1a. IRFA Anti-Trust Policy/Independent Board Member Policy

IOWA RENEWABLE FUEL ASSOCIATION
ANTITRUST POLICY AND MEETING GUIDELINES

The Antitrust Law. U.S. and state antitrust laws have as their general goal the promotion of free competition. Under the antitrust laws, competitors may not restrain competition via agreements or understandings regarding the price, production or distribution of products and services. Competitors may not engage in any activity intended to restrict the competitive capabilities of their customers, suppliers, or other competitors.

The antitrust laws are complex and often of unclear applicability. Unlawful agreements can be inferred from even circumstantial evidence. A conviction for violating the antitrust laws may result in severe penalties, both on corporations and individuals. Convicted individuals are subject to fines of up to $100,000 and jail terms of as much as three years. Corporations may be punished by fines not exceeding $1 million. If the lawsuit is won by a damaged individual, actual damages are automatically trebled by the court, and the defendant must pay the plaintiff's attorneys fees. Even if the antitrust case is won or settled, the demands upon the time of those involved can be very high.

Meeting Guidelines. At IRFA meetings, the following subjects will not be discussed:

1. Current or future industry prices; either prices of the industry product; or prices of inputs. (Great care must be taken in discussing past prices).

2. What constitutes a "fair" profit level.

3. Possible increases or decreases in industry prices.

4. Standardizing or stabilizing final prices.

5. Pricing procedures.

6. Cash discounts.

7. Credit terms.

8. Control of sales.
9. Allocation of markets or customers.

10. Refusals to deal with a corporation or an individual because of its pricing or marketing practices.

11. Whether or not the pricing practices of any industry member are unethical or constitute an unfair trade practice.

General Operating Procedures. To guard against unintentional conduct, all IRFA meetings shall be conducted in accordance with the following procedures.

1. A written agenda will be prepared for each meeting, and will be reviewed by legal counsel upon request of the Executive Director.

2. Accurate minutes providing a complete summary of each meeting will be prepared. The minutes of all meetings will be reviewed by legal counsel to ensure there is no misinterpretation.

3. Upon request of the Executive Director, legal counsel will be present at meetings of the Board of Directors, or of the Executive Committee, or other meetings at which sensitive issues will be discussed.

4. All Association meetings will be properly and formally scheduled; members should never hold "rump" meetings.

5. In case of doubt concerning the propriety of any topic of discussion, members will consult IRFA legal counsel prior to raising it at an IRFA meeting.

6. Should a question arise as to the propriety of remarks or discussion at an IRFA meeting, state the question. If the discussion is not terminated or the question not satisfactorily resolved, the chair shall adjourn the meeting temporarily to request advice of legal counsel. If the issue is not resolved to the satisfaction of the concerned member, that member should leave the meeting.

Outside IRFA Meetings:

1. Members shall not attend or stay at any informal meeting where there is no agenda, no minutes are taken, and no Association staff member is present.

2. Members shall not do anything before or after Association meetings, or at social events, which would be improper at a formal Association meeting.

3. Members shall alert Association staff to any improper discussion.

4. Members shall send copies to an Association staff member of any communication or documents sent, received, or developed by the member when acting for the Association.

5. Members shall alert every employee in their company who deals with the Association about the Association’s Antitrust Compliance Policy.

6. Members should be conservative. If you feel an activity might be improper, ask for guidance from the Association staff in advance.

IRFA Antitrust Compliance Policy to be Read at all Meetings:

"IRFA and its officers, directors, and employees fully support and intend to comply with all applicable federal and state antitrust laws and shall not engage in anti-competitive conduct or practice, nor allow IRFA to be used by any member or other party for anti-competitive or unlawful purpose, including but not limited to the following kinds of prohibited conduct:

a. Any discussions or effort to directly or indirectly fix, raise, lower, control, recommend, suggest, or maintain prices on products or inputs.

b. Any contract, combination, conspiracy, discussions or effort to divide or allocate markets or customers.

c. Any discussions or effort to engage in any boycott or considered refusal to deal.

d. Any discussions or effort through unsanctioned industry standards, restrictions or any other method, to injure the business or trade of anyone.

Minutes will be kept of all meetings of the Board of Directors, the Executive Committee and Standing Committees. These minutes shall summarize accurately and concisely the action taken at the meeting."

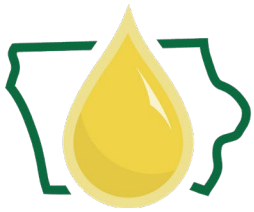
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The above Antitrust Policy and Meeting Guidelines was adopted by majority vote at a regular meeting of the Board of Directors of the Iowa Renewable Fuels Association, a quorum being present.

_____
President, Ia. Renewable Fuels Assn.

_____
Date

051130 Antitrust Policy T4224

Iowa Renewable  Fuels Association

Procedure for Determining Independent Board Members

The Iowa Renewable Fuels Association has the right to expect that all actions and decisions of its Board of Directors and Officers will be made objectively and in the best interests of the Association. Directors and executive officers must be free from undue influence of personal or outside business interests that may appear to or actually interfere with IRFA best interests.

In order to ensure that the Board of Directors and Officers are acting in the best interest of IRFA, the following procedure will be read into and included in the minutes of each board meeting.

Independent Board Member Policy

Definition of Independent Board Member
The IRS defines a voting member of the board as independent if all of the following are met at all times through the IRFA tax year;

1. The member was not compensated as an officer or other employee of the organization or a related organization
2. The member did not receive total compensation or other payments exceeding $10,000 during the IRFA tax year from either the IRFA or a related organization, other than reimbursement under an accountable plan or reasonable compensation paid for services provided in the capacity as a member of the governing body
3. Neither the member nor any family member of the member was involved in a transaction with IRFA or a related organization within the tax year.

Disclosure Requirements
If a board member cannot meet the above requirements, they must disclose to the Board of Directors and Officers the conflict present and must abstain from voting on the transaction for which a conflict of interest exists.

Conflict of Interest Statements
Each board member will be asked to sign a Conflict of Interest Policy that asks them to disclose any potential conflicts.

Updated: 11-5-08

1b. Reading of Minutes

Iowa Renewable Fuels Association
Annual Board Meeting Minutes
December 6, 2023
IRFA Office
5505 NW 88th St
Johnston, IA 50131

Draft

Meeting was called to order by IRFA President Al Giese at 8:30 a.m.

People participating:

Member Plants:	
Absolute Energy	Rick Schwarck
ADM	Chris Riley
Big River Resources	David Zimmerman
Chevron Renewable Energy Group	Paul Nees
Corn LP	Chris Boshart, Elizabeth McOllough
Elite Octane, Little Sioux Corn Processors	Nick Bowdish
Gevo, Inc.	Kent Hartwig
Golden Grain Energy	Chad Kuhlers
Green Plains Inc.	Devin Mogler
Homeland Energy	Beth Eiler
Lincolnway Energy	Bill Couser
Plymouth Energy	Eamonn Byrne
Quad County Corn Processors	Al Giese
Siouxland Energy	Bob Van Gelder
Southwest Iowa Renewable Energy	Mike Jerke
Western Iowa Energy	Brad Wilson

Associate Members	
Alliant Energy	Nick Peterson
Christianson PLLP	Jamey Cline
EcoEngineers	Mark Heckman
Fluid Quip Technologies	Scott Alan, Kolton Sellers
Growmark	Jason Stauffer
Growth Energy	Kelly Manning
H20 Innovation	Jerry Tegels
ICM, Inc.	Neil Havran
IFF	Griffin Ford, Hans Foerster
Iowa Corn Growers Association	Kevin Studer, Ryan Sauer

Pinion Global	James Jirak
Renewable Fuels Association	Robert White
Other Participants	
Heller Law Firm	Mike Heller
Iowa Renewable Fuels Association	Monte Shaw, Nathan Hohnstein, Lisa Coffelt, Emma Koehler
Valero	Craig Schoenfeld

1A. IRFA Anti-Trust Policy/Independent Board Member Policy

The Board's anti-trust policy was reviewed:

"IRFA and its officers, directors, and employees fully support and intend to comply with all applicable federal and state antitrust laws and shall not engage in anti-competitive conduct or practice, nor allow IRFA to be used by any member or other party for anti-competitive or unlawful purpose, including but not limited to the following kinds of prohibited conduct:

a. Any discussions or effort to directly or indirectly fix, raise, lower, control, recommend, suggest, or maintain prices on products or inputs.

b. Any contract, combination, conspiracy, discussions or effort to divide or allocate markets or customers.

c. Any discussions or effort to engage in any boycott or considered refusal to deal.

d. Any discussions or effort through unsanctioned industry standards, restrictions or any other method, to injure the business or trade of anyone.

Minutes will be kept of all meetings of the Board of Directors, the Executive Committee and Standing Committees. These minutes shall summarize accurately and concisely the action taken at the meeting."

The Independent Board Member Policy was reviewed:

Definition of Independent Board Member

The IRS defines a voting member of the board as independent if all of the following are met at all times through the IRFA tax year;

1. The member was not compensated as an officer or other employee of the organization or a related organization
2. The member did not receive total compensation or other payments exceeding $10,000 during the IRFA tax year from either the IRFA or a related organization, other than reimbursement under an accountable plan or reasonable compensation paid for services provided in the capacity as a member of the governing body
3. Neither the member nor any family member of the member was involved in a transaction with IRFA or a related organization within the tax year

Disclosure Requirements

If a board member cannot meet the above requirements, they must disclose to the Board of Directors and Officers the conflict present and must abstain from voting on the transaction for which a conflict of interest exists.

Conflict of Interest Statements

Each board member will be asked to sign a Conflict of Interest Policy that asks them to disclose any potential conflicts.

1B. Reading of Minutes

The minutes of the September 7 quarterly board meeting and the December 5 executive committee meeting were reviewed.

Moved by Bowdish, seconded by Schwarck, to approve the minutes. Motion carried.

1C. President's Report

Giese thanked the members, the IRFA board, and staff for the honor to serve as 2023 IRFA Board President.

1D. Treasurer's Report

Shaw gave an update on IRFA's financials and year-end projections. He also noted that Giese and Boshart reviewed IRFA's checkbook and expense reports through October.

Moved by Mogler, seconded by Couser, to approve the Treasurer's reports as presented. Motion carried.

1E. Executive Director's Report

Shaw expressed excitement for the IRFA team and progress made throughout 2023. Shaw noted the Hormel Institute's biofuels research project update and referenced the Kevin Reynolds card for all members to sign. Shaw also recognized Schoenfeld with Valero as a guest to the board meeting and thanked Giese for serving as board president.

1F. Members' Update

IRFA members reported on current activities for their respective companies.

2A. IRFA Nominating Committee

Shaw reviewed the IRFA Nominating Committee Report for board members and alternates.

Moved by Bowdish, second by Jerke to approve the Nominating Committee report for IRFA 2024 board members and alternates as recommended. Motion carried.

2B. Election of IRFA Officers and Executive Committee

Shaw reviewed the IRFA Nominating Committee report for IRFA officers and Executive Committee members and asked for any further nominations from the floor. There were none.

Moved by Hartwig, seconded by Riley, to approve the Nominating Committee report for IRFA 2024 officers and Executive Committee members as recommended. Motion carried.

2C. 2024 IRFA Board Meeting Dates

Shaw gave an overview of all proposed 2024 meeting dates. There was a consensus to change the proposed March 2024 meeting date to not conflict with the FEW Conference.

Moved by Couser, seconded by Zimmerman, to approve the meeting dates as modified. Motion carried.

2D. 2024 IRFA Member Dues

Shaw gave an overview of the Executive Committee proposal for FY2024 dues, which called for no changes.

Moved by Hartwig, seconded by Jerke, to adopt the FY24 dues as recommended. Motion carried.

2E. 2024 IRFA Budget

Shaw went over the 2024 IRFA budget as proposed by the Executive Committee and highlighted some budget categories.

Moved by Byrne, seconded by Nees, to adopt the proposed 2024 IRFA budget as recommended. Motion carried.

2F. IRFA Member PACs

Hohnstein expressed gratitude for the support of IRFA biofuel champions, as honored at the IRFA board dinner the previous evening. Hohnstein mentioned the upcoming FEC and Iowa Ethics training for members on December 12 along with pushing for additional PAC mailers after the New Year. Discussion followed about potential candidates running in primary races.

2G. IRFA Renewable Fuels Summit

Coffelt gave an update on the sponsors and trade show participants. She gave a brief overview of upcoming speakers and panels.

2H. 2024 Biofuels: Science and Sustainability Tour

Shaw presented the board with a save the date flyer and briefly discussed the 2024 route, likely from Des Moines to Sioux Falls, ending in South Dakota. Potential stops could be Western Iowa Energy and Little Sioux Corn Processors.

2I. 2024 Members' Day

Hohnstein presented the board with the save the date for the 2024 Members' Day. Discussion followed on interest in changing the venue location away from Lake Panorama.

There was a consensus for staying at Lake Panorama for 2024 Members' Day.

2J. Iowa Monarch Conservation Consortium

Koehler mentioned the September 2023 migration and invited any plants who have not already participated, to think about adding a Monarch Fueling Station. Hohnstein reminded the board of the potential issues if monarch butterflies are listed as an endangered species by the U.S. Fish and Wildlife Service.

2K. Communications Update

Koehler noted congrats letters, press releases and social media content since the last board meeting. She also mentioned the next quarterly update, inviting board members to take physical copies back to respective plants.

2I. Biofuels Vision 2024

Hohnstein noted Biofuels Vision Executive Director, Logan Shine, will be needing IRFA member support in attending events so volunteers can ask vital questions to candidates. Hohnstein further highlighted the updated candidate matrix and their positions of biofuels issues. Discussion followed.

3Ai. State Legislative Issues – IRFA Priorities

Hohnstein discussed the top priorities for the 2024 legislative session, including equitable treatment of pipeline projects, RFIP funding, protecting the E15 Access Standard and Biofuel Retailer Tax Credits. Hohnstein and Shaw gave background on the Iowa Corn checkoff situation and E85 Future Proofing Infrastructure. Discussion continued.

There was a consensus for maintaining IRFA's current position on checkoff issues until such a time as new bills are introduced.

3Bi. Federal Issues – RFS2

Shaw noted OPIS article on D4/D6 RINS, Fifth Circuit Court's remanding to EPA's rejection of small refinery exemption requests, and global study on used cooking oil. He also highlighted Sen. Grassley, Growth Energy, and RFA's press releases about the Adopt GREET Act.

There was a consensus to support Rep. Miller-Meeks marine RINs legislation.

3Bii. Federal Issues – E15

Shaw noted progress with Attorney General Brenna Bird's lawsuit against the EPA for its inability to act on year-round E15. Shaw noted API's request for federal legislation of a permanent national solution.

3Biii. Federal Issues – Low Carbon/Higher Blends/FFVs

Shaw mentioned his participation in the North American SAF conference. He noted the ongoing DIS study on the potential benefit from carbon capture, mentioning funding partners and the study to include specific breakout numbers for Iowa, Illinois and South Dakota. Shaw noted the circulated SAF flyer, showing the new market of SAF would transform the industry. Shaw also highlighted Miller-Meeks' Flex Fuel Fairness Act of 2023, mentioning New Jersey's mandate for EVs by 2035. He noted comments submitted by RFA, NCGA, and NFU in response to the Corporate Average Fuel Economy Standards.

3Biv. Federal Issues – Tax Credits

Shaw expressed the necessity for a long term SAF tax credit and referenced the letter from industry leaders to Secretary Yellen expressing support for GREET model.

3Bv. Federal Issues – USDA/DOE

Coffelt gave a brief update on USDA HBIIP. Shaw made note of the federally funded 7 hydrogen hubs, NREL article, SAF Farm to Fly Act and Bipartisan Agricultural Biorefinery Innovation and Opportunity Act.

3C. State Trade Associations Meeting

Hohnstein gave a brief background on the September trade meeting and highlighted the next meeting prior to the Iowa Renewable Fuel Summit. Discussion followed.

3D. International Trade

Shaw made remarks over the recent U.S. Grains Council Global Ethanol Summit. He added Grains Councils response to USDA RAPP announcement. He expanded upon global export markets such as Brazil, Philippines and Canada while also mentioning discussion with the Ethanol A-Team from a quarterly update call.

3E. ASTM/NCWM Updates

Hohnstein gave an update on CWMA Interim Meeting, with more updates from IRFA contractor, Chuck Corr, to come as ASTM meetings are convening this week.

4A. Ethanol Promotion Committee

Coffelt gave a brief overview of Drive Clean social media. She noted that IRFA is considering transitioning away from Bing Bang and will be working together with ICGA on how to develop content and postings for 2024. She briefly reviewed results from Hummingbird support of the campaign and noted the Drive Clean website will be further

developed in 2024. Coffelt also announced upcoming 2024 partnership opportunities with 4H.

4B. Biodiesel Promotion Committee

Coffelt gave a brief update on the On Farm Biodiesel Credit Program, including a geofencing campaign with testimonials from credit recipients. Coffelt mentioned the Humboldt School system pilot study, presenting at the 2024 IPTA conference, and potential additional school systems interested in participating in the study. Coffelt also mentioned available funds for Clean Fuels Conference Sponsorships to people within the industry that would like to learn more about biodiesel.

4C. Membership Committee

Coffelt announced new member Continuum Ag and noted that the Wage and Benefits Survey will be conducted with Christianson & Associates again. She referenced the membership rosters in the board book.

4D. IRFA PAC Committee

Hohnstein highlighted final tallies from IRFA's Members' Day and individually recognized Pine Lake Corn Processors for their significant contribution to the IRFA PAC. The current balance is a record high. Discussion followed. Shaw thanked those who donated and bid on items on Members' Day.

4E. Co-Products Committee

Coffelt noted the Anaerobic Digestion on the Farm Conference and the increase in interest for digesters on dairy farms.

4F. Safety / Environmental Compliance Task Force

Hohnstein discussed the last meeting on November 1 and mentioned the upcoming meeting on January 24, encouraging EHS managers to attend.

5Ai. DNR - Iowa Comprehensive Petroleum Underground Storage Tank Fund Board

Coffelt gave a brief update on the Fund board and potential to be eliminated in 2024.

5Bi. IDALS – Renewable Fuels Infrastructure Program

Coffelt gave a brief overview of submitted applications for FY24. She noted the lack of applications is related to HBIIP applications and future proofing legislation with retailers. Discussion followed.

5Bii. E15 Access Standard Implementation

Hohnstein gave brief background and status update on waiver requests. Discussion followed.

5Ci. Department of Revenue – IA Biodiesel Production Tax Credit

Shaw reviewed the updated production and credit numbers for the quarter.

5Di. CO2 Projects

Hohnstein explained IUB wrapped up hearings over the Summit project. He mentioned IRFA is optimistic thus far. Shaw added the process was fair to both sides. Shaw also gave an update on North and South Dakota in terms of the Summit project. Discussion followed. Shaw shared recent landowner ads IRFA has placed in newspapers across Iowa.

5Dii. Alliant Energy Rate Case

Shaw explained, historically, IRFA has not gotten involved in rate cases. He encouraged members with concerns to first talk with Alliant. If plants want to become involved, they can be directed to groups with expertise in opposing rate increases. Nick Peterson, with Alliant, explained why Alliant asked for the rate increase. Discussion followed.

5E. USDA NRCS State Technical Committee

Heckman had no report, as next meeting was the following day.

5F. ISU Iowa Grain Quality Initiative Advisory Committee

Giese noted a representative from the committee will be at the IRFA board meeting in March. He added the new ISU project is a great facility.

Moved by Couser, seconded by Zimmerman, to adjourn the meeting. Motion carried.

The board meeting adjourned at 1:33 p.m.

_____ _____

IRFA Secretary **Date**

1c. President’s Report – Brad Wilson

1d. Treasurer’s Report – Nick Bowdish

Iowa Renewable Fuels Association
Statement of Revenue and Expense
for the period ending December 31, 2023

	Budget		Actual	
REVENUE				
Members	$ 1,155,600.00		$ 1,156,100.00	
Associate Members	$ 122,400.00		$ 120,125.00	
Interest Income			$ 39,491.77	
PAC			$ 54,195.50	
Summit	$ 120,000.00		$ 121,365.00	
Members Day	$ 20,750.00		$ 24,450.00	
Tour	$ 65,000.00		$ 77,000.00	
Other - Misc.	$ 15,000.00		$ 197,441.87	
TOTAL REVENUE		**$ 1,498,750.00**		**$ 1,790,169.14**
EXPENDITURES				
Auto Maintenance	$ 2,500.00		$ 777.92	
Insurance	$ 5,000.00		$ 4,894.00	
Gain on Sale of Asset			$ -	
Professional Fees	$ 20,000.00		$ 18,815.04	
Supplies	$ 5,000.00		$ 4,801.59	
Salaries & Benefits	$ 605,000.00		$ 585,731.56	
Federal & State Taxes	$ 1,500.00		$ -	
Services Contract	$ 69,500.00		$ 69,500.00	
Telephone	$ 3,000.00		$ 4,462.43	
Computer	$ 1,000.00		$ -	
Depreciation Expense - Auto			$ -	
TOTAL ADMIN EXPENSES		**$ 712,500.00**		**$ 688,982.54**
Meeting Expense	$ 7,500.00		$ 7,549.39	
**Members Day	$ 20,750.00		$ 21,486.64	
Member Relations	$ 20,000.00		$ 33,175.52	
Web/Press	$ 10,000.00		$ 6,580.39	
Staff Travel	$ 50,000.00		$ 62,476.13	
IRFA Memberships	$ 5,000.00		$ 3,580.00	
Research & Development	$ 106,000.00		$ 142,337.15	
Lobbying	$ 140,000.00		$ 115,175.19	
Promo	$ 190,000.00		$ 187,946.34	
**Summit	$ 85,000.00		$ 90,502.56	
**Ethanol	$ 125,000.00		$ 89,902.54	
**BioD	$ 45,000.00		$ 72,338.43	
**Tour	$ 70,000.00		$ 62,182.57	
**Retailer Outreach	$ 56,000.00		$ 46,528.70	
PAC-administration	$ 3,000.00		$ 1,337.47	
IRFA PAC			$ 14,300.00	
TOTAL INTERNAL PROGRAMS		**$ 933,250.00**		**$ 957,399.02**
TOTAL EXPENDITURES		**$ 1,645,750.00**		**$ 1,646,381.56**
PROJECTED INCOME		**$ 1,498,750.00**		**$ 1,790,169.14**
SURPLUS/(DEFICIT)		**$ (147,000.00)**		**$ 143,787.58**
Roll-forward surplus		**$ 248,000.00**		
Bottom Line		**$ 101,000.00**		

CASH IN BANK	$ 708,432.40	
RESERVE ACCOUNT	$ 559,067.48	
RESTRICTED ASSETS-IRFA PAC	$ 149,442.25	
PREPAID EXPENSE	$ 17,238.93	
ACCOUNTS RECEIVABLE	$ 43,416.64	
TOTAL CURRENT ASSETS		$ 1,477,597.70
FIXED ASSETS		
COMPUTER	$0.00	
AUTO	$54,587.85	
ACCUMULATED DEPRECIATION - COMPUTER	$0.00	
ACCUMULATED DEPRECIATION - AUTO	($54,587.85)	
TOTAL FIXED ASSETS		$0.00
TOTAL ASSETS		$ 1,477,597.70
CURRENT LIABILITIES		
ACCOUNTS PAYABLE	$ 324,721.03	
ACCRUED INTEREST PAYABLE	$ -	
DEFERRED REVENUE	$ 126,525.00	
TOTAL CURRENT LIABILITIES		$ 451,246.03
NET ASSETS		
NET ASSETS - BEGINNING BALANCE	$ 882,564.09	
RESTRICTED ASSETS-LEG ED FUND	$ -	
NET INCOME - YEAR TO DATE	$ 143,787.58	
TOTAL NET ASSETS		$ 1,026,351.67
TOTAL LIABILITIES AND NET ASSETS		$ 1,477,597.70

Iowa Renewable Fuels Association
Statement of Revenue and Expense
for the period ending February 29, 2024

	Budget		Actual	
REVENUE				
Members	$ 1,252,100.00		$ 287,800.00	
Associate Members	$ 120,000.00		$ 77,400.00	
Interest Income	$ 12,000.00		$ 3,302.39	
PAC			$ -	
Summit	$ 105,000.00		$ 136,750.00	
Members Day	$ 24,000.00		$ -	
Tour	$ 70,000.00		$ -	
Other - Misc.	$ 35,000.00		$ -	
TOTAL REVENUE		**$ 1,618,100.00**		**$ 505,252.39**
EXPENDITURES				
Auto Maintenance	$ 2,500.00		$ -	
Insurance	$ 5,000.00		$ 2,364.00	
Gain on Sale of Asset			$ -	
Professional Fees	$ 20,000.00		$ 580.54	
Supplies	$ 5,000.00		$ 38.54	
Salaries & Benefits	$ 615,000.00		$ -	
Federal & State Taxes	$ 8,000.00		$ -	
Services Contract	$ 71,238.00		$ -	
Telephone	$ 3,000.00		$ -	
Computer	$ 1,000.00		$ -	
Depreciation Expense - Auto			$ -	
TOTAL ADMIN EXPENSES		**$ 730,738.00**		**$ 2,983.08**
Meeting Expense	$ 7,500.00		$ 187.15	
**Members Day	$ 22,000.00		$ -	
Member Relations	$ 30,000.00		$ 2,325.95	
Web/Press	$ 10,000.00		$ 396.69	
Staff Travel	$ 60,000.00		$ 6,161.89	
IRFA Memberships	$ 5,000.00		$ 3,600.00	
Research & Development	$ 97,500.00		$ 14,470.60	
Lobbying	$ 145,000.00		$ 26,796.42	
Promo	$ 195,000.00		$ 13,484.81	
**Summit	$ 75,000.00		$ 74,349.40	
**Ethanol	$ 125,000.00		$ 24,066.00	
**BioD	$ 48,000.00		$ 844.15	
**Tour	$ 70,000.00		$ -	
**Retailer Outreach	$ 57,000.00		$ -	
PAC-administration	$ 3,000.00		$ -	
IRFA PAC			$ 2,000.00	
TOTAL INTERNAL PROGRAMS		**$ 950,000.00**		**$ 168,683.06**
TOTAL EXPENDITURES		**$ 1,680,738.00**		**$ 171,666.14**
PROJECTED INCOME		**$ 1,618,100.00**		**$ 505,252.39**
SURPLUS/(DEFICIT)		**$ (62,638.00)**		**$ 333,586.25**
Roll-forward surplus		**$ 260,000.00**		
Bottom Line		**$ 197,362.00**		

CASH IN BANK	$ 644,476.20		
RESERVE ACCOUNT	$ 559,519.44		
RESTRICTED ASSETS-IRFA PAC	$ 147,442.25		
PREPAID EXPENSE	$ 3,500.00		
ACCOUNTS RECEIVABLE	$ 5,000.00		
TOTAL CURRENT ASSETS		$	1,359,937.89
FIXED ASSETS			
COMPUTER	$0.00		
AUTO	$54,587.85		
ACCUMULATED DEPRECIATION - COMPUTER	$0.00		
ACCUMULATED DEPRECIATION - AUTO	($54,587.85)		
TOTAL FIXED ASSETS			$0.00
TOTAL ASSETS		$	1,359,937.89
CURRENT LIABILITIES			
ACCOUNTS PAYABLE	$ -		
ACCRUED INTEREST PAYABLE	$ -		
DEFERRED REVENUE	$ -		
TOTAL CURRENT LIABILITIES		$	-
NET ASSETS			
NET ASSETS - BEGINNING BALANCE	$ 1,026,351.64		
RESTRICTED ASSETS-LEG ED FUND	$ -		
NET INCOME - YEAR TO DATE	$ 333,586.25		
TOTAL NET ASSETS		$	1,359,937.89
TOTAL LIABILITIES AND NET ASSETS		$	1,359,937.89

1e. Executive Director’s Report – Monte Shaw

Iowa Renewable Fuels Association

PRESS RELEASE

FOR IMMEDIATE RELEASE
February 5, 2024

Press Contact: Emma Koehler
515-322-0435

IRFA Statement on Bill Northey

JOHNSTON, IA – Today the entire agriculture community was deeply saddened to learn of the passing of former Iowa Secretary of Agriculture Bill Northey. Iowa Renewable Fuels Association Executive Director Monte Shaw made the following statement:

"As a farmer, president of both National and Iowa Corn Growers, Iowa Secretary of Agriculture, USDA Undersecretary, and Agribusiness Association of Iowa CEO, Bill has always been a thoughtful but forceful leader for farmers and rural America. He was an incredible friend to ethanol and biodiesel producers because he saw the big picture. This wasn't just about turning a profit – this was about preserving a way of rural life.

"Others can talk more about that. My favorite meetings with Bill and Cindy weren't at his official office, but rather at church. Bill was just a great human being. The few times I met his kids you just knew instantly that they had great parents. My heart goes out to Cindy and the entire family. I hope they can take some small measure of solace from knowing that Bill left an impact, not just on farm policy and practices, but on the hearts of all who were lucky enough to know him."

The Iowa Renewable Fuels Association represents the state's liquid renewable fuels industry and works to foster its growth. Iowa is the nation's leader in renewable fuels production with 42 ethanol refineries capable of producing 4.7 billion gallons annually – including 34 million gallons of annual cellulosic ethanol production capacity – and 10 biodiesel facilities with the capacity to produce 416 million gallons annually. For more information, visit the Iowa Renewable Fuels Association website at: www.IowaRFA.org.

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Iowa Renewable Fuels Association

March 14, 2024

Mr. Craig Schoenfeld
Valero Energy
510 East Locust St, Suite 106
Des Moines, IA 50309

Dear Mr. Schoenfeld:

Thank you for your interest in the Iowa Renewable Fuels Association (IRFA). We appreciate you taking time out of your schedule to attend our holiday reception and December board meeting. Your participation contributed to good discussions and allowed several IRFA members to get to know you and Valero better.

As such, the Iowa Renewable Fuels Association Executive Committee would like to invite Valero Energy to become a producer member and board member of IRFA.

Board members are comprised of Iowa's ethanol, biodiesel, and renewable natural gas producers. We work collectively on issues that spur the growth in the production and use of biofuels. Priorities are set by the board. Current priorities include fair treatment for CO2 pipeline projects and retailer infrastructure grants at the state level, while at the federal level we work to push back on electric vehicle mandates, for proper accounting for carbon incentives, to extend biofuel tax credits, to maximize exports and more.

While our members never agree on 100 percent of all issues, there is much common ground where we can work together to create more opportunities for all. We believe IRFA's approach in this way would dovetail with Valero's renewable fuel goals.

We stand ready to answer any questions about IRFA that you and your colleagues might have. If Valero chooses to apply, we can provide the necessary form. According to IRFA bylaws, there would then be a vote of the board to ratify the membership. For reference, our next board meeting is March 20, and the following quarterly meeting will be on June 13.

The IRFA exemplifies the synergy within Iowa's biofuels community and serves as the recognized spokesperson for ethanol and biodiesel refineries. We hope you will decide to join the IRFA to help enhance our effectiveness in legislative, regulatory, marketing, and promotional initiatives. Feel free to contact Monte Shaw, IRFA Executive Director, at 515-252-6249 with any questions or for more information.

Sincerely,

Brad Wilson
Western Iowa Energy
President

Chris Boshart
Corn, LP
Vice President

Nick Bowdish
Elite Octane
Treasurer

Telly Papasimakis
Homeland Energy Solutions
Secretary

Al Giese
Quad County Corn Processors
Past President

Paul Nees
Chevron Renewable Energy Group
At-Large

Rick Schwarck
Absolute Energy
At-Large

1f. Members’ Update

IOWA CORN™

I-LEAD

What is I-LEAD?

The Iowa Corn Leadership Enhancement and Development (I-LEAD) Program is a resource for talented people who want to contribute to a better future for Iowa's communities and the long-term profitability of agriculture in Iowa. The program focuses on developing strong leaders for Iowa agriculture.

I-LEAD Class 11 Mission

As I-LEAD Class 11, we have determined as a class that we would like to build our understanding of new and emerging export markets and how we can better align ourselves to meet their demand, solidify our relationships, and build our knowledge of their cultures. Our goal is to travel internationally to location(s) yet to be determined and get hands-on experience with Iowa's agricultural products and how they impact the lives of our international neighbors. We plan to leverage relationships with our government officials, the US Grains Council's overseas offices, and key organizations tied to Iowa's agricultural exports to help us fulfill that goal. We ask for your continued financial support as we embark on this mission that will help foster new relationships, reaffirm existing relationships, and teach us what being a leader on the international stage looks like.









IOWA CORN™

I-LEAD

I-LEAD Sponsor Information

Thank you for your generous support of I-LEAD. Your contribution will foster stronger leadership for agriculture and rural Iowa. More than 80 groups and companies backed the last mission, supporting the I-LEAD program at variety of levels. Sponsorship levels will be indicated in our many sponsor recognition materials.

Platinum	$7,500 or more
Gold	$5,000 to $7,499
Silver	$2,500 to $4,999
Bronze	$1000 to $2,499
Partner	$50 to $999

Sponsorship Level	Platinum $7,500+
Benefits	All the benefits of the levels below, plus: • Company logo recognition as a Platinum sponsor at I-LEAD Class 10 graduation banquet • Opportunity for company representative to speak at an I-LEAD class session.

Sponsorship Level	Gold $5,000 to $7,499
Benefits	All the benefits of the levels below, plus: • Company logo recognition as a Gold sponsor at I-LEAD Class 10 graduation banquet • Opportunity for I-LEAD team to provide a recap of their mission to company representatives once completed.

Sponsorship Level	Silver $2,500 to $4,999
Benefits	All the benefits of the levels below, plus: • Access to mission report compiled by I-LEAD members.

Sponsorship Level	Bronze $1000 to $2,499
Benefits	All the benefits of the level below, plus: • Company name recognition in Iowa Corn communication material, including: ○ Roots, Roots: ICPB Special Edition **(40,000 distribution each)** ○ Iowa Corn Insider (weekly newsletter) **(7,500 distribution)** ○ Iowa Corn Press Releases

Sponsorship Level	Partner $50 to $999
Benefits	• Company name listing on donors list submitted to Iowa Corn Growers Association and Iowa Corn Promotion Board for review during meetings. • Company thanked at the I-LEAD Graduation Banquet

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I-LEAD

Make checks payable to: **Iowa Corn Growers Association**.

In the memo: "I-LEAD Mission Sponsorship."

Checks can be mailed to:
Iowa Corn Growers Association
5505 NW 88th St.
Johnston, IA 50131

We want to sponsor the I-LEAD Class 11 Mission!

Enclosed is our check for: _____

Please invoice us for: _____

Company: _____

Contact Person: _____

Address: _____

Phone: _____

Email: _____

Contributions should be by check to the ICGA with a notation that they are for the I-LEAD mission. They are **not** tax-deductible as a charitable contribution. For questions or further details, contact Darin Proffit: darin.proffit@gmail.com or (712-249-6400) or Brian Jones: bjones@iowacorn.org.

2a. 2024 Board Meeting Dates

Iowa Renewable Fuels Association

2024 IRFA Meeting/Event Dates

Approved

Iowa Renewable Fuels Summit
Thursday, January 11
Prairie Meadows Convention Center

Day on the Hill and Quarterly Board Meeting
Wednesday, March 20
IRFA Board Room

Quarterly Board Meeting
Thursday, June 13
IRFA Board Room

15th Iowa Biofuels: Science and Sustainability Tour
August 12-15

Annual Members Day Event and Quarterly Board Meeting
Wednesday/Thursday, September 4-5
Lake Panorama National Golf Resort & Conference Center

Holiday Reception and Annual Meeting
Tuesday evening/Wednesday, December 10-11
IRFA Board Room

2b. IRFA Member PACs

IRFA Member PAC Status Update

	Plant PAC	Cash on Hand (7/1/2023)	YTD Receipts (2023)	YTD Contributions (2023)	Cash on Hand (1/1/2024)
1	Absolute Energy PAC	$115,862	$60,958	$22,250	$139,896
2	Corn LP PAC	$0	$14,350	$4,450	$9,900
3	Golden Grain Energy LLC Political Action Committee (Combined)	$33,327	$15,330	$13,750	$25,577
4	Lincolnway Energy, LLC PAC	$13,624	$6,425	$1,425	$13,024
5	LSCP (Little Sioux Corn Processors) PAC	$3,886	$0	$3,000	$886
6	Quad County Corn Processors Cooperative PAC	$764	$600	$750	$914
7	Siouxland Energy & Livestock Cooperative PAC	$5,319	$1,100	$5,474	$9,693
8	Southwest Iowa Renewable Energy PAC	$6,861	$5,575	$1,906	$5,381
9	Western Dubuque Biodiesel, PAC	$70,078	$73	$6,400	$66,938
10	Western Iowa Energy LLC PAC	$10,639	$5,650	$6,636	$14,125
	Plant Total	**$260,360**	**$110,061**	**$66,041**	**$286,334**
11	Iowa Renewable Fuels Association PAC	$103,047	$54,196	$10,300	$147,448
	Industry Total	**$363,407**	**$164,257**	**$76,341**	**$433,782**

2c. 2024 IRFA Renewable Fuels Summit

Iowa Renewable Fuels Association

2024 Iowa Renewable Fuels Summit
January 11, 2024
Prairie Meadows Event Center, Altoona, IA

To ask questions during the Summit, scan here.

