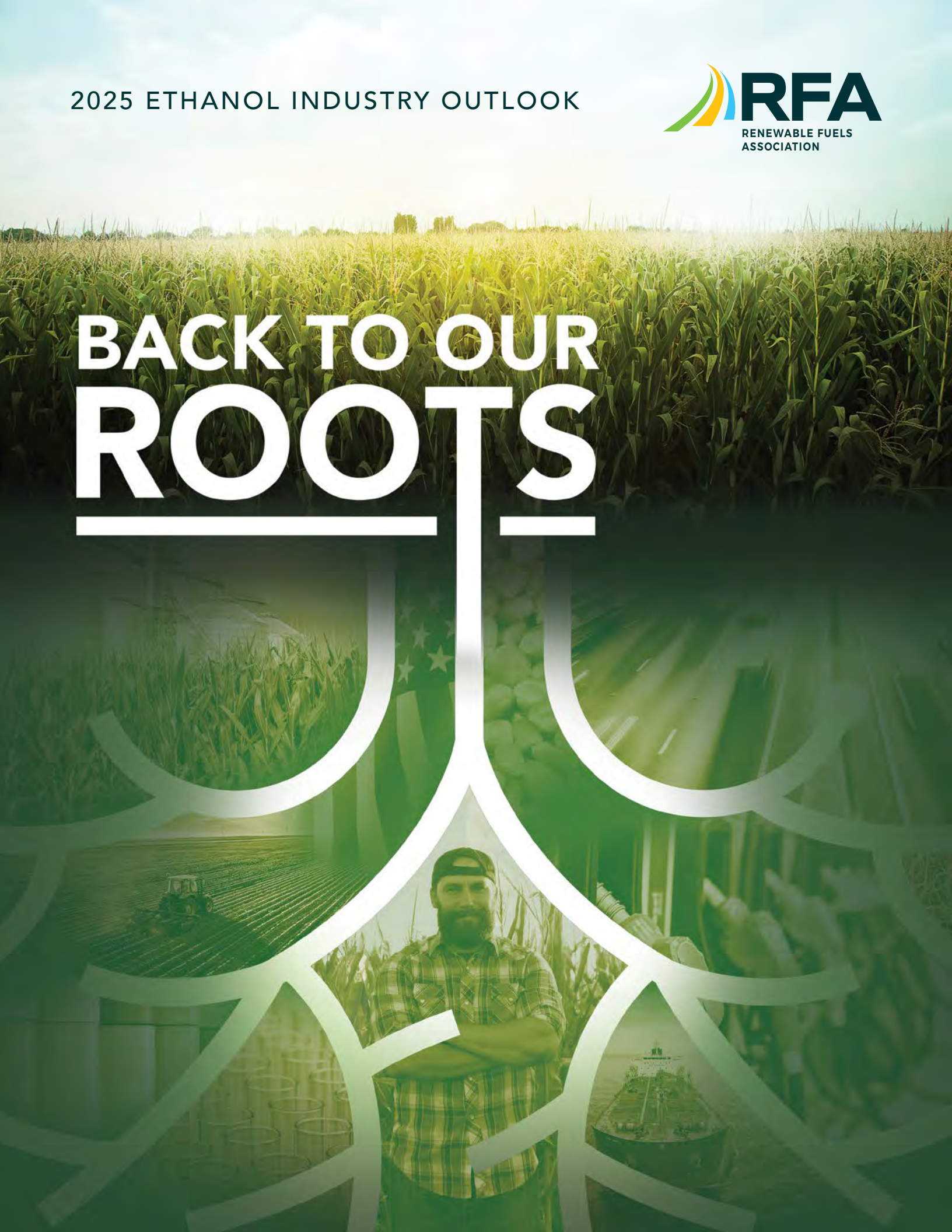
2025 ETHANOL INDUSTRY OUTLOOK

RFA
RENEWABLE FUELS ASSOCIATION

BACK TO OUR ROOTS



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Ed Stewart	Parallel Products Inc.	parallelproducts.com
Eric Baukol	Redfield Energy LLC	redfieldenergy.com
Walt Wendland	Ringneck Energy LLC	ringneckenergy.com
Mike Jerke	Southwest Iowa Renewable Energy LLC	sireethanol.com
Taichi Yamakawa	Sumitomo Corporation of Americas*	sumitomocorp.com/en/us/scoa
Dan Short	The Andersons Marathon Holdings LLC	andersonsinc.com
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**Prospective Producer Member*

BACK TO OUR ROOTS

RFA
RENEWABLE FUELS ASSOCIATION

In 2025, the Renewable Fuels Association will join with ethanol producers and farmers across the country to celebrate the 20-year anniversary of the Renewable Fuel Standard (RFS), the most transformative and influential public policy in our industry's long and storied history.

But we'll do more than simply commemorate the successes of the RFS over the past two decades. We'll also use this opportunity to remind a new administration and new Congress that the health and welfare of America's family farms is ***directly*** and ***inextricably*** tied to the health and welfare of America's biofuels industry. We'll share the lessons learned from our rich history. We'll go back to our roots.

Indeed, the RFS milestone could not come at a more important time. Many of the farm economy challenges that led Congress to adopt the RFS in 2005 are resurfacing today across rural America. As growth in the supply of agricultural commodities is again outpacing demand, farm income has plummeted 23 percent since peaking in 2022 and the total value of U.S. crops is down $37 billion—or nearly $20,000 per family farm. Agricultural exports are down, interest rates remain stubbornly elevated, farm debt is rising, cropland values are falling, and ag machinery sales are slumping. Moreover, expenses for seed, fertilizer, fuels, and labor have all hit record highs in recent years.

Things appear to be taking a turn for the worse in America's agricultural heartland, just as President Trump and his new administration are getting settled.

We've been here before. There was the devastating farm crisis of the 1980s, which saw the collapse of commodity prices and mass farm foreclosures and bankruptcies. Then there was the late 1990s and early 2000s, when crop production again outpaced demand, crop prices fell to levels below the farmer's cost of production, and farm consolidation accelerated.

But everything began to change in 2005 when Congress overwhelmingly passed legislation establishing the RFS, requiring oil refiners to blend increasing volumes of biofuels like corn ethanol into our nation's fuel supply. The RFS, which was greatly expanded by Congress two years later in 2007, ushered in a golden era of demand and value creation for America's farm sector.

Farmers and their neighbors pooled their resources to build ethanol biorefineries in their communities. Rapid expansion in ethanol production created a growing market for corn and added significant value to farm commodities. Good-paying jobs, prosperity, and wealth returned to small towns across rural America, and a new generation came home to the family farm.

It is not an exaggeration to say that growth in biofuels, driven by the RFS, helped rescue the farm economy and save rural America.

It can do so again.

Cutting away the red tape that restricts ethanol consumption will not only reduce fuel costs for consumers, but it can also help stave off a looming farm crisis by winnowing down the mountains of grain piling up across the Midwest.

President Trump, his new cabinet, and the new Congress can support and protect farmers, boost American energy production, decrease reliance on trade with undependable partners, and create new manufacturing jobs in the heartland simply by doubling down on the power of renewable fuels.

Two decades ago, passage of the RFS and the creation of a robust market for ethanol lifted family farmers out of economic peril and kicked off the most prosperous run in the history of American agriculture. Now, with farmers facing a new round of severe financial challenges, it's time to go back to our roots. It's time to turn to renewable fuels once again to lift up rural America and secure our energy future.

Geoff Cooper

Geoff Cooper, President and CEO

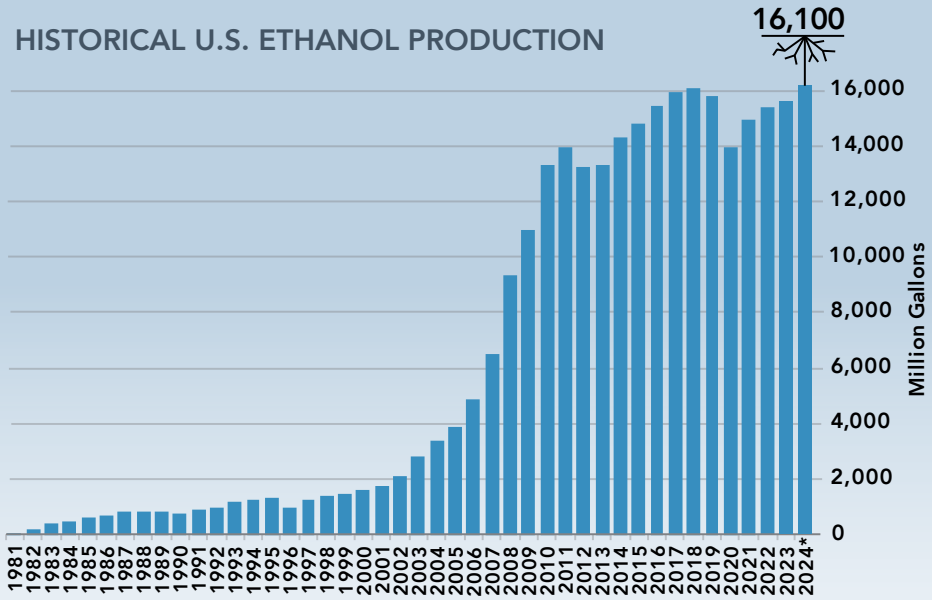
GROWING FORWARD

Poll Finds Strong Ethanol Support

A December 2024 survey of over 1,700 registered voters, conducted for RFA by Morning Consult, found that **64%** of voters have a favorable opinion of ethanol. Throughout this Industry Outlook, you will see more results from this round of polling.

As the U.S. ethanol sector continued to grow and evolve, 2024 was another highly successful year for the industry. Ethanol production in 2024 matched the record of 16.1 billion gallons set in 2018, and exports rose to a record 1.9 billion gallons. The industry also saw record output of distillers corn oil and captured biogenic CO_2. These records cap a period of relative marketplace stability, but now ethanol producers are starting a new chapter. As 2025 began, a new administration and new Congress were settling into our nation's capital; and as with any political transition, the industry faces many new questions. What does the future hold for the Renewable Fuel Standard, implementation of Inflation Reduction Act tax credits, trade policy, and electric vehicle policies?

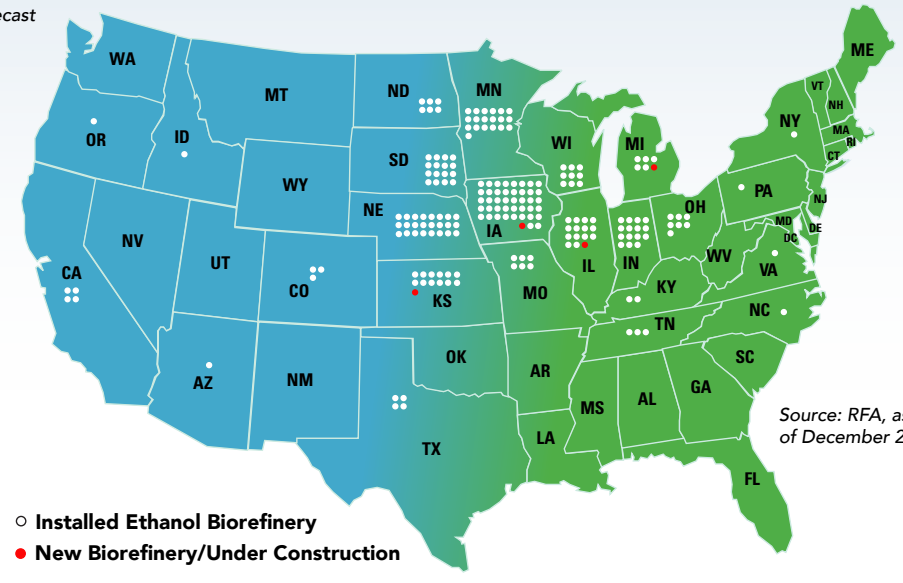
HISTORICAL U.S. ETHANOL PRODUCTION



Source: RFA and U.S. Energy Information Admin. **Forecast*

Against this backdrop of potential policy changes, 2025 marks a critical opportunity to re-emphasize the importance of renewable fuels to the agriculture sector. Today, the farm economy is facing daunting challenges. As we look "back to our roots" and celebrate an industry firmly planted on American soil, we are reminded of how the renewable fuels industry has helped lift rural America during difficult economic times. Ethanol producers stand ready in 2025 to do the same.

U.S. FUEL ETHANOL BIOREFINERIES BY STATE



Source: RFA, as of December 2024

U.S. ETHANOL PRODUCTION CAPACITY BY STATE

	Existing Production Capacity (mgy)	Capacity Under Constr./ Expansion (mgy)	Installed Ethanol Biorefineries	Biorefineries Under Constr./ Expansion
Iowa	4,881	21	42	1
Nebraska	2,371	0	24	0
Illinois	1,967	25	14	1
Minnesota	1,455	0	19	0
South Dakota	1,452	0	16	0
Indiana	1,445	0	15	0
Ohio	734	0	7	0
Wisconsin	644	0	9	0
Kansas	610	1	12	1
North Dakota	555	0	6	0
Texas	420	0	4	0
Michigan	382	2	5	1
Missouri	335	0	6	0
Tennessee	235	0	3	0
California	187	0	4	0
Colorado	140	0	3	0
Pennsylvania	120	0	1	0
New York	63	0	1	0
Idaho	60	0	1	0
North Carolina	60	0	1	0
Arizona	55	0	1	0
Kentucky	55	0	2	0
Oregon	40	0	1	0
Virginia	2	0	1	0
TOTAL U.S.	18,268	49	198	4

Source: RFA, as of December 2024

HISTORICAL ETHANOL BIOREFINERY COUNT & PRODUCTION CAPACITY

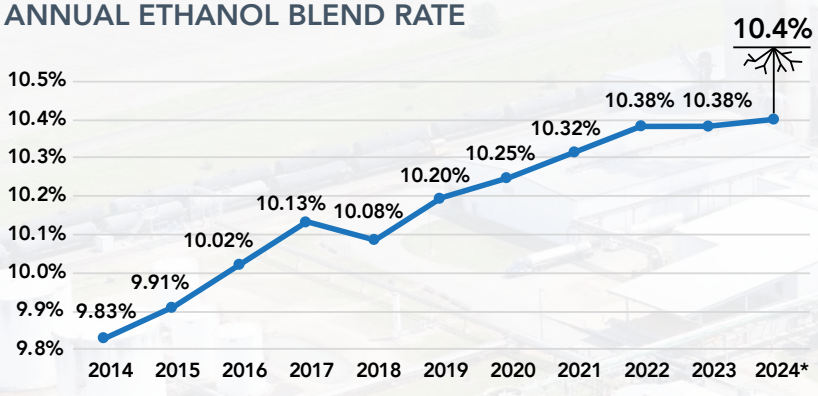
Year	Installed Ethanol Biorefineries	Total Installed Production Capacity (mgy)	Average Capacity per Biorefinery (mgy)
2004	81	4,398	54
2009	189	13,028	69
2014	213	15,077	71
2019	205	16,924	83
2024	198	18,268	92

Source: RFA **As of December for each year specified*

RFA's five-year strategic plan identifies four strategic goals that create the foundation for our work:

1. Increase global and domestic demand for renewable fuels and bioproducts.
2. Build a unifying coalition to communicate the economic, environmental, health, and energy security benefits of renewable fuels and bioproducts.
3. Facilitate innovation in policies, markets, and products.
4. Promote industry unity, best practices, safety, and continuous improvement through member services and support.

ANNUAL ETHANOL BLEND RATE



Source: RFA based on U.S. Energy Information Admin. data **Forecast*

ROOTED IN AGRICULTURE

The history of U.S. ethanol—and indeed all domestic renewable liquid fuels—begins on the humble American farm. The industry's growth in recent decades and its success today derive to a great extent from the thousands of farmers who worked together around the country to literally build a new market from the ground up. They invested their hard-earned money in rural biorefineries, promoted the benefits of ethanol in their communities, and collaborated with others to advocate for supportive policy. Thanks to the foresight and tenacity of those visionary farmers, today's 200 ethanol biorefineries across the United States are living up to the potential that was first identified by some of our nation's foremost inventors, such as Alexander Graham Bell, Henry Ford and Thomas Edison.

Notably, of the more than 310,000 jobs supported by the ethanol industry in 2024, more than two-thirds were tied to agriculture.

