



ETHANOL STRONG

2018 ETHANOL INDUSTRY OUTLOOK

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WE ARE ETHANOL STRONG

With low commodity prices jeopardizing the farm economy, ethanol stands as a pillar of strength, providing a value-added market that continues to rejuvenate rural communities. With gasoline prices rebounding and vexing consumers once again, ethanol remains the lowest-cost octane on the planet, providing savings to both refiners and consumers. With the U.S. stepping away from global climate agreements, ethanol is reducing carbon emissions anyway—by at least 43 percent compared to gasoline. And, with U.S. crude oil imports on the rise again, ethanol production is hitting new heights, representing a critical backstop for energy security. Indeed, faced with challenges to America’s economic, environmental, and energy security, the United States remains Ethanol Strong.

While the industry has been challenged by stubbornly high stocks, protectionist trade barriers, and policy uncertainty, the long-term market fundamentals remain solidly bullish and producers are facing the new year with confidence.

Part of that optimism is attributable to a new President whose steadfast support has reassured the market that the Renewable Fuel Standard is truly back on track, whose commitment to regulatory reform promises to reduce costs and open new market opportunities, and whose “America First” approach to trade has provided refreshing advocacy for ethanol in addressing a myriad of unfair trade barriers. The chaos and drama in Washington, D.C. may provide fodder for political pundits, but the business of Washington, D.C. is still getting done and providing investors and consumers with renewed enthusiasm for domestic renewable fuels.

Still, as always, there are challenges that remain, necessitating the industry’s vigilance and attention. We must continue to build demand, here and abroad, to assure future growth. That means securing fair treatment in the regulation of higher-level ethanol blends so that consumers can choose the fuel that makes the most sense for their cars and their wallets – be it E15 or blends for flex fuel vehicles like E25, E30 and E85. That also means addressing the troubling protectionist winds blowing across international biofuels markets. We need to stem these destructive efforts, lest consumers across the globe be denied access to the world’s lowest cost ethanol and U.S. farmers be denied the export opportunities that often mean the difference between profit and loss. We must also continue to work toward a more united industry—speaking as one voice on major policy and marketplace issues, and encouraging a more constructive dialogue with our customers that recognizes the need for mutual success.

This year’s Outlook provides the statistics, analyses and technical underpinning for the debates ahead. It reflects an industry that is poised for continued success, sober about the challenges we face, but confident in the knowledge that we remain now, and always, **Ethanol Strong**.

Sincerely,

A handwritten signature in black ink, appearing to read "Bob Dinneen", written in a cursive style.

Bob Dinneen, President & CEO

2017 ETHANOL PRODUCTION STRONGER THAN EVER

The strength of America's ethanol industry was on full display in 2017, as producers battled through adversity to achieve new records for both production and demand.

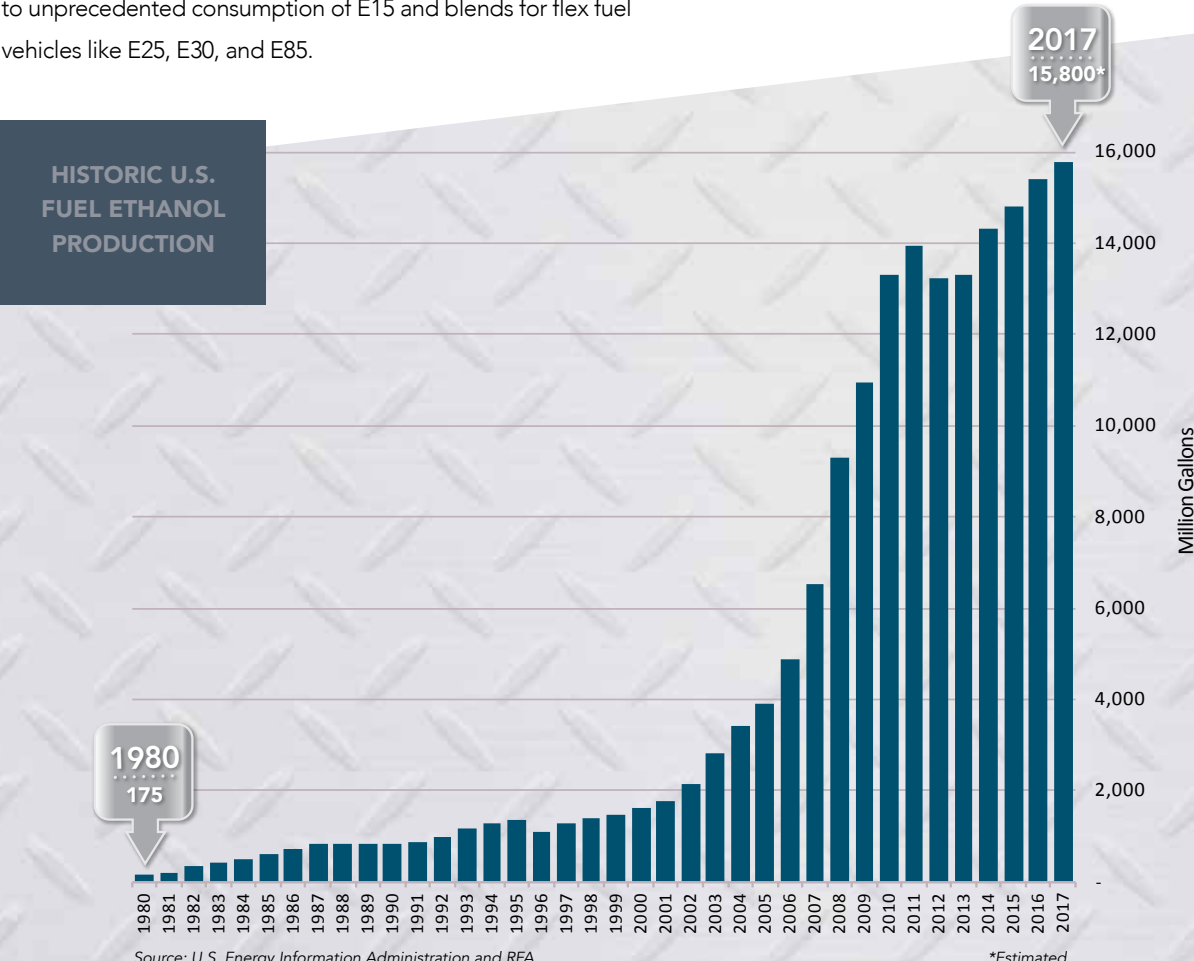
Located in 28 states, 211 ethanol biorefineries produced a record 15.8 billion gallons of renewable fuel in 2017, along with 41.4 million metric tons of animal feed and 3.6 billion pounds of distillers oil. A wave of new construction and expansions also swept across the industry in 2017, as investors showed renewed confidence in ethanol's future.

Ethanol's superior octane value, exceptional emissions benefits, and favorable blending economics drove consumption to new heights both in the U.S. and abroad. And, for the first time since 2013, the Renewable Fuel Standard's (RFS) conventional biofuel requirement was enforced as intended by Congress, leading to unprecedented consumption of E15 and blends for flex fuel vehicles like E25, E30, and E85.

Even in the face of new trade barriers in key markets, ethanol exports surged to a record level. Undeniably, more nations around the world are embracing U.S. ethanol as a proven tool for reducing carbon emissions.

Meanwhile, by creating value-added markets for nearly 5.5 billion bushels of corn, ethanol helped strengthen and stabilize a farm sector facing historic grain surpluses, decade-low commodity prices, and global trade uncertainties. Despite these headwinds, American farmers achieved a record average corn yield and harvested the second-largest crop in history—demonstrating once again they are the most productive and efficient in the world.

Overall, 2017 was a year of both challenge and triumph, and America's ethanol industry emerged stronger than ever.



U.S. ETHANOL PRODUCTION CAPACITY BY STATE

(Million Gallons per Year)

	Existing Production Capacity	Operating Production	Under Construction/Expansion	Total Capacity
Iowa	4,177	4,127	120	4,297
Nebraska	2,229	2,176	-	2,229
Illinois	1,779	1,679	-	1,779
Minnesota	1,217	1,177	105	1,322
Indiana	1,173	1,173	-	1,173
South Dakota	1,080	1,080	80	1,160
Ohio	548	548	80	628
Kansas	516	491	70	586
Wisconsin	583	583	-	583
North Dakota	465	465	-	465
Texas	385	385	-	385
Michigan	354	354	-	354
Missouri	276	261	-	276
Tennessee	225	225	-	225
California	223	218	-	223
Oregon	162	42	-	162
New York	150	150	-	150
Colorado	127	127	-	127
Georgia	120	120	-	120
Pennsylvania	110	110	-	110
Virginia	64	64	-	64
Idaho	60	60	-	60
North Carolina	60	-	-	60
Mississippi	54	54	-	54
Arizona	50	50	-	50
Kentucky	36	36	10	46
Wyoming	10	-	-	10
Florida	8	-	-	8
TOTAL U.S.	16,241	15,755	465	16,706

Source: RFA, as of January 2018

PRODUCTION FACILITIES

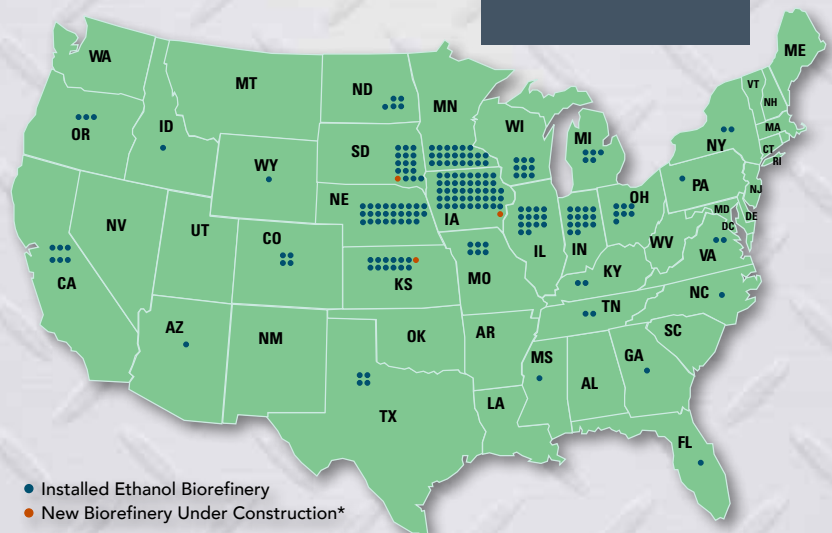
Installed Ethanol Biorefineries	Operating Ethanol Biorefineries	Biorefineries Under Constr./Expansion
43	43	1
26	24	-
14	14	-
22	20	2
14	14	-
15	15	1
7	7	1
12	11	1
9	9	-
5	5	-
4	4	-
5	5	-
6	6	-
2	2	-
6	5	-
3	2	-
2	2	-
4	4	-
1	1	-
1	1	-
2	2	-
1	1	-
1	-	-
1	1	-
2	2	1
1	-	-
1	-	-
1	-	-
211	201	7

“Rest assured that your President and this Administration value the importance of renewable fuels to America’s economy and to our energy independence. Renewable fuels are essential to America’s energy strategy.”

– President Donald J. Trump, in letter addressed to attendees of RFA’s 2017 National Ethanol Conference



U.S. FUEL ETHANOL BIOREFINERIES BY STATE



● Installed Ethanol Biorefinery
 ● New Biorefinery Under Construction*
 *Excludes expansion projects

HISTORICAL BIOREFINERY COUNT AND PRODUCTION CAPACITY

	Installed Ethanol Biorefineries	Total Installed Production Capacity (MGY)	Average Capacity per Biorefinery (MGY)
1992	59	1,335	22.6
1997	56	1,790	32.0
2002	66	2,707	41.0
2007	136	7,437	54.7
2012	213	14,837	69.7
2017	211	16,241	77.0

Source: RFA

*As of December for each year specified

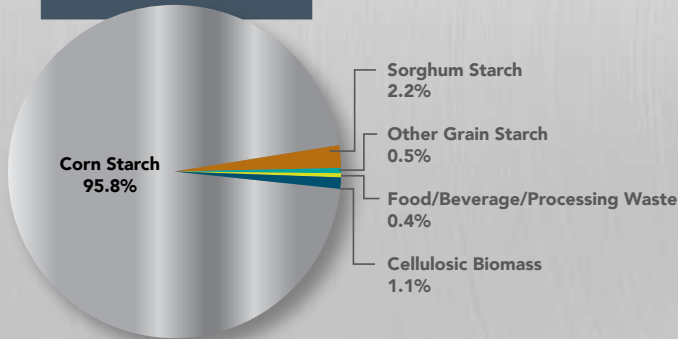
THE ETHANOL PROCESS HOW IT'S MADE

While ethanol's use as a motor fuel dates back to the days of farm stills and Henry Ford's Model T, the modern ethanol production process is light years ahead of its humble beginnings. Today, high-tech biorefineries use state-of-the-art processes to convert grain starch, beverage and food waste, cellulosic biomass, and other feedstocks into high-octane ethanol and a variety of valuable co-products.

Two processes are used for making fuel ethanol—dry milling and wet milling. Nearly 90 percent of the ethanol produced today comes from the dry milling process, with the remaining 10 percent coming from wet mills.

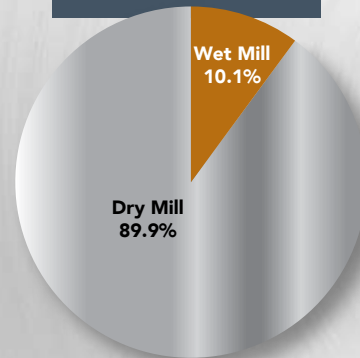
In **dry milling**, the entire grain kernel is first ground into "meal," then slurried with water to form a "mash." Enzymes are added to the mash to convert starch to sugar. The mash is cooked, then cooled and transferred to fermenters. Yeast is added and the conversion of sugar to alcohol begins. After fermentation, the resulting "beer" is separated from the remaining "stillage." The ethanol is then distilled and dehydrated, then blended with about 2 percent denaturant (such as gasoline) to render it undrinkable. It is then ready for shipment. The stillage is sent through a centrifuge that separates the solids from the solubles. These co-products eventually become distillers grains, as well as corn distillers oil.