7:30 am	Registration & Trade Show Open
8:15 am	**General Session** Welcome – Brad Wilson, President, Iowa Renewable Fuels Association Monte Shaw, Executive Director, Iowa Renewable Fuels Association
8:30 pm	Iowa Governor Kim Reynolds
8:45 am	Presidential Candidate Ron DeSantis
9:00 am	Industry Keynote – Emily Skor, CEO, Growth Energy
9:30 am	Presidential Candidate Nikki Haley
9:40 am	**How Do Middle East Conflicts Impact Regional Stability and U.S. Security?** Max Abrahms, Professor of Terrorism, Northeastern University
10:15 am	Special Guest: USDA Secretary Tom Vilsack
11:00 am	**Panel: Gaining Altitude with Sustainable Aviation Fuel** Moderator: Kent Hartwig, Director of State Government Affairs, Gevo, Inc. Jeff Davidman, Vice President of Government Affairs, Delta Air Lines Mike McCurdy, Managing Director – Energy Advisory, ICF Corey Lavinsky, Executive Director – Downstream Americas Consulting, S&P Global
Noon	**The Economic Opportunity of Sustainable Aviation Fuel for the Midwest** David Miller, Chief Economist, Decision Innovation Solutions
12:15 pm	Lunch Break
1:30 pm	Presidential Candidate Asa Hutchinson
1:40 pm	**Panel: The Brazilian Wave** Moderator: Isabelle Ausdal, Global Ethanol Policy and Economics Manager, U.S. Grains Council Greg Hibner, Vice President of Business Development, J.D. Heiskell & Company Hagan Rose, Director of Sales and Marketing – International, EcoEnergy Paul Smolen, Principal, AgriNetwork
2:40 pm	**Panel: Soybeans: Crushing It** Moderator: Alan Weber, Founding Partner, MARC-IV Ryan Ruikka, Biofuels Energy Analyst, The ProExporter Network Kevin Clausen, Principal, John Stewart & Associates Inc. Erik Lightner, CEO, Platinum Crush LLC Scott Tilton, Food Animal Nutritionist and Technical Sales Advisor, The Andersons, Inc.
3:45 pm	Summit & Trade Show Conclude

Iowa Renewable Fuels Association

PRESS RELEASE

FOR IMMEDIATE RELEASE
January 11, 2024

Press Contact: Emma Koehler
515-322-0435

USDA Secretary Tom Vilsack Honored for Many Years of Support at Iowa Renewable Fuels Summit

Vilsack Received IRFA's Highest Award – "Lifetime Champion of Renewable Fuels"

JOHNSTON, IOWA – Today the Iowa Renewable Fuels Association honored Secretary of Agriculture Tom Vilsack with the "Lifetime Champion of Renewable Fuels" award at the 2024 Iowa Renewable Fuels Summit in Altoona, Iowa.

"Sec. Vilsack has been an outstanding and unrelenting champion of renewable fuels throughout his career as a state legislator, governor and now USDA secretary," said Iowa Renewable Fuels Association Executive Director Monte Shaw. "As a lawyer, he dealt first-hand with families losing the farm during the 1980s Farm Crisis. Knowing that new markets were needed, he was a champion for biofuels as both state legislator and governor. Now, Sec. Vilsack continues to push for innovative new opportunities for farmers across the country, including sustainable aviation fuel. Looking at Sec. Vilsack's entire career, it is clear he understands not just the economic value of biofuels, but the intrinsic values of hope and confidence in the future they provide for rural America."

Vilsack received the Lifetime Champion of Renewable Fuels award for his many years of supporting and advocating for biofuels throughout his distinguished career. This is only the second time this prestigious honor has been awarded. The first recipient, Gov. Terry Branstad, received the award in 2017 as he was transitioning from the governors office to be the U.S. ambassador to China.

Nominated by President Joe Biden, Sec. Vilsack was confirmed as the 32nd United States Secretary of Agriculture on Feb. 23, 2021 by the U.S. Senate. Vilsack was the longest-serving member of President Barack Obama's original Cabinet. Prior to his appointment, he served two terms as the Governor of Iowa, served in the Iowa State Senate and as the mayor of Mt. Pleasant, Iowa. He received his bachelor's degree from Hamilton College and his law degree from Albany Law School in New York.

The Iowa Renewable Fuels Association represents the state's liquid renewable fuels industry and works to foster its growth. Iowa is the nation's leader in renewable fuels production with 42 ethanol refineries capable of producing 4.5 billion gallons annually – including 34 million gallons of annual cellulosic ethanol

2024 Iowa Renewable Fuels SUMMIT SPONSORS

Thank You Summit Gold Sponsors!

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IFF
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Thank You Summit Media Sponsors!

Biodiesel Magazine
Ethanol Producer Magazine

Iowa Renewable Fuels SUMMIT



Save the Date for the 2025 Summit!

February 4, 2025
7:30 a.m. – 3:30 p.m.

The 2025 IRFA Summit will be held at The Meadows Events Center within the Prairie Meadows Racetrack and Casino in Altoona, IA.

Check out the 2024 recap!

2d. 2024 Biofuels Science and Sustainability Tour

15th Annual

Biofuels

Science and Sustainability Tour

SAVE THE DATE!

AUGUST 12-15, 2024







As the leading region in biofuels production, the Midwest is *the* place to gain a deeper understanding of how renewable fuels like ethanol and biodiesel are prepared to be a leader toward America's low-carbon future! Join experts for an educational, hands-on, and interactive look at the renewable fuels industry of today – and tomorrow! As the country grapples with big questions like how to combat climate change and ensure energy security, this tour will provide a better understanding of the challenges and exciting opportunities facing America's most dynamic energy sector.

- Invited guests will include Congressional staff, White House staff & officials from EPA, USDA, Department of Energy, and key Midwest officials.
- Planned tour locations include an ethanol plant, biodiesel plant, family farm, Iowa State University's BioCentury Farm, the Iowa State Fair, and many others.

For more information or to register for the tour, contact Monte Shaw at 515-252-6249 or mshaw@iowarfa.org.

2e. 2024 Members Day



SAVE THE DATES:

IRFA Members' Day:

September 4, 2024

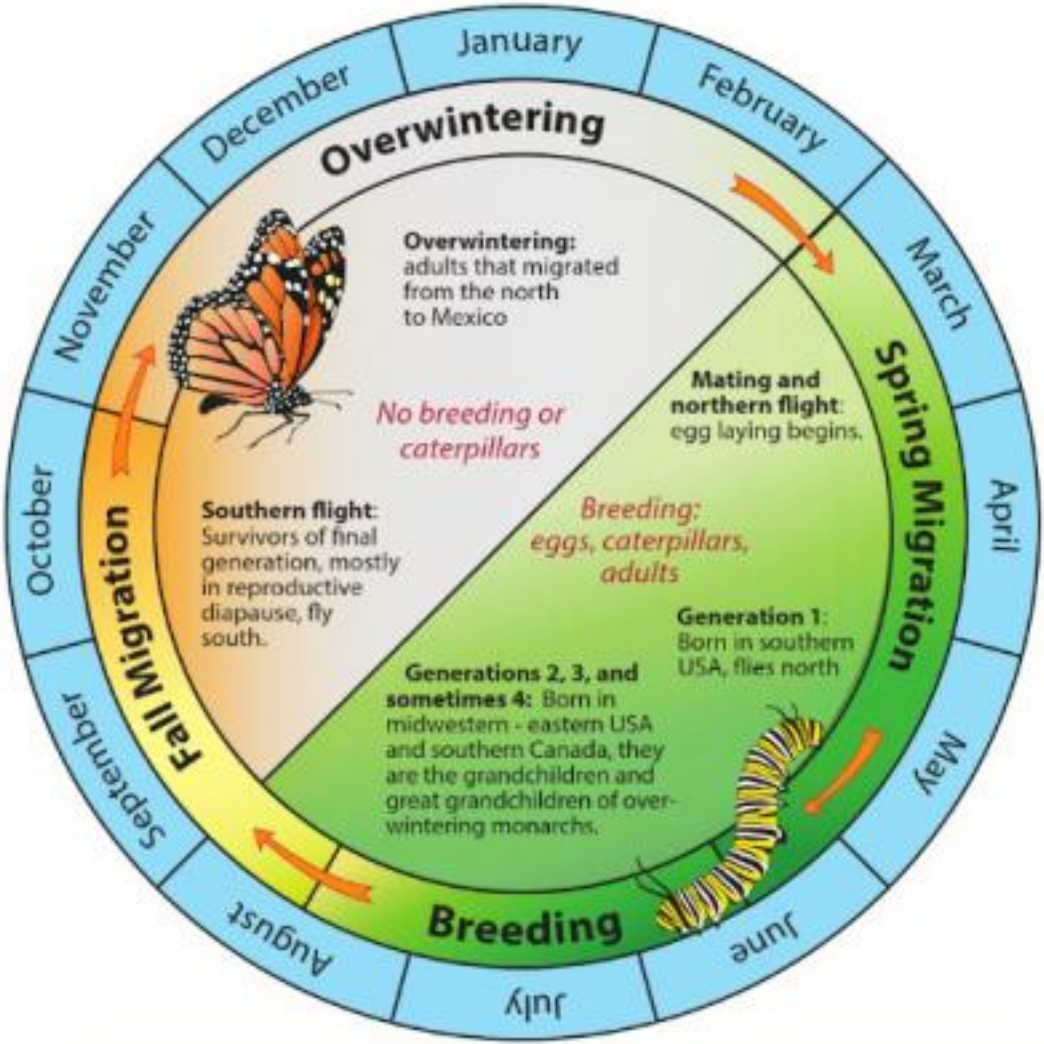
IRFA Quarterly Board Meeting:

September 5, 2024

Where:

Lake Panorama National Golf Course

2f. Iowa Monarch Conservation Consortium


January
February
March
April
May
June
July
August
September
October
November
December
Overwintering
Spring Migration
Breeding
Fall Migration
Overwintering: adults that migrated from the north to Mexico
No breeding or caterpillars
Mating and northern flight: egg laying begins.
Breeding: eggs, caterpillars, adults
Generation 1: Born in southern USA, flies north
Generations 2, 3, and sometimes 4: Born in midwestern - eastern USA and southern Canada, they are the grandchildren and great grandchildren of over-wintering monarchs.
Southern flight: Survivors of final generation, mostly in reproductive diapause, fly south.



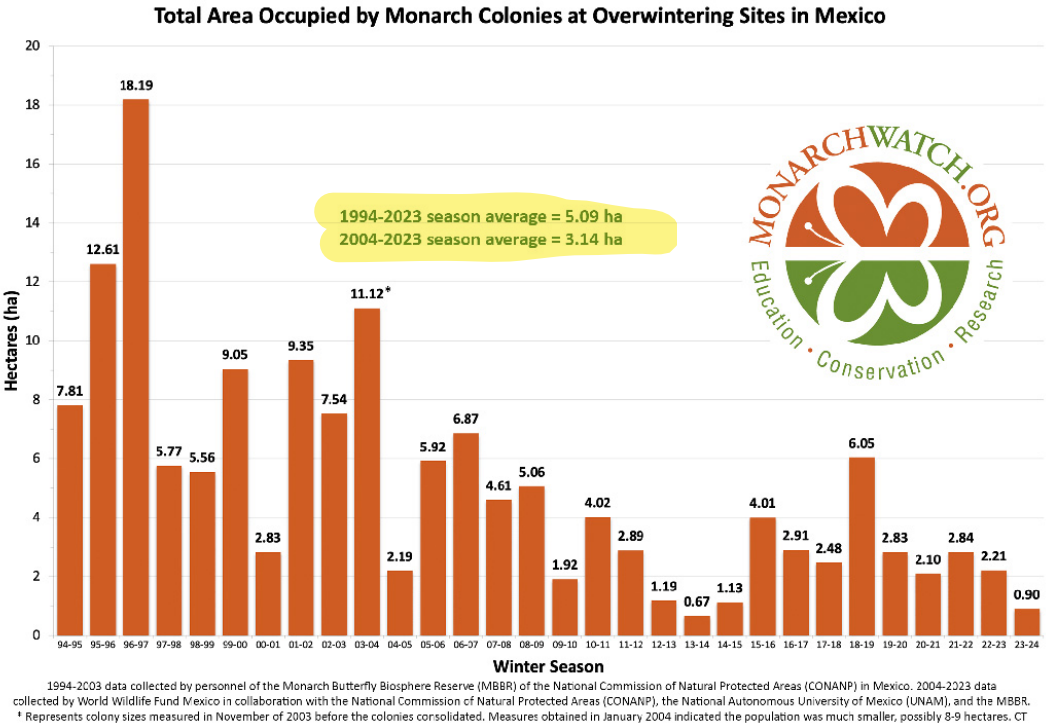
Authorities in Mexico City recently announced that the size of the eastern monarch butterfly population that overwinters in Mexico is the second smallest on record. The numbers are so low that few monarchs will be seen this summer in many parts of the U.S. and Canada.

The total forest area occupied by overwintering monarch colonies was reported (https://files.worldwildlife.org/wwfcmsprod/files/Publication/file/5wx7wlzzjm_Monarch_Butterfly_Survey_Report_Feb_7_2024_.pd _ga=2.258782920.31534884.1708626186-126042679.1708626186) as 0.90 hectares, which is a staggering 59.3 percent decrease from the previous season (2.21 hectares) by the World Wildlife Fund (https://www.worldwildlife.org/)-Telmex Telcel Foundation Alliance (https://www.fundaciontelmextelcel.org/), in collaboration with the National Commission of Natural Protected Areas (https://www.gob.mx/conanp), the National Autonomous University of Mexico (https://uceap.universityofcalifornia.edu/programs/national-autonomous-university-mexico), and the Monarch Butterfly Biosphere Reserve (https://whc.unesco.org/en/list/1290/).

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Graph showing the total area occupied by monarch colonies at overwintering sites in Mexico. Photo Credit: Monarch Watch

This is the second-lowest number of hectares counted to date. The lowest was 0.67 hectares during the 2013–2014 overwintering season. A chart produced by Monarch Watch (https://monarchwatch.org/) at the University of Kansas (https://ku.edu/) shows the total forest area occupied by overwintering monarch colonies annually since the winter of 1994–1995.

"I know many feel disheartened at the news of the eastern migratory monarch overwintering numbers," said Dr. Emily Geest, a postdoctoral fellow in conservation and science at the Oklahoma City Zoo and Botanical Garden (https://www.okczoo.org/) in Oklahoma City, Okla. "However, monarchs have had low numbers in the past and have rebounded before. With everyone working together to increase nectar and milkweed plants, monarchs can rebound again."



Wildflower garden. Photo Credit: © Oklahoma City Zoo

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Monarch numbers are at a near all-time low because of drought conditions last fall that extended from southern Oklahoma deep into central Mexico during the final, critical portion of the migration. Drought reduces flowering plants, and for plants that are still able to bloom, drought can limit how much nectar plants are able to produce. Monarchs need nectar not only to survive but also to build up fat reserves to survive winter.

WHAT CAN PEOPLE DO TO HELP MONARCHS RECOVER?

Immediate action is necessary in order for monarchs to recover. Monarchs require an abundance of milkweeds and nectar sources. Planting milkweed and native wildflowers will be essential in the effort to save monarchs.

Hero Photo Credit: © Oklahoma City Zoo

EDITED BY SARAH GILSOUL, A WRITER AND COMMUNICATIONS COORDINATOR AT AZA.

RELATED STORIES

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2g. Communications Update

Iowa Renewable Fuels Association

PRESS RELEASE

FOR IMMEDIATE RELEASE
January 24, 2024

Press Contact: Emma Koehler
515-322-0435

Start of Production of First U.S. Sustainable Aviation Fuel Plant Hits Home Need for Low Carbon Corn Ethanol

Iowa Corn Farmers and Biofuels Producers Missing Out on Massive New Market Until Carbon Sequestration Projects Move Forward

JOHNSTON, IA – Sustainable aviation fuel (SAF) could grow into the largest new market ever seen for U.S. farm commodities thanks to the start of production of SAF at LanzaJet Freedom Pines Fuels. Without low carbon ethanol, which requires carbon capture and sequestration (CCS), Iowa farmers could miss out on the chance to unlock this new market. No Iowa ethanol plant currently has a carbon intensity score low enough to qualify as a SAF feedstock. Only one plant in the U.S., using CCS, is currently producing SAF-friendly ethanol. By contrast, Brazil produces over 7 billion gallons of ethanol with a carbon score expected to qualify for SAF production.

“Today and every day going forward, American farmers and ethanol producers are losing demand until we get carbon capture and sequestration online,” stated Monte Shaw, Iowa Renewable Fuels Association executive director, who was in Georgia today to witness the LanzaJet grand opening. “LanzaJet is proving that SAF from ethanol is here today. Now it is up to us to produce a qualifying ethanol feedstock. Iowans need to realize that CCS is the key to the new market. Regardless of individual views on carbon policy, our business is making the products our customers want and right now we can’t do that.”

“LanzaJet Freedom Pines Fuels will use a variety of low carbon sustainable ethanol, making this an eye-opening experience to what Iowa corn farmers could expect to be a part of,” said Dan Keitzer, a farmer and Iowa Corn Usage and Production Committee Chair. “However, due to our inability to lower our CI score for ethanol plants here in the state, we will be missing out on a large market for the corn we produce, which is unsettling as we have had larger carryout numbers in recent years.”

The new SAF market is potentially massive according to a new study unveiled today by Decision Innovation Solutions (DIS), Iowa’s premier agricultural economic firm. The study found fully maximizing the potential of the SAF production in Iowa will have a generation impact. To meet the demand, DIS projects that Iowa would build:

- 11 new 200-million-gallon-per-year ethanol plants

- 5 new ethanol-to-jet SAF production facilities
- 3 new facilities that convert soybean oil, fats and greases to SAF.

“The construction and ongoing operations of these facilities hold the promise to fundamentally transform rural Iowa in ways even bigger than the current biofuels industry,” stated David Miller, DIS chief economist and report author. “We have the opportunity to set the stage for the next 25 years when corn production will rise to 20-21 billion bushels per year based on current acres. No other market but SAF can utilize that corn. If we do not embrace low carbon ethanol to unlock SAF, we are likely to lose 20 million acres of corn across the Midwest and the $10 billion in farm income those acres create. What will our legacy be?”

According to the study, while building out the SAF infrastructure will cover many years, the cumulative impact in Iowa will:

- Create over 35,000 jobs over the next 25 years
- Add almost $2.3 billion to Iowa incomes
- Boost Iowa GDP by more than $3 billion.

Even more exciting, the ongoing operation of this infrastructure spurs the Iowa economy every year:

- Generating over 22,000 jobs
- Increasing Iowa incomes by nearly $1 billion
- Growing Iowa GDP by more than $2.7 billion.

“The combined economic impact of constructing and operating the expected SAF infrastructure is like nothing the Midwest has ever seen,” said Miller. “And it is coming at just the right time. U.S. corn production is growing at four times the rate that demand is growing. Over the next twenty years, U.S. farmers are looking at producing 5 billion excess bushels of corn from existing acres. Add to that the increase of electric vehicles that reduce ethanol use and the rise of Brazilian corn production, and its not hard to see that we could be in for some tough times. Luckily, SAF is big enough to take all the corn we can grow and then some. The question is simply whether Iowa will do what it takes to be a part of this huge new market.”

Shaw concluded: “We are not in a status quo situation. Only the fourth year of a drought has put off the day of reckoning this long, and even with the long drought we’ve seen corn prices drop two bucks a bushel. The power is in our hands to unlock the massive SAF market. We urge all Iowans to allow farmers and ethanol producers the tools they need to move our great state forward to a time of unprecedented economic prosperity.”

The Iowa Renewable Fuels Association represents the state’s liquid renewable fuels industry and works to foster its growth. Iowa is the nation’s leader in renewable fuels production with 42 ethanol refineries capable of producing 4.5 billion gallons annually – including 34 million gallons of annual cellulosic ethanol production capacity – and 11 biodiesel facilities with the capacity to produce 410 million gallons annually. For more information, visit the Iowa Renewable Fuels Association website at: www.IowaRFA.org.

###

Get U.S. ethanol in the game

Imagine that after years of practice, sweaty scrimmages, lifting weights, and eating healthy you finally make it to the big game. You feel great. You are ready to contribute.

Then nothing happens. Your number is not called. You're left sitting on the bench during the biggest game of your life.

Ready to go, but sitting on the bench is the current state of U.S. ethanol when it comes to producing sustainable aviation fuel (SAF). Today, LanzaJet began production at the first U.S. sustainable aviation fuel plant in Soperton, Georgia.

SAF represents a 35-billion-gallon market opportunity for U.S. ethanol producers and farmers. Yet, when looking for ethanol feedstock, what will LanzaJet find? One plant in North Dakota out of the entire United States can produce entirely low carbon ethanol. In total, less than 200 million gallons of low carbon ethanol is available in the U.S. today – one percent of our 17 billion gallons of capacity. Meanwhile, Brazil already produces over 7 billion gallons of ethanol that is expected to qualify as SAF feedstock. In short, today American farmers are left on the bench.

Let that sink in. Today and every day going forward our farmers and ethanol producers are missing out on a huge new market.

To produce SAF that meets the carbon requirements of the major airlines, you must start with low carbon ethanol. Brazil can supply that using sugarcane or "second crop" corn. So, Brazil is in the game.

We have the tools to get U.S. ethanol off the bench, into the game, and to make American farmers the MVP of SAF production.

So regardless of your personal views on carbon policy, the reality is ethanol producers need to make the products their customers demand. Carbon capture and sequestration (CCS) cuts U.S. ethanol's carbon score by more than half. CCS alone gets us in the game. And it's a BIG game.

The SAF market has the potential to be the largest new market ever seen for U.S. farmers. According to a study unveiled today by Decision Innovation Solutions (DIS), fully maximizing the potential of SAF production in Iowa will have a generational impact, requiring 11 new ethanol plants and 8 new sustainable aviation fuel facilities in Iowa alone.

The cumulative impact of building out the new SAF infrastructure will:

- Create over 35,000 jobs over the next 25 years
- Add nearly $2.3 billion to Iowa incomes
- Boost Iowa GDP by more than $3 billion

The ongoing operation of this infrastructure supports the Iowa economy every year by:

- Generating over 22,000 jobs
- Increasing Iowa incomes by nearly a billion
- Growing Iowa GDP by more than $2.7 billion

If we don't get U.S. ethanol in the game, none of this happens.

CCS is the key to unlocking the new SAF market. Iowans need to realize what's at stake and then find an equitable path forward for carbon capture projects. This isn't politics. It's markets.

The largest customers of U.S. ethanol today our transitioning to lower carbon fuels. And Delta, American, United and all the world's airlines are creating the largest new market farmers will see in their lifetimes. They are demanding low carbon ethanol.

Let's work together to get American farmers and U.S. ethanol in the game.



Executive Director
Iowa Renewable Fuels Association

Iowa Renewable Fuels Association

PRESS RELEASE

FOR IMMEDIATE RELEASE
February 1, 2024

Press Contact: Emma Koehler
515-252-0435

2023 Iowa Ethanol Production Ticked Up to Another Record

JOHNSTON, IA – In 2023, Iowa ethanol production increased to a record-breaking 4.6 billion gallons, up from the previous record of 4.5 billion gallons in 2022. Solid corn production combined with some of the most efficient plants in the world drove Iowa ethanol production forward.

"Given relatively stable ethanol demand over the last few years, it was a pleasant surprise to crunch the numbers and find Iowa ethanol producers again increased production," stated Iowa Renewable Fuels Association (IRFA) Executive Director Monte Shaw. "It is a testament to the innovation and efficiency of both Iowa corn growers and ethanol producers. Looking forward, in order to provide opportunities for further growth in the short term we need to see year-round E15 finalized quickly. But we also have the opportunity to unlock a new market, sustainable aviation fuel, that can drive massive biofuels growth for the next three decades."

U.S. ethanol production in 2023 exceeded 15.5 billion gallons, with Iowa producing roughly 30 percent. Annual Iowa ethanol production capacity has increased to approximately 4.7 billion gallons and could grow dramatically if ethanol demand increased.

The IRFA compiled production information from an industry survey, public reports, and other industry sources.

The Iowa Renewable Fuels Association represents the state's liquid renewable fuels industry and works to foster its growth. Iowa is the nation's leader in renewable fuels production with 42 ethanol refineries capable of producing 4.7 billion gallons annually – including 34 million gallons of annual cellulosic ethanol production capacity – and 10 biodiesel facilities with the capacity to produce over 400 million gallons annually. For more information, visit the Iowa Renewable Fuels Association website at: www.IowaRFA.org.

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Iowa Renewable Fuels Association

PRESS RELEASE

FOR IMMEDIATE RELEASE
February 2, 2024

Press Contact: Emma Koehler
515-252-0435

Iowa Biodiesel Production Steady in 2023

JOHNSTON, IA – In 2023, Iowa biodiesel production kept steady at 350 million gallons, nearly the same as the 349 million gallons produced in 2022. Even in a changing biofuels space with increased soybean crush and renewable diesel production and talk of sustainable aviation fuel, Iowa biodiesel producers were able to maintain their production.

"During a time of great change, Iowa biodiesel producers were able to maintain their production and markets," stated Iowa Renewable Fuels Association (IRFA) Executive Director Monte Shaw. "Looking forward, we see a wide range of markets that offer growth opportunities for biodiesel, including home-heating oil, rail, and marine. IRFA will continue to focus on equity in biofuels policy that account for the role that biodiesel can and should play going forward."

Reflecting the expansion of soybean crush capacity nationally and in Iowa, soybean oil increased to 77 percent of the feedstock for Iowa biodiesel production. Animal fats followed at just over 7 percent. Corn oil just barely exceeded canola oil with both near 6 percent. Used cooking oil provided 3 percent of the feedstock.

Iowa plants have the capacity to produce 400 million gallons of biodiesel annually. The IRFA compiled production information from an industry survey.

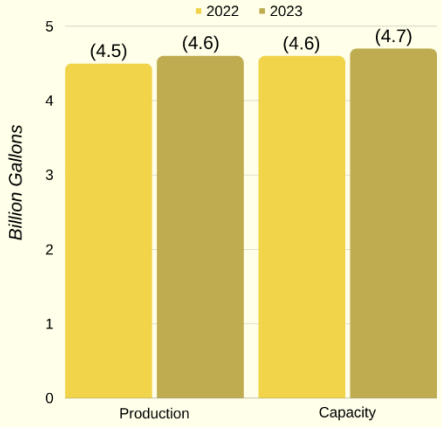
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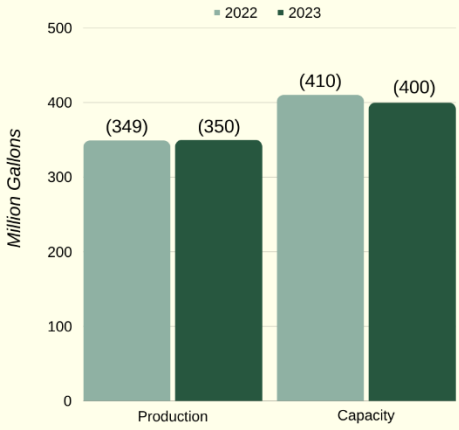
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In 2023, Iowa ethanol production increased to a record-breaking 4.6 billion gallons.



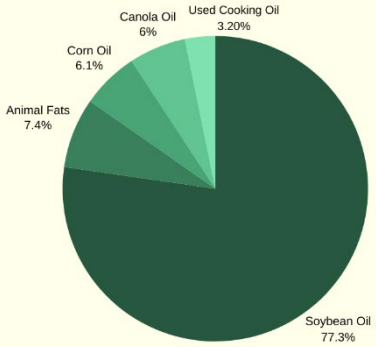
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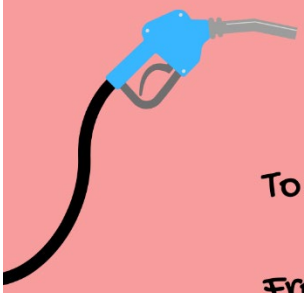


Iowa Biodiesel Production Steady in 2023

Reflecting the expansion of soybean crush capacity nationally and in Iowa, soybean oil increased to 77 percent of the feedstock for Iowa biodiesel production. Animal fats followed at just over 7 percent. Corn oil just barely exceeded canola oil with both near 6 percent. Used cooking oil provided 3 percent of the feedstock.



Can you fuel the love tonight?



To:

From:

I tried to come up with a GREET Valentine's Day joke, but all the best ones Argonne.

To:

From:

You make my heart soar (with SAF).



To:

From:

Iowa Renewable Fuels Association

PRESS RELEASE

FOR IMMEDIATE RELEASE
February 15, 2024

Press Contact: Emma Koehler
515-322-0435

Iowa Biofuels Keep Economy Strong in 2023

Signs of Softness in Commodity Demand Should Be Wake Up Call

JOHNSTON, IA – Iowa biofuels production continues to support a strong rural economy according to a new economic study released today.

John Urbanchuk of ABF Economics conducted the study, commissioned by the Iowa Renewable Fuels Association (IRFA). The study found: "The importance of the renewable fuels industry to agriculture and rural economies such as Iowa is particularly notable." Specifically, biofuels production:

- Accounts for more than $6.5 billion, or about 3 percent, of Iowa GDP
- Generates $3.2 billion of income for Iowa households; and
- Supports almost 52,000 jobs throughout the entire Iowa economy.

"Even as the value of commodity purchases dropped along with commodity prices, biofuels producers continue to play a critical role in supporting Iowa's rural economy and farmers," said IRFA Executive Director Monte Shaw. "With commodity production increasing faster than demand, Iowa needs to focus on creating new market opportunities, including higher blends, exports and sustainable aviation fuel (SAF)."

In 2023, Iowa ethanol production increased to a record-breaking 4.6 billion gallons, up from the previous record of 4.5 billion gallons in 2022. Iowa biodiesel production kept steady at 350 million gallons, nearly the same as the 349 million gallons produced in 2022.

"Development of new markets also is good news for Iowa corn growers as overproduction has led to increased ending stocks of corn at roughly 2.2 billion bushels and the largest one-year decline in corn prices in a decade," Urbanchuk wrote in the study. "Finally, enabling carbon capture and sequestration pipelines will allow the development of new markets such as Sustainable Aviation Fuel (SAF), a potentially massive market that can ensure future growth opportunities for Iowa biofuels and farmers."

To view the full study, click here.



Contribution of the renewable fuels industry to the economy of Iowa in 2023:

- *Accounts for more than $6.5 billion, or about 3 percent, of Iowa GDP*
- *Generates $3.2 billion of income for Iowa households*
- *Supports almost 52,000 jobs throughout the entire Iowa economy, equivalent to about 3 percent of total state employment*

The study was conducted by John Urbanchuk of ABF Economics, commissioned by the Iowa Renewable Fuels Association.

Development of new markets also is good news for Iowa corn growers as overproduction has led to increased ending stocks of corn at roughly 2.2 billion bushels and the largest one-year decline in corn prices in a decade. Finally, enabling carbon capture and sequestration pipelines will allow the development of new markets such as Sustainable Aviation Fuel (SAF), a potentially massive market that can ensure future growth opportunities for Iowa biofuels and farmers.

-John Urbanchuk wrote in the study

Iowa Renewable Fuels Association

QUARTERLY UPDATE

Spring 2024

Introducing.. Our New Members!

NOVASPECT
Emerson Impact Partner

CIBO TECHNOLOGIES

HOLMES MURPHY

Good: Year-Round E15 Approved in 8 States Bad: Not Until 2025

The request from eight Midwest governors, led by Iowa Gov. Kim Reynolds, was finally approved but won't apply until 2025. IRFA will continue to find a solution for consumers this summer and for a national fix. Scan below to help us take action.

Two Iowa Students Joined IRFA at Clean Fuels Alliance America's 2024 Conference

Keegan Fogarty (left) and Ethan Hassler (right), as a part of their entrepreneurship program, have developed a biofuel production technology awaiting patent approval. The two were immersed into the biofuels space during the February conference.



IRFA Survey Found Iowa Ethanol and Biodiesel Production Steady in 2023

- **Ethanol increased to a record-breaking 4.6 billion gallons**
- **Biodiesel production kept steady at 350 million gallons**

2023 Iowa Biofuels Production Levels Kept the Economy Strong

The IRFA study, released in February, was conducted by John Urbanchuk of ABF Economics.

Biofuels production:

- **Accounts for more than $6.5 billion of Iowa GDP**
- **Generates $3.2 billion income for Iowa households**
- **Supports 52,000 jobs throughout Iowa economy**

USDA Awarded $19 Million in Biofuel Infrastructure Grants

During the 2024 Iowa Renewable Fuels Summit in January, Sec. Vilsack announced 22 states would receive grants, including 88 retail locations in Iowa.



Shaw Awarded at U.S. Grains Council

IRFA Executive Director Monte Shaw was recognized for 5 years of service working to support ethanol exports during council meetings in February.



Iowa's Renewable Fuels Infrastructure Program Awarded Record $3.4 Million

These RFIP funds were awarded during the January meeting.

74 applicants that will add E15 to retail sites and one applicant to add a biodiesel terminal in Iowa.

Drive Clean Educated Young Drivers at Girls High School State Basketball

IRFA alongside Iowa Corn spent a day engaging with attendees by sharing the benefits of choosing Unleaded 88 at the pump.



We Remember Bill Northey



Bill's photo remains in IRFA's office, on a poster made for the 2018 Summit to ask for the hold on his USDA nomination be lifted. We remember Bill as a great champion for biofuels and an even better person.

Iowa Renewable Fuels Association

Spring 2024

The 2024 Iowa Renewable Fuels Summit aimed to "Chart Our Course" for future challenges and opportunities confronting biodiesel and ethanol producers. IRFA estimates over 700 attendees joined the event despite Iowa's difficult weather challenges.

Trio of Presidential Candidate Hopefuls Made Remarks and Checked Boxes

All three hopefuls checked all boxes with Biofuels Vision during their campaigns.



Ron DeSantis expressed support for an "all-of-the-above" energy strategy.



Nikki Haley made remarks on turning biofuels into an economic powerhouse.



Asa Hutchinson promoted year-round E15.

Shaw Charted a Successful Course Forward



IRFA's Executive Director Monte Shaw remarked "We cannot afford to squander this opportunity."

Growth Energy's CEO Outlined Policy Agenda

Emily Skor explained the RFS and carbon capture and sequestration would be priorities for the new year.



Iowa Governor Recalled Success



Kim Reynolds stressed just how much Iowa-made ethanol and biodiesel play a critical role in America's energy independence.

Sustainable Aviation Fuel Study Found Midwest Economy Would Be Taken to New Heights

IRFA commissioned a study, released by DIS in January, that evaluated the impact on the Midwest economy if the SAF goal of 35-billion-gallons was met by 2050.



DIS's David Miller presented the study findings during the 2024 Summit.

U.S. Secretary of Agriculture Awarded Lifetime Champion of Renewable Fuels Award

Tom Vilsack was honored for his many years of support throughout his career. He also made remarks on the efforts the USDA has made for the biofuels sector.



Middle East Expert Discussed World Conflicts

Dr. Max Abrahms explored conflicts in the Middle East and how they influence world energy markets and U.S. security.



Three Panels, Three Market Disruptions



Gaining Altitude with SAF panel discussed how SAF will open markets for biofuels, including the role CCs will play.



Brazilian Wave panel shared what rapidly growing Brazilian corn and biofuels production means for the U.S. and beyond.



Soybeans: Crushing It panel provided insight into how the growth of U.S. soy crush impacts biofuels, crops and livestock.

Notification

Make sure you are following all of IRFA's socials!

2h. Biofuels Vision 2024

Executive Committee Report

I want to express my sincere gratitude to each member of the Executive Committee for your leadership and strategic guidance throughout the Biofuels Vision 2024 caucus project. I want to acknowledge the dedication and time of all the members of your associations that played a role in making this project successful. On behalf of the Biofuels Vision team, this has been an extremely enriching experience both personally and professionally, being able to engage across the state of Iowa on vital Biofuels issues.

Accomplishments

The 2024 Iowa Caucus Project was a statewide effort designed to bring renewable fuels supporters together in a unified effort to engage candidates seeking the GOP presidential nomination. The Project's main goal was to move each presidential candidate to the most pro-renewable fuels position possible. Ultimately, we produced and distributed a voter guide to renewable fuels supporters throughout Iowa.

During these past eight months we focused on educating candidates with regards to the most important policy issues facing renewable fuels. We quickly identified and mobilized to ensure that biofuels issues were influencing presence early in the caucus. Routinely attending large and small, public, and private events to ensure Iowa Biofuel voices were heard.