Modern-day facilities use state-of-the-art technologies to produce ethanol and valuable coproducts from the starches, sugars, protein and fiber found in grains and other feedstocks, and American farmers themselves are actively involved in many of the ethanol biorefining businesses through ownership, investment, or leadership roles. Corn is the predominant feedstock for U.S. ethanol production; however, many plants can process grain sorghum and cellulosic materials, including the growing use of corn kernel fiber.

Over 92 percent of U.S. grain-based ethanol produced today is processed by dry mills, with the remaining volume processed by wet mills.

In dry milling, the entire grain kernel is 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 first 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 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 coproducts eventually become distillers grains and distillers corn oil.

Just as ethanol production starts with farm feedstock, so too does it give back to the farm—especially in the over 35 million metric tons of distillers grains as feed for livestock. Learn more about this on Page 12.

What Comes from Corn

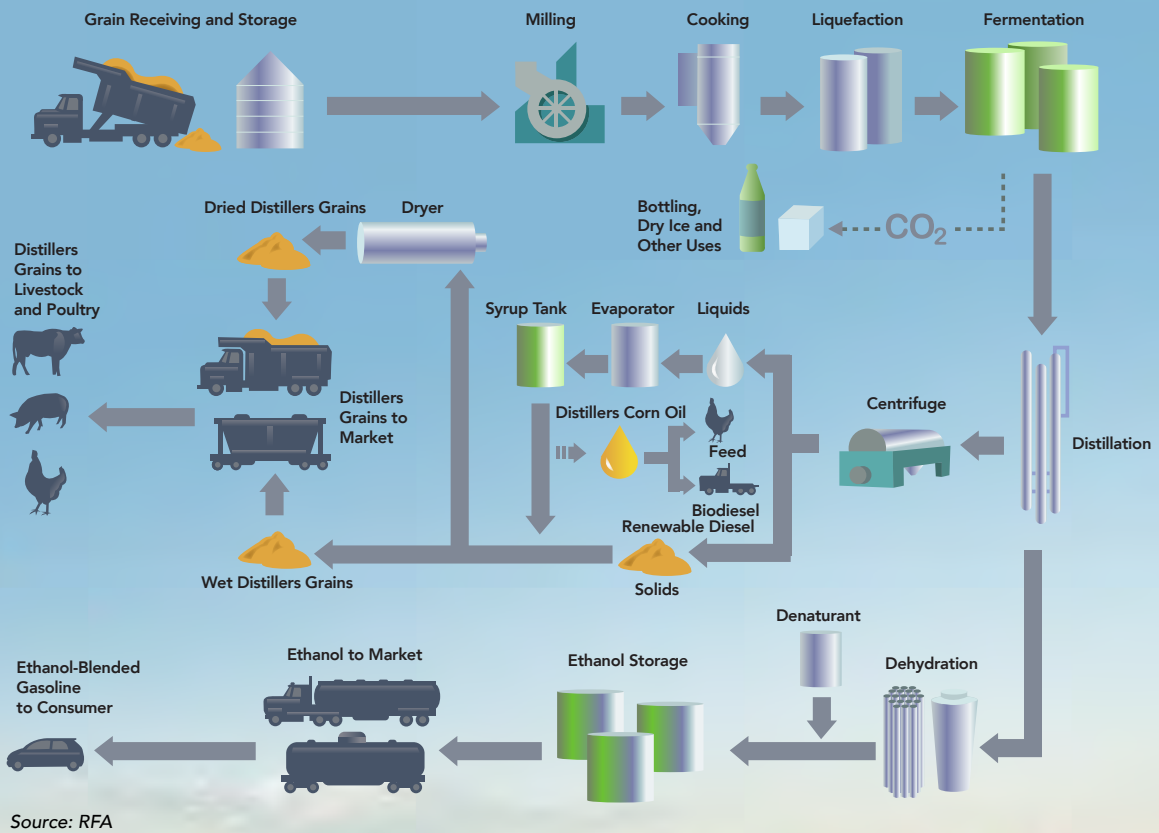
On average, 1 bushel of corn (56 pounds) processed by a dry mill ethanol biorefinery produces:

2.9 gallons	Denatured fuel ethanol
14.5 pounds	Distillers grains animal feed (10% moisture)
0.9 pounds	Distillers corn oil
16 pounds	Captured biogenic carbon dioxide (CO_2)*

In 2024, ethanol biorefineries captured roughly 2.7 million tons of CO_2 for dry ice production, bottling, food processing, and other uses.

Source: RFA based on U.S. Dept. of Agriculture data
**Approximately 30 percent of U.S. dry mills capture CO_2 from fermentation*

DRY MILL ETHANOL PROCESS



Source: RFA

Ethanol's Value-Added Proposition

Based on average prices and product yields in 2024, a typical dry mill ethanol plant was adding approximately $2.06 of additional value—nearly 50%—to every bushel of corn processed.

Source: RFA based on U.S. Dept. of Agriculture data
Estimate based on Jan.-Nov. 2024 data

Corn Cost per Bushel

$ 4.20

Value of Outputs per Bushel	
Ethanol	$ 4.71
Distillers Grains	$ 1.16
Distillers Corn Oil	$ 0.39
TOTAL	**$ 6.26**

WASHINGTON HITS RESET

A December 2024 poll found that **62%** of voters supported the Nationwide Consumer and Fuel Retailer Choice Act to ensure E15 is available year-round and **65%** backed the Flex Fuel Fairness Act, which would encourage automakers to produce more flex fuel vehicles. Watch for this legislation to be reintroduced early in the 119th Congress.

The 2024 election ushered a new guard into Washington, with Republicans taking control of both the House and Senate and President Donald Trump winning the White House. As a result, America's renewable fuel producers are preparing for different approaches to policies and regulations that impact the industry.

While the Biden administration emphasized expanding renewable energy and reducing greenhouse gas emissions in the agricultural sector through initiatives like the Inflation Reduction Act, Trump's agriculture and energy agenda is centered on reducing regulatory barriers, boosting domestic production, lowering energy prices, and leveling the playing field for global trade. Trump's cabinet features mostly new faces but still has some familiar names from his prior term. Meanwhile, Sen. John Thune (R-SD) takes over as Senate Majority Leader, and new leadership is coming to several key congressional committees.

The new administration and new Congress will face a number of unanswered questions and unresolved policy issues impacting ethanol and agriculture. Extending provisions of the 2017 Tax Cuts and Jobs Act will be a top priority, while new farm bill discussions and revisions to parts of the Inflation Reduction Act will also be up for debate. The new administration will also need to establish 2026 volume obligations under the Renewable Fuel Standard and determine how to approach implementation of increasingly stringent vehicle tailpipe standards.

New in the Cabinet

Lee Zeldin, EPA Administrator. Former representative from New York's First Congressional District; U.S. Army veteran; co-sponsored legislation to repeal or reform RFS in Congress.

Brooke Rollins, Secretary of Agriculture. Attorney and former president and CEO of America First Policy Institute; former acting director of Domestic Policy Council under President Trump; conservative policy advocate and native Texan.

Chris Wright, Secretary of Energy. CEO of oilfield services company Liberty Energy; businessman and native of Colorado; questioned the economic viability of certain climate policies.

Others to Watch

Elon Musk, Department of Government Efficiency (DOGE). President Trump tapped him to head a newly established advisory committee; focus of DOGE is to cut federal spending and reduce the size of government; DOGE will also identify opportunities for deregulation.

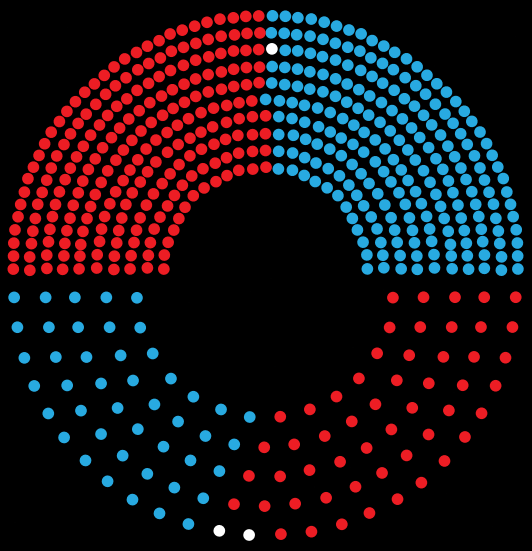
Senate Majority Leader John Thune. The fourth-term senator from South Dakota was elected majority leader for the 119th Congress; longtime biofuels supporter; sponsor of key ethanol legislation and strong proponent of the Renewable Fuel Standard.

House Speaker Mike Johnson. In his fourth term representing Louisiana's Fourth Congressional District; attorney who previously worked for the Alliance Defending Freedom; supporter of an "all-of-the-above" energy policy.

RFA Policy Priorities

1. **Maintain RFS Integrity:** The RFS continues to serve as the foundation of ethanol policy. This year, EPA needs to issue volume requirements for 2026 and beyond. Protecting and expanding the RFS will be at the top of RFA's priority list.
2. **Expand E15 Availability:** RFA urges prompt action on legislative and regulatory solutions that allow the unimpeded sales of E15 nationwide, including investment in infrastructure.
3. **Maximize the Benefit of Tax Credits:** Well-implemented tax policy can drive innovation and help meet energy security and environmental goals. As the Trump administration and Congress consider future tax policy, RFA will continue to advocate for effective programs that spur growth and investment in renewable fuels.
4. **Stimulate the Production of Flex Fuel Vehicles (FFVs):** RFA supports legislation that incentivizes the production and use of FFVs, which offer a homegrown approach to cleaner air and lower prices at the pump.
5. **Advance High-Octane, Low-Carbon (HOLC) Fuels:** RFA supports legislative solutions that compel a rapid but orderly nationwide transition to more efficient (higher octane), low-carbon liquid fuels for internal combustion engines, as well as complementary regulatory fixes.

119TH CONGRESS BY POLITICAL PARTY



House of Representatives

Republican: 219
Democrat: 215
Vacant: 1*

Senate

Republican: 53
Democrat: 45
Independent: 2**

*As of Jan. 1, 2025; *Seat representing Florida's First District; **Expected to caucus with Democrats*

THE ETHANOL ECONOMY

The U.S. ethanol industry experienced a record-breaking year in 2024, in several ways.

Weekly production estimates hit record levels multiple times, and annual output approached the previous high-water mark of 16.1 billion gallons set in 2018. This occurred in response to strong demand.

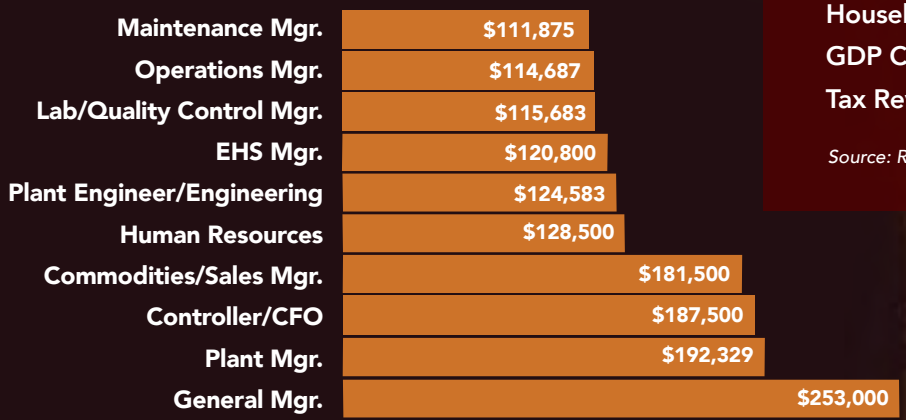
Domestic consumption was bolstered by continued expansion in the number of stations offering E15, along with growth in flex fuels like E85. However, the big story was record-smashing exports. Shipments surged to approximately 1.9 billion gallons, which was 450 million gallons more than in 2023 and roughly 200 million gallons above the previous record in 2018.

Exports were driven by favorable policies in major destination countries. Additionally, lower production costs helped keep ethanol competitive in price-sensitive markets—as well as at home.

Lower corn prices were the main driver of the reduction in production costs, as futures hit four-year lows in response to another bumper crop. Subdued natural gas prices also contributed. Although it was a challenging environment for corn growers, solid demand from both the ethanol industry and the grain export market provided support. Approximately 5.5 billion bushels of corn worth over $23 billion were processed into ethanol.

As a result of falling commodity prices, the industry's impact on the U.S. economy declined from 2023, since a substantial portion of the economic activity connected to ethanol occurs in the agriculture sector. Still, the industry continues to make significant contributions to gross domestic product and incomes

U.S. ETHANOL BIOREFINERY AVERAGE MANAGEMENT COMPENSATION BY POSITION



Source: RFA based on Ethanol Producer Magazine *2024 survey data*

Ethanol and the 2024 Economy

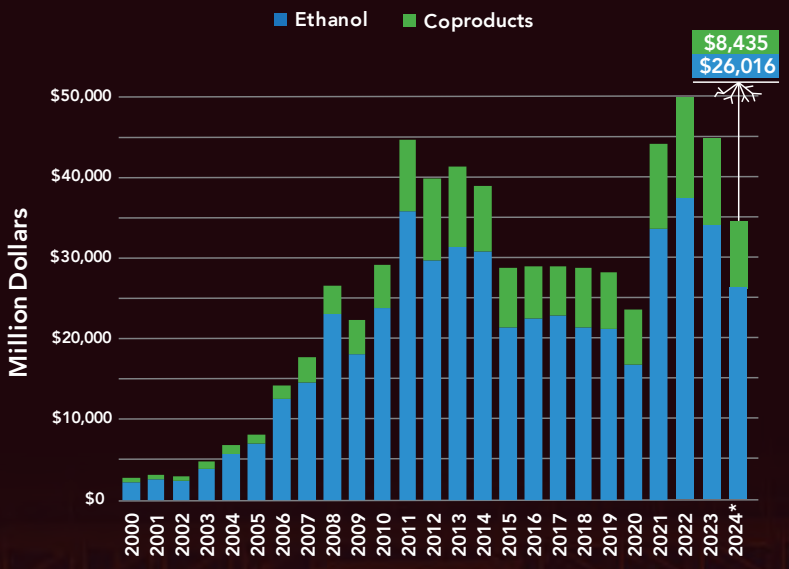
Direct Jobs	55,810
Indirect/Induced Jobs	258,089
Household Income	$28.3 Billion
GDP Contribution	$53.0 Billion
Tax Revenues	$10.3 Billion

Source: RFA

and supports hundreds of thousands of jobs, with its impact most pronounced in rural America.

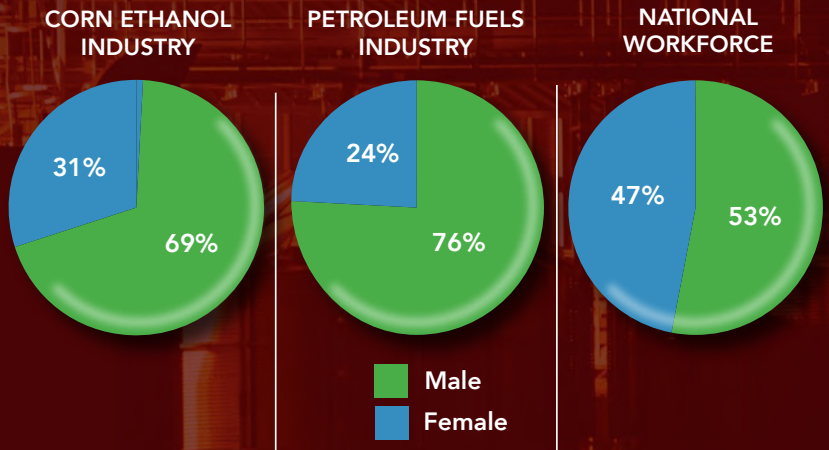
Going forward, the industry's impact will return to growth, given a 15-billion-gallon RFS requirement in 2025, the implementation of retail investments being made with $500 million in USDA's Higher Blends Infrastructure Incentive Program (HBIIP) funding, prospects for sustained export demand, and new uses such as sustainable aviation fuel on the horizon.

GROSS VALUE OF U.S. ETHANOL INDUSTRY OUTPUT



Source: RFA based on U.S. Energy Information Admin. and U.S. Dept. of Agriculture data
**Forecast*

WORKFORCE DEMOGRAPHICS



SHARE OF WORKFORCE COMPOSED OF VETERANS

CORN ETHANOL INDUSTRY	PETROLEUM FUELS INDUSTRY	NATIONAL WORKFORCE
16%	10%	5%

Source: U.S. Dept. of Energy data

BRANCHING OUT GLOBALLY

In 2024, the United States reaffirmed its position as the world's ethanol powerhouse, producing 16.1 billion gallons—nearly double Brazil's output—and maintaining its two-decade reign as the top global producer. This record production, driven by expanded capacity and low input costs, allowed the U.S. to dominate global markets with cost-competitive, cleaner-burning ethanol.

