable estimate of how refiners would value ethanol's octane content over time.

However, as an alternative to using the octane price differential, crude oil price was also used to scale ethanol's replacement costs to different years, since in addition to replacing ethanol's octane, it is necessary to replace ethanol's volume. The ICF refinery modeling estimated that refineries may need to purchase and refine more crude oil for replacing ethanol with high octane replacements. While octane prices generally vary proportional to crude oil prices, in some years they do not, therefore, octane prices may not capture one aspect of the cost to replace ethanol.

Ethanol's RVP blending cost is estimated separately from ethanol's replacement cost. Crude oil prices were used to adjust ethanol's RVP blending cost in different years. In the case of summertime RFG, ethanol's RVP blending cost are added to ethanol's replacement cost.

For 2020, when gasoline demand decreased dramatically due to the COVID pandemic, the analysis used a much lower ethanol blending value based on its blending economics while blended into gasoline instead of its replacement values, which likely better represents ethanol's value in that year. This is discussed more below in the Results and Discussion section, and in the Supporting Information document in Appendix 1.

Federal and State Ethanol Tax Subsidies (FETS and SETS) – Various federal and state tax subsidies have been provided for the use of ethanol. These tax subsidies incentivize the blending of ethanol into the gasoline pool and directly impact the decision of whether to use ethanol. The federal tax subsidy was 54 c/gal at the start of the analysis period (2000) through 2004, decreased to 51 c/gal from 2005 to 2008, and decreased again to 45 c/gal from 2009 to 2011, after which it expired (Duffield 2015). Iowa and Illinois offer an ethanol blending subsidy of 25 and 29 c/gal, respectively.[4] California's Low Carbon Fuel Standard (LCFS) is estimated to provide corn ethanol a blending credit which began to take effect in 2012 at an estimated 4 c/gal, increasing to 33 c/gal in 2019.[5] [6] Several states also have ethanol use mandates which require the use of ethanol regardless of the economics for doing so.[7] These cannot be factored into this breakeven cost equation, but were accounted for in the overall analysis by including the ethanol volume in gasoline in these states regardless of the blending economics. Other federal and state subsidies such as ethanol production subsidies, loan guarantees, grants and any other subsidies, were not considered by this analysis.

Gasoline Terminal Price (GTP) – Gasoline spot prices were used to represent the economic value of gasoline to gasoline blenders. For this analysis we used refinery gasoline rack price data from the Energy Information Administration's (EIA) sales for resale category. Since this is terminal price data, it therefore would already include the distribution costs for moving the gasoline to downstream terminals.[8] This gasoline price data was collected by state and represents the average gasoline price for all the terminals in each state.[9] Gasoline prices ranged from $1 to $3/gallon over the years of this analysis. Gasoline volume data was also collected by state.

This paper provides an overview of the analysis; additional detail is provided in the Supporting Information in Appendix 1.

Volume/E10 Blend Rate Comparison to Actuals

This analysis estimates the total volume of ethanol which was economical to blend into gasoline in any year based on a simple assumption. If the ethanol blending cost is negative for any type of gasoline in any state, it means that it was cheaper to produce gasoline with 10 percent ethanol (E10) than it was to produce finished gasoline without ethanol and ethanol is assumed to be blended into this gasoline. The cumulative volume of ethanol economic to blend into gasoline is totaled and reported out as a percent of the total gasoline pool. If ethanol is less costly to blend than gasoline for the entire US gasoline based on its replacement cost, this analysis assumes that the E10 blendwall would be met based solely on ethanol blending economics ignoring the logistical challenges to produce or distribute this volume of ethanol in any given year.

This analysis provides a sense, based solely on blending economics, whether factors apart from the RFS program were driving increased ethanol use. This is achieved by comparing the volume of corn

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[4] States' Biofuels Statutory Citations; The National Agricultural Law Center; University of Arkansas, https://nationalaglawcenter.org/state-compilations/biofuels/

[5] California Air Resources Board (CARB), Fuel Pathway Table; LCFS Pathway Certified Carbon Intensities; https://ww2.arb.ca.gov/resources/documents/lcfs-pathway-certified-carbon-intensities; downloaded September 2020.

[6] Weekly LCFS Credit Transfer Activity Reports; California Air Resources Board; https://ww3.arb.ca.gov/fuels/lcfs/credit/lrtweeklycreditreports.htm; downloaded September 2020.

[7] States' Biofuels Statutory Citations; The National Agricultural Law Center; https://nationalaglawcenter.org/state-compilations/biofuels/

[8] Energy Information Administration; Spot Prices; https://www.eia.gov/dnav/pet/pet_pri_spt_s1_a.htm

[9] Energy Information Administration; Prime Supplier Sales Volume; https://www.eia.gov/dnav/pet/pet_cons_prim_dcu_nus_m.htm.

ethanol, which this analysis estimates is cost-effective to blend into gasoline, to the actual volume of ethanol blended into US gasoline in that same year as reported by the Energy Information Administration.[10] The economic "drive" to expand ethanol blending is evaluated by reporting out the marginal ethanol blending cost at the actual ethanol consumption volume.

Corn Ethanol Production Costs

While spot prices typically provide the best information as inputs into the ethanol blending cost equation, they do not indicate the profitability associated with producing the ethanol. When ethanol spot prices are high and production costs are low, it would result in significant ethanol production profit margins and create an incentive for its increased production and use. This will be apparent in our discussion of the results of the analysis contained in the Results and Discussion section. Therefore, we also benchmarked ethanol production costs against ethanol spot prices to assess the likely profitability of ethanol production over the time frame of this analysis.

To estimate the year-by-year corn ethanol production costs, the corn, corn oil, DDGS prices and utility prices were obtained for each year from 2000 to 2018.[11] [12] [13] [14] [15] Information for corn ethanol plant feedstock and utilities inputs and production output was obtained for two different years, 2006 and 2016 (EPA 2010; Mueller 2013; Irwin 2018). The amount of ethanol produced per bushel of corn increased, and the natural gas and electricity demand decreased, between 2006 and 2016, and these differences are interpolated and extrapolated to all years of the analysis.

The corn ethanol production cost for each year of this analysis was based on a typical sized, 76 million gallon per year, dry mill plant. The corn ethanol production cost analysis did not consider the differences in plant sizes or configuration, nor did it consider how corn ethanol plant sizes may have changed over time. Today, corn ethanol plant capacities range from 10 to 300 million gallons per year. Thus, this corn ethanol plant production cost analysis may not exactly represent the average production costs of corn ethanol plants in each year, nor would it capture the range in production costs, but it does provide a typical production cost which serves as a benchmark against corn ethanol plant gate spot prices.

While corn ethanol plant managers may expect to receive a profit margin above the operating and capital costs estimated for these plants, this potential additional charge was not included in this analysis. Conversely, this corn ethanol production cost analysis assumes that capital cost charges continue indefinitely, however after several years to pay back loans to build the plants, the capital charge that could occur to replace failing equipment may be reduced, perhaps significantly.

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[10] Fuel Ethanol Overview: Ethanol Consumption; Alternative Transportation Fuels; Renewable and Alternative Fuels, Energy Information Administration; https://www.eia.gov/totalenergy/data/monthly/pdf/sec10_7.pdf

[11] Energy Information Administration United States Industrial Natural Gas Prices. https://www.eia.gov/dnav/ng/ng_pri_sum_a_EPG0_PIN_DMcf_a.htm

[12] Energy Information Administration, United States Industrial Electricity Prices; Electricity Data Browser; https://www.eia.gov/electricity/data/browser/#/topic/7?agg=1,0&geo=vvvvvvvvvvvvo&endsec=2&freq=A&start=2001&end=2019&ctype=linechart&ltype=pin&rtype=s&pin=&rse=0&maptype=0

[13] USDA Economic Research Service; US Bioenergy Statistics; Table 14 Fuel ethanol, corn and gasoline prices by month; December 2019. https://www.ers.usda.gov/data-products/us-bioenergy-statistics/

[14] USDA Economic Research Service; Feed Grains Database: Custom Query Results; DDGS; https://data.ers.usda.gov/FEED-GRAINS-custom-query.aspx#ResultsPanel

[15] USDA Economic Research Service; Oil Crops – all Tables; Table 32; https://www.ers.usda.gov/data-products/oil-crops-yearbook.aspx.

Results and Discussion

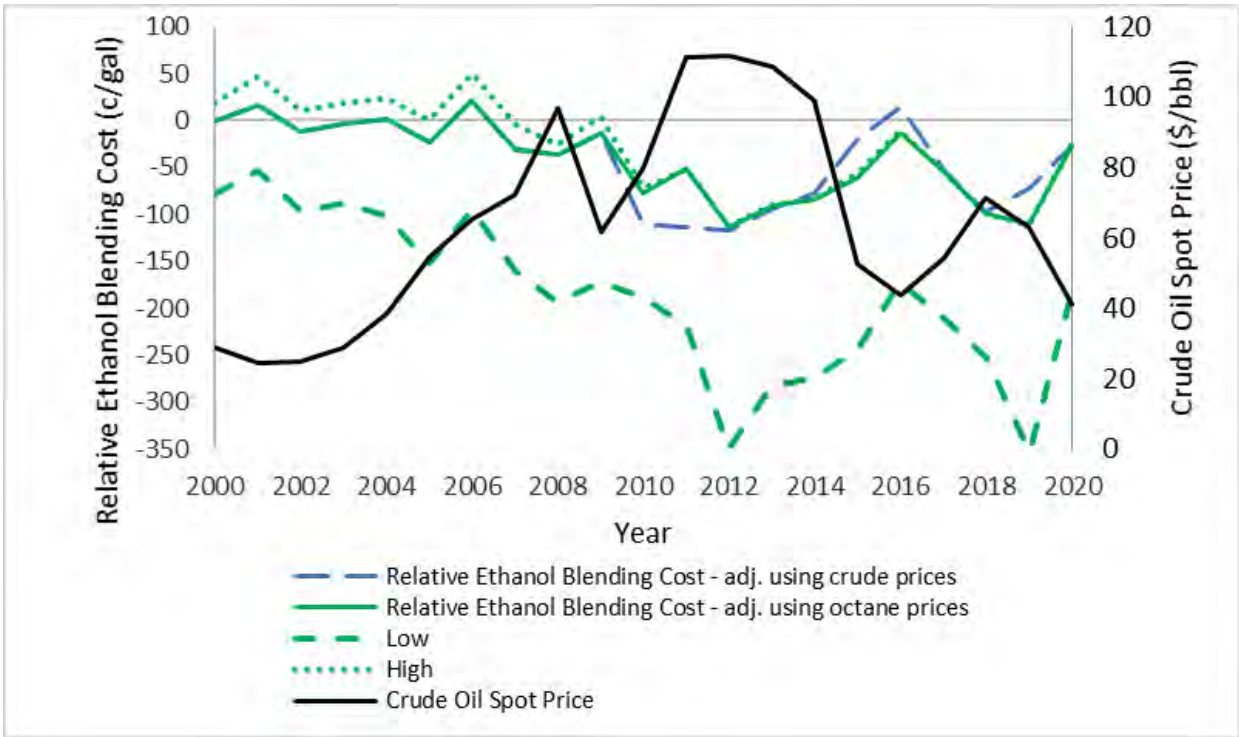
The spot prices and volume information, the ethanol subsidies and state mandates and blending values were applied using the Ethanol Blending Cost equation to estimate relative value of blending ethanol into gasoline for each year analyzed on a volumetric basis. While E10 gasoline contains about 3% less energy content than E0 gasoline, this small change in energy content is largely imperceptible to consumers and is not reflected in retail pricing.

The analysis is performed on a state-by-state basis for different gasoline types, for both summer and winter periods to derive an ethanol blending cost curve to identify the range in ethanol blending economics across the country, and to find the breakeven cost point with gasoline. The analysis first analyzes ethanol's historical blending economics and resulting projected use over the years 2000 to 2020, comparing its use to actual consumption. Then using projected ethanol and gasoline spot prices and projected ethanol production costs, the analysis assesses the ethanol's future blending economics and use.

Historical Ethanol Blending Economics

The results of the analysis are shown in the figures below. In Figure 1 ethanol's blending cost into gasoline is shown along with crude oil prices. Ethanol's blending cost is shown as a range with the most expensive market for blending ethanol shown by the top green dotted line, the least expensive market for blending ethanol shown by the bottom green dashed line. The green solid line indicates ethanol's marginal blending cost at the average volume of ethanol being blended into gasoline that year – the various solid and dashed green lines were generated by scaling ethanol's replacement cost with octane costs, while the line indicated by long blue dashes used crude oil prices to scale ethanol replacement costs. Figure 2 repeats ethanol's marginal blending cost, although eliminating the minimums and maximums, and adds the percent of E10 blendwall based on the cumulative volume of ethanol when ethanol's estimated marginal cost equals that of gasoline. Figure 2 also depicts the actual percent of E10 blendwall based on actual ethanol consumption volumes, as well as the percent of E10 blendwall mandated by the RFS volume standards.

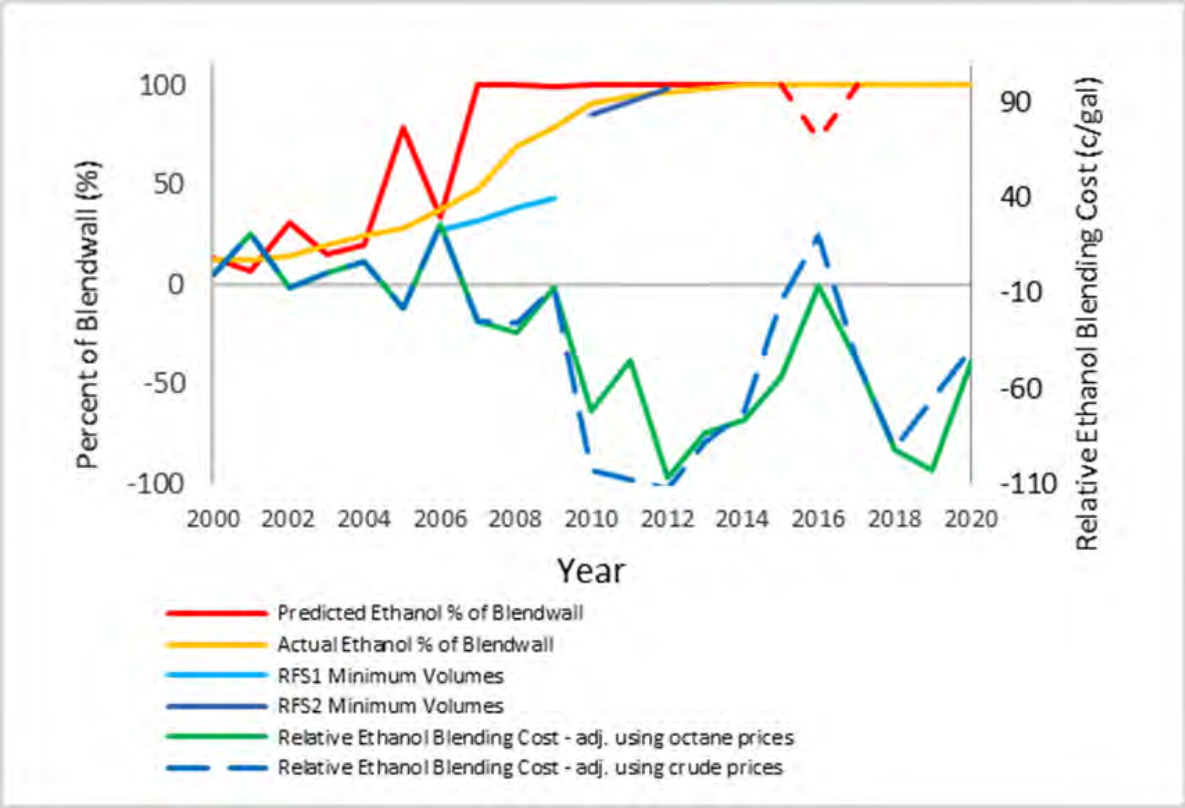
Figure 1 Ethanol blending cost and crude oil prices



For the most part, ethanol's marginal blending cost was near parity with gasoline over the years 2000 to 2004, which indicates a fairly stable corn ethanol market for the volumes being blended at that time. In many states, it was economical to blend ethanol even earlier and throughout most of the modeled period. However, as crude oil prices rose, ethanol's blending cost dropped to 15 to 30 c/gal below gasoline from 2005 to 2008. As the relative ethanol blending cost dropped, the modeled E10 percent of blendwall results show that the use of E10 would have been expected to expand to additional parts of the country, potentially reaching 100% by 2007 reflecting its favorable blending economics. The actual E10 percent of blendwall in the marketplace followed this upward trend, but lagged behind as would be expected due to logistical constraints. Considerable investment, and time to execute that investment, was required to build out ethanol production capacity, the means to distribute the additional ethanol and the ethanol storage and blending capacity at terminals across the country. Supported by the favorable blending economics, and despite the logistical inertia, Figure 2 indicates that the market preceded and exceeded the RFS1 and RFS2 requirements until 2013 when the volume of ethanol reached and began to exceed the E10 blendwall. For example, in 2008 the relative ethanol blending cost of -30 c/gal would have supported 100% use of E10 across the country and the market was able to achieve nearly 70%, well above the 40% required by RFS1. The results of this analysis therefore indicate that the RFS requirements were not binding up to the E10 blendwall. This conclusion is supported by the fact that up until 2013 when the E10 blendwall was reached, corn ethanol RIN values were low (lower than 5 c/gal for all years, except for 2009 when RIN prices increased up to 15 cents per gallon associated with lower crude oil prices. A top-down modeling study reached a mostly consistent conclusion that the RFS program was not binding during most of this period (Taheripour 2022). However, inconsistent with our study, that study estimated that the RFS caused 600 million gallons of corn ethanol to be blended into gasoline in 2011. The much more granular nature of our study

estimated the marginal blending value of ethanol in 2011 to be 80 cents per gallon cheaper than gasoline when accounting for all the factors affecting its relative value. One likely reason for this discrepancy between these two studies is that our study accounted for ethanol's replacement value, which was particularly high in 2011 due to a spike in octane prices greatly improving ethanol value as a gasoline blendstock.

Figure 2 Percent of E10 blendwall based on economics and relative ethanol blending cost



There is a notable deviation in the predicted ethanol percent of blendwall trend line in 2006 due to the phase-out of MTBE which warrants additional discussion. The phase out of MTBE played a key role in causing increased ethanol demand and likely impacted corn ethanol spot prices as shown below in Figure 3. The phase out of MTBE from the RFG pool occurred over the years from 2003 to 2006 due to the adoption of state MTBE bans, the end of the federal RFG oxygenate requirement, Congress' decision not to enact requested liability protections, and changing economic factors which favored blending ethanol over MTBE into gasoline (Lidderdale 2011). An analysis is provided in the Supporting Information which shows that as crude oil prices increased, federally subsidized ethanol would have become a lower cost gasoline blendstock than MTBE, so it is possible that ethanol would have replaced MTBE over time even without the MTBE bans and threats of litigation. All these factors resulted in the removal of MTBE from the U.S. gasoline pool, but did not mandate the addition of ethanol into RFG. However, the result was a *de facto* requirement for ethanol. With the suddenness at which MTBE needed to be removed and within the constraints of the RFG performance standards refiners could not make up the lost volume (11 volume percent) by increasing crude oil throughput or the lost octane from refinery operational changes to offset the removal of MTBE (see the Supporting Information and Response to Comments Documents in Appendix 1 and 2). For this reason, to continue to meet RFG

demand and the RFG regulations, RFG refiners needed to blend ethanol into their RFG, and rapidly built out ethanol blending capability (tankage, rail/truck offloading facilities, blending equipment, etc.) at gasoline terminals in RFG areas. The MTBE bans in Connecticut, New York and California took effect at the beginning of 2004 and likely contributed to the increase in ethanol blending in 2004, despite the slightly higher ethanol blending costs. Most of RFG switched from MTBE to ethanol in 2006, and this sudden change caused increased ethanol imports and drove up ethanol spot prices to the point that ethanol was priced at parity with gasoline despite its much lower production costs.

The period of very low crude oil prices (average of $43/bbl) in 2016 is also of significant interest. During this year the federal ethanol blending subsidy was no longer in place, although all refiners were now match-blending all their gasoline with ethanol, taking advantage of ethanol's high-octane value. Despite the large, sudden drop in crude oil prices, it was still generally more economical to blend ethanol than to replace it with any of the other petroleum-based alternatives, such as alkylate, reformate and isomerate. For this primary case, we adjusted ethanol replacement cost based on octane because the gasoline market highly valued octane value in 2016, despite very low crude oil prices. The alternative analysis which adjusted ethanol's replacement cost based on crude oil prices found that about 4 billion of the more than 14 billion gallons of ethanol being blended into gasoline would not have been economical to blend into gasoline. A separate study seemed to have reached a conclusion similar to our alternative case, finding that about 2 billion gallons of corn ethanol was not economical to blend in 2016 presumably due to the steep decline in crude oil prices. (Taheripour 2022).

Despite the drop of crude oil prices, and even if crude oil prices had dropped further in 2016 rendering ethanol less economical than its petroleum-based replacements in some gasoline markets, other factors would have caused refiners to continue to blend corn ethanol into their gasoline at 10 volume percent. Just as the decisions to start blending ethanol in earlier years required the expectation of it to be profitable over the long term and required time to materialize, the same is true when looking at 2016. To stop blending ethanol, nearly all refiners would likely have needed to invest in crude oil distillation, octane producing units, and other refinery unit expansions to accommodate the lost ethanol volume and octane (ICF 2019). These investments take time – at least a year for unit debottlenecking, and three or more years for greenfield plants, and even more time to recoup their investments. Refiners may have been able to simply turn up the severity of their existing reforming units to replace ethanol's octane, but this would further reduce gasoline volume compounding the lost ethanol volume, potentially making compliance with fuel quality standards difficult, and also lead to a shortfall in gasoline supply. To move away from E10 ethanol blending would require the expectation that the continued use of ethanol would be economically unfavorable for years to come to pay off these needed capital investments. Based on crude oil forecasts before and during this time period, crude oil prices were expected to be sufficiently high for the long term to allow ethanol to remain economical. For example, the reference case for EIA's AEO 2014 projected Brent crude oil prices to average above $90 per barrel for all future years modeled.

Even if refiners would have thought that crude oil prices would remain low, and ignoring the needed refinery investments and impact on gasoline supply, the logistical inertia of match-blending ethanol into gasoline would have kept ethanol into the gasoline pool for some time. Terminals are limited on the number of products they can store in their product storage tanks, thus, it is unlikely that they would have been able to handle both sub-octane BOBs and finished E0 gasoline. For this reason, entire gasoline markets would likely need to convert over to not using ethanol at the same time to enable the switchover from using ethanol. Such a significant changeover would take time to coordinate and most likely would not occur for what likely was perceived to be a relatively short term drop in crude oil prices. Thus, while refiners may have found that some corn ethanol may not have been economical

to blend into gasoline in 2016, other more critical factors likely ensured corn ethanol's continued use. For this reason, the predicted ethanol percent of blendwall curve in Figure 2 which shows ethanol being blended at 100% of the blendwall in 2016 is the expected result, despite the possibility that some refiners may have temporarily found ethanol to not have been economical to blend into their gasoline in the absence of the RFS program. The effect on the predicted ethanol percent of blendwall ethanol demand in 2016 based on adjusting ethanol replacement cost using crude prices and solely considering economics is also shown as a dashed line in Figure 2 - these assumptions show about 4 billion gallons less ethanol demand in 2016.

Another interesting year is 2020, the first year of the COVID pandemic when crude oil prices averaged in the low $40 per barrel range and gasoline demand dropped in 2020 by 12 percent. Refiners likely would have had adequate refinery unit capacity to replace both ethanol's volume and octane, and their situation would have provided a strong incentive for many refiners to remove E10 ethanol. However, our analysis found that E10 use continued to be economical for refiners to blend nonetheless. Competition among corn ethanol producers in a much smaller and now oversupplied gasoline market both domestically and internationally caused ethanol plant gate prices to fall well below their production costs – our estimate is that plant gate prices were 57 cents per gallon lower than their production costs in 2020. Consequently, even without the RFS program in place, we believe that the market prices for ethanol compared to gasoline would still have supported blending ethanol as E10 into gasoline. In commenting on the report and its underling analysis, two of the peer reviewers commented that the presence of the RFS program may have affected market prices and therefore affected our ability to reach the correct conclusions. After analyzing their comments, we believe that any bias caused by the RFS program on market prices would most likely cause our analysis to be conservative, further supporting our conclusions for all the years of our analysis. The one possible exception would be 2020. Because of how distorted the fuels market had become in that year, it is difficult to conclude with certainty how refiners would have reacted if the RFS program was not in place. However, as abnormal as 2020 was for the fuels industry, their economics returned to something much more close to normal in 2021.

Historical Ethanol Production Profitability

In addition to assessing whether it was economical over time for refiners to blend ethanol into gasoline, it is also important to understand whether it was economical for corn ethanol plants to produce ethanol, and invest in additional ethanol production capacity. Ethanol production economics were estimated by comparing year-by-year ethanol production costs for a typical sized corn ethanol plant to ethanol spot prices. When spot prices are higher than production costs producers are making a higher profit margin. High profit margins can be a signal of a supply shortfall which can entice producers to expand their production capacity. Figure 3 provides a plot of both estimated ethanol production costs and ethanol spot prices. Figure 3 also shows the existing corn ethanol plant capacity, and a total of existing plant capacity and plant capacity construction, as documented by the Renewable Fuels Association indicating the market's expectations of profitability in the future.

Figure 3 Corn ethanol production cost versus ethanol spot price and ethanol plant capacity

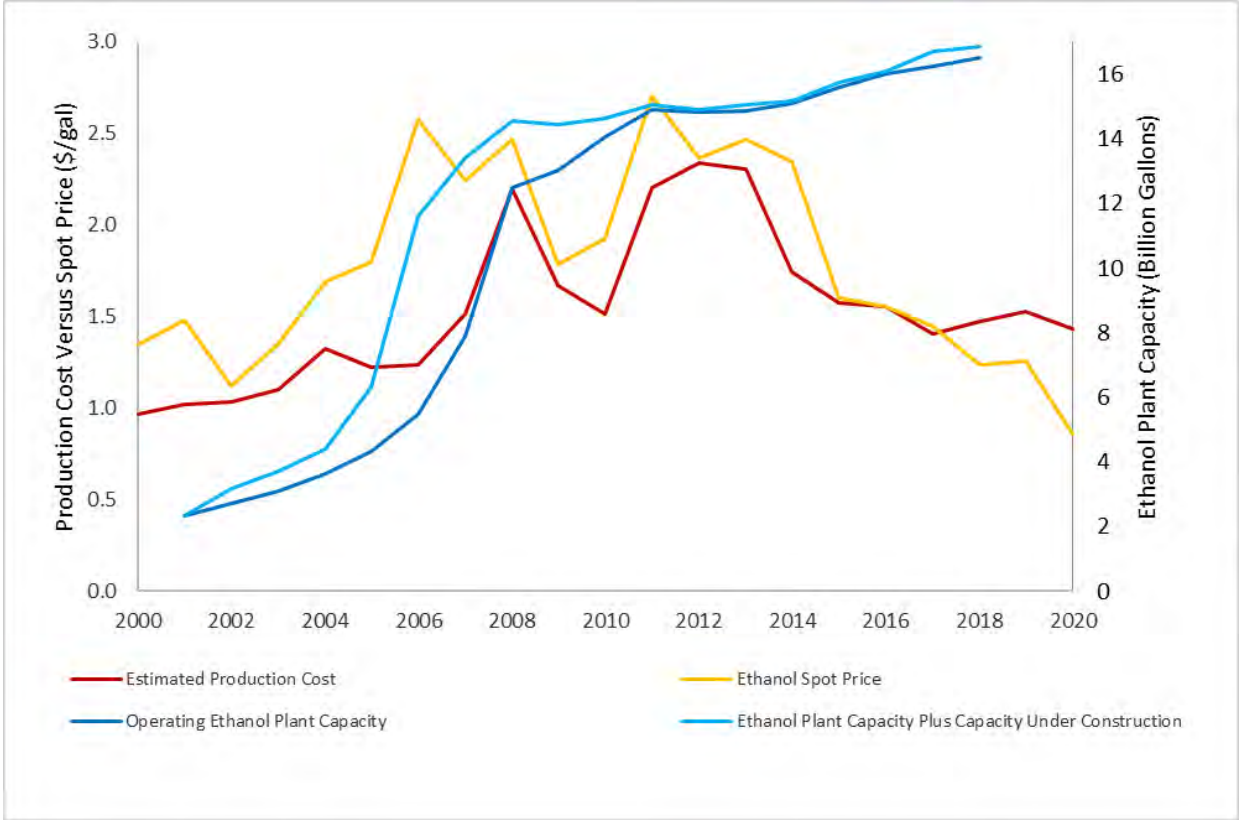


Figure 3 shows that for many years of the economic analysis, the ethanol spot price tracks the estimated corn ethanol production cost. However, there were some important deviations, such as the years 2005, 2006 and 2007. As stated above, this time period was associated the phase-out of MTBE which caused a step increase in the demand for ethanol. This drove up ethanol spot prices relative to the calculated production cost. At its peak in 2006, the profit margin for a typical corn ethanol plant exceeded $1 per gallon and averaged about 70 c/gal from 2004 to 2006. The total ethanol blending incentive to the fuels industry is the sum of ethanol's spot price above production cost and ethanol's blending cost. For example, in 2005, ethanol's spot price was about 50 c/gal above its estimated production cost, and ethanol's blending cost was about -20 c/gal – thus, the total ethanol blending incentive to the fuels industry was about 70 c/gal. It should come as no surprise that a tripling of new corn ethanol plant capacity occurred over this period. An average ethanol plant owner would have earned $173 million in profit over those three years. A similar sized greenfield corn ethanol plant was estimated to cost $114 million in 2006, thus, the payback period for a greenfield corn ethanol plant was less than 2 years.

During this period the refining industry also had a significant incentive to blend more ethanol as corn ethanol's marginal blending value was more than 20 c/gal less expensive than gasoline in 2005, 2007 and 2008. Refining net margins averaged about 7 c/gal over this period (EIA 2011), and ethanol's blending value alone would have accounted for about one quarter of this profit. Given the low ethanol blending cost and ethanol industry profitability, corn ethanol would likely have been blended up to the blendwall in a similar timeframe regardless of the RFS standards.

Other years of high profit margins for corn ethanol producers include 2010, 2011 and 2014. However, in these years corn ethanol production capacity was already nearing the E10 blendwall, which likely resulted in reduced investment in additional corn ethanol production facilities. Higher ethanol blends (E85 and E15) can be used above the E10 blendwall, although they are generally less economical than E10, and limited by the need for special retail equipment and vehicles that can use them. Production expansion that did occur in these later years supported growth in export volumes. It is beyond the scope of this paper to discuss the relative economics of higher ethanol blends or the export market.

The years 2015 through 2020 was another interesting time period for corn ethanol producers. This analysis suggested that a typical sized corn ethanol plant would not have had a profit margin in 2015 through 2017, and negative profit margins in 2018 and 2019 and even more negative profit margins in 2020. Two different analyses of the profitability of corn ethanol plants showed a similar profitability curve for corn ethanol plants (Irwin, 2019).[16] The Farmdoc author concluded that the reason for the lower corn ethanol plant margins in recent years has been the excess capacity and over production of corn ethanol in the U.S (Irwin, 2019). This analysis does not attempt to assess the ethanol supply-demand market for these more recent years. Thus, we cannot confirm or deny that author's assessment, but it seems reasonable.

Future Ethanol Blending Economics

Using future projections for corn ethanol and gasoline wholesale prices, the future blending economics of corn ethanol was assessed using the methodology described above. Both the Food and Agricultural Policy Research Institute (FAPRI) and the Energy Information Administration (EIA) project future ethanol plant gate spot prices and using them both is interesting because the two projections are quite different, particularly in the early years (FAPRI 2022, EIA 2022). Since FAPRI only projects prices out to 2026, this information was compiled through 2026 for both data sets. EIA's ethanol prices increase from $1.45 to $1.72 per gallon from 2021 to 2026, respectively, while FAPRI's ethanol prices start out higher at $2.43 per gallon and they decrease to $1.62 per gallon in 2026. Future gasoline prices are estimated by Energy Information Administration's AEO 2022 for 2021 through 2026 and are national average prices. The EIA projected national average gasoline price, after adjusting to nominal dollars, start out at $2.25 decreasing down to $1.90 per gallon in 2023, and increasing to $2.20 per gallon in 2026. For estimating future gasoline prices state-by-state and for each fuel type and season, all the state-by-state gasoline prices in any one year were adjusted from the 2018 gasoline prices using a value determined by the difference between the projected national average wholesale gasoline price in that year compared to a national average wholesale gasoline price in the year 2018. This maintained the state-by-state distribution of gasoline price estimates for each gasoline type in each season for the analysis.

Based on projected corn ethanol and gasoline prices by FAPRI and EIA, Figure 4 summarizes the projected corn ethanol blending costs at the blendwall for 2021 through 2026.

[16] Agricultural Marketing Resource Center (AgMRC); Prices and Profitability Models – Ethanol Profitability; Iowa State University; https://www.agmrc.org/renewable-energy/prices-and-profitability-models, downloaded September 2020.

Figure 4 Projected ethanol-gasoline cost difference at the blendwall

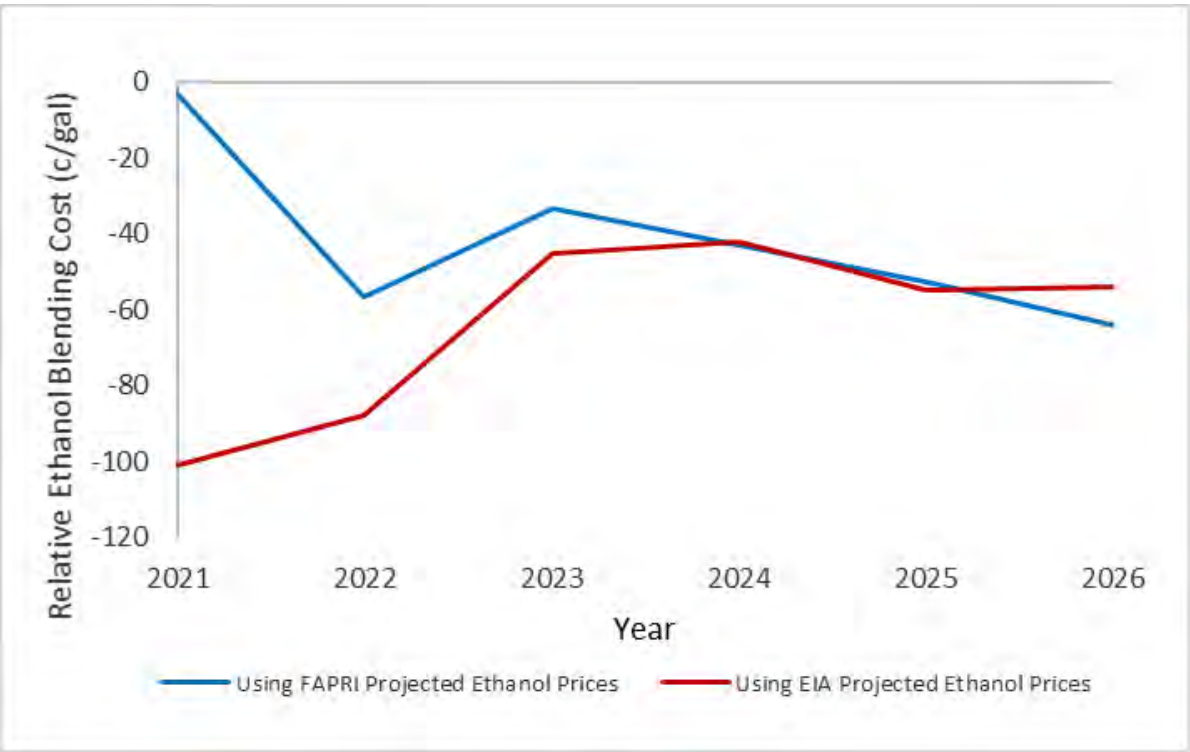


Figure 4 shows that corn ethanol would continue to be economical to blend up to the E10 blendwall. While still negative, ethanol's blending cost based on FAPRI's projected higher corn ethanol prices in 2021 approaches parity with gasoline.

Conclusions

After conducting this detailed, state-by-state, gasoline-specific analysis which factored in both economic and market drivers the following conclusions can be drawn:

- Economic and market factors alone were more than sufficient to drive the expansion of corn ethanol plants and increased blending of corn ethanol as E10 since the mid-2000s.

- Looking out into the future, the economic drivers are expected to remain sufficient to result in the continued nationwide blending of corn ethanol as E10 without any added incentive from the RFS program.

- If corn prices are priced more like their historical average, this analysis reveals that when crude oil prices decrease below about $40 per barrel, corn ethanol starts to become uneconomical to blend into parts of the nationwide gasoline pool.

- Even if crude oil were to decrease below $40 per barrel corn ethanol would remain economical in much of the country, especially in states with subsidies or in places closer to where it is produced in the Midwest.

- Even in those parts of the country where blending corn ethanol might be uneconomical, logistical hurdles would be expected to cause corn ethanol to continue to be blended into the gasoline pool despite a short-term period of poorer blending economics.

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Appendix 1 – Supporting Information

Appendix 1 contains supporting information for the technical report entitled "Economics of Blending 10 Percent Corn Ethanol into Gasoline."

A.1. Ethanol Plant Gate Spot Price

The ethanol plant gate spot price represents the price corn ethanol producers charge when they sell their ethanol. USDA collects monthly plant gate ethanol spot price data and reports this data in a report available to the public.[17] Unfortunately, there is no state-specific ethanol spot price data, so ethanol spot price data was gathered and assumed to represent the average of all the corn ethanol plants which are mainly located in the Midwest. The monthly data for each year was averaged together to develop annual average ethanol spot prices. Table A1 summarizes ethanol's annual average plant gate spot prices as reported by USDA.

Table A1. Ethanol Plant Gate Spot Prices

Year	Ethanol Spot Price ($/gal)
2000	1.35
2001	1.48
2002	1.12
2003	1.35
2004	1.69
2005	1.80
2006	2.58
2007	2.24
2008	2.47
2009	1.79
2010	1.93
2011	2.70
2012	2.37
2013	2.47
2014	2.34
2015	1.61
2016	1.55
2017	1.45
2018	1.23
2019	1.26
2020	0.86

[17] USDA Economic Research Service; US Bioenergy Statistics; Table 14 Fuel ethanol, corn and gasoline prices by month; July 2021.

A.2. Ethanol Distribution Costs

Ethanol distribution costs are the operating costs and capital charges for infrastructure needed to move the ethanol from the production facility to terminals. As part of an effort by ICF Incorporated under contract to EPA, ICF estimated ethanol distribution costs.[18] ICF estimated that the ethanol distribution costs are represented by the difference in plant gate spot prices and the downstream ethanol spot prices that are available from the marketplace for the years 2016 and 2017. For example, the spot price for ethanol was 23 cents per gallon higher in Los Angeles than the plant gate spot prices reported by USDA which would represent the distribution cost for moving the ethanol from the Midwest to Los Angeles. The Los Angeles price is at a unit train receiving terminal.

Once the ethanol is moved to a unit train or manifest train receiving terminal, there are many other terminals in these areas which must also receive the ethanol. Ethanol must then be moved either by truck or, if further away, by manifest rail, from the unit train receiving terminals to the other terminals. ICF estimated that, on average, that the further distribution of ethanol from these unit train receiving terminals to the rest of the terminals would cost an average of 11 cents per gallon. While the analysis conducted by ICF was by PADD, ICF provided some cost information by certain states of the PADDs and this information was used to estimate the distribution costs to individual states. Table A2 summarizes the distribution cost data summarized by the contractor.

Table A2. Contractor-Estimated Distribution Costs

Location		Distribution Cost to:			Total	
		Hub/Terminal (¢/g)		Blending		
		To	From	Terminal		
PADD	Area	Chicago	Chicago	(¢/g)	(¢/g)	($/b)
PADD 1	Florida/Tampa		17.8	11.0	35.8	15.0
	Southeast/Atlanta		11.7	11.0	29.7	12.5
	VA/DC/MD		9.7	11.0	27.7	11.6
	Pittsburgh		6.2	11.0	24.2	10.2
	New York		7.7	11.0	25.7	10.8
PADD 2	Chicago	7.0	0.0	11.0	18.0	7.6
	Tennessee		9.7	11.0	27.7	11.6
PADD 3	Dallas		4.5	11.0	22.5	9.5
PADD 4			6.2	11.0	24.2	10.2
PADD 5	Los Angeles		16.4	9.0	32.4	13.6
	Arizona		16.4	9.0	32.4	13.6
	Nevada		12.4	9.0	28.4	11.9
	Northwest		12.4	9.0	28.4	11.9

The distribution costs estimated by ICF was interpolated and extrapolated for this analysis to represent the distribution costs to individual states. Based on peer review comments, we removed the 7 c/gal cost for moving the ethanol to Chicago prior to loading the ethanol onto unit trains on the basis that most corn ethanol plants usually initiate unit trains from their own production facilities. Table A3 summarizes the estimated average ethanol distribution cost by groups of states which are estimated to have about the same corn ethanol distribution costs.

[18] Modeling a No-RFS Case; ICF Incorporated; Work Assignment 0,1-11, EPA contract EP-C-16-020; July 17, 2018.

Table A3. Average Ethanol Distribution Cost by State

Region	States	Average Ethanol Distribution Cost (c/gal)
PADD 1	New York, Pennsylvania, West Virginia	18.7
	District of Columbia, Connecticut, Delaware, Maryland, Massachusetts, New Jersey, Rhode Island, Virginia	20.7
	Georgia, South Carolina Vermont, New Hampshire, North Carolina	22.7
	Florida, Maine	28.8
PADD 2	Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, Ohio, South Dakota, Wisconsin	11.0
	Kentucky, North Dakota, Oklahoma, Tennessee	15.6
PADD 3	Arkansas, Louisiana, Mississippi, Texas	22.5
	Alabama, New Mexico	20.7
PADD 4	Colorado, Idaho, Montana, Utah, Wyoming	17.2
PADD 5	Oregon, Washington	21.4
	Arizona, California, Nevada	25.4
	Alaska, Hawaii	51.0

In addition to the freight costs for moving the ethanol from the midwest to different states, it is necessary to build out the infrastructure to make ethanol distribution possible. The infrastructure needs include rail cars, tank trucks, and barges for moving the ethanol, rail and marine receipt facilities for water transport, and storage tanks and blending equipment at terminals. The costs of these facilities were estimated for the 2010 RFS2 rulemaking.[19] These costs, based on 2007 dollars, were adjusted to 2017 dollars and amortized over the volume of gasoline modeled in the particular scenario modeled for RFS2. The scenario modeled in the RFS2 rulemaking was increasing ethanol consumption from 7.05 billion gallons of ethanol in 2010 to 22.2 billion gallons of ethanol in 2022. The E85 retail costs included in that analysis were omitted for this analysis. Table A4 summarizes the various infrastructure categories modeled, their

[19] Renewable Fuel Standard Program (RFS2) Regulatory Impact Analysis; Table 4.2-3; EPA-420-R-10-006; February 2010

estimated and adjusted costs, and the costs for amortizing the capital additions over the gasoline pool, which is 6.5 cents per gallon.[20]

Table A4. Capital Investments needed to Enable the Distribution of Ethanol

Distribution Infrastructure Type	2007$	2017$
Rail Cars	1279	1704
Barges	77	103
Tank Trucks	154	205
Storage Tanks at terminals	1243	1656
Blending equipment at terminals	1064	1418
Unit train Receipt Facilities	586	781
Manifest Rail Receipt Facilities	20	27
Marine Receipt Facilities	130	173
Import Receipt Facilities	53	71
Total	4606	6138
c/gal amortized over all gasoline at 10% after tax ROI		6.5

The ethanol distribution costs would be lower in previous years due to inflation and the different value of capital. The Chemical Engineering Plant Cost Index was used to adjust the investment costs in Table A4 and the CPI Inflation Index was used to adjust the state-specific ethanol freight costs shown in Table A3.[21] Table A5 summarizes the cost factors used to adjust the ethanol distribution costs.

[20] The infrastructure capital was amortized using a 10 percent after-tax return on investment which results in a 0.16 amortization factor - 0.16 is multiplied times the total capital cost to develop an average, annual capital charge, which is then divided by the volume of gasoline modeled to develop a per-gallon cost estimate.

[21] Department of Labor, Bureau of Labor Statistics, Consumers Price Index, https://data.bls.gov/cgi-bin/cpicalc.pl

Table A5. Cost Adjustment Indices

Year	Chemical Engineering Plant Cost Index	Bureau of Labor Statistics CPI Inflation Index
2000	394.1	0.7
2001	394.3	0.73
2002	395.6	0.73
2003	400.2	0.75
2004	444.2	0.77
2005	468.2	0.79
2006	499.6	0.83
2007	525.4	0.85
2008	575.4	0.89
2009	521.9	0.88
2010	550.8	0.89
2011	585.7	0.92
2012	584.6	0.94
2013	567.3	0.95
2014	576.1	0.97
2015	556.8	0.97
2016	541.7	0.98
2017	567.5	1
2018	603.1	1.03
2019	607.5	1.05
2020	596.2	1.05

The distribution capital costs are phased out over time as the ethanol distribution system is fully built out and the capital costs are sunk. Both ethanol storage and blending facilities (storage tanks, blending equipment and ethanol receipt facilities), and ethanol transportation equipment (rail cars, barges, tank trucks) are needed. Once the blendwall was reached, which occurred in the 2010 to 2013 timeframe, additional ethanol blending and transportation equipment were no longer needed. The effect on ethanol spot prices likely continued as the capital costs, which were being amortized over the price of ethanol, were still being collected. This cost/price effect was assumed to disappear as the capital costs are paid down – in this analysis they are assumed to phase out in 2015.[22]

A.3. Ethanol Blending and Replacement Value

Estimating Ethanol's Replacement Cost

Ethanol has physical properties which affect its value as a gasoline blendstock. Ethanol has a very high octane which contributes to its blending value and a high blending Reid Vapor Pressure (RVP), both relative to the gasoline pool that it is blended into. Ethanol's blending octane is approximately 115 octane number (research plus motor octane divided by 2). Ethanol's neat RVP is around 2 pounds per square inch, however, because of its nonideal blending properties when blended with hydrocarbons, it has an equivalent RVP of roughly 19 pounds per square inch when blending into gasoline at 10 volume percent.

[22] The need for additional distribution system capital investments would have started in 2004 when MTBE started to phase out, and wrap up starting in 2010 as nationwide E10 was realized, which would provide sufficient time by 2015 to pay down the distribution system capital investments. Furthermore, several years were identified as high profit for the fuels industry for blending corn ethanol, including distribution providers, which would have allowed ethanol distributors to rapidly pay down their capital investments.

These properties vary somewhat and have a different cost impact depending on the gasoline into which it is blended (match blend versus splash blend, RFG versus CG, winter versus summer, premium versus regular). These physical properties are also valued differently from a refiner's perspective compared to that of the consumer. Refiners can take advantage of ethanol's octane by lowering the octane of the gasoline that the ethanol is blended into, reducing refining costs. Refiners account for ethanol's high blending RVP, if the gasoline they are producing does not receive the 1 psi waiver, by removing some volatile, low-cost gasoline blendstock material (usually butane) to accommodate the ethanol.

Based on refinery modeling analyses conducted by ICF/Mathpro, it is possible to determine ethanol's value as a gasoline blendstock in two different ways. In the first way, ethanol is valued simply based on its blending value as a gasoline blendstock when it was already blended into gasoline. In this case, ethanol's value is estimated by marginal values (also called shadow values) as determined by the refinery model. [23] Using this approach, the estimated ethanol blending value does not take into consideration what it would take to actually replace it in gasoline, since ethanol and other high-octane gasoline blendstocks are all sharing gasoline's octane demand. There is thus sufficient volume and capacity of these high-octane blendstocks and no added cost associated with making up for ethanol's volume and octane. While this is one way to value ethanol's blending value, it does not capture ethanol's full blending value.

A second set of ethanol blending values was also estimated based on the cost of meeting all of the gasoline standards and requirements by removing and replacing the ethanol from the conventional gasoline pool with high-octane, petroleum-based replacements such as alkylate and reformate. Ethanol blending values determined in this manner reflect not just the octane value and RVP cost for replacing ethanol, but includes paying for the refinery modifications and their operating costs for replacing the ethanol. This further refinery modeling analysis by ICF/Mathpro revealed that ethanol's replacement value is considerably higher than simply its blended octane value, RVP cost, and volume extender value.[24] Reflecting ethanol's full replacement value is important for understanding the economics for using or replacing corn ethanol already blended into gasoline, and understanding how ethanol consumption figures into the cost of the RFS program.

There are several reasons why ethanol's replacement cost differs from its blending value. A primary reason is the capital costs associated with the refinery unit expansions or installations necessary to replace ethanol's volume and octane. Ethanol has been used for decades in part of the conventional gasoline pool and then replaced MTBE in the reformulated gasoline pool. Those refineries using MTBE, which was replaced by ethanol, designed their refineries around the volume and octane provided by these two high-octane oxygenates. In more recent years, as the price of crude oil increased, ethanol was blended more widely into the conventional gasoline pool. To be able to continue to produce the same gasoline volume if refiners wanted to remove the ethanol, refiners would have to add refinery unit capacity to produce the additional gasoline volume. But in addition to replacing ethanol's volume, the added refinery units would also need to make up for the lost octane. However, none of the refinery-sourced volume and octane replacements have nearly as much octane as ethanol. For example, alkylate, which is the most cost-effective octane replacement, typically has an octane number in the low to mid-90s, compared to ethanol's much higher octane value of about 115. Therefore, refineries would need to replace several times more of ethanol's volume with high-octane gasoline replacements to make up for ethanol's octane, which then increases the needed refinery investments.

Due to the options available to refiners to replace ethanol's octane, ICF/Mathpro ran two ethanol replacement cases. In the lower per-gallon cost case, the refinery model principally relied on increased alkylate production. But to be able to replace all of ethanol's octane, the refinery model estimates that refiners would also increase the octane of reformate (through increased reformer severity) and increase production of isomerate, even if the primary octane replacement is alkylate. The refinery model estimates that for this alkylate-centric case over 7.6 millon barrels per day of new refinery unit capacity would need to be added by refiners.

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[23] Modeling a No-RFS Case; ICF Incorporated; Work Assignment 0,1-11, EPA contract EP-C-16-020; July 17, 2018.

[24] ICF Incorporated. 2019. Analysis of the Effects of Low-Biofuel Use on Gasoline Properties: An Addendum to the ICF "No-RFS" Study, Work Assignment 2-11, EPA contract EP-C-16-020.

ICF/Mathpro modeled a second case. Instead of relying on large butane purchases for producing alkylate, the model increased the throughput to, and turned up the severity of, existing reforming units to increase the octane of reformate, the product stream of the reformer. This case still relied on other octane producing unit additions, including alkylate and isomerate, but increased reformate volume and octane was the principal method. This second reformate-centric refinery modeling case was less capital-intensive, but still added 3.7 million barrels per day of additional refinery unit capacity and was more costly on a per-gallon basis. Increasing the severity of reformers is relatively more expensive because of the cost associated with the production of two by-products of the reforming process which increase as the severity of the reformer is increased. Hydrogen is a by-product of reforming, but reformer-produced hydrogen is much more expensive than hydrogen produced from natural gas because natural gas has been priced much lower than crude oil. Fuel gas is another reformer by-product which is usually used for refinery process heat, but displaces much cheaper purchased natural gas. For short-term octane needs refiners would likely need to rely on increasing reformate severity to avoid or minimize the amount of new refining unit capacity additions, but given the higher cost overall cost, this would not be a preferable long-term solution.

Table A6 summarizes gasoline's marginal costs for the reference case, and ethanol's marginal costs for two ethanol removal cases, for different gasoline types and refinery regions. For the two ethanol removal cases the refinery modeling for both the reference case (all gasoline with ethanol) and the low biofuel cases (conventional gasoline without ethanol), which replaced ethanol in the gasoline pool with refinery sourced alternatives, low biofuel #1 is the reformate-centric case while biofuel #2 is the alkylate-centric case. The lower marginal values for PADD 1 can be explained because Mathpro forced PADD 3 refineries to satisfy PADD 1's need for replacing ethanol's volume and octane through PADD's 3 exports into the PADD 1 after initial refinery model runs showed PADD 1's marginal costs for replacing ethanol were exceedingly high.

Table A6. Gasoline Marginal Values for Reference Case and Ethanol Marginal Values for the No-Biofuel Cases ($/bbl)

PADD of Gasoline Origin			Gasoline Marginal Values		Ethanol Marginal Values			
					Low-Biofuel #1		Low-Biofuel #2	
	Type	Grade	Summer	Winter	Summer	Winter	Summer	Winter
PADD 1	RFG	Prem	95.74	83.94	108.37	100.88		
		Reg	91.45	81.35	115.98	105.97		
	Conv.	Prem	92.68	83.89	123.02	100.87		
		Reg	88.93	81.35	136.43	105.88		
PADD 2	RFG	Prem	88.09	81.68	132.42	110.28	113.45	96.62
		Reg	84.80	79.77	145.38	116.02	122.86	101.61
	Conv.	Prem	85.55	81.25	149.08	110.41	126.74	96.25
		Reg	82.46	79.45	161.21	115.79	135.55	100.93
PADD 3	RFG	Prem	85.42	78.31	121.69	94.72	118.51	89.77
		Reg	81.86	76.39	134.67	98.45	131.29	94.48
	Conv.	Prem	83.64	78.78	133.95	95.13	129.37	89.91
		Reg	79.97	76.76	146.78	98.46	142.00	94.55
PADD 4	Conv.	Prem	79.76	77.01	135.49	115.18	150.08	103.12
		Reg	77.37	75.07	149.05	123.96	168.12	110.01
	Low RVP	Prem	81.78	82.07	136.55		151.18	
		Reg	81.70	81.99	150.10		169.21	
PADD 5	RFG	Prem	96.89	83.68	37.68	96.05		
		Reg	91.61	82.01	62.46	97.37		
	Conv.	Prem	77.63	83.00	118.14	98.01		
		Reg	73.38	81.12	126.14	97.68		
Average[2]					**135.00**	**105.00**	**133.00**	**99.00**

The gasoline-ethanol difference in marginal values is calculated and summarized on a cents per gallon basis in Table A7.

Table A7. Marginal Ethanol Replacement Cost by Gasoline Type and Season (cents/gallon)

PADD of Gasoline Origin	Gasoline		Marginal Cost for Replacing Ethanol in the Gasoline Pool (c/gal)			
			Reformate-centric		Alkylate-centric	
	Type	Grade	Summer	Winter	Summer	Winter
PADD 1	RFG	Prem	30.07	40.35		
		Reg	58.41	58.62		
	Conv.	Prem	72.23	40.43		
		Reg	113.10	58.42		
PADD 2	RFG	Prem	105.56	68.08	60.39	35.55
		Reg	144.23	86.31	90.61	52.00
	Conv.	Prem	151.27	69.44	98.08	35.73
		Reg	187.51	86.52	126.41	51.15
PADD 3	RFG	Prem	86.35	39.08	78.77	27.29
		Reg	125.74	52.52	117.69	43.07
	Conv.	Prem	119.78	38.93	108.86	26.50
		Reg	159.07	51.68	147.69	42.38
PADD 4	Conv.	Prem	132.70	90.86	167.45	62.16
		Reg	170.67	116.41	216.07	83.19
	Low RVP	Prem	100.19	0.00	135.02	0.00
		Reg	123.27	0.00	168.77	0.00
PADD 5	RFG	Prem	-140.97	29.46		
		Reg	-69.39	36.56		
	Conv.	Prem	96.44	35.73		
		Reg	125.61	39.43		

The regional ethanol replacement costs are volume-weighted together to develop national-average ethanol replacement costs by gasoline grade and season. These costs are only presented for the conventional gasoline pool since the ethanol was only replaced in the conventional portion of the gasoline pool. Table A8 summarizes these estimated ethanol-replacement costs.

Table A8 National Average Ethanol Replacement Cost by Gasoline Grade and Season (c/gal)

		Reformate-centric		Alkylate-centric	
		Summer	Winter	Summer	Winter
Conv.	Prem	124.58	50.79	112.04	32.65
	Reg	165.11	66.83	144.23	48.19

In the process of conducting this analysis, corn ethanol was found to typically be cost-effective for refiners to blend it into gasoline. Thus, this analysis is most interested in scenarios when refiners would consider removing ethanol from the gasoline pool. These situations occurred when crude oil prices dropped to low levels for short periods of time, and for this reason, the low capital investment, reformate-centric ethanol replacement cost from Table A8 was used to estimate ethanol replacement costs.

While the ethanol replacement cost was estimated through the removal of ethanol from the conventional gasoline pool, these costs likely apply to the RFG pool as well since both gasoline pools must meet the same fuel

standards, except that summertime RFG must also meet a stringent volatility standard.[25] Thus, it was necessary to estimate a volatility cost of summertime RFG to add onto the CG-estimated ethanol replacement costs, to enable estimating the summertime RFG ethanol replacement cost. The ICF refinery modeling case provided an estimate of the RFG volatility cost by comparing the ethanol marginal values for blending ethanol into RFG versus blending ethanol into CG. Table A9 contains the refinery model estimated marginal values estimated for the year 2020 for ethanol for the various Petroleum Administration Districts for Defense (PADDs) and gasoline types (the states included in each PADD are shown in Table A3) based on Mathpro's refinery economic optimization model output.

Table A9 Marginal Ethanol Values for the Year 2020 (dollars per barrel)

PADD of Gasoline Origin	Gasoline Type	Gasoline Grade	Ethanol Marginal Values ($/bbl)
PADD 1	RFG	Prem	100.11
		Reg	104.70
	Conv.	Prem	109.85
		Reg	115.23
PADD 2	RFG	Prem	92.25
		Reg	96.53
	Conv.	Prem	101.84
		Reg	105.85
PADD 3	RFG	Prem	88.72
		Reg	93.66
	Conv.	Prem	98.03
		Reg	102.91
PADD 4	Conv.	Prem	93.81
		Reg	97.67
	Low RVP	Prem	94.47
		Reg	98.33
PADD 5	RFG	Prem	44.83
		Reg	45.29
	Conv.	Prem	103.63
		Reg	107.88

To estimate the volatility cost, ethanol's marginal values in Table A9 for RFG are subtracted from those for CG, although the values are calculated separately for premium and regular grade gasolines. These calculated values are summarized in Table A10. Although this analysis could have separately analyzed RVP-controlled conventional gasoline without a waiver, it did not since its gasoline volume was less than 2% of the total gasoline pool.

[25] Both RFG and CG must meet the same sulfur and benzene federal fuel standards, as well as ASTM fuel property consensus standards. However, summertime RFG typically is 7.1 RVP after ethanol is blended into gasoline while conventional gasoline typically is 10 RVP after ethanol is blended into gasoline and the 1 psi waiver is applied. When complying with the more stringent summertime RFG volatility standard, refiners typically remove butanes, and in some cases they may need to remove some pentanes as well.

Table A10. Ethanol's RVP Blending Cost in Reformulated Gasoline in 2020 by PADD ($/gal)[a]

PADD of Gasoline Origin	Gasoline Type	Gasoline Grade	RFG-CG Marginal Values ($/bbl)
PADD 1	RFG	Prem	9.74
		Reg	10.53
	Conv.	Prem	
		Reg	
PADD 2	RFG	Prem	9.59
		Reg	9.32
	Conv.	Prem	
		Reg	
PADD 3	RFG	Prem	9.31
		Reg	9.25
	Conv.	Prem	
		Reg	
PADD 4	Conv.	Prem	
		Reg	
	Low RVP	Prem	
		Reg	
PADD 5	RFG	Prem	58.79
		Reg	62.59
	Conv.	Prem	
		Reg	

The ethanol RVP blending cost estimated by the refinery model are volume-weighted together to develop national-average values, and ethanol's RVP blending costs are calculated separately for premium and regular grades of summertime RFG and summarized in Table A11. The PADD 5 RFG, which is California RFG, is modeled to have a volatility cost which is five time higher than other RFG areas. The cost of complying with California RFG standards may be higher than that for other RFG areas, but a factor of five seemed much too high and was considered an outlier.[26] Therefore, the modeled California RFG ethanol marginal costs, which should reflect ethanol's volatility cost, were omitted from this analysis and the PADD 1 – 3 costs were volume-weighted together and used for all RFG areas, including California.

[26] California's relies on ethanol blended at 10 volume percent for compliance with its Low Carbon Fuel Standard, thus, removing E10 ethanol from California gasoline is an unlikely possibility.

Table A11. Marginal Values and Calculated RVP Blending Costs by Fuel Grade ($/gallon)

	Grade	c/gal	$/bbl
Agregagted Cost	Prem	22.5	9.46
	Reg	22.8	9.57

The impacts of the COVID pandemic on fuel markets presented a lower economic challenge for blending ethanol. While the drop in crude oil prices to the low $40 per barrel range presented one challenge, the 12% drop in gasoline demand presented a unique challenge which would be expected to impact ethanol's blending value. The large drop in gasoline demand would likely provide refiners adequate refining capacity to cover ethanol's volume and octane using existing refinery capacity and not require capital investments to enable replacing ethanol's octane and volume, thus, using ethanol's replacement cost described above would not seem appropriate. Consequently, for 2020 a different set of blending values were estimated for ethanol which accounted for ethanol's value while blended into the gasoline pool, and therefore excludes replacing ethanol in the gasoline pool. These ethanol blending values are estimated by subtracting ethanol's marginal value in Table A9 by gasoline's marginal values in S6, volume-weighting the different PADDs by gasoline type. The resulting values are then adjusted to 2020 values using crude oil prices and converted to cents per gallon, which results in the estimated values summarized in Table A12. These values are used, along with the estimated RVP costs, in the blending cost equation, but solely for the year 2020.

A12 Ethanol's Estimated Blending Values for 2020

		Summer	Winter
Aggregated CG Cost (c/gal)	Prem	21.5	12.2
	Reg	32.2	18.2

Adjusting Ethanol Replacement and RVP Costs

The ethanol replacement costs reported in Table A8 and ethanol's' RVP costs reported in Table A11 were estimated from a refinery modeling study based on a certain set of assumptions which included modeling the year 2020 and assumed a crude oil price of $72/bbl. The economics for replacing ethanol, however, would be expected to vary over time based on changing market factors such as the market value for RVP control costs, crude oil prices, and particularly the market value for octane. For example, crude oil averaged about $43/bbl in 2016 and therefore was the most challenging year for corn ethanol over the years analyzed. As explained in more detail below, ethanol replacement costs were adjusted using both octane prices and crude oil prices to capture how the two varies in certain years, while RVP costs were adjusted solely using crude oil prices.

Ethanol's most important property for its replacement is its octane value, therefore, ethanol's replacement cost is likely to track octane value changes over time. To estimate ethanol's replacement cost in different years, the relative cost of premium and regular grade gasolines, which have a known octane difference, were used to scale ethanol's replacement cost in other years. Refinery bulk gasoline prices were used because they likely best reflect refinery production costs of these fuels, and therefore best reflect refinery octane price differences between these fuels. Table A13 summarizes the bulk regular and premium gasoline grade prices and shows the difference between these two prices.

Table A13. Regular and Premium Gasoline Grade Bulk Prices ($/gal)

	Regular Bulk Price	Premium Bulk Price	Difference
2000	0.87	0.93	0.05
2001	0.79	0.83	0.04
2002	0.74	0.80	0.07
2003	0.89	0.96	0.07
2004	1.18	1.27	0.09
2005	1.57	1.70	0.13
2006	1.87	1.99	0.12
2007	2.07	2.21	0.14
2008	2.53	2.69	0.16
2009	1.67	1.82	0.15
2010	2.07	2.19	0.11
2011	2.76	2.87	0.11
2012	2.84	3.10	0.27
2013	2.75	3.01	0.26
2014	2.52	2.78	0.26
2015	1.60	1.85	0.24
2016	1.35	1.54	0.18
2017	1.62	1.83	0.20
2018	1.92	2.11	0.18
2019	1.71	1.97	0.26
2020	1.19	1.32	0.12

The difference in the bulk premium and regular grade gasoline prices is used to adjust ethanol's replacement cost by a ratio of the price difference in a year relative to the price difference in 2018. The year 2018 was chosen as a base year because the crude oil price in that year averaged nearly the same $72/bbl price that Mathpro used in its refinery cost study. For example, the premium-regular price difference in 2004 is half the value in 2018, so ethanol's replacement cost in 2004 is estimated to be half the value estimated by ICF/Mathpro.

Adjusting the ICF/Mathpro results based solely on octane, however, may not appropriately capture the impacts of ethanol on volume. This is particularly a concern because in the key year in question for this analysis, 2016, the premium-regular grade bulk price differential was the same as in 2018 despite crude oil prices averaging just $43/bbl compared to $72/bbl in 2018. Normally the premium-regular grade bulk price differential would be expected to be correlated with crude oil price, however, this was not the case in 2016. Yet one of the inputs into refineries as modeled by the ICF/Mathpro refinery model for the ethanol removal case was crude oil. Therefore, as another means to adjust the ethanol replacement values calculated from the ICF modeling over time, we proportioned them based on crude oil prices relative to $72/bbl using the crude oil prices summarized in Tables A20 and A21.

Since ethanol's RVP costs were estimated separately from ethanol's replacement costs, it was also necessary to estimate how to adjust ethanol's estimated RVP blending costs to other years. RVP costs are directly associated with butane's price relative to gasoline because removing butane is the most likely strategy refiners use to adjust RVP to accommodate the added ethanol. As crude oil prices increase, gasoline's price margin above butane prices increases, and gasoline's price margin above butane decreases as crude oil prices decrease. Thus, the relative crude oil price for a year being analyzed to the crude oil price in 2018 is used to estimate ethanol's RVP cost in that year. Again, Brent crude oil spot prices are used for these adjustments.

While reformulated gasoline blended with ethanol was always match-blended, conventional gasoline was initially splash-blended with ethanol and transitioned to match blending as infrastructure changed to accommodate it.

Our understanding from conversations with industry is that the transition to CBOBs began in the mid-2000s by some refineries at their co-located distribution terminals, but that the large-scale transition to CBOBs did not occur until the pipeline systems transitioned to carrying CBOBs, which in turn varied by pipeline system across the country. For the purposes of this analysis, we have made the simplifying assumption that the change-over occurred all at once in 2010. By this time the vast majority of gasoline in the country contained ethanol. In addition, precision on this factor during this time period may not be necessary as around 2010, the economics were so favorable for blending ethanol due to high crude oil prices in most years that it would not make any difference to the conclusions of this study whether match-blending for conventional gasoline started as soon as 2008 or as late as 2014. Blending ethanol would have been economical even absent its blending value.

A.4. Federal and State Subsidies and Mandates

There were several ethanol blending subsidies which were in place over the period of this analysis. A 54 cent per gallon federal subsidy was already in place at the beginning of the analysis period which continued through 2010, although the value decreased to 51 cents per gallon in 2005 and decreased again to 45 cents per gallon in 2009 until it expired at the end of 2011. [27] Iowa, Illinois and Oklahoma all provided ethanol blending subsidies which applied in those respective states.[28] California established the Low Carbon Fuel Standard (LCFS) in 2009.[29] The LCFS established E10 California Reformulated Gasoline as its baseline. From 2010 to 2020, the LCFS required increasing reductions in greenhouse gas emissions from California's fuels which provided additional incentive for using corn ethanol as reflected in the increasing credit price over this time period.[30] [31] [32] Table A14 summarizes the federal and state subsidies which applied during the analysis period.

Table A14. Federal and State Ethanol Blending Subsidies

		Years	Amount (c/gal)
Federal Subsidy		2000 - 2004	54
		2005 - 2008	51
		2009 - 2010	45
State Subsidies	Iowa	2002 to Present	29.5
	Illinois	2003 to Present	25.5
	Oklahoma	2006 to Present	1.6
	California	2011 to Present	LCFS
State Mandates	Florida	2011 to 2013	-
	Hawaii	2007 to 2015	-
	Minnesota	2000 to Present	-
	Missouri	2008 to Present	-
	Oregon	2007 to Present	-

Table A15 provides the estimated LCFS subsidy effect based on the average LCFS credit value for each year, assuming that all corn ethanol achieves a carbon intensity (CI) score of 72.9 grams of carbon dioxide per mega joule of

[27] Duffield, James A et as.; US Ethanol: An Examination of Policy, Production, Use, Distribution, and Market Interactions; US Dept of Agriculture; September 2015.
[28] States' Biofuels Statutory Citations; The National Agricultural Law Center; https://nationalaglawcenter.org/state-compilations/biofuels/
[29] California Air Resources Board; Low Carbon Fuel Standard; https://ww2.arb.ca.gov/our-work/programs/low-carbon-fuel-standard/about.
[30] Monthly LCFS Credit Trading Activity Report for January 2014; https://ww3.arb.ca.gov/fuels/lcfs/credit/lrtmonthlycreditreports.htm.
[31] Monthly LCFS Credit Trading Activity Report for January 2017; https://ww3.arb.ca.gov/fuels/lcfs/credit/lrtmonthlycreditreports.htm .
[32] Monthly LCFS Credit Trading Activity Report for January 2019; https://ww3.arb.ca.gov/fuels/lcfs/credit/lrtmonthlycreditreports.htm .

ethanol, and petroleum gasoline achieves a CI score in the mid-90s.[33] [34] For projecting the future blending economics of corn ethanol, the LCFS corn ethanol credit is assumed to remain the same as that in 2019.

Table A15. Corn Ethanol's LCFS Credit

	Ethanol CI Score (gCO2/MJ)	Gasoline CI Score (gCO2/MJ)	Average LCFS Credit ($/ton)	LCFS Credit ($/gal)
2012	72.9	95.4	14	0.03
2013	72.9	98.0	56	0.11
2014	72.9	98.0	28	0.06
2015	72.9	98.0	51	0.10
2016	72.9	96.5	100	0.19
2017	72.9	95.0	89	0.16
2018	72.9	93.6	168	0.28
2019	72.9	93.2	197	0.33
2020+				0.33*

* Projected LCFS credit value for 2020 and later years.

There were also a number of state ethanol production subsidies which applied during the analysis period. It seems that Hawaii, Maine, South Dakota and Kansas all offered production subsidies. Also, two other states, Pennsylvania and Montana also offered production subsidies only if certain ethanol production thresholds were met, but it was unlikely that this occurred. Since this analysis concerned whether the corn ethanol was economical to use, the spot price, the downstream distribution costs and the blending subsides were the most important factors in assessing the economics of using corn ethanol. The marginal corn ethanol producer usually sets the spot price. While impacting where the ethanol was produced, these production subsidies likely did not have a significant effect on ethanol's pricing.

Certain states mandate the use of ethanol in the gasoline sold in their state.[35] If a state mandated the use of corn ethanol blended at 10 volume percent, the analysis assumed that the gasoline in that state was E10 regardless of the blending economics. Federal and California RFG programs which started in the mid-1990s mandated the use of oxygenates. Table A16 lists RFG areas, which are mainly metropolitan statistical areas or parts of states which had a chronic pollution problem. During the early years, some of the RFG areas satisfied their oxygenate requirement with the use of ethanol (mainly Chicago and Milwaukee), however, most RFG areas initially relied upon the use of methyl tertiary butyl ether (MTBE). Due to the reports that MTBE was contaminating groundwater in areas where it was used, states began to ban the use of MTBE and then in 2005, the federal government rescinded the oxygenate requirement and combined with some other factors (section A7 contains more discussion about MTBE bans), caused refiners to stop using MTBE in the U.S. gasoline altogether. Although refiners were no longer required to use oxygenate in RFG, because their gasoline production included the octane and volume of oxygenates and they continued to need to meet the applicable emission standards for RFG, they needed to substitute the MTBE with a similar replacement. Ethanol was the next best and available replacement to MTBE. Refiners had a choice between blending 5.7 volume percent (vol%) ethanol and 10 vol% ethanol. Due to improving economics for blending in subsidized ethanol, and likely because 10 vol% ethanol nearly completely replaced MTBE which comprised 11 vol% of the gasoline pool, these factors likely led refiners to choose to blend ethanol at 10 vol%. The one exception was California which blended in ethanol at 5.7 vol% until their Predictive Model was modified in 2008 to allow for blending ethanol at 10 vol%. California, Connecticut and New York banned the

[33] Fuel Pathway Table; LCFS Pathway Certified Carbon Intensities; California Air Resources Board; https://ww2.arb.ca.gov/resources/documents/lcfs-pathway-certified-carbon-intensities; downloaded September 2020.
[34] Weekly LCFS Credit Transfer Activity Reports; California Air Resources Board; https://ww3.arb.ca.gov/fuels/lcfs/credit/lrtweeklycreditreports.htm; downloaded September 2020.
[35] States' Biofuels Statutory Citations; The National Agricultural Law Center; https://nationalaglawcenter.org/state-compilations/biofuels/

use of MTBE earlier than other states and were assumed to switch over to ethanol starting in 2004. The rest of the RFG areas which were still using MTBE were assumed to switch over to using ethanol in place of MTBE in 2006.

Oxygenated Fuel (oxyfuel) areas were required by the Clean Air Act Amendments of 1990 to contain 2.7% oxygen during the wintertime to reduce the emissions of carbon monoxide from light-duty vehicles. Some of these areas used MTBE, while others used ethanol as the oxygenate. Three of the oxyfuels areas, Los Angeles, Phoenix and Tuscon were also covered by RFG program which already required 2.0 wt% oxygen. The non-RFG oxyfuels areas comprised about 5% of the U.S. population, however, since these areas were only required to use oxygenates during the winter, their impact on overall oxygenate use was more limited. Most of these areas, after having come into compliance with the national ambient air quality standard for carbon monoxide, and in the wake of MTBE groundwater concerns, also rescinded their mandates before and during the first few years of the RFS program. Due to their small volume and variability, this analysis did not try to reflect potential impacts on ethanol demand of the oxyfuel area mandates.

Table A16. RFG Programs and Oxyfuel Areas

		Years
Federal and California Reformulated Gasoline	Phoenix, Arizona (opted into CA RFG)	Oxygenate mandate in place 1995 to 2005[a]
	Los Angeles, San Diego, Sacramento and San Juaquin Valley - California	
	Connecticut (entire state)	
	Sussex – Delaware (entire state)	
	Washington D.C. – D.C. & Maryland & Virginia	
	Atlanta - Georgia	
	Chicago - Indiana & Illinois	
	Covington and Louisville - Kentucky	
	Baton Rouge - Louisiana	
	Baltimore - Maryland	
	Kent/Queen Anne's - Maryland	
	Springfield, Boston - Massachusetts (entire state) & New Hampshire	
	St. Louis - Missouri	
	Warren County, Atlantic City - New Jersey (entire State)	
	Essex, Long Island - New York & Connecticut & New Jersey	
	Rhode Island	
	Philadelphia - Pennsylvania & Delaware & Maryland & New Jersey	
	Houston, Dallas/Fort Worth - Texas	
	Norfolk, Richmond - Virginia	
	Milwaukee - Wisconsin	
Federal Oxyfuel Areas	Anchorage – Alaska (Ended in 2004)	Wintertime only for these urban areas
	Phoenix and Tucson – Arizona [e]	
	Los Angeles – California [e]	
	Denver/Boulder, Longmont and Fort Collins – Colorado (ended in 2007, 2007 and 2003)	
	Missoula - Montana	
	Las Vegas and Reno – Nevada (Las Vegas ended in 2010)	
	Albuquerque - New Mexico	
	Portland – Oregon (ended in 2007)	
	El Paso - Texas	
	Ogden & Provo/Orem – Utah (ended in 2001 and 2005)	
	Spokane – Washington (ended in 2005)	

a The Reformulated Gasoline (RFG) program included an oxygenate mandate, which was met using ethanol in the RFG areas located in the Midwest – Chicago and Milwaukee, while other RFG areas relied on the use of Methyl Tertiary Butyl Ether (MTBE). As state MTBE bans took effect, RFG areas in those states switched to ethanol. Finally, when Congress rescinded the Federal RFG oxygenate requirement in combination with other factors, the remaining RFG areas switched over to ethanol.

b Minnesota put in place a statewide oxygenate requirement in 1997 that lasted until 2002. In 2003, the oxygenate requirement was changed to a 10 volume percent ethanol requirement, and then changed again in 2013 to a 10 volume percent conventional biofuel requirement.

c The State of Washington requires that its state's gasoline contain 2 volume percent ethanol, which resulted in at least 20% of the gasoline containing 10 volume percent ethanol.

d The State of California put into place the Low Carbon Fuel Standard in 2007, which did not require the use of ethanol, per se, but since the LCFS compliance costs are lower with corn ethanol than other renewable fuels, the LCFS acted like a mandate for corn ethanol. Up until 2008, California's Predictive Model only allowed up to 5.7 volume percent ethanol. The Predictive Model was changed to permit 10 volume percent ethanol in 2008.

e CA and Phoenix, AZ were also covered by RFG program oxygenate mandate.

A.5. Corn Ethanol Production Costs

Corn ethanol plant demand (i.e., feedstock, utilities) and production output information was obtained for two different years, 2006 and 2016. This allowed us to model how corn ethanol plant economics have changed over time by interpolating and extrapolating the plant economics to other years.

For the 2016 corn ethanol plant, the operating costs and plant yields were based on a 2012 survey of corn ethanol plants.[36] Capital costs are based on a review of corn ethanol construction costs for a 100 million gallon per year corn ethanol plant in 2016. For this analysis the capital costs were scaled to the US average sized corn ethanol plant with a nameplate capacity of 85 million gallons per year assumed to operate at 90% of nameplate capacity, therefore producing 76 million gallons of ethanol per year.[37] Since the capital cost is based on the total construction cost of already constructed corn ethanol plants, no contingency cost factors are applied to the capital costs. The capital costs are amortized based on an after-tax 10% return on investment. For a year 2006 corn ethanol plant, we used cost information from USDA which was the basis for the cost analysis used for the 2010 RFS2 rulemaking.[38] It is worth noting that the USDA information shows no corn oil extraction for dry mill corn ethanol plants, as this was a development which occurred after 2006. Corn ethanol plants produce a byproduct primarily used for animal feed termed distillers dried grains with solubles (DDGS). The DDGS prices are from Food and Agricultural Policy Research Institute (FAPRI) associated with the University of Missouri.[39] Corn prices are farm gate prices and a transportation spreadsheet was used to estimate a cost of 6 cents per bushel to transport the corn to a corn ethanol plant.[40] Of the corn ethanol plants in the 2012 survey, 74% were separating and selling corn oil so selling corn oil was assumed for 70 percent of the plant capacity.

Table A17 contains the plant demand and outputs and capital costs for the 2006 and 2016 year corn ethanol plants based on the historical cost information for the various inputs and outputs.

[36] Mueller, Steffen; 2012 Corn Ethanol: Emerging Plant Energy and Environmental Technologies; April 29, 2013.
[37] Irwin, Scott; Weekly Output: Ethanol Plants Remain Barely Profitable; 3/16/2018.
[38] Renewable Fuels Standard Program (RFS2) Regulatory Impact Analysis; EPA-420-R-10-006; February 2010; EPA-HQ-OAR-2005-0161- 2726.
[39] U.S Baseline Outlook – Projections for Agricultural and Biofuels Markets; Food and Agricultural Policy Research Institute (FAPRI); March 2018.
[40] Edwards, William; Grain Truck Transportation Cost Calculator (a3-29graintransportation.xlsx version 1.4_82017); Iowa State University.

Table A17. 2006 and 2016 Corn Ethanol Plant Demands, Production Levels and Capital Costs

	2006	**2016**
Ethanol Yield	2.77 Gal/Bu	2.82 Gal/Bu
DDG Yield	18.4 Lbs/Bu	15.7 Lbs/Bu
Corn Oil Yield	0 Lbs/Bu	0.53 Lbs/Bu
Thermal Demand	34,200 BTU/Gal	23,800 BTU/Gal
Electricity Demand	0.90 KWh/Gal	0.75 KWh/Gal
Water Use	2.7 Gal/Gal	2.7 Gal/Gal
Labor Cost	0.06 $/Gal	0.07 $/Gal
Capital Cost (100 MM Gals/Yr)	1.50 $/Gal Plant Cap.	2.11 $/Gal Plant Cap.
Capital Cost (76 MM Gals/Yr)		2.34 $/Gal Plant Cap.
Annual Fixed Cost	5.5% of Total Cap Cost	5.5% of Total Cap Cost
Denaturant	5 volume percent	2 volume percent

To estimate the year-by-year corn ethanol production costs, the corn, corn oil, DDGS prices and utility prices were obtained for each year from 2000 to 2020.[41] [42] [43] [44] [45] These are summarized in Table A18.

[41] United States Industrial Natural Gas Prices; Energy Information Administration.
[42] United States Industrial Electricity Prices, Energy Information Administration.
[43] USDA Economic Research Service; US Bioenergy Statistics; Table 14 Fuel ethanol, corn and gasoline prices by month; December 2019.
[44] USDA Economic Research Service; Feed Grains Database: Custom Query Results; DDGS; https://data.ers.usda.gov/FEED-GRAINS-custom-query.aspx#ResultsPanel
[45] USDA Economic Research Service; Oil Crops – all Tables; Table 32; https://www.ers.usda.gov/data-products/oil-crops-yearbook.aspx; Inedible distillers corn oil price used for 2013 - 2018, and the average of the ratio of inedible to edible corn oil price is applied to edible corn oil prices for the years prior to 2013.

Table A18. Corn, DDGS, Corn Oil, Electricity and Natural Gas Prices for the Years 2000 to 2020

Year	Natural Gas ($/KFt3)	Electricity (c/kwhr)	Corn Prices ($/bushel)	DDGS Prices ($/dry ton)	Inedible Corn Oil Prices (c/lb)
2000	4.45	4.64	1.92	89	14.7
2001	5.24	5.05	1.95	82	11.1
2002	4.04	4.88	2.19	89	15.7
2003	5.89	5.11	2.33	108	23.2
2004	6.53	5.25	2.53	69	23.4
2005	8.56	5.73	2.02	79	22.9
2006	7.87	6.16	2.34	115	20.7
2007	7.68	6.39	3.45	159	26.2
2008	9.65	6.96	4.84	122	57.1
2009	5.33	6.83	3.81	117	26.9
2010	5.49	6.77	3.89	195	32.3
2011	5.13	6.82	6.07	229	50.0
2012	3.88	6.67	6.73	251	46.2
2013	4.64	6.89	6.19	196	36.8
2014	5.62	7.10	4.17	155	31.6
2015	3.93	6.91	3.76	136	26.8
2016	3.51	6.76	3.54	105	26.2
2017	4.08	6.88	3.36	150	28.1
2018	4.21	6.92	3.47	146	36.8
2019	3.90	6.91	3.50	138	24.7
2020	3.32	6.66	3.50	169	28.5

Other factors were used to estimate the year-by-year corn ethanol production costs. The capital costs were adjusted using the Chemical Engineering Cost Index. Once the 2016 capital costs were adjusted back to year 2006 capital costs, there was still a cost difference with the capital costs for the 2006 plant costs. One difference is that the 2006 capital costs were for a plant producing 40 million gallons of ethanol per year plant, versus a plant producing 76 million gallons of ethanol per year for 2016. In addition, most dry mill corn ethanol plants added corn oil extraction after 2006 to further improve the economics of their plants which would add to the capital costs for the facilities. The natural gas consumption is much lower and electricity consumption is somewhat lower for the more recent corn ethanol plant which suggests that energy efficiency improvements were made to corn ethanol plants over time. The additional difference in capital costs beyond the Chemical Engineering Cost Index adjustment is summarized in Table A19. The capital adjustments to account for corn oil extraction are made between 2016 and 2006, and then are assumed to be flat prior to 2006. The amount of ethanol produced per bushel of corn increased between 2006 and 2016, and this difference is interpolated and extrapolated to all years. Natural gas and electricity demand varied between 2006 and 2016 and was interpolated and extrapolated to all years. Table A19 summarizes these year-by-year inputs.

Table A19. Year-by-Year Capital Cost Adjustments, Utility Demands and Ethanol Production

	Chemical Engineering Cost Index	Other Capital Cost Adjustment	Ethanol Production from Corn (gal/bushel)	Fraction of Corn Ethanol Plants Extracting Corn Oil	Natural Gas Demand	Electricity Demand (Kwhr/gal)
2000	394.1	0.8	2.74	0	40338	0.99
2001	394.3	0.8	2.75	0	39311	0.98
2002	395.6	0.8	2.75	0	38284	0.96
2003	400.2	0.8	2.75	0	37258	0.95
2004	444.2	0.8	2.76	0	36229	0.93
2005	468.2	0.8	2.76	0	35201	0.92
2006	499.6	0.8	2.77	0	34174	0.90
2007	525.4	0.82	2.78	6	33147	0.89
2008	575.4	0.84	2.79	12	32119	0.87
2009	521.9	0.85	2.78	19	31092	0.86
2010	550.8	0.87	2.79	25	30064	0.84
2011	585.7	0.89	2.79	31	29037	0.83
2012	584.6	0.90	2.79	37	28010	0.81
2013	567.3	0.92	2.80	43	26982	0.80
2014	576.1	0.93	2.80	49	25955	0.78
2015	556.8	0.95	2.81	56	24927	0.77
2016	541.7	0.97	2.81	62	23900	0.75
2017	567.5	0.98	2.82	68	22873	0.73
2018	603.1	1.0	2.82	74	21845	0.72
2019	607.5	1.0	2.82	0.80	21845	0.72
2020	596.2	1.0	2.83	0.86	21845	0.72

Finally, this production cost analysis did not consider any state/local facility grants, tax breaks, nor subsidized loans which would effectively reduce the production costs for producing corn ethanol. Thus, this corn ethanol plant production cost analysis may not exactly represent the typical or average production costs of corn ethanol plants, but the intent of this analysis is to benchmark production costs versus ethanol spot prices to assess the likely profitability of ethanol production over the time frame of this analysis.

The comparison of corn ethanol production cost to corn ethanol price provides an estimate of corn ethanol plant profit for a typical sized corn ethanol plant. The estimated corn ethanol plant profit margin is shown in Table A20 by subtracting corn ethanol plant gate prices from the estimated production cost. The table also shows the existing corn ethanol plant capacity and the announced increases in corn ethanol plant capacity and totals the two together to highlight the planned total production capacity once the capacity expansions are realized. The table then compares the current and planned total corn ethanol capacity with the RFS standards which applied in each year. Because there was such large profit margins and corn ethanol plant capacity was increasing much faster than the RFS program volume requirements, this comparison supports our conclusion that economics, rather than the RFS program requirements, was the primary driver for increasing corn ethanol plant capacity. This information is represented in Figures 2 and 3 in the report.

Figure A20 Corn Ethanol Plant Capacity, Profit and RFS Standards

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Ethanol Marginal Blending Cost	-4	1	-23	21	-31	-37	-13	-36	-29	-18
Corn Ethanol Plant Profit Margin	0.25	0.37	0.57	1.33	0.73	0.27	0.12	0.41	0.50	0.03
Plant Capacity	3.1	3.6	4.3	5.5	7.9	12.4	13.0	14.1	14.9	14.9
Announced New Plant Capacity	0.6	0.8	2.0	6.1	5.5	2.1	1.4	0.6	0.1	0.1
Actual Plant Capacity plus Announced Plant Capacity	3.7	4.4	6.3	11.6	13.4	14.5	14.5	14.6	15.0	15.0
US Ethanol Consumption	2.8	3.6	4.1	5.5	6.9	9.7	11.0	12.9	13.2	13.4
RFS1 Standard	-	-	-	4.0	4.7	5.4	6.1	6.8	7.4	7.5
EISA/RFS2 Standard						9	10.5	12	12.6	13.2
Ethanol Consumption above RFS Std.	-	-	-	1.5	2.2	0.7	0.5	0.9	0.6	0.2
Existing Ethanol Plant Capacity above RFS Std.				1.5	3.2	4	4	2.6	2.3	1.7
Existing and Announced Plant Capacity above RFS Std.				7.6	8.7	5.5	4.0	2.6	2.4	1.6

A.6. Gasoline Prices and Volumes

Gasoline prices at terminals were obtained from the Energy Information Administration (EIA). Their gasoline "Sales for Resale" category of gasoline prices best represents the sales prices of gasoline from terminals.[46] The Sales for Resale gasoline price data for both regular and premium gasoline types was downloaded from EIA's website for each state and for each year from 2000 to 2020. Some of the data is withheld (shown in greyscale in the table) so it was

[46] Energy Information Administration; Refiner Gasoline Prices by Grade and Sales Type; https://www.eia.gov/dnav/pet/pet_pri_refmg_dcu_nus_a.htm.

necessary to estimate the prices for those situations. In some cases, the gasoline prices for an adjacent state was used for the missing data, and for other cases the spot price of Brent crude oil, shown at the top of the regular grade prices tables, was used to estimate the gasoline prices for that state from a previous or following year.[47] Tables A21 through A24 summarize the gasoline pricing data and the estimated gasoline prices for the withheld data.

[47] Energy Information Administration; Spot Prices; https://www.eia.gov/dnav/pet/pet_pri_spt_s1_a.htm

Table A21. State-by-State Regular Grade Sales for Resale Gasoline Prices for years 2000 to 2009 ($/gal)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Brent ($/bbl)	28.66	24.46	24.99	28.85	38.26	54.57	65.16	72.44	96.94	61.74
Alaska	1.10	1.09	1.03	1.22	1.50	1.86	2.17	2.31	3.20	2.46
Alabama	0.88	0.78	0.75	0.92	1.22	1.62	1.90	2.11	2.57	1.71
Arkansas	0.89	0.83	0.78	0.94	1.22	1.62	1.90	2.14	2.53	1.71
Arizona	1.01	0.95	0.87	1.15	1.43	1.81	2.06	2.21	2.66	1.80
California	1.06	1.00	0.91	1.17	1.48	1.79	2.10	2.31	2.68	1.92
Colorado	0.95	0.91	0.83	0.98	1.27	1.70	1.99	2.21	2.58	1.71
Connecticut	0.99	0.88	0.83	1.02	1.33	1.66	1.99	2.18	2.54	1.76
DC	0.96	0.87	0.82	0.98	1.27	1.68	1.99	2.16	2.59	1.74
Delaware	0.97	0.86	0.80	0.98	1.26	1.66	1.99	2.13	2.48	1.75
Florida	0.90	0.80	0.78	0.94	1.24	1.64	1.92	2.12	2.59	1.76
Georgia	0.89	0.80	0.77	0.94	1.25	1.66	1.92	2.14	2.56	1.73
Hawaii	1.16	1.17	1.01	1.21	1.42	1.78	2.19	2.38	2.91	2.01
Iowa	0.93	0.88	0.82	0.98	1.25	1.65	1.98	2.22	2.55	1.72
Idaho	1.01	0.92	0.85	1.03	1.33	1.70	2.00	2.22	2.69	1.76
Illinois	0.97	0.92	0.84	1.00	1.27	1.65	1.96	2.19	2.56	1.75
Indiana	0.94	0.88	0.81	0.97	1.26	1.64	1.93	2.17	2.56	1.75
Kansas	0.91	0.86	0.80	0.95	1.22	1.62	1.91	2.19	2.46	1.70
Kentucky	0.94	0.86	0.81	0.97	1.27	1.68	1.95	2.18	2.61	1.79
Louisiana	0.87	0.77	0.74	0.89	1.19	1.56	1.88	2.08	2.50	1.67
Massachusetts	1.02	0.91	0.85	1.03	1.29	1.68	2.00	2.16	2.56	1.77
Maryland	0.99	0.90	0.84	1.00	1.28	1.70	2.02	2.17	2.60	1.74
Maine	0.94	0.79	0.79	0.95	1.25	1.62	1.92	2.15	2.61	1.75
Michigan	0.96	0.89	0.82	0.99	1.26	1.64	1.91	2.18	2.55	1.75
Minnesota	0.97	0.93	0.86	1.01	1.28	1.64	1.96	2.22	2.53	1.72
Missouri	0.94	0.88	0.82	0.98	1.27	1.67	1.96	2.17	2.59	1.72
Mississippi	0.86	0.77	0.76	0.91	1.21	1.60	1.89	2.08	2.53	1.71
Montana	0.99	0.94	0.85	1.01	1.29	1.68	1.95	2.22	2.59	1.75
North Carolina	0.88	0.79	0.77	0.92	1.23	1.63	1.90	2.11	2.55	1.71
North Dakota	0.95	0.90	0.83	0.99	1.26	1.65	1.96	2.24	2.55	1.74
Nebraska	0.93	0.88	0.81	0.97	1.24	1.64	1.96	2.22	2.49	1.71
New	0.98	0.87	0.83	1.00	1.27	1.66	1.98	2.14	2.55	1.62
New Jersey	0.96	0.85	0.80	0.97	1.25	1.61	1.90	2.11	2.51	1.71
New Mexico	0.95	0.87	0.82	0.99	1.27	1.73	2.03	2.25	2.66	1.82
Nevada	1.08	0.94	0.83	1.12	1.44	1.79	2.08	2.25	2.66	1.81
New York	0.97	0.88	0.84	1.01	1.31	1.66	1.96	2.16	2.58	1.77
Ohio	0.94	0.87	0.81	0.97	1.25	1.63	1.90	2.17	2.58	1.75
Oklahoma	0.88	0.83	0.77	0.91	1.19	1.61	1.87	2.18	2.55	1.69
Oregon	1.02	0.91	0.83	1.04	1.33	1.70	2.03	2.26	2.64	1.84
Pennsylvania	0.93	0.82	0.78	0.97	1.25	1.62	1.91	2.12	2.55	1.73
Rhode Island	0.99	0.89	0.83	1.00	1.27	1.66	1.99	2.16	2.51	1.76
South Carolina	0.88	0.79	0.77	0.92	1.24	1.65	1.91	2.11	2.56	1.71
South Dakota	0.94	0.89	0.83	0.99	1.26	1.66	1.96	2.23	2.53	1.73
Tennessee	0.88	0.81	0.77	0.93	1.23	1.64	1.90	2.11	2.53	1.71
Texas	0.87	0.79	0.75	0.90	1.19	1.59	1.91	2.09	2.53	1.68
Utah	0.99	0.91	0.84	1.03	1.29	1.64	1.96	2.19	2.59	1.70
Virginia	0.94	0.85	0.80	0.96	1.25	1.66	1.96	2.14	2.57	1.74
Vermont	0.96	0.82	0.80	0.98	1.27	1.64	1.92	2.14	2.56	1.63
Washington	1.03	0.93	0.83	1.03	1.32	1.72	2.03	2.23	2.61	1.83
Wisconsin	0.94	0.90	0.83	1.00	1.26	1.66	1.97	2.19	2.55	1.75
West Virginia	0.91	0.79	0.79	0.95	1.25	1.63	1.90	2.14	2.56	1.73
Wyoming	0.98	0.93	0.85	1.00	1.29	1.72	2.00	2.23	2.61	1.70

Table A22. State-by-State Regular Grade Sales for Resale Gasoline Prices for years 2010 to 2020

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Brent ($/bbl)	80	111	112	109	99	52	44	54	71	63	41
Alaska	2.82	3.94	3.95	3.28	3.20	2.24	1.87	2.31	2.52	2.90	2.88
Alabama	2.11	2.82	2.83	2.71	2.52	1.58	1.35	1.56	1.83	1.68	1.19
Arkansas	2.11	2.81	2.84	2.72	2.53	1.61	1.36	1.58	1.87	1.70	1.19
Arizona	2.20	2.85	2.98	2.82	2.62	1.74	1.45	1.69	2.06	2.00	1.45
California	2.26	2.94	3.07	2.93	2.73	2.10	1.67	1.93	2.30	2.37	1.77
Colorado	2.12	2.81	2.86	2.77	2.60	1.65	1.40	1.67	1.96	1.85	1.33
Connecticut	2.16	2.89	2.98	2.87	2.66	1.66	1.42	1.64	1.93	1.77	1.30
DC	2.15	2.86	2.91	2.79	2.58	1.62	1.38	1.61	1.88	2.26	2.24
Delaware	2.12	2.84	2.94	2.84	2.62	1.66	1.40	1.62	1.91	1.74	1.25
Florida	2.14	2.84	2.88	2.77	2.58	1.64	1.39	1.63	1.88	1.72	1.26
Georgia	2.13	2.83	2.86	2.74	2.57	1.61	1.36	1.57	1.84	1.69	1.20
Hawaii	2.47	3.45	3.46	3.08	2.97	1.84	1.54	1.91	2.38	2.76	2.74
Iowa	2.16	2.90	2.91	2.74	2.53	1.63	1.35	1.61	1.89	1.73	1.18
Idaho	2.28	2.84	2.86	2.78	2.65	1.80	1.49	1.76	2.13	1.92	1.43
Illinois	2.14	2.85	2.91	2.81	2.60	1.67	1.40	1.63	1.88	1.75	1.19
Indiana	2.11	2.83	2.88	2.78	2.57	1.62	1.37	1.58	1.85	1.72	1.16
Kansas	2.11	2.83	2.84	2.74	2.52	1.60	1.34	1.57	1.87	1.71	1.17
Kentucky	2.16	2.86	2.92	2.78	2.60	1.67	1.44	1.65	1.90	1.75	1.25
Louisiana	2.09	2.78	2.82	2.70	2.50	1.58	1.35	1.58	1.85	1.66	1.18
Massachusetts	2.18	2.90	2.99	2.85	2.68	1.66	1.41	1.64	1.91	1.75	1.25
Maryland	2.16	2.88	2.93	2.80	2.61	1.63	1.39	1.61	1.89	1.74	1.23
Maine	2.15	2.84	2.97	2.86	2.67	1.71	1.46	1.67	1.98	1.83	1.30
Michigan	2.13	2.84	2.90	2.78	2.59	1.63	1.40	1.60	1.87	1.74	1.21
Minnesota	2.14	2.85	2.83	2.71	2.50	1.61	1.33	1.59	1.87	1.73	1.17
Missouri	2.13	2.85	2.87	2.75	2.55	1.63	1.37	1.60	1.88	1.74	1.19
Mississippi	2.09	2.80	2.79	2.70	2.53	1.55	1.36	1.58	1.87	1.69	1.16
Montana	2.20	2.83	2.84	2.72	2.57	1.71	1.45	1.70	2.01	1.84	1.33
North Carolina	2.11	2.81	2.83	2.70	2.52	1.57	1.35	1.56	1.83	1.69	1.19
North Dakota	2.21	2.92	2.90	2.73	2.56	1.66	1.37	1.61	1.92	1.77	1.20
Nebraska	2.17	2.87	2.91	2.77	2.54	1.63	1.35	1.61	1.89	1.74	1.19
New	2.15	2.70	3.04	2.86	2.67	1.69	1.46	1.64	1.95	2.33	2.31
New Jersey	2.12	2.85	2.95	2.81	2.60	1.60	1.36	1.59	1.88	1.72	1.24
New Mexico	2.20	2.83	2.86	2.72	2.57	1.69	1.40	1.65	1.94	1.82	1.29
Nevada	2.23	2.88	2.96	2.80	2.67	1.96	1.50	1.74	2.12	2.11	1.48
New York	2.16	2.88	2.98	2.84	2.65	1.66	1.40	1.63	1.93	1.78	1.30
Ohio	2.13	2.84	2.89	2.77	2.60	1.61	1.38	1.58	1.84	1.73	1.19
Oklahoma	2.11	2.80	2.84	2.78	2.50	1.61	1.34	1.59	1.88	1.72	1.17
Oregon	2.27	2.93	3.01	2.83	2.67	1.80	1.45	1.76	2.10	1.95	1.43
Pennsylvania	2.13	2.86	2.95	2.81	2.58	1.59	1.36	1.60	1.88	1.72	1.21
Rhode Island	2.15	2.89	3.01	2.87	2.71	1.66	1.42	1.64	1.93	1.78	1.30
South Carolina	2.11	2.81	2.82	2.71	2.54	1.58	1.35	1.57	1.83	1.69	1.20
South Dakota	2.19	2.88	2.88	2.77	2.54	1.65	1.35	1.61	1.90	1.75	1.22
Tennessee	2.11	2.81	2.83	2.70	2.52	1.58	1.36	1.56	1.83	1.68	1.19
Texas	2.09	2.80	2.85	2.73	2.52	1.59	1.35	1.60	1.88	1.72	1.22
Utah	2.26	2.81	2.84	2.75	2.60	1.79	1.42	1.68	2.10	1.86	1.40
Virginia	2.14	2.85	2.89	2.77	2.56	1.62	1.38	1.60	1.88	1.73	1.23
Vermont	2.14	2.79	3.04	2.86	2.66	1.68	1.46	1.67	1.92	1.76	1.28
Washington	2.26	2.91	2.96	2.79	2.63	1.76	1.45	1.76	2.11	1.97	1.42
Wisconsin	2.14	2.84	2.88	2.77	2.57	1.65	1.37	1.61	1.87	1.75	1.17
West Virginia	2.11	2.82	2.90	2.76	2.62	1.59	1.38	1.59	1.88	1.75	1.20
Wyoming	2.16	2.82	2.80	2.69	2.57	1.67	1.35	1.60	1.95	1.78	1.26

Table A23. State-by-State Premium Grade Sales for Resale Gasoline Prices for years 2000 to 2009

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Alaska	1.20	1.14	1.19	1.37	1.56	1.91	2.24	2.42	3.19	2.56
Alabama	0.99	0.89	0.86	1.03	1.33	1.72	2.04	2.31	2.74	1.93
Arkansas	0.97	0.90	0.86	1.02	1.32	1.72	2.00	2.24	2.70	1.88
Arizona	1.14	1.07	1.00	1.27	1.56	1.93	2.19	2.39	2.79	1.96
California	1.19	1.14	1.04	1.30	1.61	1.92	2.23	2.48	2.80	2.08
Colorado	1.04	0.99	0.92	1.06	1.35	1.77	2.08	2.36	2.70	1.88
Connecticut	1.10	1.01	0.96	1.15	1.45	1.77	2.18	2.39	2.71	1.97
DC	1.08	0.99	0.94	1.10	1.39	1.80	2.16	2.37	2.78	1.97
Delaware	1.08	0.95	0.91	1.09	1.38	1.79	2.07	2.26	2.73	1.88
Florida	1.02	0.93	0.90	1.06	1.36	1.75	2.07	2.30	2.77	1.96
Georgia	1.00	0.91	0.88	1.05	1.36	1.77	2.09	2.33	2.70	1.95
Hawaii	1.25	1.30	1.09	1.30	1.49	1.85	2.29	2.50	3.01	2.15
Iowa	1.02	0.96	0.91	1.09	1.36	1.77	2.10	2.41	2.70	1.92
Idaho	1.11	1.02	0.95	1.13	1.42	1.79	2.11	2.38	2.82	1.94
Illinois	1.12	1.08	1.00	1.15	1.41	1.79	2.12	2.37	2.73	1.96
Indiana	1.04	0.99	0.93	1.08	1.37	1.76	2.08	2.31	2.63	1.91
Kansas	0.99	0.93	0.88	1.05	1.32	1.72	2.05	2.39	2.62	1.88
Kentucky	1.03	0.95	0.91	1.07	1.37	1.76	2.08	2.36	2.76	1.97
Louisiana	0.92	0.87	0.82	0.96	1.29	1.66	2.02	2.24	2.62	1.88
Massachusetts	1.13	1.04	1.00	1.17	1.42	1.82	2.19	2.37	2.76	1.98
Maryland	1.10	1.02	0.96	1.13	1.41	1.82	2.18	2.38	2.79	1.96
Maine	1.04	0.89	0.90	1.05	1.36	1.76	2.12	2.35	2.93	1.96
Michigan	1.07	1.00	0.94	1.11	1.37	1.75	2.06	2.33	2.68	1.93
Minnesota	1.05	1.00	0.95	1.09	1.35	1.73	2.09	2.37	2.66	1.86
Missouri	1.04	0.97	0.93	1.08	1.37	1.78	2.10	2.35	2.76	1.91
Mississippi	0.96	0.86	0.85	1.01	1.31	1.70	2.03	2.25	2.64	1.90
Montana	1.11	1.07	0.98	1.15	1.41	1.80	2.09	2.36	2.71	1.93
North Carolina	0.98	0.89	0.87	1.03	1.33	1.74	2.04	2.30	2.73	1.91
North Dakota	1.04	0.99	0.93	1.09	1.35	1.75	2.10	2.42	2.69	1.93
Nebraska	1.02	0.96	0.90	1.07	1.35	1.75	2.07	2.40	2.72	1.93
New Hampshire	1.11	0.99	0.96	1.13	1.38	1.77	2.18	2.34	2.76	1.75
New Jersey	1.09	1.01	0.96	1.13	1.40	1.77	2.07	2.26	2.73	1.88
New Mexico	1.05	0.96	0.91	1.09	1.36	1.82	2.15	2.42	2.81	2.01
Nevada	1.21	1.06	0.97	1.24	1.57	1.92	2.22	2.40	2.77	1.98
New York	1.11	1.05	1.00	1.19	1.48	1.84	2.18	2.39	2.81	1.99
Ohio	1.06	0.98	0.93	1.09	1.36	1.74	2.05	2.34	2.71	1.93
Oklahoma	0.95	0.90	0.85	1.01	1.29	1.67	2.02	2.32	2.59	1.85
Oregon	1.16	1.05	0.97	1.18	1.48	1.83	2.18	2.44	2.83	2.05
Pennsylvania	1.03	0.93	0.90	1.08	1.36	1.74	2.12	2.32	2.71	1.92
Rhode Island	1.10	1.01	0.96	1.13	1.40	1.80	2.18	2.37	2.73	1.99
South Carolina	0.98	0.89	0.88	1.03	1.34	1.76	2.05	2.30	2.73	1.90
South Dakota	1.03	0.97	0.94	1.10	1.37	1.81	2.16	2.43	2.82	1.97
Tennessee	0.98	0.91	0.87	1.03	1.33	1.74	2.06	2.30	2.78	1.91
Texas	0.96	0.87	0.84	1.00	1.30	1.72	2.06	2.31	2.72	1.88
Utah	1.08	1.01	0.93	1.13	1.39	1.74	2.07	2.33	2.73	1.88
Virginia	1.05	0.96	0.92	1.07	1.37	1.78	2.13	2.35	2.77	1.98
Vermont	1.05	0.92	0.91	1.09	1.38	1.77	2.12	2.34	2.78	1.96
Washington	1.17	1.07	0.98	1.17	1.47	1.86	2.18	2.41	2.78	2.03
Wisconsin	1.04	1.01	0.94	1.11	1.37	1.77	2.10	2.36	2.73	1.94
West Virginia	1.01	0.88	0.89	1.05	1.35	1.74	2.05	2.32	2.72	1.92
Wyoming	1.07	1.02	0.94	1.10	1.39	1.83	2.14	2.42	2.78	1.94

Table A24. State-by-State Premium Grade Sales for Resale Gasoline Prices for years 2010 to 2020

	2010	2011	2012	2013	2014	2015	2016	2017	2018	20199	20200
Alaska	2.98	3.47	3.60	3.49	3.36	2.48	2.05	2.33	2.60	2.44	1.85
Alabama	2.33	3.04	3.11	3.07	2.90	2.02	1.82	2.01	2.26	2.11	1.61
Arkansas	2.30	3.02	3.11	3.04	2.85	1.96	1.70	1.88	2.15	2.03	1.48
Arizona	2.38	3.02	3.17	3.02	2.82	1.99	1.71	1.93	2.30	2.29	1.71
California	2.42	3.10	3.24	3.10	2.88	2.31	1.93	2.18	2.54	2.61	2.01
Colorado	2.31	3.00	3.06	3.03	2.88	1.99	1.79	2.06	2.36	2.26	1.71
Connecticut	2.35	3.11	3.24	3.16	2.95	2.04	1.77	1.98	2.23	2.09	1.59
DC	2.36	3.09	3.20	3.14	2.91	1.98	1.70	1.91	2.16	2.54	2.52
Delaware	2.29	3.07	3.22	3.07	2.87	1.92	1.60	1.82	2.12	2.02	1.46
Florida	2.34	3.05	3.15	3.12	2.94	2.06	1.80	2.03	2.27	2.07	1.60
Georgia	2.35	3.04	3.12	3.09	2.93	2.02	1.78	2.00	2.26	2.10	1.60
Hawaii	2.61	3.65	3.66	3.26	3.16	2.01	1.67	2.08	2.50	2.88	2.86
Iowa	2.33	3.10	3.16	3.08	2.90	2.05	1.69	1.89	2.20	2.06	1.39
Idaho	2.47	3.02	3.04	2.97	2.84	2.00	1.73	2.00	2.38	2.21	1.75
Illinois	2.33	3.06	3.24	3.17	3.00	2.19	1.90	2.02	2.25	2.17	1.55
Indiana	2.28	3.01	3.16	3.08	2.95	2.10	1.85	1.98	2.26	2.16	1.54
Kansas	2.27	3.03	3.04	3.03	2.76	1.94	1.64	1.80	2.09	1.97	1.37
Kentucky	2.33	3.05	3.16	3.10	2.99	2.11	1.91	2.07	2.30	2.16	1.60
Louisiana	2.26	3.01	3.09	3.05	2.84	1.93	1.63	1.88	2.10	1.92	1.44
Massachusetts	2.37	3.11	3.23	3.09	2.91	1.97	1.70	1.90	2.13	2.00	1.49
Maryland	2.37	3.10	3.21	3.14	2.91	1.96	1.67	1.88	2.13	2.00	1.44
Maine	2.34	3.08	3.25	3.11	2.93	2.06	1.72	1.96	2.24	2.17	1.56
Michigan	2.29	3.05	3.17	3.09	2.96	2.16	1.99	2.11	2.39	2.26	1.66
Minnesota	2.27	3.04	3.09	3.06	2.82	1.98	1.62	1.80	2.12	2.01	1.37
Missouri	2.29	3.05	3.12	3.11	2.88	2.02	1.75	1.93	2.19	2.08	1.46
Mississippi	2.27	2.91	3.11	2.99	2.78	1.88	1.58	1.91	2.23	2.09	1.56
Montana	2.40	3.03	3.06	3.00	2.90	2.05	1.86	2.16	2.48	2.30	1.78
North Carolina	2.30	3.01	3.10	3.05	2.89	1.99	1.76	1.97	2.23	2.07	1.56
North Dakota	2.38	3.13	3.15	3.16	2.95	2.07	1.78	1.98	2.31	2.18	1.48
Nebraska	2.33	3.08	3.15	3.08	2.91	2.06	1.70	1.89	2.17	2.55	2.53
New	2.34	2.97	3.25	3.09	2.91	2.06	1.72	1.90	2.24	2.62	2.60
New Jersey	2.30	3.07	3.22	3.07	2.85	1.91	1.61	1.84	2.12	2.91	1.47
New Mexico	2.39	3.01	3.06	2.95	2.81	1.98	1.73	1.98	2.28	2.18	1.63
Nevada	2.38	3.05	3.14	2.97	2.83	2.17	1.72	1.96	2.35	2.36	1.72
New York	2.37	3.11	3.26	3.14	2.94	2.01	1.72	1.95	2.26	2.14	1.62
Ohio	2.29	3.03	3.14	3.05	2.97	2.09	1.91	2.04	2.31	2.21	1.60
Oklahoma	2.26	2.97	3.05	3.03	2.80	1.95	1.59	1.82	2.09	1.94	1.34
Oregon	2.46	3.13	3.21	3.04	2.88	2.04	1.73	2.02	2.38	2.26	1.73
Pennsylvania	2.32	3.09	3.16	3.05	2.80	1.92	1.62	1.85	2.13	2.04	1.45
Rhode Island	2.34	3.13	3.27	3.16	2.94	2.04	1.77	1.90	2.16	2.54	2.52
South Carolina	2.29	3.00	3.10	3.06	2.90	2.00	1.76	1.97	2.24	2.09	1.58
South Dakota	2.38	3.08	3.13	3.09	2.93	2.14	1.75	1.92	2.23	2.10	1.47
Tennessee	2.29	3.00	3.10	3.05	2.87	1.95	1.73	1.92	2.18	2.03	1.51
Texas	2.27	2.98	3.12	3.04	2.81	1.87	1.61	1.86	2.11	1.98	1.41
Utah	2.45	2.99	3.03	2.95	2.80	2.00	1.64	1.91	2.33	2.13	1.70
Virginia	2.36	3.09	3.19	3.14	2.91	2.00	1.74	1.93	2.19	2.06	1.51
Vermont	2.34	2.97	3.25	3.11	2.93	2.06	1.72	1.90	2.24	2.13	1.58
Washington	2.45	3.11	3.17	3.03	2.85	2.02	1.75	2.06	2.42	2.30	1.75
Wisconsin	2.34	3.10	3.21	3.21	3.04	2.25	1.92	2.01	2.31	2.24	1.60
West Virginia	2.29	3.01	3.15	3.07	2.95	2.00	1.82	2.06	2.29	2.13	1.56
Wyoming	2.37	3.09	3.01	2.96	2.88	2.02	1.72	1.99	2.43	2.18	1.66

The prices in the above tables represent year-round prices for both reformulated and conventional types of gasoline. Separate gasoline prices for summertime and wintertime, and for reformulated and conventional gasoline types were estimated from this gasoline price data. Based on national average gasoline price data, summer gasoline averaged 5 cents higher than winter gasoline. This average summer/winter price differential for the annual average price data was assumed for each state. Reformulated gasoline prices averaged 6 cents more than conventional gasoline nationally and this price relationship was assumed for all states which consumed both reformulated and conventional types of gasoline. If the state solely consumed conventional or reformulated gasoline types, no price adjustment was necessary.

To estimate the volume of ethanol which could be blended into each state's gasoline it was necessary to estimate each state's gasoline consumption. The conventional and reformulated, regular and premium grade gasoline volume for each state was obtained from EIA's Prime Supplier gasoline sales data for 2016.[48] Table A25 summarizes the gasoline Prime Supplier Sales Volumes for 2016.

[48] Energy Information Administration; Prime Supplier Sales Volume; https://www.eia.gov/dnav/pet/pet_cons_prim_dcu_nus_m.htm.

Table A25. Prime Supplier Gasoline Sales Volume for 2016 (Thousand Gallons per Day)

	Conventional			Reformulated			
	Regular	Mid	Premium	Regular	Mid	Premium	Total
Alaska	639	18	69				726
Alabama	5,971	120	542				6,633
Arkansas	3,611	56	283				3,950
Arizona	2,543	57	299	4,559	102	666	8,227
California				30,489	1,032	8,444	39,966
Colorado	4,801	147	997				5,946
Connecticut				3,678	86	567	4,331
DC				147	8	34	189
Delaware				1,098	16	129	1,244
Florida	17,885	341	2,480				20,707
Georgia	11,703	352	1,454				13,509
Hawaii	975	67	269				1,311
Iowa	2,853	101	327				3,281
Idaho	1,694	26	276				1,996
Illinois	4,394	85	230	7,491	122	1,027	13,349
Indiana	6,935	112	444	1,147	26	108	8,773
Kansas	4,002	61	312				4,375
Kentucky	4,030	64	251	1,111	20	100	5,575
Louisiana	6,736	76	560				7,372
Massachusetts				6,253	151	888	7,291
Maryland	509	5	39	4,319	88	754	5,713
Maine	739	4	62	1,085	17	64	1,970
Michigan	11,655	88	729				12,472
Minnesota	5,896	188	509				6,593
Missouri	4,695	83	356	2,408	46	216	7,804
Mississippi	4,312	70	413				4,795
Montana	1,622	77	319				2,018
North Carolina	10,594	296	1,196				12,086
North Dakota	958	36	101				1,095
Nebraska	1,895	53	229				2,177
New Hampshire	330	3	24	1,074	22	110	1,562
New Jersey				9,371	159	1,447	10,978
New Mexico	2,296	89	304				2,688
Nevada	2,423	93	594				3,109
New York	5,942	81	543	7,095	255	1,612	15,528
Ohio	11,976	182	862				13,020
Oklahoma	5,126	71	470				5,666
Oregon	3,918	38	534				4,490
Pennsylvania	5,094	95	443	2,248	55	353	8,286
Rhode Island				1,503	36	207	1,746
South Carolina	6,296	204	659				7,159
South Dakota	1,026	35	109				1,169
Tennessee	8,396	210	879				9,485
Texas	20,081	290	1,820	14,693	315	2,148	39,347
Utah	2,814	62	738				3,613
Virginia	3,814	80	333	4,499	119	829	9,675
Vermont	779	10	65				854
Washington	6,275	109	1,202				7,585
Wisconsin	4,733	78	386	1,956	30	164	7,347
West Virginia	1,836	32	100				1,968
Wyoming	808	22	153				983

Two different adjustments were made to the 2016 gasoline sales volume data. The midgrade volume was less than 2 percent of the total gasoline pool and modeling this relatively small volume separately would not have made a material difference in the conclusions of the analysis. Therefore, the midgrade gasoline volume shown in the Table A25 was subdivided equally and half was added to the regular gasoline grade and the other half to the premium gasoline grade. For this analysis, we needed the state-by-state granularity provided by EIA's Prime Supplier sales data. However, EIA also publishes gasoline Product Supplied data (not reported on a state-by-state basis) which they believe more accurately captures overall gasoline sales volumes (the Prime Supplier sales data may miss some sales from small terminals and bulk plants). Comparing the Prime Supplier Sales data to the volume of gasoline Product Supplied shows that the Prime Supplier sales data to be about 4.5 percent lower.[49] To account for this shortfall, the 2016 Prime Supplier data summarized in Table A26 was increased by 4.5 percent.

Gasoline sales data for years other than 2016 was estimated using by a ratio of the total US gasoline demand for the respective year relative to that for 2016.[50] For example, the U.S. gasoline demand in 2014 was about 7 percent lower than that in 2016, thus, the 2014 gasoline sales for each state and each gasoline type was reduced by 7 percent relative to the base 2016 volumes.

Table A26. US Total Gasoline Volumes for Years 2000 to 2020 (thousand gallons per day)

2000	353,899
2001	361,723
2002	370,312
2003	370,939
2004	372,310
2005	378,473
2006	377,608
2007	376,636
2008	362,968
2009	362,798
2010	365,247
2011	354,951
2012	347,234
2013	348,657
2014	346,707
2015	361,056
2016	371,725
2017	375,118
2018	374,602
2019	367,306
2020	322,498

A.7. MTBE Bans and MTBE Blending Economics

The phase out of methyl tertiary butyl ether (MTBE) from the RFG pool, which occurred over the years from 2003 to 2006, occurred as a result of the adoption of state MTBE bans, the end of the federal RFG oxygenate requirement, and the failure of liability protections to be enacted by Congress.[51] [52] Table A27 lists the states which enacted MTBE bans, the year of their bans and the volume of MTBE consumed in each state in the year 2001.

[49] Energy Information Administration; Prime Supplier Sales Volume; https://www.eia.gov/dnav/pet/pet_cons_prim_dcu_nus_m.htm.
[50] Energy Information Administration; Product Supplied; https://www.eia.gov/dnav/pet/pet_cons_psup_dc_nus_mbbl_a.htm.
[51] Lidderdale, Tancrid; Motor Gasoline Outlook and State MTBE Bans; Energy Information Administration; April 6, 2003.
[52] Some state MTBE bans took effect as early as the year 2000, but there was no reported MTBE use in the states which enacted the earliest state MTBE bans.

Table A27. State MTBE Bans

State	Ban Date	RFG Program	MTBE Consumption in 2001 (thousand barrels/day)
California	Jan. 1, 2004	Yes	79.7
Connecticut	Oct. 1 2003	Yes	9.4
Kentucky	Jan. 1, 2006	Yes	2.2
Missouri	Jul. 1, 2005		3.2
New York	Jan. 1, 2004	Yes	21.1
Illinois	Jul. 24, 2004	Yes	0
Colorado	May 1, 2002		0
Indiana	Jul. 24, 2004	Yes	0
Iowa	May 11, 2000		0
Kansas	Jul. 1, 2004		0
Michigan	Jun. 1, 2003		0
Minnesota	Jul. 1, 2005		0
Nebraska	Jan. 1, 2004		0
Nevada	Jan. 1, 2001		0
Ohio	Jul. 1, 2005		0
South Dakota	Jul. 1, 2000		0
Washington	Jan. 1, 2004		0

Of the 17 states which enacted MTBE bans, only 5 of them showed any MTBE consumption in the year 2001, and actually 9 of them showed no MTBE consumption even in years prior to 2001 (the MTBE consumption data prior to 2001 was not included in the table). Of the states which were blending MTBE into their gasoline in 2001, 4 out of 5 of them had RFG programs in their state which required the use of an oxygenate. After the federal government rescinded the RFG oxygenate requirement in 2005 and bills providing liability protection to refiners failed, MTBE was no longer blended into the RFG pool. Table A28 summarizes the phase down of MTBE in gasoline, and also summarizes the increased blending of ethanol into gasoline. There is generally a one-to-one relationship such that the volume of MTBE removed from gasoline is matched by the volume of ethanol newly blended into gasoline.

Table A28 Summary of MTBE and Ethanol Volumes by Year

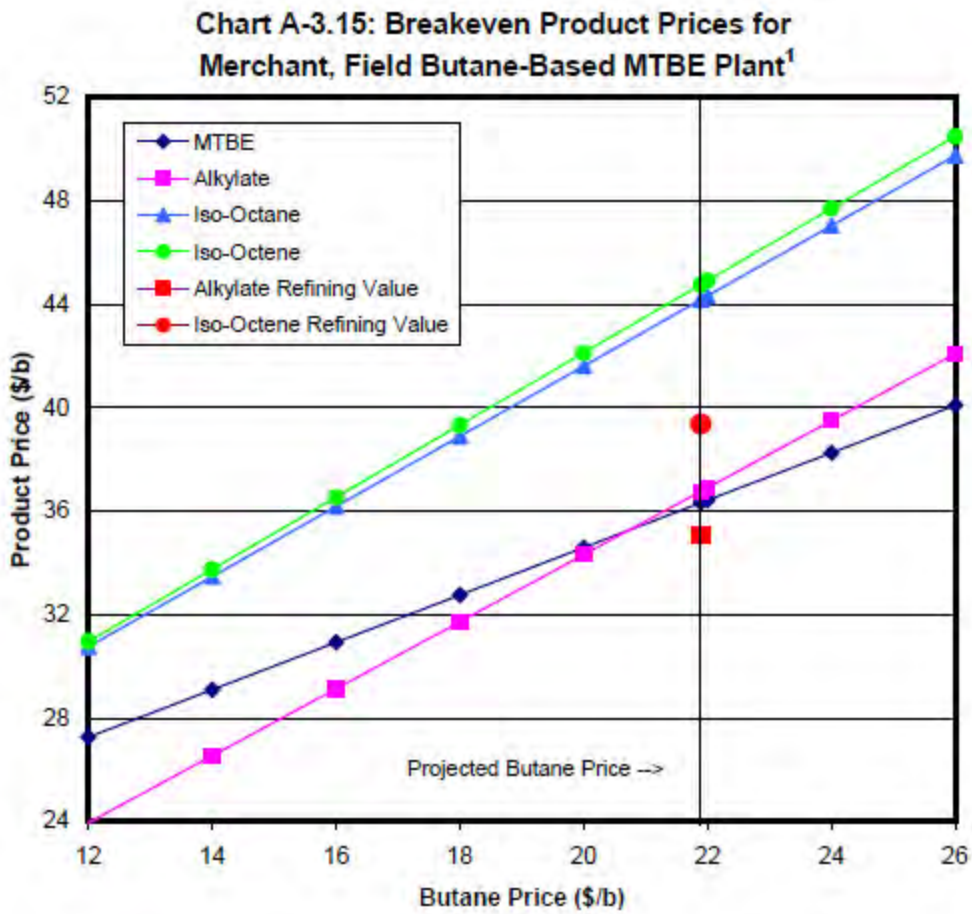
MTBE and Ethanol Blended into Gasoline (billion gallons)							
	2001	2002	2003	2004	2005	2006	2007
MTBE Volume	4.4	4.1	3.1	2.4	2.1	0.6	0
Ethanol Volume	1.7	2.1	2.8	3.6	4.1	5.5	6.6

While the state MTBE bans and the liability issues associated with using MTBE were the primary causes for the removal of MTBE from the gasoline pool, the blending economics of MTBE vs ethanol may have also played a role. The blending economics of MTBE was assessed by an Abt Associates (Mathpro) refinery modeling study conducted for EPA

when the phase-out of MTBE was being contemplated early in the 2000's.[53] The Abt refinery modeling study assessed MTBE's blending economics for the year 2007. However, it was conducted in 2002 and therefore did not take into consideration the increase in crude oil prices that occurred during the last part of the 2000 to 2010 time period. Abt used an MTBE price of $40.63 per barrel (96.7 cents per gallon) and projected a crude oil price of $23.25 per barrel in 2007. Abt also provided a breakeven cost curve for MTBE based on the feedstock price of butanes which is shown in Figure A1.

[53] Refinery Modeling: Legislative and Regulatory Developments: Effects on Gasoline Supply; Subtask 4.1: Federal Oxygenate Cases; Prepared for US Environmental Protection Agency by Abt Associates under subcontract from ICF Consulting; September 30, 2002.

Figure A1. MTBE Breakeven Costs Provided by Apt Associates



Butane Price ($/b)	Breakeven Product Price ($/b)			
			Iso-	
	MTBE	Alkylate	Octene	Octane
12	27.26	23.95	30.96	30.75
14	29.09	26.54	33.75	33.47
16	30.93	29.13	36.54	36.18
18	32.76	31.73	39.33	38.90
20	34.59	34.32	42.13	41.61
21.89	*36.33*	*36.77*	*44.76*	*44.18*
22	36.43	36.91	44.92	44.33
24	38.26	39.50	47.71	47.04
26	40.09	42.09	50.50	49.76

Note: Breakeven prices reflect subsidization of retrofit investments.
1 For Federal Oxygenate Case #1.

When the $21.89 per barrel butane price which Abt used in its refinery modeling analysis is applied to the breakeven cost curve, the breakeven MTBE breakeven cost is estimated to be $36.3 per barrel. The MTBE price used by Abt is $4.3 per barrel, or 10 cents per gallon, higher than the MTBE breakeven price. This price likely represents MTBE's higher octane value above that of gasoline (high octane gasoline blendstocks are typically priced higher than gasoline based on their relative octane value). To enable a comparison between MTBE and ethanol's blending value, MTBE's blending value was adjusted to represent its blending value in any year using the crude oil price in that year relative to the crude oil price used by Abt. The MTBE breakeven price is estimated assuming that butane is priced at 80 percent of

crude oil based on how butane was priced relative to crude oil since the early 2000s, which is a lower price than that used by Abt.[54] Table A29 summarizes the MTBE-ethanol blending cost comparison.

Table A29. MTBE-Ethanol Blending Cost Comparison

	Year							Mathpro 2007 Case Study
	2000	2001	2002	2003	2004	2005	2006	
Crude Oil Price ($/bbl)	28.66	24.46	24.99	28.85	38.26	54.57	65.16	23.25
Butane Price ($/bbl)	22.9	19.6	20.0	23.1	30.6	43.7	52.1	21.89
MTBE Breakeven $/bbl	37.3	34.2	34.6	37.4	44.3	56.3	64.0	36.3
MTBE Breakeven ($/gal)	0.89	0.81	0.82	0.89	1.06	1.34	1.52	
Actual MTBE price ($/gal)	0.99	0.91	0.92	1.00	1.18	1.50	1.71	0.97
Ethanol Blending Cost ($/gal)	1.20	1.35	1.00	1.23	1.57	1.68	2.46	
Ethanol Blending Cost based on Production Cost ($/gal)	0.82	0.89	0.91	0.98	1.20	1.11	1.13	

The MTBE blending analysis shows that MTBE was a lower cost gasoline blendstock than corn ethanol over the 2000 to 2006 timeframe. Between 2000 and 2006, the estimated actual MTBE price starts at $0.99/gal and rises to $1.71 per gallon. In comparison, the ethanol blending cost over this time period is $1.20 increasing to $2.46 per gallon. However, the ethanol blending cost increased dramatically in 2005 and 2006 due to the phase out of MTBE which likely caused an acute ethanol supply shortage.

The ethanol blending cost based on production cost (instead of spot prices) is summarized as well to understand what ethanol blending costs might be if ethanol prices had not spiked due to the MTBE phase out.[55] Over this time period, the ethanol blending cost was as low as 10 cents per gallon above the ethanol production cost. If we add that to the ethanol blending cost based on the production cost, the ethanol blending cost could have been as low as $1.11 and $1.13 per gallon for 2005 and 2006, respectively. Both of these estimated blending costs are lower than even the MTBE price breakeven prices for those two years. It could be, that ethanol would have been priced lower than MTBE starting in 2005 if the MTBE phase out due to groundwater concerns did not occur and ethanol perhaps would have started a more gradual process to replace MTBE in the RFG market.

A.8. Projection of Future Ethanol Blending Economics

Table A30 summarizes projected ethanol spot prices which are estimated by both Food and Agricultural Policy Research Institute (FAPRI) and the Energy Information Administration (EIA). [56] [57]Table A30. Projected Ethanol Spot Prices ($/gal, nominal dollars)

[54] Keller, Anne; Midstream Energy Group; November 2010.
[55] The ethanol blending cost based on production cost substitutes the estimated ethanol production cost for the ethanol spot prices in that year – this removes the large profit gained by ethanol producers which occurred the year of the MTBE phase-out.
[56] U.S. Baseline Outlook, Projections for Agricultural and Biofuels Markets; Food and Agricultural Policy Research Institute (FAPRI), University of Missouri; April 2022
[57] Annual Energy Outlook 2022, Table 12 Petroleum and Other Liquids Prices, Energy Information Administration.

	2021	2022	2023	2024	2025	2026
FAPRI 2022	2.43	1.80	1.67	1.64	1.61	1.62
EIA AEO 2022	1.45	1.49	1.55	1.65	1.59	1.72

In AEO 2020, EIA projects the wholesale price of gasoline for future years and this information was also compiled through the year 2028. The EIA wholesale gasoline price projections are only reported in 2021 dollars, so they were converted to nominal dollars using the EIA inflation projections. Table A31 contains the EIA projected wholesale price projections and the adjusted values in nominal dollars.

Table A31 Gasoline Wholesale Price Projections

	2021	2022	2023	2024	2025	2026
Brent Spot Prices ($/bbl)	72	72	63	70	73	77
Gasoline Spot Prices AEO 2022 (2021$)	2.25	2.13	1.82	1.81	1.79	1.82
EIA Inflation Adjustment	3.7	2.4	2.2	2.2	2.2	2.1
Gasoline Nominal Spot Prices (dollars)	2.25	2.18	1.90	1.93	1.95	2.03

For estimating future gasoline prices state-by-state and for each fuel type and season, all the state-by-state gasoline prices in any one year are adjusted from the 2018 gasoline prices using a value determined by the difference between the projected national average wholesale gasoline price in that year compared to a national average wholesale gasoline price in the year 2018. For example, the projected national average wholesale gasoline price in 2026 is 2.03 cents per gallon, which is 33 cents per gallon higher than the 1.98 cents per gallon average wholesale gasoline price in 2018. For the gasoline prices for each gasoline type and season, 5 cents per gallon is added to the respective 2018 wholesale gasoline price to estimate the year 2028 wholesale gasoline prices.

The ethanol blending value, both octane and RVP, are adjusted to future years using EIA's projected Brent spot price in nominal dollars, using the same method used for estimating corn ethanol's historical RVP blending value as described in Section A3. The projected Brent spot prices are also summarized in Table A29. Distribution costs are adjusted higher based on the inflation factors shown in Table A29.

A9. Ethanol Blending Cost Tables

The following tables summarize the results of the ethanol blending cost analysis year-by-year from the year 2000 to 2020. Because of the number of gasoline types/grades/seasons being modeled, each year's results are reported in three separate tables to avoid tables breaking across multiple pages. The gasoline code is shown in a A-BBB-CCCC configuration, where the "A" represents the season (S is for summer or W is for winter), the "BBB" represents the gasoline type (CG is conventional gasoline, RFG is reformulated gasoline) and "CCCC" represents the gasoline grade (reg is regular grade, Prem is premium grade). Ethanol's blending cost is summarized in the third column from the right, generally organized from lowest cost (usually negative indicating that ethanol is cheaper to use than gasoline) to highest cost. The Ethanol's Blending Cost is calculated by totaling the values in the Gasoline Price through State Subsidy columns in the table. At the top of the table are the gasolines which are controlled by a state mandate or RFG mandate, and these gasolines and their data are highlighted in a light grey color. In the early years, the reformulated gasolines (RFG) which relied on MTBE and which were presumed to not be candidates for blending ethanol are listed at the end of the table highlighted in a darker grey color. The two right-most columns in the tables summarize the ethanol volume which comprises 10 volume percent of the gasoline type being analyzed and the cumulative ethanol volume from the lowest cost to highest blending cost gasolines. The cumulative ethanol volume in the table which matches the actual ethanol volume consumed in that year is indicated by a dark line border around that cumulative ethanol volume. In these tables, the baseline ethanol replacement costs are adjusted to other years using octane prices, as opposed to crude oil prices The table numbering methodology is different for these tables. The table number refers to the year

analyzed followed by a letter A or B or C indicating whether it is the first, second or third portion of the data table for that analysis year.