- 100+ events attended by staff and volunteers
- 80+ video answers captured since beginning of project
- 10 biofuel plant tours
    - DeSantis, Scott, Burgum, Hutchinson, Binkley, Perry, Elder
- 4 candidates checked all eight issue boxes
- All candidates support growing biofuels, year-round E-15 and opposed electric vehicle mandates

	Growing biofuels	Tax Credits	RFS	Year round E15	Greet	Higher Blends	Farm Bill	EV
Trump	X	-	-	X	-	-	-	X
DeSantis	X	X	X	X	X	X	X	X
~~Scott~~	X	X	X	X	X	X	X	X
Haley	X	X	X	X	X	X	X	X
~~Pence~~	X	-	-	X	-	-	X	X
Vivek	X	X	X	X	-	X	X	X
~~Perry~~	X	-	-	X	-	-	-	X
Asa	X	X	X	X	X	X	X	X
~~Burgum~~	X	X	-	X	-	X	-	X
~~Christie~~	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
~~Elder~~	X	-	-	X	-	X	-	X
Binkley	X	X	-	X	-	-	-	X

Pre-Caucus Media Sampling:

- Presidential Hopefuls Back Ethanol
- GOP Sprint to the Iowa Caucuses
- Presidential candidates cater to Iowa ethanol industry at annual conference
- Republicans dodge Iowa's hot-button energy issue: CO2 pipelines
- Ron DeSantis: Ag is essential for America's revival. I will stand with our farmers.
- Nikki Haley: Launches new coalition aimed at supporting Iowa Farmers

3a. State Legislative Issues

Iowa Renewable Fuels Association

2024 Iowa Statehouse Legislation

- Protect Equitable Treatment for Pipeline Projects (HF 2522)
- Renewable Fuels Infrastructure Program (Gov/Sec Recs)
  - $10 million in funding
  - Protect grant size and requirements
- Future Proofing Infrastructure
- Defend Integrity of the E15 Access Standard
- Protect Biofuel Retailer Tax Credits
- Iowa Corn Check Off

Other Issues of Note:

- Grain Indemnity Fund (SF 2401)
- Research Activities Credit (HSB 727)
- Right to First Refusal (HF 2551/SF 2372)

Iowa Renewable Fuels Association (IRFA) | 5505 N.W. 88th St., Johnston, Iowa 50131 | (515) 252-6249
info@IowaRFA.org | www.IowaRFA.org

Why tiered implementation of Future Proofing is a Win-Win

Priorities:

- Maximize ethanol sales in the near term.
- Prepare for any future higher blends in the marketplace.
- Partner with retailers that are doing a good job taking our product to the public.

Phase 1: E15 Standard

From date of enactment through June 30, 2025, the standard would revert to being compatible with the fuel being sold. This is the federal standard and the same standard in the other 49 states today.

We know there are dozens of stations across Iowa that could be selling E15 today if the standard E15 upgrade kits could be used (E85 kits do not exist today). Furthermore, this provides time for the main dispenser manufacturers, Wayne & Gilbarco, to make their base equipment E40 compatible.

Phase 2: E40 Standard

From July 1, 2025, to June 30, 2030, the standard for dispensers (everything from shear valve to the hose breakaway) would be required to be compatible with E40. This allows a low to no cost compliance option for retailers. There are approximately 800 to 1200 Iowa retailers that may qualify for a Tier 2 or Small Retailer waiver from the E15 access standard. A low-cost compliance option would encourage these retailers to move forward offering E15 instead of seeking a waiver.

Phase 3: E85 Standard

From July 1, 2030 on, the standard for everything up to the hose breakaway would be required to be compatible with E85.This brings the future proofing standard up to the highest currently possible level in a timing that allows for dispensers to be engineered to offer E15 and E85 simultaneously and from opposite sides of the pump

Other Key Points

- Not Retroactive - Future Proofing requirements only apply to new equipment being installed.

- Hanging Hardware - This proposal would effectively exempt hanging hardware from the future proofing standard.

- Tanks and Piping - Everything from the storage tank through the shear valve (commonly referred to as “below ground” equipment) would continue to always fall under an E85 compatibility standard.

- RFIP Grants - The dispenser eligibility for RFIP grants would be changed to mirror the tiered phase-in of the future proofing requirement as adopted.

IOWA RIGHT-OF-FIRST-REFUSAL (ROFR) LEGISLATION WILL ENSURE IOWA COMPANIES DEVELOP ELECTRIC TRANSMISSION PROJECTS IN THE BEST INTEREST OF IOWANS

CONSIDER THIS COMPARISON BETWEEN ITC MIDWEST AND OUT-OF-STATE COMPANIES:

ITC MIDWEST

SYSTEM RELIABILITY

- Driven to maintain a reliable and resilient transmission system.
- ITCMW is an Iowa-based company with 118 employees, 234 contract utility line workers, and facilities in Cedar Rapids, Des Moines, Dubuque, Iowa City and Perry.
- Close coordination with Alliant Energy in system planning and restoring power after outages.

RATES/COST

- Regionally cost-shared projects, like those covered by ROFR, benefit ITCMW network ratepayer costs when ITCMW builds the projects.
- Construction of regional projects are all competitively bid by qualified transmission contractors.
- Order 1000 competitively-bid projects have not resulted in lower project costs but instead led to delays and cost overruns in most cases (Concentric Report).

LANDOWNERS/COMMUNITIES

- ITCMW works to accommodate landowners resulting in a 98% voluntary easement rate.

OUT-OF-STATE COMPANY

LOWEST COST BID

- Driven to cut corners and build cheapest transmission line to win bid.
- Prioritizes project cost over landowner impacts, community plans, design quality and system resiliency.
- Shifts decision-making authority away from the IUB to an out-of-state entity.

NO GUARANTEE OF ONGOING MAINTENANCE

- Incentive to minimize ongoing maintenance of transmission lines jeopardizing reliability.

NO GUARANTEE OF COORDINATED OUTAGE RESPONSE

- Adding out-of-state developers owning individual segments and no knowledge of the system complicates providing a coordinated, safe response during emergencies, such as the devastating 2020 derecho.
- Out-of-state developers don't have the relationships, personnel, materials, facilities and other resources strategically in place to ensure prompt response to storm-related outages.

ROFR IS CRITICAL FOR FUTURE ECONOMIC DEVELOPMENT

ITC Midwest, Alliant Energy, rural electric cooperatives and municipal utilities work closely together with economic development organizations on initiatives to promote growth and improve the quality of life for Iowans.

- For example, IEDA and its partners have invested in "shovel-ready" property in several large industrial parks.
  - ROFR legislation would help ensure that ITC Midwest can rapidly respond to needs to transmission upgrades to attract and serve prospective large industrial customers in these industrial parks.
  - This is critical for future economic development in Iowa, as these companies will provide good-paying jobs.

Future electricity load growth is also important to reduce upward pressure on rates for ITC Midwest and its customers – including Alliant Energy – creating a shared focus on cost-effective and timely transmission service.

ITC MIDWEST ACTIVELY SUPPORTS THE COMMUNITIES WE SERVE TO IMPROVE THE QUALITY OF LIFE ACROSS THE STATE

- The company has donated more than $900,000 to community organizations in the past three years.
- Our employees live, work and raise their families in Iowa.

Iowa Renewable Fuels Association

PRESS RELEASE

FOR IMMEDIATE RELEASE

January 11, 2024

Press Contact: Emma Koehler

515-322-0435

Sustainable Aviation Fuel Study Finds Midwest Economy Would Be Taken to New Heights

Carbon Capture and Sequestration Is Found to Be Necessary to Unlock Full Potential of Sustainable Aviation Fuel Market

JOHNSTON, IA- Decision Innovation Solutions (DIS) today released a study of the economic impact on the Midwest if the sustainable aviation fuel (SAF) goal of 35 billion gallons was met by 2050. The Midwest stands to benefit greatly as two of the most likely SAF feedstocks would be soybean oil and corn ethanol.

In order to reach the 35-billion-gallon goal, the study found that 63 new 200-million-gallon-per-year ethanol plants, 30 new ethanol-to-jet SAF production facilities and six new oils/fats SAF production facilities would need to be built.

DIS report author David Miller concluded: “SAF production provides a substantial opportunity for Midwestern states, Midwestern farmers, and Midwestern renewable fuel producers to prosper in the coming years if the SAF Grand Challenge comes to fruition and the Midwestern states take steps to be active participants in making the roadmap come to life. The pathway that DIS estimates most likely to be realized has [oils/fats]-based SAF and ethanol-to-jet (ETJ) being the two most prominent pathways for SAF production at least for the next 20 years.”

In addition to a huge economic jolt from the construction of the new SAF infrastructure, ongoing operations would:

- Boost employment by 224,440 jobs
- Increase labor income by $9.3 billion
- Add $427 million to farm revenues in ethanol plant basis premiums alone
- Raise farm income by $11,670 for a typical 1000-acre farm split 50/50 between corn and soybeans.

With corn production grow outpacing demand, without the new SAF market corn farmers would face an extended period of overproduction, resulting in:

- Reducing corn acreage 68 million acres by 2050

- Slashing of farm revenues by nearly $10 billion per year
- Cutting farm income by $60,240 for a typical 1000-acre farm split 50/50 between corn and soybeans.

“[T]his potential cannot be fully realized without carbon capture and sequestration (CCS) for ethanol,” continued Miller. “And, without the potential new use for corn for ETJ-SAF, the U.S. corn supply is and will continue to grow at a pace that outstrips demand. Either stocks will build, and prices will decline, or a significant amount of corn acreage will need to be pulled out of production. Time is of the essence and the clock is ticking.”

Iowa Renewable Fuels Association (IRFA) commissioned DIS to conduct a study of the economic impact on the Midwest if the Sustainable Aviation Fuel Grand Challenge of 35 billion gallons by 2050 was met. The study does not attempt to judge the policies or incentives that would be necessary to achieve the goal, but rather to outline what the Midwest has to gain if the challenge was fulfilled.

Read the full study here.

The Iowa Renewable Fuels Association represents the state’s liquid renewable fuels industry and works to foster its growth. Iowa is the nation’s leader in renewable fuels production with 42 ethanol refineries capable of producing 4.5 billion gallons annually – including 34 million gallons of annual cellulosic ethanol production capacity – and 11 biodiesel facilities with the capacity to produce 410 million gallons annually. For more information, visit the Iowa Renewable Fuels Association website at: www.IowaRFA.org.

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Sustainable Aviation Fuel: Taking Iowa to New Heights

Background: With corn production rising faster than demand and corn prices taking their largest drop in a decade, a large potential new market is emerging: sustainable aviation fuel (SAF). SAF holds the promise for the largest rural transformation since the introduction of corn hybrids. However, to unlock the full potential of SAF, there needs to be long-term, stable public policy, proper carbon accounting metrics, and carbon capture and sequestration opportunities for ethanol producers. Decision Innovation Solutions (DIS) conducted a study of the economic impact on Iowa if the SAF Grand Challenge goal of 35 billion gallons by 2050 was met.

Top Line Results: The study determined that SAF from fats, oils, and greases (HEFA-SAF) and ethanol-to-jet (ETJ-SAF) will require building in Iowa the following:

- 11 new 200-million-gallon-per-year ethanol plants
- 5 new ETJ-SAF production facilities
- 3 new HEFA-SAF production facilities

Building and operating these facilities will generate an unprecedented boost to the Iowa economy over the next 25 years. The figures don't include the long-term potential of power-to-fuel (PTF) benefits which mean potentially another 8 PTF facilities for light-vehicle fuel market.

Iowa Construction Impact Summary

Event	Employment	Labor Income ($M)	Value Added ($M)	Output ($M)
New Ethanol Production	20,432	$ 1,286.6	$ 1,744.4	$ 3,333.1
SAF from ETJ	9,175	$ 587.9	$ 806.1	$ 1,532.5
SAF from HEFA	6,069	$ 389.6	$ 535.3	$ 1,016.8
Total	**35,676**	**$ 2,264.1**	**$ 3,085.9**	**$ 5,882.4**

Iowa Operations Impact Summary
(Direct, Indirect, and Induced Impacts)

Event	Employment	Labor Income ($M)	Value Added ($M)	Output ($M)
New Ethanol Production	18,018	$ 709.1	$ 1,738.7	$ 7,897.9
SAF from ETJ	2,574	$ 128.9	$ 4.3	$ 492.7
SAF from HEFA	1,577	$ 115.5	$ 977.9	$ 3,508.7
Total	**22,169**	**$ 953.6**	**$ 2,721.0**	**$ 11,899.3**

Key State Economic Findings (not including PFT potential benefits):

- **35,676** construction jobs adding over **$3 billion** to Iowa's GDP and **$2.2 billion** in income
- **22,169** permanent new jobs
- **$954 million** in new household income
- **$2.7 billion** added to Iowa's GDP
- **770 million bushels** of new corn grind per year in Iowa
- **$13,000** additional farm income per year
    - Typical 1,000-acre Iowa farm at 50/50 split between corn and soybeans



LAST YEAR, CORN LOST ROUGHLY $2 PER BUSHEL

U.S. corn production is growing
4 times faster than demand.
Even after a 4-year drought, ending stocks are up and prices are down.
Something has to give...

Paid for by the Iowa Renewable Fuels Association

CORN FARMERS FACE CUTTING 20 MILLION ACRES

We've seen this movie before. With innovation and hard work, farmers eventually over-produce the market.

Without new markets, corn acreage will need to drop by 20 million acres over the next 20 years.

- **Midwest farm income down $10 billion per year ($120 per acre of corn).**
- **Typical farmer with 1000 acres in corn and soybeans would lose over $60,000 each year.**

[1]

Luckily, there is a new market that will help grain piles disappear.

The missing piece is

SUSTAINABLE AVIATION FUEL

Scan here for more information.

(1) Study by Decision Innovation Solutions, the premier economic research and analysis firm for agriculture in Iowa.

SUSTAINABLE AVIATION FUEL CAN TAKE IOWA TO NEW HEIGHTS



Sustainable aviation fuel (SAF) could add 770 million bushels of new corn grind to Iowa each year.

Paid for by the Iowa Renewable Fuels Association

A new study determined that SAF from fats, oils, and greases (HEFA-SAF) and ethanol-to-jet (ETJ-SAF) will require building the following in Iowa:

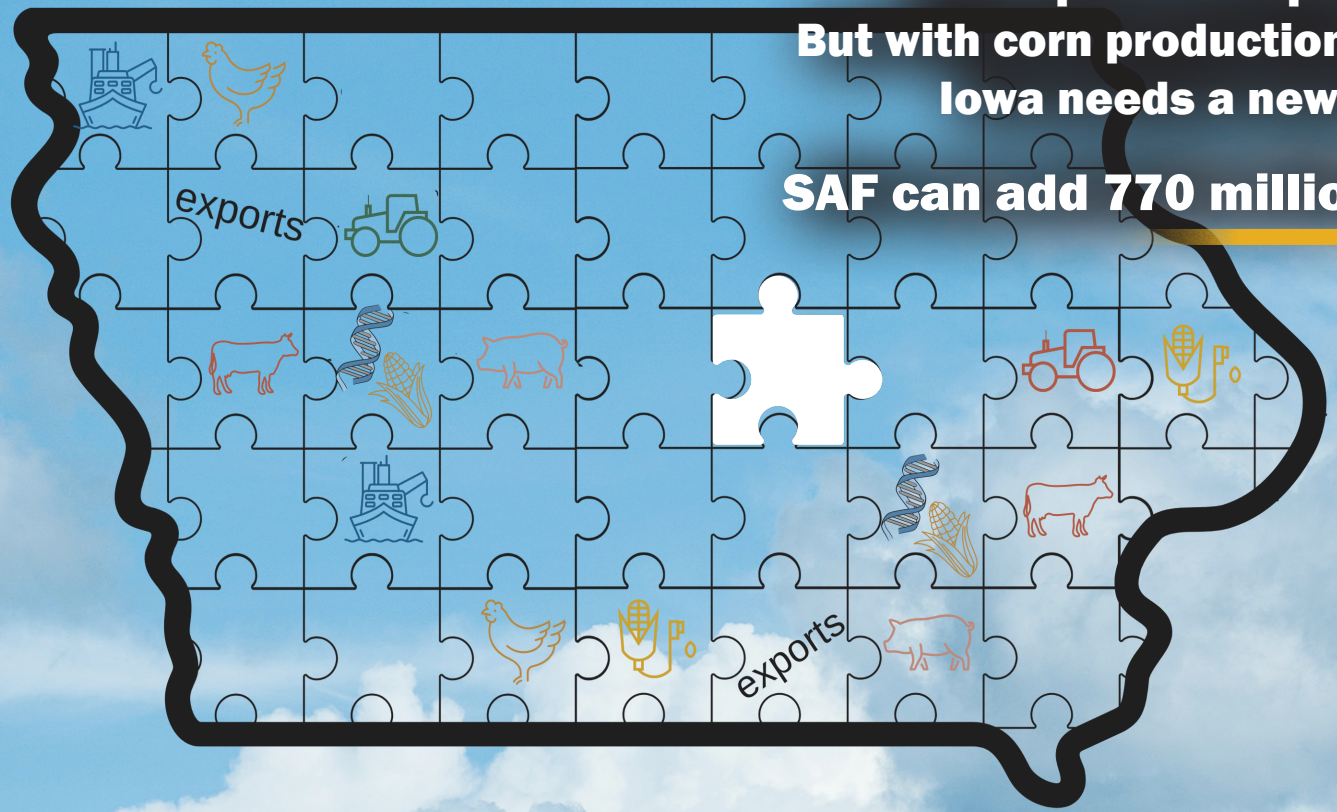
11 200-million-gallon per year ethanol plants

5 new ETJ-SAF production facilities

3 new HEFA-SAF production facilities[1]

Lots of pieces help keep Iowa's rural economy strong. But with corn production growing 4 times faster than demand, Iowa needs a new market to complete the puzzle.

SAF can add 770 million bushels of corn demand in Iowa.



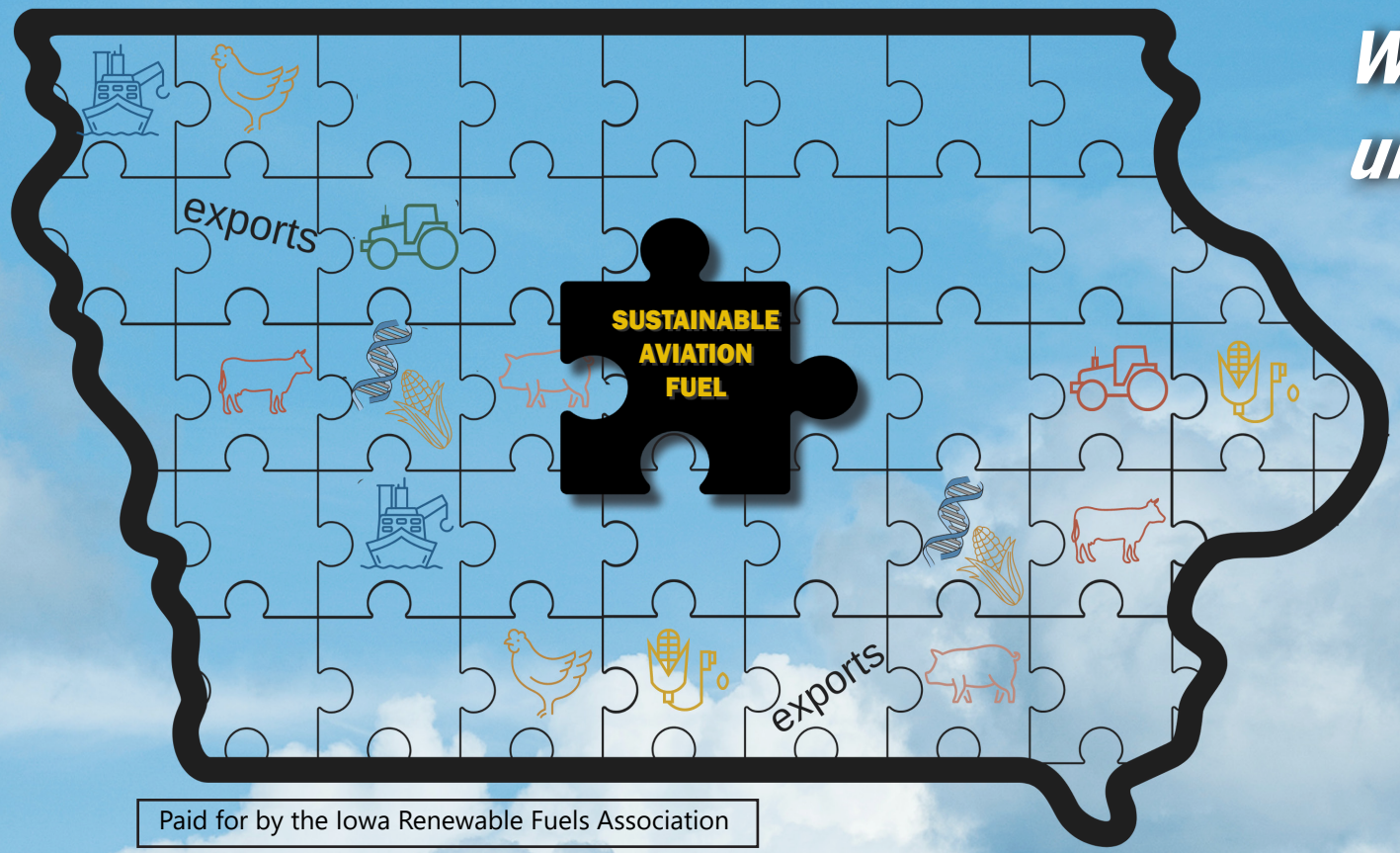
SUSTAINABLE AVIATION FUEL

Scan here for more information.

(1) Study by Decision Innovation Solutions, the premier economic research and analysis firm for agriculture in Iowa.

SUSTAINABLE AVIATION FUEL IS THE MISSING PIECE TO IOWA'S RURAL ECONOMY PUZZLE

Right now, Iowa corn growers and ethanol producers are locked out of this new 35-billion-gallon market.



What is the key to unlock this opportunity?

Paid for by the Iowa Renewable Fuels Association

THE KEY TO THE SAF MARKET IS CARBON CAPTURE AND SEQUESTRATION (CCS)

Today, Iowa ethanol does not qualify as a sustainable aviation fuel (SAF) feedstock. CCS lowers the carbon intensity of Iowa corn ethanol by more than half, opening the door to SAF production.

Building and operating new ethanol and SAF production facilities will:

- **Spark nearly 36,000 construction jobs adding $2.2 billion in personal income**
- **Boost Iowa GDP by over $3 billion**
- **Add more than 22,000 permanent new jobs providing nearly $1 billion in personal income**
- **Will ramp up Iowa GDP another $2.7 billion**[1]



(1) Study by Decision Innovation Solutions, the premier economic research and analysis firm for agriculture in Iowa.

IOWA HAS THE POWER TO CHANGE THE NARRATIVE

It's time to unlock the 35-billion-gallon sustainable aviation fuel (SAF) market.

"US farmers face harsh economics with record corn supplies in silos"
Reuters | Feb. 22 2024

"U.S. crop prices head downhill"
Successful Farming | Jan. 16 2024

"Record US corn crop, corn prices drop to 3 year low"
The Pig Site | Jan. 17 2024

"Economist explains 'tough' year ahead for corn, soybean"
Farm Progress Network | Jan. 2 2024

"Falling corn prices heap pressure on farmers"
Financial Times | Nov. 30 2023

Sustainable aviation fuel (SAF) can take Iowa to new heights.

"Sustainable Aviation Fuel Would Benefit Midwest"
Energy AgWired | Jan. 16 2024

"Ethanol-based Aviation Fuel Offers Massive Market for Ag"
Farm Equipment | Jan. 24 2024

"U.S. Clears Path for SAF From Corn Ethanol"
Aviation Week Network | Dec. 15 2023

"Treasury charts biofuel path to claiming SAF credits"
Successful Farming | Dec. 18 2023

"ATJ offers viable pathway to increased SAF production"
Oil & Gas Journal | Jan. 16 2024

"Ethanol's new flight path - US corn farmers pivot to jet fuel"
Farms.com | Jan. 29 2024

"Iowa Corn growers hail opening of ethanol-to-jet fuel plant"
High Plains Journal | Feb. 6 2024

SUSTAINABLE AVIATION FUEL IS REAL TODAY, NOW IS THE TIME.

IOWA CORN ETHANOL IS LOCKED OUT OF THE MASSIVE SUSTAINABLE AVIATION FUEL (SAF) MARKET.

"You Can't Fly with Lead Wings, or Corn Ethanol's SAF CI Problem"
Advanced Biofuels USA | Feb. 26 2024

"Vilsack: US ethanol needs carbon capture to feed aviation fuel market"
Reuters | Nov. 30 2023

"Carbon capture might be 'life or death' for producers"
Iowa Capital Dispatch | Feb. 7 2023

"Carbon capture is essential to the future of ethanol"
Des Moines Register | March 12 2023

"Carbon capture creates new opportunities for ethanol"
Successful Farming | Nov. 8 2022

"U.S. ethanol industry banks on carbon capture"
Reuters | March 11 2022

Carbon capture and sequestration (CCS) unlocks SAF for Iowa corn ethanol.

THE HEADLINES ARE OUT

CORN SUPPLY IS UP; PRICES ARE DOWN

SUSTAINABLE AVIATION FUEL (SAF) CAN CHANGE HOW THE STORY ENDS

BUT WITHOUT CARBON CAPTURE AND SEQUESTRATION,

THERE IS NO SAF.

Scan here for more information.

Paid for by the Iowa Renewable Fuels Association

The Des Moines Register

As sustainable aviation fuel plant opens, get US ethanol into the game

Carbon capture and sequestration cuts U.S. ethanol's carbon score by more than half. Carbon capture and sequestration alone gets us in the game.

Monte Shaw
Executive Director, Iowa Renewable Fuels Association

Published on Jan. 24, 2024

Imagine that after years of practice, sweaty scrimmages, lifting weights, and eating healthy you finally make it to the big game. You feel great. You are ready to contribute.

Then nothing happens. Your number is not called. You're left sitting on the bench during the biggest game of your life.

Ready to go, but sitting on the bench, is the current state of U.S. ethanol when it comes to producing sustainable aviation fuel, or SAF. On Jan. 24, LanzaJet begins production at the first U.S. sustainable aviation fuel plant in Soperton, Georgia.

SAF represents a 35-billion-gallon market opportunity for U.S. ethanol producers and farmers. Yet, when looking for ethanol feedstock, what will LanzaJet find? One plant in North Dakota out of the entire United States can produce entirely low carbon ethanol. In total, less than 200 million gallons of low carbon ethanol is available in the U.S. today – 1% of our 17 billion gallons of capacity.

Meanwhile, Brazil already produces over 7 billion gallons of ethanol that is expected to qualify as SAF feedstock. In short, today American farmers are left on the bench.

Let that sink in. Today and every day going forward our farmers and ethanol producers are missing out on a huge new market.

To produce SAF that meets the carbon requirements of the major airlines, you must start with low carbon ethanol. Brazil can supply that using sugarcane or "second crop" corn. So, Brazil is in the game. We have the tools to get U.S. ethanol off the bench, into the game, and to make American farmers the MVP of SAF production.

So regardless of your personal views on carbon policy, the reality is ethanol producers need to make the products their customers demand. Carbon capture and sequestration (CCS) cuts U.S. ethanol's carbon score by more than half. Carbon capture and sequestration alone gets us in the game. And it's a BIG game.

The SAF market has the potential to be the largest new market ever seen for U.S. farmers. According to a study by Decision Innovation Solutions, fully maximizing the potential of SAF production in Iowa will have a generational impact, requiring 11 new ethanol plants and eight new sustainable aviation fuel facilities in Iowa alone.

The cumulative impact of building out the new SAF infrastructure will:

- Create over 35,000 jobs over the next 25 years.
- Add nearly $2.3 billion to Iowa incomes.
- Boost Iowa GDP by more than $3 billion.

The ongoing operation of this infrastructure supports the Iowa economy every year by:

- Generating over 22,000 jobs.
- Increasing Iowa incomes by nearly $1 billion.
- Growing Iowa GDP by more than $2.7 billion.

If we don't get U.S. ethanol in the game, none of this happens.

CCS is the key to unlocking the new SAF market. Iowans need to realize what's at stake and then find an equitable path forward for carbon capture projects. This isn't politics. It's markets.

The largest customers of U.S. ethanol today our transitioning to lower carbon fuels. And Delta, American, United and all the world's airlines are creating the largest new market farmers will see in their lifetimes.

They are demanding low carbon ethanol.

Let's work together to get American farmers and U.S. ethanol in the game.

I wanted to make sure you saw our important op-ed on the future of Iowa's rural economy and corn ethanol in case you missed it in the Register.

Monte Shaw

Key Takeaways:

(1) Corn production is growing 4 times faster than corn demand. Ending stocks are up. Prices are down. Even after 3 years of drought.

(2) Sustainable Aviation Fuel (SAF) is a massive new 35-billion-gallon market. It's here now. SAF is being produced. Airlines are asking for it.

(3) U.S. corn ethanol is lower carbon than gasoline. But it is not yet low carbon enough to qualify as a SAF feedstock.

(4) Carbon capture and sequestration cuts ethanol's carbon score in half. That alone unlocks the SAF market.

(5) SAF production from ethanol can grow along with corn production - driving our rural economy forward for the next 2-3 decades.

Scan here for more information.

SUSTAINABLE AVIATION FUEL CAN TAKE IOWA TO NEW HEIGHTS



Sustainable aviation fuel (SAF) could add 770 million bushels of new corn grind to Iowa each year.

Paid for by the Iowa Renewable Fuels Association

THE 35-BILLION-GALLON SUSTAINABLE AVIATION FUEL (SAF) MARKET COULD INCREASE IOWA ETHANOL PRODUCTION FROM 4.7 TO 7 BILLION GALLONS[1]

HOW FARMERS BENEFIT FROM SAF

- **Greater corn demand**
- **Higher corn prices**
- **Premiums for corn from sustainable farming practices**

WHAT IS THE KEY?

Today's corn ethanol does not qualify for SAF.

With carbon capture and sequestration,
Iowa's ethanol would qualify.

Sustainable aviation fuel can power the rural economy for decades to come.

Scan here for more information.

(1) Study by Decision Innovation Solutions, the premier economic research and analysis firm for agriculture in Iowa.

Sustainable Aviation Fuel for the Future: What Does the Midwest Have to Gain?

January 2024

Prepared For:

Iowa Renewable Fuels Association

Prepared By:

Decision Innovation Solutions

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Legal Disclaimer

Decision Innovation Solutions, LLC ("DIS") has prepared this analysis (the "Project") for review and use. The Project consists of estimates of future pathways for sustainable aviation fuel production by various pathways and estimates of the economic impacts from the development of such fuels.

While DIS has made every attempt to obtain the most accurate data and include the most critical factors in preparing the Project, DIS makes no representation as to the accuracy or completeness of the data and factors used or in the interpretation of such data and factors included in the Project. The responsibility for the decisions made by you based on the Project, and the risk resulting from such decisions remains solely with you; therefore, you should review and use the Project with that in mind.

While the Project does include certain estimates and possible explanations for future production estimates of SAF and the economic impacts associated with such development, it cannot be ascertained with certainty the extent to which these estimates are entirely accurate. The following factors, among others, may prevent complete accuracy of the estimation of these future events and explanations for the same:

Inadvertent errors and omissions related to data collection, data summarization, and visual display of data.

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Table 1. Acronyms

Acronym	Description
ANL	Argonne National Laboratory
ASCENT	Center of Excellence for Alternative Jet Fuels and Environment
ASTM	American Society for Testing and Materials
ATJ	alcohol to jet
BD	Biodiesel
BEA	Bureau of Economic Analysis
BLS	Bureau of Land Statistics
Bpd	barrels per day
BTC	blenders tax credit
BtL	biomass to liquid
CANO	canola oil
CAPEX	capital expenditure
CCS	carbon capture and sequestration
CCUS	carbon capture, utilization and storage
CI	carbon intensity
DAC	direct air capture
DCO	distillers corn oil
DIS	Decision Innovation Solutions
DOE	Department of Energy
DOT	Department of Transportation
EDCO	enhanced distillers corn oil
EIA	Energy Information Administration
EISA	Energy Independence and Security Act
EOR	enhanced oil recovery
EPA	Environmental Protection Agency
ETJ	ethanol to jet
EY	end of year
FAA	Federal Aviation Administration
FECM	Office of Fossil Energy and Carbon Management
FOG	fats, oils, greases
FT	Fischer-Tropsch
GHG	greenhouse gas
GREET	Greenhouse Gases, Regulated Emissions, and Energy Use in Transportation
HEFA	hydroprocessed esters and fatty acids
IRA	Inflation Reduction Act
MSW	municipal solid waste
mmt	million metric ton
MT	metric ton
MWh	megawatt hours
NG	natural gas
NGO	nongovernmental organization
OPEX	operating expenses
OTT	Office of Technology Transitions
PTF	power to fuel
PtL	power to liquid jet
RD	renewable diesel
RFS	Renewable Fuel Standard

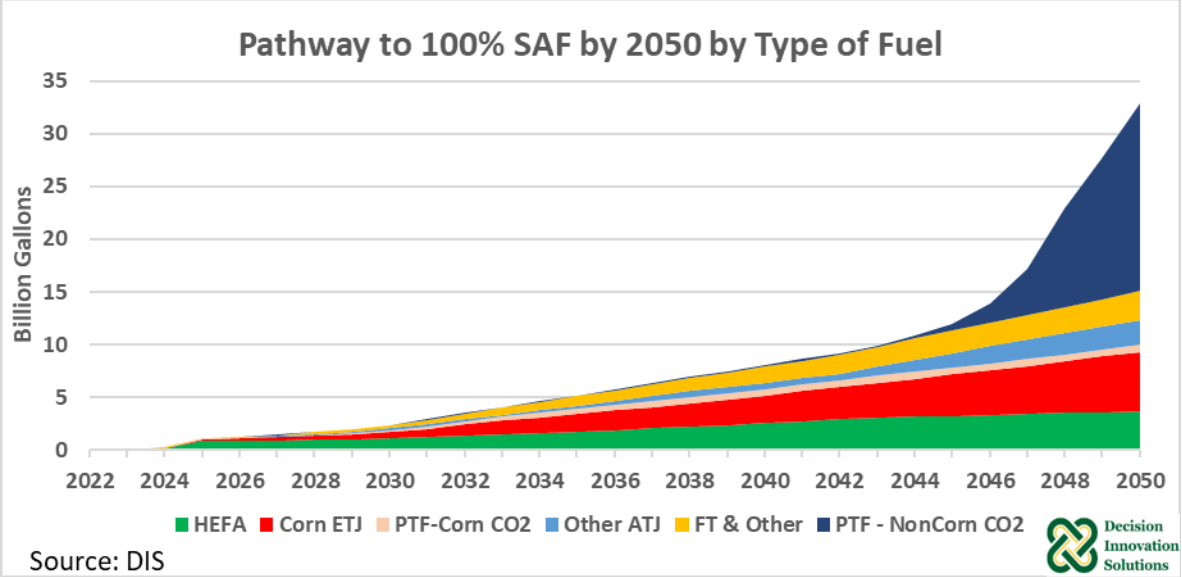
Acronym	Description
RG	renewable gasoline
RIN	Renewable Identification Number
ROW	right of way
SAF	sustainable aviation fuel
SBO	soybean oil
SPD	synthetic paraffinic diesel
SPK	synthetic paraffinic kerosene
TCF	Technology Commercialization Fund
UCO	used cooking oil
U.S.	United States
USDA	United States Department of Agriculture
USDA-ARS	Agricultural Research Service
USDA-FS	Forest Service
USDA-NIFA	National Institute of Food and Agriculture
USDA-PSD	Production, Supply, and Distribution Database

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1 Executive Summary

Sustainable Aviation Fuel (SAF) production provides a substantial opportunity for Midwestern states, Midwestern farmers, and Midwestern renewable fuel producers to prosper in the coming years if the SAF Grand Challenge comes to fruition and the Midwestern states take steps to be active participants in making the Roadmap come to life. The pathway that DIS estimates most likely to be realized has HEFA-based SAF and ethanol-to-jet (ETJ) being the two most prominent pathways for SAF production at least for the next 20 years. SAF from HEFA, ETJ, and PTF-corn CO2 are expected to be more than 90% of SAF production in 2026, around 80% of SAF production in 2030, and still more than 70% of SAF production in 2043 before the eventual development of PTF-SAF from direct air capture and renewable hydrogen kick in for the final push to 100% SAF adoption by 2050.

But, this potential cannot be fully realized without Carbon Capture and Sequestration (CCS) for ethanol. And, without the potential new use for corn for ETJ-SAF, the U.S. corn supply is and will continue to grow at a pace that outstrips demand. Either stocks will build, and prices will decline, or a significant amount of corn acreage will need to be pulled out of production. Furthermore, the urgency of facilitation of CCS for ethanol becomes even greater if Electric Vehicle (EV) adoption happens more rapidly than projected by the current Energy Information Administration (EIA) baseline. Time is of the essence and the clock is ticking.



HEFA-based SAF will lead the way in early development with more than 1.1 billion gallons of SAF being produced from HEFA feedstocks by 2030. ETJ will begin to become more prominent as ethanol plants that are located over geological formations that can support on-site sequestration of CO2 produce feedstock for ETJ-SAF plants. But to fully realize the potential for SAF production, there is an opportunity to develop 12 billion gallons of additional ethanol production with more than 90 percent of that new production in the Midwest to go along with the current ethanol production capacity that supports domestic ethanol blending (more than 14.8 billion gallons projected by EIA to be blended for light vehicle use in 2050).

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Midwest Construction Impact Summary				
Event	Employment	Labor Income ($M)	Value Added ($M)	Output ($M)
New Ethanol Production	139,066	$ 9,513.6	$ 13,493.0	$ 25,600.3
SAF from ETJ	64,960	$ 4,505.4	$ 6,424.6	$ 12,070.0
SAF from HEFA	21,456	$ 1,490.2	$ 2,127.8	$ 3,990.4
Total	**225,482**	**$ 15,509.2**	**$ 22,045.4**	**$ 41,660.6**

The construction of this new ethanol production capacity (modeled as 63 new 200 mgy ethanol plants) is expected to generate $25.6 billion in new output, along with $12 billion of new output from the construction of 30 ETJ-SAF production facilities, $4 billion from 6 new HEFA-SAF facilities and eventually even more economic activity from 29 new Power-to-Fuel production facilities. It is expected that more than 225,400 jobs will result from the construction of this new industry, providing $15.5 billion in labor income and more than $22 billion value-added activities. These construction activities are expected to occur over the next 25 years and since there is new capacity projected to be developed nearly every year the impacts in the Midwestern economy should be relatively consistent with more than 9,000 steady construction jobs every year, $620 million in labor or household income, and $881 of additional Gross Domestic Product (GDP) that comes from the value-added activities.