The U.S. has been a net exporter of ethanol for 15 consecutive years, as national commitments to reduce GHG emissions, improve air quality and reduce consumer fuel prices have served as critical drivers. In 2024, U.S. ethanol exports grew 35 percent to an all-time high of 1.9 billion gallons. Increased fuel ethanol exports to India, the United Kingdom, Colombia, and Canada accounted for 65 percent of that growth. Notably, exports exceeded 2023 volumes across 50 countries.

Canada accounted for over one-third of U.S. ethanol exports, with demand rising 38 percent since the 2022 implementation of its Clean Fuel Regulation. Favorable pricing and preparations for 2025 blending increases in provinces like Ontario and Quebec further amplified Canada's import demand. The United Kingdom became the second-largest export market, with shipments surging 65 percent over 2023 levels. Ethanol consumption in the U.K. has been increasing since 2021 implementation of an E10 standard, and with recent surges closely tied to increasing Renewable Transport Fuel Obligations.

The European Union followed with a 26 percent increase in imports compared to 2023, driven by Renewable Energy Directive II requirements. Meanwhile, U.S. ethanol exports to India quadrupled to record volumes. Since imported ethanol for transportation fuel blending is prohibited in India, U.S. ethanol has found demand in industrial applications, thereby freeing up domestic product to fulfil India's ambitious Ethanol Blended Petrol targets.

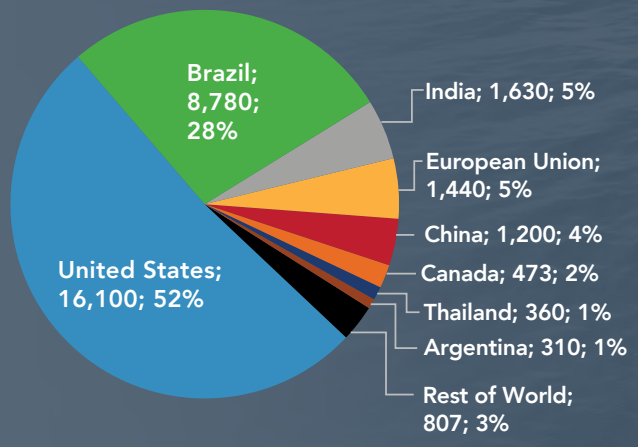
Conversely, exports to Brazil fell to historic lows. Brazil's reinstated 18-percent tariff on U.S. ethanol, upheld in mid-2024, kept American ethanol out of this once-booming export market. U.S. ethanol exports to China were similarly limited as prohibitive tariffs continued to restrict access.

While exports soared, U.S. ethanol imports in 2024 dropped to a low of 3.5 million gallons, nearly all arriving duty-free from Brazil to take advantage of the RFS and California LCFS programs.

With strong roots in innovation and sustainability, the U.S. continues to grow as the world's leading ethanol producer and exporter, shaping global biofuel markets through its scale and commitment to progress.

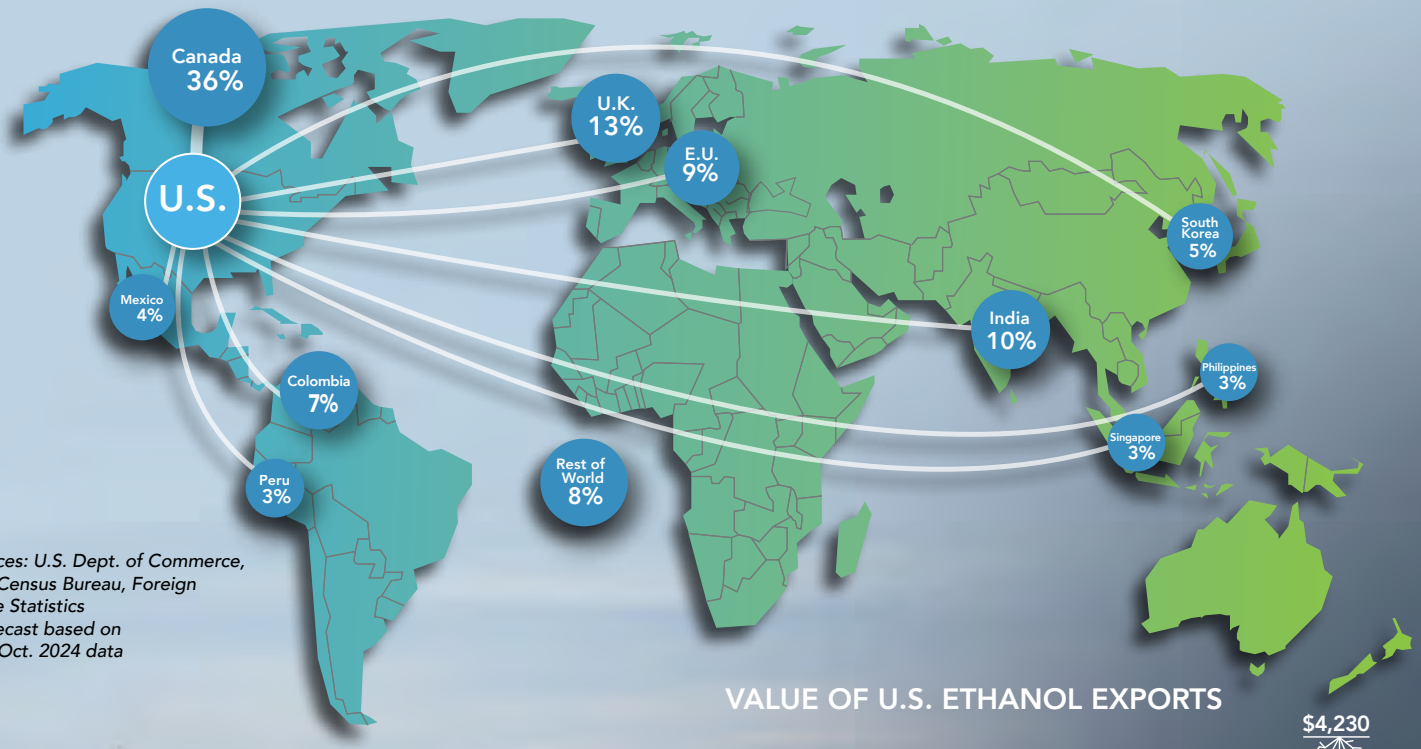
2024 GLOBAL FUEL ETHANOL PRODUCTION BY COUNTRY

Country; million gallons; share of global production



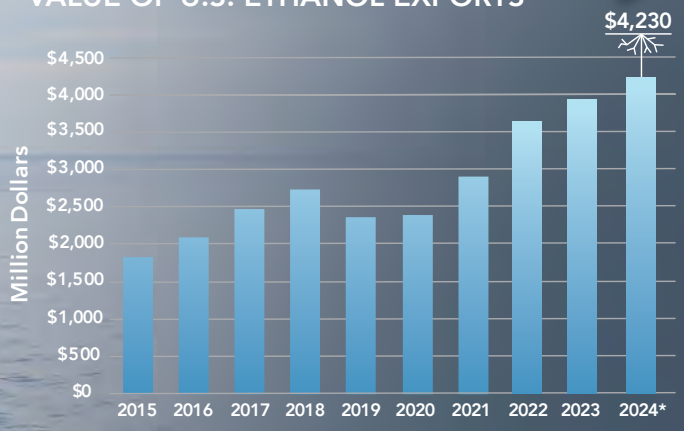
Source: RFA analysis of public and private data sources

TOP DESTINATIONS FOR U.S. ETHANOL EXPORTS



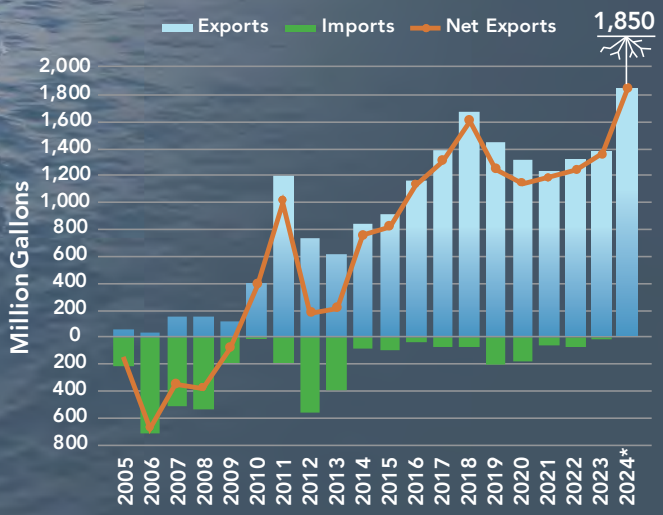
Sources: U.S. Dept. of Commerce, U.S. Census Bureau, Foreign Trade Statistics
**Forecast based on Jan.-Oct. 2024 data*

VALUE OF U.S. ETHANOL EXPORTS



Sources: U.S. Dept. of Commerce, U.S. Census Bureau, Foreign Trade Statistics
**Forecast based on Jan.-Oct. 2024 data*

U.S. ETHANOL EXPORTS AND IMPORTS



Sources: U.S. Dept. of Commerce, U.S. Census Bureau, Foreign Trade Statistics
**Forecast based on Jan.-Oct. 2024 data*

CRUCIAL COPRODUCTS

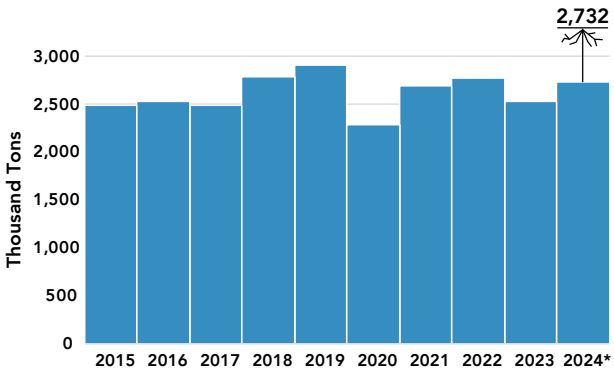
America's ethanol biorefineries deliver more than just high-octane, low-carbon fuel to the world. They also are among the largest global suppliers of high-protein, low-cost animal feed for livestock, poultry, and aquaculture. In 2024, U.S. ethanol producers generated 36 million metric tons (mmt) of distillers grains and corn gluten feed and meal.

In addition, biorefineries produced over 4.5 billion pounds of distillers corn oil (DCO)—a record amount. Ethanol producers continued to pursue optimized DCO production, as demand continued to surge. From its value as a poultry feed ingredient to its use as a major feedstock for renewable diesel, biodiesel, and even sustainable aviation fuel production, DCO demand has never been hotter.

U.S. biorefineries not only satisfy animal nutrition needs domestically, but they also export about one-third of the distillers grains they produce to customers around the world. In 2024, more than 50 countries purchased a cumulative 12.2 mmt of U.S. distillers grains. Half of these exports landed in Southeast and East Asia. Meanwhile, Mexico accounted for 21 percent of total U.S. distillers grains exports shipped, extending the country's title as the top DDGS importer for the eighth consecutive year.

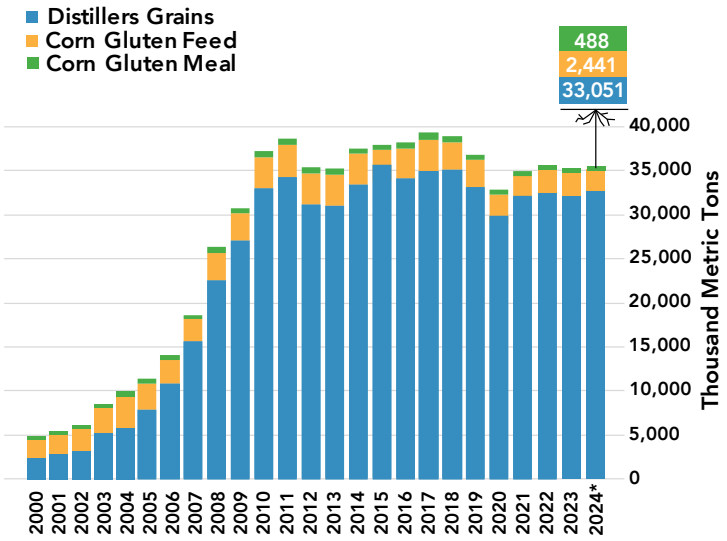
Additionally, biogenic CO_2 produced via fermentation continues to serve as an increasingly valuable coproduct from ethanol biorefineries, with a diversity of uses, such as beverage carbonation, dry ice, wastewater treatment, welding and many other commercial applications. In 2024, ethanol producers across the country turned their focus to emerging opportunities for captured CO_2, ranging from geological sequestration to utilization in new chemical, fuel, and industrial product applications.

ANNUAL BIOGENIC CO_2 CAPTURED AT U.S. ETHANOL FACILITIES



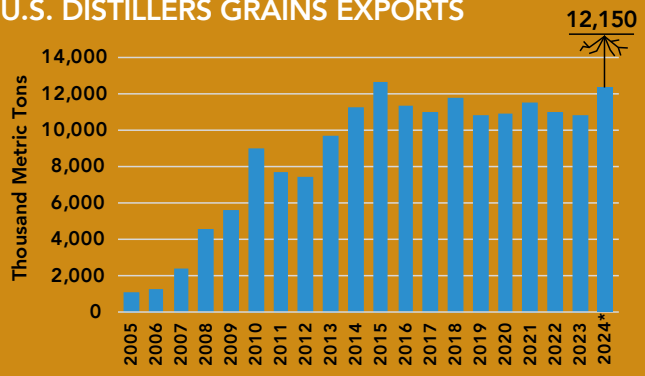
Source: RFA based on U.S. Dept. of Agriculture data
**Projected based on Jan.-Nov. data*

U.S. ETHANOL INDUSTRY COPRODUCT ANIMAL FEED OUTPUT



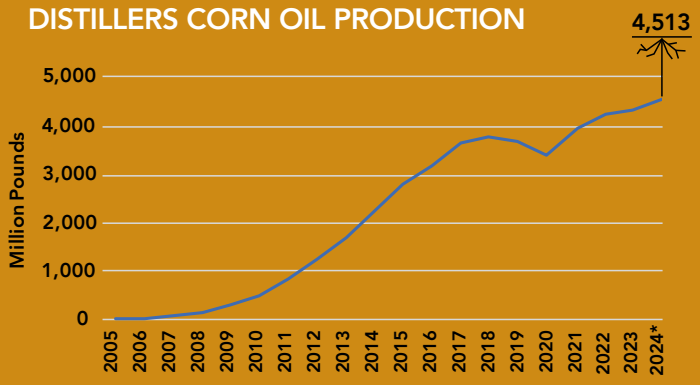
Note: All coproducts converted to 10% moisture basis
Sources: RFA and U.S. Dept. of Agriculture
**Forecast based on Jan.-Oct. 2024 data*