Table A2000A Input Costs, Ethanol Blending Cost and Ethanol Volumes

Year 2000 State	Gasoline Code	Gasoline Volume MMgals	Gasoline Price $/gal	Ethanol Gate Price $/gal	Ethanol Dist Cost $/gal	Ethanol Blending $/gal	Federal Subsidy $/gal	State Subsidy $/gal	State Mandate	RFG "Mandate"	Ethanol Blending Cost c/gal	Ethanol Volume MMgals	Cumulative Eth Vol MMgals
Illinois	S-RFG-Reg	1254	1.02	1.35	0.12	0.40	0.54	0.26	0	1	-74.6	125.4	125
Illinois	S-RFG-Prem	181	1.17	1.35	0.12	0.28	0.54	0.26	0	1	-77.5	18.1	144
Indiana	S-RFG-Reg	193	1.01	1.35	0.12	0.40	0.54	0.00	0	1	-48.7	19.3	163
Wisconsin	S-RFG-Reg	327	1.01	1.35	0.12	0.40	0.54	0.00	0	1	-48.6	32.7	196
Indiana	S-RFG-Prem	20	1.12	1.35	0.12	0.28	0.54	0.00	0	1	-47.4	2.0	198
Wisconsin	S-RFG-Prem	30	1.11	1.35	0.12	0.28	0.54	0.00	0	1	-46.5	3.0	201
Illinois	W-RFG-Prem	219	1.12	1.35	0.12	0.15	0.54	0.26	0	1	-59.5	21.9	222
Illinois	W-RFG-reg	1517	0.97	1.35	0.12	0.20	0.54	0.26	0	1	-49.3	151.7	374
Indiana	W-RFG-Prem	24	1.07	1.35	0.12	0.15	0.54	0.00	0	1	-29.4	2.4	376
Indiana	W-RFG-reg	233	0.96	1.35	0.12	0.20	0.54	0.00	0	1	-23.4	23.3	400
Wisconsin	W-RFG-reg	396	0.96	1.35	0.12	0.20	0.54	0.00	0	1	-23.3	39.6	439
Wisconsin	W-RFG-Prem	36	1.06	1.35	0.12	0.15	0.54	0.00	0	1	-28.5	3.6	443
Minnesota	S-CG-Prem	100	1.07	1.35	0.12	0.00	0.54	0.00	1	0	-14.3	10.0	453
Minnesota	W-CG-Prem	121	1.02	1.35	0.12	0.00	0.54	0.00	1	0	-9.3	12.1	465
Minnesota	S-CG-Reg	995	0.99	1.35	0.12	0.00	0.54	0.00	1	0	-6.6	99.5	565
Minnesota	W-CG-reg	1203	0.94	1.35	0.12	0.00	0.54	0.00	1	0	-1.6	120.3	685
Missouri	S-RFG-Reg	404	1.00	1.35	0.12	0.40	0.54	0.00	0	0	-47.7	40.4	725
Rhode Island	S-RFG-Reg	253	1.02	1.35	0.19	0.40	0.54	0.00	0	0	-42.3	25.3	751
DC	S-RFG-Reg	25	0.99	1.35	0.19	0.40	0.54	0.00	0	0	-39.2	2.5	753
Illinois	S-CG-Prem	45	1.11	1.35	0.12	0.00	0.54	0.26	0	0	-43.3	4.5	758
Iowa	S-CG-Prem	63	1.04	1.35	0.12	0.00	0.54	0.30	0	0	-40.9	6.3	764
Illinois	W-CG-Prem	55	1.06	1.35	0.12	0.00	0.54	0.26	0	0	-38.3	5.5	769
Iowa	W-CG-Prem	76	0.99	1.35	0.12	0.00	0.54	0.30	0	0	-35.9	7.6	777
Iowa	S-CG-Reg	482	0.96	1.35	0.12	0.00	0.54	0.30	0	0	-32.5	48.2	825
Illinois	S-CG-Reg	737	0.96	1.35	0.12	0.00	0.54	0.26	0	0	-28.3	73.7	899
Iowa	W-CG-reg	583	0.91	1.35	0.12	0.00	0.54	0.30	0	0	-27.5	58.3	957
Illinois	W-CG-reg	891	0.91	1.35	0.12	0.00	0.54	0.26	0	0	-23.3	89.1	1,046
Nevada	S-CG-Prem	106	1.23	1.35	0.22	0.00	0.54	0.00	0	0	-20.3	10.6	1,057
Washington	S-CG-Prem	209	1.19	1.35	0.19	0.00	0.54	0.00	0	0	-19.1	20.9	1,078
Oregon	S-CG-Prem	92	1.19	1.35	0.19	0.00	0.54	0.00	0	0	-18.5	9.2	1,087
Michigan	S-CG-Prem	128	1.09	1.35	0.12	0.00	0.54	0.00	0	0	-16.6	12.8	1,100
Idaho	S-CG-Prem	48	1.13	1.35	0.16	0.00	0.54	0.00	0	0	-16.0	4.8	1,105
Montana	S-CG-Prem	59	1.13	1.35	0.16	0.00	0.54	0.00	0	0	-15.9	5.9	1,110
Nevada	W-CG-Prem	129	1.18	1.35	0.22	0.00	0.54	0.00	0	0	-15.3	12.9	1,123
Ohio	S-CG-Prem	158	1.08	1.35	0.12	0.00	0.54	0.00	0	0	-15.2	15.8	1,139
Washington	W-CG-Prem	252	1.14	1.35	0.19	0.00	0.54	0.00	0	0	-14.1	25.2	1,164
Utah	S-CG-Prem	128	1.11	1.35	0.16	0.00	0.54	0.00	0	0	-13.7	12.8	1,177
Oregon	W-CG-Prem	111	1.14	1.35	0.19	0.00	0.54	0.00	0	0	-13.5	11.1	1,188
Indiana	S-CG-Prem	83	1.06	1.35	0.12	0.00	0.54	0.00	0	0	-13.3	8.3	1,197
Wyoming	S-CG-Prem	27	1.10	1.35	0.16	0.00	0.54	0.00	0	0	-12.8	2.7	1,199
Wisconsin	S-CG-Prem	71	1.05	1.35	0.12	0.00	0.54	0.00	0	0	-12.4	7.1	1,206
South Dakota	S-CG-Prem	21	1.05	1.35	0.12	0.00	0.54	0.00	0	0	-12.3	2.1	1,208
Nebraska	S-CG-Prem	42	1.05	1.35	0.12	0.00	0.54	0.00	0	0	-11.7	4.2	1,213
Michigan	W-CG-Prem	155	1.04	1.35	0.12	0.00	0.54	0.00	0	0	-11.6	15.5	1,228
Missouri	S-CG-Prem	66	1.04	1.35	0.12	0.00	0.54	0.00	0	0	-11.5	6.6	1,235
Idaho	W-CG-Prem	58	1.08	1.35	0.16	0.00	0.54	0.00	0	0	-11.0	5.8	1,241
Montana	W-CG-Prem	72	1.08	1.35	0.16	0.00	0.54	0.00	0	0	-10.9	7.2	1,248
Ohio	W-CG-Prem	191	1.03	1.35	0.12	0.00	0.54	0.00	0	0	-10.2	19.1	1,267
Colorado	S-CG-Prem	178	1.07	1.35	0.16	0.00	0.54	0.00	0	0	-9.7	17.8	1,285
Arizona	S-CG-Prem	54	1.12	1.35	0.22	0.00	0.54	0.00	0	0	-9.3	5.4	1,290
Kansas	S-CG-Prem	57	1.02	1.35	0.12	0.00	0.54	0.00	0	0	-9.0	5.7	1,296
Utah	W-CG-Prem	154	1.06	1.35	0.16	0.00	0.54	0.00	0	0	-8.7	15.4	1,311
Indiana	W-CG-Prem	100	1.01	1.35	0.12	0.00	0.54	0.00	0	0	-8.3	10.0	1,321
Wyoming	W-CG-Prem	33	1.05	1.35	0.16	0.00	0.54	0.00	0	0	-7.8	3.3	1,325
New Mexico	S-CG-Prem	58	1.07	1.35	0.19	0.00	0.54	0.00	0	0	-7.7	5.8	1,330
Maryland	S-CG-Prem	7	1.07	1.35	0.19	0.00	0.54	0.00	0	0	-7.7	0.7	1,331
Wisconsin	W-CG-Prem	85	1.00	1.35	0.12	0.00	0.54	0.00	0	0	-7.4	8.5	1,340
South Dakota	W-CG-Prem	25	1.00	1.35	0.12	0.00	0.54	0.00	0	0	-7.3	2.5	1,342
Nevada	S-CG-Reg	410	1.10	1.35	0.22	0.00	0.54	0.00	0	0	-7.3	41.0	1,383
New York	W-CG-Prem	117	1.05	1.35	0.17	0.00	0.54	0.00	0	0	-7.0	11.7	1,395
Hawaii	S-CG-Prem	50	1.28	1.35	0.40	0.00	0.54	0.00	0	0	-6.8	5.0	1,400
Nebraska	W-CG-Prem	51	1.00	1.35	0.12	0.00	0.54	0.00	0	0	-6.7	5.1	1,405
North Dakota	S-CG-Prem	20	1.06	1.35	0.19	0.00	0.54	0.00	0	0	-6.6	2.0	1,407
Vermont	S-CG-Prem	12	1.08	1.35	0.20	0.00	0.54	0.00	0	0	-6.6	1.2	1,408
Idaho	S-CG-Reg	284	1.04	1.35	0.16	0.00	0.54	0.00	0	0	-6.6	28.4	1,437
Missouri	W-CG-Prem	80	0.99	1.35	0.12	0.00	0.54	0.00	0	0	-6.5	8.0	1,444
Washington	S-CG-Reg	1051	1.06	1.35	0.19	0.00	0.54	0.00	0	0	-5.8	105.1	1,550
Michigan	S-CG-Reg	1943	0.98	1.35	0.12	0.00	0.54	0.00	0	0	-5.6	194.3	1,744
Pennsylvania	S-CG-Prem	81	1.04	1.35	0.17	0.00	0.54	0.00	0	0	-5.5	8.1	1,752
Kentucky	S-CG-Prem	47	1.05	1.35	0.19	0.00	0.54	0.00	0	0	-5.0	4.7	1,757
Virginia	S-CG-Prem	62	1.04	1.35	0.19	0.00	0.54	0.00	0	0	-4.9	6.2	1,763
West Virginia	S-CG-Prem	19	1.03	1.35	0.17	0.00	0.54	0.00	0	0	-4.8	1.9	1,765
Colorado	W-CG-Prem	215	1.02	1.35	0.16	0.00	0.54	0.00	0	0	-4.7	21.5	1,786
Oregon	S-CG-Reg	654	1.05	1.35	0.19	0.00	0.54	0.00	0	0	-4.6	65.4	1,852
Arizona	W-CG-Prem	66	1.07	1.35	0.22	0.00	0.54	0.00	0	0	-4.3	6.6	1,858
Montana	S-CG-Reg	276	1.01	1.35	0.16	0.00	0.54	0.00	0	0	-4.1	27.6	1,886
Utah	S-CG-Reg	473	1.01	1.35	0.16	0.00	0.54	0.00	0	0	-4.1	47.3	1,933
Kansas	W-CG-Prem	69	0.97	1.35	0.12	0.00	0.54	0.00	0	0	-4.0	6.9	1,940
Ohio	S-CG-Reg	2004	0.97	1.35	0.12	0.00	0.54	0.00	0	0	-3.9	200.4	2,141
Arkansas	S-CG-Prem	52	1.00	1.35	0.15	0.00	0.54	0.00	0	0	-3.7	5.2	2,146
South Dakota	S-CG-Reg	173	0.96	1.35	0.12	0.00	0.54	0.00	0	0	-3.5	17.3	2,163
Wyoming	S-CG-Reg	136	1.00	1.35	0.16	0.00	0.54	0.00	0	0	-3.3	13.6	2,177
New Hampshire	W-CG-Prem	5	1.04	1.35	0.20	0.00	0.54	0.00	0	0	-3.2	0.5	2,177
New Mexico	W-CG-Prem	70	1.02	1.35	0.19	0.00	0.54	0.00	0	0	-2.7	7.0	2,184
Maryland	W-CG-Prem	8	1.02	1.35	0.19	0.00	0.54	0.00	0	0	-2.7	0.8	2,185

Table A2000B Input Costs, Ethanol Blending Cost and Ethanol Volumes

Year 2000 State	Gasoline Code	Gasoline Volume MMgals	Gasoline Price $/gal	Ethanol Gate Price $/gal	Ethanol Dist Cost $/gal	Ethanol Blending $/gal	Federal Subsidy $/gal	State Subsidy $/gal	State Mandate	RFG "Mandate"	Ethanol Blending Cost c/gal	Ethanol Volume MMgals	Cumulative Eth Vol MMgals
Nebraska	S-CG-Reg	319	0.95	1.35	0.12	0.00	0.54	0.00	0	0	-2.6	31.9	2,217
Mississippi	S-CG-Prem	74	0.99	1.35	0.15	0.00	0.54	0.00	0	0	-2.6	7.4	2,224
Indiana	S-CG-Reg	1161	0.95	1.35	0.12	0.00	0.54	0.00	0	0	-2.5	116.1	2,340
Wisconsin	S-CG-Reg	793	0.95	1.35	0.12	0.00	0.54	0.00	0	0	-2.4	79.3	2,420
Nevada	W-CG-reg	496	1.05	1.35	0.22	0.00	0.54	0.00	0	0	-2.3	49.6	2,469
Hawaii	W-CG-Prem	61	1.23	1.35	0.40	0.00	0.54	0.00	0	0	-1.8	6.1	2,475
Alaska	S-CG-Prem	13	1.23	1.35	0.40	0.00	0.54	0.00	0	0	-1.7	1.3	2,477
North Dakota	W-CG-Prem	24	1.01	1.35	0.19	0.00	0.54	0.00	0	0	-1.6	2.4	2,479
Vermont	W-CG-Prem	14	1.03	1.35	0.20	0.00	0.54	0.00	0	0	-1.6	1.4	2,480
Idaho	W-CG-reg	343	0.99	1.35	0.16	0.00	0.54	0.00	0	0	-1.6	34.3	2,515
Alabama	S-CG-Prem	100	1.01	1.35	0.19	0.00	0.54	0.00	0	0	-1.5	10.0	2,525
Missouri	S-CG-Reg	787	0.94	1.35	0.12	0.00	0.54	0.00	0	0	-1.5	78.7	2,603
Kansas	S-CG-Reg	670	0.94	1.35	0.12	0.00	0.54	0.00	0	0	-1.1	67.0	2,670
Georgia	S-CG-Prem	271	1.02	1.35	0.20	0.00	0.54	0.00	0	0	-1.0	27.1	2,697
Tennessee	S-CG-Prem	163	1.01	1.35	0.19	0.00	0.54	0.00	0	0	-1.0	16.3	2,714
Colorado	S-CG-Reg	810	0.98	1.35	0.16	0.00	0.54	0.00	0	0	-0.8	81.0	2,795
Washington	W-CG-reg	1271	1.01	1.35	0.19	0.00	0.54	0.00	0	0	-0.8	127.1	2,922
Michigan	W-CG-reg	2350	0.93	1.35	0.12	0.00	0.54	0.00	0	0	-0.6	235.0	3,157
Pennsylvania	W-CG-Prem	98	0.99	1.35	0.17	0.00	0.54	0.00	0	0	-0.5	9.8	3,167
Texas	S-CG-Prem	326	0.96	1.35	0.15	0.00	0.54	0.00	0	0	-0.1	32.6	3,199
Kentucky	W-CG-Prem	57	1.00	1.35	0.19	0.00	0.54	0.00	0	0	0.0	5.7	3,205
Virginia	W-CG-Prem	75	0.99	1.35	0.19	0.00	0.54	0.00	0	0	0.1	7.5	3,213
West Virginia	W-CG-Prem	23	0.98	1.35	0.17	0.00	0.54	0.00	0	0	0.2	2.3	3,215
Oklahoma	S-CG-Prem	84	0.98	1.35	0.19	0.00	0.54	0.02	0	0	0.4	8.4	3,223
South Carolina	S-CG-Prem	126	1.01	1.35	0.20	0.00	0.54	0.00	0	0	0.4	12.6	3,236
Oregon	W-CG-reg	791	1.00	1.35	0.19	0.00	0.54	0.00	0	0	0.4	79.1	3,315
Florida	S-CG-Prem	440	1.05	1.35	0.24	0.00	0.54	0.00	0	0	0.5	44.0	3,359
North Carolina	S-CG-Prem	223	1.00	1.35	0.20	0.00	0.54	0.00	0	0	0.7	22.3	3,381
Montana	W-CG-reg	334	0.96	1.35	0.16	0.00	0.54	0.00	0	0	0.9	33.4	3,415
Utah	W-CG-reg	571	0.96	1.35	0.16	0.00	0.54	0.00	0	0	0.9	57.1	3,472
Ohio	W-CG-reg	2424	0.92	1.35	0.12	0.00	0.54	0.00	0	0	1.1	242.4	3,714
Louisiana	S-CG-Prem	99	0.95	1.35	0.15	0.00	0.54	0.00	0	0	1.1	9.9	3,724
Arkansas	W-CG-Prem	62	0.95	1.35	0.15	0.00	0.54	0.00	0	0	1.3	6.2	3,730
South Dakota	W-CG-reg	210	0.91	1.35	0.12	0.00	0.54	0.00	0	0	1.5	21.0	3,751
New Mexico	S-CG-Reg	389	0.98	1.35	0.19	0.00	0.54	0.00	0	0	1.7	38.9	3,790
Wyoming	W-CG-reg	164	0.95	1.35	0.16	0.00	0.54	0.00	0	0	1.7	16.4	3,807
North Dakota	S-CG-Reg	162	0.97	1.35	0.19	0.00	0.54	0.00	0	0	2.4	16.2	3,823
Vermont	S-CG-Reg	130	0.99	1.35	0.20	0.00	0.54	0.00	0	0	2.4	13.0	3,836
Nebraska	W-CG-reg	386	0.90	1.35	0.12	0.00	0.54	0.00	0	0	2.4	38.6	3,874
Mississippi	W-CG-Prem	90	0.94	1.35	0.15	0.00	0.54	0.00	0	0	2.4	9.0	3,883
New York	S-CG-Reg	994	0.96	1.35	0.17	0.00	0.54	0.00	0	0	2.4	99.4	3,983
Indiana	W-CG-reg	1404	0.90	1.35	0.12	0.00	0.54	0.00	0	0	2.5	140.4	4,123
Hawaii	S-CG-Reg	168	1.18	1.35	0.40	0.00	0.54	0.00	0	0	2.6	16.8	4,140
Wisconsin	W-CG-reg	958	0.90	1.35	0.12	0.00	0.54	0.00	0	0	2.6	95.8	4,236
Maine	S-CG-Prem	11	1.03	1.35	0.24	0.00	0.54	0.00	0	0	2.7	1.1	4,237
Alaska	W-CG-Prem	16	1.18	1.35	0.40	0.00	0.54	0.00	0	0	3.3	1.6	4,238
Alabama	W-CG-Prem	121	0.96	1.35	0.19	0.00	0.54	0.00	0	0	3.5	12.1	4,251
Missouri	W-CG-reg	951	0.89	1.35	0.12	0.00	0.54	0.00	0	0	3.5	95.1	4,346
Arizona	S-CG-Reg	427	0.99	1.35	0.22	0.00	0.54	0.00	0	0	3.7	42.7	4,388
Kansas	W-CG-reg	810	0.89	1.35	0.12	0.00	0.54	0.00	0	0	3.9	81.0	4,469
Maryland	S-CG-Reg	85	0.96	1.35	0.19	0.00	0.54	0.00	0	0	3.9	8.5	4,478
Georgia	W-CG-Prem	327	0.97	1.35	0.20	0.00	0.54	0.00	0	0	4.0	32.7	4,511
Tennessee	W-CG-Prem	198	0.96	1.35	0.19	0.00	0.54	0.00	0	0	4.0	19.8	4,530
Arkansas	S-CG-Reg	604	0.92	1.35	0.15	0.00	0.54	0.00	0	0	4.0	60.4	4,591
Colorado	W-CG-reg	979	0.93	1.35	0.16	0.00	0.54	0.00	0	0	4.2	97.9	4,689
Kentucky	S-CG-Reg	675	0.95	1.35	0.19	0.00	0.54	0.00	0	0	4.4	67.5	4,756
New Hampshire	S-CG-Reg	55	0.96	1.35	0.20	0.00	0.54	0.00	0	0	4.7	5.5	4,762
Pennsylvania	S-CG-Reg	854	0.93	1.35	0.17	0.00	0.54	0.00	0	0	4.8	85.4	4,847
West Virginia	S-CG-Reg	308	0.93	1.35	0.17	0.00	0.54	0.00	0	0	4.9	30.8	4,878
Texas	W-CG-Prem	395	0.91	1.35	0.15	0.00	0.54	0.00	0	0	4.9	39.5	4,917
Oklahoma	W-CG-Prem	101	0.93	1.35	0.19	0.00	0.54	0.02	0	0	5.4	10.1	4,927
South Carolina	W-CG-Prem	153	0.96	1.35	0.20	0.00	0.54	0.00	0	0	5.4	15.3	4,943
Florida	W-CG-Prem	532	1.00	1.35	0.24	0.00	0.54	0.00	0	0	5.5	53.2	4,996
North Carolina	W-CG-Prem	270	0.95	1.35	0.20	0.00	0.54	0.00	0	0	5.7	27.0	5,023
Louisiana	W-CG-Prem	120	0.90	1.35	0.15	0.00	0.54	0.00	0	0	6.1	12.0	5,035
Louisiana	S-CG-Reg	1125	0.89	1.35	0.15	0.00	0.54	0.00	0	0	6.5	112.5	5,148
New Mexico	W-CG-reg	470	0.93	1.35	0.19	0.00	0.54	0.00	0	0	6.7	47.0	5,195
Virginia	S-CG-Reg	640	0.93	1.35	0.19	0.00	0.54	0.00	0	0	6.9	64.0	5,259
Mississippi	S-CG-Reg	722	0.89	1.35	0.15	0.00	0.54	0.00	0	0	7.0	72.2	5,331
Oklahoma	S-CG-Reg	857	0.91	1.35	0.19	0.00	0.54	0.02	0	0	7.2	85.7	5,416
North Dakota	W-CG-reg	196	0.92	1.35	0.19	0.00	0.54	0.00	0	0	7.4	19.6	5,436
Vermont	W-CG-reg	157	0.94	1.35	0.20	0.00	0.54	0.00	0	0	7.4	15.7	5,452
New York	W-CG-reg	1202	0.91	1.35	0.17	0.00	0.54	0.00	0	0	7.4	120.2	5,572
Hawaii	W-CG-reg	203	1.13	1.35	0.40	0.00	0.54	0.00	0	0	7.6	20.3	5,592
Maine	W-CG-Prem	13	0.98	1.35	0.24	0.00	0.54	0.00	0	0	7.7	1.3	5,594
Arizona	W-CG-reg	517	0.94	1.35	0.22	0.00	0.54	0.00	0	0	8.7	51.7	5,645
Tennessee	S-CG-Reg	1412	0.91	1.35	0.19	0.00	0.54	0.00	0	0	8.8	141.2	5,786
Alaska	S-CG-Reg	108	1.12	1.35	0.40	0.00	0.54	0.00	0	0	8.8	10.8	5,797
Texas	S-CG-Reg	3360	0.87	1.35	0.15	0.00	0.54	0.00	0	0	8.8	336.0	6,133
Alabama	S-CG-Reg	1002	0.91	1.35	0.19	0.00	0.54	0.00	0	0	8.9	100.2	6,233
Maryland	W-CG-reg	103	0.91	1.35	0.19	0.00	0.54	0.00	0	0	8.9	10.3	6,244
Arkansas	W-CG-reg	731	0.87	1.35	0.15	0.00	0.54	0.00	0	0	9.0	73.1	6,317
Kentucky	W-CG-reg	816	0.90	1.35	0.19	0.00	0.54	0.00	0	0	9.4	81.6	6,398
Georgia	S-CG-Reg	1973	0.91	1.35	0.20	0.00	0.54	0.00	0	0	9.7	197.3	6,596
New Hampshire	W-CG-reg	67	0.91	1.35	0.20	0.00	0.54	0.00	0	0	9.7	6.7	6,602

Table A2000C Input Costs, Ethanol Blending Cost and Ethanol Volumes

Year 2000 State	Gasoline Code	Gasoline Volume MMgals	Gasoline Price $/gal	Ethanol Gate Price $/gal	Ethanol Dist Cost $/gal	Ethanol Blending $/gal	Federal Subsidy $/gal	State Subsidy $/gal	State Mandate	RFG "Mandate"	Ethanol Blending Cost c/gal	Ethanol Volume MMgals	Cumulative Eth Vol MMgals
Pennsylvania	W-CG-reg	1033	0.88	1.35	0.17	0.00	0.54	0.00	0	0	9.8	103.3	6,705
West Virginia	W-CG-reg	372	0.88	1.35	0.17	0.00	0.54	0.00	0	0	9.9	37.2	6,743
South Carolina	S-CG-Reg	1063	0.91	1.35	0.20	0.00	0.54	0.00	0	0	10.3	106.3	6,849
North Carolina	S-CG-Reg	1784	0.91	1.35	0.20	0.00	0.54	0.00	0	0	10.4	178.4	7,027
Louisiana	W-CG-reg	1361	0.84	1.35	0.15	0.00	0.54	0.00	0	0	11.5	136.1	7,163
Virginia	W-CG-reg	774	0.88	1.35	0.19	0.00	0.54	0.00	0	0	11.9	77.4	7,241
Mississippi	W-CG-reg	873	0.84	1.35	0.15	0.00	0.54	0.00	0	0	12.0	87.3	7,328
Oklahoma	W-CG-reg	1037	0.86	1.35	0.19	0.00	0.54	0.02	0	0	12.2	103.7	7,432
Maine	S-CG-Reg	123	0.93	1.35	0.24	0.00	0.54	0.00	0	0	12.3	12.3	7,444
Florida	S-CG-Reg	2999	0.92	1.35	0.24	0.00	0.54	0.00	0	0	13.1	299.9	7,744
Tennessee	W-CG-reg	1707	0.86	1.35	0.19	0.00	0.54	0.00	0	0	13.8	170.7	7,915
Alaska	W-CG-reg	130	1.07	1.35	0.40	0.00	0.54	0.00	0	0	13.8	13.0	7,928
Texas	W-CG-reg	4062	0.82	1.35	0.15	0.00	0.54	0.00	0	0	13.8	406.2	8,334
Alabama	W-CG-reg	1211	0.86	1.35	0.19	0.00	0.54	0.00	0	0	13.9	121.1	8,455
Georgia	W-CG-reg	2386	0.86	1.35	0.20	0.00	0.54	0.00	0	0	14.7	238.6	8,694
South Carolina	W-CG-reg	1285	0.86	1.35	0.20	0.00	0.54	0.00	0	0	15.3	128.5	8,822
North Carolina	W-CG-reg	2158	0.86	1.35	0.20	0.00	0.54	0.00	0	0	15.4	215.8	9,038
Maine	W-CG-reg	149	0.88	1.35	0.24	0.00	0.54	0.00	0	0	17.3	14.9	9,053
Florida	W-CG-reg	3627	0.87	1.35	0.24	0.00	0.54	0.00	0	0	18.1	362.7	9,416
California	S-RFG-Prem	1488	1.21	1.35	0.22	0.28	0.54	0.00	0	0	-46.4	148.8	9,564
New York	S-RFG-Prem	289	1.16	1.35	0.17	0.28	0.54	0.00	0	0	-46.1	28.9	9,593
Missouri	S-RFG-Prem	40	1.10	1.35	0.12	0.28	0.54	0.00	0	0	-45.6	4.0	9,597
Massachusetts	S-RFG-Prem	160	1.16	1.35	0.19	0.28	0.54	0.00	0	0	-44.2	16.0	9,613
Arizona	S-RFG-Prem	119	1.18	1.35	0.22	0.28	0.54	0.00	0	0	-43.4	11.9	9,625
New Hampshire	S-RFG-Prem	20	1.15	1.35	0.20	0.28	0.54	0.00	0	0	-42.4	2.0	9,627
Maryland	S-RFG-Prem	133	1.13	1.35	0.19	0.28	0.54	0.00	0	0	-41.9	13.3	9,640
California	W-RFG-Prem	1800	1.16	1.35	0.22	0.15	0.54	0.00	0	0	-28.4	180.0	9,820
New York	W-RFG-Prem	349	1.11	1.35	0.17	0.15	0.54	0.00	0	0	-28.1	34.9	9,855
Missouri	W-RFG-Prem	48	1.05	1.35	0.12	0.15	0.54	0.00	0	0	-27.6	4.8	9,860
Connecticut	S-RFG-Prem	101	1.12	1.35	0.19	0.28	0.54	0.00	0	0	-41.0	10.1	9,870
Rhode Island	S-RFG-Prem	37	1.12	1.35	0.19	0.28	0.54	0.00	0	0	-41.0	3.7	9,874
New York	S-CG-Prem	97	1.10	1.35	0.17	0.00	0.54	0.00	0	0	-12.0	9.7	9,884
California	S-RFG-Reg	5150	1.08	1.35	0.22	0.40	0.54	0.00	0	0	-45.8	515.0	10,399
New Jersey	S-RFG-Prem	254	1.11	1.35	0.19	0.28	0.54	0.00	0	0	-39.7	25.4	10,424
Pennsylvania	S-RFG-Prem	63	1.10	1.35	0.17	0.28	0.54	0.00	0	0	-39.7	6.3	10,430
Massachusetts	W-RFG-Prem	193	1.11	1.35	0.19	0.15	0.54	0.00	0	0	-26.2	19.3	10,450
Massachusetts	S-RFG-Reg	1051	1.05	1.35	0.19	0.40	0.54	0.00	0	0	-45.2	105.1	10,555
Kentucky	S-RFG-Prem	18	1.11	1.35	0.19	0.28	0.54	0.00	0	0	-39.2	1.8	10,557
Virginia	S-RFG-Prem	148	1.10	1.35	0.19	0.28	0.54	0.00	0	0	-39.0	14.8	10,571
Arizona	W-RFG-Prem	144	1.13	1.35	0.22	0.15	0.54	0.00	0	0	-25.4	14.4	10,586
DC	S-RFG-Prem	6	1.10	1.35	0.19	0.28	0.54	0.00	0	0	-38.8	0.6	10,586
Delaware	S-RFG-Prem	23	1.10	1.35	0.19	0.28	0.54	0.00	0	0	-38.6	2.3	10,589
New York	S-RFG-Reg	1200	1.02	1.35	0.17	0.40	0.54	0.00	0	0	-43.8	120.0	10,709
New Hampshire	W-RFG-Prem	24	1.10	1.35	0.20	0.15	0.54	0.00	0	0	-24.4	2.4	10,711
Maryland	W-RFG-Prem	160	1.08	1.35	0.19	0.15	0.54	0.00	0	0	-23.9	16.0	10,727
Arizona	S-RFG-Reg	766	1.05	1.35	0.22	0.40	0.54	0.00	0	0	-42.5	76.6	10,804
Connecticut	S-RFG-Reg	618	1.02	1.35	0.19	0.40	0.54	0.00	0	0	-42.4	61.8	10,865
New Hampshire	S-CG-Prem	4	1.09	1.35	0.20	0.00	0.54	0.00	0	0	-8.2	0.4	10,866
Maryland	S-RFG-Reg	725	1.02	1.35	0.19	0.40	0.54	0.00	0	0	-42.4	72.5	10,938
Connecticut	W-RFG-Prem	123	1.07	1.35	0.19	0.15	0.54	0.00	0	0	-23.0	12.3	10,951
Rhode Island	W-RFG-Prem	45	1.07	1.35	0.19	0.15	0.54	0.00	0	0	-23.0	4.5	10,955
Kentucky	S-RFG-Reg	186	1.01	1.35	0.19	0.40	0.54	0.00	0	0	-41.9	18.6	10,974
New Hampshire	S-RFG-Reg	180	1.02	1.35	0.20	0.40	0.54	0.00	0	0	-41.6	18.0	10,992
Pennsylvania	S-RFG-Reg	378	0.99	1.35	0.17	0.40	0.54	0.00	0	0	-41.5	37.8	11,030
New Jersey	W-RFG-Prem	307	1.06	1.35	0.19	0.15	0.54	0.00	0	0	-21.7	30.7	11,060
Pennsylvania	W-RFG-Prem	76	1.05	1.35	0.17	0.15	0.54	0.00	0	0	-21.7	7.6	11,068
Kentucky	W-RFG-Prem	22	1.06	1.35	0.19	0.15	0.54	0.00	0	0	-21.2	2.2	11,070
Virginia	W-RFG-Prem	179	1.05	1.35	0.19	0.15	0.54	0.00	0	0	-21.0	17.9	11,088
Delaware	S-RFG-Reg	184	0.99	1.35	0.19	0.40	0.54	0.00	0	0	-40.0	18.4	11,106
DC	W-RFG-Prem	8	1.05	1.35	0.19	0.15	0.54	0.00	0	0	-20.8	0.8	11,107
Texas	S-RFG-Prem	383	1.02	1.35	0.15	0.28	0.54	0.00	0	0	-34.2	38.3	11,145
Delaware	W-RFG-Prem	28	1.05	1.35	0.19	0.15	0.54	0.00	0	0	-20.6	2.8	11,148
Virginia	S-RFG-Reg	757	0.99	1.35	0.19	0.40	0.54	0.00	0	0	-39.3	75.7	11,224
New Jersey	S-RFG-Reg	1570	0.98	1.35	0.19	0.40	0.54	0.00	0	0	-38.9	157.0	11,381
Texas	S-RFG-Reg	2467	0.93	1.35	0.15	0.40	0.54	0.00	0	0	-37.4	246.7	11,628
Maine	S-RFG-Prem	12	1.09	1.35	0.24	0.28	0.54	0.00	0	0	-31.5	1.2	11,629
Missouri	W-RFG-reg	488	0.95	1.35	0.12	0.20	0.54	0.00	0	0	-22.4	48.8	11,678
Texas	W-RFG-Prem	463	0.97	1.35	0.15	0.15	0.54	0.00	0	0	-16.2	46.3	11,724
California	W-RFG-reg	6228	1.03	1.35	0.22	0.20	0.54	0.00	0	0	-20.5	622.8	12,347
Massachusetts	W-RFG-reg	1271	1.00	1.35	0.19	0.20	0.54	0.00	0	0	-19.9	127.1	12,474
Maine	S-RFG-Reg	182	0.99	1.35	0.24	0.40	0.54	0.00	0	0	-34.0	18.2	12,492
New York	W-RFG-reg	1451	0.97	1.35	0.17	0.20	0.54	0.00	0	0	-18.5	145.1	12,637
Maine	W-RFG-Prem	15	1.04	1.35	0.24	0.15	0.54	0.00	0	0	-13.5	1.5	12,638
Arizona	W-RFG-reg	926	1.00	1.35	0.22	0.20	0.54	0.00	0	0	-17.2	92.6	12,731
Connecticut	W-RFG-reg	747	0.97	1.35	0.19	0.20	0.54	0.00	0	0	-17.1	74.7	12,806
Maryland	W-RFG-reg	876	0.97	1.35	0.19	0.20	0.54	0.00	0	0	-17.1	87.6	12,893
Rhode Island	W-RFG-reg	305	0.97	1.35	0.19	0.20	0.54	0.00	0	0	-17.0	30.5	12,924
Kentucky	W-RFG-reg	225	0.96	1.35	0.19	0.20	0.54	0.00	0	0	-16.6	22.5	12,946
New Hampshire	W-RFG-reg	218	0.97	1.35	0.20	0.20	0.54	0.00	0	0	-16.2	21.8	12,968
Pennsylvania	W-RFG-reg	457	0.94	1.35	0.17	0.20	0.54	0.00	0	0	-16.2	45.7	13,014
Delaware	W-RFG-reg	222	0.94	1.35	0.19	0.20	0.54	0.00	0	0	-14.7	22.2	13,036
Virginia	W-RFG-reg	916	0.94	1.35	0.19	0.20	0.54	0.00	0	0	-14.0	91.6	13,128
DC	W-RFG-reg	30	0.94	1.35	0.19	0.20	0.54	0.00	0	0	-13.9	3.0	13,131
New Jersey	W-RFG-reg	1898	0.93	1.35	0.19	0.20	0.54	0.00	0	0	-13.6	189.8	13,320
Texas	W-RFG-reg	2983	0.88	1.35	0.15	0.20	0.54	0.00	0	0	-12.1	298.3	13,619
Maine	W-RFG-reg	220	0.94	1.35	0.24	0.20	0.54	0.00	0	0	-8.7	22.0	13,641

Table A2001A Input Costs, Ethanol Blending Cost and Ethanol Volumes

Year 2001 State	Gasoline Code	Gasoline Volume MMgals	Gasoline Price $/gal	Ethanol Gate Price $/gal	Ethanol Dist Cost $/gal	Ethanol Blending $/gal	Federal Subsidy $/gal	State Subsidy $/gal	State Mandate	RFG "Mandate"	Ethanol Blending Cost c/gal	Ethanol Volume MMgals	Cumulative Eth Vol MMgals
Illinois	S-RFG-Prem	185	1.12	1.48	0.12	0.23	0.54	0.26	0	1	-54.3	18.5	18
Illinois	S-RFG-Reg	1282	0.97	1.48	0.12	0.32	0.54	0.26	0	1	-48.6	128.2	147
Illinois	W-RFG-Prem	223	1.07	1.48	0.12	0.12	0.54	0.26	0	1	-39.0	22.3	169
Wisconsin	S-RFG-Reg	335	0.97	1.48	0.12	0.32	0.54	0.00	0	1	-23.1	33.5	202
Indiana	S-RFG-Reg	197	0.95	1.48	0.12	0.32	0.54	0.00	0	1	-21.8	19.7	222
Wisconsin	S-RFG-Prem	30	1.07	1.48	0.12	0.23	0.54	0.00	0	1	-23.9	3.0	225
Indiana	S-RFG-Prem	21	1.07	1.48	0.12	0.23	0.54	0.00	0	1	-23.5	2.1	227
Illinois	W-RFG-reg	1550	0.92	1.48	0.12	0.16	0.54	0.26	0	1	-27.4	155.0	382
Wisconsin	W-RFG-Prem	37	1.02	1.48	0.12	0.12	0.54	0.00	0	1	-8.7	3.7	386
Indiana	W-RFG-Prem	25	1.02	1.48	0.12	0.12	0.54	0.00	0	1	-8.3	2.5	388
Wisconsin	W-RFG-reg	405	0.92	1.48	0.12	0.16	0.54	0.00	0	1	-1.9	40.5	429
Indiana	W-RFG-reg	238	0.90	1.48	0.12	0.16	0.54	0.00	0	1	-0.6	23.8	453
Minnesota	S-CG-Prem	102	1.03	1.48	0.12	0.00	0.54	0.00	1	0	3.2	10.2	463
Minnesota	W-CG-Prem	124	0.98	1.48	0.12	0.00	0.54	0.00	1	0	8.2	12.4	475
Minnesota	S-CG-Reg	1017	0.96	1.48	0.12	0.00	0.54	0.00	1	0	10.4	101.7	577
Minnesota	W-CG-reg	1230	0.91	1.48	0.12	0.00	0.54	0.00	1	0	15.4	123.0	700
Illinois	S-CG-Prem	46	1.06	1.48	0.12	0.00	0.54	0.26	0	0	-25.7	4.6	705
Iowa	S-CG-Prem	64	0.99	1.48	0.12	0.00	0.54	0.30	0	0	-22.0	6.4	711
Illinois	W-CG-Prem	56	1.01	1.48	0.12	0.00	0.54	0.26	0	0	-20.7	5.6	717
Iowa	W-CG-Prem	78	0.94	1.48	0.12	0.00	0.54	0.30	0	0	-17.0	7.8	724
Iowa	S-CG-Reg	493	0.91	1.48	0.12	0.00	0.54	0.30	0	0	-14.1	49.3	774
Illinois	S-CG-Reg	753	0.91	1.48	0.12	0.00	0.54	0.26	0	0	-10.2	75.3	849
Iowa	W-CG-reg	596	0.86	1.48	0.12	0.00	0.54	0.30	0	0	-9.1	59.6	909
Illinois	W-CG-reg	911	0.86	1.48	0.12	0.00	0.54	0.26	0	0	-5.2	91.1	1,000
Montana	S-CG-Prem	61	1.09	1.48	0.17	0.00	0.54	0.00	0	0	1.4	6.1	1,006
Hawaii	S-CG-Prem	51	1.33	1.48	0.41	0.00	0.54	0.00	0	0	2.7	5.1	1,011
Michigan	S-CG-Prem	131	1.02	1.48	0.12	0.00	0.54	0.00	0	0	3.8	13.1	1,024
Washington	S-CG-Prem	213	1.10	1.48	0.20	0.00	0.54	0.00	0	0	4.0	21.3	1,045
Wisconsin	S-CG-Prem	72	1.01	1.48	0.12	0.00	0.54	0.00	0	0	4.7	7.2	1,053
Indiana	S-CG-Prem	85	1.01	1.48	0.12	0.00	0.54	0.00	0	0	5.1	8.5	1,061
Ohio	S-CG-Prem	162	1.00	1.48	0.12	0.00	0.54	0.00	0	0	6.0	16.2	1,077
Oregon	S-CG-Prem	94	1.08	1.48	0.20	0.00	0.54	0.00	0	0	6.1	9.4	1,087
Wyoming	S-CG-Prem	28	1.04	1.48	0.17	0.00	0.54	0.00	0	0	6.3	2.8	1,089
Montana	W-CG-Prem	73	1.04	1.48	0.17	0.00	0.54	0.00	0	0	6.4	7.3	1,097
Idaho	S-CG-Prem	49	1.04	1.48	0.17	0.00	0.54	0.00	0	0	6.5	4.9	1,102
South Dakota	S-CG-Prem	21	0.99	1.48	0.12	0.00	0.54	0.00	0	0	6.6	2.1	1,104
Utah	S-CG-Prem	130	1.03	1.48	0.17	0.00	0.54	0.00	0	0	7.5	13.0	1,117
Hawaii	W-CG-Prem	62	1.28	1.48	0.41	0.00	0.54	0.00	0	0	7.7	6.2	1,123
Nevada	S-CG-Prem	109	1.09	1.48	0.23	0.00	0.54	0.00	0	0	7.9	10.9	1,134
New York	S-CG-Prem	99	1.04	1.48	0.18	0.00	0.54	0.00	0	0	8.0	9.9	1,144
Nebraska	S-CG-Prem	43	0.98	1.48	0.12	0.00	0.54	0.00	0	0	8.0	4.3	1,148
Missouri	S-CG-Prem	68	0.98	1.48	0.12	0.00	0.54	0.00	0	0	8.4	6.8	1,155
Michigan	W-CG-Prem	159	0.97	1.48	0.12	0.00	0.54	0.00	0	0	8.8	15.9	1,171
Washington	W-CG-Prem	258	1.05	1.48	0.20	0.00	0.54	0.00	0	0	9.0	25.8	1,197
Colorado	S-CG-Prem	182	1.01	1.48	0.17	0.00	0.54	0.00	0	0	9.2	18.2	1,215
Wisconsin	W-CG-Prem	87	0.96	1.48	0.12	0.00	0.54	0.00	0	0	9.7	8.7	1,223
Indiana	W-CG-Prem	103	0.96	1.48	0.12	0.00	0.54	0.00	0	0	10.1	10.3	1,234
Kansas	S-CG-Prem	58	0.96	1.48	0.12	0.00	0.54	0.00	0	0	10.3	5.8	1,239
Ohio	W-CG-Prem	196	0.95	1.48	0.12	0.00	0.54	0.00	0	0	11.0	19.6	1,259
Oregon	W-CG-Prem	113	1.03	1.48	0.20	0.00	0.54	0.00	0	0	11.1	11.3	1,270
Arizona	S-CG-Prem	56	1.05	1.48	0.23	0.00	0.54	0.00	0	0	11.1	5.6	1,276
Wyoming	W-CG-Prem	34	0.99	1.48	0.17	0.00	0.54	0.00	0	0	11.3	3.4	1,279
Idaho	W-CG-Prem	59	0.99	1.48	0.17	0.00	0.54	0.00	0	0	11.5	5.9	1,285
North Dakota	S-CG-Prem	20	1.02	1.48	0.19	0.00	0.54	0.00	0	0	11.6	2.0	1,287
South Dakota	W-CG-Prem	26	0.94	1.48	0.12	0.00	0.54	0.00	0	0	11.6	2.6	1,290
Utah	W-CG-Prem	158	0.98	1.48	0.17	0.00	0.54	0.00	0	0	12.5	15.8	1,306
Nevada	W-CG-Prem	131	1.04	1.48	0.23	0.00	0.54	0.00	0	0	12.9	13.1	1,319
New York	W-CG-Prem	120	0.99	1.48	0.18	0.00	0.54	0.00	0	0	13.0	12.0	1,331
Nebraska	W-CG-Prem	52	0.93	1.48	0.12	0.00	0.54	0.00	0	0	13.0	5.2	1,336
Missouri	W-CG-Prem	82	0.93	1.48	0.12	0.00	0.54	0.00	0	0	13.4	8.2	1,344
Maryland	S-CG-Prem	7	0.99	1.48	0.19	0.00	0.54	0.00	0	0	13.7	0.7	1,345
Montana	S-CG-Reg	282	0.97	1.48	0.17	0.00	0.54	0.00	0	0	14.0	28.2	1,373
Colorado	W-CG-Prem	220	0.96	1.48	0.17	0.00	0.54	0.00	0	0	14.2	22.0	1,395
South Dakota	S-CG-Reg	177	0.92	1.48	0.12	0.00	0.54	0.00	0	0	14.3	17.7	1,413
Michigan	S-CG-Reg	1986	0.91	1.48	0.12	0.00	0.54	0.00	0	0	14.6	198.6	1,611
New Mexico	S-CG-Prem	59	0.98	1.48	0.19	0.00	0.54	0.00	0	0	14.7	5.9	1,617
Wyoming	S-CG-Reg	139	0.96	1.48	0.17	0.00	0.54	0.00	0	0	14.7	13.9	1,631
Kansas	W-CG-Prem	70	0.91	1.48	0.12	0.00	0.54	0.00	0	0	15.3	7.0	1,638
Wisconsin	S-CG-Reg	810	0.91	1.48	0.12	0.00	0.54	0.00	0	0	15.4	81.0	1,719
Hawaii	S-CG-Reg	171	1.19	1.48	0.41	0.00	0.54	0.00	0	0	15.8	17.1	1,736
Nebraska	S-CG-Reg	326	0.90	1.48	0.12	0.00	0.54	0.00	0	0	15.9	32.6	1,769
Idaho	S-CG-Reg	290	0.95	1.48	0.17	0.00	0.54	0.00	0	0	15.9	29.0	1,798
Arizona	W-CG-Prem	67	1.00	1.48	0.23	0.00	0.54	0.00	0	0	16.1	6.7	1,805
Ohio	S-CG-Reg	2049	0.90	1.48	0.12	0.00	0.54	0.00	0	0	16.5	204.9	2,010
North Dakota	W-CG-Prem	24	0.97	1.48	0.19	0.00	0.54	0.00	0	0	16.6	2.4	2,012
Arkansas	S-CG-Prem	53	0.93	1.48	0.16	0.00	0.54	0.00	0	0	16.6	5.3	2,017
Kentucky	S-CG-Prem	48	0.96	1.48	0.19	0.00	0.54	0.00	0	0	16.6	4.8	2,022
Indiana	S-CG-Reg	1187	0.89	1.48	0.12	0.00	0.54	0.00	0	0	16.7	118.7	2,141
Colorado	S-CG-Reg	828	0.93	1.48	0.17	0.00	0.54	0.00	0	0	17.3	82.8	2,224
Utah	S-CG-Reg	483	0.93	1.48	0.17	0.00	0.54	0.00	0	0	17.3	48.3	2,272
Kansas	S-CG-Reg	685	0.89	1.48	0.12	0.00	0.54	0.00	0	0	17.4	68.5	2,340
Pennsylvania	S-CG-Prem	83	0.94	1.48	0.18	0.00	0.54	0.00	0	0	17.7	8.3	2,349
Washington	S-CG-Reg	1074	0.96	1.48	0.20	0.00	0.54	0.00	0	0	18.0	107.4	2,456
Missouri	S-CG-Reg	804	0.88	1.48	0.12	0.00	0.54	0.00	0	0	18.1	80.4	2,537
Virginia	S-CG-Prem	63	0.95	1.48	0.19	0.00	0.54	0.00	0	0	18.2	6.3	2,543

Table A2001B Input Costs, Ethanol Blending Cost and Ethanol Volumes

Year 2001 State	Gasoline Code	Gasoline Volume MMgals	Gasoline Price $/gal	Ethanol Gate Price $/gal	Ethanol Dist Cost $/gal	Ethanol Blending $/gal	Federal Subsidy $/gal	State Subsidy $/gal	State Mandate	RFG "Mandate"	Ethanol Blending Cost c/gal	Ethanol Volume MMgals	Cumulative Eth Vol MMgals
New Hampshire	S-CG-Prem	4	0.96	1.48	0.21	0.00	0.54	0.00	0	0	18.2	0.4	2,543
Maryland	W-CG-Prem	9	0.94	1.48	0.19	0.00	0.54	0.00	0	0	18.7	0.9	2,544
Alaska	S-CG-Prem	13	1.16	1.48	0.41	0.00	0.54	0.00	0	0	18.8	1.3	2,545
Montana	W-CG-reg	341	0.92	1.48	0.17	0.00	0.54	0.00	0	0	19.0	34.1	2,580
South Dakota	W-CG-reg	214	0.87	1.48	0.12	0.00	0.54	0.00	0	0	19.3	21.4	2,601
Oklahoma	S-CG-Prem	86	0.92	1.48	0.19	0.00	0.54	0.02	0	0	19.5	8.6	2,610
Michigan	W-CG-reg	2402	0.86	1.48	0.12	0.00	0.54	0.00	0	0	19.6	240.2	2,850
New Mexico	W-CG-Prem	71	0.93	1.48	0.19	0.00	0.54	0.00	0	0	19.7	7.1	2,857
Wyoming	W-CG-reg	168	0.91	1.48	0.17	0.00	0.54	0.00	0	0	19.7	16.8	2,874
Vermont	S-CG-Prem	12	0.95	1.48	0.21	0.00	0.54	0.00	0	0	19.9	1.2	2,875
Tennessee	S-CG-Prem	167	0.93	1.48	0.19	0.00	0.54	0.00	0	0	20.0	16.7	2,892
Oregon	S-CG-Reg	668	0.94	1.48	0.20	0.00	0.54	0.00	0	0	20.0	66.8	2,958
Nevada	S-CG-Reg	419	0.97	1.48	0.23	0.00	0.54	0.00	0	0	20.0	41.9	3,000
Louisiana	S-CG-Prem	102	0.89	1.48	0.16	0.00	0.54	0.00	0	0	20.3	10.2	3,010
Wisconsin	W-CG-reg	980	0.86	1.48	0.12	0.00	0.54	0.00	0	0	20.4	98.0	3,108
North Dakota	S-CG-Reg	166	0.93	1.48	0.19	0.00	0.54	0.00	0	0	20.6	16.6	3,125
Hawaii	W-CG-reg	207	1.14	1.48	0.41	0.00	0.54	0.00	0	0	20.8	20.7	3,146
Nebraska	W-CG-reg	394	0.85	1.48	0.12	0.00	0.54	0.00	0	0	20.9	39.4	3,185
Idaho	W-CG-reg	350	0.90	1.48	0.17	0.00	0.54	0.00	0	0	20.9	35.0	3,220
Mississippi	S-CG-Prem	76	0.88	1.48	0.16	0.00	0.54	0.00	0	0	21.1	7.6	3,228
West Virginia	S-CG-Prem	20	0.90	1.48	0.18	0.00	0.54	0.00	0	0	21.2	2.0	3,230
Georgia	S-CG-Prem	277	0.93	1.48	0.21	0.00	0.54	0.00	0	0	21.3	27.7	3,257
Ohio	W-CG-reg	2477	0.85	1.48	0.12	0.00	0.54	0.00	0	0	21.5	247.7	3,505
Arkansas	W-CG-Prem	64	0.88	1.48	0.16	0.00	0.54	0.00	0	0	21.6	6.4	3,512
Kentucky	W-CG-Prem	58	0.91	1.48	0.19	0.00	0.54	0.00	0	0	21.6	5.8	3,517
Indiana	W-CG-reg	1435	0.84	1.48	0.12	0.00	0.54	0.00	0	0	21.7	143.5	3,661
Texas	S-CG-Prem	334	0.87	1.48	0.16	0.00	0.54	0.00	0	0	22.0	33.4	3,694
Alabama	S-CG-Prem	102	0.91	1.48	0.19	0.00	0.54	0.00	0	0	22.1	10.2	3,704
Colorado	W-CG-reg	1001	0.88	1.48	0.17	0.00	0.54	0.00	0	0	22.3	100.1	3,805
Utah	W-CG-reg	584	0.88	1.48	0.17	0.00	0.54	0.00	0	0	22.3	58.4	3,863
Kansas	W-CG-reg	828	0.84	1.48	0.12	0.00	0.54	0.00	0	0	22.4	82.8	3,946
Pennsylvania	W-CG-Prem	101	0.89	1.48	0.18	0.00	0.54	0.00	0	0	22.7	10.1	3,956
South Carolina	S-CG-Prem	129	0.92	1.48	0.21	0.00	0.54	0.00	0	0	22.9	12.9	3,969
Washington	W-CG-reg	1299	0.91	1.48	0.20	0.00	0.54	0.00	0	0	23.0	129.9	4,099
North Carolina	S-CG-Prem	228	0.92	1.48	0.21	0.00	0.54	0.00	0	0	23.1	22.8	4,121
Missouri	W-CG-reg	972	0.83	1.48	0.12	0.00	0.54	0.00	0	0	23.1	97.2	4,219
Virginia	W-CG-Prem	77	0.90	1.48	0.19	0.00	0.54	0.00	0	0	23.2	7.7	4,226
New Hampshire	W-CG-Prem	5	0.91	1.48	0.21	0.00	0.54	0.00	0	0	23.2	0.5	4,227
Arizona	S-CG-Reg	437	0.93	1.48	0.23	0.00	0.54	0.00	0	0	23.4	43.7	4,271
New Mexico	S-CG-Reg	397	0.90	1.48	0.19	0.00	0.54	0.00	0	0	23.5	39.7	4,310
Florida	S-CG-Prem	450	0.95	1.48	0.25	0.00	0.54	0.00	0	0	23.8	45.0	4,355
Alaska	W-CG-Prem	16	1.11	1.48	0.41	0.00	0.54	0.00	0	0	23.8	1.6	4,357
Alaska	S-CG-Reg	110	1.11	1.48	0.41	0.00	0.54	0.00	0	0	24.0	11.0	4,368
Arkansas	S-CG-Reg	618	0.85	1.48	0.16	0.00	0.54	0.00	0	0	24.1	61.8	4,430
Oklahoma	W-CG-Prem	104	0.87	1.48	0.19	0.00	0.54	0.02	0	0	24.5	10.4	4,440
Vermont	W-CG-Prem	14	0.90	1.48	0.21	0.00	0.54	0.00	0	0	24.9	1.4	4,441
Tennessee	W-CG-Prem	202	0.88	1.48	0.19	0.00	0.54	0.00	0	0	25.0	20.2	4,462
New York	S-CG-Reg	1016	0.87	1.48	0.18	0.00	0.54	0.00	0	0	25.0	101.6	4,563
Oregon	W-CG-reg	808	0.89	1.48	0.20	0.00	0.54	0.00	0	0	25.0	80.8	4,644
Nevada	W-CG-reg	507	0.92	1.48	0.23	0.00	0.54	0.00	0	0	25.0	50.7	4,695
Louisiana	W-CG-Prem	123	0.84	1.48	0.16	0.00	0.54	0.00	0	0	25.3	12.3	4,707
North Dakota	W-CG-reg	200	0.88	1.48	0.19	0.00	0.54	0.00	0	0	25.6	20.0	4,727
Oklahoma	S-CG-Reg	876	0.86	1.48	0.19	0.00	0.54	0.02	0	0	25.7	87.6	4,815
Kentucky	S-CG-Reg	690	0.87	1.48	0.19	0.00	0.54	0.00	0	0	25.7	69.0	4,884
Maryland	S-CG-Reg	87	0.87	1.48	0.19	0.00	0.54	0.00	0	0	25.9	8.7	4,892
Mississippi	W-CG-Prem	92	0.83	1.48	0.16	0.00	0.54	0.00	0	0	26.1	9.2	4,902
West Virginia	W-CG-Prem	24	0.85	1.48	0.18	0.00	0.54	0.00	0	0	26.2	2.4	4,904
Georgia	W-CG-Prem	335	0.88	1.48	0.21	0.00	0.54	0.00	0	0	26.3	33.5	4,937
Texas	W-CG-Prem	403	0.82	1.48	0.16	0.00	0.54	0.00	0	0	27.0	40.3	4,978
Alabama	W-CG-Prem	124	0.86	1.48	0.19	0.00	0.54	0.00	0	0	27.1	12.4	4,990
South Carolina	W-CG-Prem	156	0.87	1.48	0.21	0.00	0.54	0.00	0	0	27.9	15.6	5,006
North Carolina	W-CG-Prem	276	0.87	1.48	0.21	0.00	0.54	0.00	0	0	28.1	27.6	5,033
Arizona	W-CG-reg	528	0.88	1.48	0.23	0.00	0.54	0.00	0	0	28.4	52.8	5,086
New Mexico	W-CG-reg	480	0.85	1.48	0.19	0.00	0.54	0.00	0	0	28.5	48.0	5,134
Pennsylvania	S-CG-Reg	873	0.83	1.48	0.18	0.00	0.54	0.00	0	0	28.8	87.3	5,221
Florida	W-CG-Prem	544	0.90	1.48	0.25	0.00	0.54	0.00	0	0	28.8	54.4	5,276
Alaska	W-CG-reg	133	1.06	1.48	0.41	0.00	0.54	0.00	0	0	29.0	13.3	5,289
Arkansas	W-CG-reg	747	0.80	1.48	0.16	0.00	0.54	0.00	0	0	29.1	74.7	5,364
New Hampshire	S-CG-Reg	56	0.85	1.48	0.21	0.00	0.54	0.00	0	0	29.3	5.6	5,369
Mississippi	S-CG-Reg	738	0.80	1.48	0.16	0.00	0.54	0.00	0	0	29.4	73.8	5,443
Virginia	S-CG-Reg	654	0.84	1.48	0.19	0.00	0.54	0.00	0	0	29.5	65.4	5,509
Louisiana	S-CG-Reg	1150	0.80	1.48	0.16	0.00	0.54	0.00	0	0	29.7	115.0	5,624
Tennessee	S-CG-Reg	1443	0.83	1.48	0.19	0.00	0.54	0.00	0	0	29.8	144.3	5,768
New York	W-CG-reg	1228	0.82	1.48	0.18	0.00	0.54	0.00	0	0	30.0	122.8	5,891
West Virginia	S-CG-Reg	314	0.82	1.48	0.18	0.00	0.54	0.00	0	0	30.0	31.4	5,922
Texas	S-CG-Reg	3434	0.79	1.48	0.16	0.00	0.54	0.00	0	0	30.1	343.4	6,266
Vermont	S-CG-Reg	133	0.84	1.48	0.21	0.00	0.54	0.00	0	0	30.4	13.3	6,279
Oklahoma	W-CG-reg	1060	0.81	1.48	0.19	0.00	0.54	0.02	0	0	30.7	106.0	6,385
Kentucky	W-CG-reg	834	0.82	1.48	0.19	0.00	0.54	0.00	0	0	30.7	83.4	6,468
Maine	S-CG-Prem	11	0.88	1.48	0.25	0.00	0.54	0.00	0	0	30.8	1.1	6,469
Maryland	W-CG-reg	105	0.82	1.48	0.19	0.00	0.54	0.00	0	0	30.9	10.5	6,480
Georgia	S-CG-Reg	2017	0.83	1.48	0.21	0.00	0.54	0.00	0	0	32.1	201.7	6,681
Alabama	S-CG-Reg	1024	0.81	1.48	0.19	0.00	0.54	0.00	0	0	32.6	102.4	6,784
South Carolina	S-CG-Reg	1086	0.82	1.48	0.21	0.00	0.54	0.00	0	0	32.7	108.6	6,893
North Carolina	S-CG-Reg	1824	0.82	1.48	0.21	0.00	0.54	0.00	0	0	33.0	182.4	7,075

Table A2001C Input Costs, Ethanol Blending Cost and Ethanol Volumes

Year 2001 State	Gasoline Code	Gasoline Volume MMgals	Gasoline Price $/gal	Ethanol Gate Price $/gal	Ethanol Dist Cost $/gal	Ethanol Blending $/gal	Federal Subsidy $/gal	State Subsidy $/gal	State Mandate	RFG "Mandate"	Ethanol Blending Cost c/gal	Ethanol Volume MMgals	Cumulative Eth Vol MMgals
Pennsylvania	W-CG-reg	1055	0.78	1.48	0.18	0.00	0.54	0.00	0	0	33.8	105.5	7,180
New Hampshire	W-CG-reg	68	0.80	1.48	0.21	0.00	0.54	0.00	0	0	34.3	6.8	7,187
Mississippi	W-CG-reg	892	0.75	1.48	0.16	0.00	0.54	0.00	0	0	34.4	89.2	7,276
Virginia	W-CG-reg	791	0.79	1.48	0.19	0.00	0.54	0.00	0	0	34.5	79.1	7,356
Louisiana	W-CG-reg	1391	0.75	1.48	0.16	0.00	0.54	0.00	0	0	34.7	139.1	7,495
Tennessee	W-CG-reg	1745	0.78	1.48	0.19	0.00	0.54	0.00	0	0	34.8	174.5	7,669
West Virginia	W-CG-reg	380	0.77	1.48	0.18	0.00	0.54	0.00	0	0	35.0	38.0	7,707
Texas	W-CG-reg	4152	0.74	1.48	0.16	0.00	0.54	0.00	0	0	35.1	415.2	8,122
Vermont	W-CG-reg	161	0.79	1.48	0.21	0.00	0.54	0.00	0	0	35.4	16.1	8,139
Maine	W-CG-Prem	13	0.83	1.48	0.25	0.00	0.54	0.00	0	0	35.8	1.3	8,140
Florida	S-CG-Reg	3065	0.83	1.48	0.25	0.00	0.54	0.00	0	0	36.3	306.5	8,446
Georgia	W-CG-reg	2439	0.78	1.48	0.21	0.00	0.54	0.00	0	0	37.1	243.9	8,690
Alabama	W-CG-reg	1238	0.76	1.48	0.19	0.00	0.54	0.00	0	0	37.6	123.8	8,814
South Carolina	W-CG-reg	1313	0.77	1.48	0.21	0.00	0.54	0.00	0	0	37.7	131.3	8,945
North Carolina	W-CG-reg	2205	0.77	1.48	0.21	0.00	0.54	0.00	0	0	38.0	220.5	9,166
Maine	S-CG-Reg	126	0.78	1.48	0.25	0.00	0.54	0.00	0	0	40.9	12.6	9,178
Florida	W-CG-reg	3707	0.78	1.48	0.25	0.00	0.54	0.00	0	0	41.3	370.7	9,549
Maine	W-CG-reg	152	0.73	1.48	0.25	0.00	0.54	0.00	0	0	45.9	15.2	9,564
California	S-RFG-Prem	1521	1.16	1.48	0.23	0.23	0.54	0.00	0	0	-22.4	152.1	9,716
New York	S-RFG-Prem	295	1.10	1.48	0.18	0.23	0.54	0.00	0	0	-20.6	29.5	9,746
Missouri	S-RFG-Prem	41	1.04	1.48	0.12	0.23	0.54	0.00	0	0	-20.2	4.1	9,750
Arizona	S-RFG-Prem	122	1.11	1.48	0.23	0.23	0.54	0.00	0	0	-17.5	12.2	9,762
Massachusetts	S-RFG-Prem	164	1.06	1.48	0.19	0.23	0.54	0.00	0	0	-15.5	16.4	9,779
Maryland	S-RFG-Prem	136	1.05	1.48	0.19	0.23	0.54	0.00	0	0	-14.9	13.6	9,792
California	W-RFG-Prem	1840	1.11	1.48	0.23	0.12	0.54	0.00	0	0	-7.1	184.0	9,976
Rhode Island	S-RFG-Prem	38	1.04	1.48	0.19	0.23	0.54	0.00	0	0	-13.1	3.8	9,980
New York	W-RFG-Prem	357	1.05	1.48	0.18	0.12	0.54	0.00	0	0	-5.3	35.7	10,016
New Jersey	S-RFG-Prem	259	1.03	1.48	0.19	0.23	0.54	0.00	0	0	-12.8	25.9	10,042
Missouri	W-RFG-Prem	49	0.99	1.48	0.12	0.12	0.54	0.00	0	0	-5.0	4.9	10,046
Connecticut	S-RFG-Prem	104	1.03	1.48	0.19	0.23	0.54	0.00	0	0	-12.5	10.4	10,057
Kentucky	S-RFG-Prem	19	1.02	1.48	0.19	0.23	0.54	0.00	0	0	-12.0	1.9	10,059
DC	S-RFG-Prem	6	1.02	1.48	0.19	0.23	0.54	0.00	0	0	-11.0	0.6	10,059
Pennsylvania	S-RFG-Prem	65	1.00	1.48	0.18	0.23	0.54	0.00	0	0	-10.9	6.5	10,066
Virginia	S-RFG-Prem	151	1.01	1.48	0.19	0.23	0.54	0.00	0	0	-10.4	15.1	10,081
New Hampshire	S-RFG-Prem	20	1.02	1.48	0.21	0.23	0.54	0.00	0	0	-10.4	2.0	10,083
Arizona	W-RFG-Prem	147	1.06	1.48	0.23	0.12	0.54	0.00	0	0	-2.2	14.7	10,098
Missouri	S-RFG-Reg	413	0.94	1.48	0.12	0.32	0.54	0.00	0	0	-20.4	41.3	10,139
Massachusetts	W-RFG-Prem	198	1.01	1.48	0.19	0.12	0.54	0.00	0	0	-0.2	19.8	10,159
Maryland	W-RFG-Prem	164	1.00	1.48	0.19	0.12	0.54	0.00	0	0	0.4	16.4	10,175
Delaware	S-RFG-Prem	23	0.98	1.48	0.19	0.23	0.54	0.00	0	0	-7.3	2.3	10,177
California	S-RFG-Reg	5264	1.03	1.48	0.23	0.32	0.54	0.00	0	0	-18.7	526.4	10,704
Texas	S-RFG-Prem	391	0.93	1.48	0.16	0.23	0.54	0.00	0	0	-6.6	39.1	10,743
Rhode Island	W-RFG-Prem	46	0.99	1.48	0.19	0.12	0.54	0.00	0	0	2.2	4.6	10,748
New Jersey	W-RFG-Prem	313	0.98	1.48	0.19	0.12	0.54	0.00	0	0	2.5	31.3	10,779
Connecticut	W-RFG-Prem	125	0.98	1.48	0.19	0.12	0.54	0.00	0	0	2.8	12.5	10,791
Kentucky	W-RFG-Prem	23	0.97	1.48	0.19	0.12	0.54	0.00	0	0	3.3	2.3	10,794
Arizona	S-RFG-Reg	783	0.99	1.48	0.23	0.32	0.54	0.00	0	0	-15.0	78.3	10,872
DC	W-RFG-Prem	8	0.97	1.48	0.19	0.12	0.54	0.00	0	0	4.2	0.8	10,873
Pennsylvania	W-RFG-Prem	78	0.95	1.48	0.18	0.12	0.54	0.00	0	0	4.3	7.8	10,881
Missouri	W-RFG-reg	499	0.89	1.48	0.12	0.16	0.54	0.00	0	0	0.8	49.9	10,930
Virginia	W-RFG-Prem	182	0.96	1.48	0.19	0.12	0.54	0.00	0	0	4.8	18.2	10,949
New Hampshire	W-RFG-Prem	25	0.97	1.48	0.21	0.12	0.54	0.00	0	0	4.8	2.5	10,951
New York	S-RFG-Reg	1226	0.93	1.48	0.18	0.32	0.54	0.00	0	0	-13.4	122.6	11,074
Massachusetts	S-RFG-Reg	1074	0.94	1.48	0.19	0.32	0.54	0.00	0	0	-13.0	107.4	11,181
California	W-RFG-reg	6365	0.98	1.48	0.23	0.16	0.54	0.00	0	0	2.5	636.5	11,818
Kentucky	S-RFG-Reg	190	0.93	1.48	0.19	0.32	0.54	0.00	0	0	-12.7	19.0	11,837
Maryland	S-RFG-Reg	741	0.93	1.48	0.19	0.32	0.54	0.00	0	0	-12.5	74.1	11,911
Rhode Island	S-RFG-Reg	258	0.92	1.48	0.19	0.32	0.54	0.00	0	0	-11.2	25.8	11,937
Delaware	W-RFG-Prem	28	0.93	1.48	0.19	0.12	0.54	0.00	0	0	8.0	2.8	11,939
Texas	W-RFG-Prem	473	0.88	1.48	0.16	0.12	0.54	0.00	0	0	8.7	47.3	11,987
Connecticut	S-RFG-Reg	632	0.90	1.48	0.19	0.32	0.54	0.00	0	0	-9.7	63.2	12,050
Pennsylvania	S-RFG-Reg	386	0.89	1.48	0.18	0.32	0.54	0.00	0	0	-9.7	38.6	12,089
Maine	S-RFG-Prem	12	0.94	1.48	0.25	0.23	0.54	0.00	0	0	2.2	1.2	12,090
New Hampshire	S-RFG-Reg	184	0.91	1.48	0.21	0.32	0.54	0.00	0	0	-9.2	18.4	12,108
DC	S-RFG-Reg	26	0.90	1.48	0.19	0.32	0.54	0.00	0	0	-9.1	2.6	12,111
Arizona	W-RFG-reg	946	0.94	1.48	0.23	0.16	0.54	0.00	0	0	6.2	94.6	12,205
Virginia	S-RFG-Reg	774	0.90	1.48	0.19	0.32	0.54	0.00	0	0	-9.0	77.4	12,283
Texas	S-RFG-Reg	2521	0.85	1.48	0.16	0.32	0.54	0.00	0	0	-8.3	252.1	12,535
Delaware	S-RFG-Reg	188	0.88	1.48	0.19	0.32	0.54	0.00	0	0	-7.7	18.8	12,554
New York	W-RFG-reg	1483	0.88	1.48	0.18	0.16	0.54	0.00	0	0	7.8	148.3	12,702
Massachusetts	W-RFG-reg	1299	0.89	1.48	0.19	0.16	0.54	0.00	0	0	8.2	129.9	12,832
New Jersey	S-RFG-Reg	1605	0.88	1.48	0.19	0.32	0.54	0.00	0	0	-6.8	160.5	12,992
Kentucky	W-RFG-reg	230	0.88	1.48	0.19	0.16	0.54	0.00	0	0	8.5	23.0	13,015
Maryland	W-RFG-reg	896	0.88	1.48	0.19	0.16	0.54	0.00	0	0	8.7	89.6	13,105
Rhode Island	W-RFG-reg	312	0.87	1.48	0.19	0.16	0.54	0.00	0	0	10.0	31.2	13,136
Connecticut	W-RFG-reg	764	0.85	1.48	0.19	0.16	0.54	0.00	0	0	11.5	76.4	13,213
Pennsylvania	W-RFG-reg	467	0.84	1.48	0.18	0.16	0.54	0.00	0	0	11.5	46.7	13,259
New Hampshire	W-RFG-reg	223	0.86	1.48	0.21	0.16	0.54	0.00	0	0	12.0	22.3	13,282
DC	W-RFG-reg	31	0.85	1.48	0.19	0.16	0.54	0.00	0	0	12.1	3.1	13,285
Virginia	W-RFG-reg	936	0.85	1.48	0.19	0.16	0.54	0.00	0	0	12.2	93.6	13,378
Texas	W-RFG-reg	3049	0.80	1.48	0.16	0.16	0.54	0.00	0	0	12.9	304.9	13,683
Delaware	W-RFG-reg	227	0.83	1.48	0.19	0.16	0.54	0.00	0	0	13.5	22.7	13,706
Maine	W-RFG-Prem	15	0.89	1.48	0.25	0.12	0.54	0.00	0	0	17.4	1.5	13,707
New Jersey	W-RFG-reg	1940	0.83	1.48	0.19	0.16	0.54	0.00	0	0	14.4	194.0	13,901
Maine	S-RFG-Reg	186	0.84	1.48	0.25	0.32	0.54	0.00	0	0	2.4	18.6	13,920
Maine	W-RFG-reg	224	0.79	1.48	0.25	0.16	0.54	0.00	0	0	23.6	22.4	13,942

Table A2002A Input Costs, Ethanol Blending Cost and Ethanol Volumes

Year 2002 State	Gasoline Code	Gasoline Volume MMgals	Gasoline Price $/gal	Ethanol Gate Price $/gal	Ethanol Dist Cost $/gal	Ethanol Blending $/gal	Federal Subsidy $/gal	State Subsidy $/gal	State Mandate	RFG "Mandate"	Ethanol Blending Cost c/gal	Ethanol Volume MMgals	Cumulative Eth Vol MMgals
Illinois	S-RFG-Prem	189	1.05	1.12	0.12	0.37	0.54	0.26	0	1	-96.3	18.9	19
Illinois	S-RFG-Reg	1313	0.89	1.12	0.12	0.51	0.54	0.26	0	1	-95.3	131.3	150
Illinois	W-RFG-Prem	229	1.00	1.12	0.12	0.18	0.54	0.26	0	1	-72.6	22.9	173
Wisconsin	S-RFG-Reg	343	0.89	1.12	0.12	0.51	0.54	0.00	0	1	-70.3	34.3	207
Indiana	S-RFG-Reg	202	0.88	1.12	0.12	0.51	0.54	0.00	0	1	-69.1	20.2	227
Wisconsin	S-RFG-Prem	31	1.01	1.12	0.12	0.37	0.54	0.00	0	1	-66.8	3.1	231
Indiana	S-RFG-Prem	21	1.00	1.12	0.12	0.37	0.54	0.00	0	1	-66.6	2.1	233
Illinois	W-RFG-reg	1587	0.84	1.12	0.12	0.24	0.54	0.26	0	1	-62.9	158.7	391
Wisconsin	W-RFG-Prem	38	0.96	1.12	0.12	0.18	0.54	0.00	0	1	-43.2	3.8	395
Indiana	W-RFG-Prem	25	0.95	1.12	0.12	0.18	0.54	0.00	0	1	-42.9	2.5	398
Wisconsin	W-RFG-reg	414	0.84	1.12	0.12	0.24	0.54	0.00	0	1	-37.8	41.4	439
Indiana	W-RFG-reg	244	0.83	1.12	0.12	0.24	0.54	0.00	0	1	-36.7	24.4	464
Minnesota	S-CG-Prem	105	0.97	1.12	0.12	0.00	0.54	0.00	1	0	-26.4	10.5	474
Minnesota	W-CG-Prem	127	0.92	1.12	0.12	0.00	0.54	0.00	1	0	-21.4	12.7	487
Minnesota	S-CG-Reg	1041	0.88	1.12	0.12	0.00	0.54	0.00	1	0	-17.5	104.1	591
Minnesota	W-CG-reg	1259	0.83	1.12	0.12	0.00	0.54	0.00	1	0	-12.5	125.9	717
Illinois	S-CG-Prem	47	0.99	1.12	0.12	0.00	0.54	0.26	0	0	-53.4	4.7	721
Iowa	S-CG-Prem	66	0.94	1.12	0.12	0.00	0.54	0.30	0	0	-52.8	6.6	728
Illinois	W-CG-Prem	57	0.94	1.12	0.12	0.00	0.54	0.26	0	0	-48.4	5.7	734
Iowa	W-CG-Prem	79	0.89	1.12	0.12	0.00	0.54	0.30	0	0	-47.8	7.9	742
Iowa	S-CG-Reg	505	0.84	1.12	0.12	0.00	0.54	0.30	0	0	-43.1	50.5	792
Iowa	W-CG-reg	610	0.79	1.12	0.12	0.00	0.54	0.30	0	0	-38.1	61.0	853
Illinois	S-CG-Reg	771	0.83	1.12	0.12	0.00	0.54	0.26	0	0	-37.9	77.1	930
Illinois	W-CG-reg	932	0.78	1.12	0.12	0.00	0.54	0.26	0	0	-32.9	93.2	1,023
Michigan	S-CG-Prem	134	0.97	1.12	0.12	0.00	0.54	0.00	0	0	-26.1	13.4	1,037
South Dakota	S-CG-Prem	22	0.97	1.12	0.12	0.00	0.54	0.00	0	0	-25.9	2.2	1,039
Montana	S-CG-Prem	62	1.00	1.12	0.17	0.00	0.54	0.00	0	0	-25.3	6.2	1,045
Ohio	S-CG-Prem	166	0.95	1.12	0.12	0.00	0.54	0.00	0	0	-24.6	16.6	1,062
Wisconsin	S-CG-Prem	74	0.95	1.12	0.12	0.00	0.54	0.00	0	0	-23.9	7.4	1,069
Indiana	S-CG-Prem	87	0.94	1.12	0.12	0.00	0.54	0.00	0	0	-23.7	8.7	1,078
New York	S-CG-Prem	101	0.99	1.12	0.18	0.00	0.54	0.00	0	0	-22.7	10.1	1,088
Idaho	S-CG-Prem	50	0.98	1.12	0.17	0.00	0.54	0.00	0	0	-22.7	5.0	1,093
Missouri	S-CG-Prem	69	0.93	1.12	0.12	0.00	0.54	0.00	0	0	-22.5	6.9	1,100
Nebraska	S-CG-Prem	44	0.93	1.12	0.12	0.00	0.54	0.00	0	0	-22.3	4.4	1,104
Washington	S-CG-Prem	218	1.00	1.12	0.20	0.00	0.54	0.00	0	0	-22.0	21.8	1,126
Wyoming	S-CG-Prem	28	0.97	1.12	0.17	0.00	0.54	0.00	0	0	-21.6	2.8	1,129
Oregon	S-CG-Prem	96	1.00	1.12	0.20	0.00	0.54	0.00	0	0	-21.4	9.6	1,139
Alaska	S-CG-Prem	14	1.21	1.12	0.41	0.00	0.54	0.00	0	0	-21.2	1.4	1,140
Michigan	W-CG-Prem	162	0.92	1.12	0.12	0.00	0.54	0.00	0	0	-21.1	16.2	1,156
South Dakota	W-CG-Prem	26	0.92	1.12	0.12	0.00	0.54	0.00	0	0	-20.9	2.6	1,159
Utah	S-CG-Prem	134	0.96	1.12	0.17	0.00	0.54	0.00	0	0	-20.7	13.4	1,172
Kansas	S-CG-Prem	59	0.91	1.12	0.12	0.00	0.54	0.00	0	0	-20.3	5.9	1,178
Montana	W-CG-Prem	75	0.95	1.12	0.17	0.00	0.54	0.00	0	0	-20.3	7.5	1,186
Ohio	W-CG-Prem	200	0.90	1.12	0.12	0.00	0.54	0.00	0	0	-19.6	20.0	1,206
Wisconsin	W-CG-Prem	89	0.90	1.12	0.12	0.00	0.54	0.00	0	0	-18.9	8.9	1,215
Colorado	S-CG-Prem	186	0.94	1.12	0.17	0.00	0.54	0.00	0	0	-18.9	18.6	1,233
Indiana	W-CG-Prem	105	0.89	1.12	0.12	0.00	0.54	0.00	0	0	-18.7	10.5	1,244
North Dakota	S-CG-Prem	21	0.96	1.12	0.19	0.00	0.54	0.00	0	0	-18.2	2.1	1,246
Nevada	S-CG-Prem	111	0.99	1.12	0.23	0.00	0.54	0.00	0	0	-18.0	11.1	1,257
New York	W-CG-Prem	123	0.94	1.12	0.18	0.00	0.54	0.00	0	0	-17.7	12.3	1,269
Idaho	W-CG-Prem	61	0.93	1.12	0.17	0.00	0.54	0.00	0	0	-17.7	6.1	1,275
Arizona	S-CG-Prem	57	0.99	1.12	0.23	0.00	0.54	0.00	0	0	-17.6	5.7	1,281
Missouri	W-CG-Prem	84	0.88	1.12	0.12	0.00	0.54	0.00	0	0	-17.5	8.4	1,289
Nebraska	W-CG-Prem	54	0.88	1.12	0.12	0.00	0.54	0.00	0	0	-17.3	5.4	1,295
Washington	W-CG-Prem	264	0.95	1.12	0.20	0.00	0.54	0.00	0	0	-17.0	26.4	1,321
Wyoming	W-CG-Prem	34	0.92	1.12	0.17	0.00	0.54	0.00	0	0	-16.6	3.4	1,325
Oregon	W-CG-Prem	116	0.95	1.12	0.20	0.00	0.54	0.00	0	0	-16.4	11.6	1,336
New Mexico	S-CG-Prem	60	0.94	1.12	0.19	0.00	0.54	0.00	0	0	-16.2	6.0	1,342
Alaska	W-CG-Prem	16	1.16	1.12	0.41	0.00	0.54	0.00	0	0	-16.2	1.6	1,344
Maryland	S-CG-Prem	7	0.93	1.12	0.19	0.00	0.54	0.00	0	0	-15.8	0.7	1,345
Utah	W-CG-Prem	161	0.91	1.12	0.17	0.00	0.54	0.00	0	0	-15.7	16.1	1,361
Kansas	W-CG-Prem	72	0.86	1.12	0.12	0.00	0.54	0.00	0	0	-15.3	7.2	1,368
West Virginia	S-CG-Prem	20	0.92	1.12	0.18	0.00	0.54	0.00	0	0	-15.3	2.0	1,370
New Hampshire	S-CG-Prem	4	0.94	1.12	0.21	0.00	0.54	0.00	0	0	-15.1	0.4	1,370
Arkansas	S-CG-Prem	54	0.88	1.12	0.16	0.00	0.54	0.00	0	0	-14.5	5.4	1,376
South Dakota	S-CG-Reg	181	0.85	1.12	0.12	0.00	0.54	0.00	0	0	-14.5	18.1	1,394
Vermont	S-CG-Prem	12	0.94	1.12	0.21	0.00	0.54	0.00	0	0	-14.3	1.2	1,395
Michigan	S-CG-Reg	2033	0.85	1.12	0.12	0.00	0.54	0.00	0	0	-14.1	203.3	1,599
Kentucky	S-CG-Prem	49	0.92	1.12	0.19	0.00	0.54	0.00	0	0	-14.1	4.9	1,603
Pennsylvania	S-CG-Prem	85	0.90	1.12	0.18	0.00	0.54	0.00	0	0	-14.0	8.5	1,612
Mississippi	S-CG-Prem	78	0.88	1.12	0.16	0.00	0.54	0.00	0	0	-13.9	7.8	1,620
Colorado	W-CG-Prem	225	0.89	1.12	0.17	0.00	0.54	0.00	0	0	-13.9	22.5	1,642
Virginia	S-CG-Prem	65	0.91	1.12	0.19	0.00	0.54	0.00	0	0	-13.3	6.5	1,649
North Dakota	W-CG-Prem	25	0.91	1.12	0.19	0.00	0.54	0.00	0	0	-13.2	2.5	1,651
Nevada	W-CG-Prem	135	0.94	1.12	0.23	0.00	0.54	0.00	0	0	-13.0	13.5	1,665
Wisconsin	S-CG-Reg	829	0.83	1.12	0.12	0.00	0.54	0.00	0	0	-12.8	82.9	1,748
Nebraska	S-CG-Reg	334	0.83	1.12	0.12	0.00	0.54	0.00	0	0	-12.8	33.4	1,781
Ohio	S-CG-Reg	2097	0.83	1.12	0.12	0.00	0.54	0.00	0	0	-12.8	209.7	1,991
Idaho	S-CG-Reg	297	0.88	1.12	0.17	0.00	0.54	0.00	0	0	-12.7	29.7	2,020
Wyoming	S-CG-Reg	142	0.88	1.12	0.17	0.00	0.54	0.00	0	0	-12.7	14.2	2,035
Arizona	W-CG-Prem	69	0.94	1.12	0.23	0.00	0.54	0.00	0	0	-12.6	6.9	2,042
Montana	S-CG-Reg	289	0.87	1.12	0.17	0.00	0.54	0.00	0	0	-12.2	28.9	2,070
Tennessee	S-CG-Prem	171	0.90	1.12	0.19	0.00	0.54	0.00	0	0	-12.1	17.1	2,088
Missouri	S-CG-Reg	823	0.83	1.12	0.12	0.00	0.54	0.00	0	0	-12.0	82.3	2,170
Hawaii	S-CG-Prem	53	1.12	1.12	0.41	0.00	0.54	0.00	0	0	-11.9	5.3	2,175

Table A2002B Input Costs, Ethanol Blending Cost and Ethanol Volumes

Year 2002 State	Gasoline Code	Gasoline Volume MMgals	Gasoline Price $/gal	Ethanol Gate Price $/gal	Ethanol Dist Cost $/gal	Ethanol Blending $/gal	Federal Subsidy $/gal	State Subsidy $/gal	State Mandate	RFG "Mandate"	Ethanol Blending Cost c/gal	Ethanol Volume MMgals	Cumulative Eth Vol MMgals
Indiana	S-CG-Reg	1215	0.82	1.12	0.12	0.00	0.54	0.00	0	0	-11.7	121.5	2,297
Georgia	S-CG-Prem	283	0.91	1.12	0.21	0.00	0.54	0.00	0	0	-11.6	28.3	2,325
Kansas	S-CG-Reg	701	0.82	1.12	0.12	0.00	0.54	0.00	0	0	-11.4	70.1	2,395
New Mexico	W-CG-Prem	73	0.89	1.12	0.19	0.00	0.54	0.00	0	0	-11.2	7.3	2,402
Louisiana	S-CG-Prem	104	0.85	1.12	0.16	0.00	0.54	0.00	0	0	-10.9	10.4	2,413
Utah	S-CG-Reg	494	0.86	1.12	0.17	0.00	0.54	0.00	0	0	-10.9	49.4	2,462
South Carolina	S-CG-Prem	132	0.90	1.12	0.21	0.00	0.54	0.00	0	0	-10.8	13.2	2,475
Maryland	W-CG-Prem	9	0.88	1.12	0.19	0.00	0.54	0.00	0	0	-10.8	0.9	2,476
North Carolina	S-CG-Prem	234	0.90	1.12	0.21	0.00	0.54	0.00	0	0	-10.5	23.4	2,500
Alabama	S-CG-Prem	105	0.88	1.12	0.19	0.00	0.54	0.00	0	0	-10.3	10.5	2,510
West Virginia	W-CG-Prem	24	0.87	1.12	0.18	0.00	0.54	0.00	0	0	-10.3	2.4	2,513
New Hampshire	W-CG-Prem	5	0.89	1.12	0.21	0.00	0.54	0.00	0	0	-10.1	0.5	2,513
Colorado	S-CG-Reg	847	0.85	1.12	0.17	0.00	0.54	0.00	0	0	-10.1	84.7	2,598
Texas	S-CG-Prem	342	0.84	1.12	0.16	0.00	0.54	0.00	0	0	-9.8	34.2	2,632
Oklahoma	S-CG-Prem	88	0.87	1.12	0.19	0.00	0.54	0.00	0	0	-9.5	8.8	2,641
Arkansas	W-CG-Prem	65	0.83	1.12	0.16	0.00	0.54	0.00	0	0	-9.5	6.5	2,647
South Dakota	W-CG-reg	219	0.80	1.12	0.12	0.00	0.54	0.00	0	0	-9.5	21.9	2,669
Vermont	W-CG-Prem	15	0.89	1.12	0.21	0.00	0.54	0.00	0	0	-9.3	1.5	2,671
Florida	S-CG-Prem	461	0.93	1.12	0.25	0.00	0.54	0.00	0	0	-9.1	46.1	2,717
Michigan	W-CG-reg	2459	0.80	1.12	0.12	0.00	0.54	0.00	0	0	-9.1	245.9	2,963
Kentucky	W-CG-Prem	59	0.87	1.12	0.19	0.00	0.54	0.00	0	0	-9.1	5.9	2,969
Pennsylvania	W-CG-Prem	103	0.85	1.12	0.18	0.00	0.54	0.00	0	0	-9.0	10.3	2,979
Mississippi	W-CG-Prem	94	0.83	1.12	0.16	0.00	0.54	0.00	0	0	-8.9	9.4	2,988
Virginia	W-CG-Prem	78	0.86	1.12	0.19	0.00	0.54	0.00	0	0	-8.3	7.8	2,996
Wisconsin	W-CG-reg	1003	0.78	1.12	0.12	0.00	0.54	0.00	0	0	-7.8	100.3	3,096
Nebraska	W-CG-reg	404	0.78	1.12	0.12	0.00	0.54	0.00	0	0	-7.8	40.4	3,137
Ohio	W-CG-reg	2536	0.78	1.12	0.12	0.00	0.54	0.00	0	0	-7.8	253.6	3,390
Idaho	W-CG-reg	359	0.83	1.12	0.17	0.00	0.54	0.00	0	0	-7.7	35.9	3,426
Wyoming	W-CG-reg	172	0.83	1.12	0.17	0.00	0.54	0.00	0	0	-7.7	17.2	3,444
North Dakota	S-CG-Reg	170	0.85	1.12	0.19	0.00	0.54	0.00	0	0	-7.6	17.0	3,460
Washington	S-CG-Reg	1100	0.86	1.12	0.20	0.00	0.54	0.00	0	0	-7.3	110.0	3,570
Montana	W-CG-reg	349	0.82	1.12	0.17	0.00	0.54	0.00	0	0	-7.2	34.9	3,605
Tennessee	W-CG-Prem	207	0.85	1.12	0.19	0.00	0.54	0.00	0	0	-7.1	20.7	3,626
Missouri	W-CG-reg	996	0.78	1.12	0.12	0.00	0.54	0.00	0	0	-7.0	99.6	3,726
Oregon	S-CG-Reg	684	0.85	1.12	0.20	0.00	0.54	0.00	0	0	-6.9	68.4	3,794
Hawaii	W-CG-Prem	64	1.07	1.12	0.41	0.00	0.54	0.00	0	0	-6.9	6.4	3,800
Indiana	W-CG-reg	1469	0.77	1.12	0.12	0.00	0.54	0.00	0	0	-6.7	146.9	3,947
Georgia	W-CG-Prem	343	0.86	1.12	0.21	0.00	0.54	0.00	0	0	-6.6	34.3	3,982
New Mexico	S-CG-Reg	407	0.84	1.12	0.19	0.00	0.54	0.00	0	0	-6.6	40.7	4,022
Arkansas	S-CG-Reg	632	0.81	1.12	0.16	0.00	0.54	0.00	0	0	-6.6	63.2	4,085
Kansas	W-CG-reg	847	0.77	1.12	0.12	0.00	0.54	0.00	0	0	-6.4	84.7	4,170
New York	S-CG-Reg	1040	0.83	1.12	0.18	0.00	0.54	0.00	0	0	-6.3	104.0	4,274
Louisiana	W-CG-Prem	126	0.80	1.12	0.16	0.00	0.54	0.00	0	0	-5.9	12.6	4,287
Utah	W-CG-reg	598	0.81	1.12	0.17	0.00	0.54	0.00	0	0	-5.9	59.8	4,347
South Carolina	W-CG-Prem	160	0.85	1.12	0.21	0.00	0.54	0.00	0	0	-5.8	16.0	4,363
Maine	S-CG-Prem	11	0.89	1.12	0.25	0.00	0.54	0.00	0	0	-5.6	1.1	4,364
North Carolina	W-CG-Prem	282	0.85	1.12	0.21	0.00	0.54	0.00	0	0	-5.5	28.2	4,392
Alaska	S-CG-Reg	113	1.05	1.12	0.41	0.00	0.54	0.00	0	0	-5.5	11.3	4,403
Alabama	W-CG-Prem	126	0.83	1.12	0.19	0.00	0.54	0.00	0	0	-5.3	12.6	4,416
West Virginia	S-CG-Reg	322	0.82	1.12	0.18	0.00	0.54	0.00	0	0	-5.3	32.2	4,448
Colorado	W-CG-reg	1025	0.80	1.12	0.17	0.00	0.54	0.00	0	0	-5.1	102.5	4,550
Texas	W-CG-Prem	413	0.79	1.12	0.16	0.00	0.54	0.00	0	0	-4.8	41.3	4,592
Arizona	S-CG-Reg	447	0.86	1.12	0.23	0.00	0.54	0.00	0	0	-4.7	44.7	4,636
Oklahoma	W-CG-Prem	106	0.82	1.12	0.19	0.00	0.54	0.00	0	0	-4.5	10.6	4,647
Nevada	S-CG-Reg	429	0.86	1.12	0.23	0.00	0.54	0.00	0	0	-4.5	42.9	4,690
Kentucky	S-CG-Reg	706	0.82	1.12	0.19	0.00	0.54	0.00	0	0	-4.4	70.6	4,761
Mississippi	S-CG-Reg	756	0.78	1.12	0.16	0.00	0.54	0.00	0	0	-4.1	75.6	4,836
Florida	W-CG-Prem	557	0.88	1.12	0.25	0.00	0.54	0.00	0	0	-4.1	55.7	4,892
Hawaii	S-CG-Reg	175	1.04	1.12	0.41	0.00	0.54	0.00	0	0	-3.7	17.5	4,909
Vermont	S-CG-Reg	136	0.83	1.12	0.21	0.00	0.54	0.00	0	0	-3.6	13.6	4,923
Louisiana	S-CG-Reg	1177	0.77	1.12	0.16	0.00	0.54	0.00	0	0	-2.9	117.7	5,041
Maryland	S-CG-Reg	89	0.81	1.12	0.19	0.00	0.54	0.00	0	0	-2.9	8.9	5,050
Pennsylvania	S-CG-Reg	894	0.79	1.12	0.18	0.00	0.54	0.00	0	0	-2.6	89.4	5,139
North Dakota	W-CG-reg	205	0.80	1.12	0.19	0.00	0.54	0.00	0	0	-2.6	20.5	5,159
Washington	W-CG-reg	1330	0.81	1.12	0.20	0.00	0.54	0.00	0	0	-2.3	133.0	5,292
Tennessee	S-CG-Reg	1478	0.80	1.12	0.19	0.00	0.54	0.00	0	0	-2.0	147.8	5,440
Oregon	W-CG-reg	827	0.80	1.12	0.20	0.00	0.54	0.00	0	0	-1.9	82.7	5,523
New Hampshire	S-CG-Reg	58	0.81	1.12	0.21	0.00	0.54	0.00	0	0	-1.6	5.8	5,529
New Mexico	W-CG-reg	492	0.79	1.12	0.19	0.00	0.54	0.00	0	0	-1.6	49.2	5,578
Arkansas	W-CG-reg	765	0.76	1.12	0.16	0.00	0.54	0.00	0	0	-1.6	76.5	5,654
Virginia	S-CG-Reg	670	0.79	1.12	0.19	0.00	0.54	0.00	0	0	-1.5	67.0	5,721
Oklahoma	S-CG-Reg	897	0.79	1.12	0.19	0.00	0.54	0.00	0	0	-1.4	89.7	5,811
New York	W-CG-reg	1257	0.78	1.12	0.18	0.00	0.54	0.00	0	0	-1.3	125.7	5,937
Texas	S-CG-Reg	3515	0.75	1.12	0.16	0.00	0.54	0.00	0	0	-0.7	351.5	6,288
Georgia	S-CG-Reg	2065	0.80	1.12	0.21	0.00	0.54	0.00	0	0	-0.6	206.5	6,495
Maine	W-CG-Prem	13	0.84	1.12	0.25	0.00	0.54	0.00	0	0	-0.6	1.3	6,496
Alaska	W-CG-reg	136	1.00	1.12	0.41	0.00	0.54	0.00	0	0	-0.5	13.6	6,510
West Virginia	W-CG-reg	389	0.77	1.12	0.18	0.00	0.54	0.00	0	0	-0.3	38.9	6,549
North Carolina	S-CG-Reg	1867	0.79	1.12	0.21	0.00	0.54	0.00	0	0	-0.2	186.7	6,735
South Carolina	S-CG-Reg	1112	0.79	1.12	0.21	0.00	0.54	0.00	0	0	-0.1	111.2	6,847
Alabama	S-CG-Reg	1048	0.78	1.12	0.19	0.00	0.54	0.00	0	0	0.0	104.8	6,951
Arizona	W-CG-reg	541	0.81	1.12	0.23	0.00	0.54	0.00	0	0	0.3	54.1	7,005
Nevada	W-CG-reg	519	0.81	1.12	0.23	0.00	0.54	0.00	0	0	0.5	51.9	7,057
Kentucky	W-CG-reg	854	0.77	1.12	0.19	0.00	0.54	0.00	0	0	0.6	85.4	7,143
Mississippi	W-CG-reg	914	0.73	1.12	0.16	0.00	0.54	0.00	0	0	0.9	91.4	7,234

Table A2002C Input Costs, Ethanol Blending Cost and Ethanol Volumes

Year 2002 State	Gasoline Code	Gasoline Volume MMgals	Gasoline Price $/gal	Ethanol Gate Price $/gal	Ethanol Dist Cost $/gal	Ethanol Blending $/gal	Federal Subsidy $/gal	State Subsidy $/gal	State Mandate	RFG "Mandate"	Ethanol Blending Cost c/gal	Ethanol Volume MMgals	Cumulative Eth Vol MMgals
Hawaii	W-CG-reg	212	0.99	1.12	0.41	0.00	0.54	0.00	0	0	1.3	21.2	7,255
Vermont	W-CG-reg	165	0.78	1.12	0.21	0.00	0.54	0.00	0	0	1.4	16.5	7,272
Louisiana	W-CG-reg	1424	0.72	1.12	0.16	0.00	0.54	0.00	0	0	2.1	142.4	7,414
Maryland	W-CG-reg	107	0.76	1.12	0.19	0.00	0.54	0.00	0	0	2.1	10.7	7,425
Pennsylvania	W-CG-reg	1080	0.74	1.12	0.18	0.00	0.54	0.00	0	0	2.4	108.0	7,533
Tennessee	W-CG-reg	1787	0.75	1.12	0.19	0.00	0.54	0.00	0	0	3.0	178.7	7,712
Florida	S-CG-Reg	3138	0.80	1.12	0.25	0.00	0.54	0.00	0	0	3.3	313.8	8,025
New Hampshire	W-CG-reg	70	0.76	1.12	0.21	0.00	0.54	0.00	0	0	3.4	7.0	8,032
Virginia	W-CG-reg	810	0.74	1.12	0.19	0.00	0.54	0.00	0	0	3.5	81.0	8,113
Oklahoma	W-CG-reg	1085	0.74	1.12	0.19	0.00	0.54	0.00	0	0	3.6	108.5	8,222
Texas	W-CG-reg	4251	0.70	1.12	0.16	0.00	0.54	0.00	0	0	4.3	425.1	8,647
Georgia	W-CG-reg	2497	0.75	1.12	0.21	0.00	0.54	0.00	0	0	4.4	249.7	8,897
North Carolina	W-CG-reg	2258	0.74	1.12	0.21	0.00	0.54	0.00	0	0	4.8	225.8	9,122
South Carolina	W-CG-reg	1345	0.74	1.12	0.21	0.00	0.54	0.00	0	0	4.9	134.5	9,257
Alabama	W-CG-reg	1268	0.73	1.12	0.19	0.00	0.54	0.00	0	0	5.0	126.8	9,384
Maine	S-CG-Reg	129	0.78	1.12	0.25	0.00	0.54	0.00	0	0	5.7	12.9	9,396
Florida	W-CG-reg	3795	0.75	1.12	0.25	0.00	0.54	0.00	0	0	8.3	379.5	9,776
Maine	W-CG-reg	156	0.73	1.12	0.25	0.00	0.54	0.00	0	0	10.7	15.6	9,791
New York	S-RFG-Prem	302	1.05	1.12	0.18	0.37	0.54	0.00	0	0	-65.6	30.2	9,822
Missouri	S-RFG-Prem	42	0.99	1.12	0.12	0.37	0.54	0.00	0	0	-65.4	4.2	9,826
California	S-RFG-Prem	1557	1.06	1.12	0.23	0.37	0.54	0.00	0	0	-62.1	155.7	9,982
Massachusetts	S-RFG-Prem	167	1.02	1.12	0.19	0.37	0.54	0.00	0	0	-61.2	16.7	9,998
Missouri	S-RFG-Reg	422	0.89	1.12	0.12	0.51	0.54	0.00	0	0	-69.5	42.2	10,041
New York	W-RFG-Prem	366	1.00	1.12	0.18	0.18	0.54	0.00	0	0	-41.9	36.6	10,077
Missouri	W-RFG-Prem	50	0.94	1.12	0.12	0.18	0.54	0.00	0	0	-41.8	5.0	10,082
Arizona	S-RFG-Prem	125	1.05	1.12	0.23	0.37	0.54	0.00	0	0	-60.5	12.5	10,095
Maryland	S-RFG-Prem	139	0.99	1.12	0.19	0.37	0.54	0.00	0	0	-58.7	13.9	10,108
New Jersey	S-RFG-Prem	265	0.99	1.12	0.19	0.37	0.54	0.00	0	0	-58.1	26.5	10,135
Rhode Island	S-RFG-Prem	39	0.99	1.12	0.19	0.37	0.54	0.00	0	0	-58.1	3.9	10,139
New Hampshire	S-RFG-Prem	21	1.00	1.12	0.21	0.37	0.54	0.00	0	0	-58.0	2.1	10,141
California	W-RFG-Prem	1883	1.01	1.12	0.23	0.18	0.54	0.00	0	0	-38.4	188.3	10,329
Connecticut	S-RFG-Prem	106	0.98	1.12	0.19	0.37	0.54	0.00	0	0	-57.5	10.6	10,340
Kentucky	S-RFG-Prem	19	0.98	1.12	0.19	0.37	0.54	0.00	0	0	-57.0	1.9	10,342
Pennsylvania	S-RFG-Prem	66	0.96	1.12	0.18	0.37	0.54	0.00	0	0	-56.9	6.6	10,348
Massachusetts	W-RFG-Prem	202	0.97	1.12	0.19	0.18	0.54	0.00	0	0	-37.5	20.2	10,369
Virginia	S-RFG-Prem	154	0.97	1.12	0.19	0.37	0.54	0.00	0	0	-56.2	15.4	10,384
Arizona	W-RFG-Prem	151	1.00	1.12	0.23	0.18	0.54	0.00	0	0	-36.8	15.1	10,399
DC	S-RFG-Prem	7	0.97	1.12	0.19	0.37	0.54	0.00	0	0	-55.8	0.7	10,400
New York	S-RFG-Reg	1255	0.89	1.12	0.18	0.51	0.54	0.00	0	0	-63.7	125.5	10,525
California	S-RFG-Reg	5389	0.93	1.12	0.23	0.51	0.54	0.00	0	0	-63.4	538.9	11,064
Maryland	W-RFG-Prem	168	0.94	1.12	0.19	0.18	0.54	0.00	0	0	-35.0	16.8	11,081
Arizona	S-RFG-Reg	801	0.92	1.12	0.23	0.51	0.54	0.00	0	0	-62.1	80.1	11,161
New Jersey	W-RFG-Prem	321	0.94	1.12	0.19	0.18	0.54	0.00	0	0	-34.4	32.1	11,193
Rhode Island	W-RFG-Prem	47	0.94	1.12	0.19	0.18	0.54	0.00	0	0	-34.4	4.7	11,198
New Hampshire	W-RFG-Prem	25	0.95	1.12	0.21	0.18	0.54	0.00	0	0	-34.4	2.5	11,201
Kentucky	S-RFG-Reg	195	0.88	1.12	0.19	0.51	0.54	0.00	0	0	-61.8	19.5	11,220
Massachusetts	S-RFG-Reg	1100	0.88	1.12	0.19	0.51	0.54	0.00	0	0	-61.4	110.0	11,330
Connecticut	W-RFG-Prem	128	0.93	1.12	0.19	0.18	0.54	0.00	0	0	-33.8	12.8	11,343
Texas	S-RFG-Prem	401	0.90	1.12	0.16	0.37	0.54	0.00	0	0	-52.7	40.1	11,383
Kentucky	W-RFG-Prem	23	0.93	1.12	0.19	0.18	0.54	0.00	0	0	-33.3	2.3	11,385
Pennsylvania	W-RFG-Prem	80	0.91	1.12	0.18	0.18	0.54	0.00	0	0	-33.3	8.0	11,393
Delaware	S-RFG-Prem	24	0.93	1.12	0.19	0.37	0.54	0.00	0	0	-52.2	2.4	11,396
Maryland	S-RFG-Reg	758	0.87	1.12	0.19	0.51	0.54	0.00	0	0	-60.3	75.8	11,471
Virginia	W-RFG-Prem	187	0.92	1.12	0.19	0.18	0.54	0.00	0	0	-32.6	18.7	11,490
Pennsylvania	S-RFG-Reg	395	0.85	1.12	0.18	0.51	0.54	0.00	0	0	-60.1	39.5	11,530
DC	W-RFG-Prem	8	0.92	1.12	0.19	0.18	0.54	0.00	0	0	-32.2	0.8	11,530
Rhode Island	S-RFG-Reg	264	0.86	1.12	0.19	0.51	0.54	0.00	0	0	-59.4	26.4	11,557
New Hampshire	S-RFG-Reg	189	0.87	1.12	0.21	0.51	0.54	0.00	0	0	-59.0	18.9	11,576
Connecticut	S-RFG-Reg	647	0.85	1.12	0.19	0.51	0.54	0.00	0	0	-59.0	64.7	11,640
Virginia	S-RFG-Reg	792	0.85	1.12	0.19	0.51	0.54	0.00	0	0	-59.0	79.2	11,720
Missouri	W-RFG-reg	511	0.84	1.12	0.12	0.24	0.54	0.00	0	0	-37.0	51.1	11,771
Texas	S-RFG-Reg	2581	0.81	1.12	0.16	0.51	0.54	0.00	0	0	-58.1	258.1	12,029
DC	S-RFG-Reg	26	0.84	1.12	0.19	0.51	0.54	0.00	0	0	-58.0	2.6	12,031
Maine	S-RFG-Prem	13	0.95	1.12	0.25	0.37	0.54	0.00	0	0	-48.5	1.3	12,033
Texas	W-RFG-Prem	485	0.85	1.12	0.16	0.18	0.54	0.00	0	0	-29.0	48.5	12,081
Delaware	S-RFG-Reg	192	0.82	1.12	0.19	0.51	0.54	0.00	0	0	-56.1	19.2	12,100
Delaware	W-RFG-Prem	29	0.88	1.12	0.19	0.18	0.54	0.00	0	0	-28.5	2.9	12,103
New Jersey	S-RFG-Reg	1643	0.82	1.12	0.19	0.51	0.54	0.00	0	0	-56.0	164.3	12,268
New York	W-RFG-reg	1518	0.84	1.12	0.18	0.24	0.54	0.00	0	0	-31.3	151.8	12,419
California	W-RFG-reg	6516	0.88	1.12	0.23	0.24	0.54	0.00	0	0	-31.0	651.6	13,071
Maine	W-RFG-Prem	15	0.90	1.12	0.25	0.18	0.54	0.00	0	0	-24.9	1.5	13,073
Maine	S-RFG-Reg	190	0.84	1.12	0.25	0.51	0.54	0.00	0	0	-51.8	19.0	13,092
Arizona	W-RFG-reg	969	0.87	1.12	0.23	0.24	0.54	0.00	0	0	-29.7	96.9	13,188
Kentucky	W-RFG-reg	236	0.83	1.12	0.19	0.24	0.54	0.00	0	0	-29.4	23.6	13,212
Massachusetts	W-RFG-reg	1330	0.83	1.12	0.19	0.24	0.54	0.00	0	0	-29.0	133.0	13,345
Maryland	W-RFG-reg	917	0.82	1.12	0.19	0.24	0.54	0.00	0	0	-27.9	91.7	13,437
Pennsylvania	W-RFG-reg	478	0.80	1.12	0.18	0.24	0.54	0.00	0	0	-27.6	47.8	13,484
Rhode Island	W-RFG-reg	320	0.81	1.12	0.19	0.24	0.54	0.00	0	0	-27.0	32.0	13,516
New Hampshire	W-RFG-reg	228	0.82	1.12	0.21	0.24	0.54	0.00	0	0	-26.6	22.8	13,539
Connecticut	W-RFG-reg	782	0.80	1.12	0.19	0.24	0.54	0.00	0	0	-26.6	78.2	13,617
Virginia	W-RFG-reg	958	0.80	1.12	0.19	0.24	0.54	0.00	0	0	-26.5	95.8	13,713
Texas	W-RFG-reg	3121	0.76	1.12	0.16	0.24	0.54	0.00	0	0	-25.7	312.1	14,025
DC	W-RFG-reg	32	0.79	1.12	0.19	0.24	0.54	0.00	0	0	-25.6	3.2	14,029
Delaware	W-RFG-reg	233	0.77	1.12	0.19	0.24	0.54	0.00	0	0	-23.7	23.3	14,052
New Jersey	W-RFG-reg	1986	0.77	1.12	0.19	0.24	0.54	0.00	0	0	-23.6	198.6	14,250
Maine	W-RFG-reg	230	0.79	1.12	0.25	0.24	0.54	0.00	0	0	-19.3	23.0	14,273

Table A2003A Input Costs, Ethanol Blending Cost and Ethanol Volumes

Year 2003 State	Gasoline Code	Gasoline Volume MMgals	Gasoline Price $/gal	Ethanol Gate Price $/gal	Ethanol Dist Cost $/gal	Ethanol Blending $/gal	Federal Subsidy $/gal	State Subsidy $/gal	State Mandate	RFG "Mandate"	Ethanol Blending Cost c/gal	Ethanol Volume MMgals	Cumulative Eth Vol MMgals
Illinois	S-RFG-Reg	1315	1.05	1.35	0.13	0.52	0.54	0.26	0	1	-88.4	131.5	131
Illinois	S-RFG-Prem	189	1.19	1.35	0.13	0.37	0.54	0.26	0	1	-88.3	18.9	150
Wisconsin	S-RFG-Reg	343	1.06	1.35	0.13	0.52	0.54	0.00	0	1	-64.8	34.3	185
Indiana	S-RFG-Reg	202	1.04	1.35	0.13	0.52	0.54	0.00	0	1	-62.5	20.2	205
Illinois	W-RFG-Prem	229	1.14	1.35	0.13	0.19	0.54	0.26	0	1	-65.1	22.9	228
Wisconsin	S-RFG-Prem	31	1.18	1.35	0.13	0.37	0.54	0.00	0	1	-61.0	3.1	231
Indiana	S-RFG-Prem	21	1.16	1.35	0.13	0.37	0.54	0.00	0	1	-59.0	2.1	233
Illinois	W-RFG-reg	1590	1.00	1.35	0.13	0.25	0.54	0.26	0	1	-56.1	159.0	392
Wisconsin	W-RFG-Prem	38	1.13	1.35	0.13	0.19	0.54	0.00	0	1	-37.7	3.8	396
Indiana	W-RFG-Prem	25	1.11	1.35	0.13	0.19	0.54	0.00	0	1	-35.8	2.5	398
Wisconsin	W-RFG-reg	415	1.01	1.35	0.13	0.25	0.54	0.00	0	1	-32.4	41.5	440
Indiana	W-RFG-reg	244	0.99	1.35	0.13	0.25	0.54	0.00	0	1	-30.2	24.4	464
Minnesota	S-CG-Prem	105	1.11	1.35	0.13	0.00	0.54	0.00	1	0	-17.6	10.5	475
Minnesota	W-CG-Prem	127	1.06	1.35	0.13	0.00	0.54	0.00	1	0	-12.6	12.7	487
Minnesota	S-CG-Reg	1043	1.03	1.35	0.13	0.00	0.54	0.00	1	0	-9.6	104.3	592
Minnesota	W-CG-reg	1261	0.98	1.35	0.13	0.00	0.54	0.00	1	0	-4.6	126.1	718
Iowa	S-CG-Prem	66	1.11	1.35	0.13	0.00	0.54	0.30	0	0	-47.0	6.6	724
Illinois	S-CG-Prem	47	1.13	1.35	0.13	0.00	0.54	0.26	0	0	-45.3	4.7	729
Iowa	W-CG-Prem	79	1.06	1.35	0.13	0.00	0.54	0.30	0	0	-42.0	7.9	737
Illinois	W-CG-Prem	57	1.08	1.35	0.13	0.00	0.54	0.26	0	0	-40.3	5.7	743
Iowa	S-CG-Reg	505	1.01	1.35	0.13	0.00	0.54	0.30	0	0	-36.4	50.5	793
Iowa	W-CG-reg	611	0.96	1.35	0.13	0.00	0.54	0.30	0	0	-31.4	61.1	855
Illinois	S-CG-Reg	772	0.99	1.35	0.13	0.00	0.54	0.26	0	0	-30.4	77.2	932
Illinois	W-CG-reg	934	0.94	1.35	0.13	0.00	0.54	0.26	0	0	-25.4	93.4	1,025
Nevada	S-CG-Prem	111	1.26	1.35	0.23	0.00	0.54	0.00	0	0	-21.8	11.1	1,036
Arizona	S-CG-Prem	57	1.26	1.35	0.23	0.00	0.54	0.00	0	0	-21.6	5.7	1,042
Michigan	S-CG-Prem	135	1.13	1.35	0.13	0.00	0.54	0.00	0	0	-19.4	13.5	1,055
Oregon	S-CG-Prem	96	1.21	1.35	0.20	0.00	0.54	0.00	0	0	-19.3	9.6	1,065
South Dakota	S-CG-Prem	22	1.13	1.35	0.13	0.00	0.54	0.00	0	0	-19.2	2.2	1,067
Montana	S-CG-Prem	62	1.17	1.35	0.17	0.00	0.54	0.00	0	0	-18.8	6.2	1,073
New York	S-CG-Prem	102	1.18	1.35	0.18	0.00	0.54	0.00	0	0	-18.2	10.2	1,084
Washington	S-CG-Prem	219	1.20	1.35	0.20	0.00	0.54	0.00	0	0	-18.2	21.9	1,106
Wisconsin	S-CG-Prem	74	1.12	1.35	0.13	0.00	0.54	0.00	0	0	-17.9	7.4	1,113
Utah	S-CG-Prem	134	1.16	1.35	0.17	0.00	0.54	0.00	0	0	-17.4	13.4	1,126
Ohio	S-CG-Prem	166	1.11	1.35	0.13	0.00	0.54	0.00	0	0	-17.4	16.6	1,143
Idaho	S-CG-Prem	50	1.15	1.35	0.17	0.00	0.54	0.00	0	0	-16.8	5.0	1,148
Nevada	W-CG-Prem	135	1.21	1.35	0.23	0.00	0.54	0.00	0	0	-16.8	13.5	1,161
Arizona	W-CG-Prem	69	1.21	1.35	0.23	0.00	0.54	0.00	0	0	-16.6	6.9	1,168
Indiana	S-CG-Prem	87	1.10	1.35	0.13	0.00	0.54	0.00	0	0	-16.0	8.7	1,177
Alaska	S-CG-Prem	14	1.40	1.35	0.43	0.00	0.54	0.00	0	0	-15.9	1.4	1,178
Nebraska	S-CG-Prem	44	1.09	1.35	0.13	0.00	0.54	0.00	0	0	-15.8	4.4	1,183
Michigan	W-CG-Prem	163	1.08	1.35	0.13	0.00	0.54	0.00	0	0	-14.4	16.3	1,199
Missouri	S-CG-Prem	69	1.08	1.35	0.13	0.00	0.54	0.00	0	0	-14.3	6.9	1,206
Oregon	W-CG-Prem	116	1.16	1.35	0.20	0.00	0.54	0.00	0	0	-14.3	11.6	1,218
South Dakota	W-CG-Prem	27	1.08	1.35	0.13	0.00	0.54	0.00	0	0	-14.2	2.7	1,220
Montana	W-CG-Prem	75	1.12	1.35	0.17	0.00	0.54	0.00	0	0	-13.8	7.5	1,228
Wyoming	S-CG-Prem	29	1.12	1.35	0.17	0.00	0.54	0.00	0	0	-13.8	2.9	1,231
Kansas	S-CG-Prem	60	1.07	1.35	0.13	0.00	0.54	0.00	0	0	-13.8	6.0	1,237
New York	W-CG-Prem	123	1.13	1.35	0.18	0.00	0.54	0.00	0	0	-13.2	12.3	1,249
Washington	W-CG-Prem	264	1.15	1.35	0.20	0.00	0.54	0.00	0	0	-13.2	26.4	1,275
Wisconsin	W-CG-Prem	90	1.07	1.35	0.13	0.00	0.54	0.00	0	0	-12.9	9.0	1,284
Utah	W-CG-Prem	162	1.11	1.35	0.17	0.00	0.54	0.00	0	0	-12.4	16.2	1,300
Ohio	W-CG-Prem	201	1.06	1.35	0.13	0.00	0.54	0.00	0	0	-12.4	20.1	1,321
Idaho	W-CG-Prem	61	1.10	1.35	0.17	0.00	0.54	0.00	0	0	-11.8	6.1	1,327
Indiana	W-CG-Prem	105	1.05	1.35	0.13	0.00	0.54	0.00	0	0	-11.0	10.5	1,337
Alaska	W-CG-Prem	16	1.35	1.35	0.43	0.00	0.54	0.00	0	0	-10.9	1.6	1,339
Nebraska	W-CG-Prem	54	1.04	1.35	0.13	0.00	0.54	0.00	0	0	-10.8	5.4	1,344
Colorado	S-CG-Prem	186	1.09	1.35	0.17	0.00	0.54	0.00	0	0	-10.6	18.6	1,363
North Dakota	S-CG-Prem	21	1.11	1.35	0.20	0.00	0.54	0.00	0	0	-10.5	2.1	1,365
New Mexico	S-CG-Prem	61	1.11	1.35	0.20	0.00	0.54	0.00	0	0	-10.1	6.1	1,371
Nevada	S-CG-Reg	430	1.14	1.35	0.23	0.00	0.54	0.00	0	0	-9.8	43.0	1,414
Missouri	W-CG-Prem	84	1.03	1.35	0.13	0.00	0.54	0.00	0	0	-9.3	8.4	1,422
Maryland	S-CG-Prem	7	1.10	1.35	0.20	0.00	0.54	0.00	0	0	-9.3	0.7	1,423
Vermont	S-CG-Prem	12	1.11	1.35	0.21	0.00	0.54	0.00	0	0	-9.0	1.2	1,424
Arizona	S-CG-Reg	448	1.13	1.35	0.23	0.00	0.54	0.00	0	0	-9.0	44.8	1,469
Hawaii	S-CG-Prem	53	1.33	1.35	0.43	0.00	0.54	0.00	0	0	-9.0	5.3	1,474
Wyoming	W-CG-Prem	35	1.07	1.35	0.17	0.00	0.54	0.00	0	0	-8.8	3.5	1,478
Pennsylvania	S-CG-Prem	85	1.08	1.35	0.18	0.00	0.54	0.00	0	0	-8.8	8.5	1,486
Kansas	W-CG-Prem	72	1.02	1.35	0.13	0.00	0.54	0.00	0	0	-8.8	7.2	1,493
New Hampshire	S-CG-Prem	4	1.11	1.35	0.21	0.00	0.54	0.00	0	0	-8.8	0.4	1,494
South Dakota	S-CG-Reg	182	1.02	1.35	0.13	0.00	0.54	0.00	0	0	-8.0	18.2	1,512
Arkansas	S-CG-Prem	54	1.05	1.35	0.16	0.00	0.54	0.00	0	0	-7.9	5.4	1,518
West Virginia	S-CG-Prem	20	1.07	1.35	0.18	0.00	0.54	0.00	0	0	-7.8	2.0	1,520
Michigan	S-CG-Reg	2037	1.01	1.35	0.13	0.00	0.54	0.00	0	0	-7.6	203.7	1,723
Kentucky	S-CG-Prem	49	1.08	1.35	0.20	0.00	0.54	0.00	0	0	-7.1	4.9	1,728
Idaho	S-CG-Reg	297	1.05	1.35	0.17	0.00	0.54	0.00	0	0	-7.0	29.7	1,758
Utah	S-CG-Reg	495	1.05	1.35	0.17	0.00	0.54	0.00	0	0	-6.8	49.5	1,807
Mississippi	S-CG-Prem	78	1.04	1.35	0.16	0.00	0.54	0.00	0	0	-6.8	7.8	1,815
Wisconsin	S-CG-Reg	831	1.00	1.35	0.13	0.00	0.54	0.00	0	0	-6.7	83.1	1,898
Nebraska	S-CG-Reg	335	1.00	1.35	0.13	0.00	0.54	0.00	0	0	-5.9	33.5	1,932
Ohio	S-CG-Reg	2101	1.00	1.35	0.13	0.00	0.54	0.00	0	0	-5.9	210.1	2,142
Colorado	W-CG-Prem	225	1.04	1.35	0.17	0.00	0.54	0.00	0	0	-5.6	22.5	2,164
Virginia	S-CG-Prem	65	1.07	1.35	0.20	0.00	0.54	0.00	0	0	-5.6	6.5	2,171
Montana	S-CG-Reg	289	1.04	1.35	0.17	0.00	0.54	0.00	0	0	-5.5	28.9	2,200
North Dakota	W-CG-Prem	25	1.06	1.35	0.20	0.00	0.54	0.00	0	0	-5.5	2.5	2,202

Table A2003B Input Costs, Ethanol Blending Cost and Ethanol Volumes

Year 2003 State	Gasoline Code	Gasoline Volume MMgals	Gasoline Price $/gal	Ethanol Gate Price $/gal	Ethanol Dist Cost $/gal	Ethanol Blending $/gal	Federal Subsidy $/gal	State Subsidy $/gal	State Mandate	RFG "Mandate"	Ethanol Blending Cost c/gal	Ethanol Volume MMgals	Cumulative Eth Vol MMgals
New Mexico	W-CG-Prem	73	1.06	1.35	0.20	0.00	0.54	0.00	0	0	-5.1	7.3	2,210
Nevada	W-CG-reg	520	1.09	1.35	0.23	0.00	0.54	0.00	0	0	-4.8	52.0	2,262
Oregon	S-CG-Reg	685	1.06	1.35	0.20	0.00	0.54	0.00	0	0	-4.8	68.5	2,330
Georgia	S-CG-Prem	284	1.07	1.35	0.21	0.00	0.54	0.00	0	0	-4.7	28.4	2,358
Tennessee	S-CG-Prem	171	1.06	1.35	0.20	0.00	0.54	0.00	0	0	-4.7	17.1	2,376
Wyoming	S-CG-Reg	143	1.03	1.35	0.17	0.00	0.54	0.00	0	0	-4.6	14.3	2,390
Indiana	S-CG-Reg	1217	0.98	1.35	0.13	0.00	0.54	0.00	0	0	-4.5	121.7	2,512
Missouri	S-CG-Reg	825	0.98	1.35	0.13	0.00	0.54	0.00	0	0	-4.3	82.5	2,594
Alabama	S-CG-Prem	105	1.05	1.35	0.20	0.00	0.54	0.00	0	0	-4.3	10.5	2,605
Maryland	W-CG-Prem	9	1.05	1.35	0.20	0.00	0.54	0.00	0	0	-4.3	0.9	2,605
Washington	S-CG-Reg	1102	1.06	1.35	0.20	0.00	0.54	0.00	0	0	-4.2	110.2	2,716
Kansas	S-CG-Reg	702	0.98	1.35	0.13	0.00	0.54	0.00	0	0	-4.1	70.2	2,786
Vermont	W-CG-Prem	15	1.06	1.35	0.21	0.00	0.54	0.00	0	0	-4.0	1.5	2,787
Arizona	W-CG-reg	541	1.08	1.35	0.23	0.00	0.54	0.00	0	0	-4.0	54.1	2,841
Hawaii	W-CG-Prem	64	1.28	1.35	0.43	0.00	0.54	0.00	0	0	-4.0	6.4	2,848
Pennsylvania	W-CG-Prem	103	1.03	1.35	0.18	0.00	0.54	0.00	0	0	-3.8	10.3	2,858
New Hampshire	W-CG-Prem	5	1.06	1.35	0.21	0.00	0.54	0.00	0	0	-3.8	0.5	2,859
South Carolina	S-CG-Prem	132	1.06	1.35	0.21	0.00	0.54	0.00	0	0	-3.3	13.2	2,872
Oklahoma	S-CG-Prem	88	1.04	1.35	0.20	0.00	0.54	0.00	0	0	-3.0	8.8	2,881
South Dakota	W-CG-reg	220	0.97	1.35	0.13	0.00	0.54	0.00	0	0	-3.0	22.0	2,903
Arkansas	W-CG-Prem	65	1.00	1.35	0.16	0.00	0.54	0.00	0	0	-2.9	6.5	2,909
West Virginia	W-CG-Prem	24	1.02	1.35	0.18	0.00	0.54	0.00	0	0	-2.8	2.4	2,912
North Carolina	S-CG-Prem	234	1.05	1.35	0.21	0.00	0.54	0.00	0	0	-2.6	23.4	2,935
Texas	S-CG-Prem	342	1.00	1.35	0.16	0.00	0.54	0.00	0	0	-2.6	34.2	2,969
Michigan	W-CG-reg	2463	0.96	1.35	0.13	0.00	0.54	0.00	0	0	-2.6	246.3	3,216
Kentucky	W-CG-Prem	60	1.03	1.35	0.20	0.00	0.54	0.00	0	0	-2.1	6.0	3,221
Idaho	W-CG-reg	359	1.00	1.35	0.17	0.00	0.54	0.00	0	0	-2.0	35.9	3,257
Colorado	S-CG-Reg	849	1.00	1.35	0.17	0.00	0.54	0.00	0	0	-1.9	84.9	3,342
Utah	W-CG-reg	599	1.00	1.35	0.17	0.00	0.54	0.00	0	0	-1.8	59.9	3,402
Florida	S-CG-Prem	461	1.09	1.35	0.26	0.00	0.54	0.00	0	0	-1.8	46.1	3,448
Mississippi	W-CG-Prem	94	0.99	1.35	0.16	0.00	0.54	0.00	0	0	-1.8	9.4	3,458
Wisconsin	W-CG-reg	1005	0.95	1.35	0.13	0.00	0.54	0.00	0	0	-1.7	100.5	3,558
Louisiana	S-CG-Prem	104	0.99	1.35	0.16	0.00	0.54	0.00	0	0	-1.5	10.4	3,569
Alaska	S-CG-Reg	113	1.25	1.35	0.43	0.00	0.54	0.00	0	0	-1.3	11.3	3,580
New York	S-CG-Reg	1042	1.00	1.35	0.18	0.00	0.54	0.00	0	0	-1.0	104.2	3,684
North Dakota	S-CG-Reg	170	1.02	1.35	0.20	0.00	0.54	0.00	0	0	-0.9	17.0	3,701
Nebraska	W-CG-reg	405	0.95	1.35	0.13	0.00	0.54	0.00	0	0	-0.9	40.5	3,742
Ohio	W-CG-reg	2540	0.95	1.35	0.13	0.00	0.54	0.00	0	0	-0.9	254.0	3,996
Virginia	W-CG-Prem	79	1.02	1.35	0.20	0.00	0.54	0.00	0	0	-0.6	7.9	4,003
New Mexico	S-CG-Reg	407	1.02	1.35	0.20	0.00	0.54	0.00	0	0	-0.6	40.7	4,044
Montana	W-CG-reg	350	0.99	1.35	0.17	0.00	0.54	0.00	0	0	-0.5	35.0	4,079
Hawaii	S-CG-Reg	176	1.24	1.35	0.43	0.00	0.54	0.00	0	0	-0.1	17.6	4,097
Oregon	W-CG-reg	829	1.01	1.35	0.20	0.00	0.54	0.00	0	0	0.2	82.9	4,180
Georgia	W-CG-Prem	343	1.02	1.35	0.21	0.00	0.54	0.00	0	0	0.3	34.3	4,214
Tennessee	W-CG-Prem	207	1.01	1.35	0.20	0.00	0.54	0.00	0	0	0.3	20.7	4,235
Wyoming	W-CG-reg	172	0.98	1.35	0.17	0.00	0.54	0.00	0	0	0.4	17.2	4,252
Indiana	W-CG-reg	1472	0.93	1.35	0.13	0.00	0.54	0.00	0	0	0.5	147.2	4,399
Missouri	W-CG-reg	997	0.93	1.35	0.13	0.00	0.54	0.00	0	0	0.7	99.7	4,499
Alabama	W-CG-Prem	127	1.00	1.35	0.20	0.00	0.54	0.00	0	0	0.7	12.7	4,511
Washington	W-CG-reg	1332	1.01	1.35	0.20	0.00	0.54	0.00	0	0	0.8	133.2	4,645
Arkansas	S-CG-Reg	634	0.96	1.35	0.16	0.00	0.54	0.00	0	0	0.9	63.4	4,708
Kansas	W-CG-reg	849	0.93	1.35	0.13	0.00	0.54	0.00	0	0	0.9	84.9	4,793
South Carolina	W-CG-Prem	160	1.01	1.35	0.21	0.00	0.54	0.00	0	0	1.7	16.0	4,809
Pennsylvania	S-CG-Reg	895	0.97	1.35	0.18	0.00	0.54	0.00	0	0	1.9	89.5	4,898
Oklahoma	W-CG-Prem	106	0.99	1.35	0.20	0.00	0.54	0.00	0	0	2.0	10.6	4,909
Vermont	S-CG-Reg	136	1.00	1.35	0.21	0.00	0.54	0.00	0	0	2.0	13.6	4,923
West Virginia	S-CG-Reg	322	0.97	1.35	0.18	0.00	0.54	0.00	0	0	2.3	32.2	4,955
North Carolina	W-CG-Prem	283	1.00	1.35	0.21	0.00	0.54	0.00	0	0	2.4	28.3	4,983
Texas	W-CG-Prem	414	0.95	1.35	0.16	0.00	0.54	0.00	0	0	2.4	41.4	5,025
Kentucky	S-CG-Reg	707	0.98	1.35	0.20	0.00	0.54	0.00	0	0	2.4	70.7	5,095
Maine	S-CG-Prem	11	1.04	1.35	0.26	0.00	0.54	0.00	0	0	2.9	1.1	5,096
Colorado	W-CG-reg	1026	0.95	1.35	0.17	0.00	0.54	0.00	0	0	3.1	102.6	5,199
Florida	W-CG-Prem	558	1.04	1.35	0.26	0.00	0.54	0.00	0	0	3.2	55.8	5,255
Louisiana	W-CG-Prem	126	0.94	1.35	0.16	0.00	0.54	0.00	0	0	3.5	12.6	5,267
Maryland	S-CG-Reg	89	0.97	1.35	0.20	0.00	0.54	0.00	0	0	3.7	8.9	5,276
Alaska	W-CG-reg	136	1.20	1.35	0.43	0.00	0.54	0.00	0	0	3.7	13.6	5,290
Mississippi	S-CG-Reg	757	0.93	1.35	0.16	0.00	0.54	0.00	0	0	3.9	75.7	5,366
New York	W-CG-reg	1259	0.95	1.35	0.18	0.00	0.54	0.00	0	0	4.0	125.9	5,492
North Dakota	W-CG-reg	205	0.97	1.35	0.20	0.00	0.54	0.00	0	0	4.1	20.5	5,512
New Mexico	W-CG-reg	493	0.97	1.35	0.20	0.00	0.54	0.00	0	0	4.4	49.3	5,561
New Hampshire	S-CG-Reg	58	0.98	1.35	0.21	0.00	0.54	0.00	0	0	4.4	5.8	5,567
Hawaii	W-CG-reg	212	1.19	1.35	0.43	0.00	0.54	0.00	0	0	4.9	21.2	5,588
Louisiana	S-CG-Reg	1179	0.92	1.35	0.16	0.00	0.54	0.00	0	0	5.3	117.9	5,706
Tennessee	S-CG-Reg	1480	0.96	1.35	0.20	0.00	0.54	0.00	0	0	5.4	148.0	5,854
Arkansas	W-CG-reg	766	0.91	1.35	0.16	0.00	0.54	0.00	0	0	5.9	76.6	5,931
Virginia	S-CG-Reg	671	0.95	1.35	0.20	0.00	0.54	0.00	0	0	6.3	67.1	5,998
Alabama	S-CG-Reg	1050	0.95	1.35	0.20	0.00	0.54	0.00	0	0	6.4	105.0	6,103
Georgia	S-CG-Reg	2068	0.96	1.35	0.21	0.00	0.54	0.00	0	0	6.4	206.8	6,310
Pennsylvania	W-CG-reg	1082	0.92	1.35	0.18	0.00	0.54	0.00	0	0	6.9	108.2	6,418
Vermont	W-CG-reg	165	0.95	1.35	0.21	0.00	0.54	0.00	0	0	7.0	16.5	6,435
Oklahoma	S-CG-Reg	899	0.94	1.35	0.20	0.00	0.54	0.00	0	0	7.1	89.9	6,524
Texas	S-CG-Reg	3521	0.90	1.35	0.16	0.00	0.54	0.00	0	0	7.2	352.1	6,877
West Virginia	W-CG-reg	390	0.92	1.35	0.18	0.00	0.54	0.00	0	0	7.3	39.0	6,916
Kentucky	W-CG-reg	855	0.93	1.35	0.20	0.00	0.54	0.00	0	0	7.4	85.5	7,001
South Carolina	S-CG-Reg	1114	0.95	1.35	0.21	0.00	0.54	0.00	0	0	7.6	111.4	7,112

Table A2003C Input Costs, Ethanol Blending Cost and Ethanol Volumes

Year 2003 State	Gasoline Code	Gasoline Volume MMgals	Gasoline Price $/gal	Ethanol Gate Price $/gal	Ethanol Dist Cost $/gal	Ethanol Blending $/gal	Federal Subsidy $/gal	State Subsidy $/gal	State Mandate	RFG "Mandate"	Ethanol Blending Cost c/gal	Ethanol Volume MMgals	Cumulative Eth Vol MMgals
North Carolina	S-CG-Reg	1870	0.95	1.35	0.21	0.00	0.54	0.00	0	0	7.7	187.0	7,299
Maine	W-CG-Prem	13	0.99	1.35	0.26	0.00	0.54	0.00	0	0	7.9	1.3	7,301
Maryland	W-CG-reg	108	0.92	1.35	0.20	0.00	0.54	0.00	0	0	8.7	10.8	7,312
Mississippi	W-CG-reg	915	0.88	1.35	0.16	0.00	0.54	0.00	0	0	8.9	91.5	7,403
New Hampshire	W-CG-reg	70	0.93	1.35	0.21	0.00	0.54	0.00	0	0	9.4	7.0	7,410
Louisiana	W-CG-reg	1426	0.87	1.35	0.16	0.00	0.54	0.00	0	0	10.3	142.6	7,553
Tennessee	W-CG-reg	1790	0.91	1.35	0.20	0.00	0.54	0.00	0	0	10.4	179.0	7,732
Florida	S-CG-Reg	3144	0.96	1.35	0.26	0.00	0.54	0.00	0	0	10.6	314.4	8,046
Virginia	W-CG-reg	811	0.90	1.35	0.20	0.00	0.54	0.00	0	0	11.3	81.1	8,127
Alabama	W-CG-reg	1270	0.90	1.35	0.20	0.00	0.54	0.00	0	0	11.4	127.0	8,254
Georgia	W-CG-reg	2501	0.91	1.35	0.21	0.00	0.54	0.00	0	0	11.4	250.1	8,504
Oklahoma	W-CG-reg	1087	0.89	1.35	0.20	0.00	0.54	0.00	0	0	12.1	108.7	8,613
Texas	W-CG-reg	4258	0.85	1.35	0.16	0.00	0.54	0.00	0	0	12.2	425.8	9,039
South Carolina	W-CG-reg	1347	0.90	1.35	0.21	0.00	0.54	0.00	0	0	12.6	134.7	9,173
North Carolina	W-CG-reg	2261	0.90	1.35	0.21	0.00	0.54	0.00	0	0	12.7	226.1	9,399
Maine	S-CG-Reg	129	0.94	1.35	0.26	0.00	0.54	0.00	0	0	13.4	12.9	9,412
Florida	W-CG-reg	3801	0.91	1.35	0.26	0.00	0.54	0.00	0	0	15.6	380.1	9,792
Maine	W-CG-reg	156	0.89	1.35	0.26	0.00	0.54	0.00	0	0	18.4	15.6	9,808
California	S-RFG-Prem	1560	1.33	1.35	0.23	0.37	0.54	0.00	0	0	-65.3	156.0	9,964
Arizona	S-RFG-Prem	125	1.32	1.35	0.23	0.37	0.54	0.00	0	0	-64.6	12.5	9,977
New York	S-RFG-Prem	303	1.24	1.35	0.18	0.37	0.54	0.00	0	0	-61.3	30.3	10,007
California	W-RFG-Prem	1886	1.28	1.35	0.23	0.19	0.54	0.00	0	0	-42.1	188.6	10,195
Arizona	W-RFG-Prem	151	1.27	1.35	0.23	0.19	0.54	0.00	0	0	-41.4	15.1	10,211
Missouri	S-RFG-Prem	42	1.14	1.35	0.13	0.37	0.54	0.00	0	0	-57.4	4.2	10,215
California	S-RFG-Reg	5398	1.20	1.35	0.23	0.52	0.54	0.00	0	0	-67.4	539.8	10,755
Arizona	S-RFG-Reg	803	1.19	1.35	0.23	0.52	0.54	0.00	0	0	-67.0	80.3	10,835
New York	W-RFG-Prem	366	1.19	1.35	0.18	0.19	0.54	0.00	0	0	-38.0	36.6	10,871
Massachusetts	S-RFG-Prem	168	1.19	1.35	0.20	0.37	0.54	0.00	0	0	-55.1	16.8	10,888
Connecticut	S-RFG-Prem	106	1.17	1.35	0.20	0.37	0.54	0.00	0	0	-53.1	10.6	10,899
Maryland	S-RFG-Prem	139	1.16	1.35	0.20	0.37	0.54	0.00	0	0	-52.3	13.9	10,913
New Jersey	S-RFG-Prem	266	1.16	1.35	0.20	0.37	0.54	0.00	0	0	-51.9	26.6	10,939
Pennsylvania	S-RFG-Prem	66	1.14	1.35	0.18	0.37	0.54	0.00	0	0	-51.8	6.6	10,946
New Hampshire	S-RFG-Prem	21	1.17	1.35	0.21	0.37	0.54	0.00	0	0	-51.8	2.1	10,948
Missouri	W-RFG-Prem	50	1.09	1.35	0.13	0.19	0.54	0.00	0	0	-34.1	5.0	10,953
Rhode Island	S-RFG-Prem	39	1.15	1.35	0.20	0.37	0.54	0.00	0	0	-51.4	3.9	10,957
Missouri	S-RFG-Reg	423	1.04	1.35	0.13	0.52	0.54	0.00	0	0	-62.4	42.3	10,999
Kentucky	S-RFG-Prem	19	1.14	1.35	0.20	0.37	0.54	0.00	0	0	-50.1	1.9	11,001
Massachusetts	W-RFG-Prem	203	1.14	1.35	0.20	0.19	0.54	0.00	0	0	-31.9	20.3	11,021
DC	S-RFG-Prem	7	1.13	1.35	0.20	0.37	0.54	0.00	0	0	-48.9	0.7	11,022
Virginia	S-RFG-Prem	155	1.13	1.35	0.20	0.37	0.54	0.00	0	0	-48.7	15.5	11,038
New York	S-RFG-Reg	1257	1.06	1.35	0.18	0.52	0.54	0.00	0	0	-59.1	125.7	11,163
Connecticut	W-RFG-Prem	128	1.12	1.35	0.20	0.19	0.54	0.00	0	0	-29.9	12.8	11,176
Delaware	S-RFG-Prem	24	1.11	1.35	0.20	0.37	0.54	0.00	0	0	-47.3	2.4	11,179
California	W-RFG-reg	6527	1.15	1.35	0.23	0.25	0.54	0.00	0	0	-35.1	652.7	11,831
Maryland	W-RFG-Prem	168	1.11	1.35	0.20	0.19	0.54	0.00	0	0	-29.1	16.8	11,848
Arizona	W-RFG-reg	971	1.14	1.35	0.23	0.25	0.54	0.00	0	0	-34.7	97.1	11,945
New Jersey	W-RFG-Prem	321	1.11	1.35	0.20	0.19	0.54	0.00	0	0	-28.7	32.1	11,977
Pennsylvania	W-RFG-Prem	80	1.09	1.35	0.18	0.19	0.54	0.00	0	0	-28.6	8.0	11,985
New Hampshire	W-RFG-Prem	25	1.12	1.35	0.21	0.19	0.54	0.00	0	0	-28.6	2.5	11,988
Rhode Island	W-RFG-Prem	47	1.10	1.35	0.20	0.19	0.54	0.00	0	0	-28.2	4.7	11,993
Texas	S-RFG-Prem	401	1.06	1.35	0.16	0.37	0.54	0.00	0	0	-45.6	40.1	12,033
Massachusetts	S-RFG-Reg	1102	1.05	1.35	0.20	0.52	0.54	0.00	0	0	-56.1	110.2	12,143
Pennsylvania	S-RFG-Reg	396	1.03	1.35	0.18	0.52	0.54	0.00	0	0	-56.1	39.6	12,182
Kentucky	S-RFG-Reg	195	1.04	1.35	0.20	0.52	0.54	0.00	0	0	-55.6	19.5	12,202
Kentucky	W-RFG-Prem	23	1.09	1.35	0.20	0.19	0.54	0.00	0	0	-26.9	2.3	12,204
Connecticut	S-RFG-Reg	648	1.04	1.35	0.20	0.52	0.54	0.00	0	0	-55.1	64.8	12,269
Maryland	S-RFG-Reg	760	1.03	1.35	0.20	0.52	0.54	0.00	0	0	-54.3	76.0	12,345
DC	W-RFG-Prem	8	1.08	1.35	0.20	0.19	0.54	0.00	0	0	-25.6	0.8	12,346
Virginia	W-RFG-Prem	187	1.08	1.35	0.20	0.19	0.54	0.00	0	0	-25.4	18.7	12,365
New Hampshire	S-RFG-Reg	189	1.04	1.35	0.21	0.52	0.54	0.00	0	0	-53.6	18.9	12,383
Rhode Island	S-RFG-Reg	265	1.02	1.35	0.20	0.52	0.54	0.00	0	0	-53.2	26.5	12,410
Missouri	W-RFG-reg	512	0.99	1.35	0.13	0.25	0.54	0.00	0	0	-30.0	51.2	12,461
Delaware	W-RFG-Prem	29	1.06	1.35	0.20	0.19	0.54	0.00	0	0	-24.1	2.9	12,464
Virginia	S-RFG-Reg	794	1.01	1.35	0.20	0.52	0.54	0.00	0	0	-51.8	79.4	12,543
Delaware	S-RFG-Reg	193	1.00	1.35	0.20	0.52	0.54	0.00	0	0	-51.5	19.3	12,563
DC	S-RFG-Reg	26	1.00	1.35	0.20	0.52	0.54	0.00	0	0	-51.4	2.6	12,565
Maine	S-RFG-Prem	13	1.10	1.35	0.26	0.37	0.54	0.00	0	0	-40.1	1.3	12,566
Texas	W-RFG-Prem	485	1.01	1.35	0.16	0.19	0.54	0.00	0	0	-22.4	48.5	12,615
Texas	S-RFG-Reg	2585	0.96	1.35	0.16	0.52	0.54	0.00	0	0	-50.8	258.5	12,874
New Jersey	S-RFG-Reg	1645	0.99	1.35	0.20	0.52	0.54	0.00	0	0	-50.3	164.5	13,038
New York	W-RFG-reg	1520	1.01	1.35	0.18	0.25	0.54	0.00	0	0	-26.8	152.0	13,190
Massachusetts	W-RFG-reg	1332	1.00	1.35	0.20	0.25	0.54	0.00	0	0	-23.8	133.2	13,323
Pennsylvania	W-RFG-reg	479	0.98	1.35	0.18	0.25	0.54	0.00	0	0	-23.8	47.9	13,371
Kentucky	W-RFG-reg	236	0.99	1.35	0.20	0.25	0.54	0.00	0	0	-23.3	23.6	13,395
Connecticut	W-RFG-reg	783	0.99	1.35	0.20	0.25	0.54	0.00	0	0	-22.8	78.3	13,473
Maine	W-RFG-Prem	15	1.05	1.35	0.26	0.19	0.54	0.00	0	0	-16.9	1.5	13,475
Maryland	W-RFG-reg	918	0.98	1.35	0.20	0.25	0.54	0.00	0	0	-22.0	91.8	13,567
Maine	S-RFG-Reg	190	1.00	1.35	0.26	0.52	0.54	0.00	0	0	-44.6	19.0	13,586
New Hampshire	W-RFG-reg	228	0.99	1.35	0.21	0.25	0.54	0.00	0	0	-21.3	22.8	13,608
Rhode Island	W-RFG-reg	320	0.97	1.35	0.20	0.25	0.54	0.00	0	0	-20.9	32.0	13,640
Virginia	W-RFG-reg	960	0.96	1.35	0.20	0.25	0.54	0.00	0	0	-19.4	96.0	13,736
Delaware	W-RFG-reg	233	0.95	1.35	0.20	0.25	0.54	0.00	0	0	-19.2	23.3	13,760
DC	W-RFG-reg	32	0.95	1.35	0.20	0.25	0.54	0.00	0	0	-19.1	3.2	13,763
Texas	W-RFG-reg	3126	0.91	1.35	0.16	0.25	0.54	0.00	0	0	-18.5	312.6	14,076
New Jersey	W-RFG-reg	1990	0.94	1.35	0.20	0.25	0.54	0.00	0	0	-18.0	199.0	14,275
Maine	W-RFG-reg	230	0.95	1.35	0.26	0.25	0.54	0.00	0	0	-12.3	23.0	14,298