U.S. ETHANOL PRODUCTION CAPACITY BY FEEDSTOCK TYPE



Source: RFA based on data from U.S. Dept. of Agriculture

U.S. ETHANOL PRODUCTION BY TECHNOLOGY TYPE



Source: U.S. Dept. of Agriculture

ON AVERAGE, 1 BUSHEL OF CORN (56 POUNDS) PROCESSED BY A DRY MILL ETHANOL BIOREFINERY PRODUCES:

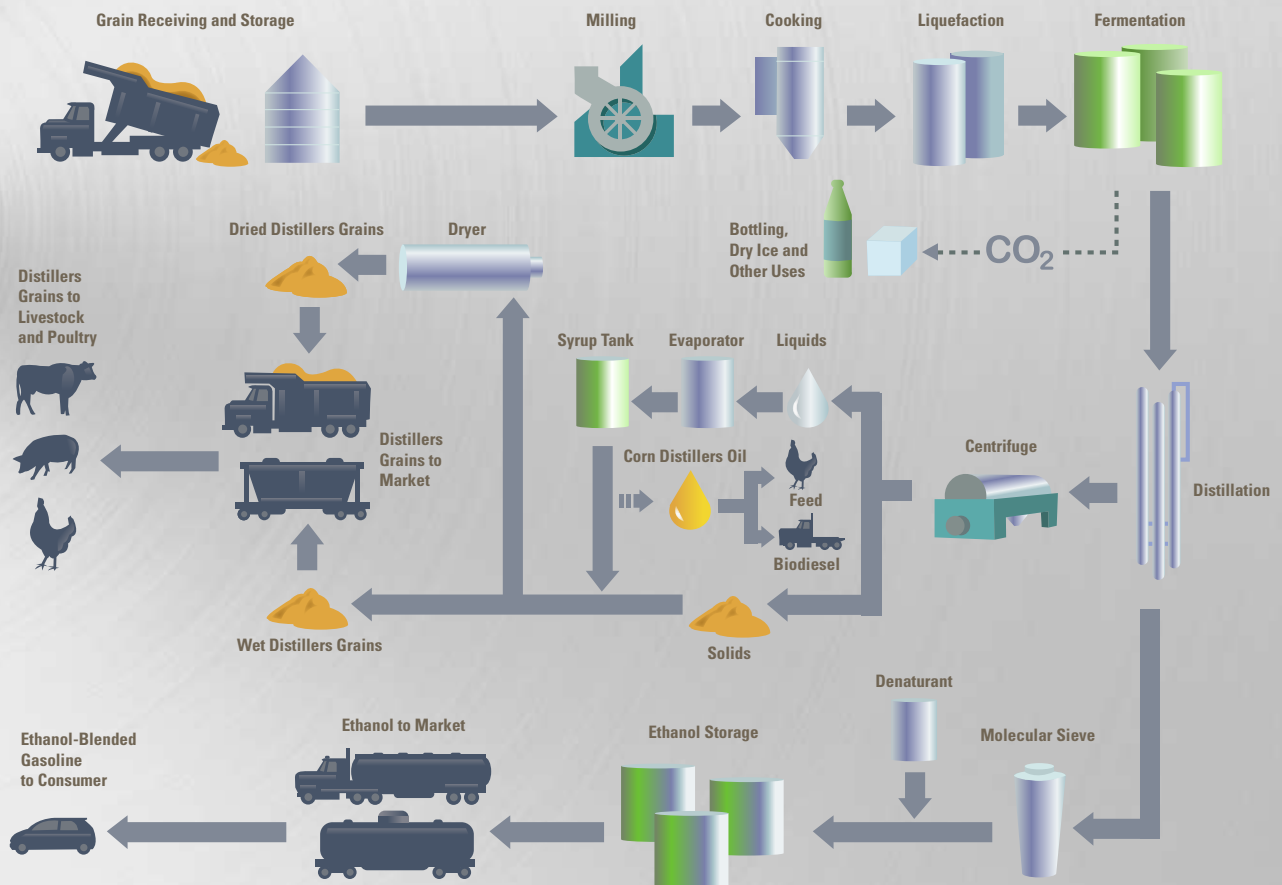


- 2.87 gallons of denatured fuel ethanol
- 16.4 pounds of distillers grains animal feed (10% moisture)
- 0.75 pounds of corn distillers oil
- 16.5 pounds of biogenic carbon dioxide

In 2017, ethanol biorefineries captured **more than 2.5 million tons of CO₂**, which was used for bottling, food processing, dry ice production and other uses.

In **wet milling**, the grain is first separated into its basic components through soaking. After steeping, the slurry is processed through grinders to separate the corn germ. The remaining fiber, gluten and starch components are further segregated. The gluten component (protein) is filtered and dried to produce animal feed. The remaining starch can then be fermented into ethanol, using a process similar to the dry mill process.

DRY MILL ETHANOL PROCESS



Source: RFA

ETHANOL'S ECONOMIC IMPACT FUELING THE HEARTLAND

Rural America continued to struggle with a host of economic challenges in 2017. According to Creighton University, bank loan volumes in the Midwest region were down, hiring dropped off, retail sales decreased, and land values were lower. In the farm sector, decade-low commodity prices, historically high grain stocks, and rising input costs dramatically affected bottom lines.

Fortunately, ethanol biorefineries provided a lifeline in communities across the Heartland, helping to stabilize commodity markets and stem further economic losses. As incremental growth in ethanol production continues, the industry is attracting new investment, generating new employment opportunities, stimulating the tax base, and crucially adding value to farm products.

Ethanol's Value-Added Proposition

Based on average prices and product yields in November 2017, an Iowa dry mill ethanol plant was adding \$2 of additional value—or 63%—to every bushel of corn processed.

CORN COST
PER BUSHEL
\$3.20

VALUE OF OUTPUTS PER BUSHEL

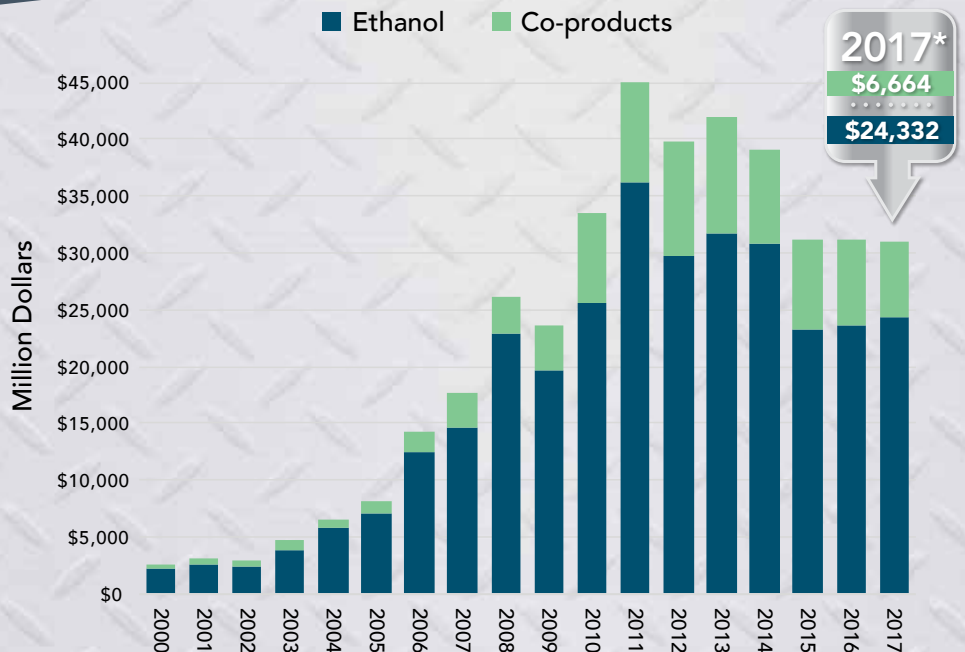
Ethanol	\$4.02
Distillers Grains	\$0.98
Corn Distillers Oil	\$0.20
TOTAL	\$5.20

A recent study published in the *American Journal of Agricultural Economics* found that "the current RFS program considerably benefits the agriculture sector." Key conclusions included:

- Ethanol production under the RFS provided a **\$14.1 billion boost** in the value of the U.S. farm sector in 2015, or **\$6,800 per American farm**.
- Corn prices averaged \$3.68 per bushel in 2015, but would have averaged just **\$2.75 per bushel** without the RFS and a robust ethanol industry.

Source: G. Moschini, H. Lapan, H. Kim; *The Renewable Fuel Standard in Competitive Equilibrium: Market and Welfare Effects*, *American Journal of Agricultural Economics*, Volume 99, Issue 5, 1 October 2017, Pages 1117–1142

GROSS VALUE OF U.S. ETHANOL INDUSTRY OUTPUT



Source: RFA based on U.S. Dept. of Agriculture data

*Estimated

Overall, the production of 15.8 billion gallons of ethanol in 2017 directly employed 71,906 American workers. In addition, the ethanol industry supported 285,587 indirect and induced jobs across all sectors of the economy. The industry created \$24 billion in household income and contributed \$45 billion to the national Gross Domestic Product (GDP). Moreover, ethanol producers paid nearly \$10 billion in federal, state and local taxes, and spent \$32 billion on raw materials, inputs, and other goods and services.

Surveys show that workers in the ethanol industry are well compensated, satisfied with their jobs, and proud of the contributions they make to our nation’s environmental quality and energy security. In fact, a new U.S. Department of Energy survey revealed that 19 percent of ethanol sector employees are veterans of the U.S. military, underscoring the strong sense of patriotism and American pride that percolates through the industry.

In 2017, the production of 15.8 billion gallons of ethanol and 43 million metric tons of co-products and distillers oil had substantial economic impacts, including:

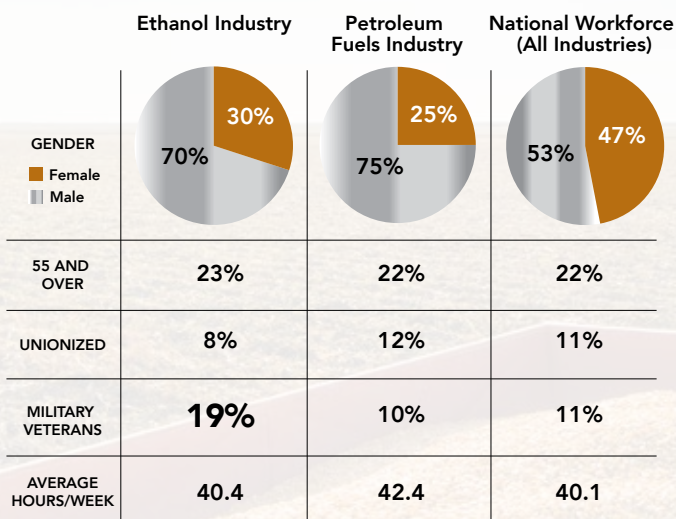
- 71,906 direct jobs
- 285,587 indirect and induced jobs
- \$45 billion contribution to GDP
- \$24 billion in household income
- \$10 billion in tax revenue

Source: ABF Economics

“Producing renewable fuel from crops grown on American family farms allows us to continue honoring a commitment to make our nation stronger and more independent. Veterans working in the ethanol industry take great pride in knowing we are improving our nation’s energy security, economic vitality and environmental quality each and every day.”

– Tony Leiding, Director of Operations, Trenton Agri-Products, LLC and former U.S. Army Captain

ETHANOL INDUSTRY WORKFORCE DEMOGRAPHICS



Sources: U.S. Dept. of Energy; U.S. Bureau of Labor Statistics



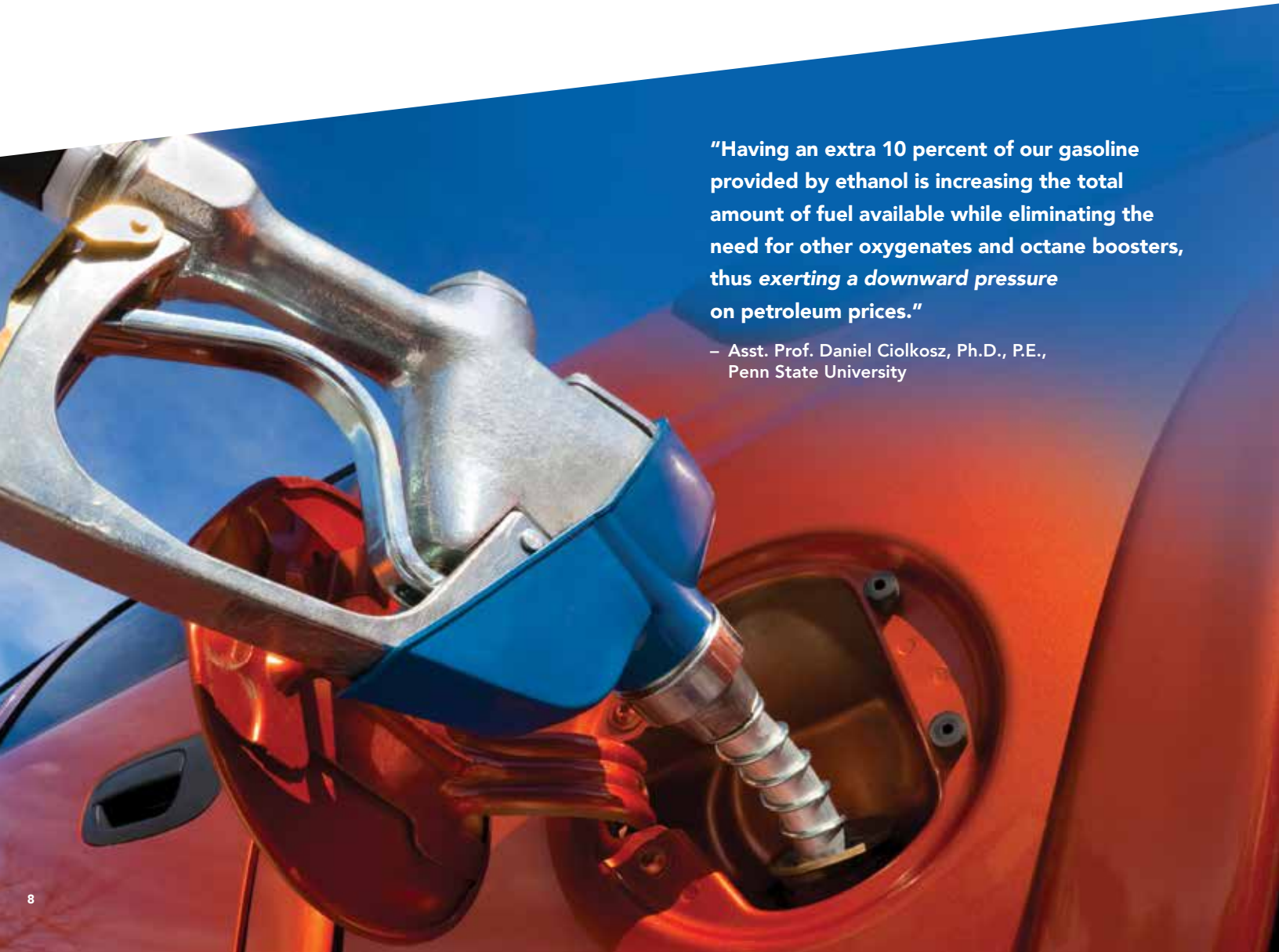
ETHANOL AND THE U.S. FUEL MARKET DRIVING CHANGE

The emergence of ethanol as a major gasoline component has unquestionably revolutionized our nation's motor fuel market. Today, ethanol is blended into gasoline from coast to coast and border to border, extending domestic fuel supplies and lowering consumer prices.

In 2017, ethanol accounted for slightly more than 10 percent of the U.S. gasoline pool, marking the second year in a row that the blend rate exceeded the fictional "blend wall" perpetuated by ethanol opponents. In fact, several states saw average ethanol blend rates well above 10 percent in 2017. Minnesota led the nation with an average

ethanol content near 13 percent, while Iowa was second at approximately 12 percent. This clearly dispels the oil industry myth that ethanol should be limited to 9.7 percent of the gasoline pool.

Nationally, ethanol consumption has grown from 1.7 billion gallons (bg) in 2000 to 14.4 bg in 2017—a 750 percent increase. Meanwhile, gasoline blendstock consumption has stagnated, registering at 128.6 bg in 2000, dipping as low as 121 bg in 2012, and recently rebounding to 2000-era levels. When these dramatic shifts in market share are considered, it's easy to understand why many in the oil industry oppose further growth in renewables.