U.S. DISTILLERS GRAINS EXPORTS



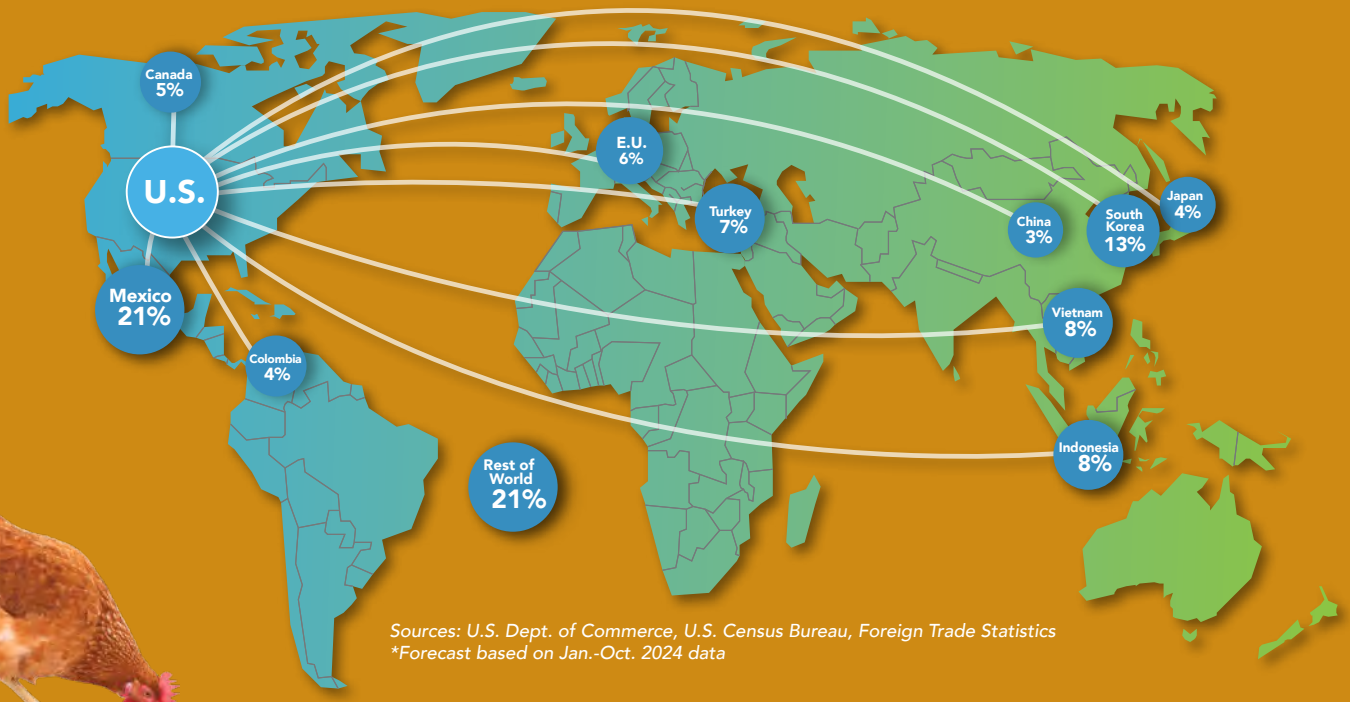
Sources: U.S. Dept. of Commerce, U.S. Census Bureau, Foreign Trade Statistics
**Forecast based on Jan.-Oct. 2024 data*

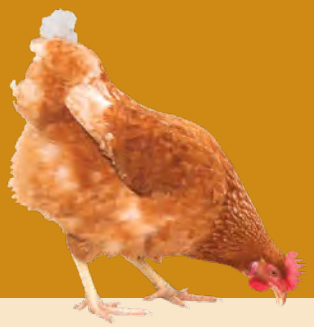
DISTILLERS CORN OIL PRODUCTION



Sources: RFA and U.S. Dept. of Agriculture
**Forecast based on Jan.-Oct. 2024 data*

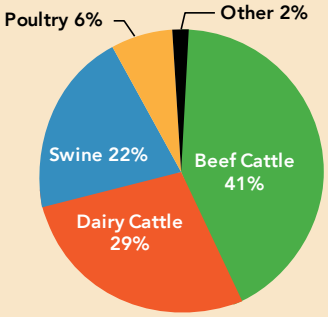
TOP DESTINATIONS FOR U.S. DISTILLERS GRAINS EXPORTS IN 2024





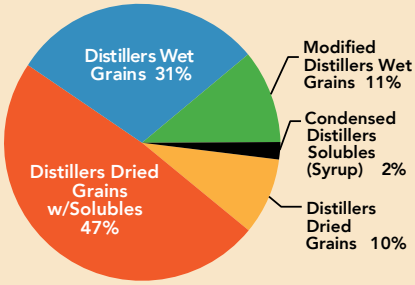
Sources: U.S. Dept. of Commerce, U.S. Census Bureau, Foreign Trade Statistics
**Forecast based on Jan.-Oct. 2024 data*

2024 DISTILLERS GRAINS CONSUMPTION BY SPECIES



Source: Distillers grains marketing companies

2024 DISTILLERS GRAINS PRODUCTION BY TYPE, AS-IS BASIS



Source: U.S. Dept. of Agriculture
Based on Jan.-Oct. 2024 data

THE RFS AT TWENTY

Twenty years ago—against a backdrop of rising crude oil imports, surging gas prices, and a flailing farm economy—Congress overwhelmingly passed the Energy Policy Act of 2005. The bill, which had broad bipartisan support and was championed by President George W. Bush, established the world's first Renewable Fuel Standard (RFS) requiring oil refiners to blend annually increasing amounts of biofuels like ethanol into the fuel supply.

The RFS was so successful that, just two years later, Congress expanded and extended it as part of the Energy Independence and Security Act of 2007, which was again strongly supported, and signed into law, by President Bush.

By creating marketplace certainty and predictability, the RFS single-handedly spurred a surge of investment in renewable fuel production facilities across the country. Farmers pooled their resources and worked with local banks to build ethanol plants in their communities; meanwhile, major grain processing corporations, transportation companies, fuel marketers, and technology providers also made substantial investments in renewable fuels.

The goals of the RFS were clear:

- **Cleaner Air**
- **A Stronger Farm Economy**
- **Energy Security**
- **Fuel Choice and Diversification**

Twenty years later, we can proudly proclaim that the RFS hasn't just lived up to its ambitious expectations—it has far exceeded them. The RFS has decreased reliance on imported petroleum, reduced emissions of harmful tailpipe pollutants, slashed greenhouse gases from transportation, lowered consumer fuel prices, supported good-paying jobs in rural America, and boosted the agricultural economy by adding value to the crops produced by our nation's farmers.

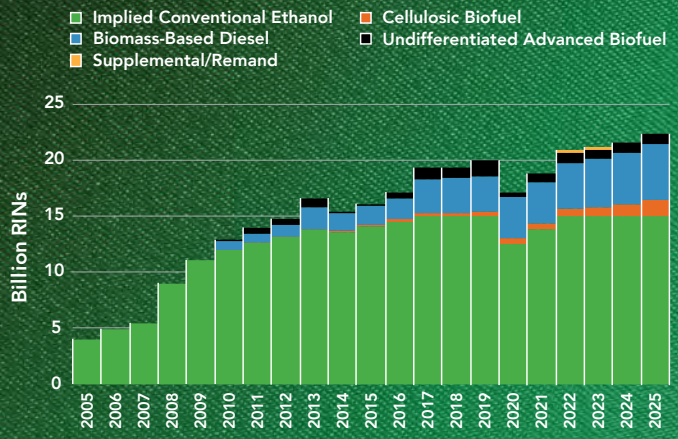
And far from "distorting the free market" as RFS opponents often claim, the policy has been remarkably effective in stimulating market competition and giving consumers more choices. Simply put, the RFS ensures renewable fuels are able to gain access to a fuel market that had been monopolized for nearly a century and would otherwise be closed to competition. That's why the RFS remains so critically important today.

While the platinum anniversary of the RFS provides an opportunity to pause for historical reflection, it also gives us a chance to look forward. The RFS isn't done yet. Indeed, it's only gotten started.

In its next chapter, the RFS will drive accelerated decarbonization of our liquid fuel supply, stimulate increased fuel and engine efficiency, further diversify our fuel mix, expand economic opportunities for the farm sector, and catalyze even lower prices and greater competition at the pump.

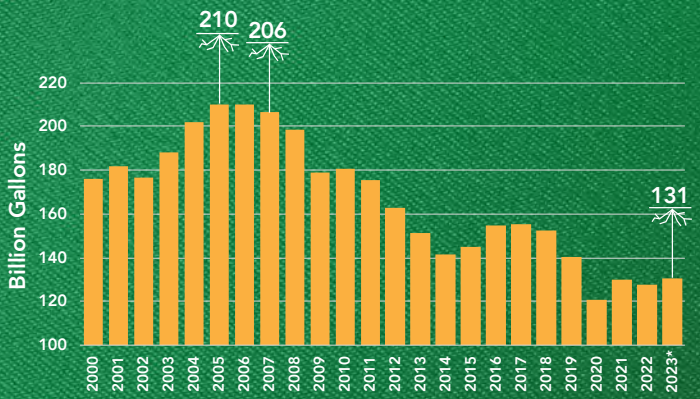
68% of voters polled by Morning Consult in December 2024 support the Renewable Fuel Standard.

RENEWABLE FUEL STANDARD (RFS) VOLUMES



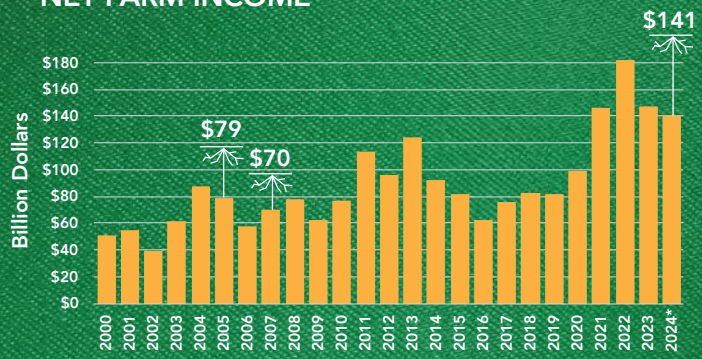
Source: RFA, based on RFS regulations and volume standards

U.S. IMPORTS OF CRUDE OIL AND PETROLEUM PRODUCTS



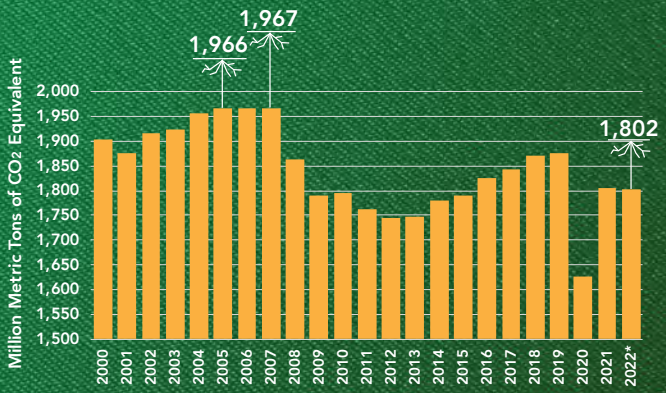
Source: RFA, based on U.S. Energy Information Admin. data
**Forecast*

NET FARM INCOME



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

TRANSPORTATION SECTOR GHG EMISSIONS



Source: RFA, based on U.S. Environmental Protection Agency data
**Estimate*

20 RFS

NET-ZERO TAKES ROOT

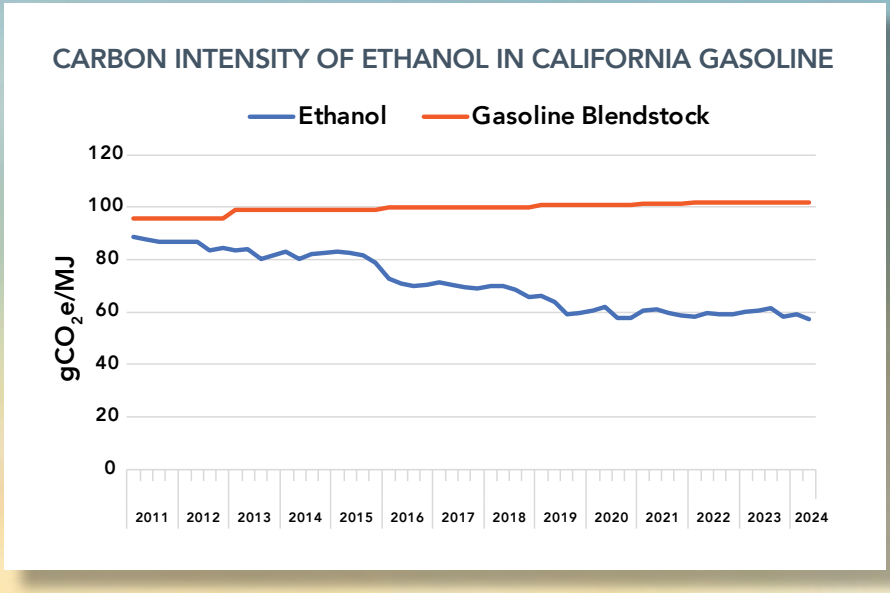
Four years ago, RFA's producer members pledged that the ethanol they produce will achieve net-zero emissions by 2050 or sooner. The following year, RFA issued a landmark study that identified multiple technology pathways to achieve the net-zero goal. In fact, with the right policy and market conditions, the study found the industry could hit its net-zero aspiration around 2040—or 10 years ahead of schedule. Today, ethanol producers are already well on the way there, with nearly eight out of ten RFA member facilities reporting they are on track to achieve net zero by 2050 or sooner.

Nevertheless, there are some barriers that remain to be overcome, such as securing capital with favorable terms for decarbonization projects, permitting challenges, policy and regulatory uncertainty, and a lack of clear return on investment for certain technologies and approaches.

Permanent storage or utilization of biogenic CO_2 captured from fermentation is the quickest, most cost-effective way for ethanol producers to lower carbon intensity. Ethanol CO_2 transportation infrastructure remains a hurdle, yet 2024 saw promising progress toward developing a comprehensive pipeline network. In the year ahead, RFA will continue to support this pivotal strategy for the ethanol industry's transition to net-zero emissions.

American farmers are a critical part of this effort as well. In November 2024, a new report initiated by U.S. Farmers & Ranchers in Action concluded that U.S. agriculture, with enhanced implementation of conservation practices and emerging technologies, has an opportunity to more than offset its carbon footprint while increasing farmer profitability and farm resilience. Farmers also made great strides in 2024 toward broader adoption of climate-smart agriculture practices that can help lower ethanol's carbon footprint.

The U.S. ethanol industry recognizes its pivotal role in reducing carbon emissions over the long term. Ethanol producers are making progress, and their success is taking root.

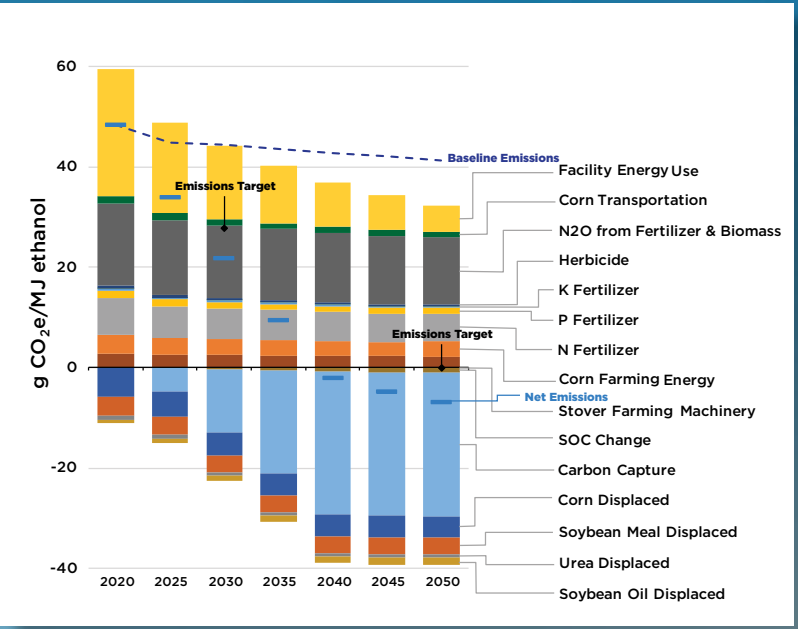


Source: California Air Resources Board

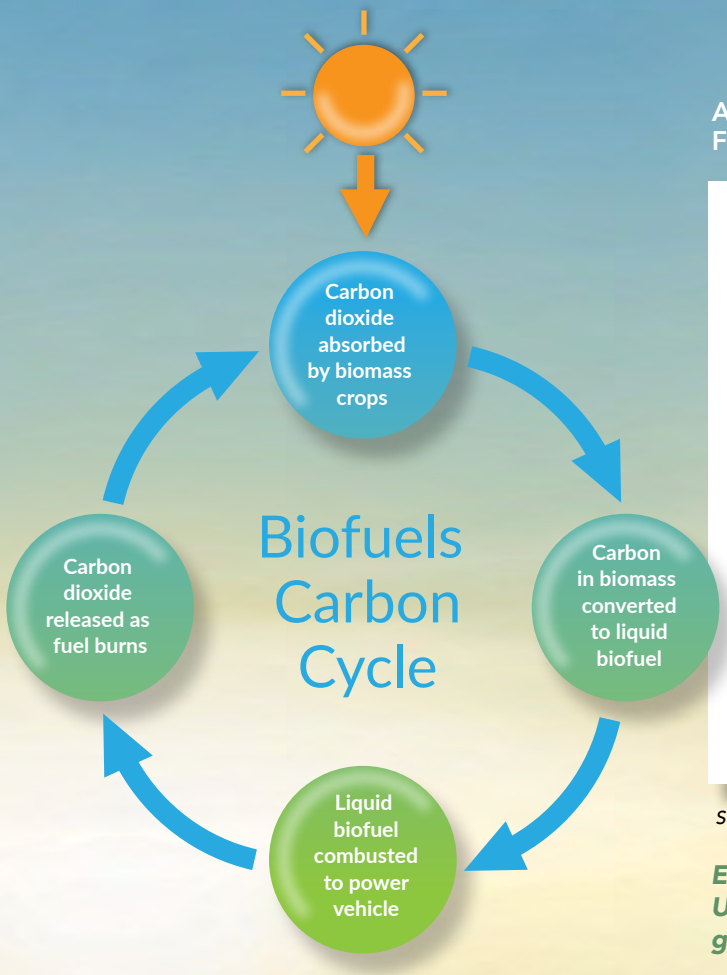
The use of ethanol in gasoline in 2024 reduced CO_2-equivalent greenhouse gas emissions from the transportation sector by 54.3 million metric tons. That's equivalent to eliminating:

- 12 million cars from the road for an entire year
- Annual emissions from 14 coal-fired power plants
- Emissions from 313,000 roundtrip flights from LA to NYC

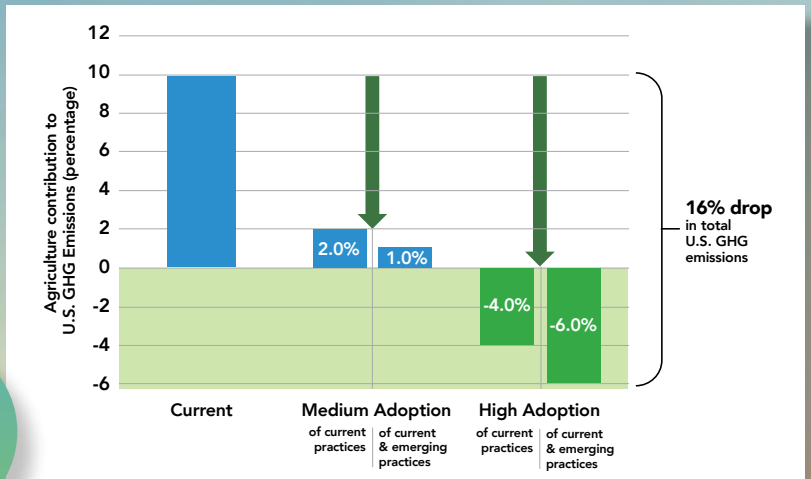
CORE PATHWAY TO NET-ZERO EMISSIONS



Source: Informed Sustainability Consulting LLC (2022), Pathways to Net-Zero Ethanol: Scenarios for Ethanol Producers to Achieve Carbon Neutrality by 2050



AGRICULTURE HAS THE POTENTIAL TO REDUCE ITS FOOTPRINT TO -6% OF TOTAL GHG EMISSIONS



Medium adoption of current practices to improve Nitrogen management, soil carbon sequestration, animal feed and on-farm energy use has the potential to reduce 80% of the current agriculture GHG emissions. With the addition of frontier and emerging technologies including cellulosic biomass production, solar and wind energy production, and advance cropping systems, agriculture can reduce emissions to -6% of total U.S. GHG emissions—that's a 16% drop in total.

Source: U.S. Farmers and Ranchers in Action

Even with medium adoption of current practices, U.S. agriculture can significantly reduce its greenhouse gas emissions.

INNOVATION HELPS ETHANOL FLY HIGHER

In 2024, a major new market opportunity for biofuels finally got off the ground. Estimated global production of sustainable aviation fuels (SAF) more than doubled to 343 million gallons, up from the 159 million gallons produced in 2023. While most of the new SAF production in 2024 came from lipid feedstocks (fats, oils, and greases), the nascent alcohol-to-jet industry continued to make progress toward takeoff.

As governments and businesses around the world are recognizing the substantial environmental impacts of air travel, more investment and R&D into the alcohol-to-jet process continues to flow into the industry. Programs such as the U.S. SAF Grand Challenge and the Inflation Reduction Act's 40B and 45Z tax credits are helping to foster innovation and investment, but more policy certainty and durability is needed to truly open the market.

Ethanol remains positioned as the most attractive long-term feedstock for U.S. SAF production, with a potential low-cost supply of 18 billion gallons and a well-established infrastructure network to support increased growth.

While ethanol already offers a low-carbon feedstock for SAF, efficiency improvements at U.S. biorefineries are playing a critical role in reducing carbon intensity even more. Innovations in process optimization, energy integration, and advanced enzymes and yeasts have enabled producers to extract more ethanol per bushel of corn while lowering energy and water use. Integration of combined heat and power—along with renewable energy sources like solar and wind—is further reducing reliance on fossil fuels, contributing to lower carbon intensity (CI) scores.

In addition, coupling climate-smart farming practices with the implementation of carbon capture, utilization and sequestration can result in the production of ethanol-based SAF that offers a greater than 50-percent reduction in CI compared to petroleum-derived SAF.

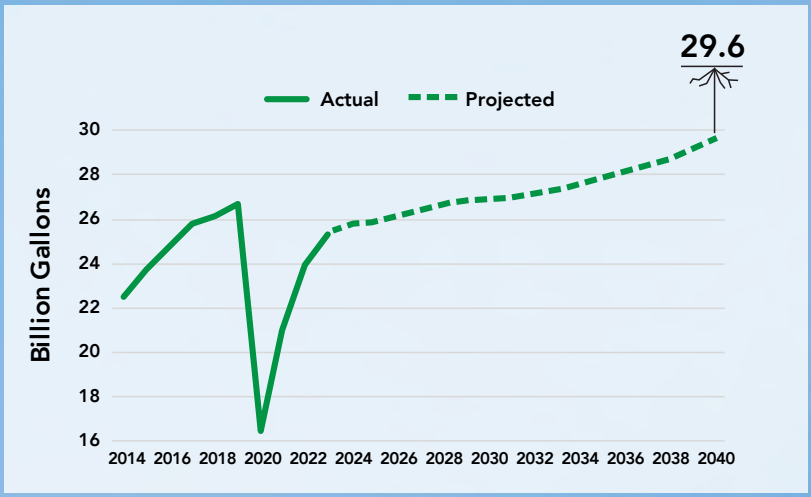
The U.S. ethanol industry is uniquely positioned to substantially contribute to air transportation decarbonization on a global scale, born from homegrown renewable energy production and led by America's family farmers. Our focus on SAF from technologically advanced ethanol underscores our commitment to expanding our role in the transition to a low-carbon economy. These advancements not only enhance the ethanol industry's environmental credentials but also open new revenue streams, ensuring relevance and resilience in a rapidly changing energy landscape.

For a list of U.S. alcohol-to-jet SAF biorefinery projects, see the centerfold insert.

Report indicates tremendous U.S. SAF progress

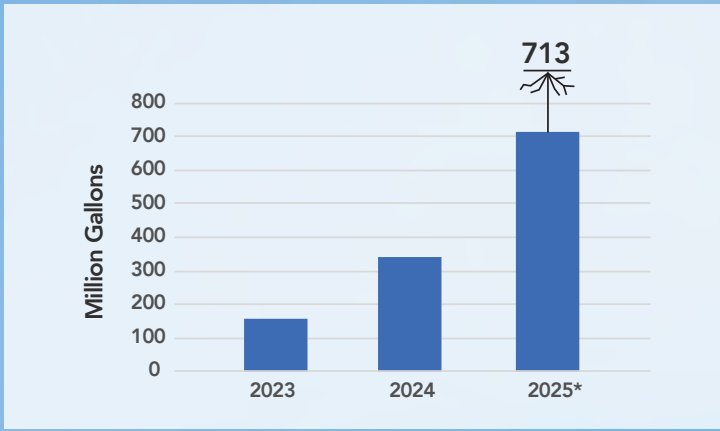
An intergovernmental three-year assessment released in January 2025 analyzed advancements in feedstock innovation and conversion technologies, supply chains, policy and valuation analysis, and end uses motivated through the SAF Grand Challenge. 2024 U.S. SAF production through September totaled roughly 30 mg, up from 5 mg in 2021 and a 570,000 $mtCO_2e$ reduction. U.S. production is projected to surpass 3 bgy by 2030, supported by the development of roughly 160 SAF projects.

U.S. JET FUEL CONSUMPTION



Source: RFA based on U.S. Energy Information Administration data

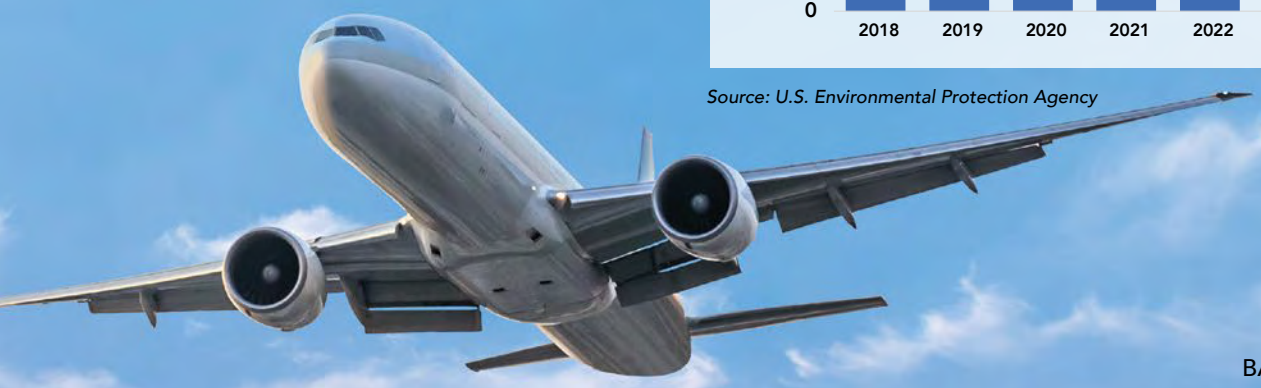
GLOBAL SAF PRODUCTION



*Source: RFA based on International Air Transport Assn. *Estimated*

U.S. SAF PRODUCTION

Source: U.S. Environmental Protection Agency *Jan.-Nov.*



HIGHER BLENDS, SMARTER GROWTH

Expanding the availability of E15 and flex fuels like E85 remains critically important to the future of the ethanol industry. The continued push for year-round E15, in particular, shows how the ethanol industry's partnerships lead to progress. In 2024, RFA worked with fuel retailers, the American Petroleum Institute, and others to advance legislation that would make E15 permanently available year-round and nationwide. And while the legislation fell just short of passage, all signs point toward success in 2025.

For the third time in as many years, RFA's efforts helped secure emergency waivers from the Biden administration for year-round E15 in summer 2024. The result was record sales volumes of lower-cost E15, with more than 1.2 billion gallons consumed, and rapid growth in the number of customers seeking out the fuel.

The U.S. Environmental Protection Agency has approved the use of E15 in all light-duty vehicles manufactured in the last 25 years, and the vast majority of automakers continue to warrant the use of E15 in their vehicles. Only Mercedes-Benz, Mazda and Volvo—representing less than 6 percent of new vehicles sold—still do not specifically list E15 as an approved fuel.

Flex fuels like E85 also continue to gain in popularity, and its use in California rose to record heights in 2024. Automakers who have backtracked on FFV production in recent years are beginning to see the light; after offering no FFVs in 2024, Chevrolet now offers 2025 Trax and Trailblazer SUV models with flex fuel capability, as does Buick for its new Encore and Envista models. Otherwise, the only FFV available to consumers is a select Ford F-150 model, with a few other models available for fleet purchase only. RFA continues to strongly advocate for the production of more FFVs and fairness in how alternative fuel vehicles are incentivized under fuel economy and greenhouse gas regulations, such as with the Flex Fuel Fairness Act.

"No president has ever fought harder for our farmers than I did. I issued a rule declaring that E15 would be made available all year round. In addition, I dramatically increased the number of fueling stations where E15 could be sold across the country, by letting them use the existing pumps. … We won't just increase ethanol production in our own country, we will make it our mission to export ethanol all over the world."

– President Donald Trump, September 2024

E15 APPROVAL STATUS FOR U.S. LIGHT-DUTY VEHICLES

E15 approved by automaker in ALL models
E15 approved by automaker in SOME models
E15 approved by EPA only; NOT approved by automaker

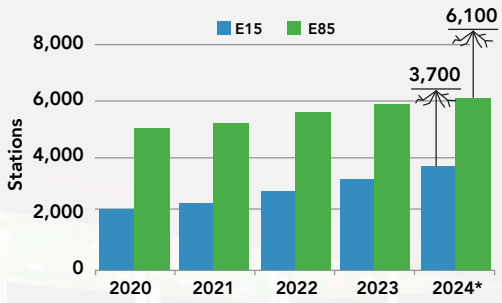
AUTOMAKERS / MODELS	MODEL YEAR 2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	MARKET SHARE *
BMW Group **															
BMW															2.2%
Mini															0.2%
Daimler Group (Mercedes-Benz)															2.3%
Ford Motor Co. (Ford & Lincoln)															15.2%
GM (Buick, Cadillac, Chevrolet & GMC)															16.9%
Honda Motor Co. (Honda & Acura)															9.4%
Hyundai Motor Co. (Genesis, Hyundai & Kia)															10.5%
Mazda															2.8%
Mitsubishi Motors Corp. †															0.7%
Nissan Motor Co. ‡															
Infiniti															0.4%
Nissan															5.7%
Stellantis (Alfa Romeo, Chrysler, Dodge, Fiat, Jeep & Ram)															8.8%
Subaru															4.4%
Tata Motors (Jaguar & Land Rover)															0.6%
Toyota Motor Corp.															
Lexus															2.2%
Toyota §															13.2%
Volkswagen Group															
Audi															1.1%
Porsche															0.4%
Volkswagen															2.3%
Volvo Car Group															0.8%

* Internal combustion engine models only.
** Approves the use of up to 25% ethanol blends.
† Approves the use of E15 in Outlander.
‡ Approves the use of E15 except in 1.6L & 2.0L engines.
§ Approves the use of up to 25% ethanol blends in Supra.

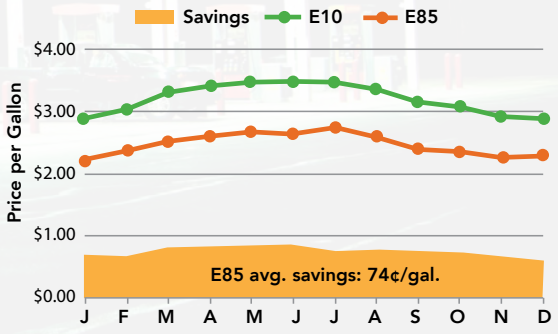
Source: RFA based on manufacturer owner's manuals and GoodCarBadCar data

The savings to drivers of ethanol blends like E15 were on clear display in November 2024 at a gas station in Willmar, Minn.

EXPANSION OF U.S. RETAIL STATIONS OFFERING E15 & E85



2024 NATIONAL AVERAGE RETAIL PRICES FOR E10 & E85



When it comes to higher blends, **69%** of voters surveyed in December 2024 support increasing the availability of E15 and **67%** believe it is important for the U.S. government to support the production and sale of flex fuel vehicles.

SECURING ENERGY INDEPENDENCE

President Trump and the Republican Party have pledged to "Unleash American Energy," stating that the United States "will unleash Energy Production from all sources…to immediately slash inflation and power American homes, cars, and factories with reliable, abundant, and affordable energy." Just as it has done for decades, ethanol is already helping to accomplish that objective. And the industry stands ready to contribute even more.

Ethanol is the quintessential American energy source. More than 99 percent of the ethanol consumed in the United States is produced domestically, as is the grain that is used to produce it. No other energy source produced in the United States can rival ethanol when it comes to being American-made. In fact, U.S.-produced ethanol displaced the need for approximately 630 million barrels of imported crude oil in 2024 alone.

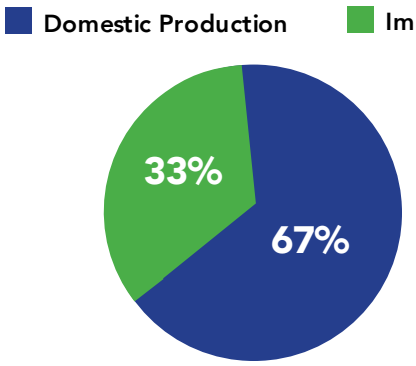
Additionally, ethanol held down fuel prices for American consumers battling inflation. Ethanol was priced at a roughly 60-cent-per-gallon discount to gasoline in 2024. For a two-month period, the discount was over a dollar per gallon. Simply put, adding more ethanol to gasoline results in a lower-cost product for drivers across the country.