Table A2004A Input Costs, Ethanol Blending Cost and Ethanol Volumes

Year 2004 State	Gasoline Code	Gasoline Volume MMgals	Gasoline Price $/gal	Ethanol Gate Price $/gal	Ethanol Dist Cost $/gal	Ethanol Blending $/gal	Federal Subsidy $/gal	State Subsidy $/gal	State Mandate	RFG "Mandate"	Ethanol Blending Cost c/gal	Ethanol Volume MMgals	Cumulative Eth Vol MMgals
Illinois	S-RFG-Reg	1320	1.32	1.69	0.13	0.72	0.54	0.26	0	1	-100.7	132.0	132
Illinois	S-RFG-Prem	190	1.46	1.69	0.13	0.51	0.54	0.26	0	1	-94.0	19.0	151
California	S-RFG-Reg	5418	1.50	1.69	0.24	0.72	0.54	0.00	0	1	-82.5	308.8	460
Indiana	S-RFG-Reg	203	1.33	1.69	0.13	0.72	0.54	0.00	0	1	-76.5	20.3	480
Wisconsin	S-RFG-Reg	344	1.33	1.69	0.13	0.72	0.54	0.00	0	1	-76.2	34.4	515
California	S-RFG-Prem	1566	1.63	1.69	0.24	0.51	0.54	0.00	0	1	-74.9	89.2	604
New York	S-RFG-Reg	1262	1.36	1.69	0.19	0.72	0.54	0.00	0	1	-73.3	126.2	730
Connecticut	S-RFG-Reg	650	1.35	1.69	0.21	0.72	0.54	0.00	0	1	-71.1	65.0	795
New York	S-RFG-Prem	304	1.53	1.69	0.19	0.51	0.54	0.00	0	1	-69.9	30.4	825
Indiana	S-RFG-Prem	21	1.44	1.69	0.13	0.51	0.54	0.00	0	1	-67.2	2.1	828
Wisconsin	S-RFG-Prem	31	1.44	1.69	0.13	0.51	0.54	0.00	0	1	-66.3	3.1	831
Connecticut	S-RFG-Prem	107	1.48	1.69	0.21	0.51	0.54	0.00	0	1	-63.2	10.7	841
Illinois	W-RFG-Prem	230	1.41	1.69	0.13	0.26	0.54	0.26	0	1	-63.5	23.0	864
Illinois	W-RFG-reg	1596	1.27	1.69	0.13	0.34	0.54	0.26	0	1	-57.8	159.6	1,024
California	W-RFG-Prem	1893	1.58	1.69	0.24	0.26	0.54	0.00	0	1	-44.4	107.9	1,132
California	W-RFG-reg	6552	1.45	1.69	0.24	0.34	0.54	0.00	0	1	-39.6	373.4	1,505
New York	W-RFG-Prem	368	1.48	1.69	0.19	0.26	0.54	0.00	0	1	-39.4	36.8	1,542
Indiana	W-RFG-Prem	26	1.39	1.69	0.13	0.26	0.54	0.00	0	1	-36.7	2.6	1,545
Wisconsin	W-RFG-Prem	38	1.39	1.69	0.13	0.26	0.54	0.00	0	1	-35.9	3.8	1,548
Indiana	W-RFG-reg	245	1.28	1.69	0.13	0.34	0.54	0.00	0	1	-33.6	24.5	1,573
Wisconsin	W-RFG-reg	416	1.28	1.69	0.13	0.34	0.54	0.00	0	1	-33.3	41.6	1,614
Connecticut	W-RFG-Prem	129	1.43	1.69	0.21	0.26	0.54	0.00	0	1	-32.8	12.9	1,627
New York	W-RFG-reg	1526	1.31	1.69	0.19	0.34	0.54	0.00	0	1	-30.4	152.6	1,780
Connecticut	W-RFG-reg	786	1.30	1.69	0.21	0.34	0.54	0.00	0	1	-28.2	78.6	1,859
Minnesota	S-CG-Prem	105	1.38	1.69	0.13	0.00	0.54	0.00	1	0	-9.1	10.5	1,869
Minnesota	W-CG-Prem	127	1.33	1.69	0.13	0.00	0.54	0.00	1	0	-4.1	12.7	1,882
Minnesota	S-CG-Reg	1047	1.30	1.69	0.13	0.00	0.54	0.00	1	0	-1.8	104.7	1,987
Minnesota	W-CG-reg	1266	1.25	1.69	0.13	0.00	0.54	0.00	1	0	3.2	126.6	2,113
Iowa	S-CG-Prem	66	1.39	1.69	0.13	0.00	0.54	0.30	0	0	-39.7	6.6	2,120
Illinois	S-CG-Prem	47	1.40	1.69	0.13	0.00	0.54	0.26	0	0	-36.7	4.7	2,124
Iowa	W-CG-Prem	80	1.34	1.69	0.13	0.00	0.54	0.30	0	0	-34.7	8.0	2,132
Illinois	W-CG-Prem	57	1.35	1.69	0.13	0.00	0.54	0.26	0	0	-31.7	5.7	2,138
Iowa	S-CG-Reg	507	1.28	1.69	0.13	0.00	0.54	0.30	0	0	-28.6	50.7	2,189
Iowa	W-CG-reg	613	1.23	1.69	0.13	0.00	0.54	0.30	0	0	-23.6	61.3	2,250
Illinois	S-CG-Reg	775	1.26	1.69	0.13	0.00	0.54	0.26	0	0	-22.8	77.5	2,328
Nevada	S-CG-Prem	112	1.59	1.69	0.24	0.00	0.54	0.00	0	0	-19.8	11.2	2,339
Illinois	W-CG-reg	937	1.21	1.69	0.13	0.00	0.54	0.26	0	0	-17.8	93.7	2,433
Arizona	S-CG-Prem	57	1.55	1.69	0.24	0.00	0.54	0.00	0	0	-15.1	5.7	2,438
Nevada	W-CG-Prem	135	1.54	1.69	0.24	0.00	0.54	0.00	0	0	-14.8	13.5	2,452
Oregon	S-CG-Prem	97	1.50	1.69	0.21	0.00	0.54	0.00	0	0	-13.5	9.7	2,462
Washington	S-CG-Prem	219	1.49	1.69	0.21	0.00	0.54	0.00	0	0	-12.9	21.9	2,484
New York	S-CG-Prem	102	1.47	1.69	0.19	0.00	0.54	0.00	0	0	-12.6	10.2	2,494
South Dakota	S-CG-Prem	22	1.40	1.69	0.13	0.00	0.54	0.00	0	0	-11.3	2.2	2,496
Michigan	S-CG-Prem	135	1.40	1.69	0.13	0.00	0.54	0.00	0	0	-11.1	13.5	2,509
Idaho	S-CG-Prem	51	1.44	1.69	0.18	0.00	0.54	0.00	0	0	-10.8	5.1	2,515
Montana	S-CG-Prem	62	1.44	1.69	0.18	0.00	0.54	0.00	0	0	-10.4	6.2	2,521
Ohio	S-CG-Prem	167	1.39	1.69	0.13	0.00	0.54	0.00	0	0	-10.4	16.7	2,537
Arizona	W-CG-Prem	69	1.50	1.69	0.24	0.00	0.54	0.00	0	0	-10.1	6.9	2,544
Indiana	S-CG-Prem	87	1.38	1.69	0.13	0.00	0.54	0.00	0	0	-9.9	8.7	2,553
Missouri	S-CG-Prem	69	1.38	1.69	0.13	0.00	0.54	0.00	0	0	-9.1	6.9	2,560
Wisconsin	S-CG-Prem	74	1.38	1.69	0.13	0.00	0.54	0.00	0	0	-9.1	7.4	2,567
Utah	S-CG-Prem	134	1.42	1.69	0.18	0.00	0.54	0.00	0	0	-8.5	13.4	2,581
Nebraska	S-CG-Prem	45	1.37	1.69	0.13	0.00	0.54	0.00	0	0	-8.5	4.5	2,585
Oregon	W-CG-Prem	117	1.45	1.69	0.21	0.00	0.54	0.00	0	0	-8.5	11.7	2,597
Wyoming	S-CG-Prem	29	1.42	1.69	0.18	0.00	0.54	0.00	0	0	-8.5	2.9	2,600
Washington	W-CG-Prem	265	1.44	1.69	0.21	0.00	0.54	0.00	0	0	-7.9	26.5	2,626
New York	W-CG-Prem	123	1.42	1.69	0.19	0.00	0.54	0.00	0	0	-7.6	12.3	2,639
Nevada	S-CG-Reg	431	1.46	1.69	0.24	0.00	0.54	0.00	0	0	-6.6	43.1	2,682
South Dakota	W-CG-Prem	27	1.35	1.69	0.13	0.00	0.54	0.00	0	0	-6.3	2.7	2,685
Michigan	W-CG-Prem	163	1.35	1.69	0.13	0.00	0.54	0.00	0	0	-6.1	16.3	2,701
Kansas	S-CG-Prem	60	1.34	1.69	0.13	0.00	0.54	0.00	0	0	-5.9	6.0	2,707
Idaho	W-CG-Prem	61	1.39	1.69	0.18	0.00	0.54	0.00	0	0	-5.8	6.1	2,713
Montana	W-CG-Prem	75	1.39	1.69	0.18	0.00	0.54	0.00	0	0	-5.4	7.5	2,721
Ohio	W-CG-Prem	201	1.34	1.69	0.13	0.00	0.54	0.00	0	0	-5.4	20.1	2,741
Indiana	W-CG-Prem	106	1.33	1.69	0.13	0.00	0.54	0.00	0	0	-4.9	10.6	2,751
Colorado	S-CG-Prem	187	1.38	1.69	0.18	0.00	0.54	0.00	0	0	-4.4	18.7	2,770
Missouri	W-CG-Prem	84	1.33	1.69	0.13	0.00	0.54	0.00	0	0	-4.1	8.4	2,778
Wisconsin	W-CG-Prem	90	1.33	1.69	0.13	0.00	0.54	0.00	0	0	-4.1	9.0	2,787
Utah	W-CG-Prem	162	1.37	1.69	0.18	0.00	0.54	0.00	0	0	-3.5	16.2	2,804
Nebraska	W-CG-Prem	54	1.32	1.69	0.13	0.00	0.54	0.00	0	0	-3.5	5.4	2,809
Wyoming	W-CG-Prem	35	1.37	1.69	0.18	0.00	0.54	0.00	0	0	-3.5	3.5	2,812
West Virginia	S-CG-Prem	20	1.37	1.69	0.19	0.00	0.54	0.00	0	0	-3.0	2.0	2,814
Vermont	S-CG-Prem	12	1.40	1.69	0.22	0.00	0.54	0.00	0	0	-2.9	1.2	2,816
Pennsylvania	S-CG-Prem	86	1.37	1.69	0.19	0.00	0.54	0.00	0	0	-2.6	8.6	2,824
New Mexico	S-CG-Prem	61	1.39	1.69	0.21	0.00	0.54	0.00	0	0	-2.5	6.1	2,830
Kentucky	S-CG-Prem	49	1.38	1.69	0.21	0.00	0.54	0.00	0	0	-2.4	4.9	2,835
Arkansas	S-CG-Prem	54	1.34	1.69	0.17	0.00	0.54	0.00	0	0	-2.1	5.4	2,841
Maryland	S-CG-Prem	7	1.38	1.69	0.21	0.00	0.54	0.00	0	0	-2.0	0.7	2,841
North Dakota	S-CG-Prem	21	1.38	1.69	0.21	0.00	0.54	0.00	0	0	-1.9	2.1	2,844
Idaho	S-CG-Reg	298	1.35	1.69	0.18	0.00	0.54	0.00	0	0	-1.8	29.8	2,873
Arizona	S-CG-Reg	449	1.41	1.69	0.24	0.00	0.54	0.00	0	0	-1.7	44.9	2,918
Nevada	W-CG-reg	522	1.41	1.69	0.24	0.00	0.54	0.00	0	0	-1.6	52.2	2,970
Mississippi	S-CG-Prem	78	1.33	1.69	0.17	0.00	0.54	0.00	0	0	-1.0	7.8	2,978
Kansas	W-CG-Prem	72	1.29	1.69	0.13	0.00	0.54	0.00	0	0	-0.9	7.2	2,986
Georgia	S-CG-Prem	285	1.38	1.69	0.22	0.00	0.54	0.00	0	0	-0.6	28.5	3,014

Table A2004B Input Costs, Ethanol Blending Cost and Ethanol Volumes

Year 2004 State	Gasoline Code	Gasoline Volume MMgals	Gasoline Price $/gal	Ethanol Gate Price $/gal	Ethanol Dist Cost $/gal	Ethanol Blending $/gal	Federal Subsidy $/gal	State Subsidy $/gal	State Mandate	RFG "Mandate"	Ethanol Blending Cost c/gal	Ethanol Volume MMgals	Cumulative Eth Vol MMgals
Virginia	S-CG-Prem	65	1.36	1.69	0.21	0.00	0.54	0.00	0	0	0.1	6.5	3,021
South Dakota	S-CG-Reg	182	1.28	1.69	0.13	0.00	0.54	0.00	0	0	0.2	18.2	3,039
Michigan	S-CG-Reg	2044	1.28	1.69	0.13	0.00	0.54	0.00	0	0	0.3	204.4	3,243
Tennessee	S-CG-Prem	172	1.36	1.69	0.21	0.00	0.54	0.00	0	0	0.5	17.2	3,260
Colorado	W-CG-Prem	226	1.33	1.69	0.18	0.00	0.54	0.00	0	0	0.6	22.6	3,283
Alaska	S-CG-Prem	14	1.59	1.69	0.44	0.00	0.54	0.00	0	0	0.6	1.4	3,284
Louisiana	S-CG-Prem	104	1.31	1.69	0.17	0.00	0.54	0.00	0	0	0.8	10.4	3,295
Alabama	S-CG-Prem	105	1.35	1.69	0.21	0.00	0.54	0.00	0	0	0.9	10.5	3,305
Ohio	S-CG-Reg	2109	1.28	1.69	0.13	0.00	0.54	0.00	0	0	0.9	210.9	3,516
South Carolina	S-CG-Prem	133	1.37	1.69	0.22	0.00	0.54	0.00	0	0	1.0	13.3	3,529
Missouri	S-CG-Reg	828	1.27	1.69	0.13	0.00	0.54	0.00	0	0	1.1	82.8	3,612
Oregon	S-CG-Reg	688	1.35	1.69	0.21	0.00	0.54	0.00	0	0	1.3	68.8	3,681
Utah	S-CG-Reg	497	1.32	1.69	0.18	0.00	0.54	0.00	0	0	1.4	49.7	3,731
Wyoming	S-CG-Reg	143	1.32	1.69	0.18	0.00	0.54	0.00	0	0	1.4	14.3	3,745
Indiana	S-CG-Reg	1222	1.27	1.69	0.13	0.00	0.54	0.00	0	0	1.4	122.2	3,867
Wisconsin	S-CG-Reg	834	1.27	1.69	0.13	0.00	0.54	0.00	0	0	1.6	83.4	3,951
Nebraska	S-CG-Reg	336	1.27	1.69	0.13	0.00	0.54	0.00	0	0	1.7	33.6	3,984
New Hampshire	S-CG-Prem	4	1.36	1.69	0.22	0.00	0.54	0.00	0	0	1.7	0.4	3,985
Montana	S-CG-Reg	290	1.32	1.69	0.18	0.00	0.54	0.00	0	0	1.8	29.0	4,014
West Virginia	W-CG-Prem	24	1.32	1.69	0.19	0.00	0.54	0.00	0	0	2.0	2.4	4,016
Vermont	W-CG-Prem	15	1.35	1.69	0.22	0.00	0.54	0.00	0	0	2.1	1.5	4,018
North Carolina	S-CG-Prem	235	1.35	1.69	0.22	0.00	0.54	0.00	0	0	2.1	23.5	4,041
Washington	S-CG-Reg	1106	1.34	1.69	0.21	0.00	0.54	0.00	0	0	2.2	110.6	4,152
Pennsylvania	W-CG-Prem	104	1.32	1.69	0.19	0.00	0.54	0.00	0	0	2.4	10.4	4,162
New Mexico	W-CG-Prem	74	1.34	1.69	0.21	0.00	0.54	0.00	0	0	2.5	7.4	4,169
Texas	S-CG-Prem	343	1.29	1.69	0.17	0.00	0.54	0.00	0	0	2.6	34.3	4,204
Kentucky	W-CG-Prem	60	1.33	1.69	0.21	0.00	0.54	0.00	0	0	2.6	6.0	4,210
Arkansas	W-CG-Prem	66	1.29	1.69	0.17	0.00	0.54	0.00	0	0	2.9	6.6	4,216
Maryland	W-CG-Prem	9	1.33	1.69	0.21	0.00	0.54	0.00	0	0	3.0	0.9	4,217
North Dakota	W-CG-Prem	25	1.33	1.69	0.21	0.00	0.54	0.00	0	0	3.1	2.5	4,220
Idaho	W-CG-reg	361	1.30	1.69	0.18	0.00	0.54	0.00	0	0	3.2	36.1	4,256
Arizona	W-CG-reg	543	1.36	1.69	0.24	0.00	0.54	0.00	0	0	3.3	54.3	4,310
Colorado	S-CG-Reg	852	1.29	1.69	0.18	0.00	0.54	0.00	0	0	3.9	85.2	4,395
Florida	S-CG-Prem	463	1.38	1.69	0.27	0.00	0.54	0.00	0	0	3.9	46.3	4,442
Mississippi	W-CG-Prem	95	1.28	1.69	0.17	0.00	0.54	0.00	0	0	4.0	9.5	4,451
Kansas	S-CG-Reg	705	1.24	1.69	0.13	0.00	0.54	0.00	0	0	4.3	70.5	4,522
Georgia	W-CG-Prem	344	1.33	1.69	0.22	0.00	0.54	0.00	0	0	4.4	34.4	4,556
New York	S-CG-Reg	1045	1.30	1.69	0.19	0.00	0.54	0.00	0	0	4.6	104.5	4,661
Oklahoma	S-CG-Prem	88	1.31	1.69	0.21	0.00	0.54	0.00	0	0	5.0	8.8	4,669
Virginia	W-CG-Prem	79	1.31	1.69	0.21	0.00	0.54	0.00	0	0	5.1	7.9	4,677
South Dakota	W-CG-reg	220	1.23	1.69	0.13	0.00	0.54	0.00	0	0	5.2	22.0	4,699
Michigan	W-CG-reg	2472	1.23	1.69	0.13	0.00	0.54	0.00	0	0	5.3	247.2	4,946
Tennessee	W-CG-Prem	208	1.31	1.69	0.21	0.00	0.54	0.00	0	0	5.5	20.8	4,967
Alaska	W-CG-Prem	16	1.54	1.69	0.44	0.00	0.54	0.00	0	0	5.6	1.6	4,969
Louisiana	W-CG-Prem	126	1.26	1.69	0.17	0.00	0.54	0.00	0	0	5.8	12.6	4,982
Alabama	W-CG-Prem	127	1.30	1.69	0.21	0.00	0.54	0.00	0	0	5.9	12.7	4,994
Ohio	W-CG-reg	2550	1.23	1.69	0.13	0.00	0.54	0.00	0	0	5.9	255.0	5,249
South Carolina	W-CG-Prem	161	1.32	1.69	0.22	0.00	0.54	0.00	0	0	6.0	16.1	5,265
Missouri	W-CG-reg	1001	1.22	1.69	0.13	0.00	0.54	0.00	0	0	6.1	100.1	5,365
Oregon	W-CG-reg	832	1.30	1.69	0.21	0.00	0.54	0.00	0	0	6.3	83.2	5,449
Utah	W-CG-reg	601	1.27	1.69	0.18	0.00	0.54	0.00	0	0	6.4	60.1	5,509
Wyoming	W-CG-reg	173	1.27	1.69	0.18	0.00	0.54	0.00	0	0	6.4	17.3	5,526
Indiana	W-CG-reg	1477	1.22	1.69	0.13	0.00	0.54	0.00	0	0	6.4	147.7	5,674
Wisconsin	W-CG-reg	1008	1.22	1.69	0.13	0.00	0.54	0.00	0	0	6.6	100.8	5,775
Nebraska	W-CG-reg	406	1.22	1.69	0.13	0.00	0.54	0.00	0	0	6.7	40.6	5,815
Alaska	S-CG-Reg	113	1.53	1.69	0.44	0.00	0.54	0.00	0	0	6.7	11.3	5,826
New Hampshire	W-CG-Prem	5	1.31	1.69	0.22	0.00	0.54	0.00	0	0	6.7	0.5	5,827
New Mexico	S-CG-Reg	409	1.29	1.69	0.21	0.00	0.54	0.00	0	0	6.8	40.9	5,868
Montana	W-CG-reg	351	1.27	1.69	0.18	0.00	0.54	0.00	0	0	6.8	35.1	5,903
Maine	S-CG-Prem	11	1.35	1.69	0.27	0.00	0.54	0.00	0	0	7.1	1.1	5,904
North Carolina	W-CG-Prem	284	1.30	1.69	0.22	0.00	0.54	0.00	0	0	7.1	28.4	5,932
North Dakota	S-CG-Reg	171	1.29	1.69	0.21	0.00	0.54	0.00	0	0	7.2	17.1	5,950
Washington	W-CG-reg	1337	1.29	1.69	0.21	0.00	0.54	0.00	0	0	7.2	133.7	6,083
Arkansas	S-CG-Reg	636	1.25	1.69	0.17	0.00	0.54	0.00	0	0	7.3	63.6	6,147
West Virginia	S-CG-Reg	324	1.27	1.69	0.19	0.00	0.54	0.00	0	0	7.3	32.4	6,179
Kentucky	S-CG-Reg	710	1.29	1.69	0.21	0.00	0.54	0.00	0	0	7.4	71.0	6,250
Texas	W-CG-Prem	415	1.24	1.69	0.17	0.00	0.54	0.00	0	0	7.6	41.5	6,292
Hawaii	S-CG-Prem	53	1.52	1.69	0.44	0.00	0.54	0.00	0	0	7.7	5.3	6,297
Vermont	S-CG-Reg	137	1.30	1.69	0.22	0.00	0.54	0.00	0	0	7.9	13.7	6,311
Pennsylvania	S-CG-Reg	898	1.26	1.69	0.19	0.00	0.54	0.00	0	0	8.8	89.8	6,401
Colorado	W-CG-reg	1030	1.24	1.69	0.18	0.00	0.54	0.00	0	0	8.9	103.0	6,504
Florida	W-CG-Prem	560	1.33	1.69	0.27	0.00	0.54	0.00	0	0	8.9	56.0	6,560
Mississippi	S-CG-Reg	760	1.23	1.69	0.17	0.00	0.54	0.00	0	0	9.0	76.0	6,636
Kansas	W-CG-reg	852	1.19	1.69	0.13	0.00	0.54	0.00	0	0	9.3	85.2	6,721
New York	W-CG-reg	1264	1.25	1.69	0.19	0.00	0.54	0.00	0	0	9.6	126.4	6,847
Oklahoma	W-CG-Prem	107	1.26	1.69	0.21	0.00	0.54	0.00	0	0	10.0	10.7	6,858
Maryland	S-CG-Reg	89	1.25	1.69	0.21	0.00	0.54	0.00	0	0	10.5	8.9	6,867
Georgia	S-CG-Reg	2076	1.27	1.69	0.22	0.00	0.54	0.00	0	0	10.5	207.6	7,074
Tennessee	S-CG-Reg	1486	1.25	1.69	0.21	0.00	0.54	0.00	0	0	10.6	148.6	7,223
Louisiana	S-CG-Reg	1184	1.21	1.69	0.17	0.00	0.54	0.00	0	0	11.0	118.4	7,341
Alabama	S-CG-Reg	1054	1.25	1.69	0.21	0.00	0.54	0.00	0	0	11.5	105.4	7,447
South Carolina	S-CG-Reg	1118	1.26	1.69	0.22	0.00	0.54	0.00	0	0	11.5	111.8	7,558
Alaska	W-CG-reg	137	1.48	1.69	0.44	0.00	0.54	0.00	0	0	11.7	13.7	7,572
New Mexico	W-CG-reg	494	1.24	1.69	0.21	0.00	0.54	0.00	0	0	11.8	49.4	7,622
Maine	W-CG-Prem	13	1.30	1.69	0.27	0.00	0.54	0.00	0	0	12.1	1.3	7,623

Table A2004C Input Costs, Ethanol Blending Cost and Ethanol Volumes

Year 2004 State	Gasoline Code	Gasoline Volume MMgals	Gasoline Price $/gal	Ethanol Gate Price $/gal	Ethanol Dist Cost $/gal	Ethanol Blending $/gal	Federal Subsidy $/gal	State Subsidy $/gal	State Mandate	RFG "Mandate"	Ethanol Blending Cost c/gal	Ethanol Volume MMgals	Cumulative Eth Vol MMgals
North Dakota	W-CG-reg	206	1.24	1.69	0.21	0.00	0.54	0.00	0	0	12.2	20.6	7,644
Virginia	S-CG-Reg	673	1.24	1.69	0.21	0.00	0.54	0.00	0	0	12.2	67.3	7,711
Arkansas	W-CG-reg	769	1.20	1.69	0.17	0.00	0.54	0.00	0	0	12.3	76.9	7,788
North Carolina	S-CG-Reg	1877	1.25	1.69	0.22	0.00	0.54	0.00	0	0	12.3	187.7	7,975
West Virginia	W-CG-reg	391	1.22	1.69	0.19	0.00	0.54	0.00	0	0	12.3	39.1	8,015
Kentucky	W-CG-reg	858	1.24	1.69	0.21	0.00	0.54	0.00	0	0	12.4	85.8	8,100
Hawaii	W-CG-Prem	64	1.47	1.69	0.44	0.00	0.54	0.00	0	0	12.7	6.4	8,107
New Hampshire	S-CG-Reg	58	1.25	1.69	0.22	0.00	0.54	0.00	0	0	12.7	5.8	8,113
Vermont	W-CG-reg	166	1.25	1.69	0.22	0.00	0.54	0.00	0	0	12.9	16.6	8,129
Texas	S-CG-Reg	3534	1.19	1.69	0.17	0.00	0.54	0.00	0	0	13.3	353.4	8,483
Pennsylvania	W-CG-reg	1086	1.21	1.69	0.19	0.00	0.54	0.00	0	0	13.8	108.6	8,591
Mississippi	W-CG-reg	919	1.18	1.69	0.17	0.00	0.54	0.00	0	0	14.0	91.9	8,683
Oklahoma	S-CG-Reg	902	1.21	1.69	0.21	0.00	0.54	0.00	0	0	14.7	90.2	8,773
Hawaii	S-CG-Reg	176	1.44	1.69	0.44	0.00	0.54	0.00	0	0	15.1	17.6	8,791
Maryland	W-CG-reg	108	1.20	1.69	0.21	0.00	0.54	0.00	0	0	15.5	10.8	8,802
Georgia	W-CG-reg	2510	1.22	1.69	0.22	0.00	0.54	0.00	0	0	15.5	251.0	9,053
Tennessee	W-CG-reg	1796	1.20	1.69	0.21	0.00	0.54	0.00	0	0	15.6	179.6	9,232
Florida	S-CG-Reg	3155	1.27	1.69	0.27	0.00	0.54	0.00	0	0	15.6	315.5	9,548
Louisiana	W-CG-reg	1431	1.16	1.69	0.17	0.00	0.54	0.00	0	0	16.0	143.1	9,691
Alabama	W-CG-reg	1274	1.20	1.69	0.21	0.00	0.54	0.00	0	0	16.5	127.4	9,818
South Carolina	W-CG-reg	1352	1.21	1.69	0.22	0.00	0.54	0.00	0	0	16.5	135.2	9,954
Virginia	W-CG-reg	814	1.19	1.69	0.21	0.00	0.54	0.00	0	0	17.2	81.4	10,035
North Carolina	W-CG-reg	2270	1.20	1.69	0.22	0.00	0.54	0.00	0	0	17.3	227.0	10,262
New Hampshire	W-CG-reg	70	1.20	1.69	0.22	0.00	0.54	0.00	0	0	17.7	7.0	10,269
Maine	S-CG-Reg	129	1.24	1.69	0.27	0.00	0.54	0.00	0	0	18.0	12.9	10,282
Texas	W-CG-reg	4274	1.14	1.69	0.17	0.00	0.54	0.00	0	0	18.3	427.4	10,709
Oklahoma	W-CG-reg	1091	1.16	1.69	0.21	0.00	0.54	0.00	0	0	19.7	109.1	10,818
Hawaii	W-CG-reg	213	1.39	1.69	0.44	0.00	0.54	0.00	0	0	20.1	21.3	10,840
Florida	W-CG-reg	3815	1.22	1.69	0.27	0.00	0.54	0.00	0	0	20.6	381.5	11,221
Maine	W-CG-reg	157	1.19	1.69	0.27	0.00	0.54	0.00	0	0	23.0	15.7	11,237
Arizona	S-RFG-Prem	125	1.61	1.69	0.24	0.51	0.54	0.00	0	0	-72.4	12.5	11,249
Arizona	W-RFG-Prem	151	1.56	1.69	0.24	0.26	0.54	0.00	0	0	-42.0	15.1	11,265
Missouri	S-RFG-Prem	42	1.44	1.69	0.13	0.51	0.54	0.00	0	0	-66.3	4.2	11,269
Arizona	S-RFG-Reg	806	1.47	1.69	0.24	0.72	0.54	0.00	0	0	-79.6	80.6	11,349
Missouri	S-RFG-Reg	425	1.33	1.69	0.13	0.72	0.54	0.00	0	0	-76.7	42.5	11,392
Missouri	W-RFG-Prem	50	1.39	1.69	0.13	0.26	0.54	0.00	0	0	-35.9	5.0	11,397
Pennsylvania	S-RFG-Prem	66	1.43	1.69	0.19	0.51	0.54	0.00	0	0	-59.8	6.6	11,403
Kentucky	S-RFG-Prem	19	1.44	1.69	0.21	0.51	0.54	0.00	0	0	-59.7	1.9	11,405
Massachusetts	S-RFG-Prem	168	1.44	1.69	0.21	0.51	0.54	0.00	0	0	-59.6	16.8	11,422
Maryland	S-RFG-Prem	139	1.44	1.69	0.21	0.51	0.54	0.00	0	0	-59.3	13.9	11,436
New Jersey	S-RFG-Prem	267	1.43	1.69	0.21	0.51	0.54	0.00	0	0	-58.2	26.7	11,463
Rhode Island	S-RFG-Prem	39	1.43	1.69	0.21	0.51	0.54	0.00	0	0	-58.0	3.9	11,467
Virginia	S-RFG-Prem	155	1.42	1.69	0.21	0.51	0.54	0.00	0	0	-57.1	15.5	11,482
DC	S-RFG-Prem	7	1.41	1.69	0.21	0.51	0.54	0.00	0	0	-56.6	0.7	11,483
Kentucky	S-RFG-Reg	196	1.35	1.69	0.21	0.72	0.54	0.00	0	0	-70.5	19.6	11,503
Delaware	S-RFG-Prem	24	1.41	1.69	0.21	0.51	0.54	0.00	0	0	-55.8	2.4	11,505
New Hampshire	S-RFG-Prem	21	1.42	1.69	0.22	0.51	0.54	0.00	0	0	-55.6	2.1	11,507
Pennsylvania	S-RFG-Reg	398	1.32	1.69	0.19	0.72	0.54	0.00	0	0	-69.0	39.8	11,547
Texas	S-RFG-Prem	403	1.35	1.69	0.17	0.51	0.54	0.00	0	0	-54.7	40.3	11,587
Pennsylvania	W-RFG-Prem	80	1.38	1.69	0.19	0.26	0.54	0.00	0	0	-29.4	8.0	11,595
Kentucky	W-RFG-Prem	23	1.39	1.69	0.21	0.26	0.54	0.00	0	0	-29.2	2.3	11,597
Massachusetts	W-RFG-Prem	204	1.39	1.69	0.21	0.26	0.54	0.00	0	0	-29.2	20.4	11,618
Maryland	W-RFG-Prem	169	1.39	1.69	0.21	0.26	0.54	0.00	0	0	-28.8	16.9	11,635
Arizona	W-RFG-reg	974	1.42	1.69	0.24	0.34	0.54	0.00	0	0	-36.7	97.4	11,732
Massachusetts	S-RFG-Reg	1106	1.32	1.69	0.21	0.72	0.54	0.00	0	0	-67.4	110.6	11,843
Maryland	S-RFG-Reg	762	1.31	1.69	0.21	0.72	0.54	0.00	0	0	-67.4	76.2	11,919
New Jersey	W-RFG-Prem	323	1.38	1.69	0.21	0.26	0.54	0.00	0	0	-27.8	32.3	11,951
Rhode Island	W-RFG-Prem	48	1.38	1.69	0.21	0.26	0.54	0.00	0	0	-27.6	4.8	11,956
Virginia	W-RFG-Prem	188	1.37	1.69	0.21	0.26	0.54	0.00	0	0	-26.7	18.8	11,975
Rhode Island	S-RFG-Reg	266	1.30	1.69	0.21	0.72	0.54	0.00	0	0	-65.8	26.6	12,001
Virginia	S-RFG-Reg	797	1.30	1.69	0.21	0.72	0.54	0.00	0	0	-65.7	79.7	12,081
DC	W-RFG-Prem	8	1.36	1.69	0.21	0.26	0.54	0.00	0	0	-26.2	0.8	12,082
New Hampshire	S-RFG-Reg	190	1.31	1.69	0.22	0.72	0.54	0.00	0	0	-65.2	19.0	12,101
DC	S-RFG-Reg	26	1.29	1.69	0.21	0.72	0.54	0.00	0	0	-64.9	2.6	12,103
Missouri	W-RFG-reg	514	1.28	1.69	0.13	0.34	0.54	0.00	0	0	-33.8	51.4	12,155
Delaware	S-RFG-Reg	193	1.29	1.69	0.21	0.72	0.54	0.00	0	0	-64.8	19.3	12,174
Texas	S-RFG-Reg	2595	1.25	1.69	0.17	0.72	0.54	0.00	0	0	-64.6	259.5	12,434
Delaware	W-RFG-Prem	29	1.36	1.69	0.21	0.26	0.54	0.00	0	0	-25.4	2.9	12,436
New Hampshire	W-RFG-Prem	26	1.37	1.69	0.22	0.26	0.54	0.00	0	0	-25.1	2.6	12,439
Maine	S-RFG-Prem	13	1.41	1.69	0.27	0.51	0.54	0.00	0	0	-50.2	1.3	12,440
New Jersey	S-RFG-Reg	1651	1.28	1.69	0.21	0.72	0.54	0.00	0	0	-63.7	165.1	12,605
Texas	W-RFG-Prem	487	1.30	1.69	0.17	0.26	0.54	0.00	0	0	-24.2	48.7	12,654
Maine	S-RFG-Reg	191	1.30	1.69	0.27	0.72	0.54	0.00	0	0	-59.9	19.1	12,673
Maine	W-RFG-Prem	15	1.36	1.69	0.27	0.26	0.54	0.00	0	0	-19.8	1.5	12,675
Kentucky	W-RFG-reg	237	1.30	1.69	0.21	0.34	0.54	0.00	0	0	-27.6	23.7	12,698
Pennsylvania	W-RFG-reg	481	1.27	1.69	0.19	0.34	0.54	0.00	0	0	-26.1	48.1	12,746
Massachusetts	W-RFG-reg	1337	1.27	1.69	0.21	0.34	0.54	0.00	0	0	-24.5	133.7	12,880
Maryland	W-RFG-reg	922	1.26	1.69	0.21	0.34	0.54	0.00	0	0	-24.5	92.2	12,972
Rhode Island	W-RFG-reg	321	1.25	1.69	0.21	0.34	0.54	0.00	0	0	-22.9	32.1	13,005
Virginia	W-RFG-reg	963	1.25	1.69	0.21	0.34	0.54	0.00	0	0	-22.7	96.3	13,101
New Hampshire	W-RFG-reg	229	1.26	1.69	0.22	0.34	0.54	0.00	0	0	-22.2	22.9	13,124
DC	W-RFG-reg	32	1.24	1.69	0.21	0.34	0.54	0.00	0	0	-22.0	3.2	13,127
Delaware	W-RFG-reg	234	1.24	1.69	0.21	0.34	0.54	0.00	0	0	-21.9	23.4	13,150
Texas	W-RFG-reg	3138	1.20	1.69	0.17	0.34	0.54	0.00	0	0	-21.7	313.8	13,464
New Jersey	W-RFG-reg	1997	1.23	1.69	0.21	0.34	0.54	0.00	0	0	-20.8	199.7	13,664
Maine	W-RFG-reg	231	1.25	1.69	0.27	0.34	0.54	0.00	0	0	-17.0	23.1	13,687

Table A2005A Input Costs, Ethanol Blending Cost and Ethanol Volumes

Year 2005 State	Gasoline Code	Gasoline Volume MMgals	Gasoline Price $/gal	Ethanol Gate Price $/gal	Ethanol Dist Cost $/gal	Ethanol Blending $/gal	Federal Subsidy $/gal	State Subsidy $/gal	State Mandate	RFG "Mandate"	Ethanol Blending Cost c/gal	Ethanol Volume MMgals	Cumulative Eth Vol MMgals
Illinois	S-RFG-Reg	1342	1.70	1.80	0.14	1.00	0.51	0.26	0	1	-152.7	134.2	134
Illinois	S-RFG-Prem	193	1.84	1.80	0.14	0.71	0.51	0.26	0	1	-137.7	19.3	153
Wisconsin	S-RFG-Reg	350	1.72	1.80	0.14	1.00	0.51	0.00	0	1	-129.5	35.0	188
Indiana	S-RFG-Reg	206	1.72	1.80	0.14	1.00	0.51	0.00	0	1	-129.0	20.6	209
California	S-RFG-Reg	5508	1.82	1.80	0.25	1.00	0.51	0.00	0	1	-127.5	313.9	523
New York	S-RFG-Reg	1283	1.71	1.80	0.20	1.00	0.51	0.00	0	1	-122.4	128.3	651
Connecticut	S-RFG-Reg	661	1.68	1.80	0.21	1.00	0.51	0.00	0	1	-117.9	66.1	717
Wisconsin	S-RFG-Prem	32	1.83	1.80	0.14	0.71	0.51	0.00	0	1	-112.0	3.2	721
Indiana	S-RFG-Prem	22	1.83	1.80	0.14	0.71	0.51	0.00	0	1	-112.0	2.2	723
California	S-RFG-Prem	1592	1.94	1.80	0.25	0.71	0.51	0.00	0	1	-111.4	90.7	813
New York	S-RFG-Prem	309	1.89	1.80	0.20	0.71	0.51	0.00	0	1	-111.3	30.9	844
Connecticut	S-RFG-Prem	108	1.79	1.80	0.21	0.71	0.51	0.00	0	1	-100.1	10.8	855
Illinois	W-RFG-Prem	234	1.79	1.80	0.14	0.36	0.51	0.26	0	1	-97.6	23.4	879
Illinois	W-RFG-reg	1622	1.65	1.80	0.14	0.47	0.51	0.26	0	1	-95.4	162.2	1,041
Wisconsin	W-RFG-reg	423	1.67	1.80	0.14	0.47	0.51	0.00	0	1	-72.2	42.3	1,083
Indiana	W-RFG-reg	249	1.67	1.80	0.14	0.47	0.51	0.00	0	1	-71.7	24.9	1,108
Wisconsin	W-RFG-Prem	38	1.78	1.80	0.14	0.36	0.51	0.00	0	1	-72.0	3.8	1,112
Indiana	W-RFG-Prem	26	1.78	1.80	0.14	0.36	0.51	0.00	0	1	-71.9	2.6	1,115
California	W-RFG-Prem	1925	1.89	1.80	0.25	0.36	0.51	0.00	0	1	-71.3	109.7	1,224
New York	W-RFG-Prem	374	1.84	1.80	0.20	0.36	0.51	0.00	0	1	-71.3	37.4	1,262
California	W-RFG-reg	6660	1.77	1.80	0.25	0.47	0.51	0.00	0	1	-70.2	379.6	1,641
New York	W-RFG-reg	1551	1.66	1.80	0.20	0.47	0.51	0.00	0	1	-65.0	155.1	1,796
Connecticut	W-RFG-reg	799	1.63	1.80	0.21	0.47	0.51	0.00	0	1	-60.6	79.9	1,876
Connecticut	W-RFG-Prem	131	1.74	1.80	0.21	0.36	0.51	0.00	0	1	-60.1	13.1	1,889
Minnesota	S-CG-Prem	107	1.76	1.80	0.14	0.00	0.51	0.00	1	0	-33.2	10.7	1,900
Minnesota	W-CG-Prem	129	1.71	1.80	0.14	0.00	0.51	0.00	1	0	-28.2	12.9	1,913
Minnesota	S-CG-Reg	1064	1.67	1.80	0.14	0.00	0.51	0.00	1	0	-24.2	106.4	2,019
Minnesota	W-CG-reg	1287	1.62	1.80	0.14	0.00	0.51	0.00	1	0	-19.2	128.7	2,148
Iowa	S-CG-Prem	67	1.80	1.80	0.14	0.00	0.51	0.30	0	0	-66.9	6.7	2,155
Iowa	W-CG-Prem	81	1.75	1.80	0.14	0.00	0.51	0.30	0	0	-61.9	8.1	2,163
Illinois	S-CG-Prem	48	1.78	1.80	0.14	0.00	0.51	0.26	0	0	-60.7	4.8	2,168
Illinois	W-CG-Prem	58	1.73	1.80	0.14	0.00	0.51	0.26	0	0	-55.7	5.8	2,174
Iowa	S-CG-Reg	516	1.67	1.80	0.14	0.00	0.51	0.30	0	0	-54.4	51.6	2,225
Iowa	W-CG-reg	624	1.62	1.80	0.14	0.00	0.51	0.30	0	0	-49.4	62.4	2,287
Illinois	S-CG-Reg	788	1.64	1.80	0.14	0.00	0.51	0.26	0	0	-47.1	78.8	2,366
Illinois	W-CG-reg	953	1.59	1.80	0.14	0.00	0.51	0.26	0	0	-42.1	95.3	2,462
South Dakota	S-CG-Prem	22	1.83	1.80	0.14	0.00	0.51	0.00	0	0	-40.9	2.2	2,464
Nevada	S-CG-Prem	114	1.94	1.80	0.25	0.00	0.51	0.00	0	0	-40.6	11.4	2,475
Wyoming	S-CG-Prem	29	1.85	1.80	0.19	0.00	0.51	0.00	0	0	-37.9	2.9	2,478
Washington	S-CG-Prem	223	1.88	1.80	0.22	0.00	0.51	0.00	0	0	-37.8	22.3	2,500
Arizona	S-CG-Prem	58	1.91	1.80	0.25	0.00	0.51	0.00	0	0	-37.5	5.8	2,506
South Dakota	W-CG-Prem	27	1.78	1.80	0.14	0.00	0.51	0.00	0	0	-35.9	2.7	2,509
Missouri	S-CG-Prem	71	1.78	1.80	0.14	0.00	0.51	0.00	0	0	-35.7	7.1	2,516
Nevada	W-CG-Prem	137	1.89	1.80	0.25	0.00	0.51	0.00	0	0	-35.6	13.7	2,530
Montana	S-CG-Prem	63	1.83	1.80	0.19	0.00	0.51	0.00	0	0	-35.5	6.3	2,536
Nebraska	S-CG-Prem	45	1.78	1.80	0.14	0.00	0.51	0.00	0	0	-35.4	4.5	2,541
Oregon	S-CG-Prem	98	1.86	1.80	0.22	0.00	0.51	0.00	0	0	-35.3	9.8	2,550
Wisconsin	S-CG-Prem	76	1.77	1.80	0.14	0.00	0.51	0.00	0	0	-35.0	7.6	2,558
Indiana	S-CG-Prem	89	1.77	1.80	0.14	0.00	0.51	0.00	0	0	-35.0	8.9	2,567
Michigan	S-CG-Prem	137	1.77	1.80	0.14	0.00	0.51	0.00	0	0	-35.0	13.7	2,581
New Mexico	S-CG-Prem	62	1.85	1.80	0.21	0.00	0.51	0.00	0	0	-34.7	6.2	2,587
Idaho	S-CG-Prem	51	1.82	1.80	0.19	0.00	0.51	0.00	0	0	-34.4	5.1	2,592
Ohio	S-CG-Prem	169	1.77	1.80	0.14	0.00	0.51	0.00	0	0	-34.4	16.9	2,609
New York	S-CG-Prem	104	1.83	1.80	0.20	0.00	0.51	0.00	0	0	-34.3	10.4	2,619
Wyoming	W-CG-Prem	35	1.80	1.80	0.19	0.00	0.51	0.00	0	0	-32.9	3.5	2,623
Washington	W-CG-Prem	270	1.83	1.80	0.22	0.00	0.51	0.00	0	0	-32.8	27.0	2,650
Colorado	S-CG-Prem	190	1.80	1.80	0.19	0.00	0.51	0.00	0	0	-32.6	19.0	2,669
Arizona	W-CG-Prem	70	1.86	1.80	0.25	0.00	0.51	0.00	0	0	-32.5	7.0	2,676
Kansas	S-CG-Prem	61	1.74	1.80	0.14	0.00	0.51	0.00	0	0	-31.7	6.1	2,682
Missouri	W-CG-Prem	85	1.73	1.80	0.14	0.00	0.51	0.00	0	0	-30.7	8.5	2,690
Montana	W-CG-Prem	77	1.78	1.80	0.19	0.00	0.51	0.00	0	0	-30.5	7.7	2,698
Nebraska	W-CG-Prem	55	1.73	1.80	0.14	0.00	0.51	0.00	0	0	-30.4	5.5	2,704
Oregon	W-CG-Prem	119	1.81	1.80	0.22	0.00	0.51	0.00	0	0	-30.3	11.9	2,715
Wisconsin	W-CG-Prem	91	1.72	1.80	0.14	0.00	0.51	0.00	0	0	-30.0	9.1	2,725
Indiana	W-CG-Prem	107	1.72	1.80	0.14	0.00	0.51	0.00	0	0	-30.0	10.7	2,735
Michigan	W-CG-Prem	166	1.72	1.80	0.14	0.00	0.51	0.00	0	0	-30.0	16.6	2,752
New Mexico	W-CG-Prem	75	1.80	1.80	0.21	0.00	0.51	0.00	0	0	-29.7	7.5	2,759
Idaho	W-CG-Prem	62	1.77	1.80	0.19	0.00	0.51	0.00	0	0	-29.4	6.2	2,766
Ohio	W-CG-Prem	205	1.72	1.80	0.14	0.00	0.51	0.00	0	0	-29.4	20.5	2,786
New York	W-CG-Prem	125	1.78	1.80	0.20	0.00	0.51	0.00	0	0	-29.3	12.5	2,799
Utah	S-CG-Prem	136	1.77	1.80	0.19	0.00	0.51	0.00	0	0	-29.3	13.6	2,812
Maryland	S-CG-Prem	7	1.79	1.80	0.21	0.00	0.51	0.00	0	0	-29.0	0.7	2,813
Arkansas	S-CG-Prem	55	1.74	1.80	0.17	0.00	0.51	0.00	0	0	-28.1	5.5	2,819
Georgia	S-CG-Prem	290	1.79	1.80	0.23	0.00	0.51	0.00	0	0	-27.8	29.0	2,847
West Virginia	S-CG-Prem	21	1.76	1.80	0.20	0.00	0.51	0.00	0	0	-27.6	2.1	2,850
Kentucky	S-CG-Prem	50	1.78	1.80	0.21	0.00	0.51	0.00	0	0	-27.6	5.0	2,855
Colorado	W-CG-Prem	230	1.75	1.80	0.19	0.00	0.51	0.00	0	0	-27.6	23.0	2,878
Vermont	S-CG-Prem	12	1.79	1.80	0.23	0.00	0.51	0.00	0	0	-27.5	1.2	2,879
Nevada	S-CG-Reg	439	1.81	1.80	0.25	0.00	0.51	0.00	0	0	-27.4	43.9	2,923
Wyoming	S-CG-Reg	145	1.75	1.80	0.19	0.00	0.51	0.00	0	0	-27.4	14.5	2,937
Virginia	S-CG-Prem	66	1.77	1.80	0.21	0.00	0.51	0.00	0	0	-27.2	6.6	2,944
North Dakota	S-CG-Prem	21	1.77	1.80	0.21	0.00	0.51	0.00	0	0	-27.0	2.1	2,946
Mississippi	S-CG-Prem	80	1.73	1.80	0.17	0.00	0.51	0.00	0	0	-26.7	8.0	2,954
Kansas	W-CG-Prem	73	1.69	1.80	0.14	0.00	0.51	0.00	0	0	-26.7	7.3	2,961
South Dakota	S-CG-Reg	185	1.69	1.80	0.14	0.00	0.51	0.00	0	0	-26.5	18.5	2,980

Table A2005B Input Costs, Ethanol Blending Cost and Ethanol Volumes

Year 2005 State	Gasoline Code	Gasoline Volume MMgals	Gasoline Price $/gal	Ethanol Gate Price $/gal	Ethanol Dist Cost $/gal	Ethanol Blending $/gal	Federal Subsidy $/gal	State Subsidy $/gal	State Mandate	RFG "Mandate"	Ethanol Blending Cost c/gal	Ethanol Volume MMgals	Cumulative Eth Vol MMgals
South Carolina	S-CG-Prem	135	1.78	1.80	0.23	0.00	0.51	0.00	0	0	-26.5	13.5	2,993
Tennessee	S-CG-Prem	175	1.76	1.80	0.21	0.00	0.51	0.00	0	0	-26.3	17.5	3,011
Texas	S-CG-Prem	349	1.72	1.80	0.17	0.00	0.51	0.00	0	0	-26.3	34.9	3,046
Pennsylvania	S-CG-Prem	87	1.75	1.80	0.20	0.00	0.51	0.00	0	0	-26.2	8.7	3,054
Arizona	S-CG-Reg	457	1.80	1.80	0.25	0.00	0.51	0.00	0	0	-25.9	45.7	3,100
New Mexico	S-CG-Reg	416	1.76	1.80	0.21	0.00	0.51	0.00	0	0	-25.5	41.6	3,142
Colorado	S-CG-Reg	866	1.73	1.80	0.19	0.00	0.51	0.00	0	0	-25.3	86.6	3,228
North Carolina	S-CG-Prem	239	1.77	1.80	0.23	0.00	0.51	0.00	0	0	-25.3	23.9	3,252
Missouri	S-CG-Reg	841	1.67	1.80	0.14	0.00	0.51	0.00	0	0	-25.0	84.1	3,336
Idaho	S-CG-Reg	303	1.72	1.80	0.19	0.00	0.51	0.00	0	0	-25.0	30.3	3,367
Alabama	S-CG-Prem	107	1.75	1.80	0.21	0.00	0.51	0.00	0	0	-24.8	10.7	3,377
Utah	W-CG-Prem	165	1.72	1.80	0.19	0.00	0.51	0.00	0	0	-24.3	16.5	3,394
Maryland	W-CG-Prem	9	1.74	1.80	0.21	0.00	0.51	0.00	0	0	-24.0	0.9	3,395
Wisconsin	S-CG-Reg	848	1.66	1.80	0.14	0.00	0.51	0.00	0	0	-23.9	84.8	3,479
Nebraska	S-CG-Reg	341	1.66	1.80	0.14	0.00	0.51	0.00	0	0	-23.9	34.1	3,514
Michigan	S-CG-Reg	2078	1.66	1.80	0.14	0.00	0.51	0.00	0	0	-23.8	207.8	3,721
Washington	S-CG-Reg	1124	1.74	1.80	0.22	0.00	0.51	0.00	0	0	-23.8	112.4	3,834
Montana	S-CG-Reg	295	1.71	1.80	0.19	0.00	0.51	0.00	0	0	-23.7	29.5	3,863
Indiana	S-CG-Reg	1242	1.66	1.80	0.14	0.00	0.51	0.00	0	0	-23.4	124.2	3,988
Arkansas	W-CG-Prem	67	1.69	1.80	0.17	0.00	0.51	0.00	0	0	-23.1	6.7	3,994
Ohio	S-CG-Reg	2144	1.65	1.80	0.14	0.00	0.51	0.00	0	0	-23.1	214.4	4,209
Louisiana	S-CG-Prem	106	1.69	1.80	0.17	0.00	0.51	0.00	0	0	-22.9	10.6	4,219
New Hampshire	S-CG-Prem	5	1.74	1.80	0.23	0.00	0.51	0.00	0	0	-22.8	0.5	4,220
Georgia	W-CG-Prem	350	1.74	1.80	0.23	0.00	0.51	0.00	0	0	-22.8	35.0	4,255
West Virginia	W-CG-Prem	25	1.71	1.80	0.20	0.00	0.51	0.00	0	0	-22.6	2.5	4,257
Kentucky	W-CG-Prem	61	1.73	1.80	0.21	0.00	0.51	0.00	0	0	-22.6	6.1	4,263
Vermont	W-CG-Prem	15	1.74	1.80	0.23	0.00	0.51	0.00	0	0	-22.5	1.5	4,265
Nevada	W-CG-reg	530	1.76	1.80	0.25	0.00	0.51	0.00	0	0	-22.4	53.0	4,318
Wyoming	W-CG-reg	176	1.70	1.80	0.19	0.00	0.51	0.00	0	0	-22.4	17.6	4,335
Virginia	W-CG-Prem	80	1.72	1.80	0.21	0.00	0.51	0.00	0	0	-22.2	8.0	4,343
Kansas	S-CG-Reg	716	1.64	1.80	0.14	0.00	0.51	0.00	0	0	-22.1	71.6	4,415
North Dakota	W-CG-Prem	26	1.72	1.80	0.21	0.00	0.51	0.00	0	0	-22.0	2.6	4,418
Mississippi	W-CG-Prem	96	1.68	1.80	0.17	0.00	0.51	0.00	0	0	-21.7	9.6	4,427
Oregon	S-CG-Reg	699	1.72	1.80	0.22	0.00	0.51	0.00	0	0	-21.6	69.9	4,497
South Dakota	W-CG-reg	224	1.64	1.80	0.14	0.00	0.51	0.00	0	0	-21.5	22.4	4,520
South Carolina	W-CG-Prem	163	1.73	1.80	0.23	0.00	0.51	0.00	0	0	-21.5	16.3	4,536
Tennessee	W-CG-Prem	211	1.71	1.80	0.21	0.00	0.51	0.00	0	0	-21.3	21.1	4,557
Texas	W-CG-Prem	422	1.67	1.80	0.17	0.00	0.51	0.00	0	0	-21.3	42.2	4,599
Pennsylvania	W-CG-Prem	105	1.70	1.80	0.20	0.00	0.51	0.00	0	0	-21.2	10.5	4,610
Arizona	W-CG-reg	552	1.75	1.80	0.25	0.00	0.51	0.00	0	0	-20.9	55.2	4,665
Florida	S-CG-Prem	471	1.77	1.80	0.28	0.00	0.51	0.00	0	0	-20.7	47.1	4,712
New Mexico	W-CG-reg	503	1.71	1.80	0.21	0.00	0.51	0.00	0	0	-20.5	50.3	4,762
Colorado	W-CG-reg	1047	1.68	1.80	0.19	0.00	0.51	0.00	0	0	-20.3	104.7	4,867
North Carolina	W-CG-Prem	289	1.72	1.80	0.23	0.00	0.51	0.00	0	0	-20.3	28.9	4,896
Missouri	W-CG-reg	1017	1.62	1.80	0.14	0.00	0.51	0.00	0	0	-20.0	101.7	4,998
Idaho	W-CG-reg	367	1.67	1.80	0.19	0.00	0.51	0.00	0	0	-20.0	36.7	5,034
Alabama	W-CG-Prem	129	1.70	1.80	0.21	0.00	0.51	0.00	0	0	-19.8	12.9	5,047
Oklahoma	S-CG-Prem	90	1.70	1.80	0.21	0.00	0.51	0.00	0	0	-19.8	9.0	5,056
Alaska	S-CG-Prem	14	1.94	1.80	0.45	0.00	0.51	0.00	0	0	-19.8	1.4	5,058
Utah	S-CG-Reg	505	1.67	1.80	0.19	0.00	0.51	0.00	0	0	-19.7	50.5	5,108
Wisconsin	W-CG-reg	1025	1.61	1.80	0.14	0.00	0.51	0.00	0	0	-18.9	102.5	5,211
Kentucky	S-CG-Reg	721	1.69	1.80	0.21	0.00	0.51	0.00	0	0	-18.9	72.1	5,283
Nebraska	W-CG-reg	413	1.61	1.80	0.14	0.00	0.51	0.00	0	0	-18.9	41.3	5,324
Michigan	W-CG-reg	2513	1.61	1.80	0.14	0.00	0.51	0.00	0	0	-18.8	251.3	5,575
Maine	S-CG-Prem	11	1.75	1.80	0.28	0.00	0.51	0.00	0	0	-18.8	1.1	5,576
Washington	W-CG-reg	1359	1.69	1.80	0.22	0.00	0.51	0.00	0	0	-18.8	135.9	5,712
Arkansas	S-CG-Reg	646	1.65	1.80	0.17	0.00	0.51	0.00	0	0	-18.7	64.6	5,777
Montana	W-CG-reg	357	1.66	1.80	0.19	0.00	0.51	0.00	0	0	-18.7	35.7	5,813
Indiana	W-CG-reg	1502	1.61	1.80	0.14	0.00	0.51	0.00	0	0	-18.4	150.2	5,963
Ohio	W-CG-reg	2592	1.60	1.80	0.14	0.00	0.51	0.00	0	0	-18.1	259.2	6,222
Louisiana	W-CG-Prem	128	1.64	1.80	0.17	0.00	0.51	0.00	0	0	-17.9	12.8	6,235
New Hampshire	W-CG-Prem	5	1.69	1.80	0.23	0.00	0.51	0.00	0	0	-17.8	0.5	6,235
North Dakota	S-CG-Reg	173	1.68	1.80	0.21	0.00	0.51	0.00	0	0	-17.7	17.3	6,253
Maryland	S-CG-Reg	91	1.67	1.80	0.21	0.00	0.51	0.00	0	0	-17.4	9.1	6,262
West Virginia	S-CG-Reg	329	1.66	1.80	0.20	0.00	0.51	0.00	0	0	-17.4	32.9	6,295
Kansas	W-CG-reg	866	1.59	1.80	0.14	0.00	0.51	0.00	0	0	-17.1	86.6	6,381
Georgia	S-CG-Reg	2110	1.69	1.80	0.23	0.00	0.51	0.00	0	0	-17.0	211.0	6,592
New York	S-CG-Reg	1063	1.65	1.80	0.20	0.00	0.51	0.00	0	0	-16.7	106.3	6,699
Tennessee	S-CG-Reg	1510	1.67	1.80	0.21	0.00	0.51	0.00	0	0	-16.6	151.0	6,850
Oregon	W-CG-reg	846	1.67	1.80	0.22	0.00	0.51	0.00	0	0	-16.6	84.6	6,934
Mississippi	S-CG-Reg	772	1.62	1.80	0.17	0.00	0.51	0.00	0	0	-16.3	77.2	7,011
Florida	W-CG-Prem	569	1.72	1.80	0.28	0.00	0.51	0.00	0	0	-15.7	56.9	7,068
Virginia	S-CG-Reg	685	1.66	1.80	0.21	0.00	0.51	0.00	0	0	-15.6	68.5	7,137
South Carolina	S-CG-Reg	1137	1.67	1.80	0.23	0.00	0.51	0.00	0	0	-15.5	113.7	7,251
Vermont	S-CG-Reg	139	1.67	1.80	0.23	0.00	0.51	0.00	0	0	-15.1	13.9	7,264
Alaska	S-CG-Reg	115	1.89	1.80	0.45	0.00	0.51	0.00	0	0	-14.9	11.5	7,276
Oklahoma	W-CG-Prem	108	1.65	1.80	0.21	0.00	0.51	0.00	0	0	-14.8	10.8	7,287
Alaska	W-CG-Prem	17	1.89	1.80	0.45	0.00	0.51	0.00	0	0	-14.8	1.7	7,288
Utah	W-CG-reg	611	1.62	1.80	0.19	0.00	0.51	0.00	0	0	-14.7	61.1	7,350
Pennsylvania	S-CG-Reg	913	1.63	1.80	0.20	0.00	0.51	0.00	0	0	-14.4	91.3	7,441
North Carolina	S-CG-Reg	1908	1.66	1.80	0.23	0.00	0.51	0.00	0	0	-14.4	190.8	7,632
Alabama	S-CG-Reg	1071	1.64	1.80	0.21	0.00	0.51	0.00	0	0	-14.3	107.1	7,739
Kentucky	W-CG-reg	872	1.64	1.80	0.21	0.00	0.51	0.00	0	0	-13.9	87.2	7,826
Maine	W-CG-Prem	14	1.70	1.80	0.28	0.00	0.51	0.00	0	0	-13.8	1.4	7,827
Arkansas	W-CG-reg	782	1.60	1.80	0.17	0.00	0.51	0.00	0	0	-13.7	78.2	7,906

Table A2005C Input Costs, Ethanol Blending Cost and Ethanol Volumes

Year 2005 State	Gasoline Code	Gasoline Volume MMgals	Gasoline Price $/gal	Ethanol Gate Price $/gal	Ethanol Dist Cost $/gal	Ethanol Blending $/gal	Federal Subsidy $/gal	State Subsidy $/gal	State Mandate	RFG "Mandate"	Ethanol Blending Cost c/gal	Ethanol Volume MMgals	Cumulative Eth Vol MMgals
Hawaii	S-CG-Prem	54	1.87	1.80	0.45	0.00	0.51	0.00	0	0	-13.5	5.4	7,911
Oklahoma	S-CG-Reg	917	1.63	1.80	0.21	0.00	0.51	0.00	0	0	-13.2	91.7	8,003
Texas	S-CG-Reg	3593	1.59	1.80	0.17	0.00	0.51	0.00	0	0	-13.1	359.3	8,362
Louisiana	S-CG-Reg	1203	1.59	1.80	0.17	0.00	0.51	0.00	0	0	-13.0	120.3	8,482
North Dakota	W-CG-reg	210	1.63	1.80	0.21	0.00	0.51	0.00	0	0	-12.7	21.0	8,503
New Hampshire	S-CG-Reg	59	1.64	1.80	0.23	0.00	0.51	0.00	0	0	-12.5	5.9	8,509
Maryland	W-CG-reg	110	1.62	1.80	0.21	0.00	0.51	0.00	0	0	-12.4	11.0	8,520
West Virginia	W-CG-reg	398	1.61	1.80	0.20	0.00	0.51	0.00	0	0	-12.4	39.8	8,560
Georgia	W-CG-reg	2552	1.64	1.80	0.23	0.00	0.51	0.00	0	0	-12.0	255.2	8,815
New York	W-CG-reg	1285	1.60	1.80	0.20	0.00	0.51	0.00	0	0	-11.7	128.5	8,944
Tennessee	W-CG-reg	1826	1.62	1.80	0.21	0.00	0.51	0.00	0	0	-11.6	182.6	9,126
Mississippi	W-CG-reg	934	1.57	1.80	0.17	0.00	0.51	0.00	0	0	-11.3	93.4	9,220
Virginia	W-CG-reg	828	1.61	1.80	0.21	0.00	0.51	0.00	0	0	-10.6	82.8	9,302
South Carolina	W-CG-reg	1374	1.62	1.80	0.23	0.00	0.51	0.00	0	0	-10.5	137.4	9,440
Vermont	W-CG-reg	168	1.62	1.80	0.23	0.00	0.51	0.00	0	0	-10.1	16.8	9,457
Alaska	W-CG-reg	139	1.84	1.80	0.45	0.00	0.51	0.00	0	0	-9.9	13.9	9,471
Florida	S-CG-Reg	3207	1.66	1.80	0.28	0.00	0.51	0.00	0	0	-9.7	320.7	9,791
Pennsylvania	W-CG-reg	1104	1.58	1.80	0.20	0.00	0.51	0.00	0	0	-9.4	110.4	9,902
North Carolina	W-CG-reg	2307	1.61	1.80	0.23	0.00	0.51	0.00	0	0	-9.4	230.7	10,132
Alabama	W-CG-reg	1295	1.59	1.80	0.21	0.00	0.51	0.00	0	0	-9.3	129.5	10,262
Hawaii	W-CG-Prem	65	1.82	1.80	0.45	0.00	0.51	0.00	0	0	-8.5	6.5	10,268
Oklahoma	W-CG-reg	1109	1.58	1.80	0.21	0.00	0.51	0.00	0	0	-8.2	110.9	10,379
Texas	W-CG-reg	4344	1.54	1.80	0.17	0.00	0.51	0.00	0	0	-8.1	434.4	10,814
Louisiana	W-CG-reg	1455	1.54	1.80	0.17	0.00	0.51	0.00	0	0	-8.0	145.5	10,959
New Hampshire	W-CG-reg	71	1.59	1.80	0.23	0.00	0.51	0.00	0	0	-7.5	7.1	10,966
Hawaii	S-CG-Reg	179	1.81	1.80	0.45	0.00	0.51	0.00	0	0	-7.0	17.9	10,984
Florida	W-CG-reg	3878	1.61	1.80	0.28	0.00	0.51	0.00	0	0	-4.7	387.8	11,372
Maine	S-CG-Reg	132	1.61	1.80	0.28	0.00	0.51	0.00	0	0	-4.2	13.2	11,385
Hawaii	W-CG-reg	217	1.76	1.80	0.45	0.00	0.51	0.00	0	0	-2.0	21.7	11,407
Maine	W-CG-reg	159	1.56	1.80	0.28	0.00	0.51	0.00	0	0	0.8	15.9	11,423
Arizona	S-RFG-Prem	127	1.97	1.80	0.25	0.71	0.51	0.00	0	0	-114.5	12.7	11,436
Missouri	S-RFG-Prem	42	1.84	1.80	0.14	0.71	0.51	0.00	0	0	-112.7	4.2	11,440
Arizona	S-RFG-Reg	819	1.86	1.80	0.25	1.00	0.51	0.00	0	0	-131.5	81.9	11,522
Missouri	S-RFG-Reg	432	1.73	1.80	0.14	1.00	0.51	0.00	0	0	-130.6	43.2	11,565
Arizona	W-RFG-Prem	154	1.92	1.80	0.25	0.36	0.51	0.00	0	0	-74.5	15.4	11,580
Missouri	W-RFG-Prem	51	1.79	1.80	0.14	0.36	0.51	0.00	0	0	-72.7	5.1	11,585
Maryland	S-RFG-Prem	142	1.85	1.80	0.21	0.71	0.51	0.00	0	0	-106.0	14.2	11,600
Massachusetts	S-RFG-Prem	171	1.85	1.80	0.21	0.71	0.51	0.00	0	0	-105.5	17.1	11,617
Kentucky	S-RFG-Prem	20	1.84	1.80	0.21	0.71	0.51	0.00	0	0	-104.5	2.0	11,619
Virginia	S-RFG-Prem	158	1.83	1.80	0.21	0.71	0.51	0.00	0	0	-104.1	15.8	11,634
Kentucky	S-RFG-Reg	199	1.75	1.80	0.21	1.00	0.51	0.00	0	0	-124.5	19.9	11,654
Rhode Island	S-RFG-Prem	40	1.83	1.80	0.21	0.71	0.51	0.00	0	0	-103.5	4.0	11,658
DC	S-RFG-Prem	7	1.82	1.80	0.21	0.71	0.51	0.00	0	0	-103.4	0.7	11,659
Texas	S-RFG-Prem	410	1.78	1.80	0.17	0.71	0.51	0.00	0	0	-103.3	41.0	11,700
Pennsylvania	S-RFG-Prem	68	1.81	1.80	0.20	0.71	0.51	0.00	0	0	-103.1	6.8	11,707
Maryland	S-RFG-Reg	775	1.73	1.80	0.21	1.00	0.51	0.00	0	0	-123.0	77.5	11,784
Delaware	S-RFG-Prem	24	1.81	1.80	0.21	0.71	0.51	0.00	0	0	-102.3	2.4	11,787
Virginia	S-RFG-Reg	810	1.72	1.80	0.21	1.00	0.51	0.00	0	0	-121.2	81.0	11,868
New Jersey	S-RFG-Prem	271	1.79	1.80	0.21	0.71	0.51	0.00	0	0	-100.3	27.1	11,895
Maryland	W-RFG-Prem	171	1.80	1.80	0.21	0.36	0.51	0.00	0	0	-65.9	17.1	11,912
DC	S-RFG-Reg	27	1.71	1.80	0.21	1.00	0.51	0.00	0	0	-120.5	2.7	11,915
New Hampshire	S-RFG-Prem	21	1.80	1.80	0.23	0.71	0.51	0.00	0	0	-99.8	2.1	11,917
Massachusetts	S-RFG-Reg	1124	1.70	1.80	0.21	1.00	0.51	0.00	0	0	-120.0	112.4	12,029
Massachusetts	W-RFG-Prem	207	1.80	1.80	0.21	0.36	0.51	0.00	0	0	-65.5	20.7	12,050
Pennsylvania	S-RFG-Reg	404	1.69	1.80	0.20	1.00	0.51	0.00	0	0	-120.0	40.4	12,090
Kentucky	W-RFG-Prem	24	1.79	1.80	0.21	0.36	0.51	0.00	0	0	-64.5	2.4	12,093
Texas	S-RFG-Reg	2638	1.65	1.80	0.17	1.00	0.51	0.00	0	0	-118.7	263.8	12,356
Virginia	W-RFG-Prem	191	1.78	1.80	0.21	0.36	0.51	0.00	0	0	-64.1	19.1	12,376
New Hampshire	S-RFG-Reg	193	1.70	1.80	0.23	1.00	0.51	0.00	0	0	-118.1	19.3	12,395
Rhode Island	W-RFG-Prem	48	1.78	1.80	0.21	0.36	0.51	0.00	0	0	-63.5	4.8	12,400
DC	W-RFG-Prem	8	1.77	1.80	0.21	0.36	0.51	0.00	0	0	-63.4	0.8	12,400
Delaware	S-RFG-Reg	197	1.68	1.80	0.21	1.00	0.51	0.00	0	0	-117.9	19.7	12,420
Texas	W-RFG-Prem	495	1.73	1.80	0.17	0.36	0.51	0.00	0	0	-63.2	49.5	12,470
Rhode Island	S-RFG-Reg	270	1.68	1.80	0.21	1.00	0.51	0.00	0	0	-117.7	27.0	12,497
Pennsylvania	W-RFG-Prem	82	1.76	1.80	0.20	0.36	0.51	0.00	0	0	-63.1	8.2	12,505
Arizona	W-RFG-reg	990	1.81	1.80	0.25	0.47	0.51	0.00	0	0	-74.2	99.0	12,604
Delaware	W-RFG-Prem	29	1.76	1.80	0.21	0.36	0.51	0.00	0	0	-62.3	2.9	12,607
Missouri	W-RFG-reg	522	1.68	1.80	0.14	0.47	0.51	0.00	0	0	-73.3	52.2	12,659
Maine	S-RFG-Prem	13	1.81	1.80	0.28	0.71	0.51	0.00	0	0	-95.7	1.3	12,660
New Jersey	W-RFG-Prem	328	1.74	1.80	0.21	0.36	0.51	0.00	0	0	-60.3	32.8	12,693
New Hampshire	W-RFG-Prem	26	1.75	1.80	0.23	0.36	0.51	0.00	0	0	-59.7	2.6	12,696
New Jersey	S-RFG-Reg	1679	1.63	1.80	0.21	1.00	0.51	0.00	0	0	-112.7	167.9	12,864
Kentucky	W-RFG-reg	241	1.70	1.80	0.21	0.47	0.51	0.00	0	0	-67.2	24.1	12,888
Maine	W-RFG-Prem	16	1.76	1.80	0.28	0.36	0.51	0.00	0	0	-55.7	1.6	12,889
Maine	S-RFG-Reg	194	1.67	1.80	0.28	1.00	0.51	0.00	0	0	-109.8	19.4	12,909
Maryland	W-RFG-reg	937	1.68	1.80	0.21	0.47	0.51	0.00	0	0	-65.7	93.7	13,002
Virginia	W-RFG-reg	979	1.67	1.80	0.21	0.47	0.51	0.00	0	0	-63.8	97.9	13,100
DC	W-RFG-reg	32	1.66	1.80	0.21	0.47	0.51	0.00	0	0	-63.1	3.2	13,103
Massachusetts	W-RFG-reg	1359	1.65	1.80	0.21	0.47	0.51	0.00	0	0	-62.7	135.9	13,239
Pennsylvania	W-RFG-reg	489	1.64	1.80	0.20	0.47	0.51	0.00	0	0	-62.6	48.9	13,288
Texas	W-RFG-reg	3190	1.60	1.80	0.17	0.47	0.51	0.00	0	0	-61.4	319.0	13,607
New Hampshire	W-RFG-reg	233	1.65	1.80	0.23	0.47	0.51	0.00	0	0	-60.8	23.3	13,631
Delaware	W-RFG-reg	238	1.63	1.80	0.21	0.47	0.51	0.00	0	0	-60.6	23.8	13,654
Rhode Island	W-RFG-reg	327	1.63	1.80	0.21	0.47	0.51	0.00	0	0	-60.4	32.7	13,687
New Jersey	W-RFG-reg	2030	1.58	1.80	0.21	0.47	0.51	0.00	0	0	-55.4	203.0	13,890
Maine	W-RFG-reg	235	1.62	1.80	0.28	0.47	0.51	0.00	0	0	-52.4	23.5	13,913

Table A2006A Input Costs, Ethanol Blending Cost and Ethanol Volumes

Year 2006 State	Gasoline Code	Gasoline Volume MMgals	Gasoline Price $/gal	Ethanol Gate Price $/gal	Ethanol Dist Cost $/gal	Ethanol Blending $/gal	Federal Subsidy $/gal	State Subsidy $/gal	State Mandate	RFG "Mandate"	Ethanol Blending Cost c/gal	Ethanol Volume MMgals	Cumulative Eth Vol MMgals
Illinois	S-RFG-Reg	1339	2.00	2.58	0.14	0.91	0.51	0.26	0	1	-95.5	133.9	134
Illinois	S-RFG-Prem	193	2.16	2.58	0.14	0.63	0.51	0.26	0	1	-84.3	19.3	153
Wisconsin	S-RFG-Reg	349	2.03	2.58	0.14	0.91	0.51	0.00	0	1	-73.1	34.9	188
Missouri	S-RFG-Reg	431	2.02	2.58	0.14	0.91	0.51	0.00	0	1	-72.0	43.1	231
Indiana	S-RFG-Reg	206	2.00	2.58	0.14	0.91	0.51	0.00	0	1	-70.2	20.6	252
California	S-RFG-Reg	5495	2.12	2.58	0.26	0.91	0.51	0.00	0	1	-70.1	313.2	565
Arizona	S-RFG-Reg	817	2.11	2.58	0.26	0.91	0.51	0.00	0	1	-68.4	81.7	647
Maryland	S-RFG-Reg	773	2.05	2.58	0.23	0.91	0.51	0.00	0	1	-66.4	77.3	724
Massachusetts	S-RFG-Reg	1122	2.03	2.58	0.23	0.91	0.51	0.00	0	1	-64.6	112.2	836
New York	S-RFG-Reg	1280	2.01	2.58	0.21	0.91	0.51	0.00	0	1	-64.3	128.0	964
Connecticut	S-RFG-Reg	659	2.02	2.58	0.23	0.91	0.51	0.00	0	1	-63.5	65.9	1,030
Rhode Island	S-RFG-Reg	270	2.02	2.58	0.23	0.91	0.51	0.00	0	1	-63.4	27.0	1,057
Kentucky	S-RFG-Reg	199	2.02	2.58	0.23	0.91	0.51	0.00	0	1	-63.4	19.9	1,077
DC	S-RFG-Reg	27	2.01	2.58	0.23	0.91	0.51	0.00	0	1	-63.2	2.7	1,080
Virginia	S-RFG-Reg	808	2.01	2.58	0.23	0.91	0.51	0.00	0	1	-63.2	80.8	1,160
Delaware	S-RFG-Reg	196	2.01	2.58	0.23	0.91	0.51	0.00	0	1	-62.7	19.6	1,180
Texas	S-RFG-Reg	2632	1.96	2.58	0.18	0.91	0.51	0.00	0	1	-62.5	263.2	1,443
New Hampshire	S-RFG-Reg	192	2.02	2.58	0.24	0.91	0.51	0.00	0	1	-61.8	19.2	1,462
Pennsylvania	S-RFG-Reg	403	1.97	2.58	0.21	0.91	0.51	0.00	0	1	-60.8	40.3	1,503
New York	S-RFG-Prem	308	2.23	2.58	0.21	0.63	0.51	0.00	0	1	-59.4	30.8	1,534
Wisconsin	S-RFG-Prem	32	2.17	2.58	0.14	0.63	0.51	0.00	0	1	-59.3	3.2	1,537
Missouri	S-RFG-Prem	42	2.16	2.58	0.14	0.63	0.51	0.00	0	1	-58.9	4.2	1,541
Indiana	S-RFG-Prem	21	2.16	2.58	0.14	0.63	0.51	0.00	0	1	-58.4	2.1	1,543
Massachusetts	S-RFG-Prem	171	2.21	2.58	0.23	0.63	0.51	0.00	0	1	-55.7	17.1	1,560
California	S-RFG-Prem	1588	2.25	2.58	0.26	0.63	0.51	0.00	0	1	-55.7	90.5	1,651
Maryland	S-RFG-Prem	141	2.21	2.58	0.23	0.63	0.51	0.00	0	1	-55.4	14.1	1,665
Rhode Island	S-RFG-Prem	40	2.21	2.58	0.23	0.63	0.51	0.00	0	1	-55.2	4.0	1,669
Connecticut	S-RFG-Prem	108	2.21	2.58	0.23	0.63	0.51	0.00	0	1	-54.9	10.8	1,680
New Hampshire	S-RFG-Prem	21	2.22	2.58	0.24	0.63	0.51	0.00	0	1	-54.3	2.1	1,682
Pennsylvania	S-RFG-Prem	67	2.18	2.58	0.21	0.63	0.51	0.00	0	1	-54.3	6.7	1,688
New Jersey	S-RFG-Reg	1675	1.93	2.58	0.23	0.91	0.51	0.00	0	1	-54.2	167.5	1,856
Arizona	S-RFG-Prem	127	2.24	2.58	0.26	0.63	0.51	0.00	0	1	-54.2	12.7	1,869
Virginia	S-RFG-Prem	158	2.18	2.58	0.23	0.63	0.51	0.00	0	1	-52.7	15.8	1,884
DC	S-RFG-Prem	7	2.18	2.58	0.23	0.63	0.51	0.00	0	1	-52.4	0.7	1,885
Maine	S-RFG-Reg	194	1.97	2.58	0.29	0.91	0.51	0.00	0	1	-52.2	19.4	1,904
Illinois	W-RFG-Prem	233	2.11	2.58	0.14	0.34	0.51	0.26	0	1	-50.1	23.3	1,928
Texas	S-RFG-Prem	409	2.11	2.58	0.18	0.63	0.51	0.00	0	1	-50.2	40.9	1,969
Kentucky	S-RFG-Prem	19	2.15	2.58	0.23	0.63	0.51	0.00	0	1	-49.9	1.9	1,971
Illinois	W-RFG-reg	1619	1.95	2.58	0.14	0.45	0.51	0.26	0	1	-44.8	161.9	2,132
Maine	S-RFG-Prem	13	2.17	2.58	0.29	0.63	0.51	0.00	0	1	-45.1	1.3	2,134
Delaware	S-RFG-Prem	24	2.10	2.58	0.23	0.63	0.51	0.00	0	1	-44.1	2.4	2,136
New Jersey	S-RFG-Prem	271	2.10	2.58	0.23	0.63	0.51	0.00	0	1	-44.1	27.1	2,163
New York	W-RFG-Prem	373	2.18	2.58	0.21	0.34	0.51	0.00	0	1	-25.2	37.3	2,201
Wisconsin	W-RFG-Prem	38	2.12	2.58	0.14	0.34	0.51	0.00	0	1	-25.1	3.8	2,204
Missouri	W-RFG-Prem	51	2.11	2.58	0.14	0.34	0.51	0.00	0	1	-24.7	5.1	2,209
Indiana	W-RFG-Prem	26	2.11	2.58	0.14	0.34	0.51	0.00	0	1	-24.2	2.6	2,212
Wisconsin	W-RFG-reg	422	1.98	2.58	0.14	0.45	0.51	0.00	0	1	-22.4	42.2	2,254
Massachusetts	W-RFG-Prem	206	2.16	2.58	0.23	0.34	0.51	0.00	0	1	-21.5	20.6	2,275
California	W-RFG-Prem	1920	2.20	2.58	0.26	0.34	0.51	0.00	0	1	-21.5	109.5	2,384
Missouri	W-RFG-reg	521	1.97	2.58	0.14	0.45	0.51	0.00	0	1	-21.3	52.1	2,437
Maryland	W-RFG-Prem	171	2.16	2.58	0.23	0.34	0.51	0.00	0	1	-21.2	17.1	2,454
Rhode Island	W-RFG-Prem	48	2.16	2.58	0.23	0.34	0.51	0.00	0	1	-21.0	4.8	2,458
Connecticut	W-RFG-Prem	131	2.16	2.58	0.23	0.34	0.51	0.00	0	1	-20.7	13.1	2,472
New Hampshire	W-RFG-Prem	26	2.17	2.58	0.24	0.34	0.51	0.00	0	1	-20.1	2.6	2,474
Pennsylvania	W-RFG-Prem	81	2.13	2.58	0.21	0.34	0.51	0.00	0	1	-20.0	8.1	2,482
Arizona	W-RFG-Prem	154	2.19	2.58	0.26	0.34	0.51	0.00	0	1	-20.0	15.4	2,498
Indiana	W-RFG-reg	249	1.95	2.58	0.14	0.45	0.51	0.00	0	1	-19.5	24.9	2,522
California	W-RFG-reg	6645	2.07	2.58	0.26	0.45	0.51	0.00	0	1	-19.4	378.8	2,901
Virginia	W-RFG-Prem	190	2.13	2.58	0.23	0.34	0.51	0.00	0	1	-18.4	19.0	2,920
DC	W-RFG-Prem	8	2.13	2.58	0.23	0.34	0.51	0.00	0	1	-18.2	0.8	2,921
Arizona	W-RFG-reg	988	2.06	2.58	0.26	0.45	0.51	0.00	0	1	-17.6	98.8	3,020
Texas	W-RFG-Prem	494	2.06	2.58	0.18	0.34	0.51	0.00	0	1	-16.0	49.4	3,069
Maryland	W-RFG-reg	935	2.00	2.58	0.23	0.45	0.51	0.00	0	1	-15.7	93.5	3,163
Kentucky	W-RFG-Prem	24	2.10	2.58	0.23	0.34	0.51	0.00	0	1	-15.7	2.4	3,165
Massachusetts	W-RFG-reg	1356	1.98	2.58	0.23	0.45	0.51	0.00	0	1	-13.9	135.6	3,301
New York	W-RFG-reg	1548	1.96	2.58	0.21	0.45	0.51	0.00	0	1	-13.6	154.8	3,456
Connecticut	W-RFG-reg	797	1.97	2.58	0.23	0.45	0.51	0.00	0	1	-12.8	79.7	3,535
Rhode Island	W-RFG-reg	326	1.97	2.58	0.23	0.45	0.51	0.00	0	1	-12.7	32.6	3,568
Kentucky	W-RFG-reg	240	1.97	2.58	0.23	0.45	0.51	0.00	0	1	-12.7	24.0	3,592
DC	W-RFG-reg	32	1.96	2.58	0.23	0.45	0.51	0.00	0	1	-12.4	3.2	3,595
Virginia	W-RFG-reg	977	1.96	2.58	0.23	0.45	0.51	0.00	0	1	-12.4	97.7	3,693
Delaware	W-RFG-reg	237	1.96	2.58	0.23	0.45	0.51	0.00	0	1	-12.0	23.7	3,717
Texas	W-RFG-reg	3183	1.91	2.58	0.18	0.45	0.51	0.00	0	1	-11.8	318.3	4,035
New Hampshire	W-RFG-reg	232	1.97	2.58	0.24	0.45	0.51	0.00	0	1	-11.0	23.2	4,058
Maine	W-RFG-Prem	16	2.12	2.58	0.29	0.34	0.51	0.00	0	1	-10.8	1.6	4,060
Pennsylvania	W-RFG-reg	488	1.92	2.58	0.21	0.45	0.51	0.00	0	1	-10.0	48.8	4,108
Delaware	W-RFG-Prem	29	2.05	2.58	0.23	0.34	0.51	0.00	0	1	-9.9	2.9	4,111
New Jersey	W-RFG-Prem	327	2.05	2.58	0.23	0.34	0.51	0.00	0	1	-9.9	32.7	4,144
New Jersey	W-RFG-reg	2025	1.88	2.58	0.23	0.45	0.51	0.00	0	1	-3.5	202.5	4,347
Maine	W-RFG-reg	234	1.92	2.58	0.29	0.45	0.51	0.00	0	1	-1.4	23.4	4,370
Minnesota	S-CG-Prem	107	2.12	2.58	0.14	0.00	0.51	0.00	1	0	9.5	10.7	4,381
Minnesota	W-CG-Prem	129	2.07	2.58	0.14	0.00	0.51	0.00	1	0	14.5	12.9	4,394
Minnesota	S-CG-Reg	1062	1.99	2.58	0.14	0.00	0.51	0.00	1	0	22.5	106.2	4,500
Minnesota	W-CG-reg	1284	1.94	2.58	0.14	0.00	0.51	0.00	1	0	27.5	128.4	4,628
Iowa	S-CG-Prem	67	2.12	2.58	0.14	0.00	0.51	0.30	0	0	-20.9	6.7	4,635

Table A2006B Input Costs, Ethanol Blending Cost and Ethanol Volumes

Year 2006 State	Gasoline Code	Gasoline Volume MMgals	Gasoline Price $/gal	Ethanol Gate Price $/gal	Ethanol Dist Cost $/gal	Ethanol Blending $/gal	Federal Subsidy $/gal	State Subsidy $/gal	State Mandate	RFG "Mandate"	Ethanol Blending Cost c/gal	Ethanol Volume MMgals	Cumulative Eth Vol MMgals
Iowa	W-CG-Prem	81	2.07	2.58	0.14	0.00	0.51	0.30	0	0	-15.9	8.1	4,643
Illinois	S-CG-Prem	48	2.10	2.58	0.14	0.00	0.51	0.26	0	0	-14.8	4.8	4,648
Illinois	W-CG-Prem	58	2.05	2.58	0.14	0.00	0.51	0.26	0	0	-9.8	5.8	4,654
Iowa	S-CG-Reg	515	2.00	2.58	0.14	0.00	0.51	0.30	0	0	-8.5	51.5	4,705
South Dakota	S-CG-Prem	22	2.19	2.58	0.14	0.00	0.51	0.09	0	0	-6.6	2.2	4,707
Iowa	W-CG-reg	622	1.95	2.58	0.14	0.00	0.51	0.30	0	0	-3.5	62.2	4,769
South Dakota	W-CG-Prem	27	2.14	2.58	0.14	0.00	0.51	0.09	0	0	-1.6	2.7	4,772
Illinois	S-CG-Reg	786	1.94	2.58	0.14	0.00	0.51	0.26	0	0	1.3	78.6	4,851
Illinois	W-CG-reg	951	1.89	2.58	0.14	0.00	0.51	0.26	0	0	6.3	95.1	4,946
Nevada	S-CG-Prem	113	2.25	2.58	0.26	0.00	0.51	0.00	0	0	8.5	11.3	4,957
Washington	S-CG-Prem	223	2.21	2.58	0.23	0.00	0.51	0.00	0	0	8.9	22.3	4,979
Oregon	S-CG-Prem	98	2.21	2.58	0.23	0.00	0.51	0.00	0	0	9.0	9.8	4,989
Wyoming	S-CG-Prem	29	2.17	2.58	0.20	0.00	0.51	0.00	0	0	9.6	2.9	4,992
New York	S-CG-Prem	103	2.17	2.58	0.21	0.00	0.51	0.00	0	0	10.1	10.3	5,002
Wisconsin	S-CG-Prem	75	2.11	2.58	0.14	0.00	0.51	0.00	0	0	10.2	7.5	5,010
Missouri	S-CG-Prem	70	2.10	2.58	0.14	0.00	0.51	0.00	0	0	10.6	7.0	5,017
Indiana	S-CG-Prem	89	2.10	2.58	0.14	0.00	0.51	0.00	0	0	11.1	8.9	5,026
Nebraska	S-CG-Prem	45	2.09	2.58	0.14	0.00	0.51	0.00	0	0	11.7	4.5	5,030
New Mexico	S-CG-Prem	62	2.17	2.58	0.23	0.00	0.51	0.00	0	0	11.9	6.2	5,037
Idaho	S-CG-Prem	51	2.14	2.58	0.20	0.00	0.51	0.00	0	0	12.2	5.1	5,042
Michigan	S-CG-Prem	137	2.08	2.58	0.14	0.00	0.51	0.00	0	0	13.0	13.7	5,055
South Dakota	S-CG-Reg	185	1.99	2.58	0.14	0.00	0.51	0.09	0	0	13.2	18.5	5,074
Nevada	W-CG-Prem	137	2.20	2.58	0.26	0.00	0.51	0.00	0	0	13.5	13.7	5,088
Kansas	S-CG-Prem	61	2.07	2.58	0.14	0.00	0.51	0.00	0	0	13.8	6.1	5,094
Ohio	S-CG-Prem	169	2.07	2.58	0.14	0.00	0.51	0.00	0	0	13.8	16.9	5,111
Washington	W-CG-Prem	269	2.16	2.58	0.23	0.00	0.51	0.00	0	0	13.9	26.9	5,138
Oregon	W-CG-Prem	118	2.16	2.58	0.23	0.00	0.51	0.00	0	0	14.0	11.8	5,149
Maryland	S-CG-Prem	7	2.15	2.58	0.23	0.00	0.51	0.00	0	0	14.1	0.7	5,150
Wyoming	W-CG-Prem	35	2.12	2.58	0.20	0.00	0.51	0.00	0	0	14.6	3.5	5,154
Montana	S-CG-Prem	63	2.11	2.58	0.20	0.00	0.51	0.00	0	0	15.0	6.3	5,160
New York	W-CG-Prem	125	2.12	2.58	0.21	0.00	0.51	0.00	0	0	15.1	12.5	5,172
New Hampshire	S-CG-Prem	5	2.16	2.58	0.24	0.00	0.51	0.00	0	0	15.1	0.5	5,173
Wisconsin	W-CG-Prem	91	2.06	2.58	0.14	0.00	0.51	0.00	0	0	15.2	9.1	5,182
Pennsylvania	S-CG-Prem	87	2.12	2.58	0.21	0.00	0.51	0.00	0	0	15.2	8.7	5,191
Arizona	S-CG-Prem	58	2.18	2.58	0.26	0.00	0.51	0.00	0	0	15.2	5.8	5,197
Missouri	W-CG-Prem	85	2.05	2.58	0.14	0.00	0.51	0.00	0	0	15.6	8.5	5,205
Colorado	S-CG-Prem	190	2.10	2.58	0.20	0.00	0.51	0.00	0	0	15.7	19.0	5,224
Indiana	W-CG-Prem	107	2.05	2.58	0.14	0.00	0.51	0.00	0	0	16.1	10.7	5,235
Vermont	S-CG-Prem	12	2.15	2.58	0.24	0.00	0.51	0.00	0	0	16.2	1.2	5,236
North Dakota	S-CG-Prem	21	2.12	2.58	0.23	0.00	0.51	0.00	0	0	16.7	2.1	5,238
Nebraska	W-CG-Prem	55	2.04	2.58	0.14	0.00	0.51	0.00	0	0	16.7	5.5	5,244
Utah	S-CG-Prem	136	2.09	2.58	0.20	0.00	0.51	0.00	0	0	16.7	13.6	5,257
Virginia	S-CG-Prem	66	2.12	2.58	0.23	0.00	0.51	0.00	0	0	16.8	6.6	5,264
New Mexico	W-CG-Prem	75	2.12	2.58	0.23	0.00	0.51	0.00	0	0	16.9	7.5	5,271
Idaho	W-CG-Prem	62	2.09	2.58	0.20	0.00	0.51	0.00	0	0	17.2	6.2	5,277
Michigan	W-CG-Prem	166	2.03	2.58	0.14	0.00	0.51	0.00	0	0	18.0	16.6	5,294
South Dakota	W-CG-reg	224	1.94	2.58	0.14	0.00	0.51	0.09	0	0	18.2	22.4	5,316
Kansas	W-CG-Prem	73	2.02	2.58	0.14	0.00	0.51	0.00	0	0	18.8	7.3	5,324
Ohio	W-CG-Prem	204	2.02	2.58	0.14	0.00	0.51	0.00	0	0	18.8	20.4	5,344
Maryland	W-CG-Prem	9	2.10	2.58	0.23	0.00	0.51	0.00	0	0	19.1	0.9	5,345
Texas	S-CG-Prem	348	2.05	2.58	0.18	0.00	0.51	0.00	0	0	19.3	34.8	5,380
Mississippi	S-CG-Prem	79	2.05	2.58	0.18	0.00	0.51	0.00	0	0	19.5	7.9	5,388
Kentucky	S-CG-Prem	50	2.09	2.58	0.23	0.00	0.51	0.00	0	0	19.6	5.0	5,393
Georgia	S-CG-Prem	289	2.11	2.58	0.24	0.00	0.51	0.00	0	0	19.6	28.9	5,422
West Virginia	S-CG-Prem	21	2.08	2.58	0.21	0.00	0.51	0.00	0	0	19.9	2.1	5,424
Montana	W-CG-Prem	77	2.06	2.58	0.20	0.00	0.51	0.00	0	0	20.0	7.7	5,431
New Hampshire	W-CG-Prem	5	2.11	2.58	0.24	0.00	0.51	0.00	0	0	20.1	0.5	5,432
Pennsylvania	W-CG-Prem	105	2.07	2.58	0.21	0.00	0.51	0.00	0	0	20.2	10.5	5,442
Arizona	W-CG-Prem	70	2.13	2.58	0.26	0.00	0.51	0.00	0	0	20.2	7.0	5,449
Tennessee	S-CG-Prem	174	2.09	2.58	0.23	0.00	0.51	0.00	0	0	20.4	17.4	5,467
Louisiana	S-CG-Prem	106	2.04	2.58	0.18	0.00	0.51	0.00	0	0	20.5	10.6	5,477
Colorado	W-CG-Prem	229	2.05	2.58	0.20	0.00	0.51	0.00	0	0	20.7	22.9	5,500
Vermont	W-CG-Prem	15	2.10	2.58	0.24	0.00	0.51	0.00	0	0	21.2	1.5	5,502
North Dakota	W-CG-Prem	26	2.07	2.58	0.23	0.00	0.51	0.00	0	0	21.7	2.6	5,505
Utah	W-CG-Prem	165	2.04	2.58	0.20	0.00	0.51	0.00	0	0	21.7	16.5	5,521
Virginia	W-CG-Prem	80	2.07	2.58	0.23	0.00	0.51	0.00	0	0	21.8	8.0	5,529
Arkansas	S-CG-Prem	55	2.03	2.58	0.18	0.00	0.51	0.00	0	0	21.9	5.5	5,534
Hawaii	S-CG-Prem	54	2.32	2.58	0.48	0.00	0.51	0.00	0	0	22.5	5.4	5,540
Alabama	S-CG-Prem	107	2.06	2.58	0.23	0.00	0.51	0.00	0	0	22.7	10.7	5,550
Nevada	S-CG-Reg	438	2.10	2.58	0.26	0.00	0.51	0.00	0	0	22.9	43.8	5,594
Nebraska	S-CG-Reg	341	1.98	2.58	0.14	0.00	0.51	0.00	0	0	23.0	34.1	5,628
South Carolina	S-CG-Prem	135	2.08	2.58	0.24	0.00	0.51	0.00	0	0	23.2	13.5	5,642
Wyoming	S-CG-Reg	145	2.03	2.58	0.20	0.00	0.51	0.00	0	0	23.2	14.5	5,656
Oklahoma	S-CG-Prem	90	2.04	2.58	0.23	0.00	0.51	0.02	0	0	23.5	9.0	5,665
Idaho	S-CG-Reg	303	2.03	2.58	0.20	0.00	0.51	0.00	0	0	23.6	30.3	5,696
Wisconsin	S-CG-Reg	846	1.97	2.58	0.14	0.00	0.51	0.00	0	0	23.7	84.6	5,780
Washington	S-CG-Reg	1122	2.06	2.58	0.23	0.00	0.51	0.00	0	0	23.7	112.2	5,892
New Mexico	S-CG-Reg	415	2.05	2.58	0.23	0.00	0.51	0.00	0	0	24.1	41.5	5,934
Oregon	S-CG-Reg	698	2.06	2.58	0.23	0.00	0.51	0.00	0	0	24.1	69.8	6,003
Texas	W-CG-Prem	421	2.00	2.58	0.18	0.00	0.51	0.00	0	0	24.3	42.1	6,046
North Carolina	S-CG-Prem	238	2.06	2.58	0.24	0.00	0.51	0.00	0	0	24.3	23.8	6,069
Maine	S-CG-Prem	11	2.11	2.58	0.29	0.00	0.51	0.00	0	0	24.4	1.1	6,071
Mississippi	W-CG-Prem	96	2.00	2.58	0.18	0.00	0.51	0.00	0	0	24.5	9.6	6,080
Kentucky	W-CG-Prem	61	2.04	2.58	0.23	0.00	0.51	0.00	0	0	24.6	6.1	6,086
Georgia	W-CG-Prem	349	2.06	2.58	0.24	0.00	0.51	0.00	0	0	24.6	34.9	6,121

Table A2006C Input Costs, Ethanol Blending Cost and Ethanol Volumes

Year 2006 State	Gasoline Code	Gasoline Volume MMgals	Gasoline Price $/gal	Ethanol Gate Price $/gal	Ethanol Dist Cost $/gal	Ethanol Blending $/gal	Federal Subsidy $/gal	State Subsidy $/gal	State Mandate	RFG "Mandate"	Ethanol Blending Cost c/gal	Ethanol Volume MMgals	Cumulative Eth Vol MMgals
Missouri	S-CG-Reg	839	1.96	2.58	0.14	0.00	0.51	0.00	0	0	24.8	83.9	6,205
West Virginia	W-CG-Prem	25	2.03	2.58	0.21	0.00	0.51	0.00	0	0	24.9	2.5	6,208
Colorado	S-CG-Reg	864	2.01	2.58	0.20	0.00	0.51	0.00	0	0	25.1	86.4	6,294
Tennessee	W-CG-Prem	211	2.04	2.58	0.23	0.00	0.51	0.00	0	0	25.4	21.1	6,315
Louisiana	W-CG-Prem	128	1.99	2.58	0.18	0.00	0.51	0.00	0	0	25.5	12.8	6,328
Florida	S-CG-Prem	470	2.09	2.58	0.29	0.00	0.51	0.00	0	0	26.6	47.0	6,375
Indiana	S-CG-Reg	1239	1.94	2.58	0.14	0.00	0.51	0.00	0	0	26.6	123.9	6,499
Arkansas	W-CG-Prem	67	1.98	2.58	0.18	0.00	0.51	0.00	0	0	26.9	6.7	6,505
Kansas	S-CG-Reg	715	1.94	2.58	0.14	0.00	0.51	0.00	0	0	27.1	71.5	6,577
Hawaii	W-CG-Prem	65	2.27	2.58	0.48	0.00	0.51	0.00	0	0	27.5	6.5	6,583
Michigan	S-CG-Reg	2073	1.94	2.58	0.14	0.00	0.51	0.00	0	0	27.5	207.3	6,791
Alabama	W-CG-Prem	129	2.01	2.58	0.23	0.00	0.51	0.00	0	0	27.7	12.9	6,804
Nevada	W-CG-reg	529	2.05	2.58	0.26	0.00	0.51	0.00	0	0	27.9	52.9	6,857
Alaska	S-CG-Prem	14	2.26	2.58	0.48	0.00	0.51	0.00	0	0	27.9	1.4	6,858
Utah	S-CG-Reg	504	1.98	2.58	0.20	0.00	0.51	0.00	0	0	27.9	50.4	6,908
Nebraska	W-CG-reg	412	1.93	2.58	0.14	0.00	0.51	0.00	0	0	28.0	41.2	6,949
Ohio	S-CG-Reg	2139	1.93	2.58	0.14	0.00	0.51	0.00	0	0	28.2	213.9	7,163
South Carolina	W-CG-Prem	163	2.03	2.58	0.24	0.00	0.51	0.00	0	0	28.2	16.3	7,180
Wyoming	W-CG-reg	176	1.98	2.58	0.20	0.00	0.51	0.00	0	0	28.2	17.6	7,197
Arizona	S-CG-Reg	456	2.05	2.58	0.26	0.00	0.51	0.00	0	0	28.4	45.6	7,243
Oklahoma	W-CG-Prem	108	1.99	2.58	0.23	0.00	0.51	0.02	0	0	28.5	10.8	7,254
Idaho	W-CG-reg	366	1.98	2.58	0.20	0.00	0.51	0.00	0	0	28.6	36.6	7,290
Wisconsin	W-CG-reg	1023	1.92	2.58	0.14	0.00	0.51	0.00	0	0	28.7	102.3	7,392
Washington	W-CG-reg	1356	2.01	2.58	0.23	0.00	0.51	0.00	0	0	28.7	135.6	7,528
Montana	S-CG-Reg	294	1.97	2.58	0.20	0.00	0.51	0.00	0	0	28.7	29.4	7,558
New Mexico	W-CG-reg	501	2.00	2.58	0.23	0.00	0.51	0.00	0	0	29.1	50.1	7,608
Oregon	W-CG-reg	844	2.01	2.58	0.23	0.00	0.51	0.00	0	0	29.1	84.4	7,692
North Carolina	W-CG-Prem	288	2.01	2.58	0.24	0.00	0.51	0.00	0	0	29.3	28.8	7,721
Maine	W-CG-Prem	14	2.06	2.58	0.29	0.00	0.51	0.00	0	0	29.4	1.4	7,722
Missouri	W-CG-reg	1015	1.91	2.58	0.14	0.00	0.51	0.00	0	0	29.8	101.5	7,824
Colorado	W-CG-reg	1045	1.96	2.58	0.20	0.00	0.51	0.00	0	0	30.1	104.5	7,928
North Dakota	S-CG-Reg	173	1.99	2.58	0.23	0.00	0.51	0.00	0	0	30.2	17.3	7,945
Maryland	S-CG-Reg	91	1.99	2.58	0.23	0.00	0.51	0.00	0	0	30.4	9.1	7,955
Florida	W-CG-Prem	568	2.04	2.58	0.29	0.00	0.51	0.00	0	0	31.6	56.8	8,011
Indiana	W-CG-reg	1498	1.89	2.58	0.14	0.00	0.51	0.00	0	0	31.6	149.8	8,161
Kansas	W-CG-reg	864	1.89	2.58	0.14	0.00	0.51	0.00	0	0	32.1	86.4	8,248
Hawaii	S-CG-Reg	179	2.22	2.58	0.48	0.00	0.51	0.00	0	0	32.3	17.9	8,265
Arkansas	S-CG-Reg	645	1.92	2.58	0.18	0.00	0.51	0.00	0	0	32.4	64.5	8,330
New York	S-CG-Reg	1060	1.95	2.58	0.21	0.00	0.51	0.00	0	0	32.5	106.0	8,436
Michigan	W-CG-reg	2507	1.89	2.58	0.14	0.00	0.51	0.00	0	0	32.5	250.7	8,687
Alaska	W-CG-Prem	17	2.21	2.58	0.48	0.00	0.51	0.00	0	0	32.9	1.7	8,688
Utah	W-CG-reg	610	1.93	2.58	0.20	0.00	0.51	0.00	0	0	32.9	61.0	8,749
Ohio	W-CG-reg	2586	1.88	2.58	0.14	0.00	0.51	0.00	0	0	33.2	258.6	9,008
Kentucky	S-CG-Reg	720	1.96	2.58	0.23	0.00	0.51	0.00	0	0	33.4	72.0	9,080
Arizona	W-CG-reg	551	2.00	2.58	0.26	0.00	0.51	0.00	0	0	33.4	55.1	9,135
Virginia	S-CG-Reg	683	1.95	2.58	0.23	0.00	0.51	0.00	0	0	33.6	68.3	9,203
Mississippi	S-CG-Reg	770	1.91	2.58	0.18	0.00	0.51	0.00	0	0	33.6	77.0	9,280
Montana	W-CG-reg	356	1.92	2.58	0.20	0.00	0.51	0.00	0	0	33.7	35.6	9,316
Texas	S-CG-Reg	3585	1.90	2.58	0.18	0.00	0.51	0.00	0	0	34.3	358.5	9,674
Louisiana	S-CG-Reg	1201	1.90	2.58	0.18	0.00	0.51	0.00	0	0	34.7	120.1	9,795
West Virginia	S-CG-Reg	328	1.93	2.58	0.21	0.00	0.51	0.00	0	0	34.8	32.8	9,827
Alaska	S-CG-Reg	115	2.19	2.58	0.48	0.00	0.51	0.00	0	0	34.8	11.5	9,839
New Hampshire	S-CG-Reg	59	1.96	2.58	0.24	0.00	0.51	0.00	0	0	35.0	5.9	9,845
North Dakota	W-CG-reg	209	1.94	2.58	0.23	0.00	0.51	0.00	0	0	35.2	20.9	9,866
Maryland	W-CG-reg	110	1.94	2.58	0.23	0.00	0.51	0.00	0	0	35.4	11.0	9,877
Georgia	S-CG-Reg	2105	1.95	2.58	0.24	0.00	0.51	0.00	0	0	36.0	210.5	10,087
Pennsylvania	S-CG-Reg	911	1.91	2.58	0.21	0.00	0.51	0.00	0	0	36.0	91.1	10,178
Alabama	S-CG-Reg	1069	1.93	2.58	0.23	0.00	0.51	0.00	0	0	36.2	106.9	10,285
Vermont	S-CG-Reg	139	1.94	2.58	0.24	0.00	0.51	0.00	0	0	36.3	13.9	10,299
Tennessee	S-CG-Reg	1507	1.93	2.58	0.23	0.00	0.51	0.00	0	0	36.6	150.7	10,450
Hawaii	W-CG-reg	216	2.17	2.58	0.48	0.00	0.51	0.00	0	0	37.3	21.6	10,471
Arkansas	W-CG-reg	780	1.87	2.58	0.18	0.00	0.51	0.00	0	0	37.4	78.0	10,549
New York	W-CG-reg	1282	1.90	2.58	0.21	0.00	0.51	0.00	0	0	37.5	128.2	10,677
South Carolina	S-CG-Reg	1134	1.93	2.58	0.24	0.00	0.51	0.00	0	0	37.6	113.4	10,791
Oklahoma	S-CG-Reg	915	1.89	2.58	0.23	0.00	0.51	0.02	0	0	38.2	91.5	10,882
North Carolina	S-CG-Reg	1904	1.93	2.58	0.24	0.00	0.51	0.00	0	0	38.2	190.4	11,073
Kentucky	W-CG-reg	870	1.91	2.58	0.23	0.00	0.51	0.00	0	0	38.4	87.0	11,160
Virginia	W-CG-reg	826	1.90	2.58	0.23	0.00	0.51	0.00	0	0	38.6	82.6	11,242
Mississippi	W-CG-reg	932	1.86	2.58	0.18	0.00	0.51	0.00	0	0	38.6	93.2	11,336
Texas	W-CG-reg	4335	1.85	2.58	0.18	0.00	0.51	0.00	0	0	39.3	433.5	11,769
Louisiana	W-CG-reg	1452	1.85	2.58	0.18	0.00	0.51	0.00	0	0	39.7	145.2	11,914
West Virginia	W-CG-reg	397	1.88	2.58	0.21	0.00	0.51	0.00	0	0	39.8	39.7	11,954
Alaska	W-CG-reg	139	2.14	2.58	0.48	0.00	0.51	0.00	0	0	39.8	13.9	11,968
New Hampshire	W-CG-reg	71	1.91	2.58	0.24	0.00	0.51	0.00	0	0	40.0	7.1	11,975
Georgia	W-CG-reg	2546	1.90	2.58	0.24	0.00	0.51	0.00	0	0	41.0	254.6	12,229
Pennsylvania	W-CG-reg	1102	1.86	2.58	0.21	0.00	0.51	0.00	0	0	41.0	110.2	12,340
Alabama	W-CG-reg	1292	1.88	2.58	0.23	0.00	0.51	0.00	0	0	41.2	129.2	12,469
Florida	S-CG-Reg	3200	1.95	2.58	0.29	0.00	0.51	0.00	0	0	41.3	320.0	12,789
Vermont	W-CG-reg	168	1.89	2.58	0.24	0.00	0.51	0.00	0	0	41.3	16.8	12,806
Tennessee	W-CG-reg	1822	1.88	2.58	0.23	0.00	0.51	0.00	0	0	41.6	182.2	12,988
South Carolina	W-CG-reg	1371	1.88	2.58	0.24	0.00	0.51	0.00	0	0	42.6	137.1	13,125
Oklahoma	W-CG-reg	1106	1.84	2.58	0.23	0.00	0.51	0.02	0	0	43.2	110.6	13,236
North Carolina	W-CG-reg	2302	1.88	2.58	0.24	0.00	0.51	0.00	0	0	43.2	230.2	13,466
Maine	S-CG-Reg	131	1.91	2.58	0.29	0.00	0.51	0.00	0	0	44.6	13.1	13,479
Florida	W-CG-reg	3870	1.90	2.58	0.29	0.00	0.51	0.00	0	0	46.3	387.0	13,866
Maine	W-CG-reg	159	1.86	2.58	0.29	0.00	0.51	0.00	0	0	49.6	15.9	13,882

Table A2007A Input Costs, Ethanol Blending Cost and Ethanol Volumes

Year 2007 State	Gasoline Code	Gasoline Volume MMgals	Gasoline Price $/gal	Ethanol Gate Price $/gal	Ethanol Dist Cost $/gal	Ethanol Blending $/gal	Federal Subsidy $/gal	State Subsidy $/gal	State Mandate	RFG "Mandate"	Ethanol Blending Cost c/gal	Ethanol Volume MMgals	Cumulative Eth Vol MMgals
Illinois	S-RFG-Reg	1335	2.24	2.24	0.15	1.00	0.51	0.26	0	1	-161.1	133.5	134
Illinois	S-RFG-Prem	192	2.42	2.24	0.15	0.70	0.51	0.26	0	1	-148.9	19.2	153
Wisconsin	S-RFG-Reg	348	2.25	2.24	0.15	1.00	0.51	0.00	0	1	-137.3	34.8	188
Indiana	S-RFG-Reg	205	2.24	2.24	0.15	1.00	0.51	0.00	0	1	-136.2	20.5	208
Missouri	S-RFG-Reg	430	2.23	2.24	0.15	1.00	0.51	0.00	0	1	-135.0	43.0	251
California	S-RFG-Reg	5481	2.34	2.24	0.27	1.00	0.51	0.00	0	1	-133.3	312.4	563
Kentucky	S-RFG-Reg	198	2.25	2.24	0.23	1.00	0.51	0.00	0	1	-129.2	19.8	583
New York	S-RFG-Reg	1277	2.21	2.24	0.22	1.00	0.51	0.00	0	1	-125.9	127.7	711
Arizona	S-RFG-Reg	815	2.26	2.24	0.27	1.00	0.51	0.00	0	1	-125.5	81.5	792
Pennsylvania	S-RFG-Reg	402	2.19	2.24	0.22	1.00	0.51	0.00	0	1	-124.3	40.2	833
Connecticut	S-RFG-Reg	658	2.21	2.24	0.23	1.00	0.51	0.00	0	1	-124.2	65.8	898
Maryland	S-RFG-Reg	771	2.20	2.24	0.23	1.00	0.51	0.00	0	1	-123.9	77.1	976
Virginia	S-RFG-Reg	806	2.19	2.24	0.23	1.00	0.51	0.00	0	1	-123.1	80.6	1,056
Texas	S-RFG-Reg	2625	2.14	2.24	0.19	1.00	0.51	0.00	0	1	-122.6	262.5	1,319
Massachusetts	S-RFG-Reg	1119	2.19	2.24	0.23	1.00	0.51	0.00	0	1	-122.2	111.9	1,431
DC	S-RFG-Reg	27	2.18	2.24	0.23	1.00	0.51	0.00	0	1	-121.9	2.7	1,433
Rhode Island	S-RFG-Reg	269	2.18	2.24	0.23	1.00	0.51	0.00	0	1	-121.8	26.9	1,460
New Hampshire	S-RFG-Reg	192	2.18	2.24	0.25	1.00	0.51	0.00	0	1	-120.2	19.2	1,479
Delaware	S-RFG-Reg	196	2.15	2.24	0.23	1.00	0.51	0.00	0	1	-119.0	19.6	1,499
New Jersey	S-RFG-Reg	1671	2.14	2.24	0.23	1.00	0.51	0.00	0	1	-117.2	167.1	1,666
Maine	S-RFG-Reg	193	2.20	2.24	0.30	1.00	0.51	0.00	0	1	-116.5	19.3	1,685
Wisconsin	S-RFG-Prem	32	2.43	2.24	0.15	0.70	0.51	0.00	0	1	-124.3	3.2	1,688
Missouri	S-RFG-Prem	42	2.42	2.24	0.15	0.70	0.51	0.00	0	1	-123.5	4.2	1,693
Indiana	S-RFG-Prem	21	2.39	2.24	0.15	0.70	0.51	0.00	0	1	-120.5	2.1	1,695
California	S-RFG-Prem	1584	2.50	2.24	0.27	0.70	0.51	0.00	0	1	-119.5	90.3	1,785
New York	S-RFG-Prem	307	2.44	2.24	0.22	0.70	0.51	0.00	0	1	-118.8	30.7	1,816
Kentucky	S-RFG-Prem	19	2.43	2.24	0.23	0.70	0.51	0.00	0	1	-116.3	1.9	1,818
Connecticut	S-RFG-Prem	108	2.42	2.24	0.23	0.70	0.51	0.00	0	1	-115.1	10.8	1,828
Maryland	S-RFG-Prem	141	2.41	2.24	0.23	0.70	0.51	0.00	0	1	-114.5	14.1	1,843
Texas	S-RFG-Prem	408	2.36	2.24	0.19	0.70	0.51	0.00	0	1	-114.3	40.8	1,883
Pennsylvania	S-RFG-Prem	67	2.39	2.24	0.22	0.70	0.51	0.00	0	1	-114.0	6.7	1,890
Virginia	S-RFG-Prem	157	2.40	2.24	0.23	0.70	0.51	0.00	0	1	-113.8	15.7	1,906
Arizona	S-RFG-Prem	127	2.44	2.24	0.27	0.70	0.51	0.00	0	1	-113.3	12.7	1,918
Rhode Island	S-RFG-Prem	40	2.40	2.24	0.23	0.70	0.51	0.00	0	1	-113.0	4.0	1,922
Massachusetts	S-RFG-Prem	170	2.39	2.24	0.23	0.70	0.51	0.00	0	1	-112.7	17.0	1,939
DC	S-RFG-Prem	7	2.39	2.24	0.23	0.70	0.51	0.00	0	1	-112.5	0.7	1,940
New Hampshire	S-RFG-Prem	21	2.38	2.24	0.25	0.70	0.51	0.00	0	1	-109.8	2.1	1,942
Maine	S-RFG-Prem	13	2.40	2.24	0.30	0.70	0.51	0.00	0	1	-106.5	1.3	1,944
Delaware	S-RFG-Prem	24	2.29	2.24	0.23	0.70	0.51	0.00	0	1	-102.4	2.4	1,946
New Jersey	S-RFG-Prem	270	2.29	2.24	0.23	0.70	0.51	0.00	0	1	-102.4	27.0	1,973
Illinois	W-RFG-Prem	233	2.37	2.24	0.15	0.38	0.51	0.26	0	1	-111.7	23.3	1,996
Illinois	W-RFG-reg	1614	2.19	2.24	0.15	0.50	0.51	0.26	0	1	-105.5	161.4	2,158
Wisconsin	W-RFG-Prem	38	2.38	2.24	0.15	0.38	0.51	0.00	0	1	-87.0	3.8	2,162
Missouri	W-RFG-Prem	51	2.37	2.24	0.15	0.38	0.51	0.00	0	1	-86.2	5.1	2,167
Wisconsin	W-RFG-reg	421	2.20	2.24	0.15	0.50	0.51	0.00	0	1	-81.8	42.1	2,209
Indiana	W-RFG-reg	248	2.19	2.24	0.15	0.50	0.51	0.00	0	1	-80.7	24.8	2,234
Missouri	W-RFG-reg	520	2.18	2.24	0.15	0.50	0.51	0.00	0	1	-79.5	52.0	2,285
Indiana	W-RFG-Prem	26	2.34	2.24	0.15	0.38	0.51	0.00	0	1	-83.3	2.6	2,288
California	W-RFG-Prem	1915	2.45	2.24	0.27	0.38	0.51	0.00	0	1	-82.2	109.2	2,397
California	W-RFG-reg	6628	2.29	2.24	0.27	0.50	0.51	0.00	0	1	-77.8	377.8	2,775
New York	W-RFG-Prem	372	2.39	2.24	0.22	0.38	0.51	0.00	0	1	-81.6	37.2	2,812
Kentucky	W-RFG-Prem	23	2.38	2.24	0.23	0.38	0.51	0.00	0	1	-79.0	2.3	2,815
Kentucky	W-RFG-reg	240	2.20	2.24	0.23	0.50	0.51	0.00	0	1	-73.7	24.0	2,839
Connecticut	W-RFG-Prem	130	2.37	2.24	0.23	0.38	0.51	0.00	0	1	-77.8	13.0	2,852
Maryland	W-RFG-Prem	171	2.36	2.24	0.23	0.38	0.51	0.00	0	1	-77.2	17.1	2,869
Texas	W-RFG-Prem	493	2.31	2.24	0.19	0.38	0.51	0.00	0	1	-77.0	49.3	2,918
Pennsylvania	W-RFG-Prem	81	2.34	2.24	0.22	0.38	0.51	0.00	0	1	-76.7	8.1	2,926
Virginia	W-RFG-Prem	190	2.35	2.24	0.23	0.38	0.51	0.00	0	1	-76.5	19.0	2,945
Arizona	W-RFG-Prem	153	2.39	2.24	0.27	0.38	0.51	0.00	0	1	-76.0	15.3	2,960
Rhode Island	W-RFG-Prem	48	2.35	2.24	0.23	0.38	0.51	0.00	0	1	-75.7	4.8	2,965
Massachusetts	W-RFG-Prem	206	2.34	2.24	0.23	0.38	0.51	0.00	0	1	-75.4	20.6	2,986
DC	W-RFG-Prem	8	2.34	2.24	0.23	0.38	0.51	0.00	0	1	-75.3	0.8	2,987
New York	W-RFG-reg	1544	2.16	2.24	0.22	0.50	0.51	0.00	0	1	-70.4	154.4	3,141
Arizona	W-RFG-reg	985	2.21	2.24	0.27	0.50	0.51	0.00	0	1	-70.0	98.5	3,239
Pennsylvania	W-RFG-reg	486	2.14	2.24	0.22	0.50	0.51	0.00	0	1	-68.8	48.6	3,288
Connecticut	W-RFG-reg	795	2.16	2.24	0.23	0.50	0.51	0.00	0	1	-68.7	79.5	3,368
Maryland	W-RFG-reg	933	2.15	2.24	0.23	0.50	0.51	0.00	0	1	-68.4	93.3	3,461
New Hampshire	W-RFG-Prem	26	2.33	2.24	0.25	0.38	0.51	0.00	0	1	-72.6	2.6	3,463
Virginia	W-RFG-reg	974	2.14	2.24	0.23	0.50	0.51	0.00	0	1	-67.6	97.4	3,561
Texas	W-RFG-reg	3174	2.09	2.24	0.19	0.50	0.51	0.00	0	1	-67.1	317.4	3,878
Massachusetts	W-RFG-reg	1353	2.14	2.24	0.23	0.50	0.51	0.00	0	1	-66.7	135.3	4,014
DC	W-RFG-reg	32	2.13	2.24	0.23	0.50	0.51	0.00	0	1	-66.4	3.2	4,017
Rhode Island	W-RFG-reg	325	2.13	2.24	0.23	0.50	0.51	0.00	0	1	-66.3	32.5	4,049
Maine	W-RFG-Prem	16	2.35	2.24	0.30	0.38	0.51	0.00	0	1	-69.3	1.6	4,051
New Hampshire	W-RFG-reg	232	2.13	2.24	0.25	0.50	0.51	0.00	0	1	-64.7	23.2	4,074
Delaware	W-RFG-reg	237	2.10	2.24	0.23	0.50	0.51	0.00	0	1	-63.5	23.7	4,098
New Jersey	W-RFG-reg	2020	2.09	2.24	0.23	0.50	0.51	0.00	0	1	-61.7	202.0	4,300
Maine	W-RFG-reg	234	2.15	2.24	0.30	0.50	0.51	0.00	0	1	-60.9	23.4	4,323
Delaware	W-RFG-Prem	29	2.24	2.24	0.23	0.38	0.51	0.00	0	1	-65.1	2.9	4,326
New Jersey	W-RFG-Prem	326	2.24	2.24	0.23	0.38	0.51	0.00	0	1	-65.1	32.6	4,359
Minnesota	S-CG-Prem	107	2.40	2.24	0.15	0.00	0.51	0.00	1	0	-51.3	10.7	4,369
Oregon	S-CG-Prem	98	2.46	2.24	0.24	0.00	0.51	0.00	1	0	-48.9	9.8	4,379
Minnesota	W-CG-Prem	129	2.35	2.24	0.15	0.00	0.51	0.00	1	0	-46.3	12.9	4,392
Oregon	W-CG-Prem	118	2.41	2.24	0.24	0.00	0.51	0.00	1	0	-43.9	11.8	4,404
Minnesota	S-CG-Reg	1059	2.25	2.24	0.15	0.00	0.51	0.00	1	0	-36.2	105.9	4,510

Table A2007B Input Costs, Ethanol Blending Cost and Ethanol Volumes

Year 2007 State	Gasoline Code	Gasoline Volume MMgals	Gasoline Price $/gal	Ethanol Gate Price $/gal	Ethanol Dist Cost $/gal	Ethanol Blending $/gal	Federal Subsidy $/gal	State Subsidy $/gal	State Mandate	RFG "Mandate"	Ethanol Blending Cost c/gal	Ethanol Volume MMgals	Cumulative Eth Vol MMgals
Minnesota	W-CG-reg	1280	2.20	2.24	0.15	0.00	0.51	0.00	1	0	-31.2	128.0	4,638
Oregon	S-CG-Reg	696	2.28	2.24	0.24	0.00	0.51	0.00	1	0	-30.7	69.6	4,707
Hawaii	S-CG-Prem	53	2.53	2.24	0.49	0.00	0.51	0.00	1	0	-30.2	5.3	4,713
Oregon	W-CG-reg	841	2.23	2.24	0.24	0.00	0.51	0.00	1	0	-25.7	84.1	4,797
Hawaii	W-CG-Prem	65	2.48	2.24	0.49	0.00	0.51	0.00	1	0	-25.2	6.5	4,803
Hawaii	S-CG-Reg	178	2.40	2.24	0.49	0.00	0.51	0.00	1	0	-17.7	17.8	4,821
Hawaii	W-CG-reg	216	2.35	2.24	0.49	0.00	0.51	0.00	1	0	-12.7	21.6	4,843
Iowa	S-CG-Prem	67	2.43	2.24	0.15	0.00	0.51	0.30	0	0	-84.3	6.7	4,849
Iowa	W-CG-Prem	81	2.38	2.24	0.15	0.00	0.51	0.30	0	0	-79.3	8.1	4,857
Illinois	S-CG-Prem	48	2.36	2.24	0.15	0.00	0.51	0.26	0	0	-72.8	4.8	4,862
Illinois	W-CG-Prem	58	2.31	2.24	0.15	0.00	0.51	0.26	0	0	-67.8	5.8	4,868
South Dakota	S-CG-Prem	22	2.46	2.24	0.15	0.00	0.51	0.09	0	0	-66.4	2.2	4,870
Iowa	S-CG-Reg	513	2.24	2.24	0.15	0.00	0.51	0.30	0	0	-65.5	51.3	4,922
South Dakota	W-CG-Prem	27	2.41	2.24	0.15	0.00	0.51	0.09	0	0	-61.4	2.7	4,924
Iowa	W-CG-reg	621	2.19	2.24	0.15	0.00	0.51	0.30	0	0	-60.5	62.1	4,986
Illinois	S-CG-Reg	784	2.18	2.24	0.15	0.00	0.51	0.26	0	0	-54.7	78.4	5,065
Nebraska	S-CG-Prem	45	2.43	2.24	0.15	0.00	0.51	0.00	0	0	-54.4	4.5	5,069
Kansas	S-CG-Prem	60	2.41	2.24	0.15	0.00	0.51	0.00	0	0	-52.7	6.0	5,075
Wyoming	S-CG-Prem	29	2.45	2.24	0.20	0.00	0.51	0.00	0	0	-51.3	2.9	5,078
Illinois	W-CG-reg	948	2.13	2.24	0.15	0.00	0.51	0.26	0	0	-49.7	94.8	5,173
Nebraska	W-CG-Prem	55	2.38	2.24	0.15	0.00	0.51	0.00	0	0	-49.4	5.5	5,179
Wisconsin	S-CG-Prem	75	2.37	2.24	0.15	0.00	0.51	0.00	0	0	-48.1	7.5	5,186
New Mexico	S-CG-Prem	62	2.44	2.24	0.23	0.00	0.51	0.00	0	0	-47.7	6.2	5,192
Kansas	W-CG-Prem	73	2.36	2.24	0.15	0.00	0.51	0.00	0	0	-47.7	7.3	5,200
North Dakota	S-CG-Prem	21	2.44	2.24	0.23	0.00	0.51	0.00	0	0	-47.6	2.1	5,202
Ohio	S-CG-Prem	168	2.36	2.24	0.15	0.00	0.51	0.00	0	0	-47.6	16.8	5,218
Missouri	S-CG-Prem	70	2.36	2.24	0.15	0.00	0.51	0.00	0	0	-47.3	7.0	5,225
Michigan	S-CG-Prem	137	2.36	2.24	0.15	0.00	0.51	0.00	0	0	-47.1	13.7	5,239
South Dakota	S-CG-Reg	184	2.26	2.24	0.15	0.00	0.51	0.09	0	0	-46.6	18.4	5,258
Washington	S-CG-Prem	222	2.44	2.24	0.24	0.00	0.51	0.00	0	0	-46.3	22.2	5,280
Idaho	S-CG-Prem	51	2.40	2.24	0.20	0.00	0.51	0.00	0	0	-46.3	5.1	5,285
Wyoming	W-CG-Prem	35	2.40	2.24	0.20	0.00	0.51	0.00	0	0	-46.3	3.5	5,288
Indiana	S-CG-Prem	88	2.33	2.24	0.15	0.00	0.51	0.00	0	0	-44.4	8.8	5,297
Colorado	S-CG-Prem	189	2.38	2.24	0.20	0.00	0.51	0.00	0	0	-44.3	18.9	5,316
Montana	S-CG-Prem	63	2.38	2.24	0.20	0.00	0.51	0.00	0	0	-44.3	6.3	5,322
Wisconsin	W-CG-Prem	91	2.32	2.24	0.15	0.00	0.51	0.00	0	0	-43.1	9.1	5,332
New Mexico	W-CG-Prem	74	2.39	2.24	0.23	0.00	0.51	0.00	0	0	-42.7	7.4	5,339
New York	S-CG-Prem	103	2.38	2.24	0.22	0.00	0.51	0.00	0	0	-42.7	10.3	5,349
North Dakota	W-CG-Prem	25	2.39	2.24	0.23	0.00	0.51	0.00	0	0	-42.6	2.5	5,352
Ohio	W-CG-Prem	204	2.31	2.24	0.15	0.00	0.51	0.00	0	0	-42.6	20.4	5,372
Missouri	W-CG-Prem	85	2.31	2.24	0.15	0.00	0.51	0.00	0	0	-42.3	8.5	5,381
Michigan	W-CG-Prem	165	2.31	2.24	0.15	0.00	0.51	0.00	0	0	-42.1	16.5	5,397
Utah	S-CG-Prem	136	2.36	2.24	0.20	0.00	0.51	0.00	0	0	-41.9	13.6	5,411
Nevada	S-CG-Prem	113	2.43	2.24	0.27	0.00	0.51	0.00	0	0	-41.8	11.3	5,422
South Dakota	W-CG-reg	223	2.21	2.24	0.15	0.00	0.51	0.09	0	0	-41.6	22.3	5,444
Washington	W-CG-Prem	268	2.39	2.24	0.24	0.00	0.51	0.00	0	0	-41.3	26.8	5,471
Idaho	W-CG-Prem	62	2.35	2.24	0.20	0.00	0.51	0.00	0	0	-41.3	6.2	5,478
Kentucky	S-CG-Prem	50	2.37	2.24	0.23	0.00	0.51	0.00	0	0	-40.1	5.0	5,483
West Virginia	S-CG-Prem	20	2.34	2.24	0.22	0.00	0.51	0.00	0	0	-39.4	2.0	5,485
Indiana	W-CG-Prem	107	2.28	2.24	0.15	0.00	0.51	0.00	0	0	-39.4	10.7	5,495
Colorado	W-CG-Prem	229	2.33	2.24	0.20	0.00	0.51	0.00	0	0	-39.3	22.9	5,518
Montana	W-CG-Prem	76	2.33	2.24	0.20	0.00	0.51	0.00	0	0	-39.3	7.6	5,526
Oklahoma	S-CG-Prem	89	2.34	2.24	0.23	0.00	0.51	0.02	0	0	-39.1	8.9	5,535
Vermont	S-CG-Prem	12	2.37	2.24	0.25	0.00	0.51	0.00	0	0	-38.3	1.2	5,536
Maryland	S-CG-Prem	7	2.35	2.24	0.23	0.00	0.51	0.00	0	0	-38.3	0.7	5,537
Texas	S-CG-Prem	347	2.30	2.24	0.19	0.00	0.51	0.00	0	0	-38.1	34.7	5,571
Pennsylvania	S-CG-Prem	87	2.33	2.24	0.22	0.00	0.51	0.00	0	0	-37.8	8.7	5,580
New York	W-CG-Prem	125	2.33	2.24	0.22	0.00	0.51	0.00	0	0	-37.7	12.5	5,593
Virginia	S-CG-Prem	66	2.34	2.24	0.23	0.00	0.51	0.00	0	0	-37.7	6.6	5,599
Georgia	S-CG-Prem	288	2.36	2.24	0.25	0.00	0.51	0.00	0	0	-37.2	28.8	5,628
Arizona	S-CG-Prem	58	2.38	2.24	0.27	0.00	0.51	0.00	0	0	-37.2	5.8	5,634
Utah	W-CG-Prem	164	2.31	2.24	0.20	0.00	0.51	0.00	0	0	-36.9	16.4	5,650
Nevada	W-CG-Prem	137	2.38	2.24	0.27	0.00	0.51	0.00	0	0	-36.8	13.7	5,664
Alabama	S-CG-Prem	106	2.33	2.24	0.23	0.00	0.51	0.00	0	0	-36.5	10.6	5,674
Tennessee	S-CG-Prem	174	2.33	2.24	0.23	0.00	0.51	0.00	0	0	-36.0	17.4	5,692
Nebraska	S-CG-Reg	340	2.24	2.24	0.15	0.00	0.51	0.00	0	0	-35.9	34.0	5,726
Mississippi	S-CG-Prem	79	2.28	2.24	0.19	0.00	0.51	0.00	0	0	-35.6	7.9	5,734
Kentucky	W-CG-Prem	60	2.32	2.24	0.23	0.00	0.51	0.00	0	0	-35.1	6.0	5,740
West Virginia	W-CG-Prem	25	2.29	2.24	0.22	0.00	0.51	0.00	0	0	-34.4	2.5	5,742
Louisiana	S-CG-Prem	106	2.26	2.24	0.19	0.00	0.51	0.00	0	0	-34.2	10.6	5,753
Oklahoma	W-CG-Prem	108	2.29	2.24	0.23	0.00	0.51	0.02	0	0	-34.1	10.8	5,764
North Carolina	S-CG-Prem	238	2.32	2.24	0.25	0.00	0.51	0.00	0	0	-33.8	23.8	5,787
Arkansas	S-CG-Prem	55	2.26	2.24	0.19	0.00	0.51	0.00	0	0	-33.8	5.5	5,793
New Hampshire	S-CG-Prem	5	2.32	2.24	0.25	0.00	0.51	0.00	0	0	-33.7	0.5	5,793
South Carolina	S-CG-Prem	134	2.32	2.24	0.25	0.00	0.51	0.00	0	0	-33.6	13.4	5,807
Vermont	W-CG-Prem	15	2.32	2.24	0.25	0.00	0.51	0.00	0	0	-33.3	1.5	5,808
Maryland	W-CG-Prem	9	2.30	2.24	0.23	0.00	0.51	0.00	0	0	-33.3	0.9	5,809
Texas	W-CG-Prem	420	2.25	2.24	0.19	0.00	0.51	0.00	0	0	-33.1	42.0	5,851
Kansas	S-CG-Reg	713	2.21	2.24	0.15	0.00	0.51	0.00	0	0	-33.0	71.3	5,922
Pennsylvania	W-CG-Prem	105	2.28	2.24	0.22	0.00	0.51	0.00	0	0	-32.8	10.5	5,933
Virginia	W-CG-Prem	80	2.29	2.24	0.23	0.00	0.51	0.00	0	0	-32.7	8.0	5,941
Michigan	S-CG-Reg	2068	2.21	2.24	0.15	0.00	0.51	0.00	0	0	-32.4	206.8	6,148
Georgia	W-CG-Prem	348	2.31	2.24	0.25	0.00	0.51	0.00	0	0	-32.2	34.8	6,183
Arizona	W-CG-Prem	70	2.33	2.24	0.27	0.00	0.51	0.00	0	0	-32.2	7.0	6,190
Alabama	W-CG-Prem	129	2.28	2.24	0.23	0.00	0.51	0.00	0	0	-31.5	12.9	6,202