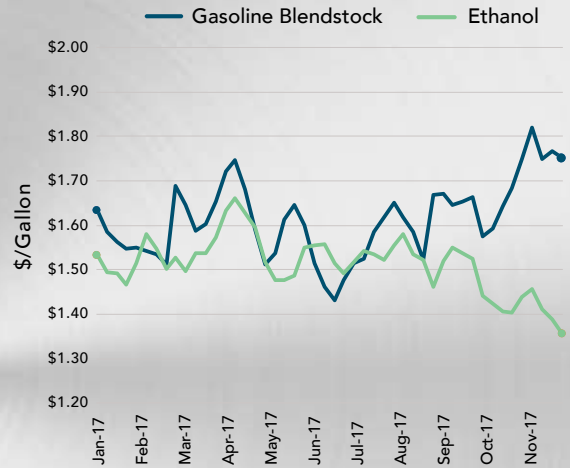
"Having an extra 10 percent of our gasoline provided by ethanol is increasing the total amount of fuel available while eliminating the need for other oxygenates and octane boosters, thus exerting a downward pressure on petroleum prices."

— Asst. Prof. Daniel Ciolkosz, Ph.D., P.E.,
Penn State University

Not only has increased ethanol use kept gasoline consumption in check, it has also resulted in lower fuel prices for American families. Even in an era of relatively inexpensive crude oil, wholesale ethanol was priced 8 percent below gasoline blendstock on average in 2017, with the spread widening to as much as 23 percent late in the year.

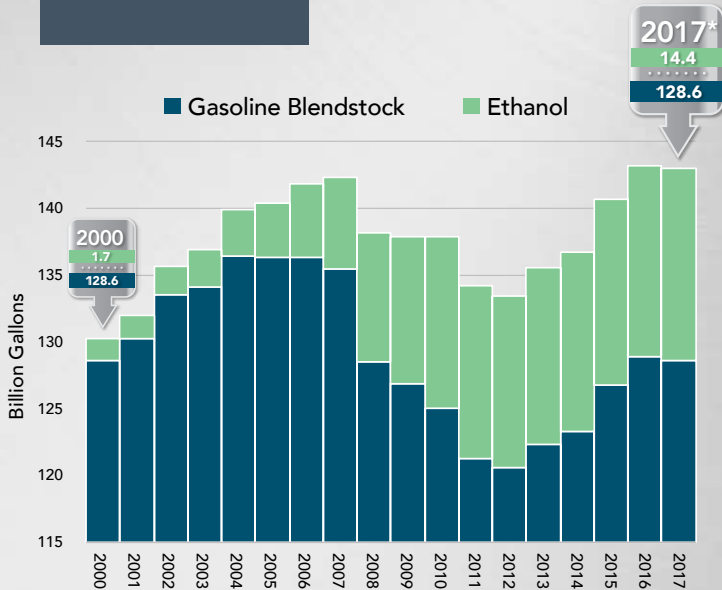
As the evolution of our transportation sector continues, ethanol will continue to drive positive change for consumers across the country.

COMPARISON OF 2017 WEEKLY GASOLINE AND ETHANOL FUTURES PRICES



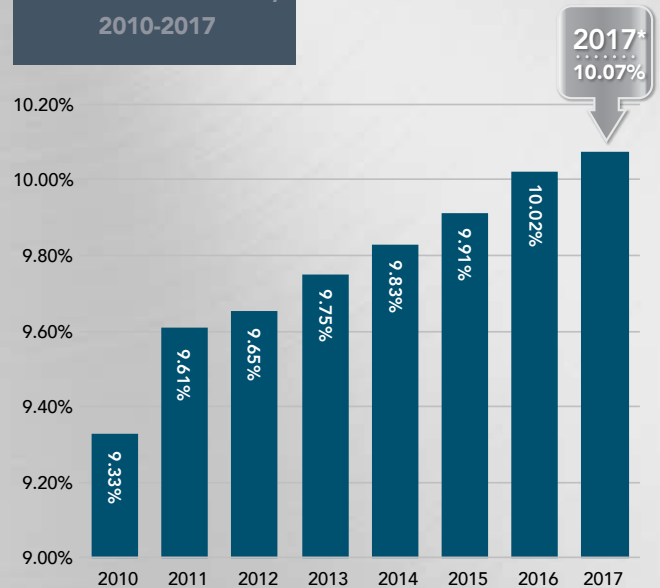
Source: CME Group

COMPOSITION OF U.S. GASOLINE POOL, 2000-2017



Source: U.S. Energy Information Administration and RFA *Estimated based on Jan.-Oct. 2017 data

AVERAGE ETHANOL CONTENT OF FINISHED GASOLINE, 2010-2017



Source: U.S. Energy Information Administration and RFA

*Estimated based on EIA Nov. 2017 Short-Term Energy Outlook

A recent study published in the *American Journal of Agricultural Economics* found that ethanol consumption under the RFS resulted in the following benefits to the U.S. economy in 2015:

- **\$17.8 billion** savings on gasoline spending, equivalent to **\$142 per household**
- **9.5% reduction** in gasoline prices, equivalent to **\$0.18 per gallon**

Source: G. Moschini, H. Lapan, H. Kim; *The Renewable Fuel Standard in Competitive Equilibrium: Market and Welfare Effects*, *American Journal of Agricultural Economics*, Volume 99, Issue 5, 1 October 2017, Pages 1117-1142



ETHANOL'S OCTANE ADVANTAGE FULL-STRENGTH FUEL

The message from automobile manufacturers could not be clearer: they want—and need—more octane.

As automakers introduce more efficient engine technologies, the demand for higher-octane fuels continues to grow. In fact, sales of premium gasoline hit a 15-year high in 2017. But traditional petroleum-based octane boosters are expensive and in short supply.

Fortunately, ethanol stands ready to deliver. With a blending octane rating of 114, ethanol is the cleanest and most affordable source of octane on the planet.

In the past, refiners produced all the octane they needed from hydrocarbons. But refinery processes to increase octane are costly and energy intensive. Thus, as ethanol availability

has grown, refiners have optimized operations to reduce hydrocarbon octane production and take advantage of ethanol's superior octane properties.

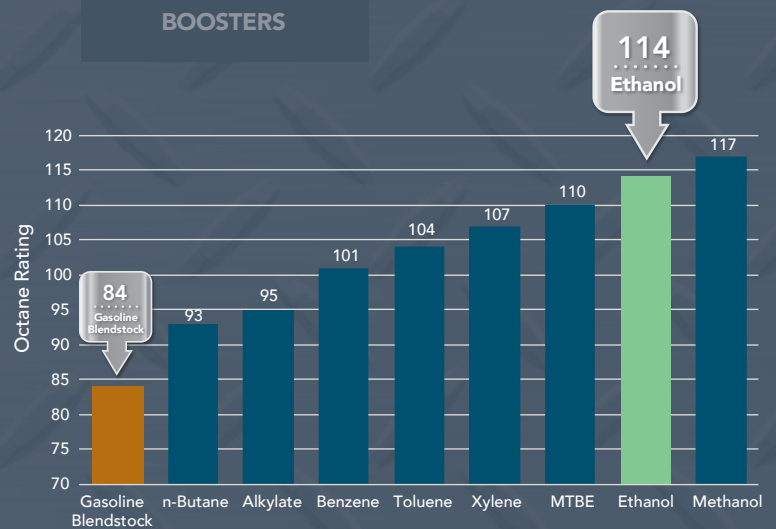
Most refiners today produce gasoline blendstock with an octane rating of 84, then upgrade it to 87 (the minimum allowed in most states) by adding 10 percent ethanol. This offers significant savings, reduced energy use, and lower emissions at the refinery.

Ethanol's role as an octane source has an even brighter future. Already, E15 offers an octane rating of 88, giving consumers an added boost at a lower cost. Moreover, a

"Transitioning the fleet to higher-octane gasoline would result in significant economic and environmental benefits through reduced gasoline consumption."

– Massachusetts Institute of Technology

BLENDING OCTANE RATINGS OF VARIOUS GASOLINE OCTANE BOOSTERS



Source: U.S. Department of Energy and MathPro, Inc.



future high-octane fuel like E20-E40 could deliver the same—or better—fuel economy as regular gasoline when paired with an optimized engine, but with less energy expended per mile and fewer emissions. That’s why automakers view ethanol-based high-octane fuels as a winning strategy for compliance with more stringent future fuel economy and emissions standards.

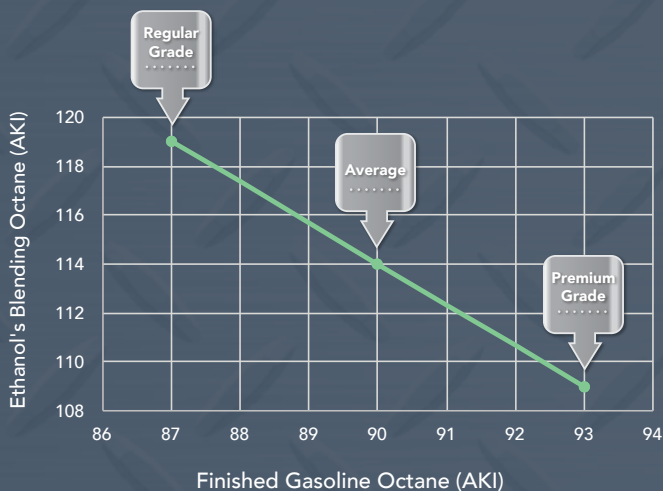
In addition to ethanol’s economic benefits as an octane source, it is also the cleanest and safest option available. Aromatic hydrocarbon octane boosters like benzene are toxic and worsen air pollution.

ETHANOL'S BLENDING OCTANE NUMBER

Ethanol’s pure component octane number is **100 AKI**.

But its blending octane number is **109-119 AKI**, depending on the octane of the finished fuel.

Ethanol’s blending octane number is highest when used with lower-octane hydrocarbon blendstock.

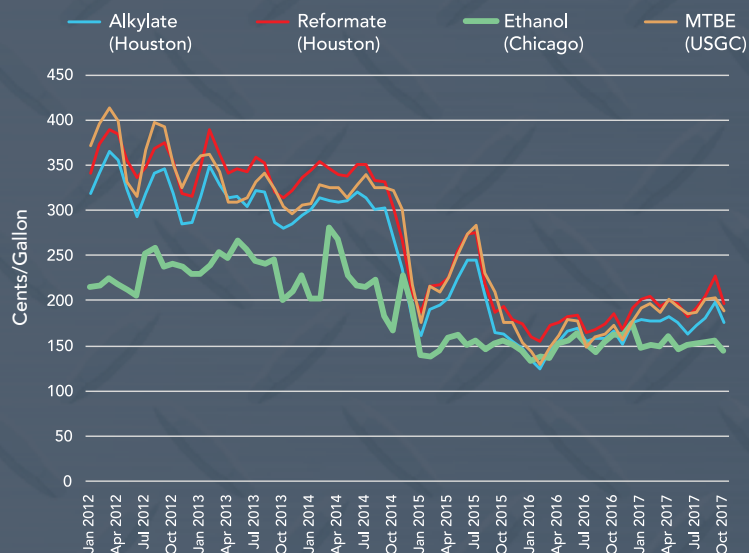


Source: MathPro, Inc.

WHAT IS OCTANE AND WHY IS IT IMPORTANT?

A fuel’s octane rating is the measure of its ability to resist “knocking” in the engine, which is caused when the air/fuel mixture detonates prematurely during combustion. According to the U.S. Department of Energy, “Using a lower octane fuel than required can cause the engine to run poorly and can damage the engine and emissions control system over time. It may also void your warranty.”

MONTHLY SPOT PRICES FOR ETHANOL VS. OTHER OCTANE BOOSTERS



Source: Argus Media

INTERNATIONAL ETHANOL TRADE A GLOBAL FORCE

America's ethanol industry exerted itself as a global force in 2017, with ethanol exports surging to a new record of more than 1.3 billion gallons. Thus, the United States was not only the world's top ethanol producer and consumer in 2017, but it was also the world's top exporter by far.

U.S. ethanol remained the lowest-cost source of octane on the planet, resulting in both increased exports to longtime customers as well as shipments to new destinations. For the third year in a row, Brazil and Canada were the top two markets for U.S. exports, receiving roughly 60 percent of 2017 shipments. India, the Philippines, the United Arab Emirates, Peru, and South Korea were other leading destinations in 2017.

Meanwhile, U.S. ethanol imports continued to languish. While not cost competitive with U.S.-produced corn ethanol, roughly 80 million gallons of Brazilian sugarcane ethanol were imported only because it receives favorable treatment under the California Low Carbon Fuel Standard (LCFS) and RFS.

Unfortunately, with record exports came a raft of new trade barriers and unprecedented protectionism in 2017. The year began with China—the third-largest export market in 2016—raising tariffs on U.S. ethanol imports. In response, exports to China collapsed in 2017. In the fall, Brazil implemented a tariff rate quota and 20 percent tariff on ethanol imports. Finally, the European Union remained effectively closed to U.S. ethanol due to its long-running import tariff.

As 2018 began, RFA continued to work with its partners to resolve these barriers and stimulate growth in the global ethanol marketplace.

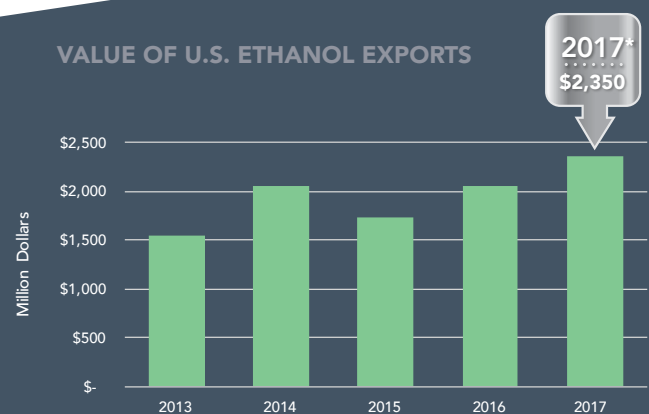
“We are facing an acute problem of pollution due to the use of crude oil. And due to the unavailability of jobs in the rural sector, people are migrating to cities. Diversification of agriculture towards energy and power is the solution to all these issues. An integrated approach needs to be brought as far as the use of ethanol in India is concerned.”

– Nitin Gadkari, India's Minister of Road Transport and Highways



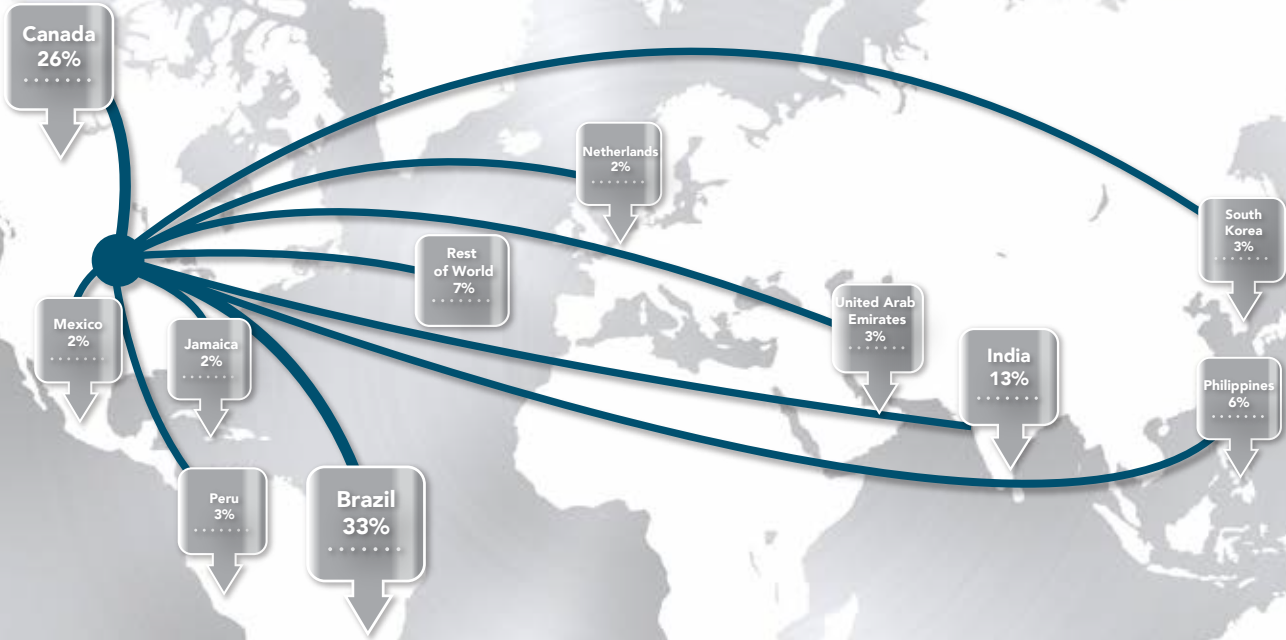
Global fuel ethanol production hit a new record of more than 27 billion gallons in 2017, with the United States again accounting for nearly 60 percent of the world's production.