Meanwhile, the United States continued to import 200 million barrels of crude oil per month, on average. Similar to 2023, imports accounted for one-third of the U.S. oil supply and for 40 percent of inputs to refineries. As a result, Americans sent another $29 billion to OPEC countries such as Saudi Arabia, Venezuela, and Libya for crude oil, and countless billions to other nations that send their oil to U.S. refiners.

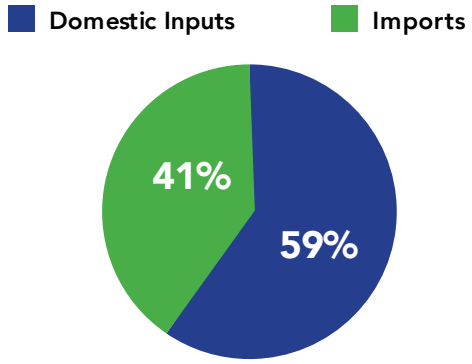
Simple steps to boost the use of ethanol, such as allowing E15 sales year-round, could do even more for energy security, consumers' budgets, and the environment. If E15 were to replace E10 as the predominant form of gasoline sold in the United States, ethanol would displace nearly 1 billion barrels of oil annually, further reducing the need for imported energy.

Voters believe America needs to strive for energy independence, according to a December 2024 survey, with 90% of voters saying it is important. And 77% of voters say that renewable fuels like ethanol are important for securing American energy independence.

SOURCES OF U.S. CRUDE OIL SUPPLY

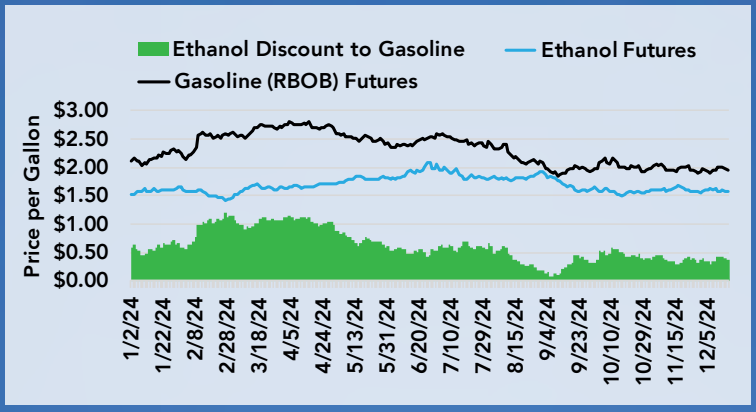


INPUTS TO U.S. REFINERIES



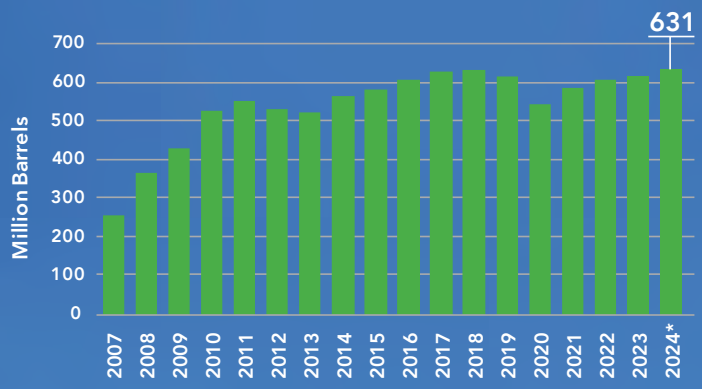
Source: RFA based on U.S. Dept. of Energy data

ETHANOL VS. GASOLINE PRICES



Source: RFA based on CME data

HISTORICAL OIL IMPORT DISPLACEMENT BY ETHANOL



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

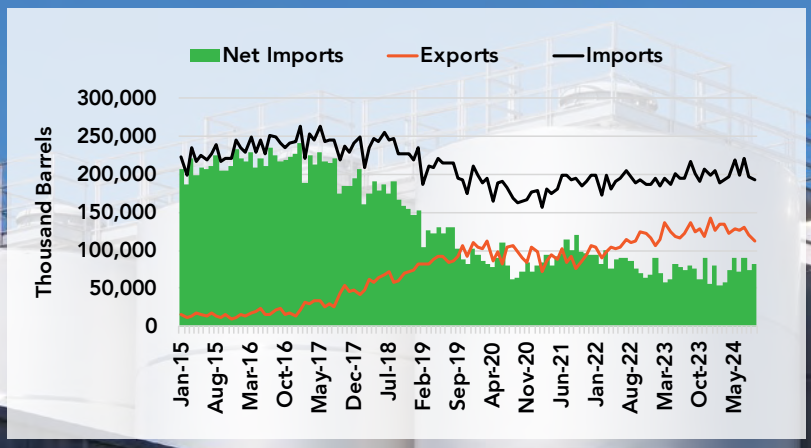
Transferring American Wealth to OPEC

Our nation still transfers billions of dollars every year to the OPEC cartel. **In 2024 alone, the U.S. spent $29 billion for OPEC oil, or $220 per American household.**

OPEC Nation	U.S. Spending on Crude Oil Imports (Billion $)
Saudi Arabia	$8.5
Iraq	$5.5
Venezuela	$5.4
Nigeria	$4.5
Angola	$1.6
Libya	$1.6
Other OPEC	$2.0
TOTAL	**$29.1**

Source: RFA based on U.S. Census Bureau data through Oct.

U.S. CRUDE OIL TRADE



Source: U.S. Dept. of Energy

Even though U.S. crude oil exports have grown, we still import nearly 2.5 billion barrels per year and remain a net importer.

THE POWER OF OCTANE

Automakers and consumers alike continue to demand higher octane fuels. Each year, auto manufacturers produce more turbocharged, higher-compression engines that need higher-octane gasoline to operate efficiently. This is the sort of marketplace dynamic that demands ethanol as a clean, affordable source of octane—a need that will only intensify as automakers contend with more stringent fuel economy requirements moving forward.

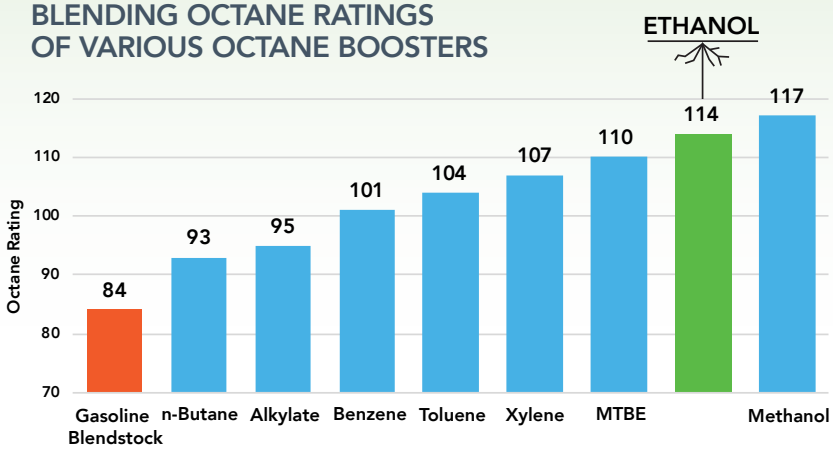
Ethanol's blending octane rating of 114 is significantly higher than the ratings of the main petroleum-based octane components. Moreover, aromatic hydrocarbons such as benzene and toluene may raise octane, but they worsen air pollution and are highly toxic—that's why the use of certain aromatics is strictly limited by U.S. EPA.

Refiners have largely optimized their processes to take advantage of ethanol's properties. Today, most regular gasoline in the United States is produced using blendstock with an octane rating of 84, which is then upgraded to a rating of 87 by adding 10 percent ethanol. In the future, refiners may continue to reduce the octane rating of the gasoline blendstock to 82 or 83 as E15 becomes more ubiquitous. This allows refiners to reduce crude oil imports and increase the throughput of hydrocarbon blendstock at a lower cost.

Demand for sources of octane is expected to continue to grow, driven by the utilization of advanced vehicle engines, tighter gasoline specifications and sulfur limits, and the expansion of E15. Rising demand and tightening supplies of octane are reflected by the growing price spread between regular gasoline (87 octane) and premium (91-94 octane).

Octane demand could be propelled further by policies that compel the use of mid-level ethanol blends such as E25 or E30 to meet future fuel economy and emissions standards. RFA continues to push for an expanded future role for high-octane, low-carbon ethanol and we continue our work with policymakers to highlight the benefits of such fuels—especially as ethanol moves toward net-zero emissions.

BLENDING OCTANE RATINGS OF VARIOUS OCTANE BOOSTERS



Source: U.S. Dept. of Energy

What is OCTANE?

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."

ETHANOL CLEARS THE AIR

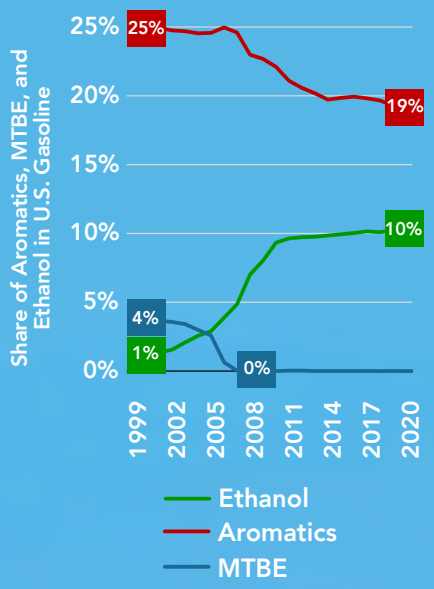
While there has been a lot of attention paid—and rightly so—to ethanol's ability to reduce greenhouse gas emissions, the renewable fuel also has an incredibly important role to play in reducing tailpipe pollution harmful to human health. Adding ethanol to gasoline reduces tailpipe emissions of the following pollutants:

- **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.

Not surprisingly, more ethanol means even less pollution. Testing of 20 vehicles by the University of California, Riverside in 2022 found that simply replacing E10 with E15 provides the following emissions benefits:

- Particulate matter reductions of **18 percent**;
- Hydrocarbon gas emissions reductions of **5 to 8 percent**;
- Carbon monoxide reductions of **17 percent**; and
- Nitrogen oxide reductions of **3 percent**.

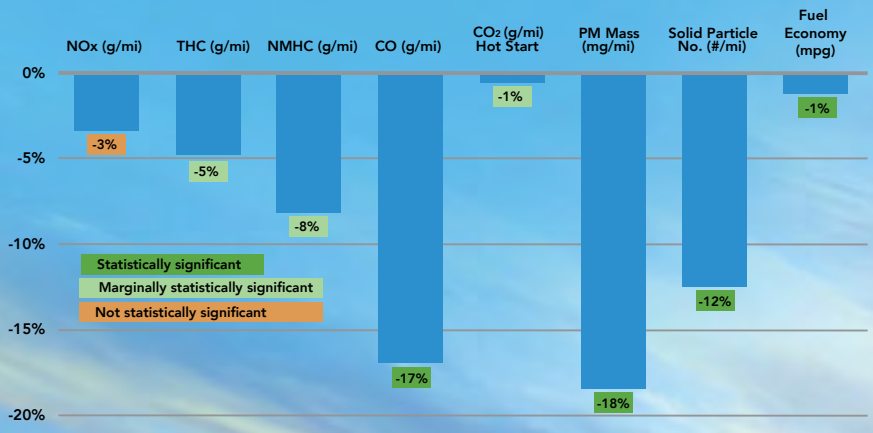
MORE ETHANOL MEANS LESS HARMFUL AROMATICS AND MTBE



Source: U.S. Environmental Protection Agency

These emissions benefits—along with ethanol's ability to replace toxic aromatic compounds in gasoline—mean ethanol blended fuels present a lower risk to human health than regular gasoline. Indeed, a study by The Hormel Institute, the University of Minnesota, and the Energy Resources Center at the University of Illinois Chicago, demonstrates that using more ethanol in our fuel can significantly reduce cancer risk by displacing the most dangerous and toxic chemicals in gasoline.

E15 VS. E10: CHANGES IN EMISSIONS AND FUEL ECONOMY



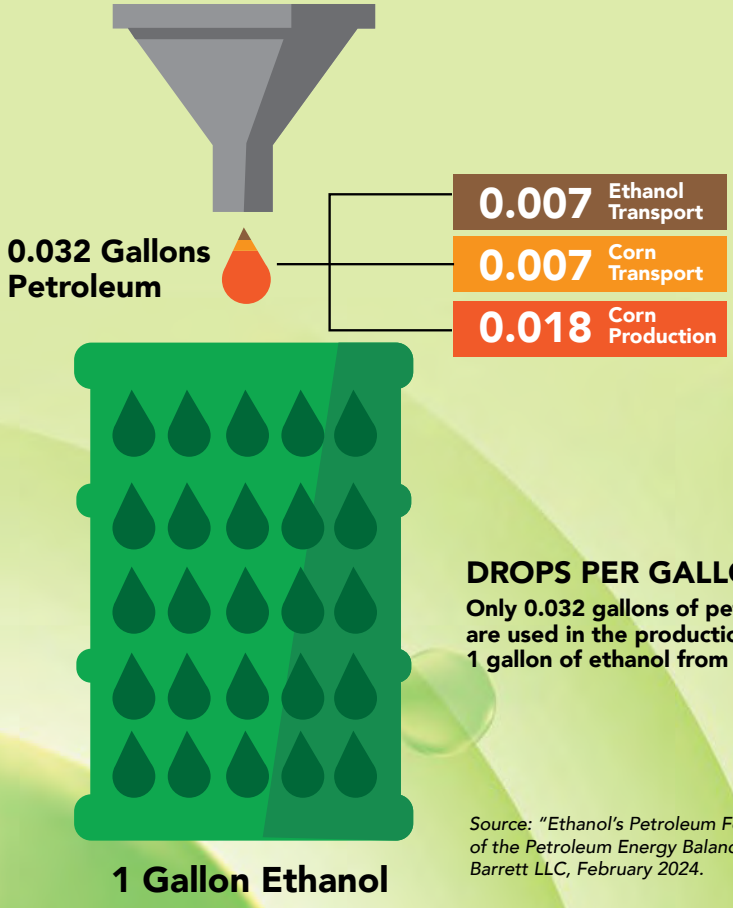
Source: University of California, Riverside CE-CERT
Notes: Statistical significance based on least square means; NOx, THC, NMHC, CO, CO_2 and PM Mass results are weighted based on cold-start, hot-start, and hot-running emissions.

ROOTED IN THE TRUTH

Since the ethanol industry's humble beginnings, the undeniable benefits of renewable fuels have been proved time and time again. Yet, opponents who want to stifle the transition to low-carbon, renewable, liquid fuels continue to repeat the same old myths—and invent new ones. Here's a look at the facts to refute some of the common falsehoods and misinformation that detractors of ethanol continue to spread.

FACT: The ethanol production process requires almost NO petroleum at all

A 2024 study conducted by Higby Barrett took a comprehensive look at how much petroleum is actually used in the entire ethanol production process—from farms to fuel tanks. According to the researchers, only "drops" of petroleum—less than 0.03 gallon, or approximately 8 tablespoons—are used in the process to make a gallon of ethanol. In fact, the only petroleum fuels used in the process are solely for corn production and the transport of both corn and ethanol, representing a tiny share of the total energy use invested in ethanol production. Indeed, the overwhelming majority of the fossil energy used in the process comes from natural gas—whether to produce fertilizers or to generate steam and heat at the biorefinery. Of course, natural gas is an abundant domestic resource with far lower carbon intensity than other fossil fuels like crude oil or coal.