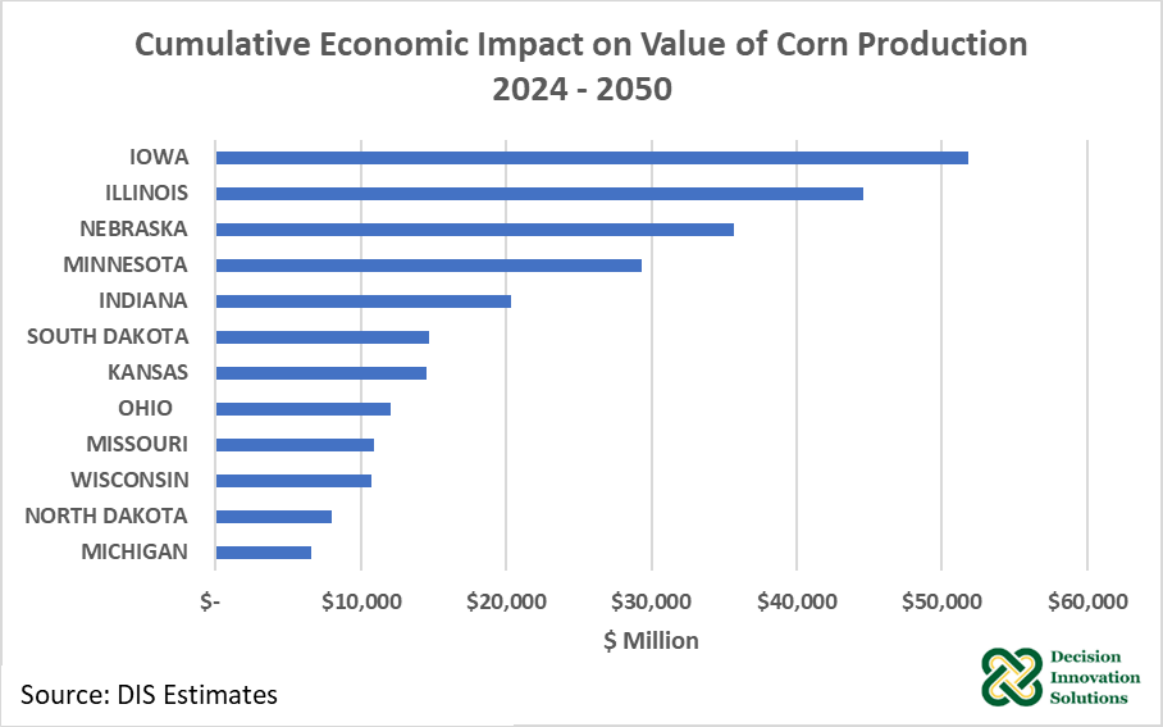
By 2050, annual operations of the new ethanol and SAF production facilities are expected to generate $71 billion per year in additional annual output compared to today's ethanol and SAF production, 224,440 more employment, $9.3 billion in annual labor income, and $19.7 billion in value-added activity expanding the GDP of the Midwest. The 30 new ETJ-SAF production plants are each projected to use 426 million gallons of ethanol annually. In addition, 6 new HEFA-SAF plants are projected to be built and operating in the Midwest by 2050 producing more than 1.1 billion gallons of SAF. And as the industry develops, CO2 captured from the ethanol plants that are producing ethanol for light-vehicle fuel blending can be converted to SAF at the 29 new PTF-SAF plants that would use the CO2 from those ethanol plants.

Midwest Operations Impact Summary				
Event	Employment	Labor Income ($M)	Value Added ($M)	Output ($M)
New Ethanol Production	184,115	$ 7,339.6	$ 15,692.2	$ 56,403.0
SAF from ETJ	22,610	$ 1,140.9	$ 724.3	$ 4,289.3
SAF from HEFA	17,716	$ 840.6	$ 3,277.8	$ 10,449.7
Total	**224,440**	**$ 9,321.1**	**$ 19,694.2**	**$ 71,142.0**

One measure of the economic impact of facilitating corn use for ETJ is the difference in the value of corn production with ETJ demand and without ETJ demand. Using a "stable price" of $4.67 per bushel, the lost value of corn production was calculated in today's dollars. For the Midwestern states in total, the difference in value of production of the corn crop with ETJ versus the scenario of no significant new corn demand is $259.3 billion across the 2024-2050 period. **This is nearly $10 billion per year, on average.**

If that $10 billion per year impact is spread across the current 83 million acres of corn, then it would amount to $120 per acre of corn and for a 1,000-acre farm with 50/50 corn-soybeans, it would amount to $60,240 per year less revenue, on average over the next 25 years. Clearly, the annual impacts would be greater further out in the future than they would be near-term, but strong upward trends in

production need to be accompanied with strong upward trends in utilization or as has been experienced in the past, sharp, painful adjustments to both price and acreage will develop.



Across the Midwest, the new ethanol plants each using approximately 70 million bushels of corn annually with an average basis premium of 10 cents per bushel would add $441 million of additional income to farmers who merchandise corn to these ethanol plants. And this is beyond the economic impact of standard returns for producing those 4.41 billion bushels of additional corn beyond what is being produced in 2023. For a 1,000-acre farm with 50/50 corn and soybeans and trendline national yields, this would mean $11,760 more income in 2050.

Trendline production is increasing by 210 million bushels per year due to trendline yields which are increasing by 1.9 bushels per acre per year and without expanded demand for this new production, either acres in corn production need to decline or price will plummet in response to corn production outpacing the 55 million bushels per year trendline increase in all other uses of corn beyond ethanol production.

As of the writing of this report, there are three CO2 pipelines still under active development in the Midwest. Wolf Carbon Solutions is still working on their pipeline through eastern Iowa and Illinois. Summit Carbon Solutions is still working on a CO2 pipeline that would cross parts of five Midwestern states (IA, MN, NE, SD, and ND) and TallGrass Energy is converting a natural gas pipeline in Nebraska for transport of CO2 to a sequestration point in Wyoming. The exact number of facilities that will capture CO2 is unknown, although a prior-released analysis was conducted that included 31 collection facilities. If regulatory approval for the main trunk line, pumping stations and the sequestration site facilities is eventually approved, it is likely that other facilities that were considering carbon sequestration via pipeline could be added to the Summit Carbon pipeline.

Building out CO2 capture and sequestration via pipeline could have substantial positive impacts across the Midwest. While the trunkline and 31 connected plants are estimated to generate $5.1 billion in

construction impacts, the eventual addition of 33 more plants to that trunkline are estimated to add another $2.58 billion in construction impact. Gross economic impact of capital output relative to capital expenditures is estimated to be $5.4 billion for the combined set of CO2 sequestration construction and capital outlays. Construction employment is estimated to be 4,697 jobs and total federal, state, and local taxes from construction activities and capital outlays is estimated to be $559 million.

Annual operations of the combined carbon collection and sequestration activities are estimated to be $256 million with gross economic output of $568 million with 3,499 jobs and $146 in annual federal, state and local taxes being generated.

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2 Introduction

Carbon capture and sequestration (CCS) holds great potential for allowing Iowa produced renewable fuels to move from reduced carbon fuels to securing a position as a producer of very low carbon fuels. The capturing of carbon dioxide at ethanol plants, power plants, and other manufacturing facilities that currently emit carbon dioxide as a result of fuel consumption or as a byproduct of a manufacturing process is technically feasible and is becoming more economically feasible, especially when combined with pipeline transport of the captured carbon dioxide to permanent terrestrial storage.

In December 2022, the Administration through the U.S. Department of Energy announced the launch of four programs that are designed to accelerate private-sector investment and spur advancements in carbon management technologies. The new efforts from the Bipartisan Infrastructure Law are:

- **Direct Air Capture Commercial and Pre-Commercial Prize** –support and prize awards totaling $115 million to promote diverse approaches to direct air capture. The Direct Air Capture Pre-Commercial Prize provides up to $15 million in prizes to incubate and accelerate research and development of breakthrough direct air capture technologies. The Direct Air Capture Commercial Prize provides up to $100 million in prizes to qualified direct air capture facilities for capturing CO2 from the atmosphere.
- **Regional Direct Air Capture Hubs** – DOE will invest $3.5 billion to develop four domestic regional direct air capture hubs, each of which will demonstrate a direct air capture technology or suite of technologies at commercial scale with the potential for capturing at least 1 million metric tons of CO2 annually from the atmosphere and storing that CO2 permanently in a geologic formation or through its conversion into products.
- **Carbon Utilization Procurement Grants** – which will provide grants to states, local governments, and public utilities to support the commercialization of technologies that reduce carbon emissions while also procuring and using commercial or industrial products developed from captured carbon emissions.
- **Bipartisan Infrastructure Law Technology Commercialization Fund (TCF)** – DOE's Office of Technology Transitions (OTT), in partnership with FECM, will issue a Lab Call to accelerate commercialization of carbon dioxide removal technologies, including direct air capture, by advancing measurement, reporting, and verification best practices and capabilities. OTT anticipates awarding $15 million to projects led by DOE National Laboratories, plants, and sites, and supported by diverse industry partnerships spanning the emerging carbon dioxide removal sector.

In addition to these new programs the Inflation Reduction Act enhanced the tax credits provided by Section 45Q of the tax code and initiated a new set of tax credits in Section 45Z that have the potential to stimulate carbon-reducing activities all along the supply chain of renewable fuels and greatly enhance the role of carbon capture and sequestration in the effort to reduce the carbon Intensity (CI) scores of ethanol and other advanced biofuels such as Sustainable Aviation Fuel (SAF).

First introduced in 2008, Section 45Q of the Unites States Internal Revenue Code provides a tax credit for CO2 storage. The policy is intended to incentivize deployment of carbon capture, utilization and storage (CCUS), and a variety of project types are eligible. Under Section 45Q, captured carbon dioxide must be either stored underground in secure geologic formations, used for carbon dioxide-enhanced oil recovery or utilized in other projects that permanently sequester carbon dioxide.

The 2022 changes to 45Q provide up to $85 per metric ton of CO2 permanently stored and $60 per metric ton of CO2 used for enhanced oil recovery (EOR) or other industrial uses of CO2, provided emissions reductions can be clearly demonstrated. The credit amount significantly increases for direct air capture (DAC) projects to $180 per metric ton of CO2 permanently stored and $130 per metric ton for used CO2. In addition, the 2022 changes reduce the capacity requirements for eligible projects: 18,750 metric tons per year for power plants (provided at least 75% of the CO2 is captured), 12,000 metric tons per year for other facilities, and 1,000 metric tons per year for DAC facilities. Finally, the 2022 changes include a seven-year extension to qualify for the tax credit, meaning that projects have until January 2033 to begin construction.

In Part 2 of Subtitle D of the Inflation Reduction Act, tax credits for clean fuel production are contained in section 45Z. This credit applies to clean fuels produced after 2024 and generally sold before 2028. It is a new general business credit for clean transportation fuel that is produced at a qualifying facility and sells for qualifying purposes. These fuels must meet certain emissions standards. For ethanol the credit-per-gallon base amount is $0.20 (non-aviation fuel) and the credit amount increases to $1.00 per gallon (non-aviation fuel) if wage and apprenticeship requirements are met and are based on the fuel's carbon intensity score with a CI score of 50 kgCO2e/mmbtu (based on the GREET model) being the trigger point, and the credit potential increasing as the CI score declines toward zero. So, essentially, each reduction in the CI score of the fuel below 50 generates a 2 cents per gallon production tax credit with the tax credit being maximized at $1.00 per gallon if the CI score is zero.

No credit under the 45Z tax credit is allowed at a facility that includes property for which a credit is taken under sections 45Q, 45X, or section 48 ITC for clean hydrogen production facilities during the taxable year.

Currently, most of the corn-starch-based ethanol production in Iowa has CI scores between 55 – 65 based on the GREET model. There are a number of production techniques and methodologies that can be implemented to incrementally reduce the carbon emissions of ethanol production, but the use of CCUS is the most effective means of dramatically reducing the carbon emissions of ethanol production from corn with the implementation of CCUS estimated to typically reduce the CI score of an ethanol facility by approximately 30 CI points. In addition to the changes to the processes at the ethanol plants there are changes to production practices that corn producers can make which can also reduce the CI score of ethanol by reducing the CI score of the corn production process.

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2.1 SAF Grand Challenge Roadmap Overview

An interagency team led by DOE, DOT, and USDA worked with EPA, other government agencies, and stakeholders from national labs, universities, nongovernmental organizations (NGOs), and the aviation, agricultural, and energy industries to develop the SAF Grand Challenge Roadmap which was released in September 2022. The Roadmap outlines a whole-of-government approach with coordinated policies and specific activities that should be undertaken by the federal agencies to support achievement of both the 2030 and 2050 goals of the SAF Grand Challenge. The roadmap is designed to ensure alignment of government and industry actions and coordinate government policies to achieve the goals of the SAF Grand Challenge. This includes coordination in the formation and execution of plans in research, development, demonstration, and deployment such as modeling and analysis to ensure sharing of approaches, tools, assumptions, and insights across agencies' research centers at the DOE national laboratories, FAA's Center of Excellence for Alternative Jet Fuels and Environment (ASCENT), and USDA's Agricultural Research Service (USDA-ARS), Forest Service (USDA-FS), and USDA's National Institute of Food and Agriculture (USDA-NIFA).

The Roadmap lays out six action areas detailing all activities with the potential to impact SAF Grand Challenge objectives of (1) expanding SAF supply and end use, (2) reducing the cost of SAF, and (3) enhancing the sustainability of SAF. The six action areas are:

- Feedstock Innovation
- Conversion Technology Innovation
- Building Supply Chains
- Policy and Valuation Analysis
- Enabling End Use
- Communicating Progress and Building Support

Within the SAF Grand Challenge, two primary goals for the U.S. have been established:

- 3 billion gallons of SAF production and use per year by 2030
- 35 billion gallons of SAF production and use per year by 2050

These goals account for about one-third of the global targets for the SAF market which are likely 100 million gallons or more. Just as the U.S. is an exporter of ethanol and other fuels, there will likely be opportunities for the U.S. to be exporters of SAF.

While there are many specific policy statements, actions and activities that have been put in place or are being put in place to support these goals, several provisions were contained within the 2022 Inflation Reduction Act (IRA) that were specifically targeted at supporting the 2030 objectives of the SAF Grand Challenge Roadmap. As cited in the Roadmap, these provisions are:

SAF Provisions of the 2022 Inflation Reduction Act (IRA)
The Inflation Reduction Act of 2022, signed into law by President Biden on August 16, includes a two-year tax credit for those who blend SAF; a subsequent three-year tax credit for those who produce SAF; and a grant program of $290 million over four years to carry out projects that produce, transport, blend, or store SAF, or develop, demonstrate, or apply low-emission aviation technologies. To be eligible, the SAF must achieve, in general, at least a 50% improvement in GHG emissions performance on a life cycle basis as compared with conventional jet fuel. The tax credit—which starts at $1.25/gallon of neat SAF—increases with every percentage point of improvement in life cycle emissions performance up to $1.75/gallon.

2.2 Summary: What is Needed to Achieve 100% SAF Use by 2050?

The factors that characterize what is needed to achieve 100% SAF use in the U.S. by 2050 are:

- Increased production of feedstocks
- Reduced cost of transformation processes
- Demand drivers
- Enabling policy
- Public support

The early development of SAF will require increased production of feedstocks, primarily those feedstocks that are used in HEFA-SAF pathways and the use of low-carbon ethanol for ETJ. Increased availability of HEFA feedstocks can come about through technological advancements such as increased Distillers Corn Oil (DCO) recovery, increased recovery of used cooking oil (UCO), and increased vegetable oil yields on a per-acre basis of both soybean oil and canola oil[1]. Increased low-carbon ethanol as a feedstock will become increasingly available from ethanol facilities that can do direct sequestration of CO2 onsite, but the real ramp-up in availability of low-carbon ethanol will come from capture and sequestration via pipeline for the ethanol produced in Iowa, Minnesota, Nebraska, South Dakota, and North Dakota.

Transformation processes for cellulosic ethanol, some Fischer-Tropsch (FT) gasification pathways, and for transformation of direct air capture CO2 to SAF all are relatively expensive at present. Technological breakthroughs are needed to reduce the cost of these pathways. Cellulosic ethanol has a very attractive CI score, but the feedstock gathering costs tend to be high, materials handling can be difficult, and the cost of transformation of cellulosic materials into alcohols is generally more expensive than using starch-based materials such as corn. According to (Zang et.al, 2021) one of the key issues with use of the FT process for liquid fuel production from hydrogen and CO2 is the cost of hydrogen production as well as the cost of electrical generation which can result in FT liquid fuels costing 75% to 100% more than petroleum-based fuels. Most Power-to-Fuel (PTF) processes that use captured CO2 and renewable hydrogen, while technically feasible, are very expensive to produce.

[1] A substantial amount of research is currently underway for oilseed cover crops that may provide additional, low-carbon feedstocks for HEFA, but the research has not progressed far enough at this time to be included in this study.

Typically, replacement of one fuel source with another comes from within a market that takes into account the costs and benefits of the newer fuel. In the case of SAF, the demand drivers are very likely to be based in government policy as it relates to carbon emissions and the desire to de-carbonize the air travel industry. Demand driven by this consideration will likely need substantial incentives to mobilize the private sector investments that will be needed to build the next generation of low carbon fuel production facilities. Airlines, themselves, will need to be very involved in the early stages of the transformation of fuel supplies to SAF. Offtake contracts and other instruments that will provide sufficient stability for long-term investments in SAF production will likely be common to get SAF production capacity up to a critical mass where market economics can become more of the driver of full adoption.

Public policy needs to be enabling of the early investments in SAF production and consumption. Federal tax policies as contained in the Inflation Reduction Act of 2022 will play influential roles in both feedstock development and production as well as SAF production itself. But these public incentives need to be evaluated on regular basis to make sure that the policies are not creating their own barriers to SAF development such as the seemingly advantage that renewable diesel has over SAF production when all tax and renewable energy credits are taken into account. For the 100% SAF goal to be achieved in 2050, such disparities will need to be addressed.

And then there is public support. Production of SAF requires low-carbon feedstocks. And one of the most promising low-carbon feedstocks can be corn-based ethanol with the carbon sequestered. Some ethanol plants have the potential to do on-site sequestration of CO2. But most plants in Iowa, Minnesota, Nebraska, South Dakota, and Nort Dakota will need to move the CO2 captured at their ethanol plants to sequestration sites that may be several hundred miles away and the most economical and efficient way to transport such CO2 is via pipeline. But pipelines face vocal public opposition in some areas. Getting public buy-in to the whole process will be an essential element of unleashing the potential economic value that can accrue to the Midwest through SAF production.

And, the potential for SAF adoption will depend on the extent to which low-carbon air transport is demanded by the public. SAF is likely to cost more than petroleum-based jet fuels. And this extra cost will, at least to some degree, be borne by those who utilize air travel. Engaging the public and eliciting public support will be a very important aspect of the future of SAF production.

3 SAF Production Pathways

There are multiple technology pathways to produce fuels approved by ASTM and blending limitations based on these pathways. ASTM D7566 *Standard Specification for Aviation Turbine Fuel Containing Synthesized Hydrocarbons* dictates fuel quality standards for non-petroleum-based jet fuel and outlines approved SAF-based fuels and the percent allowable in a blend with Jet A. ASTM D1655 *Standard Specification for Aviation Turbine Fuels* allows co-processing of biomass feedstocks at a petroleum refinery in blends up to 5%. Both ASTM standards are continuously updated to allow for advancements in technology to produce SAF. DOE's Sustainable Aviation Fuel Review of Technical Pathways provides details on various SAF production pathways.

The pathways below represent only those currently approved by ASTM. Processes and tests exist for the approval of other feedstocks, fuel molecules, and blending limits, and the types of approved fuels will increase as these are evaluated through this process[2].

Pathway	Feedstocks
Fischer-Tropsch (FT) Synthetic Paraffinic Kerosene (SPK)	**Municipal solid waste, agricultural and forest wastes, energy crops**
Hydroprocessed Esters and Fatty Acids (HEFA)	**Oil-based feedstocks (e.g., jatropha, algae, camelina, and yellow grease)**
Hydroprocessed Fermented Sugars to Synthetic Isoparaffins	**Sugars**
FT-SPK with Aromatics	**Municipal solid waste, agricultural and forest wastes, energy crops**
Alcohol-to-Jet Synthetic Paraffinic Kerosene	**Cellulosic biomass**
Catalytic Hydrothermolysis Synthesized Kerosene	**Fatty acids or fatty acid esters or lipids from fat oil greases**
Hydrocarbon-Hydroprocessed Esters and Fatty Acids (HEFA)	**Algal oil**
Fats, Oils, and Greases (FOG) Co-Processing	**Fats, oils, and greases**
FT Co-Processing	**FT biocrude**

[2] A detailed list of the SAF pathways is included in the appendix.

4 U.S. SAF Pathway(s)

The Energy Information Administration (EIA) in their 2023 Outlook forecasts jet fuel use will rise to 32.887 billion gallons[3] by 2050 from 23.111 million gallons of use in 2022. In 2022, it is estimated that 15.8 million gallons of SAF were produced in the U.S., representing less than 0.1% of total jet fuel use.

A goal has been established to use 3 billion gallons of SAF by 2030 in the U.S. and to have production of 35 billion gallons of SAF in the U.S. by 2050. Additionally, there are industry objectives to use 100% SAF in aviation fuels by 2050. For this analysis, the latter goal of 100% SAF by 2050 was used. SAF production in 2050 was set equal to the EIA's 2050 jet fuel production projection 32.887 billion gallons.

Figure 1 presents two potential pathways for the U.S. aviation industry to reach 100% SAF by 2050. One scenario assumes that 3 billion gallons will be available and used annually by 2030 and then assumes a linear trend on replacement of conventional jet fuel with SAF from 2030 to 2050. This scenario is given by the gray line in Figure 1.

A more likely scenario is one where there is a strong push to achieve 3 billion gallons of SAF production in the U.S. by 2030 but the ramp-up to 100% SAF use in the U.S. falls short of a linear trend and has a slower ramp-up throughout the 2030s and into the 2040s and then rapidly accelerates beginning in the mid-2040s with rapid deployment of CO2-based Power-to-Fuels technology advances and becomes much more cost effective. This scenario is shown by the blue bars in Figure 1.

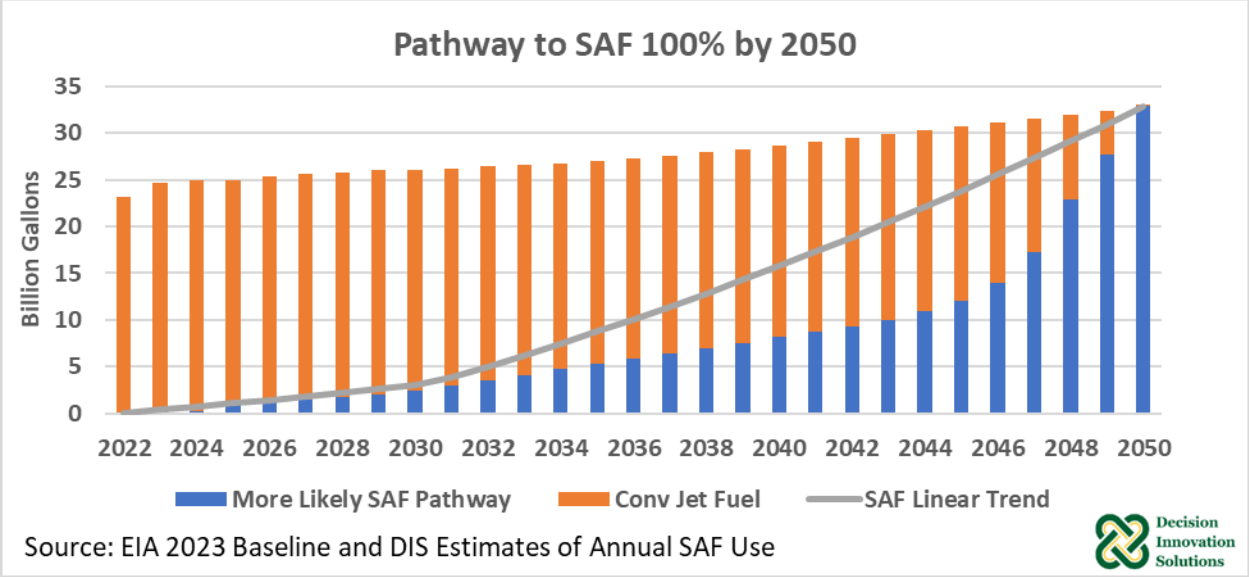


Figure 1. Pathway to SAF 100% by 2050

The Environmental Protection Agency (EPA) collects renewable fuel data as part of the Renewable Fuel Standard. Although the data is labeled as production data, it gives an approximate consumption of biofuels such as SAF. According to this data about 5 million gallons of SAF were consumed in 2021 and over 18 million gallons in 2023 (through September) (see Figure 2). Two other commercial producers of SAF are World Energy, which began production in 2016 at their Paramount facility in California, and international producer Neste. World Energy supplies SAF to Los Angeles International Airport and

[3] Converting trillion Btus into million gallons by multiplying by the conversion factor of 7.4195 gallons of kerosene type jet fuel per 1 million Btus.

Ontario International Airport. Neste supplied SAF to San Francisco International Airport in 2020, and in 2021 the company introduced SAF at a regional airport (Telluride Regional Airport) and at a county airport (Aspen/Pitkin County Airport) in Colorado. More producers have begun supplying SAF to customers in 2023 and several more facilities are under construction or ramping up production over the coming years. The demand side is also beginning to pull product through the system with many airlines having signed agreements with existing and future SAF producers to utilize hundreds of millions of gallons of these fuels (US DOE, 2023, Sustainable Aviation Fuel).

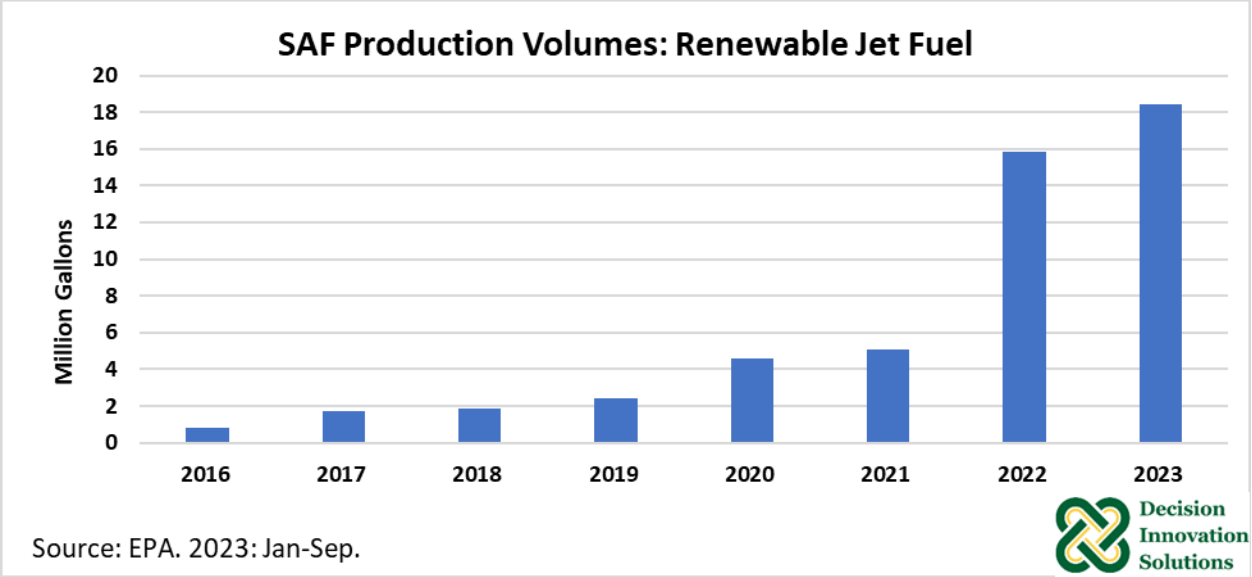


Figure 2. SAF Production Volumes: Renewable Jet Fuel

Figure 3 is an example of the potential pathways by major feedstock type for SAF aiming to reach the stated goals of 3 billion gallons of SAF use in the U.S. by 2030 (although the DIS pathway only reaches 2.4 billion gallons of SAF in 2030) and to reach 100% SAF utilization in the U.S. by 2050 using the DIS "more likely" pathway for SAF adoption in the U.S. This example follows the McCurdy-ICF pathway estimates for Fischer-Tropsch (FT) SAF which grows to approximately 2.7 billion gallons by 2050, and adds to that the DIS estimates for HEFA-based SAF, corn-ethanol-based SAF (ETJ), assumes that other Alcohol to Jet (ATJ) will grow slowly and top out at about 2.4 billion gallons, and Power to Fuel (PTF) options will fill in the residual to meet the overall goals and annual milestones along the way to the ultimate goal of 100% SAF utilization in the U.S. by 2050 (McCurdy, 2023). The pathway estimates assume that once production is ramped up, PTF from CO2 from ethanol plants will make up a significant portion of the initial PTF component of SAF and that other (non-corn CO2 or other feedstocks) PTF fuels will fill in the requirements to meet "Net Zero" by 2050. Key assumptions for these pathways results are summarized below and discussed in more detail in sections 0-9 and sections 14.7-14.9 in the appendix.

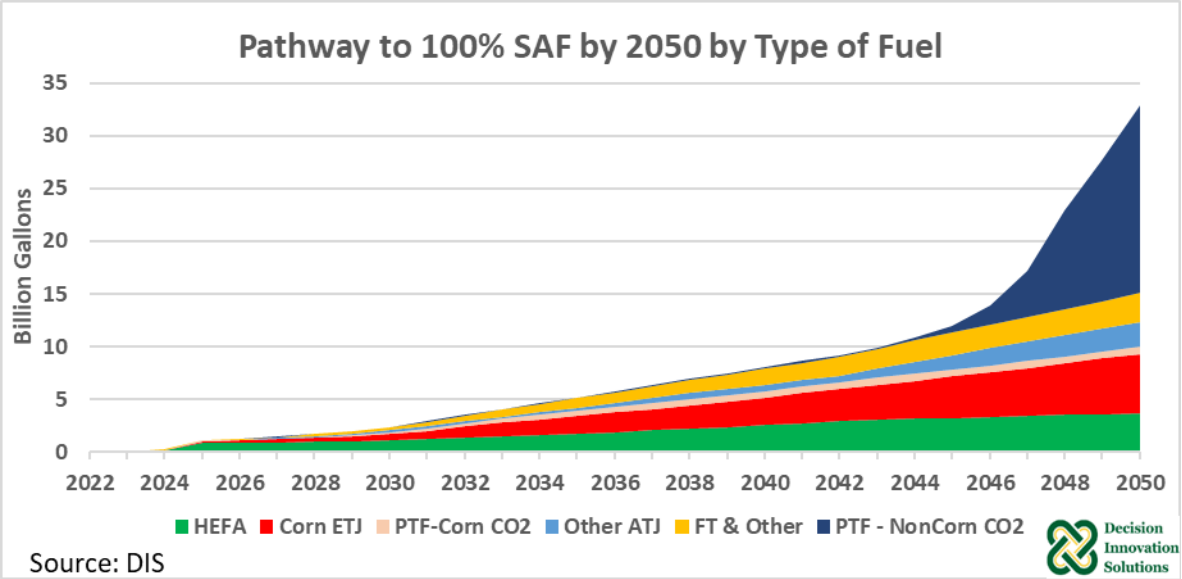


Figure 3. Fulfillment of U.S. SAF Demand by year, 2021 – 2050; DIS Estimates

In this set of pathways[4], HEFA-based SAF is the early leader. It rises from approximately 16 million gallons used in 2022 to 1.1 billion gallons in 2030, and then rises to 3.7 billion gallons in 2050. The DIS HEFA pathway accounts for co-product production of renewable diesel (RD) from other pathways and assumes that HEFA-based renewable energy capacity will be re-directed to SAF as other sources of RD ramp up.

The ETJ pathway begins with 21 million gallons coming online in 2024, ramps up to 623 million gallons in 2030, and rises through the remaining period to 5.59 billion gallons of ETJ-SAF by 2050. This ETJ pathway assumes that U.S. corn production grows at the rate of the 1980-2023 trendline (driven by increasing trends for corn yields while maintaining corn acres in line with recent levels), that non-ethanol use of corn (exports, feed, food) grows at the rate of the 2013-2023 trendline (55 million bushels per year), and that the balance of corn would be available for ethanol production. This production would satisfy both the EIA baseline for light-vehicle use and meet export demand and that the balance would be available for ethanol production that could be used for ETJ-SAF production with ETJ-SAF production ramping up from 5% of the potential newly available ethanol being used for ETJ-SAF in 2024 and reaching 100% of the extra ethanol being available and used for ETJ-SAF production by 2050. This also assumes that the combination of policy incentives, technological advances, and infrastructure development are sufficient to lower the CI score of corn-based ethanol enough so that it can be successfully transformed into SAF.

This pathway assumes that the ethanol produced with carbon capture and sequestration and used for ETJ represents 0.2% of ethanol production in 2024, 8.6% of ethanol in 2030, and 45.9% of ethanol production in 2050. The DIS pathway assumes that plants producing ethanol for ETJ will be a mixture of existing plants that install carbon capture and sequestration and new plants that are built specifically for ethanol production for ETJ and incorporate CCS at construction either by tying into an existing CO2 pipeline or through on-site direct injection of CO2.

The Other Alcohol to Jet (ATJ-SAF) pathway starts out at 20 million gallons of production in 2024 and grows to 140 million gallons by 2030 and then continues to increase to 2.4 billion gallons by 2050.

[4] Specific pathway details are contained in Section 5.

The FT-SAF pathway begins with an estimated 26 million gallons of FT-SAF in 2023, increases to 300 million gallons by 2030, and rises throughout the remainder of the pathway to 2050, reaching 2.7 billion gallons of FT-SAF use in 2050.

The Power to Fuel (PTF-SAF) pathway has two parts[5]. The first part is PTF-SAF that is made from CO2 captured at ethanol plants that produce ethanol for light-duty vehicles, capture CO2 and then that captured CO2 is converted into SAF either nearby or in plants that receive their CO2 from an existing pipeline, or by rail. This pathway is modeled to grow from 10 million gallons in 2024 to 180 million gallons by 2030 and then continues to increase through 2050, reaching 674 million gallons of SAF in 2050 and utilizes 90% of the CO2 captured from ethanol production that is used in light-duty vehicles. Note that due to current tax policy, it is assumed that for ethanol to be used for ETJ, the CO2 must be captured and sequestered. Thus, the only CO2 from ethanol plants that is available for SAF production is from ethanol which is blended and used in light-duty vehicles.

The second part of the PTF pathway uses feedstocks other than CO2 from corn ethanol production. For this study, we have modeled this CO2 as primarily being of direct air capture (DAC). This pathway is expected to grow from 10 million gallons in 2024 to 40 million gallons by 2030 and then rise to 17.8 billion gallons in 2050. Currently, this pathway is likely the most expensive pathway for SAF production, but it is assumed that technology advances will occur that allow for this pathway to become much more cost effective in the future and will be the largest source of SAF by 2050, ultimately supplying 42% of total SAF used in the U.S. in 2050.

The DIS pathway for SAF production in the U.S. does not reach 3 billion gallons until 2032 (only reaching 2.402 billion gallons in 2030); only reaches 22% market penetration by 2040; does not exceed 50% market penetration until 2047; and ramps up very rapidly in the 2048-2050 period. “Speeding up” the adoption rate of this pathway could be achieved if policy initiatives, tax incentives, market demand and public support align for swifter development of cost reductions in PTF, more complete facilitation of ETJ from existing ethanol plants, and more cost-effective development of the FT pathways.

[5] The Brandlt *et. al. models* indicate that each ton of captured CO2 can be transformed into 17.0589 gallons of SAF.

5 Operational Models of HEFA, ETJ, PTF, and FT

Operational models are used to understand the relative competitiveness of each SAF feedstock and pathway under projected incentives and cost structures. Models needed to be specified at the feedstock level as CI scores of finished SAF can vary significantly by feedstock, even for the same general pathway.

Models developed by Brandt *et. al.* (2021a, 2021b, 2021c) were used to create hypothetical operational models. The models developed by Brandt *et al* contained key default parameters including product yields, CAPEX costs, OPEX costs, and historic fuel price relationships among others. Figure 4 and Table 2 outline some of the key defaults taken from these models.

Note: Actual industry experiences may differ from the parameters contained in the models used. And, we expect industry to achieve greater yields, improved efficiencies, and reduced costs over time as the pathways expand commercially. However, given the nascent nature of the SAF industry at this time, and the lack of publicly available data on actual operations, we believe the models used in this report provide results that are directionally correct and reflect the relative performance of the pathways correctly.

Figure 4 shows the distillate breakout from each pathway. It is important to note that not all output product of an SAF plant is SAF. Some mixture of co-products including renewable diesel, aviation gasoline, naphtha, and propane are produced as well. We used the highest possible SAF distillate percentage available in the models developed by Brandt *et. al.* in this analysis and these are included in Figure 4. ETJ and HEFA have the highest percentages of modeled SAF from the distillate stack while PTF pathways have lower percentages of SAF.