VALUE OF U.S. ETHANOL EXPORTS



Sources: U.S. Dept. of Commerce, U.S. Census Bureau, Foreign Trade Statistics
*2017 estimated based on Jan.-Nov. 2017

TOP DESTINATIONS FOR U.S. ETHANOL EXPORTS IN 2017

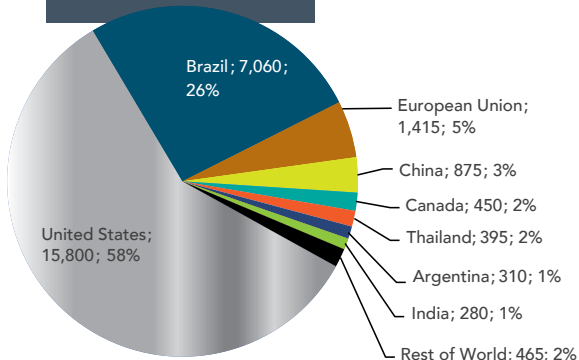


Sources: U.S. Dept. of Commerce, U.S. Census Bureau, Foreign Trade Statistics. Based on Jan.-Nov. 2017

U.S. ETHANOL EXPORTS AND IMPORTS

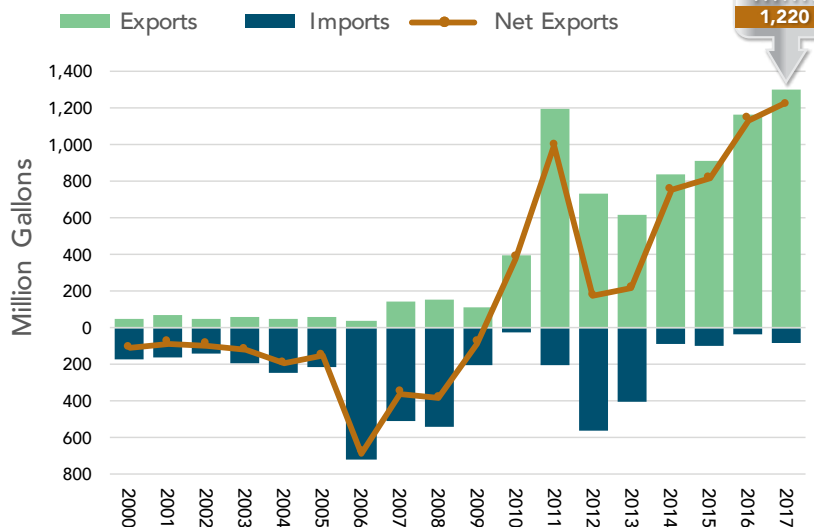


2017 GLOBAL FUEL ETHANOL PRODUCTION BY COUNTRY



(Country; million gallons; share of global production)

Source: RFA analysis of public and private data sources

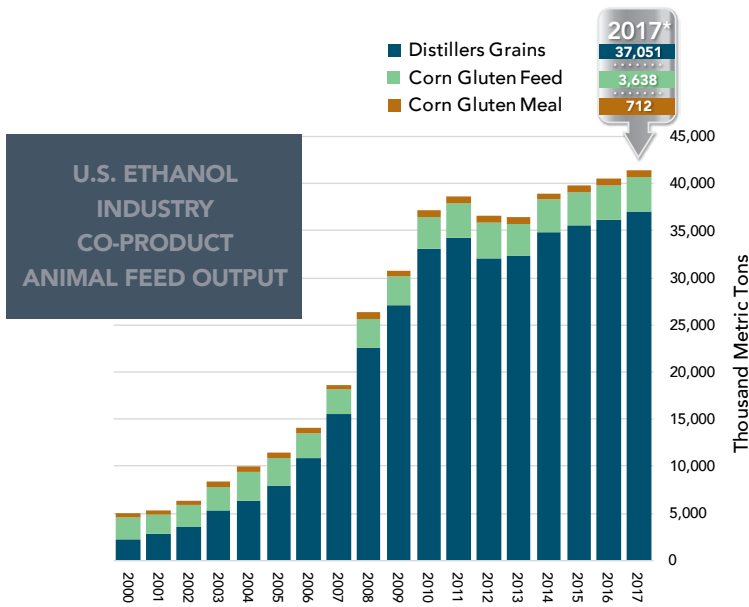


Sources: U.S. Dept. of Commerce, U.S. Census Bureau, Foreign Trade Statistics
*2017 estimated based on Jan.-Nov. 2017

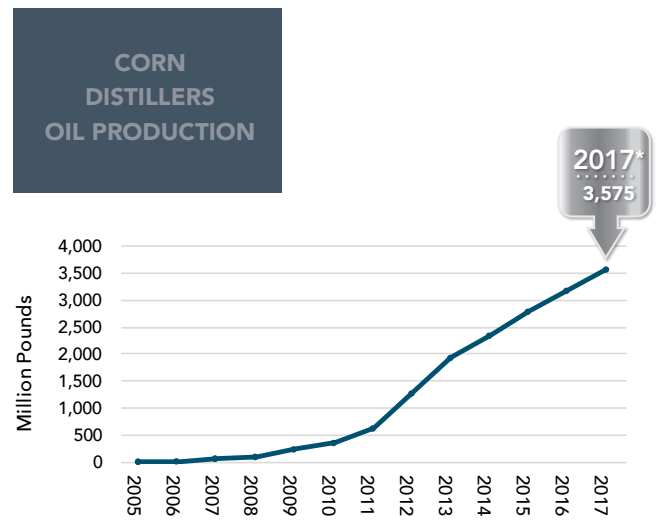
ANIMAL FEED PRODUCTION PROTEIN POWER

Once considered “byproducts” of ethanol production, distillers grains and other co-products have since evolved into a critical component of the global animal feed market—and a vital contributor to the industry’s bottom line. In 2017, the U.S. ethanol industry generated a record 41.4 million metric tons (mmt) of distillers grains, gluten feed and gluten meal. In addition, the industry also produced nearly 3.6 billion pounds of corn distillers oil, used as a feed ingredient or biodiesel feedstock.

Far from creating a “food or fuel” dilemma, the ethanol process creates both fuel and high-protein animal feed. Indeed, one-third of every bushel of grain that enters the ethanol process is enhanced and returned to the feed market, most often in the form of distillers grains. Only the starch portion of the grain is made into ethanol; the remaining protein, fat, and fiber pass through to the co-products.



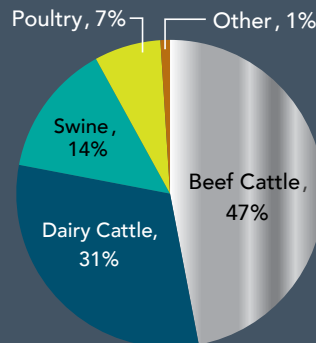
Source: RFA and U.S. Dept. of Agriculture
Note: All co-products converted to 10% moisture basis
*Estimated



Source: RFA based on U.S. Dept. of Agriculture data *Estimated

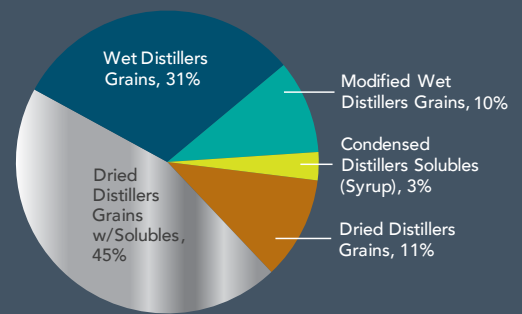


DISTILLERS GRAINS CONSUMPTION BY SPECIES



Source: Distillers grains marketing companies

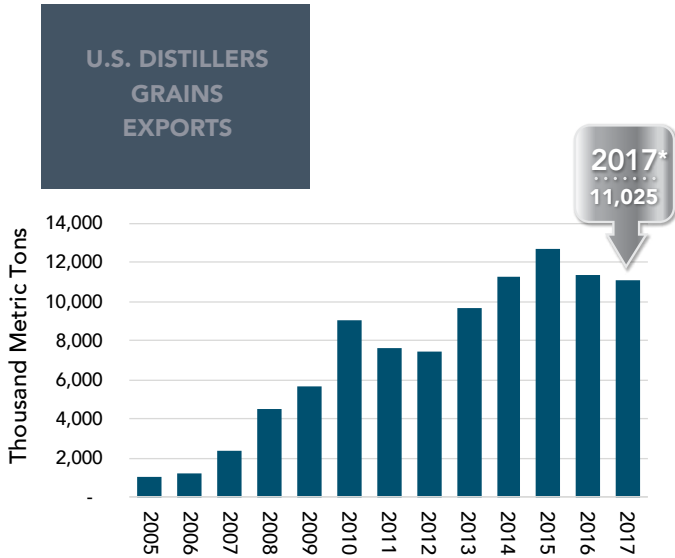
DISTILLERS GRAINS PRODUCTION BY TYPE



Source: U.S. Dept. of Agriculture

Types of Distillers Grains	Typical Moisture Content
Dried Distillers Grains (DDG)	10-12%
Dried Distillers Grains w/Solubles (DDGS)	10-12%
Wet Distillers Grains (WDG)	65% or more
Condensed Distillers Solubles (CDS or “Syrup”)	70-80%
Modified Wet Distillers Grains (MWDG)	40-64%

As demand for protein and caloric energy continues to grow both in the U.S. and internationally, America's ethanol producers stand ready to meet the needs of a growing population.



Sources: U.S. Dept. of Commerce, U.S. Census Bureau, Foreign Trade Statistics
*2017 estimated based on Jan.-Nov. 2017

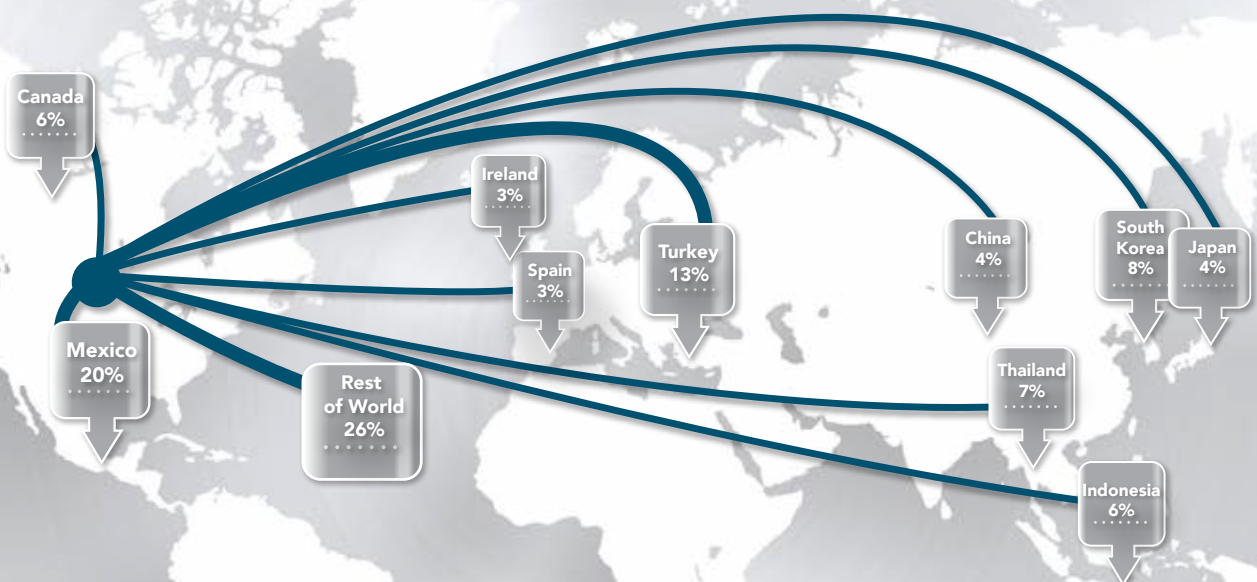
Feeding the World

The low cost and nutritional properties of distillers grains make it one of the most valuable feed ingredients in the world. In fact, one out of every three tons of distillers grains produced in 2017 was exported. Mexico was the top market for U.S. distillers grains exports, receiving nearly 20 percent of total shipments. Turkey, South Korea, Canada, and Thailand were other top markets in 2017.

As with ethanol, protectionist trade barriers also affected exports of distillers grains. Once the destination for more than half of U.S. distillers grains exports, China accounted for less than 5 percent of U.S. exports in 2017 due to imposition of restrictive tariffs. Similarly, exports to Vietnam collapsed in early 2017 as the country instituted new import policies. By the fall, however, the Vietnamese market had reopened and there was growing optimism that other trade barriers would soon be resolved.



TOP DESTINATIONS FOR U.S. DISTILLERS GRAINS EXPORTS IN 2017



Sources: U.S. Dept. of Commerce, U.S. Census Bureau, Foreign Trade Statistics. Based on Jan.-Nov. 2017

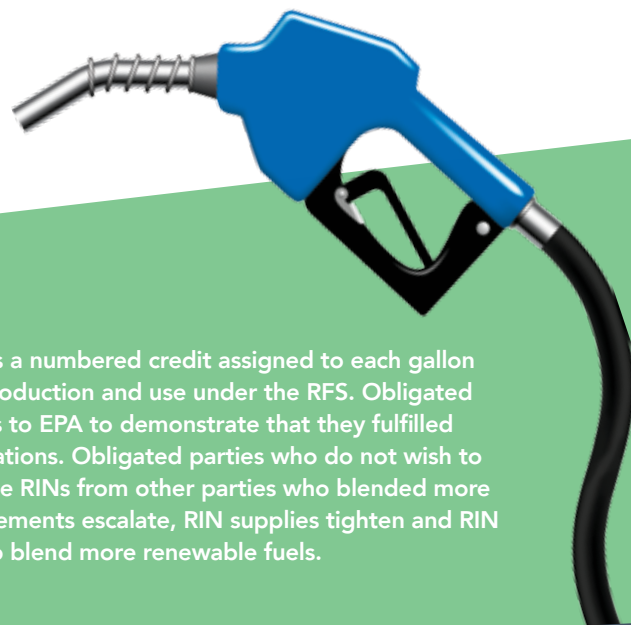
THE RENEWABLE FUEL STANDARD STRENGTH AND STABILITY

The Renewable Fuel Standard (RFS) has been the single most successful clean fuels policy in the United States, helping to generate jobs, revive rural economies, reduce oil imports, lower gasoline prices, reduce air pollution and cut greenhouse gas emissions. First enacted in 2005 and expanded in 2007, the RFS has ushered in tremendous growth in the U.S. biofuels sector.