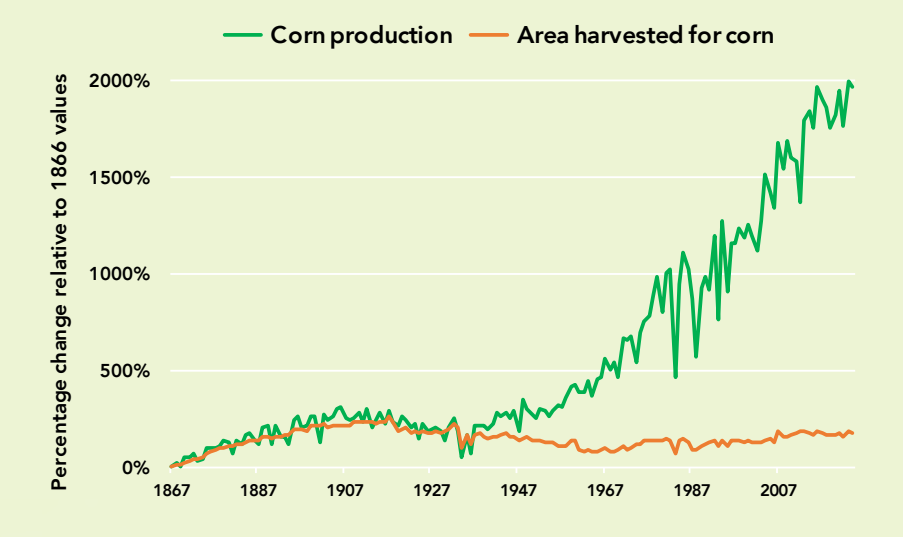
DROPS PER GALLON:
Only 0.032 gallons of petroleum are used in the production of 1 gallon of ethanol from corn.

Source: "Ethanol's Petroleum Footprint: An Analysis of the Petroleum Energy Balance for Ethanol," Higby Barrett LLC, February 2024.

FACT: Cropland has NOT expanded in response to growth in ethanol production expansion

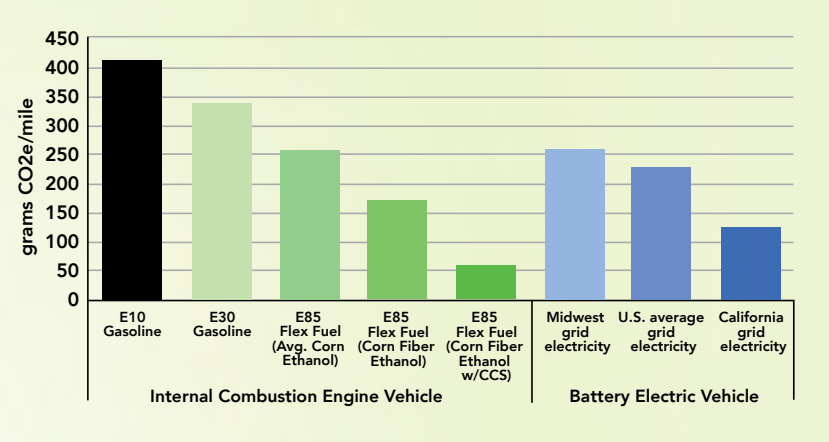
Ethanol critics have long suggested that expanded production would require a large increase in cropland to support increased cultivation of corn and other feedstocks, and that forestland and other natural habitats will be converted to crops. In reality, there has been no increase in cropland planted during the "ethanol era" because farmers are producing significantly more grain per unit of land. According to the U.S. Department of Agriculture and the U.S. Environmental Protection Agency, the amount of U.S. cropland has actually continued to shrink significantly over the past 40 years as biofuels have expanded.

CHANGE IN U.S. CORN PRODUCTION AND LAND USE



Source: RFA, based on U.S. Department of Agriculture data

FULL LIFECYCLE GHG EMISSIONS (TAILPIPE AND UPSTREAM) FOR A TYPICAL CROSSOVER SUV



Source: RFA, using Argonne National Laboratory's R&D GREET Model_2023

FACT: EVs are NOT "zero-emissions vehicles"

Many policymakers and self-proclaimed climate advocates like to say that battery electric vehicles have "zero emissions" because they don't have tailpipes. Of course, this argument blatantly ignores the upstream emissions related to electricity generation (the "fuel" for the EV), as well as the substantial emissions involved in battery mineral extraction and vehicle construction. An apples-to-apples comparison of full lifecycle greenhouse gas emissions shows that battery electric vehicles are not free of carbon emissions impacts, and that other technologies—in particular, flex fuel vehicles using low-carbon ethanol—can achieve better environmental results.

THRIVING TOGETHER

The Renewable Fuels Association offers its members a platform to engage, influence, and contribute to the advancement of renewable fuels, expanding their impact beyond individual operations through collaborative committees, forums, and networks.

RFA Environment, Health & Safety Committee: The EH&S Committee is dedicated to helping member facilities meet and exceed environmental, health, and safety standards. This committee serves as a vital platform for members to collaborate on best practices, navigate complex regulations, and develop innovative solutions. With a focus on production, handling, distribution, and incident response, RFA's EH&S Committee prioritizes protecting the environment and ensuring the safety of employees and consumers.

RFA Strategy and Innovation Forum: The renewable fuels industry is evolving rapidly, fueled by technological advancements and emerging opportunities. Launched in 2023, this seminar series explores critical topics shaping the industry, including cutting-edge technologies, production efficiencies, emerging coproducts, and novel research. RFA's Strategy and Innovation Forum empowers members to stay ahead of the curve and strategically position their organizations for sustained success in the renewable fuels sector.

RFA Technical Committee: Accurate and reliable information regarding the production, blending, distribution, and performance of renewable fuels is essential for the success of our industry. The RFA Technical Committee focuses heavily on fuel specifications and standards such as ASTM International, National Conference of Weights and Measures, ISO, Canadian General Standards Board, and other international fuel requirements.

In August, RFA staff conducted a 3-day Preventive Controls for Animal Food compliance course tailored specifically for ethanol industry personnel. The training equipped participants with the knowledge to develop and implement biorefinery-specific food safety programs. Completing the course also fulfilled FDA requirements for becoming a Preventive Controls Qualified Individual, a critical designation for ethanol plants producing animal feed.

Gatherings at important industry events like the National Ethanol Conference provide a way for young professionals to build networks, learn from others and each other, and dive more deeply into the ethanol industry as a smart career choice.

Young Professionals Network:
Launched in 2020, RFA's YPN connects the next generation of leaders committed to driving progress and innovation in the renewable fuels industry. It offers member-only events that focus on networking, leadership growth, operational improvements, and exploring fresh strategies to expand ethanol's market presence. RFA's YPN is open to professionals 39 years old and younger who are employed in the U.S. ethanol industry or related stakeholder sectors.

Veterans for Renewable Fuels:
RFA's VRF is a growing community dedicated to honoring and supporting military veterans within the U.S. ethanol industry—a sector employing veterans at three times the rate of the national workforce. Established in 2023, VRF celebrates the invaluable contributions of veterans while fostering camaraderie, professional growth, and mutual support. The group also serves as a strong voice for advocacy.

Sponsors Grow Our Programs

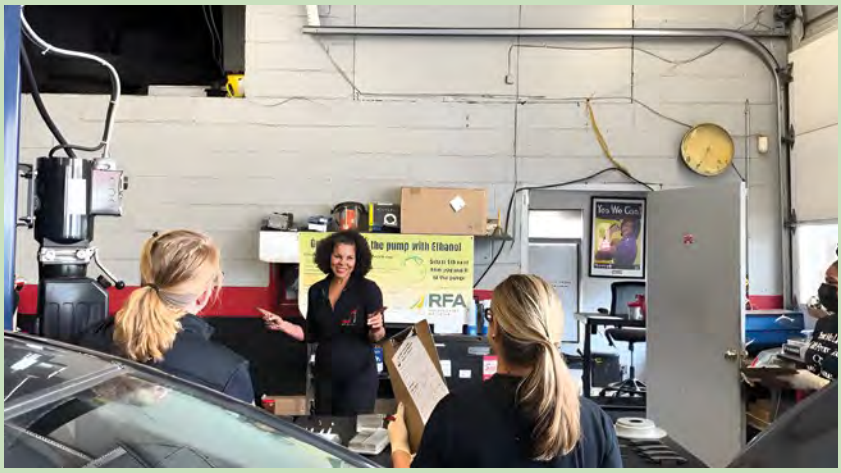
RFA appreciates the generous support from our sponsors, whose contributions drive the success of our YPN and VRF initiatives. We are proud to recognize:

- **Lallemand Biofuels & Distilled Spirits**
- **Chase Nedrow**
- **Commonwealth Agri-Energy**
- **CTE Global**
- **IFF**
- **Kansas Corn**
- **Pearson Fuels**
- **Pinion**

In April, RFA was honored with the Department of Defense Patriotic Employer award, bestowed to President and CEO Geoff Cooper, a U.S. Army veteran. This prestigious recognition highlights RFA's dedication to supporting employee participation in America's National Guard and Reserve forces. Under Cooper's leadership, RFA also launched the Veterans for Renewable Fuels initiative.

GROWING INTEREST IN ETHANOL

When it comes to expanding markets for ethanol, the Renewable Fuels Association works to identify appropriate opportunities to reach new and growing audiences that especially need to learn and see for themselves the power of ethanol.



Flex Fuel EV proving ground: In June 2024, RFA released its final report showcasing our Plug-in Hybrid Electric Flex Fuel Vehicle (PHEFFV) concept. After extensive emissions testing, lifecycle GHG analysis, and nearly 34,000 miles of real-world driving, the study confirmed that PHEFFVs offer unique advantages over fully electric vehicles. When using E85, the PHEFFV delivered:

- Reductions in lifecycle GHG emissions that rival, or outperform, the GHG reductions achievable with many battery electric vehicles
- Substantial reductions (when compared to gasoline-powered vehicles) in emissions of harmful tailpipe pollutants like nitrogen oxides (NOx), particulate matter (PM), and carbon monoxide (CO)
- Lower cost of ownership and operation (purchase price, fuel cost per mile) than a similar BEV
- No meaningful impact on fuel economy, with a mere 1.5% reduction in miles per gallon compared to the EPA-estimated rate when using E10

Empowering ethanol with the Girls Auto Clinic: RFA teamed up with Girls Auto Clinic (GAC) to expand ethanol education to women actively involved in car buying, maintenance, and repair. Founded by Patrice Banks in 2013, GAC empowers women, known as "shecanics," with the knowledge to make informed automotive decisions. Through this partnership, GAC expands our reach to highlight ethanol's benefits, including consumer cost savings, environmental advantages, and positive impacts on public health. In 2024, RFA sponsored 19 Car Care Workshops in the Northeast, including a special ethanol-focused community workshop that sold out in 30 minutes. GAC also features ethanol content in social media and the Shecanic Blog.

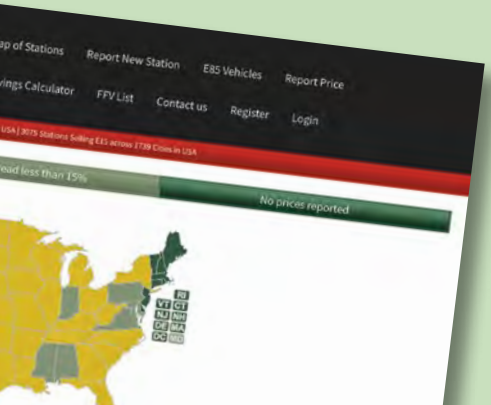
Fuel price trackers: Hosted by RFA, the websites E85Prices.com and E15Prices.com provide crowdsourced data on the prices of E85 and E15 fuels, offering users the ability to view real-time price updates across different regions. The websites also include features like a station locator, map, a price reporting tool, a savings calculator, and a list of vehicles that are compatible with E15 and E85, giving consumers instant insight into fuel prices and the potential savings of using ethanol compared to traditional gasoline.

Planting Seeds for Infrastructure Expansion

RFA's collaboration with the U.S. Department of Agriculture's Higher Blends Infrastructure Incentive Program (HBIIP) has enabled fuel retailers and distributors to secure more than $200 million in USDA grants over eight rounds of funding since 2020. RFA assisted 223 companies with writing and submitting grant applications for projects totaling $513 million, including matching funds, with a 100 percent success rate. These applications lay the groundwork for the addition of nearly 6,300 higher-blend dispensers in roughly 1,150 locations across more than 30 states.

Success in motorsports: Our partnership with Husker Motorsports continues to yield impressive results. Husker Motorsports, a student-run organization at the University of Nebraska-Lincoln, consists of 45 students ranging from freshmen to graduate level. The team designs, constructs, and races an open-wheel formula-style race car in one of the world's largest design competitions, Formula SAE. Approximately 500 teams worldwide participate in the program, with around 150 teams from North America. At this year's internal combustion FSAE competition, Husker Motorsports placed 25th overall. Notable finishes include 12th in acceleration, 17th in skidpad, and 7th in autocross. Their current world ranking is 102nd out of 641 teams. RFA will be extending its sponsorship to also include Purdue University in 2025.

Reaching new depths: RFA sponsors competitive anglers to promote the use of ethanol in boating. Dylan Faulconer, recognized for his achievements in the Midwest Crappie Chaser series, secured a fourth-place finish this season and was honored with a third-place standing in the Angler of the Year award, which highlights consistent performance over the season. Meanwhile Ryan Armstrong competed in Major League Fishing bass tournaments across the country. Armstrong participated in the Tackle Warehouse Invitationals, a series of six three-day tournaments featuring 150 anglers each that serves as a proving ground for anglers aiming to qualify for the Bass Pro Tour.



RENEWABLE FUELS ASSOCIATION

FOUNDED: 1981

MISSION: Drive growth in sustainable renewable fuels and bioproducts for a better future.

VISION: Help the world by unlocking the power of renewable fuels and bioproducts.

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View profiles: EthanolRFA.org/about/our-staff

RENEWABLE FUELS FOUNDATION

FOUNDED: 1985

MISSION: Meet the future education, research, and strategic planning needs of the U.S. ethanol industry.

FOCUS: Collaboration with academia, industry, and public policymakers on new uses, feedstocks, and technologies that will impact the future of ethanol.

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2025 U.S. ETHANOL PRODUCTION CAPACITY BY BIOREFINERY

Company	City	State	Feedstock	Production Capacity (mgy)	Capacity Under Construction/Expansion (mgy)
Absolute Energy LLC	St. Ansgar	IA	Corn, Cellulosic Fiber	128	_
Ace Ethanol LLC	Stanley	WI	Corn, Cellulosic Fiber	54	_
Adkins Energy LLC	Lena	IL	Corn	60	_
ADM	Clinton	IA	Corn	237	_
ADM	Decatur	IL	Corn	375	_
ADM	Marshall	MN	Corn	48	_
ADM (Dry Mill)	Cedar Rapids	IA	Corn	300	_
ADM (Dry Mill)	Columbus	NE	Corn, Cellulosic Fiber	313	_
ADM (Wet Mill)	Cedar Rapids	IA	Corn	240	_
ADM (Wet Mill)	Columbus	NE	Corn	100	_
Aemetis Inc.	Keyes	CA	Corn, Sorghum	70	_
Al-Corn Clean Fuel LLC	Claremont	MN	Corn, Cellulosic Fiber	140	_
Alto Ingredients Columbia Inc.	Boardman	OR	Corn	40	_
Alto Ingredients Magic Valley Inc.	Burley	ID	Corn	60	_
Alto Ingredients Pekin ICP Inc.	Pekin	IL	Corn	90	_
Alto Ingredients Pekin Inc. (Dry Mill)	Pekin	IL	Corn	60	_
Alto Ingredients Pekin Inc. (Wet Mill)	Pekin	IL	Corn	100	_
Amber Wave	Phillipsburg	KS	Wheat Byproducts	50	_
Arkalon Energy LLC	Liberal	KS	Corn, Sorghum, Cellulosic Crop Residue	115	_
Aztalan Bio LLC	Jefferson	WI	Corn	108	_
Badger State Ethanol LLC	Monroe	WI	Corn, Cellulosic Fiber	81	_
Benchmark Renewable Energy LLC	Raeford	NC	Corn	60	_
Big River Resources Boyceville LLC	Boyceville	WI	Corn	64	_
Big River Resources Galva LLC	Galva	IL	Corn	129	_
Big River Resources West Burlington LLC	West Burlington	IA	Corn	113	_
Big River United Energy LLC	Dyersville	IA	Corn	130	_
BioUrja Renewables LLC	Peoria	IL	Corn	135	_
Bonanza BioEnergy LLC	Garden City	KS	Corn, Sorghum	62	_
Bridgeport Ethanol LLC	Bridgeport	NE	Corn	54	_
Bushmills Ethanol Inc.	Atwater	MN	Corn	90	_
Calgren Renewable Fuels LLC	Pixley	CA	Corn, Sorghum, Cellulosic Fiber	55	_
Carbon Green BioEnergy LLC	Lake Odessa	MI	Corn	55	_
Cardinal Colwich LLC	Colwich	KS	Corn	70	_
Cardinal Ethanol LLC	Union City	IN	Corn	135	_
Cargill Inc.	Blair	NE	Corn	210	_
Cargill Inc.	Eddyville	IA	Corn	71	_
Cargill Inc.	Fort Dodge	IA	Corn	130	_
Chief Ethanol Fuels Inc.	Hastings	NE	Corn, Cellulosic Fiber	75	_
Chief Ethanol Fuels Inc.	Lexington	NE	Corn, Cellulosic Fiber	48	_
Chippewa Valley Ethanol Co.	Benson	MN	Corn, Cellulosic Fiber	50	_
CHS Inc.	Annawan	IL	Corn	130	_
CHS Inc.	Rochelle	IL	Corn	138	_
CIE	Marion	IN	Corn	55	_
CIE	Norfolk	NE	Corn	50	_
Commonwealth Agri-Energy LLC	Hopkinsville	KY	Corn	50	_
CORN LP	Goldfield	IA	Corn, Cellulosic Fiber	75	_
Crysalis Biosciences Inc.	Sauget	IL	Corn	55	_
Dairy Distillery Alliance LLC	Constantine	MI	Food/Beverage/CPG Waste	-	2
Dakota Ethanol LLC	Wentworth	SD	Corn, Cellulosic Fiber	100	_
DENCO II LLC	Morris	MN	Corn, Cellulosic Fiber	36	_
Diamond Ethanol LLC	Levelland	TX	Corn, Sorghum	40	_
Didion Ethanol LLC	Cambria	WI	Corn	50	_
Dynamic Recycling LLC	Bristol	TN	Food/Beverage/CPG Waste	5	_
E Energy Adams LLC	Adams	NE	Corn, Cellulosic Fiber	100	_
East Kansas Agri-Energy LLC	Garnett	KS	Corn, Cellulosic Fiber	45	_