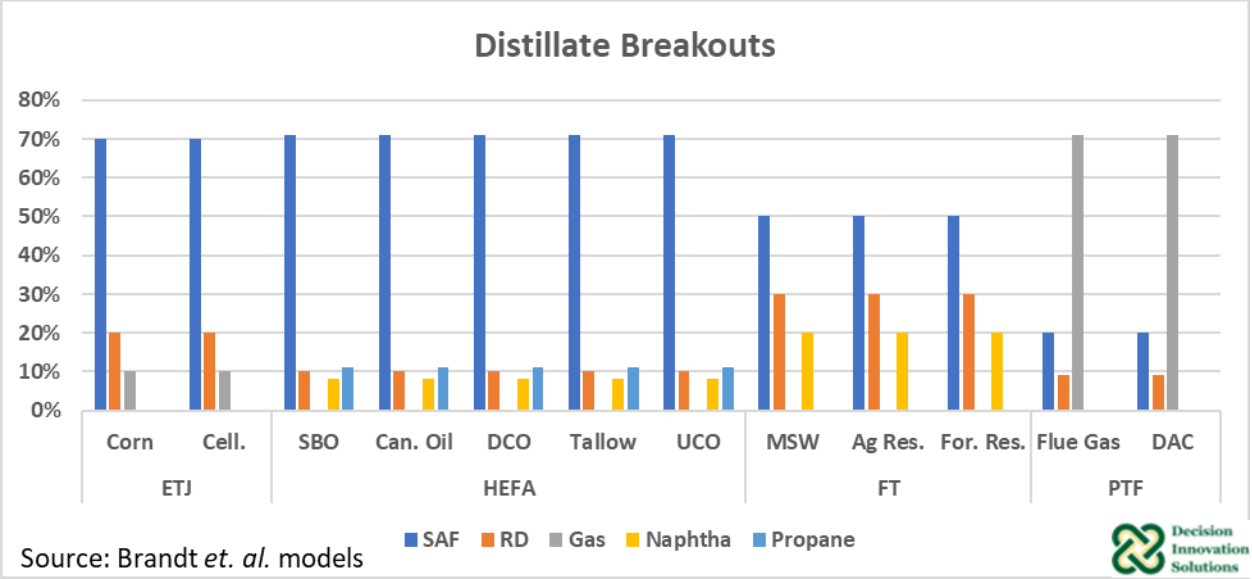


Figure 4. Distillate Breakouts

Table 2 provides some key default values including distillate yields and plant level capacity and production. Given the assumptions used in this paper, ETJ and HEFA plants will have much higher production of SAF per plant than FT and PTF pathways.

Table 2. SAF Key Factors

Processing Technology	Feedstock	Yield (MT distillate/ MT feedstock)	Plant Feedstock Capacity (1,000 MT feestock/yr)	Plant Distillate Capacity (mil gal distillate/yr)	SAF Production (mil gal/yr)
ATJ	ethanol	0.60	1,260	264	185
HEFA	vegetable oils	0.83	892	264	185
HEFA	FOGs	0.83	892	264	185
FT	MSW	0.31	1,290	132	70
FT	forest residues	0.18	1,290	106	41
FT	agricultural residues	0.14	1,290	79	31
PTF	flue gas	0.24	1,290	264	22
PTF	DAC	0.24	1,290	264	22

Notes: FOGS = fats, oils, and greases; MSW = municipal solid waste; DAC = direct air capture
Source: Adapted from ICAO SAF rules of thumb and supported by Brandt *et. al.* models

Current price levels were collected for all necessary inputs for each feedstock pathway. In general, these did not vary significantly from the model defaults, though some feedstock prices had relatively large differences. For example, soybean oil has increased in price notably since the models were originally developed.

CI score estimates were also collected so 45Z tax credits could be estimated. Most CI score estimates are from the GREET Aviation module (Figure 5). The module did not contain flue gas or direct air capture (DAC). Aggressive assumptions of a zero CI score for the CO2 used to produce these fuels. As noted later in the report, even with aggressively low CI scores, these fuels still are not yet projected to be cost competitive. All CI scores for SAF were adjusted by relative fuel energy content to get CI scores of co-product fuels.

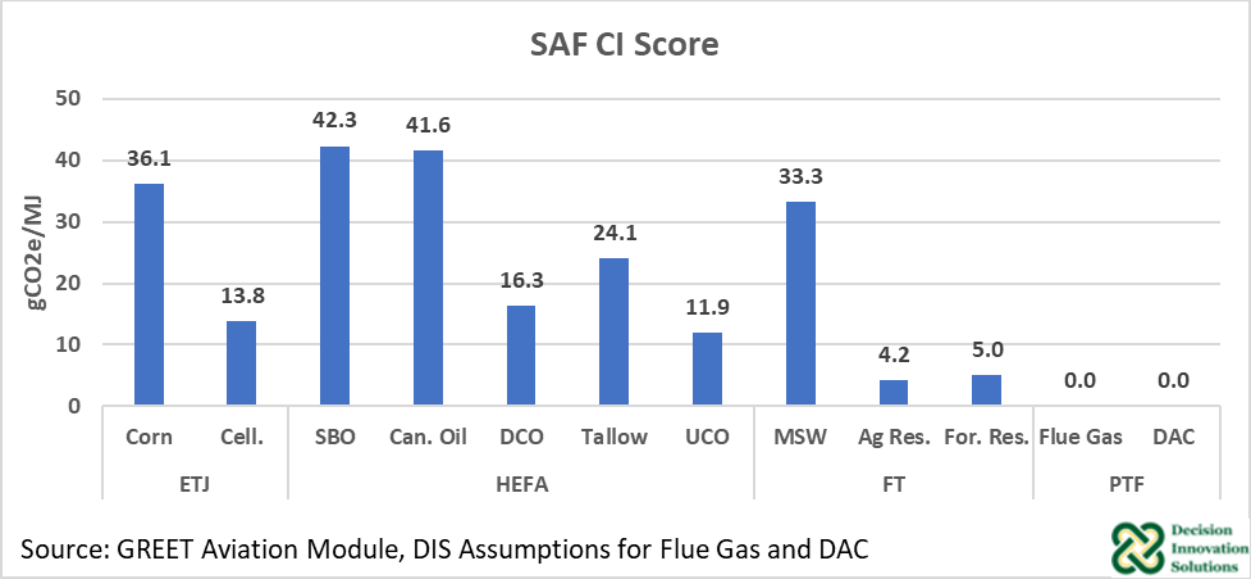


Figure 5. SAF CI Scores

Reporting only costs and revenues of the SAF plant can be misleading because of the differences in the assumed percent of the distillate converted to SAF. For this paper, these assumed distillate levels mean pathways like ETJ and HEFA will be better able to capture SAF benefits, as a higher percentage of their

total distillate is SAF. Pathways with lower SAF distillate yields will have a harder time utilizing SAF benefits, because the benefits apply to a lower percentage of their total distillate.

For this reason, values for revenues and expenditures of SAF plants are reported on a per mass of distillate basis instead of only on an SAF basis. This allows for better comparison of the total profitability of the plant. Using assumed prices collected by DIS and models created by Brandt *et. al.* revenues and expenditures of multiple SAF pathways were calculated for a projected year 2050.

EIA long term projections were used for jet fuel, electricity, and natural gas prices. The historic relationship between jet fuel and other wholesale fuel prices was used to determine the prices of other fuels. In most other cases a large assumption was made that prices would increase at exactly the rate of inflation.

Two additional large assumptions relate to RIN prices and other feedstock prices. First, it is assumed that RIN prices will remain at current levels. RIN prices are essentially policy driven as they are based on EIA's mandated blend rates relative to US production capacity, so they are extremely difficult to forecast. Second, it is assumed feedstock prices will remain unchanged from current levels, except for adjustments to inflation. This is the large assumption and least likely to hold as large increase in demand from SAF production will likely increase prices of all feedstocks.

With these admittedly large assumptions, it is still possible to see the relative profitability of various SAF pathways. Corn ETJ looks very profitable, with cellulosic ETJ also slightly profitable. This even included a higher ethanol price to accommodate cellulosic ethanol production. All HEFA pathways are very profitable, especially distillers corn oil (DCO) and used-cooking oil (UCO), two pathways with relatively low CI scores. The Fischer-Tropsch pathways analyzed here also look profitable, especially for municipal solid waste (MSW). Though this assumes feedstocks can be obtained at relatively low costs. This assumption may not hold, particularly for MSW at relatively high quantities of production.

Figure 6 shows the revenue and costs of various feedstocks and pathways assessed in this analysis. Figure 7 shows the net revenue at the SAF plant level reported on a dollar per kg of distillate level. As noted above, the varying distillate breakouts make it misleading to report the net operating returns of an SAF plant based solely on SAF output.

With all previous stated assumptions, MSW has the greatest net revenue per kg of distillate mix at $1.30/kg. PTF pathways show negative returns even with an aggressive assumption of a 0 CI score for these pathways. No assumptions were made about the technological improvements to reduce relative costs. Alternatively, technological advances that would increase the relative percentage of SAF from the distillate in these pathways (or increase the amount of distillate per unit of input) would raise revenue and potentially make these pathways look more attractive in the future.

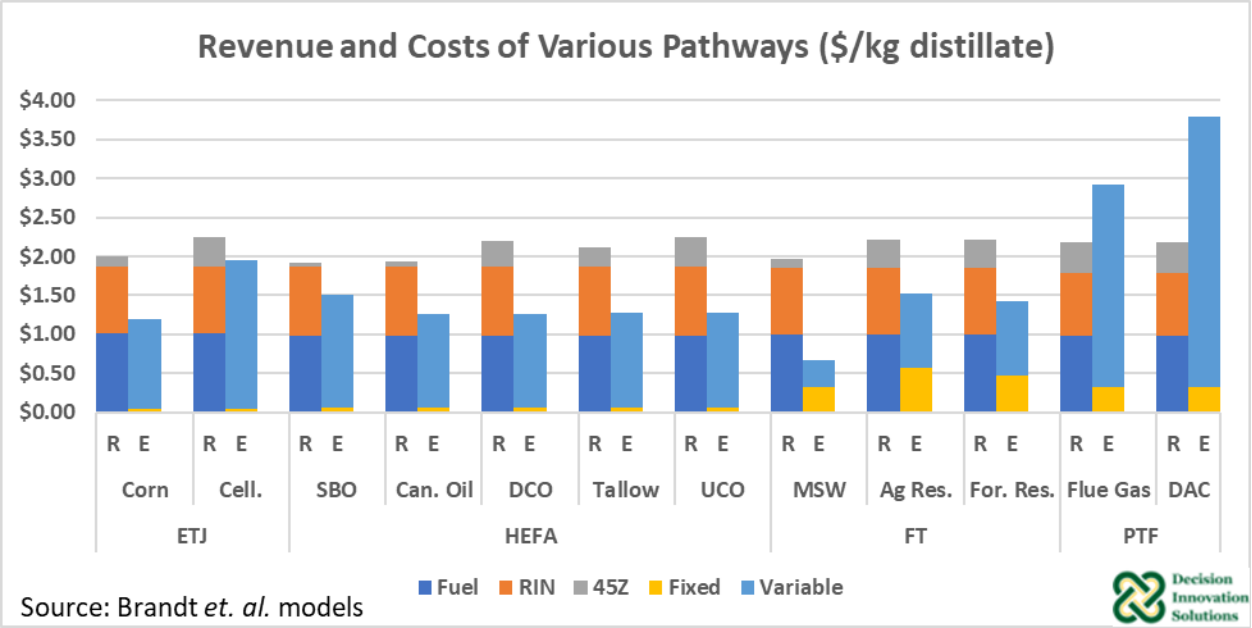


Figure 6. Revenue and Costs of Various Pathways ($/kg distillate)

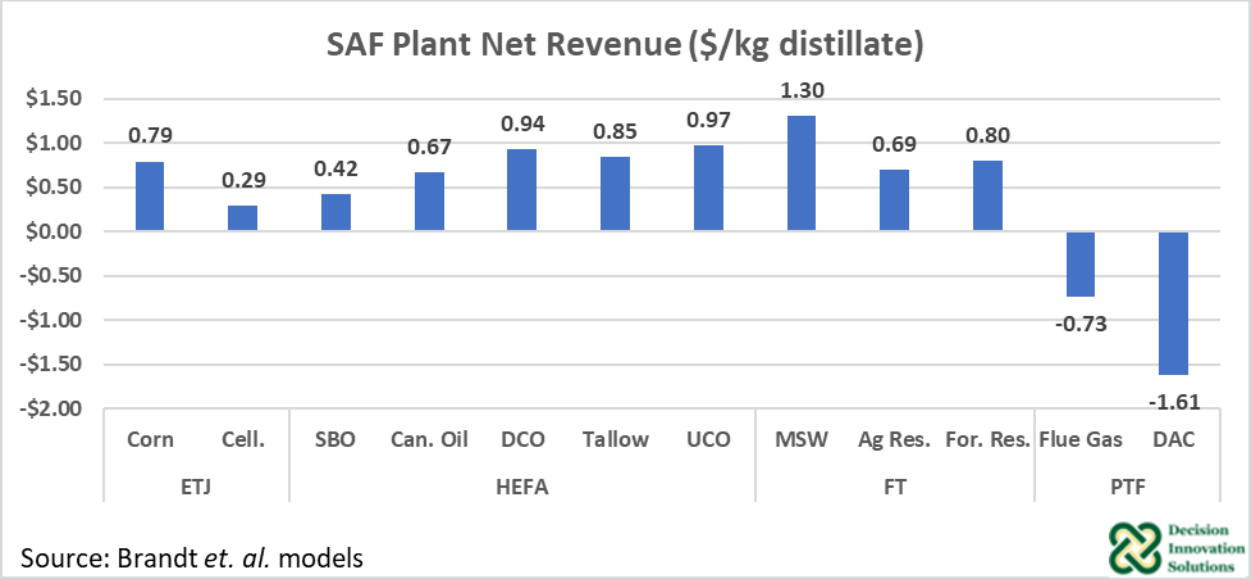


Figure 7. SAF Plant Net Revenue ($/kg distillate)

6 HEFA-based Biofuels and HEFA-SAF Forward Production Pathways

Feedstock supplies for HEFA-based fuels primarily come from vegetable oils (soybean oil, distillers corn oil, and canola oil), animal fats (tallow, choice white grease, poultry fat) and recovered fats (yellow grease, brown grease, and used cooking oil). In 2022, it is estimated that 23.282 billion pounds of these feedstocks were used for combined methyl-ester biodiesel, renewable diesel, and SAF fuel production. In 2022, 51.5% of the HEFA feedstocks were soybean oil (SBO), 16.2% was distiller corn oil (DCO), 4.2% was canola oil (CANO), and 28.2% was from animal fats and other fats/oils (Table 3).

Table 3. HEFA-Based Biofuels Feedstock Use by Type of Fuel (2022)

HEFA-Based Biofuels Feedstock Use by Type of Fuel (2022)				
	Million Pounds			
Feedstock	ME-BD	RD	HEFA-Fuels Total	Share Pct
Soybean Oil	6,828	5,154	11,982	51.5%
DDG Corn Oil	1,279	2,484	3,763	16.2%
Canola Oil	968	-	968	4.2%
Inedible Tallow	370	863	1,232	5.3%
White Grease	703	-	703	3.0%
Yellow Grease	1,235	2,194	3,429	14.7%
Brown Grease	549	-	549	2.4%
Poultry Fat	274	341	616	2.6%
Other/Residual	40	-	40	0.2%
Total	12,246	11,036	23,282	100.0%
Source: EIA				

Forward projections of soybean production were done by applying the 1980-2023 trend for soybean yields to the current level (10-year average) of soybean acres (Figure 8). The U.S. soybean yield is increasing by 0.549 bushels per acre per year. The 10-year average of soybean harvested acres is 83.7 million acres. Projecting these forward results in 4.332 billion bushels of soybean production in 2024 and increases to 5.526 billion bushels of soybean production in 2050.[6]

[6] DIS calculated forward soybean production using a simple 1980-2023 production trend. This method resulted in slightly less soybean production in the near term (2024-2026) but resulted in more soybean production for the years 2027 through 2050 with 5.947 billion bushels in 2050. For this analysis DIS selected the more conservative production estimate.

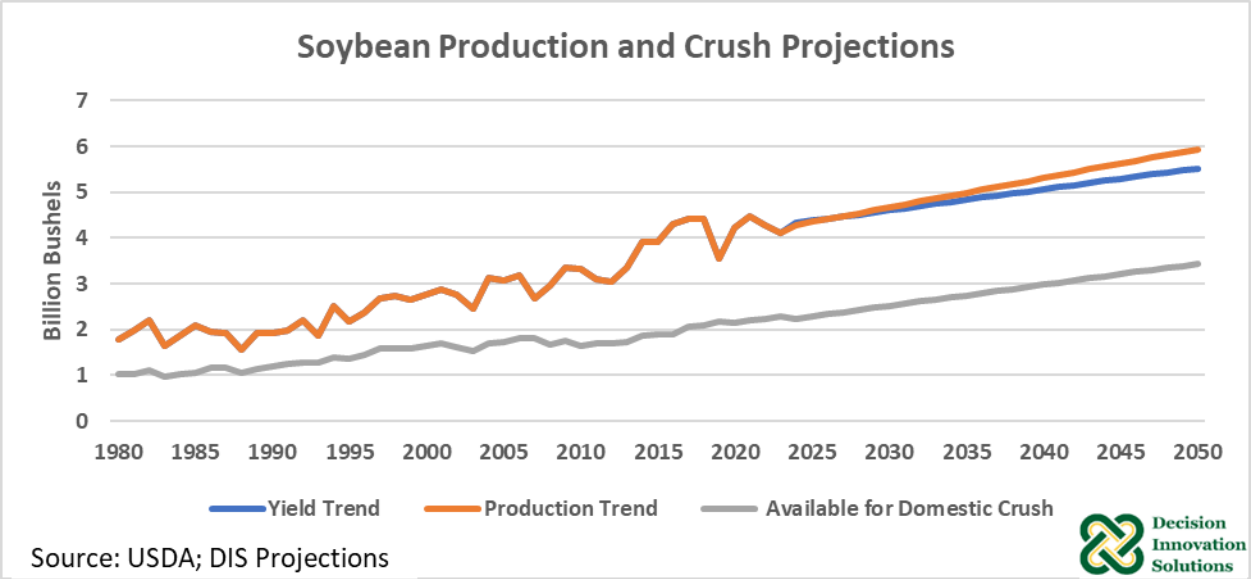


Figure 8. Soybean Production and Soybean Crush Projections

Fats and oils available for HEFA-based biofuel production were projected based on soybeans available for domestic crush, a soybean oil yield of 11.88 pounds of oil per bushel (19.8% oil content); DCO yields from ethanol production of 0.7 pounds per bushel processed for ethanol, and trendline projection of total animal fats[7] (Figure 9).

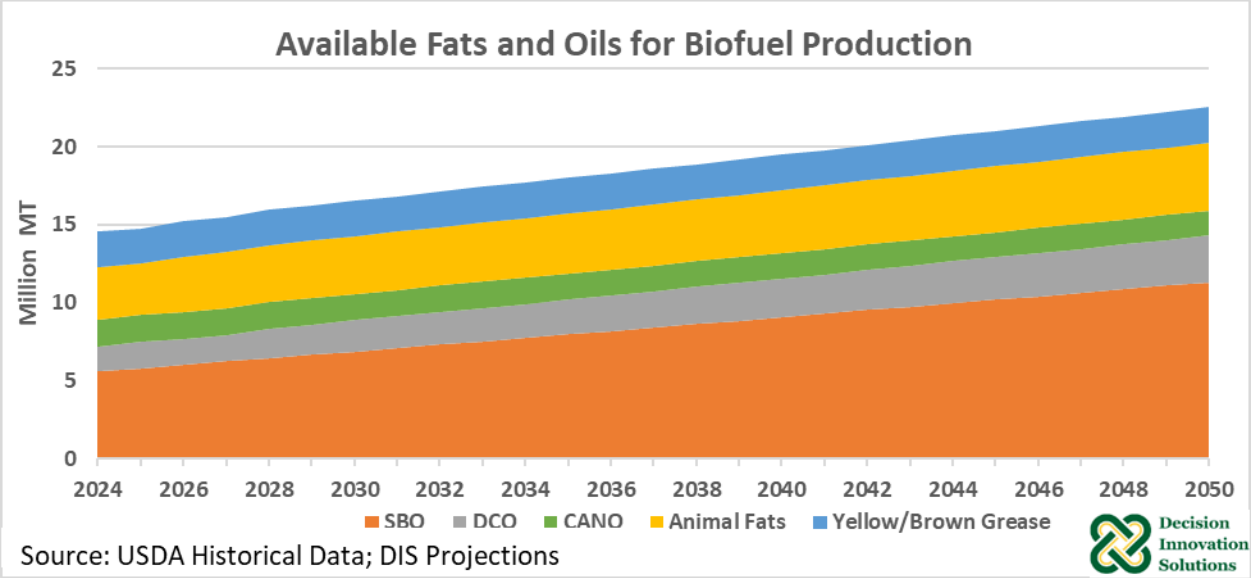


Figure 9. Available Fats and Oils for Biofuel Production

The forward projections for HEFA-based biofuels used the EIA 2023 baseline projections for biodiesel, and renewable diesel and used the balance of the HEFA feedstocks for HEFA-SAF production (Figure 10).

[7] Fat yield coefficients for animal fats used per million pounds of meat production are: lard: 1.3%; choice white grease: 5.03%; poultry fat: 4.70%; beef edible tallow: 7.00%; and beef inedible tallow of 14.00%. Brown grease and yellow grease data was added to historic totals for animal fats from 2005 through 2023.

The production coefficient for HEFA-SAF was 6.7 pounds of HEFA feedstock per gallon of HEFA-SAF. The initial ramp-up of HEFA-SAF production assumes 187 million gallons of HEFA-SAF in 2024, rising to 1 billion gallons of HEFA-SAF by 2030, then rising from 2031 through 2050 based on HEFA feedstock available for HEFA-SAF. Total projected HEFA-based biofuels rise from 4.015 billion gallons in 2024 to 6.522 billion gallons in 2050. Methyl-ester biodiesel production is projected to peak in 2026 at 1.857 billion gallons and then decline to 1.001 billion gallons in 2050. Renewable diesel production is estimated to be 2.119 billion gallons in 2024, declining to 2.073 billion gallons in 2031 and then increasing to 3.025 billion gallons in 2050.

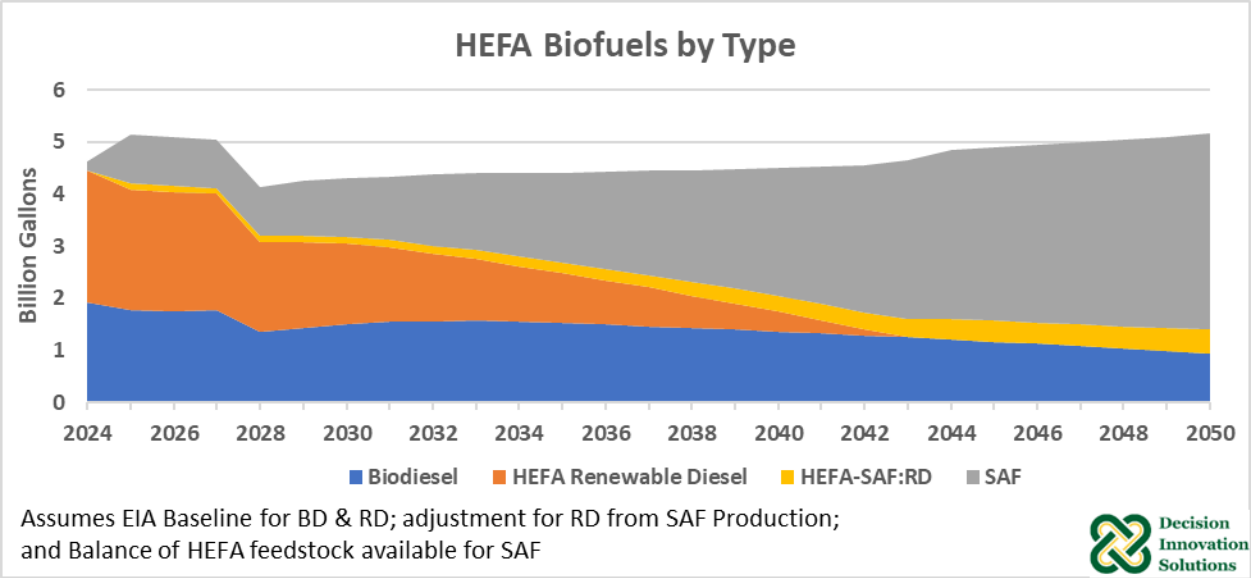


Figure 10. HEFA Biofuels by Type

6.1 HEFA Availability Maps

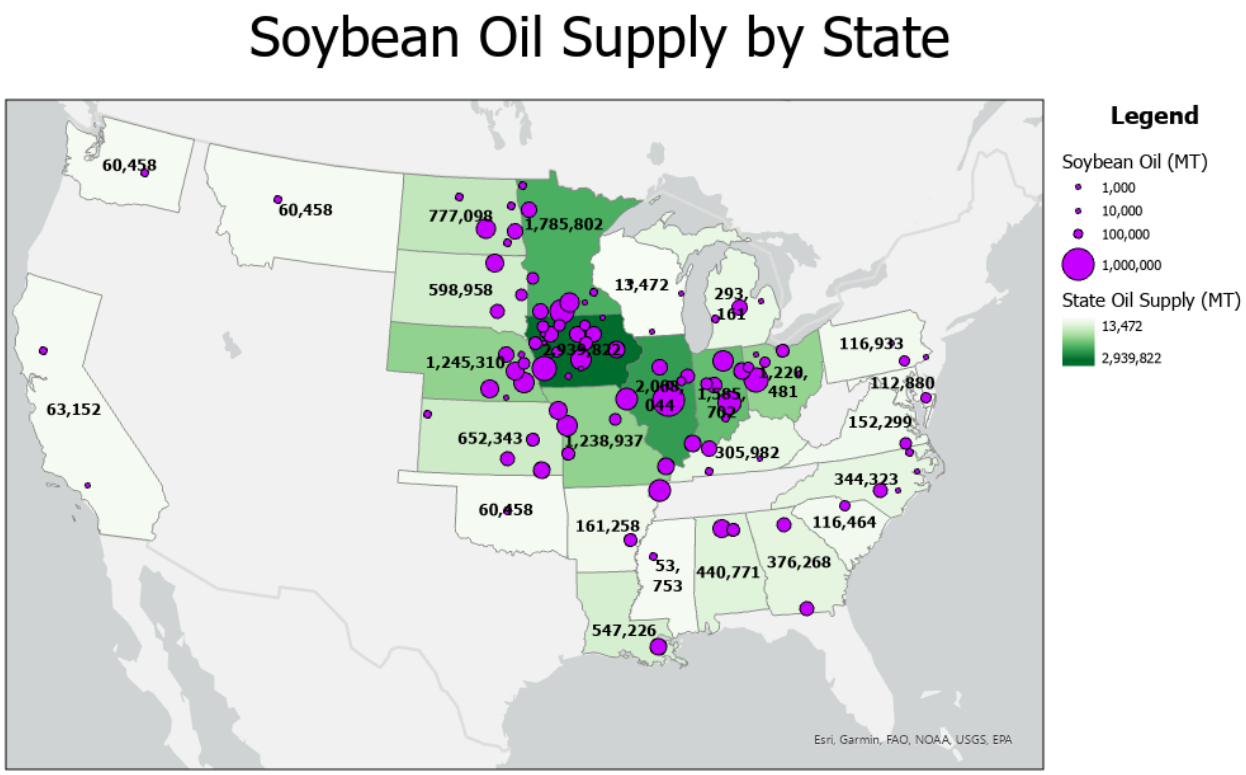


Figure 11. State Soybean Oil Supply and Soy Processing Plants

Animal Fat Supply by State

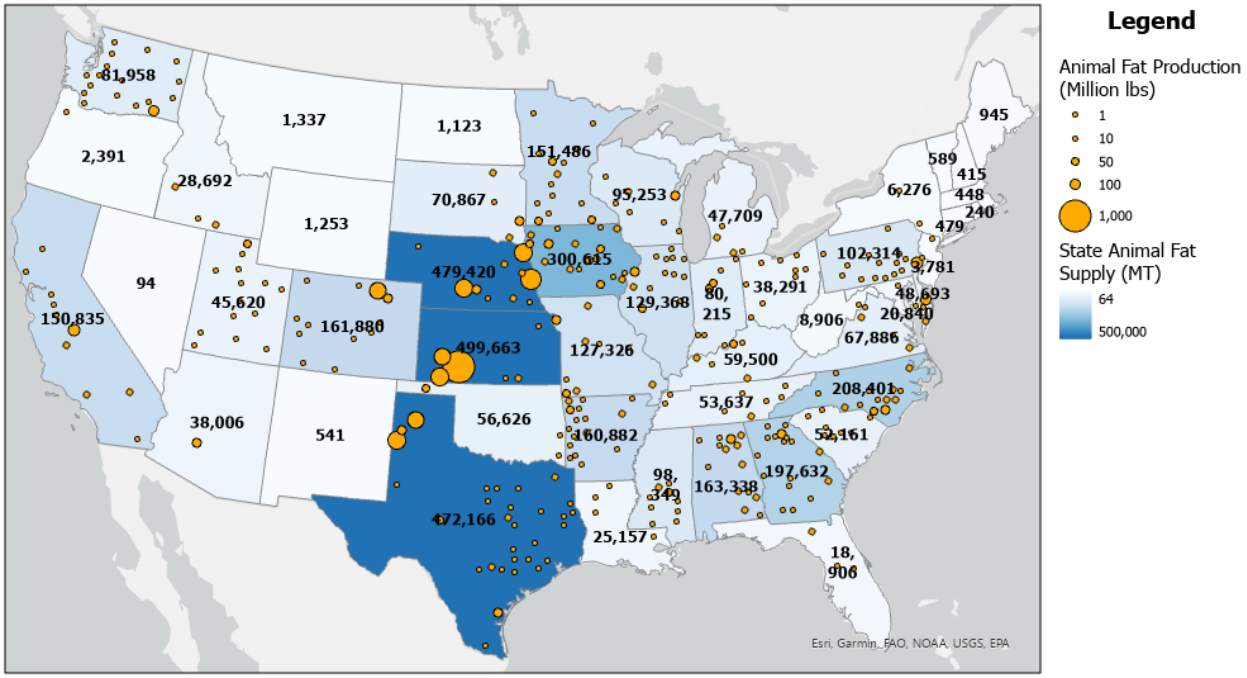


Figure 12. State Animal Fat Supply and Major Counties

HEFA Feedstock Availability and Bio/Renewable Diesel Production

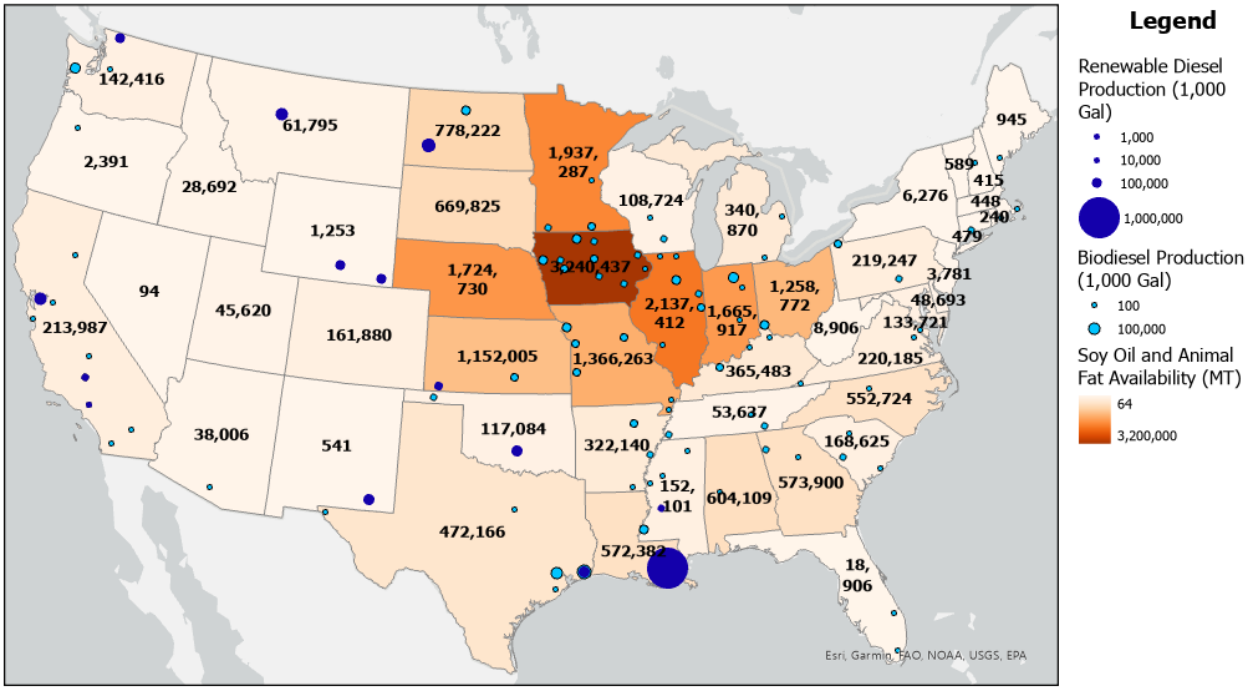


Figure 13. State HEFA Feedstock Availability and Bio/Renewable Diesel Production Facilities

6.2 HEFA-SAF Distribution of New Production

Biodiesel production developed as a very distributed system with 87 plants located in 38 states and with only one plant with greater than 100 million gallons per year of capacity. Of the 87 plants, 77 have less than 50 million gallons of annual capacity and half of the plants are 12 million gallons or less in capacity (Figure 14).

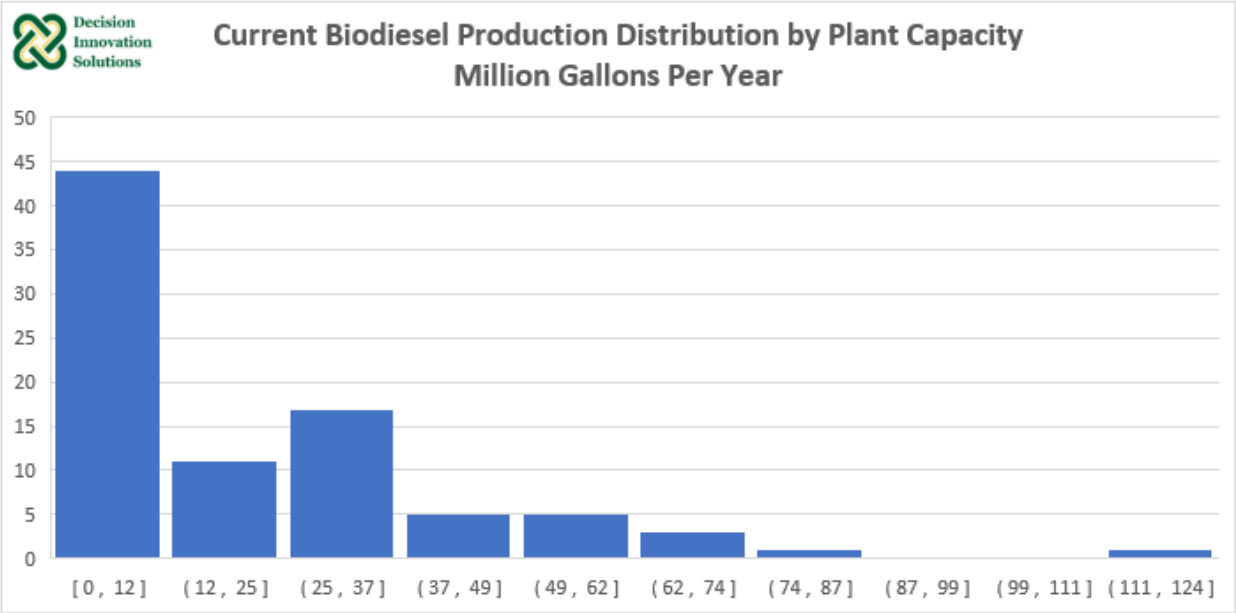


Figure 14. Current Biodiesel Production Distribution by Plant Capacity

In contrast, renewable diesel production capacity is developing differently. To date, there are 17 plants operating in 11 states with only 7 of the plants having less than 100-million gallons of capacity and the largest one with nearly 1 billion gallons of capacity (Figure 15). Eight of the plants have between 100-200 million gallons of capacity. The largest renewable diesel production facilities are located so that they can distribute their production through pipelines.