Table A2007C Input Costs, Ethanol Blending Cost and Ethanol Volumes

Year 2007 State	Gasoline Code	Gasoline Volume MMgals	Gasoline Price $/gal	Ethanol Gate Price $/gal	Ethanol Dist Cost $/gal	Ethanol Blending $/gal	Federal Subsidy $/gal	State Subsidy $/gal	State Mandate	RFG "Mandate"	Ethanol Blending Cost c/gal	Ethanol Volume MMgals	Cumulative Eth Vol MMgals
Wyoming	S-CG-Reg	145	2.25	2.24	0.20	0.00	0.51	0.00	0	0	-31.3	14.5	6,217
Ohio	S-CG-Reg	2133	2.20	2.24	0.15	0.00	0.51	0.00	0	0	-31.2	213.3	6,430
Idaho	S-CG-Reg	302	2.25	2.24	0.20	0.00	0.51	0.00	0	0	-31.1	30.2	6,460
Tennessee	W-CG-Prem	210	2.28	2.24	0.23	0.00	0.51	0.00	0	0	-31.0	21.0	6,481
Wisconsin	S-CG-Reg	843	2.19	2.24	0.15	0.00	0.51	0.00	0	0	-30.9	84.3	6,566
Nebraska	W-CG-reg	411	2.19	2.24	0.15	0.00	0.51	0.00	0	0	-30.9	41.1	6,607
Montana	S-CG-Reg	294	2.24	2.24	0.20	0.00	0.51	0.00	0	0	-30.6	29.4	6,636
Mississippi	W-CG-Prem	96	2.23	2.24	0.19	0.00	0.51	0.00	0	0	-30.6	9.6	6,646
New Mexico	S-CG-Reg	414	2.27	2.24	0.23	0.00	0.51	0.00	0	0	-30.5	41.4	6,687
Maine	S-CG-Prem	11	2.34	2.24	0.30	0.00	0.51	0.00	0	0	-30.4	1.1	6,688
North Dakota	S-CG-Reg	173	2.27	2.24	0.23	0.00	0.51	0.00	0	0	-29.9	17.3	6,706
Colorado	S-CG-Reg	862	2.24	2.24	0.20	0.00	0.51	0.00	0	0	-29.8	86.2	6,792
Indiana	S-CG-Reg	1236	2.18	2.24	0.15	0.00	0.51	0.00	0	0	-29.8	123.6	6,915
Florida	S-CG-Prem	469	2.33	2.24	0.30	0.00	0.51	0.00	0	0	-29.4	46.9	6,962
Louisiana	W-CG-Prem	128	2.21	2.24	0.19	0.00	0.51	0.00	0	0	-29.2	12.8	6,975
North Carolina	W-CG-Prem	287	2.27	2.24	0.25	0.00	0.51	0.00	0	0	-28.8	28.7	7,004
Arkansas	W-CG-Prem	66	2.21	2.24	0.19	0.00	0.51	0.00	0	0	-28.8	6.6	7,010
New Hampshire	W-CG-Prem	5	2.27	2.24	0.25	0.00	0.51	0.00	0	0	-28.7	0.5	7,011
South Carolina	W-CG-Prem	163	2.27	2.24	0.25	0.00	0.51	0.00	0	0	-28.6	16.3	7,027
Missouri	S-CG-Reg	837	2.17	2.24	0.15	0.00	0.51	0.00	0	0	-28.6	83.7	7,111
Washington	S-CG-Reg	1119	2.26	2.24	0.24	0.00	0.51	0.00	0	0	-28.3	111.9	7,223
Kansas	W-CG-reg	862	2.16	2.24	0.15	0.00	0.51	0.00	0	0	-28.0	86.2	7,309
Michigan	W-CG-reg	2501	2.16	2.24	0.15	0.00	0.51	0.00	0	0	-27.4	250.1	7,559
Utah	S-CG-Reg	503	2.21	2.24	0.20	0.00	0.51	0.00	0	0	-27.3	50.3	7,609
Nevada	S-CG-Reg	436	2.28	2.24	0.27	0.00	0.51	0.00	0	0	-26.8	43.6	7,653
Wyoming	W-CG-reg	175	2.20	2.24	0.20	0.00	0.51	0.00	0	0	-26.3	17.5	7,670
Ohio	W-CG-reg	2579	2.15	2.24	0.15	0.00	0.51	0.00	0	0	-26.2	257.9	7,928
Idaho	W-CG-reg	365	2.20	2.24	0.20	0.00	0.51	0.00	0	0	-26.1	36.5	7,965
Wisconsin	W-CG-reg	1020	2.14	2.24	0.15	0.00	0.51	0.00	0	0	-25.9	102.0	8,067
Montana	W-CG-reg	355	2.19	2.24	0.20	0.00	0.51	0.00	0	0	-25.6	35.5	8,102
New Mexico	W-CG-reg	500	2.22	2.24	0.23	0.00	0.51	0.00	0	0	-25.5	50.0	8,152
Maine	W-CG-Prem	14	2.29	2.24	0.30	0.00	0.51	0.00	0	0	-25.4	1.4	8,154
Oklahoma	S-CG-Reg	912	2.20	2.24	0.23	0.00	0.51	0.02	0	0	-25.0	91.2	8,245
North Dakota	W-CG-reg	209	2.22	2.24	0.23	0.00	0.51	0.00	0	0	-24.9	20.9	8,266
Colorado	W-CG-reg	1042	2.19	2.24	0.20	0.00	0.51	0.00	0	0	-24.8	104.2	8,370
Indiana	W-CG-reg	1494	2.13	2.24	0.15	0.00	0.51	0.00	0	0	-24.8	149.4	8,520
Florida	W-CG-Prem	567	2.28	2.24	0.30	0.00	0.51	0.00	0	0	-24.4	56.7	8,576
Arkansas	S-CG-Reg	643	2.16	2.24	0.19	0.00	0.51	0.00	0	0	-24.2	64.3	8,641
Missouri	W-CG-reg	1013	2.12	2.24	0.15	0.00	0.51	0.00	0	0	-23.6	101.3	8,742
Washington	W-CG-reg	1353	2.21	2.24	0.24	0.00	0.51	0.00	0	0	-23.3	135.3	8,877
Kentucky	S-CG-Reg	718	2.19	2.24	0.23	0.00	0.51	0.00	0	0	-22.8	71.8	8,949
Alaska	S-CG-Prem	14	2.45	2.24	0.49	0.00	0.51	0.00	0	0	-22.4	1.4	8,950
Utah	W-CG-reg	608	2.16	2.24	0.20	0.00	0.51	0.00	0	0	-22.3	60.8	9,011
Nevada	W-CG-reg	528	2.23	2.24	0.27	0.00	0.51	0.00	0	0	-21.8	52.8	9,064
West Virginia	S-CG-Reg	327	2.16	2.24	0.22	0.00	0.51	0.00	0	0	-21.4	32.7	9,097
Oklahoma	W-CG-reg	1103	2.15	2.24	0.23	0.00	0.51	0.02	0	0	-20.0	110.3	9,207
New York	S-CG-Reg	1058	2.15	2.24	0.22	0.00	0.51	0.00	0	0	-19.6	105.8	9,313
Arkansas	W-CG-reg	778	2.11	2.24	0.19	0.00	0.51	0.00	0	0	-19.2	77.8	9,390
Arizona	S-CG-Reg	455	2.20	2.24	0.27	0.00	0.51	0.00	0	0	-19.2	45.5	9,436
Mississippi	S-CG-Reg	768	2.11	2.24	0.19	0.00	0.51	0.00	0	0	-18.5	76.8	9,513
Vermont	S-CG-Reg	138	2.17	2.24	0.25	0.00	0.51	0.00	0	0	-18.1	13.8	9,527
Georgia	S-CG-Reg	2100	2.16	2.24	0.25	0.00	0.51	0.00	0	0	-17.9	210.0	9,737
Pennsylvania	S-CG-Reg	909	2.13	2.24	0.22	0.00	0.51	0.00	0	0	-17.9	90.9	9,827
Kentucky	W-CG-reg	868	2.14	2.24	0.23	0.00	0.51	0.00	0	0	-17.8	86.8	9,914
Louisiana	S-CG-Reg	1198	2.10	2.24	0.19	0.00	0.51	0.00	0	0	-17.8	119.8	10,034
Maryland	S-CG-Reg	90	2.14	2.24	0.23	0.00	0.51	0.00	0	0	-17.5	9.0	10,043
Alaska	W-CG-Prem	17	2.40	2.24	0.49	0.00	0.51	0.00	0	0	-17.4	1.7	10,045
Alabama	S-CG-Reg	1066	2.14	2.24	0.23	0.00	0.51	0.00	0	0	-17.1	106.6	10,151
Tennessee	S-CG-Reg	1503	2.14	2.24	0.23	0.00	0.51	0.00	0	0	-17.1	150.3	10,302
Virginia	S-CG-Reg	681	2.13	2.24	0.23	0.00	0.51	0.00	0	0	-16.8	68.1	10,370
West Virginia	W-CG-reg	396	2.11	2.24	0.22	0.00	0.51	0.00	0	0	-16.4	39.6	10,409
Texas	S-CG-Reg	3575	2.08	2.24	0.19	0.00	0.51	0.00	0	0	-16.2	357.5	10,767
South Carolina	S-CG-Reg	1131	2.14	2.24	0.25	0.00	0.51	0.00	0	0	-15.5	113.1	10,880
North Carolina	S-CG-Reg	1899	2.14	2.24	0.25	0.00	0.51	0.00	0	0	-15.4	189.9	11,070
New York	W-CG-reg	1279	2.10	2.24	0.22	0.00	0.51	0.00	0	0	-14.6	127.9	11,198
Arizona	W-CG-reg	550	2.15	2.24	0.27	0.00	0.51	0.00	0	0	-14.2	55.0	11,253
New Hampshire	S-CG-Reg	59	2.12	2.24	0.25	0.00	0.51	0.00	0	0	-13.8	5.9	11,259
Mississippi	W-CG-reg	929	2.06	2.24	0.19	0.00	0.51	0.00	0	0	-13.5	92.9	11,351
Vermont	W-CG-reg	167	2.12	2.24	0.25	0.00	0.51	0.00	0	0	-13.1	16.7	11,368
Georgia	W-CG-reg	2539	2.11	2.24	0.25	0.00	0.51	0.00	0	0	-12.9	253.9	11,622
Pennsylvania	W-CG-reg	1099	2.08	2.24	0.22	0.00	0.51	0.00	0	0	-12.9	109.9	11,732
Louisiana	W-CG-reg	1448	2.05	2.24	0.19	0.00	0.51	0.00	0	0	-12.8	144.8	11,877
Maryland	W-CG-reg	109	2.09	2.24	0.23	0.00	0.51	0.00	0	0	-12.5	10.9	11,888
Alabama	W-CG-reg	1289	2.09	2.24	0.23	0.00	0.51	0.00	0	0	-12.1	128.9	12,017
Tennessee	W-CG-reg	1817	2.09	2.24	0.23	0.00	0.51	0.00	0	0	-12.1	181.7	12,198
Virginia	W-CG-reg	824	2.08	2.24	0.23	0.00	0.51	0.00	0	0	-11.8	82.4	12,281
Alaska	S-CG-Reg	114	2.34	2.24	0.49	0.00	0.51	0.00	0	0	-11.4	11.4	12,292
Texas	W-CG-reg	4323	2.03	2.24	0.19	0.00	0.51	0.00	0	0	-11.2	432.3	12,725
Florida	S-CG-Reg	3192	2.15	2.24	0.30	0.00	0.51	0.00	0	0	-11.2	319.2	13,044
South Carolina	W-CG-reg	1368	2.09	2.24	0.25	0.00	0.51	0.00	0	0	-10.5	136.8	13,181
North Carolina	W-CG-reg	2296	2.09	2.24	0.25	0.00	0.51	0.00	0	0	-10.4	229.6	13,410
Maine	S-CG-Reg	131	2.14	2.24	0.30	0.00	0.51	0.00	0	0	-10.1	13.1	13,423
New Hampshire	W-CG-reg	71	2.07	2.24	0.25	0.00	0.51	0.00	0	0	-8.8	7.1	13,430
Alaska	W-CG-reg	138	2.29	2.24	0.49	0.00	0.51	0.00	0	0	-6.4	13.8	13,444
Florida	W-CG-reg	3860	2.10	2.24	0.30	0.00	0.51	0.00	0	0	-6.2	386.0	13,830
Maine	W-CG-reg	158	2.09	2.24	0.30	0.00	0.51	0.00	0	0	-5.1	15.8	13,846

Table A2008A Input Costs, Ethanol Blending Cost and Ethanol Volumes

Year 2008 State	Gasoline Code	Gasoline Volume MMgals	Gasoline Price $/gal	Ethanol Gate Price $/gal	Ethanol Dist Cost $/gal	Ethanol Blending $/gal	Federal Subsidy $/gal	State Subsidy $/gal	State Mandate	RFG "Mandate"	Ethanol Blending Cost c/gal	Ethanol Volume MMgals	Cumulative Eth Vol MMgals
Illinois	S-RFG-Reg	1287	2.61	2.47	0.16	1.19	0.51	0.26	0	1	-193.2	128.7	129
Missouri	S-RFG-Reg	414	2.65	2.47	0.16	1.19	0.51	0.00	1	1	-172.3	41.4	170
Indiana	S-RFG-Reg	198	2.64	2.47	0.16	1.19	0.51	0.00	0	1	-170.6	19.8	190
Wisconsin	S-RFG-Reg	336	2.62	2.47	0.16	1.19	0.51	0.00	0	1	-168.6	33.6	223
Kentucky	S-RFG-Reg	191	2.68	2.47	0.25	1.19	0.51	0.00	0	1	-166.9	19.1	242
California	S-RFG-Reg	5282	2.71	2.47	0.29	1.19	0.51	0.00	0	1	-165.0	301.1	544
Arizona	S-RFG-Reg	785	2.71	2.47	0.29	1.19	0.51	0.00	0	1	-165.0	78.5	622
New York	S-RFG-Reg	1230	2.63	2.47	0.23	1.19	0.51	0.00	0	1	-163.6	123.0	745
Texas	S-RFG-Reg	2530	2.59	2.47	0.20	1.19	0.51	0.00	0	1	-162.1	253.0	998
Maryland	S-RFG-Reg	743	2.63	2.47	0.25	1.19	0.51	0.00	0	1	-161.6	74.3	1,072
Pennsylvania	S-RFG-Reg	388	2.61	2.47	0.23	1.19	0.51	0.00	0	1	-161.4	38.8	1,111
Virginia	S-RFG-Reg	777	2.62	2.47	0.25	1.19	0.51	0.00	0	1	-160.5	77.7	1,189
DC	S-RFG-Reg	26	2.61	2.47	0.25	1.19	0.51	0.00	0	1	-159.5	2.6	1,191
Maine	S-RFG-Reg	186	2.66	2.47	0.32	1.19	0.51	0.00	0	1	-157.6	18.6	1,210
Massachusetts	S-RFG-Reg	1078	2.58	2.47	0.25	1.19	0.51	0.00	0	1	-156.4	107.8	1,318
New Hampshire	S-RFG-Reg	185	2.59	2.47	0.26	1.19	0.51	0.00	0	1	-155.6	18.5	1,336
Illinois	S-RFG-Prem	185	2.77	2.47	0.16	0.82	0.51	0.26	0	1	-173.0	18.5	1,355
Connecticut	S-RFG-Reg	634	2.56	2.47	0.25	1.19	0.51	0.00	0	1	-154.4	63.4	1,418
New Jersey	S-RFG-Reg	1610	2.54	2.47	0.25	1.19	0.51	0.00	0	1	-152.0	161.0	1,579
Rhode Island	S-RFG-Reg	259	2.54	2.47	0.25	1.19	0.51	0.00	0	1	-152.0	25.9	1,605
Delaware	S-RFG-Reg	189	2.50	2.47	0.25	1.19	0.51	0.00	0	1	-148.6	18.9	1,624
Maine	S-RFG-Prem	12	2.98	2.47	0.32	0.82	0.51	0.00	0	1	-152.8	1.2	1,625
Missouri	S-RFG-Prem	41	2.82	2.47	0.16	0.82	0.51	0.00	1	1	-152.8	4.1	1,629
Wisconsin	S-RFG-Prem	31	2.80	2.47	0.16	0.82	0.51	0.00	0	1	-149.9	3.1	1,632
New York	S-RFG-Prem	296	2.86	2.47	0.23	0.82	0.51	0.00	0	1	-149.5	29.6	1,662
Kentucky	S-RFG-Prem	19	2.83	2.47	0.25	0.82	0.51	0.00	0	1	-144.9	1.9	1,664
Virginia	S-RFG-Prem	151	2.82	2.47	0.25	0.82	0.51	0.00	0	1	-143.9	15.1	1,679
Maryland	S-RFG-Prem	136	2.82	2.47	0.25	0.82	0.51	0.00	0	1	-143.9	13.6	1,693
Texas	S-RFG-Prem	393	2.77	2.47	0.20	0.82	0.51	0.00	0	1	-143.7	39.3	1,732
DC	S-RFG-Prem	6	2.81	2.47	0.25	0.82	0.51	0.00	0	1	-142.3	0.6	1,733
Arizona	S-RFG-Prem	122	2.84	2.47	0.29	0.82	0.51	0.00	0	1	-141.2	12.2	1,745
Indiana	S-RFG-Prem	21	2.71	2.47	0.16	0.82	0.51	0.00	0	1	-140.9	2.1	1,747
Pennsylvania	S-RFG-Prem	65	2.77	2.47	0.23	0.82	0.51	0.00	0	1	-140.7	6.5	1,753
Massachusetts	S-RFG-Prem	164	2.78	2.47	0.25	0.82	0.51	0.00	0	1	-140.0	16.4	1,770
California	S-RFG-Prem	1526	2.82	2.47	0.29	0.82	0.51	0.00	0	1	-139.7	87.0	1,857
New Hampshire	S-RFG-Prem	21	2.79	2.47	0.26	0.82	0.51	0.00	0	1	-139.3	2.1	1,859
Rhode Island	S-RFG-Prem	38	2.76	2.47	0.25	0.82	0.51	0.00	0	1	-137.2	3.8	1,863
Delaware	S-RFG-Prem	23	2.75	2.47	0.25	0.82	0.51	0.00	0	1	-136.9	2.3	1,865
New Jersey	S-RFG-Prem	260	2.75	2.47	0.25	0.82	0.51	0.00	0	1	-136.9	26.0	1,891
Connecticut	S-RFG-Prem	104	2.74	2.47	0.25	0.82	0.51	0.00	0	1	-135.2	10.4	1,901
Illinois	W-RFG-reg	1556	2.56	2.47	0.16	0.61	0.51	0.26	0	1	-129.6	155.6	2,057
Illinois	W-RFG-Prem	224	2.72	2.47	0.16	0.46	0.51	0.26	0	1	-131.6	22.4	2,079
Missouri	W-RFG-reg	501	2.60	2.47	0.16	0.61	0.51	0.00	1	1	-108.7	50.1	2,129
Indiana	W-RFG-reg	239	2.59	2.47	0.16	0.61	0.51	0.00	0	1	-107.0	23.9	2,153
Wisconsin	W-RFG-reg	406	2.57	2.47	0.16	0.61	0.51	0.00	0	1	-105.0	40.6	2,194
Maine	W-RFG-Prem	15	2.93	2.47	0.32	0.46	0.51	0.00	0	1	-111.5	1.5	2,195
Missouri	W-RFG-Prem	49	2.77	2.47	0.16	0.46	0.51	0.00	1	1	-111.4	4.9	2,200
Kentucky	W-RFG-reg	231	2.63	2.47	0.25	0.61	0.51	0.00	0	1	-103.3	23.1	2,223
California	W-RFG-reg	6387	2.66	2.47	0.29	0.61	0.51	0.00	0	1	-101.5	364.1	2,588
Arizona	W-RFG-reg	950	2.66	2.47	0.29	0.61	0.51	0.00	0	1	-101.4	95.0	2,682
Wisconsin	W-RFG-Prem	37	2.75	2.47	0.16	0.46	0.51	0.00	0	1	-108.5	3.7	2,686
New York	W-RFG-Prem	358	2.81	2.47	0.23	0.46	0.51	0.00	0	1	-108.2	35.8	2,722
New York	W-RFG-reg	1488	2.58	2.47	0.23	0.61	0.51	0.00	0	1	-100.1	148.8	2,871
Texas	W-RFG-reg	3059	2.54	2.47	0.20	0.61	0.51	0.00	0	1	-98.6	305.9	3,177
Maryland	W-RFG-reg	899	2.58	2.47	0.25	0.61	0.51	0.00	0	1	-98.0	89.9	3,267
Pennsylvania	W-RFG-reg	469	2.56	2.47	0.23	0.61	0.51	0.00	0	1	-97.8	46.9	3,313
Virginia	W-RFG-reg	939	2.57	2.47	0.25	0.61	0.51	0.00	0	1	-97.0	93.9	3,407
Kentucky	W-RFG-Prem	23	2.78	2.47	0.25	0.46	0.51	0.00	0	1	-103.5	2.3	3,410
DC	W-RFG-reg	31	2.56	2.47	0.25	0.61	0.51	0.00	0	1	-95.9	3.1	3,413
Virginia	W-RFG-Prem	183	2.77	2.47	0.25	0.46	0.51	0.00	0	1	-102.6	18.3	3,431
Maryland	W-RFG-Prem	164	2.77	2.47	0.25	0.46	0.51	0.00	0	1	-102.5	16.4	3,447
Texas	W-RFG-Prem	475	2.72	2.47	0.20	0.46	0.51	0.00	0	1	-102.3	47.5	3,495
Maine	W-RFG-reg	225	2.61	2.47	0.32	0.61	0.51	0.00	0	1	-94.0	22.5	3,517
DC	W-RFG-Prem	8	2.76	2.47	0.25	0.46	0.51	0.00	0	1	-100.9	0.8	3,518
Massachusetts	W-RFG-reg	1304	2.53	2.47	0.25	0.61	0.51	0.00	0	1	-92.9	130.4	3,649
Arizona	W-RFG-Prem	148	2.79	2.47	0.29	0.46	0.51	0.00	0	1	-99.9	14.8	3,663
Indiana	W-RFG-Prem	25	2.66	2.47	0.16	0.46	0.51	0.00	0	1	-99.5	2.5	3,666
New Hampshire	W-RFG-reg	223	2.54	2.47	0.26	0.61	0.51	0.00	0	1	-92.0	22.3	3,688
Pennsylvania	W-RFG-Prem	78	2.72	2.47	0.23	0.46	0.51	0.00	0	1	-99.3	7.8	3,696
Massachusetts	W-RFG-Prem	198	2.73	2.47	0.25	0.46	0.51	0.00	0	1	-98.6	19.8	3,716
California	W-RFG-Prem	1846	2.77	2.47	0.29	0.46	0.51	0.00	0	1	-98.4	105.2	3,821
Connecticut	W-RFG-reg	766	2.51	2.47	0.25	0.61	0.51	0.00	0	1	-90.9	76.6	3,898
New Hampshire	W-RFG-Prem	25	2.74	2.47	0.26	0.46	0.51	0.00	0	1	-97.9	2.5	3,900
Rhode Island	W-RFG-Prem	46	2.71	2.47	0.25	0.46	0.51	0.00	0	1	-95.8	4.6	3,905
New Jersey	W-RFG-reg	1947	2.49	2.47	0.25	0.61	0.51	0.00	0	1	-88.5	194.7	4,100
Rhode Island	W-RFG-reg	313	2.49	2.47	0.25	0.61	0.51	0.00	0	1	-88.5	31.3	4,131
Delaware	W-RFG-Prem	28	2.70	2.47	0.25	0.46	0.51	0.00	0	1	-95.5	2.8	4,134
New Jersey	W-RFG-Prem	315	2.70	2.47	0.25	0.46	0.51	0.00	0	1	-95.5	31.5	4,165
Connecticut	W-RFG-Prem	126	2.69	2.47	0.25	0.46	0.51	0.00	0	1	-93.8	12.6	4,178
Delaware	W-RFG-reg	228	2.45	2.47	0.25	0.61	0.51	0.00	0	1	-85.1	22.8	4,201
Missouri	S-CG-Prem	68	2.76	2.47	0.16	0.00	0.51	0.00	1	0	-64.4	6.8	4,207
Oregon	S-CG-Prem	94	2.85	2.47	0.25	0.00	0.51	0.00	1	0	-64.1	9.4	4,217
Missouri	W-CG-Prem	82	2.71	2.47	0.16	0.00	0.51	0.00	1	0	-59.4	8.2	4,225
Oregon	W-CG-Prem	114	2.80	2.47	0.25	0.00	0.51	0.00	1	0	-59.1	11.4	4,236
Minnesota	S-CG-Prem	103	2.68	2.47	0.16	0.00	0.51	0.00	1	0	-56.3	10.3	4,247

Table A2008B Input Costs, Ethanol Blending Cost and Ethanol Volumes

Year 2008 State	Gasoline Code	Gasoline Volume MMgals	Gasoline Price $/gal	Ethanol Gate Price $/gal	Ethanol Dist Cost $/gal	Ethanol Blending $/gal	Federal Subsidy $/gal	State Subsidy $/gal	State Mandate	RFG "Mandate"	Ethanol Blending Cost c/gal	Ethanol Volume MMgals	Cumulative Eth Vol MMgals
Hawaii	S-CG-Prem	51	3.03	2.47	0.52	0.00	0.51	0.00	1	0	-55.7	5.1	4,252
Minnesota	W-CG-Prem	124	2.63	2.47	0.16	0.00	0.51	0.00	1	0	-51.3	12.4	4,264
Hawaii	W-CG-Prem	62	2.98	2.47	0.52	0.00	0.51	0.00	1	0	-50.7	6.2	4,270
Missouri	S-CG-Reg	807	2.59	2.47	0.16	0.00	0.51	0.00	1	0	-47.2	80.7	4,351
Oregon	S-CG-Reg	671	2.67	2.47	0.25	0.00	0.51	0.00	1	0	-45.5	67.1	4,418
Hawaii	S-CG-Reg	172	2.93	2.47	0.52	0.00	0.51	0.00	1	0	-45.4	17.2	4,435
Minnesota	S-CG-Reg	1020	2.55	2.47	0.16	0.00	0.51	0.00	1	0	-43.2	102.0	4,537
Missouri	W-CG-reg	976	2.54	2.47	0.16	0.00	0.51	0.00	1	0	-42.2	97.6	4,635
Oregon	W-CG-reg	811	2.62	2.47	0.25	0.00	0.51	0.00	1	0	-40.5	81.1	4,716
Hawaii	W-CG-reg	208	2.88	2.47	0.52	0.00	0.51	0.00	1	0	-40.4	20.8	4,737
Minnesota	W-CG-reg	1234	2.50	2.47	0.16	0.00	0.51	0.00	1	0	-38.2	123.4	4,860
Iowa	S-CG-Prem	64	2.72	2.47	0.16	0.00	0.51	0.30	0	0	-89.6	6.4	4,867
Iowa	W-CG-Prem	78	2.67	2.47	0.16	0.00	0.51	0.30	0	0	-84.6	7.8	4,874
Illinois	S-CG-Prem	46	2.71	2.47	0.16	0.00	0.51	0.26	0	0	-84.6	4.6	4,879
South Dakota	S-CG-Prem	21	2.84	2.47	0.16	0.00	0.51	0.09	0	0	-81.3	2.1	4,881
Illinois	W-CG-Prem	56	2.66	2.47	0.16	0.00	0.51	0.26	0	0	-79.6	5.6	4,887
South Dakota	W-CG-Prem	26	2.79	2.47	0.16	0.00	0.51	0.09	0	0	-76.3	2.6	4,889
Alaska	S-CG-Reg	110	3.23	2.47	0.52	0.00	0.51	0.00	0	0	-75.0	11.0	4,900
Iowa	S-CG-Reg	495	2.57	2.47	0.16	0.00	0.51	0.30	0	0	-74.5	49.5	4,950
Alaska	S-CG-Prem	13	3.22	2.47	0.52	0.00	0.51	0.00	0	0	-74.2	1.3	4,951
Alaska	W-CG-reg	133	3.18	2.47	0.52	0.00	0.51	0.00	0	0	-70.0	13.3	4,965
Iowa	W-CG-reg	598	2.52	2.47	0.16	0.00	0.51	0.30	0	0	-69.5	59.8	5,024
Alaska	W-CG-Prem	16	3.17	2.47	0.52	0.00	0.51	0.00	0	0	-69.2	1.6	5,026
Illinois	S-CG-Reg	756	2.55	2.47	0.16	0.00	0.51	0.26	0	0	-68.1	75.6	5,102
Idaho	S-CG-Prem	49	2.84	2.47	0.21	0.00	0.51	0.00	0	0	-66.5	4.9	5,106
Maine	S-CG-Prem	11	2.92	2.47	0.32	0.00	0.51	0.00	0	0	-64.4	1.1	5,108
Wyoming	S-CG-Prem	28	2.81	2.47	0.21	0.00	0.51	0.00	0	0	-63.2	2.8	5,110
Illinois	W-CG-reg	914	2.50	2.47	0.16	0.00	0.51	0.26	0	0	-63.1	91.4	5,202
Nebraska	S-CG-Prem	44	2.75	2.47	0.16	0.00	0.51	0.00	0	0	-62.6	4.4	5,206
New Mexico	S-CG-Prem	59	2.83	2.47	0.25	0.00	0.51	0.00	0	0	-62.5	5.9	5,212
Ohio	S-CG-Prem	162	2.74	2.47	0.16	0.00	0.51	0.00	0	0	-61.5	16.2	5,228
Idaho	W-CG-Prem	60	2.79	2.47	0.21	0.00	0.51	0.00	0	0	-61.5	6.0	5,234
Wisconsin	S-CG-Prem	72	2.74	2.47	0.16	0.00	0.51	0.00	0	0	-61.5	7.2	5,241
New York	S-CG-Prem	99	2.80	2.47	0.23	0.00	0.51	0.00	0	0	-61.1	9.9	5,251
Maine	W-CG-Prem	13	2.87	2.47	0.32	0.00	0.51	0.00	0	0	-59.4	1.3	5,253
Tennessee	S-CG-Prem	168	2.80	2.47	0.25	0.00	0.51	0.00	0	0	-59.3	16.8	5,269
Washington	S-CG-Prem	214	2.81	2.47	0.25	0.00	0.51	0.00	0	0	-59.2	21.4	5,291
Vermont	S-CG-Prem	12	2.81	2.47	0.26	0.00	0.51	0.00	0	0	-58.4	1.2	5,292
Wyoming	W-CG-Prem	34	2.76	2.47	0.21	0.00	0.51	0.00	0	0	-58.2	3.4	5,295
Michigan	S-CG-Prem	132	2.70	2.47	0.16	0.00	0.51	0.00	0	0	-57.9	13.2	5,309
Utah	S-CG-Prem	131	2.76	2.47	0.21	0.00	0.51	0.00	0	0	-57.9	13.1	5,322
Nebraska	W-CG-Prem	53	2.70	2.47	0.16	0.00	0.51	0.00	0	0	-57.6	5.3	5,327
New Mexico	W-CG-Prem	72	2.78	2.47	0.25	0.00	0.51	0.00	0	0	-57.5	7.2	5,334
Ohio	W-CG-Prem	196	2.69	2.47	0.16	0.00	0.51	0.00	0	0	-56.5	19.6	5,354
Wisconsin	W-CG-Prem	88	2.69	2.47	0.16	0.00	0.51	0.00	0	0	-56.5	8.8	5,362
Kentucky	S-CG-Prem	48	2.77	2.47	0.25	0.00	0.51	0.00	0	0	-56.5	4.8	5,367
Arkansas	S-CG-Prem	53	2.72	2.47	0.20	0.00	0.51	0.00	0	0	-56.3	5.3	5,373
Alabama	S-CG-Prem	103	2.77	2.47	0.25	0.00	0.51	0.00	0	0	-56.2	10.3	5,383
New York	W-CG-Prem	120	2.75	2.47	0.23	0.00	0.51	0.00	0	0	-56.1	12.0	5,395
Montana	S-CG-Prem	61	2.73	2.47	0.21	0.00	0.51	0.00	0	0	-55.6	6.1	5,401
Virginia	S-CG-Prem	64	2.76	2.47	0.25	0.00	0.51	0.00	0	0	-55.5	6.4	5,407
Maryland	S-CG-Prem	7	2.76	2.47	0.25	0.00	0.51	0.00	0	0	-55.5	0.7	5,408
Texas	S-CG-Prem	335	2.71	2.47	0.20	0.00	0.51	0.00	0	0	-55.3	33.5	5,442
West Virginia	S-CG-Prem	20	2.74	2.47	0.23	0.00	0.51	0.00	0	0	-55.3	2.0	5,443
Colorado	S-CG-Prem	182	2.73	2.47	0.21	0.00	0.51	0.00	0	0	-55.1	18.2	5,462
Tennessee	W-CG-Prem	203	2.75	2.47	0.25	0.00	0.51	0.00	0	0	-54.3	20.3	5,482
Washington	W-CG-Prem	259	2.76	2.47	0.25	0.00	0.51	0.00	0	0	-54.2	25.9	5,508
Nevada	S-CG-Prem	109	2.79	2.47	0.29	0.00	0.51	0.00	0	0	-54.1	10.9	5,519
Idaho	S-CG-Reg	291	2.72	2.47	0.21	0.00	0.51	0.00	0	0	-54.0	29.1	5,548
Vermont	W-CG-Prem	14	2.76	2.47	0.26	0.00	0.51	0.00	0	0	-53.4	1.4	5,549
South Dakota	S-CG-Reg	178	2.56	2.47	0.16	0.00	0.51	0.09	0	0	-53.0	17.8	5,567
Michigan	W-CG-Prem	159	2.65	2.47	0.16	0.00	0.51	0.00	0	0	-52.9	15.9	5,583
South Carolina	S-CG-Prem	130	2.75	2.47	0.26	0.00	0.51	0.00	0	0	-52.9	13.0	5,596
Utah	W-CG-Prem	158	2.71	2.47	0.21	0.00	0.51	0.00	0	0	-52.9	15.8	5,612
Kansas	S-CG-Prem	58	2.65	2.47	0.16	0.00	0.51	0.00	0	0	-52.8	5.8	5,618
Arizona	S-CG-Prem	56	2.78	2.47	0.29	0.00	0.51	0.00	0	0	-52.8	5.6	5,623
North Carolina	S-CG-Prem	229	2.75	2.47	0.26	0.00	0.51	0.00	0	0	-52.5	22.9	5,646
Indiana	S-CG-Prem	85	2.65	2.47	0.16	0.00	0.51	0.00	0	0	-52.5	8.5	5,655
Pennsylvania	S-CG-Prem	84	2.71	2.47	0.23	0.00	0.51	0.00	0	0	-52.3	8.4	5,663
Florida	S-CG-Prem	452	2.80	2.47	0.32	0.00	0.51	0.00	0	0	-51.6	45.2	5,708
Kentucky	W-CG-Prem	58	2.72	2.47	0.25	0.00	0.51	0.00	0	0	-51.5	5.8	5,714
Arkansas	W-CG-Prem	64	2.67	2.47	0.20	0.00	0.51	0.00	0	0	-51.3	6.4	5,720
Alabama	W-CG-Prem	124	2.72	2.47	0.25	0.00	0.51	0.00	0	0	-51.2	12.4	5,733
North Dakota	S-CG-Prem	20	2.72	2.47	0.25	0.00	0.51	0.00	0	0	-50.9	2.0	5,735
New Hampshire	S-CG-Prem	4	2.73	2.47	0.26	0.00	0.51	0.00	0	0	-50.9	0.4	5,735
Mississippi	S-CG-Prem	76	2.67	2.47	0.20	0.00	0.51	0.00	0	0	-50.8	7.6	5,743
Montana	W-CG-Prem	74	2.68	2.47	0.21	0.00	0.51	0.00	0	0	-50.6	7.4	5,750
Virginia	W-CG-Prem	77	2.71	2.47	0.25	0.00	0.51	0.00	0	0	-50.5	7.7	5,758
Maryland	W-CG-Prem	9	2.71	2.47	0.25	0.00	0.51	0.00	0	0	-50.5	0.9	5,759
Texas	W-CG-Prem	405	2.66	2.47	0.20	0.00	0.51	0.00	0	0	-50.3	40.5	5,799
West Virginia	W-CG-Prem	24	2.69	2.47	0.23	0.00	0.51	0.00	0	0	-50.3	2.4	5,802
Georgia	S-CG-Prem	278	2.73	2.47	0.26	0.00	0.51	0.00	0	0	-50.2	27.8	5,829
Colorado	W-CG-Prem	221	2.68	2.47	0.21	0.00	0.51	0.00	0	0	-50.1	22.1	5,851
Nevada	W-CG-Prem	132	2.74	2.47	0.29	0.00	0.51	0.00	0	0	-49.1	13.2	5,865
Idaho	W-CG-reg	352	2.67	2.47	0.21	0.00	0.51	0.00	0	0	-49.0	35.2	5,900

Table A2008C Input Costs, Ethanol Blending Cost and Ethanol Volumes

Year 2008 State	Gasoline Code	Gasoline Volume MMgals	Gasoline Price $/gal	Ethanol Gate Price $/gal	Ethanol Dist Cost $/gal	Ethanol Blending $/gal	Federal Subsidy $/gal	State Subsidy $/gal	State Mandate	RFG "Mandate"	Ethanol Blending Cost c/gal	Ethanol Volume MMgals	Cumulative Eth Vol MMgals
Ohio	S-CG-Reg	2056	2.61	2.47	0.16	0.00	0.51	0.00	0	0	-48.8	205.6	6,105
Louisiana	S-CG-Prem	102	2.65	2.47	0.20	0.00	0.51	0.00	0	0	-48.8	10.2	6,116
South Dakota	W-CG-reg	215	2.51	2.47	0.16	0.00	0.51	0.09	0	0	-48.0	21.5	6,137
South Carolina	W-CG-Prem	157	2.70	2.47	0.26	0.00	0.51	0.00	0	0	-47.9	15.7	6,153
Kansas	W-CG-Prem	70	2.60	2.47	0.16	0.00	0.51	0.00	0	0	-47.8	7.0	6,160
Arizona	W-CG-Prem	68	2.73	2.47	0.29	0.00	0.51	0.00	0	0	-47.8	6.8	6,166
North Carolina	W-CG-Prem	277	2.70	2.47	0.26	0.00	0.51	0.00	0	0	-47.5	27.7	6,194
New Mexico	S-CG-Reg	399	2.68	2.47	0.25	0.00	0.51	0.00	0	0	-47.5	39.9	6,234
Indiana	W-CG-Prem	103	2.60	2.47	0.16	0.00	0.51	0.00	0	0	-47.5	10.3	6,244
Pennsylvania	W-CG-Prem	101	2.66	2.47	0.23	0.00	0.51	0.00	0	0	-47.3	10.1	6,254
Florida	W-CG-Prem	546	2.75	2.47	0.32	0.00	0.51	0.00	0	0	-46.6	54.6	6,309
Wyoming	S-CG-Reg	140	2.64	2.47	0.21	0.00	0.51	0.00	0	0	-45.9	14.0	6,323
North Dakota	W-CG-Prem	25	2.67	2.47	0.25	0.00	0.51	0.00	0	0	-45.9	2.5	6,325
New Hampshire	W-CG-Prem	5	2.68	2.47	0.26	0.00	0.51	0.00	0	0	-45.9	0.5	6,326
Mississippi	W-CG-Prem	92	2.62	2.47	0.20	0.00	0.51	0.00	0	0	-45.8	9.2	6,335
Indiana	S-CG-Reg	1191	2.58	2.47	0.16	0.00	0.51	0.00	0	0	-45.5	119.1	6,454
Georgia	W-CG-Prem	336	2.68	2.47	0.26	0.00	0.51	0.00	0	0	-45.2	33.6	6,488
Michigan	S-CG-Reg	1993	2.57	2.47	0.16	0.00	0.51	0.00	0	0	-45.1	199.3	6,687
Montana	S-CG-Reg	283	2.62	2.47	0.21	0.00	0.51	0.00	0	0	-44.3	28.3	6,715
Utah	S-CG-Reg	485	2.62	2.47	0.21	0.00	0.51	0.00	0	0	-44.3	48.5	6,764
Ohio	W-CG-reg	2486	2.56	2.47	0.16	0.00	0.51	0.00	0	0	-43.8	248.6	7,013
Louisiana	W-CG-Prem	123	2.60	2.47	0.20	0.00	0.51	0.00	0	0	-43.8	12.3	7,025
Nevada	S-CG-Reg	421	2.69	2.47	0.29	0.00	0.51	0.00	0	0	-43.6	42.1	7,067
Wisconsin	S-CG-Reg	813	2.56	2.47	0.16	0.00	0.51	0.00	0	0	-43.5	81.3	7,148
Colorado	S-CG-Reg	831	2.60	2.47	0.21	0.00	0.51	0.00	0	0	-42.8	83.1	7,231
New Mexico	W-CG-reg	482	2.63	2.47	0.25	0.00	0.51	0.00	0	0	-42.5	48.2	7,279
Oklahoma	S-CG-Prem	86	2.61	2.47	0.25	0.00	0.51	0.02	0	0	-42.3	8.6	7,288
Washington	S-CG-Reg	1078	2.63	2.47	0.25	0.00	0.51	0.00	0	0	-42.0	107.8	7,396
Kentucky	S-CG-Reg	692	2.62	2.47	0.25	0.00	0.51	0.00	0	0	-41.8	69.2	7,465
Wyoming	W-CG-reg	169	2.59	2.47	0.21	0.00	0.51	0.00	0	0	-40.9	16.9	7,482
Indiana	W-CG-reg	1440	2.53	2.47	0.16	0.00	0.51	0.00	0	0	-40.5	144.0	7,626
Michigan	W-CG-reg	2410	2.52	2.47	0.16	0.00	0.51	0.00	0	0	-40.1	241.0	7,867
Arizona	S-CG-Reg	438	2.65	2.47	0.29	0.00	0.51	0.00	0	0	-39.8	43.8	7,911
West Virginia	S-CG-Reg	316	2.59	2.47	0.23	0.00	0.51	0.00	0	0	-39.8	31.6	7,942
Arkansas	S-CG-Reg	620	2.55	2.47	0.20	0.00	0.51	0.00	0	0	-39.3	62.0	8,004
Montana	W-CG-reg	342	2.57	2.47	0.21	0.00	0.51	0.00	0	0	-39.3	34.2	8,039
Utah	W-CG-reg	586	2.57	2.47	0.21	0.00	0.51	0.00	0	0	-39.3	58.6	8,097
Nebraska	S-CG-Reg	327	2.51	2.47	0.16	0.00	0.51	0.00	0	0	-38.9	32.7	8,130
Mississippi	S-CG-Reg	741	2.55	2.47	0.20	0.00	0.51	0.00	0	0	-38.9	74.1	8,204
Alabama	S-CG-Reg	1027	2.59	2.47	0.25	0.00	0.51	0.00	0	0	-38.7	102.7	8,307
Nevada	W-CG-reg	509	2.64	2.47	0.29	0.00	0.51	0.00	0	0	-38.6	50.9	8,358
New York	S-CG-Reg	1019	2.57	2.47	0.23	0.00	0.51	0.00	0	0	-38.5	101.9	8,459
Wisconsin	W-CG-reg	983	2.51	2.47	0.16	0.00	0.51	0.00	0	0	-38.5	98.3	8,558
Oklahoma	S-CG-Reg	879	2.57	2.47	0.25	0.00	0.51	0.02	0	0	-37.9	87.9	8,646
Colorado	W-CG-reg	1004	2.55	2.47	0.21	0.00	0.51	0.00	0	0	-37.8	100.4	8,746
Oklahoma	W-CG-Prem	104	2.56	2.47	0.25	0.00	0.51	0.02	0	0	-37.3	10.4	8,756
Texas	S-CG-Reg	3446	2.53	2.47	0.20	0.00	0.51	0.00	0	0	-37.0	344.6	9,101
North Dakota	S-CG-Reg	166	2.58	2.47	0.25	0.00	0.51	0.00	0	0	-37.0	16.6	9,118
Washington	W-CG-reg	1304	2.58	2.47	0.25	0.00	0.51	0.00	0	0	-37.0	130.4	9,248
Kentucky	W-CG-reg	837	2.57	2.47	0.25	0.00	0.51	0.00	0	0	-36.8	83.7	9,332
Kansas	S-CG-Reg	687	2.49	2.47	0.16	0.00	0.51	0.00	0	0	-36.5	68.7	9,400
Maryland	S-CG-Reg	87	2.57	2.47	0.25	0.00	0.51	0.00	0	0	-36.5	8.7	9,409
Pennsylvania	S-CG-Reg	876	2.55	2.47	0.23	0.00	0.51	0.00	0	0	-36.3	87.6	9,497
Georgia	S-CG-Reg	2024	2.59	2.47	0.26	0.00	0.51	0.00	0	0	-36.1	202.4	9,699
Louisiana	S-CG-Reg	1154	2.52	2.47	0.20	0.00	0.51	0.00	0	0	-35.9	115.4	9,814
South Carolina	S-CG-Reg	1090	2.58	2.47	0.26	0.00	0.51	0.00	0	0	-35.5	109.0	9,923
Vermont	S-CG-Reg	133	2.58	2.47	0.26	0.00	0.51	0.00	0	0	-35.5	13.3	9,937
Virginia	S-CG-Reg	657	2.56	2.47	0.25	0.00	0.51	0.00	0	0	-35.4	65.7	10,002
North Carolina	S-CG-Reg	1830	2.58	2.47	0.26	0.00	0.51	0.00	0	0	-35.4	183.0	10,186
Arizona	W-CG-reg	530	2.60	2.47	0.29	0.00	0.51	0.00	0	0	-34.8	53.0	10,238
West Virginia	W-CG-reg	382	2.54	2.47	0.23	0.00	0.51	0.00	0	0	-34.8	38.2	10,277
Tennessee	S-CG-Reg	1448	2.55	2.47	0.25	0.00	0.51	0.00	0	0	-34.7	144.8	10,421
Arkansas	W-CG-reg	750	2.50	2.47	0.20	0.00	0.51	0.00	0	0	-34.3	75.0	10,496
Nebraska	W-CG-reg	396	2.46	2.47	0.16	0.00	0.51	0.00	0	0	-33.9	39.6	10,536
Mississippi	W-CG-reg	895	2.50	2.47	0.20	0.00	0.51	0.00	0	0	-33.9	89.5	10,626
Florida	S-CG-Reg	3076	2.62	2.47	0.32	0.00	0.51	0.00	0	0	-33.8	307.6	10,933
Alabama	W-CG-reg	1242	2.54	2.47	0.25	0.00	0.51	0.00	0	0	-33.7	124.2	11,057
New York	W-CG-reg	1232	2.52	2.47	0.23	0.00	0.51	0.00	0	0	-33.5	123.2	11,181
Oklahoma	W-CG-reg	1063	2.52	2.47	0.25	0.00	0.51	0.02	0	0	-32.9	106.3	11,287
Maine	S-CG-Reg	126	2.60	2.47	0.32	0.00	0.51	0.00	0	0	-32.4	12.6	11,300
Texas	W-CG-reg	4166	2.48	2.47	0.20	0.00	0.51	0.00	0	0	-32.0	416.6	11,716
North Dakota	W-CG-reg	201	2.53	2.47	0.25	0.00	0.51	0.00	0	0	-32.0	20.1	11,736
Kansas	W-CG-reg	831	2.44	2.47	0.16	0.00	0.51	0.00	0	0	-31.5	83.1	11,819
Maryland	W-CG-reg	105	2.52	2.47	0.25	0.00	0.51	0.00	0	0	-31.5	10.5	11,830
Pennsylvania	W-CG-reg	1059	2.50	2.47	0.23	0.00	0.51	0.00	0	0	-31.3	105.9	11,936
Georgia	W-CG-reg	2447	2.54	2.47	0.26	0.00	0.51	0.00	0	0	-31.1	244.7	12,181
Louisiana	W-CG-reg	1396	2.47	2.47	0.20	0.00	0.51	0.00	0	0	-30.9	139.6	12,320
South Carolina	W-CG-reg	1318	2.53	2.47	0.26	0.00	0.51	0.00	0	0	-30.5	131.8	12,452
Vermont	W-CG-reg	161	2.53	2.47	0.26	0.00	0.51	0.00	0	0	-30.5	16.1	12,468
New Hampshire	S-CG-Reg	56	2.53	2.47	0.26	0.00	0.51	0.00	0	0	-30.5	5.6	12,474
Virginia	W-CG-reg	794	2.51	2.47	0.25	0.00	0.51	0.00	0	0	-30.4	79.4	12,553
North Carolina	W-CG-reg	2213	2.53	2.47	0.26	0.00	0.51	0.00	0	0	-30.4	221.3	12,774
Tennessee	W-CG-reg	1751	2.50	2.47	0.25	0.00	0.51	0.00	0	0	-29.7	175.1	12,949
Florida	W-CG-reg	3719	2.57	2.47	0.32	0.00	0.51	0.00	0	0	-28.8	371.9	13,321
Maine	W-CG-reg	153	2.55	2.47	0.32	0.00	0.51	0.00	0	0	-27.4	15.3	13,337
New Hampshire	W-CG-reg	68	2.48	2.47	0.26	0.00	0.51	0.00	0	0	-25.5	6.8	13,343

Table A2009A Input Costs, Ethanol Blending Cost and Ethanol Volumes

Year 2009 State	Gasoline Code	Gasoline Volume MMgals	Gasoline Price $/gal	Ethanol Gate Price $/gal	Ethanol Dist Cost $/gal	Ethanol Blending $/gal	Federal Subsidy $/gal	State Subsidy $/gal	State Mandate	RFG "Mandate"	Ethanol Blending Cost c/gal	Ethanol Volume MMgals	Cumulative Eth Vol MMgals
Illinois	S-RFG-Reg	1286	1.80	1.79	0.15	1.16	0.45	0.26	0	1	-171.7	128.6	129
Illinois	S-RFG-Prem	185	2.00	1.79	0.15	0.82	0.45	0.26	0	1	-159.3	18.5	147
Indiana	S-RFG-Reg	198	1.82	1.79	0.15	1.16	0.45	0.00	0	1	-148.9	19.8	167
Wisconsin	S-RFG-Reg	336	1.82	1.79	0.15	1.16	0.45	0.00	0	1	-148.2	33.6	200
California	S-RFG-Reg	5280	1.94	1.79	0.28	1.16	0.45	0.00	0	1	-147.9	300.9	501
Missouri	S-RFG-Reg	414	1.79	1.79	0.15	1.16	0.45	0.00	1	1	-145.3	41.4	543
Kentucky	S-RFG-Reg	191	1.86	1.79	0.24	1.16	0.45	0.00	0	1	-143.7	19.1	562
New York	S-RFG-Reg	1230	1.82	1.79	0.22	1.16	0.45	0.00	0	1	-141.4	123.0	685
Pennsylvania	S-RFG-Reg	387	1.79	1.79	0.22	1.16	0.45	0.00	0	1	-138.9	38.7	724
Arizona	S-RFG-Reg	785	1.85	1.79	0.28	1.16	0.45	0.00	0	1	-138.7	78.5	802
Massachusetts	S-RFG-Reg	1078	1.79	1.79	0.24	1.16	0.45	0.00	0	1	-137.2	107.8	910
Virginia	S-RFG-Reg	776	1.79	1.79	0.24	1.16	0.45	0.00	0	1	-137.1	77.6	987
Rhode Island	S-RFG-Reg	259	1.79	1.79	0.24	1.16	0.45	0.00	0	1	-136.7	25.9	1,013
Texas	S-RFG-Reg	2529	1.74	1.79	0.19	1.16	0.45	0.00	0	1	-136.5	252.9	1,266
Connecticut	S-RFG-Reg	634	1.78	1.79	0.24	1.16	0.45	0.00	0	1	-136.4	63.4	1,330
Maryland	S-RFG-Reg	743	1.77	1.79	0.24	1.16	0.45	0.00	0	1	-135.5	74.3	1,404
Delaware	S-RFG-Reg	188	1.77	1.79	0.24	1.16	0.45	0.00	0	1	-135.1	18.8	1,423
DC	S-RFG-Reg	26	1.77	1.79	0.24	1.16	0.45	0.00	0	1	-134.7	2.6	1,425
Wisconsin	S-RFG-Prem	31	2.01	1.79	0.15	0.82	0.45	0.00	0	1	-134.5	3.1	1,428
Indiana	S-RFG-Prem	21	1.99	1.79	0.15	0.82	0.45	0.00	0	1	-131.9	2.1	1,430
California	S-RFG-Prem	1526	2.11	1.79	0.28	0.82	0.45	0.00	0	1	-131.3	87.0	1,517
New Jersey	S-RFG-Reg	1609	1.73	1.79	0.24	1.16	0.45	0.00	0	1	-131.2	160.9	1,678
Missouri	S-RFG-Prem	41	1.97	1.79	0.15	0.82	0.45	0.00	1	1	-130.7	4.1	1,682
New York	S-RFG-Prem	296	2.04	1.79	0.22	0.82	0.45	0.00	0	1	-130.5	29.6	1,712
Maine	S-RFG-Reg	186	1.80	1.79	0.31	1.16	0.45	0.00	0	1	-130.4	18.6	1,731
Kentucky	S-RFG-Prem	19	2.04	1.79	0.24	0.82	0.45	0.00	0	1	-128.7	1.9	1,732
Virginia	S-RFG-Prem	151	2.04	1.79	0.24	0.82	0.45	0.00	0	1	-128.4	15.1	1,748
Rhode Island	S-RFG-Prem	38	2.01	1.79	0.24	0.82	0.45	0.00	0	1	-126.0	3.8	1,751
Massachusetts	S-RFG-Prem	164	2.00	1.79	0.24	0.82	0.45	0.00	0	1	-125.0	16.4	1,768
Pennsylvania	S-RFG-Prem	65	1.98	1.79	0.22	0.82	0.45	0.00	0	1	-124.8	6.5	1,774
DC	S-RFG-Prem	6	2.00	1.79	0.24	0.82	0.45	0.00	0	1	-124.5	0.6	1,775
Connecticut	S-RFG-Prem	104	1.99	1.79	0.24	0.82	0.45	0.00	0	1	-123.9	10.4	1,785
Maryland	S-RFG-Prem	136	1.99	1.79	0.24	0.82	0.45	0.00	0	1	-123.9	13.6	1,799
Texas	S-RFG-Prem	393	1.94	1.79	0.19	0.82	0.45	0.00	0	1	-123.7	39.3	1,838
New Hampshire	S-RFG-Reg	185	1.66	1.79	0.26	1.16	0.45	0.00	0	1	-122.6	18.5	1,857
Arizona	S-RFG-Prem	122	2.00	1.79	0.28	0.82	0.45	0.00	0	1	-121.0	12.2	1,869
Maine	S-RFG-Prem	12	2.01	1.79	0.31	0.82	0.45	0.00	0	1	-118.9	1.2	1,870
Delaware	S-RFG-Prem	23	1.90	1.79	0.24	0.82	0.45	0.00	0	1	-114.9	2.3	1,872
New Jersey	S-RFG-Prem	260	1.90	1.79	0.24	0.82	0.45	0.00	0	1	-114.9	26.0	1,898
Illinois	W-RFG-Prem	224	1.95	1.79	0.15	0.42	0.45	0.26	0	1	-113.4	22.4	1,921
Illinois	W-RFG-reg	1555	1.75	1.79	0.15	0.55	0.45	0.26	0	1	-105.7	155.5	2,076
New Hampshire	S-RFG-Prem	21	1.79	1.79	0.26	0.82	0.45	0.00	0	1	-102.4	2.1	2,078
Wisconsin	W-RFG-Prem	37	1.96	1.79	0.15	0.42	0.45	0.00	0	1	-88.5	3.7	2,082
Indiana	W-RFG-Prem	25	1.94	1.79	0.15	0.42	0.45	0.00	0	1	-86.0	2.5	2,085
California	W-RFG-Prem	1845	2.06	1.79	0.28	0.42	0.45	0.00	0	1	-85.4	105.2	2,190
Missouri	W-RFG-Prem	49	1.92	1.79	0.15	0.42	0.45	0.00	1	1	-84.7	4.9	2,195
New York	W-RFG-Prem	358	1.99	1.79	0.22	0.42	0.45	0.00	0	1	-84.6	35.8	2,230
Indiana	W-RFG-reg	239	1.77	1.79	0.15	0.55	0.45	0.00	0	1	-82.9	23.9	2,254
Kentucky	W-RFG-Prem	23	1.99	1.79	0.24	0.42	0.45	0.00	0	1	-82.7	2.3	2,257
Virginia	W-RFG-Prem	183	1.99	1.79	0.24	0.42	0.45	0.00	0	1	-82.5	18.3	2,275
Wisconsin	W-RFG-reg	406	1.77	1.79	0.15	0.55	0.45	0.00	0	1	-82.2	40.6	2,316
California	W-RFG-reg	6384	1.89	1.79	0.28	0.55	0.45	0.00	0	1	-81.9	363.9	2,679
Rhode Island	W-RFG-Prem	46	1.96	1.79	0.24	0.42	0.45	0.00	0	1	-80.1	4.6	2,684
Missouri	W-RFG-reg	500	1.74	1.79	0.15	0.55	0.45	0.00	1	1	-79.4	50.0	2,734
Massachusetts	W-RFG-Prem	198	1.95	1.79	0.24	0.42	0.45	0.00	0	1	-79.1	19.8	2,754
Pennsylvania	W-RFG-Prem	78	1.93	1.79	0.22	0.42	0.45	0.00	0	1	-78.9	7.8	2,762
DC	W-RFG-Prem	8	1.95	1.79	0.24	0.42	0.45	0.00	0	1	-78.6	0.8	2,763
Connecticut	W-RFG-Prem	126	1.94	1.79	0.24	0.42	0.45	0.00	0	1	-78.0	12.6	2,775
Maryland	W-RFG-Prem	164	1.94	1.79	0.24	0.42	0.45	0.00	0	1	-77.9	16.4	2,792
Texas	W-RFG-Prem	475	1.89	1.79	0.19	0.42	0.45	0.00	0	1	-77.8	47.5	2,839
Kentucky	W-RFG-reg	231	1.81	1.79	0.24	0.55	0.45	0.00	0	1	-77.7	23.1	2,862
New York	W-RFG-reg	1487	1.77	1.79	0.22	0.55	0.45	0.00	0	1	-75.5	148.7	3,011
Arizona	W-RFG-Prem	148	1.95	1.79	0.28	0.42	0.45	0.00	0	1	-75.0	14.8	3,026
Maine	W-RFG-Prem	15	1.96	1.79	0.31	0.42	0.45	0.00	0	1	-73.0	1.5	3,027
Pennsylvania	W-RFG-reg	468	1.74	1.79	0.22	0.55	0.45	0.00	0	1	-72.9	46.8	3,074
Arizona	W-RFG-reg	949	1.80	1.79	0.28	0.55	0.45	0.00	0	1	-72.7	94.9	3,169
Massachusetts	W-RFG-reg	1303	1.74	1.79	0.24	0.55	0.45	0.00	0	1	-71.3	130.3	3,299
Virginia	W-RFG-reg	939	1.74	1.79	0.24	0.55	0.45	0.00	0	1	-71.2	93.9	3,393
Rhode Island	W-RFG-reg	313	1.74	1.79	0.24	0.55	0.45	0.00	0	1	-70.8	31.3	3,424
Texas	W-RFG-reg	3058	1.69	1.79	0.19	0.55	0.45	0.00	0	1	-70.5	305.8	3,730
Connecticut	W-RFG-reg	766	1.73	1.79	0.24	0.55	0.45	0.00	0	1	-70.5	76.6	3,807
Maryland	W-RFG-reg	898	1.72	1.79	0.24	0.55	0.45	0.00	0	1	-69.5	89.8	3,896
Delaware	W-RFG-reg	228	1.72	1.79	0.24	0.55	0.45	0.00	0	1	-69.2	22.8	3,919
Delaware	W-RFG-Prem	28	1.85	1.79	0.24	0.42	0.45	0.00	0	1	-69.0	2.8	3,922
New Jersey	W-RFG-Prem	314	1.85	1.79	0.24	0.42	0.45	0.00	0	1	-69.0	31.4	3,954
DC	W-RFG-reg	31	1.72	1.79	0.24	0.55	0.45	0.00	0	1	-68.8	3.1	3,957
New Jersey	W-RFG-reg	1946	1.68	1.79	0.24	0.55	0.45	0.00	0	1	-65.3	194.6	4,151
Maine	W-RFG-reg	225	1.75	1.79	0.31	0.55	0.45	0.00	0	1	-64.5	22.5	4,174
New Hampshire	W-RFG-reg	223	1.61	1.79	0.26	0.55	0.45	0.00	0	1	-56.6	22.3	4,196
New Hampshire	W-RFG-Prem	25	1.74	1.79	0.26	0.42	0.45	0.00	0	1	-56.5	2.5	4,199
Oregon	S-CG-Prem	94	2.08	1.79	0.24	0.00	0.45	0.00	1	0	-49.4	9.4	4,208
Oregon	W-CG-Prem	114	2.03	1.79	0.24	0.00	0.45	0.00	1	0	-44.4	11.4	4,219
Missouri	S-CG-Prem	68	1.91	1.79	0.15	0.00	0.45	0.00	1	0	-42.2	6.8	4,226
Minnesota	S-CG-Prem	103	1.89	1.79	0.15	0.00	0.45	0.00	1	0	-39.5	10.3	4,236
Missouri	W-CG-Prem	82	1.86	1.79	0.15	0.00	0.45	0.00	1	0	-37.2	8.2	4,245

Table A2009B Input Costs, Ethanol Blending Cost and Ethanol Volumes

Year 2009 State	Gasoline Code	Gasoline Volume MMgals	Gasoline Price $/gal	Ethanol Gate Price $/gal	Ethanol Dist Cost $/gal	Ethanol Blending $/gal	Federal Subsidy $/gal	State Subsidy $/gal	State Mandate	RFG "Mandate"	Ethanol Blending Cost c/gal	Ethanol Volume MMgals	Cumulative Eth Vol MMgals
Minnesota	W-CG-Prem	124	1.84	1.79	0.15	0.00	0.45	0.00	1	0	-34.5	12.4	4,257
Hawaii	S-CG-Prem	51	2.17	1.79	0.50	0.00	0.45	0.00	1	0	-33.2	5.1	4,262
Oregon	S-CG-Reg	670	1.87	1.79	0.24	0.00	0.45	0.00	1	0	-28.4	67.0	4,329
Hawaii	W-CG-Prem	62	2.12	1.79	0.50	0.00	0.45	0.00	1	0	-28.2	6.2	4,335
Minnesota	S-CG-Reg	1020	1.74	1.79	0.15	0.00	0.45	0.00	1	0	-25.3	102.0	4,437
Missouri	S-CG-Reg	807	1.73	1.79	0.15	0.00	0.45	0.00	1	0	-23.7	80.7	4,518
Oregon	W-CG-reg	811	1.82	1.79	0.24	0.00	0.45	0.00	1	0	-23.4	81.1	4,599
Minnesota	W-CG-reg	1233	1.69	1.79	0.15	0.00	0.45	0.00	1	0	-20.3	123.3	4,722
Hawaii	S-CG-Reg	172	2.03	1.79	0.50	0.00	0.45	0.00	1	0	-19.1	17.2	4,740
Hawaii	W-CG-reg	208	1.98	1.79	0.50	0.00	0.45	0.00	1	0	-14.1	20.8	4,760
Iowa	S-CG-Prem	64	1.95	1.79	0.15	0.00	0.45	0.30	0	0	-75.4	6.4	4,767
Alaska	S-CG-Prem	13	2.58	1.79	0.50	0.00	0.45	0.00	0	0	-73.9	1.3	4,768
Illinois	S-CG-Prem	46	1.94	1.79	0.15	0.00	0.45	0.26	0	0	-70.9	4.6	4,773
Iowa	W-CG-Prem	78	1.90	1.79	0.15	0.00	0.45	0.30	0	0	-70.4	7.8	4,781
Alaska	W-CG-Prem	16	2.53	1.79	0.50	0.00	0.45	0.00	0	0	-68.9	1.6	4,782
Illinois	W-CG-Prem	56	1.89	1.79	0.15	0.00	0.45	0.26	0	0	-65.9	5.6	4,788
Alaska	S-CG-Reg	110	2.48	1.79	0.50	0.00	0.45	0.00	0	0	-64.0	11.0	4,799
South Dakota	S-CG-Prem	21	2.00	1.79	0.15	0.00	0.45	0.09	0	0	-59.8	2.1	4,801
Alaska	W-CG-reg	133	2.43	1.79	0.50	0.00	0.45	0.00	0	0	-59.0	13.3	4,814
Iowa	S-CG-Reg	494	1.75	1.79	0.15	0.00	0.45	0.30	0	0	-55.0	49.4	4,864
South Dakota	W-CG-Prem	26	1.95	1.79	0.15	0.00	0.45	0.09	0	0	-54.8	2.6	4,866
Illinois	S-CG-Reg	755	1.74	1.79	0.15	0.00	0.45	0.26	0	0	-50.1	75.5	4,942
Iowa	W-CG-reg	598	1.70	1.79	0.15	0.00	0.45	0.30	0	0	-50.0	59.8	5,002
Washington	S-CG-Prem	214	2.06	1.79	0.24	0.00	0.45	0.00	0	0	-47.4	21.4	5,023
Nebraska	S-CG-Prem	44	1.96	1.79	0.15	0.00	0.45	0.00	0	0	-46.6	4.4	5,027
New Mexico	S-CG-Prem	59	2.04	1.79	0.24	0.00	0.45	0.00	0	0	-46.3	5.9	5,033
Ohio	S-CG-Prem	162	1.95	1.79	0.15	0.00	0.45	0.00	0	0	-46.1	16.2	5,049
Wisconsin	S-CG-Prem	72	1.95	1.79	0.15	0.00	0.45	0.00	0	0	-46.0	7.2	5,057
Michigan	S-CG-Prem	132	1.95	1.79	0.15	0.00	0.45	0.00	0	0	-46.0	13.2	5,070
Illinois	W-CG-reg	913	1.69	1.79	0.15	0.00	0.45	0.26	0	0	-45.1	91.3	5,161
Indiana	S-CG-Prem	85	1.93	1.79	0.15	0.00	0.45	0.00	0	0	-43.5	8.5	5,170
Washington	W-CG-Prem	259	2.01	1.79	0.24	0.00	0.45	0.00	0	0	-42.4	25.9	5,196
New York	S-CG-Prem	99	1.98	1.79	0.22	0.00	0.45	0.00	0	0	-42.0	9.9	5,206
Wyoming	S-CG-Prem	28	1.96	1.79	0.21	0.00	0.45	0.00	0	0	-41.9	2.8	5,208
Kansas	S-CG-Prem	58	1.91	1.79	0.15	0.00	0.45	0.00	0	0	-41.8	5.8	5,214
Idaho	S-CG-Prem	49	1.96	1.79	0.21	0.00	0.45	0.00	0	0	-41.6	4.9	5,219
Nebraska	W-CG-Prem	53	1.91	1.79	0.15	0.00	0.45	0.00	0	0	-41.6	5.3	5,224
New Mexico	W-CG-Prem	72	1.99	1.79	0.24	0.00	0.45	0.00	0	0	-41.3	7.2	5,232
Montana	S-CG-Prem	61	1.96	1.79	0.21	0.00	0.45	0.00	0	0	-41.1	6.1	5,238
Ohio	W-CG-Prem	196	1.90	1.79	0.15	0.00	0.45	0.00	0	0	-41.1	19.6	5,257
Wisconsin	W-CG-Prem	88	1.90	1.79	0.15	0.00	0.45	0.00	0	0	-41.0	8.8	5,266
Michigan	W-CG-Prem	159	1.90	1.79	0.15	0.00	0.45	0.00	0	0	-41.0	15.9	5,282
Kentucky	S-CG-Prem	48	1.98	1.79	0.24	0.00	0.45	0.00	0	0	-40.2	4.8	5,287
Virginia	S-CG-Prem	64	1.98	1.79	0.24	0.00	0.45	0.00	0	0	-39.9	6.4	5,293
Vermont	S-CG-Prem	12	1.99	1.79	0.26	0.00	0.45	0.00	0	0	-39.4	1.2	5,294
Mississippi	S-CG-Prem	76	1.92	1.79	0.19	0.00	0.45	0.00	0	0	-39.1	7.6	5,302
West Virginia	S-CG-Prem	20	1.95	1.79	0.22	0.00	0.45	0.00	0	0	-38.9	2.0	5,304
Nevada	S-CG-Prem	109	2.01	1.79	0.28	0.00	0.45	0.00	0	0	-38.8	10.9	5,315
Indiana	W-CG-Prem	103	1.88	1.79	0.15	0.00	0.45	0.00	0	0	-38.5	10.3	5,325
Alabama	S-CG-Prem	102	1.96	1.79	0.24	0.00	0.45	0.00	0	0	-38.1	10.2	5,335
Georgia	S-CG-Prem	278	1.97	1.79	0.26	0.00	0.45	0.00	0	0	-38.0	27.8	5,363
Louisiana	S-CG-Prem	102	1.91	1.79	0.19	0.00	0.45	0.00	0	0	-37.9	10.2	5,373
Arkansas	S-CG-Prem	53	1.91	1.79	0.19	0.00	0.45	0.00	0	0	-37.5	5.3	5,379
North Dakota	S-CG-Prem	20	1.95	1.79	0.24	0.00	0.45	0.00	0	0	-37.4	2.0	5,381
New York	W-CG-Prem	120	1.93	1.79	0.22	0.00	0.45	0.00	0	0	-37.0	12.0	5,393
Wyoming	W-CG-Prem	34	1.91	1.79	0.21	0.00	0.45	0.00	0	0	-36.9	3.4	5,396
Kansas	W-CG-Prem	70	1.86	1.79	0.15	0.00	0.45	0.00	0	0	-36.8	7.0	5,403
Idaho	W-CG-Prem	60	1.91	1.79	0.21	0.00	0.45	0.00	0	0	-36.6	6.0	5,409
Pennsylvania	S-CG-Prem	83	1.92	1.79	0.22	0.00	0.45	0.00	0	0	-36.4	8.3	5,417
Colorado	S-CG-Prem	182	1.91	1.79	0.21	0.00	0.45	0.00	0	0	-36.3	18.2	5,436
Montana	W-CG-Prem	74	1.91	1.79	0.21	0.00	0.45	0.00	0	0	-36.1	7.4	5,443
Utah	S-CG-Prem	131	1.90	1.79	0.21	0.00	0.45	0.00	0	0	-35.9	13.1	5,456
Tennessee	S-CG-Prem	167	1.93	1.79	0.24	0.00	0.45	0.00	0	0	-35.8	16.7	5,473
South Dakota	S-CG-Reg	178	1.76	1.79	0.15	0.00	0.45	0.09	0	0	-35.8	17.8	5,490
Maryland	S-CG-Prem	7	1.93	1.79	0.24	0.00	0.45	0.00	0	0	-35.4	0.7	5,491
Texas	S-CG-Prem	335	1.88	1.79	0.19	0.00	0.45	0.00	0	0	-35.3	33.5	5,525
Kentucky	W-CG-Prem	58	1.93	1.79	0.24	0.00	0.45	0.00	0	0	-35.2	5.8	5,530
Virginia	W-CG-Prem	77	1.93	1.79	0.24	0.00	0.45	0.00	0	0	-34.9	7.7	5,538
Vermont	W-CG-Prem	14	1.94	1.79	0.26	0.00	0.45	0.00	0	0	-34.4	1.4	5,540
Mississippi	W-CG-Prem	92	1.87	1.79	0.19	0.00	0.45	0.00	0	0	-34.1	9.2	5,549
North Carolina	S-CG-Prem	229	1.93	1.79	0.26	0.00	0.45	0.00	0	0	-34.0	22.9	5,572
West Virginia	W-CG-Prem	24	1.90	1.79	0.22	0.00	0.45	0.00	0	0	-33.9	2.4	5,574
Nevada	W-CG-Prem	132	1.96	1.79	0.28	0.00	0.45	0.00	0	0	-33.8	13.2	5,587
South Carolina	S-CG-Prem	130	1.93	1.79	0.26	0.00	0.45	0.00	0	0	-33.5	13.0	5,600
Florida	S-CG-Prem	451	1.98	1.79	0.31	0.00	0.45	0.00	0	0	-33.4	45.1	5,645
Alabama	W-CG-Prem	124	1.91	1.79	0.24	0.00	0.45	0.00	0	0	-33.1	12.4	5,658
Georgia	W-CG-Prem	336	1.92	1.79	0.26	0.00	0.45	0.00	0	0	-33.0	33.6	5,691
Louisiana	W-CG-Prem	123	1.86	1.79	0.19	0.00	0.45	0.00	0	0	-32.9	12.3	5,704
Arizona	S-CG-Prem	56	1.94	1.79	0.28	0.00	0.45	0.00	0	0	-32.5	5.6	5,709
Arkansas	W-CG-Prem	64	1.86	1.79	0.19	0.00	0.45	0.00	0	0	-32.5	6.4	5,716
North Dakota	W-CG-Prem	25	1.90	1.79	0.24	0.00	0.45	0.00	0	0	-32.4	2.5	5,718
Pennsylvania	W-CG-Prem	101	1.87	1.79	0.22	0.00	0.45	0.00	0	0	-31.4	10.1	5,728
Colorado	W-CG-Prem	220	1.86	1.79	0.21	0.00	0.45	0.00	0	0	-31.3	22.0	5,750
Oklahoma	S-CG-Prem	86	1.87	1.79	0.24	0.00	0.45	0.02	0	0	-31.2	8.6	5,759
Utah	W-CG-Prem	158	1.85	1.79	0.21	0.00	0.45	0.00	0	0	-30.9	15.8	5,775

Table A2009C Input Costs, Ethanol Blending Cost and Ethanol Volumes

Year 2009 State	Gasoline Code	Gasoline Volume MMgals	Gasoline Price $/gal	Ethanol Gate Price $/gal	Ethanol Dist Cost $/gal	Ethanol Blending $/gal	Federal Subsidy $/gal	State Subsidy $/gal	State Mandate	RFG "Mandate"	Ethanol Blending Cost c/gal	Ethanol Volume MMgals	Cumulative Eth Vol MMgals
Tennessee	W-CG-Prem	203	1.88	1.79	0.24	0.00	0.45	0.00	0	0	-30.8	20.3	5,795
South Dakota	W-CG-reg	215	1.71	1.79	0.15	0.00	0.45	0.09	0	0	-30.8	21.5	5,816
Maine	S-CG-Prem	11	1.95	1.79	0.31	0.00	0.45	0.00	0	0	-30.4	1.1	5,817
Maryland	W-CG-Prem	9	1.88	1.79	0.24	0.00	0.45	0.00	0	0	-30.4	0.9	5,818
Texas	W-CG-Prem	405	1.83	1.79	0.19	0.00	0.45	0.00	0	0	-30.3	40.5	5,859
North Carolina	W-CG-Prem	277	1.88	1.79	0.26	0.00	0.45	0.00	0	0	-29.0	27.7	5,886
South Carolina	W-CG-Prem	157	1.88	1.79	0.26	0.00	0.45	0.00	0	0	-28.5	15.7	5,902
Michigan	S-CG-Reg	1992	1.78	1.79	0.15	0.00	0.45	0.00	0	0	-28.5	199.2	6,101
Florida	W-CG-Prem	546	1.93	1.79	0.31	0.00	0.45	0.00	0	0	-28.4	54.6	6,156
Ohio	S-CG-Reg	2055	1.77	1.79	0.15	0.00	0.45	0.00	0	0	-28.4	205.5	6,361
Washington	S-CG-Reg	1078	1.86	1.79	0.24	0.00	0.45	0.00	0	0	-27.5	107.8	6,469
Arizona	W-CG-Prem	68	1.89	1.79	0.28	0.00	0.45	0.00	0	0	-27.5	6.8	6,476
Indiana	S-CG-Reg	1191	1.76	1.79	0.15	0.00	0.45	0.00	0	0	-27.3	119.1	6,595
New Mexico	S-CG-Reg	398	1.85	1.79	0.24	0.00	0.45	0.00	0	0	-26.9	39.8	6,635
Wisconsin	S-CG-Reg	812	1.76	1.79	0.15	0.00	0.45	0.00	0	0	-26.6	81.2	6,716
Oklahoma	W-CG-Prem	104	1.82	1.79	0.24	0.00	0.45	0.02	0	0	-26.2	10.4	6,726
Maine	W-CG-Prem	13	1.90	1.79	0.31	0.00	0.45	0.00	0	0	-25.4	1.3	6,728
Nebraska	S-CG-Reg	327	1.74	1.79	0.15	0.00	0.45	0.00	0	0	-24.5	32.7	6,760
Idaho	S-CG-Reg	291	1.79	1.79	0.21	0.00	0.45	0.00	0	0	-24.1	29.1	6,790
Michigan	W-CG-reg	2409	1.73	1.79	0.15	0.00	0.45	0.00	0	0	-23.5	240.9	7,030
Ohio	W-CG-reg	2485	1.72	1.79	0.15	0.00	0.45	0.00	0	0	-23.4	248.5	7,279
Kansas	S-CG-Reg	687	1.72	1.79	0.15	0.00	0.45	0.00	0	0	-23.2	68.7	7,348
Montana	S-CG-Reg	283	1.77	1.79	0.21	0.00	0.45	0.00	0	0	-22.9	28.3	7,376
Washington	W-CG-reg	1303	1.81	1.79	0.24	0.00	0.45	0.00	0	0	-22.5	130.3	7,506
Indiana	W-CG-reg	1440	1.71	1.79	0.15	0.00	0.45	0.00	0	0	-22.3	144.0	7,650
Kentucky	S-CG-Reg	692	1.80	1.79	0.24	0.00	0.45	0.00	0	0	-22.1	69.2	7,719
New Mexico	W-CG-reg	482	1.80	1.79	0.24	0.00	0.45	0.00	0	0	-21.9	48.2	7,767
Nevada	S-CG-Reg	420	1.84	1.79	0.28	0.00	0.45	0.00	0	0	-21.8	42.0	7,809
Wisconsin	W-CG-reg	982	1.71	1.79	0.15	0.00	0.45	0.00	0	0	-21.6	98.2	7,908
Arkansas	S-CG-Reg	620	1.73	1.79	0.19	0.00	0.45	0.00	0	0	-20.3	62.0	7,970
Mississippi	S-CG-Reg	740	1.73	1.79	0.19	0.00	0.45	0.00	0	0	-20.3	74.0	8,044
West Virginia	S-CG-Reg	315	1.76	1.79	0.22	0.00	0.45	0.00	0	0	-20.0	31.5	8,075
New York	S-CG-Reg	1019	1.76	1.79	0.22	0.00	0.45	0.00	0	0	-19.8	101.9	8,177
Nebraska	W-CG-reg	396	1.69	1.79	0.15	0.00	0.45	0.00	0	0	-19.5	39.6	8,217
Idaho	W-CG-reg	351	1.74	1.79	0.21	0.00	0.45	0.00	0	0	-19.1	35.1	8,252
Colorado	S-CG-Reg	830	1.74	1.79	0.21	0.00	0.45	0.00	0	0	-19.0	83.0	8,335
Missouri	W-CG-reg	975	1.68	1.79	0.15	0.00	0.45	0.00	1	0	-18.7	97.5	8,432
North Dakota	S-CG-Reg	166	1.76	1.79	0.24	0.00	0.45	0.00	0	0	-18.5	16.6	8,449
Kansas	W-CG-reg	830	1.67	1.79	0.15	0.00	0.45	0.00	0	0	-18.2	83.0	8,532
Montana	W-CG-reg	342	1.72	1.79	0.21	0.00	0.45	0.00	0	0	-17.9	34.2	8,566
Utah	S-CG-Reg	484	1.72	1.79	0.21	0.00	0.45	0.00	0	0	-17.7	48.4	8,615
Wyoming	S-CG-Reg	139	1.72	1.79	0.21	0.00	0.45	0.00	0	0	-17.5	13.9	8,629
Pennsylvania	S-CG-Reg	875	1.73	1.79	0.22	0.00	0.45	0.00	0	0	-17.3	87.5	8,716
Arizona	S-CG-Reg	438	1.79	1.79	0.28	0.00	0.45	0.00	0	0	-17.1	43.8	8,760
Kentucky	W-CG-reg	836	1.75	1.79	0.24	0.00	0.45	0.00	0	0	-17.1	83.6	8,844
Louisiana	S-CG-Reg	1154	1.70	1.79	0.19	0.00	0.45	0.00	0	0	-16.9	115.4	8,959
Nevada	W-CG-reg	508	1.79	1.79	0.28	0.00	0.45	0.00	0	0	-16.8	50.8	9,010
Georgia	S-CG-Reg	2023	1.75	1.79	0.26	0.00	0.45	0.00	0	0	-15.8	202.3	9,212
Tennessee	S-CG-Reg	1448	1.73	1.79	0.24	0.00	0.45	0.00	0	0	-15.7	144.8	9,357
Virginia	S-CG-Reg	656	1.73	1.79	0.24	0.00	0.45	0.00	0	0	-15.5	65.6	9,422
Oklahoma	S-CG-Reg	879	1.72	1.79	0.24	0.00	0.45	0.02	0	0	-15.5	87.9	9,510
Alabama	S-CG-Reg	1027	1.73	1.79	0.24	0.00	0.45	0.00	0	0	-15.4	102.7	9,613
Arkansas	W-CG-reg	749	1.68	1.79	0.19	0.00	0.45	0.00	0	0	-15.3	74.9	9,688
Mississippi	W-CG-reg	895	1.68	1.79	0.19	0.00	0.45	0.00	0	0	-15.3	89.5	9,777
West Virginia	W-CG-reg	381	1.71	1.79	0.22	0.00	0.45	0.00	0	0	-15.0	38.1	9,816
Texas	S-CG-Reg	3444	1.68	1.79	0.19	0.00	0.45	0.00	0	0	-14.9	344.4	10,160
New York	W-CG-reg	1232	1.71	1.79	0.22	0.00	0.45	0.00	0	0	-14.8	123.2	10,283
South Carolina	S-CG-Reg	1089	1.74	1.79	0.26	0.00	0.45	0.00	0	0	-14.4	108.9	10,392
Colorado	W-CG-reg	1004	1.69	1.79	0.21	0.00	0.45	0.00	0	0	-14.0	100.4	10,492
New Hampshire	S-CG-Prem	4	1.73	1.79	0.26	0.00	0.45	0.00	0	0	-14.0	0.4	10,493
North Carolina	S-CG-Reg	1829	1.73	1.79	0.26	0.00	0.45	0.00	0	0	-14.0	182.9	10,676
Maryland	S-CG-Reg	87	1.71	1.79	0.24	0.00	0.45	0.00	0	0	-13.9	8.7	10,685
North Dakota	W-CG-reg	201	1.71	1.79	0.24	0.00	0.45	0.00	0	0	-13.5	20.1	10,705
Florida	S-CG-Reg	3075	1.78	1.79	0.31	0.00	0.45	0.00	0	0	-13.3	307.5	11,012
Utah	W-CG-reg	586	1.67	1.79	0.21	0.00	0.45	0.00	0	0	-12.7	58.6	11,071
Wyoming	W-CG-reg	169	1.67	1.79	0.21	0.00	0.45	0.00	0	0	-12.5	16.9	11,088
Pennsylvania	W-CG-reg	1059	1.68	1.79	0.22	0.00	0.45	0.00	0	0	-12.3	105.9	11,193
Arizona	W-CG-reg	530	1.74	1.79	0.28	0.00	0.45	0.00	0	0	-12.1	53.0	11,246
Louisiana	W-CG-reg	1395	1.65	1.79	0.19	0.00	0.45	0.00	0	0	-11.9	139.5	11,386
Georgia	W-CG-reg	2446	1.70	1.79	0.26	0.00	0.45	0.00	0	0	-10.8	244.6	11,630
Tennessee	W-CG-reg	1750	1.68	1.79	0.24	0.00	0.45	0.00	0	0	-10.7	175.0	11,805
Virginia	W-CG-reg	794	1.68	1.79	0.24	0.00	0.45	0.00	0	0	-10.5	79.4	11,885
Oklahoma	W-CG-reg	1063	1.67	1.79	0.24	0.00	0.45	0.02	0	0	-10.5	106.3	11,991
Alabama	W-CG-reg	1242	1.68	1.79	0.24	0.00	0.45	0.00	0	0	-10.4	124.2	12,115
Texas	W-CG-reg	4165	1.63	1.79	0.19	0.00	0.45	0.00	0	0	-9.9	416.5	12,532
South Carolina	W-CG-reg	1317	1.69	1.79	0.26	0.00	0.45	0.00	0	0	-9.4	131.7	12,663
New Hampshire	W-CG-Prem	5	1.68	1.79	0.26	0.00	0.45	0.00	0	0	-9.0	0.5	12,664
North Carolina	W-CG-reg	2212	1.68	1.79	0.26	0.00	0.45	0.00	0	0	-9.0	221.2	12,885
Maryland	W-CG-reg	105	1.66	1.79	0.24	0.00	0.45	0.00	0	0	-8.9	10.5	12,896
Maine	S-CG-Reg	126	1.74	1.79	0.31	0.00	0.45	0.00	0	0	-8.8	12.6	12,908
Florida	W-CG-reg	3718	1.73	1.79	0.31	0.00	0.45	0.00	0	0	-8.3	371.8	13,280
Vermont	S-CG-Reg	133	1.65	1.79	0.26	0.00	0.45	0.00	0	0	-5.9	13.3	13,293
Maine	W-CG-reg	153	1.69	1.79	0.31	0.00	0.45	0.00	0	0	-3.8	15.3	13,309
New Hampshire	S-CG-Reg	56	1.60	1.79	0.26	0.00	0.45	0.00	0	0	-1.0	5.6	13,314
Vermont	W-CG-reg	161	1.60	1.79	0.26	0.00	0.45	0.00	0	0	-0.9	16.1	13,330
New Hampshire	W-CG-reg	68	1.55	1.79	0.26	0.00	0.45	0.00	0	0	4.0	6.8	13,337

Table A2010A Input Costs, Ethanol Blending Cost and Ethanol Volumes

Year 2010 State	Gasoline Code	Gasoline Volume MMgals	Gasoline Price $/gal	Ethanol Gate Price $/gal	Ethanol Dist Cost $/gal	Ethanol Blending $/gal	Federal Subsidy $/gal	State Subsidy $/gal	State Mandate	RFG "Mandate"	Ethanol Blending Cost c/gal	Ethanol Volume MMgals	Cumulative Eth Vol MMgals
Oregon	S-CG-Reg	675	2.29	1.93	0.25	1.04	0.45	0.00	1	0	-160.5	67.5	67
Illinois	S-RFG-Reg	1295	2.19	1.93	0.16	0.79	0.45	0.26	0	1	-159.6	129.5	197
Minnesota	S-CG-Reg	1027	2.16	1.93	0.16	1.04	0.45	0.00	1	0	-156.8	102.7	300
Hawaii	S-CG-Reg	173	2.50	1.93	0.51	1.04	0.45	0.00	1	0	-154.5	17.3	317
Oregon	S-CG-Prem	95	2.49	1.93	0.25	0.78	0.45	0.00	1	0	-154.3	9.5	326
Missouri	S-CG-Reg	812	2.14	1.93	0.16	1.04	0.45	0.00	1	0	-154.2	81.2	408
Illinois	S-RFG-Prem	187	2.38	1.93	0.16	0.53	0.45	0.26	0	1	-153.3	18.7	426
Missouri	S-CG-Prem	68	2.30	1.93	0.16	0.78	0.45	0.00	1	0	-144.8	6.8	433
Minnesota	S-CG-Prem	103	2.30	1.93	0.16	0.78	0.45	0.00	1	0	-144.7	10.3	443
Hawaii	S-CG-Prem	52	2.64	1.93	0.51	0.78	0.45	0.00	1	0	-142.9	5.2	449
Wisconsin	S-RFG-Reg	338	2.20	1.93	0.16	0.79	0.45	0.00	0	1	-135.8	33.8	482
Missouri	S-RFG-Reg	417	2.20	1.93	0.16	0.79	0.45	0.00	1	1	-135.1	41.7	524
Indiana	S-RFG-Reg	199	2.19	1.93	0.16	0.79	0.45	0.00	0	1	-134.3	19.9	544
California	S-RFG-Reg	5315	2.29	1.93	0.29	0.79	0.45	0.00	0	1	-131.3	531.5	1,075
Wisconsin	S-RFG-Prem	31	2.41	1.93	0.16	0.53	0.45	0.00	0	1	-130.7	3.1	1,079
Kentucky	S-RFG-Reg	192	2.24	1.93	0.24	0.79	0.45	0.00	0	1	-130.4	19.2	1,098
New York	S-RFG-Reg	1238	2.21	1.93	0.23	0.79	0.45	0.00	0	1	-130.0	123.8	1,222
Pennsylvania	S-RFG-Reg	390	2.20	1.93	0.23	0.79	0.45	0.00	0	1	-128.2	39.0	1,261
Arizona	S-RFG-Reg	790	2.25	1.93	0.29	0.79	0.45	0.00	0	1	-127.3	79.0	1,340
Illinois	W-RFG-Prem	226	2.33	1.93	0.16	0.32	0.45	0.26	0	1	-126.8	22.6	1,362
Massachusetts	S-RFG-Reg	1085	2.20	1.93	0.24	0.79	0.45	0.00	0	1	-127.0	108.5	1,471
Texas	S-RFG-Reg	2546	2.15	1.93	0.20	0.79	0.45	0.00	0	1	-126.1	254.6	1,725
Missouri	S-RFG-Prem	41	2.36	1.93	0.16	0.53	0.45	0.00	1	1	-125.7	4.1	1,729
Maryland	S-RFG-Reg	748	2.19	1.93	0.24	0.79	0.45	0.00	0	1	-125.5	74.8	1,804
Virginia	S-RFG-Reg	781	2.19	1.93	0.24	0.79	0.45	0.00	0	1	-125.5	78.1	1,882
New York	S-RFG-Prem	298	2.42	1.93	0.23	0.53	0.45	0.00	0	1	-125.4	29.8	1,912
Connecticut	S-RFG-Reg	638	2.18	1.93	0.24	0.79	0.45	0.00	0	1	-125.2	63.8	1,976
Indiana	S-RFG-Prem	21	2.35	1.93	0.16	0.53	0.45	0.00	0	1	-125.1	2.1	1,978
Rhode Island	S-RFG-Reg	261	2.18	1.93	0.24	0.79	0.45	0.00	0	1	-124.8	26.1	2,004
DC	S-RFG-Reg	26	2.17	1.93	0.24	0.79	0.45	0.00	0	1	-123.9	2.6	2,007
New Hampshire	S-RFG-Reg	186	2.19	1.93	0.26	0.79	0.45	0.00	0	1	-123.8	18.6	2,025
Virginia	S-RFG-Prem	152	2.41	1.93	0.24	0.53	0.45	0.00	0	1	-122.7	15.2	2,040
California	S-RFG-Prem	1536	2.45	1.93	0.29	0.53	0.45	0.00	0	1	-122.0	153.6	2,194
Kentucky	S-RFG-Prem	19	2.40	1.93	0.24	0.53	0.45	0.00	0	1	-121.8	1.9	2,196
Pennsylvania	S-RFG-Prem	65	2.38	1.93	0.23	0.53	0.45	0.00	0	1	-121.2	6.5	2,202
New Jersey	S-RFG-Reg	1620	2.14	1.93	0.24	0.79	0.45	0.00	0	1	-121.2	162.0	2,364
Delaware	S-RFG-Reg	190	2.14	1.93	0.24	0.79	0.45	0.00	0	1	-121.1	19.0	2,383
Maryland	S-RFG-Prem	137	2.40	1.93	0.24	0.53	0.45	0.00	0	1	-120.9	13.7	2,397
Massachusetts	S-RFG-Prem	165	2.39	1.93	0.24	0.53	0.45	0.00	0	1	-120.3	16.5	2,414
DC	S-RFG-Prem	7	2.39	1.93	0.24	0.53	0.45	0.00	0	1	-120.2	0.7	2,414
Arizona	S-RFG-Prem	123	2.42	1.93	0.29	0.53	0.45	0.00	0	1	-119.5	12.3	2,427
Maine	S-RFG-Reg	187	2.20	1.93	0.32	0.79	0.45	0.00	0	1	-119.2	18.7	2,445
Connecticut	S-RFG-Prem	105	2.38	1.93	0.24	0.53	0.45	0.00	0	1	-119.0	10.5	2,456
Texas	S-RFG-Prem	395	2.33	1.93	0.20	0.53	0.45	0.00	0	1	-118.5	39.5	2,495
Illinois	W-RFG-reg	1566	2.14	1.93	0.16	0.42	0.45	0.26	0	1	-117.7	156.6	2,652
Rhode Island	S-RFG-Prem	39	2.37	1.93	0.24	0.53	0.45	0.00	0	1	-118.0	3.9	2,656
New Hampshire	S-RFG-Prem	21	2.38	1.93	0.26	0.53	0.45	0.00	0	1	-117.8	2.1	2,658
New Jersey	S-RFG-Prem	262	2.33	1.93	0.24	0.53	0.45	0.00	0	1	-114.2	26.2	2,684
Maine	S-RFG-Prem	12	2.39	1.93	0.32	0.53	0.45	0.00	0	1	-113.5	1.2	2,685
Delaware	S-RFG-Prem	24	2.31	1.93	0.24	0.53	0.45	0.00	0	1	-112.3	2.4	2,688
Wisconsin	W-RFG-Prem	37	2.36	1.93	0.16	0.32	0.45	0.00	0	1	-104.3	3.7	2,691
Oregon	W-CG-Prem	115	2.44	1.93	0.25	0.32	0.45	0.00	1	0	-102.9	11.5	2,703
Missouri	W-RFG-Prem	50	2.31	1.93	0.16	0.32	0.45	0.00	1	1	-99.3	5.0	2,708
New York	W-RFG-Prem	361	2.37	1.93	0.23	0.32	0.45	0.00	0	1	-98.9	36.1	2,744
Indiana	W-RFG-Prem	25	2.30	1.93	0.16	0.32	0.45	0.00	0	1	-98.7	2.5	2,746
Virginia	W-RFG-Prem	184	2.36	1.93	0.24	0.32	0.45	0.00	0	1	-96.2	18.4	2,765
California	W-RFG-Prem	1857	2.40	1.93	0.29	0.32	0.45	0.00	0	1	-95.5	185.7	2,950
Kentucky	W-RFG-Prem	23	2.35	1.93	0.24	0.32	0.45	0.00	0	1	-95.4	2.3	2,953
Pennsylvania	W-RFG-Prem	79	2.33	1.93	0.23	0.32	0.45	0.00	0	1	-94.8	7.9	2,961
Maryland	W-RFG-Prem	165	2.35	1.93	0.24	0.32	0.45	0.00	0	1	-94.5	16.5	2,977
Wisconsin	W-RFG-reg	408	2.15	1.93	0.16	0.42	0.45	0.00	0	1	-94.0	40.8	3,018
Massachusetts	W-RFG-Prem	200	2.34	1.93	0.24	0.32	0.45	0.00	0	1	-93.9	20.0	3,038
DC	W-RFG-Prem	8	2.34	1.93	0.24	0.32	0.45	0.00	0	1	-93.7	0.8	3,039
Oregon	W-CG-reg	816	2.24	1.93	0.25	0.42	0.45	0.00	1	0	-93.6	81.6	3,120
Missouri	W-CG-Prem	82	2.25	1.93	0.16	0.32	0.45	0.00	1	0	-93.3	8.2	3,129
Missouri	W-RFG-reg	504	2.15	1.93	0.16	0.42	0.45	0.00	1	0	-93.3	50.4	3,179
Minnesota	W-CG-Prem	125	2.25	1.93	0.16	0.32	0.45	0.00	1	0	-93.2	12.5	3,191
Arizona	W-RFG-Prem	149	2.37	1.93	0.29	0.32	0.45	0.00	0	1	-93.0	14.9	3,206
Connecticut	W-RFG-Prem	127	2.33	1.93	0.24	0.32	0.45	0.00	0	1	-92.6	12.7	3,219
Indiana	W-RFG-reg	240	2.14	1.93	0.16	0.42	0.45	0.00	0	1	-92.5	24.0	3,243
Texas	W-RFG-Prem	478	2.28	1.93	0.20	0.32	0.45	0.00	0	1	-92.1	47.8	3,291
Rhode Island	W-RFG-Prem	47	2.32	1.93	0.24	0.32	0.45	0.00	0	1	-91.6	4.7	3,295
Hawaii	W-CG-Prem	63	2.59	1.93	0.51	0.32	0.45	0.00	1	0	-91.4	6.3	3,302
New Hampshire	W-RFG-Prem	25	2.33	1.93	0.26	0.32	0.45	0.00	0	1	-91.4	2.5	3,304
Minnesota	W-CG-reg	1242	2.11	1.93	0.16	0.42	0.45	0.00	1	0	-89.9	124.2	3,428
California	W-RFG-reg	6427	2.24	1.93	0.29	0.42	0.45	0.00	0	1	-89.4	642.7	4,071
Kentucky	W-RFG-reg	232	2.19	1.93	0.24	0.42	0.45	0.00	0	1	-88.6	23.2	4,094
New York	W-RFG-reg	1497	2.16	1.93	0.23	0.42	0.45	0.00	0	1	-88.1	149.7	4,244
New Jersey	W-RFG-Prem	316	2.28	1.93	0.24	0.32	0.45	0.00	0	1	-87.8	31.6	4,276
Hawaii	W-CG-reg	209	2.45	1.93	0.51	0.42	0.45	0.00	1	0	-87.6	20.9	4,297
Missouri	W-CG-reg	982	2.09	1.93	0.16	0.42	0.45	0.00	1	0	-87.3	98.2	4,395
Maine	W-RFG-Prem	15	2.34	1.93	0.32	0.32	0.45	0.00	0	1	-87.0	1.5	4,396
Pennsylvania	W-RFG-reg	472	2.15	1.93	0.23	0.42	0.45	0.00	0	1	-86.4	47.2	4,443
Delaware	W-RFG-Prem	28	2.26	1.93	0.24	0.32	0.45	0.00	0	1	-85.9	2.8	4,446
Arizona	W-RFG-reg	956	2.20	1.93	0.29	0.42	0.45	0.00	0	1	-85.4	95.6	4,542

Table A2010B Input Costs, Ethanol Blending Cost and Ethanol Volumes

Year 2010 State	Gasoline Code	Gasoline Volume MMgals	Gasoline Price $/gal	Ethanol Gate Price $/gal	Ethanol Dist Cost $/gal	Ethanol Blending $/gal	Federal Subsidy $/gal	State Subsidy $/gal	State Mandate	RFG "Mandate"	Ethanol Blending Cost c/gal	Ethanol Volume MMgals	Cumulative Eth Vol MMgals
Massachusetts	W-RFG-reg	1312	2.15	1.93	0.24	0.42	0.45	0.00	0	1	-85.1	131.2	4,673
Texas	W-RFG-reg	3078	2.10	1.93	0.20	0.42	0.45	0.00	0	1	-84.2	307.8	4,981
Maryland	W-RFG-reg	904	2.14	1.93	0.24	0.42	0.45	0.00	0	1	-83.7	90.4	5,071
Virginia	W-RFG-reg	945	2.14	1.93	0.24	0.42	0.45	0.00	0	1	-83.6	94.5	5,166
Connecticut	W-RFG-reg	771	2.13	1.93	0.24	0.42	0.45	0.00	0	1	-83.3	77.1	5,243
Rhode Island	W-RFG-reg	315	2.13	1.93	0.24	0.42	0.45	0.00	0	1	-82.9	31.5	5,274
DC	W-RFG-reg	31	2.12	1.93	0.24	0.42	0.45	0.00	0	1	-82.0	3.1	5,278
New Hampshire	W-RFG-reg	225	2.14	1.93	0.26	0.42	0.45	0.00	0	1	-81.9	22.5	5,300
New Jersey	W-RFG-reg	1959	2.09	1.93	0.24	0.42	0.45	0.00	0	1	-79.3	195.9	5,496
Delaware	W-RFG-reg	229	2.09	1.93	0.24	0.42	0.45	0.00	0	1	-79.2	22.9	5,519
Maine	W-RFG-reg	227	2.15	1.93	0.32	0.42	0.45	0.00	0	1	-77.3	22.7	5,542
Alaska	S-CG-Reg	111	2.84	1.93	0.51	1.04	0.45	0.00	0	0	-189.0	11.1	5,553
Iowa	S-CG-Reg	498	2.19	1.93	0.16	1.04	0.45	0.30	0	0	-188.9	49.8	5,602
Alaska	S-CG-Prem	13	3.01	1.93	0.51	0.78	0.45	0.00	0	0	-180.0	1.3	5,604
Iowa	S-CG-Prem	65	2.35	1.93	0.16	0.78	0.45	0.30	0	0	-179.5	6.5	5,610
Illinois	S-CG-Reg	761	2.13	1.93	0.16	1.04	0.45	0.26	0	0	-178.6	76.1	5,686
Illinois	S-CG-Prem	47	2.32	1.93	0.16	0.78	0.45	0.26	0	0	-172.3	4.7	5,691
South Dakota	S-CG-Reg	179	2.21	1.93	0.16	1.04	0.45	0.09	0	0	-171.0	17.9	5,709
Idaho	S-CG-Reg	293	2.31	1.93	0.21	1.04	0.45	0.00	0	0	-165.9	29.3	5,738
South Dakota	S-CG-Prem	22	2.41	1.93	0.16	0.78	0.45	0.09	0	0	-164.7	2.2	5,740
Utah	S-CG-Reg	488	2.28	1.93	0.21	1.04	0.45	0.00	0	0	-163.4	48.8	5,789
Nebraska	S-CG-Reg	329	2.19	1.93	0.16	1.04	0.45	0.00	0	0	-159.6	32.9	5,822
Washington	S-CG-Reg	1085	2.28	1.93	0.25	1.04	0.45	0.00	0	0	-159.5	108.5	5,930
Idaho	S-CG-Prem	50	2.49	1.93	0.21	0.78	0.45	0.00	0	0	-158.5	5.0	5,935
Montana	S-CG-Reg	285	2.23	1.93	0.21	1.04	0.45	0.00	0	0	-157.8	28.5	5,964
Utah	S-CG-Prem	132	2.48	1.93	0.21	0.78	0.45	0.00	0	0	-157.1	13.2	5,977
Michigan	S-CG-Reg	2006	2.16	1.93	0.16	1.04	0.45	0.00	0	0	-156.0	200.6	6,178
Ohio	S-CG-Reg	2069	2.15	1.93	0.16	1.04	0.45	0.00	0	0	-155.8	206.9	6,384
North Dakota	S-CG-Reg	167	2.23	1.93	0.24	1.04	0.45	0.00	0	0	-155.3	16.7	6,401
Wisconsin	S-CG-Reg	818	2.14	1.93	0.16	1.04	0.45	0.00	0	0	-154.9	81.8	6,483
Kansas	S-CG-Reg	691	2.14	1.93	0.16	1.04	0.45	0.00	0	0	-154.4	69.1	6,552
New Mexico	S-CG-Reg	401	2.22	1.93	0.24	1.04	0.45	0.00	0	0	-154.2	40.1	6,592
Wyoming	S-CG-Reg	140	2.19	1.93	0.21	1.04	0.45	0.00	0	0	-153.5	14.0	6,606
Indiana	S-CG-Reg	1199	2.13	1.93	0.16	1.04	0.45	0.00	0	0	-153.4	119.9	6,726
Nevada	S-CG-Reg	423	2.25	1.93	0.29	1.04	0.45	0.00	0	0	-152.8	42.3	6,768
Washington	S-CG-Prem	215	2.47	1.93	0.25	0.78	0.45	0.00	0	0	-152.7	21.5	6,790
Montana	S-CG-Prem	61	2.42	1.93	0.21	0.78	0.45	0.00	0	0	-151.7	6.1	6,796
Nebraska	S-CG-Prem	44	2.36	1.93	0.16	0.78	0.45	0.00	0	0	-150.9	4.4	6,800
Arkansas	S-CG-Reg	624	2.14	1.93	0.20	1.04	0.45	0.00	0	0	-150.0	62.4	6,863
Wisconsin	S-CG-Prem	73	2.35	1.93	0.16	0.78	0.45	0.00	0	0	-149.7	7.3	6,870
Colorado	S-CG-Reg	836	2.15	1.93	0.21	1.04	0.45	0.00	0	0	-149.7	83.6	6,954
Kentucky	S-CG-Reg	696	2.18	1.93	0.24	1.04	0.45	0.00	0	0	-149.5	69.6	7,023
Wyoming	S-CG-Prem	28	2.40	1.93	0.21	0.78	0.45	0.00	0	0	-149.1	2.8	7,026
New York	S-CG-Reg	1026	2.15	1.93	0.23	1.04	0.45	0.00	0	0	-149.0	102.6	7,129
Louisiana	S-CG-Reg	1161	2.11	1.93	0.20	1.04	0.45	0.00	0	0	-147.8	116.1	7,245
Mississippi	S-CG-Reg	745	2.11	1.93	0.20	1.04	0.45	0.00	0	0	-147.8	74.5	7,319
New Mexico	S-CG-Prem	60	2.41	1.93	0.24	0.78	0.45	0.00	0	0	-147.7	6.0	7,325
West Virginia	S-CG-Reg	317	2.14	1.93	0.23	1.04	0.45	0.00	0	0	-147.4	31.7	7,357
Pennsylvania	S-CG-Reg	881	2.14	1.93	0.23	1.04	0.45	0.00	0	0	-147.3	88.1	7,445
North Dakota	S-CG-Prem	20	2.41	1.93	0.24	0.78	0.45	0.00	0	0	-147.0	2.0	7,447
Michigan	S-CG-Prem	132	2.32	1.93	0.16	0.78	0.45	0.00	0	0	-146.9	13.2	7,461
Ohio	S-CG-Prem	163	2.32	1.93	0.16	0.78	0.45	0.00	0	0	-146.9	16.3	7,477
Oklahoma	S-CG-Reg	885	2.13	1.93	0.24	1.04	0.45	0.02	0	0	-146.9	88.5	7,565
Vermont	S-CG-Reg	134	2.16	1.93	0.26	1.04	0.45	0.00	0	0	-146.5	13.4	7,579
Arizona	S-CG-Reg	441	2.19	1.93	0.29	1.04	0.45	0.00	0	0	-146.3	44.1	7,623
Georgia	S-CG-Reg	2036	2.16	1.93	0.26	1.04	0.45	0.00	0	0	-145.8	203.6	7,827
Alabama	S-CG-Reg	1034	2.14	1.93	0.24	1.04	0.45	0.00	0	0	-145.5	103.4	7,930
Tennessee	S-CG-Reg	1457	2.13	1.93	0.24	1.04	0.45	0.00	0	0	-145.2	145.7	8,076
Texas	S-CG-Reg	3467	2.09	1.93	0.20	1.04	0.45	0.00	0	0	-145.1	346.7	8,422
Maryland	S-CG-Reg	88	2.13	1.93	0.24	1.04	0.45	0.00	0	0	-144.6	8.8	8,431
Virginia	S-CG-Reg	661	2.13	1.93	0.24	1.04	0.45	0.00	0	0	-144.5	66.1	8,497
New York	S-CG-Prem	100	2.36	1.93	0.23	0.78	0.45	0.00	0	0	-144.4	10.0	8,507
Indiana	S-CG-Prem	86	2.29	1.93	0.16	0.78	0.45	0.00	0	0	-144.1	8.6	8,516
Kansas	S-CG-Prem	59	2.29	1.93	0.16	0.78	0.45	0.00	0	0	-144.1	5.9	8,522
North Carolina	S-CG-Reg	1842	2.14	1.93	0.26	1.04	0.45	0.00	0	0	-143.6	184.2	8,706
South Carolina	S-CG-Reg	1097	2.14	1.93	0.26	1.04	0.45	0.00	0	0	-143.6	109.7	8,815
Arkansas	S-CG-Prem	53	2.32	1.93	0.20	0.78	0.45	0.00	0	0	-143.2	5.3	8,821
Colorado	S-CG-Prem	184	2.34	1.93	0.21	0.78	0.45	0.00	0	0	-143.1	18.4	8,839
New Hampshire	S-CG-Reg	57	2.13	1.93	0.26	1.04	0.45	0.00	0	0	-142.8	5.7	8,845
Nevada	S-CG-Prem	110	2.41	1.93	0.29	0.78	0.45	0.00	0	0	-142.8	11.0	8,856
Virginia	S-CG-Prem	64	2.35	1.93	0.24	0.78	0.45	0.00	0	0	-141.7	6.4	8,862
Georgia	S-CG-Prem	279	2.37	1.93	0.26	0.78	0.45	0.00	0	0	-141.6	27.9	8,890
Alabama	S-CG-Prem	103	2.35	1.93	0.24	0.78	0.45	0.00	0	0	-141.6	10.3	8,900
Vermont	S-CG-Prem	12	2.37	1.93	0.26	0.78	0.45	0.00	0	0	-141.5	1.2	8,902
Florida	S-CG-Reg	3095	2.16	1.93	0.32	1.04	0.45	0.00	0	0	-140.9	309.5	9,211
Kentucky	S-CG-Prem	49	2.34	1.93	0.24	0.78	0.45	0.00	0	0	-140.8	4.9	9,216
Mississippi	S-CG-Prem	77	2.29	1.93	0.20	0.78	0.45	0.00	0	0	-140.4	7.7	9,224
Pennsylvania	S-CG-Prem	84	2.32	1.93	0.23	0.78	0.45	0.00	0	0	-140.2	8.4	9,232
Maryland	S-CG-Prem	7	2.34	1.93	0.24	0.78	0.45	0.00	0	0	-140.0	0.7	9,233
West Virginia	S-CG-Prem	20	2.31	1.93	0.23	0.78	0.45	0.00	0	0	-139.4	2.0	9,235
Louisiana	S-CG-Prem	103	2.28	1.93	0.20	0.78	0.45	0.00	0	0	-139.3	10.3	9,245
Arizona	S-CG-Prem	56	2.36	1.93	0.29	0.78	0.45	0.00	0	0	-138.5	5.6	9,251
Maine	S-CG-Reg	127	2.14	1.93	0.32	1.04	0.45	0.00	0	0	-138.2	12.7	9,263
Texas	S-CG-Prem	337	2.27	1.93	0.20	0.78	0.45	0.00	0	0	-137.6	33.7	9,297
Tennessee	S-CG-Prem	169	2.31	1.93	0.24	0.78	0.45	0.00	0	0	-137.5	16.9	9,314

Table A2010C Input Costs, Ethanol Blending Cost and Ethanol Volumes

Year 2010 State	Gasoline Code	Gasoline Volume MMgals	Gasoline Price $/gal	Ethanol Gate Price $/gal	Ethanol Dist Cost $/gal	Ethanol Blending $/gal	Federal Subsidy $/gal	State Subsidy $/gal	State Mandate	RFG "Mandate"	Ethanol Blending Cost c/gal	Ethanol Volume MMgals	Cumulative Eth Vol MMgals
North Carolina	S-CG-Prem	230	2.33	1.93	0.26	0.78	0.45	0.00	0	0	-137.3	23.0	9,337
New Hampshire	S-CG-Prem	4	2.32	1.93	0.26	0.78	0.45	0.00	0	0	-136.9	0.4	9,337
Oklahoma	S-CG-Prem	87	2.29	1.93	0.24	0.78	0.45	0.02	0	0	-136.6	8.7	9,346
Florida	S-CG-Prem	454	2.37	1.93	0.32	0.78	0.45	0.00	0	0	-136.1	45.4	9,392
South Carolina	S-CG-Prem	130	2.31	1.93	0.26	0.78	0.45	0.00	0	0	-136.0	13.0	9,405
Maine	S-CG-Prem	11	2.33	1.93	0.32	0.78	0.45	0.00	0	0	-132.5	1.1	9,406
Alaska	W-CG-Prem	16	2.96	1.93	0.51	0.32	0.45	0.00	0	0	-128.5	1.6	9,407
Iowa	W-CG-Prem	78	2.30	1.93	0.16	0.32	0.45	0.30	0	0	-128.0	7.8	9,415
Alaska	W-CG-reg	134	2.79	1.93	0.51	0.42	0.45	0.00	0	0	-122.1	13.4	9,429
Iowa	W-CG-reg	602	2.14	1.93	0.16	0.42	0.45	0.30	0	0	-122.0	60.2	9,489
Illinois	W-CG-Prem	56	2.27	1.93	0.16	0.32	0.45	0.26	0	0	-120.8	5.6	9,494
South Dakota	W-CG-Prem	26	2.36	1.93	0.16	0.32	0.45	0.09	0	0	-113.3	2.6	9,497
Illinois	W-CG-reg	920	2.08	1.93	0.16	0.42	0.45	0.26	0	0	-111.7	92.0	9,589
Idaho	W-CG-Prem	60	2.44	1.93	0.21	0.32	0.45	0.00	0	0	-107.0	6.0	9,595
Utah	W-CG-Prem	159	2.43	1.93	0.21	0.32	0.45	0.00	0	0	-105.6	15.9	9,611
South Dakota	W-CG-reg	216	2.16	1.93	0.16	0.42	0.45	0.09	0	0	-104.1	21.6	9,632
Washington	W-CG-Prem	260	2.42	1.93	0.25	0.32	0.45	0.00	0	0	-101.3	26.0	9,658
Montana	W-CG-Prem	74	2.37	1.93	0.21	0.32	0.45	0.00	0	0	-100.2	7.4	9,666
Nebraska	W-CG-Prem	53	2.31	1.93	0.16	0.32	0.45	0.00	0	0	-99.4	5.3	9,671
Idaho	W-CG-reg	354	2.26	1.93	0.21	0.42	0.45	0.00	0	0	-99.0	35.4	9,707
Wisconsin	W-CG-Prem	88	2.30	1.93	0.16	0.32	0.45	0.00	0	0	-98.3	8.8	9,715
Wyoming	W-CG-Prem	34	2.35	1.93	0.21	0.32	0.45	0.00	0	0	-97.6	3.4	9,719
Utah	W-CG-reg	590	2.23	1.93	0.21	0.42	0.45	0.00	0	0	-96.5	59.0	9,778
New Mexico	W-CG-Prem	72	2.36	1.93	0.24	0.32	0.45	0.00	0	0	-96.2	7.2	9,785
North Dakota	W-CG-Prem	25	2.36	1.93	0.24	0.32	0.45	0.00	0	0	-95.5	2.5	9,787
Michigan	W-CG-Prem	160	2.27	1.93	0.16	0.32	0.45	0.00	0	0	-95.4	16.0	9,803
Ohio	W-CG-Prem	198	2.27	1.93	0.16	0.32	0.45	0.00	0	0	-95.4	19.8	9,823
New York	W-CG-Prem	121	2.31	1.93	0.23	0.32	0.45	0.00	0	0	-92.9	12.1	9,835
Nebraska	W-CG-reg	398	2.14	1.93	0.16	0.42	0.45	0.00	0	0	-92.7	39.8	9,875
Indiana	W-CG-Prem	104	2.24	1.93	0.16	0.32	0.45	0.00	0	0	-92.7	10.4	9,886
Kansas	W-CG-Prem	71	2.24	1.93	0.16	0.32	0.45	0.00	0	0	-92.6	7.1	9,893
Washington	W-CG-reg	1312	2.23	1.93	0.25	0.42	0.45	0.00	0	0	-92.6	131.2	10,024
Arkansas	W-CG-Prem	64	2.27	1.93	0.20	0.32	0.45	0.00	0	0	-91.7	6.4	10,030
Colorado	W-CG-Prem	222	2.29	1.93	0.21	0.32	0.45	0.00	0	0	-91.6	22.2	10,052
Nevada	W-CG-Prem	133	2.36	1.93	0.29	0.32	0.45	0.00	0	0	-91.3	13.3	10,066
Montana	W-CG-reg	344	2.18	1.93	0.21	0.42	0.45	0.00	0	0	-90.9	34.4	10,100
Virginia	W-CG-Prem	77	2.30	1.93	0.24	0.32	0.45	0.00	0	0	-90.2	7.7	10,108
Georgia	W-CG-Prem	338	2.32	1.93	0.26	0.32	0.45	0.00	0	0	-90.1	33.8	10,142
Alabama	W-CG-Prem	125	2.30	1.93	0.24	0.32	0.45	0.00	0	0	-90.1	12.5	10,154
Vermont	W-CG-Prem	15	2.32	1.93	0.26	0.32	0.45	0.00	0	0	-90.0	1.5	10,156
Kentucky	W-CG-Prem	59	2.29	1.93	0.24	0.32	0.45	0.00	0	0	-89.4	5.9	10,161
Michigan	W-CG-reg	2425	2.11	1.93	0.16	0.42	0.45	0.00	0	0	-89.1	242.5	10,404
Ohio	W-CG-reg	2501	2.10	1.93	0.16	0.42	0.45	0.00	0	0	-88.9	250.1	10,654
Mississippi	W-CG-Prem	93	2.24	1.93	0.20	0.32	0.45	0.00	0	0	-88.9	9.3	10,663
Pennsylvania	W-CG-Prem	102	2.27	1.93	0.23	0.32	0.45	0.00	0	0	-88.8	10.2	10,674
Maryland	W-CG-Prem	9	2.29	1.93	0.24	0.32	0.45	0.00	0	0	-88.5	0.9	10,674
North Dakota	W-CG-reg	202	2.18	1.93	0.24	0.42	0.45	0.00	0	0	-88.4	20.2	10,695
Wisconsin	W-CG-reg	989	2.09	1.93	0.16	0.42	0.45	0.00	0	0	-88.0	98.9	10,794
West Virginia	W-CG-Prem	24	2.26	1.93	0.23	0.32	0.45	0.00	0	0	-87.9	2.4	10,796
Louisiana	W-CG-Prem	124	2.23	1.93	0.20	0.32	0.45	0.00	0	0	-87.8	12.4	10,808
Kansas	W-CG-reg	836	2.09	1.93	0.16	0.42	0.45	0.00	0	0	-87.5	83.6	10,892
New Mexico	W-CG-reg	485	2.17	1.93	0.24	0.42	0.45	0.00	0	0	-87.3	48.5	10,940
Arizona	W-CG-Prem	68	2.31	1.93	0.29	0.32	0.45	0.00	0	0	-87.0	6.8	10,947
Wyoming	W-CG-reg	170	2.14	1.93	0.21	0.42	0.45	0.00	0	0	-86.6	17.0	10,964
Indiana	W-CG-reg	1449	2.08	1.93	0.16	0.42	0.45	0.00	0	0	-86.5	144.9	11,109
Texas	W-CG-Prem	407	2.22	1.93	0.20	0.32	0.45	0.00	0	0	-86.1	40.7	11,150
Tennessee	W-CG-Prem	204	2.26	1.93	0.24	0.32	0.45	0.00	0	0	-86.0	20.4	11,170
Nevada	W-CG-reg	512	2.20	1.93	0.29	0.42	0.45	0.00	0	0	-85.9	51.2	11,221
North Carolina	W-CG-Prem	279	2.28	1.93	0.26	0.32	0.45	0.00	0	0	-85.8	27.9	11,249
New Hampshire	W-CG-Prem	5	2.27	1.93	0.26	0.32	0.45	0.00	0	0	-85.4	0.5	11,250
Oklahoma	W-CG-Prem	105	2.24	1.93	0.24	0.32	0.45	0.02	0	0	-85.1	10.5	11,260
Florida	W-CG-Prem	549	2.32	1.93	0.32	0.32	0.45	0.00	0	0	-84.6	54.9	11,315
South Carolina	W-CG-Prem	158	2.26	1.93	0.26	0.32	0.45	0.00	0	0	-84.5	15.8	11,331
Arkansas	W-CG-reg	754	2.09	1.93	0.20	0.42	0.45	0.00	0	0	-83.1	75.4	11,406
Colorado	W-CG-reg	1011	2.10	1.93	0.21	0.42	0.45	0.00	0	0	-82.8	101.1	11,508
Kentucky	W-CG-reg	842	2.13	1.93	0.24	0.42	0.45	0.00	0	0	-82.6	84.2	11,592
New York	W-CG-reg	1240	2.10	1.93	0.23	0.42	0.45	0.00	0	0	-82.1	124.0	11,716
Maine	W-CG-Prem	13	2.28	1.93	0.32	0.32	0.45	0.00	0	0	-81.0	1.3	11,717
Louisiana	W-CG-reg	1404	2.06	1.93	0.20	0.42	0.45	0.00	0	0	-80.9	140.4	11,857
Mississippi	W-CG-reg	901	2.06	1.93	0.20	0.42	0.45	0.00	0	0	-80.9	90.1	11,948
West Virginia	W-CG-reg	384	2.09	1.93	0.23	0.42	0.45	0.00	0	0	-80.5	38.4	11,986
Pennsylvania	W-CG-reg	1066	2.09	1.93	0.23	0.42	0.45	0.00	0	0	-80.4	106.6	12,093
Oklahoma	W-CG-reg	1070	2.08	1.93	0.24	0.42	0.45	0.02	0	0	-80.0	107.0	12,200
Vermont	W-CG-reg	162	2.11	1.93	0.26	0.42	0.45	0.00	0	0	-79.6	16.2	12,216
Arizona	W-CG-reg	533	2.14	1.93	0.29	0.42	0.45	0.00	0	0	-79.4	53.3	12,269
Georgia	W-CG-reg	2462	2.11	1.93	0.26	0.42	0.45	0.00	0	0	-78.9	246.2	12,515
Alabama	W-CG-reg	1250	2.09	1.93	0.24	0.42	0.45	0.00	0	0	-78.6	125.0	12,640
Tennessee	W-CG-reg	1762	2.08	1.93	0.24	0.42	0.45	0.00	0	0	-78.3	176.2	12,817
Texas	W-CG-reg	4193	2.04	1.93	0.20	0.42	0.45	0.00	0	0	-78.2	419.3	13,236
Maryland	W-CG-reg	106	2.08	1.93	0.24	0.42	0.45	0.00	0	0	-77.7	10.6	13,246
Virginia	W-CG-reg	799	2.08	1.93	0.24	0.42	0.45	0.00	0	0	-77.6	79.9	13,326
North Carolina	W-CG-reg	2227	2.09	1.93	0.26	0.42	0.45	0.00	0	0	-76.7	222.7	13,549
South Carolina	W-CG-reg	1326	2.09	1.93	0.26	0.42	0.45	0.00	0	0	-76.7	132.6	13,682
New Hampshire	W-CG-reg	69	2.08	1.93	0.26	0.42	0.45	0.00	0	0	-75.9	6.9	13,688
Florida	W-CG-reg	3743	2.11	1.93	0.32	0.42	0.45	0.00	0	0	-74.0	374.3	14,063
Maine	W-CG-reg	154	2.09	1.93	0.32	0.42	0.45	0.00	0	0	-71.3	15.4	14,078

Table A2011A Input Costs, Ethanol Blending Cost and Ethanol Volumes

Year 2011 State	Gasoline Code	Gasoline Volume MMgals	Gasoline Price $/gal	Ethanol Gate Price $/gal	Ethanol Dist Cost $/gal	Ethanol Blending $/gal	Federal Subsidy $/gal	State Subsidy $/gal	State Mandate	RFG "Mandate"	Ethanol Blending Cost c/gal	Ethanol Volume MMgals	Cumulative Eth Vol MMgals
Hawaii	S-CG-Reg	168	3.48	2.70	0.53	1.01	0.45	0.00	1	0	-170.7	16.8	17
Minnesota	S-CG-Reg	998	2.87	2.70	0.16	1.01	0.45	0.00	1	0	-146.8	99.8	117
Oregon	S-CG-Reg	656	2.96	2.70	0.26	1.01	0.45	0.00	1	0	-145.8	65.6	182
Missouri	S-CG-Reg	789	2.85	2.70	0.16	1.01	0.45	0.00	1	0	-144.9	78.9	261
Florida	S-CG-Reg	3008	2.86	2.70	0.33	1.01	0.45	0.00	1	0	-129.3	300.8	562
Hawaii	S-CG-Prem	50	3.67	2.70	0.53	0.76	0.45	0.00	1	0	-165.3	5.0	567
Missouri	S-RFG-Reg	405	2.91	2.70	0.16	0.66	0.45	0.00	1	0	-115.9	40.5	607
Minnesota	S-CG-Prem	100	3.06	2.70	0.16	0.76	0.45	0.00	1	0	-140.9	10.0	617
Oregon	S-CG-Prem	92	3.16	2.70	0.26	0.76	0.45	0.00	1	0	-140.7	9.2	627
Missouri	S-CG-Prem	66	3.05	2.70	0.16	0.76	0.45	0.00	1	0	-139.9	6.6	633
Florida	S-CG-Prem	442	3.07	2.70	0.33	0.76	0.45	0.00	1	0	-125.5	44.2	677
Missouri	S-RFG-Prem	40	3.11	2.70	0.16	0.41	0.45	0.00	1	0	-110.9	4.0	681
Hawaii	W-CG-reg	203	3.43	2.70	0.53	0.41	0.45	0.00	1	0	-105.4	20.3	702
Hawaii	W-CG-Prem	61	3.62	2.70	0.53	0.31	0.45	0.00	1	0	-115.0	6.1	708
Missouri	W-RFG-reg	490	2.86	2.70	0.16	0.41	0.45	0.00	1	0	-85.6	49.0	757
Minnesota	W-CG-reg	1207	2.82	2.70	0.16	0.41	0.45	0.00	1	0	-81.5	120.7	877
Oregon	W-CG-reg	793	2.91	2.70	0.26	0.41	0.45	0.00	1	0	-80.5	79.3	957
Missouri	W-RFG-Prem	48	3.06	2.70	0.16	0.31	0.45	0.00	1	0	-95.6	4.8	962
Missouri	W-CG-reg	954	2.80	2.70	0.16	0.41	0.45	0.00	1	0	-79.6	95.4	1,057
Minnesota	W-CG-Prem	121	3.01	2.70	0.16	0.31	0.45	0.00	1	0	-90.7	12.1	1,069
Oregon	W-CG-Prem	111	3.11	2.70	0.26	0.31	0.45	0.00	1	0	-90.5	11.1	1,080
Missouri	W-CG-Prem	80	3.00	2.70	0.16	0.31	0.45	0.00	1	0	-89.6	8.0	1,088
Florida	W-CG-reg	3637	2.81	2.70	0.33	0.41	0.45	0.00	1	0	-64.0	363.7	1,452
Florida	W-CG-Prem	534	3.02	2.70	0.33	0.31	0.45	0.00	1	0	-75.3	53.4	1,505
Alaska	S-CG-Reg	108	3.96	2.70	0.53	1.01	0.45	0.00	0	0	-218.9	10.8	1,516
Iowa	S-CG-Reg	484	2.92	2.70	0.16	1.01	0.45	0.30	0	0	-181.2	48.4	1,565
Illinois	S-CG-Reg	739	2.84	2.70	0.16	1.01	0.45	0.26	0	0	-168.8	73.9	1,639
South Dakota	S-CG-Reg	174	2.91	2.70	0.16	1.01	0.45	0.09	0	0	-159.4	17.4	1,656
Nebraska	S-CG-Reg	320	2.90	2.70	0.16	1.01	0.45	0.00	0	0	-149.4	32.0	1,688
Michigan	S-CG-Reg	1949	2.87	2.70	0.16	1.01	0.45	0.00	0	0	-146.6	194.9	1,883
Ohio	S-CG-Reg	2010	2.86	2.70	0.16	1.01	0.45	0.00	0	0	-145.8	201.0	2,084
Kansas	S-CG-Reg	672	2.86	2.70	0.16	1.01	0.45	0.00	0	0	-145.4	67.2	2,151
North Dakota	S-CG-Reg	163	2.94	2.70	0.25	1.01	0.45	0.00	0	0	-144.8	16.3	2,167
Wisconsin	S-CG-Reg	795	2.85	2.70	0.16	1.01	0.45	0.00	0	0	-144.8	79.5	2,247
Indiana	S-CG-Reg	1165	2.85	2.70	0.16	1.01	0.45	0.00	0	0	-144.4	116.5	2,363
Washington	S-CG-Reg	1054	2.93	2.70	0.26	1.01	0.45	0.00	0	0	-143.5	105.4	2,469
Idaho	S-CG-Reg	284	2.87	2.70	0.22	1.01	0.45	0.00	0	0	-140.7	28.4	2,497
Montana	S-CG-Reg	277	2.86	2.70	0.22	1.01	0.45	0.00	0	0	-139.7	27.7	2,525
Arkansas	S-CG-Reg	606	2.84	2.70	0.21	1.01	0.45	0.00	0	0	-139.4	60.6	2,585
New York	S-CG-Reg	997	2.87	2.70	0.23	1.01	0.45	0.00	0	0	-139.3	99.7	2,685
Illinois	S-RFG-Reg	1258	2.90	2.70	0.16	0.66	0.45	0.26	0	0	-139.8	125.8	2,811
Pennsylvania	S-CG-Reg	856	2.86	2.70	0.23	1.01	0.45	0.00	0	0	-139.1	85.6	2,897
Wyoming	S-CG-Reg	136	2.85	2.70	0.22	1.01	0.45	0.00	0	0	-138.7	13.6	2,910
Iowa	S-CG-Prem	63	3.13	2.70	0.16	0.76	0.45	0.30	0	0	-176.9	6.3	2,916
Mississippi	S-CG-Reg	724	2.82	2.70	0.21	1.01	0.45	0.00	0	0	-137.6	72.4	2,989
Colorado	S-CG-Reg	812	2.84	2.70	0.22	1.01	0.45	0.00	0	0	-137.6	81.2	3,070
Kentucky	S-CG-Reg	677	2.87	2.70	0.25	1.01	0.45	0.00	0	0	-137.5	67.7	3,138
West Virginia	S-CG-Reg	309	2.85	2.70	0.23	1.01	0.45	0.00	0	0	-137.3	30.9	3,169
Utah	S-CG-Reg	474	2.83	2.70	0.22	1.01	0.45	0.00	0	0	-137.2	47.4	3,216
Nevada	S-CG-Reg	411	2.90	2.70	0.30	1.01	0.45	0.00	0	0	-136.6	41.1	3,257
New Mexico	S-CG-Reg	390	2.85	2.70	0.25	1.01	0.45	0.00	0	0	-135.7	39.0	3,296
Maryland	S-CG-Reg	85	2.85	2.70	0.25	1.01	0.45	0.00	0	0	-135.6	8.5	3,305
Texas	S-CG-Reg	3370	2.80	2.70	0.21	1.01	0.45	0.00	0	0	-135.6	337.0	3,642
Louisiana	S-CG-Reg	1129	2.80	2.70	0.21	1.01	0.45	0.00	0	0	-135.5	112.9	3,754
Virginia	S-CG-Reg	642	2.84	2.70	0.25	1.01	0.45	0.00	0	0	-135.0	64.2	3,819
Alabama	S-CG-Reg	1005	2.84	2.70	0.25	1.01	0.45	0.00	0	0	-134.8	100.5	3,919
Georgia	S-CG-Reg	1979	2.86	2.70	0.27	1.01	0.45	0.00	0	0	-134.8	197.9	4,117
Oklahoma	S-CG-Reg	860	2.82	2.70	0.25	1.01	0.45	0.02	0	0	-134.3	86.0	4,203
Tennessee	S-CG-Reg	1416	2.83	2.70	0.25	1.01	0.45	0.00	0	0	-133.8	141.6	4,345
South Carolina	S-CG-Reg	1066	2.83	2.70	0.27	1.01	0.45	0.00	0	0	-132.0	106.6	4,451
North Carolina	S-CG-Reg	1790	2.83	2.70	0.27	1.01	0.45	0.00	0	0	-131.9	179.0	4,630
Vermont	S-CG-Reg	131	2.82	2.70	0.27	1.01	0.45	0.00	0	0	-130.6	13.1	4,643
Arizona	S-CG-Reg	428	2.83	2.70	0.30	1.01	0.45	0.00	0	0	-129.5	42.8	4,686
Illinois	S-CG-Prem	45	3.05	2.70	0.16	0.76	0.45	0.26	0	0	-164.8	4.5	4,691
Maine	S-CG-Reg	123	2.83	2.70	0.33	1.01	0.45	0.00	0	0	-126.0	12.3	4,703
New Hampshire	S-CG-Reg	55	2.68	2.70	0.27	1.01	0.45	0.00	0	0	-116.9	5.5	4,708
South Dakota	S-CG-Prem	21	3.11	2.70	0.16	0.76	0.45	0.09	0	0	-154.8	2.1	4,711
Wisconsin	S-RFG-Reg	328	2.91	2.70	0.16	0.66	0.45	0.00	0	0	-115.8	32.8	4,743
Indiana	S-RFG-Reg	193	2.91	2.70	0.16	0.66	0.45	0.00	0	0	-115.4	19.3	4,763
New York	S-RFG-Reg	1203	2.93	2.70	0.23	0.66	0.45	0.00	0	0	-110.3	120.3	4,883
Pennsylvania	S-RFG-Reg	379	2.92	2.70	0.23	0.66	0.45	0.00	0	0	-110.1	37.9	4,921
Alaska	S-CG-Prem	13	3.49	2.70	0.53	0.76	0.45	0.00	0	0	-147.1	1.3	4,922
Kentucky	S-RFG-Reg	187	2.93	2.70	0.25	0.66	0.45	0.00	0	0	-108.5	18.7	4,941
Massachusetts	S-RFG-Reg	1054	2.93	2.70	0.25	0.66	0.45	0.00	0	0	-108.5	105.4	5,046
California	S-RFG-Reg	5165	2.97	2.70	0.30	0.66	0.45	0.00	0	0	-107.9	516.5	5,563
Nebraska	S-CG-Prem	43	3.11	2.70	0.16	0.76	0.45	0.00	0	0	-145.6	4.3	5,567
Connecticut	S-RFG-Reg	620	2.92	2.70	0.25	0.66	0.45	0.00	0	0	-107.5	62.0	5,629
Rhode Island	S-RFG-Reg	253	2.92	2.70	0.25	0.66	0.45	0.00	0	0	-107.5	25.3	5,654
Wisconsin	S-CG-Prem	71	3.10	2.70	0.16	0.76	0.45	0.00	0	0	-145.1	7.1	5,662
Maryland	S-RFG-Reg	727	2.91	2.70	0.25	0.66	0.45	0.00	0	0	-106.6	72.7	5,734
Texas	S-RFG-Reg	2474	2.86	2.70	0.21	0.66	0.45	0.00	0	0	-106.6	247.4	5,982
Virginia	S-RFG-Reg	759	2.90	2.70	0.25	0.66	0.45	0.00	0	0	-106.0	75.9	6,058
DC	S-RFG-Reg	25	2.89	2.70	0.25	0.66	0.45	0.00	0	0	-104.7	2.5	6,060
Michigan	S-CG-Prem	129	3.07	2.70	0.16	0.76	0.45	0.00	0	0	-142.0	12.9	6,073
New Jersey	S-RFG-Reg	1574	2.88	2.70	0.25	0.66	0.45	0.00	0	0	-103.7	157.4	6,230

Table A2011B Input Costs, Ethanol Blending Cost and Ethanol Volumes

Year 2011 State	Gasoline Code	Gasoline Volume MMgals	Gasoline Price $/gal	Ethanol Gate Price $/gal	Ethanol Dist Cost $/gal	Ethanol Blending $/gal	Federal Subsidy $/gal	State Subsidy $/gal	State Mandate	RFG "Mandate"	Ethanol Blending Cost c/gal	Ethanol Volume MMgals	Cumulative Eth Vol MMgals
North Dakota	S-CG-Prem	20	3.15	2.70	0.25	0.76	0.45	0.00	0	0	-141.3	2.0	6,232
Wyoming	S-CG-Prem	27	3.12	2.70	0.22	0.76	0.45	0.00	0	0	-140.8	2.7	6,235
Kansas	S-CG-Prem	57	3.06	2.70	0.16	0.76	0.45	0.00	0	0	-140.7	5.7	6,241
Delaware	S-RFG-Reg	184	2.87	2.70	0.25	0.66	0.45	0.00	0	0	-102.5	18.4	6,259
Ohio	S-CG-Prem	159	3.05	2.70	0.16	0.76	0.45	0.00	0	0	-140.2	15.9	6,275
Arizona	S-RFG-Reg	768	2.89	2.70	0.30	0.66	0.45	0.00	0	0	-100.6	76.8	6,352
Washington	S-CG-Prem	209	3.13	2.70	0.26	0.76	0.45	0.00	0	0	-138.3	20.9	6,373
New York	S-CG-Prem	97	3.10	2.70	0.23	0.76	0.45	0.00	0	0	-137.8	9.7	6,383
Indiana	S-CG-Prem	83	3.03	2.70	0.16	0.76	0.45	0.00	0	0	-137.7	8.3	6,391
Pennsylvania	S-CG-Prem	82	3.09	2.70	0.23	0.76	0.45	0.00	0	0	-137.0	8.2	6,399
Illinois	S-RFG-Prem	181	3.11	2.70	0.16	0.41	0.45	0.26	0	0	-135.8	18.1	6,417
Montana	S-CG-Prem	59	3.06	2.70	0.22	0.76	0.45	0.00	0	0	-135.0	5.9	6,423
Arkansas	S-CG-Prem	52	3.04	2.70	0.21	0.76	0.45	0.00	0	0	-135.0	5.2	6,428
Maine	S-RFG-Reg	182	2.89	2.70	0.33	0.66	0.45	0.00	0	0	-97.1	18.2	6,447
Louisiana	S-CG-Prem	100	3.03	2.70	0.21	0.76	0.45	0.00	0	0	-133.8	10.0	6,457
Virginia	S-CG-Prem	62	3.08	2.70	0.25	0.76	0.45	0.00	0	0	-133.7	6.2	6,463
Idaho	S-CG-Prem	48	3.04	2.70	0.22	0.76	0.45	0.00	0	0	-133.4	4.8	6,468
Maryland	S-CG-Prem	7	3.07	2.70	0.25	0.76	0.45	0.00	0	0	-132.7	0.7	6,468
Kentucky	S-CG-Prem	47	3.06	2.70	0.25	0.76	0.45	0.00	0	0	-132.0	4.7	6,473
Colorado	S-CG-Prem	178	3.03	2.70	0.22	0.76	0.45	0.00	0	0	-131.9	17.8	6,491
Alabama	S-CG-Prem	100	3.06	2.70	0.25	0.76	0.45	0.00	0	0	-131.9	10.0	6,501
West Virginia	S-CG-Prem	19	3.04	2.70	0.23	0.76	0.45	0.00	0	0	-131.3	1.9	6,503
Utah	S-CG-Prem	128	3.02	2.70	0.22	0.76	0.45	0.00	0	0	-130.7	12.8	6,516
Georgia	S-CG-Prem	272	3.06	2.70	0.27	0.76	0.45	0.00	0	0	-130.4	27.2	6,543
New Mexico	S-CG-Prem	58	3.04	2.70	0.25	0.76	0.45	0.00	0	0	-129.6	5.8	6,549
Nevada	S-CG-Prem	107	3.08	2.70	0.30	0.76	0.45	0.00	0	0	-129.3	10.7	6,559
Texas	S-CG-Prem	327	2.98	2.70	0.21	0.76	0.45	0.00	0	0	-128.6	32.7	6,592
Tennessee	S-CG-Prem	164	3.02	2.70	0.25	0.76	0.45	0.00	0	0	-128.3	16.4	6,608
North Carolina	S-CG-Prem	224	3.04	2.70	0.27	0.76	0.45	0.00	0	0	-127.9	22.4	6,631
South Carolina	S-CG-Prem	127	3.03	2.70	0.27	0.76	0.45	0.00	0	0	-126.9	12.7	6,643
Oklahoma	S-CG-Prem	84	2.99	2.70	0.25	0.76	0.45	0.02	0	0	-126.7	8.4	6,652
New Hampshire	S-RFG-Reg	181	2.74	2.70	0.27	0.66	0.45	0.00	0	0	-87.9	18.1	6,670
Maine	S-CG-Prem	11	3.07	2.70	0.33	0.76	0.45	0.00	0	0	-125.1	1.1	6,671
Mississippi	S-CG-Prem	75	2.94	2.70	0.21	0.76	0.45	0.00	0	0	-124.2	7.5	6,678
Vermont	S-CG-Prem	12	2.99	2.70	0.27	0.76	0.45	0.00	0	0	-123.4	1.2	6,680
Arizona	S-CG-Prem	55	3.00	2.70	0.30	0.76	0.45	0.00	0	0	-121.9	5.5	6,685
New Hampshire	S-CG-Prem	4	2.95	2.70	0.27	0.76	0.45	0.00	0	0	-118.7	0.4	6,685
Wisconsin	S-RFG-Prem	30	3.16	2.70	0.16	0.41	0.45	0.00	0	0	-116.1	3.0	6,688
New York	S-RFG-Prem	290	3.16	2.70	0.23	0.41	0.45	0.00	0	0	-108.8	29.0	6,717
Indiana	S-RFG-Prem	20	3.09	2.70	0.16	0.41	0.45	0.00	0	0	-108.8	2.0	6,719
Pennsylvania	S-RFG-Prem	63	3.15	2.70	0.23	0.41	0.45	0.00	0	0	-108.0	6.3	6,726
Rhode Island	S-RFG-Prem	37	3.15	2.70	0.25	0.41	0.45	0.00	0	0	-105.9	3.7	6,729
Massachusetts	S-RFG-Prem	160	3.14	2.70	0.25	0.41	0.45	0.00	0	0	-104.8	16.0	6,746
Virginia	S-RFG-Prem	148	3.14	2.70	0.25	0.41	0.45	0.00	0	0	-104.7	14.8	6,760
Connecticut	S-RFG-Prem	102	3.13	2.70	0.25	0.41	0.45	0.00	0	0	-103.9	10.2	6,771
Maryland	S-RFG-Prem	133	3.13	2.70	0.25	0.41	0.45	0.00	0	0	-103.7	13.3	6,784
Kentucky	S-RFG-Prem	18	3.12	2.70	0.25	0.41	0.45	0.00	0	0	-103.0	1.8	6,786
DC	S-RFG-Prem	6	3.12	2.70	0.25	0.41	0.45	0.00	0	0	-102.6	0.6	6,786
Delaware	S-RFG-Prem	23	3.09	2.70	0.25	0.41	0.45	0.00	0	0	-100.3	2.3	6,789
New Jersey	S-RFG-Prem	254	3.09	2.70	0.25	0.41	0.45	0.00	0	0	-100.3	25.4	6,814
Texas	S-RFG-Prem	384	3.04	2.70	0.21	0.41	0.45	0.00	0	0	-99.6	38.4	6,852
Alaska	W-CG-reg	130	3.91	2.70	0.53	0.41	0.45	0.00	0	0	-153.7	13.0	6,865
California	S-RFG-Prem	1493	3.12	2.70	0.30	0.41	0.45	0.00	0	0	-98.7	149.3	7,015
Maine	S-RFG-Prem	12	3.13	2.70	0.33	0.41	0.45	0.00	0	0	-96.1	1.2	7,016
Arizona	S-RFG-Prem	119	3.06	2.70	0.30	0.41	0.45	0.00	0	0	-92.9	11.9	7,028
New Hampshire	S-RFG-Prem	20	3.01	2.70	0.27	0.41	0.45	0.00	0	0	-89.7	2.0	7,030
Iowa	W-CG-reg	585	2.87	2.70	0.16	0.41	0.45	0.30	0	0	-115.9	58.5	7,088
Iowa	W-CG-Prem	76	3.08	2.70	0.16	0.31	0.45	0.30	0	0	-126.7	7.6	7,096
Illinois	W-RFG-reg	1521	2.85	2.70	0.16	0.41	0.45	0.26	0	0	-109.5	152.1	7,248
Illinois	W-RFG-Prem	219	3.06	2.70	0.16	0.31	0.45	0.26	0	0	-120.6	21.9	7,270
Illinois	W-CG-reg	894	2.79	2.70	0.16	0.41	0.45	0.26	0	0	-103.5	89.4	7,359
Illinois	W-CG-Prem	55	3.00	2.70	0.16	0.31	0.45	0.26	0	0	-114.6	5.5	7,365
South Dakota	W-CG-reg	210	2.86	2.70	0.16	0.41	0.45	0.09	0	0	-94.1	21.0	7,386
South Dakota	W-CG-Prem	25	3.06	2.70	0.16	0.31	0.45	0.09	0	0	-104.5	2.5	7,388
Wisconsin	W-RFG-Prem	36	3.11	2.70	0.16	0.31	0.45	0.00	0	0	-100.8	3.6	7,392
Wisconsin	W-RFG-reg	397	2.86	2.70	0.16	0.41	0.45	0.00	0	0	-85.5	39.7	7,432
Indiana	W-RFG-reg	234	2.86	2.70	0.16	0.41	0.45	0.00	0	0	-85.1	23.4	7,455
Nebraska	W-CG-reg	387	2.85	2.70	0.16	0.41	0.45	0.00	0	0	-84.1	38.7	7,494
Alaska	W-CG-Prem	16	3.44	2.70	0.53	0.31	0.45	0.00	0	0	-96.9	1.6	7,495
Michigan	W-CG-reg	2357	2.82	2.70	0.16	0.41	0.45	0.00	0	0	-81.3	235.7	7,731
Ohio	W-CG-reg	2431	2.81	2.70	0.16	0.41	0.45	0.00	0	0	-80.5	243.1	7,974
Nebraska	W-CG-Prem	51	3.06	2.70	0.16	0.31	0.45	0.00	0	0	-95.4	5.1	7,979
Kansas	W-CG-reg	812	2.81	2.70	0.16	0.41	0.45	0.00	0	0	-80.1	81.2	8,061
New York	W-RFG-reg	1455	2.88	2.70	0.23	0.41	0.45	0.00	0	0	-80.1	145.5	8,206
Pennsylvania	W-RFG-reg	458	2.87	2.70	0.23	0.41	0.45	0.00	0	0	-79.8	45.8	8,252
Wisconsin	W-CG-Prem	86	3.05	2.70	0.16	0.31	0.45	0.00	0	0	-94.8	8.6	8,260
North Dakota	W-CG-reg	197	2.89	2.70	0.25	0.41	0.45	0.00	0	0	-79.6	19.7	8,280
Wisconsin	W-CG-reg	961	2.80	2.70	0.16	0.41	0.45	0.00	0	0	-79.5	96.1	8,376
Indiana	W-CG-reg	1408	2.80	2.70	0.16	0.41	0.45	0.00	0	0	-79.1	140.8	8,517
New York	W-RFG-Prem	350	3.11	2.70	0.23	0.31	0.45	0.00	0	0	-93.5	35.0	8,552
Indiana	W-RFG-Prem	24	3.04	2.70	0.16	0.31	0.45	0.00	0	0	-93.5	2.4	8,555
Kentucky	W-RFG-reg	226	2.88	2.70	0.25	0.41	0.45	0.00	0	0	-78.3	22.6	8,577
Washington	W-CG-reg	1275	2.88	2.70	0.26	0.41	0.45	0.00	0	0	-78.2	127.5	8,705
Massachusetts	W-RFG-reg	1275	2.88	2.70	0.25	0.41	0.45	0.00	0	0	-78.2	127.5	8,832
California	W-RFG-reg	6246	2.92	2.70	0.30	0.41	0.45	0.00	0	0	-77.7	624.6	9,457