In 2017, the expanded program (often called “RFS2”) celebrated its 10th anniversary. A decade after the RFS2 was adopted, enormous progress has been made toward achieving the objectives of this landmark policy. America’s dependence on petroleum—particularly imports—is down significantly. Greenhouse gas emissions and harmful tailpipe pollution from the transportation sector have fallen. The value of agricultural products and farm income have been buoyed. And, communities across the country have benefited from the job creation, increased tax revenue, and heightened household income that stem from the construction and operation of a biorefinery.

Meanwhile, the doomsday outcomes threatened by opponents of the RFS2 simply have not materialized. U.S. cropland continues to shrink as forestland and grassland expand, Amazon deforestation rates continue to decline, and U.S. and global food price inflation rates are lower than before the RFS was adopted.

The biofuels industry needs consistent policy in place for continued growth and innovation, and the first year of the Trump administration indeed brought that stability. For 2018, EPA finalized a slight increase in the total RFS volume and maintained the statutory 15-billion-gallon allotment for conventional biofuel. The 2018 RFS requirements provide certainty, while continuing to offer consumers greater access to cleaner, lower-cost biofuels.



WHAT IS A RIN CREDIT?

A Renewable Identification Number (RIN) is a numbered credit assigned to each gallon of biofuel for the purpose of tracking its production and use under the RFS. Obligated parties (refiners and importers) turn in RINs to EPA to demonstrate that they fulfilled their annual renewable fuel blending obligations. Obligated parties who do not wish to blend renewable fuels may instead purchase RINs from other parties who blended more than their obligated volume. As RFS requirements escalate, RIN supplies tighten and RIN prices rise. This creates greater incentive to blend more renewable fuels.

WHAT HAPPENS TO THE RFS AFTER 2022?

Contrary to a popular myth, the RFS does not “phase out” or “sunset” at the end of 2022. In adopting the Energy Independence and Security Act of 2007 (EISA), Congress specified RFS volumetric requirements through the year 2022 for total renewable fuels, advanced biofuels, cellulosic biofuels, and biomass-based diesel. For years after 2022, the law clearly states that required volumes of each renewable fuel shall be determined by the EPA Administrator, in coordination with the Secretary of Energy and the Secretary of Agriculture. In other words, the law requires EPA to set RFS volumes for 2023 and beyond, according to certain criteria defined in the statute.

WHAT HAS HAPPENED SINCE THE RFS2 WAS ADOPTED IN 2007?

The number of ethanol plants has almost doubled...



...and ethanol industry jobs are up nearly 50%



Corn production is up 12%...



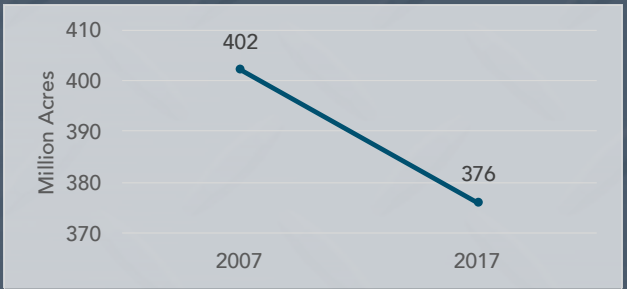
...but land dedicated to growing corn is down 3%



U.S. forest and grassland has expanded...



...as total cropland has fallen 7%



Crude oil imports are down...



...and so are gasoline imports



GHG emissions from transportation are falling...



...and household spending on fuel is down



Sources: RFA, ABF Economics, U.S. Dept. of Agriculture, U.S. Environmental Protection Agency, U.S. Energy Information Administration, U.S. Bureau of Labor Statistics

E15 MARKET UPDATE

GAINING GROUND

Consumers found greater choice at the pump in 2017, as the number of retail gas stations offering E15 more than doubled from the previous year. Thanks to the U.S. Department of Agriculture’s Biofuels Infrastructure Partnership grant program and ethanol industry initiatives like Prime the Pump, E15 was available at more than 1,200 stations across 29 states as 2018 began.

E15 was found in both major metropolitan areas and in small towns across the Heartland. And leading retailers, including Sheetz, Kum & Go, Murphy USA, RaceTrac, Thornton’s, and QuikTrip, added E15 to their slate of fuel offerings.

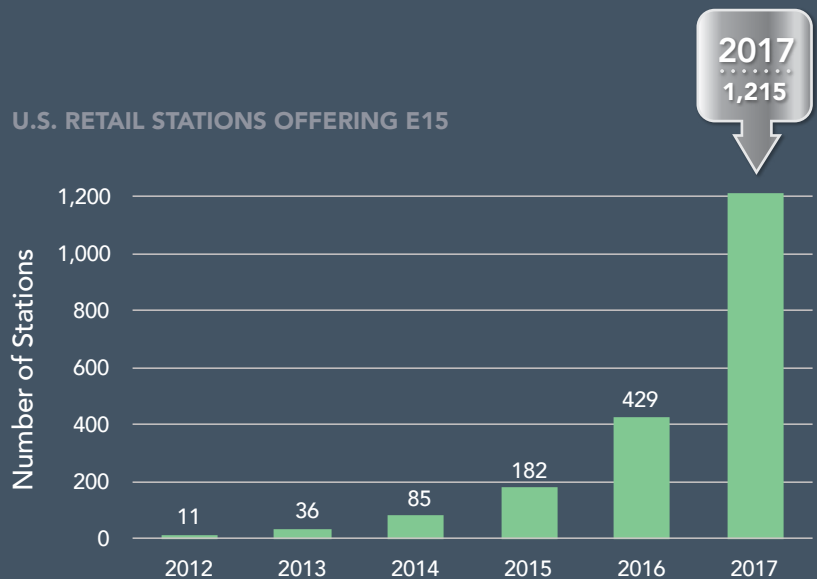
Meanwhile, progress continued on automaker approval of E15, with 90 percent of new 2018 model year vehicles explicitly approved by the manufacturer to use E15. For the first time, Nissan Motor Company approved the use of E15 in most of its model year 2018 vehicles. Nissan joins Fiat-

Chrysler, General Motors, Ford, Toyota, Honda, Hyundai/Kia, Volkswagen, and other automakers in approving E15. EPA’s fuel waiver allowing the use of E15 in all vehicles built in 2001 or later means approximately 90 percent of the vehicles on the road today are legally approved to use E15.

However, widespread consumer access to E15 remained hampered by nonsensical and outdated fuel volatility regulations. EPA’s decades-old Reid vapor pressure (RVP) regulations essentially prohibit retail gasoline stations from selling the fuel blend in more than two-thirds of the nation’s gasoline market during the summer months. Whether through administrative or legislative action, the RFA is working to secure parity in the volatility regulation of E10, E15, and other ethanol blends.



U.S. RETAIL STATIONS OFFERING E15



Source: RFA

E15 APPROVAL STATUS FOR CONVENTIONAL (NON-FFV) AUTOMOBILES

	MODEL YEAR							U.S. Market Share*
	2012	2013	2014	2015	2016	2017	2018	
BMW Group								
BMW								1.7%
Mini**								0.3%
Daimler (Mercedes-Benz)								
FCA (Chrysler, Dodge, Fiat, Jeep, Ram)								11.9%
Ford Motor Company (Ford, Lincoln)								
General Motors (Buick, Cadillac, Chevrolet, GMC)								17.2%
Honda Motor Company (Honda, Acura)								
Hyundai Motor Company (Hyundai, Kia)***								7.5%
Mazda								
Mitsubishi Motors Corporation								
Nissan Motor Company (Nissan, Infiniti)								9.3%
Subaru								
Tata Motors (Jaguar, Land Rover)								
Toyota Motor Corporation								
Lexus								14.2%
Toyota								
Volkswagen Group								
Audi								1.3%
Porsche								0.3%
Volkswagen								2.0%
Volvo Car Group								
All Others								0.7%



E15 Approved by Automaker in ALL Models



E15 Approved by Automaker in SOME Models



E15 Approved by EPA only; Not Approved by Automaker

* Motor Intelligence (Jan.-Nov. 2017)

** Approved the use of up to 25% ethanol blends

*** Approved the use of E15 for all models except Hyundai Sonata

In the six years since E15 was formally approved for use by EPA, American drivers have logged approximately 2.2 billion miles on the fuel without a single reported case of “engine damage,” misfueling, or inferior performance.

E85 AND FLEX FUELS FLEXING FUEL CHOICE

The market for E85 and other flex fuels achieved two key milestones in 2017. First, the number of flex fuel vehicles (FFVs) in the U.S. auto fleet hit 24 million, meaning one out of every 10 vehicles on the road today is approved to use E85 and other flex fuels. Second, the number of retail gas stations selling flex fuels topped 4,000, giving consumers greater access than ever before.

Flex fuels could be found in 45 states across the country in 2017. Minnesota continued to lead the nation with 422 stations, but states outside the Corn Belt, including California, Texas, Florida, North Carolina and Pennsylvania, experienced significant growth. Most of these new stations also offered E15 and mid-level ethanol blends like E20, E30 and E40, providing drivers with even more choice at the pump.



WHAT ARE FLEX FUELS?

Flex fuels are gasoline-ethanol blends containing between 51-83 percent ethanol (excluding denaturant). Flex fuels are intended for use in flex fuel vehicles (FFVs) only. Historically, flex fuels had been commonly referred to as "E85" because prior to 2012, the fuels were limited to 70-85 percent denatured ethanol and E85 was the most popular blend. Today, the actual amount of ethanol in the flex fuel depends on economics.

CAN YOU FLEX FUEL?

The following model year 2018 vehicles are available as Flex Fuel Vehicles (FFVs)

Chevrolet Express (6.0L)	Ford Transit T150 (3.7L)
Chevrolet Impala (3.6L)	GMC Savana (6.0L)
Chevrolet Silverado (4.3L, 5.3L)	GMC Sierra (4.3L, 5.3L)
Chevrolet Silverado HD (6.0L)	GMC Sierra HD (6.0L)
Dodge Grand Caravan (3.6L)	Jeep Cherokee (2.4L)
Dodge Journey (3.6L)	Jeep Renegade (2.4L)
Dodge Ram 1500 (3.6L)	Mercedes-Benz CLA250 (2.0L)
Ford Escape (2.5L)	Mercedes-Benz GLA250 (2.0L)
Ford Explorer (3.5L)	Mercedes-Benz GLE350 (3.5L)
Ford F-150 (3.5L, 5.0L)	Nissan Frontier (4.0L)
Ford F-Series Super Duty (6.2L)	Toyota Sequoia (5.7L)
Ford Taurus (3.5L)	Toyota Tundra (5.7L)
Ford Transit Connect (2.5L)	

Available for Fleet Purchase Only:

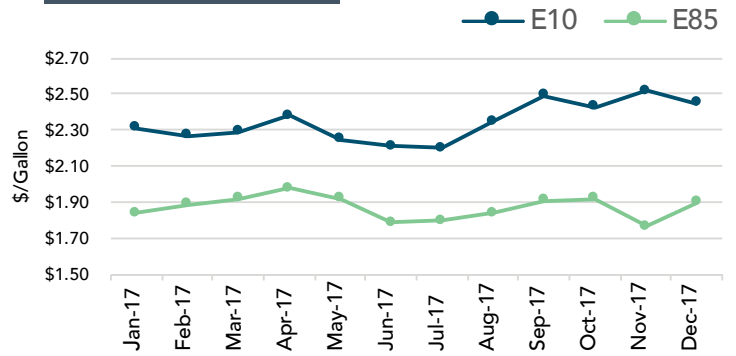
Chevrolet Suburban (5.3L)
Chevrolet Tahoe (5.3L)
Chrysler 300 (3.6L)
Dodge Charger (3.6L)
Ford Police Interceptor (3.5L, 3.7L)
GMC Yukon (5.3L)
GMC Yukon XL (5.3L)

**Is your pre-2018 vehicle an FFV?
Find out at www.e85vehicles.com**

E85 was the lowest-priced motor fuel on the planet in 2017, with FFV drivers experiencing unprecedented savings on their fuel purchases. Thanks to low ethanol prices and the effect of RIN (Renewable Identification Number) credits, consumers saw E85 priced at a 20 percent discount to E10 on average in 2017.

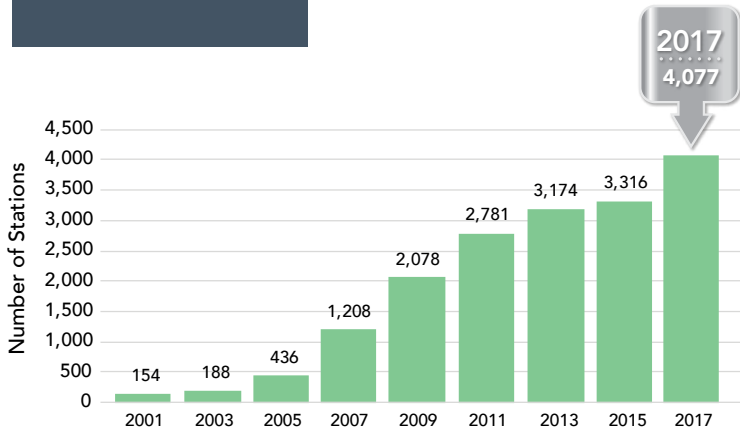
What's more, E85 and other flex fuels continue to deliver significant emissions benefits, from reducing greenhouse gas emissions to lowering carbon monoxide, air toxics, and other harmful pollutants.

**NATIONAL AVERAGE
RETAIL PRICES
FOR E10 AND E85**



Source: E85prices.com

**U.S. RETAIL STATIONS
OFFERING E85 AND
OTHER FLEX FUELS**



Source: RFA and U.S. Dept. of Energy



ETHANOL AND ENERGY SECURITY SECURING OUR FUTURE

U.S. dependence on imported petroleum continued to wane in 2017, thanks to booming domestic production of both renewable fuels and crude oil. Net U.S. imports of crude oil and petroleum products fell to their lowest level since the early 1980s, as ethanol production hit a new record and U.S. oil output rebounded from a lull in 2016.

On a net basis, U.S. dependence on imported crude oil and petroleum products fell to just 20 percent in 2017. However, without the addition of 15.8 billion gallons of ethanol to the domestic fuel supply, U.S. net import dependence would have been above 27 percent. In fact, an additional 560 million barrels of imported crude oil would have been needed to produce an amount of gasoline equivalent to last year's record ethanol production.