Company	City	State	Feedstock	Production Capacity (mgy)	Capacity Under Construction/Expansion (mgy)
Elite Octane LLC	Atlantic	IA	Corn, Cellulosic Fiber	150	_
Fox River Valley Ethanol LLC	Oshkosh	WI	Corn	65	_
Front Range Energy LLC	Windsor	CO	Corn	40	_
Gevo Inc.	Luverne	MN	Corn	22	_
Glacial Lakes Energy LLC	Aberdeen	SD	Corn, Cellulosic Fiber	61	_
Glacial Lakes Energy LLC	Huron	SD	Corn	38	_
Glacial Lakes Energy LLC	Mina	SD	Corn	162	_
Glacial Lakes Energy LLC	Watertown	SD	Corn, Cellulosic Fiber	148	_
Golden Grain Energy LLC	Mason City	IA	Corn, Cellulosic Fiber	115	_
Golden Triangle Energy LLC	Craig	MO	Corn	20	_
Grain Processing Corp.	Muscatine	IA	Corn	83	_
Grain Processing Corp.	Washington	IN	Corn	37	_
Granite Falls Energy LLC	Granite Falls	MN	Corn	63	_
Green Plains Central City LLC	Central City	NE	Corn	116	_
Green Plains Fairmont LLC	Fairmont	MN	Corn	119	_
Green Plains Madison LLC	Madison	IL	Corn	90	_
Green Plains Mount Vernon LLC	Mount Vernon	IN	Corn	90	_
Green Plains Obion LLC	Rives	TN	Corn	120	_
Green Plains Otter Tail LLC	Fergus Falls	MN	Corn	55	_
Green Plains Shenandoah LLC	Shenandoah	IA	Corn	82	_
Green Plains Superior LLC	Superior	IA	Corn	60	_
Green Plains Wood River LLC	Wood River	NE	Corn	121	_
Green Plains York LLC	York	NE	Corn	50	_
GreenAmerica Biofuels Ord LLC	Ord	NE	Corn	65	_
Greenfield Global Inc.	Winnebago	MN	Corn	48	_
Guardian Energy LLC	Janesville	MN	Corn, Cellulosic Fiber	155	_
Guardian Hankinson LLC	Hankinson	ND	Corn, Cellulosic Fiber	150	_
Guardian Lima LLC	Lima	OH	Corn, Cellulosic Fiber	75	_
Harvestone Low Carbon Partners	Rensselaer	IN	Corn	60	_
Harvestone Low Carbon Partners	Spiritwood	ND	Corn	80	_
Harvestone Low Carbon Partners	Underwood	ND	Corn	73	_
Heartland Corn Products	Winthrop	MN	Corn, Cellulosic Fiber	150	_
Hereford Ethanol Partners LP	Hereford	TX	Corn, Sorghum, Cellulosic Fiber	120	_
Heron Lake BioEnergy LLC	Heron Lake	MN	Corn	68	_
Highwater Ethanol LLC	Lamberton	MN	Corn, Cellulosic Fiber	65	_
Homeland Energy Solutions LLC	Lawler	IA	Corn, Cellulosic Fiber	200	_
Husker Ag LLC	Plainview	NE	Corn, Cellulosic Fiber	110	_
ICM Biofuels LLC	St. Joseph	MO	Corn	50	_
KAAPA Ethanol LLC	Minden	NE	Corn, Cellulosic Fiber	83	_
KAAPA Ethanol Ravenna LLC	Ravenna	NE	Corn	135	_
KAAPA Partners Aurora LLC	Aurora	NE	Corn, Cellulosic Fiber	150	_
Kansas Ethanol LLC	Lyons	KS	Corn, Sorghum, Cellulosic Fiber	80	_
Lincolnland Agri-Energy LLC	Palestine	IL	Corn	60	_
Lincolnway Energy LLC	Nevada	IA	Corn, Cellulosic Fiber	90	_
Little Sioux Corn Processors LLC	Marcus	IA	Corn, Cellulosic Fiber	165	_
Louis Dreyfus Grand Junction LLC	Grand Junction	IA	Corn, Cellulosic Fiber	125	_
Marquis Energy LLC	Hennepin	IL	Corn, Cellulosic Fiber	395	_
Marysville Ethanol LLC	Marysville	MI	Corn	50	_
MGP Ingredients Inc.	Atchison	KS	Corn	3	_
Mid America Agri Products/Wheatland LLC	Madrid	NE	Corn, Cellulosic Fiber	48	_
Mid-Missouri Energy LLC	Malta Bend	MO	Corn, Cellulosic Fiber	60	_
Midwest Renewable Energy LLC	Sutherland	NE	Corn	26	_
MXI Environmental Services LLC	Abingdon	VA	Food/Beverage/CPG Waste	2	_
Nebraska Corn Processing LLC	Cambridge	NE	Corn	50	_
Nesika Energy LLC	Scandia	KS	Corn	10	_
Net-Zero Richardton LLC	Richardton	ND	Corn, Cellulosic Fiber	65	_
New Energy Blue LLC	Mason City	IA	Cellulosic Crop Residue	-	21

Company	City	State	Feedstock	Production Capacity (mgy)	Capacity Under Construction/Expansion (mgy)
NuGen Energy LLC	Marion	SD	Corn, Sorghum	150	-
One Earth Energy LLC	Gibson City	IL	Corn	150	25
Parallel Products of California	Rancho Cucamonga	CA	Food/Beverage/CPG Waste	2	_
Parallel Products of Kentucky	Louisville	KY	Food/Beverage/CPG Waste	5	_
Pelican Renewables LLC	Stockton	CA	Corn, Sorghum, Food/Beverage/CPG Waste	60	_
Pennsylvania Grain Processing LLC	Clearfield	PA	Corn	120	_
Pinal Energy LLC	Maricopa	AZ	Corn	55	_
Pine Lake Corn Processors LLC	Steamboat Rock	IA	Corn	80	_
Plymouth Energy LLC	Merrill	IA	Corn	65	_
POET Biorefining - Alexandria LLC	Alexandria	IN	Corn, Cellulosic Fiber	90	_
POET Biorefining - Arthur LLC	Arthur	IA	Corn, Cellulosic Fiber	132	_
POET Biorefining - Ashton LLC	Ashton	IA	Corn, Cellulosic Fiber	68	_
POET Biorefining - Big Stone LLC	Big Stone City	SD	Corn, Cellulosic Fiber	105	_
POET Biorefining - Bingham Lake LLC	Bingham Lake	MN	Corn, Cellulosic Fiber	35	_
POET Biorefining - Caro LLC	Caro	MI	Corn, Cellulosic Fiber	80	_
POET Biorefining - Chancellor LLC	Chancellor	SD	Corn, Cellulosic Fiber	125	_
POET Biorefining - Cloverdale LLC	Cloverdale	IN	Corn, Cellulosic Fiber	95	_
POET Biorefining - Coon Rapids LLC	Coon Rapids	IA	Corn, Cellulosic Fiber	65	_
POET Biorefining - Corning LLC	Corning	IA	Corn, Cellulosic Fiber	90	_
POET Biorefining - Emmetsburg LLC	Emmetsburg	IA	Corn, Cellulosic Fiber	68	_
POET Biorefining - Fairbank LLC	Fairbank	IA	Corn, Cellulosic Fiber	132	_
POET Biorefining - Fairmont LLC	Fairmont	NE	Corn, Cellulosic Fiber	131	_
POET Biorefining - Fostoria LLC	Fostoria	OH	Corn, Cellulosic Fiber	90	_
POET Biorefining - Glenville LLC	Albert Lea	MN	Corn, Cellulosic Fiber	48	_
POET Biorefining - Gowrie LLC	Gowrie	IA	Corn, Cellulosic Fiber	90	_
POET Biorefining - Groton LLC	Groton	SD	Corn, Cellulosic Fiber	68	_
POET Biorefining - Hanlontown LLC	Hanlontown	IA	Corn, Cellulosic Fiber	80	_
POET Biorefining - Hudson LLC	Hudson	SD	Corn, Cellulosic Fiber	80	_
POET Biorefining - Iowa Falls LLC	Iowa Falls	IA	Corn, Cellulosic Fiber	112	_
POET Biorefining - Jewell LLC	Jewell	IA	Corn, Cellulosic Fiber	90	_
POET Biorefining - Laddonia LLC	Laddonia	MO	Corn, Cellulosic Fiber	80	_
POET Biorefining - Lake Crystal LLC	Lake Crystal	MN	Corn, Cellulosic Fiber	68	_
POET Biorefining - Leipsic LLC	Leipsic	OH	Corn, Cellulosic Fiber	90	_
POET Biorefining - Macon LLC	Macon	MO	Corn, Cellulosic Fiber	55	_
POET Biorefining - Marion LLC	Marion	OH	Corn, Cellulosic Fiber	154	_
POET Biorefining - Menlo LLC	Menlo	IA	Corn, Cellulosic Fiber	132	_
POET Biorefining - Mitchell LLC	Mitchell	SD	Corn, Cellulosic Fiber	86	_
POET Biorefining - North Manchester LLC	North Manchester	IN	Corn, Cellulosic Fiber	90	_
POET Biorefining - Portland LLC	Portland	IN	Corn, Cellulosic Fiber	90	_
POET Biorefining - Preston LLC	Preston	MN	Corn, Cellulosic Fiber	55	_
POET Biorefining - Shelbyville LLC	Shelbyville	IN	Corn, Cellulosic Fiber	98	_
POET Biorefining - Shell Rock LLC	Shell Rock	IA	Corn, Cellulosic Fiber	131	_
POET Research Center Inc.	Scotland	SD	Corn, Cellulosic Fiber	12	_
Pratt Energy LLC	Pratt	KS	Corn, Sorghum, Cellulosic Fiber	55	_
Primient	Loudon	TN	Corn	110	_
PureField Ingredients LLC	Russell	KS	Corn, Sorghum, Wheat Byproducts	55	_
Quad County Corn Processors	Galva	IA	Corn, Cellulosic Fiber	37	_
Red River BioRefinery LLC	Grand Forks	ND	Food/Beverage/CPG Waste	17	_
Red River Energy LLC	Rosholt	SD	Corn	35	_
Redfield Energy LLC	Redfield	SD	Corn, Cellulosic Fiber	62	_
Reeve Agri-Energy Inc.	Garden City	KS	Corn, Sorghum	13	_
Ringneck Energy LLC	Onida	SD	Corn, Sorghum, Cellulosic Fiber	80	_
SAFFiRE Renewables LLC	Liberal	KS	Cellulosic Crop Residue	_	1
Sandhills Renewable Energy LLC	Atkinson	NE	Corn	55	_
Show Me Ethanol LLC	Carrollton	MO	Corn, Cellulosic Fiber	70	_
Siouxland Energy Cooperative	Sioux Center	IA	Corn, Cellulosic Fiber	70	_
Siouxland Ethanol LLC	Jackson	NE	Corn, Cellulosic Fiber	100	_

Company	City	State	Feedstock	Production Capacity (mgy)	Capacity Under Construction/Expansion (mgy)
Southwest Iowa Renewable Energy LLC	Council Bluffs	IA	Corn, Cellulosic Fiber	130	_
Sterling Ethanol LLC	Sterling	CO	Corn	50	_
Tharaldson Ethanol LLC	Casselton	ND	Corn	170	_
The Andersons Albion Ethanol LLC	Albion	MI	Corn, Cellulosic Fiber	140	_
The Andersons Clymers Ethanol LLC	Logansport	IN	Corn, Cellulosic Fiber	135	_
The Andersons Denison Ethanol LLC	Denison	IA	Corn, Cellulosic Fiber	65	_
The Andersons Marathon Ethanol LLC	Greenville	OH	Corn, Cellulosic Fiber	135	_
Three Rivers Energy LLC	Coshocton	OH	Corn	55	_
Trenton Agri Products LLC	Trenton	NE	Corn, Sorghum, Cellulosic Fiber	46	_
United Energy Necedah LLC	Necedah	WI	Corn	100	_
United Ethanol LLC	Milton	WI	Corn	60	_
United Wisconsin Grain Producers LLC	Friesland	WI	Corn, Cellulosic Fiber	62	_
Valero Renewable Fuels Co. LLC	Albert City	IA	Corn, Cellulosic Fiber	135	_
Valero Renewable Fuels Co. LLC	Albion	NE	Corn	135	_
Valero Renewable Fuels Co. LLC	Aurora	SD	Corn	140	_
Valero Renewable Fuels Co. LLC	Bloomingburg	OH	Corn	135	_
Valero Renewable Fuels Co. LLC	Bluffton	IN	Corn	135	_
Valero Renewable Fuels Co. LLC	Charles City	IA	Corn, Cellulosic Fiber	140	_
Valero Renewable Fuels Co. LLC	Fort Dodge	IA	Corn, Cellulosic Fiber	140	_
Valero Renewable Fuels Co. LLC	Hartley	IA	Corn, Cellulosic Fiber	140	_
Valero Renewable Fuels Co. LLC	Lakota	IA	Corn	135	_
Valero Renewable Fuels Co. LLC	Linden	IN	Corn	135	_
Valero Renewable Fuels Co. LLC	Mount Vernon	IN	Corn	110	_
Valero Renewable Fuels Co. LLC	Welcome	MN	Corn, Cellulosic Fiber	140	_
VERBIO Nevada Biorefinery	Nevada	IA	Corn, Cellulosic Crop Residue	60	_
VERBIO North America Corp.	South Bend	IN	Corn	90	_
Western New York Energy LLC	Medina	NY	Corn	63	_
Western Plains Energy LLC	Oakley	KS	Corn, Sorghum	52	_
White Energy Inc.	Hereford	TX	Corn, Sorghum	130	_
White Energy Inc.	Plainview	TX	Corn, Sorghum	130	_
Yuma Ethanol LLC	Yuma	CO	Corn	50	_
ZFS Riga LLC	Riga	MI	Corn	57	_
U.S. TOTAL				**18,268**	**49**

2025 U.S. ALCOHOL-TO-JET (ATJ) PRODUCTION CAPACITY BY BIOREFINERY

Company	City	State	Existing Production Capacity (mgy)	Proposed Production Capacity (mgy)
Crysalis Biosciences Inc.	Sauget	IL	0	30
DG Fuels	Moorhead	MN	0	193
Gevo Net-Zero 1 LLC	Lake Preston	SD	0	65
LanzaJet Freedom Pines Fuels LLC	Soperton	GA	10	0
Marquis Sustainable Aviation Fuel	Hennepin	IL	0	120
SAFFiRE Renewables LLC	Liberal	KS	0	N/A
Summit Next Gen LLC	Houston	TX	0	250
U.S. TOTAL			**10**	**658**

Source: RFA, as of December 2024

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