Table A2011C Input Costs, Ethanol Blending Cost and Ethanol Volumes

Year 2011 State	Gasoline Code	Gasoline Volume MMgals	Gasoline Price $/gal	Ethanol Gate Price $/gal	Ethanol Dist Cost $/gal	Ethanol Blending $/gal	Federal Subsidy $/gal	State Subsidy $/gal	State Mandate	RFG "Mandate"	Ethanol Blending Cost c/gal	Ethanol Volume MMgals	Cumulative Eth Vol MMgals
Pennsylvania	W-RFG-Prem	77	3.10	2.70	0.23	0.31	0.45	0.00	0	0	-92.8	7.7	9,464
Connecticut	W-RFG-reg	750	2.87	2.70	0.25	0.41	0.45	0.00	0	0	-77.2	75.0	9,539
Rhode Island	W-RFG-reg	306	2.87	2.70	0.25	0.41	0.45	0.00	0	0	-77.2	30.6	9,570
Michigan	W-CG-Prem	156	3.02	2.70	0.16	0.31	0.45	0.00	0	0	-91.8	15.6	9,586
Maryland	W-RFG-reg	879	2.86	2.70	0.25	0.41	0.45	0.00	0	0	-76.4	87.9	9,673
Texas	W-RFG-reg	2992	2.81	2.70	0.21	0.41	0.45	0.00	0	0	-76.3	299.2	9,973
North Dakota	W-CG-Prem	24	3.10	2.70	0.25	0.31	0.45	0.00	0	0	-91.0	2.4	9,975
Virginia	W-RFG-reg	918	2.85	2.70	0.25	0.41	0.45	0.00	0	0	-75.7	91.8	10,067
Rhode Island	W-RFG-Prem	45	3.10	2.70	0.25	0.31	0.45	0.00	0	0	-90.6	4.5	10,071
Wyoming	W-CG-Prem	33	3.07	2.70	0.22	0.31	0.45	0.00	0	0	-90.6	3.3	10,075
Idaho	W-CG-reg	344	2.82	2.70	0.22	0.41	0.45	0.00	0	0	-75.4	34.4	10,109
Kansas	W-CG-Prem	69	3.01	2.70	0.16	0.31	0.45	0.00	0	0	-90.5	6.9	10,116
Ohio	W-CG-Prem	192	3.00	2.70	0.16	0.31	0.45	0.00	0	0	-90.0	19.2	10,135
DC	W-RFG-reg	30	2.84	2.70	0.25	0.41	0.45	0.00	0	0	-74.4	3.0	10,138
Montana	W-CG-reg	335	2.81	2.70	0.22	0.41	0.45	0.00	0	0	-74.4	33.5	10,172
Massachusetts	W-RFG-Prem	194	3.09	2.70	0.25	0.31	0.45	0.00	0	0	-89.5	19.4	10,191
Virginia	W-RFG-Prem	179	3.09	2.70	0.25	0.31	0.45	0.00	0	0	-89.5	17.9	10,209
Arkansas	W-CG-reg	733	2.79	2.70	0.21	0.41	0.45	0.00	0	0	-74.2	73.3	10,282
New York	W-CG-reg	1205	2.82	2.70	0.23	0.41	0.45	0.00	0	0	-74.1	120.5	10,403
Pennsylvania	W-CG-reg	1036	2.81	2.70	0.23	0.41	0.45	0.00	0	0	-73.8	103.6	10,506
Connecticut	W-RFG-Prem	123	3.08	2.70	0.25	0.31	0.45	0.00	0	0	-88.6	12.3	10,519
Wyoming	W-CG-reg	165	2.80	2.70	0.22	0.41	0.45	0.00	0	0	-73.4	16.5	10,535
New Jersey	W-RFG-reg	1904	2.83	2.70	0.25	0.41	0.45	0.00	0	0	-73.4	190.4	10,725
Maryland	W-RFG-Prem	161	3.08	2.70	0.25	0.31	0.45	0.00	0	0	-88.4	16.1	10,742
Washington	W-CG-Prem	253	3.08	2.70	0.26	0.31	0.45	0.00	0	0	-88.1	25.3	10,767
Kentucky	W-RFG-Prem	22	3.07	2.70	0.25	0.31	0.45	0.00	0	0	-87.7	2.2	10,769
Mississippi	W-CG-reg	876	2.77	2.70	0.21	0.41	0.45	0.00	0	0	-72.4	87.6	10,857
New York	W-CG-Prem	118	3.05	2.70	0.23	0.31	0.45	0.00	0	0	-87.5	11.8	10,868
Indiana	W-CG-Prem	101	2.98	2.70	0.16	0.31	0.45	0.00	0	0	-87.5	10.1	10,878
Colorado	W-CG-reg	982	2.79	2.70	0.22	0.41	0.45	0.00	0	0	-72.3	98.2	10,977
Kentucky	W-CG-reg	818	2.82	2.70	0.25	0.41	0.45	0.00	0	0	-72.3	81.8	11,059
Delaware	W-RFG-reg	223	2.82	2.70	0.25	0.41	0.45	0.00	0	0	-72.2	22.3	11,081
DC	W-RFG-Prem	8	3.07	2.70	0.25	0.31	0.45	0.00	0	0	-87.3	0.8	11,082
West Virginia	W-CG-reg	373	2.80	2.70	0.23	0.41	0.45	0.00	0	0	-72.0	37.3	11,119
Utah	W-CG-reg	573	2.78	2.70	0.22	0.41	0.45	0.00	0	0	-71.9	57.3	11,176
Pennsylvania	W-CG-Prem	99	3.04	2.70	0.23	0.31	0.45	0.00	0	0	-86.8	9.9	11,186
Nevada	W-CG-reg	497	2.85	2.70	0.30	0.41	0.45	0.00	0	0	-71.4	49.7	11,236
New Mexico	W-CG-reg	471	2.80	2.70	0.25	0.41	0.45	0.00	0	0	-70.5	47.1	11,283
Maryland	W-CG-reg	103	2.80	2.70	0.25	0.41	0.45	0.00	0	0	-70.4	10.3	11,293
Texas	W-CG-reg	4074	2.75	2.70	0.21	0.41	0.45	0.00	0	0	-70.3	407.4	11,701
Arizona	W-RFG-reg	929	2.84	2.70	0.30	0.41	0.45	0.00	0	0	-70.3	92.9	11,794
Louisiana	W-CG-reg	1365	2.75	2.70	0.21	0.41	0.45	0.00	0	0	-70.3	136.5	11,930
Delaware	W-RFG-Prem	28	3.04	2.70	0.25	0.31	0.45	0.00	0	0	-85.0	2.8	11,933
New Jersey	W-RFG-Prem	308	3.04	2.70	0.25	0.31	0.45	0.00	0	0	-85.0	30.8	11,964
Virginia	W-CG-reg	776	2.79	2.70	0.25	0.41	0.45	0.00	0	0	-69.7	77.6	12,041
Montana	W-CG-Prem	72	3.01	2.70	0.22	0.31	0.45	0.00	0	0	-84.8	7.2	12,048
Alabama	W-CG-reg	1215	2.79	2.70	0.25	0.41	0.45	0.00	0	0	-69.6	121.5	12,170
Arkansas	W-CG-Prem	63	2.99	2.70	0.21	0.31	0.45	0.00	0	0	-84.7	6.3	12,176
Georgia	W-CG-reg	2393	2.81	2.70	0.27	0.41	0.45	0.00	0	0	-69.5	239.3	12,415
Texas	W-RFG-Prem	464	2.99	2.70	0.21	0.31	0.45	0.00	0	0	-84.3	46.4	12,462
Oklahoma	W-CG-reg	1040	2.77	2.70	0.25	0.41	0.45	0.02	0	0	-69.1	104.0	12,566
Tennessee	W-CG-reg	1713	2.78	2.70	0.25	0.41	0.45	0.00	0	0	-68.6	171.3	12,737
Louisiana	W-CG-Prem	120	2.98	2.70	0.21	0.31	0.45	0.00	0	0	-83.5	12.0	12,749
Virginia	W-CG-Prem	75	3.03	2.70	0.25	0.31	0.45	0.00	0	0	-83.5	7.5	12,757
California	W-RFG-Prem	1805	3.07	2.70	0.30	0.31	0.45	0.00	0	0	-83.4	180.5	12,937
Idaho	W-CG-Prem	58	2.99	2.70	0.22	0.31	0.45	0.00	0	0	-83.2	5.8	12,943
Maryland	W-CG-Prem	8	3.02	2.70	0.25	0.31	0.45	0.00	0	0	-82.4	0.8	12,944
Maine	W-RFG-reg	220	2.84	2.70	0.33	0.41	0.45	0.00	0	0	-66.8	22.0	12,966
South Carolina	W-CG-reg	1289	2.78	2.70	0.27	0.41	0.45	0.00	0	0	-66.7	128.9	13,095
North Carolina	W-CG-reg	2164	2.78	2.70	0.27	0.41	0.45	0.00	0	0	-66.6	216.4	13,311
Kentucky	W-CG-Prem	57	3.01	2.70	0.25	0.31	0.45	0.00	0	0	-81.7	5.7	13,317
Colorado	W-CG-Prem	216	2.98	2.70	0.22	0.31	0.45	0.00	0	0	-81.7	21.6	13,338
Alabama	W-CG-Prem	121	3.01	2.70	0.25	0.31	0.45	0.00	0	0	-81.6	12.1	13,351
West Virginia	W-CG-Prem	23	2.99	2.70	0.23	0.31	0.45	0.00	0	0	-81.1	2.3	13,353
Maine	W-RFG-Prem	15	3.08	2.70	0.33	0.31	0.45	0.00	0	0	-80.8	1.5	13,354
Vermont	W-CG-reg	158	2.77	2.70	0.27	0.41	0.45	0.00	0	0	-65.3	15.8	13,370
Utah	W-CG-Prem	155	2.97	2.70	0.22	0.31	0.45	0.00	0	0	-80.5	15.5	13,386
Georgia	W-CG-Prem	328	3.01	2.70	0.27	0.31	0.45	0.00	0	0	-80.1	32.8	13,418
Arizona	W-CG-reg	518	2.78	2.70	0.30	0.41	0.45	0.00	0	0	-64.3	51.8	13,470
New Mexico	W-CG-Prem	70	2.99	2.70	0.25	0.31	0.45	0.00	0	0	-79.3	7.0	13,477
Nevada	W-CG-Prem	129	3.03	2.70	0.30	0.31	0.45	0.00	0	0	-79.0	12.9	13,490
Texas	W-CG-Prem	396	2.93	2.70	0.21	0.31	0.45	0.00	0	0	-78.3	39.6	13,530
Tennessee	W-CG-Prem	198	2.97	2.70	0.25	0.31	0.45	0.00	0	0	-78.0	19.8	13,550
Arizona	W-RFG-Prem	144	3.01	2.70	0.30	0.31	0.45	0.00	0	0	-77.6	14.4	13,564
North Carolina	W-CG-Prem	271	2.99	2.70	0.27	0.31	0.45	0.00	0	0	-77.6	27.1	13,591
South Carolina	W-CG-Prem	153	2.98	2.70	0.27	0.31	0.45	0.00	0	0	-76.6	15.3	13,606
Oklahoma	W-CG-Prem	102	2.94	2.70	0.25	0.31	0.45	0.02	0	0	-76.4	10.2	13,617
Maine	W-CG-reg	149	2.78	2.70	0.33	0.41	0.45	0.00	0	0	-60.8	14.9	13,631
Maine	W-CG-Prem	13	3.02	2.70	0.33	0.31	0.45	0.00	0	0	-74.8	1.3	13,633
New Hampshire	W-RFG-Prem	24	2.96	2.70	0.27	0.31	0.45	0.00	0	0	-74.5	2.4	13,635
Mississippi	W-CG-Prem	90	2.89	2.70	0.21	0.31	0.45	0.00	0	0	-73.9	9.0	13,644
Vermont	W-CG-Prem	14	2.94	2.70	0.27	0.31	0.45	0.00	0	0	-73.1	1.4	13,646
New Hampshire	W-RFG-reg	219	2.69	2.70	0.27	0.41	0.45	0.00	0	0	-57.6	21.9	13,667
Arizona	W-CG-Prem	66	2.95	2.70	0.30	0.31	0.45	0.00	0	0	-71.6	6.6	13,674
New Hampshire	W-CG-Prem	5	2.90	2.70	0.27	0.31	0.45	0.00	0	0	-68.5	0.5	13,675
New Hampshire	W-CG-reg	67	2.63	2.70	0.27	0.41	0.45	0.00	0	0	-51.6	6.7	13,681

Table A2012A Input Costs, Ethanol Blending Cost and Ethanol Volumes

Year 2012 State	Gasoline Code	Gasoline Volume MMgals	Gasoline Price $/gal	Ethanol Gate Price $/gal	Ethanol Dist Cost $/gal	Ethanol Blending $/gal	Federal Subsidy $/gal	State Subsidy $/gal	State Mandate	RFG "Mandate"	Ethanol Blending Cost c/gal	Ethanol Volume MMgals	Cumulative Eth Vol MMgals
Hawaii	S-CG-Reg	164	3.49	2.37	0.54	2.43	0.00	0.00	1	0	-300.6	16.4	16
Oregon	S-CG-Reg	642	3.03	2.37	0.26	2.43	0.00	0.00	1	0	-282.7	64.2	81
Missouri	S-CG-Reg	772	2.88	2.37	0.17	2.43	0.00	0.00	1	0	-276.9	77.2	158
Minnesota	S-CG-Reg	976	2.85	2.37	0.17	2.43	0.00	0.00	1	0	-274.4	97.6	255
Florida	S-CG-Reg	2943	2.90	2.37	0.33	2.43	0.00	0.00	1	0	-262.6	294.3	550
Hawaii	S-CG-Prem	49	3.68	2.37	0.54	1.83	0.00	0.00	1	0	-260.5	4.9	555
Missouri	S-RFG-Reg	396	2.94	2.37	0.17	2.08	0.00	0.00	1	0	-247.8	39.6	594
Oregon	S-CG-Prem	90	3.23	2.37	0.26	1.83	0.00	0.00	1	0	-242.8	9.0	603
Missouri	S-CG-Prem	65	3.13	2.37	0.17	1.83	0.00	0.00	1	0	-242.3	6.5	610
Minnesota	S-CG-Prem	98	3.12	2.37	0.17	1.83	0.00	0.00	1	0	-241.3	9.8	620
Florida	S-CG-Prem	432	3.18	2.37	0.33	1.83	0.00	0.00	1	0	-230.4	43.2	663
Missouri	S-RFG-Prem	39	3.19	2.37	0.17	1.48	0.00	0.00	1	0	-213.2	3.9	667
Hawaii	W-CG-reg	199	3.44	2.37	0.54	0.98	0.00	0.00	1	0	-151.1	19.9	686
Hawaii	W-CG-Prem	60	3.63	2.37	0.54	0.75	0.00	0.00	1	0	-147.1	6.0	692
Missouri	W-RFG-reg	479	2.89	2.37	0.17	0.98	0.00	0.00	1	0	-133.5	47.9	740
Missouri	W-RFG-Prem	47	3.14	2.37	0.17	0.75	0.00	0.00	1	0	-134.8	4.7	745
Oregon	W-CG-reg	776	2.98	2.37	0.26	0.98	0.00	0.00	1	0	-133.3	77.6	823
Oregon	W-CG-Prem	109	3.18	2.37	0.26	0.75	0.00	0.00	1	0	-129.4	10.9	834
Missouri	W-CG-reg	933	2.83	2.37	0.17	0.98	0.00	0.00	1	0	-127.5	93.3	927
Missouri	W-CG-Prem	78	3.08	2.37	0.17	0.75	0.00	0.00	1	0	-128.8	7.8	935
Minnesota	W-CG-Prem	119	3.07	2.37	0.17	0.75	0.00	0.00	1	0	-127.9	11.9	947
Minnesota	W-CG-reg	1180	2.80	2.37	0.17	0.98	0.00	0.00	1	0	-125.0	118.0	1,065
Florida	W-CG-Prem	522	3.13	2.37	0.33	0.75	0.00	0.00	1	0	-117.0	52.2	1,117
Florida	W-CG-reg	3558	2.85	2.37	0.33	0.98	0.00	0.00	1	0	-113.1	355.8	1,473
Alaska	S-CG-Reg	106	3.97	2.37	0.54	2.43	0.00	0.00	0	0	-349.0	10.6	1,483
Iowa	S-CG-Reg	473	2.93	2.37	0.17	2.43	0.00	0.30	0	0	-311.7	47.3	1,531
Illinois	S-CG-Reg	723	2.90	2.37	0.17	2.43	0.00	0.26	0	0	-304.3	72.3	1,603
South Dakota	S-CG-Reg	170	2.91	2.37	0.17	2.43	0.00	0.09	0	0	-289.2	17.0	1,620
Vermont	S-CG-Reg	128	3.06	2.37	0.28	2.43	0.00	0.00	0	0	-284.3	12.8	1,633
Nebraska	S-CG-Reg	313	2.93	2.37	0.17	2.43	0.00	0.00	0	0	-282.4	31.3	1,664
Michigan	S-CG-Reg	1907	2.93	2.37	0.17	2.43	0.00	0.00	0	0	-281.9	190.7	1,855
Ohio	S-CG-Reg	1967	2.91	2.37	0.17	2.43	0.00	0.00	0	0	-280.4	196.7	2,051
New Hampshire	S-CG-Reg	54	3.01	2.37	0.28	2.43	0.00	0.00	0	0	-279.7	5.4	2,057
New York	S-CG-Reg	975	2.97	2.37	0.24	2.43	0.00	0.00	0	0	-278.7	97.5	2,154
Indiana	S-CG-Reg	1139	2.89	2.37	0.17	2.43	0.00	0.00	0	0	-278.4	113.9	2,268
Washington	S-CG-Reg	1031	2.99	2.37	0.26	2.43	0.00	0.00	0	0	-278.3	103.1	2,371
Wisconsin	S-CG-Reg	778	2.89	2.37	0.17	2.43	0.00	0.00	0	0	-278.0	77.8	2,449
Pennsylvania	S-CG-Reg	838	2.95	2.37	0.24	2.43	0.00	0.00	0	0	-277.2	83.8	2,533
Kansas	S-CG-Reg	657	2.86	2.37	0.17	2.43	0.00	0.00	0	0	-275.3	65.7	2,599
Illinois	S-RFG-Reg	1231	2.96	2.37	0.17	2.08	0.00	0.26	0	0	-275.2	123.1	2,722
Nevada	S-CG-Reg	402	2.99	2.37	0.30	2.43	0.00	0.00	0	0	-274.6	40.2	2,762
West Virginia	S-CG-Reg	302	2.92	2.37	0.24	2.43	0.00	0.00	0	0	-274.3	30.2	2,792
Iowa	S-CG-Prem	62	3.19	2.37	0.17	1.83	0.00	0.30	0	0	-277.8	6.2	2,798
Illinois	S-CG-Prem	44	3.22	2.37	0.17	1.83	0.00	0.26	0	0	-277.4	4.4	2,803
Kentucky	S-CG-Reg	662	2.93	2.37	0.26	2.43	0.00	0.00	0	0	-272.7	66.2	2,869
North Dakota	S-CG-Reg	159	2.92	2.37	0.26	2.43	0.00	0.00	0	0	-272.3	15.9	2,885
Arizona	S-CG-Reg	419	2.97	2.37	0.30	2.43	0.00	0.00	0	0	-272.2	41.9	2,927
Idaho	S-CG-Reg	278	2.89	2.37	0.22	2.43	0.00	0.00	0	0	-272.0	27.8	2,954
Colorado	S-CG-Reg	795	2.89	2.37	0.22	2.43	0.00	0.00	0	0	-271.9	79.5	3,034
Arkansas	S-CG-Reg	593	2.87	2.37	0.21	2.43	0.00	0.00	0	0	-271.7	59.3	3,093
Montana	S-CG-Reg	271	2.87	2.37	0.22	2.43	0.00	0.00	0	0	-270.0	27.1	3,120
Utah	S-CG-Reg	464	2.87	2.37	0.22	2.43	0.00	0.00	0	0	-269.9	46.4	3,167
Maryland	S-CG-Reg	83	2.90	2.37	0.26	2.43	0.00	0.00	0	0	-269.9	8.3	3,175
Louisiana	S-CG-Reg	1104	2.85	2.37	0.21	2.43	0.00	0.00	0	0	-269.7	110.4	3,285
Texas	S-CG-Reg	3296	2.85	2.37	0.21	2.43	0.00	0.00	0	0	-269.5	329.6	3,615
Maine	S-CG-Reg	121	2.96	2.37	0.33	2.43	0.00	0.00	0	0	-268.8	12.1	3,627
New Mexico	S-CG-Reg	381	2.89	2.37	0.26	2.43	0.00	0.00	0	0	-268.7	38.1	3,665
Oklahoma	S-CG-Reg	841	2.86	2.37	0.26	2.43	0.00	0.02	0	0	-268.1	84.1	3,749
Virginia	S-CG-Reg	628	2.88	2.37	0.26	2.43	0.00	0.00	0	0	-267.8	62.8	3,812
Mississippi	S-CG-Reg	708	2.81	2.37	0.21	2.43	0.00	0.00	0	0	-266.4	70.8	3,883
Georgia	S-CG-Reg	1936	2.88	2.37	0.28	2.43	0.00	0.00	0	0	-266.2	193.6	4,077
Wyoming	S-CG-Reg	133	2.83	2.37	0.22	2.43	0.00	0.00	0	0	-265.9	13.3	4,090
Alabama	S-CG-Reg	983	2.86	2.37	0.26	2.43	0.00	0.00	0	0	-265.7	98.3	4,188
Tennessee	S-CG-Reg	1385	2.85	2.37	0.26	2.43	0.00	0.00	0	0	-265.3	138.5	4,327
North Carolina	S-CG-Reg	1751	2.85	2.37	0.28	2.43	0.00	0.00	0	0	-263.2	175.1	4,502
South Carolina	S-CG-Reg	1043	2.85	2.37	0.28	2.43	0.00	0.00	0	0	-263.1	104.3	4,606
Alaska	S-CG-Prem	13	3.63	2.37	0.54	1.83	0.00	0.00	0	0	-254.6	1.3	4,607
South Dakota	S-CG-Prem	21	3.16	2.37	0.17	1.83	0.00	0.09	0	0	-254.4	2.1	4,609
New Hampshire	S-RFG-Reg	177	3.07	2.37	0.28	2.08	0.00	0.00	0	0	-250.6	17.7	4,627
California	S-RFG-Reg	5053	3.10	2.37	0.30	2.08	0.00	0.00	0	0	-250.3	505.3	5,132
New York	S-RFG-Reg	1177	3.03	2.37	0.24	2.08	0.00	0.00	0	0	-249.6	117.7	5,250
Indiana	S-RFG-Reg	189	2.95	2.37	0.17	2.08	0.00	0.00	0	0	-249.3	18.9	5,269
Wisconsin	S-RFG-Reg	321	2.95	2.37	0.17	2.08	0.00	0.00	0	0	-248.9	32.1	5,301
Wisconsin	S-CG-Prem	69	3.22	2.37	0.17	1.83	0.00	0.00	0	0	-251.8	6.9	5,308
Rhode Island	S-RFG-Reg	248	3.03	2.37	0.26	2.08	0.00	0.00	0	0	-248.2	24.8	5,333
Pennsylvania	S-RFG-Reg	371	3.01	2.37	0.24	2.08	0.00	0.00	0	0	-248.1	37.1	5,370
Massachusetts	S-RFG-Reg	1031	3.02	2.37	0.26	2.08	0.00	0.00	0	0	-246.7	103.1	5,473
Michigan	S-CG-Prem	126	3.20	2.37	0.17	1.83	0.00	0.00	0	0	-249.2	12.6	5,486
Connecticut	S-RFG-Reg	606	3.01	2.37	0.26	2.08	0.00	0.00	0	0	-245.6	60.6	5,546
Illinois	S-RFG-Prem	177	3.28	2.37	0.17	1.48	0.00	0.26	0	0	-248.3	17.7	5,564
Indiana	S-CG-Prem	81	3.18	2.37	0.17	1.83	0.00	0.00	0	0	-247.3	8.1	5,572
Nebraska	S-CG-Prem	42	3.18	2.37	0.17	1.83	0.00	0.00	0	0	-247.1	4.2	5,576
New York	S-CG-Prem	95	3.25	2.37	0.24	1.83	0.00	0.00	0	0	-247.0	9.5	5,586
Kentucky	S-RFG-Reg	183	2.99	2.37	0.26	2.08	0.00	0.00	0	0	-243.6	18.3	5,604
Arizona	S-RFG-Reg	751	3.03	2.37	0.30	2.08	0.00	0.00	0	0	-243.1	75.1	5,679

Table A2012B Input Costs, Ethanol Blending Cost and Ethanol Volumes

Year 2012 State	Gasoline Code	Gasoline Volume MMgals	Gasoline Price $/gal	Ethanol Gate Price $/gal	Ethanol Dist Cost $/gal	Ethanol Blending $/gal	Federal Subsidy $/gal	State Subsidy $/gal	State Mandate	RFG "Mandate"	Ethanol Blending Cost c/gal	Ethanol Volume MMgals	Cumulative Eth Vol MMgals
Vermont	S-CG-Prem	11	3.27	2.37	0.28	1.83	0.00	0.00	0	0	-245.9	1.1	5,680
New Jersey	S-RFG-Reg	1540	2.98	2.37	0.26	2.08	0.00	0.00	0	0	-242.5	154.0	5,834
Ohio	S-CG-Prem	155	3.16	2.37	0.17	1.83	0.00	0.00	0	0	-245.7	15.5	5,850
Delaware	S-RFG-Reg	180	2.96	2.37	0.26	2.08	0.00	0.00	0	0	-241.2	18.0	5,868
Maryland	S-RFG-Reg	711	2.96	2.37	0.26	2.08	0.00	0.00	0	0	-240.8	71.1	5,939
Texas	S-RFG-Reg	2420	2.91	2.37	0.21	2.08	0.00	0.00	0	0	-240.4	242.0	6,181
Maine	S-RFG-Reg	178	3.02	2.37	0.33	2.08	0.00	0.00	0	0	-239.7	17.8	6,199
Virginia	S-RFG-Reg	743	2.94	2.37	0.26	2.08	0.00	0.00	0	0	-238.7	74.3	6,273
DC	S-RFG-Reg	25	2.93	2.37	0.26	2.08	0.00	0.00	0	0	-238.1	2.5	6,276
New Hampshire	S-CG-Prem	4	3.23	2.37	0.28	1.83	0.00	0.00	0	0	-241.3	0.4	6,276
Washington	S-CG-Prem	205	3.20	2.37	0.26	1.83	0.00	0.00	0	0	-239.4	20.5	6,297
West Virginia	S-CG-Prem	19	3.17	2.37	0.24	1.83	0.00	0.00	0	0	-239.4	1.9	6,298
Maryland	S-CG-Prem	7	3.18	2.37	0.26	1.83	0.00	0.00	0	0	-239.0	0.7	6,299
Arkansas	S-CG-Prem	51	3.14	2.37	0.21	1.83	0.00	0.00	0	0	-238.9	5.1	6,304
Mississippi	S-CG-Prem	73	3.14	2.37	0.21	1.83	0.00	0.00	0	0	-238.9	7.3	6,312
Pennsylvania	S-CG-Prem	80	3.16	2.37	0.24	1.83	0.00	0.00	0	0	-238.9	8.0	6,320
Virginia	S-CG-Prem	61	3.18	2.37	0.26	1.83	0.00	0.00	0	0	-238.8	6.1	6,326
North Dakota	S-CG-Prem	19	3.17	2.37	0.26	1.83	0.00	0.00	0	0	-237.5	1.9	6,328
Kentucky	S-CG-Prem	46	3.17	2.37	0.26	1.83	0.00	0.00	0	0	-237.5	4.6	6,332
Louisiana	S-CG-Prem	97	3.12	2.37	0.21	1.83	0.00	0.00	0	0	-237.1	9.7	6,342
Texas	S-CG-Prem	320	3.12	2.37	0.21	1.83	0.00	0.00	0	0	-237.0	32.0	6,374
Maine	S-CG-Prem	10	3.24	2.37	0.33	1.83	0.00	0.00	0	0	-236.6	1.0	6,375
Kansas	S-CG-Prem	56	3.07	2.37	0.17	1.83	0.00	0.00	0	0	-236.5	5.6	6,381
Alabama	S-CG-Prem	98	3.14	2.37	0.26	1.83	0.00	0.00	0	0	-234.3	9.8	6,390
Georgia	S-CG-Prem	266	3.15	2.37	0.28	1.83	0.00	0.00	0	0	-233.4	26.6	6,417
Tennessee	S-CG-Prem	160	3.13	2.37	0.26	1.83	0.00	0.00	0	0	-233.1	16.0	6,433
Nevada	S-CG-Prem	104	3.17	2.37	0.30	1.83	0.00	0.00	0	0	-233.0	10.4	6,443
Colorado	S-CG-Prem	175	3.08	2.37	0.22	1.83	0.00	0.00	0	0	-231.9	17.5	6,461
Montana	S-CG-Prem	58	3.08	2.37	0.22	1.83	0.00	0.00	0	0	-231.9	5.8	6,467
South Carolina	S-CG-Prem	124	3.13	2.37	0.28	1.83	0.00	0.00	0	0	-231.3	12.4	6,479
Arizona	S-CG-Prem	53	3.15	2.37	0.30	1.83	0.00	0.00	0	0	-231.2	5.3	6,484
North Carolina	S-CG-Prem	219	3.13	2.37	0.28	1.83	0.00	0.00	0	0	-231.1	21.9	6,506
Idaho	S-CG-Prem	47	3.06	2.37	0.22	1.83	0.00	0.00	0	0	-230.0	4.7	6,511
Oklahoma	S-CG-Prem	82	3.08	2.37	0.26	1.83	0.00	0.02	0	0	-229.7	8.2	6,519
Utah	S-CG-Prem	125	3.05	2.37	0.22	1.83	0.00	0.00	0	0	-229.0	12.5	6,532
New Mexico	S-CG-Prem	57	3.08	2.37	0.26	1.83	0.00	0.00	0	0	-228.9	5.7	6,537
Wyoming	S-CG-Prem	27	3.04	2.37	0.22	1.83	0.00	0.00	0	0	-227.4	2.7	6,540
Wisconsin	S-RFG-Prem	29	3.28	2.37	0.17	1.48	0.00	0.00	0	0	-222.7	2.9	6,543
Indiana	S-RFG-Prem	20	3.24	2.37	0.17	1.48	0.00	0.00	0	0	-218.2	2.0	6,545
New York	S-RFG-Prem	283	3.31	2.37	0.24	1.48	0.00	0.00	0	0	-217.9	28.3	6,573
Rhode Island	S-RFG-Prem	37	3.29	2.37	0.26	1.48	0.00	0.00	0	0	-214.5	3.7	6,577
New Hampshire	S-RFG-Prem	20	3.29	2.37	0.28	1.48	0.00	0.00	0	0	-212.2	2.0	6,579
Connecticut	S-RFG-Prem	99	3.27	2.37	0.26	1.48	0.00	0.00	0	0	-211.9	9.9	6,589
Massachusetts	S-RFG-Prem	157	3.26	2.37	0.26	1.48	0.00	0.00	0	0	-211.1	15.7	6,605
Maryland	S-RFG-Prem	130	3.24	2.37	0.26	1.48	0.00	0.00	0	0	-209.9	13.0	6,618
Pennsylvania	S-RFG-Prem	62	3.22	2.37	0.24	1.48	0.00	0.00	0	0	-209.8	6.2	6,624
Virginia	S-RFG-Prem	145	3.24	2.37	0.26	1.48	0.00	0.00	0	0	-209.7	14.5	6,638
Delaware	S-RFG-Prem	22	3.24	2.37	0.26	1.48	0.00	0.00	0	0	-209.4	2.2	6,641
New Jersey	S-RFG-Prem	249	3.24	2.37	0.26	1.48	0.00	0.00	0	0	-209.4	24.9	6,665
Kentucky	S-RFG-Prem	18	3.23	2.37	0.26	1.48	0.00	0.00	0	0	-208.4	1.8	6,667
DC	S-RFG-Prem	6	3.23	2.37	0.26	1.48	0.00	0.00	0	0	-208.2	0.6	6,668
Texas	S-RFG-Prem	376	3.18	2.37	0.21	1.48	0.00	0.00	0	0	-207.9	37.6	6,705
Maine	S-RFG-Prem	12	3.30	2.37	0.33	1.48	0.00	0.00	0	0	-207.5	1.2	6,707
California	S-RFG-Prem	1460	3.26	2.37	0.30	1.48	0.00	0.00	0	0	-207.0	146.0	6,853
Arizona	S-RFG-Prem	117	3.21	2.37	0.30	1.48	0.00	0.00	0	0	-202.1	11.7	6,864
Alaska	W-CG-reg	128	3.92	2.37	0.54	0.98	0.00	0.00	0	0	-199.5	12.8	6,877
Illinois	W-RFG-Prem	214	3.23	2.37	0.17	0.75	0.00	0.26	0	0	-170.0	21.4	6,899
Iowa	W-CG-Prem	74	3.14	2.37	0.17	0.75	0.00	0.30	0	0	-164.4	7.4	6,906
Illinois	W-CG-Prem	54	3.17	2.37	0.17	0.75	0.00	0.26	0	0	-164.0	5.4	6,911
Iowa	W-CG-reg	572	2.88	2.37	0.17	0.98	0.00	0.30	0	0	-162.3	57.2	6,969
Illinois	W-RFG-reg	1488	2.91	2.37	0.17	0.98	0.00	0.26	0	0	-160.9	148.8	7,117
Illinois	W-CG-reg	874	2.85	2.37	0.17	0.98	0.00	0.26	0	0	-154.9	87.4	7,205
Wisconsin	W-RFG-Prem	35	3.23	2.37	0.17	0.75	0.00	0.00	0	0	-144.3	3.5	7,208
South Dakota	W-CG-reg	206	2.86	2.37	0.17	0.98	0.00	0.09	0	0	-139.8	20.6	7,229
Alaska	W-CG-Prem	15	3.58	2.37	0.54	0.75	0.00	0.00	0	0	-141.2	1.5	7,230
South Dakota	W-CG-Prem	25	3.11	2.37	0.17	0.75	0.00	0.09	0	0	-140.9	2.5	7,233
Indiana	W-RFG-Prem	24	3.19	2.37	0.17	0.75	0.00	0.00	0	0	-139.9	2.4	7,235
New York	W-RFG-Prem	343	3.26	2.37	0.24	0.75	0.00	0.00	0	0	-139.6	34.3	7,270
Wisconsin	W-CG-Prem	84	3.17	2.37	0.17	0.75	0.00	0.00	0	0	-138.3	8.4	7,278
New Hampshire	W-RFG-reg	214	3.02	2.37	0.28	0.98	0.00	0.00	0	0	-136.2	21.4	7,299
California	W-RFG-reg	6110	3.05	2.37	0.30	0.98	0.00	0.00	0	0	-135.9	611.0	7,910
New York	W-RFG-reg	1423	2.98	2.37	0.24	0.98	0.00	0.00	0	0	-135.3	142.3	8,053
Indiana	W-RFG-reg	229	2.90	2.37	0.17	0.98	0.00	0.00	0	0	-135.0	22.9	8,076
Vermont	W-CG-reg	154	3.01	2.37	0.28	0.98	0.00	0.00	0	0	-134.9	15.4	8,091
Rhode Island	W-RFG-Prem	44	3.24	2.37	0.26	0.75	0.00	0.00	0	0	-136.2	4.4	8,095
Wisconsin	W-RFG-reg	388	2.90	2.37	0.17	0.98	0.00	0.00	0	0	-134.6	38.8	8,134
Michigan	W-CG-Prem	152	3.15	2.37	0.17	0.75	0.00	0.00	0	0	-135.8	15.2	8,149
Rhode Island	W-RFG-reg	300	2.98	2.37	0.26	0.98	0.00	0.00	0	0	-133.8	30.0	8,179
Pennsylvania	W-RFG-reg	448	2.96	2.37	0.24	0.98	0.00	0.00	0	0	-133.8	44.8	8,224
Nebraska	W-CG-reg	379	2.88	2.37	0.17	0.98	0.00	0.00	0	0	-133.0	37.9	8,262
Michigan	W-CG-reg	2306	2.88	2.37	0.17	0.98	0.00	0.00	0	0	-132.5	230.6	8,493
Indiana	W-CG-Prem	99	3.13	2.37	0.17	0.75	0.00	0.00	0	0	-133.9	9.9	8,503
New Hampshire	W-RFG-Prem	24	3.24	2.37	0.28	0.75	0.00	0.00	0	0	-133.9	2.4	8,505
Massachusetts	W-RFG-reg	1247	2.97	2.37	0.26	0.98	0.00	0.00	0	0	-132.3	124.7	8,630
Nebraska	W-CG-Prem	50	3.13	2.37	0.17	0.75	0.00	0.00	0	0	-133.7	5.0	8,635

Table A2012C Input Costs, Ethanol Blending Cost and Ethanol Volumes

Year 2012 State	Gasoline Code	Gasoline Volume MMgals	Gasoline Price $/gal	Ethanol Gate Price $/gal	Ethanol Dist Cost $/gal	Ethanol Blending $/gal	Federal Subsidy $/gal	State Subsidy $/gal	State Mandate	RFG "Mandate"	Ethanol Blending Cost c/gal	Ethanol Volume MMgals	Cumulative Eth Vol MMgals
New York	W-CG-Prem	115	3.20	2.37	0.24	0.75	0.00	0.00	0	0	-133.6	11.5	8,646
Connecticut	W-RFG-Prem	120	3.22	2.37	0.26	0.75	0.00	0.00	0	0	-133.6	12.0	8,658
Massachusetts	W-RFG-Prem	190	3.21	2.37	0.26	0.75	0.00	0.00	0	0	-132.8	19.0	8,677
Connecticut	W-RFG-reg	733	2.96	2.37	0.26	0.98	0.00	0.00	0	0	-131.2	73.3	8,751
Vermont	W-CG-Prem	14	3.22	2.37	0.28	0.75	0.00	0.00	0	0	-132.5	1.4	8,752
Ohio	W-CG-reg	2378	2.86	2.37	0.17	0.98	0.00	0.00	0	0	-131.0	237.8	8,990
Ohio	W-CG-Prem	188	3.11	2.37	0.17	0.75	0.00	0.00	0	0	-132.3	18.8	9,008
New Hampshire	W-CG-reg	65	2.96	2.37	0.28	0.98	0.00	0.00	0	0	-130.2	6.5	9,015
Maryland	W-RFG-Prem	157	3.19	2.37	0.26	0.75	0.00	0.00	0	0	-131.6	15.7	9,031
Pennsylvania	W-RFG-Prem	75	3.17	2.37	0.24	0.75	0.00	0.00	0	0	-131.4	7.5	9,038
Virginia	W-RFG-Prem	175	3.19	2.37	0.26	0.75	0.00	0.00	0	0	-131.4	17.5	9,056
Delaware	W-RFG-Prem	27	3.19	2.37	0.26	0.75	0.00	0.00	0	0	-131.1	2.7	9,058
New Jersey	W-RFG-Prem	301	3.19	2.37	0.26	0.75	0.00	0.00	0	0	-131.1	30.1	9,089
Kentucky	W-RFG-reg	221	2.94	2.37	0.26	0.98	0.00	0.00	0	0	-129.3	22.1	9,111
New York	W-CG-reg	1179	2.92	2.37	0.24	0.98	0.00	0.00	0	0	-129.3	117.9	9,229
Indiana	W-CG-reg	1378	2.84	2.37	0.17	0.98	0.00	0.00	0	0	-129.0	137.8	9,366
Washington	W-CG-reg	1247	2.94	2.37	0.26	0.98	0.00	0.00	0	0	-128.9	124.7	9,491
Arizona	W-RFG-reg	909	2.98	2.37	0.30	0.98	0.00	0.00	0	0	-128.7	90.9	9,582
Wisconsin	W-CG-reg	940	2.84	2.37	0.17	0.98	0.00	0.00	0	0	-128.6	94.0	9,676
Kentucky	W-RFG-Prem	22	3.18	2.37	0.26	0.75	0.00	0.00	0	0	-130.0	2.2	9,678
DC	W-RFG-Prem	8	3.18	2.37	0.26	0.75	0.00	0.00	0	0	-129.9	0.8	9,679
New Jersey	W-RFG-reg	1862	2.93	2.37	0.26	0.98	0.00	0.00	0	0	-128.1	186.2	9,865
Texas	W-RFG-Prem	454	3.13	2.37	0.21	0.75	0.00	0.00	0	0	-129.5	45.4	9,910
Pennsylvania	W-CG-reg	1013	2.90	2.37	0.24	0.98	0.00	0.00	0	0	-127.8	101.3	10,012
Maine	W-RFG-Prem	14	3.25	2.37	0.33	0.75	0.00	0.00	0	0	-129.2	1.4	10,013
California	W-RFG-Prem	1766	3.21	2.37	0.30	0.75	0.00	0.00	0	0	-128.7	176.6	10,190
Delaware	W-RFG-reg	218	2.91	2.37	0.26	0.98	0.00	0.00	0	0	-126.8	21.8	10,212
Maryland	W-RFG-reg	860	2.91	2.37	0.26	0.98	0.00	0.00	0	0	-126.4	86.0	10,298
New Hampshire	W-CG-Prem	5	3.18	2.37	0.28	0.75	0.00	0.00	0	0	-127.9	0.5	10,298
Texas	W-RFG-reg	2927	2.86	2.37	0.21	0.98	0.00	0.00	0	0	-126.1	292.7	10,591
Kansas	W-CG-reg	795	2.81	2.37	0.17	0.98	0.00	0.00	0	0	-125.9	79.5	10,670
Maine	W-RFG-reg	215	2.97	2.37	0.33	0.98	0.00	0.00	0	0	-125.4	21.5	10,692
Nevada	W-CG-reg	487	2.94	2.37	0.30	0.98	0.00	0.00	0	0	-125.1	48.7	10,740
West Virginia	W-CG-reg	365	2.87	2.37	0.24	0.98	0.00	0.00	0	0	-124.8	36.5	10,777
Washington	W-CG-Prem	248	3.15	2.37	0.26	0.75	0.00	0.00	0	0	-126.0	24.8	10,802
West Virginia	W-CG-Prem	23	3.12	2.37	0.24	0.75	0.00	0.00	0	0	-126.0	2.3	10,804
Virginia	W-RFG-reg	898	2.89	2.37	0.26	0.98	0.00	0.00	0	0	-124.4	89.8	10,894
Maryland	W-CG-Prem	8	3.13	2.37	0.26	0.75	0.00	0.00	0	0	-125.6	0.8	10,895
Arkansas	W-CG-Prem	61	3.09	2.37	0.21	0.75	0.00	0.00	0	0	-125.5	6.1	10,901
Mississippi	W-CG-Prem	88	3.09	2.37	0.21	0.75	0.00	0.00	0	0	-125.5	8.8	10,910
Pennsylvania	W-CG-Prem	97	3.11	2.37	0.24	0.75	0.00	0.00	0	0	-125.4	9.7	10,919
Virginia	W-CG-Prem	74	3.13	2.37	0.26	0.75	0.00	0.00	0	0	-125.4	7.4	10,927
DC	W-RFG-reg	30	2.88	2.37	0.26	0.98	0.00	0.00	0	0	-123.8	3.0	10,930
Kentucky	W-CG-reg	800	2.88	2.37	0.26	0.98	0.00	0.00	0	0	-123.3	80.0	11,010
North Dakota	W-CG-reg	192	2.87	2.37	0.26	0.98	0.00	0.00	0	0	-122.8	19.2	11,029
Arizona	W-CG-reg	507	2.92	2.37	0.30	0.98	0.00	0.00	0	0	-122.7	50.7	11,080
North Dakota	W-CG-Prem	23	3.12	2.37	0.26	0.75	0.00	0.00	0	0	-124.1	2.3	11,082
Kentucky	W-CG-Prem	56	3.12	2.37	0.26	0.75	0.00	0.00	0	0	-124.0	5.6	11,087
Idaho	W-CG-reg	336	2.84	2.37	0.22	0.98	0.00	0.00	0	0	-122.5	33.6	11,121
Colorado	W-CG-reg	961	2.84	2.37	0.22	0.98	0.00	0.00	0	0	-122.4	96.1	11,217
Arizona	W-RFG-Prem	141	3.16	2.37	0.30	0.75	0.00	0.00	0	0	-123.8	14.1	11,231
Arkansas	W-CG-reg	717	2.82	2.37	0.21	0.98	0.00	0.00	0	0	-122.2	71.7	11,303
Louisiana	W-CG-Prem	118	3.07	2.37	0.21	0.75	0.00	0.00	0	0	-123.7	11.8	11,315
Texas	W-CG-Prem	387	3.07	2.37	0.21	0.75	0.00	0.00	0	0	-123.5	38.7	11,354
Maine	W-CG-Prem	13	3.19	2.37	0.33	0.75	0.00	0.00	0	0	-123.2	1.3	11,355
Kansas	W-CG-Prem	67	3.02	2.37	0.17	0.75	0.00	0.00	0	0	-123.1	6.7	11,362
Montana	W-CG-reg	327	2.82	2.37	0.22	0.98	0.00	0.00	0	0	-120.5	32.7	11,394
Utah	W-CG-reg	561	2.82	2.37	0.22	0.98	0.00	0.00	0	0	-120.4	56.1	11,450
Maryland	W-CG-reg	101	2.85	2.37	0.26	0.98	0.00	0.00	0	0	-120.4	10.1	11,460
Louisiana	W-CG-reg	1335	2.80	2.37	0.21	0.98	0.00	0.00	0	0	-120.2	133.5	11,594
Texas	W-CG-reg	3986	2.80	2.37	0.21	0.98	0.00	0.00	0	0	-120.1	398.6	11,992
Maine	W-CG-reg	146	2.91	2.37	0.33	0.98	0.00	0.00	0	0	-119.4	14.6	12,007
Alabama	W-CG-Prem	119	3.09	2.37	0.26	0.75	0.00	0.00	0	0	-120.9	11.9	12,019
New Mexico	W-CG-reg	461	2.84	2.37	0.26	0.98	0.00	0.00	0	0	-119.2	46.1	12,065
Oklahoma	W-CG-reg	1017	2.81	2.37	0.26	0.98	0.00	0.02	0	0	-118.6	101.7	12,167
Georgia	W-CG-Prem	321	3.10	2.37	0.28	0.75	0.00	0.00	0	0	-120.0	32.1	12,199
Virginia	W-CG-reg	760	2.83	2.37	0.26	0.98	0.00	0.00	0	0	-118.4	76.0	12,275
Tennessee	W-CG-Prem	194	3.08	2.37	0.26	0.75	0.00	0.00	0	0	-119.7	19.4	12,294
Nevada	W-CG-Prem	126	3.12	2.37	0.30	0.75	0.00	0.00	0	0	-119.6	12.6	12,307
Colorado	W-CG-Prem	211	3.03	2.37	0.22	0.75	0.00	0.00	0	0	-118.5	21.1	12,328
Montana	W-CG-Prem	70	3.03	2.37	0.22	0.75	0.00	0.00	0	0	-118.5	7.0	12,335
Mississippi	W-CG-reg	857	2.76	2.37	0.21	0.98	0.00	0.00	0	0	-116.9	85.7	12,421
Georgia	W-CG-reg	2341	2.83	2.37	0.28	0.98	0.00	0.00	0	0	-116.8	234.1	12,655
Wyoming	W-CG-reg	161	2.78	2.37	0.22	0.98	0.00	0.00	0	0	-116.4	16.1	12,671
South Carolina	W-CG-Prem	150	3.08	2.37	0.28	0.75	0.00	0.00	0	0	-117.9	15.0	12,686
Arizona	W-CG-Prem	65	3.10	2.37	0.30	0.75	0.00	0.00	0	0	-117.8	6.5	12,692
Alabama	W-CG-reg	1189	2.81	2.37	0.26	0.98	0.00	0.00	0	0	-116.2	118.9	12,811
North Carolina	W-CG-Prem	265	3.08	2.37	0.28	0.75	0.00	0.00	0	0	-117.7	26.5	12,838
Tennessee	W-CG-reg	1675	2.80	2.37	0.26	0.98	0.00	0.00	0	0	-115.8	167.5	13,005
Idaho	W-CG-Prem	57	3.01	2.37	0.22	0.75	0.00	0.00	0	0	-116.6	5.7	13,011
Oklahoma	W-CG-Prem	100	3.03	2.37	0.26	0.75	0.00	0.02	0	0	-116.3	10.0	13,021
Utah	W-CG-Prem	151	3.00	2.37	0.22	0.75	0.00	0.00	0	0	-115.6	15.1	13,036
New Mexico	W-CG-Prem	69	3.03	2.37	0.26	0.75	0.00	0.00	0	0	-115.5	6.9	13,043
North Carolina	W-CG-reg	2117	2.80	2.37	0.28	0.98	0.00	0.00	0	0	-113.8	211.7	13,255
South Carolina	W-CG-reg	1261	2.80	2.37	0.28	0.98	0.00	0.00	0	0	-113.7	126.1	13,381
Wyoming	W-CG-Prem	32	2.99	2.37	0.22	0.75	0.00	0.00	0	0	-114.0	3.2	13,384

Table A2013A Input Costs, Ethanol Blending Cost and Ethanol Volumes

Year 2013 State	Gasoline Code	Gasoline Volume MMgals	Gasoline Price $/gal	Ethanol Gate Price $/gal	Ethanol Dist Cost $/gal	Ethanol Blending $/gal	Federal Subsidy $/gal	State Subsidy $/gal	State Mandate	RFG "Mandate"	Ethanol Blending Cost c/gal	Ethanol Volume MMgals	Cumulative Eth Vol MMgals
Missouri	S-CG-Reg	775	2.76	2.47	0.17	2.40	0.00	0.00	1	0	-252.5	77.5	78
Oregon	S-CG-Reg	644	2.85	2.47	0.26	2.40	0.00	0.00	1	0	-252.2	64.4	142
Minnesota	S-CG-Reg	980	2.73	2.47	0.17	2.40	0.00	0.00	1	0	-250.1	98.0	240
Hawaii	S-CG-Reg	165	3.10	2.47	0.55	2.40	0.00	0.00	1	0	-249.2	16.5	256
Florida	S-CG-Reg	2955	2.79	2.47	0.33	2.40	0.00	0.00	1	0	-239.3	295.5	552
Missouri	S-CG-Prem	65	3.11	2.47	0.17	1.81	0.00	0.00	1	0	-229.1	6.5	558
Minnesota	S-CG-Prem	99	3.09	2.47	0.17	1.81	0.00	0.00	1	0	-226.6	9.9	568
Missouri	S-RFG-Reg	398	2.82	2.47	0.17	2.06	0.00	0.00	1	0	-224.4	39.8	608
Florida	S-CG-Prem	434	3.15	2.47	0.33	1.81	0.00	0.00	1	0	-215.6	43.4	651
Oregon	S-CG-Prem	90	3.06	2.47	0.26	1.81	0.00	0.00	1	0	-214.1	9.0	660
Hawaii	S-CG-Prem	49	3.28	2.47	0.55	1.81	0.00	0.00	1	0	-208.2	4.9	665
Missouri	S-RFG-Prem	39	3.17	2.47	0.17	1.47	0.00	0.00	1	0	-201.0	3.9	669
Missouri	W-RFG-Prem	47	3.12	2.47	0.17	0.74	0.00	0.00	1	0	-122.9	4.7	674
Missouri	W-CG-Prem	79	3.06	2.47	0.17	0.74	0.00	0.00	1	0	-116.9	7.9	682
Minnesota	W-CG-Prem	119	3.04	2.47	0.17	0.74	0.00	0.00	1	0	-114.4	11.9	694
Missouri	W-RFG-reg	481	2.77	2.47	0.17	0.97	0.00	0.00	1	0	-110.7	48.1	742
Missouri	W-CG-reg	937	2.71	2.47	0.17	0.97	0.00	0.00	1	0	-104.7	93.7	836
Oregon	W-CG-reg	779	2.80	2.47	0.26	0.97	0.00	0.00	1	0	-104.4	77.9	914
Florida	W-CG-Prem	525	3.10	2.47	0.33	0.74	0.00	0.00	1	0	-103.3	52.5	966
Minnesota	W-CG-reg	1185	2.68	2.47	0.17	0.97	0.00	0.00	1	0	-102.3	118.5	1,085
Oregon	W-CG-Prem	109	3.01	2.47	0.26	0.74	0.00	0.00	1	0	-101.9	10.9	1,096
Hawaii	W-CG-reg	200	3.05	2.47	0.55	0.97	0.00	0.00	1	0	-101.4	20.0	1,115
Hawaii	W-CG-Prem	60	3.23	2.47	0.55	0.74	0.00	0.00	1	0	-96.0	6.0	1,121
Florida	W-CG-reg	3573	2.74	2.47	0.33	0.97	0.00	0.00	1	0	-91.4	357.3	1,479
Iowa	S-CG-Reg	475	2.77	2.47	0.17	2.40	0.00	0.30	0	0	-282.9	47.5	1,526
Illinois	S-CG-Reg	726	2.80	2.47	0.17	2.40	0.00	0.26	0	0	-282.3	72.6	1,599
Alaska	S-CG-Reg	106	3.31	2.47	0.55	2.40	0.00	0.00	0	0	-269.5	10.6	1,609
South Dakota	S-CG-Reg	171	2.79	2.47	0.17	2.40	0.00	0.09	0	0	-265.2	17.1	1,627
Illinois	S-CG-Prem	44	3.16	2.47	0.17	1.81	0.00	0.26	0	0	-259.1	4.4	1,631
Iowa	S-CG-Prem	62	3.10	2.47	0.17	1.81	0.00	0.30	0	0	-257.7	6.2	1,637
Michigan	S-CG-Reg	1915	2.80	2.47	0.17	2.40	0.00	0.00	0	0	-257.3	191.5	1,829
Indiana	S-CG-Reg	1144	2.80	2.47	0.17	2.40	0.00	0.00	0	0	-256.4	114.4	1,943
Nebraska	S-CG-Reg	314	2.79	2.47	0.17	2.40	0.00	0.00	0	0	-256.0	31.4	1,974
Ohio	S-CG-Reg	1975	2.79	2.47	0.17	2.40	0.00	0.00	0	0	-256.0	197.5	2,172
Vermont	S-CG-Reg	128	2.89	2.47	0.28	2.40	0.00	0.00	0	0	-254.4	12.8	2,185
Wisconsin	S-CG-Reg	781	2.77	2.47	0.17	2.40	0.00	0.00	0	0	-254.3	78.1	2,263
Illinois	S-RFG-Reg	1236	2.86	2.47	0.17	2.06	0.00	0.26	0	0	-254.1	123.6	2,386
Kansas	S-CG-Reg	660	2.76	2.47	0.17	2.40	0.00	0.00	0	0	-253.1	66.0	2,452
New York	S-CG-Reg	979	2.83	2.47	0.24	2.40	0.00	0.00	0	0	-252.9	97.9	2,550
Idaho	S-CG-Reg	279	2.80	2.47	0.22	2.40	0.00	0.00	0	0	-251.0	27.9	2,578
Pennsylvania	S-CG-Reg	841	2.81	2.47	0.24	2.40	0.00	0.00	0	0	-250.9	84.1	2,662
Colorado	S-CG-Reg	798	2.79	2.47	0.22	2.40	0.00	0.00	0	0	-250.0	79.8	2,742
New Hampshire	S-CG-Reg	54	2.84	2.47	0.28	2.40	0.00	0.00	0	0	-249.8	5.4	2,748
Oklahoma	S-CG-Reg	845	2.80	2.47	0.26	2.40	0.00	0.02	0	0	-249.3	84.5	2,832
Washington	S-CG-Reg	1036	2.82	2.47	0.26	2.40	0.00	0.00	0	0	-248.9	103.6	2,936
Utah	S-CG-Reg	466	2.77	2.47	0.22	2.40	0.00	0.00	0	0	-248.1	46.6	2,982
West Virginia	S-CG-Reg	303	2.78	2.47	0.24	2.40	0.00	0.00	0	0	-247.7	30.3	3,012
Kentucky	S-CG-Reg	665	2.80	2.47	0.26	2.40	0.00	0.00	0	0	-247.2	66.5	3,079
Arkansas	S-CG-Reg	596	2.74	2.47	0.21	2.40	0.00	0.00	0	0	-246.7	59.6	3,138
Montana	S-CG-Reg	272	2.75	2.47	0.22	2.40	0.00	0.00	0	0	-245.5	27.2	3,166
Texas	S-CG-Reg	3310	2.73	2.47	0.21	2.40	0.00	0.00	0	0	-245.5	331.0	3,497
Nevada	S-CG-Reg	404	2.82	2.47	0.30	2.40	0.00	0.00	0	0	-245.4	40.4	3,537
Mississippi	S-CG-Reg	711	2.73	2.47	0.21	2.40	0.00	0.00	0	0	-245.3	71.1	3,608
Maine	S-CG-Reg	121	2.85	2.47	0.33	2.40	0.00	0.00	0	0	-245.2	12.1	3,620
Maryland	S-CG-Reg	84	2.77	2.47	0.26	2.40	0.00	0.00	0	0	-245.1	8.4	3,629
Louisiana	S-CG-Reg	1109	2.72	2.47	0.21	2.40	0.00	0.00	0	0	-244.6	110.9	3,739
Arizona	S-CG-Reg	421	2.81	2.47	0.30	2.40	0.00	0.00	0	0	-244.0	42.1	3,782
Virginia	S-CG-Reg	631	2.76	2.47	0.26	2.40	0.00	0.00	0	0	-243.8	63.1	3,845
North Dakota	S-CG-Reg	160	2.76	2.47	0.26	2.40	0.00	0.00	0	0	-243.1	16.0	3,861
Georgia	S-CG-Reg	1944	2.77	2.47	0.28	2.40	0.00	0.00	0	0	-242.4	194.4	4,055
Wyoming	S-CG-Reg	134	2.71	2.47	0.22	2.40	0.00	0.00	0	0	-242.2	13.4	4,068
New Mexico	S-CG-Reg	383	2.74	2.47	0.26	2.40	0.00	0.00	0	0	-241.8	38.3	4,107
Alabama	S-CG-Reg	987	2.73	2.47	0.26	2.40	0.00	0.00	0	0	-241.0	98.7	4,205
Tennessee	S-CG-Reg	1391	2.73	2.47	0.26	2.40	0.00	0.00	0	0	-240.4	139.1	4,345
Wisconsin	S-CG-Prem	70	3.22	2.47	0.17	1.81	0.00	0.00	0	0	-239.9	7.0	4,351
South Carolina	S-CG-Reg	1047	2.73	2.47	0.28	2.40	0.00	0.00	0	0	-239.1	104.7	4,456
South Dakota	S-CG-Prem	21	3.12	2.47	0.17	1.81	0.00	0.09	0	0	-239.0	2.1	4,458
North Carolina	S-CG-Reg	1758	2.72	2.47	0.28	2.40	0.00	0.00	0	0	-238.1	175.8	4,634
Alaska	S-CG-Prem	13	3.51	2.47	0.55	1.81	0.00	0.00	0	0	-231.3	1.3	4,635
Illinois	S-RFG-Prem	178	3.22	2.47	0.17	1.47	0.00	0.26	0	0	-230.9	17.8	4,653
Michigan	S-CG-Prem	126	3.12	2.47	0.17	1.81	0.00	0.00	0	0	-229.5	12.6	4,666
Nebraska	S-CG-Prem	42	3.10	2.47	0.17	1.81	0.00	0.00	0	0	-228.4	4.2	4,670
Indiana	S-RFG-Reg	190	2.86	2.47	0.17	2.06	0.00	0.00	0	0	-228.2	19.0	4,689
North Dakota	S-CG-Prem	19	3.19	2.47	0.26	1.81	0.00	0.00	0	0	-227.4	1.9	4,691
Indiana	S-CG-Prem	82	3.09	2.47	0.17	1.81	0.00	0.00	0	0	-227.2	8.2	4,699
Ohio	S-CG-Prem	156	3.08	2.47	0.17	1.81	0.00	0.00	0	0	-225.9	15.6	4,715
Wisconsin	S-RFG-Reg	322	2.83	2.47	0.17	2.06	0.00	0.00	0	0	-226.2	32.2	4,747
New York	S-RFG-Reg	1182	2.89	2.47	0.24	2.06	0.00	0.00	0	0	-224.7	118.2	4,865
California	S-RFG-Reg	5074	2.95	2.47	0.30	2.06	0.00	0.00	0	0	-224.1	507.4	5,372
Kansas	S-CG-Prem	56	3.06	2.47	0.17	1.81	0.00	0.00	0	0	-223.6	5.6	5,378
New York	S-CG-Prem	96	3.13	2.47	0.24	1.81	0.00	0.00	0	0	-223.3	9.6	5,388
Rhode Island	S-RFG-Reg	249	2.90	2.47	0.26	2.06	0.00	0.00	0	0	-223.4	24.9	5,412
Pennsylvania	S-RFG-Reg	372	2.87	2.47	0.24	2.06	0.00	0.00	0	0	-222.8	37.2	5,450
Connecticut	S-RFG-Reg	609	2.89	2.47	0.26	2.06	0.00	0.00	0	0	-222.7	60.9	5,511
Virginia	S-CG-Prem	61	3.13	2.47	0.26	1.81	0.00	0.00	0	0	-221.5	6.1	5,517

Table A2013B Input Costs, Ethanol Blending Cost and Ethanol Volumes

Year 2013 State	Gasoline Code	Gasoline Volume MMgals	Gasoline Price $/gal	Ethanol Gate Price $/gal	Ethanol Dist Cost $/gal	Ethanol Blending $/gal	Federal Subsidy $/gal	State Subsidy $/gal	State Mandate	RFG "Mandate"	Ethanol Blending Cost c/gal	Ethanol Volume MMgals	Cumulative Eth Vol MMgals
New Hampshire	S-RFG-Reg	178	2.90	2.47	0.28	2.06	0.00	0.00	0	0	-221.7	17.8	5,534
Louisiana	S-CG-Prem	98	3.07	2.47	0.21	1.81	0.00	0.00	0	0	-220.9	9.8	5,544
Massachusetts	S-RFG-Reg	1036	2.88	2.47	0.26	2.06	0.00	0.00	0	0	-221.4	103.6	5,648
Vermont	S-CG-Prem	11	3.14	2.47	0.28	1.81	0.00	0.00	0	0	-220.8	1.1	5,649
West Virginia	S-CG-Prem	19	3.10	2.47	0.24	1.81	0.00	0.00	0	0	-220.5	1.9	5,651
Arkansas	S-CG-Prem	51	3.07	2.47	0.21	1.81	0.00	0.00	0	0	-220.3	5.1	5,656
Maryland	S-CG-Prem	7	3.11	2.47	0.26	1.81	0.00	0.00	0	0	-220.0	0.7	5,657
Kentucky	S-CG-Prem	46	3.11	2.47	0.26	1.81	0.00	0.00	0	0	-219.9	4.6	5,661
Delaware	S-RFG-Reg	181	2.86	2.47	0.26	2.06	0.00	0.00	0	0	-219.6	18.1	5,679
Alabama	S-CG-Prem	98	3.10	2.47	0.26	1.81	0.00	0.00	0	0	-218.7	9.8	5,689
Kentucky	S-RFG-Reg	183	2.86	2.47	0.26	2.06	0.00	0.00	0	0	-219.1	18.3	5,708
Georgia	S-CG-Prem	267	3.11	2.47	0.28	1.81	0.00	0.00	0	0	-218.1	26.7	5,734
Texas	S-CG-Prem	322	3.04	2.47	0.21	1.81	0.00	0.00	0	0	-217.5	32.2	5,766
Colorado	S-CG-Prem	175	3.05	2.47	0.22	1.81	0.00	0.00	0	0	-217.1	17.5	5,784
Texas	S-RFG-Reg	2430	2.79	2.47	0.21	2.06	0.00	0.00	0	0	-217.3	243.0	6,027
New Jersey	S-RFG-Reg	1547	2.84	2.47	0.26	2.06	0.00	0.00	0	0	-217.1	154.7	6,182
Maine	S-RFG-Reg	179	2.91	2.47	0.33	2.06	0.00	0.00	0	0	-217.1	17.9	6,199
Maryland	S-RFG-Reg	714	2.83	2.47	0.26	2.06	0.00	0.00	0	0	-217.0	71.4	6,271
Tennessee	S-CG-Prem	161	3.07	2.47	0.26	1.81	0.00	0.00	0	0	-216.2	16.1	6,287
Pennsylvania	S-CG-Prem	80	3.05	2.47	0.24	1.81	0.00	0.00	0	0	-215.9	8.0	6,295
Oklahoma	S-CG-Prem	83	3.05	2.47	0.26	1.81	0.00	0.02	0	0	-215.7	8.3	6,303
South Carolina	S-CG-Prem	124	3.09	2.47	0.28	1.81	0.00	0.00	0	0	-215.4	12.4	6,316
Arizona	S-RFG-Reg	754	2.87	2.47	0.30	2.06	0.00	0.00	0	0	-215.9	75.4	6,391
Virginia	S-RFG-Reg	746	2.82	2.47	0.26	2.06	0.00	0.00	0	0	-215.6	74.6	6,466
Mississippi	S-CG-Prem	73	3.01	2.47	0.21	1.81	0.00	0.00	0	0	-215.0	7.3	6,473
Montana	S-CG-Prem	58	3.02	2.47	0.22	1.81	0.00	0.00	0	0	-214.5	5.8	6,479
DC	S-RFG-Reg	25	2.81	2.47	0.26	2.06	0.00	0.00	0	0	-214.7	2.5	6,481
North Carolina	S-CG-Prem	220	3.07	2.47	0.28	1.81	0.00	0.00	0	0	-213.9	22.0	6,503
New Hampshire	S-CG-Prem	4	3.07	2.47	0.28	1.81	0.00	0.00	0	0	-213.7	0.4	6,504
Washington	S-CG-Prem	206	3.05	2.47	0.26	1.81	0.00	0.00	0	0	-213.3	20.6	6,524
Maine	S-CG-Prem	10	3.10	2.47	0.33	1.81	0.00	0.00	0	0	-211.4	1.0	6,525
Idaho	S-CG-Prem	47	2.99	2.47	0.22	1.81	0.00	0.00	0	0	-211.3	4.7	6,530
Wisconsin	S-RFG-Prem	29	3.28	2.47	0.17	1.47	0.00	0.00	0	0	-211.8	2.9	6,533
Wyoming	S-CG-Prem	27	2.99	2.47	0.22	1.81	0.00	0.00	0	0	-211.0	2.7	6,536
Utah	S-CG-Prem	126	2.97	2.47	0.22	1.81	0.00	0.00	0	0	-209.1	12.6	6,548
New Mexico	S-CG-Prem	57	2.97	2.47	0.26	1.81	0.00	0.00	0	0	-205.9	5.7	6,554
Arizona	S-CG-Prem	54	3.01	2.47	0.30	1.81	0.00	0.00	0	0	-205.3	5.4	6,559
Nevada	S-CG-Prem	105	2.99	2.47	0.30	1.81	0.00	0.00	0	0	-203.7	10.5	6,570
Indiana	S-RFG-Prem	20	3.15	2.47	0.17	1.47	0.00	0.00	0	0	-199.1	2.0	6,572
New York	S-RFG-Prem	285	3.19	2.47	0.24	1.47	0.00	0.00	0	0	-195.2	28.5	6,600
Virginia	S-RFG-Prem	145	3.19	2.47	0.26	1.47	0.00	0.00	0	0	-193.3	14.5	6,615
Connecticut	S-RFG-Prem	100	3.18	2.47	0.26	1.47	0.00	0.00	0	0	-192.9	10.0	6,625
Rhode Island	S-RFG-Prem	37	3.18	2.47	0.26	1.47	0.00	0.00	0	0	-192.8	3.7	6,628
Maryland	S-RFG-Prem	131	3.17	2.47	0.26	1.47	0.00	0.00	0	0	-191.9	13.1	6,642
Kentucky	S-RFG-Prem	18	3.17	2.47	0.26	1.47	0.00	0.00	0	0	-191.8	1.8	6,643
DC	S-RFG-Prem	6	3.16	2.47	0.26	1.47	0.00	0.00	0	0	-191.0	0.6	6,644
Texas	S-RFG-Prem	377	3.10	2.47	0.21	1.47	0.00	0.00	0	0	-189.3	37.7	6,682
Pennsylvania	S-RFG-Prem	62	3.11	2.47	0.24	1.47	0.00	0.00	0	0	-187.8	6.2	6,688
Massachusetts	S-RFG-Prem	158	3.12	2.47	0.26	1.47	0.00	0.00	0	0	-186.1	15.8	6,704
New Hampshire	S-RFG-Prem	20	3.13	2.47	0.28	1.47	0.00	0.00	0	0	-185.6	2.0	6,706
Delaware	S-RFG-Prem	22	3.10	2.47	0.26	1.47	0.00	0.00	0	0	-184.4	2.2	6,708
New Jersey	S-RFG-Prem	250	3.10	2.47	0.26	1.47	0.00	0.00	0	0	-184.4	25.0	6,733
Maine	S-RFG-Prem	12	3.16	2.47	0.33	1.47	0.00	0.00	0	0	-183.3	1.2	6,734
California	S-RFG-Prem	1466	3.13	2.47	0.30	1.47	0.00	0.00	0	0	-182.9	146.6	6,881
Arizona	S-RFG-Prem	117	3.07	2.47	0.30	1.47	0.00	0.00	0	0	-177.2	11.7	6,892
Illinois	W-RFG-Prem	215	3.17	2.47	0.17	0.74	0.00	0.26	0	0	-152.9	21.5	6,914
Illinois	W-CG-Prem	54	3.11	2.47	0.17	0.74	0.00	0.26	0	0	-146.9	5.4	6,919
Iowa	W-CG-Prem	75	3.05	2.47	0.17	0.74	0.00	0.30	0	0	-145.5	7.5	6,927
Illinois	W-RFG-reg	1494	2.81	2.47	0.17	0.97	0.00	0.26	0	0	-140.5	149.4	7,076
Iowa	W-CG-reg	574	2.72	2.47	0.17	0.97	0.00	0.30	0	0	-135.1	57.4	7,134
Illinois	W-CG-reg	878	2.75	2.47	0.17	0.97	0.00	0.26	0	0	-134.5	87.8	7,221
Wisconsin	W-RFG-Prem	35	3.23	2.47	0.17	0.74	0.00	0.00	0	0	-133.7	3.5	7,225
Wisconsin	W-CG-Prem	84	3.17	2.47	0.17	0.74	0.00	0.00	0	0	-127.7	8.4	7,233
South Dakota	W-CG-Prem	25	3.07	2.47	0.17	0.74	0.00	0.09	0	0	-126.8	2.5	7,236
Alaska	W-CG-reg	128	3.26	2.47	0.55	0.97	0.00	0.00	0	0	-121.7	12.8	7,249
Indiana	W-RFG-Prem	24	3.10	2.47	0.17	0.74	0.00	0.00	0	0	-121.0	2.4	7,251
Alaska	W-CG-Prem	15	3.46	2.47	0.55	0.74	0.00	0.00	0	0	-119.1	1.5	7,253
South Dakota	W-CG-reg	206	2.74	2.47	0.17	0.97	0.00	0.09	0	0	-117.4	20.6	7,273
Michigan	W-CG-Prem	153	3.07	2.47	0.17	0.74	0.00	0.00	0	0	-117.3	15.3	7,289
New York	W-RFG-Prem	344	3.14	2.47	0.24	0.74	0.00	0.00	0	0	-117.1	34.4	7,323
Nebraska	W-CG-Prem	51	3.05	2.47	0.17	0.74	0.00	0.00	0	0	-116.2	5.1	7,328
Virginia	W-RFG-Prem	176	3.14	2.47	0.26	0.74	0.00	0.00	0	0	-115.3	17.6	7,346
North Dakota	W-CG-Prem	24	3.14	2.47	0.26	0.74	0.00	0.00	0	0	-115.1	2.4	7,348
Indiana	W-CG-Prem	99	3.04	2.47	0.17	0.74	0.00	0.00	0	0	-115.0	9.9	7,358
Connecticut	W-RFG-Prem	121	3.13	2.47	0.26	0.74	0.00	0.00	0	0	-114.8	12.1	7,370
Rhode Island	W-RFG-Prem	45	3.13	2.47	0.26	0.74	0.00	0.00	0	0	-114.7	4.5	7,374
Indiana	W-RFG-reg	230	2.81	2.47	0.17	0.97	0.00	0.00	0	0	-114.6	23.0	7,397
Maryland	W-RFG-Prem	158	3.12	2.47	0.26	0.74	0.00	0.00	0	0	-113.8	15.8	7,413
Kentucky	W-RFG-Prem	22	3.12	2.47	0.26	0.74	0.00	0.00	0	0	-113.7	2.2	7,415
Ohio	W-CG-Prem	189	3.03	2.47	0.17	0.74	0.00	0.00	0	0	-113.7	18.9	7,434
DC	W-RFG-Prem	8	3.11	2.47	0.26	0.74	0.00	0.00	0	0	-112.9	0.8	7,435
Wisconsin	W-RFG-reg	390	2.78	2.47	0.17	0.97	0.00	0.00	0	0	-112.5	39.0	7,474
Kansas	W-CG-Prem	68	3.01	2.47	0.17	0.74	0.00	0.00	0	0	-111.4	6.8	7,481
Texas	W-RFG-Prem	456	3.05	2.47	0.21	0.74	0.00	0.00	0	0	-111.3	45.6	7,526
New York	W-CG-Prem	116	3.08	2.47	0.24	0.74	0.00	0.00	0	0	-111.1	11.6	7,538

Table A2013C Input Costs, Ethanol Blending Cost and Ethanol Volumes

Year 2013 State	Gasoline Code	Gasoline Volume MMgals	Gasoline Price $/gal	Ethanol Gate Price $/gal	Ethanol Dist Cost $/gal	Ethanol Blending $/gal	Federal Subsidy $/gal	State Subsidy $/gal	State Mandate	RFG "Mandate"	Ethanol Blending Cost c/gal	Ethanol Volume MMgals	Cumulative Eth Vol MMgals
New York	W-RFG-reg	1429	2.84	2.47	0.24	0.97	0.00	0.00	0	0	-111.1	142.9	7,681
California	W-RFG-reg	6135	2.90	2.47	0.30	0.97	0.00	0.00	0	0	-110.5	613.5	8,294
Rhode Island	W-RFG-reg	301	2.85	2.47	0.26	0.97	0.00	0.00	0	0	-109.7	30.1	8,324
Pennsylvania	W-RFG-Prem	75	3.06	2.47	0.24	0.74	0.00	0.00	0	0	-109.7	7.5	8,332
Michigan	W-CG-reg	2315	2.75	2.47	0.17	0.97	0.00	0.00	0	0	-109.5	231.5	8,563
Virginia	W-CG-Prem	74	3.08	2.47	0.26	0.74	0.00	0.00	0	0	-109.3	7.4	8,571
Pennsylvania	W-RFG-reg	450	2.82	2.47	0.24	0.97	0.00	0.00	0	0	-109.1	45.0	8,616
Connecticut	W-RFG-reg	736	2.84	2.47	0.26	0.97	0.00	0.00	0	0	-109.0	73.6	8,690
Louisiana	W-CG-Prem	118	3.02	2.47	0.21	0.74	0.00	0.00	0	0	-108.7	11.8	8,701
Indiana	W-CG-reg	1383	2.75	2.47	0.17	0.97	0.00	0.00	0	0	-108.6	138.3	8,840
Vermont	W-CG-Prem	14	3.09	2.47	0.28	0.74	0.00	0.00	0	0	-108.5	1.4	8,841
West Virginia	W-CG-Prem	23	3.05	2.47	0.24	0.74	0.00	0.00	0	0	-108.2	2.3	8,843
Nebraska	W-CG-reg	380	2.74	2.47	0.17	0.97	0.00	0.00	0	0	-108.2	38.0	8,881
Ohio	W-CG-reg	2388	2.74	2.47	0.17	0.97	0.00	0.00	0	0	-108.2	238.8	9,120
Arkansas	W-CG-Prem	61	3.02	2.47	0.21	0.74	0.00	0.00	0	0	-108.1	6.1	9,126
Massachusetts	W-RFG-Prem	191	3.07	2.47	0.26	0.74	0.00	0.00	0	0	-108.0	19.1	9,145
New Hampshire	W-RFG-reg	215	2.85	2.47	0.28	0.97	0.00	0.00	0	0	-108.0	21.5	9,167
Maryland	W-CG-Prem	8	3.06	2.47	0.26	0.74	0.00	0.00	0	0	-107.8	0.8	9,168
Massachusetts	W-RFG-reg	1252	2.83	2.47	0.26	0.97	0.00	0.00	0	0	-107.7	125.2	9,293
Kentucky	W-CG-Prem	56	3.06	2.47	0.26	0.74	0.00	0.00	0	0	-107.7	5.6	9,299
New Hampshire	W-RFG-Prem	24	3.08	2.47	0.28	0.74	0.00	0.00	0	0	-107.5	2.4	9,301
Vermont	W-CG-reg	155	2.84	2.47	0.28	0.97	0.00	0.00	0	0	-106.6	15.5	9,316
Wisconsin	W-CG-reg	944	2.72	2.47	0.17	0.97	0.00	0.00	0	0	-106.5	94.4	9,411
Alabama	W-CG-Prem	119	3.05	2.47	0.26	0.74	0.00	0.00	0	0	-106.4	11.9	9,423
Delaware	W-RFG-Prem	27	3.05	2.47	0.26	0.74	0.00	0.00	0	0	-106.3	2.7	9,425
New Jersey	W-RFG-Prem	302	3.05	2.47	0.26	0.74	0.00	0.00	0	0	-106.3	30.2	9,456
Delaware	W-RFG-reg	219	2.81	2.47	0.26	0.97	0.00	0.00	0	0	-105.9	21.9	9,478
Georgia	W-CG-Prem	323	3.06	2.47	0.28	0.74	0.00	0.00	0	0	-105.8	32.3	9,510
Kentucky	W-RFG-reg	222	2.81	2.47	0.26	0.97	0.00	0.00	0	0	-105.4	22.2	9,532
Texas	W-CG-Prem	389	2.99	2.47	0.21	0.74	0.00	0.00	0	0	-105.3	38.9	9,571
Kansas	W-CG-reg	798	2.71	2.47	0.17	0.97	0.00	0.00	0	0	-105.3	79.8	9,651
Maine	W-RFG-Prem	14	3.11	2.47	0.33	0.74	0.00	0.00	0	0	-105.2	1.4	9,652
New York	W-CG-reg	1184	2.78	2.47	0.24	0.97	0.00	0.00	0	0	-105.1	118.4	9,770
Colorado	W-CG-Prem	212	3.00	2.47	0.22	0.74	0.00	0.00	0	0	-104.9	21.2	9,792
California	W-RFG-Prem	1773	3.08	2.47	0.30	0.74	0.00	0.00	0	0	-104.8	177.3	9,969
Tennessee	W-CG-Prem	195	3.02	2.47	0.26	0.74	0.00	0.00	0	0	-103.9	19.5	9,988
Pennsylvania	W-CG-Prem	97	3.00	2.47	0.24	0.74	0.00	0.00	0	0	-103.7	9.7	9,998
Texas	W-RFG-reg	2939	2.74	2.47	0.21	0.97	0.00	0.00	0	0	-103.7	293.9	10,292
Oklahoma	W-CG-Prem	100	3.00	2.47	0.26	0.74	0.00	0.02	0	0	-103.4	10.0	10,302
New Jersey	W-RFG-reg	1870	2.79	2.47	0.26	0.97	0.00	0.00	0	0	-103.4	187.0	10,489
Maine	W-RFG-reg	216	2.86	2.47	0.33	0.97	0.00	0.00	0	0	-103.4	21.6	10,511
Maryland	W-RFG-reg	863	2.78	2.47	0.26	0.97	0.00	0.00	0	0	-103.3	86.3	10,597
Idaho	W-CG-reg	338	2.75	2.47	0.22	0.97	0.00	0.00	0	0	-103.2	33.8	10,631
South Carolina	W-CG-Prem	151	3.04	2.47	0.28	0.74	0.00	0.00	0	0	-103.1	15.1	10,646
Pennsylvania	W-CG-reg	1017	2.76	2.47	0.24	0.97	0.00	0.00	0	0	-103.1	101.7	10,747
Mississippi	W-CG-Prem	89	2.96	2.47	0.21	0.74	0.00	0.00	0	0	-102.8	8.9	10,756
Montana	W-CG-Prem	71	2.97	2.47	0.22	0.74	0.00	0.00	0	0	-102.3	7.1	10,763
Arizona	W-RFG-reg	912	2.82	2.47	0.30	0.97	0.00	0.00	0	0	-102.2	91.2	10,855
Colorado	W-CG-reg	965	2.74	2.47	0.22	0.97	0.00	0.00	0	0	-102.2	96.5	10,951
New Hampshire	W-CG-reg	66	2.79	2.47	0.28	0.97	0.00	0.00	0	0	-102.0	6.6	10,958
Virginia	W-RFG-reg	902	2.77	2.47	0.26	0.97	0.00	0.00	0	0	-102.0	90.2	11,048
North Carolina	W-CG-Prem	266	3.02	2.47	0.28	0.74	0.00	0.00	0	0	-101.6	26.6	11,074
Oklahoma	W-CG-reg	1021	2.75	2.47	0.26	0.97	0.00	0.02	0	0	-101.5	102.1	11,177
New Hampshire	W-CG-Prem	5	3.02	2.47	0.28	0.74	0.00	0.00	0	0	-101.5	0.5	11,177
Washington	W-CG-Prem	249	3.00	2.47	0.26	0.74	0.00	0.00	0	0	-101.1	24.9	11,202
Washington	W-CG-reg	1252	2.77	2.47	0.26	0.97	0.00	0.00	0	0	-101.1	125.2	11,327
DC	W-RFG-reg	30	2.76	2.47	0.26	0.97	0.00	0.00	0	0	-101.0	3.0	11,330
Utah	W-CG-reg	563	2.72	2.47	0.22	0.97	0.00	0.00	0	0	-100.3	56.3	11,386
West Virginia	W-CG-reg	366	2.73	2.47	0.24	0.97	0.00	0.00	0	0	-99.9	36.6	11,423
Kentucky	W-CG-reg	804	2.75	2.47	0.26	0.97	0.00	0.00	0	0	-99.4	80.4	11,503
Maine	W-CG-Prem	13	3.05	2.47	0.33	0.74	0.00	0.00	0	0	-99.2	1.3	11,505
Arizona	W-RFG-Prem	142	3.02	2.47	0.30	0.74	0.00	0.00	0	0	-99.1	14.2	11,519
Idaho	W-CG-Prem	57	2.94	2.47	0.22	0.74	0.00	0.00	0	0	-99.1	5.7	11,525
Arkansas	W-CG-reg	720	2.69	2.47	0.21	0.97	0.00	0.00	0	0	-98.9	72.0	11,597
Wyoming	W-CG-Prem	32	2.94	2.47	0.22	0.74	0.00	0.00	0	0	-98.8	3.2	11,600
Montana	W-CG-reg	329	2.70	2.47	0.22	0.97	0.00	0.00	0	0	-97.7	32.9	11,633
Texas	W-CG-reg	4002	2.68	2.47	0.21	0.97	0.00	0.00	0	0	-97.7	400.2	12,033
Nevada	W-CG-reg	489	2.77	2.47	0.30	0.97	0.00	0.00	0	0	-97.6	48.9	12,082
Mississippi	W-CG-reg	860	2.68	2.47	0.21	0.97	0.00	0.00	0	0	-97.5	86.0	12,168
Maine	W-CG-reg	147	2.80	2.47	0.33	0.97	0.00	0.00	0	0	-97.4	14.7	12,183
Maryland	W-CG-reg	101	2.72	2.47	0.26	0.97	0.00	0.00	0	0	-97.3	10.1	12,193
Utah	W-CG-Prem	152	2.92	2.47	0.22	0.74	0.00	0.00	0	0	-96.9	15.2	12,208
Louisiana	W-CG-reg	1341	2.67	2.47	0.21	0.97	0.00	0.00	0	0	-96.8	134.1	12,342
Arizona	W-CG-reg	509	2.76	2.47	0.30	0.97	0.00	0.00	0	0	-96.2	50.9	12,393
Virginia	W-CG-reg	763	2.71	2.47	0.26	0.97	0.00	0.00	0	0	-96.0	76.3	12,469
North Dakota	W-CG-reg	193	2.71	2.47	0.26	0.97	0.00	0.00	0	0	-95.3	19.3	12,488
Georgia	W-CG-reg	2351	2.72	2.47	0.28	0.97	0.00	0.00	0	0	-94.6	235.1	12,723
Wyoming	W-CG-reg	162	2.66	2.47	0.22	0.97	0.00	0.00	0	0	-94.4	16.2	12,740
New Mexico	W-CG-reg	463	2.69	2.47	0.26	0.97	0.00	0.00	0	0	-94.0	46.3	12,786
New Mexico	W-CG-Prem	69	2.92	2.47	0.26	0.74	0.00	0.00	0	0	-93.6	6.9	12,793
Alabama	W-CG-reg	1193	2.68	2.47	0.26	0.97	0.00	0.00	0	0	-93.2	119.3	12,912
Arizona	W-CG-Prem	65	2.96	2.47	0.30	0.74	0.00	0.00	0	0	-93.1	6.5	12,919
Tennessee	W-CG-reg	1682	2.68	2.47	0.26	0.97	0.00	0.00	0	0	-92.6	168.2	13,087
Nevada	W-CG-Prem	127	2.94	2.47	0.30	0.74	0.00	0.00	0	0	-91.5	12.7	13,099
South Carolina	W-CG-reg	1266	2.68	2.47	0.28	0.97	0.00	0.00	0	0	-91.3	126.6	13,226
North Carolina	W-CG-reg	2126	2.67	2.47	0.28	0.97	0.00	0.00	0	0	-90.3	212.6	13,439

Table A2014A Input Costs, Ethanol Blending Cost and Ethanol Volumes

Year 2014 State	Gasoline Code	Gasoline Volume MMgals	Gasoline Price $/gal	Ethanol Gate Price $/gal	Ethanol Dist Cost $/gal	Ethanol Blending $/gal	Federal Subsidy $/gal	State Subsidy $/gal	State Mandate	RFG "Mandate"	Ethanol Blending Cost c/gal	Ethanol Volume MMgals	Cumulative Eth Vol MMgals
Hawaii	S-CG-Reg	164	3.00	2.34	0.56	2.40	0.00	0.00	1	0	-249.6	16.4	16
Oregon	S-CG-Reg	641	2.70	2.34	0.27	2.40	0.00	0.00	1	0	-248.1	64.1	80
Missouri	S-CG-Reg	771	2.56	2.34	0.17	2.40	0.00	0.00	1	0	-244.4	77.1	158
Minnesota	S-CG-Reg	975	2.53	2.34	0.17	2.40	0.00	0.00	1	0	-241.4	97.5	255
Missouri	S-RFG-Reg	396	2.62	2.34	0.17	2.09	0.00	0.00	1	0	-219.2	39.6	295
Missouri	S-CG-Prem	65	2.88	2.34	0.17	1.81	0.00	0.00	1	0	-218.0	6.5	301
Minnesota	S-CG-Prem	98	2.84	2.34	0.17	1.81	0.00	0.00	1	0	-214.2	9.8	311
Oregon	S-CG-Prem	90	2.91	2.34	0.27	1.81	0.00	0.00	1	0	-210.5	9.0	320
Hawaii	S-CG-Prem	49	3.18	2.34	0.56	1.81	0.00	0.00	1	0	-209.4	4.9	325
Missouri	S-RFG-Prem	39	2.94	2.34	0.17	1.50	0.00	0.00	1	0	-192.8	3.9	329
Missouri	W-RFG-Prem	47	2.89	2.34	0.17	0.74	0.00	0.00	1	0	-111.8	4.7	333
Missouri	W-CG-Prem	78	2.83	2.34	0.17	0.74	0.00	0.00	1	0	-105.8	7.8	341
Missouri	W-RFG-reg	478	2.57	2.34	0.17	0.97	0.00	0.00	1	0	-102.6	47.8	389
Minnesota	W-CG-Prem	119	2.79	2.34	0.17	0.74	0.00	0.00	1	0	-102.0	11.9	401
Hawaii	W-CG-reg	198	2.95	2.34	0.56	0.97	0.00	0.00	1	0	-101.8	19.8	421
Oregon	W-CG-reg	775	2.65	2.34	0.27	0.97	0.00	0.00	1	0	-100.3	77.5	498
Oregon	W-CG-Prem	109	2.86	2.34	0.27	0.74	0.00	0.00	1	0	-98.3	10.9	509
Hawaii	W-CG-Prem	59	3.13	2.34	0.56	0.74	0.00	0.00	1	0	-97.2	5.9	515
Missouri	W-CG-reg	932	2.51	2.34	0.17	0.97	0.00	0.00	1	0	-96.6	93.2	608
Minnesota	W-CG-reg	1179	2.48	2.34	0.17	0.97	0.00	0.00	1	0	-93.6	117.9	726
Iowa	S-CG-Reg	472	2.56	2.34	0.17	2.40	0.00	0.30	0	0	-274.1	47.2	773
Illinois	S-CG-Reg	722	2.58	2.34	0.17	2.40	0.00	0.26	0	0	-272.6	72.2	846
Alaska	S-CG-Reg	105	3.23	2.34	0.56	2.40	0.00	0.00	0	0	-272.4	10.5	856
South Dakota	S-CG-Reg	170	2.56	2.34	0.17	2.40	0.00	0.09	0	0	-254.3	17.0	873
Illinois	S-CG-Prem	44	2.98	2.34	0.17	1.81	0.00	0.26	0	0	-253.4	4.4	877
Iowa	S-CG-Prem	61	2.93	2.34	0.17	1.81	0.00	0.30	0	0	-252.2	6.1	884
Ohio	S-CG-Reg	1964	2.62	2.34	0.17	2.40	0.00	0.00	0	0	-251.1	196.4	1,080
Idaho	S-CG-Reg	278	2.67	2.34	0.23	2.40	0.00	0.00	0	0	-250.0	27.8	1,108
Michigan	S-CG-Reg	1904	2.61	2.34	0.17	2.40	0.00	0.00	0	0	-249.8	190.4	1,298
Indiana	S-CG-Reg	1138	2.58	2.34	0.17	2.40	0.00	0.00	0	0	-247.1	113.8	1,412
Illinois	S-RFG-Reg	1229	2.64	2.34	0.17	2.09	0.00	0.26	0	0	-247.5	122.9	1,535
Vermont	S-CG-Reg	127	2.69	2.34	0.28	2.40	0.00	0.00	0	0	-246.3	12.7	1,548
Wisconsin	S-CG-Reg	776	2.57	2.34	0.17	2.40	0.00	0.00	0	0	-246.1	77.6	1,625
West Virginia	S-CG-Reg	301	2.64	2.34	0.24	2.40	0.00	0.00	0	0	-245.4	30.1	1,655
Utah	S-CG-Reg	463	2.63	2.34	0.23	2.40	0.00	0.00	0	0	-245.3	46.3	1,702
Nebraska	S-CG-Reg	313	2.56	2.34	0.17	2.40	0.00	0.00	0	0	-244.9	31.3	1,733
Colorado	S-CG-Reg	793	2.62	2.34	0.23	2.40	0.00	0.00	0	0	-244.9	79.3	1,812
New York	S-CG-Reg	974	2.64	2.34	0.24	2.40	0.00	0.00	0	0	-244.8	97.4	1,910
Washington	S-CG-Reg	1030	2.66	2.34	0.27	2.40	0.00	0.00	0	0	-244.5	103.0	2,013
Nevada	S-CG-Reg	402	2.69	2.34	0.31	2.40	0.00	0.00	0	0	-243.7	40.2	2,053
Kansas	S-CG-Reg	656	2.54	2.34	0.17	2.40	0.00	0.00	0	0	-242.7	65.6	2,118
Wyoming	S-CG-Reg	133	2.60	2.34	0.23	2.40	0.00	0.00	0	0	-242.6	13.3	2,132
New Hampshire	S-CG-Reg	54	2.65	2.34	0.28	2.40	0.00	0.00	0	0	-242.1	5.4	2,137
Montana	S-CG-Reg	270	2.59	2.34	0.23	2.40	0.00	0.00	0	0	-241.9	27.0	2,164
Kentucky	S-CG-Reg	661	2.62	2.34	0.26	2.40	0.00	0.00	0	0	-240.9	66.1	2,230
Arkansas	S-CG-Reg	592	2.56	2.34	0.21	2.40	0.00	0.00	0	0	-240.0	59.2	2,289
Mississippi	S-CG-Reg	707	2.55	2.34	0.21	2.40	0.00	0.00	0	0	-239.8	70.7	2,360
Pennsylvania	S-CG-Reg	837	2.58	2.34	0.24	2.40	0.00	0.00	0	0	-239.3	83.7	2,444
New Mexico	S-CG-Reg	381	2.60	2.34	0.26	2.40	0.00	0.00	0	0	-239.1	38.1	2,482
North Dakota	S-CG-Reg	159	2.59	2.34	0.26	2.40	0.00	0.00	0	0	-238.1	15.9	2,498
Maine	S-CG-Reg	121	2.66	2.34	0.34	2.40	0.00	0.00	0	0	-237.8	12.1	2,510
Maryland	S-CG-Reg	83	2.58	2.34	0.26	2.40	0.00	0.00	0	0	-237.6	8.3	2,518
Louisiana	S-CG-Reg	1102	2.53	2.34	0.21	2.40	0.00	0.00	0	0	-237.3	110.2	2,628
Georgia	S-CG-Reg	1933	2.60	2.34	0.28	2.40	0.00	0.00	0	0	-237.1	193.3	2,822
Texas	S-CG-Reg	3291	2.52	2.34	0.21	2.40	0.00	0.00	0	0	-236.4	329.1	3,151
Arizona	S-CG-Reg	419	2.61	2.34	0.31	2.40	0.00	0.00	0	0	-235.7	41.9	3,193
Wisconsin	S-CG-Prem	69	3.05	2.34	0.17	1.81	0.00	0.00	0	0	-234.9	6.9	3,200
Tennessee	S-CG-Reg	1383	2.55	2.34	0.26	2.40	0.00	0.00	0	0	-234.2	138.3	3,338
South Dakota	S-CG-Prem	20	2.95	2.34	0.17	1.81	0.00	0.09	0	0	-234.2	2.0	3,340
Virginia	S-CG-Reg	627	2.55	2.34	0.26	2.40	0.00	0.00	0	0	-234.1	62.7	3,403
Alabama	S-CG-Reg	981	2.55	2.34	0.26	2.40	0.00	0.00	0	0	-234.1	98.1	3,501
South Carolina	S-CG-Reg	1041	2.56	2.34	0.28	2.40	0.00	0.00	0	0	-233.6	104.1	3,605
Oklahoma	S-CG-Reg	840	2.52	2.34	0.26	2.40	0.00	0.02	0	0	-233.3	84.0	3,689
North Carolina	S-CG-Reg	1748	2.55	2.34	0.28	2.40	0.00	0.00	0	0	-232.0	174.8	3,864
Florida	S-CG-Reg	2938	2.60	2.34	0.34	2.40	0.00	0.00	0	0	-231.5	293.8	4,158
Ohio	S-CG-Prem	155	3.00	2.34	0.17	1.81	0.00	0.00	0	0	-229.3	15.5	4,173
Alaska	S-CG-Prem	13	3.38	2.34	0.56	1.81	0.00	0.00	0	0	-229.0	1.3	4,174
Michigan	S-CG-Prem	126	2.99	2.34	0.17	1.81	0.00	0.00	0	0	-228.6	12.6	4,187
Illinois	S-RFG-Prem	177	3.04	2.34	0.17	1.50	0.00	0.26	0	0	-228.3	17.7	4,205
Indiana	S-CG-Prem	81	2.97	2.34	0.17	1.81	0.00	0.00	0	0	-226.7	8.1	4,213
Nebraska	S-CG-Prem	42	2.93	2.34	0.17	1.81	0.00	0.00	0	0	-223.2	4.2	4,217
Indiana	S-RFG-Reg	189	2.64	2.34	0.17	2.09	0.00	0.00	0	0	-222.0	18.9	4,236
California	S-RFG-Reg	5045	2.75	2.34	0.31	2.09	0.00	0.03	0	0	-221.3	504.5	4,740
Rhode Island	S-RFG-Reg	248	2.73	2.34	0.26	2.09	0.00	0.00	0	0	-221.3	24.8	4,765
Wisconsin	S-RFG-Reg	321	2.63	2.34	0.17	2.09	0.00	0.00	0	0	-220.9	32.1	4,797
Kentucky	S-CG-Prem	46	3.00	2.34	0.26	1.81	0.00	0.00	0	0	-220.4	4.6	4,802
West Virginia	S-CG-Prem	19	2.97	2.34	0.24	1.81	0.00	0.00	0	0	-219.4	1.9	4,804
New York	S-RFG-Reg	1175	2.70	2.34	0.24	2.09	0.00	0.00	0	0	-219.7	117.5	4,921
Massachusetts	S-RFG-Reg	1030	2.71	2.34	0.26	2.09	0.00	0.00	0	0	-219.0	103.0	5,024
North Dakota	S-CG-Prem	19	2.97	2.34	0.26	1.81	0.00	0.00	0	0	-217.4	1.9	5,026
New Hampshire	S-RFG-Reg	177	2.71	2.34	0.28	2.09	0.00	0.00	0	0	-217.0	17.7	5,044
Montana	S-CG-Prem	58	2.93	2.34	0.23	1.81	0.00	0.00	0	0	-216.4	5.8	5,050
Connecticut	S-RFG-Reg	605	2.69	2.34	0.26	2.09	0.00	0.00	0	0	-216.7	60.5	5,110
Kentucky	S-RFG-Reg	182	2.68	2.34	0.26	2.09	0.00	0.00	0	0	-215.8	18.2	5,128
New York	S-CG-Prem	95	2.93	2.34	0.24	1.81	0.00	0.00	0	0	-215.2	9.5	5,138

Table A2014B Input Costs, Ethanol Blending Cost and Ethanol Volumes

Year 2014 State	Gasoline Code	Gasoline Volume MMgals	Gasoline Price $/gal	Ethanol Gate Price $/gal	Ethanol Dist Cost $/gal	Ethanol Blending $/gal	Federal Subsidy $/gal	State Subsidy $/gal	State Mandate	RFG "Mandate"	Ethanol Blending Cost c/gal	Ethanol Volume MMgals	Cumulative Eth Vol MMgals
Wyoming	S-CG-Prem	27	2.91	2.34	0.23	1.81	0.00	0.00	0	0	-214.4	2.7	5,140
Colorado	S-CG-Prem	174	2.90	2.34	0.23	1.81	0.00	0.00	0	0	-214.2	17.4	5,158
Georgia	S-CG-Prem	265	2.96	2.34	0.28	1.81	0.00	0.00	0	0	-214.1	26.5	5,184
Vermont	S-CG-Prem	11	2.95	2.34	0.28	1.81	0.00	0.00	0	0	-213.8	1.1	5,186
Pennsylvania	S-RFG-Reg	370	2.64	2.34	0.24	2.09	0.00	0.00	0	0	-214.2	37.0	5,223
Alabama	S-CG-Prem	98	2.93	2.34	0.26	1.81	0.00	0.00	0	0	-213.1	9.8	5,232
Arkansas	S-CG-Prem	51	2.87	2.34	0.21	1.81	0.00	0.00	0	0	-212.8	5.1	5,237
Delaware	S-RFG-Reg	180	2.65	2.34	0.26	2.09	0.00	0.00	0	0	-213.0	18.0	5,255
Maine	S-RFG-Reg	178	2.72	2.34	0.34	2.09	0.00	0.00	0	0	-212.7	17.8	5,273
Maryland	S-RFG-Reg	710	2.64	2.34	0.26	2.09	0.00	0.00	0	0	-212.5	71.0	5,344
Louisiana	S-CG-Prem	97	2.87	2.34	0.21	1.81	0.00	0.00	0	0	-212.0	9.7	5,354
Texas	S-RFG-Reg	2417	2.58	2.34	0.21	2.09	0.00	0.00	0	0	-211.3	241.7	5,596
Virginia	S-CG-Prem	61	2.90	2.34	0.26	1.81	0.00	0.00	0	0	-210.5	6.1	5,602
South Carolina	S-CG-Prem	124	2.92	2.34	0.28	1.81	0.00	0.00	0	0	-210.5	12.4	5,614
Idaho	S-CG-Prem	47	2.87	2.34	0.23	1.81	0.00	0.00	0	0	-210.3	4.7	5,619
Arizona	S-RFG-Reg	750	2.67	2.34	0.31	2.09	0.00	0.00	0	0	-210.5	75.0	5,694
New Jersey	S-RFG-Reg	1538	2.62	2.34	0.26	2.09	0.00	0.00	0	0	-210.2	153.8	5,848
Tennessee	S-CG-Prem	160	2.89	2.34	0.26	1.81	0.00	0.00	0	0	-209.6	16.0	5,864
North Carolina	S-CG-Prem	219	2.91	2.34	0.28	1.81	0.00	0.00	0	0	-209.6	21.9	5,885
Wisconsin	S-RFG-Prem	29	3.11	2.34	0.17	1.50	0.00	0.00	0	0	-209.7	2.9	5,888
Maryland	S-CG-Prem	7	2.88	2.34	0.26	1.81	0.00	0.00	0	0	-208.9	0.7	5,889
Florida	S-CG-Prem	431	2.96	2.34	0.34	1.81	0.00	0.00	0	0	-208.8	43.1	5,932
DC	S-RFG-Reg	25	2.61	2.34	0.26	2.09	0.00	0.00	0	0	-209.1	2.5	5,935
Virginia	S-RFG-Reg	742	2.61	2.34	0.26	2.09	0.00	0.00	0	0	-209.0	74.2	6,009
Kansas	S-CG-Prem	56	2.79	2.34	0.17	1.81	0.00	0.00	0	0	-208.3	5.6	6,014
New Hampshire	S-CG-Prem	4	2.89	2.34	0.28	1.81	0.00	0.00	0	0	-207.5	0.4	6,015
Washington	S-CG-Prem	204	2.87	2.34	0.27	1.81	0.00	0.00	0	0	-207.0	20.4	6,035
Mississippi	S-CG-Prem	73	2.81	2.34	0.21	1.81	0.00	0.00	0	0	-206.4	7.3	6,043
Utah	S-CG-Prem	125	2.83	2.34	0.23	1.81	0.00	0.00	0	0	-206.3	12.5	6,055
Texas	S-CG-Prem	320	2.81	2.34	0.21	1.81	0.00	0.00	0	0	-206.2	32.0	6,087
Oklahoma	S-CG-Prem	82	2.82	2.34	0.26	1.81	0.00	0.02	0	0	-204.4	8.2	6,095
Maine	S-CG-Prem	10	2.92	2.34	0.34	1.81	0.00	0.00	0	0	-204.3	1.0	6,096
New Mexico	S-CG-Prem	57	2.84	2.34	0.26	1.81	0.00	0.00	0	0	-204.0	5.7	6,102
Pennsylvania	S-CG-Prem	80	2.81	2.34	0.24	1.81	0.00	0.00	0	0	-203.1	8.0	6,110
Nevada	S-CG-Prem	104	2.86	2.34	0.31	1.81	0.00	0.00	0	0	-201.5	10.4	6,120
Indiana	S-RFG-Prem	20	3.03	2.34	0.17	1.50	0.00	0.00	0	0	-201.6	2.0	6,122
Arizona	S-CG-Prem	53	2.80	2.34	0.31	1.81	0.00	0.00	0	0	-196.3	5.3	6,128
Kentucky	S-RFG-Prem	18	3.06	2.34	0.26	1.50	0.00	0.00	0	0	-195.3	1.8	6,129
New York	S-RFG-Prem	283	2.99	2.34	0.24	1.50	0.00	0.00	0	0	-190.1	28.3	6,158
Connecticut	S-RFG-Prem	99	2.97	2.34	0.26	1.50	0.00	0.00	0	0	-186.5	9.9	6,168
Rhode Island	S-RFG-Prem	37	2.97	2.34	0.26	1.50	0.00	0.00	0	0	-186.0	3.7	6,171
Virginia	S-RFG-Prem	145	2.96	2.34	0.26	1.50	0.00	0.00	0	0	-185.4	14.5	6,186
Maryland	S-RFG-Prem	130	2.94	2.34	0.26	1.50	0.00	0.00	0	0	-183.8	13.0	6,199
DC	S-RFG-Prem	6	2.94	2.34	0.26	1.50	0.00	0.00	0	0	-183.0	0.6	6,199
Massachusetts	S-RFG-Prem	157	2.94	2.34	0.26	1.50	0.00	0.00	0	0	-183.0	15.7	6,215
New Hampshire	S-RFG-Prem	20	2.95	2.34	0.28	1.50	0.00	0.00	0	0	-182.4	2.0	6,217
Texas	S-RFG-Prem	375	2.87	2.34	0.21	1.50	0.00	0.00	0	0	-181.1	37.5	6,255
Maine	S-RFG-Prem	12	2.98	2.34	0.34	1.50	0.00	0.00	0	0	-179.2	1.2	6,256
Delaware	S-RFG-Prem	22	2.90	2.34	0.26	1.50	0.00	0.00	0	0	-179.1	2.2	6,258
Pennsylvania	S-RFG-Prem	62	2.87	2.34	0.24	1.50	0.00	0.00	0	0	-178.0	6.2	6,264
California	S-RFG-Prem	1458	2.90	2.34	0.31	1.50	0.00	0.03	0	0	-177.6	145.8	6,410
New Jersey	S-RFG-Prem	248	2.87	2.34	0.26	1.50	0.00	0.00	0	0	-176.6	24.8	6,435
Arizona	S-RFG-Prem	117	2.86	2.34	0.31	1.50	0.00	0.00	0	0	-171.1	11.7	6,446
Illinois	W-RFG-Prem	214	2.99	2.34	0.17	0.74	0.00	0.26	0	0	-147.2	21.4	6,468
Illinois	W-CG-Prem	53	2.93	2.34	0.17	0.74	0.00	0.26	0	0	-141.2	5.3	6,473
Iowa	W-CG-Prem	74	2.88	2.34	0.17	0.74	0.00	0.30	0	0	-140.0	7.4	6,481
Illinois	W-RFG-reg	1486	2.59	2.34	0.17	0.97	0.00	0.26	0	0	-130.8	148.6	6,629
Wisconsin	W-RFG-Prem	35	3.06	2.34	0.17	0.74	0.00	0.00	0	0	-128.7	3.5	6,633
Iowa	W-CG-reg	571	2.51	2.34	0.17	0.97	0.00	0.30	0	0	-126.3	57.1	6,690
Illinois	W-CG-reg	873	2.53	2.34	0.17	0.97	0.00	0.26	0	0	-124.8	87.3	6,777
Alaska	W-CG-reg	127	3.18	2.34	0.56	0.97	0.00	0.00	0	0	-124.6	12.7	6,790
Wisconsin	W-CG-Prem	84	3.00	2.34	0.17	0.74	0.00	0.00	0	0	-122.7	8.4	6,798
South Dakota	W-CG-Prem	25	2.90	2.34	0.17	0.74	0.00	0.09	0	0	-122.0	2.5	6,801
Indiana	W-RFG-Prem	24	2.98	2.34	0.17	0.74	0.00	0.00	0	0	-120.5	2.4	6,803
Ohio	W-CG-Prem	188	2.95	2.34	0.17	0.74	0.00	0.00	0	0	-117.1	18.8	6,822
Alaska	W-CG-Prem	15	3.33	2.34	0.56	0.74	0.00	0.00	0	0	-116.8	1.5	6,823
Michigan	W-CG-Prem	152	2.94	2.34	0.17	0.74	0.00	0.00	0	0	-116.4	15.2	6,839
Indiana	W-CG-Prem	98	2.92	2.34	0.17	0.74	0.00	0.00	0	0	-114.5	9.8	6,848
Kentucky	W-RFG-Prem	22	3.01	2.34	0.26	0.74	0.00	0.00	0	0	-114.2	2.2	6,851
Nebraska	W-CG-Prem	50	2.88	2.34	0.17	0.74	0.00	0.00	0	0	-111.0	5.0	6,856
New York	W-RFG-Prem	342	2.94	2.34	0.24	0.74	0.00	0.00	0	0	-109.0	34.2	6,890
Kentucky	W-CG-Prem	56	2.95	2.34	0.26	0.74	0.00	0.00	0	0	-108.2	5.6	6,895
West Virginia	W-CG-Prem	23	2.92	2.34	0.24	0.74	0.00	0.00	0	0	-107.1	2.3	6,898
South Dakota	W-CG-reg	205	2.51	2.34	0.17	0.97	0.00	0.09	0	0	-106.4	20.5	6,918
Connecticut	W-RFG-Prem	120	2.92	2.34	0.26	0.74	0.00	0.00	0	0	-105.4	12.0	6,930
Indiana	W-RFG-reg	228	2.59	2.34	0.17	0.97	0.00	0.00	0	0	-105.3	22.8	6,953
North Dakota	W-CG-Prem	23	2.92	2.34	0.26	0.74	0.00	0.00	0	0	-105.2	2.3	6,955
Rhode Island	W-RFG-Prem	44	2.92	2.34	0.26	0.74	0.00	0.00	0	0	-104.9	4.4	6,960
California	W-RFG-reg	6101	2.70	2.34	0.31	0.97	0.00	0.03	0	0	-104.6	610.1	7,570
Rhode Island	W-RFG-reg	299	2.68	2.34	0.26	0.97	0.00	0.00	0	0	-104.6	29.9	7,600
Virginia	W-RFG-Prem	175	2.91	2.34	0.26	0.74	0.00	0.00	0	0	-104.3	17.5	7,617
Wisconsin	W-RFG-reg	388	2.58	2.34	0.17	0.97	0.00	0.00	0	0	-104.2	38.8	7,656
Montana	W-CG-Prem	70	2.88	2.34	0.23	0.74	0.00	0.00	0	0	-104.2	7.0	7,663
Ohio	W-CG-reg	2374	2.57	2.34	0.17	0.97	0.00	0.00	0	0	-103.3	237.4	7,901
New York	W-CG-Prem	115	2.88	2.34	0.24	0.74	0.00	0.00	0	0	-103.0	11.5	7,912

Table A2014C Input Costs, Ethanol Blending Cost and Ethanol Volumes

Year 2014 State	Gasoline Code	Gasoline Volume MMgals	Gasoline Price $/gal	Ethanol Gate Price $/gal	Ethanol Dist Cost $/gal	Ethanol Blending $/gal	Federal Subsidy $/gal	State Subsidy $/gal	State Mandate	RFG "Mandate"	Ethanol Blending Cost c/gal	Ethanol Volume MMgals	Cumulative Eth Vol MMgals
New York	W-RFG-reg	1421	2.65	2.34	0.24	0.97	0.00	0.00	0	0	-103.0	142.1	8,054
Maryland	W-RFG-Prem	157	2.89	2.34	0.26	0.74	0.00	0.00	0	0	-102.7	15.7	8,070
Massachusetts	W-RFG-reg	1245	2.66	2.34	0.26	0.97	0.00	0.00	0	0	-102.3	124.5	8,194
Wyoming	W-CG-Prem	32	2.86	2.34	0.23	0.74	0.00	0.00	0	0	-102.2	3.2	8,198
Idaho	W-CG-reg	336	2.62	2.34	0.23	0.97	0.00	0.00	0	0	-102.2	33.6	8,231
Michigan	W-CG-reg	2302	2.56	2.34	0.17	0.97	0.00	0.00	0	0	-102.0	230.2	8,461
Colorado	W-CG-Prem	211	2.85	2.34	0.23	0.74	0.00	0.00	0	0	-102.0	21.1	8,483
DC	W-RFG-Prem	7	2.89	2.34	0.26	0.74	0.00	0.00	0	0	-101.9	0.7	8,483
Massachusetts	W-RFG-Prem	190	2.89	2.34	0.26	0.74	0.00	0.00	0	0	-101.9	19.0	8,502
Georgia	W-CG-Prem	321	2.91	2.34	0.28	0.74	0.00	0.00	0	0	-101.9	32.1	8,534
Vermont	W-CG-Prem	14	2.90	2.34	0.28	0.74	0.00	0.00	0	0	-101.6	1.4	8,536
New Hampshire	W-RFG-Prem	24	2.90	2.34	0.28	0.74	0.00	0.00	0	0	-101.3	2.4	8,538
Alabama	W-CG-Prem	118	2.88	2.34	0.26	0.74	0.00	0.00	0	0	-100.9	11.8	8,550
Arkansas	W-CG-Prem	61	2.82	2.34	0.21	0.74	0.00	0.00	0	0	-100.5	6.1	8,556
New Hampshire	W-RFG-reg	213	2.66	2.34	0.28	0.97	0.00	0.00	0	0	-100.3	21.3	8,577
Texas	W-RFG-Prem	454	2.82	2.34	0.21	0.74	0.00	0.00	0	0	-100.0	45.4	8,623
Connecticut	W-RFG-reg	732	2.64	2.34	0.26	0.97	0.00	0.00	0	0	-100.0	73.2	8,696
Louisiana	W-CG-Prem	118	2.82	2.34	0.21	0.74	0.00	0.00	0	0	-99.7	11.8	8,708
Indiana	W-CG-reg	1376	2.53	2.34	0.17	0.97	0.00	0.00	0	0	-99.3	137.6	8,845
Kentucky	W-RFG-reg	221	2.63	2.34	0.26	0.97	0.00	0.00	0	0	-99.1	22.1	8,867
Vermont	W-CG-reg	154	2.64	2.34	0.28	0.97	0.00	0.00	0	0	-98.5	15.4	8,883
Virginia	W-CG-Prem	73	2.85	2.34	0.26	0.74	0.00	0.00	0	0	-98.3	7.3	8,890
South Carolina	W-CG-Prem	150	2.87	2.34	0.28	0.74	0.00	0.00	0	0	-98.3	15.0	8,905
Wisconsin	W-CG-reg	939	2.52	2.34	0.17	0.97	0.00	0.00	0	0	-98.2	93.9	8,999
Idaho	W-CG-Prem	57	2.82	2.34	0.23	0.74	0.00	0.00	0	0	-98.1	5.7	9,005
Maine	W-RFG-Prem	14	2.93	2.34	0.34	0.74	0.00	0.00	0	0	-98.1	1.4	9,006
Delaware	W-RFG-Prem	27	2.85	2.34	0.26	0.74	0.00	0.00	0	0	-98.0	2.7	9,009
West Virginia	W-CG-reg	364	2.59	2.34	0.24	0.97	0.00	0.00	0	0	-97.6	36.4	9,045
Pennsylvania	W-RFG-reg	448	2.59	2.34	0.24	0.97	0.00	0.00	0	0	-97.5	44.8	9,090
Utah	W-CG-reg	560	2.58	2.34	0.23	0.97	0.00	0.00	0	0	-97.5	56.0	9,146
Tennessee	W-CG-Prem	194	2.84	2.34	0.26	0.74	0.00	0.00	0	0	-97.4	19.4	9,165
North Carolina	W-CG-Prem	264	2.86	2.34	0.28	0.74	0.00	0.00	0	0	-97.4	26.4	9,192
Nebraska	W-CG-reg	378	2.51	2.34	0.17	0.97	0.00	0.00	0	0	-97.1	37.8	9,230
Colorado	W-CG-reg	959	2.57	2.34	0.23	0.97	0.00	0.00	0	0	-97.1	95.9	9,326
New York	W-CG-reg	1177	2.59	2.34	0.24	0.97	0.00	0.00	0	0	-97.0	117.7	9,443
Pennsylvania	W-RFG-Prem	75	2.82	2.34	0.24	0.74	0.00	0.00	0	0	-96.9	7.5	9,451
Washington	W-CG-reg	1245	2.61	2.34	0.27	0.97	0.00	0.00	0	0	-96.7	124.5	9,575
Maryland	W-CG-Prem	8	2.83	2.34	0.26	0.74	0.00	0.00	0	0	-96.7	0.8	9,576
Florida	W-CG-Prem	522	2.91	2.34	0.34	0.74	0.00	0.00	0	0	-96.5	52.2	9,628
California	W-RFG-Prem	1763	2.85	2.34	0.31	0.74	0.00	0.03	0	0	-96.5	176.3	9,805
Delaware	W-RFG-reg	218	2.60	2.34	0.26	0.97	0.00	0.00	0	0	-96.3	21.8	9,826
Kansas	W-CG-Prem	67	2.74	2.34	0.17	0.74	0.00	0.00	0	0	-96.1	6.7	9,833
Maine	W-RFG-reg	215	2.67	2.34	0.34	0.97	0.00	0.00	0	0	-96.0	21.5	9,855
Nevada	W-CG-reg	486	2.64	2.34	0.31	0.97	0.00	0.00	0	0	-95.9	48.6	9,903
Maryland	W-RFG-reg	858	2.59	2.34	0.26	0.97	0.00	0.00	0	0	-95.8	85.8	9,989
New Jersey	W-RFG-Prem	300	2.82	2.34	0.26	0.74	0.00	0.00	0	0	-95.5	30.0	10,019
New Hampshire	W-CG-Prem	5	2.84	2.34	0.28	0.74	0.00	0.00	0	0	-95.3	0.5	10,020
Kansas	W-CG-reg	793	2.49	2.34	0.17	0.97	0.00	0.00	0	0	-94.9	79.3	10,099
Washington	W-CG-Prem	247	2.82	2.34	0.27	0.74	0.00	0.00	0	0	-94.8	24.7	10,124
Wyoming	W-CG-reg	161	2.55	2.34	0.23	0.97	0.00	0.00	0	0	-94.8	16.1	10,140
Texas	W-RFG-reg	2922	2.53	2.34	0.21	0.97	0.00	0.00	0	0	-94.6	292.2	10,432
New Hampshire	W-CG-reg	65	2.60	2.34	0.28	0.97	0.00	0.00	0	0	-94.3	6.5	10,438
Mississippi	W-CG-Prem	88	2.76	2.34	0.21	0.74	0.00	0.00	0	0	-94.1	8.8	10,447
Utah	W-CG-Prem	151	2.78	2.34	0.23	0.74	0.00	0.00	0	0	-94.1	15.1	10,462
Montana	W-CG-reg	327	2.54	2.34	0.23	0.97	0.00	0.00	0	0	-94.1	32.7	10,495
Texas	W-CG-Prem	387	2.76	2.34	0.21	0.74	0.00	0.00	0	0	-94.0	38.7	10,534
Arizona	W-RFG-reg	907	2.62	2.34	0.31	0.97	0.00	0.00	0	0	-93.9	90.7	10,624
New Jersey	W-RFG-reg	1860	2.57	2.34	0.26	0.97	0.00	0.00	0	0	-93.5	186.0	10,810
Kentucky	W-CG-reg	799	2.57	2.34	0.26	0.97	0.00	0.00	0	0	-93.1	79.9	10,890
DC	W-RFG-reg	30	2.56	2.34	0.26	0.97	0.00	0.00	0	0	-92.4	3.0	10,893
Virginia	W-RFG-reg	897	2.56	2.34	0.26	0.97	0.00	0.00	0	0	-92.3	89.7	10,983
Oklahoma	W-CG-Prem	99	2.77	2.34	0.26	0.74	0.00	0.02	0	0	-92.2	9.9	10,993
Arkansas	W-CG-reg	716	2.51	2.34	0.21	0.97	0.00	0.00	0	0	-92.1	71.6	11,065
Maine	W-CG-Prem	12	2.87	2.34	0.34	0.74	0.00	0.00	0	0	-92.1	1.2	11,066
Mississippi	W-CG-reg	855	2.50	2.34	0.21	0.97	0.00	0.00	0	0	-91.9	85.5	11,151
New Mexico	W-CG-Prem	68	2.79	2.34	0.26	0.74	0.00	0.00	0	0	-91.8	6.8	11,158
Pennsylvania	W-CG-reg	1012	2.53	2.34	0.24	0.97	0.00	0.00	0	0	-91.5	101.2	11,259
New Mexico	W-CG-reg	460	2.55	2.34	0.26	0.97	0.00	0.00	0	0	-91.3	46.0	11,305
Pennsylvania	W-CG-Prem	96	2.76	2.34	0.24	0.74	0.00	0.00	0	0	-90.9	9.6	11,315
North Dakota	W-CG-reg	192	2.54	2.34	0.26	0.97	0.00	0.00	0	0	-90.3	19.2	11,334
Arizona	W-RFG-Prem	141	2.81	2.34	0.31	0.74	0.00	0.00	0	0	-90.1	14.1	11,348
Maine	W-CG-reg	146	2.61	2.34	0.34	0.97	0.00	0.00	0	0	-90.0	14.6	11,363
Maryland	W-CG-reg	101	2.53	2.34	0.26	0.97	0.00	0.00	0	0	-89.8	10.1	11,373
Louisiana	W-CG-reg	1333	2.48	2.34	0.21	0.97	0.00	0.00	0	0	-89.4	133.3	11,506
Georgia	W-CG-reg	2337	2.55	2.34	0.28	0.97	0.00	0.00	0	0	-89.3	233.7	11,740
Nevada	W-CG-Prem	126	2.81	2.34	0.31	0.74	0.00	0.00	0	0	-89.2	12.6	11,753
Texas	W-CG-reg	3980	2.47	2.34	0.21	0.97	0.00	0.00	0	0	-88.6	398.0	12,151
Arizona	W-CG-reg	506	2.56	2.34	0.31	0.97	0.00	0.00	0	0	-87.9	50.6	12,201
Tennessee	W-CG-reg	1673	2.50	2.34	0.26	0.97	0.00	0.00	0	0	-86.4	167.3	12,368
Virginia	W-CG-reg	758	2.50	2.34	0.26	0.97	0.00	0.00	0	0	-86.3	75.8	12,444
Alabama	W-CG-reg	1187	2.50	2.34	0.26	0.97	0.00	0.00	0	0	-86.3	118.7	12,563
South Carolina	W-CG-reg	1259	2.51	2.34	0.28	0.97	0.00	0.00	0	0	-85.8	125.9	12,689
Oklahoma	W-CG-reg	1016	2.47	2.34	0.26	0.97	0.00	0.02	0	0	-85.5	101.6	12,790
North Carolina	W-CG-reg	2114	2.50	2.34	0.28	0.97	0.00	0.00	0	0	-84.2	211.4	13,002
Arizona	W-CG-Prem	65	2.75	2.34	0.31	0.74	0.00	0.00	0	0	-84.1	6.5	13,008
Florida	W-CG-reg	3553	2.55	2.34	0.34	0.97	0.00	0.00	0	0	-83.7	355.3	13,364

Table A2015A Input Costs, Ethanol Blending Cost and Ethanol Volumes

Year 2015 State	Gasoline Code	Gasoline Volume MMgals	Gasoline Price $/gal	Ethanol Gate Price $/gal	Ethanol Dist Cost $/gal	Ethanol Blending $/gal	Federal Subsidy $/gal	State Subsidy $/gal	State Mandate	RFG "Mandate"	Ethanol Blending Cost c/gal	Ethanol Volume MMgals	Cumulative Eth Vol MMgals
Missouri	S-CG-Prem	67	2.03	1.61	0.11	1.66	0.00	0.00	1	0	-197.3	6.7	7
Oregon	S-CG-Reg	667	1.83	1.61	0.21	2.20	0.00	0.00	1	0	-221.5	66.7	73
Minnesota	S-CG-Prem	102	2.00	1.61	0.11	1.66	0.00	0.00	1	0	-195.0	10.2	84
Oregon	S-CG-Prem	94	2.07	1.61	0.21	1.66	0.00	0.00	1	0	-191.3	9.4	93
Minnesota	S-CG-Reg	1015	1.64	1.61	0.11	2.20	0.00	0.00	1	0	-212.3	101.5	195
Missouri	S-CG-Reg	803	1.63	1.61	0.11	2.20	0.00	0.00	1	0	-212.0	80.3	275
Missouri	S-RFG-Prem	40	2.09	1.61	0.11	1.49	0.00	0.00	1	0	-186.8	4.0	279
Missouri	S-RFG-Reg	412	1.69	1.61	0.11	2.03	0.00	0.00	1	0	-201.6	41.2	320
Hawaii	S-CG-Reg	171	1.87	1.61	0.49	2.20	0.00	0.00	1	0	-196.6	17.1	337
Hawaii	S-CG-Prem	51	2.03	1.61	0.49	1.66	0.00	0.00	1	0	-159.1	5.1	342
Missouri	W-RFG-Prem	49	2.04	1.61	0.11	0.68	0.00	0.00	1	0	-100.0	4.9	347
Missouri	W-CG-Prem	81	1.98	1.61	0.11	0.68	0.00	0.00	1	0	-94.0	8.1	355
Minnesota	W-CG-Prem	123	1.95	1.61	0.11	0.68	0.00	0.00	1	0	-91.8	12.3	368
Oregon	W-CG-Prem	113	2.02	1.61	0.21	0.68	0.00	0.00	1	0	-88.1	11.3	379
Oregon	W-CG-reg	807	1.78	1.61	0.21	0.89	0.00	0.00	1	0	-85.6	80.7	460
Missouri	W-RFG-reg	498	1.64	1.61	0.11	0.89	0.00	0.00	1	0	-82.2	49.8	509
Minnesota	W-CG-reg	1227	1.59	1.61	0.11	0.89	0.00	0.00	1	0	-76.4	122.7	632
Missouri	W-CG-reg	971	1.58	1.61	0.11	0.89	0.00	0.00	1	0	-76.2	97.1	729
Hawaii	W-CG-Prem	62	1.98	1.61	0.49	0.68	0.00	0.00	1	0	-55.9	6.2	735
Hawaii	W-CG-reg	207	1.82	1.61	0.49	0.89	0.00	0.00	1	0	-60.8	20.7	756
Illinois	S-CG-Prem	46	2.17	1.61	0.11	1.66	0.00	0.26	0	0	-237.5	4.6	761
Iowa	S-CG-Prem	64	2.07	1.61	0.11	1.66	0.00	0.30	0	0	-231.4	6.4	767
Illinois	S-RFG-Prem	184	2.23	1.61	0.11	1.49	0.00	0.26	0	0	-227.1	18.4	786
Wisconsin	S-CG-Prem	72	2.26	1.61	0.11	1.66	0.00	0.00	0	0	-220.8	7.2	793
South Dakota	S-CG-Prem	21	2.17	1.61	0.11	1.66	0.00	0.09	0	0	-220.4	2.1	795
Iowa	S-CG-Reg	492	1.65	1.61	0.11	2.20	0.00	0.30	0	0	-243.2	49.2	844
California	S-RFG-Reg	5254	2.12	1.61	0.25	2.03	0.00	0.11	0	0	-241.7	525.4	1,370
Illinois	S-CG-Reg	752	1.66	1.61	0.11	2.20	0.00	0.26	0	0	-240.1	75.2	1,445
Michigan	S-CG-Prem	131	2.19	1.61	0.11	1.66	0.00	0.00	0	0	-213.4	13.1	1,458
Alaska	S-CG-Reg	110	2.26	1.61	0.49	2.20	0.00	0.00	0	0	-236.0	11.0	1,469
Wisconsin	S-RFG-Prem	30	2.32	1.61	0.11	1.49	0.00	0.00	0	0	-210.4	3.0	1,472
California	S-RFG-Prem	1518	2.34	1.61	0.25	1.49	0.00	0.11	0	0	-209.4	151.8	1,624
Nevada	S-CG-Reg	418	1.98	1.61	0.25	2.20	0.00	0.00	0	0	-233.1	41.8	1,666
Ohio	S-CG-Prem	162	2.12	1.61	0.11	1.66	0.00	0.00	0	0	-206.5	16.2	1,682
Alaska	S-CG-Prem	13	2.50	1.61	0.49	1.66	0.00	0.00	0	0	-206.3	1.3	1,683
Indiana	S-CG-Prem	85	2.11	1.61	0.11	1.66	0.00	0.00	0	0	-205.9	8.5	1,691
Illinois	S-RFG-Reg	1280	1.72	1.61	0.11	2.03	0.00	0.26	0	0	-229.6	128.0	1,819
Nebraska	S-CG-Prem	43	2.08	1.61	0.11	1.66	0.00	0.00	0	0	-202.8	4.3	1,824
Idaho	S-CG-Reg	289	1.83	1.61	0.17	2.20	0.00	0.00	0	0	-225.2	28.9	1,853
South Dakota	S-CG-Reg	177	1.67	1.61	0.11	2.20	0.00	0.09	0	0	-225.0	17.7	1,870
Nevada	S-CG-Prem	108	2.19	1.61	0.25	1.66	0.00	0.00	0	0	-199.9	10.8	1,881
Utah	S-CG-Reg	482	1.81	1.61	0.17	2.20	0.00	0.00	0	0	-224.1	48.2	1,929
Kentucky	S-CG-Prem	48	2.12	1.61	0.20	1.66	0.00	0.00	0	0	-197.8	4.8	1,934
Montana	S-CG-Prem	60	2.07	1.61	0.17	1.66	0.00	0.00	0	0	-195.7	6.0	1,940
Indiana	S-RFG-Prem	21	2.17	1.61	0.11	1.49	0.00	0.00	0	0	-195.5	2.1	1,942
North Dakota	S-CG-Prem	20	2.10	1.61	0.20	1.66	0.00	0.00	0	0	-195.1	2.0	1,944
Wyoming	S-CG-Prem	28	2.05	1.61	0.17	1.66	0.00	0.00	0	0	-193.2	2.8	1,947
Washington	S-CG-Reg	1072	1.78	1.61	0.21	2.20	0.00	0.00	0	0	-216.8	107.2	2,054
Montana	S-CG-Reg	281	1.73	1.61	0.17	2.20	0.00	0.00	0	0	-216.0	28.1	2,083
Vermont	S-CG-Prem	12	2.08	1.61	0.22	1.66	0.00	0.00	0	0	-191.5	1.2	2,084
Kansas	S-CG-Prem	58	1.97	1.61	0.11	1.66	0.00	0.00	0	0	-191.3	5.8	2,090
Idaho	S-CG-Prem	49	2.02	1.61	0.17	1.66	0.00	0.00	0	0	-190.9	4.9	2,094
Utah	S-CG-Prem	130	2.02	1.61	0.17	1.66	0.00	0.00	0	0	-190.8	13.0	2,107
Colorado	S-CG-Prem	181	2.02	1.61	0.17	1.66	0.00	0.00	0	0	-190.4	18.1	2,126
Nebraska	S-CG-Reg	326	1.66	1.61	0.11	2.20	0.00	0.00	0	0	-214.6	32.6	2,158
Wisconsin	S-CG-Reg	809	1.66	1.61	0.11	2.20	0.00	0.00	0	0	-214.3	80.9	2,239
West Virginia	S-CG-Prem	20	2.03	1.61	0.18	1.66	0.00	0.00	0	0	-189.7	2.0	2,241
Michigan	S-CG-Reg	1983	1.65	1.61	0.11	2.20	0.00	0.00	0	0	-213.9	198.3	2,439
Alabama	S-CG-Prem	102	2.04	1.61	0.20	1.66	0.00	0.00	0	0	-189.4	10.2	2,449
Washington	S-CG-Prem	213	2.04	1.61	0.21	1.66	0.00	0.00	0	0	-189.0	21.3	2,471
Arkansas	S-CG-Prem	53	1.99	1.61	0.15	1.66	0.00	0.00	0	0	-188.9	5.3	2,476
Wyoming	S-CG-Reg	139	1.70	1.61	0.17	2.20	0.00	0.00	0	0	-212.3	13.9	2,490
Indiana	S-CG-Reg	1185	1.63	1.61	0.11	2.20	0.00	0.00	0	0	-212.0	118.5	2,608
Ohio	S-CG-Reg	2045	1.63	1.61	0.11	2.20	0.00	0.00	0	0	-211.9	204.5	2,813
Georgia	S-CG-Prem	276	2.04	1.61	0.22	1.66	0.00	0.00	0	0	-187.4	27.6	2,840
New York	S-CG-Prem	99	2.00	1.61	0.18	1.66	0.00	0.00	0	0	-187.2	9.9	2,850
Kentucky	S-RFG-Prem	19	2.18	1.61	0.20	1.49	0.00	0.00	0	0	-187.3	1.9	2,852
New Hampshire	S-CG-Prem	4	2.03	1.61	0.22	1.66	0.00	0.00	0	0	-186.8	0.4	2,853
Kansas	S-CG-Reg	683	1.62	1.61	0.11	2.20	0.00	0.00	0	0	-211.0	68.3	2,921
New Mexico	S-CG-Reg	397	1.71	1.61	0.20	2.20	0.00	0.00	0	0	-210.7	39.7	2,961
Colorado	S-CG-Reg	826	1.68	1.61	0.17	2.20	0.00	0.00	0	0	-210.5	82.6	3,043
New Mexico	S-CG-Prem	59	2.01	1.61	0.20	1.66	0.00	0.00	0	0	-186.2	5.9	3,049
Louisiana	S-CG-Prem	101	1.96	1.61	0.15	1.66	0.00	0.00	0	0	-185.8	10.1	3,059
Florida	S-CG-Prem	449	2.08	1.61	0.28	1.66	0.00	0.00	0	0	-185.5	44.9	3,104
South Carolina	S-CG-Prem	129	2.02	1.61	0.22	1.66	0.00	0.00	0	0	-185.4	12.9	3,117
North Carolina	S-CG-Prem	228	2.02	1.61	0.22	1.66	0.00	0.00	0	0	-185.2	22.8	3,140
Virginia	S-CG-Prem	63	2.00	1.61	0.20	1.66	0.00	0.00	0	0	-184.8	6.3	3,146
Oklahoma	S-CG-Prem	86	1.98	1.61	0.20	1.66	0.00	0.02	0	0	-184.5	8.6	3,155
Illinois	W-RFG-Prem	223	2.18	1.61	0.11	0.68	0.00	0.26	0	0	-140.3	22.3	3,177
North Dakota	S-CG-Reg	165	1.69	1.61	0.20	2.20	0.00	0.00	0	0	-207.8	16.5	3,194
Arkansas	S-CG-Reg	617	1.63	1.61	0.15	2.20	0.00	0.00	0	0	-207.6	61.7	3,255
Tennessee	S-CG-Prem	167	1.98	1.61	0.20	1.66	0.00	0.00	0	0	-183.2	16.7	3,272
Vermont	S-CG-Reg	133	1.70	1.61	0.22	2.20	0.00	0.00	0	0	-207.3	13.3	3,285
Arizona	S-CG-Reg	436	1.73	1.61	0.25	2.20	0.00	0.00	0	0	-207.2	43.6	3,329
Kentucky	S-CG-Reg	688	1.68	1.61	0.20	2.20	0.00	0.00	0	0	-207.0	68.8	3,398