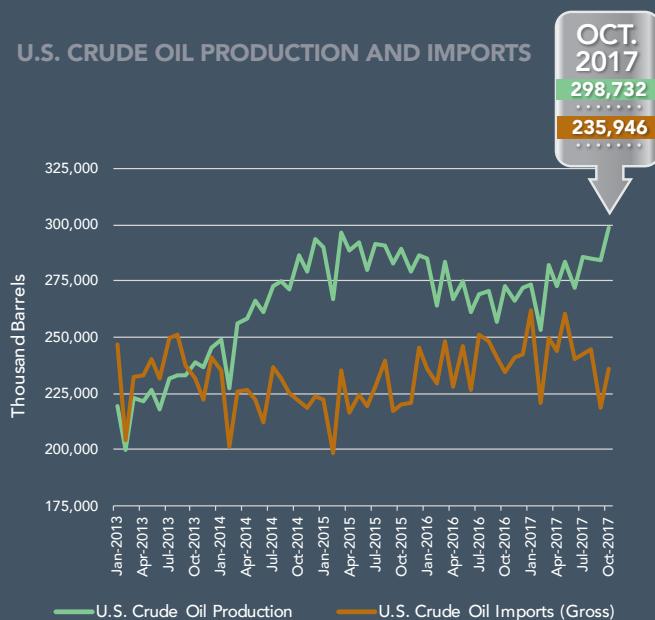
While the United States has made great strides in improving its energy security, challenges and risks remain. On a gross basis, the United States imported more than 2.9 billion barrels of crude oil in 2017, meaning 42 percent of the oil processed by U.S. refineries was imported. Moreover, 45 percent of our oil imports came from OPEC nations. That means the U.S. economy sent some \$63 billion—or nearly \$500 per American household—to countries like Iraq, Nigeria, Saudi Arabia, and Venezuela in 2017 to pay for oil.

Meanwhile, a series of hurricanes racked Gulf Coast oil refineries in 2017, sending gas prices higher and reminding American consumers once again about the dangers of overreliance on a single fuel source. Fortunately, increased ethanol production continues to help diversify our nation's fuel pool and dampen the impacts of petroleum market shocks.

"While our demand has basically been flat, oil is a global commodity and imports have long been ingrained in our own market, so we still import about 35-50% of the oil that we use. The main reason U.S. imports are still very high is because our shale oil boom and the light oil surge hasn't been a great match for our refiners."

– Forbes Magazine

U.S. CRUDE OIL PRODUCTION AND IMPORTS



While U.S. crude oil production has increased to nearly 300 million barrels per month, our nation still imports about 240 million barrels per month on a gross basis.

Source: U.S. Dept. of Energy

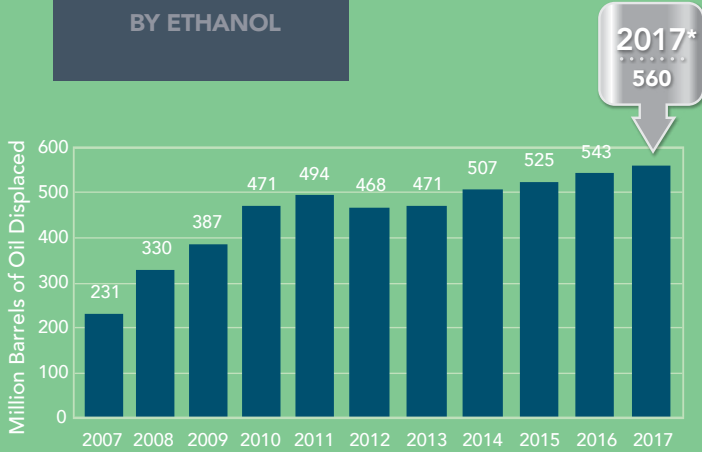
Transferring American Wealth to OPEC

Even though U.S. oil production has increased in recent years, our nation's economy still transfers tens of billions of dollars every year to the OPEC cartel. In 2017 alone, the U.S. sent some \$63 billion—or \$500 per American household—to OPEC nations to pay for crude oil imports.

OPEC Nation	U.S. Spending on Crude Oil Imports (Billion \$)
Saudi Arabia	\$ 19.4
Venezuela	\$ 12.8
Iraq	\$ 11.9
Nigeria	\$ 5.9
Ecuador	\$ 4.0
Kuwait	\$ 3.0
Angola	\$ 2.6
Algeria	\$ 1.5
Libya	\$ 1.1
Other OPEC	\$ 0.8
TOTAL	\$ 63.0

Source: RFA based on U.S. Dept. of Energy data

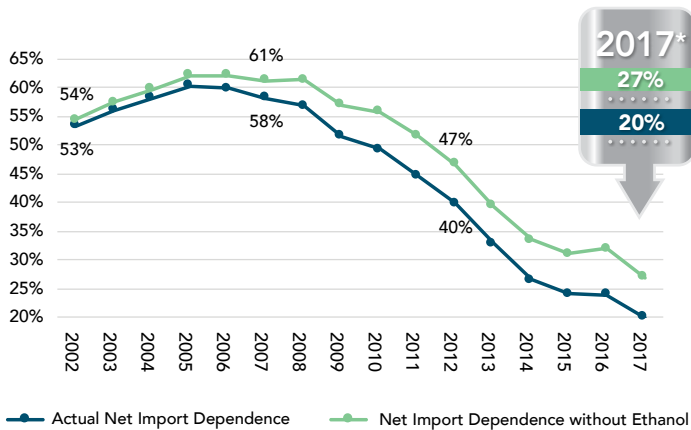
HISTORIC OIL IMPORT DISPLACEMENT BY ETHANOL



Source: RFA based on U.S. Dept. of Energy data

*Estimated

U.S. PETROLEUM NET IMPORT DEPENDENCE WITH AND WITHOUT ETHANOL



On a net basis (i.e., after accounting for U.S. exports), the United States relied on imports to meet 20% of its petroleum demand in 2017. Without the contribution of 15.8 billion gallons of ethanol, U.S. import dependence would have been equivalent to 27% of petroleum demand.

Source: RFA based on U.S. Dept. of Energy data

*Estimated

CELLULOSIC AND ADVANCED BIOFUELS GEARING UP FOR GROWTH

The ethanol industry's evolution continued in 2017. Once thought of simply as "ethanol plants," facilities across the country are quietly transitioning into "integrated biorefineries" capable of processing multiple feedstocks into a diverse array of biofuels and bioproducts.

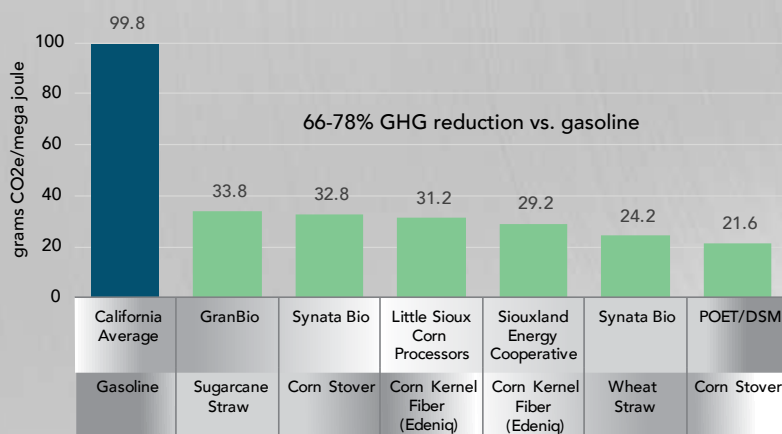
Last year, dozens of existing biorefineries across the country began to adopt "bolt-on" technologies allowing them to produce ethanol from the cellulosic fibers found in the corn kernel. These facilities can produce both cellulosic ethanol and starch-based ethanol from the same feedstock. If universally adopted across the existing fleet of biorefineries, these low-cost technologies could add roughly 1 billion gallons of cellulosic biofuel to the nation's fuel supply.

Cellulosic ethanol from corn kernel fiber offers a new economic opportunity for ethanol producers, as the fuel's superior GHG performance rating under both state Low Carbon Fuel Standards (LCFS) and the federal Renewable Fuel Standard (RFS) results in substantial price premiums.

While corn kernel fiber technologies made headlines in 2017, ethanol producers also continued to seek out other advanced and low-carbon biofuel opportunities. Onsite production of biodiesel and renewable diesel from corn distillers oil continued at several ethanol biorefineries, while others pursued carbon capture and sequestration as another means of adding value and lowering carbon intensity. Meanwhile, progress continued toward commercial production of cellulosic ethanol from crop residues at stand-alone facilities in Iowa and Kansas.

Like all nascent technologies, cellulosic and advanced biofuels need steady and reliable policy. Unfortunately, the 2018 RFS volume requirements for cellulosic biofuels represented a step backward for these emerging technologies, as EPA slightly reduced the 2018 volume from the 2017 final requirement.

LIFECYCLE CARBON INTENSITY OF APPROVED CELLULOSIC ETHANOL PATHWAYS UNDER CALIFORNIA LCFS



Source: California Air Resources Board

ANNUAL RFS CELLULOSIC BIOFUEL VOLUME REQUIREMENTS



Source: U.S. Environmental Protection Agency

One Feedstock, Multiple Biofuels

Dozens of existing biorefineries are investing in technologies to produce both conventional starch-based ethanol as well as cellulosic ethanol from the same corn kernel. Other facilities are making biodiesel or renewable diesel from the oil found in the corn kernel. On a dry basis, starch makes up about 75 percent of the corn kernel, while cellulosic fiber accounts for about 9 percent. Protein, oil, ash and sugars make up the remainder.



The endosperm makes up 82% of the corn kernel by weight and is mostly starch.

The pericarp, or seed coat, makes up 6% of the kernel and is mostly cellulosic fiber.

The germ makes up 11% of the kernel and contains oil, cellulosic fiber, protein and starch.

The tip cap makes up 1% of the kernel and is mostly cellulosic fiber

Source: Bunge North America



ETHANOL AND FOOD/FEED MARKET IMPACTS SHATTERING MYTHS

Any remaining embers of the outrageous “food vs. fuel” myth were decisively extinguished in 2017, as record grain supplies, historic grain surpluses, and low food prices put to rest any notion that biofuels somehow adversely affect feed and food markets. In reality, the U.S. ethanol industry adds to the world feed supply by stimulating increased grain production and generating nutrient-dense animal feed co-products.

In the United States, farmers produced the second-largest corn crop ever, trailing only the record harvest of 2016. As a result, more corn and co-products were available to livestock and poultry feeders than ever before in 2017, and the corn surplus remaining after all demands are met is projected to hit a 30-year high.

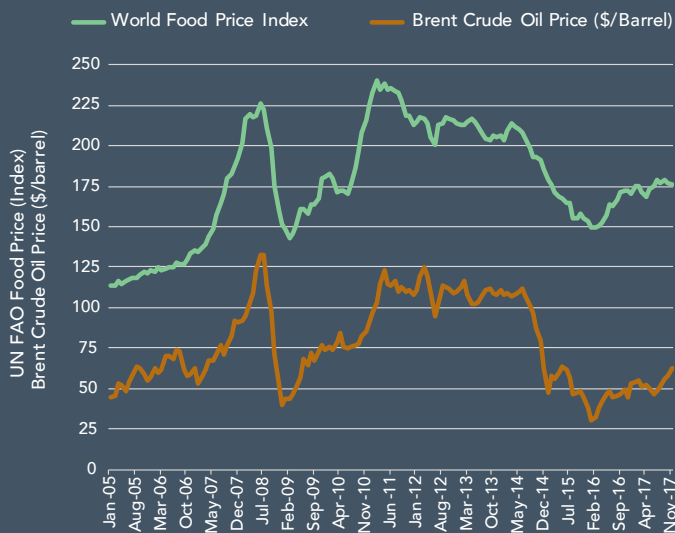
Meanwhile, retail food price inflation rates continued to trend lower, with food prices just 1 percent higher in 2017 than in 2016. Annual average food price inflation has averaged just 2.3 percent since 2005 when the RFS was

enacted, compared to an annual average of 3.0 percent in the 20 years leading up to RFS adoption.

Globally, the supply of coarse grains, wheat and rice was also the second-largest ever, falling only slightly behind the record 2016 supply. On a net basis, the U.S. ethanol industry used less than 3 percent of the world grain supply, and grain available for feed and food use hit a new high. Additionally, the United Nations reports that global food prices remain well below the oil price-induced highs of 2008-2014, while malnourishment rates continued to fall.

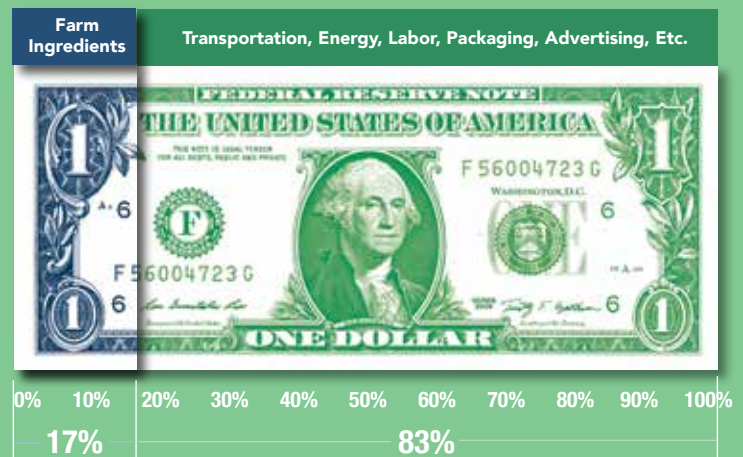
In the end, the events of 2017 provided even more evidence that the U.S. ethanol industry creates a “food and fuel” dynamic, not a “food vs. fuel” dilemma.

WORLD OIL PRICES DRIVE GLOBAL FOOD PRICES



Source: United Nations Food & Agriculture Org. and U.S. Dept. of Energy

What Does \$1 Spent on Food Really Pay For?



Source: U.S. Dept. of Agriculture

GLOBAL PREVALENCE OF UNDERNOURISHMENT

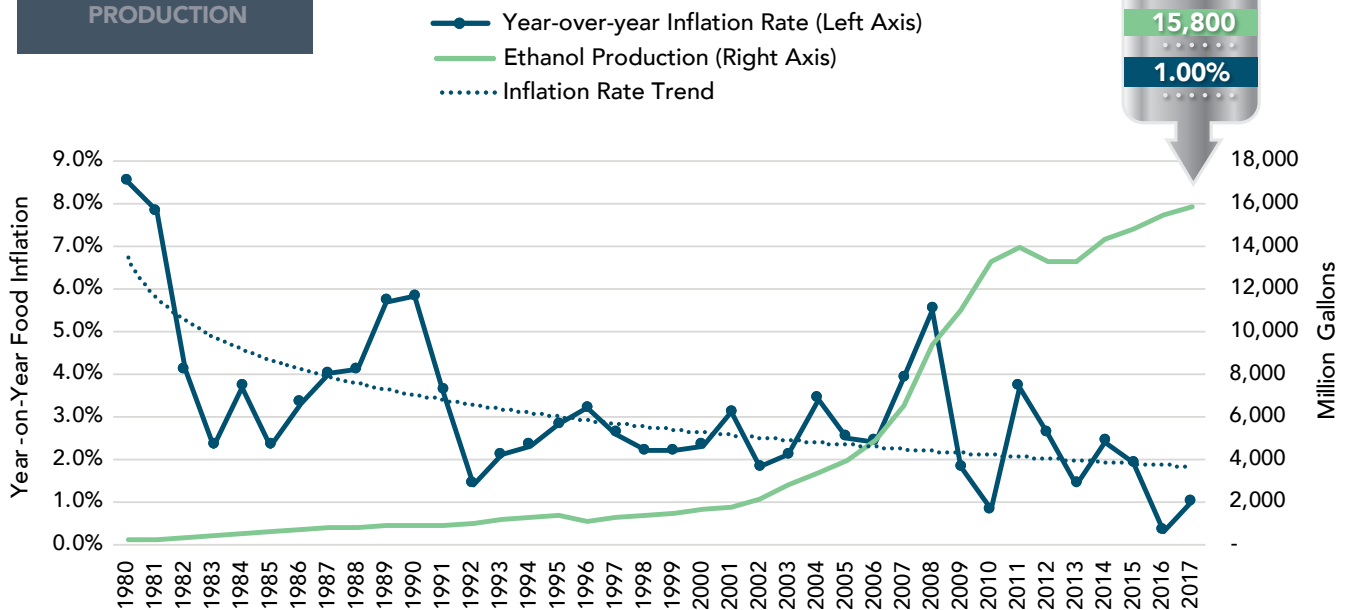


Source: U.N. Food and Agriculture Organization

“Despite population growth, 167 million fewer people suffered from hunger and undernourishment in 2015 than a decade earlier. Over the same decade, biofuel production expanded rapidly along with the number of people suffering early mortality and disease from consuming *too much* of the wrong foods. Despite a rapid increase in biofuel production, there is *no evidence* of biofuel impacts on food-related health.”