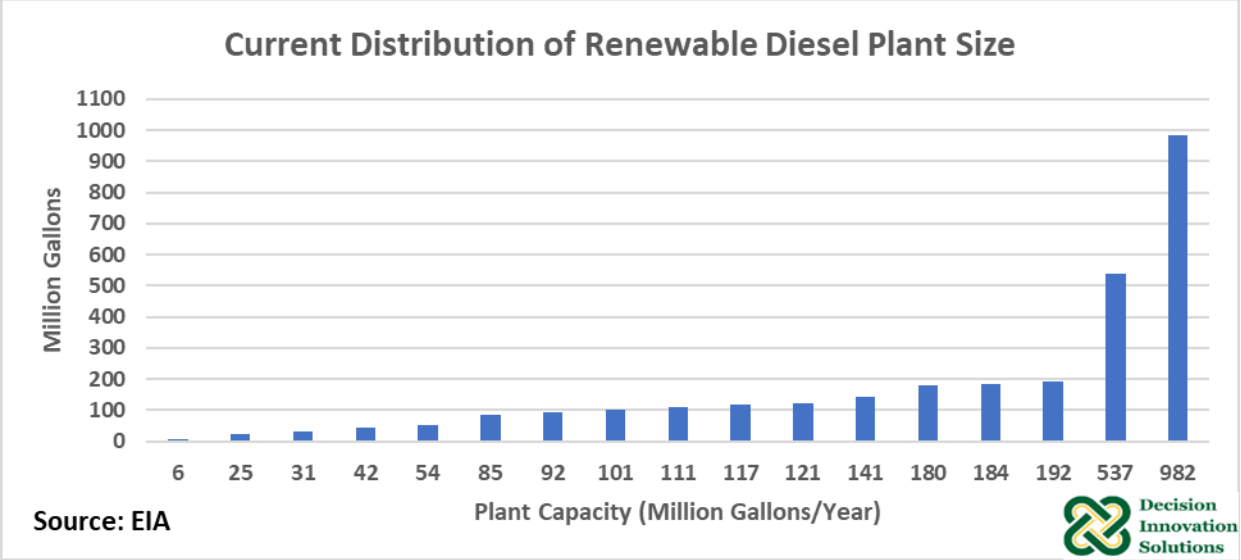


Figure 15. Current Distribution of Renewable Diesel Plant Size

SAF production so far has developed at a relatively small scale (which is normal at the onset of a new industry). However, several conversions of existing refineries for renewable diesel and SAF are at larger scale and the recently announced SAF facility in southeastern Kansas (co-located with a new soybean processing plant) is reported to be a 135-million-gallon facility. The Brandt *et. al.* SAF models sized HEFA plants at 185 million gallons per year of SAF which would have them processing about 250 million gallons of distillate. Currently there are seven announced or operating HEFA-based RD/SAF plants that will, at capacity, produce more than 2.6 billion gallons of HEFA-based RD/SAF fuels (Figure 16). In 2050, DIS projects that a total of 3.7 billion gallons of HEFA-based RD/SAF will be produced. When all current renewable diesel and planned/announced expansions of capacity at existing and new plants are completed (projected to mostly be done by 2025 or 2026), there could be as much as 4.9 billion gallons of HEFA-based RD/SAF capacity. If that is the case, then there is no need for more expansion of HEFA-based biofuels capacity unless some of the current biodiesel production ceases and those feedstocks are re-directed to HEFA-based RD/SAF.

What could develop is the upgrading of existing RD plants to RD/SAF capacity as more RD is produced as the co-product of ATJ and FT pathways. If enhanced DCO recovery technologies are widely adapted, then there will be room for about 1.1 billion gallons of HEFA-based RE/SAF capacity that needs to be built.

With an average modeled HEFA-based SAF plant size being about 250 million gallons of distillate, total HEFA-SAF could be satisfied with one more large scale HEFA plant built in the U.S. Gulf Coast area, but it could also mean 4 or 5 modeled-sized HEFA-based plants being built where new soybean oil production is locating. That would likely be in the Midwestern states. For the purposes of this study, one new HEFA-based plant will be modeled for each of (Iowa, Illinois, Kansas, Nebraska and South Dakota) since these are the states most likely to see new soybean crush capacity developed and/or have more DCO available due to enhanced DCO recovery (Figure 17).

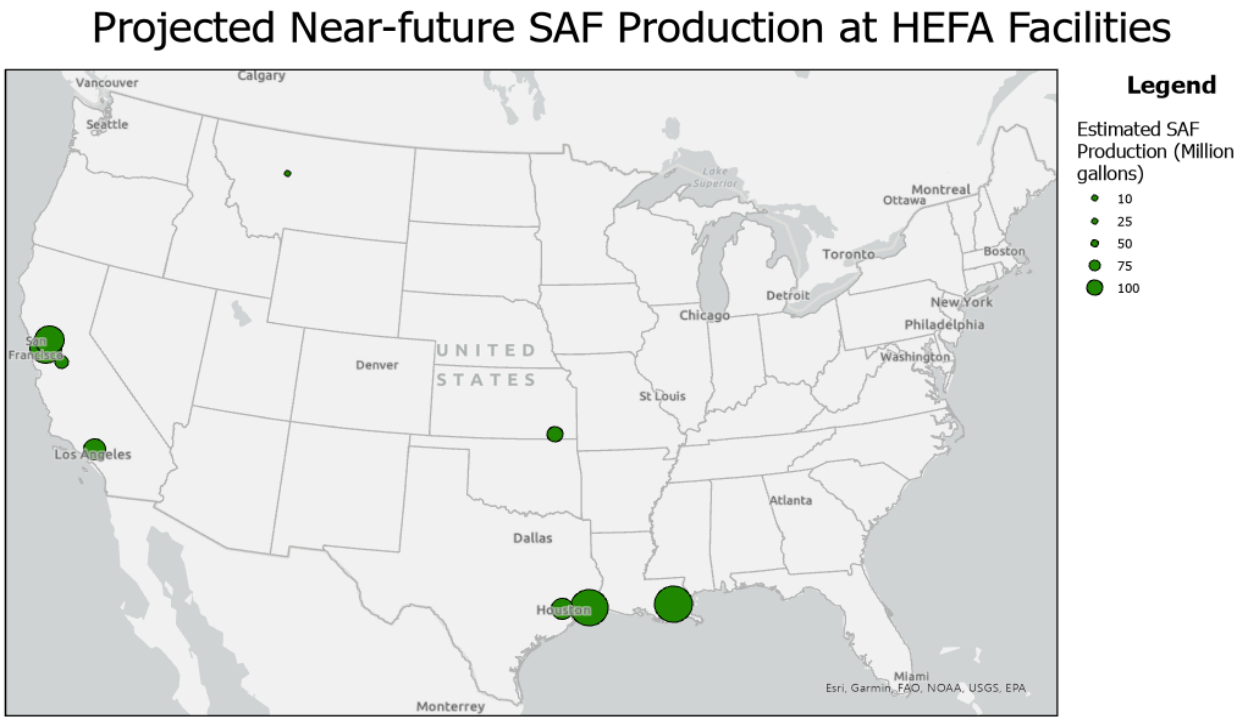


Figure 16. Projected Near-Future SAF Production at HEFA Facilities

Projected 2050 SAF Production at HEFA Facilities

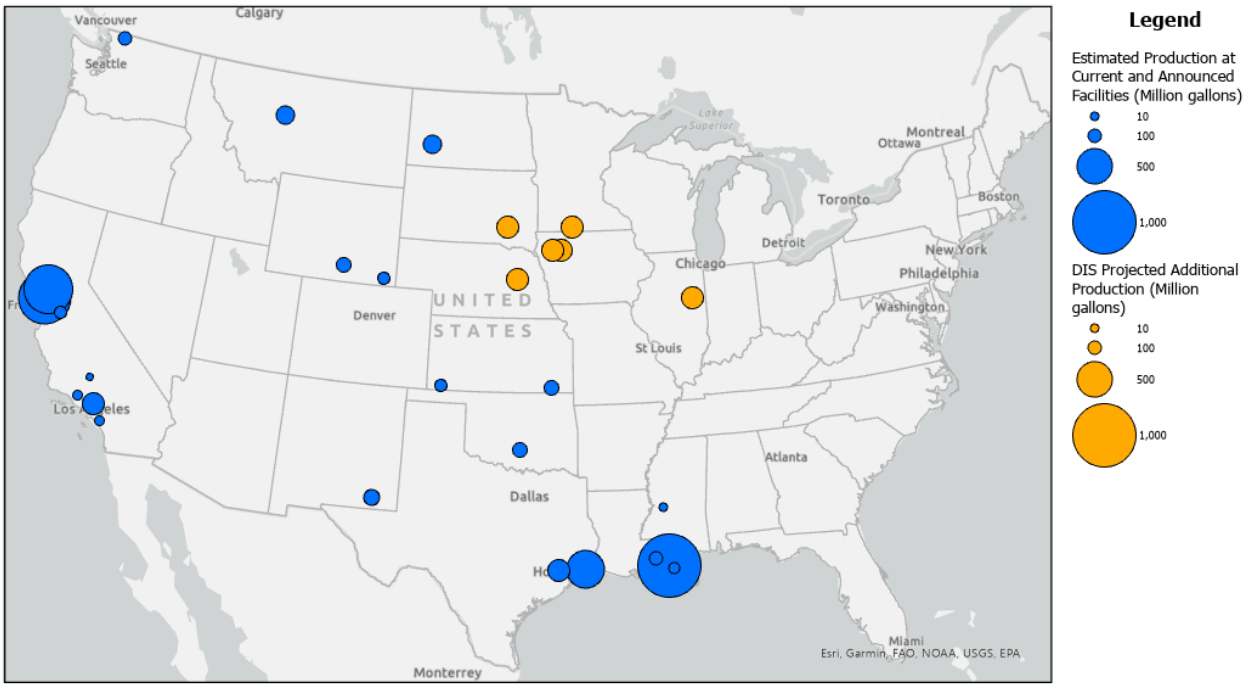


Figure 17. Projected 2050 SAF Production at HEFA Facilities

6.3 Distillers Corn Oil to Renewable Diesel and/or SAF

At one time, the maximum DCO extraction yield was around 0.4-0.5 lbs/bu. Today, the average DCO yield is closer to 0.7 lbs/bu. The total potential DCO yield is close to 2.0 lbs/bu. Today's DCO recovery is still only around 30% efficiency, and the actual yield range is a whopping 0.5-1.2 lbs/bu (Trucent, 2019).

Figure 18 shows the projected amount of DCO that would be available in the future from corn processed for ethanol if the current average yield of DCO of 0.7 lbs/bu is applied to projected corn processed for ethanol with significant amounts of ethanol being used for ETJ and how much DCO would be generated for feedstock for HEFA-based SAF if the DCO yield was nearer the "theoretical ideal" level of 2.0 lbs/bu. If this higher DCO yield is reached, the amount of DCO for HEFA feedstock would increase from 1.6 mmt in 2025 to 4.7 mmt in 2025 and by 2050 instead of 2.8 mmt of DCO there would be 7.9 mmt of DCO available for HEFA feedstock.

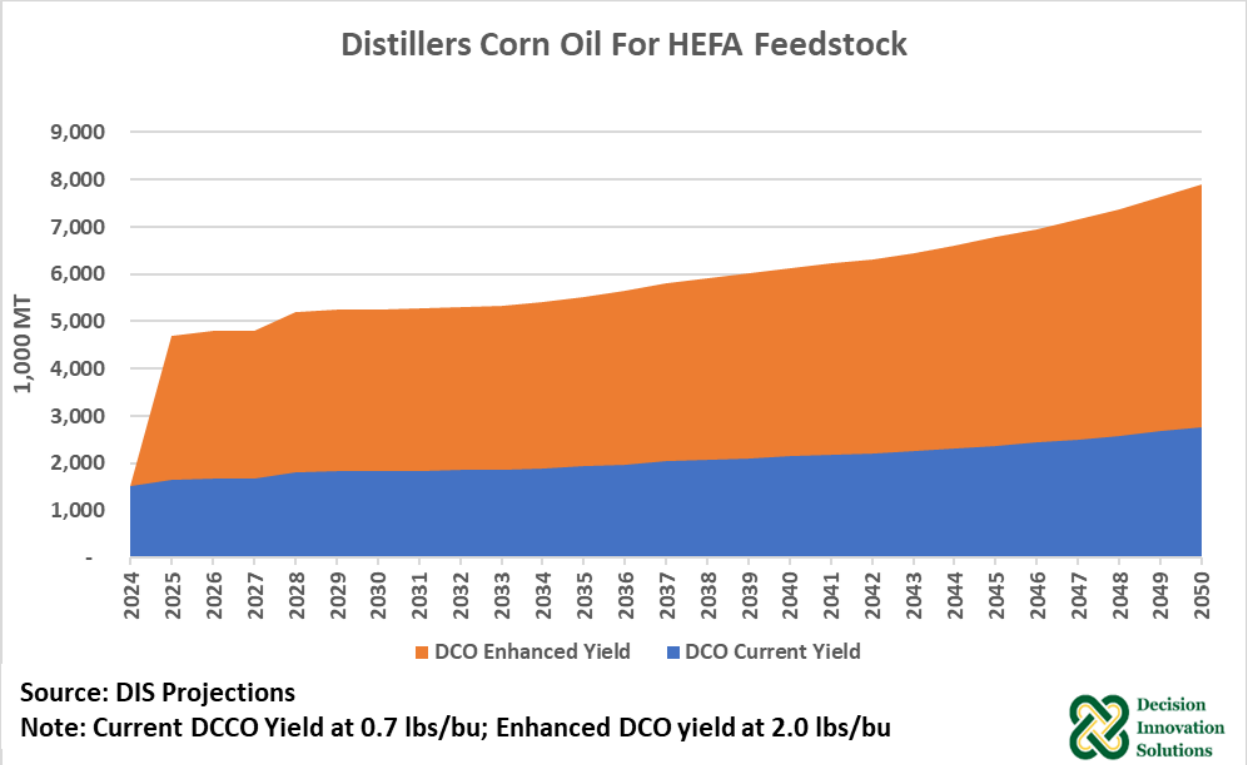


Figure 18. Distillers Corn Oil for HEFA Feedstock

In Figure 19 the baseline of HEFA biofuels by type of fuel is shown. Biodiesel from HEFA follows the EIA baseline scenario. HEFA renewable diesel begins as the primary source of renewable diesel but diminishes over time because SAF pathways produce some level of renewable diesel as a co-product. Therefore, over time the amount of SAF produced from HEFA steadily increases as supplies of HEFA feedstocks increase and less HEFA feedstock is needed for production of renewable diesel from HEFA as the primary product.

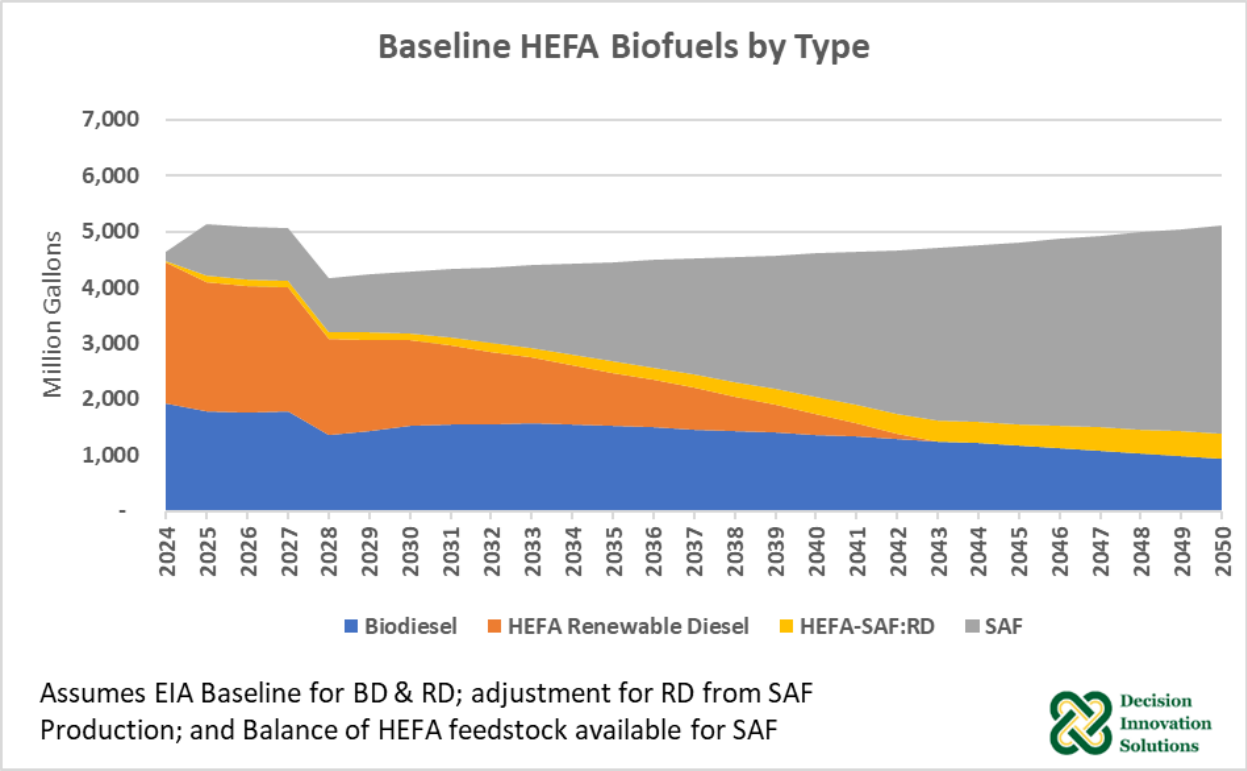


Figure 19. Baseline HEFA Biofuels by Type

In the scenario in which DCO production is enhanced, there is a significant amount of "new" HEFA feedstock (labeled as EDCO) available for SAF production as shown in Figure 20. Given time for installation of enhanced DCO recovery equipment, the modeled increase in SAF due to enhanced DCO recovery begins in 2028 with 655 million gallons and expands to 995 million gallons of SAF in 2050.

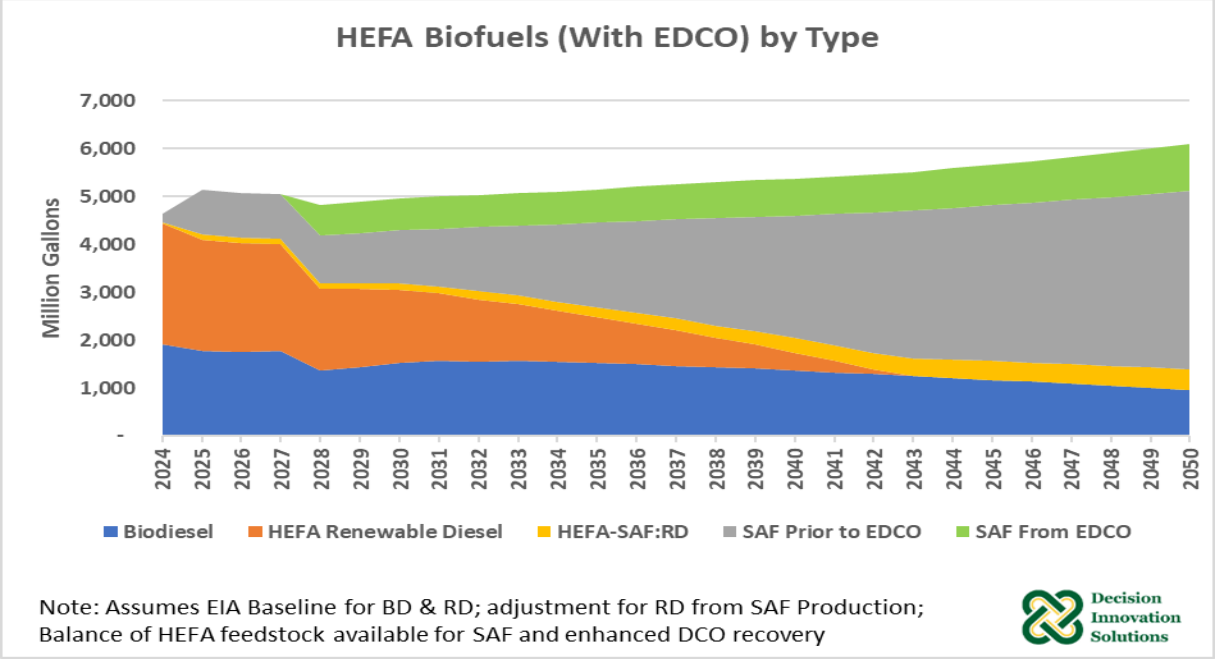


Figure 20. HEFA Biofuels (with EDCO) by Type

Figure 21 shows the overall pathways for SAF to 2050 with the additional HEFA-based SAF that would come from enhanced DCO recovery. In this set of pathways, total HEFA-based SAF in 2050 is 4.7 billion gallons; FT-SAF is 2.7 billion gallons; corn ETJ-SAF is 5.6 billion gallons; other ATJ is 2.4 billion gallons; Ethanol CO2-ETJ is 674 million gallons; and PTF-SAF is 16.7 billion gallons.

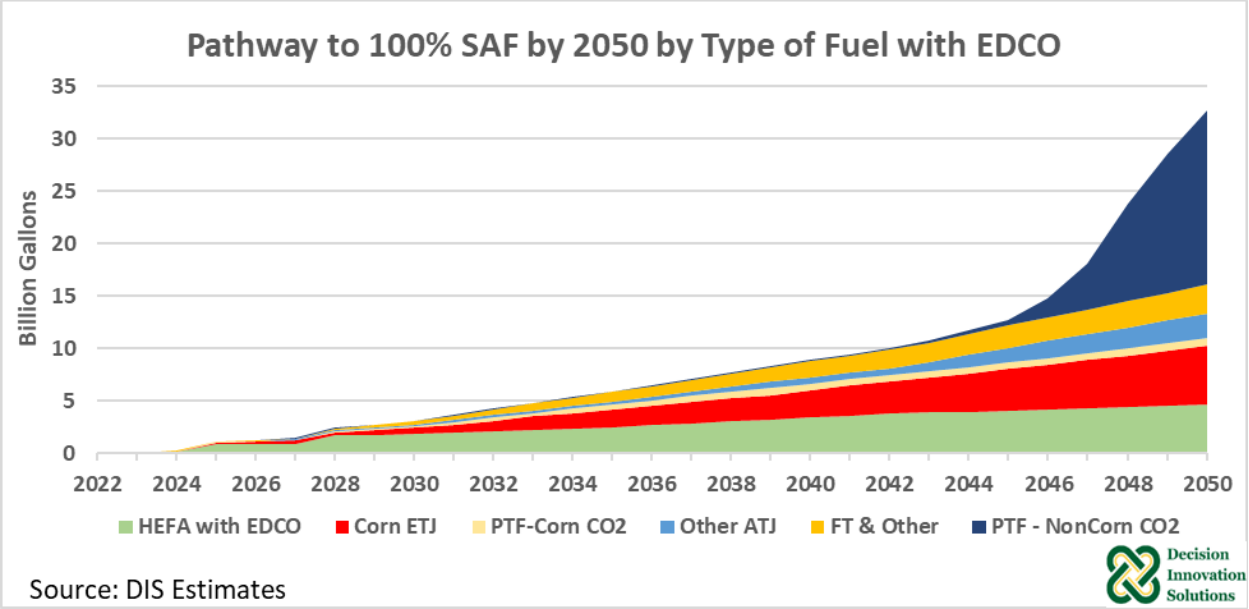


Figure 21. Pathway to 100% SAF by 2050 by Type of Fuel with EDCO

Producing SAF with enhanced DCO recovery marginally increases the amount of SAF that is available at intermediate points along the timeline. Figure 22 shows a comparison of the pathways to 100% SAF by 2050 with and without enhanced DCO recovery. EDCO does make more SAF available throughout the 2030s and early 2040, and ultimately reduces some of the PTF-SAF that is needed in 2050.

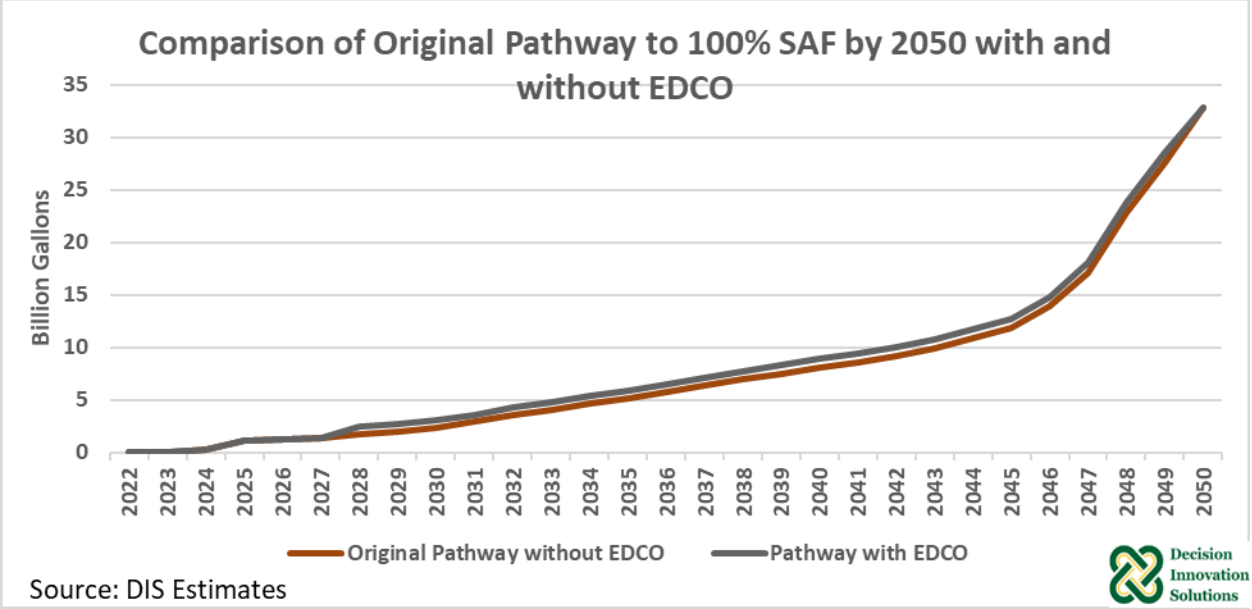


Figure 22. Comparison of Original Pathway to 100% SAF by 2050 with and without EDCO

Because the distillate production in the HEFA pathway produces a mixture of SAF and renewable diesel, adding more EDCO to the HEFA stocks also increases the amount of RD that is produced as a byproduct of SAF production. By 2050, it is estimated that an additional 119 million gallons of RD from the production of SAF from EDCO will also be produced and total RD production as a byproduct of all SAF production could reach 10.8 billion gallons in 2050 with nearly 10.3 billion gallons of the RD resulting from PTF-SAF byproduct production (Figure 23).

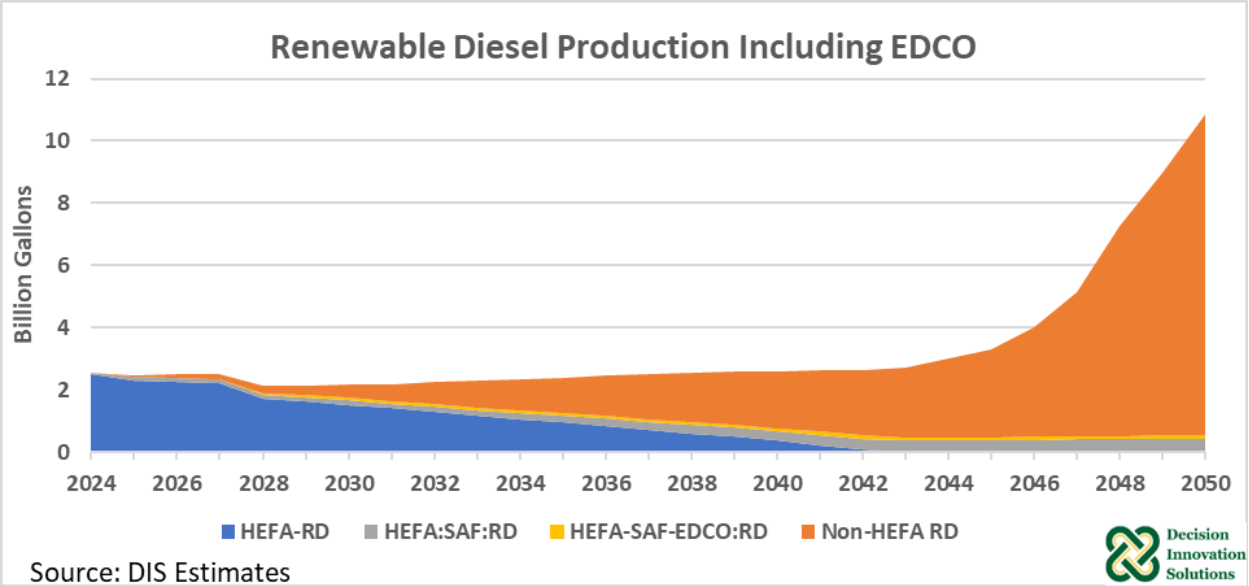


Figure 23. Renewable Diesel Production Including EDCO

Every pathway to SAF production also produces other byproduct fuels. If the U.S. achieves enough SAF production for 100% replacement of petroleum-based jet fuel by 2050, there will be substantial amounts of other fuels also produced. In 2050, it is estimated that along with 32.7 billion gallons of SAF, there will be 10.8 billion gallons of RD, 65.7 billion gallons of renewable gasoline, 1.5 billion gallons of naphtha, and 855 million gallons of propane produced (Figure 24).

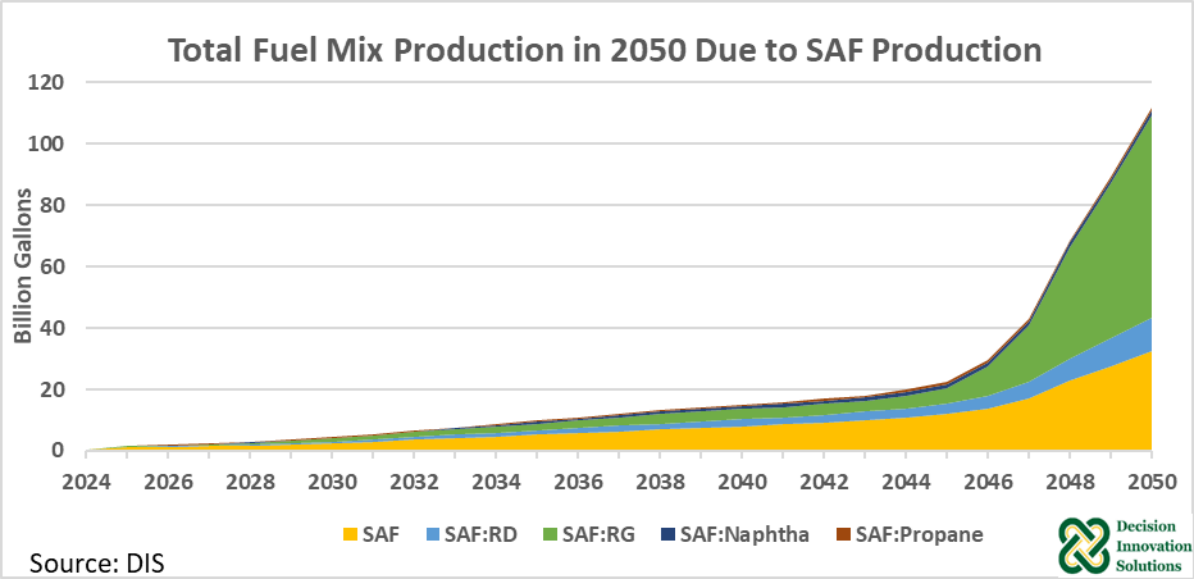


Figure 24. Total Fuel Mix Production in 2050 Sue to SAF Production

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While there is likely to be substantial demand for the SAF, RD, naphtha, and propane, it is not clear that there will be demand for 65.7 billion gallons of renewable gasoline alongside the regular gasoline that will still be produced as part of the petroleum distillation process that is making diesel, asphalt, tar, and other products. If the distillation of PTF-SAF can be modified so that less RG is produced and more RD is produced, that would likely result in less market distortions as PTF-SAF production is ramped up in the 2040s.

7 Potential Gains Enabled by Ethanol-to-Jet (ETJ) in the Midwest

For the past three years, the 12 Midwestern states (IA, IL, IN, KS, MI, MN, MO, ND, NE, OH, SD & WI) produced 93.6% of the ethanol in the U.S. These Midwestern states also produced 86.7% of the corn in the U.S. over the past three years. Furthermore, corn production in the U.S. has historically trended upward primarily due to gains in yields. If the current trend in corn production continues, the U.S. will produce nearly 20.7 billion bushels of corn by 2050. However, demand for corn is not expected to grow as quickly, especially ethanol demand. The EIA forward projection has ethanol consumption through blending for light-vehicle use declining slightly. ETJ through corn ethanol is a pathway that can utilize the additional corn that comes from higher trending yields and forestall a significant decline in corn acreage and subsequent negative impacts on the economies of the Midwestern states.

7.1 ETJ Fuel Opportunity Scenarios

If Midwest ethanol plants can lower the CI score of their ethanol through CCS, the potential of using ethanol as an intermediary feedstock for sustainable aviation fuel (SAF) increases. With CCS, ETJ can account for a significant portion of that market and provides pathways for expansion of capacity at existing ethanol plants and the potential for new ethanol plants.

To model where new ethanol plants might developed are if the corn ethanol to jet pathway developed two different scenarios are analyzed to estimate Midwest ethanol growth due to ETJ.

- **Scenario 1:** Each of the Midwestern states maintains their current shares of national ethanol production
- **Scenario 2:** Ethanol production in each Midwestern state expands according to the estimated “excess corn” that will be available in 2050 based on trendline production and trendline use of corn for “other than ethanol” uses.

7.2 Ethanol Industry Opportunities in the Midwest with CCS

Iowa State University’s ethanol model was used to estimate the ethanol margin under (1) normal conditions and (2) under conditions where the ethanol plant claimed either the 45Z or (3) the 45Q tax credit. Key assumptions regarding the size of the plant and fixed costs were taken from the Iowa State Ethanol model (Hofstrand, 2023). Key assumptions made to run the model are outlined in Table 4.

Notably, corn price was assumed to be constant in all scenarios and was set to the long run average price from 2007-2023. Natural gas (NG) prices were calculated the same way. The ethanol complex prices were calculated by regressing corn prices against the price of each product.

Table 4. Key Assumptions for All Scenarios

Prices			Yield Factors		
Corn	$/bu	$ 4.67	Ethanol Yield	gal/bu	2.88
Ethanol	$/gal	$ 1.86	NG use	mmbtus/gal	30
DDGS	$/ton	$162.95	DDGS yield	lb/bu	16
Corn Oil	$/lb	$ 0.41	DCO	lb/bu	0.7
NG	$/1000 ft^3	$ 6.20	Other Variable Costs	$/gal	$0.22
			Fixed Costs	$/gal	$0.20

Source: Iowa State Ethanol Model and DIS Estimates

Next the key assumptions and results of the three scenarios outlined above are outlined in Table 5. A baseline margin before additional incentives is outlined below. 45Z and 45Q amounts (credit per gallon of ethanol) are added for their respective scenarios. CCS and CCU costs are assumed to be equal to the value of the 45Q tax credit for both CCS and CCU respectively. The sale of CO2 is set such that margins are equal for ethanol plants. If the price were not this high, ethanol plants would likely opt for CCS and the 45Z tax credit in lieu of CCU and the 45Q tax credit. Therefore, margins are equal under both alternative scenarios. These margins are expected to be about 3.5 times higher under the alternative pathways. However, if CCS costs at the ethanol plant level are higher or lower than forecasted, this will change the margin. For example, if an ethanol plant can capture CO2 and have it sequestered via pipeline for less than $0.49/gallon of ethanol (About $81/ton of CO2 for CCS or $57/ton for CCU) then there would be additional net revenue for the ethanol plants. For a 100-million-gallon ethanol plant, the increased margin ($0.25/gallon) would translate into $25 million per year of increased net revenue. For the 14.4 billion gallons of ethanol currently being produced in the Midwestern states, an additional 25 cents per gallon of net margin would mean $3.6 billion per year in increased revenues flowing through these plants if all gallons were enabled to collect CO2 and either utilize it for PTF-CO2 or sequester it so that the ethanol could be used for ETJ.

Table 5. Ethanol Scenario Analysis

Variable	Baseline	45Z	45Q	Unit
Baseline Margin	$ 0.10	$ 0.10	$ 0.10	$/gal
45Z Tax Credit	$ -	$ 0.49	$ -	$/gal
45Q Tax Credit	$ -	$ -	$ 0.17	$/gal
Sale of CO2 for PTF	$ -	$ -	$ 0.25	$/gal
CCS Cost	$ -	$ 0.24	$ -	
CCS or CCU Cost	$ -	$ -	$ 0.17	$/gal
Final Margin	$ 0.10	$ 0.35	$ 0.35	$/gal

Source: Iowa State Ethanol Model and DIS Estimates

7.2.1 Available Corn with Trendline Production

Without demand for ethanol for ETJ, the baseline demand profile for U.S. ethanol peaks outs in 2023-2024 and declines into the late 2030s before turning upward a bit according to the current EIA baseline (Figure 38). The U.S. currently produces approximately 16.1 billion gallons of ethanol on an annual basis.