Table A2015B Input Costs, Ethanol Blending Cost and Ethanol Volumes

Year 2015 State	Gasoline Code	Gasoline Volume MMgals	Gasoline Price $/gal	Ethanol Gate Price $/gal	Ethanol Dist Cost $/gal	Ethanol Blending $/gal	Federal Subsidy $/gal	State Subsidy $/gal	State Mandate	RFG "Mandate"	Ethanol Blending Cost c/gal	Ethanol Volume MMgals	Cumulative Eth Vol MMgals
Maine	S-CG-Prem	11	2.05	1.61	0.28	1.66	0.00	0.00	0	0	-182.0	1.1	3,399
New York	S-CG-Reg	1014	1.65	1.61	0.18	2.20	0.00	0.00	0	0	-206.0	101.4	3,500
Louisiana	S-CG-Reg	1148	1.61	1.61	0.15	2.20	0.00	0.00	0	0	-204.8	114.8	3,615
Mississippi	S-CG-Prem	76	1.90	1.61	0.15	1.66	0.00	0.00	0	0	-180.5	7.6	3,622
Oklahoma	S-CG-Reg	875	1.64	1.61	0.20	2.20	0.00	0.02	0	0	-204.7	87.5	3,710
Pennsylvania	S-CG-Prem	83	1.93	1.61	0.18	1.66	0.00	0.00	0	0	-180.1	8.3	3,718
New Hampshire	S-CG-Reg	56	1.67	1.61	0.22	2.20	0.00	0.00	0	0	-204.2	5.6	3,724
Wisconsin	S-RFG-Reg	334	1.72	1.61	0.11	2.03	0.00	0.00	0	0	-203.9	33.4	3,757
Texas	S-CG-Reg	3427	1.59	1.61	0.15	2.20	0.00	0.00	0	0	-203.4	342.7	4,100
West Virginia	S-CG-Reg	314	1.62	1.61	0.18	2.20	0.00	0.00	0	0	-203.0	31.4	4,131
Illinois	W-CG-Prem	56	2.12	1.61	0.11	0.68	0.00	0.26	0	0	-134.3	5.6	4,137
Arizona	S-CG-Prem	56	1.98	1.61	0.25	1.66	0.00	0.00	0	0	-178.3	5.6	4,142
Maryland	S-CG-Prem	7	1.93	1.61	0.20	1.66	0.00	0.00	0	0	-178.2	0.7	4,143
Texas	S-CG-Prem	333	1.87	1.61	0.15	1.66	0.00	0.00	0	0	-177.4	33.3	4,176
Mississippi	S-CG-Reg	737	1.57	1.61	0.15	2.20	0.00	0.00	0	0	-201.6	73.7	4,250
Indiana	S-RFG-Reg	197	1.69	1.61	0.11	2.03	0.00	0.00	0	0	-201.5	19.7	4,270
Pennsylvania	S-CG-Reg	871	1.60	1.61	0.18	2.20	0.00	0.00	0	0	-200.9	87.1	4,357
Maine	S-CG-Reg	126	1.69	1.61	0.28	2.20	0.00	0.00	0	0	-200.9	12.6	4,369
Georgia	S-CG-Reg	2013	1.63	1.61	0.22	2.20	0.00	0.00	0	0	-200.7	201.3	4,571
New York	S-RFG-Prem	295	2.06	1.61	0.18	1.49	0.00	0.00	0	0	-176.7	29.5	4,600
New Hampshire	S-RFG-Prem	20	2.09	1.61	0.22	1.49	0.00	0.00	0	0	-176.4	2.0	4,602
Virginia	S-CG-Reg	653	1.61	1.61	0.20	2.20	0.00	0.00	0	0	-199.9	65.3	4,668
Maryland	S-CG-Reg	87	1.60	1.61	0.20	2.20	0.00	0.00	0	0	-199.7	8.7	4,676
Alabama	S-CG-Reg	1022	1.60	1.61	0.20	2.20	0.00	0.00	0	0	-199.6	102.2	4,778
Connecticut	S-RFG-Prem	103	2.07	1.61	0.20	1.49	0.00	0.00	0	0	-175.5	10.3	4,789
Rhode Island	S-RFG-Prem	38	2.07	1.61	0.20	1.49	0.00	0.00	0	0	-175.5	3.8	4,793
Tennessee	S-CG-Reg	1441	1.60	1.61	0.20	2.20	0.00	0.00	0	0	-199.4	144.1	4,937
Virginia	S-RFG-Prem	151	2.06	1.61	0.20	1.49	0.00	0.00	0	0	-174.4	15.1	4,952
South Carolina	S-CG-Reg	1084	1.60	1.61	0.22	2.20	0.00	0.00	0	0	-197.7	108.4	5,060
Florida	S-CG-Reg	3060	1.66	1.61	0.28	2.20	0.00	0.00	0	0	-197.5	306.0	5,366
North Carolina	S-CG-Reg	1820	1.60	1.61	0.22	2.20	0.00	0.00	0	0	-197.1	182.0	5,548
Iowa	W-CG-Prem	77	2.02	1.61	0.11	0.68	0.00	0.30	0	0	-128.2	7.7	5,556
Arizona	S-RFG-Reg	781	1.79	1.61	0.25	2.03	0.00	0.00	0	0	-196.8	78.1	5,634
Kentucky	S-RFG-Reg	190	1.74	1.61	0.20	2.03	0.00	0.00	0	0	-196.6	19.0	5,653
Maine	S-RFG-Prem	12	2.11	1.61	0.28	1.49	0.00	0.00	0	0	-171.5	1.2	5,654
New York	S-RFG-Reg	1224	1.71	1.61	0.18	2.03	0.00	0.00	0	0	-195.6	122.4	5,777
Pennsylvania	S-RFG-Prem	64	1.99	1.61	0.18	1.49	0.00	0.00	0	0	-169.7	6.4	5,783
New Hampshire	S-RFG-Reg	184	1.73	1.61	0.22	2.03	0.00	0.00	0	0	-193.7	18.4	5,801
DC	S-RFG-Prem	6	2.01	1.61	0.20	1.49	0.00	0.00	0	0	-169.4	0.6	5,802
Texas	S-RFG-Reg	2517	1.65	1.61	0.15	2.03	0.00	0.00	0	0	-192.9	251.7	6,054
Wisconsin	W-RFG-Prem	37	2.27	1.61	0.11	0.68	0.00	0.00	0	0	-123.6	3.7	6,057
Massachusetts	S-RFG-Prem	163	1.99	1.61	0.20	1.49	0.00	0.00	0	0	-167.8	16.3	6,074
Arizona	S-RFG-Prem	121	2.04	1.61	0.25	1.49	0.00	0.00	0	0	-167.8	12.1	6,086
Maryland	S-RFG-Prem	135	1.99	1.61	0.20	1.49	0.00	0.00	0	0	-167.7	13.5	6,099
Connecticut	S-RFG-Reg	631	1.69	1.61	0.20	2.03	0.00	0.00	0	0	-191.6	63.1	6,162
Rhode Island	S-RFG-Reg	258	1.69	1.61	0.20	2.03	0.00	0.00	0	0	-191.6	25.8	6,188
California	W-RFG-Prem	1836	2.29	1.61	0.25	0.68	0.00	0.11	0	0	-122.6	183.6	6,372
Texas	S-RFG-Prem	391	1.93	1.61	0.15	1.49	0.00	0.00	0	0	-167.0	39.1	6,411
Delaware	S-RFG-Reg	188	1.68	1.61	0.20	2.03	0.00	0.00	0	0	-191.0	18.8	6,430
Massachusetts	S-RFG-Reg	1072	1.68	1.61	0.20	2.03	0.00	0.00	0	0	-191.0	107.2	6,537
Pennsylvania	S-RFG-Reg	386	1.66	1.61	0.18	2.03	0.00	0.00	0	0	-190.4	38.6	6,575
Maine	S-RFG-Reg	185	1.75	1.61	0.28	2.03	0.00	0.00	0	0	-190.4	18.5	6,594
Virginia	S-RFG-Reg	773	1.67	1.61	0.20	2.03	0.00	0.00	0	0	-189.4	77.3	6,671
Maryland	S-RFG-Reg	739	1.66	1.61	0.20	2.03	0.00	0.00	0	0	-189.3	73.9	6,745
DC	S-RFG-Reg	26	1.65	1.61	0.20	2.03	0.00	0.00	0	0	-187.8	2.6	6,748
Delaware	S-RFG-Prem	23	1.94	1.61	0.20	1.49	0.00	0.00	0	0	-163.1	2.3	6,750
New Jersey	S-RFG-Prem	259	1.94	1.61	0.20	1.49	0.00	0.00	0	0	-162.3	25.9	6,776
Wisconsin	W-CG-Prem	87	2.21	1.61	0.11	0.68	0.00	0.00	0	0	-117.6	8.7	6,785
South Dakota	W-CG-Prem	26	2.12	1.61	0.11	0.68	0.00	0.09	0	0	-117.2	2.6	6,787
New Jersey	S-RFG-Reg	1602	1.63	1.61	0.20	2.03	0.00	0.00	0	0	-185.6	160.2	6,947
California	W-RFG-reg	6353	2.07	1.61	0.25	0.89	0.00	0.11	0	0	-122.3	635.3	7,583
Michigan	W-CG-Prem	158	2.14	1.61	0.11	0.68	0.00	0.00	0	0	-110.2	15.8	7,599
Indiana	W-RFG-Prem	25	2.12	1.61	0.11	0.68	0.00	0.00	0	0	-108.7	2.5	7,601
Ohio	W-CG-Prem	195	2.07	1.61	0.11	0.68	0.00	0.00	0	0	-103.3	19.5	7,621
Alaska	W-CG-Prem	16	2.45	1.61	0.49	0.68	0.00	0.00	0	0	-103.1	1.6	7,622
Indiana	W-CG-Prem	102	2.06	1.61	0.11	0.68	0.00	0.00	0	0	-102.7	10.2	7,632
Illinois	W-RFG-reg	1548	1.67	1.61	0.11	0.89	0.00	0.26	0	0	-110.2	154.8	7,787
Kentucky	W-RFG-Prem	23	2.13	1.61	0.20	0.68	0.00	0.00	0	0	-100.5	2.3	7,789
Nebraska	W-CG-Prem	52	2.03	1.61	0.11	0.68	0.00	0.00	0	0	-99.6	5.2	7,795
Iowa	W-CG-reg	595	1.60	1.61	0.11	0.89	0.00	0.30	0	0	-107.3	59.5	7,854
Nevada	W-CG-Prem	131	2.14	1.61	0.25	0.68	0.00	0.00	0	0	-96.7	13.1	7,867
Illinois	W-CG-reg	909	1.61	1.61	0.11	0.89	0.00	0.26	0	0	-104.2	90.9	7,958
Kentucky	W-CG-Prem	58	2.07	1.61	0.20	0.68	0.00	0.00	0	0	-94.5	5.8	7,964
Montana	W-CG-Prem	73	2.02	1.61	0.17	0.68	0.00	0.00	0	0	-92.4	7.3	7,971
North Dakota	W-CG-Prem	24	2.05	1.61	0.20	0.68	0.00	0.00	0	0	-91.9	2.4	7,974
Alaska	W-CG-reg	133	2.21	1.61	0.49	0.89	0.00	0.00	0	0	-100.1	13.3	7,987
Wyoming	W-CG-Prem	34	2.00	1.61	0.17	0.68	0.00	0.00	0	0	-89.9	3.4	7,990
New York	W-RFG-Prem	356	2.01	1.61	0.18	0.68	0.00	0.00	0	0	-89.9	35.6	8,026
New Hampshire	W-RFG-Prem	25	2.04	1.61	0.22	0.68	0.00	0.00	0	0	-89.6	2.5	8,029
Connecticut	W-RFG-Prem	125	2.02	1.61	0.20	0.68	0.00	0.00	0	0	-88.8	12.5	8,041
Rhode Island	W-RFG-Prem	46	2.02	1.61	0.20	0.68	0.00	0.00	0	0	-88.8	4.6	8,046
Vermont	W-CG-Prem	14	2.03	1.61	0.22	0.68	0.00	0.00	0	0	-88.2	1.4	8,047
Kansas	W-CG-Prem	70	1.92	1.61	0.11	0.68	0.00	0.00	0	0	-88.1	7.0	8,054
Nevada	W-CG-reg	506	1.93	1.61	0.25	0.89	0.00	0.00	0	0	-97.2	50.6	8,105
Idaho	W-CG-Prem	59	1.97	1.61	0.17	0.68	0.00	0.00	0	0	-87.6	5.9	8,111

Table A2015C Input Costs, Ethanol Blending Cost and Ethanol Volumes

Year 2015 State	Gasoline Code	Gasoline Volume MMgals	Gasoline Price $/gal	Ethanol Gate Price $/gal	Ethanol Dist Cost $/gal	Ethanol Blending $/gal	Federal Subsidy $/gal	State Subsidy $/gal	State Mandate	RFG "Mandate"	Ethanol Blending Cost c/gal	Ethanol Volume MMgals	Cumulative Eth Vol MMgals
Virginia	W-RFG-Prem	182	2.01	1.61	0.20	0.68	0.00	0.00	0	0	-87.6	18.2	8,129
Utah	W-CG-Prem	157	1.97	1.61	0.17	0.68	0.00	0.00	0	0	-87.5	15.7	8,145
Colorado	W-CG-Prem	219	1.97	1.61	0.17	0.68	0.00	0.00	0	0	-87.1	21.9	8,166
West Virginia	W-CG-Prem	24	1.98	1.61	0.18	0.68	0.00	0.00	0	0	-86.5	2.4	8,169
Alabama	W-CG-Prem	123	1.99	1.61	0.20	0.68	0.00	0.00	0	0	-86.2	12.3	8,181
Washington	W-CG-Prem	257	1.99	1.61	0.21	0.68	0.00	0.00	0	0	-85.8	25.7	8,207
Arkansas	W-CG-Prem	64	1.94	1.61	0.15	0.68	0.00	0.00	0	0	-85.7	6.4	8,213
Maine	W-RFG-Prem	15	2.06	1.61	0.28	0.68	0.00	0.00	0	0	-84.8	1.5	8,215
Georgia	W-CG-Prem	334	1.99	1.61	0.22	0.68	0.00	0.00	0	0	-84.1	33.4	8,248
New York	W-CG-Prem	120	1.95	1.61	0.18	0.68	0.00	0.00	0	0	-83.9	12.0	8,260
New Hampshire	W-CG-Prem	5	1.98	1.61	0.22	0.68	0.00	0.00	0	0	-83.6	0.5	8,261
New Mexico	W-CG-Prem	71	1.96	1.61	0.20	0.68	0.00	0.00	0	0	-83.0	7.1	8,268
Pennsylvania	W-RFG-Prem	78	1.94	1.61	0.18	0.68	0.00	0.00	0	0	-82.9	7.8	8,276
DC	W-RFG-Prem	8	1.96	1.61	0.20	0.68	0.00	0.00	0	0	-82.7	0.8	8,276
Louisiana	W-CG-Prem	123	1.91	1.61	0.15	0.68	0.00	0.00	0	0	-82.6	12.3	8,289
Florida	W-CG-Prem	543	2.03	1.61	0.28	0.68	0.00	0.00	0	0	-82.3	54.3	8,343
South Carolina	W-CG-Prem	156	1.97	1.61	0.22	0.68	0.00	0.00	0	0	-82.1	15.6	8,359
North Carolina	W-CG-Prem	275	1.97	1.61	0.22	0.68	0.00	0.00	0	0	-81.9	27.5	8,386
Virginia	W-CG-Prem	76	1.95	1.61	0.20	0.68	0.00	0.00	0	0	-81.6	7.6	8,394
Oklahoma	W-CG-Prem	103	1.93	1.61	0.20	0.68	0.00	0.02	0	0	-81.3	10.3	8,404
Massachusetts	W-RFG-Prem	197	1.94	1.61	0.20	0.68	0.00	0.00	0	0	-81.1	19.7	8,424
Arizona	W-RFG-Prem	147	1.99	1.61	0.25	0.68	0.00	0.00	0	0	-81.0	14.7	8,438
Maryland	W-RFG-Prem	164	1.94	1.61	0.20	0.68	0.00	0.00	0	0	-80.9	16.4	8,455
Texas	W-RFG-Prem	472	1.88	1.61	0.15	0.68	0.00	0.00	0	0	-80.2	47.2	8,502
Tennessee	W-CG-Prem	202	1.93	1.61	0.20	0.68	0.00	0.00	0	0	-80.0	20.2	8,522
Idaho	W-CG-reg	350	1.78	1.61	0.17	0.89	0.00	0.00	0	0	-89.3	35.0	8,557
South Dakota	W-CG-reg	214	1.62	1.61	0.11	0.89	0.00	0.09	0	0	-89.1	21.4	8,579
Maine	W-CG-Prem	13	2.00	1.61	0.28	0.68	0.00	0.00	0	0	-78.8	1.3	8,580
Utah	W-CG-reg	583	1.76	1.61	0.17	0.89	0.00	0.00	0	0	-88.2	58.3	8,638
Mississippi	W-CG-Prem	92	1.85	1.61	0.15	0.68	0.00	0.00	0	0	-77.3	9.2	8,647
Pennsylvania	W-CG-Prem	100	1.88	1.61	0.18	0.68	0.00	0.00	0	0	-76.9	10.0	8,657
Delaware	W-RFG-Prem	28	1.89	1.61	0.20	0.68	0.00	0.00	0	0	-76.4	2.8	8,660
New Jersey	W-RFG-Prem	313	1.89	1.61	0.20	0.68	0.00	0.00	0	0	-75.6	31.3	8,692
Arizona	W-CG-Prem	67	1.93	1.61	0.25	0.68	0.00	0.00	0	0	-75.0	6.7	8,698
Maryland	W-CG-Prem	9	1.88	1.61	0.20	0.68	0.00	0.00	0	0	-74.9	0.9	8,699
Wisconsin	W-RFG-reg	404	1.67	1.61	0.11	0.89	0.00	0.00	0	0	-84.5	40.4	8,739
Texas	W-CG-Prem	403	1.82	1.61	0.15	0.68	0.00	0.00	0	0	-74.2	40.3	8,780
Indiana	W-RFG-reg	238	1.64	1.61	0.11	0.89	0.00	0.00	0	0	-82.1	23.8	8,804
Washington	W-CG-reg	1297	1.73	1.61	0.21	0.89	0.00	0.00	0	0	-80.9	129.7	8,933
Montana	W-CG-reg	340	1.68	1.61	0.17	0.89	0.00	0.00	0	0	-80.1	34.0	8,967
Nebraska	W-CG-reg	394	1.61	1.61	0.11	0.89	0.00	0.00	0	0	-78.7	39.4	9,007
Wisconsin	W-CG-reg	978	1.61	1.61	0.11	0.89	0.00	0.00	0	0	-78.5	97.8	9,104
Michigan	W-CG-reg	2397	1.60	1.61	0.11	0.89	0.00	0.00	0	0	-78.0	239.7	9,344
Arizona	W-RFG-reg	945	1.74	1.61	0.25	0.89	0.00	0.00	0	0	-77.4	94.5	9,439
Kentucky	W-RFG-reg	230	1.69	1.61	0.20	0.89	0.00	0.00	0	0	-77.2	23.0	9,462
Wyoming	W-CG-reg	168	1.65	1.61	0.17	0.89	0.00	0.00	0	0	-76.4	16.8	9,478
New York	W-RFG-reg	1480	1.66	1.61	0.18	0.89	0.00	0.00	0	0	-76.2	148.0	9,626
Indiana	W-CG-reg	1433	1.58	1.61	0.11	0.89	0.00	0.00	0	0	-76.1	143.3	9,770
Ohio	W-CG-reg	2473	1.58	1.61	0.11	0.89	0.00	0.00	0	0	-76.0	247.3	10,017
Kansas	W-CG-reg	826	1.57	1.61	0.11	0.89	0.00	0.00	0	0	-75.1	82.6	10,099
New Mexico	W-CG-reg	479	1.66	1.61	0.20	0.89	0.00	0.00	0	0	-74.8	47.9	10,147
Colorado	W-CG-reg	999	1.63	1.61	0.17	0.89	0.00	0.00	0	0	-74.6	99.9	10,247
New Hampshire	W-RFG-reg	222	1.68	1.61	0.22	0.89	0.00	0.00	0	0	-74.3	22.2	10,270
Texas	W-RFG-reg	3043	1.60	1.61	0.15	0.89	0.00	0.00	0	0	-73.5	304.3	10,574
Connecticut	W-RFG-reg	762	1.64	1.61	0.20	0.89	0.00	0.00	0	0	-72.2	76.2	10,650
Rhode Island	W-RFG-reg	312	1.64	1.61	0.20	0.89	0.00	0.00	0	0	-72.2	31.2	10,681
North Dakota	W-CG-reg	200	1.64	1.61	0.20	0.89	0.00	0.00	0	0	-71.9	20.0	10,701
Arkansas	W-CG-reg	746	1.58	1.61	0.15	0.89	0.00	0.00	0	0	-71.7	74.6	10,776
Delaware	W-RFG-reg	227	1.63	1.61	0.20	0.89	0.00	0.00	0	0	-71.6	22.7	10,799
Massachusetts	W-RFG-reg	1297	1.63	1.61	0.20	0.89	0.00	0.00	0	0	-71.6	129.7	10,928
Vermont	W-CG-reg	161	1.65	1.61	0.22	0.89	0.00	0.00	0	0	-71.5	16.1	10,944
Arizona	W-CG-reg	527	1.68	1.61	0.25	0.89	0.00	0.00	0	0	-71.4	52.7	10,997
Kentucky	W-CG-reg	832	1.63	1.61	0.20	0.89	0.00	0.00	0	0	-71.2	83.2	11,080
Pennsylvania	W-RFG-reg	466	1.61	1.61	0.18	0.89	0.00	0.00	0	0	-71.0	46.6	11,127
Maine	W-RFG-reg	224	1.70	1.61	0.28	0.89	0.00	0.00	0	0	-71.0	22.4	11,149
New York	W-CG-reg	1226	1.60	1.61	0.18	0.89	0.00	0.00	0	0	-70.2	122.6	11,272
Virginia	W-RFG-reg	934	1.62	1.61	0.20	0.89	0.00	0.00	0	0	-70.0	93.4	11,365
Maryland	W-RFG-reg	894	1.61	1.61	0.20	0.89	0.00	0.00	0	0	-69.9	89.4	11,455
Louisiana	W-CG-reg	1388	1.56	1.61	0.15	0.89	0.00	0.00	0	0	-68.9	138.8	11,593
Oklahoma	W-CG-reg	1058	1.59	1.61	0.20	0.89	0.00	0.02	0	0	-68.8	105.8	11,699
DC	W-RFG-reg	31	1.60	1.61	0.20	0.89	0.00	0.00	0	0	-68.3	3.1	11,702
New Hampshire	W-CG-reg	68	1.62	1.61	0.22	0.89	0.00	0.00	0	0	-68.3	6.8	11,709
Texas	W-CG-reg	4145	1.54	1.61	0.15	0.89	0.00	0.00	0	0	-67.5	414.5	12,123
West Virginia	W-CG-reg	380	1.57	1.61	0.18	0.89	0.00	0.00	0	0	-67.1	38.0	12,161
New Jersey	W-RFG-reg	1937	1.58	1.61	0.20	0.89	0.00	0.00	0	0	-66.2	193.7	12,355
Mississippi	W-CG-reg	891	1.52	1.61	0.15	0.89	0.00	0.00	0	0	-65.7	89.1	12,444
Pennsylvania	W-CG-reg	1053	1.55	1.61	0.18	0.89	0.00	0.00	0	0	-65.0	105.3	12,550
Maine	W-CG-reg	152	1.64	1.61	0.28	0.89	0.00	0.00	0	0	-65.0	15.2	12,565
Georgia	W-CG-reg	2434	1.58	1.61	0.22	0.89	0.00	0.00	0	0	-64.9	243.4	12,808
Virginia	W-CG-reg	790	1.56	1.61	0.20	0.89	0.00	0.00	0	0	-64.0	79.0	12,887
Maryland	W-CG-reg	105	1.55	1.61	0.20	0.89	0.00	0.00	0	0	-63.9	10.5	12,898
Alabama	W-CG-reg	1236	1.55	1.61	0.20	0.89	0.00	0.00	0	0	-63.7	123.6	13,021
Tennessee	W-CG-reg	1742	1.55	1.61	0.20	0.89	0.00	0.00	0	0	-63.5	174.2	13,195
South Carolina	W-CG-reg	1311	1.55	1.61	0.22	0.89	0.00	0.00	0	0	-61.9	131.1	13,326
Florida	W-CG-reg	3700	1.61	1.61	0.28	0.89	0.00	0.00	0	0	-61.6	370.0	13,696
North Carolina	W-CG-reg	2201	1.55	1.61	0.22	0.89	0.00	0.00	0	0	-61.3	220.1	13,917

Table A2016A Input Costs, Ethanol Blending Cost and Ethanol Volumes

Year 2016 State	Gasoline Code	Gasoline Volume MMgals	Gasoline Price $/gal	Ethanol Gate Price $/gal	Ethanol Dist Cost $/gal	Ethanol Blending $/gal	Federal Subsidy $/gal	State Subsidy $/gal	State Mandate	RFG "Mandate"	Ethanol Blending Cost c/gal	Ethanol Volume MMgals	Cumulative Eth Vol MMgals
Missouri	S-CG-Prem	69	1.76	1.55	0.11	1.25	0.00	0.00	1	0	-134.2	6.9	7
Missouri	S-RFG-Prem	42	1.82	1.55	0.11	1.11	0.00	0.00	1	0	-126.5	4.2	11
Oregon	S-CG-Prem	96	1.76	1.55	0.21	1.25	0.00	0.00	1	0	-123.9	9.6	21
Minnesota	S-CG-Prem	105	1.64	1.55	0.11	1.25	0.00	0.00	1	0	-122.5	10.5	31
Oregon	S-CG-Reg	687	1.48	1.55	0.21	1.65	0.00	0.00	1	0	-136.7	68.7	100
Missouri	S-CG-Reg	826	1.38	1.55	0.11	1.65	0.00	0.00	1	0	-136.6	82.6	183
Minnesota	S-CG-Reg	1045	1.36	1.55	0.11	1.65	0.00	0.00	1	0	-134.5	104.5	287
Missouri	S-RFG-Reg	424	1.44	1.55	0.11	1.51	0.00	0.00	1	0	-128.9	42.4	330
Missouri	W-RFG-Prem	50	1.77	1.55	0.11	0.51	0.00	0.00	1	0	-61.4	5.0	335
Missouri	W-CG-Prem	84	1.71	1.55	0.11	0.51	0.00	0.00	1	0	-55.4	8.4	343
Oregon	W-CG-Prem	117	1.71	1.55	0.21	0.51	0.00	0.00	1	0	-45.1	11.7	355
Minnesota	W-CG-Prem	127	1.59	1.55	0.11	0.51	0.00	0.00	1	0	-43.7	12.7	367
Missouri	W-RFG-reg	513	1.39	1.55	0.11	0.67	0.00	0.00	1	0	-39.4	51.3	419
Oregon	W-CG-reg	831	1.43	1.55	0.21	0.67	0.00	0.00	1	0	-33.4	83.1	502
Missouri	W-CG-reg	999	1.33	1.55	0.11	0.67	0.00	0.00	1	0	-33.4	99.9	602
Minnesota	W-CG-reg	1264	1.31	1.55	0.11	0.67	0.00	0.00	1	0	-31.2	126.4	728
Illinois	S-CG-Prem	47	1.89	1.55	0.11	1.25	0.00	0.26	0	0	-172.7	4.7	733
Illinois	S-RFG-Prem	190	1.95	1.55	0.11	1.11	0.00	0.26	0	0	-165.0	19.0	752
Michigan	S-CG-Prem	135	2.01	1.55	0.11	1.25	0.00	0.00	0	0	-159.7	13.5	765
Iowa	S-CG-Prem	66	1.72	1.55	0.11	1.25	0.00	0.30	0	0	-159.5	6.6	772
Ohio	S-CG-Prem	166	1.94	1.55	0.11	1.25	0.00	0.00	0	0	-152.1	16.6	788
Wisconsin	S-CG-Prem	74	1.92	1.55	0.11	1.25	0.00	0.00	0	0	-150.7	7.4	796
Iowa	S-CG-Reg	507	1.38	1.55	0.11	1.65	0.00	0.30	0	0	-166.1	50.7	846
Illinois	S-CG-Reg	774	1.38	1.55	0.11	1.65	0.00	0.26	0	0	-162.8	77.4	924
Indiana	S-CG-Prem	87	1.87	1.55	0.11	1.25	0.00	0.00	0	0	-145.4	8.7	933
South Dakota	S-CG-Prem	22	1.77	1.55	0.11	1.25	0.00	0.09	0	0	-144.6	2.2	935
Wisconsin	S-RFG-Prem	31	1.98	1.55	0.11	1.11	0.00	0.00	0	0	-143.0	3.1	938
Montana	S-CG-Prem	62	1.89	1.55	0.17	1.25	0.00	0.00	0	0	-141.3	6.2	944
Kentucky	S-CG-Prem	49	1.92	1.55	0.20	1.25	0.00	0.00	0	0	-140.8	4.9	949
Illinois	S-RFG-Reg	1318	1.44	1.55	0.11	1.51	0.00	0.26	0	0	-155.1	131.8	1,081
Indiana	S-RFG-Prem	21	1.93	1.55	0.11	1.11	0.00	0.00	0	0	-137.7	2.1	1,083
West Virginia	S-CG-Prem	20	1.84	1.55	0.18	1.25	0.00	0.00	0	0	-135.3	2.0	1,085
Colorado	S-CG-Prem	187	1.82	1.55	0.17	1.25	0.00	0.00	0	0	-134.2	18.7	1,104
Alabama	S-CG-Prem	105	1.84	1.55	0.20	1.25	0.00	0.00	0	0	-133.1	10.5	1,114
Alaska	S-CG-Reg	113	1.89	1.55	0.50	1.65	0.00	0.00	0	0	-148.8	11.3	1,125
Kentucky	S-RFG-Prem	19	1.98	1.55	0.20	1.11	0.00	0.00	0	0	-133.1	1.9	1,127
California	S-RFG-Prem	1563	1.96	1.55	0.25	1.11	0.00	0.06	0	0	-132.1	156.3	1,284
Nebraska	S-CG-Prem	45	1.73	1.55	0.11	1.25	0.00	0.00	0	0	-131.1	4.5	1,288
California	S-RFG-Reg	5410	1.70	1.55	0.25	1.51	0.00	0.06	0	0	-146.7	541.0	1,829
South Dakota	S-CG-Reg	182	1.37	1.55	0.11	1.65	0.00	0.09	0	0	-145.1	18.2	1,847
North Dakota	S-CG-Prem	21	1.80	1.55	0.20	1.25	0.00	0.00	0	0	-129.2	2.1	1,849
Idaho	S-CG-Reg	298	1.52	1.55	0.17	1.65	0.00	0.00	0	0	-144.8	29.8	1,879
Illinois	W-RFG-Prem	230	1.90	1.55	0.11	0.51	0.00	0.26	0	0	-99.9	23.0	1,902
Georgia	S-CG-Prem	284	1.81	1.55	0.22	1.25	0.00	0.00	0	0	-127.8	28.4	1,931
Idaho	S-CG-Prem	50	1.75	1.55	0.17	1.25	0.00	0.00	0	0	-127.4	5.0	1,936
Wyoming	S-CG-Prem	29	1.75	1.55	0.17	1.25	0.00	0.00	0	0	-127.2	2.9	1,938
Alaska	S-CG-Prem	14	2.08	1.55	0.50	1.25	0.00	0.00	0	0	-126.9	1.4	1,940
Arkansas	S-CG-Prem	54	1.73	1.55	0.15	1.25	0.00	0.00	0	0	-126.8	5.4	1,945
South Carolina	S-CG-Prem	133	1.79	1.55	0.22	1.25	0.00	0.00	0	0	-125.9	13.3	1,959
Michigan	S-CG-Reg	2041	1.43	1.55	0.11	1.65	0.00	0.00	0	0	-141.6	204.1	2,163
North Carolina	S-CG-Prem	234	1.78	1.55	0.22	1.25	0.00	0.00	0	0	-125.4	23.4	2,186
Washington	S-CG-Prem	219	1.77	1.55	0.21	1.25	0.00	0.00	0	0	-125.4	21.9	2,208
Kansas	S-CG-Prem	60	1.66	1.55	0.11	1.25	0.00	0.00	0	0	-124.8	6.0	2,214
Tennessee	S-CG-Prem	172	1.76	1.55	0.20	1.25	0.00	0.00	0	0	-124.6	17.2	2,231
Montana	S-CG-Reg	290	1.47	1.55	0.17	1.65	0.00	0.00	0	0	-140.2	29.0	2,260
New Mexico	S-CG-Prem	61	1.75	1.55	0.20	1.25	0.00	0.00	0	0	-124.1	6.1	2,266
Ohio	S-CG-Reg	2105	1.40	1.55	0.11	1.65	0.00	0.00	0	0	-139.4	210.5	2,477
Florida	S-CG-Prem	462	1.82	1.55	0.28	1.25	0.00	0.00	0	0	-123.3	46.2	2,523
Illinois	W-CG-Prem	57	1.84	1.55	0.11	0.51	0.00	0.26	0	0	-93.9	5.7	2,529
Nevada	S-CG-Reg	431	1.53	1.55	0.25	1.65	0.00	0.00	0	0	-137.8	43.1	2,572
New York	S-CG-Prem	102	1.71	1.55	0.18	1.25	0.00	0.00	0	0	-121.9	10.2	2,582
Indiana	S-CG-Reg	1220	1.39	1.55	0.11	1.65	0.00	0.00	0	0	-137.5	122.0	2,704
Virginia	S-CG-Prem	65	1.73	1.55	0.20	1.25	0.00	0.00	0	0	-121.6	6.5	2,710
Wisconsin	S-CG-Reg	832	1.38	1.55	0.11	1.65	0.00	0.00	0	0	-137.1	83.2	2,794
Utah	S-CG-Reg	496	1.44	1.55	0.17	1.65	0.00	0.00	0	0	-136.9	49.6	2,843
Nebraska	S-CG-Reg	335	1.38	1.55	0.11	1.65	0.00	0.00	0	0	-136.9	33.5	2,877
Vermont	S-CG-Prem	12	1.74	1.55	0.22	1.25	0.00	0.00	0	0	-121.0	1.2	2,878
Washington	S-CG-Reg	1104	1.48	1.55	0.21	1.65	0.00	0.00	0	0	-136.6	110.4	2,988
Kansas	S-CG-Reg	704	1.37	1.55	0.11	1.65	0.00	0.00	0	0	-135.8	70.4	3,059
Vermont	S-CG-Reg	137	1.48	1.55	0.22	1.65	0.00	0.00	0	0	-135.7	13.7	3,072
Colorado	S-CG-Reg	851	1.43	1.55	0.17	1.65	0.00	0.00	0	0	-135.4	85.1	3,158
Louisiana	S-CG-Prem	104	1.65	1.55	0.15	1.25	0.00	0.00	0	0	-119.3	10.4	3,168
Utah	S-CG-Prem	134	1.67	1.55	0.17	1.25	0.00	0.00	0	0	-119.0	13.4	3,181
Nevada	S-CG-Prem	112	1.75	1.55	0.25	1.25	0.00	0.00	0	0	-119.0	11.2	3,193
Kentucky	S-CG-Reg	709	1.45	1.55	0.20	1.65	0.00	0.00	0	0	-134.5	70.9	3,263
Arkansas	S-CG-Reg	635	1.38	1.55	0.15	1.65	0.00	0.00	0	0	-132.8	63.5	3,327
Mississippi	S-CG-Reg	758	1.38	1.55	0.15	1.65	0.00	0.00	0	0	-132.7	75.8	3,403
New Mexico	S-CG-Reg	408	1.43	1.55	0.20	1.65	0.00	0.00	0	0	-132.2	40.8	3,444
New Hampshire	S-CG-Prem	4	1.69	1.55	0.22	1.25	0.00	0.00	0	0	-116.4	0.4	3,444
Louisiana	S-CG-Reg	1182	1.37	1.55	0.15	1.65	0.00	0.00	0	0	-131.9	118.2	3,562
West Virginia	S-CG-Reg	323	1.40	1.55	0.18	1.65	0.00	0.00	0	0	-131.8	32.3	3,595
New Hampshire	S-CG-Reg	58	1.44	1.55	0.22	1.65	0.00	0.00	0	0	-131.4	5.8	3,600
Texas	S-CG-Prem	343	1.61	1.55	0.15	1.25	0.00	0.00	0	0	-115.2	34.3	3,635
New York	S-CG-Reg	1044	1.39	1.55	0.18	1.65	0.00	0.00	0	0	-130.8	104.4	3,739
Connecticut	S-RFG-Prem	106	1.80	1.55	0.20	1.11	0.00	0.00	0	0	-114.9	10.6	3,750

Table A2016B Input Costs, Ethanol Blending Cost and Ethanol Volumes

Year 2016 State	Gasoline Code	Gasoline Volume MMgals	Gasoline Price $/gal	Ethanol Gate Price $/gal	Ethanol Dist Cost $/gal	Ethanol Blending $/gal	Federal Subsidy $/gal	State Subsidy $/gal	State Mandate	RFG "Mandate"	Ethanol Blending Cost c/gal	Ethanol Volume MMgals	Cumulative Eth Vol MMgals
Rhode Island	S-RFG-Prem	39	1.80	1.55	0.20	1.11	0.00	0.00	0	0	-114.9	3.9	3,754
Wyoming	S-CG-Reg	143	1.37	1.55	0.17	1.65	0.00	0.00	0	0	-130.2	14.3	3,768
Mississippi	S-CG-Prem	78	1.60	1.55	0.15	1.25	0.00	0.00	0	0	-114.5	7.8	3,776
Arizona	S-CG-Prem	57	1.70	1.55	0.25	1.25	0.00	0.00	0	0	-114.1	5.7	3,781
New York	S-RFG-Prem	303	1.77	1.55	0.18	1.11	0.00	0.00	0	0	-114.1	30.3	3,812
Indiana	S-RFG-Reg	202	1.45	1.55	0.11	1.51	0.00	0.00	0	0	-129.8	20.2	3,832
North Dakota	S-CG-Reg	170	1.40	1.55	0.20	1.65	0.00	0.00	0	0	-129.4	17.0	3,849
Virginia	S-RFG-Prem	155	1.79	1.55	0.20	1.11	0.00	0.00	0	0	-113.9	15.5	3,864
Texas	S-CG-Reg	3529	1.35	1.55	0.15	1.65	0.00	0.00	0	0	-129.3	352.9	4,217
Pennsylvania	S-CG-Prem	86	1.63	1.55	0.18	1.25	0.00	0.00	0	0	-113.5	8.6	4,226
Wisconsin	S-RFG-Reg	344	1.44	1.55	0.11	1.51	0.00	0.00	0	0	-129.4	34.4	4,260
Arizona	S-CG-Reg	449	1.44	1.55	0.25	1.65	0.00	0.00	0	0	-128.8	44.9	4,305
Maryland	S-CG-Prem	7	1.64	1.55	0.20	1.25	0.00	0.00	0	0	-112.9	0.7	4,306
Oklahoma	S-CG-Prem	88	1.62	1.55	0.20	1.25	0.00	0.02	0	0	-112.5	8.8	4,315
Tennessee	S-CG-Reg	1483	1.39	1.55	0.20	1.65	0.00	0.00	0	0	-128.2	148.3	4,463
Pennsylvania	S-CG-Reg	897	1.37	1.55	0.18	1.65	0.00	0.00	0	0	-128.1	89.7	4,553
Maine	S-CG-Prem	11	1.70	1.55	0.28	1.25	0.00	0.00	0	0	-111.5	1.1	4,554
Alabama	S-CG-Reg	1052	1.38	1.55	0.20	1.65	0.00	0.00	0	0	-127.1	105.2	4,659
Oklahoma	S-CG-Reg	900	1.36	1.55	0.20	1.65	0.00	0.02	0	0	-127.1	90.0	4,749
Maine	S-CG-Reg	129	1.45	1.55	0.28	1.65	0.00	0.00	0	0	-126.8	12.9	4,762
Virginia	S-CG-Reg	672	1.37	1.55	0.20	1.65	0.00	0.00	0	0	-126.7	67.2	4,829
Kentucky	S-RFG-Reg	196	1.51	1.55	0.20	1.51	0.00	0.00	0	0	-126.7	19.6	4,849
Georgia	S-CG-Reg	2073	1.38	1.55	0.22	1.65	0.00	0.00	0	0	-125.5	207.3	5,056
South Carolina	S-CG-Reg	1116	1.38	1.55	0.22	1.65	0.00	0.00	0	0	-125.3	111.6	5,168
Michigan	W-CG-Prem	163	1.96	1.55	0.11	0.51	0.00	0.00	0	0	-80.9	16.3	5,184
North Carolina	S-CG-Reg	1874	1.38	1.55	0.22	1.65	0.00	0.00	0	0	-125.1	187.4	5,371
Maryland	S-CG-Reg	89	1.36	1.55	0.20	1.65	0.00	0.00	0	0	-125.1	8.9	5,380
Iowa	W-CG-Prem	80	1.67	1.55	0.11	0.51	0.00	0.30	0	0	-80.7	8.0	5,388
New Hampshire	S-RFG-Prem	21	1.75	1.55	0.22	1.11	0.00	0.00	0	0	-108.6	2.1	5,390
New Hampshire	S-RFG-Reg	189	1.50	1.55	0.22	1.51	0.00	0.00	0	0	-123.7	18.9	5,409
DC	S-RFG-Prem	7	1.73	1.55	0.20	1.11	0.00	0.00	0	0	-107.9	0.7	5,410
Massachusetts	S-RFG-Prem	168	1.73	1.55	0.20	1.11	0.00	0.00	0	0	-107.8	16.8	5,427
Florida	S-CG-Reg	3150	1.42	1.55	0.28	1.65	0.00	0.00	0	0	-123.1	315.0	5,742
Texas	S-RFG-Prem	402	1.67	1.55	0.15	1.11	0.00	0.00	0	0	-107.5	40.2	5,782
New York	S-RFG-Reg	1260	1.45	1.55	0.18	1.51	0.00	0.00	0	0	-123.1	126.0	5,908
Wisconsin	W-RFG-Prem	38	1.93	1.55	0.11	0.51	0.00	0.00	0	0	-77.9	3.8	5,912
Arizona	S-RFG-Prem	125	1.76	1.55	0.25	1.11	0.00	0.00	0	0	-106.3	12.5	5,924
Texas	S-RFG-Reg	2591	1.41	1.55	0.15	1.51	0.00	0.00	0	0	-121.5	259.1	6,183
Pennsylvania	S-RFG-Prem	66	1.69	1.55	0.18	1.11	0.00	0.00	0	0	-105.8	6.6	6,190
Arizona	S-RFG-Reg	804	1.50	1.55	0.25	1.51	0.00	0.00	0	0	-121.1	80.4	6,270
Maryland	S-RFG-Prem	139	1.70	1.55	0.20	1.11	0.00	0.00	0	0	-105.2	13.9	6,284
Pennsylvania	S-RFG-Reg	397	1.43	1.55	0.18	1.51	0.00	0.00	0	0	-120.4	39.7	6,324
Connecticut	S-RFG-Reg	649	1.44	1.55	0.20	1.51	0.00	0.00	0	0	-120.2	64.9	6,389
Rhode Island	S-RFG-Reg	265	1.44	1.55	0.20	1.51	0.00	0.00	0	0	-120.2	26.5	6,416
Massachusetts	S-RFG-Reg	1104	1.44	1.55	0.20	1.51	0.00	0.00	0	0	-119.6	110.4	6,526
Maine	S-RFG-Prem	13	1.76	1.55	0.28	1.11	0.00	0.00	0	0	-103.7	1.3	6,527
Maine	S-RFG-Reg	191	1.51	1.55	0.28	1.51	0.00	0.00	0	0	-119.1	19.1	6,546
Virginia	S-RFG-Reg	795	1.43	1.55	0.20	1.51	0.00	0.00	0	0	-119.0	79.5	6,626
Delaware	S-RFG-Reg	193	1.42	1.55	0.20	1.51	0.00	0.00	0	0	-118.2	19.3	6,645
Ohio	W-CG-Prem	201	1.89	1.55	0.11	0.51	0.00	0.00	0	0	-73.3	20.1	6,665
Maryland	S-RFG-Reg	761	1.42	1.55	0.20	1.51	0.00	0.00	0	0	-117.3	76.1	6,741
Indiana	W-RFG-Prem	26	1.88	1.55	0.11	0.51	0.00	0.00	0	0	-72.6	2.6	6,744
DC	S-RFG-Reg	26	1.41	1.55	0.20	1.51	0.00	0.00	0	0	-116.6	2.6	6,747
Wisconsin	W-CG-Prem	90	1.87	1.55	0.11	0.51	0.00	0.00	0	0	-71.9	9.0	6,756
Hawaii	S-CG-Reg	176	1.56	1.55	0.50	1.65	0.00	0.00	0	0	-116.0	17.6	6,773
New Jersey	S-RFG-Prem	266	1.64	1.55	0.20	1.11	0.00	0.00	0	0	-99.0	26.6	6,800
New Jersey	S-RFG-Reg	1649	1.39	1.55	0.20	1.51	0.00	0.00	0	0	-114.4	164.9	6,965
Delaware	S-RFG-Prem	24	1.62	1.55	0.20	1.11	0.00	0.00	0	0	-97.6	2.4	6,967
Kentucky	W-RFG-Prem	23	1.93	1.55	0.20	0.51	0.00	0.00	0	0	-68.1	2.3	6,969
California	W-RFG-Prem	1890	1.91	1.55	0.25	0.51	0.00	0.06	0	0	-67.1	189.0	7,158
Indiana	W-CG-Prem	105	1.82	1.55	0.11	0.51	0.00	0.00	0	0	-66.6	10.5	7,169
South Dakota	W-CG-Prem	27	1.72	1.55	0.11	0.51	0.00	0.09	0	0	-65.8	2.7	7,172
Montana	W-CG-Prem	75	1.84	1.55	0.17	0.51	0.00	0.00	0	0	-62.5	7.5	7,179
Kentucky	W-CG-Prem	60	1.87	1.55	0.20	0.51	0.00	0.00	0	0	-62.1	6.0	7,185
Hawaii	S-CG-Prem	53	1.70	1.55	0.50	1.25	0.00	0.00	0	0	-89.2	5.3	7,190
Illinois	W-RFG-reg	1593	1.39	1.55	0.11	0.67	0.00	0.26	0	0	-65.5	159.3	7,350
Iowa	W-CG-reg	612	1.33	1.55	0.11	0.67	0.00	0.30	0	0	-62.8	61.2	7,411
West Virginia	W-CG-Prem	24	1.79	1.55	0.18	0.51	0.00	0.00	0	0	-56.5	2.4	7,413
Colorado	W-CG-Prem	226	1.77	1.55	0.17	0.51	0.00	0.00	0	0	-55.4	22.6	7,436
Alabama	W-CG-Prem	127	1.79	1.55	0.20	0.51	0.00	0.00	0	0	-54.3	12.7	7,449
Illinois	W-CG-reg	936	1.33	1.55	0.11	0.67	0.00	0.26	0	0	-59.5	93.6	7,542
Nebraska	W-CG-Prem	54	1.68	1.55	0.11	0.51	0.00	0.00	0	0	-52.3	5.4	7,548
California	W-RFG-reg	6541	1.65	1.55	0.25	0.67	0.00	0.06	0	0	-57.1	654.1	8,202
North Dakota	W-CG-Prem	25	1.75	1.55	0.20	0.51	0.00	0.00	0	0	-50.4	2.5	8,204
Connecticut	W-RFG-Prem	129	1.75	1.55	0.20	0.51	0.00	0.00	0	0	-49.9	12.9	8,217
Rhode Island	W-RFG-Prem	47	1.75	1.55	0.20	0.51	0.00	0.00	0	0	-49.9	4.7	8,222
New York	W-RFG-Prem	367	1.72	1.55	0.18	0.51	0.00	0.00	0	0	-49.1	36.7	8,259
Georgia	W-CG-Prem	344	1.76	1.55	0.22	0.51	0.00	0.00	0	0	-49.0	34.4	8,293
Virginia	W-RFG-Prem	187	1.74	1.55	0.20	0.51	0.00	0.00	0	0	-48.8	18.7	8,312
Idaho	W-CG-Prem	61	1.70	1.55	0.17	0.51	0.00	0.00	0	0	-48.6	6.1	8,318
Wyoming	W-CG-Prem	35	1.70	1.55	0.17	0.51	0.00	0.00	0	0	-48.4	3.5	8,321
Alaska	W-CG-Prem	16	2.03	1.55	0.50	0.51	0.00	0.00	0	0	-48.1	1.6	8,323
Arkansas	W-CG-Prem	66	1.68	1.55	0.15	0.51	0.00	0.00	0	0	-48.0	6.6	8,330
South Carolina	W-CG-Prem	160	1.74	1.55	0.22	0.51	0.00	0.00	0	0	-47.1	16.0	8,346
North Carolina	W-CG-Prem	283	1.73	1.55	0.22	0.51	0.00	0.00	0	0	-46.6	28.3	8,374

Table A2016C Input Costs, Ethanol Blending Cost and Ethanol Volumes

Year 2016 State	Gasoline Code	Gasoline Volume MMgals	Gasoline Price $/gal	Ethanol Gate Price $/gal	Ethanol Dist Cost $/gal	Ethanol Blending $/gal	Federal Subsidy $/gal	State Subsidy $/gal	State Mandate	RFG "Mandate"	Ethanol Blending Cost c/gal	Ethanol Volume MMgals	Cumulative Eth Vol MMgals
Washington	W-CG-Prem	265	1.72	1.55	0.21	0.51	0.00	0.00	0	0	-46.6	26.5	8,400
Kansas	W-CG-Prem	72	1.61	1.55	0.11	0.51	0.00	0.00	0	0	-46.0	7.2	8,408
Tennessee	W-CG-Prem	207	1.71	1.55	0.20	0.51	0.00	0.00	0	0	-45.8	20.7	8,428
New Mexico	W-CG-Prem	73	1.70	1.55	0.20	0.51	0.00	0.00	0	0	-45.3	7.3	8,436
Florida	W-CG-Prem	559	1.77	1.55	0.28	0.51	0.00	0.00	0	0	-44.5	55.9	8,492
New Hampshire	W-RFG-Prem	25	1.70	1.55	0.22	0.51	0.00	0.00	0	0	-43.6	2.5	8,494
New York	W-CG-Prem	123	1.66	1.55	0.18	0.51	0.00	0.00	0	0	-43.1	12.3	8,507
DC	W-RFG-Prem	8	1.68	1.55	0.20	0.51	0.00	0.00	0	0	-42.9	0.8	8,507
Virginia	W-CG-Prem	79	1.68	1.55	0.20	0.51	0.00	0.00	0	0	-42.8	7.9	8,515
Massachusetts	W-RFG-Prem	203	1.68	1.55	0.20	0.51	0.00	0.00	0	0	-42.8	20.3	8,536
Texas	W-RFG-Prem	486	1.62	1.55	0.15	0.51	0.00	0.00	0	0	-42.5	48.6	8,584
Vermont	W-CG-Prem	15	1.69	1.55	0.22	0.51	0.00	0.00	0	0	-42.2	1.5	8,586
Arizona	W-RFG-Prem	151	1.71	1.55	0.25	0.51	0.00	0.00	0	0	-41.3	15.1	8,601
Pennsylvania	W-RFG-Prem	80	1.64	1.55	0.18	0.51	0.00	0.00	0	0	-40.7	8.0	8,609
Louisiana	W-CG-Prem	126	1.60	1.55	0.15	0.51	0.00	0.00	0	0	-40.5	12.6	8,621
Utah	W-CG-Prem	162	1.62	1.55	0.17	0.51	0.00	0.00	0	0	-40.2	16.2	8,638
Nevada	W-CG-Prem	135	1.70	1.55	0.25	0.51	0.00	0.00	0	0	-40.2	13.5	8,651
Maryland	W-RFG-Prem	168	1.65	1.55	0.20	0.51	0.00	0.00	0	0	-40.2	16.8	8,668
Alaska	W-CG-reg	137	1.84	1.55	0.50	0.67	0.00	0.00	0	0	-45.5	13.7	8,682
Maine	W-RFG-Prem	15	1.71	1.55	0.28	0.51	0.00	0.00	0	0	-38.7	1.5	8,683
New Hampshire	W-CG-Prem	5	1.64	1.55	0.22	0.51	0.00	0.00	0	0	-37.6	0.5	8,684
Texas	W-CG-Prem	415	1.56	1.55	0.15	0.51	0.00	0.00	0	0	-36.5	41.5	8,725
Mississippi	W-CG-Prem	95	1.55	1.55	0.15	0.51	0.00	0.00	0	0	-35.7	9.5	8,735
South Dakota	W-CG-reg	220	1.32	1.55	0.11	0.67	0.00	0.09	0	0	-41.9	22.0	8,757
Idaho	W-CG-reg	360	1.47	1.55	0.17	0.67	0.00	0.00	0	0	-41.5	36.0	8,793
Arizona	W-CG-Prem	69	1.65	1.55	0.25	0.51	0.00	0.00	0	0	-35.3	6.9	8,800
Pennsylvania	W-CG-Prem	103	1.58	1.55	0.18	0.51	0.00	0.00	0	0	-34.7	10.3	8,810
Maryland	W-CG-Prem	9	1.59	1.55	0.20	0.51	0.00	0.00	0	0	-34.2	0.9	8,811
Indiana	W-RFG-reg	245	1.40	1.55	0.11	0.67	0.00	0.00	0	0	-40.2	24.5	8,835
New Jersey	W-RFG-Prem	322	1.59	1.55	0.20	0.51	0.00	0.00	0	0	-34.0	32.2	8,867
Oklahoma	W-CG-Prem	107	1.57	1.55	0.20	0.51	0.00	0.02	0	0	-33.7	10.7	8,878
Wisconsin	W-RFG-reg	416	1.39	1.55	0.11	0.67	0.00	0.00	0	0	-39.9	41.6	8,920
Maine	W-CG-Prem	13	1.65	1.55	0.28	0.51	0.00	0.00	0	0	-32.7	1.3	8,921
Delaware	W-RFG-Prem	29	1.57	1.55	0.20	0.51	0.00	0.00	0	0	-32.6	2.9	8,924
Michigan	W-CG-reg	2468	1.38	1.55	0.11	0.67	0.00	0.00	0	0	-38.3	246.8	9,171
Kentucky	W-RFG-reg	236	1.46	1.55	0.20	0.67	0.00	0.00	0	0	-37.2	23.6	9,194
Montana	W-CG-reg	350	1.42	1.55	0.17	0.67	0.00	0.00	0	0	-36.9	35.0	9,229
Ohio	W-CG-reg	2546	1.35	1.55	0.11	0.67	0.00	0.00	0	0	-36.1	254.6	9,484
Nevada	W-CG-reg	521	1.48	1.55	0.25	0.67	0.00	0.00	0	0	-34.5	52.1	9,536
Indiana	W-CG-reg	1475	1.34	1.55	0.11	0.67	0.00	0.00	0	0	-34.2	147.5	9,684
New Hampshire	W-RFG-reg	229	1.45	1.55	0.22	0.67	0.00	0.00	0	0	-34.1	22.9	9,706
Wisconsin	W-CG-reg	1007	1.33	1.55	0.11	0.67	0.00	0.00	0	0	-33.9	100.7	9,807
Utah	W-CG-reg	600	1.39	1.55	0.17	0.67	0.00	0.00	0	0	-33.6	60.0	9,867
Nebraska	W-CG-reg	405	1.33	1.55	0.11	0.67	0.00	0.00	0	0	-33.6	40.5	9,908
New York	W-RFG-reg	1524	1.40	1.55	0.18	0.67	0.00	0.00	0	0	-33.5	152.4	10,060
Washington	W-CG-reg	1335	1.43	1.55	0.21	0.67	0.00	0.00	0	0	-33.3	133.5	10,194
Kansas	W-CG-reg	851	1.32	1.55	0.11	0.67	0.00	0.00	0	0	-32.5	85.1	10,279
Vermont	W-CG-reg	165	1.43	1.55	0.22	0.67	0.00	0.00	0	0	-32.4	16.5	10,295
Colorado	W-CG-reg	1028	1.38	1.55	0.17	0.67	0.00	0.00	0	0	-32.1	102.8	10,398
Texas	W-RFG-reg	3133	1.36	1.55	0.15	0.67	0.00	0.00	0	0	-32.0	313.3	10,711
Arizona	W-RFG-reg	973	1.45	1.55	0.25	0.67	0.00	0.00	0	0	-31.5	97.3	10,809
Kentucky	W-CG-reg	857	1.40	1.55	0.20	0.67	0.00	0.00	0	0	-31.2	85.7	10,894
Pennsylvania	W-RFG-reg	480	1.38	1.55	0.18	0.67	0.00	0.00	0	0	-30.8	48.0	10,942
Connecticut	W-RFG-reg	785	1.39	1.55	0.20	0.67	0.00	0.00	0	0	-30.6	78.5	11,021
Rhode Island	W-RFG-reg	321	1.39	1.55	0.20	0.67	0.00	0.00	0	0	-30.6	32.1	11,053
Massachusetts	W-RFG-reg	1335	1.39	1.55	0.20	0.67	0.00	0.00	0	0	-30.0	133.5	11,186
Maine	W-RFG-reg	231	1.46	1.55	0.28	0.67	0.00	0.00	0	0	-29.5	23.1	11,209
Arkansas	W-CG-reg	768	1.33	1.55	0.15	0.67	0.00	0.00	0	0	-29.5	76.8	11,286
Virginia	W-RFG-reg	962	1.38	1.55	0.20	0.67	0.00	0.00	0	0	-29.4	96.2	11,382
Mississippi	W-CG-reg	917	1.33	1.55	0.15	0.67	0.00	0.00	0	0	-29.4	91.7	11,474
New Mexico	W-CG-reg	494	1.38	1.55	0.20	0.67	0.00	0.00	0	0	-28.9	49.4	11,523
Delaware	W-RFG-reg	233	1.37	1.55	0.20	0.67	0.00	0.00	0	0	-28.6	23.3	11,547
Louisiana	W-CG-reg	1429	1.32	1.55	0.15	0.67	0.00	0.00	0	0	-28.6	142.9	11,690
West Virginia	W-CG-reg	391	1.35	1.55	0.18	0.67	0.00	0.00	0	0	-28.5	39.1	11,729
New Hampshire	W-CG-reg	70	1.39	1.55	0.22	0.67	0.00	0.00	0	0	-28.1	7.0	11,736
Maryland	W-RFG-reg	920	1.37	1.55	0.20	0.67	0.00	0.00	0	0	-27.8	92.0	11,828
New York	W-CG-reg	1262	1.34	1.55	0.18	0.67	0.00	0.00	0	0	-27.5	126.2	11,954
DC	W-RFG-reg	32	1.36	1.55	0.20	0.67	0.00	0.00	0	0	-27.0	3.2	11,957
Wyoming	W-CG-reg	173	1.32	1.55	0.17	0.67	0.00	0.00	0	0	-26.9	17.3	11,974
North Dakota	W-CG-reg	206	1.35	1.55	0.20	0.67	0.00	0.00	0	0	-26.1	20.6	11,995
Texas	W-CG-reg	4267	1.30	1.55	0.15	0.67	0.00	0.00	0	0	-26.0	426.7	12,422
Arizona	W-CG-reg	543	1.39	1.55	0.25	0.67	0.00	0.00	0	0	-25.5	54.3	12,476
Tennessee	W-CG-reg	1793	1.34	1.55	0.20	0.67	0.00	0.00	0	0	-24.9	179.3	12,655
Pennsylvania	W-CG-reg	1085	1.32	1.55	0.18	0.67	0.00	0.00	0	0	-24.8	108.5	12,764
New Jersey	W-RFG-reg	1994	1.34	1.55	0.20	0.67	0.00	0.00	0	0	-24.8	199.4	12,963
Alabama	W-CG-reg	1272	1.33	1.55	0.20	0.67	0.00	0.00	0	0	-23.8	127.2	13,090
Oklahoma	W-CG-reg	1089	1.31	1.55	0.20	0.67	0.00	0.02	0	0	-23.8	108.9	13,199
Maine	W-CG-reg	156	1.40	1.55	0.28	0.67	0.00	0.00	0	0	-23.5	15.6	13,215
Virginia	W-CG-reg	813	1.32	1.55	0.20	0.67	0.00	0.00	0	0	-23.4	81.3	13,296
Georgia	W-CG-reg	2506	1.33	1.55	0.22	0.67	0.00	0.00	0	0	-22.2	250.6	13,547
South Carolina	W-CG-reg	1350	1.33	1.55	0.22	0.67	0.00	0.00	0	0	-22.0	135.0	13,682
North Carolina	W-CG-reg	2266	1.33	1.55	0.22	0.67	0.00	0.00	0	0	-21.8	226.6	13,908
Maryland	W-CG-reg	108	1.31	1.55	0.20	0.67	0.00	0.00	0	0	-21.8	10.8	13,919
Florida	W-CG-reg	3809	1.37	1.55	0.28	0.67	0.00	0.00	0	0	-19.8	380.9	14,300
Hawaii	W-CG-Prem	64	1.65	1.55	0.50	0.51	0.00	0.00	0	0	-10.4	6.4	14,307
Hawaii	W-CG-reg	213	1.51	1.55	0.50	0.67	0.00	0.00	0	0	-12.7	21.3	14,328

Table A2017A Input Costs, Ethanol Blending Cost and Ethanol Volumes

Year 2017 State	Gasoline Code	Gasoline Volume MMgals	Gasoline Price $/gal	Ethanol Gate Price $/gal	Ethanol Dist Cost $/gal	Ethanol Blending $/gal	Federal Subsidy $/gal	State Subsidy $/gal	State Mandate	RFG "Mandate"	Ethanol Blending Cost c/gal	Ethanol Volume MMgals	Cumulative Eth Vol MMgals
Oregon	S-CG-Reg	693	1.78	1.45	0.21	1.66	0.00	0.00	1	0	-178.3	69.3	69
Minnesota	S-CG-Reg	1055	1.62	1.45	0.11	1.66	0.00	0.00	1	0	-171.9	105.5	175
Missouri	S-CG-Reg	834	1.61	1.45	0.11	1.66	0.00	0.00	1	0	-171.1	83.4	258
Missouri	S-RFG-Reg	428	1.67	1.45	0.11	1.44	0.00	0.00	1	0	-154.7	42.8	301
Missouri	S-RFG-Prem	42	2.00	1.45	0.11	1.03	0.00	0.00	1	0	-146.7	4.2	305
Oregon	S-CG-Prem	97	2.05	1.45	0.21	1.40	0.00	0.00	1	0	-178.2	9.7	315
Missouri	S-CG-Prem	70	1.94	1.45	0.11	1.40	0.00	0.00	1	0	-177.6	7.0	322
Minnesota	S-CG-Prem	106	1.83	1.45	0.11	1.40	0.00	0.00	1	0	-166.9	10.6	333
Missouri	W-RFG-Prem	51	1.95	1.45	0.11	0.51	0.00	0.00	1	0	-90.0	5.1	338
Oregon	W-CG-Prem	118	2.00	1.45	0.21	0.51	0.00	0.00	1	0	-84.5	11.8	349
Missouri	W-CG-Prem	85	1.89	1.45	0.11	0.51	0.00	0.00	1	0	-84.0	8.5	358
Oregon	W-CG-reg	838	1.73	1.45	0.21	0.67	0.00	0.00	1	0	-74.4	83.8	442
Minnesota	W-CG-Prem	128	1.78	1.45	0.11	0.51	0.00	0.00	1	0	-73.2	12.8	454
Missouri	W-RFG-reg	517	1.62	1.45	0.11	0.67	0.00	0.00	1	0	-73.3	51.7	506
Minnesota	W-CG-reg	1275	1.57	1.45	0.11	0.67	0.00	0.00	1	0	-68.0	127.5	634
Missouri	W-CG-reg	1008	1.56	1.45	0.11	0.67	0.00	0.00	1	0	-67.3	100.8	735
Alaska	S-CG-Reg	114	2.34	1.45	0.51	1.66	0.00	0.00	0	0	-204.1	11.4	746
Iowa	S-CG-Reg	511	1.63	1.45	0.11	1.66	0.00	0.30	0	0	-203.0	51.1	797
Illinois	S-CG-Reg	781	1.61	1.45	0.11	1.66	0.00	0.26	0	0	-197.0	78.1	875
South Dakota	S-CG-Reg	184	1.64	1.45	0.11	1.66	0.00	0.09	0	0	-182.9	18.4	894
Idaho	S-CG-Reg	301	1.78	1.45	0.17	1.66	0.00	0.00	0	0	-182.3	30.1	924
Illinois	S-RFG-Reg	1330	1.67	1.45	0.11	1.44	0.00	0.26	0	0	-180.6	133.0	1,057
Illinois	S-RFG-Prem	192	2.06	1.45	0.11	1.03	0.00	0.26	0	0	-179.0	19.2	1,076
California	S-RFG-Reg	5459	1.95	1.45	0.25	1.44	0.00	0.10	0	0	-179.0	545.9	1,622
Washington	S-CG-Reg	1114	1.78	1.45	0.21	1.66	0.00	0.00	0	0	-177.9	111.4	1,733
Montana	S-CG-Reg	292	1.73	1.45	0.17	1.66	0.00	0.00	0	0	-176.8	29.2	1,762
Utah	S-CG-Reg	501	1.70	1.45	0.17	1.66	0.00	0.00	0	0	-174.2	50.1	1,812
Colorado	S-CG-Reg	858	1.69	1.45	0.17	1.66	0.00	0.00	0	0	-173.4	85.8	1,898
Nebraska	S-CG-Reg	338	1.63	1.45	0.11	1.66	0.00	0.00	0	0	-173.3	33.8	1,932
Michigan	S-CG-Reg	2060	1.63	1.45	0.11	1.66	0.00	0.00	0	0	-173.2	206.0	2,138
Nevada	S-CG-Reg	435	1.77	1.45	0.25	1.66	0.00	0.00	0	0	-172.5	43.5	2,182
Wisconsin	S-CG-Reg	840	1.61	1.45	0.11	1.66	0.00	0.00	0	0	-171.6	84.0	2,266
Ohio	S-CG-Reg	2125	1.60	1.45	0.11	1.66	0.00	0.00	0	0	-170.4	212.5	2,478
Kansas	S-CG-Reg	710	1.60	1.45	0.11	1.66	0.00	0.00	0	0	-170.2	71.0	2,549
Indiana	S-CG-Reg	1231	1.59	1.45	0.11	1.66	0.00	0.00	0	0	-169.7	123.1	2,672
New Mexico	S-CG-Reg	412	1.68	1.45	0.21	1.66	0.00	0.00	0	0	-168.2	41.2	2,713
Vermont	S-CG-Reg	138	1.69	1.45	0.23	1.66	0.00	0.00	0	0	-167.6	13.8	2,727
Wyoming	S-CG-Reg	144	1.63	1.45	0.17	1.66	0.00	0.00	0	0	-167.0	14.4	2,741
Mississippi	S-CG-Reg	765	1.61	1.45	0.16	1.66	0.00	0.00	0	0	-166.6	76.5	2,818
Kentucky	S-CG-Reg	715	1.66	1.45	0.21	1.66	0.00	0.00	0	0	-166.5	71.5	2,890
Arkansas	S-CG-Reg	641	1.61	1.45	0.16	1.66	0.00	0.00	0	0	-166.5	64.1	2,954
Louisiana	S-CG-Reg	1193	1.61	1.45	0.16	1.66	0.00	0.00	0	0	-166.5	119.3	3,073
Texas	S-CG-Reg	3561	1.60	1.45	0.16	1.66	0.00	0.00	0	0	-166.1	356.1	3,429
Illinois	S-CG-Prem	48	2.00	1.45	0.11	1.40	0.00	0.26	0	0	-209.9	4.8	3,434
New York	S-CG-Reg	1053	1.62	1.45	0.19	1.66	0.00	0.00	0	0	-164.9	105.3	3,539
Oklahoma	S-CG-Reg	909	1.62	1.45	0.21	1.66	0.00	0.02	0	0	-164.1	90.9	3,630
West Virginia	S-CG-Reg	326	1.61	1.45	0.19	1.66	0.00	0.00	0	0	-164.0	32.6	3,663
North Dakota	S-CG-Reg	172	1.63	1.45	0.21	1.66	0.00	0.00	0	0	-163.9	17.2	3,680
California	S-RFG-Prem	1578	2.21	1.45	0.25	1.03	0.00	0.10	0	0	-163.6	157.8	3,837
Hawaii	S-CG-Reg	178	1.93	1.45	0.51	1.66	0.00	0.00	0	0	-163.4	17.8	3,855
Pennsylvania	S-CG-Reg	905	1.61	1.45	0.19	1.66	0.00	0.00	0	0	-163.1	90.5	3,946
Arizona	S-CG-Reg	453	1.67	1.45	0.25	1.66	0.00	0.00	0	0	-163.0	45.3	3,991
Iowa	S-CG-Prem	66	1.92	1.45	0.11	1.40	0.00	0.30	0	0	-205.4	6.6	3,998
Virginia	S-CG-Reg	679	1.60	1.45	0.21	1.66	0.00	0.00	0	0	-160.1	67.9	4,066
New Hampshire	S-CG-Reg	58	1.61	1.45	0.23	1.66	0.00	0.00	0	0	-159.9	5.8	4,071
Alabama	S-CG-Reg	1062	1.59	1.45	0.21	1.66	0.00	0.00	0	0	-159.1	106.2	4,178
Maryland	S-CG-Reg	90	1.58	1.45	0.21	1.66	0.00	0.00	0	0	-158.9	9.0	4,187
Tennessee	S-CG-Reg	1497	1.58	1.45	0.21	1.66	0.00	0.00	0	0	-158.7	149.7	4,336
Georgia	S-CG-Reg	2091	1.60	1.45	0.23	1.66	0.00	0.00	0	0	-158.2	209.1	4,545
Maine	S-CG-Reg	130	1.65	1.45	0.29	1.66	0.00	0.00	0	0	-157.9	13.0	4,558
Florida	S-CG-Reg	3179	1.65	1.45	0.29	1.66	0.00	0.00	0	0	-157.9	317.9	4,876
South Carolina	S-CG-Reg	1126	1.59	1.45	0.23	1.66	0.00	0.00	0	0	-157.8	112.6	4,989
North Carolina	S-CG-Reg	1891	1.59	1.45	0.23	1.66	0.00	0.00	0	0	-157.5	189.1	5,178
Wisconsin	S-RFG-Prem	32	2.08	1.45	0.11	1.03	0.00	0.00	0	0	-155.2	3.2	5,181
Wisconsin	S-RFG-Reg	347	1.67	1.45	0.11	1.44	0.00	0.00	0	0	-155.2	34.7	5,216
Michigan	S-CG-Prem	136	2.14	1.45	0.11	1.40	0.00	0.00	0	0	-197.6	13.6	5,230
Indiana	S-RFG-Reg	204	1.65	1.45	0.11	1.44	0.00	0.00	0	0	-153.3	20.4	5,250
Indiana	S-RFG-Prem	21	2.06	1.45	0.11	1.03	0.00	0.00	0	0	-153.0	2.1	5,252
Montana	S-CG-Prem	63	2.19	1.45	0.17	1.40	0.00	0.00	0	0	-196.5	6.3	5,258
Kentucky	S-RFG-Prem	19	2.14	1.45	0.21	1.03	0.00	0.00	0	0	-151.3	1.9	5,260
Kentucky	S-RFG-Reg	197	1.72	1.45	0.21	1.44	0.00	0.00	0	0	-150.1	19.7	5,280
Texas	S-RFG-Reg	2615	1.66	1.45	0.16	1.44	0.00	0.00	0	0	-149.6	261.5	5,542
New York	S-RFG-Reg	1272	1.68	1.45	0.19	1.44	0.00	0.00	0	0	-148.5	127.2	5,669
Pennsylvania	S-RFG-Reg	401	1.67	1.45	0.19	1.44	0.00	0.00	0	0	-146.7	40.1	5,709
Arizona	S-RFG-Reg	812	1.73	1.45	0.25	1.44	0.00	0.00	0	0	-146.6	81.2	5,790
Ohio	S-CG-Prem	168	2.06	1.45	0.11	1.40	0.00	0.00	0	0	-190.1	16.8	5,807
Massachusetts	S-RFG-Reg	1114	1.67	1.45	0.21	1.44	0.00	0.00	0	0	-144.8	111.4	5,918
Connecticut	S-RFG-Reg	655	1.66	1.45	0.21	1.44	0.00	0.00	0	0	-144.4	65.5	5,984
Rhode Island	S-RFG-Reg	268	1.66	1.45	0.21	1.44	0.00	0.00	0	0	-144.4	26.8	6,010
South Dakota	S-CG-Prem	22	1.95	1.45	0.11	1.40	0.00	0.09	0	0	-187.7	2.2	6,013
Virginia	S-RFG-Reg	803	1.66	1.45	0.21	1.44	0.00	0.00	0	0	-143.7	80.3	6,093
New Hampshire	S-RFG-Reg	191	1.67	1.45	0.23	1.44	0.00	0.00	0	0	-143.5	19.1	6,112
Maryland	S-RFG-Reg	768	1.64	1.45	0.21	1.44	0.00	0.00	0	0	-142.4	76.8	6,189
Colorado	S-CG-Prem	189	2.09	1.45	0.17	1.40	0.00	0.00	0	0	-186.4	18.9	6,208
Delaware	S-RFG-Reg	195	1.64	1.45	0.21	1.44	0.00	0.00	0	0	-142.3	19.5	6,227

Table A2017B Input Costs, Ethanol Blending Cost and Ethanol Volumes

Year 2017 State	Gasoline Code	Gasoline Volume MMgals	Gasoline Price $/gal	Ethanol Gate Price $/gal	Ethanol Dist Cost $/gal	Ethanol Blending $/gal	Federal Subsidy $/gal	State Subsidy $/gal	State Mandate	RFG "Mandate"	Ethanol Blending Cost c/gal	Ethanol Volume MMgals	Cumulative Eth Vol MMgals
Wisconsin	S-CG-Prem	75	2.02	1.45	0.11	1.40	0.00	0.00	0	0	-186.1	7.5	6,235
Maine	S-RFG-Reg	192	1.71	1.45	0.29	1.44	0.00	0.00	0	0	-141.5	19.2	6,254
DC	S-RFG-Reg	27	1.63	1.45	0.21	1.44	0.00	0.00	0	0	-141.4	2.7	6,256
West Virginia	S-CG-Prem	20	2.09	1.45	0.19	1.40	0.00	0.00	0	0	-184.8	2.0	6,259
New Jersey	S-RFG-Reg	1664	1.62	1.45	0.21	1.44	0.00	0.00	0	0	-140.0	166.4	6,425
Indiana	S-CG-Prem	88	2.00	1.45	0.11	1.40	0.00	0.00	0	0	-183.9	8.8	6,434
New York	S-RFG-Prem	306	2.00	1.45	0.19	1.03	0.00	0.00	0	0	-139.6	30.6	6,464
Kentucky	S-CG-Prem	50	2.08	1.45	0.21	1.40	0.00	0.00	0	0	-182.1	5.0	6,469
Washington	S-CG-Prem	221	2.08	1.45	0.21	1.40	0.00	0.00	0	0	-181.8	22.1	6,491
Connecticut	S-RFG-Prem	107	2.00	1.45	0.21	1.03	0.00	0.00	0	0	-137.6	10.7	6,502
Idaho	S-CG-Prem	51	2.03	1.45	0.17	1.40	0.00	0.00	0	0	-180.6	5.1	6,507
Virginia	S-RFG-Prem	156	1.98	1.45	0.21	1.03	0.00	0.00	0	0	-135.8	15.6	6,523
Alaska	S-CG-Prem	14	2.36	1.45	0.51	1.40	0.00	0.00	0	0	-179.6	1.4	6,524
Wyoming	S-CG-Prem	29	2.01	1.45	0.17	1.40	0.00	0.00	0	0	-179.1	2.9	6,527
Texas	S-RFG-Prem	406	1.92	1.45	0.16	1.03	0.00	0.00	0	0	-134.8	40.6	6,568
Alabama	S-CG-Prem	106	2.03	1.45	0.21	1.40	0.00	0.00	0	0	-177.4	10.6	6,578
Pennsylvania	S-RFG-Prem	67	1.92	1.45	0.19	1.03	0.00	0.00	0	0	-131.3	6.7	6,585
North Dakota	S-CG-Prem	21	2.01	1.45	0.21	1.40	0.00	0.00	0	0	-175.0	2.1	6,587
Nebraska	S-CG-Prem	45	1.91	1.45	0.11	1.40	0.00	0.00	0	0	-175.0	4.5	6,592
Georgia	S-CG-Prem	287	2.03	1.45	0.23	1.40	0.00	0.00	0	0	-174.8	28.7	6,620
DC	S-RFG-Prem	7	1.93	1.45	0.21	1.03	0.00	0.00	0	0	-130.6	0.7	6,621
Maine	S-RFG-Prem	13	2.01	1.45	0.29	1.03	0.00	0.00	0	0	-130.4	1.3	6,622
Arizona	S-RFG-Prem	126	1.98	1.45	0.25	1.03	0.00	0.00	0	0	-130.4	12.6	6,635
New Mexico	S-CG-Prem	61	2.00	1.45	0.21	1.40	0.00	0.00	0	0	-174.3	6.1	6,641
Rhode Island	S-RFG-Prem	40	1.92	1.45	0.21	1.03	0.00	0.00	0	0	-129.6	4.0	6,645
Massachusetts	S-RFG-Prem	170	1.92	1.45	0.21	1.03	0.00	0.00	0	0	-129.4	17.0	6,662
New Hampshire	S-RFG-Prem	21	1.94	1.45	0.23	1.03	0.00	0.00	0	0	-129.3	2.1	6,664
Maryland	S-RFG-Prem	141	1.91	1.45	0.21	1.03	0.00	0.00	0	0	-128.6	14.1	6,678
Mississippi	S-CG-Prem	79	1.93	1.45	0.16	1.40	0.00	0.00	0	0	-172.5	7.9	6,686
South Carolina	S-CG-Prem	134	1.99	1.45	0.23	1.40	0.00	0.00	0	0	-171.6	13.4	6,699
North Carolina	S-CG-Prem	237	1.99	1.45	0.23	1.40	0.00	0.00	0	0	-171.5	23.7	6,723
Utah	S-CG-Prem	135	1.94	1.45	0.17	1.40	0.00	0.00	0	0	-171.5	13.5	6,737
Florida	S-CG-Prem	467	2.05	1.45	0.29	1.40	0.00	0.00	0	0	-171.4	46.7	6,783
New York	S-CG-Prem	103	1.94	1.45	0.19	1.40	0.00	0.00	0	0	-170.5	10.3	6,794
Louisiana	S-CG-Prem	105	1.91	1.45	0.16	1.40	0.00	0.00	0	0	-170.4	10.5	6,804
Arkansas	S-CG-Prem	55	1.91	1.45	0.16	1.40	0.00	0.00	0	0	-170.1	5.5	6,810
Tennessee	S-CG-Prem	173	1.95	1.45	0.21	1.40	0.00	0.00	0	0	-169.1	17.3	6,827
New Jersey	S-RFG-Prem	269	1.87	1.45	0.21	1.03	0.00	0.00	0	0	-124.3	26.9	6,854
Nevada	S-CG-Prem	113	1.98	1.45	0.25	1.40	0.00	0.00	0	0	-167.7	11.3	6,865
Illinois	W-RFG-Prem	232	2.01	1.45	0.11	0.51	0.00	0.26	0	0	-122.2	23.2	6,888
Virginia	S-CG-Prem	66	1.92	1.45	0.21	1.40	0.00	0.00	0	0	-166.7	6.6	6,895
Kansas	S-CG-Prem	60	1.83	1.45	0.11	1.40	0.00	0.00	0	0	-166.7	6.0	6,901
Delaware	S-RFG-Prem	24	1.85	1.45	0.21	1.03	0.00	0.00	0	0	-122.3	2.4	6,903
Texas	S-CG-Prem	346	1.86	1.45	0.16	1.40	0.00	0.00	0	0	-165.7	34.6	6,938
Vermont	S-CG-Prem	12	1.93	1.45	0.23	1.40	0.00	0.00	0	0	-164.8	1.2	6,939
Pennsylvania	S-CG-Prem	86	1.86	1.45	0.19	1.40	0.00	0.00	0	0	-162.1	8.6	6,948
Maine	S-CG-Prem	11	1.95	1.45	0.29	1.40	0.00	0.00	0	0	-161.3	1.1	6,949
Arizona	S-CG-Prem	58	1.92	1.45	0.25	1.40	0.00	0.00	0	0	-161.3	5.8	6,955
Illinois	W-CG-Prem	58	1.95	1.45	0.11	0.51	0.00	0.26	0	0	-116.2	5.8	6,960
Oklahoma	S-CG-Prem	89	1.85	1.45	0.21	1.40	0.00	0.02	0	0	-160.6	8.9	6,969
New Hampshire	S-CG-Prem	4	1.88	1.45	0.23	1.40	0.00	0.00	0	0	-160.1	0.4	6,970
Maryland	S-CG-Prem	7	1.85	1.45	0.21	1.40	0.00	0.00	0	0	-159.5	0.7	6,970
Iowa	W-CG-Prem	80	1.87	1.45	0.11	0.51	0.00	0.30	0	0	-111.7	8.0	6,978
Hawaii	S-CG-Prem	53	2.10	1.45	0.51	1.40	0.00	0.00	0	0	-154.1	5.3	6,984
California	W-RFG-Prem	1908	2.16	1.45	0.25	0.51	0.00	0.10	0	0	-106.8	190.8	7,175
Michigan	W-CG-Prem	165	2.09	1.45	0.11	0.51	0.00	0.00	0	0	-103.9	16.5	7,191
Montana	W-CG-Prem	76	2.14	1.45	0.17	0.51	0.00	0.00	0	0	-102.8	7.6	7,199
Alaska	W-CG-reg	138	2.29	1.45	0.51	0.67	0.00	0.00	0	0	-100.2	13.8	7,212
Illinois	W-RFG-reg	1608	1.62	1.45	0.11	0.67	0.00	0.26	0	0	-99.2	160.8	7,373
Iowa	W-CG-reg	618	1.58	1.45	0.11	0.67	0.00	0.30	0	0	-99.1	61.8	7,435
Wisconsin	W-RFG-Prem	38	2.03	1.45	0.11	0.51	0.00	0.00	0	0	-98.5	3.8	7,439
California	W-RFG-reg	6601	1.90	1.45	0.25	0.67	0.00	0.10	0	0	-97.6	660.1	8,099
Ohio	W-CG-Prem	203	2.01	1.45	0.11	0.51	0.00	0.00	0	0	-96.4	20.3	8,119
Indiana	W-RFG-Prem	26	2.01	1.45	0.11	0.51	0.00	0.00	0	0	-96.2	2.6	8,122
Kentucky	W-RFG-Prem	23	2.09	1.45	0.21	0.51	0.00	0.00	0	0	-94.5	2.3	8,124
South Dakota	W-CG-Prem	27	1.90	1.45	0.11	0.51	0.00	0.09	0	0	-94.1	2.7	8,127
Illinois	W-CG-reg	944	1.56	1.45	0.11	0.67	0.00	0.26	0	0	-93.2	94.4	8,221
Colorado	W-CG-Prem	228	2.04	1.45	0.17	0.51	0.00	0.00	0	0	-92.7	22.8	8,244
Wisconsin	W-CG-Prem	91	1.97	1.45	0.11	0.51	0.00	0.00	0	0	-92.5	9.1	8,253
West Virginia	W-CG-Prem	25	2.04	1.45	0.19	0.51	0.00	0.00	0	0	-91.1	2.5	8,256
Indiana	W-CG-Prem	106	1.95	1.45	0.11	0.51	0.00	0.00	0	0	-90.2	10.6	8,266
Kentucky	W-CG-Prem	60	2.03	1.45	0.21	0.51	0.00	0.00	0	0	-88.5	6.0	8,272
Washington	W-CG-Prem	267	2.03	1.45	0.21	0.51	0.00	0.00	0	0	-88.1	26.7	8,299
Idaho	W-CG-Prem	62	1.98	1.45	0.17	0.51	0.00	0.00	0	0	-86.9	6.2	8,305
Alaska	W-CG-Prem	17	2.31	1.45	0.51	0.51	0.00	0.00	0	0	-85.9	1.7	8,307
Wyoming	W-CG-Prem	35	1.96	1.45	0.17	0.51	0.00	0.00	0	0	-85.4	3.5	8,310
Alabama	W-CG-Prem	128	1.98	1.45	0.21	0.51	0.00	0.00	0	0	-83.7	12.8	8,323
New York	W-RFG-Prem	370	1.95	1.45	0.19	0.51	0.00	0.00	0	0	-82.9	37.0	8,360
Nebraska	W-CG-Prem	54	1.86	1.45	0.11	0.51	0.00	0.00	0	0	-81.3	5.4	8,366
North Dakota	W-CG-Prem	25	1.96	1.45	0.21	0.51	0.00	0.00	0	0	-81.3	2.5	8,368
Georgia	W-CG-Prem	347	1.98	1.45	0.23	0.51	0.00	0.00	0	0	-81.1	34.7	8,403
Connecticut	W-RFG-Prem	130	1.95	1.45	0.21	0.51	0.00	0.00	0	0	-80.8	13.0	8,416
New Mexico	W-CG-Prem	74	1.95	1.45	0.21	0.51	0.00	0.00	0	0	-80.6	7.4	8,423
Virginia	W-RFG-Prem	189	1.93	1.45	0.21	0.51	0.00	0.00	0	0	-79.0	18.9	8,442
South Dakota	W-CG-reg	222	1.59	1.45	0.11	0.67	0.00	0.09	0	0	-79.1	22.2	8,464

Table A2017C Input Costs, Ethanol Blending Cost and Ethanol Volumes

Year 2017 State	Gasoline Code	Gasoline Volume MMgals	Gasoline Price $/gal	Ethanol Gate Price $/gal	Ethanol Dist Cost $/gal	Ethanol Blending $/gal	Federal Subsidy $/gal	State Subsidy $/gal	State Mandate	RFG "Mandate"	Ethanol Blending Cost c/gal	Ethanol Volume MMgals	Cumulative Eth Vol MMgals
Mississippi	W-CG-Prem	95	1.88	1.45	0.16	0.51	0.00	0.00	0	0	-78.8	9.5	8,474
Idaho	W-CG-reg	363	1.73	1.45	0.17	0.67	0.00	0.00	0	0	-78.4	36.3	8,510
Texas	W-RFG-Prem	491	1.87	1.45	0.16	0.51	0.00	0.00	0	0	-78.0	49.1	8,559
South Carolina	W-CG-Prem	162	1.94	1.45	0.23	0.51	0.00	0.00	0	0	-77.9	16.2	8,575
North Carolina	W-CG-Prem	286	1.94	1.45	0.23	0.51	0.00	0.00	0	0	-77.8	28.6	8,604
Utah	W-CG-Prem	164	1.89	1.45	0.17	0.51	0.00	0.00	0	0	-77.8	16.4	8,620
Florida	W-CG-Prem	564	2.00	1.45	0.29	0.51	0.00	0.00	0	0	-77.7	56.4	8,677
New York	W-CG-Prem	124	1.89	1.45	0.19	0.51	0.00	0.00	0	0	-76.9	12.4	8,689
Louisiana	W-CG-Prem	127	1.86	1.45	0.16	0.51	0.00	0.00	0	0	-76.7	12.7	8,702
Arkansas	W-CG-Prem	66	1.86	1.45	0.16	0.51	0.00	0.00	0	0	-76.4	6.6	8,709
Tennessee	W-CG-Prem	209	1.90	1.45	0.21	0.51	0.00	0.00	0	0	-75.4	20.9	8,730
Pennsylvania	W-RFG-Prem	81	1.87	1.45	0.19	0.51	0.00	0.00	0	0	-74.5	8.1	8,738
Nevada	W-CG-Prem	136	1.93	1.45	0.25	0.51	0.00	0.00	0	0	-74.0	13.6	8,751
Washington	W-CG-reg	1347	1.73	1.45	0.21	0.67	0.00	0.00	0	0	-74.0	134.7	8,886
DC	W-RFG-Prem	8	1.88	1.45	0.21	0.51	0.00	0.00	0	0	-73.8	0.8	8,887
Wisconsin	W-RFG-reg	420	1.62	1.45	0.11	0.67	0.00	0.00	0	0	-73.8	42.0	8,929
Maine	W-RFG-Prem	15	1.96	1.45	0.29	0.51	0.00	0.00	0	0	-73.7	1.5	8,930
Arizona	W-RFG-Prem	153	1.93	1.45	0.25	0.51	0.00	0.00	0	0	-73.6	15.3	8,946
Virginia	W-CG-Prem	79	1.87	1.45	0.21	0.51	0.00	0.00	0	0	-73.0	7.9	8,954
Kansas	W-CG-Prem	73	1.78	1.45	0.11	0.51	0.00	0.00	0	0	-73.0	7.3	8,961
Montana	W-CG-reg	354	1.68	1.45	0.17	0.67	0.00	0.00	0	0	-72.9	35.4	8,996
Rhode Island	W-RFG-Prem	48	1.87	1.45	0.21	0.51	0.00	0.00	0	0	-72.8	4.8	9,001
Massachusetts	W-RFG-Prem	205	1.87	1.45	0.21	0.51	0.00	0.00	0	0	-72.6	20.5	9,021
New Hampshire	W-RFG-Prem	26	1.89	1.45	0.23	0.51	0.00	0.00	0	0	-72.5	2.6	9,024
Texas	W-CG-Prem	418	1.81	1.45	0.16	0.51	0.00	0.00	0	0	-72.0	41.8	9,066
Maryland	W-RFG-Prem	170	1.86	1.45	0.21	0.51	0.00	0.00	0	0	-71.8	17.0	9,083
Indiana	W-RFG-reg	247	1.60	1.45	0.11	0.67	0.00	0.00	0	0	-71.9	24.7	9,108
Vermont	W-CG-Prem	15	1.88	1.45	0.23	0.51	0.00	0.00	0	0	-71.1	1.5	9,109
Utah	W-CG-reg	606	1.65	1.45	0.17	0.67	0.00	0.00	0	0	-70.3	60.6	9,170
Colorado	W-CG-reg	1038	1.64	1.45	0.17	0.67	0.00	0.00	0	0	-69.5	103.8	9,273
Nebraska	W-CG-reg	409	1.58	1.45	0.11	0.67	0.00	0.00	0	0	-69.4	40.9	9,314
Michigan	W-CG-reg	2491	1.58	1.45	0.11	0.67	0.00	0.00	0	0	-69.3	249.1	9,563
Kentucky	W-RFG-reg	239	1.67	1.45	0.21	0.67	0.00	0.00	0	0	-68.7	23.9	9,587
Nevada	W-CG-reg	526	1.72	1.45	0.25	0.67	0.00	0.00	0	0	-68.6	52.6	9,640
Pennsylvania	W-CG-Prem	104	1.81	1.45	0.19	0.51	0.00	0.00	0	0	-68.5	10.4	9,650
Texas	W-RFG-reg	3162	1.61	1.45	0.16	0.67	0.00	0.00	0	0	-68.2	316.2	9,966
Wisconsin	W-CG-reg	1016	1.56	1.45	0.11	0.67	0.00	0.00	0	0	-67.8	101.6	10,068
Maine	W-CG-Prem	14	1.90	1.45	0.29	0.51	0.00	0.00	0	0	-67.7	1.4	10,069
Arizona	W-CG-Prem	70	1.87	1.45	0.25	0.51	0.00	0.00	0	0	-67.6	7.0	10,076
New Jersey	W-RFG-Prem	325	1.82	1.45	0.21	0.51	0.00	0.00	0	0	-67.5	32.5	10,109
New York	W-RFG-reg	1538	1.63	1.45	0.19	0.67	0.00	0.00	0	0	-67.1	153.8	10,263
Oklahoma	W-CG-Prem	108	1.80	1.45	0.21	0.51	0.00	0.02	0	0	-66.9	10.8	10,273
New Hampshire	W-CG-Prem	5	1.83	1.45	0.23	0.51	0.00	0.00	0	0	-66.5	0.5	10,274
Ohio	W-CG-reg	2569	1.55	1.45	0.11	0.67	0.00	0.00	0	0	-66.5	256.9	10,531
Kansas	W-CG-reg	858	1.55	1.45	0.11	0.67	0.00	0.00	0	0	-66.3	85.8	10,617
Maryland	W-CG-Prem	9	1.80	1.45	0.21	0.51	0.00	0.00	0	0	-65.8	0.9	10,618
Indiana	W-CG-reg	1488	1.54	1.45	0.11	0.67	0.00	0.00	0	0	-65.9	148.8	10,766
Delaware	W-RFG-Prem	29	1.80	1.45	0.21	0.51	0.00	0.00	0	0	-65.5	2.9	10,769
Pennsylvania	W-RFG-reg	484	1.62	1.45	0.19	0.67	0.00	0.00	0	0	-65.3	48.4	10,818
Arizona	W-RFG-reg	981	1.68	1.45	0.25	0.67	0.00	0.00	0	0	-65.2	98.1	10,916
New Mexico	W-CG-reg	498	1.63	1.45	0.21	0.67	0.00	0.00	0	0	-64.3	49.8	10,966
Vermont	W-CG-reg	167	1.64	1.45	0.23	0.67	0.00	0.00	0	0	-63.7	16.7	10,982
Massachusetts	W-RFG-reg	1347	1.62	1.45	0.21	0.67	0.00	0.00	0	0	-63.4	134.7	11,117
Wyoming	W-CG-reg	174	1.58	1.45	0.17	0.67	0.00	0.00	0	0	-63.1	17.4	11,135
Connecticut	W-RFG-reg	792	1.61	1.45	0.21	0.67	0.00	0.00	0	0	-63.0	79.2	11,214
Rhode Island	W-RFG-reg	324	1.61	1.45	0.21	0.67	0.00	0.00	0	0	-63.0	32.4	11,246
Mississippi	W-CG-reg	925	1.56	1.45	0.16	0.67	0.00	0.00	0	0	-62.7	92.5	11,339
Kentucky	W-CG-reg	865	1.61	1.45	0.21	0.67	0.00	0.00	0	0	-62.7	86.5	11,425
Arkansas	W-CG-reg	775	1.56	1.45	0.16	0.67	0.00	0.00	0	0	-62.6	77.5	11,503
Louisiana	W-CG-reg	1442	1.56	1.45	0.16	0.67	0.00	0.00	0	0	-62.6	144.2	11,647
Virginia	W-RFG-reg	970	1.61	1.45	0.21	0.67	0.00	0.00	0	0	-62.3	97.0	11,744
Texas	W-CG-reg	4306	1.55	1.45	0.16	0.67	0.00	0.00	0	0	-62.2	430.6	12,174
New Hampshire	W-RFG-reg	231	1.62	1.45	0.23	0.67	0.00	0.00	0	0	-62.1	23.1	12,198
New York	W-CG-reg	1274	1.57	1.45	0.19	0.67	0.00	0.00	0	0	-61.1	127.4	12,325
Maryland	W-RFG-reg	929	1.59	1.45	0.21	0.67	0.00	0.00	0	0	-61.0	92.9	12,418
Delaware	W-RFG-reg	236	1.59	1.45	0.21	0.67	0.00	0.00	0	0	-60.9	23.6	12,441
Hawaii	W-CG-Prem	64	2.05	1.45	0.51	0.51	0.00	0.00	0	0	-60.4	6.4	12,448
Oklahoma	W-CG-reg	1099	1.57	1.45	0.21	0.67	0.00	0.02	0	0	-60.2	109.9	12,558
West Virginia	W-CG-reg	394	1.56	1.45	0.19	0.67	0.00	0.00	0	0	-60.1	39.4	12,597
Maine	W-RFG-reg	233	1.66	1.45	0.29	0.67	0.00	0.00	0	0	-60.1	23.3	12,620
North Dakota	W-CG-reg	208	1.58	1.45	0.21	0.67	0.00	0.00	0	0	-60.0	20.8	12,641
DC	W-RFG-reg	32	1.58	1.45	0.21	0.67	0.00	0.00	0	0	-60.0	3.2	12,644
Hawaii	W-CG-reg	215	1.88	1.45	0.51	0.67	0.00	0.00	0	0	-59.6	21.5	12,666
Pennsylvania	W-CG-reg	1095	1.56	1.45	0.19	0.67	0.00	0.00	0	0	-59.3	109.5	12,775
Arizona	W-CG-reg	548	1.62	1.45	0.25	0.67	0.00	0.00	0	0	-59.2	54.8	12,830
New Jersey	W-RFG-reg	2012	1.57	1.45	0.21	0.67	0.00	0.00	0	0	-58.6	201.2	13,031
Virginia	W-CG-reg	821	1.55	1.45	0.21	0.67	0.00	0.00	0	0	-56.3	82.1	13,113
New Hampshire	W-CG-reg	71	1.56	1.45	0.23	0.67	0.00	0.00	0	0	-56.1	7.1	13,120
Alabama	W-CG-reg	1284	1.54	1.45	0.21	0.67	0.00	0.00	0	0	-55.2	128.4	13,249
Maryland	W-CG-reg	109	1.53	1.45	0.21	0.67	0.00	0.00	0	0	-55.0	10.9	13,260
Tennessee	W-CG-reg	1810	1.53	1.45	0.21	0.67	0.00	0.00	0	0	-54.8	181.0	13,441
Georgia	W-CG-reg	2529	1.55	1.45	0.23	0.67	0.00	0.00	0	0	-54.3	252.9	13,694
Maine	W-CG-reg	158	1.60	1.45	0.29	0.67	0.00	0.00	0	0	-54.1	15.8	13,709
Florida	W-CG-reg	3844	1.60	1.45	0.29	0.67	0.00	0.00	0	0	-54.0	384.4	14,094
South Carolina	W-CG-reg	1362	1.54	1.45	0.23	0.67	0.00	0.00	0	0	-53.9	136.2	14,230
North Carolina	W-CG-reg	2287	1.54	1.45	0.23	0.67	0.00	0.00	0	0	-53.6	228.7	14,459

Table A2018A Input Costs, Ethanol Blending Cost and Ethanol Volumes

Year 2018 State	Gasoline Code	Gasoline Volume MMgals	Gasoline Price $/gal	Ethanol Gate Price $/gal	Ethanol Dist Cost $/gal	Ethanol Blending $/gal	Federal Subsidy $/gal	State Subsidy $/gal	State Mandate	RFG "Mandate"	Ethanol Blending Cost c/gal	Ethanol Volume MMgals	Cumulative Eth Vol MMgals
Oregon	S-CG-Reg	692	2.12	1.23	0.22	1.66	0.00	0.00	1	0	-233.0	69.2	69
Minnesota	S-CG-Reg	1053	1.90	1.23	0.11	1.66	0.00	0.00	1	0	-221.2	105.3	175
Oregon	S-CG-Prem	97	2.41	1.23	0.22	1.25	0.00	0.00	1	0	-220.4	9.7	184
Missouri	S-CG-Reg	833	1.89	1.23	0.11	1.66	0.00	0.00	1	0	-220.0	83.3	268
Missouri	S-CG-Prem	70	2.20	1.23	0.11	1.25	0.00	0.00	1	0	-210.1	7.0	275
Minnesota	S-CG-Prem	106	2.14	1.23	0.11	1.25	0.00	0.00	1	0	-204.7	10.6	285
Missouri	S-RFG-Reg	427	1.95	1.23	0.11	1.44	0.00	0.00	1	0	-203.6	42.7	328
Missouri	S-RFG-Prem	42	2.26	1.23	0.11	1.03	0.00	0.00	1	0	-193.6	4.2	332
Oregon	W-CG-Prem	118	2.36	1.23	0.22	0.51	0.00	0.00	1	0	-141.2	11.8	344
Missouri	W-RFG-Prem	51	2.21	1.23	0.11	0.51	0.00	0.00	1	0	-136.9	5.1	349
Missouri	W-CG-Prem	85	2.15	1.23	0.11	0.51	0.00	0.00	1	0	-130.9	8.5	357
Oregon	W-CG-reg	837	2.07	1.23	0.22	0.67	0.00	0.00	1	0	-129.1	83.7	441
Minnesota	W-CG-Prem	128	2.09	1.23	0.11	0.51	0.00	0.00	1	0	-125.5	12.8	454
Missouri	W-RFG-reg	517	1.90	1.23	0.11	0.67	0.00	0.00	1	0	-122.2	51.7	506
Minnesota	W-CG-reg	1273	1.85	1.23	0.11	0.67	0.00	0.00	1	0	-117.3	127.3	633
Missouri	W-CG-reg	1007	1.84	1.23	0.11	0.67	0.00	0.00	1	0	-116.2	100.7	734
Iowa	S-CG-Reg	510	1.91	1.23	0.11	1.66	0.00	0.30	0	0	-251.8	51.0	785
California	S-RFG-Reg	5451	2.33	1.23	0.26	1.44	0.00	0.19	0	0	-246.0	545.1	1,330
Alaska	S-CG-Reg	114	2.55	1.23	0.53	1.66	0.00	0.00	0	0	-244.9	11.4	1,341
Illinois	S-CG-Reg	780	1.87	1.23	0.11	1.66	0.00	0.26	0	0	-243.4	78.0	1,419
Iowa	S-CG-Prem	66	2.22	1.23	0.11	1.25	0.00	0.30	0	0	-242.1	6.6	1,426
Idaho	S-CG-Reg	300	2.16	1.23	0.18	1.66	0.00	0.00	0	0	-240.4	30.0	1,456
Illinois	S-CG-Prem	48	2.24	1.23	0.11	1.25	0.00	0.26	0	0	-240.0	4.8	1,461
Utah	S-CG-Reg	500	2.12	1.23	0.18	1.66	0.00	0.00	0	0	-237.0	50.0	1,511
Montana	S-CG-Prem	63	2.50	1.23	0.18	1.25	0.00	0.00	0	0	-234.4	6.3	1,517
Washington	S-CG-Reg	1113	2.13	1.23	0.22	1.66	0.00	0.00	0	0	-233.9	111.3	1,628
South Dakota	S-CG-Reg	183	1.92	1.23	0.11	1.66	0.00	0.09	0	0	-232.4	18.3	1,646
Michigan	S-CG-Prem	136	2.41	1.23	0.11	1.25	0.00	0.00	0	0	-231.9	13.6	1,660
Nevada	S-CG-Reg	434	2.15	1.23	0.26	1.66	0.00	0.00	0	0	-231.3	43.4	1,703
Hawaii	S-CG-Reg	177	2.40	1.23	0.53	1.66	0.00	0.00	0	0	-230.2	17.7	1,721
Wyoming	S-CG-Prem	29	2.45	1.23	0.18	1.25	0.00	0.00	0	0	-229.3	2.9	1,724
California	S-RFG-Prem	1575	2.57	1.23	0.26	1.03	0.00	0.19	0	0	-229.1	157.5	1,882
Montana	S-CG-Reg	292	2.03	1.23	0.18	1.66	0.00	0.00	0	0	-228.3	29.2	1,911
Illinois	S-RFG-Reg	1328	1.93	1.23	0.11	1.44	0.00	0.26	0	0	-227.0	132.8	2,044
South Dakota	S-CG-Prem	22	2.25	1.23	0.11	1.25	0.00	0.09	0	0	-224.9	2.2	2,046
Washington	S-CG-Prem	221	2.45	1.23	0.22	1.25	0.00	0.00	0	0	-224.6	22.1	2,068
Idaho	S-CG-Prem	51	2.40	1.23	0.18	1.25	0.00	0.00	0	0	-224.3	5.1	2,073
Ohio	S-CG-Prem	168	2.33	1.23	0.11	1.25	0.00	0.00	0	0	-223.7	16.8	2,090
Colorado	S-CG-Reg	857	1.99	1.23	0.18	1.66	0.00	0.00	0	0	-223.6	85.7	2,175
Illinois	S-RFG-Prem	191	2.30	1.23	0.11	1.03	0.00	0.26	0	0	-223.6	19.1	2,195
Nebraska	S-CG-Reg	338	1.91	1.23	0.11	1.66	0.00	0.00	0	0	-222.6	33.8	2,228
Colorado	S-CG-Prem	188	2.38	1.23	0.18	1.25	0.00	0.00	0	0	-222.3	18.8	2,247
Wisconsin	S-CG-Prem	75	2.32	1.23	0.11	1.25	0.00	0.00	0	0	-222.2	7.5	2,255
Wyoming	S-CG-Reg	144	1.97	1.23	0.18	1.66	0.00	0.00	0	0	-222.1	14.4	2,269
Arizona	S-CG-Reg	452	2.04	1.23	0.26	1.66	0.00	0.00	0	0	-220.9	45.2	2,314
Kansas	S-CG-Reg	709	1.89	1.23	0.11	1.66	0.00	0.00	0	0	-220.6	70.9	2,385
Michigan	S-CG-Reg	2057	1.89	1.23	0.11	1.66	0.00	0.00	0	0	-220.3	205.7	2,591
Utah	S-CG-Prem	135	2.36	1.23	0.18	1.25	0.00	0.00	0	0	-219.6	13.5	2,604
Wisconsin	S-CG-Reg	839	1.88	1.23	0.11	1.66	0.00	0.00	0	0	-219.0	83.9	2,688
Indiana	S-CG-Prem	88	2.28	1.23	0.11	1.25	0.00	0.00	0	0	-218.5	8.8	2,697
Ohio	S-CG-Reg	2122	1.87	1.23	0.11	1.66	0.00	0.00	0	0	-218.2	212.2	2,909
New Mexico	S-CG-Reg	411	1.97	1.23	0.21	1.66	0.00	0.00	0	0	-218.0	41.1	2,950
Indiana	S-CG-Reg	1229	1.86	1.23	0.11	1.66	0.00	0.00	0	0	-217.5	122.9	3,073
North Dakota	S-CG-Reg	172	1.95	1.23	0.21	1.66	0.00	0.00	0	0	-216.2	17.2	3,090
Mississippi	S-CG-Reg	764	1.89	1.23	0.16	1.66	0.00	0.00	0	0	-215.9	76.4	3,167
Arkansas	S-CG-Reg	640	1.89	1.23	0.16	1.66	0.00	0.00	0	0	-215.7	64.0	3,231
New York	S-CG-Reg	1052	1.92	1.23	0.19	1.66	0.00	0.00	0	0	-215.5	105.2	3,336
Texas	S-CG-Reg	3556	1.88	1.23	0.16	1.66	0.00	0.00	0	0	-214.4	355.6	3,692
West Virginia	S-CG-Prem	20	2.31	1.23	0.19	1.25	0.00	0.00	0	0	-214.0	2.0	3,694
North Dakota	S-CG-Prem	21	2.33	1.23	0.21	1.25	0.00	0.00	0	0	-213.8	2.1	3,696
Louisiana	S-CG-Reg	1191	1.87	1.23	0.16	1.66	0.00	0.00	0	0	-213.8	119.1	3,815
Nevada	S-CG-Prem	113	2.38	1.23	0.26	1.25	0.00	0.00	0	0	-213.4	11.3	3,826
Vermont	S-CG-Reg	138	1.94	1.23	0.23	1.66	0.00	0.00	0	0	-213.4	13.8	3,840
West Virginia	S-CG-Reg	326	1.90	1.23	0.19	1.66	0.00	0.00	0	0	-213.3	32.6	3,873
Oklahoma	S-CG-Reg	907	1.90	1.23	0.21	1.66	0.00	0.02	0	0	-213.3	90.7	3,963
Alaska	S-CG-Prem	14	2.63	1.23	0.53	1.25	0.00	0.00	0	0	-212.2	1.4	3,965
Pennsylvania	S-CG-Reg	904	1.89	1.23	0.19	1.66	0.00	0.00	0	0	-212.1	90.4	4,055
Kentucky	S-CG-Reg	714	1.91	1.23	0.21	1.66	0.00	0.00	0	0	-212.0	71.4	4,126
New Hampshire	S-CG-Reg	58	1.93	1.23	0.23	1.66	0.00	0.00	0	0	-211.9	5.8	4,132
Kentucky	S-CG-Prem	50	2.31	1.23	0.21	1.25	0.00	0.00	0	0	-211.7	5.0	4,137
Mississippi	S-CG-Prem	79	2.26	1.23	0.16	1.25	0.00	0.00	0	0	-211.4	7.9	4,145
New Mexico	S-CG-Prem	61	2.31	1.23	0.21	1.25	0.00	0.00	0	0	-211.2	6.1	4,151
Nebraska	S-CG-Prem	45	2.20	1.23	0.11	1.25	0.00	0.00	0	0	-210.4	4.5	4,156
Maine	S-CG-Reg	130	1.97	1.23	0.30	1.66	0.00	0.00	0	0	-209.9	13.0	4,169
Alabama	S-CG-Prem	106	2.28	1.23	0.21	1.25	0.00	0.00	0	0	-208.9	10.6	4,179
Virginia	S-CG-Reg	678	1.87	1.23	0.21	1.66	0.00	0.00	0	0	-208.3	67.8	4,247
New York	S-CG-Prem	103	2.25	1.23	0.19	1.25	0.00	0.00	0	0	-207.1	10.3	4,257
Georgia	S-CG-Prem	287	2.28	1.23	0.23	1.25	0.00	0.00	0	0	-206.9	28.7	4,286
Maryland	S-CG-Reg	90	1.86	1.23	0.21	1.66	0.00	0.00	0	0	-207.1	9.0	4,295
Alabama	S-CG-Reg	1060	1.85	1.23	0.21	1.66	0.00	0.00	0	0	-206.7	106.0	4,401
Tennessee	S-CG-Reg	1495	1.85	1.23	0.21	1.66	0.00	0.00	0	0	-206.5	149.5	4,550
Georgia	S-CG-Reg	2089	1.87	1.23	0.23	1.66	0.00	0.00	0	0	-206.0	208.9	4,759
Wisconsin	S-RFG-Prem	32	2.38	1.23	0.11	1.03	0.00	0.00	0	0	-205.7	3.2	4,763
Vermont	S-CG-Prem	12	2.27	1.23	0.23	1.25	0.00	0.00	0	0	-205.0	1.2	4,764
North Carolina	S-CG-Reg	1889	1.86	1.23	0.23	1.66	0.00	0.00	0	0	-205.0	188.9	4,953

Table A2018B Input Costs, Ethanol Blending Cost and Ethanol Volumes

Year 2018 State	Gasoline Code	Gasoline Volume MMgals	Gasoline Price $/gal	Ethanol Gate Price $/gal	Ethanol Dist Cost $/gal	Ethanol Blending $/gal	Federal Subsidy $/gal	State Subsidy $/gal	State Mandate	RFG "Mandate"	Ethanol Blending Cost c/gal	Ethanol Volume MMgals	Cumulative Eth Vol MMgals
South Carolina	S-CG-Reg	1125	1.86	1.23	0.23	1.66	0.00	0.00	0	0	-204.9	112.5	5,065
South Carolina	S-CG-Prem	134	2.26	1.23	0.23	1.25	0.00	0.00	0	0	-204.5	13.4	5,078
North Carolina	S-CG-Prem	236	2.26	1.23	0.23	1.25	0.00	0.00	0	0	-204.1	23.6	5,102
Arizona	S-CG-Prem	58	2.28	1.23	0.26	1.25	0.00	0.00	0	0	-204.0	5.8	5,108
Arizona	S-RFG-Reg	811	2.10	1.23	0.26	1.44	0.00	0.00	0	0	-204.4	81.1	5,189
Arkansas	S-CG-Prem	55	2.18	1.23	0.16	1.25	0.00	0.00	0	0	-203.8	5.5	5,194
Florida	S-CG-Reg	3175	1.90	1.23	0.30	1.66	0.00	0.00	0	0	-203.1	317.5	5,512
Kansas	S-CG-Prem	60	2.12	1.23	0.11	1.25	0.00	0.00	0	0	-202.3	6.0	5,518
Wisconsin	S-RFG-Reg	346	1.94	1.23	0.11	1.44	0.00	0.00	0	0	-202.6	34.6	5,552
Hawaii	S-CG-Prem	53	2.53	1.23	0.53	1.25	0.00	0.00	0	0	-201.9	5.3	5,558
Indiana	S-RFG-Prem	21	2.34	1.23	0.11	1.03	0.00	0.00	0	0	-202.1	2.1	5,560
Florida	S-CG-Prem	466	2.29	1.23	0.30	1.25	0.00	0.00	0	0	-201.5	46.6	5,607
Tennessee	S-CG-Prem	173	2.21	1.23	0.21	1.25	0.00	0.00	0	0	-201.0	17.3	5,624
Indiana	S-RFG-Reg	204	1.92	1.23	0.11	1.44	0.00	0.00	0	0	-201.1	20.4	5,644
New Hampshire	S-CG-Prem	4	2.22	1.23	0.23	1.25	0.00	0.00	0	0	-200.3	0.4	5,645
Virginia	S-CG-Prem	66	2.18	1.23	0.21	1.25	0.00	0.00	0	0	-198.7	6.6	5,651
New York	S-RFG-Reg	1270	1.98	1.23	0.19	1.44	0.00	0.00	0	0	-199.0	127.0	5,778
Louisiana	S-CG-Prem	105	2.12	1.23	0.16	1.25	0.00	0.00	0	0	-198.0	10.5	5,789
Texas	S-RFG-Reg	2611	1.94	1.23	0.16	1.44	0.00	0.00	0	0	-198.0	261.1	6,050
Texas	S-CG-Prem	345	2.11	1.23	0.16	1.25	0.00	0.00	0	0	-197.1	34.5	6,084
Pennsylvania	S-CG-Prem	86	2.14	1.23	0.19	1.25	0.00	0.00	0	0	-196.5	8.6	6,093
Maine	S-CG-Prem	11	2.23	1.23	0.30	1.25	0.00	0.00	0	0	-195.1	1.1	6,094
Pennsylvania	S-RFG-Reg	400	1.95	1.23	0.19	1.44	0.00	0.00	0	0	-195.7	40.0	6,134
Kentucky	S-RFG-Reg	197	1.97	1.23	0.21	1.44	0.00	0.00	0	0	-195.5	19.7	6,154
New Hampshire	S-RFG-Reg	191	1.99	1.23	0.23	1.44	0.00	0.00	0	0	-195.5	19.1	6,173
Kentucky	S-RFG-Prem	19	2.37	1.23	0.21	1.03	0.00	0.00	0	0	-195.3	1.9	6,175
Connecticut	S-RFG-Reg	654	1.95	1.23	0.21	1.44	0.00	0.00	0	0	-194.3	65.4	6,240
Rhode Island	S-RFG-Reg	267	1.95	1.23	0.21	1.44	0.00	0.00	0	0	-194.3	26.7	6,267
Oklahoma	S-CG-Prem	89	2.11	1.23	0.21	1.25	0.00	0.02	0	0	-193.4	8.9	6,276
Maine	S-RFG-Reg	192	2.03	1.23	0.30	1.44	0.00	0.00	0	0	-193.5	19.2	6,295
Massachusetts	S-RFG-Reg	1113	1.93	1.23	0.21	1.44	0.00	0.00	0	0	-192.2	111.3	6,406
Delaware	S-RFG-Reg	195	1.93	1.23	0.21	1.44	0.00	0.00	0	0	-192.0	19.5	6,426
Virginia	S-RFG-Reg	801	1.93	1.23	0.21	1.44	0.00	0.00	0	0	-191.9	80.1	6,506
New York	S-RFG-Prem	306	2.31	1.23	0.19	1.03	0.00	0.00	0	0	-190.7	30.6	6,537
Maryland	S-CG-Prem	7	2.10	1.23	0.21	1.25	0.00	0.00	0	0	-190.1	0.7	6,537
Maryland	S-RFG-Reg	767	1.92	1.23	0.21	1.44	0.00	0.00	0	0	-190.6	76.7	6,614
DC	S-RFG-Reg	27	1.91	1.23	0.21	1.44	0.00	0.00	0	0	-189.7	2.7	6,617
New Jersey	S-RFG-Reg	1662	1.91	1.23	0.21	1.44	0.00	0.00	0	0	-189.4	166.2	6,783
Arizona	S-RFG-Prem	126	2.34	1.23	0.26	1.03	0.00	0.00	0	0	-187.6	12.6	6,795
New Hampshire	S-RFG-Prem	21	2.28	1.23	0.23	1.03	0.00	0.00	0	0	-183.9	2.1	6,798
Connecticut	S-RFG-Prem	107	2.26	1.23	0.21	1.03	0.00	0.00	0	0	-183.7	10.7	6,808
Virginia	S-RFG-Prem	156	2.24	1.23	0.21	1.03	0.00	0.00	0	0	-182.2	15.6	6,824
Texas	S-RFG-Prem	405	2.17	1.23	0.16	1.03	0.00	0.00	0	0	-180.6	40.5	6,864
Pennsylvania	S-RFG-Prem	67	2.20	1.23	0.19	1.03	0.00	0.00	0	0	-180.0	6.7	6,871
Maine	S-RFG-Prem	13	2.29	1.23	0.30	1.03	0.00	0.00	0	0	-178.7	1.3	6,872
Rhode Island	S-RFG-Prem	40	2.19	1.23	0.21	1.03	0.00	0.00	0	0	-176.8	4.0	6,876
DC	S-RFG-Prem	7	2.18	1.23	0.21	1.03	0.00	0.00	0	0	-176.3	0.7	6,877
Maryland	S-RFG-Prem	140	2.16	1.23	0.21	1.03	0.00	0.00	0	0	-173.7	14.0	6,891
Massachusetts	S-RFG-Prem	169	2.15	1.23	0.21	1.03	0.00	0.00	0	0	-173.1	16.9	6,908
California	W-RFG-Prem	1905	2.52	1.23	0.26	0.51	0.00	0.19	0	0	-172.3	190.5	7,098
New Jersey	S-RFG-Prem	268	2.15	1.23	0.21	1.03	0.00	0.00	0	0	-172.7	26.8	7,125
Delaware	S-RFG-Prem	24	2.15	1.23	0.21	1.03	0.00	0.00	0	0	-172.6	2.4	7,128
Illinois	W-RFG-Prem	231	2.25	1.23	0.11	0.51	0.00	0.26	0	0	-166.8	23.1	7,151
California	W-RFG-reg	6592	2.28	1.23	0.26	0.67	0.00	0.19	0	0	-164.7	659.2	7,810
Iowa	W-CG-Prem	80	2.17	1.23	0.11	0.51	0.00	0.30	0	0	-162.9	8.0	7,818
Illinois	W-CG-Prem	58	2.19	1.23	0.11	0.51	0.00	0.26	0	0	-160.8	5.8	7,824
Montana	W-CG-Prem	76	2.45	1.23	0.18	0.51	0.00	0.00	0	0	-155.2	7.6	7,831
Michigan	W-CG-Prem	164	2.36	1.23	0.11	0.51	0.00	0.00	0	0	-152.7	16.4	7,848
Wyoming	W-CG-Prem	35	2.40	1.23	0.18	0.51	0.00	0.00	0	0	-150.1	3.5	7,851
Wisconsin	W-RFG-Prem	38	2.33	1.23	0.11	0.51	0.00	0.00	0	0	-149.0	3.8	7,855
Iowa	W-CG-reg	617	1.86	1.23	0.11	0.67	0.00	0.30	0	0	-147.9	61.7	7,917
South Dakota	W-CG-Prem	27	2.20	1.23	0.11	0.51	0.00	0.09	0	0	-145.7	2.7	7,920
Illinois	W-RFG-reg	1606	1.88	1.23	0.11	0.67	0.00	0.26	0	0	-145.6	160.6	8,080
Washington	W-CG-Prem	267	2.40	1.23	0.22	0.51	0.00	0.00	0	0	-145.4	26.7	8,107
Indiana	W-RFG-Prem	26	2.29	1.23	0.11	0.51	0.00	0.00	0	0	-145.4	2.6	8,109
Idaho	W-CG-Prem	61	2.35	1.23	0.18	0.51	0.00	0.00	0	0	-145.1	6.1	8,116
Ohio	W-CG-Prem	203	2.28	1.23	0.11	0.51	0.00	0.00	0	0	-144.5	20.3	8,136
Colorado	W-CG-Prem	228	2.33	1.23	0.18	0.51	0.00	0.00	0	0	-143.1	22.8	8,159
Wisconsin	W-CG-Prem	90	2.27	1.23	0.11	0.51	0.00	0.00	0	0	-143.0	9.0	8,168
Alaska	W-CG-reg	138	2.50	1.23	0.53	0.67	0.00	0.00	0	0	-141.1	13.8	8,181
Utah	W-CG-Prem	163	2.31	1.23	0.18	0.51	0.00	0.00	0	0	-140.4	16.3	8,198
Illinois	W-CG-reg	943	1.82	1.23	0.11	0.67	0.00	0.26	0	0	-139.6	94.3	8,292
Indiana	W-CG-Prem	106	2.23	1.23	0.11	0.51	0.00	0.00	0	0	-139.4	10.6	8,303
Kentucky	W-RFG-Prem	23	2.32	1.23	0.21	0.51	0.00	0.00	0	0	-138.5	2.3	8,305
Idaho	W-CG-reg	363	2.11	1.23	0.18	0.67	0.00	0.00	0	0	-136.6	36.3	8,341
West Virginia	W-CG-Prem	25	2.26	1.23	0.19	0.51	0.00	0.00	0	0	-134.8	2.5	8,344
North Dakota	W-CG-Prem	25	2.28	1.23	0.21	0.51	0.00	0.00	0	0	-134.6	2.5	8,346
Nevada	W-CG-Prem	136	2.33	1.23	0.26	0.51	0.00	0.00	0	0	-134.2	13.6	8,360
New York	W-RFG-Prem	370	2.26	1.23	0.19	0.51	0.00	0.00	0	0	-133.9	37.0	8,397
Utah	W-CG-reg	605	2.07	1.23	0.18	0.67	0.00	0.00	0	0	-133.2	60.5	8,457
Alaska	W-CG-Prem	17	2.58	1.23	0.53	0.51	0.00	0.00	0	0	-133.0	1.7	8,459
Kentucky	W-CG-Prem	60	2.26	1.23	0.21	0.51	0.00	0.00	0	0	-132.5	6.0	8,465
Mississippi	W-CG-Prem	95	2.21	1.23	0.16	0.51	0.00	0.00	0	0	-132.2	9.5	8,475
New Mexico	W-CG-Prem	74	2.26	1.23	0.21	0.51	0.00	0.00	0	0	-132.0	7.4	8,482
Nebraska	W-CG-Prem	54	2.15	1.23	0.11	0.51	0.00	0.00	0	0	-131.2	5.4	8,487

Table A2018C Input Costs, Ethanol Blending Cost and Ethanol Volumes

Year 2018 State	Gasoline Code	Gasoline Volume MMgals	Gasoline Price $/gal	Ethanol Gate Price $/gal	Ethanol Dist Cost $/gal	Ethanol Blending $/gal	Federal Subsidy $/gal	State Subsidy $/gal	State Mandate	RFG "Mandate"	Ethanol Blending Cost c/gal	Ethanol Volume MMgals	Cumulative Eth Vol MMgals
Arizona	W-RFG-Prem	152	2.29	1.23	0.26	0.51	0.00	0.00	0	0	-130.8	15.2	8,503
Washington	W-CG-reg	1346	2.08	1.23	0.22	0.67	0.00	0.00	0	0	-130.0	134.6	8,637
Alabama	W-CG-Prem	128	2.23	1.23	0.21	0.51	0.00	0.00	0	0	-129.7	12.8	8,650
South Dakota	W-CG-reg	222	1.87	1.23	0.11	0.67	0.00	0.09	0	0	-128.6	22.2	8,672
New York	W-CG-Prem	124	2.20	1.23	0.19	0.51	0.00	0.00	0	0	-127.9	12.4	8,685
Georgia	W-CG-Prem	347	2.23	1.23	0.23	0.51	0.00	0.00	0	0	-127.7	34.7	8,719
Nevada	W-CG-reg	525	2.10	1.23	0.26	0.67	0.00	0.00	0	0	-127.5	52.5	8,772
New Hampshire	W-RFG-Prem	26	2.23	1.23	0.23	0.51	0.00	0.00	0	0	-127.1	2.6	8,774
Connecticut	W-RFG-Prem	130	2.21	1.23	0.21	0.51	0.00	0.00	0	0	-126.9	13.0	8,787
Hawaii	W-CG-reg	214	2.35	1.23	0.53	0.67	0.00	0.00	0	0	-126.3	21.4	8,809
Vermont	W-CG-Prem	15	2.22	1.23	0.23	0.51	0.00	0.00	0	0	-125.8	1.5	8,810
Virginia	W-RFG-Prem	189	2.19	1.23	0.21	0.51	0.00	0.00	0	0	-125.5	18.9	8,829
South Carolina	W-CG-Prem	162	2.21	1.23	0.23	0.51	0.00	0.00	0	0	-125.3	16.2	8,845
North Carolina	W-CG-Prem	286	2.21	1.23	0.23	0.51	0.00	0.00	0	0	-124.9	28.6	8,874
Arizona	W-CG-Prem	70	2.23	1.23	0.26	0.51	0.00	0.00	0	0	-124.8	7.0	8,881
Arkansas	W-CG-Prem	66	2.13	1.23	0.16	0.51	0.00	0.00	0	0	-124.6	6.6	8,887
Montana	W-CG-reg	353	1.98	1.23	0.18	0.67	0.00	0.00	0	0	-124.5	35.3	8,923
Texas	W-RFG-Prem	490	2.12	1.23	0.16	0.51	0.00	0.00	0	0	-123.9	49.0	8,972
Pennsylvania	W-RFG-Prem	81	2.15	1.23	0.19	0.51	0.00	0.00	0	0	-123.3	8.1	8,980
Kansas	W-CG-Prem	73	2.07	1.23	0.11	0.51	0.00	0.00	0	0	-123.1	7.3	8,987
Arizona	W-RFG-reg	980	2.05	1.23	0.26	0.67	0.00	0.00	0	0	-123.0	98.0	9,085
Hawaii	W-CG-Prem	64	2.48	1.23	0.53	0.51	0.00	0.00	0	0	-122.7	6.4	9,092
Florida	W-CG-Prem	564	2.24	1.23	0.30	0.51	0.00	0.00	0	0	-122.3	56.4	9,148
Maine	W-RFG-Prem	15	2.24	1.23	0.30	0.51	0.00	0.00	0	0	-121.9	1.5	9,149
Tennessee	W-CG-Prem	209	2.16	1.23	0.21	0.51	0.00	0.00	0	0	-121.8	20.9	9,170
New Hampshire	W-CG-Prem	5	2.17	1.23	0.23	0.51	0.00	0.00	0	0	-121.1	0.5	9,171
Wisconsin	W-RFG-reg	419	1.89	1.23	0.11	0.67	0.00	0.00	0	0	-121.2	41.9	9,213
Rhode Island	W-RFG-Prem	48	2.14	1.23	0.21	0.51	0.00	0.00	0	0	-120.0	4.8	9,218
Colorado	W-CG-reg	1036	1.94	1.23	0.18	0.67	0.00	0.00	0	0	-119.8	103.6	9,321
DC	W-RFG-Prem	8	2.13	1.23	0.21	0.51	0.00	0.00	0	0	-119.6	0.8	9,322
Indiana	W-RFG-reg	247	1.87	1.23	0.11	0.67	0.00	0.00	0	0	-119.7	24.7	9,347
Virginia	W-CG-Prem	79	2.13	1.23	0.21	0.51	0.00	0.00	0	0	-119.5	7.9	9,355
Louisiana	W-CG-Prem	127	2.07	1.23	0.16	0.51	0.00	0.00	0	0	-118.8	12.7	9,367
Nebraska	W-CG-reg	409	1.86	1.23	0.11	0.67	0.00	0.00	0	0	-118.7	40.9	9,408
Wyoming	W-CG-reg	174	1.92	1.23	0.18	0.67	0.00	0.00	0	0	-118.3	17.4	9,426
Texas	W-CG-Prem	418	2.06	1.23	0.16	0.51	0.00	0.00	0	0	-117.9	41.8	9,467
New York	W-RFG-reg	1535	1.93	1.23	0.19	0.67	0.00	0.00	0	0	-117.7	153.5	9,621
Pennsylvania	W-CG-Prem	104	2.09	1.23	0.19	0.51	0.00	0.00	0	0	-117.3	10.4	9,631
Arizona	W-CG-reg	547	1.99	1.23	0.26	0.67	0.00	0.00	0	0	-117.0	54.7	9,686
Maryland	W-RFG-Prem	170	2.11	1.23	0.21	0.51	0.00	0.00	0	0	-116.9	17.0	9,703
Kansas	W-CG-reg	857	1.84	1.23	0.11	0.67	0.00	0.00	0	0	-116.7	85.7	9,789
Texas	W-RFG-reg	3157	1.89	1.23	0.16	0.67	0.00	0.00	0	0	-116.6	315.7	10,104
Michigan	W-CG-reg	2487	1.84	1.23	0.11	0.67	0.00	0.00	0	0	-116.4	248.7	10,353
Massachusetts	W-RFG-Prem	205	2.10	1.23	0.21	0.51	0.00	0.00	0	0	-116.3	20.5	10,374
Maine	W-CG-Prem	14	2.18	1.23	0.30	0.51	0.00	0.00	0	0	-115.9	1.4	10,375
New Jersey	W-RFG-Prem	325	2.10	1.23	0.21	0.51	0.00	0.00	0	0	-115.9	32.5	10,407
Delaware	W-RFG-Prem	29	2.10	1.23	0.21	0.51	0.00	0.00	0	0	-115.8	2.9	10,410
Wisconsin	W-CG-reg	1014	1.83	1.23	0.11	0.67	0.00	0.00	0	0	-115.2	101.4	10,512
Ohio	W-CG-reg	2565	1.82	1.23	0.11	0.67	0.00	0.00	0	0	-114.3	256.5	10,768
Oklahoma	W-CG-Prem	107	2.06	1.23	0.21	0.51	0.00	0.02	0	0	-114.2	10.7	10,779
Pennsylvania	W-RFG-reg	484	1.90	1.23	0.19	0.67	0.00	0.00	0	0	-114.3	48.4	10,827
New Mexico	W-CG-reg	497	1.92	1.23	0.21	0.67	0.00	0.00	0	0	-114.2	49.7	10,877
Kentucky	W-RFG-reg	238	1.92	1.23	0.21	0.67	0.00	0.00	0	0	-114.1	23.8	10,901
New Hampshire	W-RFG-reg	231	1.94	1.23	0.23	0.67	0.00	0.00	0	0	-114.1	23.1	10,924
Indiana	W-CG-reg	1486	1.81	1.23	0.11	0.67	0.00	0.00	0	0	-113.7	148.6	11,073
Connecticut	W-RFG-reg	791	1.90	1.23	0.21	0.67	0.00	0.00	0	0	-112.9	79.1	11,152
Rhode Island	W-RFG-reg	323	1.90	1.23	0.21	0.67	0.00	0.00	0	0	-112.9	32.3	11,184
North Dakota	W-CG-reg	208	1.90	1.23	0.21	0.67	0.00	0.00	0	0	-112.4	20.8	11,205
Mississippi	W-CG-reg	924	1.84	1.23	0.16	0.67	0.00	0.00	0	0	-112.1	92.4	11,297
Maine	W-RFG-reg	232	1.98	1.23	0.30	0.67	0.00	0.00	0	0	-112.1	23.2	11,321
Arkansas	W-CG-reg	774	1.84	1.23	0.16	0.67	0.00	0.00	0	0	-111.9	77.4	11,398
New York	W-CG-reg	1272	1.87	1.23	0.19	0.67	0.00	0.00	0	0	-111.7	127.2	11,525
Maryland	W-CG-Prem	9	2.05	1.23	0.21	0.51	0.00	0.00	0	0	-110.9	0.9	11,526
Massachusetts	W-RFG-reg	1345	1.88	1.23	0.21	0.67	0.00	0.00	0	0	-110.8	134.5	11,661
Texas	W-CG-reg	4300	1.83	1.23	0.16	0.67	0.00	0.00	0	0	-110.6	430.0	12,091
Delaware	W-RFG-reg	235	1.88	1.23	0.21	0.67	0.00	0.00	0	0	-110.6	23.5	12,114
Virginia	W-RFG-reg	969	1.88	1.23	0.21	0.67	0.00	0.00	0	0	-110.5	96.9	12,211
Louisiana	W-CG-reg	1440	1.82	1.23	0.16	0.67	0.00	0.00	0	0	-110.0	144.0	12,355
Vermont	W-CG-reg	167	1.89	1.23	0.23	0.67	0.00	0.00	0	0	-109.6	16.7	12,372
West Virginia	W-CG-reg	394	1.85	1.23	0.19	0.67	0.00	0.00	0	0	-109.5	39.4	12,411
Oklahoma	W-CG-reg	1097	1.85	1.23	0.21	0.67	0.00	0.02	0	0	-109.5	109.7	12,521
Maryland	W-RFG-reg	927	1.87	1.23	0.21	0.67	0.00	0.00	0	0	-109.2	92.7	12,614
Pennsylvania	W-CG-reg	1093	1.84	1.23	0.19	0.67	0.00	0.00	0	0	-108.3	109.3	12,723
DC	W-RFG-reg	32	1.86	1.23	0.21	0.67	0.00	0.00	0	0	-108.3	3.2	12,726
Kentucky	W-CG-reg	863	1.86	1.23	0.21	0.67	0.00	0.00	0	0	-108.1	86.3	12,812
New Hampshire	W-CG-reg	70	1.88	1.23	0.23	0.67	0.00	0.00	0	0	-108.1	7.0	12,819
New Jersey	W-RFG-reg	2009	1.86	1.23	0.21	0.67	0.00	0.00	0	0	-108.0	200.9	13,020
Maine	W-CG-reg	157	1.92	1.23	0.30	0.67	0.00	0.00	0	0	-106.1	15.7	13,036
Virginia	W-CG-reg	819	1.82	1.23	0.21	0.67	0.00	0.00	0	0	-104.5	81.9	13,118
Maryland	W-CG-reg	109	1.81	1.23	0.21	0.67	0.00	0.00	0	0	-103.2	10.9	13,129
Alabama	W-CG-reg	1282	1.80	1.23	0.21	0.67	0.00	0.00	0	0	-102.9	128.2	13,257
Tennessee	W-CG-reg	1807	1.80	1.23	0.21	0.67	0.00	0.00	0	0	-102.7	180.7	13,438
Georgia	W-CG-reg	2525	1.82	1.23	0.23	0.67	0.00	0.00	0	0	-102.2	252.5	13,690
North Carolina	W-CG-reg	2284	1.81	1.23	0.23	0.67	0.00	0.00	0	0	-101.2	228.4	13,919
South Carolina	W-CG-reg	1360	1.81	1.23	0.23	0.67	0.00	0.00	0	0	-101.1	136.0	14,055
Florida	W-CG-reg	3839	1.85	1.23	0.30	0.67	0.00	0.00	0	0	-99.3	383.9	14,439

Table A2019A Input Costs, Ethanol Blending Cost and Ethanol Volumes

Year 2019 State	Gasoline Code	Gasoline Volume MMgals	Gasoline Price $/gal	Ethanol Gate Price $/gal	Ethanol Dist Cost $/gal	Ethanol Blending $/gal	Federal Subsidy $/gal	State Subsidy $/gal	State Mandate	RFG "Mandate"	Ethanol Blending Cost c/gal	Ethanol Volume MMgals	Cumulative Eth Vol MMgals
Oregon	S-CG-Reg	679	1.98	1.26	0.22	2.39	0	0.00	1	0	-288.9	67.9	68
Minnesota	S-CG-Reg	1033	1.76	1.26	0.11	2.39	0	0.00	1	0	-277.3	103.3	171
Missouri	S-CG-Reg	817	1.74	1.26	0.11	2.39	0	0.00	1	0	-276.2	81.7	253
Missouri	S-RFG-Reg	419	1.80	1.26	0.11	2.19	0	0.00	1	0	-262.0	41.9	295
Oregon	S-CG-Prem	95	2.28	1.26	0.22	1.80	0	0.00	1	0	-260.8	9.5	304
Missouri	S-CG-Prem	69	2.08	1.26	0.11	1.80	0	0.00	1	0	-251.5	6.9	311
Minnesota	S-CG-Prem	104	2.03	1.26	0.11	1.80	0	0.00	1	0	-246.4	10.4	321
Missouri	S-RFG-Prem	41	2.14	1.26	0.11	1.60	0	0.00	1	0	-237.3	4.1	326
Oregon	W-CG-Prem	115	2.23	1.26	0.22	0.74	0	0.00	1	0	-149.0	11.5	337
Missouri	W-RFG-Prem	50	2.09	1.26	0.11	0.74	0	0.00	1	0	-145.7	5.0	342
Oregon	W-CG-reg	821	1.93	1.26	0.22	0.97	0	0.00	1	0	-141.7	82.1	424
Missouri	W-CG-Prem	83	2.03	1.26	0.11	0.74	0	0.00	1	0	-139.7	8.3	432
Missouri	W-RFG-reg	507	1.75	1.26	0.11	0.97	0	0.00	1	0	-134.9	50.7	483
Minnesota	W-CG-Prem	126	1.98	1.26	0.11	0.74	0	0.00	1	0	-134.6	12.6	496
Minnesota	W-CG-reg	1249	1.71	1.26	0.11	0.97	0	0.00	1	0	-130.0	124.9	621
Missouri	W-CG-reg	987	1.69	1.26	0.11	0.97	0	0.00	1	0	-128.9	98.7	719
Alaska	S-CG-Reg	112	2.93	1.26	0.53	2.39	0	0.00	0	0	-353.4	11.2	730
Hawaii	S-CG-Reg	174	2.78	1.26	0.53	2.39	0	0.00	0	0	-338.7	17.4	748
California	S-RFG-Reg	5345	2.40	1.26	0.26	2.19	0	0.16	0	0	-322.2	534.5	1,282
New Hampshire	S-CG-Reg	57	2.31	1.26	0.23	2.39	0	0.00	0	0	-320.4	5.7	1,288
Iowa	S-CG-Reg	501	1.76	1.26	0.11	2.39	0	0.30	0	0	-306.8	50.1	1,338
New Jersey	S-RFG-Prem	263	2.94	1.26	0.21	1.60	0	0.00	0	0	-306.7	26.3	1,364
New Hampshire	S-RFG-Reg	187	2.37	1.26	0.23	2.19	0	0.00	0	0	-306.2	18.7	1,383
Nebraska	S-CG-Prem	44	2.58	1.26	0.11	1.80	0	0.00	0	0	-301.0	4.4	1,388
Illinois	S-CG-Reg	765	1.74	1.26	0.11	2.39	0	0.26	0	0	-300.9	76.5	1,464
Nevada	S-CG-Reg	426	2.14	1.26	0.26	2.39	0	0.00	0	0	-300.4	42.6	1,507
DC	S-RFG-Reg	26	2.29	1.26	0.21	2.19	0	0.00	0	0	-300.3	2.6	1,509
Hawaii	S-CG-Prem	52	2.91	1.26	0.53	1.80	0	0.00	0	0	-292.5	5.2	1,514
New Hampshire	S-CG-Prem	4	2.60	1.26	0.23	1.80	0	0.00	0	0	-290.9	0.4	1,515
Washington	S-CG-Reg	1091	2.00	1.26	0.22	2.39	0	0.00	0	0	-290.5	109.1	1,624
Idaho	S-CG-Reg	294	1.95	1.26	0.18	2.39	0	0.00	0	0	-289.9	29.4	1,653
South Dakota	S-CG-Reg	180	1.77	1.26	0.11	2.39	0	0.09	0	0	-287.9	18.0	1,671
California	S-RFG-Prem	1545	2.64	1.26	0.26	1.60	0	0.16	0	0	-287.6	154.5	1,826
Illinois	S-RFG-Reg	1302	1.80	1.26	0.11	2.19	0	0.26	0	0	-286.6	130.2	1,956
Arizona	S-CG-Reg	443	1.99	1.26	0.26	2.39	0	0.00	0	0	-285.5	44.3	2,000
Illinois	S-CG-Prem	47	2.16	1.26	0.11	1.80	0	0.26	0	0	-284.5	4.7	2,005
Utah	S-CG-Reg	490	1.89	1.26	0.18	2.39	0	0.00	0	0	-283.9	49.0	2,054
Colorado	S-CG-Reg	840	1.88	1.26	0.18	2.39	0	0.00	0	0	-282.9	84.0	2,138
Montana	S-CG-Reg	286	1.86	1.26	0.18	2.39	0	0.00	0	0	-281.6	28.6	2,167
Iowa	S-CG-Prem	65	2.09	1.26	0.11	1.80	0	0.30	0	0	-281.5	6.5	2,173
Nebraska	S-CG-Reg	331	1.77	1.26	0.11	2.39	0	0.00	0	0	-278.3	33.1	2,206
Michigan	S-CG-Reg	2017	1.76	1.26	0.11	2.39	0	0.00	0	0	-277.9	201.7	2,408
Wisconsin	S-CG-Reg	823	1.76	1.26	0.11	2.39	0	0.00	0	0	-277.3	82.3	2,490
Ohio	S-CG-Reg	2080	1.76	1.26	0.11	2.39	0	0.00	0	0	-277.3	208.0	2,698
New Hampshire	S-RFG-Prem	21	2.66	1.26	0.23	1.60	0	0.00	0	0	-276.7	2.1	2,700
New Mexico	S-CG-Reg	403	1.85	1.26	0.21	2.39	0	0.00	0	0	-276.3	40.3	2,741
Wyoming	S-CG-Reg	141	1.80	1.26	0.18	2.39	0	0.00	0	0	-275.6	14.1	2,755
Indiana	S-CG-Reg	1205	1.74	1.26	0.11	2.39	0	0.00	0	0	-275.4	120.5	2,875
Kansas	S-CG-Reg	695	1.74	1.26	0.11	2.39	0	0.00	0	0	-275.3	69.5	2,945
Michigan	S-CG-Prem	133	2.28	1.26	0.11	1.80	0	0.00	0	0	-271.4	13.3	2,958
North Dakota	S-CG-Reg	168	1.80	1.26	0.21	2.39	0	0.00	0	0	-271.3	16.8	2,975
Arizona	S-RFG-Reg	795	2.05	1.26	0.26	2.19	0	0.00	0	0	-271.3	79.5	3,055
West Virginia	S-CG-Reg	319	1.77	1.26	0.19	2.39	0	0.00	0	0	-270.9	31.9	3,087
New York	S-CG-Reg	1031	1.77	1.26	0.19	2.39	0	0.00	0	0	-270.9	103.1	3,190
Illinois	S-RFG-Prem	188	2.22	1.26	0.11	1.60	0	0.26	0	0	-270.3	18.8	3,208
Arkansas	S-CG-Reg	627	1.73	1.26	0.16	2.39	0	0.00	0	0	-269.6	62.7	3,271
Rhode Island	S-RFG-Prem	39	2.57	1.26	0.21	1.60	0	0.00	0	0	-269.6	3.9	3,275
Montana	S-CG-Prem	62	2.33	1.26	0.18	1.80	0	0.00	0	0	-269.2	6.2	3,281
DC	S-RFG-Prem	7	2.56	1.26	0.21	1.60	0	0.00	0	0	-269.1	0.7	3,282
Mississippi	S-CG-Reg	749	1.72	1.26	0.16	2.39	0	0.00	0	0	-268.6	74.9	3,357
Texas	S-CG-Reg	3487	1.71	1.26	0.16	2.39	0	0.00	0	0	-268.5	348.7	3,705
Vermont	S-CG-Reg	135	1.79	1.26	0.23	2.39	0	0.00	0	0	-268.2	13.5	3,719
Wisconsin	S-CG-Prem	73	2.25	1.26	0.11	1.80	0	0.00	0	0	-268.0	7.3	3,726
Kentucky	S-CG-Reg	700	1.76	1.26	0.21	2.39	0	0.00	0	0	-267.9	70.0	3,796
Oklahoma	S-CG-Reg	890	1.75	1.26	0.21	2.39	0	0.02	0	0	-267.9	89.0	3,885
Nevada	S-CG-Prem	110	2.38	1.26	0.26	1.80	0	0.00	0	0	-266.6	11.0	3,896
Pennsylvania	S-CG-Reg	886	1.73	1.26	0.19	2.39	0	0.00	0	0	-266.4	88.6	3,985
Ohio	S-CG-Prem	164	2.23	1.26	0.11	1.80	0	0.00	0	0	-266.4	16.4	4,001
Louisiana	S-CG-Reg	1168	1.69	1.26	0.16	2.39	0	0.00	0	0	-265.6	116.8	4,118
Maine	S-CG-Reg	128	1.82	1.26	0.30	2.39	0	0.00	0	0	-265.4	12.8	4,131
Washington	S-CG-Prem	217	2.33	1.26	0.22	1.80	0	0.00	0	0	-264.9	21.7	4,153
Colorado	S-CG-Prem	185	2.28	1.26	0.18	1.80	0	0.00	0	0	-264.8	18.5	4,171
South Dakota	S-CG-Prem	22	2.13	1.26	0.11	1.80	0	0.09	0	0	-264.7	2.2	4,173
Virginia	S-CG-Reg	664	1.72	1.26	0.21	2.39	0	0.00	0	0	-263.9	66.4	4,240
Maryland	S-CG-Reg	88	1.71	1.26	0.21	2.39	0	0.00	0	0	-262.8	8.8	4,248
Wisconsin	S-RFG-Reg	340	1.82	1.26	0.11	2.19	0	0.00	0	0	-263.1	34.0	4,282
Alabama	S-CG-Reg	1040	1.70	1.26	0.21	2.39	0	0.00	0	0	-262.1	104.0	4,386
Tennessee	S-CG-Reg	1466	1.70	1.26	0.21	2.39	0	0.00	0	0	-261.9	146.6	4,533
Georgia	S-CG-Reg	2048	1.72	1.26	0.23	2.39	0	0.00	0	0	-261.2	204.8	4,738
South Carolina	S-CG-Reg	1103	1.71	1.26	0.23	2.39	0	0.00	0	0	-260.9	110.3	4,848
Indiana	S-RFG-Reg	200	1.80	1.26	0.11	2.19	0	0.00	0	0	-261.2	20.0	4,868
North Carolina	S-CG-Reg	1852	1.71	1.26	0.23	2.39	0	0.00	0	0	-260.8	185.2	5,053
Indiana	S-CG-Prem	86	2.17	1.26	0.11	1.80	0	0.00	0	0	-260.4	8.6	5,062
Idaho	S-CG-Prem	50	2.23	1.26	0.18	1.80	0	0.00	0	0	-259.9	5.0	5,067
Florida	S-CG-Reg	3113	1.75	1.26	0.30	2.39	0	0.00	0	0	-257.9	311.3	5,378