– Oak Ridge National Laboratory, World Bank, International Food Policy Research Institute, Imperial College London, University of São Paulo, Delft University of Technology, University of Twente, Institute of Rural Engineering (Argentina), World Agroforestry Centre, and BEE Energy

U.S. FOOD PRICE INFLATION AND ETHANOL PRODUCTION



Source: U.S. Bureau of Labor Statistics and RFA

*Estimated

ETHANOL AND THE ENVIRONMENT

CLEAN FUEL, CLEANER AIR

Over the past four decades, ethanol has served as an affordable and effective tool for reducing harmful emissions from the transportation sector. Because ethanol is a pure compound that is 35 percent oxygen, it burns more cleanly and completely than gasoline, which can contain as many as 1,000 unique compounds.

By displacing hydrocarbon substances like aromatics in gasoline, ethanol helps reduce emissions of air toxics, particulate matter, carbon monoxide, nitrous oxides, and exhaust hydrocarbons. These pollutants cause smog and ground-level ozone and adversely affect human health. Reducing these emissions means fewer cases of respiratory illness and asthma, heart disease, lung disease, cancer, and even fewer premature deaths.

Ethanol also serves as a low-cost option for reducing greenhouse gas (GHG) emissions from transportation.

Plants that are ultimately made into biofuels absorb carbon dioxide from the atmosphere as they grow, and that same amount of carbon dioxide is re-released when the biofuel is combusted in an engine. In this way, ethanol and other biofuels are simply recycling atmospheric carbon.

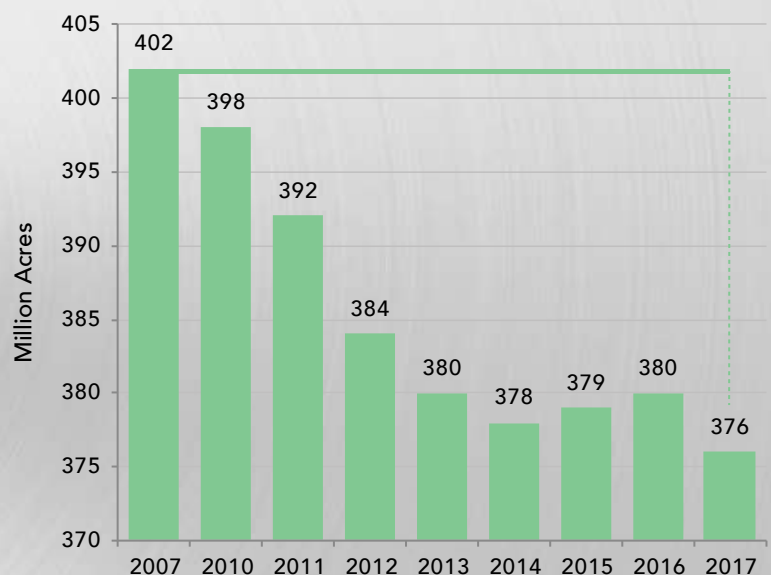
According to the U.S. Departments of Energy and Agriculture, corn ethanol from a typical dry mill reduces GHG emissions by 40-45 percent compared to gasoline—even when hypothetical land use change emissions are included. But data from EPA show that agricultural land use is actually shrinking and forest and grassland are expanding, undermining the land use change theory.

As emissions standards tighten and nations around the world prioritize GHG reduction, ethanol can play an even larger role in cleaning our air.

“Numerous studies in which ethanol was splash-blended with a fixed gasoline blendstock have demonstrated reductions of vehicle exhaust emissions, particularly particulate matter (PM), non-methane hydrocarbons (NMHC), and the air toxics 1,3-butadiene and benzene.”

– Ford Motor Company, General Motors, and AVL Powertrain

U.S. EPA
DETERMINATION OF
AGRICULTURAL LAND
USE VS. 2007 BASELINE



Source: U.S. Environmental Protection Agency

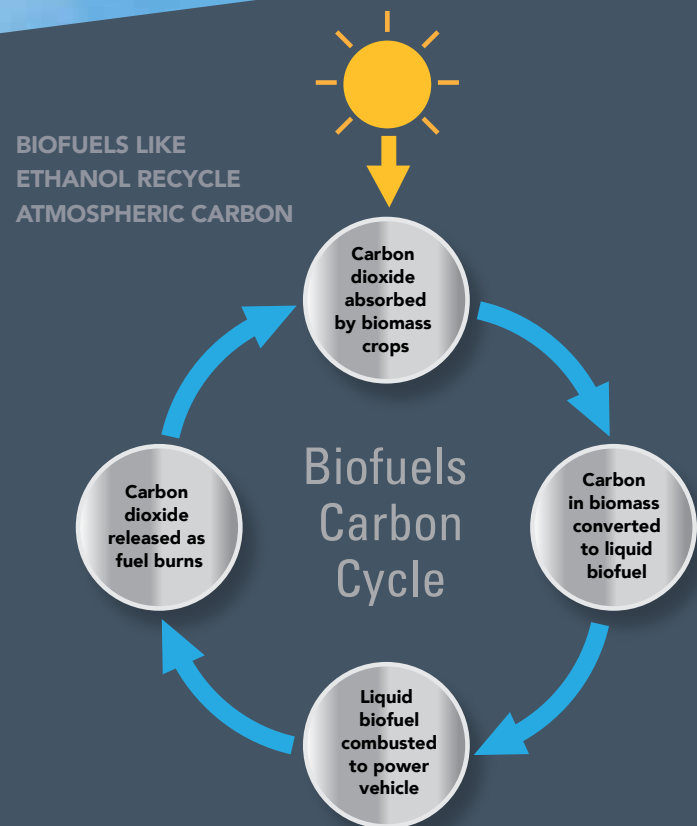
Clearing the Air with ETHANOL

In addition to reducing GHG emissions, ethanol is the best tool available to reduce tailpipe emissions of other harmful pollutants. Adding ethanol to gasoline reduces tailpipe emissions of the following pollutants, among others:

- **Carbon monoxide**, which can cause harmful health effects by reducing oxygen delivery to the body's organs.
- **Exhaust hydrocarbons**, which contribute to ozone, irritate the eyes, damage the lungs, and aggravate respiratory problems.
- **Air toxics like benzene**, which can cause cancer and reproductive effects or birth defects.
- **Fine particulate matter**, which can pass through the throat and nose and enter the lungs, causing serious health effects.

"The use of oil transfers into today's atmosphere GHGs that had been sequestered and secured for millennia and would have remained out of Earth's atmosphere if not for human intervention. A bioenergy cycle can be managed while maintaining atmospheric conditions similar to those that allowed humans to evolve and thrive on Earth. In contrast, massive release of fossil fuel carbon alters this balance, and the resulting changes to atmospheric concentrations of GHGs will impact Earth's climate for eons."

– Duke University, Oak Ridge National Laboratory, and the University of Minnesota



The use of ethanol in gasoline in 2017 reduced CO₂-equivalent greenhouse gas emissions from the transportation sector by 53.5 million metric tons. That's equivalent to removing 11.4 million cars from the road for an entire year, or eliminating the annual emissions from 13 coal-fired power plants.

SOURCE: RFA analysis using U.S. Dept. of Energy GREET model

RFA COMMITTEES, EDUCATION AND OUTREACH ACTION, ADVOCACY, AND

Since 1981, the RFA has proudly served as the ethanol industry's national trade association. The Association advances policy and regulatory initiatives that support industry growth, educates key decision-makers, serves as the voice of the industry through public and media relations efforts, and provides the technical foundation to move the industry forward. RFA's Board of Directors is solely comprised of ethanol producers who are ascribed one vote per company. In addition, a broad cross-section of RFA producer, associate, and supporting members participate on standing committees that address issues important to the industry.

The RFA Technical Committee focuses on fuel specifications and standards development by ASTM International, National Conference of Weights and Measures, regulatory bodies, and other organizations. Committee members monitor technical issues impacting day-to-day plant operations, such as storage and handling, transportation, and fuel quality, as well as state and regional regulations and international blending practices.

Committee Chair: Cathy Woodliff, The Andersons Albion Ethanol LLC

The RFA Co-Products Committee focuses on issues relevant to co-products from ethanol production, including distillers grains, corn distillers oil, corn gluten, carbon dioxide and other products. Committee members address operational and regulatory issues concerning production, storage and handling, transportation, international trade, animal nutrition, and animal feed safety.

Committee Chair: Sean Broderick, CHS, Inc.

The RFA Plant & Employee Safety Committee leads the industry in advocating safe practices in ethanol production, storage and handling, transportation, and use. Committee members monitor and share information on hazardous materials, safety standards, and federal and state safety regulations. The Committee also supports continuing education for every link of the ethanol supply chain.

Committee Chair: Joe Oswalt, E Energy Adams, LLC



EXPERIENCE

The RFA Environmental Compliance Committee examines and educates industry stakeholders on the implementation of environmental regulations for production, storage and handling, and transportation of ethanol. The committee tackles complex regulatory issues and provides guidance to members.

Committee Chair: Steve Schleicher, Pinnacle Engineering, Inc.

The RFA Export Committee assesses opportunities and challenges in growing international demand for U.S. ethanol. The group advocates for free and fair trade policies, examines technical and regulatory barriers, interacts with U.S. trade officials, and monitors data and trends in the global trade.



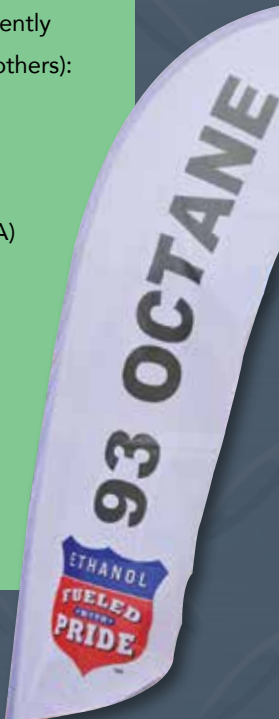
The Renewable Fuels PAC builds a stronger voice for American-made renewable fuels on Capitol Hill. Organized and operated by RFA members and staff, this Political Action Committee promotes consistent and forward-looking public policy essential to the growth and evolution of the industry by focusing on federal election activity.

Committee Chair: Randall Doyal, Al-Corn Clean Fuel, LLC

Navigating the Regulatory Landscape

Nearly every facet of the ethanol industry—from production at the facility to consumption in the vehicle—is affected by a plethora of federal and state regulations. Ethanol producers face a multitude of registration, reporting, recordkeeping, and compliance requirements, and the regulatory landscape is constantly changing and is becoming more complex. Providing analyses of important regulations and technical issues has long been a hallmark of the RFA, and we strive to ensure our member companies know exactly how their operations—and industry—will be affected by new, pending, or amended regulations. On behalf of its members, RFA staff frequently interact with the following regulatory bodies (among others):

- Alcohol Tobacco Tax and Trade Bureau (TTB)
- Federal Trade Commission (FTC)
- Occupational Safety & Health Administration (OSHA)
- U.S. Department of Agriculture (USDA)
- U.S. Department of Commerce (DOC)
- U.S. Department of Energy (DOE)
- U.S. Department of Transportation (DOT)
- U.S. Environmental Protection Agency (EPA)



Our Mission

Drive expanded production and use of American-made renewable fuels and bio-products worldwide.

Our Expertise

- Public Policy & Regulation
- Fuel Ethanol Technical Issues
- Trade Policy & Export Promotion
- Safety Training & Emergency Response
- Ethanol Market Development
- Research & Analysis
- Communications, Media & Public Relations
- Consumer Advertising, Promotions & Education

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Cassie Mullen	Director, Market Development
Missy Ruff	Technical Services Manager

Find bios and contact info at
www.EthanolRFA.org/about/staff.

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Mission

Meet the research and education needs of the U.S. fuel ethanol industry.

Focus

Collaboration with academia, industry, and public policymakers on new uses, feedstocks, and technologies to promote a growing and sustainable renewable fuels industry.

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www.agmotion.com

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www.basf.com/us/en.html

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www.innospecinc.com

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www.intlfcstone.com

Iowa Renewable Fuels Association
www.iowarfa.org

Kansas Corn Commission
www.kscom.com/kcc

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www.kcoe.com

Lallemand Biofuels & Distilled Spirits
www.lallemandbds.com

Merjent, Inc.
www.merjent.com

Minnesota Bio-Fuels Association
www.mnbiofuels.org

Minnesota Corn Growers Association
www.mncorn.org

Murex, LLC
www.murexltd.com

NALCO Water
www.ecolab.com/nalco-water

National Corn Growers Association
www.ncga.com

Novozymes
www.novozymes.com/advance-your-
business/bioenergy

Phibro EPG
www.ethanolperformancegroup.com

Pinnacle Engineering Inc.
www.pineng.com

Protec Fuel Management, LLC
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PRX Geographic, Inc.
www.prxgeo.com

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www.renewablefuelsne.com

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Association

United Association

United Sorghum Checkoff Program

Water Assurance Technology Energy
Resources

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2018 U.S. ETHANOL PRODUCTION CAPACITY BY PLANT