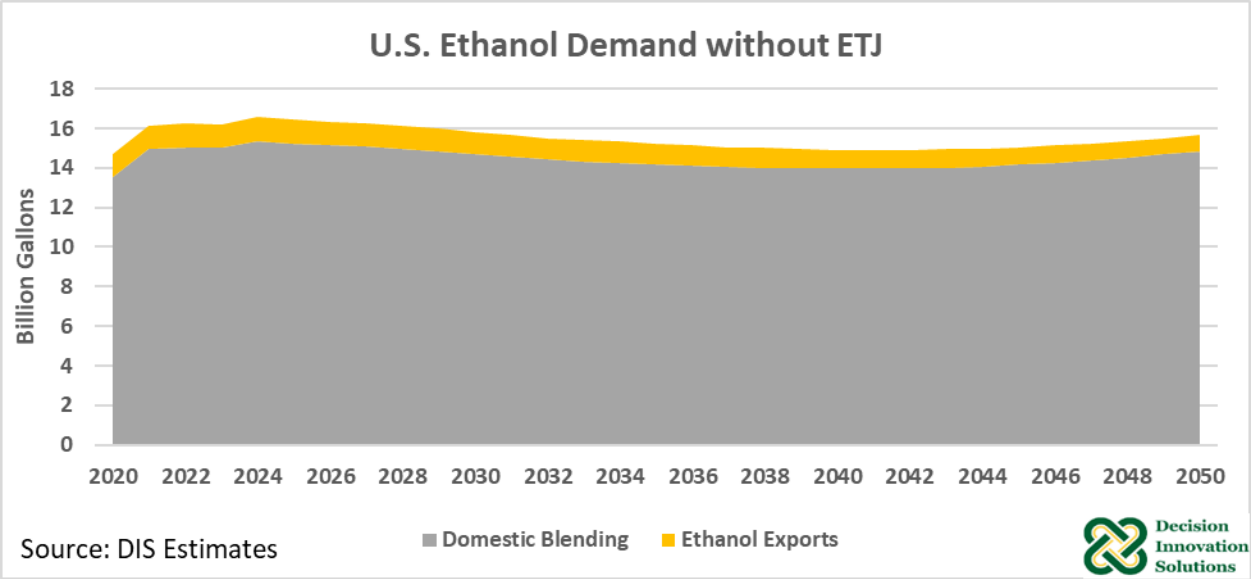


Figure 25. US Ethanol Demand without ETJ

Some of the current ethanol production already captures and sequesters CO2[8] and would be eligible for use as a feedstock for ETJ, however, this does not represent the majority of production. Without ETJ for broad-based ethanol demand, there will still be some ethanol available from current production that if it has carbon capture and sequestration at the plant (such as ADM in Decatur, IL, and Marquis Energy in Hennepin, IL) then by 2036 there could be 1.2 billion gallons of current ethanol production that is in excess of what the EIA baseline indicates will be needed for light vehicle use and exports (Figure 26). This amount of surplus ethanol production would put downward pressure on the ethanol market if a new market like SAF from ETJ is not developed.

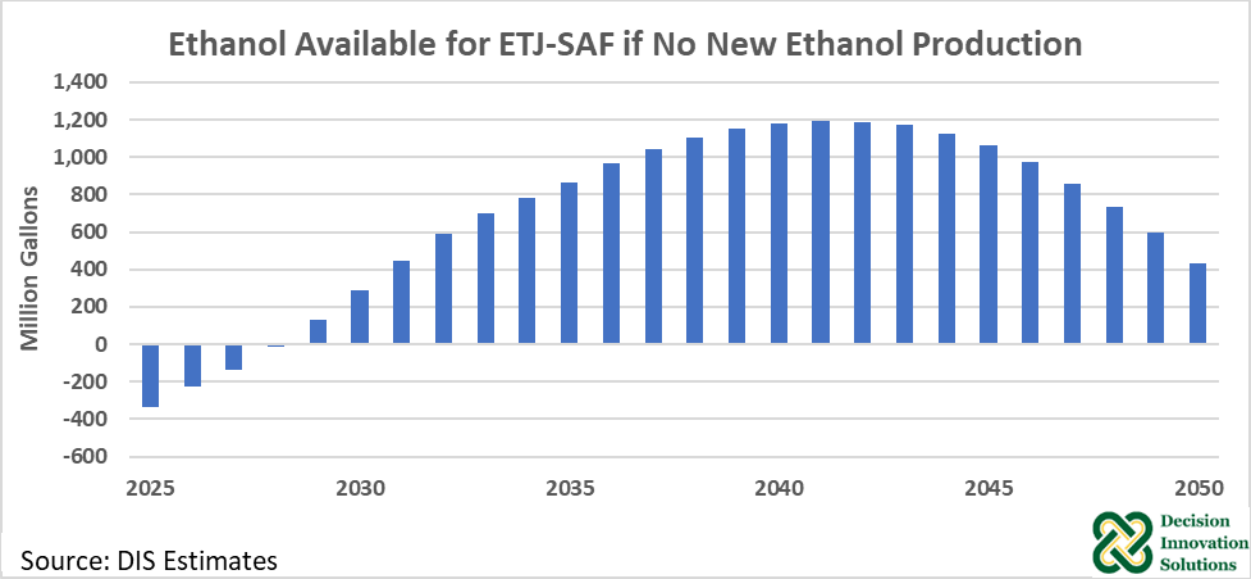
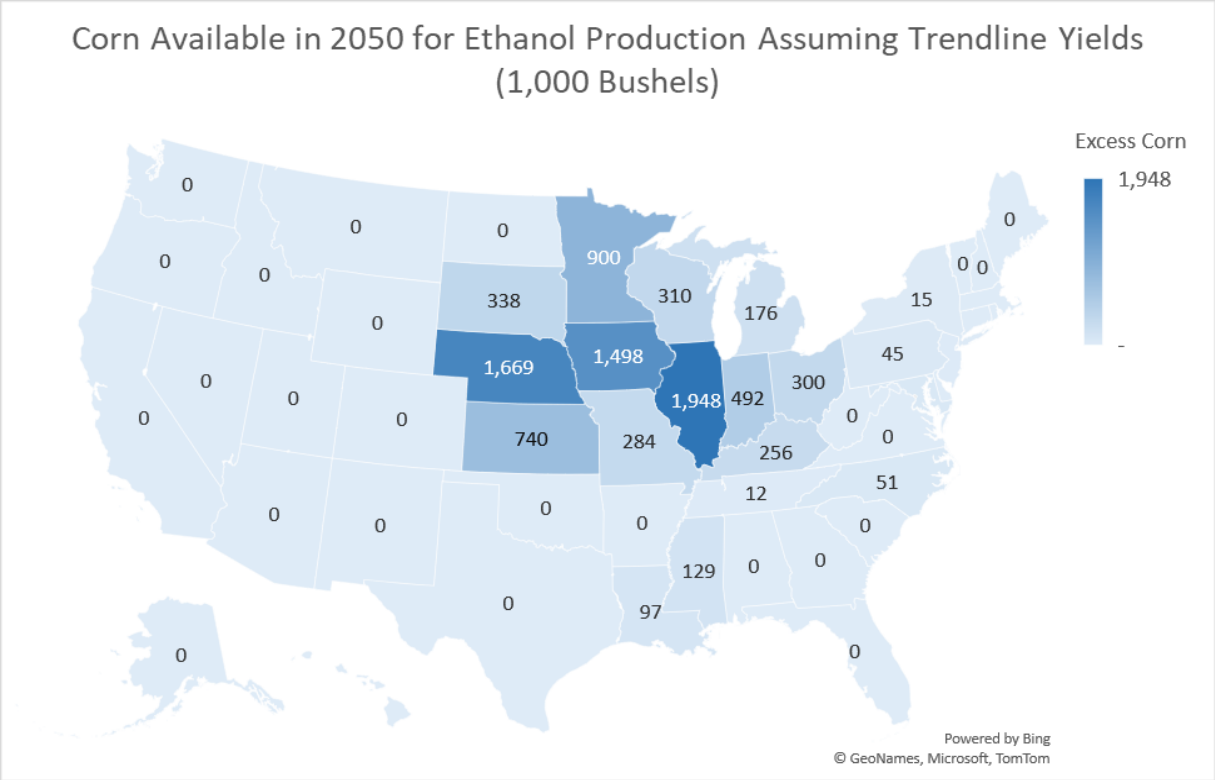


Figure 26. Ethanol Available for ETJ-SAF if No New Ethanol Production

[8] Approximately 10.8% of ethanol-based CO2 currently is captured and sequestered either through on-site sequestration or sent via pipeline for sequestration as a part of enhanced oil recovery.

In 2050, without an expansion of new uses for corn, there could be significant "surpluses" of corn in many Midwestern states assuming that the 1980 trend for corn production continues and that trendline consumption of corn for purposes other than ethanol (growth of 55 million bushels per year) continue to develop. Figure 27 shows the "surplus" bushels of corn that would exist if trendline production is maintained without expanded uses like ETJ.


Corn Available in 2050 for Ethanol Production Assuming Trendline Yields (1,000 Bushels)
Excess Corn
1,948
-
0
0
0

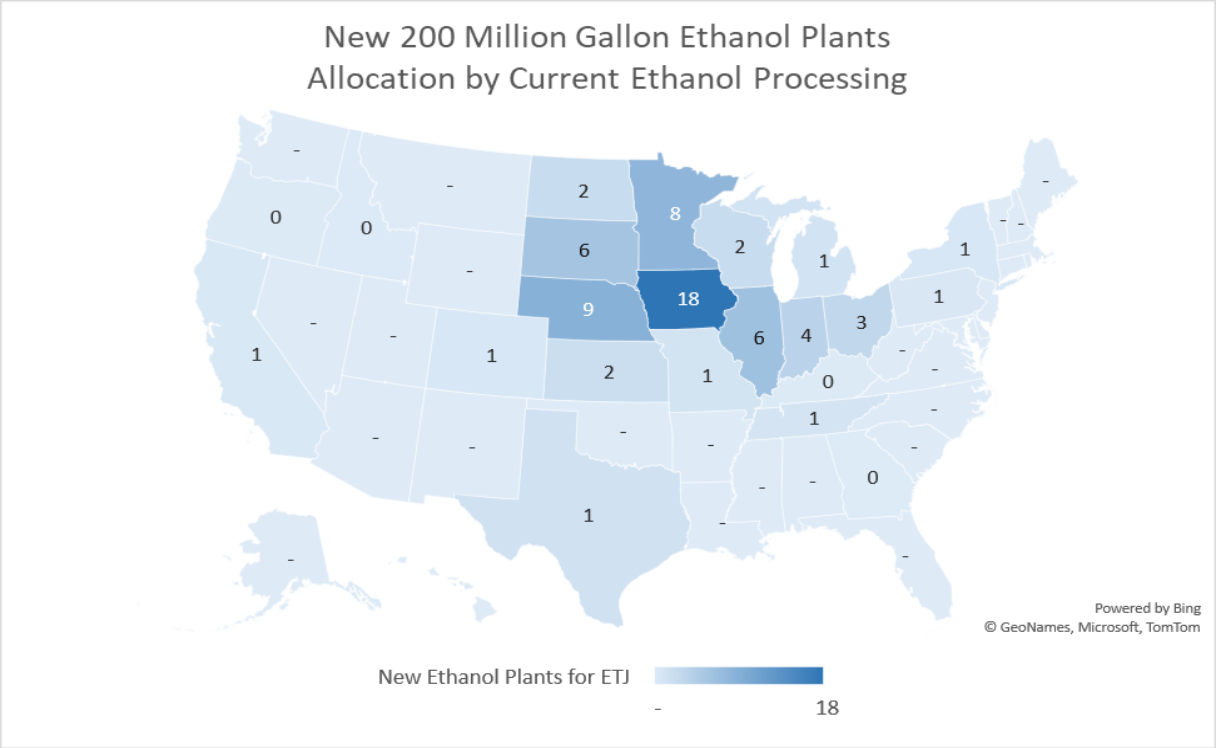


Figure 28. New 200-Million Gallon Ethanol Plants -- Allocation by Current Ethanol Processing

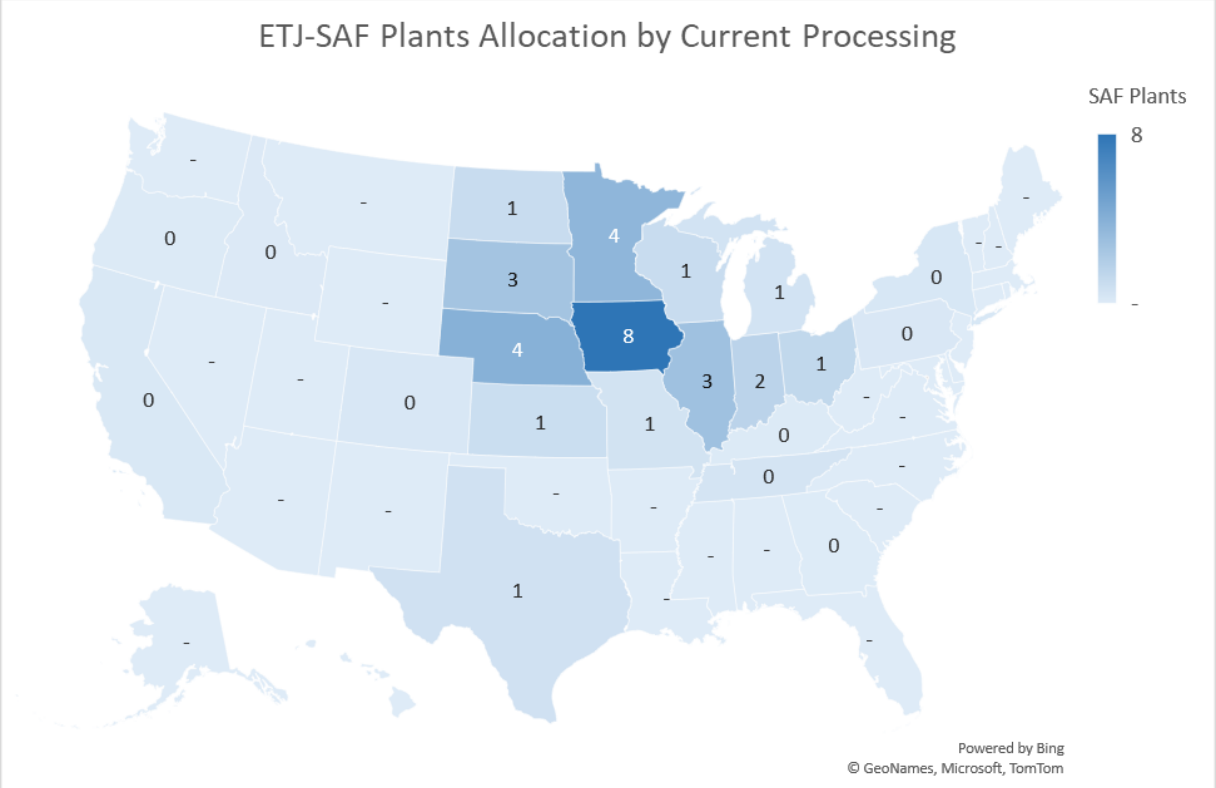


Figure 29. ETJ-SAF Plants Allocation by Current Ethanol Processing

In Figure 30 and Figure 31 the distribution of the new ethanol plants and associated SAF plants is based on the distribution of the calculated surplus corn rather than current distribution of ethanol production.

In this case, less plants are built in Iowa (7 less), South Dakota (4 less), and North Dakota (2 less), Ohio (1 less), and more plants would be built in Illinois (8 more), Nebraska (3 more), Kansas (3 more), Minnesota (1 more), Missouri (1 more). There is no difference between the scenarios for ethanol plants in Indiana, Michigan, and Wisconsin. What could sway siting decisions for ethanol plants away from Iowa, Nebraska, Minnesota, and South Dakota in favor of Indiana, Michigan, and Ohio is the potential for onsite, direct injection of CO2 for sequestration which is geologically feasible in those states versus the need for carbon capture and sequestration via pipeline in the states where the most surplus corn is likely to be.

For ETJ-SAF plants, if new ethanol plants are built based on surplus corn projections in 2050 rather than on the current distribution of ethanol production, then states with less ETJ-SAF plants would be Iowa (3 less), South Dakota (2 less), Minnesota (1 less), and North Dakota (1 less). States with more ETJ-SAF plants would be IL (4 more), Nebraska (2 more), Kansas (2 more), and five states (IN, MI, MO, OH, and WI) would have the same number of ETJ-SAF plants built under either scenario.

Note: While two of the three current ETJ plants are not in the Midwest, there are a number of reasons why early development of production facilities may be located away from the feedstock supply. In one case it may be to facilitate importation of low-carbon sugarcane-based ethanol since carbon sequestration policy in the Midwest is still unsettled. In another case, relatively easy access to the end-use market may have played a role in the siting of the facility.

There are pro and con arguments regarding the siting of ETJ production facilities close of feedstock supplies versus siting production facilities near jet fuel use locations or near access to pipelines that distribute jet fuel to major airports. DIS believes that if an abundance of low-carbon ethanol feedstock is available in the Midwest, then the advantages of minimizing feedstock transportation costs will play a major role in the siting of future, large-scale ETJ plants, but there is uncertainty about where future large-scale plants will be located.

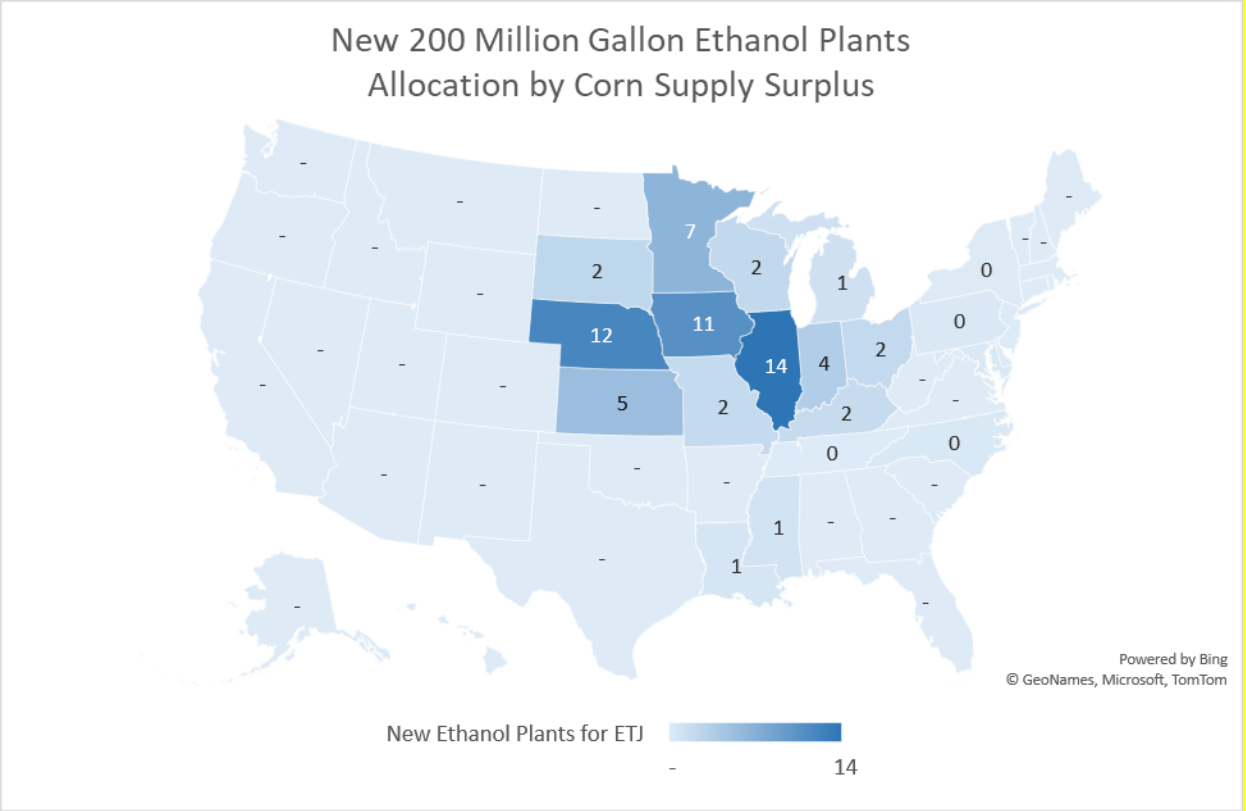


Figure 30. New 200-Million Gallon Ethanol Plants -- Allocation by Corn Supply Surplus in 2050

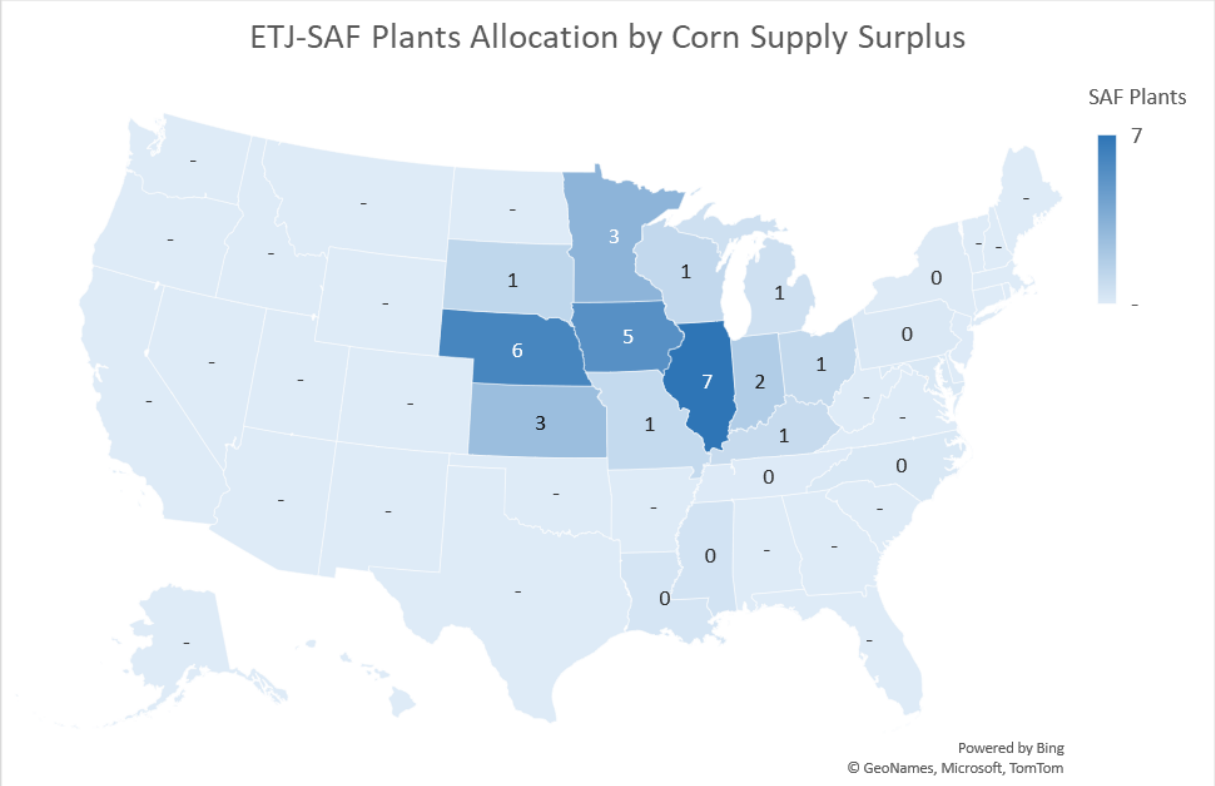


Figure 31. ETJ-SAF Allocation by Corn Supply Surplus (2050)

7.3 Corn Market Outlook with and Without ETJ

Without new demand for corn through ETJ, assuming trendline yields, U.S. corn acreage will begin to slip in 2024 and decline throughout the study period falling to 68.4 million acres harvested for grain by 2050 (Figure 32). With ETJ, corn acres harvested for grain stabilize at roughly 80 million acres and then after 2024 rise to about 87 million acres. This includes allowance for growth of non-ethanol uses of corn at approximately 55 million bushels per year.

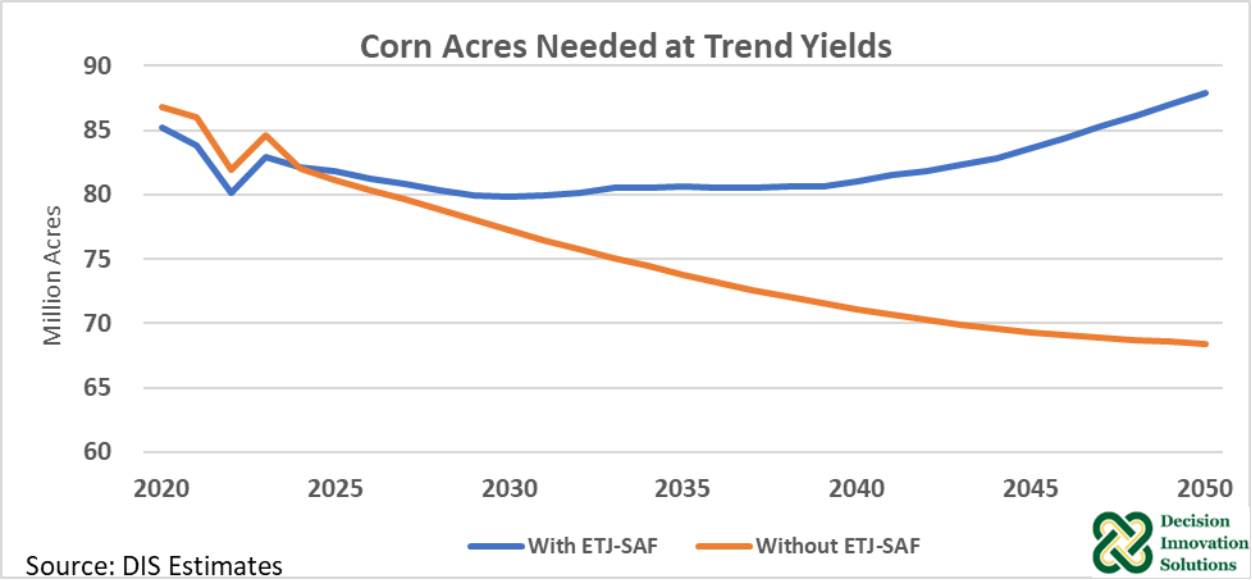


Figure 32. Corn Acres Needed at Trend Yields

One measure of the economic impact of facilitating corn use for ETJ is the difference in the value of corn production with ETJ demand and without ETJ demand. Using a "stable price" of $4.67/bu the lost value of corn production was calculated in today's dollars. Figure 33 shows the state-by-state cumulative impacts across the Midwest between having a robust ETJ industry develop and not having that new demand for corn. For the Midwestern states in total, the difference in value of production of the corn crop with ETJ-SAF versus the scenario of no significant new corn demand is $259.3 billion across the 2024-2050 period. **This is nearly $10 billion per year, on average.**

If that $10 billion per year impact is spread across the current 83 million acres of corn, then it would amount to $120 per acre of corn and for a 1,000-acre farm with 50/50 corn-soybeans, it would amount to $60,240 per year less revenue, on average over the next 25 years. Clearly, the annual impacts would be greater further out in the future than they would be near-term, but strong upward trends in production need to be accompanied with strong upward trends in utilization or as has been experienced in the past, sharp, painful adjustments to both price and acreage will develop. Just how the corn market would adjust is uncertain (both in magnitude of price and acreage adjustments), and where those adjustments would be made geographically is uncertain, but policy decisions now could have lasting effects on how these adjustments would develop over the next few decades.

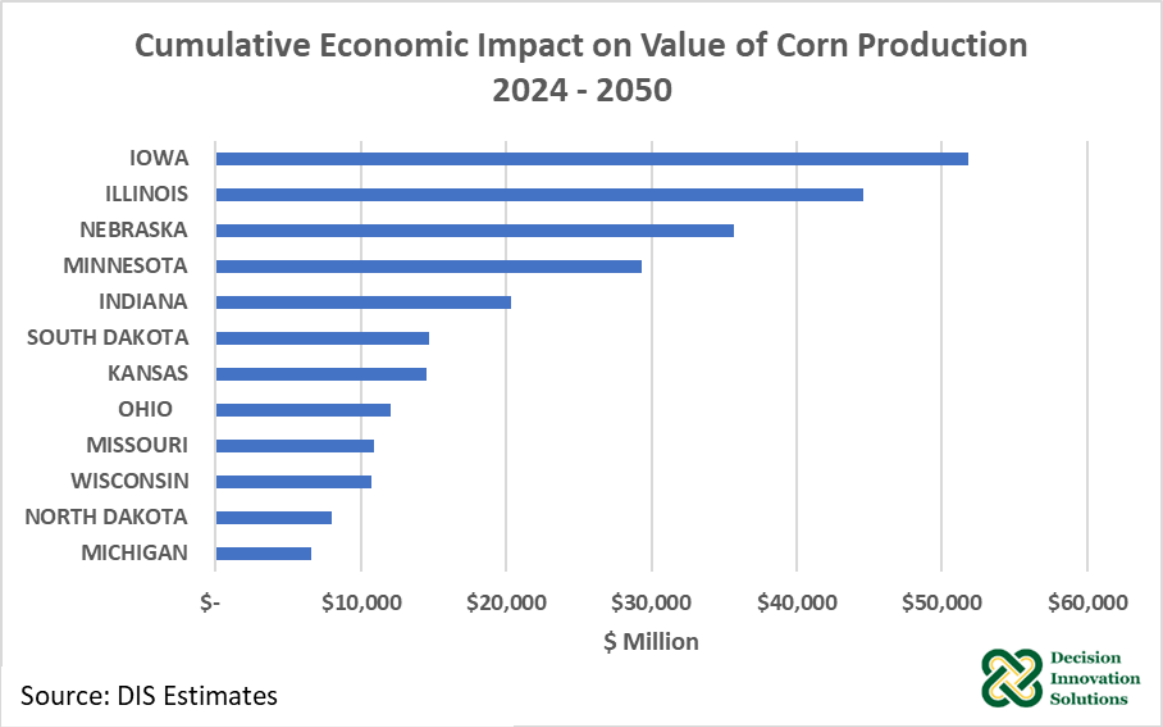


Figure 33. Cumulative Economic Impact on Value of Corn Production 2024-2050

7.4 Corn Production, Ethanol Production and ETJ-SAF Production Forward Pathways

Corn production is a product of the harvested corn acreage and annual yields. While acreage and yields vary year-to-year, yields exhibit a strong uptrend over the past 40+ years. Over the period of 1980 through 2023, corn yields are increasing at the rate of 1.90 bushels per acre per year. Corn production shows a slightly steeper slope (See Figure 34) and is increasing by 210.64 million bushels per year.

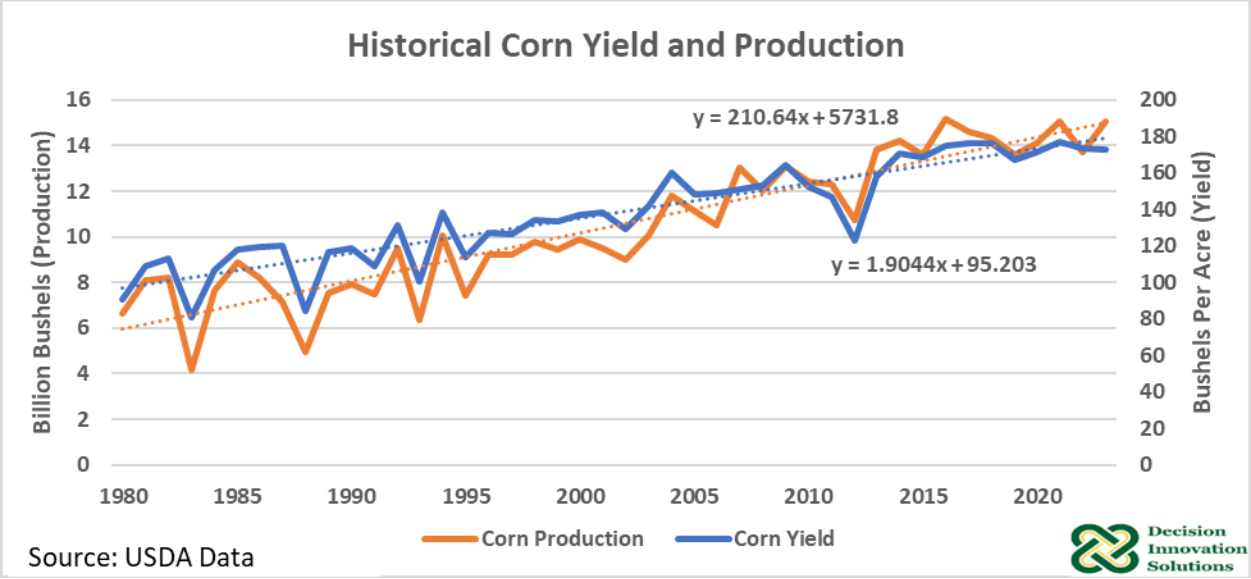


Figure 34. Historical Corn Yield and Production

To project forward corn production, we examined two approaches. The first was to simply use the production trend from 1980-2023 to project forward corn production for 2024 through 2050. This projects growth in corn production of 210 million bushels per year and results in 20.467 billion bushels of corn production in 2050.

The second approach was to apply the trend yield on a forward basis and to gradually increase corn acreage after 2030 from current acreage levels (83 million acres harvested) to 87 million acres harvested for grain by 2050. A maximum of 87 million acres was chosen as it is a recent high in harvested corn acres. That pathway is also shown in Figure 35 and is represented by the blue line on the graph. That pathway resulted in 20.687 billion bushels of corn production in 2050. For the analysis in this report, we used the simple trendline forecast of corn production as the corn supply.

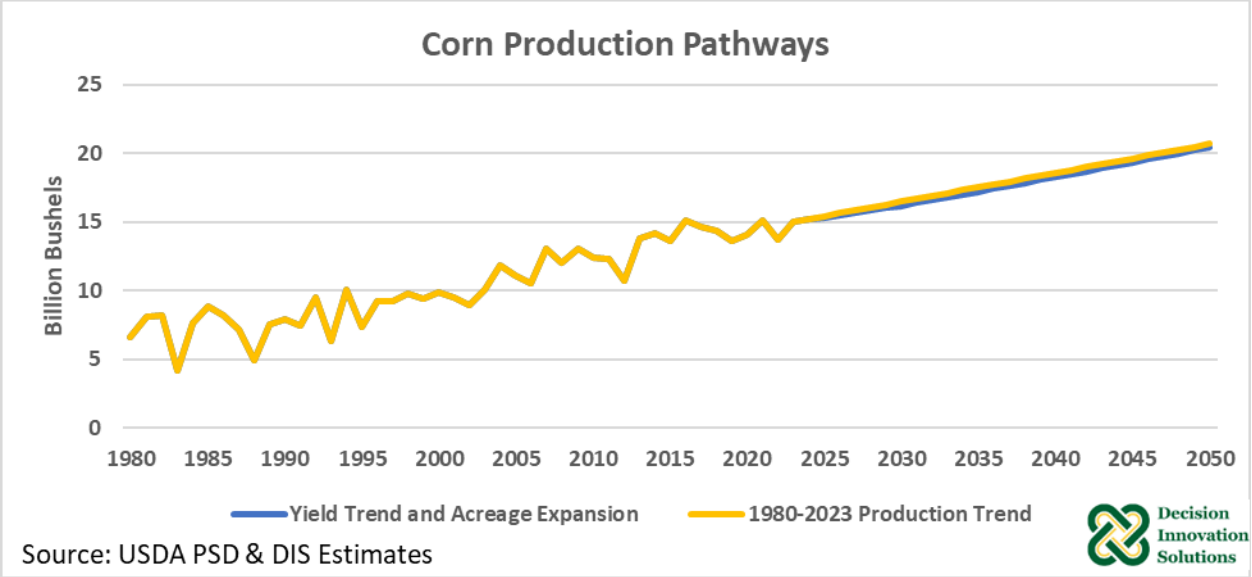


Figure 35. Corn Production Pathways

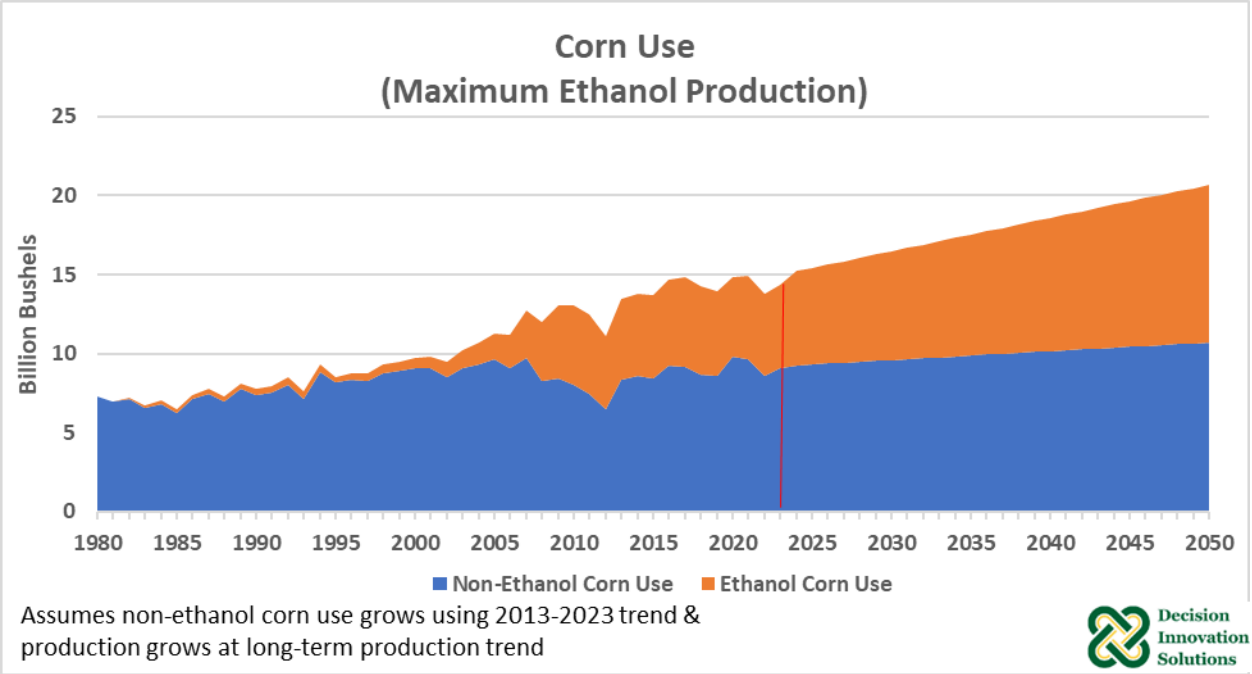


Figure 36. Corn Use (Maximum Ethanol Production)

To determine the quantity of corn that could be available for ethanol production, historical corn usage for all non-ethanol uses (feed, food, exports) was determined and a 2013-2023 trend was applied to project non-ethanol corn use for the 2024 through 2050 period. A shorter trend was used here as this is the period after major ethanol expansion had taken place. The 2013-2023 trend increases non-ethanol corn use by 55 million bushels per year. The non-ethanol corn use was subtracted from projected corn production to project corn available for ethanol production if the demand were to develop due to use of ethanol as a feedstock in ethanol to jet (ETJ-SAF) fuels.