Table A2019B Input Costs, Ethanol Blending Cost and Ethanol Volumes

Year 2019 State	Gasoline Code	Gasoline Volume MMgals	Gasoline Price $/gal	Ethanol Gate Price $/gal	Ethanol Dist Cost $/gal	Ethanol Blending $/gal	Federal Subsidy $/gal	State Subsidy $/gal	State Mandate	RFG "Mandate"	Ethanol Blending Cost c/gal	Ethanol Volume MMgals	Cumulative Eth Vol MMgals
Wyoming	S-CG-Prem	28	2.20	1.26	0.18	1.80	0	0.000	0	0	-256.9	2.8	5,381
New York	S-RFG-Reg	1245	1.83	1.26	0.19	2.19	0	0.000	0	0	-256.6	124.5	5,505
Arizona	S-CG-Prem	57	2.27	1.26	0.26	1.80	0	0.000	0	0	-255.4	5.7	5,511
Texas	S-RFG-Reg	2560	1.77	1.26	0.16	2.19	0	0.000	0	0	-254.3	256.0	5,767
North Dakota	S-CG-Prem	21	2.21	1.26	0.21	1.80	0	0.000	0	0	-253.6	2.1	5,769
Wisconsin	S-RFG-Prem	31	2.31	1.26	0.11	1.60	0	0.000	0	0	-253.8	3.1	5,772
Kentucky	S-RFG-Reg	193	1.82	1.26	0.21	2.19	0	0.000	0	0	-253.7	19.3	5,792
New Mexico	S-CG-Prem	60	2.20	1.26	0.21	1.80	0	0.000	0	0	-253.1	6.0	5,798
Pennsylvania	S-RFG-Reg	392	1.79	1.26	0.19	2.19	0	0.000	0	0	-252.2	39.2	5,837
Utah	S-CG-Prem	132	2.15	1.26	0.18	1.80	0	0.000	0	0	-251.7	13.2	5,850
Rhode Island	S-RFG-Reg	262	1.80	1.26	0.21	2.19	0	0.000	0	0	-251.6	26.2	5,876
West Virginia	S-CG-Prem	20	2.16	1.26	0.19	1.80	0	0.000	0	0	-251.0	2.0	5,878
Maine	S-RFG-Reg	188	1.88	1.26	0.30	2.19	0	0.000	0	0	-251.1	18.8	5,897
Connecticut	S-RFG-Reg	641	1.80	1.26	0.21	2.19	0	0.000	0	0	-251.0	64.1	5,961
Kentucky	S-CG-Prem	49	2.18	1.26	0.21	1.80	0	0.000	0	0	-250.7	4.9	5,966
Mississippi	S-CG-Prem	77	2.12	1.26	0.16	1.80	0	0.000	0	0	-249.9	7.7	5,974
Virginia	S-RFG-Reg	786	1.78	1.26	0.21	2.19	0	0.000	0	0	-249.7	78.6	6,052
Massachusetts	S-RFG-Reg	1091	1.78	1.26	0.21	2.19	0	0.000	0	0	-249.0	109.1	6,162
Alaska	S-CG-Prem	13	2.47	1.26	0.53	1.80	0	0.000	0	0	-248.4	1.3	6,163
Maryland	S-RFG-Reg	752	1.77	1.26	0.21	2.19	0	0.000	0	0	-248.6	75.2	6,238
Delaware	S-RFG-Reg	191	1.77	1.26	0.21	2.19	0	0.000	0	0	-248.0	19.1	6,257
New York	S-CG-Prem	101	2.13	1.26	0.19	1.80	0	0.000	0	0	-247.7	10.1	6,267
Alabama	S-CG-Prem	104	2.13	1.26	0.21	1.80	0	0.000	0	0	-246.4	10.4	6,278
Vermont	S-CG-Prem	12	2.15	1.26	0.23	1.80	0	0.000	0	0	-246.3	1.2	6,279
Indiana	S-RFG-Prem	21	2.23	1.26	0.11	1.60	0	0.000	0	0	-246.2	2.1	6,281
New Jersey	S-RFG-Reg	1629	1.75	1.26	0.21	2.19	0	0.000	0	0	-246.0	162.9	6,444
Arkansas	S-CG-Prem	54	2.05	1.26	0.16	1.80	0	0.000	0	0	-243.4	5.4	6,449
Georgia	S-CG-Prem	281	2.12	1.26	0.23	1.80	0	0.000	0	0	-243.2	28.1	6,477
South Carolina	S-CG-Prem	131	2.12	1.26	0.23	1.80	0	0.000	0	0	-242.8	13.1	6,490
Kansas	S-CG-Prem	59	2.00	1.26	0.11	1.80	0	0.000	0	0	-242.6	5.9	6,496
Arizona	S-RFG-Prem	124	2.33	1.26	0.26	1.60	0	0.000	0	0	-241.1	12.4	6,509
Maine	S-CG-Prem	11	2.16	1.26	0.30	1.80	0	0.000	0	0	-240.5	1.1	6,510
North Carolina	S-CG-Prem	232	2.09	1.26	0.23	1.80	0	0.000	0	0	-240.2	23.2	6,533
Pennsylvania	S-CG-Prem	85	2.05	1.26	0.19	1.80	0	0.000	0	0	-239.7	8.5	6,541
Tennessee	S-CG-Prem	170	2.05	1.26	0.21	1.80	0	0.000	0	0	-238.4	17.0	6,558
Virginia	S-CG-Prem	64	2.05	1.26	0.21	1.80	0	0.000	0	0	-238.2	6.4	6,565
Kentucky	S-RFG-Prem	19	2.24	1.26	0.21	1.60	0	0.000	0	0	-236.4	1.9	6,567
Texas	S-CG-Prem	339	1.98	1.26	0.16	1.80	0	0.000	0	0	-236.1	33.9	6,601
Florida	S-CG-Prem	457	2.09	1.26	0.30	1.80	0	0.000	0	0	-233.7	45.7	6,646
New York	S-RFG-Prem	300	2.19	1.26	0.19	1.60	0	0.000	0	0	-233.5	30.0	6,676
Louisiana	S-CG-Prem	103	1.95	1.26	0.16	1.80	0	0.000	0	0	-233.1	10.3	6,687
Oklahoma	S-CG-Prem	87	1.97	1.26	0.21	1.80	0	0.016	0	0	-231.2	8.7	6,695
Maryland	S-CG-Prem	7	1.97	1.26	0.21	1.80	0	0.000	0	0	-230.2	0.7	6,696
Maine	S-RFG-Prem	13	2.22	1.26	0.30	1.60	0	0.000	0	0	-226.3	1.3	6,697
Pennsylvania	S-RFG-Prem	66	2.11	1.26	0.19	1.60	0	0.000	0	0	-225.5	6.6	6,704
Virginia	S-RFG-Prem	153	2.11	1.26	0.21	1.60	0	0.000	0	0	-224.0	15.3	6,719
Connecticut	S-RFG-Prem	105	2.11	1.26	0.21	1.60	0	0.000	0	0	-223.9	10.5	6,730
Texas	S-RFG-Prem	397	2.04	1.26	0.16	1.60	0	0.000	0	0	-221.9	39.7	6,769
Delaware	S-RFG-Prem	24	2.05	1.26	0.21	1.60	0	0.000	0	0	-217.4	2.4	6,772
Maryland	S-RFG-Prem	138	2.03	1.26	0.21	1.60	0	0.000	0	0	-216.0	13.8	6,785
New Jersey	W-RFG-Prem	318	2.89	1.26	0.21	0.74	0	0.000	0	0	-215.1	31.8	6,817
Massachusetts	S-RFG-Prem	166	2.02	1.26	0.21	1.60	0	0.000	0	0	-214.9	16.6	6,834
Alaska	W-CG-reg	135	2.88	1.26	0.53	0.97	0	0.000	0	0	-206.1	13.5	6,847
California	W-RFG-Prem	1868	2.59	1.26	0.26	0.74	0	0.160	0	0	-196.0	186.8	7,034
California	W-RFG-reg	6463	2.35	1.26	0.26	0.97	0	0.160	0	0	-195.2	646.3	7,681
Hawaii	W-CG-reg	210	2.73	1.26	0.53	0.97	0	0.000	0	0	-191.4	21.0	7,702
Nebraska	W-CG-Prem	53	2.53	1.26	0.11	0.74	0	0.000	0	0	-189.2	5.3	7,707
New Hampshire	W-RFG-Prem	25	2.61	1.26	0.23	0.74	0	0.000	0	0	-185.1	2.5	7,709
Hawaii	W-CG-Prem	63	2.86	1.26	0.53	0.74	0	0.000	0	0	-180.7	6.3	7,716
New Hampshire	W-RFG-reg	226	2.32	1.26	0.23	0.97	0	0.000	0	0	-179.2	22.6	7,738
New Hampshire	W-CG-Prem	5	2.55	1.26	0.23	0.74	0	0.000	0	0	-179.1	0.5	7,739
Illinois	W-RFG-Prem	227	2.17	1.26	0.11	0.74	0	0.255	0	0	-178.7	22.7	7,762
Rhode Island	W-RFG-Prem	47	2.52	1.26	0.21	0.74	0	0.000	0	0	-178.0	4.7	7,766
DC	W-RFG-Prem	8	2.51	1.26	0.21	0.74	0	0.000	0	0	-177.5	0.8	7,767
DC	W-RFG-reg	31	2.24	1.26	0.21	0.97	0	0.000	0	0	-173.3	3.1	7,770
New Hampshire	W-CG-reg	69	2.26	1.26	0.23	0.97	0	0.000	0	0	-173.2	6.9	7,777
Illinois	W-CG-Prem	57	2.11	1.26	0.11	0.74	0	0.255	0	0	-172.7	5.7	7,783
Iowa	W-CG-Prem	79	2.04	1.26	0.11	0.74	0	0.295	0	0	-169.7	7.9	7,791
Wisconsin	W-RFG-Prem	37	2.26	1.26	0.11	0.74	0	0.000	0	0	-162.2	3.7	7,794
Illinois	W-RFG-reg	1574	1.75	1.26	0.11	0.97	0	0.255	0	0	-159.6	157.4	7,952
Michigan	W-CG-Prem	161	2.23	1.26	0.11	0.74	0	0.000	0	0	-159.6	16.1	7,968
Iowa	W-CG-reg	605	1.71	1.26	0.11	0.97	0	0.295	0	0	-159.5	60.5	8,028
Montana	W-CG-Prem	74	2.28	1.26	0.18	0.74	0	0.000	0	0	-157.4	7.4	8,036
Wisconsin	W-CG-Prem	89	2.20	1.26	0.11	0.74	0	0.000	0	0	-156.2	8.9	8,045
Nevada	W-CG-Prem	133	2.33	1.26	0.26	0.74	0	0.000	0	0	-154.8	13.3	8,058
Indiana	W-RFG-Prem	25	2.18	1.26	0.11	0.74	0	0.000	0	0	-154.6	2.5	8,061
Ohio	W-CG-Prem	199	2.18	1.26	0.11	0.74	0	0.000	0	0	-154.6	19.9	8,080
Illinois	W-CG-reg	925	1.69	1.26	0.11	0.97	0	0.255	0	0	-153.6	92.5	8,173
Nevada	W-CG-reg	515	2.09	1.26	0.26	0.97	0	0.000	0	0	-153.2	51.5	8,224
Washington	W-CG-Prem	262	2.28	1.26	0.22	0.74	0	0.000	0	0	-153.1	26.2	8,251
Colorado	W-CG-Prem	223	2.23	1.26	0.18	0.74	0	0.000	0	0	-153.0	22.3	8,273
South Dakota	W-CG-Prem	26	2.08	1.26	0.11	0.74	0	0.091	0	0	-152.9	2.6	8,276
Arizona	W-RFG-Prem	149	2.28	1.26	0.26	0.74	0	0.000	0	0	-149.6	14.9	8,291
Indiana	W-CG-Prem	104	2.12	1.26	0.11	0.74	0	0.000	0	0	-148.6	10.4	8,301
Idaho	W-CG-Prem	60	2.18	1.26	0.18	0.74	0	0.000	0	0	-148.1	6.0	8,307

Table A2019C Input Costs, Ethanol Blending Cost and Ethanol Volumes

Year 2019 State	Gasoline Code	Gasoline Volume MMgals	Gasoline Price $/gal	Ethanol Gate Price $/gal	Ethanol Dist Cost $/gal	Ethanol Blending $/gal	Federal Subsidy $/gal	State Subsidy $/gal	State Mandate	RFG "Mandate"	Ethanol Blending Cost c/gal	Ethanol Volume MMgals	Cumulative Eth Vol MMgals
Wyoming	W-CG-Prem	34	2.15	1.26	0.18	0.74	0	0.000	0	0	-145.1	3.4	8,310
Kentucky	W-RFG-Prem	23	2.19	1.26	0.21	0.74	0	0.000	0	0	-144.9	2.3	8,313
Arizona	W-RFG-reg	961	2.00	1.26	0.26	0.97	0	0.000	0	0	-144.3	96.1	8,409
Arizona	W-CG-Prem	68	2.22	1.26	0.26	0.74	0	0.000	0	0	-143.6	6.8	8,416
Washington	W-CG-reg	1319	1.95	1.26	0.22	0.97	0	0.000	0	0	-143.3	131.9	8,548
Idaho	W-CG-reg	356	1.90	1.26	0.18	0.97	0	0.000	0	0	-142.6	35.6	8,583
New York	W-RFG-Prem	363	2.14	1.26	0.19	0.74	0	0.000	0	0	-141.9	36.3	8,619
North Dakota	W-CG-Prem	25	2.16	1.26	0.21	0.74	0	0.000	0	0	-141.8	2.5	8,622
New Mexico	W-CG-Prem	73	2.15	1.26	0.21	0.74	0	0.000	0	0	-141.3	7.3	8,629
South Dakota	W-CG-reg	217	1.72	1.26	0.11	0.97	0	0.091	0	0	-140.6	21.7	8,651
Utah	W-CG-Prem	160	2.10	1.26	0.18	0.74	0	0.000	0	0	-139.9	16.0	8,667
West Virginia	W-CG-Prem	24	2.11	1.26	0.19	0.74	0	0.000	0	0	-139.1	2.4	8,669
Kentucky	W-CG-Prem	59	2.13	1.26	0.21	0.74	0	0.000	0	0	-138.9	5.9	8,675
Arizona	W-CG-reg	536	1.94	1.26	0.26	0.97	0	0.000	0	0	-138.3	53.6	8,729
Mississippi	W-CG-Prem	93	2.07	1.26	0.16	0.74	0	0.000	0	0	-138.1	9.3	8,738
Utah	W-CG-reg	593	1.84	1.26	0.18	0.97	0	0.000	0	0	-136.6	59.3	8,797
Alaska	W-CG-Prem	16	2.42	1.26	0.53	0.74	0	0.000	0	0	-136.6	1.6	8,799
Wisconsin	W-RFG-reg	411	1.77	1.26	0.11	0.97	0	0.000	0	0	-136.0	41.1	8,840
New York	W-CG-Prem	122	2.08	1.26	0.19	0.74	0	0.000	0	0	-135.9	12.2	8,852
Colorado	W-CG-reg	1016	1.83	1.26	0.18	0.97	0	0.000	0	0	-135.6	101.6	8,954
Maine	W-RFG-Prem	15	2.17	1.26	0.30	0.74	0	0.000	0	0	-134.7	1.5	8,955
Alabama	W-CG-Prem	125	2.08	1.26	0.21	0.74	0	0.000	0	0	-134.6	12.5	8,968
Vermont	W-CG-Prem	15	2.10	1.26	0.23	0.74	0	0.000	0	0	-134.5	1.5	8,969
Montana	W-CG-reg	346	1.81	1.26	0.18	0.97	0	0.000	0	0	-134.3	34.6	9,004
Indiana	W-RFG-reg	242	1.75	1.26	0.11	0.97	0	0.000	0	0	-134.1	24.2	9,028
Pennsylvania	W-RFG-Prem	79	2.06	1.26	0.19	0.74	0	0.000	0	0	-133.9	7.9	9,036
Virginia	W-RFG-Prem	185	2.06	1.26	0.21	0.74	0	0.000	0	0	-132.4	18.5	9,055
Connecticut	W-RFG-Prem	127	2.06	1.26	0.21	0.74	0	0.000	0	0	-132.3	12.7	9,067
Arkansas	W-CG-Prem	65	2.00	1.26	0.16	0.74	0	0.000	0	0	-131.6	6.5	9,074
Georgia	W-CG-Prem	340	2.07	1.26	0.23	0.74	0	0.000	0	0	-131.4	34.0	9,108
South Carolina	W-CG-Prem	159	2.07	1.26	0.23	0.74	0	0.000	0	0	-131.0	15.9	9,124
Nebraska	W-CG-reg	401	1.72	1.26	0.11	0.97	0	0.000	0	0	-131.0	40.1	9,164
Kansas	W-CG-Prem	71	1.95	1.26	0.11	0.74	0	0.000	0	0	-130.8	7.1	9,171
Michigan	W-CG-reg	2439	1.71	1.26	0.11	0.97	0	0.000	0	0	-130.6	243.9	9,415
Texas	W-RFG-Prem	481	1.99	1.26	0.16	0.74	0	0.000	0	0	-130.3	48.1	9,463
Wisconsin	W-CG-reg	995	1.71	1.26	0.11	0.97	0	0.000	0	0	-130.0	99.5	9,562
Ohio	W-CG-reg	2516	1.71	1.26	0.11	0.97	0	0.000	0	0	-130.0	251.6	9,814
New York	W-RFG-reg	1506	1.78	1.26	0.19	0.97	0	0.000	0	0	-129.6	150.6	9,964
New Mexico	W-CG-reg	488	1.80	1.26	0.21	0.97	0	0.000	0	0	-129.0	48.8	10,013
Maine	W-CG-Prem	13	2.11	1.26	0.30	0.74	0	0.000	0	0	-128.7	1.3	10,015
North Carolina	W-CG-Prem	280	2.04	1.26	0.23	0.74	0	0.000	0	0	-128.4	28.0	10,043
Wyoming	W-CG-reg	171	1.75	1.26	0.18	0.97	0	0.000	0	0	-128.3	17.1	10,060
Indiana	W-CG-reg	1457	1.69	1.26	0.11	0.97	0	0.000	0	0	-128.1	145.7	10,205
Kansas	W-CG-reg	841	1.69	1.26	0.11	0.97	0	0.000	0	0	-128.0	84.1	10,289
Pennsylvania	W-CG-Prem	102	2.00	1.26	0.19	0.74	0	0.000	0	0	-127.9	10.2	10,300
Texas	W-RFG-reg	3096	1.72	1.26	0.16	0.97	0	0.000	0	0	-127.2	309.6	10,609
Kentucky	W-RFG-reg	234	1.77	1.26	0.21	0.97	0	0.000	0	0	-126.7	23.4	10,633
Tennessee	W-CG-Prem	205	2.00	1.26	0.21	0.74	0	0.000	0	0	-126.6	20.5	10,653
Virginia	W-CG-Prem	78	2.00	1.26	0.21	0.74	0	0.000	0	0	-126.4	7.8	10,661
Delaware	W-RFG-Prem	29	2.00	1.26	0.21	0.74	0	0.000	0	0	-125.8	2.9	10,664
Pennsylvania	W-RFG-reg	474	1.74	1.26	0.19	0.97	0	0.000	0	0	-125.1	47.4	10,711
Rhode Island	W-RFG-reg	317	1.75	1.26	0.21	0.97	0	0.000	0	0	-124.6	31.7	10,743
Maryland	W-RFG-Prem	166	1.98	1.26	0.21	0.74	0	0.000	0	0	-124.4	16.6	10,760
Texas	W-CG-Prem	410	1.93	1.26	0.16	0.74	0	0.000	0	0	-124.3	41.0	10,800
Maine	W-RFG-reg	228	1.83	1.26	0.30	0.97	0	0.000	0	0	-124.1	22.8	10,823
Connecticut	W-RFG-reg	776	1.75	1.26	0.21	0.97	0	0.000	0	0	-124.0	77.6	10,901
North Dakota	W-CG-reg	203	1.75	1.26	0.21	0.97	0	0.000	0	0	-124.0	20.3	10,921
West Virginia	W-CG-reg	386	1.72	1.26	0.19	0.97	0	0.000	0	0	-123.7	38.6	10,960
New York	W-CG-reg	1247	1.72	1.26	0.19	0.97	0	0.000	0	0	-123.6	124.7	11,085
Massachusetts	W-RFG-Prem	201	1.97	1.26	0.21	0.74	0	0.000	0	0	-123.3	20.1	11,105
Virginia	W-RFG-reg	950	1.73	1.26	0.21	0.97	0	0.000	0	0	-122.6	95.0	11,200
Arkansas	W-CG-reg	759	1.68	1.26	0.16	0.97	0	0.000	0	0	-122.3	75.9	11,275
Massachusetts	W-RFG-reg	1319	1.73	1.26	0.21	0.97	0	0.000	0	0	-122.0	131.9	11,407
Florida	W-CG-Prem	553	2.04	1.26	0.30	0.74	0	0.000	0	0	-121.9	55.3	11,463
Maryland	W-RFG-reg	909	1.72	1.26	0.21	0.97	0	0.000	0	0	-121.6	90.9	11,554
Mississippi	W-CG-reg	906	1.67	1.26	0.16	0.97	0	0.000	0	0	-121.3	90.6	11,644
Louisiana	W-CG-Prem	125	1.90	1.26	0.16	0.74	0	0.000	0	0	-121.3	12.5	11,657
Texas	W-CG-reg	4216	1.66	1.26	0.16	0.97	0	0.000	0	0	-121.2	421.6	12,078
Delaware	W-RFG-reg	231	1.72	1.26	0.21	0.97	0	0.000	0	0	-121.0	23.1	12,101
Vermont	W-CG-reg	163	1.74	1.26	0.23	0.97	0	0.000	0	0	-120.9	16.3	12,118
Kentucky	W-CG-reg	847	1.71	1.26	0.21	0.97	0	0.000	0	0	-120.7	84.7	12,202
Oklahoma	W-CG-reg	1076	1.70	1.26	0.21	0.97	0	0.016	0	0	-120.6	107.6	12,310
Oklahoma	W-CG-Prem	105	1.92	1.26	0.21	0.74	0	0.016	0	0	-119.4	10.5	12,320
Pennsylvania	W-CG-reg	1072	1.68	1.26	0.19	0.97	0	0.000	0	0	-119.1	107.2	12,428
New Jersey	W-RFG-reg	1970	1.70	1.26	0.21	0.97	0	0.000	0	0	-119.0	197.0	12,625
Maryland	W-CG-Prem	9	1.92	1.26	0.21	0.74	0	0.000	0	0	-118.4	0.9	12,626
Louisiana	W-CG-reg	1412	1.64	1.26	0.16	0.97	0	0.000	0	0	-118.3	141.2	12,767
Maine	W-CG-reg	154	1.77	1.26	0.30	0.97	0	0.000	0	0	-118.1	15.4	12,782
Virginia	W-CG-reg	803	1.67	1.26	0.21	0.97	0	0.000	0	0	-116.6	80.3	12,863
Maryland	W-CG-reg	107	1.66	1.26	0.21	0.97	0	0.000	0	0	-115.6	10.7	12,873
Alabama	W-CG-reg	1257	1.65	1.26	0.21	0.97	0	0.000	0	0	-114.8	125.7	12,999
Tennessee	W-CG-reg	1772	1.65	1.26	0.21	0.97	0	0.000	0	0	-114.6	177.2	13,176
Georgia	W-CG-reg	2476	1.67	1.26	0.23	0.97	0	0.000	0	0	-113.9	247.6	13,424
South Carolina	W-CG-reg	1334	1.66	1.26	0.23	0.97	0	0.000	0	0	-113.6	133.4	13,557
North Carolina	W-CG-reg	2239	1.66	1.26	0.23	0.97	0	0.000	0	0	-113.5	223.9	13,781
Florida	W-CG-reg	3764	1.70	1.26	0.30	0.97	0	0.000	0	0	-110.7	376.4	14,157

Table A2020A Input Costs, Ethanol Blending Cost and Ethanol Volumes

Year 2020 State	Gasoline Code	Gasoline Volume MMgals	Gasoline Price $/gal	Ethanol Gate Price $/gal	Ethanol Dist Cost $/gal	Ethanol Blending $/gal	Federal Subsidy $/gal	State Subsidy $/gal	State Mandate	RFG "Mandate"	Ethanol Blending Cost c/gal	Ethanol Volume MMgals	Cumulative Eth Vol MMgals
Oregon	S-CG-Prem	84	1.75	0.86	0.22	0.22	0	0.000	1	0	-89.6	8.4	8
Oregon	W-CG-Prem	101	1.70	0.86	0.22	0.12	0	0.000	1	0	-75.0	10.1	18
Missouri	S-CG-Prem	60	1.47	0.86	0.11	0.22	0	0.000	1	0	-71.8	6.0	25
Oregon	S-CG-Reg	596	1.45	0.86	0.22	0.33	0	0.000	1	0	-70.3	59.6	84
Missouri	S-RFG-Prem	36	1.53	0.86	0.11	0.09	0	0.000	1	0	-64.6	3.6	88
Minnesota	S-CG-Prem	91	1.40	0.86	0.11	0.22	0	0.000	1	0	-64.6	9.1	97
Missouri	W-RFG-Prem	44	1.48	0.86	0.11	0.12	0	0.000	1	0	-63.3	4.4	101
Missouri	W-CG-Prem	73	1.42	0.86	0.11	0.12	0	0.000	1	0	-57.3	7.3	108
Minnesota	S-CG-Reg	907	1.20	0.86	0.11	0.33	0	0.000	1	0	-55.5	90.7	199
Missouri	S-CG-Reg	717	1.19	0.86	0.11	0.33	0	0.000	1	0	-55.4	71.7	271
Oregon	W-CG-reg	721	1.40	0.86	0.22	0.19	0	0.000	1	0	-51.0	72.1	343
Minnesota	W-CG-Prem	110	1.35	0.86	0.11	0.12	0	0.000	1	0	-50.0	11.0	354
Missouri	S-RFG-Reg	368	1.25	0.86	0.11	0.20	0	0.000	1	0	-48.2	36.8	391
Missouri	W-RFG-reg	445	1.20	0.86	0.11	0.19	0	0.000	1	0	-42.1	44.5	435
Minnesota	W-CG-reg	1096	1.15	0.86	0.11	0.19	0	0.000	1	0	-36.2	109.6	545
Missouri	W-CG-reg	867	1.14	0.86	0.11	0.19	0	0.000	1	0	-36.1	86.7	632
Alaska	S-CG-Reg	98	2.91	0.86	0.53	0.33	0	0.000	0	0	-185.6	9.8	641
Nebraska	S-CG-Prem	39	2.56	0.86	0.11	0.22	0	0.000	0	0	-181.0	3.9	645
Hawaii	S-CG-Prem	46	2.89	0.86	0.53	0.22	0	0.000	0	0	-172.5	4.6	650
New Hampshire	S-CG-Prem	4	2.58	0.86	0.23	0.22	0	0.000	0	0	-170.9	0.4	650
Hawaii	S-CG-Reg	153	2.76	0.86	0.53	0.33	0	0.000	0	0	-170.9	15.3	665
Nebraska	W-CG-Prem	47	2.51	0.86	0.11	0.12	0	0.000	0	0	-166.4	4.7	670
Alaska	W-CG-reg	119	2.86	0.86	0.53	0.19	0	0.000	0	0	-166.3	11.9	682
New Hampshire	S-RFG-Prem	18	2.64	0.86	0.23	0.09	0	0.000	0	0	-163.7	1.8	684
New Hampshire	W-RFG-Prem	22	2.59	0.86	0.23	0.12	0	0.000	0	0	-162.4	2.2	686
Hawaii	W-CG-Prem	55	2.84	0.86	0.53	0.12	0	0.000	0	0	-157.9	5.5	692
Rhode Island	S-RFG-Prem	34	2.55	0.86	0.21	0.09	0	0.000	0	0	-156.6	3.4	695
New Hampshire	W-CG-Prem	5	2.53	0.86	0.23	0.12	0	0.000	0	0	-156.4	0.5	695
DC	S-RFG-Prem	6	2.54	0.86	0.21	0.09	0	0.000	0	0	-156.1	0.6	696
Rhode Island	W-RFG-Prem	41	2.50	0.86	0.21	0.12	0	0.000	0	0	-155.3	4.1	700
DC	W-RFG-Prem	7	2.49	0.86	0.21	0.12	0	0.000	0	0	-154.8	0.7	701
New Hampshire	S-CG-Reg	50	2.29	0.86	0.23	0.33	0	0.000	0	0	-152.6	5.0	706
Hawaii	W-CG-reg	185	2.71	0.86	0.53	0.19	0	0.000	0	0	-151.6	18.5	724
New Hampshire	S-RFG-Reg	164	2.35	0.86	0.23	0.20	0	0.000	0	0	-145.4	16.4	741
DC	S-RFG-Reg	23	2.27	0.86	0.21	0.20	0	0.000	0	0	-139.6	2.3	743
New Hampshire	W-RFG-reg	199	2.30	0.86	0.23	0.19	0	0.000	0	0	-139.4	19.9	763
DC	W-RFG-reg	28	2.22	0.86	0.21	0.19	0	0.000	0	0	-133.5	2.8	766
New Hampshire	W-CG-reg	61	2.24	0.86	0.23	0.19	0	0.000	0	0	-133.4	6.1	772
California	S-RFG-Prem	1356	2.04	0.86	0.26	0.09	0	0.283	0	0	-128.8	135.6	907
California	W-RFG-Prem	1640	1.99	0.86	0.26	0.12	0	0.283	0	0	-127.5	164.0	1,071
California	S-RFG-Reg	4693	1.80	0.86	0.26	0.20	0	0.283	0	0	-115.7	469.3	1,541
California	W-RFG-reg	5675	1.75	0.86	0.26	0.19	0	0.283	0	0	-109.6	567.5	2,108
Illinois	S-CG-Prem	41	1.53	0.86	0.11	0.22	0	0.255	0	0	-104.0	4.1	2,112
Montana	S-CG-Prem	54	1.81	0.86	0.18	0.22	0	0.000	0	0	-99.2	5.4	2,118
Illinois	S-RFG-Prem	165	1.59	0.86	0.11	0.09	0	0.255	0	0	-96.8	16.5	2,134
Idaho	S-CG-Prem	44	1.78	0.86	0.18	0.22	0	0.000	0	0	-96.5	4.4	2,138
Iowa	S-CG-Prem	57	1.42	0.86	0.11	0.22	0	0.295	0	0	-96.4	5.7	2,144
Illinois	W-RFG-Prem	199	1.54	0.86	0.11	0.12	0	0.255	0	0	-95.5	19.9	2,164
Michigan	S-CG-Prem	117	1.69	0.86	0.11	0.22	0	0.000	0	0	-94.0	11.7	2,176
Colorado	S-CG-Prem	162	1.73	0.86	0.18	0.22	0	0.000	0	0	-91.7	16.2	2,192
Washington	S-CG-Prem	190	1.77	0.86	0.22	0.22	0	0.000	0	0	-91.7	19.0	2,211
Utah	S-CG-Prem	116	1.73	0.86	0.18	0.22	0	0.000	0	0	-91.5	11.6	2,223
Illinois	W-CG-Prem	50	1.48	0.86	0.11	0.12	0	0.255	0	0	-89.5	5.0	2,228
Wyoming	S-CG-Prem	25	1.69	0.86	0.18	0.22	0	0.000	0	0	-87.2	2.5	2,230
Ohio	S-CG-Prem	144	1.62	0.86	0.11	0.22	0	0.000	0	0	-87.1	14.4	2,245
Wisconsin	S-CG-Prem	64	1.61	0.86	0.11	0.22	0	0.000	0	0	-86.2	6.4	2,251
Iowa	S-CG-Reg	439	1.21	0.86	0.11	0.33	0	0.295	0	0	-86.0	43.9	2,295
Nevada	S-CG-Prem	97	1.75	0.86	0.26	0.22	0	0.000	0	0	-84.8	9.7	2,305
Montana	W-CG-Prem	65	1.76	0.86	0.18	0.12	0	0.000	0	0	-84.7	6.5	2,311
South Dakota	S-CG-Prem	19	1.50	0.86	0.11	0.22	0	0.091	0	0	-83.7	1.9	2,313
Idaho	W-CG-Prem	53	1.73	0.86	0.18	0.12	0	0.000	0	0	-82.0	5.3	2,318
Iowa	W-CG-Prem	69	1.37	0.86	0.11	0.12	0	0.295	0	0	-81.8	6.9	2,325
New Mexico	S-CG-Prem	53	1.65	0.86	0.21	0.22	0	0.000	0	0	-80.4	5.3	2,331
Indiana	S-CG-Prem	76	1.55	0.86	0.11	0.22	0	0.000	0	0	-80.3	7.6	2,338
Arizona	S-CG-Prem	50	1.70	0.86	0.26	0.22	0	0.000	0	0	-79.9	5.0	2,343
Michigan	W-CG-Prem	141	1.64	0.86	0.11	0.12	0	0.000	0	0	-79.4	14.1	2,357
Illinois	S-CG-Reg	672	1.18	0.86	0.11	0.33	0	0.255	0	0	-79.1	67.2	2,424
Wisconsin	S-RFG-Prem	27	1.67	0.86	0.11	0.09	0	0.000	0	0	-79.0	2.7	2,427
Mississippi	S-CG-Prem	68	1.59	0.86	0.16	0.22	0	0.000	0	0	-79.0	6.8	2,434
Alabama	S-CG-Prem	91	1.64	0.86	0.21	0.22	0	0.000	0	0	-78.6	9.1	2,443
New York	S-CG-Prem	88	1.61	0.86	0.19	0.22	0	0.000	0	0	-78.2	8.8	2,452
Wisconsin	W-RFG-Prem	33	1.62	0.86	0.11	0.12	0	0.000	0	0	-77.7	3.3	2,455
Colorado	W-CG-Prem	196	1.68	0.86	0.18	0.12	0	0.000	0	0	-77.2	19.6	2,475
Washington	W-CG-Prem	230	1.72	0.86	0.22	0.12	0	0.000	0	0	-77.1	23.0	2,498
Utah	W-CG-Prem	141	1.68	0.86	0.18	0.12	0	0.000	0	0	-77.0	14.1	2,512
Kentucky	S-CG-Prem	43	1.61	0.86	0.21	0.22	0	0.000	0	0	-76.6	4.3	2,516
Georgia	S-CG-Prem	247	1.63	0.86	0.23	0.22	0	0.000	0	0	-75.5	24.7	2,541
West Virginia	S-CG-Prem	18	1.58	0.86	0.19	0.22	0	0.000	0	0	-75.5	1.8	2,542
Idaho	S-CG-Reg	258	1.46	0.86	0.18	0.33	0	0.000	0	0	-75.1	25.8	2,568
Vermont	S-CG-Prem	11	1.60	0.86	0.23	0.22	0	0.000	0	0	-73.2	1.1	2,569
South Carolina	S-CG-Prem	115	1.60	0.86	0.23	0.22	0	0.000	0	0	-73.1	11.5	2,581
Indiana	S-RFG-Prem	18	1.61	0.86	0.11	0.09	0	0.000	0	0	-73.1	1.8	2,583
Arizona	S-RFG-Prem	109	1.76	0.86	0.26	0.09	0	0.000	0	0	-72.7	10.9	2,594
Wyoming	W-CG-Prem	30	1.64	0.86	0.18	0.12	0	0.000	0	0	-72.7	3.0	2,597
Ohio	W-CG-Prem	174	1.57	0.86	0.11	0.12	0	0.000	0	0	-72.5	17.4	2,614

Table A2020B Input Costs, Ethanol Blending Cost and Ethanol Volumes

Year 2020 State	Gasoline Code	Gasoline Volume MMgals	Gasoline Price $/gal	Ethanol Gate Price $/gal	Ethanol Dist Cost $/gal	Ethanol Blending $/gal	Federal Subsidy $/gal	State Subsidy $/gal	State Mandate	RFG "Mandate"	Ethanol Blending Cost c/gal	Ethanol Volume MMgals	Cumulative Eth Vol MMgals
Alabama	S-CG-Prem	91	1.64	0.86	0.21	0.22	0	0.00	0	0	-78.6	9.1	2,443
New York	S-CG-Prem	88	1.61	0.86	0.19	0.22	0	0.00	0	0	-78.2	8.8	2,452
Wisconsin	W-RFG-Prem	33	1.62	0.86	0.11	0.12	0	0.00	0	0	-77.7	3.3	2,455
Colorado	W-CG-Prem	196	1.68	0.86	0.18	0.12	0	0.00	0	0	-77.2	19.6	2,475
Washington	W-CG-Prem	230	1.72	0.86	0.22	0.12	0	0.00	0	0	-77.1	23.0	2,498
Utah	W-CG-Prem	141	1.68	0.86	0.18	0.12	0	0.00	0	0	-77.0	14.1	2,512
Kentucky	S-CG-Prem	43	1.61	0.86	0.21	0.22	0	0.00	0	0	-76.6	4.3	2,516
Georgia	S-CG-Prem	247	1.63	0.86	0.23	0.22	0	0.00	0	0	-75.5	24.7	2,541
West Virginia	S-CG-Prem	18	1.58	0.86	0.19	0.22	0	0.00	0	0	-75.5	1.8	2,542
Idaho	S-CG-Reg	258	1.46	0.86	0.18	0.33	0	0.00	0	0	-75.1	25.8	2,568
Vermont	S-CG-Prem	11	1.60	0.86	0.23	0.22	0	0.00	0	0	-73.2	1.1	2,569
South Carolina	S-CG-Prem	115	1.60	0.86	0.23	0.22	0	0.00	0	0	-73.1	11.5	2,581
Indiana	S-RFG-Prem	18	1.61	0.86	0.11	0.09	0	0.00	0	0	-73.1	1.8	2,583
Arizona	S-RFG-Prem	109	1.76	0.86	0.26	0.09	0	0.00	0	0	-72.7	10.9	2,594
Wyoming	W-CG-Prem	30	1.64	0.86	0.18	0.12	0	0.00	0	0	-72.7	3.0	2,597
Ohio	W-CG-Prem	174	1.57	0.86	0.11	0.12	0	0.00	0	0	-72.5	17.4	2,614
Illinois	S-RFG-Reg	1143	1.24	0.86	0.11	0.20	0	0.26	0	0	-71.9	114.3	2,728
Indiana	W-RFG-Prem	22	1.56	0.86	0.11	0.12	0	0.00	0	0	-71.8	2.2	2,730
Wisconsin	W-CG-Prem	78	1.56	0.86	0.11	0.12	0	0.00	0	0	-71.7	7.8	2,738
Utah	S-CG-Reg	431	1.42	0.86	0.18	0.33	0	0.00	0	0	-71.7	43.1	2,781
Nevada	S-CG-Reg	374	1.51	0.86	0.26	0.33	0	0.00	0	0	-71.6	37.4	2,819
Alaska	S-CG-Prem	12	1.88	0.86	0.53	0.22	0	0.00	0	0	-71.4	1.2	2,820
Arizona	W-RFG-Prem	131	1.71	0.86	0.26	0.12	0	0.00	0	0	-71.3	13.1	2,833
North Carolina	S-CG-Prem	203	1.58	0.86	0.23	0.22	0	0.00	0	0	-71.0	20.3	2,853
New York	S-RFG-Prem	263	1.67	0.86	0.19	0.09	0	0.00	0	0	-71.0	26.3	2,880
Arkansas	S-CG-Prem	47	1.51	0.86	0.16	0.22	0	0.00	0	0	-71.0	4.7	2,884
Nevada	W-CG-Prem	117	1.70	0.86	0.26	0.12	0	0.00	0	0	-70.2	11.7	2,896
Washington	S-CG-Reg	958	1.45	0.86	0.22	0.33	0	0.00	0	0	-69.8	95.8	2,992
New York	W-RFG-Prem	318	1.62	0.86	0.19	0.12	0	0.00	0	0	-69.7	31.8	3,024
South Dakota	S-CG-Reg	158	1.25	0.86	0.11	0.33	0	0.09	0	0	-69.6	15.8	3,040
Kentucky	S-RFG-Prem	17	1.67	0.86	0.21	0.09	0	0.00	0	0	-69.4	1.7	3,041
South Dakota	W-CG-Prem	23	1.45	0.86	0.11	0.12	0	0.09	0	0	-69.2	2.3	3,043
Florida	S-CG-Prem	401	1.62	0.86	0.30	0.22	0	0.00	0	0	-69.1	40.1	3,084
Tennessee	S-CG-Prem	149	1.54	0.86	0.21	0.22	0	0.00	0	0	-68.8	14.9	3,098
Kentucky	W-RFG-Prem	20	1.62	0.86	0.21	0.12	0	0.00	0	0	-68.0	2.0	3,101
Louisiana	S-CG-Prem	91	1.47	0.86	0.16	0.22	0	0.00	0	0	-67.4	9.1	3,110
Iowa	W-CG-reg	531	1.16	0.86	0.11	0.19	0	0.30	0	0	-66.7	53.1	3,163
New Mexico	W-CG-Prem	64	1.60	0.86	0.21	0.12	0	0.00	0	0	-65.9	6.4	3,169
Illinois	W-RFG-reg	1382	1.19	0.86	0.11	0.19	0	0.26	0	0	-65.8	138.2	3,307
Indiana	W-CG-Prem	92	1.50	0.86	0.11	0.12	0	0.00	0	0	-65.8	9.2	3,316
North Dakota	S-CG-Prem	18	1.50	0.86	0.21	0.22	0	0.00	0	0	-65.4	1.8	3,318
Arizona	W-CG-Prem	60	1.65	0.86	0.26	0.12	0	0.00	0	0	-65.3	6.0	3,324
Montana	S-CG-Reg	251	1.36	0.86	0.18	0.33	0	0.00	0	0	-65.1	25.1	3,349
Colorado	S-CG-Reg	738	1.36	0.86	0.18	0.33	0	0.00	0	0	-65.1	73.8	3,423
Virginia	S-CG-Prem	56	1.50	0.86	0.21	0.22	0	0.00	0	0	-65.0	5.6	3,429
Arizona	S-CG-Reg	389	1.44	0.86	0.26	0.33	0	0.00	0	0	-64.8	38.9	3,468
Mississippi	W-CG-Prem	82	1.54	0.86	0.16	0.12	0	0.00	0	0	-64.4	8.2	3,476
Kansas	S-CG-Prem	52	1.39	0.86	0.11	0.22	0	0.00	0	0	-64.2	5.2	3,481
Alabama	W-CG-Prem	110	1.59	0.86	0.21	0.12	0	0.00	0	0	-64.1	11.0	3,492
New York	W-CG-Prem	107	1.56	0.86	0.19	0.12	0	0.00	0	0	-63.7	10.7	3,503
Connecticut	S-RFG-Prem	92	1.61	0.86	0.21	0.09	0	0.00	0	0	-63.2	9.2	3,512
Pennsylvania	S-CG-Prem	74	1.46	0.86	0.19	0.22	0	0.00	0	0	-62.7	7.4	3,520
Maine	S-CG-Prem	10	1.55	0.86	0.30	0.22	0	0.00	0	0	-62.1	1.0	3,520
Kentucky	W-CG-Prem	52	1.56	0.86	0.21	0.12	0	0.00	0	0	-62.0	5.2	3,526
Connecticut	W-RFG-Prem	112	1.56	0.86	0.21	0.12	0	0.00	0	0	-61.9	11.2	3,537
Texas	S-CG-Prem	297	1.41	0.86	0.16	0.22	0	0.00	0	0	-61.3	29.7	3,567
Georgia	W-CG-Prem	298	1.58	0.86	0.23	0.12	0	0.00	0	0	-61.0	29.8	3,596
West Virginia	W-CG-Prem	21	1.53	0.86	0.19	0.12	0	0.00	0	0	-60.9	2.1	3,599
Illinois	W-CG-reg	812	1.13	0.86	0.11	0.19	0	0.26	0	0	-59.8	81.2	3,680
Michigan	S-CG-Reg	1771	1.24	0.86	0.11	0.33	0	0.00	0	0	-59.5	177.1	3,857
Vermont	W-CG-Prem	13	1.55	0.86	0.23	0.12	0	0.00	0	0	-58.7	1.3	3,858
South Carolina	W-CG-Prem	139	1.55	0.86	0.23	0.12	0	0.00	0	0	-58.6	13.9	3,872
Wyoming	S-CG-Reg	124	1.29	0.86	0.18	0.33	0	0.00	0	0	-58.1	12.4	3,884
Virginia	S-RFG-Prem	135	1.56	0.86	0.21	0.09	0	0.00	0	0	-57.8	13.5	3,898
Arizona	S-RFG-Reg	698	1.50	0.86	0.26	0.20	0	0.00	0	0	-57.6	69.8	3,968
New Mexico	S-CG-Reg	354	1.32	0.86	0.21	0.33	0	0.00	0	0	-57.5	35.4	4,003
Nebraska	S-CG-Reg	291	1.22	0.86	0.11	0.33	0	0.00	0	0	-57.5	29.1	4,032
New York	S-CG-Reg	906	1.29	0.86	0.19	0.33	0	0.00	0	0	-57.1	90.6	4,123
Ohio	S-CG-Reg	1827	1.21	0.86	0.11	0.33	0	0.00	0	0	-57.0	182.7	4,305
Alaska	W-CG-Prem	14	1.83	0.86	0.53	0.12	0	0.00	0	0	-56.8	1.4	4,307
North Carolina	W-CG-Prem	246	1.53	0.86	0.23	0.12	0	0.00	0	0	-56.5	24.6	4,331
Virginia	W-RFG-Prem	163	1.51	0.86	0.21	0.12	0	0.00	0	0	-56.5	16.3	4,348
Arkansas	W-CG-Prem	57	1.46	0.86	0.16	0.12	0	0.00	0	0	-56.4	5.7	4,353
Idaho	W-CG-reg	312	1.41	0.86	0.18	0.19	0	0.00	0	0	-55.8	31.2	4,385
Maryland	S-CG-Prem	6	1.41	0.86	0.21	0.22	0	0.00	0	0	-55.7	0.6	4,385
Pennsylvania	S-RFG-Prem	58	1.52	0.86	0.19	0.09	0	0.00	0	0	-55.5	5.8	4,391
Kansas	S-CG-Reg	610	1.20	0.86	0.11	0.33	0	0.00	0	0	-55.5	61.0	4,452
Maine	S-RFG-Prem	11	1.61	0.86	0.30	0.09	0	0.00	0	0	-54.9	1.1	4,453
Florida	W-CG-Prem	485	1.57	0.86	0.30	0.12	0	0.00	0	0	-54.5	48.5	4,502
Tennessee	W-CG-Prem	180	1.49	0.86	0.21	0.12	0	0.00	0	0	-54.3	18.0	4,520
Pennsylvania	W-RFG-Prem	70	1.47	0.86	0.19	0.12	0	0.00	0	0	-54.2	7.0	4,527
Texas	S-RFG-Prem	349	1.47	0.86	0.16	0.09	0	0.00	0	0	-54.1	34.9	4,561
Vermont	S-CG-Reg	119	1.30	0.86	0.23	0.33	0	0.00	0	0	-54.1	11.9	4,573
Wisconsin	S-CG-Reg	722	1.18	0.86	0.11	0.33	0	0.00	0	0	-53.7	72.2	4,646
Indiana	S-CG-Reg	1058	1.18	0.86	0.11	0.33	0	0.00	0	0	-53.6	105.8	4,751
Maine	W-RFG-Prem	13	1.56	0.86	0.30	0.12	0	0.00	0	0	-53.6	1.3	4,753

Table A2020C Input Costs, Ethanol Blending Cost and Ethanol Volumes

Year 2020 State	Gasoline Code	Gasoline Volume MMgals	Gasoline Price $/gal	Ethanol Gate Price $/gal	Ethanol Dist Cost $/gal	Ethanol Blending $/gal	Federal Subsidy $/gal	State Subsidy $/gal	State Mandate	RFG "Mandate"	Ethanol Blending Cost c/gal	Ethanol Volume MMgals	Cumulative Eth Vol MMgals
Virginia	W-CG-Prem	68	1.45	0.86	0.21	0.12	0	0.00	0	0	-50.5	6.8	5,701
Delaware	S-RFG-Prem	21	1.49	0.86	0.21	0.09	0	0.00	0	0	-50.4	2.1	5,703
South Dakota	W-CG-reg	191	1.20	0.86	0.11	0.19	0	0.09	0	0	-50.3	19.1	5,722
West Virginia	S-CG-Reg	280	1.22	0.86	0.19	0.33	0	0.00	0	0	-50.1	28.0	5,750
New York	S-RFG-Reg	1093	1.35	0.86	0.19	0.20	0	0.00	0	0	-49.9	109.3	5,859
New Jersey	W-RFG-Prem	279	1.44	0.86	0.21	0.12	0	0.00	0	0	-49.9	27.9	5,887
Mississippi	S-CG-Reg	658	1.19	0.86	0.16	0.33	0	0.00	0	0	-49.8	65.8	5,953
Kansas	W-CG-Prem	63	1.34	0.86	0.11	0.12	0	0.00	0	0	-49.6	6.3	5,959
Pennsylvania	S-CG-Reg	778	1.22	0.86	0.19	0.33	0	0.00	0	0	-49.6	77.8	6,037
Delaware	W-RFG-Prem	25	1.44	0.86	0.21	0.12	0	0.00	0	0	-49.1	2.5	6,039
North Dakota	S-CG-Reg	148	1.23	0.86	0.21	0.33	0	0.00	0	0	-48.5	14.8	6,054
Maryland	S-RFG-Prem	121	1.47	0.86	0.21	0.09	0	0.00	0	0	-48.5	12.1	6,066
Pennsylvania	W-CG-Prem	90	1.41	0.86	0.19	0.12	0	0.00	0	0	-48.2	9.0	6,075
Virginia	S-CG-Reg	583	1.22	0.86	0.21	0.33	0	0.00	0	0	-48.1	58.3	6,134
Maine	W-CG-Prem	12	1.50	0.86	0.30	0.12	0	0.00	0	0	-47.6	1.2	6,135
Alabama	S-CG-Reg	913	1.22	0.86	0.21	0.33	0	0.00	0	0	-47.5	91.3	6,226
Tennessee	S-CG-Reg	1287	1.21	0.86	0.21	0.33	0	0.00	0	0	-47.2	128.7	6,355
Maryland	W-RFG-Prem	146	1.42	0.86	0.21	0.12	0	0.00	0	0	-47.1	14.6	6,369
Texas	W-CG-Prem	360	1.36	0.86	0.16	0.12	0	0.00	0	0	-46.8	36.0	6,405
Oklahoma	S-CG-Reg	781	1.19	0.86	0.21	0.33	0	0.02	0	0	-46.6	78.1	6,483
Wisconsin	S-RFG-Reg	298	1.24	0.86	0.11	0.20	0	0.00	0	0	-46.5	29.8	6,513
Georgia	S-CG-Reg	1798	1.23	0.86	0.23	0.33	0	0.00	0	0	-46.4	179.8	6,693
Indiana	S-RFG-Reg	176	1.24	0.86	0.11	0.20	0	0.00	0	0	-46.4	17.6	6,711
Florida	S-CG-Reg	2733	1.29	0.86	0.30	0.33	0	0.00	0	0	-46.1	273.3	6,984
Maine	S-CG-Reg	112	1.28	0.86	0.30	0.33	0	0.00	0	0	-46.1	11.2	6,995
Maryland	S-CG-Reg	77	1.20	0.86	0.21	0.33	0	0.00	0	0	-46.1	7.7	7,003
South Carolina	S-CG-Reg	968	1.22	0.86	0.23	0.33	0	0.00	0	0	-46.0	96.8	7,100
Texas	S-RFG-Reg	2248	1.28	0.86	0.16	0.20	0	0.00	0	0	-46.0	224.8	7,324
Montana	W-CG-reg	304	1.31	0.86	0.18	0.19	0	0.00	0	0	-45.8	30.4	7,355
Colorado	W-CG-reg	892	1.31	0.86	0.18	0.19	0	0.00	0	0	-45.8	89.2	7,444
Arizona	W-CG-reg	471	1.39	0.86	0.26	0.19	0	0.00	0	0	-45.5	47.1	7,491
North Carolina	S-CG-Reg	1626	1.22	0.86	0.23	0.33	0	0.00	0	0	-45.4	162.6	7,654
Connecticut	S-RFG-Reg	563	1.33	0.86	0.21	0.20	0	0.00	0	0	-45.3	56.3	7,710
Rhode Island	S-RFG-Reg	230	1.32	0.86	0.21	0.20	0	0.00	0	0	-44.8	23.0	7,733
Kentucky	S-RFG-Reg	170	1.32	0.86	0.21	0.20	0	0.00	0	0	-44.5	17.0	7,750
New York	W-RFG-reg	1322	1.30	0.86	0.19	0.19	0	0.00	0	0	-43.8	132.2	7,882
Pennsylvania	S-RFG-Reg	344	1.28	0.86	0.19	0.20	0	0.00	0	0	-42.4	34.4	7,917
Maryland	W-CG-Prem	8	1.36	0.86	0.21	0.12	0	0.00	0	0	-41.1	0.8	7,917
Virginia	S-RFG-Reg	690	1.28	0.86	0.21	0.20	0	0.00	0	0	-40.9	69.0	7,986
Wisconsin	W-RFG-reg	361	1.19	0.86	0.11	0.19	0	0.00	0	0	-40.4	36.1	8,023
Indiana	W-RFG-reg	212	1.19	0.86	0.11	0.19	0	0.00	0	0	-40.3	21.2	8,044
Massachusetts	S-RFG-Reg	958	1.28	0.86	0.21	0.20	0	0.00	0	0	-40.3	95.8	8,140
Delaware	S-RFG-Reg	167	1.28	0.86	0.21	0.20	0	0.00	0	0	-40.3	16.7	8,156
Michigan	W-CG-reg	2141	1.19	0.86	0.11	0.19	0	0.00	0	0	-40.2	214.1	8,370
Texas	W-RFG-reg	2718	1.23	0.86	0.16	0.19	0	0.00	0	0	-40.0	271.8	8,642
New Jersey	S-RFG-Reg	1431	1.27	0.86	0.21	0.20	0	0.00	0	0	-39.3	143.1	8,785
Connecticut	W-RFG-reg	681	1.28	0.86	0.21	0.19	0	0.00	0	0	-39.2	68.1	8,853
Maine	S-RFG-Reg	165	1.34	0.86	0.30	0.20	0	0.00	0	0	-38.9	16.5	8,870
Maryland	S-RFG-Reg	660	1.26	0.86	0.21	0.20	0	0.00	0	0	-38.9	66.0	8,936
Wyoming	W-CG-reg	150	1.24	0.86	0.18	0.19	0	0.00	0	0	-38.8	15.0	8,951
Rhode Island	W-RFG-reg	278	1.27	0.86	0.21	0.19	0	0.00	0	0	-38.7	27.8	8,979
Kentucky	W-RFG-reg	205	1.27	0.86	0.21	0.19	0	0.00	0	0	-38.4	20.5	8,999
New Mexico	W-CG-reg	428	1.27	0.86	0.21	0.19	0	0.00	0	0	-38.2	42.8	9,042
Nebraska	W-CG-reg	352	1.17	0.86	0.11	0.19	0	0.00	0	0	-38.2	35.2	9,077
Oklahoma	W-CG-Prem	92	1.31	0.86	0.21	0.12	0	0.02	0	0	-38.2	9.2	9,087
New York	W-CG-reg	1095	1.24	0.86	0.19	0.19	0	0.00	0	0	-37.8	109.5	9,196
Ohio	W-CG-reg	2209	1.16	0.86	0.11	0.19	0	0.00	0	0	-37.7	220.9	9,417
Pennsylvania	W-RFG-reg	416	1.23	0.86	0.19	0.19	0	0.00	0	0	-36.3	41.6	9,459
Kansas	W-CG-reg	738	1.15	0.86	0.11	0.19	0	0.00	0	0	-36.2	73.8	9,532
Vermont	W-CG-reg	143	1.25	0.86	0.23	0.19	0	0.00	0	0	-34.9	14.3	9,547
Virginia	W-RFG-reg	834	1.23	0.86	0.21	0.19	0	0.00	0	0	-34.8	83.4	9,630
Wisconsin	W-CG-reg	873	1.13	0.86	0.11	0.19	0	0.00	0	0	-34.4	87.3	9,717
Indiana	W-CG-reg	1280	1.13	0.86	0.11	0.19	0	0.00	0	0	-34.3	128.0	9,845
Massachusetts	W-RFG-reg	1158	1.23	0.86	0.21	0.19	0	0.00	0	0	-34.2	115.8	9,961
Delaware	W-RFG-reg	203	1.23	0.86	0.21	0.19	0	0.00	0	0	-34.2	20.3	9,981
Texas	W-CG-reg	3702	1.17	0.86	0.16	0.19	0	0.00	0	0	-34.0	370.2	10,352
Arkansas	W-CG-reg	666	1.17	0.86	0.16	0.19	0	0.00	0	0	-33.6	66.6	10,418
New Jersey	W-RFG-reg	1730	1.22	0.86	0.21	0.19	0	0.00	0	0	-33.2	173.0	10,591
Maine	W-RFG-reg	200	1.29	0.86	0.30	0.19	0	0.00	0	0	-32.8	20.0	10,611
Maryland	W-RFG-reg	798	1.21	0.86	0.21	0.19	0	0.00	0	0	-32.8	79.8	10,691
Louisiana	W-CG-reg	1240	1.16	0.86	0.16	0.19	0	0.00	0	0	-32.6	124.0	10,815
Kentucky	W-CG-reg	743	1.21	0.86	0.21	0.19	0	0.00	0	0	-32.4	74.3	10,889
West Virginia	W-CG-reg	339	1.17	0.86	0.19	0.19	0	0.00	0	0	-30.9	33.9	10,923
Mississippi	W-CG-reg	796	1.14	0.86	0.16	0.19	0	0.00	0	0	-30.6	79.6	11,003
Pennsylvania	W-CG-reg	941	1.17	0.86	0.19	0.19	0	0.00	0	0	-30.3	94.1	11,097
North Dakota	W-CG-reg	179	1.18	0.86	0.21	0.19	0	0.00	0	0	-29.2	17.9	11,115
Virginia	W-CG-reg	705	1.17	0.86	0.21	0.19	0	0.00	0	0	-28.8	70.5	11,185
Alabama	W-CG-reg	1104	1.17	0.86	0.21	0.19	0	0.00	0	0	-28.2	110.4	11,296
Tennessee	W-CG-reg	1556	1.16	0.86	0.21	0.19	0	0.00	0	0	-27.9	155.6	11,451
Oklahoma	W-CG-reg	945	1.14	0.86	0.21	0.19	0	0.02	0	0	-27.3	94.5	11,546
Georgia	W-CG-reg	2174	1.18	0.86	0.23	0.19	0	0.00	0	0	-27.2	217.4	11,763
Florida	W-CG-reg	3305	1.24	0.86	0.30	0.19	0	0.00	0	0	-26.9	330.5	12,094
Maine	W-CG-reg	136	1.23	0.86	0.30	0.19	0	0.00	0	0	-26.8	13.6	12,107
Maryland	W-CG-reg	94	1.15	0.86	0.21	0.19	0	0.00	0	0	-26.8	9.4	12,117
South Carolina	W-CG-reg	1171	1.17	0.86	0.23	0.19	0	0.00	0	0	-26.8	117.1	12,234
North Carolina	W-CG-reg	1966	1.17	0.86	0.23	0.19	0	0.00	0	0	-26.2	196.6	12,430

Appendix 2: EPA Responses to Peer Review Comments

1. Overview

This appendix section provides responses to peer review comments provided by three external peer reviewers who were retained through peer review Work Assignment 3-13 under ERG contract 68HE0C18C0001 to review the draft EPA technical report entitled "Economics of Blending Corn Ethanol into E10 Gasoline." The purpose of EPA's responses is to provide EPA's assessment of the peer review comments, explain why EPA acted as it did in response to particular peer review comments, and explain how the report or underlying analysis was changed.

This appendix section is divided into three sections. After this overview section, a brief summary is provided for the comments of greatest relevance followed by the main section which provides a summary of the peer review comments and our responses to the peer review comments.

2. Overall Summary of Comment Responses

a) All peer reviewers agreed that the ethanol valuation methodology based on an equation of different cost inputs adequately estimates ethanol's relative value to gasoline.

b) One peer reviewer questioned a 7 cents per gallon distribution cost for moving ethanol from the production plants to Chicago prior to distributing the ethanol to unit train receiving terminals, and our subsequent review of the logistics for distributing corn ethanol revealed that corn ethanol plants ship their ethanol directly to unit train receiving terminals. Therefore, this 7 c/gal cost for moving corn ethanol to Chicago prior to distributing the ethanol via unit trains was removed.

c) Two peer reviewers pointed out that the ethanol economic analysis was conducted as if the RFS program did not exist, however, the ethanol production and distribution prices and gasoline prices used for most of the analysis occurred when the RFS program was in place and the RFS program may have impacted these input prices. For several reasons the RFS program likely did not impact these input prices used in our ethanol economic analysis, and even if these market prices were impacted, the magnitude would not have been sufficient to affect the final conclusions of the analysis. This discussion is reflected in the final report.

d) In response to the suggestion by a couple peer reviewers, more tables and figures were added to the report to help the reader better understand the economics of using corn ethanol.

3. Responses to Peer Review Comments

The responses to peer review comments are organized by the list of issues to be reviewed under the charge document provided by EPA to the peer reviewers. These charge issues are organized into three principal sections: A) review the appropriateness of the ethanol blending cost equation established in the draft report, B) review the appropriateness of the source data used for the values in the ethanol blending cost equation, C) review the conclusions of the draft report. Each principal charge issue section is then subdivided into specific charge issues labeled as A1, A2…. Each individual charge issue is followed by a summary of the peer reviewer's comments (the complete peer review comments are contained in Appendix 3), our discussion of the peer reviewer comments and any implications the comment has on the paper's estimate of ethanol's blending economics, including how we adjusted the analysis or presentation of the results of the analysis in response to those comments. When summarizing, analyzing, and responding to peer review comments under a particular charge issue, we also include comments made by peer reviewers to other charge issues or other miscellaneous comments if those comments concern the particular charge issue being addressed. After

summarizing and reviewing the specific charge issue-related comments, this report then summarized and reviewed one other set of comments made by a peer reviewer unrelated to the charge issues.

When referencing the peer reviewers' comments, the peer reviewers are referenced by their last name.

A. Review the appropriateness of the ethanol blending cost equation for representing the relative blending value of ethanol in gasoline.

A1. Ethanol Blending Cost Equation:
EBC = (ESP + EDC – ERV – FETS – SETS) - GTP
EBC = ethanol blending cost (estimates ethanol's net relative value to gasoline)
ESP = ethanol plant gate spot price (ethanol's market price at ethanol plant gates)
EDC = ethanol distribution cost (cost to move ethanol to downstream markets)
ERV = ethanol replacement value (captures ethanol's octane and volatility value)
FETS = federal ethanol tax subsidy (federal tax subsidy to incentivize ethanol's use)
SETS = state ethanol tax subsidy (state tax subsidies to incentivize ethanol's use)
GTP = gasoline terminal price (baseline gasoline price to determine ethanol's relative value)

Overall, the peer reviewers supported the use of the equation as a means to assess the economics of using ethanol in E10 gasoline:

Divita said "mathematically, the equation is a reasonable, high-level approach for a blend value calculation." He expressed additional observations associated with this charge issue which will be discussed elsewhere.

Hoekman said "This equation appears to capture the most important factors that are relevant in assessing the costs of corn ethanol blending."

Tallet said "My overall assessment is that I find this equation to be sound, in principle, subject to one possible caveat…" The caveat is discussed under charge A3.

A2. How well the included factors, when combined together in the equation, represent ethanol's relative blending value for blending it at 10 volume percent in gasoline.

All three peer reviewers expressed support for the factors used in the equation:

Divita said that the equation is "a reasonable generic blend value approach…" Divita expressed a concern which will be discussed under issue A4.

Hoekman said "on a gross scale, the combination of these factors provides a reasonable estimate of ethanol's relative blending value…"

Tallet said "I do not see the need to either remove terms from the equation or add new ones."

A3. Whether a negative EBC value is a fair indicator that ethanol is less costly than gasoline and would signal to gasoline blenders that it would be economically beneficial to blend ethanol into gasoline (if it was not already blended) or remain in gasoline (if it was already blended). Similarly, whether a positive EBC value would indicate that ethanol is more expensive than gasoline and would not be economically beneficial to blend into gasoline (if it were not already), and potentially be removed from gasoline (if it was already blended) conditional to the concepts described in C.1 below.

All three peer reviewers agreed that an EBC value determined by the equation realized its intended effect. There were, however, comments on some aspects:

Tallet pointed out that the analysis would be more intuitively understandable by placing the gasoline terminal price term (GTP) first and subtracting the ethanol terms contained in the parenthetical from it, which would switch the ethanol blending cost from a negative value to a positive value if ethanol is economic to blend.

Response - This change suggested by Tallet would essentially do away with all the negative values associated with ethanol's relative value term, which would change the descriptor of the term from ethanol blending cost to something like ethanol blending value. However, most people generally believe that biofuels are more costly than petroleum fuels and by maintaining the equation in its current form makes it consistent with people's perception of the cost to produce and use biofuels. For this reason, we kept the equation format the same.

Hoekman stated that there is inherent geographical price variability within the states, and temporal variability within each summer or winter season, which should be considered.

Response - As acknowledged by Hoekman, the analysis already separately evaluated summer versus winter, and was conducted on a state-by state-basis. Additionally, the analysis also evaluated the economics of blending ethanol into premium separate from regular gasoline grades, and evaluated blending ethanol into reformulated gasoline separate from conventional gasoline. We acknowledge that additional ethanol blending cost variability likely existed during the analysis period, by month and in parts of states. However, after reviewing the results of the analysis, we can conclude for two primary reasons that it is highly unlikely that such variability would have affected the adoption of corn ethanol. First, during the ramp up of corn ethanol use from 2007 to 2011, the Ethanol Blending Cost (EBC) averaged -42 cents per gallon compared to than gasoline, ranging from 13 to 78 cents per gallon lower than gasoline during this time period. This blend incentive is sufficiently large that both temporal and geographical price variability is very unlikely to offset this blend incentive. For example, it may be more expensive to move the ethanol to a more remote geographical location, such the upper peninsula of Michigan, than the 11 cents per gallon assumed cost to move the ethanol from the unit train terminal to the product terminal. However, if we add the minimum 13 cents per gallon blending cost margin to the 11 cents per gallon distribution cost it would total 24 cents per gallon to account for the geographic variability for moving ethanol to the furthest reaches of Michigan in that higher cost year. Furthermore, one must also consider that moving gasoline to that more remote part of a state, such as northern Michigan, would also be more expensive than the average gasoline price that we used, and our analysis does consider the geographic cost variability for gasoline either. Also, since the cost analysis represents average prices and costs, if the ethanol blend incentive is lower in one part of the year, it means that the ethanol blend incentive is higher another time of year, and refiners will likely blend ethanol based on the average blending economics and are very unlikely to change their blending practices on very short term changes in prices (i.e. based on trends over the course of only a few months).

The second reason that it is highly unlikely that geographical variability would have affected the adoption of corn ethanol is that the 11 cent per gallon distribution costs we use for moving the ethanol from the unit train terminal to non-unit train terminals was considered high by one peer reviewer. If this cost is indeed high, it could capture the cost for moving the ethanol to places in each state that are geographically more difficult to reach. Therefore, our corn ethanol economic analysis maybe conservative and may already capture the cost for blending corn ethanol in the more expensive corn ethanol markets in each state. The ethanol distribution costs are further discussed in response to B2.

Divita stated that refineries have different ethanol replacement costs depending on their existing capabilities, and different abilities to replace MTBE (by using other high-octane gasoline blendstocks rather than rely on ethanol) had the RFS program not been in place. His discussion about octane and ethanol replacement costs in general will be addressed in B3 below, however, a part of his comment will be addressed here in which he concludes that not all refineries would have blended ethanol up to the blendwall based on this issue.

Response - Our ethanol blending cost analysis conservatively assumed that fuel blenders did not match-blend the corn ethanol in conventional gasoline prior to 2010. Thus, in our analysis octane and other aspects of ethanol's blending value were not considered in the increased blending of ethanol in the conventional gasoline pool prior to 2010, which is when the majority of ethanol expansion into the conventional gasoline pool occurred. If in some locations refiners were

match-blending ethanol with their conventional gasoline earlier than what we assumed, then blending corn ethanol into gasoline would have been even more economically favorable than what our analysis estimated. As explained in the report, the principal drivers for the increased blending of ethanol up to the blendwall was the MTBE phaseout and increasing crude oil prices while the federal ethanol blending subsidy was still in place.

A4. Whether other factors should be included, or should be considered for being included, in the ethanol blending cost equation.

Divita stated that without the RFS program in place refiners would have explored other options including: exporting less gasoline to make up the volume loss from MTBE's removal from the domestic gasoline pool, blending less low valued, low octane naphtha to offset the octane loss from MTBE's removal, maximizing octane production (reformer severity, C3 alkylation for example, competition with other blendstocks such as alkylate, isooctane, toluene, capital and operational opportunities for incremental octane and gasoline volume. Divita stated that because of these options, and the variability in refining costs for blending ethanol, it is difficult to figure out which strategy refiners would choose, particularly in hindsight, since it requires knowledge of the ethanol blending costs at each refinery. While Tallet does not specify other means which potentially could have been used by refiners to replace MTBE, he states that the RFS program was a primary reason which allowed refiners to remove MTBE from their gasoline along with the removal of the RFG oxygenate requirement by Congress.

Response – We agreer with Divita that refiners would explore all their options for blending up their gasoline to minimize their production costs. However, for evaluating the ramp up of ethanol in the gasoline pool versus other possible options, it is useful to begin by reviewing the steps which occurred to replace MTBE in the gasoline pool. MTBE needed to be removed from the gasoline pool because of liability concerns associated with the contamination of groundwater. [58] [59] [60] States began to ban MTBE in gasoline and refiners stopped using MTBE as an elective gasoline blendstock. At its peak MTBE consumption in the U.S. was 4.36 billion gallons (284 kbbl/day) in 2001 and this demand decreased to 3.1 billion gallons in 2003 (200 kbbl/day). When CA, NY and CT banned MTBE for 2004, MTBE consumption dropped to 2.4 billion gallons (160 kbbl/day). Because the RFG oxygenate requirement was still in place, refiners supplying the market there essentially had to use ethanol because the alternative oxygenates, such as ETBE or TAME, were also ethers and were thus assumed to have similar groundwater contamination issues. MTBE consumption decreased further to 2.1 billion gallons in 2005 (140 kbbl/day). This significant reduction in blending MTBE into conventional and reformulated gasoline occurred before the RFS program established by Congress and EPA put in place the RFS program.

In August 2005, Congress passed the Energy Policy Act (EPAct) which removed the RFG oxygenate mandate and established the Renewable Fuels Standards Program (RFS) which required the blending of renewable fuels. Notably, EPAct did not include any liability protection for refiners using MTBE despite lobbying to include it. As a result, refiners quickly acted to remove the rest of MTBE from their gasoline to protect themselves from liability so MTBE use declined to 0.56 billion gallons in 2006 (37 kbbl/day) and then to zero in 2007. Table 1 summarizes the changes in MTBE and ethanol volumes from 2001 to 2007, showing that there was approximately a one-to-one swap.

[58] Gasoline Explained: Gasoline and the environment; Energy Information Administration; Last Updated December 13, 2021; https://www.eia.gov/energyexplained/gasoline/gasoline-and-the-environment.php.
[59] The United States continues to export MTBE, mainly to Mexico, Chile, and Venezuela; Technology Org; Science and Technology News; July 16, 2018.
[60] Methyl tert-butyl ether; Wikipedia.

Table 1 Summary of MTBE and Ethanol Volumes by Year

MTBE and Ethanol Blended into Gasoline (billion gallons)							
	2001	2002	2003	2004	2005	2006	2007
MTBE Volume	4.4	4.1	3.1	2.4	2.1	0.6	0
Ethanol Volume	1.7	2.1	2.8	3.6	4.1	5.5	6.6

With the oxygenate mandate gone, Divita contends that at least some RFG refiners would have blended other high octane blendstocks besides ethanol if the RFS program was not in place. While Divita offered these suggestions, he did not provide any economic analysis to support his belief, and we continue to stand behind our assessment for several reasons. First, when the RFG oxygenate requirement was still in place, refiners were lobbying Congress to receive liability protection from Congress which would enable them to continue to use MTBE. For this reason, refiners were likely not investing capital to produce octane and volume replacements for MTBE, which would end up being stranded investments if the liability protection would have been granted and refiners would have continued to blend MTBE. [61] [62] [63] Second, other options for making up such a large octane shortfall in such a short time frame were not viable. Refiners could not simply "turn up" (increase severity of) their reformers to produce the needed octane to replace MTBE's octane loss because of regulatory limits on the concentration of toxic benzene and other aromatic hydrocarbons in gasoline. [64] Similarly, increasing alkylate/isooctane supply sufficiently to offset the loss of MTBE was not a viable option, particularly in such a short time frame. Alkylate provides about half the octane per gallon as MTBE, so about twice as much alkylate would be needed to replace MTBE. According to a news report of that time, alkylate was already in short supply. [65] Furthermore, at that time the Tier 2 gasoline sulfur program was phasing in which required refiners to comply with a 30 ppm gasoline sulfur standard. To satisfy the 30 ppm sulfur standard, most refiners hydrotreated their very high sulfur, FCC naphtha stream, the desulfurization of which also reduces the octane content of that stream. If refiners had any excess octane production capability up to this point, they likely would have used it to offset the octane loss resulting from compliance with the Tier 2 sulfur standards which phased in from 2004 to 2007. [66] Reducing the blending of low octane naphtha to increase octane would have only further exacerbated the loss in volume from the removal of MTBE.

Third, there are also compelling economic reasons why ethanol would have replaced MTBE in RFG. Based on the results of our analysis, the blending cost for blending corn ethanol into RFG in 2007 is 65 to 160 cents per gallon less expensive than gasoline. Even if ethanol's replacement value is heavily discounted (setting ethanol's blending value to zero, which reduces ethanol replacement cost to zero in the winter and heavily discounted to match its volatility cost in the summer) ethanol is still 15 to 40 cents per gallon less expensive than gasoline. There is no alternative high-octane gasoline blendstock which could have competed with the economics of using ethanol to replace MTBE in RFG. All the different options would be more expensive than ethanol as the replacement for MTBE. High octane MTBE replacements, such as

[61] Energy bill effects begin as refiner exits MTBE business; Oil and Gas Journal; August 8, 2005.
[62] Bogardus, Kevin; The politics of energy: Oil and gas; The Center for Public Integrity; December 15, 2003.
[63] Nagel, Derek; Article: Not quite off the hook: why there should be a legislative solution for MTBE contamination without a safe harbor for MTBE producers; September 19, 2007.
[64] The Renewable Fuels Standard (RFS) established in 1995 a 0.62 benzene standard for reformulated gasoline, and also established antidumping regulations which prevented benzene levels from being moved from RFG into conventional gasoline. Then starting in 2001, the Mobile Source Air Toxics (MSAT) regulations capped air toxic emission levels in conventional gasoline from increasing above the current levels, preventing benzene levels in conventional gasoline from increasing.
[65] Wilen, John; Another spike in gas prices likely this spring as key additive in short supply; Southcoast Today; January 30, 2008.
[66] Regulatory Impact Analysis – Control of Air Pollution from New Motor Vehicles: Tier 2 Motor Vehicle Emissions Standards and Gasoline Sulfur Control Requirements; Environmental Protection Agency; EPA420-R-99-023; December 1999

alkylate and reformate, which could have been produced by refineries as DeVita suggests are typically valued much more than regular grade gasoline, and in 2008 when crude oil prices were high, alkylate was priced 40 cents per gallon higher than gasoline. [67] Also during this time, the availability of feedstocks, not just its price, were limiting factors for how much alkylate could be blended into gasoline. By blending in ethanol it would replace both the lost octane value and volume of MTBE.

Fourth, even if it such alternatives to ethanol were economically viable, they could not occur in the timeframe needed. Capital and operational challenges necessary to make up both the lost octane and volume from MTBE through increasing alkylate, reformate, and isooctane would take on the order of 4 years to design, construct and start-up.

Fifth, contrary to what Divita hypothesized, it would be almost impossible for a few refiners to avoid blending ethanol into their reformulated gasoline to replace MTBE if nearly all other refiners chose to blend ethanol and therefore, the entire reformulated gasoline distribution system would have converted over to shipping RBOBs for blending with ethanol. Those refiners choosing not to use ethanol would either be limited to selling all their gasoline off their refinery terminal rack, need to ship their non-ethanol gasoline to market using rail cars or barges which would greatly increase the refinery's distribution costs, or resort to exporting their gasoline.

For those refineries which did not want to blend corn ethanol into their gasoline, they would have reviewed the economics of doing so, and discovered that the impacts for not blending ethanol would have substantially reduced their earnings. As described above, corn ethanol was typically priced 15 to 40 cents per gallon lower than gasoline. As a result, E10 gasoline would be a least 1.5 to 4 cents per gallon lower than E0 gasoline. Additionally, high octane blendstocks are usually priced higher than gasoline, such as 20 cents per gallon higher, so ethanol could earn an additional 2 cents per gallon for a total of 3.5 to 6 cents per gallon more profit than the other options for producing an E0 gasoline. We believe that refiners would not pass up this level of earnings and were compelled to blend ethanol instead of relying on other more costly options.

Sixth, exporting less gasoline to make up domestic volume would not by itself be a solution. The US exported about 2 billion gallons of gasoline in 2007, however exporting less gasoline equivalent to MTBE's volume loss in gasoline would not replace MTBE's octane and it is very unlikely that this gasoline would meet the required RFG specifications. This E0 gasoline, as just discussed, would also still be more expensive than ethanol. To put together sufficient volume of gasoline material that could replace MTBE's octane and volume would likely require the construction of a new refinery, which would not be possible given the time constraints.

Hoekman suggested evaluating how the other state ethanol subsidies, such as ethanol production subsidies, loan guarantees, grants and other subsidies, would have affected the blending economics of using ethanol.

Response – An analysis of how other subsidies affected the blending economics of using ethanol would likely not have impacted the results or conclusions. Several of the state subsidies, such as production subsides and loan guarantees, help to improve the economics of installing new ethanol plant capacity in those states which offer them and can reduce the cost of producing corn ethanol in those states. Since our ethanol blending cost analysis is based on ethanol plant prices, we believe that these types of subsidies were already incorporated into ethanol plant gate prices used in the analysis.

B. Review the appropriateness of the sources of data used for the values in the ethanol blending cost equation.

B1. The use of ethanol spot prices to represent ethanol plant gate prices.

Divita commented that the presence of the RFS program impacted corn ethanol plant gate prices during most years of the analysis when the RFS program existed and therefore would have biased the analysis, to the point of raising doubt

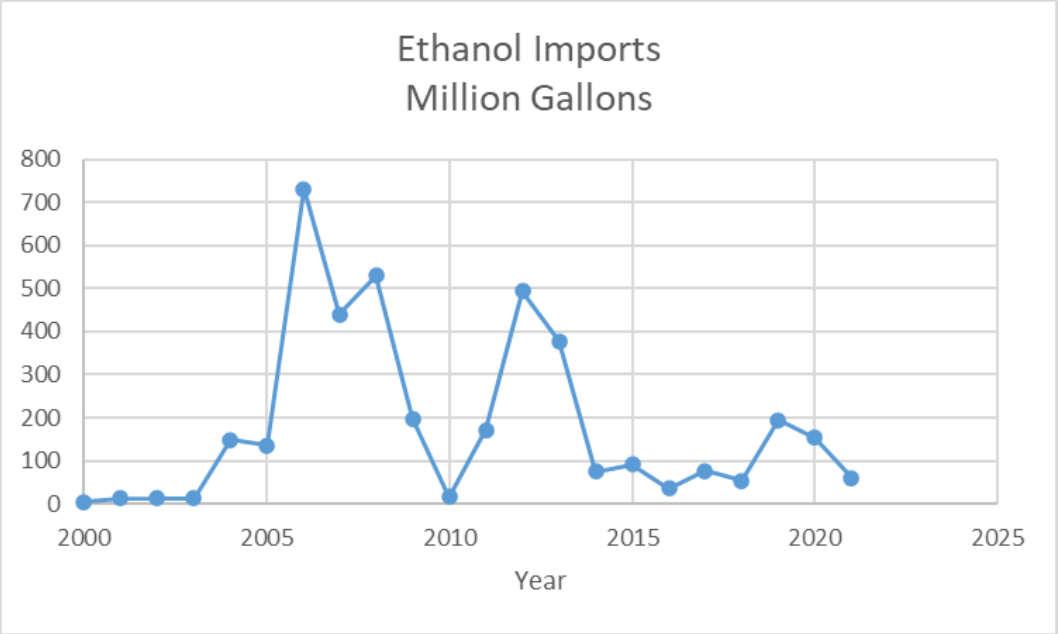
[67] Wilen, John; Another spike in gas prices likely this spring as key additive in short supply; Southcoast Today; January 30, 2008.

about the report's central conclusion – that refiners would have blended in ethanol up to the blendwall without the RFS program.

Response – It is possible that the presence of the RFS program, which first took effect in 2006 and therefore was in place during most of the analysis period, could have impacted corn ethanol plant gate prices. If the RFS mandates did impact corn ethanol plant gate prices, the most likely effect would have been that corn ethanol producers would have increased their plant gate prices to earn greater profit, since refiners would have been forced into being "price takers" and purchase the corn ethanol at whatever price to meet an RFS mandate. Assuming for a moment that this was the case, the ethanol plant gate prices would have been lower without the RFS program in place than the reported ethanol plant gate prices used in our analysis, and the incentive to blend corn ethanol into gasoline would have been even greater than what we analyzed. Therefore, we could conclude with even greater certainty that corn ethanol would have been blended up to the blendwall without the RFS program.

Furthermore, the information presented in the draft report suggest that corn ethanol prices were a function of supply and demand and not impacted by the presence of the RFS program. Figure 3 in the report compares the corn ethanol plant gate average prices and the estimated corn ethanol production costs on a year-by-year basis. When MTBE was being removed from reformulated gasoline during the years from 2004 to 2006, refiners producing RFG purchased ethanol to replace the MTBE, which resulted in ethanol imports as shown in Figure 1, and this drove ethanol prices much higher than corn ethanol production costs. Conversely, the 5 year time period from 2015 to 2019 showed breakeven or negative price margins for corn ethanol plants which an industry insider attributed to excess corn ethanol plant capacity. So while the RFS program existed this entire time from 2006 to 2019, corn ethanol plant gate profitability ranged from extremely profitable to negative, and thus it appears that the primary reason causing the different plant profit margins was the supply-demand balance, not the RFS program.

Figure 1 Ethanol Imports



Furthermore, as described in the report, during the early years of the RFS program when corn ethanol consumption was increasing, corn ethanol demand increased much faster than required under the RFS program which suggests that the RFS program was not binding, and that the marketplace was dictating ethanol consumption. In this case, the most likely explanation is that the market established ethanol's price, and not the RFS program.

B2. The estimated ethanol distribution costs to different states.

Tallet observed that the distribution costs seemed high relative to the distribution costs he used in previous cost analyses he has conducted. Reviewing the methodology for deriving the distribution costs, he raised three issues which he thought contributed to the high distribution costs. First, he thought that all corn ethanol would not incur a 7 cents per gallon cost for moving it to Chicago before being sent out in unit trains as we had assumed. Second, he thought that our estimate that the ethanol would incur an 11 cent per gallon cost for being transported to other terminals after being received at a unit train terminal seemed high. Third, Tallet stated that adding an additional 6.5 cent per gallon to distribution costs to account for amortized distribution system capital costs may be double counting since those capital costs would have been included in the market prices used to estimate ethanol distribution costs.

Response – In response to his first issue, we searched for information on unit train origination points and discovered that almost all unit trains originate from corn ethanol plants, not Chicago. Based on this comment and supporting information, we removed the 7 cent per gallon portion of the corn ethanol distribution cost which assumes that corn ethanol plants ship first to Chicago before the unit trains are formed.

Evaluating his second issue concerning the 11 cents per gallon cost estimate for moving the corn ethanol from unit train receiving terminals to other terminals proved to be a much more difficult task. We do not know of any data which can be used specifically for estimating this cost. Moving gasoline from terminals to retail stations using tank trucks, which usually carries a full tank truck or 10 thousand gallons of gasoline per load, is estimated to cost 6 cents per gallon. [68] However, we would expect the cost for moving the corn ethanol from the unit train receiving terminals to other terminals to be higher because the distances are greater. Since we do not have any other data for adjusting this estimated cost, we kept the value the same at 11 cents. If the estimated 11 c/gal value is indeed higher than the actual cost, it adds some conservativism to the analysis.

Regarding his third issue concerning the inclusion of amortized distribution system capital costs, we continue to believe that our approach is valid. The 6.5 cents per gallon cost was only added for the early years up to 2014 reflecting the time period when the ethanol distribution system was being built out. After the end of 2014 these costs were assumed to be fully amortized and thus no longer applicable. Since the data we used to estimate ethanol's distribution cost was from 2017 data, well after the time when ethanol distribution system was built out, this capital cost is unlikely to have been reflected in the 2017 distribution costs as Tallet suggests. Consequently, we have maintained the use of the 6.5 cents per gallon value. We further note, however, that if the capital costs associated with building out the ethanol distribution system is indeed already reflected in the distribution costs that we used, then it adds some conservatism to the early years of our analysis.

B3. The estimates for ethanol's octane blending value and volatility cost.

Divita stated that using octane and RVP is a reasonable, initial approach. He stated that octane blending value is highly variable between specific facilities. He stated that some refineries "give away" octane, while others are octane short. He stated that these costs are reflective of reformer economics. He said that most refiners would agree the cost of producing octane is about 1 – 2 cents per octane gallon. In discussing the value of alkylate, he referred to its "green premium," which prices in the value of its low sulfur and benzene content. Divita commented that it appears that some of ethanol's properties were not accounted for in our analysis, including T50 suppression, and low sulfur and benzene, which would skew ethanol's blending value. Divita disagreed with the use of marginal values, sometimes called shadow values, which were used in the study for estimating ethanol replacement costs. He stated that in some cases these values reported out of refinery models can increase dramatically for the last increment due to the model structure, modeling assumptions, and constraints placed on the refinery model, which can overestimate costs.

Hoekman stated that using a refinery model to estimate ethanol's replacement cost is a reasonable approach to take.

Tallet stated that he reviewed the draft report, the appendix, the refinery modeling output information presented in the appendix and he also used cost information from the cost estimation spreadsheet. He stated that ethanol has two

[68] Lenard, Jeff; Who Makes Money Selling Gas? National Association of Convenience Stores; November 12, 2021.

values, one when its use is mandated and blended into gasoline, and the other when ethanol use is optional, which he concluded is how the ICF refinery modeling analysis used in the report modeled it, and in this case includes capital costs and the operating costs for not using ethanol. Tallet noted that EPA used the latter method for estimating ethanol's replacement value (ERV). Reviewing information in the cost spreadsheet for the year 2010, Tallet noted that summertime RFG had an ERV value of $0.534/gal which increases to $0.785 if the $0.25/gal RVP cost is removed from the ERV value, largely reflecting ethanol's octane value. Tallet noted that the data we reported for the wholesale premium-regular gasoline grade price differential for 2010 was $0.114. However, premium gasoline on average has a 5 octane number differential with regular grade gasoline, but ethanol has an octane value of 115, which is a 23 octane number benefit over regular grade gasoline. Thus, to make the $0.114/gal premium-regular grade price difference comparable to ethanol's value in octane terms, it is ratioed higher by 23/5 to yield an octane value of $0.53/gal. Tallet stated that higher $0.785 replacement cost for ethanol may be conservative (high) relative to the $0.53/gal octane cost estimated using the premium-regular gasoline price differential. Although he stated that using the premium-regular grade price differential to estimate octane value would likely underestimate ethanol's octane value because of ethanol's nonlinear blending properties. He further surmised that our replacement cost did not incorporate ethanol's dilution value in RFG and therefore ethanol's blending value should be higher than ethanol's octane value. He also offered that our distribution costs seemed high which would offset the ethanol replacement cost if it was high. Tallet also commented that the report did not estimate a volatility cost for blending ethanol in the wintertime and presumed that such a cost was not included, but also commented that such a cost is likely to be very low.

Response - Both Tallet and Divita assessed ethanol's blending value (ERV) used in the report based on premium-regular grade gasoline price differentials, with both Divita and Tallet acknowledging ethanol's other properties (i.e., low sulfur and benzene) which also add to ethanol's value (Divita referred to this as "green premium"), but assumed that these other properties were not account for. However, because ethanol's blending value was estimated using a refinery model, and the sulfur and benzene standards were modeled with the refinery model, the model would have included ethanol's low sulfur and low benzene, or green premium properties in ethanol's blending value. This is one reason which explains why ethanol's blending value is higher than the price difference between premium and regular gasoline grades. The refinery model would also have captured ethanol's wintertime volatility cost, and other properties which affect gasoline's properties which are regulated by the ASTM standards.

Another reason why corn ethanol's replacement value is higher than its octane value is the capital cost associated with the installation of new octane producing units (isomerization, reformers and alkylation units) and other refinery units, to make up for ethanol's lost octane value and volume when it was removed from the gasoline pool. The total added capacity for these various units is 3.8 million barrels per day at an investment of $43 billion. Amortizing the estimated capital investment cost over the gasoline pool would add about 6 cents per gallon to the cost of gasoline. If attributed to just the ethanol in E10 gasoline, the capital investment contributes about 60 cents per gallon to the value of replacing the ethanol.

Although Divita expressed concern about using marginal prices from the refinery model to estimate ethanol's replacement costs, he did not review and analyze the refinery modeling analysis used as the basis for estimating ethanol's replacement cost. Therefore, he did not provide any evidence that this particular study overestimated ethanol replacement costs. Since EPA directed the refinery modeling analysis for estimating ethanol's replacement cost, we have no reason to believe that the marginal values which were generated by the refinery modeling analysis overestimated ethanol replacement costs. In conducting the refinery modeling analysis, the contractor did not constrain the overall octane production capacity of the refinery model in any way which could have overestimated ethanol's octane value. The contractor used conventional refinery modeling practices throughout the analysis. For estimating the impacts of removing ethanol from the gasoline pool, the contractor provided two octane replacement cases. One case which we termed the alkylate-centric case allowed for unconstrained alkylate production. The other case which we termed the reformate-centric case assumed a lower quantity of alkylate feedstocks would be available and so it relied more on reformers to provide the needed octane. We chose to use the reformate-centric case because it was the lowest capital investment case and therefore more likely be implemented on the short-term basis that would be needed to replace ethanol. If refiners do not have the time to install any capital improvements in their refineries for decisions

on a short-term basis for removing ethanol from their gasoline pool, octane costs would likely be even higher than what the refinery model marginal costs estimate.

Using marginal prices for ethanol replacement costs is also consistent with the rest of the analysis. For the historical analysis, this ethanol blending analysis uses actual market prices for the analysis, such as gasoline prices, corn ethanol plant gate prices, distribution prices, corn prices etc. This price information represents the marginal cost in each case, which arguably reflects the highest cost provider in each case. The analysis for the future economics of corn ethanol relies on projected prices which also likely reflect marginal prices. Since so much of the analysis uses marginal prices, it would make sense to use marginal prices for the ethanol replacement costs as well.

Divita has stated in the past that refinery models tend to underestimate octane costs, which is a primary cost component of ethanol's replacement cost estimated by the refinery model. [69] If refinery models do underestimate octane costs and the marginal or shadow prices used to estimate ethanol's replacement cost are higher than the average octane costs estimated by the refinery model, the refinery model marginal octane values may in fact better represent octane prices which are likely to exist in the marketplace.

B4. Adjustment factors for use in different years, particularly the use of both octane price (as estimated by the premium-regular grade price differentials), and crude oil prices to scale the estimated ethanol replacement costs to different years.

Response - Tallet and Hoekman supported the two adjustments used to adjust ethanol's replacement cost. Tallet expressed that octane value may be the more appropriate adjustment factor than crude oil prices.

B5. The use of refinery rack spot prices to represent terminal gasoline prices at the point ethanol is blended into gasoline.

All peer reviewers stated that they believed that relying on refinery rack spot prices is an appropriate data set for estimating the gasoline prices at terminals. **Hoekman** and **Tallet** commented that the rack spot prices would represent the price of E10 gasoline and would therefore include the cost impact of ethanol blended into gasoline.

Response – It is likely that the refinery rack prices do include ethanol's blending cost, however, this price impact is unlikely to impact the ultimate conclusions of the analysis. The largest potential impact of this in the analysis would occur when ethanol's blending cost is the most different from gasoline, which for example would be a Midwest state such as Iowa which offers an ethanol blending subsidy. In this case ethanol's blending cost was estimated to be -65 cents per gallon in 2007. Since ethanol comprises 10% of E10 gasoline, the potential impact on the refinery rack spot prices would be 6.5 cents per gallon. Accounting for this in the analysis would increase gasoline's rack price before the blending with ethanol by 7.2 cents per gallon. [70] This in turn would increase ethanol's blending cost to -72.2 cents per gallon (-65 – 7.2 c/gal). Since ethanol was already expected to be blended into Iowa's gasoline market, accounting for the fact that some portion of ethanol's blending cost may have already been incorporated into the refinery rack spot prices would not change the results of the analysis for states like Iowa where ethanol is already cheaper than gasoline.

A case which would be more important to the outcomes might be when ethanol's blending cost is positive which means that ethanol is more expensive than gasoline. In this case, the cost adjustment would mean that ethanol is even less cost-effective to blend into gasoline. For example, for Florida wintertime gasoline in 2016 we estimated ethanol's blending cost to be +6.8 when ethanol's replacement value was adjusted using crude oil prices, and for the same gasoline is -19.8 cents per gallon when we adjusted ethanol's replacement value using octane costs. Adjusting gasoline's

[69] DiVita, Vincent B., Development of the EIA's Liquid Fuels Market Module (LFFM), EIA's LFFM Workshop; September 2009.
[70] Since gasoline comprises 90% of the volume of E10, the gasoline price would need to increase by 6.5/0.9 or 7.2 cents per gallon.

value for ethanol's content and relative cost, ethanol's blending cost for those two ethanol replacement values, based on crude cost and octane value, would change to +7.6 and +22 cents per gallon, respectively.

Clearly when ethanol's blending cost is positive, it is more critical for understanding ethanol's true blending value because this error increases ethanol's blending cost into gasoline. However, since for all years except for 2016 when corn ethanol's blending cost is negative for a few gasolines, it does not appear that adjusting for ethanol's cost impact on refinery gasoline rack prices would have any impact on the conclusions of this analysis. Not accounting for the potential that gasoline rack spot prices already include the cost impact of ethanol blended into gasoline causes the analysis to be slightly conservative.

C. Review the appropriateness of the report conclusions.

C1. Corn ethanol profit made by corn ethanol plant producers incentivized them to build new corn ethanol plant capacity – does the data support such a conclusion?

Divita stated that the profit earned by corn ethanol plants incentivized new plant investment. But then he stated that the RFS mandate likely affected ethanol plant gate prices which therefore affected investments by corn ethanol plants, and also directly drove investment in new corn ethanol plant capacity. **Hoekman** stated that the profit of corn ethanol plants during the years 2005 to 2008 support the conclusion that corn ethanol plants would have invested without the RFS program. Hoekman also stated that growth in corn ethanol plant capacity slowed significantly after 2008, and suggested that further discussion be added to the report about the negative corn ethanol profit margins during 2019 and 2020. **Tallet** said that it is plausible that the profitability of corn ethanol plants caused the rapid expansion of corn ethanol plant capacity. But then he surmised that the primary causes for the expansion of corn ethanol plant capacity was the of MTBE bans coupled with the lack of MTBE liability protection for the oil industry followed by the RFS mandates. He thought that absent the RFS mandates, corn ethanol plant capacity would have expanded, but just not as quickly. He stated that the information presented in Figures 2 and 3 should be presented in a table to better understand the incentive for corn ethanol plant owners to add additional corn ethanol plant capacity.

Response – All three peer reviewers agree that the estimated profit experienced by corn ethanol plants would have incentized the owners to add new plant capacity. However, both Divita and Tallet stated that the presence of the volume mandates under the RFS program providing a guaranteed future market may have contributed to the speed at which the plant owners expanded their plant capacity. It is possible that the RFS mandates did provide an incentive to corn ethanol plant owners and investors to add new plant capacity, although, the pattern of corn ethanol plant expansion suggests that the RFS mandates were not the principal driving factors. As Tallet explained, the need to remove MTBE from the gasoline pool, and replace MTBE's octane and volume would have provided a large incentive to increase corn ethanol plant capacity to provide sufficient ethanol to replace the MTBE in the reformulated gasoline pool, and/or to replace the corn ethanol which was bid away from the conventional gasoline pool. This is likely a key driver for what led to the very large increase in corn ethanol plant capacity in 2006, the last year of MTBE phase-outs. However, as shown by this analysis, corn ethanol was found by refiners and blenders to be a very low-priced gasoline blendstock and therefore was in increased demand. Consequently, the RFS may have been more of an insurance policy – a belts and suspenders approach – that removed some of the liability and risk from the investments, and possibly sped up the rate of investments. However, we believe the analysis shows that the E10 blendwall would have been reached regardless of the existence of the RFS program. Table 2 provides relevant information associated with corn ethanol plant expansions and shows how plant capacity increased much faster than the RFS volume requirements.

Table 2 Corn ethanol plant capacity, announced capacity and estimated profit margins (billion gallons except where noted.

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Corn Ethanol Plant Profit Margin ($/gal)	0.25	0.37	0.57	1.33	0.73	0.27	0.12	0.41	0.50	0.03
Plant Capacity	3.1	3.6	4.3	5.5	7.9	12.4	13.0	14.1	14.9	14.9
Announced New Plant Capacity	0.6	0.8	2.0	6.1	5.5	2.1	1.4	0.6	0.1	0.1
Actual Plant Capacity plus Announced Plant Capacity	3.7	4.4	6.3	11.6	13.4	14.5	14.5	14.6	15.0	15.0
US Ethanol Consumption	2.8	3.6	4.1	5.5	6.9	9.7	11.0	12.9	13.2	13.4
RFS1 Standard	-	-	-	4.0	4.7	5.4	6.1	6.8	7.4	7.5
EISA/RFS2 Standard						9	10.5	12	12.6	13.2
Ethanol Consumption above RFS Std.	-	-	-	1.5	2.2	0.7	0.5	0.9	0.6	0.2
Existing Ethanol Plant Capacity above RFS Std.				1.5	3.2	4	4	2.6	2.3	1.7
Existing and Announced Plant Capacity above RFS Std.				7.6	8.7	5.5	4.0	2.6	2.4	1.6

C2. The conclusion that blending corn ethanol up to the E10 blendwall would have occurred anyways regardless of the RFS program (note that EPA did not conclude that the RFS did not have any impact).

Divita said that blending up to the blendwall would have occurred for some refiners, particularly in the Midwest and those with operational disadvantages. However, he also reiterated some of his previously expressed concerns about the impact of the RFS mandate on corn ethanol prices and on corn ethanol investment decisions, and his concern about using LP marginal values for estimating ethanol blending cost. **Hoekman** said that the conclusion is valid, but also stated that there likely are specific times and places where blending ethanol up to the blendwall would not have occurred. He pointed to the lawsuits and disagreements about ethanol volumes to be blended each year as a justification to conclude

that some stakeholders in the ethanol industry do not believe that blending up to the blendwall would have occurred without the RFS mandates in place. Hoekman recommended the report should also discuss these issues. **Tallet** concluded after the MTBE kickstarted the substantial growth in U.S. ethanol use, that the analysis has shown within a plausible range of uncertainty, that ethanol was economic to use in increasing volumes up to and including the E10 blendwall. He documented the consistently negative cost for blending ethanol into gasoline and that the volume of ethanol blended into gasoline exceeded the RFS standards, as principal reasons why ethanol use in gasoline was justified based on economics. While Tallet was able to reach these conclusions based on his review of the information presented in the figures provided, he suggested presenting the actual volumes that ethanol exceeded the RFS mandates to make this point clearer to the reader. He observed that the ethanol blending cost was negative enough so that even if the federal subsidy had been phased down more rapidly, ethanol still would have been economic to use. He cautioned the report's conclusion that ethanol would be used during periods of low crude oil prices, which was the situation in 2016 and 2020, even if the economics for blending ethanol into gasoline seemed favorable because the RFS program was in place.

Response –Tallet essentially agreed with the draft report's conclusion that corn ethanol would have been blended into gasoline up to the blendwall regardless of the RFS program. Tallet observed that because ethanol consumption exceeded the RFS mandates, it helped to corroborate the conclusions reached in the draft report. As Tallet had requested, the previous table which provides the ethanol volumes being blended into U.S. gasoline leading up to the blendwall, the actual corn ethanol plant capacity, the announced new corn ethanol plant capacity, and the RFS1 and RFS2 standards, has been incorporated into the supporting information part of the final report. With respect to Tallet's concern about estimating the ethanol's use when crude oil prices were low, we also were concerned and made a more conservative assumption regarding ethanol's blending value for the year 2020 which experienced low gasoline demand in addition to low crude oil prices. For 2020, we used ethanol's marginal value while blended into gasoline (33c/gal) as opposed to ethanol's replacement value (239 c/gal in 2019).

Hoekman and Divita both provided support for the report's conclusions, although only their reservations will be discussed here. Hoekman's comment that ethanol would not be blended into all gasoline all the time seemed to be due to his previous comment that the analysis may not have captured the cost to distribute ethanol to every part of every state (see charge issue A3) which we addressed. Hoekman's statement that lawsuits provided evidence that the RFS must have played a role in forcing ethanol consumption up to the blendwall seemed to be simply a hypothesis. Based on our past experience with rulemakings, however, we do not see litigation as being evidence that the RFS standards were forcing refineries to blend ethanol. Industry often litigates to avoid the restrictions imposed by a regulation which limit future optionality, or as part of a broader strategy to condemn mandates, not because they cannot or even are not already meeting the requirements of a new regulation. The most heavily litigated aspect of the RFS program has been the small refiner provisions – small refiners are litigating to avoid being subjected to the RFS volume requirements. However, as we described in the introduction to the report, even when small refiners are not subjected to the RFS volume requirements many of them still blend corn ethanol into their gasoline at 10 volume percent.

In response to Divita's restated concern that refiners may not experience the same blending value for ethanol as estimated in the analysis, as we explained in response to issue A3, the analysis estimated that refiners/blenders were splash-blending ethanol into gasoline up to 2010, which is during most all the ramp up of ethanol to the blendwall. Thus, even when not including any blending value for ethanol, the ethanol was economic for refiners to blend into gasoline. When including the ethanol replacement cost, the ethanol blending value was sufficiently negative in most all cases that it likely would have remained negative for those refiners with lower ethanol replacement cost, and logistics associated with the replacement of ethanol would have caused refiners to continue blending it. Also, as described in response to issue B1, if the RFS program affected corn ethanol plant gate prices, it likely would have increased the prices making our analysis conservative.

C3. Inertia for using ethanol when match-blended into gasoline – do the investments needed in refining and fuel distribution coupled with ethanol's volume and octane create a dependency on the part of refiners to continue to use

ethanol during short time periods where ethanol may be uneconomical to use in a small, limited number of gasoline markets?

Tallett agreed with our assessment that the current widespread use of E10 creates inertia for its use, primarily due to ethanol's high octane content. He pointed out that the previous, widespread use of MTBE proves this point. Tallett further pointed out that ethanol purchases can be established through contracts which would further contribute to its continued use during short periods of poorer blending economics. **Hoekman** also agreed that ethanol's volume and octane properties creates an ongoing incentive to continue utilize it in gasoline, although he also reiterated his statement that this incentive varies by the gasoline it is being blended into. **Divita** stated that refiners are resourceful and would use ethanol to maximize their profit margins based on what their LP refinery models would dictate. Divita also stated that the RFS mandate created a dependency for refiners to use ethanol.

Response: Both Tallett and Hoekman agreed with our assessment that the use of ethanol would create at least a short term dependency, due to its octane and volume, for its continued use. Divita did not address this directly, but referenced other factors.

Other Comments:

Industry Optimization and Modeling

Divita stated that the refining industry uses optimization software for establishing its operating plans, and does not use blendstock value equations, which seems to suggest that modeling costs with refinery models is better. He also stated that LP models provide different ethanol purchase and blending signals with and without an RFS program, which could range from 1 to 10 volume percent. He also said that refiners would evaluate their use of ethanol on a routine basis, such as monthly.

Response: We understand that the refining industry uses LP optimization software for operating its refineries. Refineries must rely on LP refinery modeling software because each refinery is balancing the purchase and refining of multiple crude oils and other feedstocks, the operations of multiple refinery units, and the needs to blend multiple refinery streams to produce specific refinery products which must meet fuel specifications. However, while refiners are trying to minimize their production costs to maximize their profits, we are trying to understand something quite different, which is the marginal blending costs for ethanol downstream of refineries. This analysis used a combination of an LP model and spreadsheet to estimate ethanol's blending economics. The LP refinery modeling estimates ethanol's marginal value to refiners, which includes its volume, octane, the volatility of the gasoline it is blended into and also considers ethanol's other properties. However, the other inputs affecting ethanol's relative cost, which includes ethanol's distribution costs and tax subsidies, are fixed values which are most efficiently analyzed for multiple gasoline types in each state by incorporating them into a spreadsheet along with the LP-estimated blending cost for ethanol. We believe that this combined approach is the most effective and efficient means for modeling ethanol's marginal blending cost in a variety of gasoline markets across the country for this analysis. Divita was also concerned that ethanol's marginal blending value in gasoline likely varies amongst refineries. We believe, though, that because the logistical limitations in the gasoline distribution system force refiners to act together when deciding about blending ethanol (i.e., the production and distribution of CBOB and RBOB instead of finished gasoline), that the average marginal ethanol blending value to refiners would most likely dictate how they would act as a group for blending in ethanol if the RFS program did not exist.

While Divita states that refiners would evaluate blending ethanol in increments from 1 to 10 percent, this is not practical for several reasons. First, during the years when ethanol was used to meet reformulated gasoline oxygen blending requirements, refiners needed to meet a 2.1 weight percent minimal oxygen content specification, which corresponded to 5.7 volume percent ethanol. Because ethanol has much higher volatility effects when blending it at lower volumes, refiners found it more economic to blend ethanol at 10 volume percent. When ethanol is blended at 10 volume percent, it about matches MTBE's 11 volume percent which allowed refiners to replace the volume of MTBE when it was removed from gasoline. Also, Divita neglected to consider the need for refiners to coordinate their gasoline distribution

plans with other refiners which are using the same gasoline distribution system. When refiners are match-blending ethanol into their gasoline, they produce a sub-octane gasoline (and a lower RVP gasoline in the case of RFG). However, the pipeline and downstream terminal companies which are distributing the gasoline are constrained in the number of gasolines which they can handle. For this reason, all the gasoline being distributed by the pipeline and terminals would likely have to be the same quality. Thus, the limits of the fuels distribution system would not allow one refiner to blend ethanol at 5.7 percent and another at 10 volume percent. Once refiners in an area have decided to match-blend their gasoline with ethanol, if one refiner were to decide to change how they blend gasoline either with or without ethanol, they would have to coordinate that change with the other refiners. Any changes would take time to coordinate and may not be permitted by some refiners depending on their ability to replace ethanol's octane and volume.

WORK ASSIGNMENT 3-13 UNDER
PRIME CONTRACT 68HE0C18C0001

EXTERNAL PEER REVIEW OF EPA'S DRAFT TECHNICAL REPORT: "ECONOMICS OF BLENDING CORN ETHANOL INTO E10 GASOLINE"

FINAL PEER REVIEW REPORT
June 1, 2022

Submitted to:
U.S. Environmental Protection Agency
Office of Transportation and Air Quality (OTAQ)
Assessment and Standard Division Ann Arbor,
Michigan 48105
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1.0 INTRODUCTION

ERG, a contractor to the U.S. Environmental Protection Agency (EPA), organized an independent external peer review of EPA's draft technical report, "Economics of Blending Corn Ethanol into E10 Gasoline," developed by EPA's Office of Transportation and Air Quality (OTAQ). This document briefly describes ERG's peer review process (Section 2.0). Appendix A provides the technical charge to reviewers; Appendix B provides the individual peer reviewer written comments; Appendix C provides peer reviewer resumes; and Appendix D provides signed peer reviewer conflict of interest (COI) statements.

2.0 PEER REVIEW PROCESS

2.1 Reviewer Search and Selection

For this review, ERG identified, screened, and selected three reviewers who had no conflict of interest in performing the review and who collectively met the following technical selection criteria provided by EPA:

- Refining economics
- Refined product distribution
- Corn ethanol production and distribution economics

ERG screened the pool of interested and available candidates against these selection criteria. From the set of candidates who met those criteria, ERG selected and proposed three candidates to EPA. Upon EPA confirmation that the proposed candidates met the selection criteria, ERG confirmed the services of the three final reviewers. ERG contracted with and committed the following three experts to perform the review (see Appendix C for resumes):

- Vince DiVita, MBA, PE; Senior Consultant, 1898 & Co.|Part of Burns & McDonnell
- S. Kent Hoekman, Ph.D.; Research Professor, Emeritus, Division of Atmospheric Sciences, Desert Research Institute
- Martin Tallett, B.Sc.; President, Tallett & Co

2.2 Conducting the Review

ERG provided reviewers with instructions for conducting the review, the assigned review document, and the assigned charge to reviewers prepared by EPA (see Appendix A). ERG instructed reviewers that they should maintain the confidentiality of the review documents and not share the review materials or consult with anyone during the review process. ERG scheduled and facilitated a briefing teleconference with reviewers and EPA on January 10, 2022, to provide reviewers with a background on the materials under review and to answer any questions of clarification on the technical charge, materials, or peer review process. After the briefing teleconference reviewers worked

individually (i.e., without contact with other reviewers, colleagues, or EPA) to prepare written comments in response to the charge questions over a two-week period following the briefing teleconference (from January 11 to 28, 2022).

ERG monitored the review and sent a reminder for the due date for written comments. Upon receipt of the written comments from reviewers, ERG confirmed that all reviewers had responded clearly to all charge questions. ERG then sent the individual comments to EPA to review for any needed clarifications. To obtain and provide needed clarifications, ERG scheduled and facilitated individual meetings with each reviewer and EPA. After these meetings reviewers were provided an opportunity to revise their comments and submit a final version. After receiving all final version of reviewer comments, ERG compiled this report. Final comments are presented exactly as submitted, without editing or correction of typographical errors (if any).

Technical Charge to External Peer Reviewers

Contract No. 68HE0C18C0001

Work Assignment 3-13

External Peer Review of EPA's Draft Technical Report: "Economics of Blending Corn Ethanol into E10 Gasoline"

BACKGROUND

The increase in ethanol blended into U.S. gasoline is often attributed to the Renewable Fuels Program (RFS), however, other factors such as rising gasoline prices and the phase-out of MTBE were also factors. Determining whether corn ethanol use occurred due to economic factors versus the RFS program is important for attribution of any cost, health, or environmental impacts of using corn ethanol. EPA conducted a detailed economic study of ethanol's blending cost into E10 gasoline, including octane and volatility costs, production cost and spot prices, distribution costs, and federal and state subsidies, while omitting RIN values, to assess whether ethanol would have been economical to blend into gasoline regardless of the RFS program. The analysis found economic factors alone were sufficient to cause the observed growth in ethanol use.

SPECIFIC CHARGE ISSUES TO BE REVIEWED

A. Review the appropriateness of the ethanol blending cost equation for representing the relative blending value of ethanol in gasoline.

A1. Ethanol Blending Cost Equation:

EBC = (ESP + EDC – ERV – FETS – SETS) - GTP

EBC = ethanol blending cost (estimates ethanol's net relative value to gasoline)
ESP = ethanol plant gate spot price (ethanol's market price at ethanol plant gates)
EDC = ethanol distribution cost (cost to move ethanol to downstream markets)
ERV = ethanol replacement value (captures ethanol's octane and volatility value)
FETS = federal ethanol tax subsidy (federal tax subsidy to incentivize ethanol's use)
SETS = state ethanol tax subsidy (state tax subsidies to incentivize ethanol's use)
GTP = gasoline terminal price (baseline gasoline price to determine ethanol's relative value)

A2. How well the included factors, when combined together in the equation, represent ethanol's relative blending value for blending it at 10 volume percent in gasoline.

A3. Whether a negative EBC value is a fair indicator that ethanol is less costly than gasoline and would signal to gasoline blenders that ethanol be blended into gasoline if it was not already blended into gasoline or remain in gasoline if it was already blended into gasoline. Similarly, whether a positive EBC value would indicate that ethanol is more expensive than gasoline and not be blended into gasoline if it were not already, and potentially be removed from gasoline conditional to the concepts described in C.1 below.

A4. Whether other factors should be included, or should be considered for being included, in the ethanol blending cost equation.

B. Review the appropriateness of the sources of data used for the values in the ethanol blending cost equation.

B1. The use of ethanol spot prices to represent ethanol plant gate prices.

B2. The estimated ethanol distribution costs to different states.

B3. The estimates for ethanol's octane blending value and volatility cost.

B4. Adjustments used to adjust the factors for use in different years, particularly the use of both octane price (as estimated by the premium-regular grade price differentials), and crude oil prices to scale the estimated ethanol replacement costs to different years.

B5. The use of refinery rack spot prices to represent terminal gasoline prices at the point ethanol is blended into gasoline.

C. Review the appropriateness of the report conclusions.

C1. Corn ethanol profit made by corn ethanol plant producers incentivized them to build new corn ethanol plant capacity – does the data support such a conclusion?

C2. The conclusion that blending corn ethanol up to the E10 blendwall would have occurred anyways regardless of the RFS program (note that EPA did not conclude that the RFS did not have any impact).

C3. Inertia for using ethanol when match-blended into gasoline – do the investments needed in refining and fuel distribution coupled with ethanol's volume and octane create a dependency on the part of refiners to continue to use ethanol during short time periods where ethanol may be uneconomical to use in a small, limited number of gasoline markets?

COMMENTS RECEIVED FROM

VINCE DIVITA, MBA, PE

Senior Consultant
1898 & Co.|Part of Burns & McDonnell

Note: Vince DiVita conducted this review as an individual and not as a representative of 1898 & Co.

April 19, 2022

Laurie Waite, Project Manager Peer Review
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Re: Peer Review Economics of Blending 10 Percent Corn Ethanol into Gasoline

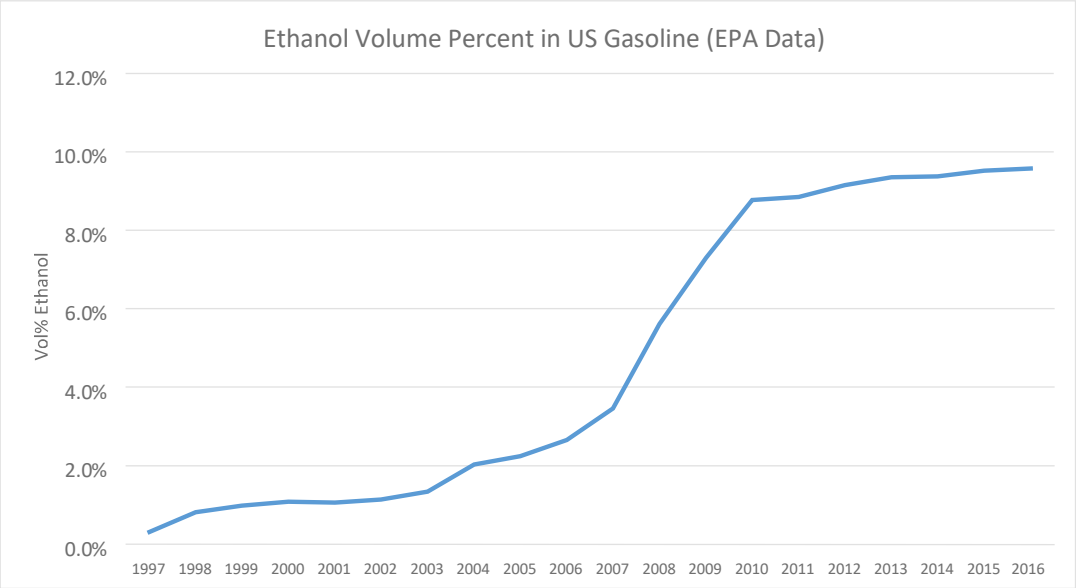
Vince DiVita, MBA, PE

Senior Consultant
1898 & Co.|Part of Burns & McDonnell

Background

The EPA study is a detailed evaluation of ethanol's blending cost into E10 gasoline to assess whether ethanol would have been economical to blend into gasoline regardless of the RFS program. Factors included octane and volatility costs, production cost and spot prices, distribution costs, and federal and state subsidies, while omitting RIN values. The outcome of the study states: "Based on this analysis, economic factors alone were sufficient to cause the observed growth in ethanol use."

The graph below shows historical volume percent of ethanol blended into US Gasoline as it spanned from nearly zero to ten volume percent over time. The paper asserts that if there were not logistic challenges to produce or distribute the E10, the E10 blendwall would have been met without an RFS program.



Summary

The analysis is performed with considerable detail in the methodology, data development, and analysis. The primary goal of this peer review is to review the work performed and provide opinions on how the approach may have influenced the outcome. I do not rework the problem.

I support that without a mandate, the blending up to the E10 blendwall would have likely occurred for some refiners. These refiners would have had favorable conditions at their site specific facilities to blend to E10, including but not limited to logistical advantages (ex: Midwest), operational disadvantages (ex: Octane short) and access to capital. It is also likely that individual refineries would have benefitted from ethanol blending at levels below E10. This volume percent is uncertain but it would have been evaluated as part of the refinery planning optimization – which is monthly for most refiners – and could have spanned from zero to ten percent based on prevailing economics.

The study offers compelling evidence of the value of ethanol blending to the industry; however, the uniqueness of refinery operations was not captured – a task that would be exceptionally challenging under any circumstance. The octane value and incremental barrels are persuasive reasons to blend ethanol, but these reasons alone do not validate specific opportunities (ex: location, configuration, geography, imports/exports, other blendstocks, operations), nor can they be rigorously analyzed in hindsight. Some examples include:

- Exporting less gasoline to make up domestic volume
- Exporting low valued blend components such as naphtha to make up octane
- Competition with other blendstocks such as alkylate, isooctane, and toluene
- Capital and operational opportunities for incremental octane and volume

Reasonable assumptions and strategies have been incorporated in the study, though my opinion is that the data integrity is insufficient to validate that the entire industry would have blended to the E10 blendwall. Additional notes which form this opinion include:

- Lack of granularity of refinery operations at the refinery site specific level
- Using historical pricing which had an RFS mandate to analyze how the industry would have reacted without an RFS mandate is problematic
- A mandate likely influenced incremental ethanol production investment decisions
- Octane price spreads and premium production was volatile over the study period which may have unclear impacts on backcasted ethanol values
- Using LP marginal values for this project analysis is premise laden. It assumes LP marginal values match the cost of octane production for the entire US refining industry

SPECIFIC CHARGE ISSUES TO BE REVIEWED

A. Review the appropriateness of the ethanol blending cost equation for representing the relative blending value of ethanol in gasoline.

A1. Ethanol Blending Cost Equation:

EBC = (ESP + EDC – ERV – FETS – SETS) - GTP
EBC = ethanol blending cost (estimates ethanol's net relative value to gasoline)
ESP = ethanol plant gate spot price (ethanol's market price at ethanol plant gates)
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ERV = ethanol replacement value (captures ethanol's octane and volatility value)
FETS = federal ethanol tax subsidy (federal tax subsidy to incentivize ethanol's use)
SETS = state ethanol tax subsidy (state tax subsidies to incentivize ethanol's use)

GTP = gasoline terminal price (baseline gasoline price to determine ethanol's relative value)

Response:

Mathematically, the equation is a reasonable, high-level approach for a blend value calculation. At an individual refinery level, LP based solutions provide more rigor and confidence. Applying a generalized equation to represent the entire downstream is highly premised. Every refinery has a different blend value versus the value predicted by the equation. In this study, state-level historical data is used to populate the equation and draw conclusions for the industry. This "state-level" approach is more granular than an aggregate "PADD Level" approach and less granular then estimating individual refinery blend values.

The calculation of Ethanol Blend Cost (EBC) represents what you paid MINUS the value. If you paid too much versus the value, the EBC is positive, meaning you lost margin on the transaction. If the EBC is negative, the value is greater than what you paid, and you would have increased margin on the transaction. This methodology is explained below.

The equation assumes the cost of ethanol at the gate (blender, terminal, rack) is ethanol FOB plus transportation to get it to the gate, represented by ESP + EDC. Next, removing the subsidies (FETS + SETS) from the refinery gate price is reasonable to calculate a true blendstock price if an RFS mandate had not been in place. What you paid to get the ethanol at the gate, excluding subsidies is ESP + EDC – FTS – STS, I will call that "A" – the cost of ethanol.

Next, the calculation of what the ethanol would be worth starts with the Ethanol Replacement Value (ERV). In the analysis the primary positive quality contribution of ethanol is the high octane, which is certain. The ERV is calculated versus gasoline (it is a premium/discount above gasoline). A positive ERV indicates the blend value is higher versus gasoline, and a negative indicates the value is lower than gasoline. The ERV is added to gasoline price (GTP) to get the absolute value (not a delta) of ethanol. I will call ERV + GTB the value of ethanol, represented by "B" – the value of ethanol.

Last, there is a calculation of what was paid "A" minus what it's worth "B." A negative indicates the blendstock value is higher what you paid, and a positive value means you paid more than the value.

A2. How well the included factors, when combined together in the equation, represent ethanol's relative blending value for blending it at 10 volume percent in gasoline.

The equation is a reasonable generic blend value approach as it attempts to establish a refinery gate price and a refinery gate value. The equation assumes that historical prices have captured the complexities of market dynamics, specific refinery operations, and blending strategies both with and without an RFS program. It assumes the historical prices would have been the same without an RFS program, which is unlikely.

Without a mandate, other options would have been explored by refiners. Some refiners may have determined ethanol blending made financial (optimal) sense. Others, would have investigated a range of options to optimize blending, including but not limited to:

- Exporting less gasoline to make up domestic volume
- Exporting low valued blend components such as naphtha to make up octane
- Maximizing octane production (reformer severity, C3 alkylation for example)
- Competition with other blendstocks such as alkylate, isooctane, and toluene
- Capital and operational opportunities for incremental octane and gasoline volume.

To be clear, two differently configured refineries side-by-side could have the same ESP, EDC, FETS, SETS, and GTP. The ethanol blend premium/discount (ERV) can be radically different. A refinery that is exceptionally "long" on octane (octane surplus) - would have little value for the high octane provide by ethanol. An example is operating a reformer at high severity to produce incremental hydrogen. This refinery makes high octane reformate that can exceed octane requirements. A refinery that is short on octane might place high value on the ethanol octane. In other words, the ERV's are vastly different. The blend equation (EBC) blend value methodology will predict identical (or remarkably similar) values, when we know the two locations place different values on ethanol.

As another example, alkylate prices in California have many times been much higher than the alkylate blend value predicted in a generic blend value equation. It is a superior blendstock for CARB gasoline. The term "green premium" reflects that some refiners pay higher than the octane/RVP blend value methodology. Restated, the blend equation can potentially do a poor job estimating the market value of alkylate. As another example, Light Straight Run (high RVP, low octane) has a blend value around 60% of gasoline (based on certain assumptions for RVP & octane). The reality is that some refiners cannot (or choose not to) blend off LSR in the summer months and blend it off in the winter. In this case the LSR blend value method grossly overstates the blendstock value for this refinery in the summer.

A3. Whether a negative EBC value is a fair indicator that ethanol is less costly than gasoline and would signal to gasoline blenders that ethanol be blended into gasoline if it was not already blended into gasoline or remain in gasoline if it was already blended into gasoline. Similarly, whether a positive EBC value would indicate that ethanol is more expensive than gasoline and not be blended into gasoline if it were not already, and potentially be removed from gasoline conditional to the concepts described in C.1 below.

Mathematically this is an appropriate. The application of this equation to the industry, and the data behind this approach is assumption driven which is discussed in other sections of this review. The EBC is the price paid minus the value provided. If ethanol value is higher than the price, the EBC calculation is negative which represents you received more blend value than you paid – this represents a buy signal. Accordingly, a negative EBC is a "buy and blend" signal.

The ERV is highly specific at individual sites and estimating specific site ERVs with public domain data is challenging. Extrapolating results from this generic mathematical representation to make an assessment for all the specific refineries that make up the US refining industry has intrinsic challenges.

A4. Whether other factors should be included, or should be considered for being included, in the ethanol blending cost equation.

Every refinery has a unique EBC (Ethanol Blend Cost). Most of the components of EBC can be reasonably estimated (ESP, EDC, FETS, SETS, and GTP). ERV (Refinery Value) for specific sites cannot easily be estimated and the ERV between all refinery sites has significant variability based on each refinery's operation. The study premise is that the equation for an aggregate region is in fact the "answer" for all the individual refinery sites in that region.

A challenge to this assumption is the exceptional number of variables that impacts ethanol value at any given location. The complexity of refinery operations and the remarkable number of variables which go to establishing ethanol value is significant. To condense these variables of all the specific refinery locations, into a single ethanol blend equation representative of the industry is debatable.

The T50 suppression impact is lacking in the ethanol adjustment. This is difficult to quantify, but it is a negative blending impact to some refineries. T50 is discussed later. Ethanol provides a positive blending benefit for low benzene (MSAT) program and low sulfur Tier 2/3 program which is not accounted for.

B. Review the appropriateness of the sources of data used for the values in the ethanol blending cost equation.

The use of historical price data which had an RFS program in place is compromised to analyze a scenario as if there was not an RFS program. The RFS program vitally changed the landscape of refinery operations, fuels production, supply/demand patterns – all of which impacts pricing & quality adjustments (e.g., the value of octane) that are essential parameters to the conclusions of the study.

The ethanol industry increased production capacity to keep up with RFS requirements. The construction of ethanol facilities had certainty that ethanol demand would increase under the RFS program. The extent to which incremental ethanol production would have constructed without an RFS program is uncertain.

Investment theory supports adjusting the discount rate for project risk. Ethanol project risk is lower when an RFS program is in place because there is more certainty for ethanol offtake, i.e., if there is a mandated ethanol demand increase, there is a "home" for the product. The discount rate for ethanol projects without an RFS program would be higher than with an RFS program because there is more risk when there is no product offtake versus product offtake guarantees. A higher discount rate (hurdle rate) will decrease the project NPV, which would reduce investment incentive. Project risk would be higher without an RFS program because there is less offtake certainty. The extent and amount of reduced investment is uncertain, but less investment would reduce ethanol supply. This changes market forces for supply, demand, and pricing. Without speculating on these impacts, it is sufficient to say the RFS program impacted the investment profile for ethanol production and blending. The historical price sets would be different if an RFS program had not been in place, the extent of which is speculative and challenges the conclusions.

B1. The use of ethanol spot prices to represent ethanol plant gate prices.

Using ethanol spot prices to represent ethanol plant gate prices is reasonable. Using historical ethanol prices when an RFS program is in place, to analyze hypothetical scenario without an RFS program is problematic.

B2. The estimated ethanol distribution costs to different states.

Using estimated distribution costs to different states, where the distribution is from the FOB source to the refinery gate is a reasonable methodology. The RFS mandate incentivized "de facto" distribution investment because the volume of ethanol to be distributed was increasing. Investment decisions to distribute ethanol when the volume of ethanol is mandated has lower risk than without a mandate. Using these historical distribution costs when an RFS program is in place is problematic to represent an analysis without an RFS program.

B3. The estimates for ethanol's octane blending value and volatility cost.

Using octane and RVP is a reasonable, initial approach for generic blend value calculations. Octane blending value has extremely high variability between specific refinery facilities. Some refiners "giveaway" octane, in which case there would be less incentive to purchase high octane blendstocks. Other refiners are short on octane and have more incentive to buy octane. Every blend from every specific refinery has a unique impact with ethanol addition. For example, a paraffinic gasoline responds differently to ethanol additions versus an aromatic pool – this distinction is not captured in a blend equation.

Using octane marginal values from LP models is problematic. SEE Discussion on Marginal Values.

The wholesale cost of octane based on ULP and ULR for the region (state) and is NOT the refinery cost of octane production. The cost to produce octane is site specific. The blend equation cannot capture the granularity of site specific octane cost or value.

With respect to ethanol there is another quality that impacted blending, which is called the "T50 suppression." The actual blending of ethanol reduced the T50 of gasoline greater than blend calculations predicted. For some refiners there was a cost to mitigate the T50 suppression. T50 suppression is not accounted for in this analysis.

B4. Adjustments used to adjust the factors for use in different years, particularly the use of both octane price (as estimated by the premium-regular grade price differentials), and crude oil prices to scale the estimated ethanol replacement costs to different years.

Adjustments made for octane using premium-regular price differentials are often used as an initial basis for octane value. It is a "rule of thumb" practice. If the historical prices and volumes of premium and regular have noticeable anomalies, the approach needs to be reviewed for the applicability. In other words, the wholesale price of octane does not always represent the cost of octane production. This is a disconnect that impacts the study because a significant value of ethanol is the high octane value. The refinery buys, sells and blends components into gasoline based in part on the cost of octane production at the refinery. The study uses market prices of ULP and ULR to estimate the value of octane – it could be reasonably accurate for some refiners, and it could be inaccurate for others. The extent that this influences the study cannot be quantified.

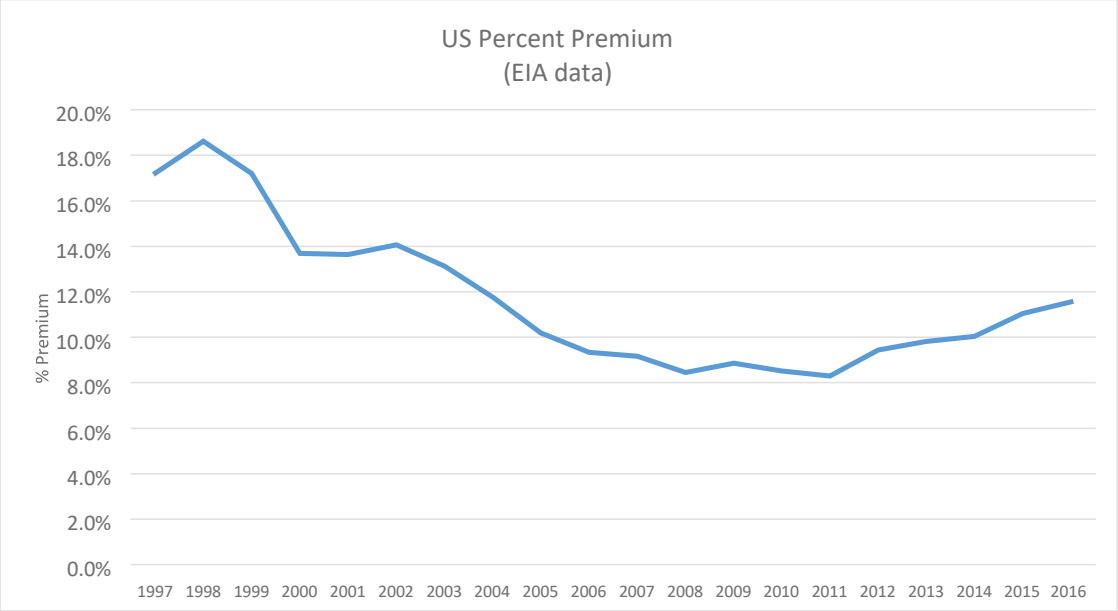
The use of the wholesale ULR and ULP prices assumes that the aggregate of all the specific refinery operations equals the reported price. I make assumptions that the aggregate response would have been the sum of all the individual operations out of convenience but need to be cautious to point these out.

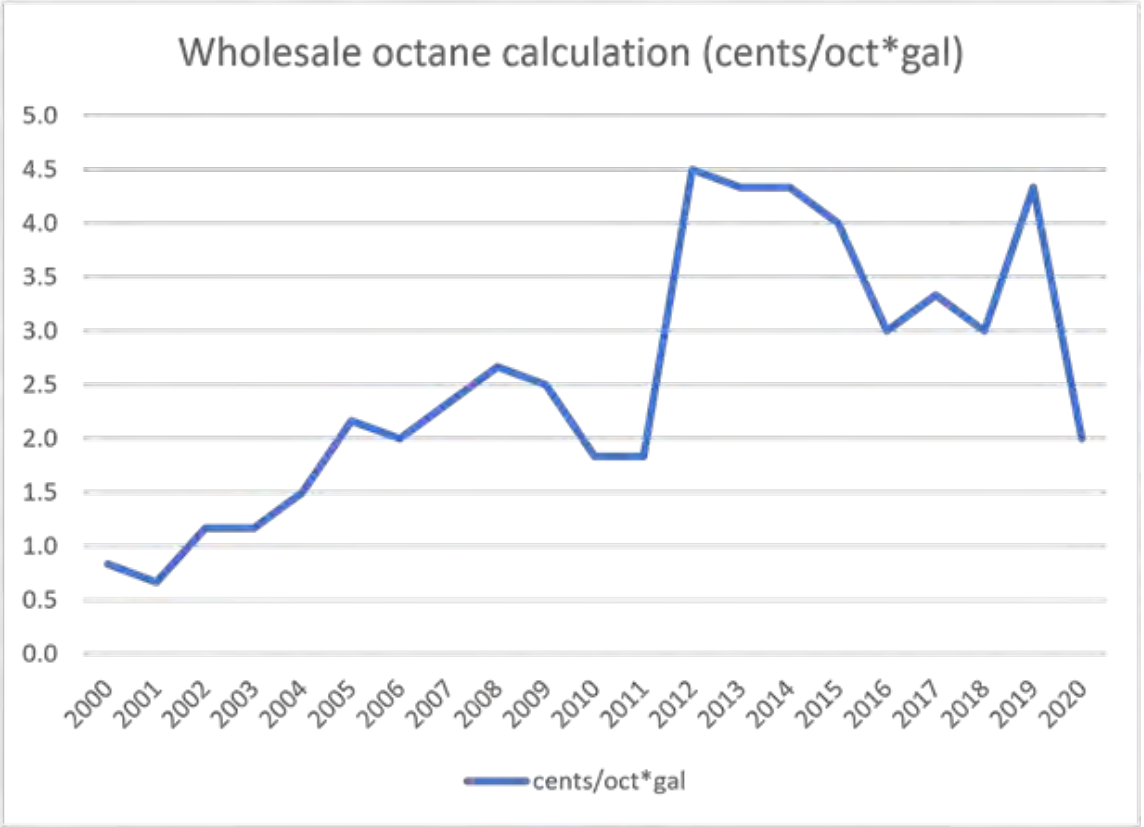
I am not familiar with the regression statistics to scale ethanol replacement cost to crude. A more granular approach would be refinery modeling for different periods versus scaling with crude.