Company	Location	State	Feedstock	Production Capacity (mgy)	Operating Production (mgy)	Under Construction/Expansion Capacity (mgy)
ABE South Dakota, LLC	Aberdeen	SD	Corn	53	53	
ABE South Dakota, LLC	Huron	SD	Corn	32	32	
Absolute Energy, LLC	St. Ansgar	IA	Corn	125	125	
Ace Ethanol, LLC	Stanley	WI	Corn	48	48	
Adkins Energy, LLC	Lena	IL	Corn	52	52	
Aemetis	Keyes	CA	Corn/Sorghum	60	60	
Al-Corn Clean Fuel	Claremont	MN	Corn	50	50	70
Alliance Bio-Products	Vero Beach	FL	Cellulosic Biomass	8	*	
Archer Daniels Midland Co. Plant 1	Cedar Rapids	IA	Corn	300	300	
Archer Daniels Midland Co. Plant 2	Cedar Rapids	IA	Corn	240	240	
Archer Daniels Midland Co.	Clinton	IA	Corn	238	238	
Archer Daniels Midland Co. Plant 1	Columbus	NE	Corn	100	100	
Archer Daniels Midland Co. Plant 2	Columbus	NE	Corn	313	313	
Archer Daniels Midland Co.	Decatur	IL	Corn	300	300	
Archer Daniels Midland Co.	Marshall	MN	Corn	40	40	
Archer Daniels Midland Co.	Peoria	IL	Corn	185	85	
Arkalon Ethanol, LLC	Liberal	KS	Corn	110	110	
Badger State Ethanol, LLC	Monroe	WI	Corn	90	90	
Big River Resources Boyceville, LLC	Boyceville	WI	Corn	57	57	
Big River Resources Galva, LLC	Galva	IL	Corn	110	110	
Big River Resources West Burlington, LLC	West Burlington	IA	Corn	105	105	
Big River United Energy, LLC	Dyersville	IA	Corn	110	110	
Blue Flint Ethanol	Underwood	ND	Corn	65	65	
Bonanza BioEnergy, LLC	Garden City	KS	Corn/Sorghum	55	55	
Bridgeport Ethanol	Bridgeport	NE	Corn	50	50	
Buffalo Lake Advanced Biofuels, LLC	Buffalo Lake	MN	Corn	18	-	
Bushmills Ethanol Inc.	Atwater	MN	Corn	65	65	35
Butamax Advanced Biofuels	Scandia	KS	Corn	10	10	
Calgren Renewable Fuels LLC	Pixley	CA	Corn	55	55	
Carbon Green BioEnergy	Woodbury	MI	Corn	55	55	
Cardinal Ethanol	Union City	IN	Corn	100	100	
Cargill, Inc.	Blair	NE	Corn	210	210	
Cargill, Inc.	Eddyville	IA	Corn	35	35	
Cargill, Inc.	Fort Dodge	IA	Corn	115	115	
Center Ethanol Company, LLC	Sauget	IL	Corn	54	54	
Central Indiana Ethanol, LLC	Marion	IN	Corn	55	55	
Central MN Renewables, LLC/Green Biologics	Little Falls	MN	Corn	22	-	
Chief Ethanol Fuels, Inc.	Hastings	NE	Corn	70	70	
Chief Ethanol Fuels, Inc.	Lexington	NE	Corn	50	50	
Chippewa Valley Ethanol, Co.	Benson	MN	Corn	50	50	
CHS Inc.	Annawan	IL	Corn	125	125	
CHS Inc.	Rochelle	IL	Corn	133	133	
Columbia Pacific Bio-Refinery/Global Partners	Clatskanie	OR	Corn	120	-	
Commonwealth Agri-Energy, LLC	Hopkinsville	KY	Corn	33	33	10
Corn Plus, LLP	Winnebago	MN	Corn	40	40	
Corn, LP	Goldfield	IA	Corn	60	60	
Dakota Ethanol, LLC	Wentworth	SD	Corn	48	48	
Dakota Spirit AgEnergy LLC	Spiritwood	ND	Corn	65	65	
DENCO II, LLC	Morris	MN	Corn	24	24	
Diamond Ethanol	Levelland	TX	Corn	40	40	
Didion Ethanol LLC	Cambria	WI	Corn	50	50	
DuPont Cellulosic Ethanol	Nevada	IA	Cellulosic Biomass	30	*	
E Energy Adams, LLC	Adams	NE	Corn	80	80	

Company	Location	State	Feedstock	Production Capacity (mgy)	Operating Production (mgy)	Under Construction/Expansion Capacity (mgy)
East Kansas Agri-Energy, LLC	Garnett	KS	Corn	42	42	
Elite Octane, LLC	Atlantic	IA	Corn	-	-	120
Ergon BioFuels, LLC	Vicksburg	MS	Corn	54	54	
ESE Alcohol Inc.	Leoti	KS	Waste Seed Corn	2	2	
Flint Hills Resources, LLC	Arthur	IA	Corn	120	120	
Flint Hills Resources, LLC	Camilla	GA	Corn	120	120	
Flint Hills Resources, LLC	Fairbank	IA	Corn	120	120	
Flint Hills Resources, LLC	Fairmont	NE	Corn	120	120	
Flint Hills Resources, LLC	Iowa Falls	IA	Corn	120	120	
Flint Hills Resources, LLC	Menlo	IA	Corn	120	120	
Flint Hills Resources, LLC	Shell Rock	IA	Corn	120	120	
Fox River Valley Ethanol LLC	Oshkosh	WI	Corn	65	65	
Front Range Energy, LLC	Windsor	CO	Corn	40	40	
Gevo	Luverne	MN	Corn	22	22	
Glacial Lakes Energy, LLC	Mina	SD	Corn	100	100	
Glacial Lakes Energy, LLC	Watertown	SD	Corn	120	120	
Golden Cheese Company of California	Corona	CA	Cheese Whey	5	-	
Golden Grain Energy, LLC	Mason City	IA	Corn	115	115	
Golden Triangle Energy, LLC	Craig	MO	Corn	20	5	
Grain Processing Corp.	Muscatine	IA	Corn	20	20	
Grain Processing Corp.	Washington	IN	Corn	20	20	
Granite Falls Energy, LLC	Granite Falls	MN	Corn	62	62	
Green Plains Inc.	Atkinson	NE	Corn	55	55	
Green Plains Inc.	Bluffton	IN	Corn	120	120	
Green Plains Inc.	Central City	NE	Corn	110	110	
Green Plains Inc.	Fairmont	MN	Corn	119	119	
Green Plains Inc.	Fergus Falls	MN	Corn	55	55	
Green Plains Inc.	Hereford	TX	Corn	105	105	
Green Plains Inc.	Hopewell	VA	Corn	60	60	
Green Plains Inc.	Lakota	IA	Corn	124	124	
Green Plains Inc.	Madison	IL	Corn	90	90	
Green Plains Inc.	Mt. Vernon	IN	Corn	90	90	
Green Plains Inc.	Obion	TN	Corn	120	120	
Green Plains Inc.	Ord	NE	Corn	61	61	
Green Plains Inc.	Riga	MI	Corn	60	60	
Green Plains Inc.	Shenandoah	IA	Corn	75	75	
Green Plains Inc.	Superior	IA	Corn	60	60	
Green Plains Inc.	Wood River	NE	Corn	121	121	
Green Plains Inc.	York	NE	Corn	50	50	
Guardian Energy, LLC	Janesville	MN	Corn	110	110	
Guardian Hankinson, LLC	Hankinson	ND	Corn	132	132	
Guardian Lima, LLC	Lima	OH	Corn	54	54	
Heartland Corn Products	Winthrop	MN	Corn	100	100	
Heron Lake BioEnergy, LLC	Heron Lake	MN	Corn	64	64	
Highwater Ethanol, LLC	Lamberton	MN	Corn	59	59	
Homeland Energy Solutions, LLC	Lawler	IA	Corn	140	140	
Husker Ag, LLC	Plainview	NE	Corn	76	76	
ICM Element	Colwich	KS	Corn/Sorghum	-	-	70
Ingredient Inc.	Cedar Rapids	IA	Corn	45	45	
Iroquois Bio-Energy Company, LLC	Rensselaer	IN	Corn	50	50	
KAAPA Ethanol Revenna, LLC	Ravenna	NE	Corn	90	90	
KAAPA Ethanol, LLC	Minden	NE	Corn	80	80	
Kansas Ethanol LLC	Lyons	KS	Corn	60	60	
Land O' Lakes	Melrose	MN	Cheese Whey	3	3	
LifeLine Foods, LLC	St. Joseph	MO	Corn	50	50	

Company	Location	State	Feedstock	Production Capacity (mgy)	Operating Production (mgy)	Under Construction/Expansion Capacity (mgy)
Lincolmland Agri-Energy, LLC	Palestine	IL	Corn	60	60	
Lincolnway Energy, LLC	Nevada	IA	Corn	55	55	
Little Sioux Corn Processors, L.P.	Marcus	IA	Corn/Cellulosic Biomass	135	135	
Louis Dreyfus Commodities	Grand Junction	IA	Corn	100	100	
Louis Dreyfus Commodities (Elkhorn Valley)	Norfolk	NE	Corn	45	45	
Marquis Energy LLC	Hennepin	IL	Corn	300	300	
Marquis Energy-Wisconsin, LLC	Necedah	WI	Corn	60	60	
Marysville Ethanol, LLC	Marysville	MI	Corn	50	50	
Maumee Express, Inc. (MXI)	Abingdon	VA	Waste Alcohol	4	4	
Mercuria Investments US	South Bend	IN	Corn	102	102	
Merrick & Company	Aurora	CO	Brewery Waste	5	5	
Mid-America BioEnergy, LLC	Madrid	NE	Corn	46	46	
Mid-Missouri Energy, LLC	Malta Bend	MO	Corn	50	50	
Midwest Renewable Energy, LLC	Sutherland	NE	Corn	28	-	
Nebraska Corn Processing, LLC	Cambridge	NE	Corn	44	44	
NuGen Energy, L.L.C.	Marion	SD	Corn	130	130	
One Earth Energy	Gibson City	IL	Corn	120	120	
Pacific Ethanol Inc. Plant 1	Aurora	NE	Corn	45	45	
Pacific Ethanol Inc. Plant 2	Aurora	NE	Corn	110	110	
Pacific Ethanol Inc.	Boardman	OR	Corn	40	40	
Pacific Ethanol Inc.	Burley	ID	Corn	60	60	
Pacific Ethanol Inc.	Madera	CA	Corn/Sorghum	40	40	
Pacific Ethanol Inc. (ICP)	Pekin	IL	Corn	90	90	
Pacific Ethanol Inc. Plant 1	Pekin	IL	Corn	100	100	
Pacific Ethanol Inc. Plant 2	Pekin	IL	Corn	60	60	
Pacific Ethanol Inc.	Stockton	CA	Corn/Sorghum/Cellulosic Biomass	60	60	
Parallel Products	Louisville	KY	Beverage Waste	3	3	
Parallel Products	Rancho Cucamonga	CA	Beverage Waste	3	3	
Pennsylvania Grain Processing, LLC	Clearfield	PA	Corn	110	110	
Pinal Energy, LLC	Maricopa	AZ	Corn	50	50	
Pine Lake Corn Processors LLC	Steamboat Rock	IA	Corn	38	38	
Plymouth Energy, LLC	Merrill	IA	Corn	50	50	
POET Biorefining - Alexandria	Alexandria	IN	Corn	68	68	
POET Biorefining - Ashton	Ashton	IA	Corn	56	56	
POET Biorefining - Big Stone	Big Stone	SD	Corn	79	79	
POET Biorefining - Bingham Lake	Bingham Lake	MN	Corn	35	35	
POET Biorefining - Caro	Caro	MI	Corn	53	53	
POET Biorefining - Chancellor	Chancellor	SD	Corn	110	110	
POET Biorefining - Cloverdale	Cloverdale	IN	Corn	92	92	
POET Biorefining - Coon Rapids	Coon Rapids	IA	Corn	54	54	
POET Biorefining - Corning	Corning	IA	Corn	65	65	
POET Biorefining - Emmetsburg	Emmetsburg	IA	Corn	55	55	
POET Biorefining - Fostoria	Fostoria	OH	Corn	68	68	
POET Biorefining - Glenville	Albert Lea	MN	Corn	42	42	
POET Biorefining - Gowrie	Gowrie	IA	Corn	69	69	
POET Biorefining - Groton	Groton	SD	Corn	53	53	
POET Biorefining - Hanlontown	Hanlontown	IA	Corn	56	56	
POET Biorefining - Hudson	Hudson	SD	Corn	56	56	
POET Biorefining - Jewell	Jewell	IA	Corn	69	69	
POET Biorefining - Laddonia	Laddonia	MO	Corn	50	50	
POET Biorefining - Lake Crystal	Lake Crystal	MN	Corn	56	56	
POET Biorefining - Leipsic	Leipsic	OH	Corn	68	68	
POET Biorefining - Macon	Macon	MO	Corn	46	46	
POET Biorefining - Marion	Marion	OH	Corn	68	68	80
POET Biorefining - Mitchell	Mitchell	SD	Corn	68	68	

Company	Location	State	Feedstock	Production Capacity (mgy)	Operating Production (mgy)	Under Construction/Expansion Capacity (mgy)
POET Biorefining - North Manchester	North Manchester	IN	Corn	68	68	
POET Biorefining - Portland	Portland	IN	Corn	68	68	
POET Biorefining - Preston	Preston	MN	Corn	46	46	
POET Research Center	Scotland	SD	Corn	11	11	
Prairie Horizon Agri-Energy, LLC	Phillipsburg	KS	Corn	40	40	
Pratt Energy	Pratt	KS	Corn	55	55	
Project LIBERTY (POET/DSM)	Emmetsburg	IA	Cellulosic Biomass	20	*	
Quad County Corn Processors	Galva	IA	Corn/Cellulosic Biomass	38	38	
Red River Energy LLC	Rosholt	SD	Corn	25	25	
Red Trail Energy, LLC	Richardton	ND	Corn	50	50	
Redfield Energy, LLC	Redfield	SD	Corn	60	60	
Reeve Agri-Energy	Garden City	KS	Corn/Sorghum	12	12	
Ringneck Energy	Onida	SD	Corn	-	-	80
Show Me Ethanol, LLC	Carrollton	MO	Corn	60	60	
Siouxland Energy Cooperative	Sioux Center	IA	Corn	60	60	
Siouxland Ethanol	Jackson	NE	Corn	80	80	
Southwest Iowa Renewable Energy, LLC	Council Bluffs	IA	Corn	130	130	
Spectrum Business Ventures Inc.	Mead	NE	Corn	25	-	
Sterling Ethanol LLC	Sterling	CO	Corn	42	42	
Summit Natural Energy	Cornelius	OR	Waste Sugars/Starch	2	2	
Sunoco Ethanol	Fulton	NY	Corn	85	85	
Synata Bio	Hugoton	KS	Cellulosic Biomass	25	-	
Tate & Lyle	Loudon	TN	Corn	105	105	
Tharaldson Ethanol	Casselton	ND	Corn	153	153	
The Andersons Albion Ethanol LLC	Albion	MI	Corn	136	136	
The Andersons Clymers Ethanol LLC	Clymers	IN	Corn	110	110	
The Andersons Denison Ethanol LLC	Denison	IA	Corn	55	55	
The Andersons Marathon Ethanol LLC	Greenville	OH	Corn	110	110	
Three Rivers Energy, LLC	Coshocton	OH	Corn	50	50	
Trenton Agri Products LLC	Trenton	NE	Corn	40	40	
Tyton NC Biofuels LLC	Raeford	NC	Corn/Tobacco	60	-	
United Ethanol, LLC	Milton	WI	Corn	50	50	
United Wisconsin Grain Producers, LLC	Friesland	WI	Corn	58	58	
Valero Renewable Fuels-Albert City	Albert City	IA	Corn	130	130	
Valero Renewable Fuels-Albion	Albion	NE	Corn	130	130	
Valero Renewable Fuels-Aurora	Aurora	SD	Corn	135	135	
Valero Renewable Fuels-Bloomingsburg	Bloomingsburg	OH	Corn	130	130	
Valero Renewable Fuels-Charles City	Charles City	IA	Corn	135	135	
Valero Renewable Fuels-Fort Dodge	Fort Dodge	IA	Corn	135	135	
Valero Renewable Fuels-Hartley	Hartley	IA	Corn	135	135	
Valero Renewable Fuels-Jefferson	Jefferson	WI	Corn	105	105	
Valero Renewable Fuels-Linden	Linden	IN	Corn	130	130	
Valero Renewable Fuels-Mount Vernon	Mount Vernon	IN	Corn	100	100	
Valero Renewable Fuels-Welcome	Welcome	MN	Corn	135	135	
Western New York Energy LLC	Medina	NY	Corn	65	65	
Western Plains Energy LLC	Campus	KS	Corn/Sorghum	50	50	
White Energy	Hereford	TX	Corn/Sorghum	120	120	
White Energy	Plainview	TX	Corn	120	120	
White Energy	Russell	KS	Corn/Sorghum/Wheat Starch	55	55	
Wyoming Ethanol	Torrington	WY	Corn	10	-	
Yuma Ethanol	Yuma	CO	Corn	40	40	
U.S. TOTALS				16,241	15,755	465

*Actual operating production unknown; not included in total.



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