Premium vs Regular. The analysis has no discussion on the anomalies of premium pricing or demand over the study time horizon. The graph below shows production of premium grade. When MTBE was phased out from 2003 – 2006, the precent premium dropped from 13.1% to 9.3%. The graph has a high of 18.5% and low of 8.3%, a substantial 10 percent drop.

The emphasis if this chart is to point out that historical premium-regular pricing was used for the analysis, during a period when clearly there were significant changes in demand for premium. During the same period there was a phase out of MTBE and the implementation of the RFS program. This demand change could be consumer behavior, cost of octane production, premium vs regular differential, the absolute price of gasoline or any number of other, or combination of events.

While there are many dynamic factors associated with premium sales (e.g., consumer behavior, cost of octane) – my comment is not intended to analyze why the premium production dropped. One reason for the premium drop could be the octane reduction associated with pulling MTBE out of the pool. It could be ethanol was priced high and some refiners chose to reduce premium production. If there was an octane shortage, ethanol could have shored up the octane balance and maintained premium production – yet premium gasoline production dropped. The answers to these questions are speculative.





Many refiners will agree the cost of producing octane is about 1 – 2 cents per octane gallon. This is reflected in the wholesale data from 2000 to 2010. This is reflective of reformer economics and is intended to represent what it costs the refinery to produce higher octane using reformer economics. When this price more than doubles from

2011 to 2012, it raises the question, why did the ULP-ULR differential change so much? It seems unlikely that the industry cost to produce octane doubled from one year to the next. This Peer Review is not intended to answer this question; however, it is to point out that using a price differential as a basis in the EBC equation can create uncertainty in the application of the equation for an industry conclusion. The graph shows that the value of octane can change dramatically year over year which will very much influence the EBC calculation. This points to the influence of historical prices.

B5. The use of refinery rack spot prices to represent terminal gasoline prices at the point ethanol is blended into gasoline.

This is my understanding of the terminology.

C. Review the appropriateness of the report conclusions.

C1. Corn ethanol profit made by corn ethanol plant producers incentivized them to build new corn ethanol plant capacity – does the data support such a conclusion?

Certainly, profit incentivizes new capital investment for incremental production

New investment is based on anticipation of the future. To a considerable extent, ethanol production investment was made with the certainly of ethanol offtake because of the RFS program. This fact changed ethanol investment decisions. Investment with a secure offtake (from the RFS mandate) is different than investment without a secure offtake.

Using historical data – with an ethanol mandate - to calculate the profit incentive for ethanol producers without a mandate can raise challenges.

C2. The conclusion that blending corn ethanol up to the E10 blendwall would have occurred anyways regardless of the RFS program (note that EPA did not conclude that the RFS did not have any impact).

Without a mandate, the blending up to the E10 blendwall may have occurred for some refiners. These refiners would likely have had site specific reasons to blend to E10, including but not limited to logistical advantages (ex: Midwest), operational disadvantages (ex: Octane short)

I think the data integrity is insufficient to validate that the entire industry would have blended to the blendwall. This includes:

- Lack of granularity of refinery operations at the refinery site specific level
- Using historical pricing with an RFS mandate to make conclusions on behavior without a mandate
- A mandate likely influenced incremental ethanol production investment decisions
- Using LP marginal values for this type of project analysis is premise laden

I agree with the EPA conclusion that the RFS did have “some” impact to E10.

C3. Inertia for using ethanol when match-blended into gasoline – do the investments needed in refining and fuel distribution coupled with ethanol’s volume and octane create a dependency on the part of refiners to continue to use ethanol during short time periods where ethanol may be uneconomical to use in a small, limited number of gasoline markets?

There are situations in the US refining industry where a specific refinery is dependent on ethanol's volume and octane, the extent of which is uncertain.

The US refining industry is resourceful and resilient and has proved its ability to balance supply, demand, and regulatory impacts. A refinery will minimize the cost of production. If a refinery uses ethanol to balance volume and quality it is because it is the least cost option to maximize margin. The study utilizes a blendstock value equation to represent the industry, but the industry does not use a blendstock value equation. The industry uses advanced LP optimization to determine the least cost strategies to meet the operating constraints.

From ethanol blending spanning 1% to 10% a dependency on external octane and volume was gradually created through the mandate. Consequently, there was no industry pressure to produce the 10% incremental gasoline volume nor to produce the incremental octane associated with the RFS mandate

Other Comments

Industry Optimization & Modeling
The use of advanced optimization software is prevalent in refining industry. The refinery LP is configured differently with an RFS mandate versus without the mandate. LP models provide different ethanol purchase and blending signals with and without an RFS program. These could have ranged from zero to ten percent based on prevailing economics. These decisions would have been made on a routine basis - monthly operating plans for most refiners.

Seasonal
The impact of seasonal specifications, prices, and blending economics is important. The analysis appropriately looks at summer and winter periods.

Marginal Values/Marginal Economics
The analysis incorporates "marginal" economics as stated in the report: "… the analysis used ethanol blending values based on its blending economics while blended into gasoline (marginal values; also called shadow values)."

Marginal economics represent "the next infinitesimal barrel" which could apply to a purchase, sale, or operation such as throughput or blending. The marginal value reflects how much the LP objective value will change for the marginal increment in the purchase, sell, or operation. Advance Linear Programming (LP) modeling systems calculate and report marginal values. In my experience, the best use of marginal values is for analytics. I review marginal values for "magnitude and direction" and talk in terms of "strong and weak" marginal values.

Using LP marginal values as primary data input is problematic for this study. In an LP model, there is the potential for a value to change dramatically based on operations "at the margin." For example, if a purchased FCC feedstock might have a high marginal value at the 5000th barrel, but the value could radically change if the refinery could not process the next barrel, the 5001 barrel, due to a capacity constraint. To understand the value of the feedstock, running successive runs -say at 4500, 5000, and 5500 (as example) is the appropriate way to value the feedstock. There is a difference between the marginal value and the average value. If the objective function increases by $50,000 for 1000 barrels of ethanol, the average value for the 1000 barrels is $50 (50,000 divided by 1000); however, the marginal value for the 1001st barrel could be $45 or $55 as an example.

LP Marginal values are based on the LP set up, the structure, the constraints, configuration, variables, assumptions – every input in the LP potentially impacts the marginal value. The marginal value for purchasing or blending an incremental barrel of ethanol in an LP model for the USA, PADD 3, USGC, or a specific refinery will all be different. In other words, the marginal value of octane or the marginal value of ethanol is site-specific and may or may not be reflective of the industry, state, or aggregate average.

I disagree with the use marginal values as a primary data source for an analysis of this significance.

COMMENTS RECEIVED FROM

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Final Revised External Peer Review of EPA Document

"Economics of Blending 10 Percent Corn Ethanol into Gasoline"

Office of Transportation and Air Quality Environmental Protection Agency

Reviewed by:

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March 4, 2022

Economics of Blending 10 Percent Corn Ethanol into Gasoline

The above-referenced draft EPA report was distributed to a group of peer reviewers along with a "Technical Charge" that provided guidance on how to perform the review and a series of specific questions to address. The structure of this review follows this guidance, with each of the main charge categories and subcategories being stated, followed by a response.

A. Review the appropriateness of the ethanol blending cost equation for representing the relative blending value of (corn) ethanol in gasoline.

A1. Ethanol blending cost equation: EBC = (ESP + EDC - ERV - FETS - SETS) - GTP

This equation appears to capture the most important factors that are relevant in assessing the costs of corn ethanol blending. (Blending of other ethanol – whether from sugarcane or cellulosic feedstocks – would require different EBC equations.) One factor explicitly excluded is Renewable Identification Number (RIN) value. Because this analysis is based on a counterfactual case without the RFS, it makes sense to exclude RIN values. But it would be good to provide a bit more explanation of this. Also, it should be mentioned that the gasoline terminal price (GTP) refers to gasoline that already contains 10 vol.% ethanol (E10), not E0. This fact slightly confounds the calculation of EBC.

A2. How well the included factors, when combined together in the equation, represent (corn) ethanol's relative blending value for blending it at 10 volume percent in gasoline.

On a gross scale, the combination of these factors provides a reasonable estimate of ethanol's relative blending value at 10 vol.% in gasoline. It's unclear whether they also provide reasonable estimates for other blending levels – particularly 15 vol.% (E15). However, because this study is focused on E10 blends, the EBC equation seems reasonable.

A3. Whether a negative EBC value is a fair indicator that (corn) ethanol is less costly than gasoline and would signal to gasoline blenders that ethanol be blended into gasoline if it was not already blended into gasoline or remain in gasoline if it was already blended into gasoline. Similarly, whether a positive EBC value would indicate that ethanol is more expensive than gasoline and not be blended into gasoline if it were not already, and potentially be removed from gasoline conditional to the concepts described in C.1 below.

Overall, a negative EBC value would indicate that ethanol is less costly than gasoline, while a positive value would indicate that ethanol is more costly than gasoline. However, the spatial and temporal scales must also be considered. The EBC values determined in this study refer to an entire state over a multimonth period (summer and winter). In reality, some of these factors in the EBC equation may vary substantially within a single state and on a shorter time frame. Thus, the EBC values calculated here would tend to dampen out some of the variability that actually occurs within the marketplace. It would be useful to provide some indication of the extent of EBC variability resulting from a more granular analysis.

A4. Whether other factors should be included, or should be considered for being included, in the (corn) ethanol blending cost equation.

As mentioned above, RIN values are an obvious factor that should be explained, though not included in the equation. Also, inclusion of ethanol tax subsidies (FETS and SETS) is a bit confusing. It might be helpful to include a graphical timeline showing the various levels of subsidies that existed in different places over the 20-year period of interest.

As mentioned in lines 214-216, "Other federal and state subsidies such as ethanol production subsidies, loan guarantees, grants and other subsidies, were not considered by this analysis." Accurate inclusion of such factors certainly would be complex, although they may well have contributed to business decisions regarding development of expanded ethanol production. It would be useful to include a table showing which states enacted such incentives, and the approximate level of the incentives.

B. Review the appropriateness of the sources of data used for the values in the ethanol blending cost equation.

B1. The use of ethanol spot prices to represent ethanol plant gate prices.

Use of ethanol spot prices seems like a reasonable approach, as these data are widely available and are regarded as reliable. However, I question the averaging of ethanol plant gate prices over an entire year. As shown in the Appendix tables, gate prices varied from a low of $1.12/gallon in 2002 to a high of $2.70/gallon in 2011. Surely there was considerable month-to-month variability in these values. It would be useful to say something about this variability and how it affected the final calculated EBC values.

It is stated in lines 247-248 that "Therefore, we also benchmarked ethanol production costs against ethanol spot prices to assess the likely profitability of ethanol over the time frame of this analysis." The value of this, however, seems questionable, as a single plant size was modeled. It is very likely that actual ethanol profitability varied with plant size. Also, in this analysis, it would be useful to graphically depict time trends of important modeling inputs and outputs, especially yields and utility costs.

A possible complication in this approach of using ethanol spot prices to represent ethanol plant gate prices is the role of ethanol imports and exports. Some comments should be made about the significance of imports/exports, and whether they somehow distort the ethanol plant gate prices that are estimated here.

B2. The estimated ethanol distribution costs to different states

The approach of utilizing regional distribution costs from the Midwest to other parts of the country is reasonable for corn ethanol produced in the Midwest. But what about ethanol imported into the country from other regions? How much imported ethanol was there in each year, and where was this ethanol distributed? Perhaps this is unimportant for the analyses done here, but the issue of ethanol imports should at least be mentioned. It might also be useful to the reader if a graphical display, such as a color-coded "heat map" of the U.S., was used to illustrate the wide range of distribution costs over different states.

B3. The estimates for ethanol's octane blending value and volatility cost.

Use of a refinery model to estimate ethanol's replacement cost is a reasonable approach to take. Also, adjusting these modeled costs (determined for 2020) to other time periods is reasonable. I am unable to judge the pros and cons of the specific adjustment methodologies used by EPA, i.e., adjustment based on gasoline premium grade and regular grade price differential, and adjustment based on crude oil prices.

B4. Adjustments used to adjust the factors for use in different years, particularly the use of both octane price (as estimated by the premium-regular grade price differentials), and crude oil prices to scale the estimated ethanol replacement costs to different years.

As shown in Figure 2, adjustments for octane price and for crude oil price give similar results for relative blending costs in most years. However, the agreement was quite poor for a few years. In particular, adjustments based on octane costs gave lower ethanol blending costs in 2015, 2016, and 2019; but higher ethanol blending costs in 2010 and 2011. The disagreement in 2016 was explained as resulting from a high value placed on octane during this time of very low crude oil prices (lines 339-353). Similar explanations should be offered (if available) for the other years in which agreement between these two adjustment approaches was quite poor. Given these discrepancies, it might be useful to investigate adjustments based on an average of these two methods, or some other adjustment methodology.

B5. The use of refinery rack spot prices to represent terminal gasoline prices at the point ethanol is blended into gasoline.

Given the ready availability of these data, use of refinery rack spot prices is a convenient and appropriate way to represent terminal gasoline prices. One limitation of this approach is that these gasoline spot prices are likely for E10, not E0. Thus, the price of ethanol is already partially included in these spot prices.

C. Review the appropriateness of the report conclusions.

C1. Corn ethanol profit made by corn ethanol plant producers incentivized them to build new corn ethanol plant capacity – does the data support such a conclusion?

The data certainly support this conclusion during the rapid ramp-up time period of 2004-2008, as shown in Figure 3. However, from 2015 onward, this does not appear to be the case. Of course, plant capacity expansion has been much slower since 2015, but according to Figure 3, modest capacity growth still occurred.

The observation that ethanol production costs significantly exceeded the ethanol spot prices in 20192020 raises questions about the suitability of this analysis, as such a situation is surely unsustainable over the long run. Are these results a consequence of the assumption of a single, typical-sized ethanol plant, whereas in reality, overall

production costs continued to decline during this period due to elimination of less efficient plants and expansion of more efficient plants? A little more discussion of these points would be useful.

C2. The conclusion that blending corn ethanol up to the E10 blendwall would have occurred anyways regardless of the RFS program (note that EPA did not conclude that the RFS did not have any impact).

On the whole, this conclusion is valid. However, there likely are specific times and places where blending ethanol up to the blend wall would not have occurred without the RFS program. Some sense of this could be provided by showing EBC values by state and by season. It would be very informative to present a few graphical depictions – perhaps maps of the U.S. with color-coding to indicate EBC values in each state.

The history of the RFS program has been fraught with disagreements and legal disputes about ethanol volumes to be blended each year. This suggests that at least some of the major stakeholders in the ethanol industry do not believe that blending up to the blend wall would have occurred anyways, regardless of the RFS program. The report should address this issue, and clearly explain any misunderstandings that may exist.

Based on this conclusion, the reader may deduce that the ethanol component of the RFS program could be eliminated, without any consequence on the amount of ethanol that is blended into gasoline. The report should discuss this issue, and assess whether such a deduction would be valid.

C3. Inertia for using ethanol when match-blended into gasoline – do the investments needed in refining and fuel distribution coupled with ethanol's volume and octane create a dependency on the part of refiners to continue to use ethanol during short time periods where ethanol may be uneconomical to use in a small, limited number of gasoline markets?

Clearly, investments made to refining and distribution infrastructure, as well as the positive volume and octane attributes of ethanol, create on-going incentives to utilize ethanol for short time periods, even when doing so is uneconomical. However, the definition of "short time periods" likely varies, depending upon the specific situation being faced by the refiner. Thus, the concept of "logistical inertia" for continuing to use ethanol is probably valid, but likely applies unequally spatially and temporally, making it difficult to conduct a uniform economic assessment. The fact that debate continues regarding required ethanol blending values suggests that this logistical inertia is not always very strong.

COMMENTS RECEVIED FROM

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External Peer Review of EPA's Draft Technical Report:
"Economics of Blending Corn Ethanol into E10 Gasoline"
Technical Charge to External Peer Reviewers
Contract No. 68HE0C18C0001
Work Assignment 3-13

BACKGROUND

The following constitutes the peer review undertaken by myself, Martin R Tallett, of the draft EPA technical report, "Economics of Blending Corn Ethanol into E10 Gasoline", under Technical Charge to External Peer Reviewers, Contract No. 68HE0C18C0001, Work Assignment 3-13.

My review draws on my fifty-plus years of international experience both within and consulting to the petroleum industry, including, *inter alia*, direct refinery planning, scheduling and gasoline blending, supporting the EPA, Department of Energy (DOE), Energy Information Administration (EIA), American Petroleum Institute (API), and others since the late 1980's in evaluating the refining, market economics and trade implications of changes in US (and worldwide) fuels specifications, including the US reformulated gasoline RFG program and the RFS; also, extensive testimony over the past 19 years on behalf of the States of New York, New Jersey, New Hampshire and Pennsylvania, the City of New York and others regarding the use of MTBE versus ethanol in US gasoline, with emphasis on the technical and economic feasibility of using ethanol versus MTBE, hence refining/blending technical and economic factors, distribution costs and market/supply cost effects, among others.

In undertaking this review, I examined the draft report itself, its primary appendix (Appendix 4); also, an Excel file containing the detail of the results tabulated in Appendix 4, source materials EPA drew on and third-party source materials I used as cross-checks. The latter are cited where appropriate in the body of my report below. The primary 'period of interest' of the EPA report is 2000-2020. I have focused my remarks on that period while, where I deem relevant, also covering the pre-2000 period.

The EPA report was summarized to me as follows:
The increase in ethanol blended into U.S. gasoline is often attributed to the Renewable Fuels Program (RFS), however, other factors such as rising gasoline prices and the phase-out of MTBE were also factors. Determining whether corn ethanol use occurred due to economic factors versus the RFS program is important for attribution of any cost, health, or environmental impacts of using corn ethanol. EPA conducted a detailed economic study of ethanol's blending cost into E10 gasoline, including octane and volatility costs, production cost and spot prices, distribution costs, and federal and state subsidies, while omitting RIN values, to assess whether ethanol would have been economical to blend into gasoline regardless of the RFS program. The analysis found economic factors alone were sufficient to cause the observed growth in ethanol use.

In conducting my review, I was specifically asked to:

- Respond to the specific charge issues as presented below.
- Explain and justify my rationale for my responses to the charge issues.
- Comment on any other issues in the report or report appendix that I deem important.

My report is set out below. **SPECIFIC CHARGE ISSUES REVIEWED**

A. Review the appropriateness of the ethanol blending cost equation for representing the relative blending value of ethanol in gasoline.

A1. Ethanol Blending Cost Equation:

EBC = (ESP + EDC – ERV – FETS – SETS) - GTP

EBC = ethanol blending cost (estimates ethanol's net relative value to gasoline)
ESP = ethanol plant gate spot price (ethanol's market price at ethanol plant gates)
EDC = ethanol distribution cost (cost to move ethanol to downstream markets) ERV = ethanol replacement value (captures ethanol's octane and volatility value)
FETS = federal ethanol tax subsidy (federal tax subsidy to incentivize ethanol's use)
SETS = state ethanol tax subsidy (state tax subsidies to incentivize ethanol's use)
GTP = gasoline terminal price (baseline gasoline price to determine ethanol's relative value)

Response:

My overall assessment is that I find this equation to be sound, in principle, subject to one possible caveat that I set out below. I am viewing the equation as reflecting the value the refiner or blender would assess for ethanol as a blendstock into gasoline. In that context, I believe it fully reflects the components of value and cost the refiner/blender would see. Under Section B below, I have commented on the specific price, cost and volume data used by the EPA and so, here, I have confined my comments mainly to the principle of whether ethanol blending cost equation is sound.

1. **Form of the Equation**. Having worked with and explained terms and examples in preparing this review, I have one overall reaction to the form of the equation, namely that I find it difficult to work with the result that the greater the negative value of the EBC, the more attractive ethanol is as a blend component and *vice versa*. In my view, it would be cleaner, and easier to understand, if the equation were reversed so that the "EBC" term became EBV, Ethanol Blending Value. Then, the situation would be that the greater the positive value the greater the attractiveness of ethanol and *vice versa*. So, the form of the equation would be: EBV = GTP - (ESP + EDC – ERV – FETS – SETS). Note, however, that everywhere throughout my review I have referenced the equation in its original form.

2. **ESP and EDC.** It is logical to start with the ethanol plant gate spot price (ESP) and then add to that the cost of distribution/transportation (EDC) to the point where it will be blended into gasoline, generally a terminal from which finished gasoline will be sent out, usually by truck, for final distribution to retail stations or other customers. (Ethanol generally has to be transported from its point of production to a terminal separately from gasoline itself because of ethanol's affinity for water, i.e. it is rarely transported with the main gasoline stream; hence the need to assess the cost for separate transportation, usually by rail, barge, truck or some combination thereof.)

3. **ERV**. In reviewing the ERV term, I make a distinction between what, to me, are two different scenarios which focus on different potential components of ERV. The EPA analysis is based on use of ethanol at 10% concentration. So, to me, the first scenario, is where the <u>ethanol is</u> <u>assumed to be available or required to be blended</u> at 10% concentration and that, therefore, the question, in terms of "ERV", is – given the ethanol is available, what effects do its physical properties have on its blending value in gasoline? The second scenario is the one where <u>ethanol</u> <u>is not necessarily available, or where the refiner/blender has the choice to either use ethanol</u> to make up 10% of the gasoline or to produce and blend other streams that will make up the lost volume and enable the finished gasoline to be still produced 'on specification' and so the question posed is - how does the blender replace that ethanol, i.e. what is its replacement value? Thus, in the discussion below, I make a distinction between 'blending value' and 'replacement value' when referring to ERV as, in my view, these call for two overlapping but essentially different sets of considerations. Both are relevant considerations, but they should not be conflated or considered additive because they are really 'either or'. Straight 'blending value' relates more to the actual history where the RFS mandated use of ethanol, so it had to be blended into gasoline. 'Replacement value' relates more to a situation where there

had been no RFS and where, among refiners/blenders, choice between ethanol and alternatives was an option.

a. **Blending Value.** The combination of ESP + EDC provides the delivered cost of ethanol, but it does not reflect ethanol's blending value in the gasoline into which it will be blended. The EPA draft report is correct to point out that ethanol's replacement value (ERV) depends on the situation. In the earlier years of ethanol's use, it was often 'splash blended' into conventional gasoline primarily to add volume. In this situation, no value was necessarily gained from ethanol's high octane. The effect of 10% ethanol raising gasoline blend volatility (Reid Vapor Pressure – RVP) by approximately 1 psi was allowed for through a 1 psi waiver. This situation changed, especially with the advent of the RFG program, starting in 1995. Under that program, the quality of roughly 30% of US gasoline (RFG) was controlled under initially the Simple Model and then the Complex Model to achieve reductions versus a baseline in emissions to air of volatile organic compounds (VOCs), nitrous oxides (NO_x) and toxics. In addition, the emissions of the remaining conventional gasoline (CG) were not allowed to deteriorate versus baseline. These and subsequent regulations, notably EPA toxics 'anti-backsliding' regulations which were brought into force with the RFS in 2006, and later Tier III to achieve ultralow sulfur standards, meant that, from around 1995 on, ethanol has mainly been blended into gasoline taking full account of its physical properties; "match-blending" is the term used by the EPA. Ethanol's blending – or replacement – value in gasoline thus became very much a function of what type of gasoline it was being blended into, where and when. Key factors included: whether the gasoline was RFG or CG, (to which a 1 psi RVP waiver generally applies), northern tier or southern tier, (which affected effective maximum allowed RVP in Summer), season of the year (tighter regulations for emissions and hence RVP applied in the Summer rather than in Winter) and gasoline grade (premium versus regular). Taking these factors together with ethanol's combination of advantageous high octane and disadvantageous high RVP means accurate replacement value must therefore be computed for specific situations – grade, season, location, etc. (as the EPA did undertake per their report and detailed results tables in Appendix 4). I discuss that further under Section B but, in principle, the EPA are correct to include the ERV term in their equation. The ERV term must necessarily reflect the differences in ethanol's physical properties, both better and worse, relative to the target qualities of the finished gasoline.

b. **Replacement Value.** As described above, there is also an element of replacement/opportunity cost for the lost volume should ethanol not be available and/or should refiners have a choice whether to use ethanol or alternatives. Essentially, what would a refiner do to replace lost ethanol volume and quality by, most likely, running incremental crude oil and altering refinery operations, potentially also process equipment, and gasoline blend compositions, to end up at the same total volume of gasoline supply with all produced gasoline grades still 'within specification'. Again, I see this as a valid consideration but one which potentially needs to be viewed separately from the 'blending value' of ethanol at 10%. A lot depends on how each value has been arrived at, i.e., whether there is potential for double-counting.

4. **FETS and SETS**. Federal and state tax subsidies for ethanol play directly into the net cost to the gasoline blender of supplied ethanol and therefore are appropriate to include in the EBC equation. If, for example, there had been no ethanol subsidy to reduce the final cost paid by the blender, then the blender would necessarily have had to have assessed the value of the ethanol as blendstock *sans* subsidy(s).

5. **GTP**. Gasoline terminal price (GTP) is an appropriate final component in the EBC equation in large part because it is necessary, whenever possible, to compare stream values at the same location. Since ethanol is generally blended at the terminal, it is therefore appropriate to bring relevant prices to the terminal location

(as with ethanol computed as ethanol plant spot price plus distribution cost to the terminal) and/or use prices quoted directly at the terminal location (as with the finished gasoline).

6. **Caveat.** As noted above, I would place a caveat on the use of the terminal gasoline prices. These are, I understand, for finished gasoline sold on for final distribution. In a 10% ethanol world, the finished gasoline price is therefore made up of 10% delivered-to-terminal ethanol price plus 90% the price of the non-ethanol component of the blend, again at the terminal. The latter is referred to as "RBOB" (Reformulated Gasoline Before Oxygenate Blending) where the product is RFG and "CBOB" (Conventional Gasoline Before Oxygenate Blending) where the product is CG.
So, taking the case of RFG/RBOB, one could rewrite the EBC equation as follows, Firstly, GTP = 0.1*(ESP + EDC) + 0.9*(RBS + RBD) where RBS equals the spot price for RBOB in a relevant major regional market and RBD equals the cost of RBOB distribution from that market to the terminal. For example, for a terminal in say New Jersey, the delivered cost of RBOB could be computed as either the US Gulf Coast spot price for RBOB plus transport (most likely via pipeline) to New Jersey or the New York Harbor spot price for RBOB plus the cost of transportation to New Jersey (most likely via barge). (Given the competition in that market, I would expect delivered RBOB prices derived either way to be very close to each other.) Secondly, substituting in the revised equation for GTP leads to an adjusted EBC equation as follows: EBC = 1.0*(ESP + EDC) – ERV – FETS – SETS – (0.1*(ESP + EDC) + 0.9*(RBS + RBD)) or, in final form, EBC = 0.9*(ESP + EDC) – ERV
– FETS – SETS – 0.9*(RBS + RBD). While this revised equation could be considered more 'rigorous', and I wish to point out the possible 'flaw' of including ethanol price effectively twice in the EPA equation, I am unconvinced the revised form would lead to practical advantages over the original equation. Firstly, the supply cost of delivering RBOB to the terminal is necessarily implicitly built in to the terminal gasoline price GTP. Secondly, (see also Section B), the EPA was able to obtain published 'rack' prices at multiple points across the US in order to calculate EBC values, again, at multiple points across the country. In contrast, RBOB and CBOB prices are often only published for a small number of major market centers.1 Thus, depending on the sources used for RBOB and CBOB pricing, it could mean that multiple distribution costs for RBOB and CBOB would have to be calculated. While this is also true for ethanol, RBOB/CBOB comprises 90% of the gasoline and so any error or uncertainty in transportation costs to terminals would have a commensurately greater impact on the final assessed EBC. Given this situation, I believe it is reasonable to accept the form of the equation as proposed by the EPA.2

7. **Note on Time Effect.** Had the EPA analysis used prices for a given day, notably ethanol plant spot price (ESP) and terminal price (GTP), to arrive at their ethanol blending cost (EBC), then timing offsets on those prices could have been a factor for the simple reason it takes time to deliver ethanol to the terminal and then more time before it is finally used in the blend that is delivered out and priced on the day of outward shipment. However, my understanding, based on examination of data and review of the draft report, is that the EPA used annual average prices as their starting point. This would render *de minimus* any possible issues because of pricing time offsets.

8. **Bottom Line.** As I have described, it is conceivable that the EPA could have taken a somewhat different approach to arriving at ethanol blending cost (EBC) by using RBOB/CBOB prices plus distribution costs to terminals, rather than using terminal gasoline prices (GTP) which implicitly embody the price of 10% ethanol in the product. At the practical level, however, I believe the methodology and equation, and hence price and cost elements, applied by the EPA were acceptable and sufficient to produce reasonable results, given the objectives of the analysis.
(Again, see Section B for commentary of specifics of the data used.)

A2. How well the included factors, when combined together in the equation, represent ethanol's relative blending value for blending it at 10 volume percent in gasoline.

Response:

As I describe above, I support the terms used by EPA in their EBC equation and believe the overall methodology employed was reasonable. I do not see the need to either remove terms from the equation or to add new ones. Since the individual elements in the equation work, and are sufficient, it follows that "the included factors, when combined together" work.

A3. Whether a negative EBC value is a fair indicator that ethanol is less costly than gasoline and would signal to gasoline blenders that ethanol be blended into gasoline if it was not already blended into gasoline or remain in gasoline if it was already blended into gasoline. Similarly, whether a positive EBC value would indicate that ethanol is more expensive than gasoline and not be blended into gasoline if it were not already, and potentially be removed from gasoline conditional to the concepts described in C.1 below.

The short answers to these two questions are: "yes" and "yes". Bear in mind that EBC equals Ethanol [net] Blending Cost relative to the value of gasoline. So, as stated in the question, a negative Cost (EBC) means the ethanol is net cheaper than the gasoline it is being blended into and a positive Cost (EBC) means more expensive. By virtue of the way the equation is constructed, a positive value for EBC means that the total delivered cost of the ethanol (to the terminal) net of its replacement/blending value cost/benefit, (i.e. EBC is lowered if the ethanol has net positive blend attributes/value3 and *vice versa*), and net of federal and any state tax subsidies, is still above the terminal gasoline price (GTP) and therefore not economic to blend into the gasoline. Correspondingly, the reverse is true. Given my view that the EPA's EBC equation is reasonable, it is therefore reasonable that the EBC, and whether it is negative or positive, represents a "fair indicator" of ethanol's value to a blender and therefore the incentive or disincentive to blend it into the gasoline.

Whether a refiner or blender would in fact elect to remove ethanol from its gasoline in a situation where the net blending cost for the ethanol is higher than the value/price of the gasoline (EBC positive) would depend on a number of factors. It is not easy to change refinery operations to replace a 'lost' oxygenate (whether MTBE or ethanol). This is especially the case for RFG where the essential absence of sulfur, aromatics, olefins in the oxygenate is important in 'diluting' adverse gasoline properties and thus in achieving emissions standards. It is also not easy to replace the lost octane. In addition, logistics systems including terminals and supply contracts are set up to generally run on the basis of a given proportion and supply of ethanol, again difficult to change. Therefore, even if there were no RFS mandating certain volumes of ethanol in gasoline, I would not expect refiners and blenders to switch in and out of ethanol use on a short-term basis; only to switch if there were some long-term change in the economics of ethanol use or its supply.

A4. Whether other factors should be included, or should be considered for being included, in the ethanol blending cost equation.

Response:

As discussed under A.2, I do not see any factors as being needed for addition into or removal from the EPA equation.

B. Review the appropriateness of the sources of data used for the values in the ethanol blending cost equation.

As noted above, my review under Section A focused primarily on the principles and methodology embodied in EPA's approach. Here under Section B, I focus in on the specifics of the data used by EPA. In that regard, I have one overall reaction/comment. I have relied, *inter alia*, on spreadsheet (Excel) data provided by the EPA containing price and related information which was used to create the tables in Appendix 4. Based on my work over many years with complex modeling systems and data, I and my colleagues have learned the hard way that it is very easy in Excel to

set up formulae that may be in error, especially when referencing data elsewhere in the workbook, and/or which are difficult to verify. I see that the EPA Excel file provided uses some lookup formulae but primarily relies on direct cell references from one cell to another, e.g. to pick up a price from a different page. Again, from experience, this is a dangerous method, as well as basic. It is far safer to use named ranges and lookup formulae to the maximum extent possible.

One consequence of the EPA approach is that, while I have undertaken limited spot-checking of formulae and data, I have not, because of the formulae EPA used, been able to verify to my satisfaction that the correct data are always being referenced and thus that results obtained and portrayed are consistently accurate. All of my comments below are underlain by this major caveat. In short, I am largely reduced to trusting not verifying that the EBC equation results EPA have produced are correct.

B1. The use of ethanol spot prices to represent ethanol plant gate prices.

Response:

I do not profess to be expert in the detail of ethanol production and associated pricing but I would make the following comments:

1. I understand that a significant amount of ethanol is traded based on term contracts. These individual contracts may or may not correspond closely to spot price at any one point in time and location but, in my experience, most or all prices are linked to some form of 'marker' so that the price received or paid will reflect market conditions. Neither the buyer nor the seller can afford to take the risk of setting a price that is not in some way market linked unless the contract is extremely short term. I have, in the past, seen evidence of ethanol (and MTBE) pricing being linked to some form of gasoline price, thereby embodying the blending value of the ethanol. Since spot price for ethanol where the intended use is in gasoline must reflect ethanol's value, at least into the 'marginal' gasoline blend, e.g. conventional rather than reformulated gasoline, I would expect ethanol spot price to be a reasonable representation of ethanol's value into gasoline at that point in time.

2. In the 1990's, and possibly early 2000's, ethanol production in the US was concentrated in the hands of a few suppliers that held a large portion of the supply. Whenever there is that situation, there is the possibility of periods when a published spot price may be open to question. However, since the yearly 2000's, US ethanol production has grown dramatically, from around 1 billion gallons annually in the mid-1990's to around 16 billion gallons in 2017/18/19. See chart and EIA data.

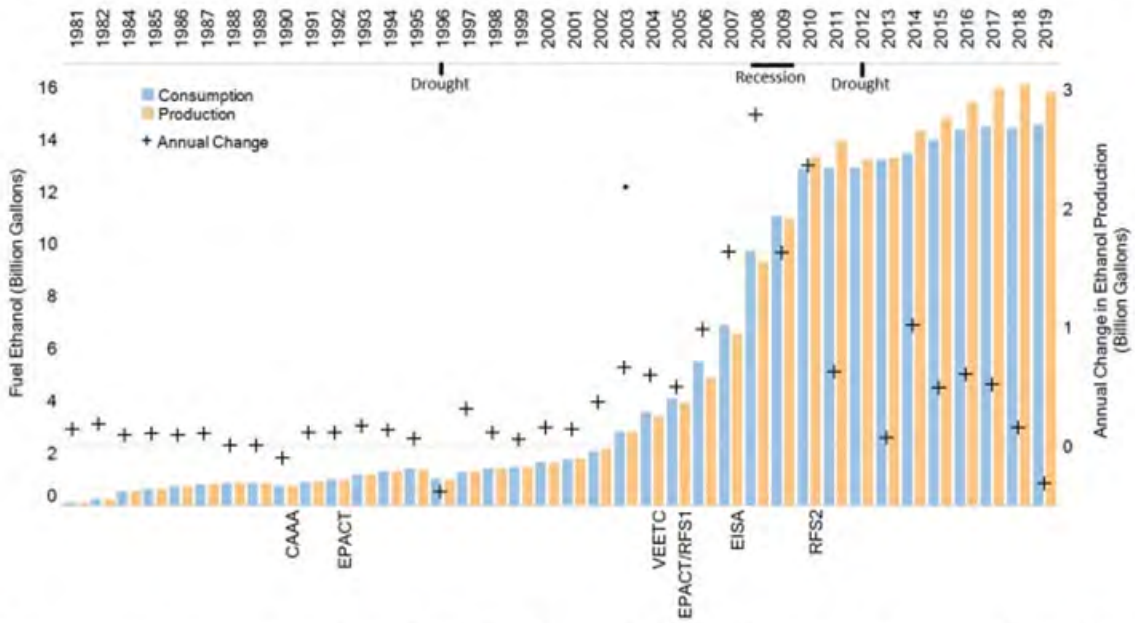
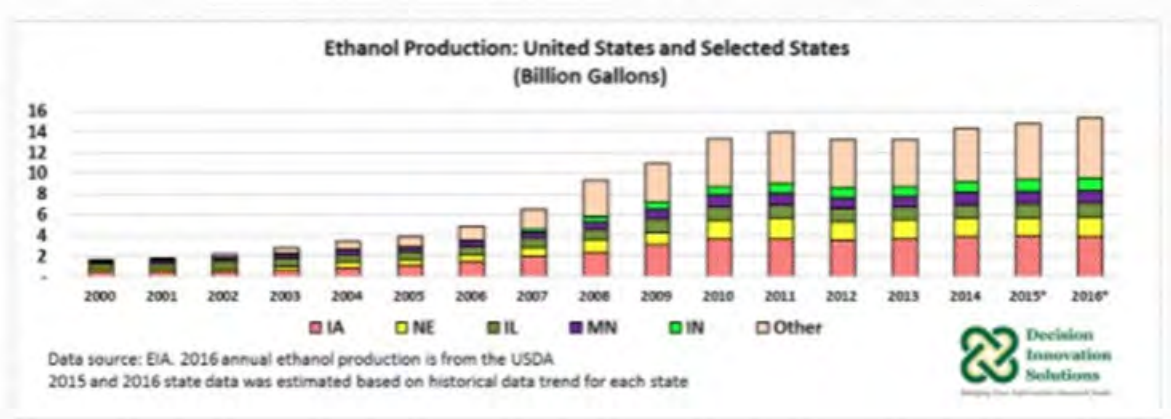


Fig. 1. Annual production and consumption of ethanol in the United States (left axis and bars) and the change from one year to the next (right axis and plus signs) from 1981 to 2019 (note different y-axis zero levels). Units are in billions of gallons per year. Production was greater than 56% of capacity in all years, with an average of 88% and median of 91% (Alternative Fuels Data Center, 2020). Data are from the U.S. Department of Agriculture (USDA Economic Research Service, 2019). Timing of key federal policy events is shown below the figure (CAAA=Clean Air Act Amendments of 1990; EPACT = Energy Policy Act; VEETC = Volumetric Ethanol Excise Tax Credit; RFS = renewable fuels standard; EISA = Energy Independence and Security Act of 2007). Timing of droughts and recession is shown at the top of the figure.

Ethanol production has also become more geographically diversified (see chart below and map) and has attracted in a large number of producers, some of whom are oil companies that have vertically integrated into ethanol production.



In addition, the US ethanol market experiences both appreciable imports and exports of ethanol. The point is I see this substantial growth, maturation, diversification of regional supplies and producers, and interaction with international markets, as all moving the ethanol supply industry to a situation where I would argue ethanol spot prices should be a sound reflection of current, i.e. short term, supply/demand, and therefore appropriate for the EPA to have used in their analysis. I would further point out that spot

price tends to reflect marginal economics, the cost of the next/last 'gallon' of supply or demand and that it has been evident for many years in the global petroleum and refining industry that it is spot/marginal prices that drive the industry. They essentially define the economics of the petroleum industry and, therefore, I would see the same applying to ethanol for use in gasoline.

B2. The estimated ethanol distribution costs to different states.

Response:

The EPA's estimates of ethanol distribution costs to states were based directly on work undertaken by ICF and are described in Appendix 4 of the EPA report. There appear to have been three steps taken to build up assessed full distribution costs: 1. Source market (plant gate) to destination market main distribution point (unit train terminal) – assessed as difference between ethanol spot prices at the two locations, plus 2. Average onward distribution cost from main unit train terminal to final distribution terminal – assessed at a flat average cost (11 cents per gallon), plus 3. Average amortized capital cost for building the necessary distribution infrastructure (an array of rail, terminal and marine facilities) – assessed at an overall average cost (6.5 cents per gallon). These costs were adjusted as deemed necessary to a 2017$ basis and then summed to establish the assessed fully-built-up ethanol distribution cost to each state. I understand a point or points in the Midwest were taken as the basis for plant gate spot price; given the Midwest is the primary region where ethanol is produced and, therefore, also the likely source of marginal ethanol supply. The resulting costs were estimated (in 2017$) to be in the range of around 25-35 c/gal for distribution to mainland states outside the Midwest and 18 c/gal to Midwest states.

In past MTBE litigation, I have developed estimates of ethanol distribution cost (including terminaling) from the Midwest to the Northeast (generally the New York, New Jersey area). Adjusted to a 2017 basis, these were appreciably lower than the costs estimated by the EPA. There may be an element of doublecounting or over-estimation in the EPA method. Spot prices are fundamentally short-term, but, over time, one would expect the difference between prices at a source and a delivery location to reflect the costs of capital recovery on the related infrastructure, otherwise the organizations operating the distribution system would be running at a loss. So, a first reaction is that some or all of the 6.5 c/gal amortized facilities cost may in fact be 'rolled in' to the spot price differential.

Secondly, I have not been able to examine the original ICF report but Table A.2 in Appendix 4 has a 7 c/gal distribution cost to Chicago included in every onward distribution, i.e. every distribution route is assessed as passing through Chicago, irrespective of whether the final destination is to the East Coast, the South or the West Coast. I can appreciate why this may have been done in order to be able to utilize price series only available at Chicago but it strikes me this assumption may overstate costs for primary distribution, at least on some routes.

Thirdly, I have, again, not been able to examine the basis for the assessed cost for the assumed final distribution stage from (assumed) unit train terminal to distribution terminal, but the 11 c/gal the EPA uses is substantial. For example, Table A.2 in Appendix 4 shows distribution cost to Chicago of 7 c/gal, plus 7.7 c/gal from Chicago to New York then the standard 11 c/gal to the final blending terminal, for a total cost of 25.7 c/gal (excluding the 6.5 c/gal for capital recovery on infrastructure). Thus, in this example, the cost for transport for the last step from main destination market terminal to final blending terminal comprises 43% of the total transport cost from the Midwest. It appears as if ICF or EPA assumed a relatively long-distance final transport by truck for the final distribution step to arrive at this significant cost. I can appreciate that using truck for this final step is realistic, indeed generally necessary, for distribution terminals that do not have rail facilities.

In practice, I would expect there to be more flexibility in the distribution network and somewhat lower costs. If one allows for a lower final-step distribution cost and/or none or only part of the infrastructure capital cost recovery, (on the basis set out above), then total distribution cost from the Midwest would come down from 25.7+6.5 = 32.2 c/gal to somewhere closer to 20-25 c/gal, a level much closer to the figures I have used in prior MTBE cases. In summary,

my sense is the distribution costs EPA has estimated may well be conservative on the high side, especially in terms of average distribution costs.

To the extent that is the case, i.e. that the distribution costs assessed for ethanol are conservative on the high side, then they lead to ethanol's delivered costs in the EBC equation also being conservative on the high side. They raise, possibly overstate, the assessed delivered cost of ethanol to the terminal, and thereby build in a safety margin by lowering ethanol's economic value versus gasoline. (This
conservatism would make the EBC value less negative / more positive.) In other words, my sense is that EPA's assessment of ethanol distribution cost (EDC) has led to a conservative view of ethanol's attractiveness based solely on economics.

B3. The estimates for ethanol's octane blending value and volatility cost.

Response:

To evaluate this, I reviewed the description of methods used in both the main EPA report and in Appendix 4. I also examined detailed spreadsheet data underlying and leading to the EBC tables presented in Appendix 4. With respect to ethanol's volatility cost, I have no issues with the methodology used and the order of magnitude values produced. It must also be born in mind that the RVP penalty is only significant in Summer gasoline because that must be blended to a relatively tight RVP level. In Winter, gasoline RVP can be much higher (often approximately twice the 7 or so psi effective in the
Summer). It can be argued that there is still a small negative RVP effect and cost for using ethanol in Winter gasoline, but the effect is minor and can be inexpensively dealt with, namely by if necessary backing out a small amount of butane from the Winter blend. Overall, I do not fault the EPA for not accounting for this potentially very small cost.

My main interest was with the way the EPA computed ethanol's octane value. The ERV calculations appear to have embodied the replacement cost values developed by ICF from refinery modeling of the, essentially long-term, costs of replacing the lost volume of ethanol as well as octane. These costs, I understand, include refinery capital investment / process capacity as well operational and blending changes. At any single point in time, I would expect ethanol blending value relative to gasoline to be based on its octane benefit minus its RVP cost (at least in Summer). However, valuations in the industry depend very much on opportunity cost. So, I would say that what represents the relevant opportunity cost depends on the situation.

If we say that ethanol use is mandated, the refiner/blender must use 10% ethanol in gasoline, then the blending value of the ethanol comes down, in my view, solely to its physical property effects, primarily octane benefit and RVP cost. In that scenario, I would say that the appropriate valuation method is direct assessment of octane benefit and RVP cost. As stated elsewhere, though, ethanol blended into RFG also brings other benefits since it helps meet RFG emissions standards through its 'dilution' of adverse blend properties, (aromatics, benzene, olefins, sulfur). The EPA does not appear to have taken this additional blending value into account with respect to RFG and therefore may be understating ethanol's blending value in RFG in this regard.

The other potential scenario is one where ethanol use is not mandated and therefore where, at least in principle, the refiner has the choice to either use ethanol or to rework refining assets, operations and blending to use other blend streams instead. Here, the work undertaken by ICF is directly relevant since they modeled exactly this situation and assessed the fully built-up costs, i.e. including capital as well as operating, of not using ethanol. This scenario is I believe closer to the situation the EPA was aiming to evaluate – what would have been the economics of using/not using ethanol had there been no RFS mandate, and would ethanol use still have been economically justified?

Given this, I have no issue in principle with the fact that EPA followed this method of arriving at ethanol's blending 'replacement value' (ERV). This still begs the question, though, as to whether there is a significant difference in valuing ethanol based on its 'replacement value' or simply on its blend octane value (net in both cases of its RVP

costs). To test this, I undertook a spot check of EPA's data. I used 2010 as a middle-of-the-road year for ethanol's EBC value and then picked the ERV for Summer RFG Premium. This is stated by the EPA as $0.534/gal. That figure is in turn made up of $0.785/gal octane value minus $0.25/gal RVP cost. Given, in 2010, EPA estimated the EBC for all Summer RFG Premium at (-)$1.159/gal, the effect of the $0.785/gal octane value is significant. I compared the $0.785/gal with octane value I estimated from EPA data for price of premium versus regular gasoline. For 2010, the differential was $0.114/gal. However, that relates to a 5-octane typical difference between Premium and Regular (92 [RON+MON]/2 for the former, 87 for the latter). In contrast, the EPA states an (RON+MON)/2 octane value for ethanol of 115, or an increase of 23 octane numbers versus Premium. Ratioing up the $0.114/gal by 23/5 leads to $0.53/gal. If anything, this may be an understatement of ethanol's octane value since octane value can be considered as rising more than linearly as octane is increased. Bearing that in mind, and recognizing this was only one spot-check, there appears to be a reasonable degree of similarity between 'straight' octane value based on Premium-Regular price differences (i.e. a figure above the $0.53/gal I estimated) and 'octane value' based on replacement cost as per the ICF analysis,
i.e. the EPA's calculation of $0.785/gal. Since the $0.785/gal represents full replacement cost, it may be conservative on the high side. However (a) I noted above that the EPA do not appear to have taken into account ethanol's 'dilution' value in RFG and (b), as I discuss in B2, I believe the EPA may be undervaluing ethanol by overstating distribution cost. Thus, any possible overstatement of ERV looks to be offset by these other two effects.

B4. Adjustments used to adjust the factors for use in different years, particularly the use of both octane price (as estimated by the premium-regular grade price differentials), and crude oil prices to scale the estimated ethanol replacement costs to different years.

Response:

Following on from my review in B3, my base opinion is that the more appropriate approach is to value octane based on direct octane considerations, be that the 'replacement value' approach or the premium-minus-regular-octane-cost approach. That said, I believe it was worth the EPA considering and including the alternative approach of scaling based on crude oil prices, since this provided a different perspective. I note from examination of the computed EPA data that the two effects at times went in different directions. Based on a spot check across all Summer and Winter EBC values in 2000, 2005, 2010, 2015 and 2020, these were minimally affected by switching from octane to crude price basis in
2000, 2005 and 2020 but were significantly increased (greater negative cost equaling more value) in 2010 and significantly reduced in 2015. The changes were not enough to affect the overall 'story' of ethanol's blending cost (EBC) but, as noted, I would put more faith in the octane price approach which is the one I understand EPA's tabular results were based on.

B5. The use of refinery rack spot prices to represent terminal gasoline prices at the point ethanol is blended into gasoline.

Response:

My understanding is that the EPA used Refiner Sales for Resale price data as submitted to the EIA. Form 782A, REFINERS'/GAS PLANT OPERATORS' MONTHLY PETROLEUM PRODUCT SALES REPORT, is a monthly report to the EIA that requires each refiner/gas plant operator to report sales volumes and prices for finished products including for RFG and CG gasoline by octane grade: regular, midgrade, premium. The form requires the submitting company to break out Retail from Wholesale sales, ("Sales for Resale"). The EIA aggregates and anonymizes the company level data and publishes monthly prices by state. Form
782A requires the submitting company to break out Sales for Resale into three sub-categories: Dealer
Tank Wagon (DTW), Rack and Bulk Sales. DTW prices include the cost of transportation by tank wagon (implicitly from the refinery) to the final destination, e.g. a gas station. Rack prices generally refer to wholesale prices at a terminal. In this case, the implication is that, since the Form 782A is submitted by refiners, then the rack price is the

price at the terminal rack which invariably a refinery has. Bulk sales refer to sales in larger volume, likely for transport by barge, tanker or rail.

The prices the EIA reports are listed solely as Sales for Resale. DTW, Rack and Bulk prices are published at the aggregate US level only and are therefore of no use in a state-by-state analysis. The published EIA data have the benefit of being 'official' and state-by-state. What is not clear is whether the EIA weightaverages (sales * volumes) to arrive at a published number or simple-averages the price data received where there is more than one refinery in a state. There are also states where substantial volumes of gasoline are supplied in via pipeline, tanker or barge from other states, also raising some question over how well the published EIA number reflects the true average wholesale price in the state. That said, refining is a highly competitive business and so one would not expect large differences in wholesale prices within a state, unless the state is large and there are significant differences in logistics costs as a function of location within the state.

There are sources of gasoline prices by terminal that can be purchased. A leading source is OPIS which tracks prices at literally hundreds of terminals across the country. However, (a) from experience, historical data covering the whole country would be expensive to purchase, (potentially prohibitively so). In addition, the data by terminal would then need to be averaged to obtain a statewide average, unless the goal was to hugely increase the detail of the analysis by utilizing gasoline sales volumes by terminal and so having to estimate ethanol distribution costs (EDC) to each listed terminal.

It is my assessment that a potential huge increase in cost, (use of taxpayers' money), complexity and effort by the EPA to have worked with terminal-by-terminal data would not have been justified by what I would see as a relatively limited increase in accuracy versus the method employed by the EPA. It is important to remember that more detailed terminal pricing data would have directly impacted only the GTP term in the EPA's EBC equation and indirectly impacted the EDC term. Other terms would not have been affected. Overall, I believe the EPA's methodology of using EIA refiner Sales for Resale prices reported by state was adequate and practical for the task undertaken. Should a need be seen to test what the potential improvement could have been, it would, in principle, be possible to obtain a subset of terminal data, e.g. say one or two states for one or two years, analyze the data and compare the results with those obtained by using the EIA data.

C. Review the appropriateness of the report conclusions.

C1. Corn ethanol profit made by corn ethanol plant producers incentivized them to build new corn ethanol plant capacity – does the data support such a conclusion?

Response:

As stated elsewhere, I do not consider myself expert in the specifics of ethanol production, plant economics and profitability and therefore have no detailed comments to offer here. That said, I see EPA's findings on historical ethanol plant profitability and capacity/expansion, as per report Figure 3, to be plausible. The state MTBE bans in 2004, the anticipation that further bans could occur then, even though that did not happen, the confirmation of MTBE liability and the RFS under EPACT 2005, led to rapid increases in ethanol demand. It stands to reason that ethanol plant profitability should have hit a high level, at least through 2007, and have brought with it a surge in ethanol plant capacity. A key shift was that ethanol went from having an uncertain market in US gasoline to a certain market, underpinned by the RFS and then the EISA 2007 RFS2. This would have given ethanol producers a higher confidence to invest. Thus, while, yes, the data support the conclusion that *ethanol profit made by corn ethanol plant producers incentivized them to build new corn ethanol plant capacity* in the early 2000's, it seems to me the primary reason was a surge in ethanol demand driven by mandates that came into effect at that time – notably the CA, NHY and CT state MTBE bans and the 2005 RFS, plus the absence of any coverage of oil industry liability on MTBE use. Those were, in my view, the keys to what drove ethanol production profitability at that time. Put another way, had there been no MTBE phase-out and no RFS, leaving ethanol to compete with MTBE purely on economics in the early to mid-2000's, I believe the rising price of crude oil, in that period, would have eventually led to a greater take-up of ethanol, but not so fast as actually happened.

2008 to around 2014 then appears to have constituted a more stable period with more moderate ethanol plant profitability and capacity expansions. From 2015 onward, ethanol capacity has continued to grow slowly but, according to EPA report Figure 3, profitability has been minimal or negative (in 2020 arguably because of COVID). According to the Renewable Fuels Association, the ethanol 10% blend wall was broken through in 2016 and US ethanol exports have doubled from around 50,000 barrels per day (b/d) in 2015 to around 100,000 b/d in 2018/2019. These two developments fit together and with an apparent reduction in ethanol plant profitability. In short, in this later period, there is much less evident connection between plant profitability, which went down, even negative, and capacity expansion, which continued. The latter may, however, have reflected the lag time between investment decision and capacity coming online. The increase in ethanol exports could be seen as a factor which reduced ethanol netbacks, hence prices, through a switch to 'export parity', in turn maintaining ethanol's attractiveness as a gasoline component. The strong EBC values (expressed as positive) in the chart in C2 below would appear to support this, at least until COVID hit in 2020.

C2. The conclusion that blending corn ethanol up to the E10 blendwall would have occurred anyway regardless of the RFS program (note that EPA did not conclude that the RFS did not have any impact).

Response:

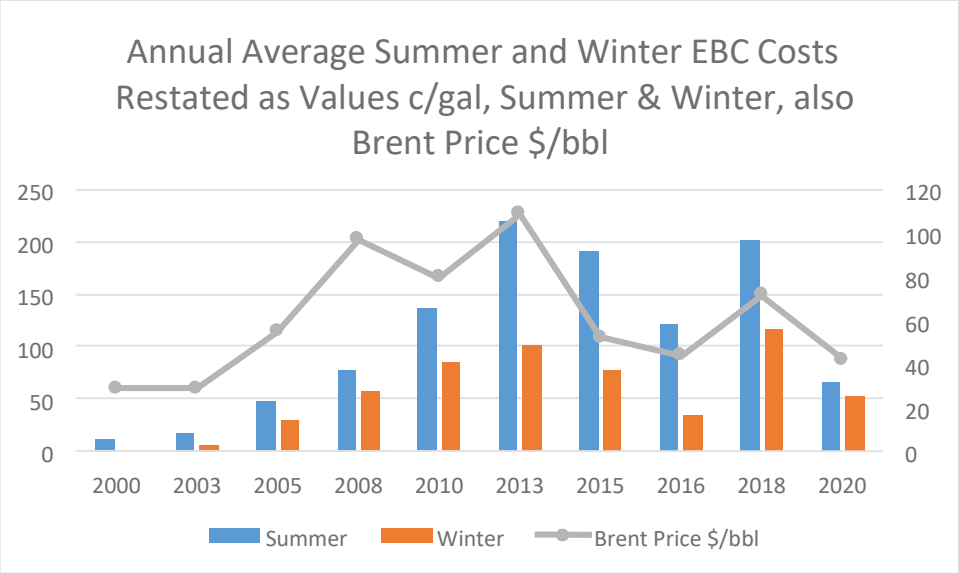
A first reaction is that I see clarification as being needed. The above statement "*EPA did not conclude that the RFS did not have any impact*" contains a double negative but I interpret it as saying that EPA did not conclude that the RFS had no impact (on ethanol use). However, on lines 450-455 of the report, the EPA states "*Based on this analysis, one can conclude that the RFS program has not been the driver for the increased corn ethanol volumes, and the many positive and negative environmental and economic outcomes attributed by various researchers to expanded corn ethanol use. This analysis finds that corn ethanol's blending economics were more favorable than a previous assessment for corn ethanol's blending economics (Taheripour 2020), which concluded that the RFS program was partially responsible for the volume of corn ethanol blended into gasoline*." To me, in these two sentences, the EPA is asserting that it did conclude the RFS had no impact on corn ethanol use. The semantics and the message need to be clarified and made consistent in the report.

As regards the central question, would ethanol blending up to the E10 blend wall have occurred regardless of the RFS program, it is my view that the RFS program (and the CA, NY and CT MTBE bans in 2004) 'kick-started' the substantial growth in ethanol use in US gasoline but that, since that early period, the analysis undertaken by the EPA has shown, to within a plausible range of uncertainty, that ethanol was economic to use in the increasing volumes up to and including the E10 blendwall which was reached in 2016.

The chart below is a summary of Summer and Winter all grades, all states, EBC values (expressed as positive to make easier to interpret) for selected years and taken directly from the data used in the EBC tables in Appendix 4. What this shows is that ethanol had only minor net positive blending value (net negative EBC per EPA's equation) in 2000 and 2003. However, thereafter, its blending value has been consistently net positive, (blending cost EBC consistently net negative). Taken at face value, this would indicate that, at least from the mid-2000's, ethanol has been favorable for blending into gasoline based on economics alone and has arguably brought down the supply costs of US gasoline. It is also evident how EBC (expressed as positive value) has tended to broadly track crude price, with more favorable economics at higher crude prices and vice versa. As discussed elsewhere in this review, this is to be expected; the more expensive the crude-based part of the gasoline, the greater the economic attractiveness of using ethanol because its costs and prices do not track crude price to the same degree. EPA's data indicate that, even in 2016 when crude prices were low, ethanol still had a positive blending value (negative EBC).

The one caveat I would place on the above conclusion is whether ethanol prices were driven to any extent by the RFS mandates, i.e. were supported by the RFS standards because these meant refiners had no option other than to purchase ethanol. In that regard, the EPA has argued that ethanol use often exceeded the annual volumes

mandated under the RFS/RFS2, thereby supporting the view that ethanol use was justified based on its economics, and not by having to meet RFS/RFS2 volumes, since use exceeded the RFS/RFS2 mandated volumes. Figure 2 in the EPA report is a key figure in that respect. But what it does not make clear is ethanol volume used in gasoline by year versus mandated ethanol volume by year. Given limitations on time, I have not undertaken that analysis, but the EPA should undertake it, include the results in the report and be guided by what they show. Again, ethanol into gasoline generally above mandated volume will tend to support the thesis that the economics applied for ethanol in the EPA analysis were truly market-based and not mandate driven. On the basis that is EPA's finding, it is a key message and conclusion from their report and should be laid out in clear terms, including in graphical and tabular form.



One further observation I would make relates to the scale of the EBC results versus the scale of ethanol subsidies. What is visible in the EPA's results is a situation where, certainly in the Summer periods, and often in the Winter periods, ethanol's EBC, expressed as a positive value, mostly exceeded the 54-45 c/gal federal ethanol subsidies that applied until finally phased out in 2011. The implication is that, in part courtesy of higher crude prices, and with the 'wonderful' benefit of hindsight, it looks as though the federal subsidy was not essential to supporting ethanol use from the mid 2000's on or, at least, that the subsidy could have been phased down more rapidly.

C3. Inertia for using ethanol when match-blended into gasoline – do the investments needed in refining and fuel distribution coupled with ethanol's volume and octane create a dependency on the part of refiners to continue to use ethanol during short time periods where ethanol may be uneconomical to use in a small, limited number of gasoline markets?

Response:

The short answer to this question is – yes – there would be substantial inertia that would work against refiners and blenders switching away from ethanol for short time periods, and by implication based on short-term economics. The US gasoline system was converted to take ethanol over a period of many years. Ethanol had, since the early 1990's, been used extensively in gasoline in the Midwest as that was the region where nearly all ethanol at the time was produced. Buildout of ethanol distribution and terminaling/blending infrastructure to other regions started in 2004 with the MTBE bans in California, New York and Connecticut and then accelerated with the advent of the RFS and RFS2 mandates as per the chart in D3. As the EPA report explains, this progressive move toward the E10 blendwall necessitated refiners making capital investment and operational changes to their plant and gasoline

(RBOB and CBOB) production, required shippers to build out rail, barge, truck and storage/terminal capacity for ethanol distribution and required modifications to bulk terminal storage, equipment and blending to accommodate ethanol addition to RBOB/CBOB at the last stage of distribution to consumers. Associated with these changes would have been multiple contracts, some short / spot but many also long-term to assure ethanol supplies.

In addition, while 'losing' ethanol's high blending RVP would be helpful, 'losing' its high octane would not, thereby tending to make ethanol difficult to replace from a quality perspective, especially given that refiners' plant and operations would have been optimized around the use of ethanol and its blend properties. This would have been even more the case for the roughly 30% of US gasoline that is RFG. Ethanol's absence of sulfur, aromatics, benzene, olefins make its ability to 'dilute' these properties important in complying with RFG emissions standards for VOC's, NO_x and toxics.

Given this, it is therefore highly unlikely in my view that refiners and blenders would switch away from ethanol for short periods. The history of ethanol versus MTBE use in US gasoline in the period 1995 through 2005 illustrates the point in an inverse way. During that period, refiners opted to use primarily MTBE rather than ethanol in RFG outside the Midwest where ethanol was produced and had been used for years in gasoline. Infrastructure for MTBE use in the RFG mandated demand areas, which were mainly along the East and West Coasts, centered on MTBE being produced at large-scale merchant plants, mainly on the Gulf Coast, and in 'captive' in-refinery plants and then, either way, being blended into gasoline at the refinery with the finished (MTBE-containing) gasoline then being shipped out, often via pipeline. The fact that production facilities, refinery operations and blending and then product distribution were all organized around use of MTBE arguably created an inertia which mitigated against switching to ethanol based on market conditions. It took initial state MTBE bans followed by the 2005 EPACT RFS, including its lack of protection for MTBE against potential litigation4, to create the largescale shift to ethanol. RFG comprised roughly 30% of US gasoline. Today, essentially 100% of the US gasoline system is built around ethanol use hence creating an arguably substantial inertia against switching away from ethanol to offset any short-term economic disadvantage, whether local or widespread.

D. Other Comments.

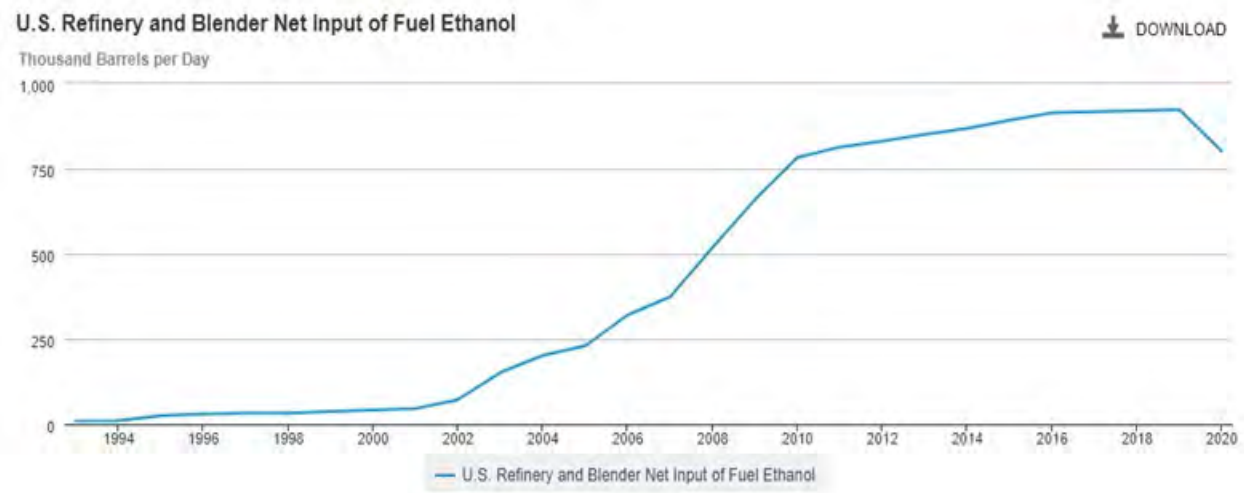
D1. EPA report lines 317 – 338. **Discussion of MTBE phaseout in 2006**. This section discusses the rapid phaseout of MTBE which occurred in 2006 and the factors that led to that phaseout. I have difficulty with the statements: "*All these factors resulted in the removal of MTBE from the U.S. gasoline pool, but did not mandate the addition of ethanol into RFG. However, the result was a de facto requirement for ethanol*." The whole section makes no mention of the RFS and almost seeks to imply that this did not exist at the time and had no impact. The same applies to language in Appendix 4, Section A.7, line 473-479: "*The phase out of methyl tertiary butyl ether (MTBE) from the RFG pool, which occurred over the years from 2003 to 2006, occurred as a result of the adoption of state MTBE bans, the end of the federal RFG oxygenate requirement, and the failure of liability protections to be enacted by Congress*." Again, no mention of the EPACT 2005 and RFS.

Table A26 lists the states which enacted MTBE bans, the year of their bans and the volume of MTBE consumed in each state in the year 2001. In August 2005, the Energy Policy Act was signed into law. One of its main provisions was a requirement for increased use of biofuels (effectively predominantly ethanol) in US fuels, (the RFS), specifically that 4 billion gallons of biofuel be blended in 2006, rising to 7.5 billion gallons by 2012.5 At the same time, the Act removed the oxygenate standard which, hitherto fore, had mandated the use of an oxygenate in RFG. It is my recollection this Act came into force in May of 2006, creating a scramble by refiners and blenders for ethanol, while MTBE was simultaneously largely 'dropped'. The result was a market spike which lasted several weeks. Yes, state bans in California, New York and Connecticut had already removed part of the market for MTBE in gasoline but it was the advent of the RFS that (a) allowed refiners to drop MTBE because of the ending of the oxygenate mandate but also (b) required substantial volumes of ethanol to be blended into gasoline under the RFS.6 As it stands, I see EPA's discussion of 2006 events as incomplete and potentially misleading and recommend it be rewritten. The fact that the RFS, which came into effect in 2006, and EISA

2007, have together greatly increased mandated ethanol use in US gasoline, does not invalidate the EPA's quest to assess whether ethanol would have been blended anyway into gasoline, at volume, based on economics alone. See also D2.

D2. EPA report lines 392 – 400. **Discussion of COVID impacts on gasoline and ethanol in 2020**. I have the same concern over this paragraph as the one I expressed in D1 regarding 2006. EPA discussion is again written as if the RFS did and does not exist and, therefore, again, in my view, is potentially misleading. The text argues that crude price reductions would, of themselves, have created a strong incentive for refiners/blenders to reduce or eliminate ethanol use but then points out that ethanol prices also dropped substantially and so "*Consequently, E10 ethanol blending continued*." The text reads as if refiners continued to E10 ethanol blend only because the economics of both crude (hence RBOB/CBOB) and ethanol adjusted, maintaining ethanol as economic. But, again, refiners and blenders were obligated to blend ethanol under the RFS, based on volume standards set by the EPA.7 As before, the fact that ethanol blending was mandated does not invalidate analysis of the economics in 2020, or other years. But avoidance of RFS' existence does risk impacting the credibility of the report by, again, creating a misleading impression.

D3. EPA report lines 372 – 388. **Discussion of 2016 low crude oil prices on ethanol blending**. In this section, the EPA discusses how some refiners might have found it uneconomic to have blended ethanol into gasoline in 2016 when crude prices were low yet how refiners appear to have continued to fully blend ethanol up to the blendwall. The chart below from EIA data confirms that ethanol blending did not drop in 2016. However, as I discuss elsewhere, whether ethanol blending stayed up because of economics or because of mandated RFS blending levels is a question. Comparison of ethanol volumes used in gasoline with mandated volumes should be included in the report to clarify this key aspect.



D4. EPA report lines 339 – 353. **Discussion of effect of low crude prices in 2016**. EPA's discussion of 2016 and how, even with low crude oil prices, (which would then have reduced the supply cost of gasoline blends before ethanol addition, i.e. RBOB's and CBOB's), most or all of the ethanol used in gasoline was still "*economically favorable*" is, in my view, part of a larger story, really the key story in this assessment, namely that a long-term increase in crude prices, and thus in the cost of crudebased gasoline and other products, led to a fundamental shift in the attractiveness of ethanol; this because ethanol's production costs were not that dependent on oil prices and thus did not rise to the same degree. A chart of WTI price illustrates the point.8 From 1980 to the early 2000's, crude prices had averaged around $20 and no more than $25/barrel. Then, around 2003/2004, so

by happenstance coincidental with the beginnings of the replacement of MTBE by ethanol in US gasoline, crude prices started to rise to a new, much higher plateau. While prices dropped in 2015/2016, annual average crude prices have essentially always been in the $50-100/barrel range ever since 2004/2005. This shift to a new, higher, plane for crude prices, and thus for crude-based gasoline components, is, in my view, the fundamental reason why the EPA has found that ethanol use has been almost always justified based on economics alone, at least since 2005 or so. Parallel improvements over the period in ethanol plant yields and production costs have reinforced the effect. In short, I think this is the 'core story' and that it could or should be set forth more clearly in the report. (See also discussion and chart in C2 above.)

D5. EPA report lines 414 – 433 and Exhibit 3. **Discussion of corn ethanol production cost and profitability**. As with D3, I also see this discussion of corn ethanol plant production costs versus spot prices and capacity as a key part of the analysis and 'story'. The difference between ethanol spot price and estimated production cost follows a logical pattern, with profitable plant operation indicated apart from (a) 2015-2019 when reduced crude prices led to implied ethanol plant break even or loss and (b) 2020 when the COVID pandemic knocked the bottom out of gasoline and so ethanol demand. Highest profits were estimated for the 2005-2007 time-frame as MTBE was phased out and the RFS came into effect, mandating biofuel, and so effectively ethanol, use. That said, care should be taken with the statement "*The total ethanol blending incentive to the fuels industry is the sum of ethanol's spot price above production cost and ethanol's blending cost*." "*Fuels industry*" as used here appears to encompass both the ethanol and the refining industries. I see some potential for misunderstanding through putting these two together under one 'moniker'. Yes, the statement is technically true, but it needs to be recognized that the only single entity that would see that full incentive would be a refiner who had integrated into ethanol production. I would suggest re-writing especially line 428, (the "also" is a problem), to make it crystal clear that the ethanol industry had an incentive of 50 c/gal and the refining industry 20 c/gal for a total of 70 c/gal.

D6. EPA report lines 457 – 501 including Figure 4. **Future Ethanol Blending Economics**. I have not reviewed this section of the report as it was not included in the reviewers' charge.

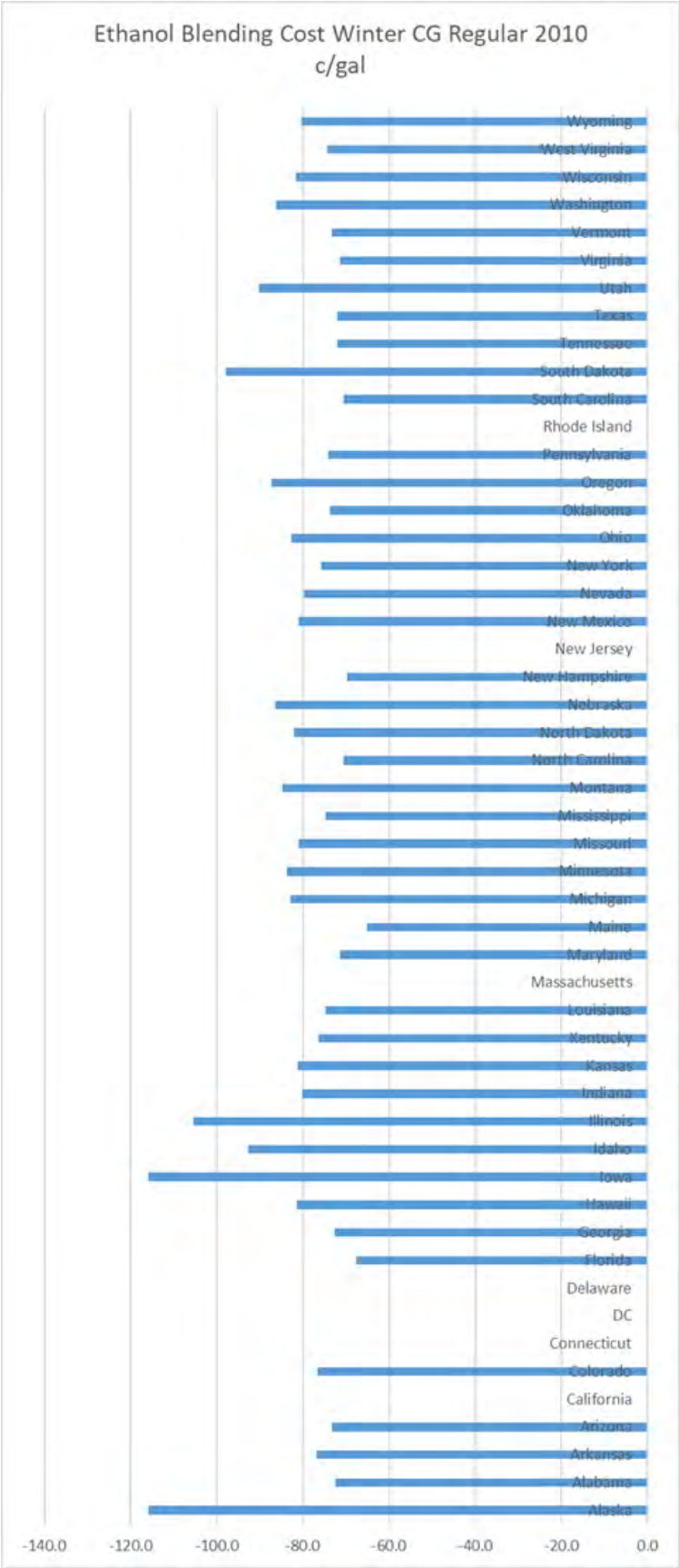
D7. **Overall report presentation**. I fully appreciate that I have been asked to review the EPA report in draft form and that, therefore, it will be subject to further editing by the EPA. In that respect, some comments/suggestions:

1. There are several typos and language glitches in the draft I reviewed which should be addressed.
2. The report could benefit from a concise Executive Summary of key findings up front and a statement of conclusions at the end (from which the Executive Summary would draw).

3. Appendix 4's *Input Costs, Ethanol Blending Cost and Ethanol Volumes* tables presented on pages S64 through S126 contain the detailed core results of EPA's analysis. Yes, arguably, they should be present but, as presented, they are almost unreadable. One option would be

for the EPA to provide the tables in Excel format (no formulae or links, just values) as either part of the final report package or as an item that can be requested.

4. Arguably, more important, I believe it is essential that these results, in either summary form or illustrative examples, be included and discussed in the main report. One example would be the chart I included in C2, extended to include every year from 2000 to 2020. This information represents the essence of the EPA's findings and, as such, should be 'front and center' in a form or forms (summary tables and charts) that are easy to grasp and thus convey the key messages. By way of illustration, another example could be something along the lines of the chart on the next page. That sets out one sample set of results, namely for Ethanol Blending Cost, Winter, CG Regular 2010. I see it as informative in that it conveys regional differences, but it also illustrates that in all reported US regions, EBC was substantially negative, i.e. it was not a situation where there was a mix of wildly negative and wildly positive EBC values.


Ethanol Blending Cost Winter CG Regular 2010
c/gal
Wyoming
West Virginia
Wisconsin
Washington
Vermont
Virginia
Utah
Texas
Tennessee
South Dakota
South Carolina
Rhode Island
Pennsylvania
Oregon
Oklahoma
Ohio
New York
Nevada
New Mexico
New Jersey
New Hampshire
Nebraska
North Dakota
North Carolina
Montana
Mississippi
Missouri
Minnesota
Michigan
Maine
Maryland
Massachusetts
Louisiana
Kentucky
Kansas
Indiana
Illinois
Idaho
Iowa
Hawaii
Georgia
Florida
Delaware
DC
Connecticut
Colorado
California
Arizona
Arkansas
Alabama
Alaska
-140.0
-120.0
-100.0
-80.0
-60.0
-40.0
-20.0
0.0

APPENDIX C

PEER REVIEWER RESUMES

VINCE DIVITA, M.B.A., P.E.

Vince is a senior consultant at 1898 & Co., part of Burns & McDonnell. He has over 35 years of experience in the chemical and petroleum industries with emphasis in technical and economic aspects in the downstream energy industry. He has specialized expertise in LP model development and applying these advanced tools to industry for single-client studies, multi-client studies and government decision-making/policy studies. His responsibilities have included project management, process design, refinery optimization, acquisition analysis, capital planning and feasibility studies.

As a group manager with Jacobs Consultancy, Vince developed a comprehensive background to the downstream energy business segment, where he developed sophisticated and innovative methologies to analyze a broad range of complex industry topics. As a senior process engineer with Rhône Poulenc at their Houston, Texas, sulfuric acid/aluminum sulfate plant, he was responsible for supervision of the company's Plant Engineering Program, which involved economic evaluations, process studies and implementation of capital improvements. Vince's previous employment as an associate engineer for Shell Oil Company encompassed assignments in architectural renovations, environmental remediation, total rebuilds, storage tank replacements, permit acquisition, cost estimating, procurement and project construction management. As a consultant with Purvin & Gertz, he was responsible for LP model development and simulation, crude valuation, refinery analysis, and energy consulting.

PRIOR EXPERIENCE

Refinery Reconfiguration Optimization Study / Confidential Client Middle East / 2019

Project Lead on the optimization and analysis of a reconfiguration strategy for an integrated refinery/chemicals processing scheme. Analysis included LP methods, cash flow calculations, capital cost estimates, and financial performance metrics. Key highlights included expansions for crude and FCC and new capacity for Vacuum Resid HYK, SDA, ULSD HDT, Hydrogen Plant, Sulfur Plant

Ethanol Blending, High Octane Fuel, Refinery Impact Study/ Fuels Working Group and DOE Argonne USA Refining System / 2017

Performed significant ethanol blending study for the government to analyze different ethanol blending scenarios of ethanol composition versus targeted RON. The study included PADD 2, PADD 3, and several configuration models of operational impact and capital analysis at different levels of penetration.

Refinery Reconfiguration Study / PCK
Germany / 2019

Team member of large reconfiguration study for German refinery. Part of the motivation was MARPOL compliance strategies, so significant effort to analyze resid destruction.

LP Technical Model Support
Global Projects / Decades of Support

Decades of technical LP model development for clients throughout the world. This focus is delivering new models, model upgrades, sub-models, simulations, kinetic model integration, technical strategies, audits, due diligence, calibration, back-casting, multi-refinery integration, inventory development, transportation development as examples.

Locations
Multiple Refineries / Ongoing

Provide LP technical support for several refinery locations including: Audit, new code and strategies, calibration, realistic predictions of operations, and new LP model development or updates of existing model.

Synthetic Crude Oil Valuation Studies / Canadian Confidential Clients Various Locations / Numerous Dates

Completed several valuation studies of synthetic crude oil produced from proprietary technology on a bitumen-based crude feed. Upgrades on South American bitumen and North American bitumen were analyzed. Modeling techniques were developed and implemented to value the synthetic crude in key world market refining centers. Mulitple projects which valued different recipes of SCO into different US refining regions.

Sweet Synthetic and Dilbit Quality Impact Assessment / Confidential Client Various Locations / Numerous Dates

Analyzed quality impacts for Sweet Synthetic and Dilbit. For each crude, the following qualities were rigorously analyzed with LP techniques: nitrogen, sulfur, vacuum resid content, organic hydrogen content, and TAN.

GTL Diesel Valuation / Confidential
Multiple Global Locations / 2013

Conducted significant analysis on the valuation of GTL diesel into the US, Canadian, and European refinery markets. The project was fundamentally based on LP modeling for the GTL valuation, including the development and calibration of approximately 70 world-wide refinery operations. Performed secondary Cold Flow analysis study.

GHG Refinery Impacts / DOE Argonne and Sasol
Numerous US Configurations/ 2012

Performed detailed analysis of GHG impacts across 50 refinery operations in the US. Developed an LP model to predict and track CO2 emissions throughout the process units.

GHG Impact - Ethanol / DOE Argonne National Laboratory
US Refining System/ 2016

Analyzed the refinery GHG impact associated with higher blends of ethanol into the gasoline pool, specifically E20 and E30. Developed representative aggregate models for current operations and forecast operations.

Ecuador Refining Analysis / Petroecuador
Ecuador Refining System / 2011

Team member for comprehensive analysis of Ecuador refining system. Specific responsibilities included developing an LP model to simulate and optimize the combined operations of multiple refineries and terminals. Conducted significant analysis for future configuration alternatives, new refinery investments, and strategies to comply with future regulatory specifications.

Tier 3 Impact Analysis / Department of Energy
US Refining Industry / 2013

Performed regulatory impact analysis of Tier 3 on the US Refining Industry. The project included technology assessments and refining strategies to produce 10 ppm gasoline. Conducted substantial LP modeling scenarios to analyze impacts, including changes to operations, blending, octane balance, and overall gross and variable margin changes. Examined different configurations with a range of crude slates.

Refinery Operation Vectors / Global Consulting Group
Various US Refinery Configurations / 2011

Developed full suite of refinery operation vectors for all major refinery process units for 20 crudes. Developed data for capital costs on all process units and fixed and variable costs.

Refinery Crude Switching Analysis / US Mid-Continent Refinery Confidential Location/ 2010

Analyzed the opportunities between running a sweet vs. sour crude slate. Extensive LP development was required to calibrate the model to existing operations. Performed numerous scenarios to determine existing break-even values for sweet vs. sour, as well as future differentials associated with regulatory impacts.

Bitumen Crude Quality Assessments / Various Canadian Producers Various US Locations / 2018 most recent

Projects with emphasis on Bitumen valuation. Multiple Projects for analysis of Bitumen Derived crude blends including: Diluent strategies (naphtha, SCO, combinations); Synbit vs Dilbit vs SynDilbit. Bitumen Technology Upgrading analysis for market and penetration analysis for each of the synthetic crudes from five technologies; Valuation for various bitumen blends. Bottomless crude analysis.

Synthetic Crude Quality Assesssments/ Various Canadian Producers Various US Locations/Over 20 years

Decades of project experience with emphasis on SCO product valuation. Performed numerous valuation studies for synthetic crude oil; composition of SCO, qualities of SCO streams, impact of refining, multiple locations throughout the US. For example: established price differential between Athabasca dilbit and a 50/50 synbit/dilbit blend.

Market Valuation for Single Components / Multiple Clients
Various US Locations/Various Dates

Developed sophisticated quantitative tools and/or specific component valuation tool, including SDA tar, Alkylate, Natural Gasoline, Naphtha. Valuations for both buyers and sellers.

Regulatory Impact on Refining Industry/ US DOE, US EPA, Argonne National Laboratory, Operating Companies, Industry Groups
Various Locations / Pre-2000s to

Performed numerous regulatory analyses to identify refinery industry impacts and key issues. Analyses were derived from LP analysis, which included creating specific configuration models to analyze these regulatory impacts. Issues examined are varied and complex including: Simple Model, Complex Model Phase 1 & 2, MTBE Ban, Tier 2/3 gasoline, ULSD, MSAT II, Marpol, E10/E15 analysis, dieselization strategies, dilbit penetration, CO2/greenhouse gas impacts.

Multiple New-to-Market Crude Oil Pricing /
International Crudes / 2018 most recent

Evaluated and developed pricing mechanisms for multiple new-to-market crude oils with reference to benchmark crude. The pricing relationships were developed from numerous LP scenarios to identify the price setting refinery mechanism for the region. Other analytical techniques include whole crude and cuts methods.

Refinery Reconfiguration Analysis / Confidential Client PADD 4 / 2007

Performed comprehensive re-configuration analysis for Rocky Mountain Refinery with over 40 scenarios that included: crude expansion alternatives, FCC expansion, Mild to Severe Hydrocracking, new alkylation, hydrogen balance, and reformer expansion. Scenarios included clean fuel requirements, lower RVP gasoline, MSAT2 compliance, ethanol blending, Canadian synthetic crude runs, and increased octane specification.

Ethanol Blending Impact Studies/Multi-Refinery LP / US EPA
Integrated 5 Padd Model/2008

Performed comprehensive analysis on the implications of ethanol blending and the effect of E10, E20, and Renewable Fuels Standard (RFS) 1 and 2. The analytic highlight included a sophisticated 5 refinery (PADD) LP model of the US, with 5 demand terminals, transportation between the PADDs, and investment strategies under various ethanol blending alternatives.

Strategic Tank Farm Analysis / Confidential Client West Coast Washington State /
2007

Performed a strategic tank farm analysis for a West Coast Refinery. Incorporated sophisticated refinery LP modeling techniques with 260 periods to analyze the economic impact of planned and unplanned outages. Also incorporated Monte Carlo risk analysis to the LP strategy to establish the likelihood of unplanned events. Estimated costs of outages vs. strategic spending to define numerous projects for capital screening.

Refinery Relocation Economic Analysis

Performed comprehensive economic analysis on a refinery relocation project. Analysis included developing a detailed LP refinery model, establishing fixed and variable costs, and ultimately creating a pro forma model for financing and partnering opportunities. Analyzed various crude options, and a phased-in refinery construction approach to optimize cash flow.

Diesel Production Maximization

Developed numerous LP sub-models and code for a client to evaluate alternatives to maximize diesel production. New sub-models and code included new swing cuts, low-conversion FCC sub-model, gasoline splitters, and coker gasoil slurry oil splitters.

Delayed Coker Strategic Analysis

Performed strategic analysis for new delayed coker on West Coast to capture heavy sour Canadian crude differentials. Established LP models for evaluation purposes, estimated capital costs for each configuration, and established cash flow models to analyze and evaluate the best strategic alternative.

SDA Installation

Analyzed a 3-refinery corporate configuration to optimize the installation of a common SDA. Constructed, calibrated, and analyzed simulation runs of LP models to evaluate the project economics for the SDA unit.

Refinery Expansion and Optimization Analysis

Conducted a detailed analysis of a US East Coast refinery for expansion and optimization opportunities. Specific analyses included: FCC operations (new technology improvements, including a riser, riser termination device, and nozzles); a new air blower; and a new cooler.

Clean Fuels Production Strategic Analysis /

Completed extensive strategic analysis for two East Coast refineries to evaluate clean fuels production alternatives. Both refineries required detailed LP calibration to existing operations before implementing several alternative scenarios for low-sulfur gasoline and low-sulfur diesel production. Key issues included ethanol blending, changing service of existing hydrotreating, VGO hydrotreating, FCC naphtha hydrotreating and technology selection, and sensitivities on oxygenate waiver, prices, high-sulfur versus low-sulfur crude slate, and blendstock purchases. Provided numerous capital alternatives to work with client's capital program and executive decision-making. Also used LP model to analyze contingency analysis with unexpected shutdowns of key process units.

Refinery Acquisition – Initial Screening Bakersfield, California

Performed initial screening study for Bakersfield, California, refinery acquisition. Calibrated the LP model to current operations and analyzed business opportunities for potential bidder. Used LP results, coupled with assessment of operating costs, to develop pro forma for investment analysis. Performed numerous sensitivity analyses on various modes of hydrocracking operations.

Crude Quality Impact Analysis

Completed detailed analysis of crude quality impact for West Coast refineries, including regional LA, San Francisco, and Washington. Crude qualities considered included basic nitrogen, sulfur, UOP-K, aromatics, RVP, cetane, and density. Developed cost curves relating variable margin to changes in crude quality to assist crude producer in determining downstream impacts. Integrated FCC simulator model into the LP models for detailed FCC response to crude quality.

PADD4 Refinery Synergy

Performed synergy analysis between two PADD 4 refineries to analyze the benefits of integrating capital investment and transferring streams between the two locations. Alternatives considered included: new shared alkylation, new C4 Isomerization, major expansion analysis, transferring streams to capture blending synergy, and shutting down one facility to run as a topping refinery. Also analyzed the impact of increasing synthetic crude feed to the complex. All models calibrated to post-2010 clean-fuels conditions.

Refinery Configuration

Performed study to establish two state-of-the-art refinery configurations for processing 100,000 bpd of medium sour crude oil. The configurations reflect a high G:D ratio case and a second case with approximately the same G:D make. Provided a cost estimate for this processing configuration; feed/product balances for the Crude and Secondary Units; cost factors for estimating utilities and offsites capital investments; and cost scalability factors for the major refinery units.

Refinery Energy Audit

Team member of extensive refinery energy audit and analysis for refinery in Mexico. Responsibilities included auditing steam, fuel (gas & oil), and electricity for all process units; comparing results to known technical standards; and summarizing key findings resulting in potential $64 million/yr savings. Also audited NOx and SOx emissions.

Process Unit Explosion Insurance Claim

Provided technical support for insurance claim resulting from process unit explosion. Ran LP models to assess associated claims resulting from delayed coker down-time.

Refinery Technical Due Diligence

Provided technical and financial due diligence assessment of Tyler, Texas, refinery for potential acquisition. Developed detailed pro forma to evaluate net present value of refinery, including investment analysis to produce clean fuels.

Refinery Planning Model

Developed a detailed refinery planning model for a USGC refinery. Integrated a second refinery to analyze economic impacts and synergies for a potential merger or acquisition. Directly integrated an outside, dynamic FCCU simulator and a delayed coker model to the LP optimization process.

Scoping Study / Grassroots Refinery

Performed an initial scoping study for development of a grassroots refinery in the Caribbean. Developed an LP model and pro forma to analyze investments under different configurations and cogeneration capabilities.

Initial Investment Analysis

Performed an initial investment analysis for the purchase of an existing Caribbean refinery. Analyzed the impact of FCCU/alkylation expansion to improve investment economics.

Refinery Enhancement Study

Performed value enhancement study for a US Midwest refinery to increase the cash flow of the facility by processing changes or expansion projects under increasingly stringent environmental compliance regulations. Tasks consisted of: developing numerous LP models representing base and proposed operations; producing Complex Model Phase II gasoline; determining incremental capital, fixed, and variable costs for scenario cases; and calculating cash flows for all scenarios.

Gasoline Blending Model Development

Developed a gasoline blending model for integrated refinery/petrochemical USGC operations to assess future gasoline blending under various scenarios, including regulatory and environmental changes, new gasoline specifications, and changes in refinery operations and availability of blending components.

Fair Market Valuation Litigation Support

Provided litigation support for a fair market value assessment for a major US Gulf Coast refinery.

Crude Valuation Analysis

Performed crude valuation analysis for various synthetic crudes under different pricing and volume options for a producer. Developed specific crude values for a targeted refinery to negotiate crude sales.

Aromatics Study

Conducted extensive aromatics study for US refinery with options of a) status quo, b) shut down, or c) modernize/grow. Developed detailed LP and pro forma to simulate numerous scenarios for the aromatics recovery unit: high- and low-pressure reformers, benzene, toluene, and xylene extraction, ortho- and paraxylene extraction and isomerization.

Grassroots PP Splitter Due Diligence
Venezuela

Project manager for Independent Engineer due diligence of a grassroots propylene splitter project in Venezuela. Worked with the investment bank and project sponsors to assess the risks and mitigating factors associated with technology, construction execution, contracts, third party operations, and environmental/health/safety.

Refinery Investment/Configuration Study

Performed comprehensive alternative investment/configuration study for major US Gulf Coast refiner. Developed LP models and calculated cash flows for over 30 separate scenarios to analyze Tier 2 gasoline sulfur regulations, MTBE ban effect, diesel sulfur regulations, and a major crude/vacuum expansion project. Developed and analyzed scenario capital expenditure cases ranging from $15–400 million.

Refinery Due Diligence

Completed refinery due diligence analysis on behalf of a pipeline company preparing a bid for purchase of a cracking refinery and terminal assets in PADD 2. Responsibilities included calibration and verification of historical and projected refinery charges and yields using LP model. Developed cash flow model, including product sales into four separate regions and cash flow sensitivity on environmental costs, fixed costs, and variable costs.

Crude Pipeline Reversal Impact

Analyzed the impact of reversing a crude oil pipeline in the US Southwest. Approach consisted of developing six regional and four terminal LP models representing logistical boundaries.

LP Simulation Modeling

In five different assignments, served as project team member responsible for performing LP simulations to assess clients' future capability to produce varying levels of gasoline meeting both reformulated and CARB specifications on the US West Coast, Midwest, East Coast, and Gulf Coast. Involved detailed modeling and calibration of over 60 US and international refineries.

LP Model to Support Refinery Acquisition

In support of a client's refinery acquisition on the Gulf Coast, constructed and calibrated LP models to simulate operations and test alternative processing configurations for the refinery. Also constructed and calibrated cash flow and spreadsheet models for financial evaluations of the 180,000+ bbl/day facility.

Refinery LP Models

Developed LP models of a major US West Coast refiner's largest refinery to value and compare economics of running Venezuelan crude oils vs. Alaskan North Slope, Indonesian, and Mexican crudes.

Process Optimization Study

Completed process optimization study for US East Coast client interested in maximizing reformulated gasoline production. Tasks included evaluation and recommendation of various benzene reduction alternatives as a route for RFG production optimization.

Process Optimization Study

Team member of process optimization study for West Coast refiner interested in 1) producing maximum economic volumes of CARB gasoline and 2) possibility of dual refinery integration to take advantage of synergies.

Refining Merger Modeling

Team member of major US refining/marketing merger. Prepared and analyzed cash flow models for numerous refinery locations to establish ownership percentages for the merger. Analyzed each refinery's planned operations and performed independent assessment of operations.

Worldwide Refining Model and Forecast

Team member of worldwide refining publication. Developed and calibrated regional and country-specific LP models for analyzing future refinery operations over a 20-year forecast horizon. Calculated replacement costs and forecasted future construction requirements to keep pace with demand projections.

Refinery LP Modeling

Developed new USGC index refinery LP models using varying crude and complexity configurations. Calculated refinery yields and operational costs for each. Separately developed LP models to calculate lowsulfur diesel and reformulated gasoline production costs.

Crude Oil Pricing Formula Development

Using LP simulations, developed a crude oil pricing formula for a blended crude oil to be purchased and processed at a refinery.

Refinery Due Diligence

Provided refinery due diligence analyses for four separate refinery acquisitions in Texas and Oklahoma.

Industrial Development Scheme – Refinery Investment

Developed preliminary industrial development scheme for international entrepreneur's Persian Gulf refinery investment project. Additional tasks included: evaluation of refinery and petrochemical complexes for a conceptual planning study; and preparation of LP models, capital budget estimates, and construction and capital investment schedules for the complex.

Process Studies Highlights / Various Clients

Texas / 1990's

Project Manager for flare systems analysis. Evaluated both existing system and proposed improvements. Tasks included: performance of contingency analysis, verification of safety valve sizes, check of flare capacities, and check/verification of header sizing and piping configuration. Lead Engineer on converter/duct replacement for 2,000 tons/day sulfuric acid unit. Served as Project Manager and Process Engineer for new stainless-steel converter and superheater replacement on new foundation. The project included an extended ductwork replacement requiring redesign of the expansion joint system. Designed Sour Water Stripper and Firewater System, nitrogen, utility air systems.

PUBLICATIONS AND PRESENTATIONS

Refinery Economics Course

Developed and presented Refinery Economics course to major Middle East company. This was a two-day course with emphasis on coking economics

LP Training Courses

Performed series of LP training courses. Topics included LP model development on large multi-refinery representation. Training included LP model maintenance, tuning, and calibration.

Crude Oil Analysis and Valuation Seminar

Conducted 2-day crude oil analysis and valuation seminar. Topics included whole crude analysis, crude fractions, crude assays, and crude impacts on refinery operations. More advanced topics included more detailed refinery operations, linear programming, product blending, crude valuation, and refinery economics.

Liquid Fuels Market Module – White Paper

Authored a White Paper on the development of the Liquid Fuels Market Module for the US Department of Energy and presented the paper to a panel of experts in Washington DC.

Industry Presentations

- *What's Happening Out There? (and how LP's are being utilized*); MUG Conference (Portland Oregon), Sept 2019
- *Crude Valuation Techniques,* presented at 2018 MUG Conference (Nashville, TN), Sept 2018
- *What's the Deal with Octane?* presented at 2017 MUG Conference (San Diego, CA), September 2017
- *Impact of MARPOL VI Implementation,* presented at 2016 MUG Conference (Washington, DC), September 2016
- *Optimization of Crudes in Changing Regulatory and Market Environments*, presented at 2016

Opportunity Crude Conference (Houston, TX) October 2016

- *LP Strategies for Refinery Efficiency and GHG Emissions,* presented at 2015 MUG Conference (Aspen, CO), September 2015
- *What's Happening Out There,* presented at Greater New Orleans Business Roundtable, March 2015
- *Qualitative and Quantitative LP Methods for Crude Evaluation*, and co-authored *LP Methods for International Refining Economic Analysis* presented at 2014 MUG Conference (Savannah, GA), September 2014
- Environmental Science and Technology, *"U.S. Refinery Efficiency: Impacts Analysis and Implications for Fuel Carbon Policy Implementation,"* by Jeongwoo Han, Grant S. Forman, Amgad Elgowainy, Hao Cai, Michael Wang, and Vincent B. DiVita
- Environmental Science and Technology, *"Energy Efficiency and Greenhouse Gas Emission Intensity of Petroleum Products at U.S. Refineries,"* by Amgad Elgowainy, Jeongwoo Han, Hao Cai, Michael Wang, Grant S. Forman, and Vincent B. DiVita
- *Tight Light Oil.* MUG Conference (Santa Barbara, California, September 2013).
- *Performing Supply Chain Analysis with LP Models.* MUG Conference (Bar Harbor, Maine, September 2011).
- *Evaluating Potential US Gasoline Specification Changes with LP Models.* MUG Conference (Coeur d'Alene, Idaho, September 2010).
- *Using the LP for Greenhouse Gas and Lifecycle Carbon Emission Analysis.* MUG Conference (San Antonio, Texas, September 2009).
- *White Paper on the Development of the Liquid Fuels Market Module (LFFM).* Department of Energy's Energy Information Agency (Washington, DC, September 2009).
- *Using the LP to Maximize Profits in a Strong Diesel Economy.* MUG Conference (Annapolis, Maryland, September 2008).
- *Developing LP Models to Analyze the Refining Industry.* MUG Conference (Santa Fe, New Mexico, September 2007).
- *Over-optimization versus Under-optimization.* MUG Conference (Sedona, Arizona, September 2006). ▪ *The Energy Policy Act of 2005: Refinery Implications and Strategies*. MUG Conference (Banff, AB Canada, October 2005).
- *ULSD – Are You Ready*? MUG Conference (Monterey, California, September 2004).
- *New Gasoline Fuel Specs and Their Impact on Refiners and Blenders*, OPIS 5th Annual Supply Summit (Las Vegas, Nevada), October 2003
- *Using LP Models for Synergy Analysis*. MUG Conference (Newport, Rhode Island, September 2003).
- *The New LP* (co-authored with Dean Trierwiler). NPRA, ERTC, ARTC, MUG (2003).
- *Modeling FCCs in LPs: Simulation versus Linearization*. MUG Conference (Vancouver, Canada, September 2002).

- *Using Refinery LPs to Analyze Blend Values in a Clean Air Environment.* MUG Conference (Minneapolis, Minnesota, November 2001.
- *Refinery Planning Using Linear Programs Containing Simple and Complex Models.* API Petro-Safe '95 Conference (Houston, Texas, January 1995).

Education

B.S. / Chemical Engineering

MBA / Finance

Registrations Professional Engineer

(TX)

2 years with 1898 & Co.

35 years of experience

S. KENT HOEKMAN

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Desert Research Institute
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email: Kent.Hoekman@dri.edu

Education

Ph.D. 1980 Iowa State University, Ames, IA Organic Chemistry B.S. 1975 Calvin University, Grand Rapids, MI Chemistry

Professional Interests and Activities

Dr. Hoekman is a Research Professor, Emeritus within the Division of Atmospheric Sciences at the Desert Research Institute (DRI). DRI is a statewide division of the Nevada System of Higher Education (NSHE) that pursues basic and applied environmental research on local, national, and international scales. His professional interests include environmental impacts of energy production, distribution, and use; development of renewable and sustainable energy systems; conversion of biomass to biofuels; air quality impacts of vehicle emissions; and impacts of advanced-technology fuels and vehicles on emissions and energy use. He is also interested in the interface between politics and environmental science, particularly in the areas of energy policy, vehicle technology, renewable fuels, greenhouse gases, and climate change.

In addition to his personal professional activities, Dr. Hoekman has provided leadership for DRI in the identification, protection, and licensing of intellectual property (IP) developed at the Institute. Dr. Hoekman was instrumental in establishing a joint Technology Transfer Office (TTO) between DRI and the University of Nevada, Reno (UNR), and has served as DRI's Liaison to the TTO, where he oversaw the activities of this office on behalf of DRI.

Dr. Hoekman has also served DRI by coordinating and promoting the Institution's R&D portfolio in the field of renewable energy. He led the effort to establish a Renewable Energy Center (REC) at DRI, and provided leadership in this area by serving as Director of DRI's Clean Technologies and Renewable Energy Center (CTREC).

In addition, Dr. Hoekman is active in the scientific academic and business communities. He serves as a reviewer for numerous science and engineering journals, is a member of several professional societies, has assisted in organizing scientific conferences, is an instructor in the Mechanical Engineering Department of the University of Nevada in Reno (UNR), and contributes to the mentoring and advisement of graduate students at UNR. Currently, he serves as Associate Editor for the journal *Energies*.

From 2001 to 2007, Dr. Hoekman served as Executive Director of DRI's Division of Atmospheric Sciences (DAS). DAS consists of approximately 50 research faculty, along with 70 technologists, graduate students, post-docs, and other support staff. The Division conducts fundamental and applied research around the world on topics pertaining to emissions, renewable energy, air pollution, meteorology, climatology, aerosol chemistry and physics, and other areas related to atmospheric science. DAS also serves as the institutional home for the Western Regional Climate Center, one of six NOAA-funded regional climate centers in the U.S. As Director, Dr. Hoekman was responsible for all personnel, financial, organizational, and professional activities of Divisional operations. The Division's scientific work is sponsored by over 100 federal, state, local, and private organizations that provide approximately $14 million per year in research grants and contracts. For more information about the Division and its activities, please refer to its web site at http://www.das.dri.edu.

Prior to joining DRI in 2001, Dr. Hoekman spent over 20 years at Chevron, where his research focused on transportation fuels and their impacts on motor vehicle emissions and air quality. Experimental work included detailed

characterization of exhaust emissions compositions from gasoline-, diesel-, and alcoholfueled vehicles. Laboratory studies were conducted to investigate how changes in fuel formulation could reduce vehicle emissions and improve ambient air quality. He has served on several technical committees representing the American Petroleum Institute (API), the Western States Petroleum Association (WSPA), the Coordinating Research Council (CRC), and other industry organizations interested in fuels, emissions, atmospheric chemistry and air quality.

Dr. Hoekman also has experience in environmental regulatory affairs pertaining to vehicles, fuels, emissions, air quality, and health effects. He has served in technical advisory roles to EPA and the Health Effects Institute's (HEI), and was a member of the California Air Resources Board (CARB) Research Screening Committee for five years.

Professional Experience

2016 – Present Research Professor, Emeritus, Division of Atmospheric Sciences, Desert Research Institute, Reno, NV

2007 – 2016 Research Professor, Division of Atmospheric Sciences, Desert Research Institute, Reno, NV

2001 – 2007 Executive Director, Division of Atmospheric Sciences, Desert Research Institute, Reno and Las Vegas, NV

1997 – 2001 Senior Staff Scientist, Chevron Products Co., San Francisco and San Ramon, CA

1990 – 1996 Staff Scientist and Senior Staff Scientist, Chevron Research and Technology Company, Richmond, CA

1980 – 1989 Research Chemist and Senior Research Chemist, Chevron Research and Technology Company, Richmond, CA

Professional Memberships

- American Association for the Advancement of Science (AAAS)
- American Chemical Society (ACS)
- Air and Waste Management Association (AWMA)
- Society of Automotive Engineers (SAE)
- American Institute of Chemical Engineers (AIChE)

Awards/Honors

- Chevron Chairman's Award (1984) – Presented in recognition of diesel emissions research
- Horning Memorial Award (1985) – Presented by the Society of Automotive Engineers
- Arch T. Colwell Merit Award (1985) – Presented by the Society of Automotive Engineers
- Society of Automotive Engineer's Award for Excellence in Oral Presentation (1993 and 1995)
- Recognition of Appreciation from the California Air Resources Board (2001)

Peer-Reviewed Publications

Carrasco, S., Silva, J., Pino-Cortes, E., Gomez, J., Vallejo, F., Diaz-Robles, L., Campos, V., Cubillos, F., Pelz, S., Paczkowski, S., Cereceda-Balic, F., Vergara-Fernandez, A., Lapuerta, M., Pazo, A. Monedero, E., and Hoekman, K. (2020). *Processes* **8**, 444. DOI 10.3390/pr8040444.

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Wang, X., Hoekman, S.K., Han, Y., Chow, J.C., Watson, J.G., Wu, X., Wu, Y., Schuetzle, D., and Schuetzle, R. (2020). Potential emission reductions by converting agricultural residue biomass to synthetic fuels for vehicles and domestic cooking in China. *Particuology* **49**, 40-47. DOI:

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Han, Y., Hoekman, S.K., Cui, Z., Jena, U., and Das, P. (2019). Hydrothermal liquefaction of marine microalgae biomass using co-solvents. *Algal Research* **38**, 101421. DOI: 10.1016/j.algal.2019.101421.

Hoekman, S.K. and Leland, A. (2018). Literature review on the effects of organometallic fuel additives in gasoline and diesel fuels. *SAE International J. Fuels Lubr*. **11** (1). DOI: 10.4271/04-11-01-0005.

Leland, A., Hoekman, S.K., and Liu. X. (2018). Review of modifications to indirect land use change modeling and resulting carbon intensity values within the California Low Carbon Fuel Standard regulations. *J. Cleaner Prod*. **180**, 698-707. DOI: 10.1016/j.jclepro.2018.01.077.

Hoekman, S.K. and Broch, A. (2018). Environmental implications of higher ethanol production and use in the U.S.: A literature review. Part II – Biodiversity, land use change, GHG emissions, and sustainability. *Renew. Sustain. Energy Rev*. **81**, 3159-3177. DOI: 10.1016/j.rser.2017.05.052.

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Renewable Energy Consortium, January, 2011. (30 pp)

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Produce Diesel Fuel.” Submitted to REII, October 30, 2010. (24 pp)

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Blendstocks for Transportation Fuels,” CRC Project No. AVFL-17, Report to Coordinating Research Council, June 2009 (289 pages)

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MARTIN TALLETT, B.SC.

President, Tallett & Co, (formerly EnSys Energy & Systems, Inc.)
112, Bishops Forest Drive, Waltham, MA 02452, USA
Tel: (781) 274 8454, Cell: (281) 788 7880, Email: martintallett@tallett.com

Mr. Tallett is widely recognized as a leading international expert on refining and oil markets. Until the sale of its assets in July 2020 to HSB Solomon Associates LLC, he was the founder and head for over thirty years of EnSys Energy, a successful consulting practice specializing in quantitative approaches to petroleum industry market, refining, environmental, investment, and strategic issues and in the provision of systems for analytical modeling. A chemical engineer, eight years refinery operational, scheduling, supply planning, management and systems experience with Exxon and Amoco preceded the current forty-four in international consulting, initially with Gordian Associates, London and since 1982 under the EnSys corporate name in the U.S.A. Mr. Tallett has become an established advisor to industry and government and a developer of decision support products and services. He is a frequent speaker at major industry conferences, an annual invitee to the International Energy Forum Symposium in Riyadh, has authored a number of significant articles, and is called on for his views and insights by the industry press.

EnSys Energy, led by Mr. Tallett, was increasingly at the forefront in the analysis of complex issues impacting refining and the global downstream. Recent projects included: working with a array of oil and shipping sector clients to assess the impacts of the IMO 2020 Sulfur Rule, detailed assessments for the European Commission focused on the impacts of potential high ethanol use in European gasoline, working with the Departments of Energy and State to model and assess the impacts on U.S. refining and oil markets of alternative pipeline scenarios centering around the Keystone XL project, also with the DOE on Strategic Petroleum Reserve options, working with the American Petroleum Institute to assess the impacts of allowing US crude oil exports, on the viability of East Coast refineries, on the potential effects on US and global refining and trade of a potential ban on Venezuelan crude oil imports and earlier on the impacts of the Waxman-Markey climate bill, assisting a super-major to simulate its U.S. refineries integrated within the U.S. and global market to gauge the outlook under a range of climate regime scenarios, acting as the primary analyst for the U.S. EPA, American Petroleum Institute and International Maritime Organization to assess the impacts on U.S. and global refining of alternative scenarios for advanced marine fuels regulation, (which lead in to the IMO Annex VI Rule), for a leading specialty chemicals supplier, simulating the refineries of Indonesia and India and the effects of fuels quality changes, for a European precious metals and catalyst supplier, projecting the outlook for FCC and other types of refinery catalyst, for the World Bank, analysis of the prospects for sub-Saharan African refining under tightening regional gasoline and diesel quality regulations and increasing international competition, for a leading US oil company, assessing the impacts of high price / supply constrained outlook on Atlantic Basin refining capacity, economics and trade, for Canadian First Nations and the Government of British Columbia, evaluations of the impacts on Pacific Northwest refining, and crude oil overland/marine movements of expanding or not expanding the Trans Mountain Pipeline. Activities included co-authoring two *Reports to Congress*.

Many of EnSys' assignments centered on the application of its unique WORLD Model® of the global refining and downstream supply system. Initially developed in 1987, this model has been continuously augmented and applied on numerous studies since. It has been used extensively for and by: U.S. DOE, EIA, EPA, API and major oil companies among others. Since 2000, Mr. Tallett has worked closely with the OPEC Secretariat in Vienna, supplying and supporting EnSys' WORLD model and undertaking annual joint studies released to Member Countries which assess global refining and downstream outlooks from 2010 to 2045. As part of this, he is a cited contributor in each annual "OPEC World Oil Outlook" (www.opec.org) with emphasis on its analysis of future refining trends and investment needs.

Under-pinning EnSys' WORLD modeling work – and built into this detailed bottom up model, is a comprehensive understanding and database on, inter alia, crude oils (some 200), multiple refinery processes with many operating mode / catalyst variants, extensive product representations covering gasoline, jet/kero, diesel, marine and residual

fuels blending, specifications and additives. WORLD embodies a detailed database and representation on U.S. and global refinery process configurations, capacities and projects that go beyond published data. As a regular component of his work, Mr. Tallett directed regular EnSys reviews and updates which cover different aspects of crude assays, refinery processes and products blending; also utilities consumptions, capital and operating costs, energy efficiency trends.

Over a long period, extensive effort has been put in to analysis and representation in WORLD of processes for the production of reformulated and ultra-low sulfur gasoline and diesel. Mr. Tallett's work on advanced/reformulated products goes back to the late 1980's and includes numerous analyses for the EIA, EPA, DOE, ORNL, Navy, API, OPEC and other organizations on the process requirements and costs of producing such fuels, using detailed refinery and blend modeling. These necessitate in-depth tracking of product quality and refining processing trends.

Detailed, gasoline-focused assessments have been a theme since the late 1980's. Mr. Tallett conducted early work on fuel reformulation in 1989 for the EIA, assessing the feasibility and economics of low-RVP and lowsulfur gasoline, supported DOE and EPA via Oakridge National Laboratory on RFG and related assessments from the "reg neg" period in the early 1990's through MTBE phase-out planning in the late 1990's, and for DOE published in 1993 a leading WORLD-based study on the national and international refining, trade and economic impacts of the RFG program. These activities also included developing a linearized version of the Complex Model which was supplied to the EIA. Analyzing gasoline with ethanol versus MTBE has been a continuing theme in modeling and other work undertaken over the past 30 years, including, as noted above, recent studies for the European Commission on high ethanol use on gasoline in Europe. A 2021 assignment with Solomon Associates centered on assessing the outlook for gasoline and other fuels under the IEA's Sustainable Development Scenario with its embodied large expansion in supply of ethanol and other biofuels.

In addition, during the last twenty years, Mr. Tallett has been heavily involved in expert witness work, many related to use of ethanol and MTBE in US gasoline. Assignments for ExxonMobil on US West and Gulf Coast refining economics issues, including gasoline, were followed by evaluation of the refining economics and other impacts of ethanol versus MTBE for the State of New York when it was sued by the Oxygenated Fuels Association. Since 2006, Mr. Tallett has worked with the representatives of water supply companies, the City of New York, the States of New Hampshire, New Jersey and, in 2021, Pennsylvania on lawsuits relating to MTBE in ground water. Activities have included extensive work on refinery processing technology and economics centered, mainly, on gasoline production using ethanol versus MTBE, i.e. on evaluating the technical and economic aspects of using MTBE and ethanol in US RFG and CG; also on the distribution of gasoline, MTBE and ethanol and related U.S. East Coast market share analyses. These assignments have also led to assessments and testimony in support of related arbitration proceedings.

In other expert witness work, Mr. Tallett led a major evaluation of Cushing crude oil markets for the CFTC in support of its Parnon Arcadia market manipulation suit. Mr. Tallett has also undertaken expert witness assignments for Enterprise Products Partners, the Senate of the US Virgin Islands, and a major Canadian pipeline company among others.

Mr. Tallett possesses particular skills and experience in the areas of:

- petroleum market analysis & projection
- refinery technology, economics and modeling
- project investment analysis
- petroleum sector and business planning
- petroleum industry technology, economics, environmental regulation
- technical/scientific/MIS computing in the energy and process industries.

International experience encompasses: UK, Europe, North Africa, sub-Saharan Africa, Middle East, USA, Caribbean, South America.

Education:

1969 B.Sc. First Class Honors, Chemical Engineering,
University of Nottingham, England
Note, this four year degree course is now called an M.Eng and equivalences to a U.S. Master's degree

Memberships / Institutions

American Institute of Chemical Engineers
International Association for Energy Economics
Institution of Chemical Engineers (UK)
Energy Institute (UK)

Experience

2020-present President, Tallett& Co, Principal Advisor, Solomon Associates
After sale of EnSys assets to Solomon Associates, continues to work actively with Solomon on WORLD-based and other studies, including 2021 and prospective 2022 support to the OPEC Secretariat regarding downstream sections of their annual World Oil Outlook, and evaluation of the refining impacts of 'sustainable' scenarios now being generated by the IEA and others.

Separately, and unaffected by the sale to Solomon, has continued to be actively involved in expert witness work, notably in 2021 for the Commonwealth of Pennsylvania.

1980-July 2020 President, EnSys Energy & Systems, Inc.

1996-June 2021 Principal, EnSys Yocum, Inc.
Established a reputation for quality work and sound client relationships as witnessed by a high proportion of repeat assignments. Through R&D activities and consistent pursuit of quality, brought EnSys to the leading edge of capability in its field. Also held a lead position in the services provided by EnSys Yocum for oil and gas production facilities design and multiphase flow measurement.

Under the EnSys Energy banner, Mr. Tallett directed a wide range of major projects and participated in project teams for U.S. and overseas government agencies, industry organizations, oil refiners and producers. Clients Include:

Environmental Protection Agency
Department of Energy
Department of State
Energy Information Administration
Argonne National Laboratory Oak Ridge Laboratory
U.S. Navy
OPEC Secretariat
World Bank
Eeste Energia
American Petroleum Institute
Natural Resources Canada
Ministry of Energy Ecuador
Inter-American Development Bank/PetroTrin
International Maritime Organisation
International Council on Clean Transportation
Commission for Environmental Cooperation
SEMARNAT Mexico
ICL (UK & Middle East)
Economist Intelligence Unit
Bloomberg
Booz Allen Hamilton (European super major)
Leading petroleum additives supplier European catalyst supplier
US midstream LP
ICF International (European super-major)
ICF International (European Commission)
IPIECA

BIMCO
Concawe/Fuels Europe
Petroleum Association of Japan
Canadian Fuels Association
International Chamber of Shipping
Canadian Shipowners Association
Maersk
ConocoPhillips/Phillips66
ExxonMobil
Koch Industries
Marathon
ARCO Chemical
Qatar General Petroleum
ADNOC
ETAP Tunisia
Air Products
Linde
Koch Industries
Union Carbide
ARCO
Caltex
ChevronTexaco
ONGC
Elf
Tesoro/Andeavor/Marathon
UOP Honeywell
Sasol
Engen
Cargill
Lubrizol
CFTC
State of New York
City of New York
State of New Hampshire
State of New New Jersey
State of Pennsylvania
Government of USVI
Gowling WLG / Tsleil-Waututh Nation
Government of British Columbia
Weitz Luxenberg
Sher Leff
Clyde & Co

The following is a list of representative assignments:

- Working annually in conjunction with the OPEC Secretariat, analysis of potential global refining trends, investments and economics now through 2045, entailing WORLD modeling projections and joint authorship of the downstream section of each OPEC *World Oil Outlook*, from 2007 through 2021
- For a national energy company, undertook an assessment, including using WORLD, of the market outlook for products derived from oil shale and of the need and opportunity to invest in additional processing given fuels quality developments, especially for gasoline and marine fuels
- For an array of industry clients, also the EPA, undertook assessments of the potential supply, refining and market impacts of the IMO Sulfur rule for over two years before it came into effect in January 2020. This included a regular, quarterly service with multiple subscribers, a leading report for IPIECA and others that was presented at the key IMO meeting on the Rule, and confidential assessment for a leading oil company of the potential impacts of the Rule
- For the Department of Energy, Office of Policy, undertook WORLD-based projections combined with detailed logistics review to assess the likely need for and dispositions of SPR crude oils in today's changed world (2018) under a series of hypothetical disruptions
- For the Departments of Energy and State, undertook two major assessments of the potential impacts of rising Canadian oil sands production and supply on U.S. refining and global oil markets under a range of alternative pipeline scenarios centering on the Keystone XL project
- For a leading European catalysts supplier, undertook a comprehensive projection of the market for hydro-processing and FCC catalysts (an update to and expansion of prior work)

- For the American Petroleum Institute, undertook a major analysis using WORLD of the potential impacts of the Waxman-Markey climate bill on U.S. and global refining. This study was very widely reported across the US and international press and has contributed to influencing political opinion at the US Senate and other levels on the potential "unintended consequences" of climate legislation and on the requirements for maintaining US energy security while meeting climate goals
- For a major oil company, a WORLD-based assessment of the post-recession outlook for refining and of the potential effects of superimposing on that climate legislation
- For the City of New York and Sher Leff, extensive expert witness support in their case against the oil industry under MDL litigation on the impacts of MTBE in gasoline and groundwater. This followed directly from earlier work in the Suffolk County MDL case with Weitz Luxenberg and Baron Budd, in turn preceded in 2003 by work with the State of New York in the Pataki case which sought to revoke the State's decision to use ethanol in place of MTBE in gasoline. Subsequent cases have included the States of New Hampshire, New Jersey and Pennsylvania.
- For a major European chemical company, and working in conjunction with marine specialist associates, undertook an in-depth assessment of the global market for marine bunker fuels additives
- For the World Bank, an integrated analysis using WORLD of the impacts of product quality regulations and global competition on sub Saharan African refining
- For a US midstream company, an analysis of projected European product flows and refining activity in association with a potential acquisition
- For a US integrated oil company, a rigorous assessment of the impacts on refining and supply of a high price/cost, low demand world, through 2025
- In parallel projects for the EPA, API and IMO, evaluation of the refining impacts of potential stricter MARPOL Annex VI regulations for international marine bunker fuels. Extensions for the EPA and for the API, the latter to examine the impacts of proposed bill S.1499
- For a specialty chemicals manufacturer, evaluation of the effects on current US and global gasoline and fuels markets, refining and CO2 emissions of wider user of proven petroleum additives
- For a super-major, evaluation of the effects on U.S. Interior (PADD2) refinery processing capacity, operations and fuel emissions of expanding Canadian tar sands syncrude production, in support of a GHG environmental impact analysis
- Evaluation of medium term refining capacity balance outlook for and with the OPEC Secretariat leading to internal report and also basis for OPEC paper at the International Energy Forum, Doha, April 2006, as reviewed in Oil & Gas Journal, June 18th edition
- Analysis of global oil market and refining developments through 2010, 2015 and 2020 under differing scenarios (multiple assignments involving WORLD model application)
- Projection of short term (2005, 2006) global downstream refining markets and margins using WORLD preceded by calibration of WORLD against 2001 and 2004 actual data
- Redevelopment of the Bloomberg refining netbacks system and on-going support based on application of the EnSys WORLD model in single refinery form
- Reformulation of the EnSys WORLD model to meet client needs, technical and systems support and training
- WORLD-based analysis of hypothetical 2003 and 2010 oil market disruptions in order to assess optimum draw and fill strategies for the U.S. Department of Strategic Petroleum Reserve and of 2015 BAU and disruptions to assess potential future compatibility of SPR crudes with market needs

- Testimony on the emissions and refining impacts of New York State's MTBE ban leading to full acceptance by the court of the State's case
- Testimony on crude valuation issues relating to the producers supplying into the Trans Alaskan Pipeline System. Specific issues included valuation of residuum and naphtha cuts and the effects of cut quality differences. Led to the FERC adopting ExxonMobil positions including Tallett method for valuing naphtha on the West Coast
- Assessment, on behalf of the Senate of the USVI, of the proposed HOVENSA joint venture between Amerada Hess and PdVsa
- Refinery technology analyses and updates for the Petroleum Market Module component of the EIA NEMS system
- Support to Natural Resources Canada to enable them to adapt the US NEMS model to the Canadian energy system
- Analysis of the technology options for and economic impacts of low sulfur gasoline and highly reformulated diesel
- Development of a linearized version of the RFG Complex Model and licensing to EPA

Review of the SOx sources and emissions from U.S. refineries, assessment of emission control approaches and of the likely impacts of proposed EPA regulations to implement a 5 minute standard for SOx emissions

- Analysis of the cost impacts on U.S. refineries of Clean Water Act amendments
- Comprehensive redevelopment of the manufacturing and distribution planning/optimization system for a major processing company
- Analysis of refining sector development options as part of a national petroleum sector master planning system for the Ministry of Energy, Ecuador
- TRINTOC refinery upgrade economic and market appraisal
- Detailed appraisal of the U.S. market, refining and trade impacts of reformulated gasoline Simulation of European gasoline and refining and of the economics of alternative oxygenates
- Advising a leading chemical company on the refining impacts of MTBE
- Design and implementation of refinery LP planning system for ADNOC
- Master planning of MIS systems and organization for QGPC, Qatar
- Confidential market and venture analysis for process engineering workstations
- Lead author of Economist special report on "The Potential of Microcomputers in the Process Industries"
- Two year project to implement a national energy modeling and planning system for ETAP (Tunisia)
- Evaluation of the potential impacts of carbon taxes on U.S. OECD and non-OECD refining sectors
- Detailed refinery technology analysis in support of EPA proposals for further reformulation of gasoline and diesel fuel
- Evaluation of alternative routes for enhancing refinery LP modeling within EPA and DOE
- Evaluation of the petroleum sector characteristics of Louisiana and the U.S. Gulf Coast as the first step in developing a comprehensive methodology for simulating the effects of disruptions impacting the region
- Review of proposed EPA regulations for refinery NESHAPS including commentary on small refiner impacts and proposals for alternative/graduated approaches to emissions control

- Evaluation of the Asia-Pacific petroleum market and of the market and military fuel supply impacts of hypothetical emergencies involving major mobilization of U.S. military forces
- Evaluation of the petroleum and electric sector energy systems of Puerto Rico and the U.S. Virgin Islands and of means to reduce their energy vulnerability, leading to a Report to Congress
- Evaluation of options for mitigating heating oil supply vulnerabilities in the U.S. north east, leading to a Report to Congress and the establishment of a north east heating oil reserve
- Analysis of industry bidding responses to the SPR drawdowns during the Middle East Crisis
- Middle East Crisis Market Simulations and Analyses, both at crisis onset and at the start of Desert Storm

1977-1980 Project Manager, Gordian Associates, London

Evolved into a leading member of London team, instrumental in key proposals and contracts.
Undertook market feasibility studies of Middle East refining, oil drilling services, and specialty chemicals. Techno-economic appraisal of sixty petrochemical processes as basis for world chemicals market and modeling study. Participated in an extensive technology transfer project for divisions of SONATRACH. Advised government departments on the likely impacts of growing North Sea oil production.

1973-1977 AMOCO Europe, London

As Amoco Europe's first European Supply Coordinator, established improved planning procedures and data, negotiated international fuels contracts and evaluated market/pricing tools, notably the Queen Mary College World Energy Model. Earlier, as Technical Systems Analyst, created computing support to European refineries. Implemented and supported new systems for: refinery modeling / planning / optimization, plant utilities, product distribution and oil accounting.

1969-1973 EXXON, ESSO Petroleum, Fawley Refinery, England

Early activities as Project Development Engineer centered on process plant design, economic and simulation studies. As Coordinator of the Refinery Capital Budget, was responsible for board appropriations, DCF analyses, monitoring multi-million dollar budget.

For two years in the Planning & Scheduling Department, held positions covering crude, residual fuels, distillates, gasoline, and all main process units in this complex refinery. Achieved various firsts to improve operating economics.

Papers & Publications

Not itemized beyond 2011 but conference presentations etc. have continued, including:

2021: Opportunity Crudes Conference, (remote)

2020: Maritime Week Americas, (remote)

2019: Jacobs Petcoke Conference, San Antonio, Maritime Week Americas, Fort Lauderdale

2018: COQA, San Antonio, Jacobs Petcoke Conference, Chandler, AZ

2017: Concawe, Antwerp, Maritime Week Americas, Miami, Platts Bunker Conference, Houston, Natural Gas for High Horsepower Summit, Houston

2016: US-China GPVI Workshop (EPA) Remote Presentation, IMO MEPC 70, London

2015: CSIS, Refining and Exports and Future of the Strategic Petroleum Reserve Workshops, Washington, DC, EUCI Webinar

2014: Argus Asphalt Summit, Houston, EIA Global Modeling Forum, Washington, DC, Argus North American Crude Transportation Summit, Houston, Opportunity Crudes Conference, Houston, COQA, San Francisco

2013: International Energy Forum, Riyadh, COQA, Seattle, AOPL, Newport Beach

2012: Canadian Oil Sands Summit, Calgary, WESTAC, Edmonton

"*Cushing Canadian Congestion A Review of Logistics Options"* Energy Forum, New York, November 22nd 2011

"*Cushing Canadian Congestion & Keystone XL A Review of Logistics Options"* COQA Tulsa, October 27th 2011

"*Global Downstream Modeling: Refinery LP (and OMNI) Taken to an Extreme"* MUG 2011 Bar Harbor, Maine, October 5 2011

"*Global Outlook for the Refining Industry – Prospects & Challenges"* 3rd Annual World Refining Technology Summit 2011 Houston- September 28, 2011

"*Canadian Oil Sands & the Keystone XL Pipeline"* LERDWG Meeting, Washington, DC April 20 2011

"*Canadian Crude Oil Exports: Outlook, Options, Implications*" Argus Americas Crude Summit, Houston, January 26-28 2011

"*Crudes Oils & Refining – Outlook and Impacts of Regulations"* Crude Oil Quality Association (COQA), Houston, October 28 2010

"*Crudes, Non-crudes, Demand & Climate Regulation: the Changing World before Us"* Opportunity Crudes Conference, Houston, October 25-26 2010

"*Availability of Low Sulphur Marine Fuels: Prospects & Issues*", ICS International Shipping Conference, London, September 15th 2010

"*Global Downstream Developments & Their Impacts On Coke*", Argus Petroleum Coke Summit Americas 2010, Houston, September 16-17 2010

"*Environmental Legislation Potential Impacts On Refining & Crude*", Argus Americas Crude Summit, Houston, January 26-28 2010

"*Tougher Energy Policies And Their Impact On The Refining Industry*", Global Refining Technology Summit, Vienna, November 2nd 2009

"*The Impact Of The Global Recession On The Refining Industry And The Way Out*", Global Refining Technology Summit, Vienna, November 2nd 2009

"Economic Slowdown – Impacts on Refining", Next Generation Oil & Gas, Middle East North Africa, January 2009

"Atlantic Basin Refiners Face Tough Challenges", Global Refining Strategies Conference, Houston, October 27-29th 2008

"US Crude Supply Outlook – Implications for Refining", Crude Oil Quality Group, San Antonio, October 23rd 2008

"European Diesel: Global Implications", Platts European Refining Markets Conference, Brussels, October 2223rd 2007

"Integrated Market Evaluation: Enhancing Refining Economics Through Complex Linear Programming Technology", Global Refining Strategies Conference, Houston TX, September 10-11th 2007

"Outlook for Marine Fuels Demand & Regulation: Implications for Refining and Are We Getting Global Oil Demand Forecasting Wrong?*"*, 26th Annual North American Conference of the USAEE/IAEE, Ann Arbor MI, September 24-27th 2006

"*Global Outlook: Implications through 2020 of Alternative Fuel Scenarios for Refining, Crude, Hydrogen*", Haldor Topsoe Catalysis Forum 2006, Hornbaek, Denmark, August 24-25th 2006

"Refinery Capacity: How was the ball dropped?Who is going to pick it up?", Energizing Supply: Oil & Gas Investment in Uncertain Times, G8 Preparatory Conference, Foreign Affairs Canada, Ottawa, Ontario, October 28 2005

"Global Outlook: Implications Through 2020 of Alternative Fuels Scenarios", CatCon 2005, Philadelphia PA, October 25-26 2005

"High Oil Prices & Alternative Fuels Impacts on the US & Global Downstream", 25th Annual North American Conference of the USAEE/IAEE, Denver CO, September 18-21 2005

"Factors Impacting Refining: U.S. & Global Contexts", USAEE/SAIS Washington Energy Conference, Washington D. C., April 26th 2005

"Impacts of GTL's, Syncrudes and Non_Crudes Supplies to 2015 - an integrated WORLD modelling analysis of impacts on crude trade, markets and refining", SMi Conference: Non Conventional Oil & Gas – Unlocking the Potential, London, June 5th 2003

"Global Refining Developments Through 2015 - Implications for Investments and Technology", CatCon 2003, Houston Texas, May 2003

"GTL's - How Far Can They Go?" Catalytic Advances Program, Houston Texas, May 2003

"Global Refining in 2010 – Refining Capital Investment Requirements", CatCon 2001, Houston Texas, May 2001

"Economic Impacts of Reformulated Diesel", Association of Automobile Manufacturers Meeting, Baltimore MD, August, 2000

"Turmoil in Global Product Specifications", Energy Forum, New York NY, March, 2000

"Perspective on Worldwide Fuels Charter", 16th Annual World Fuels Conference, San Antonio TX, March, 1999

"Global Market and Environmental Impacts on Refining - the Need for Cohesive Policies", USAEE/IAEE 18th Annual North American Conference, San Francisco CA September, 1997

"Industrial Energy: The Petroleum Refining Industry" The International Climate Change Conference, Baltimore MD, June 1997

"The Petroleum Industry: Growth, Investment, Regulation and Rationalization" USAEE Meeting Philadelphia PA, June 1997 *EnSys Experience & Key Personnel*

"*Impacts of Potential Carbon Taxes on US & Global Refining, Trade & Investment"* 17th Annual North American Conference of the USAEE/IAEE, Boston, MA October 1996

"Global Petroleum Industry Modelling Using WORLD" 1995 Haverly Systems Europe MUGI Conference, Windsor, England October 1995

"N*ew US Gasoline Regulations Could Inspire Trading Changes"* Martin R. Tallett and Peter Fusaro, *Pipeline*, The International Petroleum Exchange, February 1995

"Experience with Integrated WORLD Modelling in the Department of Energy" Martin R. Tallett, Daniel N. Dunbar, J. Leather, EIA Annual NEMS Conference, Washington, DC, February 1995

"*RFG Will Help Foreign Refiners Increase US Market Share"* Martin R. Tallett, Octane Week, October 10, 1994

"Emissions Standards: The New Field of Competition" Martin R. Tallett, AIC Conference on Meeting the Regulatory, Logistic and Economic Realities of Reformulated Gasoline, Washington, DC, October 1994

"Global Outlook for Alternative Fuels" Martin R. Tallett, Peter Fusaro, 1994 Conference on Clean Air Act Implementation & Reformulated Gasolines, Washington, DC October 1994

"Impacts of Environmental Regulations on World Regional Oil Market Economics and Trade" Martin R. Tallett, 15th Annual North American Conference of the USAEE/IAEE, Dallas, TX September 1994

"Impending RFG Rule's Impact Will Hit Far Beyond US" Martin R. Tallett, Peter Fusaro, Platt's Oilgram News, June 20, 1994

"Linear Blending Values Produce Accurate Results for EPA Emission Equations" Daniel N. Dunbar, Martin R. Tallett, John Leather, Fuel Reformulation, July/August and Sept/Oct 1993

"Year 2000: The Changed Shape of US Refining under Environmental and World Regional Impacts" Martin R. Tallett, Daniel N. Dunbar, John Leather, National Petroleum Refiners Association Annual Meeting, San Antonio, TX, March 1993
AM-93-26 *"Impacts of Green Gasoline"* Martin R. Tallett, Daniel N. Dunbar, Petroleum Economist, April 1990

APPENDIX D

PEER REVIEWER CONFLICT OF INTEREST STATEMENTS

Attachment 2
Conflict of Interest Certification
(REV 04/2019)

Order Conflict of Interest Certification (EPA Prime Contracts)
(REV 12/2017)

Subcontractor/Consultant: Vincent DiVita
EPA Contract No. 68HE0C18C0001
Order No.: WA 3-13

In accordance with EPAAR 1552.209-71 (Organizational Conflicts of Interest), EPAAR 1552.209-73 (Notification of Conflicts of Interest Regarding Personnel), and the terms and conditions of the subcontract agreement for services, before submitting this certification, Subcontractor/Consultant shall search its records accumulated, at a minimum, over the past three years immediately prior to receipt of the order to determine if any conflicts exist. Subcontractor/Consultant makes the following certifications/warranties:

ORGANIZATIONAL AND PERSONAL CONFLICTS OF INTEREST:

☒ To the best of our knowledge and belief, no actual or potential organizational conflicts of interest exist. In addition, none of the individuals proposed for work under this order has any personal conflicts of interest.

OR:

☐ To the best of our knowledge and belief, all actual or potential organizational and personal conflicts of interest have been reported to the ERG Technical Contract Manager. This disclosure statement must include a summary of the potential conflict with respect to the work proposed to be performed, any reasons why Subcontractor/ Consultant does not believe the potential work would be a conflict, and/or a proposed strategy for mitigating any potential conflict of interest.

This is to certify that our personnel who perform work under this order, or relating to this order, have been informed of their obligation to report personal and organizational conflicts of interest. Subcontractor/Consultant recognizes its continuing obligation to search for, identify, and report to the ERG Technical Contract Manager any actual or potential organizational or personnel conflicts of interests that may arise during the performance of this work order or work relating to this order.

Authorized Signature

Vincent DiVita

Printed Name/Title

January 4, 2022

Date

Attachment 2
Conflict of Interest Certification
(REV 04/2019)

Order Conflict of Interest Certification (EPA Prime Contracts)
(REV 12/2017)

Subcontractor/Consultant:	Steven Kent Hoekman, Ph.D., Consulting
EPA Contract No.	68HE0C18C0001
Order No.:	WA 3-13

In accordance with EPAAR 1552.209-71 (Organizational Conflicts of Interest), EPAAR 1552.209-73 (Notification of Conflicts of Interest Regarding Personnel), and the terms and conditions of the subcontract agreement for services, before submitting this certification, Subcontractor/Consultant shall search its records accumulated, at a minimum, over the past three years immediately prior to receipt of the order to determine if any conflicts exist. Subcontractor/Consultant makes the following certifications/warranties:

ORGANIZATIONAL AND PERSONAL CONFLICTS OF INTEREST:

☐ To the best of our knowledge and belief, no actual or potential organizational conflicts of interest exist. In addition, none of the individuals proposed for work under this order has any personal conflicts of interest.

OR:

☐ To the best of our knowledge and belief, all actual or potential organizational and personal conflicts of interest have been reported to the ERG Technical Contract Manager. This disclosure statement must include a summary of the potential conflict with respect to the work proposed to be performed, any reasons why Subcontractor/ Consultant does not believe the potential work would be a conflict, and/or a proposed strategy for mitigating any potential conflict of interest.

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2/14/22
Authorized Signature

Steven Kent Hoekman, Ph.D., Consulting
Printed Name/Title

2/14/22
Date

Attachment 2
Conflict of Interest Certification
(REV 04/2019)

Order Conflict of Interest Certification (EPA Prime Contracts)
(REV 12/2017)

Subcontractor/Consultant:	Martin R. Tallett, EnSys Energy & Systems, Inc. d.b.a. Tallett & Co.
EPA Contract No.	68HE0C18C0001
Order No.:	WA 3-13

In accordance with EPAAR 1552.209-71 (Organizational Conflicts of Interest), EPAAR 1552.209-73 (Notification of Conflicts of Interest Regarding Personnel), and the terms and conditions of the subcontract agreement for services, before submitting this certification, Subcontractor/Consultant shall search its records accumulated, at a minimum, over the past three years immediately prior to receipt of the order to determine if any conflicts exist. Subcontractor/Consultant makes the following certifications/warranties:

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OR:

☐ To the best of our knowledge and belief, all actual or potential organizational and personal conflicts of interest have been reported to the ERG Technical Contract Manager. This disclosure statement must include a summary of the potential conflict with respect to the work proposed to be performed, any reasons why Subcontractor/ Consultant does not believe the potential work would be a conflict, and/or a proposed strategy for mitigating any potential conflict of interest.

This is to certify that our personnel who perform work under this order, or relating to this order, have been informed of their obligation to report personal and organizational conflicts of interest. Subcontractor/Consultant recognizes its continuing obligation to search for, identify, and report to the ERG Technical Contract Manager any actual or potential organizational or personnel conflicts of interests that may arise during the performance of this work order or work relating to this order.

Martin R Tallett
Authorized Signature

Martin R. Tallett, EnSys Energy & Systems, Inc. d.b.a. Tallett & Co.
Printed Name/Title

Jan 03 2022
Date