An estimate of the maximum amount of corn-based ethanol production (Figure 37) was estimated from the forward projection of corn available for ethanol production. Based on the projected available corn supply, corn-based ethanol production could increase from the current 15.3 billion gallons of production (2023 estimate) to 28.97 billion gallons in 2050 (assumes 2.9 gallons of ethanol from a bushel of corn).

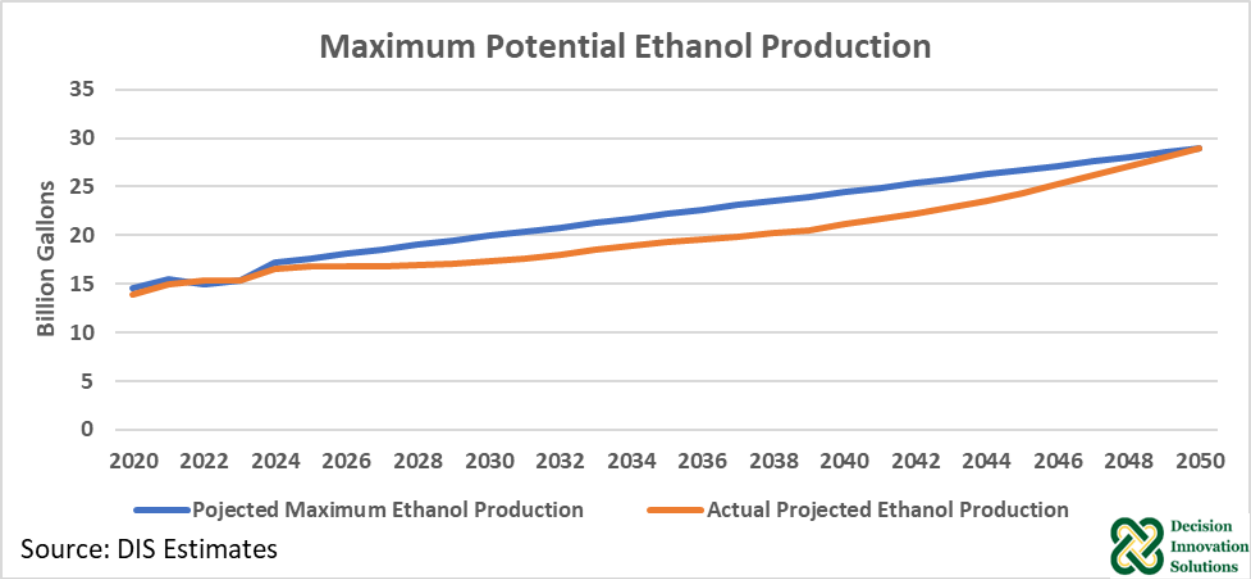


Figure 37. Maximum Potential Ethanol Production

The maximum amount of ethanol available for ETJ-SAF production (Figure 38) is calculated by taking the projected maximum amount of ethanol production and subtracting ethanol being blended with gasoline for light vehicle use and a forward projection of ethanol exports.[9] Using this approach, in 2024 there could be 687 million gallons of ethanol available for ETJ-SAF production. By 2050, there could be 13.305 billion gallons of ethanol available for ETJ-SAF production (Figure 38). These projections assume that policy and technology will be in place that can allow corn-based ethanol to be used as a feedstock for ETJ-SAF through carbon capture and storage (CCS).

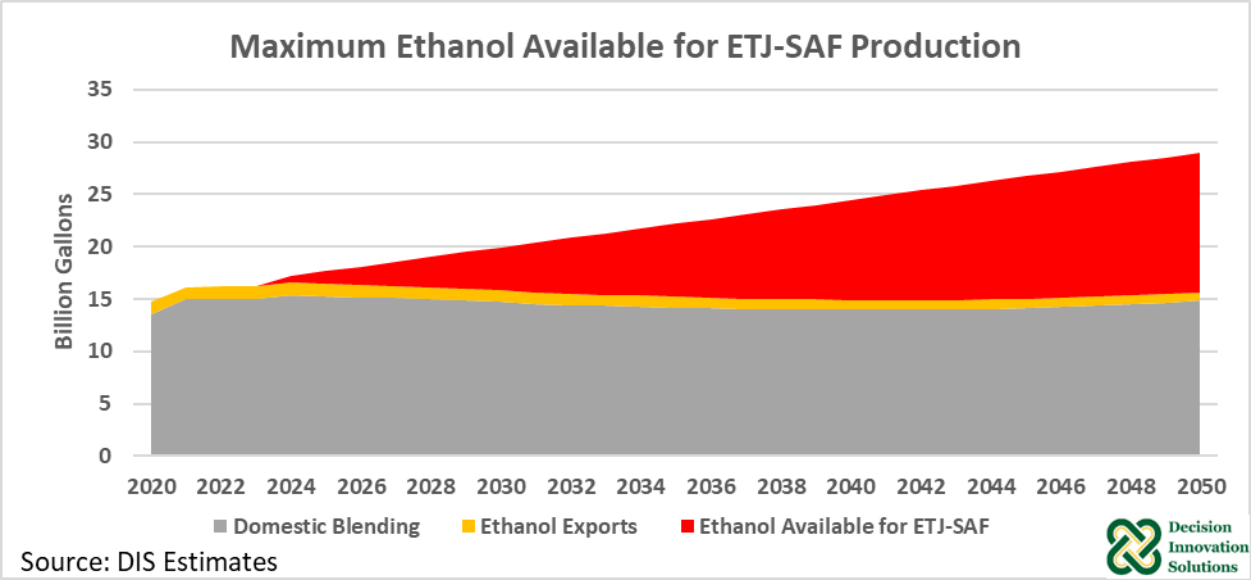


Figure 38. Maximum Ethanol Available for ETJ-SAF Production

Two projections were made of ETJ-SAF production. The first is the maximum potential ETJ-SAF which is a function of the maximum amount of ethanol which is available for ETJ-SAF production (Figure 39). It

[9] Projected ethanol exports from the U.S. were based on the 2016-2022 trend for ethanol exports.

assumes that it will take 1.6667 gallons of ethanol for each gallon of distillate and that 70% of the distillate is ETJ-SAF. Accordingly, 415 million gallons "could" be produced in 2024 and production of ETJ-SAF could increase to 5.59 billion gallons by 2050.

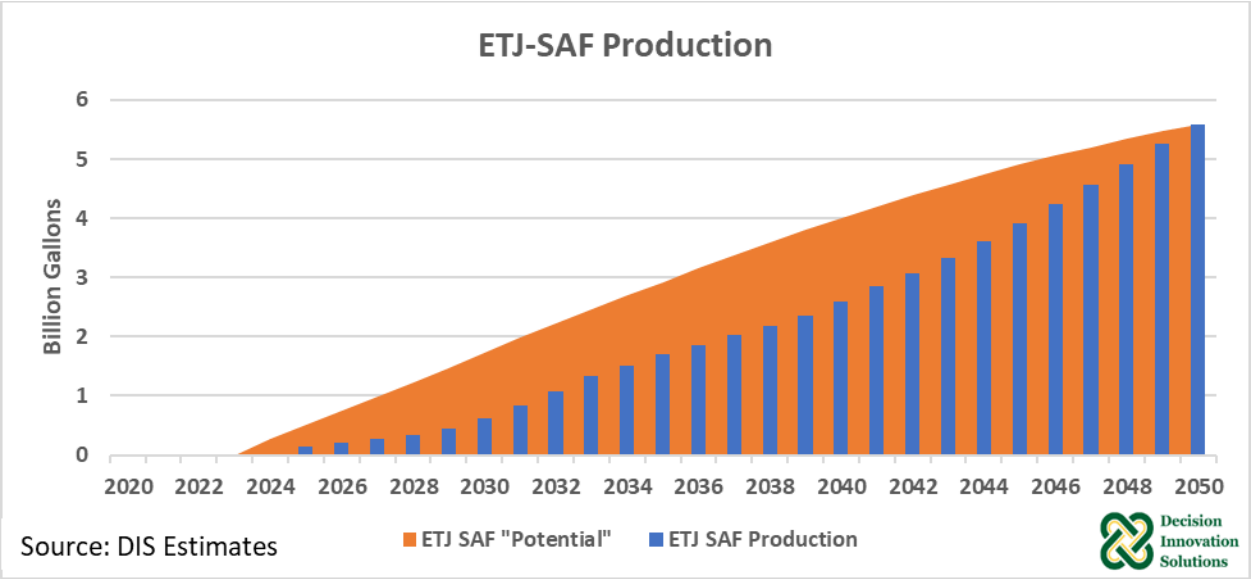


Figure 39. ETJ-SAF Production

The actual production of ETJ-SAF is projected as an increasing percentage of potential production and assumes that policy and technology will enable the CI score of ethanol to be low enough to be used as a feedstock for ETJ-SAF and that there will be sufficient policy and incentives as well as technology to support the demand side of SAF within the aviation industry. Actual production of ETJ-SAF is modeled as starting with 21 million gallons in 2024, increasing to 988 million gallons by 2030 as part of the effort to reach 3 billion gallons of SAF by 2030, and then increases to full utilization of the potential ETJ-SAF by 2050.

7.4.1 Corn Distribution Maps

Figure 40 shows estimated corn supply net of feed demand by state. As shown, Iowa has the largest net positive supply of more than 1.9 billion bushels. Texas has the largest net negative supply of more than 200 million bushels. Existing corn ethanol plants are shown with yellow dots, and existing non-ethanol corn processing plants are shown with pink dots. Corn processing is heavily concentrated in the Midwest, where all states have a positive net corn supply.

Net Corn Supply and Processing Plants, 2020

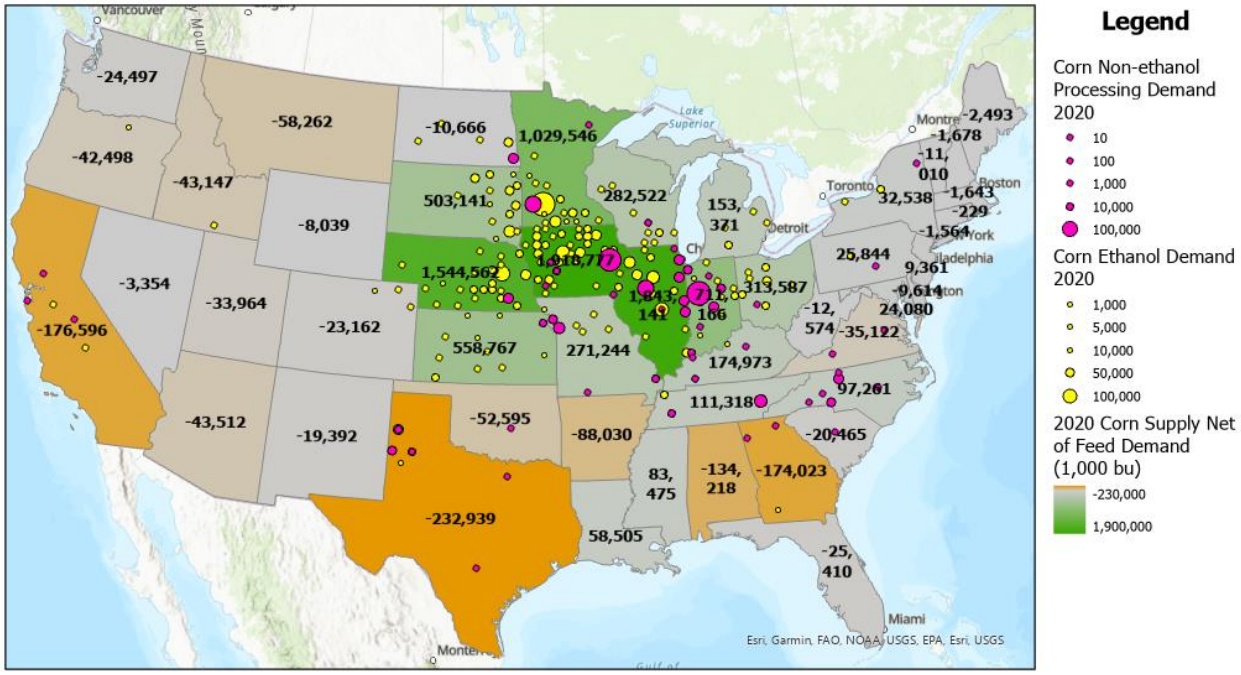


Figure 40. Map of Net Corn Supply and Processing Plants, 2020; Source: USDA, DIS

Figure 41 is similar to Figure 40, but corn supply, feed demand, and non-ethanol processing demand are estimated based off the projected 2050 values. Supply, net of feed demand, is expected to increase in most Midwestern states, as corn production is projected to increase at a faster rate than corn feed demand.

Net Corn Supply and Processing Plants, 2050

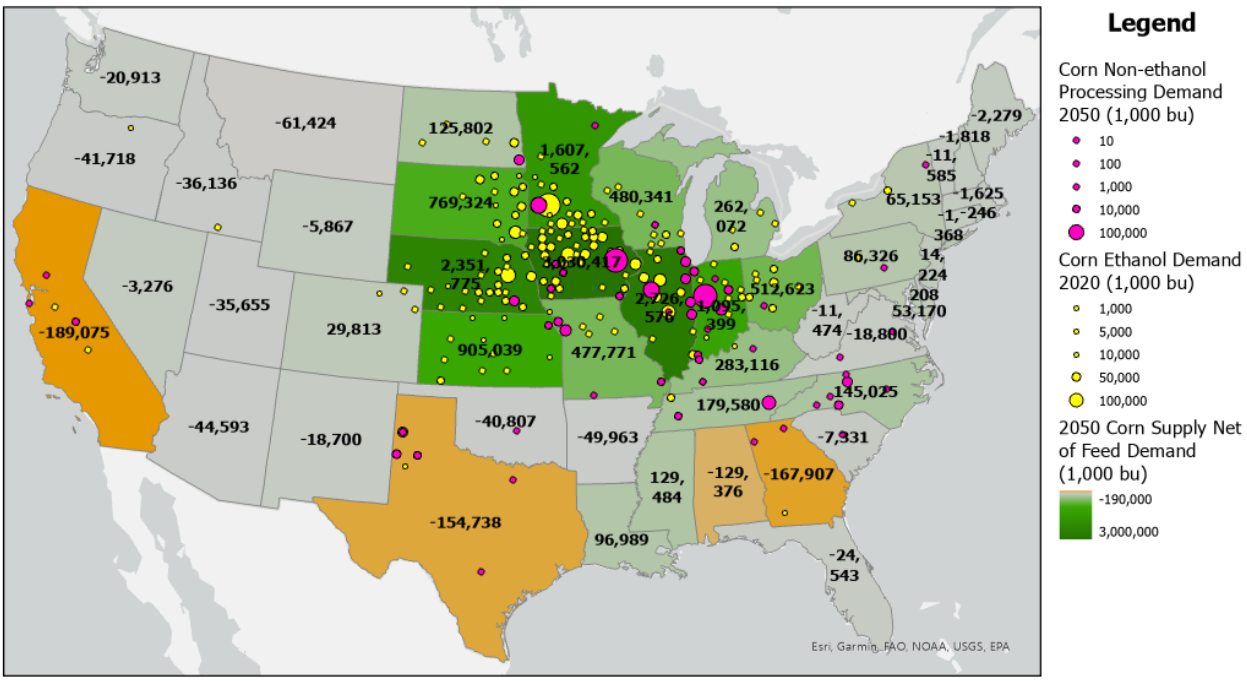


Figure 41. Map of Net Corn Supply and Processing Plants, 2050

Figure 42 shows the projected corn available for new ethanol by state, calculated as projected corn supply net of projected feed demand, projected non-ethanol processing demand, and current ethanol processing demand. Note that this estimate does not include corn exports. Iowa, Nebraska, and Illinois are expected to each have more than 1 billion bushels available for additional ethanol production. All of the Midwest, with the exception of North Dakota, is projected to have corn available for additional ethanol production.

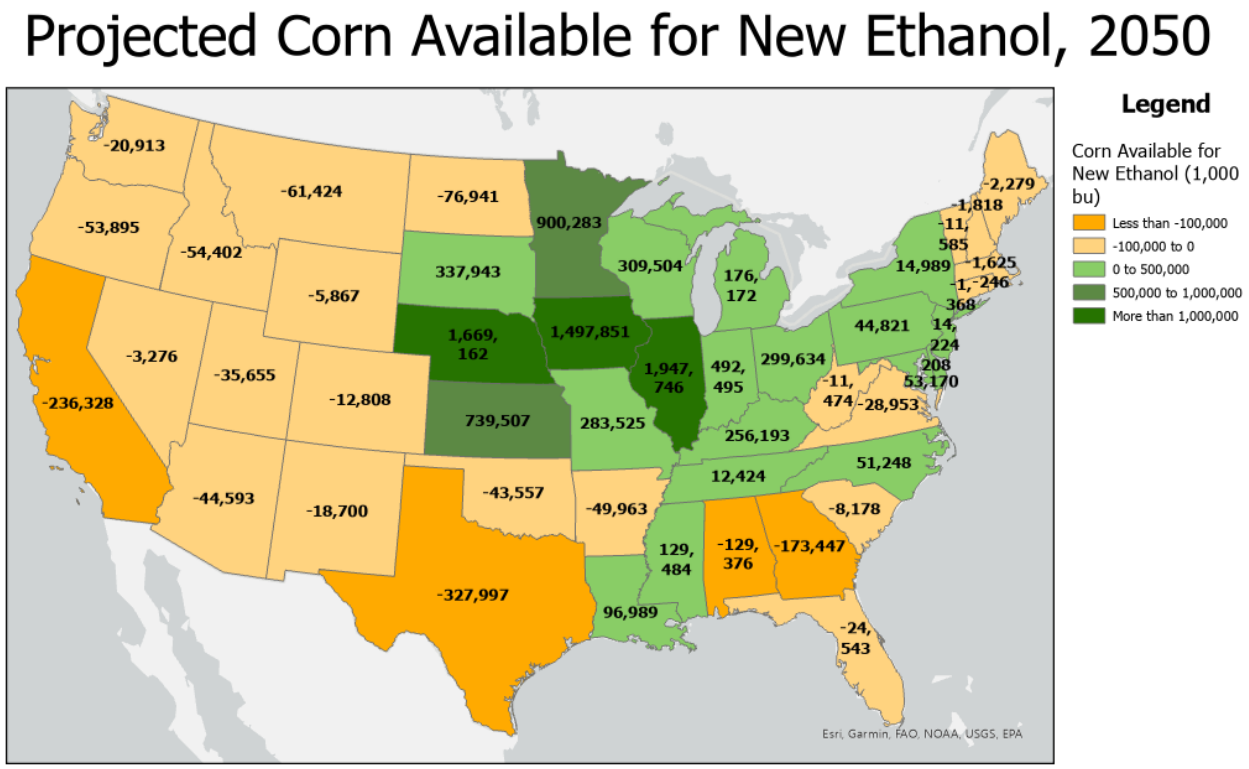


Figure 42. Map of Projected Corn Available for New Ethanol, 2050

8 CO2 Pipeline Industries Opportunities

As of the writing of this report, there are three CO2 pipelines still under active development in the Midwest. Wolf Carbon Solutions is still working on their pipeline through eastern Iowa and Illinois. Summit Carbon Solutions is still working on a CO2 pipeline that would cross parts of five Midwestern states (IA, MN, NE, SD, and ND). The exact number of facilities that will capture CO2 is unknown, although a prior-released analysis was conducted that included 31 collection facilities. If regulatory approval for the main trunk line, pumping stations and the sequestration site facilities is eventually approved, it is likely that other facilities that were considering carbon sequestration via pipeline could be added to the Summit Carbon pipeline.

TallGrass Energy's Trailblazer Pipeline Company received regulatory approval to convert their existing 400-mile-long natural gas pipeline into a carbon dioxide transportation network in October 2023. Trailblazer now intends to repurpose this pipeline for the transportation of CO2 from emissions sources in Nebraska and Colorado to geologic formations in Wyoming, where it will be permanently stored through the Trailblazer Conversion Project.

Active ethanol plants across the U.S. currently produce approximately 37.3 million metric tons of CO2 annually. Approximately 7.5 mmt of CO2 (15.3%) are currently being captured for utilization. Approximately 5.25 mmt of CO2 (10.8%) are being captured (or will shortly be captured) on site for storage either on-site or very nearby. If completed with its original potential participating ethanol plants, the Summit Carbon pipeline would capture and sequester approximately 7.96 mmt (18.2%) of CO2. The TallGrass pipeline is expected to capture and sequester approximately 1.15 mmt (2.4%) of

CO2. The Wolf and Navigator CO2 pipelines were originally slated to capture and move 11.02 mmt (22.6%) of CO2 from ethanol plants.

Based on locations of ethanol plants relative to geological formations that may be conducive to on-site carbon capture and sequestration, there is approximately 5.2 billion gallons of ethanol in the Midwestern states that could be produced by current plants that could potentially sequester carbon dioxide on-site. These ethanol plants would sequester approximately 14.5 mmt of CO2 annually. By 2050, that still leaves 8.1 billion gallons of ethanol for SAF (with the need to sequester 22.7 mmt of CO2 annually) that will need to have carbon sequestered either via CO2 pipeline or through new ethanol plant construction that is done in areas with on-site sequestration capability. The TallGrass pipeline will enable carbon capture and sequestration on 413 million gallons of ethanol (sequestering 1.2 mmt of CO2 annually. The original Summit Carbon pipeline encompassed 2.8 billion gallons of ethanol, and Navigator and Wolf pipelines were anticipated to sequester carbon from 3.96 billion gallons of ethanol. Combined, the plants on these three proposed CO2 pipelines would have sequestered 19 mmt of CO2 annually.

By 2050, ethanol plants producing ethanol that will be used as a feedstock for SAF will generate approximately 37.3 mmt of CO2 that will need to be captured and sequestered. With the development of on-site CO2 capture and sequestration by several ethanol producers roughly 14% of the ethanol needed for SAF will have carbon capture and sequestration in place in the near-term. If all current ethanol plants that have the potential to do on-site sequestration build out that capacity, that would account for 42% of the ethanol needed for SAF by 2050. There would still be a need for 21.5 mmt of CO2 annually to be captured and sequestered if that ethanol is to have a CI score sufficiently low enough to allow it to be used as SAF feedstock. If the Midwest produces 93% of the ethanol for SAF, then that would require an additional 20 mmt of CO2 be captured and sequestered in the Midwest.

Based on the data from the economic impact assessment conducted on the Summit Carbon Solutions project in 2022 (EY), some inferences can be drawn regarding the scale of impacts per million metric tons of CO2 captured and sequestered. In Table 6 and Table 7, the costs of the Summit Carbon Solutions project were adjusted to a cost per mile basis and then applied to other ethanol plants at an average estimate of 30 miles per plant from the trunkline. For this analysis, the 33 plants are proposed as estimates of plants that have expressed interest in sequestering CO2 via pipeline in the Midwest.

Table 6. Average Construction Impact Data for CO2 Pipeline(s)

Average Construction Impact Data (based on Summit Carbon Solutions project)			
Item	Impact/30 miles/Plant	Impact Projected to Trunk Line and 8 mmt CO2	Impact Projected to add 33 Plants @ an average distance of 30 miles from the Trunkline
Construction Impact ($ million)	$80	$5,100	$2,580
Gross Economic Output Relative to Capital Expenditures ($ million)	$60	$3,600	$1,820
Capital Expenditures ($ million)	$56.43	$3,683	$1,862
Employment (jobs)	142	9,290	4,697
FSL Taxes ($ million)	$5.68	$371	$188

Table 7. Average Annual Operations Impact Data Per MMT of CO2 Captured

Average Annual Operations Impact Data Per MMT of CO2 Captured (based on Summit Carbon Solutions project)			
Item	Impact/30 miles/Plant	Impact Projected to TrunkLine and 8 mmt CO2	Impact Projected to add 33 Plants @ an average distance of 30 miles from the Trunkline
Total Operations Impact ($ million)	$2.60	$170	$86
Total Gross Economic Output ($ million)	$5.78	$377	$191
Employment (jobs)	15.26	996	2,503
FSL Taxes ($ million)	$1.49	$97	$49
Note: impacts of 45Q tax credits are NOT included in these annual estimates			

Building out CO2 capture and sequestration via pipeline could have substantial positive impacts across the Midwest (Table 8). While the trunkline and 31 connected plants are estimated to generate $5.1 billion in construction impacts, the eventual addition of 33 more plants to that trunkline are estimated to add another $2.58 billion in construction impact. Gross economic impact of capital output relative to capital expenditures is estimated to be $3.6 billion for the trunkline set of CO2 sequestration construction and capital outlay with $1.8 billion of output related to adding the additional 33 plants.

Table 8. Midwest CO2 Pipeline Construction Impact Summary

Midwest CO2 Pipeline Construction Impact Summary				
Event	**Employment**	**Value Added ($M)**	**Output ($M)**	**FSL Taxes ($M)**
Trunk Line & 31 Plants	9,290	$ 5,100	$ 3,600	$ 371
33 Additional Plants	4,697	$ 2,580	$ 1,820	$ 188

Construction employment is estimated to be 9,290 jobs for the trunkline and another 4,697 jobs for the 33 additional plants. Total federal, state and local taxes from construction activities and capital outlays are estimated to be $371 million from construction of the trunkline and $188 million from construction of the 33 other plants.

Annual operations of the combined carbon collection and sequestration activities are estimated to be $170 million for the trunkline and another $86 million for the 33 additional plants (Table 9). Gross economic output is estimated to be $377 million for the trunkline and $191 million for the additional 33 plants. Operational employment is estimated to 996 jobs at the trunkline and 2,503 jobs for the additional plants. Federal, state and local taxes are estimated to be $97 million from the trunkline and $49 million from the additional plants.

Table 9. Midwest CO2 Pipeline Operations Impact Summary

Midwest CO2 Pipeline Operations Impact Summary				
Event	Employment	Value Added ($M)	Output ($M)	FSL Taxes ($M)
Trunk Line & 31 Plants	996	$ 170	$ 377	$ 97
33 Additional Plants	2,503	$ 86	$ 191	$ 49

Beyond the CO2 that needs to be captured and sequestered so that the ethanol can be used as feedstock for SAF, there is another 41-45 mmt of CO2 available to be captured from ethanol that is blended for light vehicle fuels and could be used as the feedstock for SAF using a PTF-SAF pathway. It is not yet clear whether it would make more economic sense to capture and accumulate this CO2 in pipelines and then build larger scale CO2-based PTF-SAF plants that would extract CO2 from the pipeline or whether it makes sense to simply move the CO2 to a nearby, or on-site, smaller PTF-SAF facility that could use the CO2 as feedstock for PTF-SAF.

9 Power-to-Fuel (PTF-SAF) from Captured Corn Ethanol CO2

Power-to-liquid fuel is a type of Sustainable Aviation Fuel (SAF) that only contains renewables instead of using waste or biological materials like plants. To make it, a facility takes the hydrogen out of water, carbon dioxide captured from the production of ethanol and electricity from renewable energy are all used to make jet fuel (Figure 43).

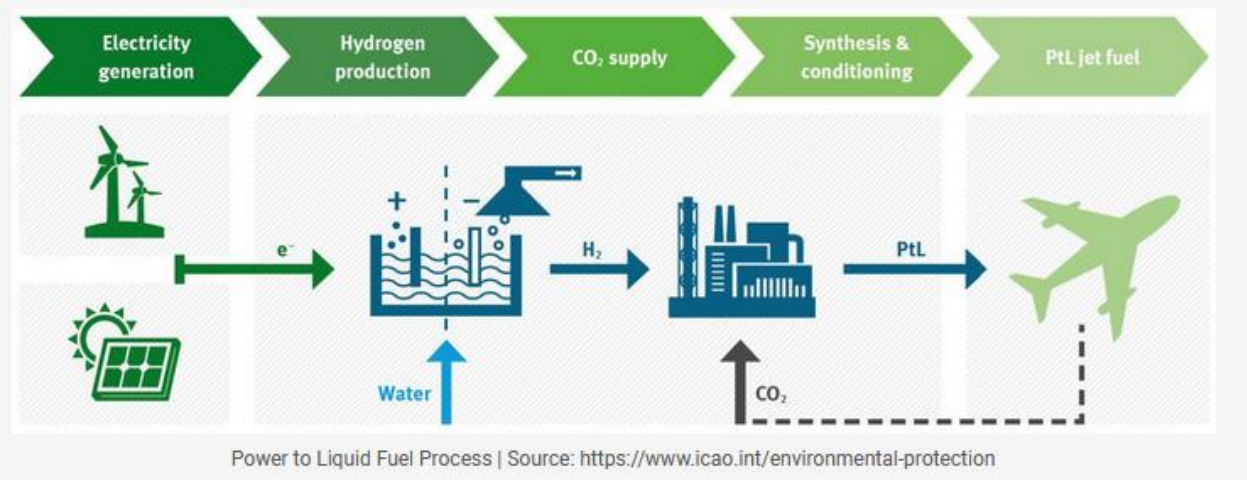


Figure 43. Power to Fuel Process

According to Sanchez *et. al.* (2018), capture of biogenic CO_2 from fermentation is unique because, unlike many other technologies, it does not require a costly separation of CO_2 and can be applied at existing biorefineries. Practiced commercially for several decades, fermentation of sugars and starch currently produces over 26 billion gallons/y of ethanol worldwide. Moreover, fermentation produces a high-purity (99%) gaseous CO_2 stream consisting only of CO_2, H_2O, and small amounts of organic and sulfur compounds. Thus, purification, dehydration, and compression of fermentation CO_2 streams can be accomplished at relatively low cost via existing technologies, including reciprocating or centrifugal compressors, pumps, and glycol dehydration. Cost estimates for CO_2 capture and compression from fermentation are typically \$30/tCO_2, among the lowest of all CO_2 point sources (Greenberg (2016), Herron (2014) and Psarras (2017)).

For this pathway, the CO2 is captured from both existing ethanol production and from the new ethanol plants that will come on-line to produce ETJ-SAF. It is assumed that there will be a ramping up of CO2 capture and utilization for PTF-SAF that starts in 2025, slowly expands to about 6% of all corn-ethanol CO2 being captured by 2030 and then ramps up through 2042 when 90% of CO2 from corn ethanol plants will be captured and converted to PTF-SAF. The DIS pathway for PTF-SAF from CO2 from corn ethanol plants then remains at 90% capture and utilization rate through 2050. This pathway assumes that the captured CO2 at the corn ethanol plants is equal to 32% of the weight of the corn processed for ethanol. It also assumes that the CO2 from each million gallons of ethanol can be converted into 0.36 million gallons of distillate that is then distilled into 20% PTF-SAF, 9% RD, and 71% Renewable Gasoline.

Twelve is a company that began producing jet fuel in a lab in 2021 using electricity, water and CO2. Twelve refers to their product as “E-Jet”. The company has broken ground on a commercial-scale facility

in Moses Lake, WA and plans to begin operations in 2024. According to media reports, Twelve aims to produce 40 million gallons per year of E-Jet before scaling up production by 10X within the first 5 years of operations. The Twelve operation plans to get CO2 from an ethanol plant in Oregon. Twelve is using a method to transform CO2 into jet fuel in a process called “industrial photosynthesis”. The Twelve process uses an electrochemical reactor that takes water and CO2 and changes them into new chemicals, materials, or fuels using renewable energy. It splits CO2 molecules into carbon monoxide while in a separate electrolyzer, water molecules are broken down into hydrogen and oxygen and then combined into a syngas that is then turned into E-Jet via the Fisher-Tropsch process.

Honeywell has also announced a new technology to produce SAF from green hydrogen and CO2 captured from industrial sources such as an ethanol plant. Honeywell has said that energy producer HF Global has signed on as the first company to use its new technology. HF Global plans to deploy the technology at a facility that will recycle about 2 million tons of captured CO2 per year by 2030 (Kelly, 2023).

DIS projects that with the proper combinations of policy and technology adoption, CO2 can be captured from the majority of ethanol plants over the next 20+ years. The CO2 that could be available from capture at ethanol plants is depicted in Figure 44. Currently, there are approximately 45 million metric tons of CO2 being produced from corn ethanol production. Only a fraction of that is being captured currently. With expansion of ethanol production to produce ETJ-SAF, there could be as much as 80 million metric tons of CO2 captured from U.S. ethanol plants in 2050.

Also shown in Figure 44 is a projection of a potential pathway for expansion of PTF-SAF from corn ethanol CO2. As noted above, Twelve has broken ground on a production facility that should produce PTF-SAF in 2024, and plans to expand that production by 2030. In the DIS pathway for PTF-SAF from ethanol CO2, we project 6% of corn-ethanol CO2 will be captured and turned into 373 million gallons of PTF-SAF from ethanol CO2 by 2030. DIS projects that this pathway will ramp up substantially between 2030 and 2042 and then stabilize at an 90% utilization rate of ethanol CO2 for PTF-SAF from 2042 through 2050.

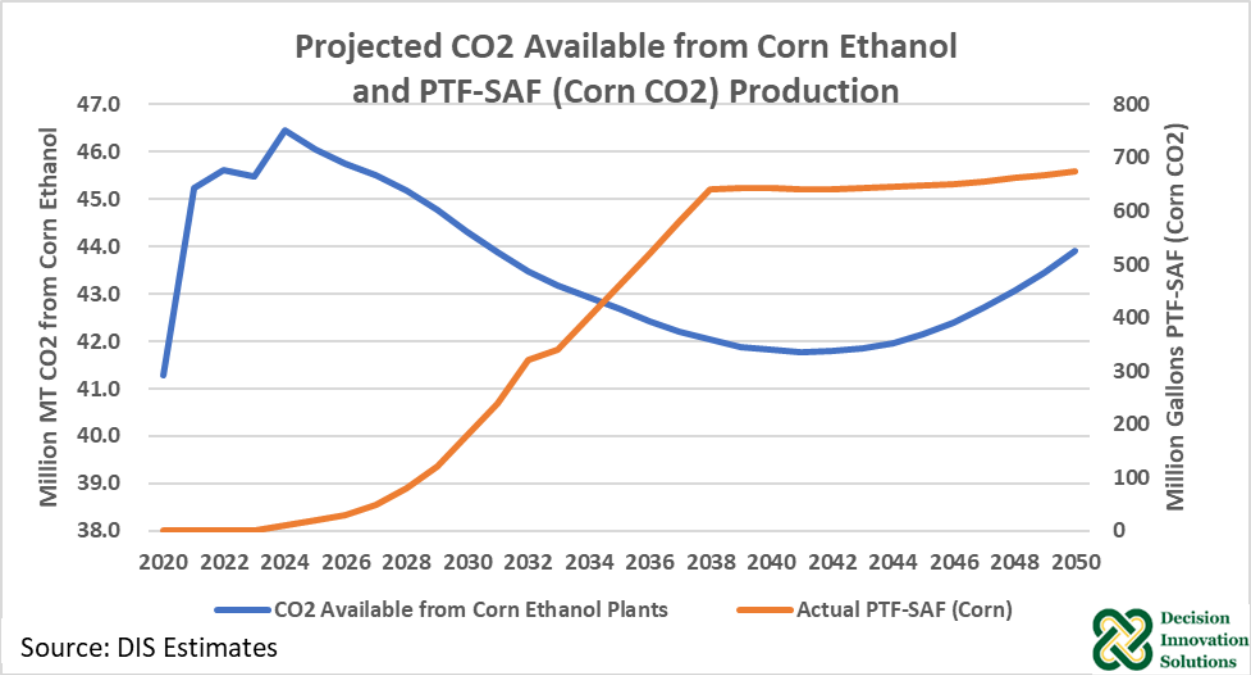


Figure 44. Projected CO2 Available from Corn Ethanol and PTF-SAF (Corn CO2) Production

9.1 Renewable Energy Availability Maps

U.S. Wind energy net generation from all sectors was about 434,297 thousand megawatt hours (MWh), which increased 14.8% from the net generation the previous year. Wind energy accounted for 10% of total electricity net generation from all sectors in 2022.

Texas was the number one state in terms of wind energy net generation in 2022 with 114,786 thousand MWh (26.4%), followed by Iowa (45,762 thousand MWh, 10.5%), and Oklahoma (37,552 thousand MWh, 8.6%) (Figure 45).

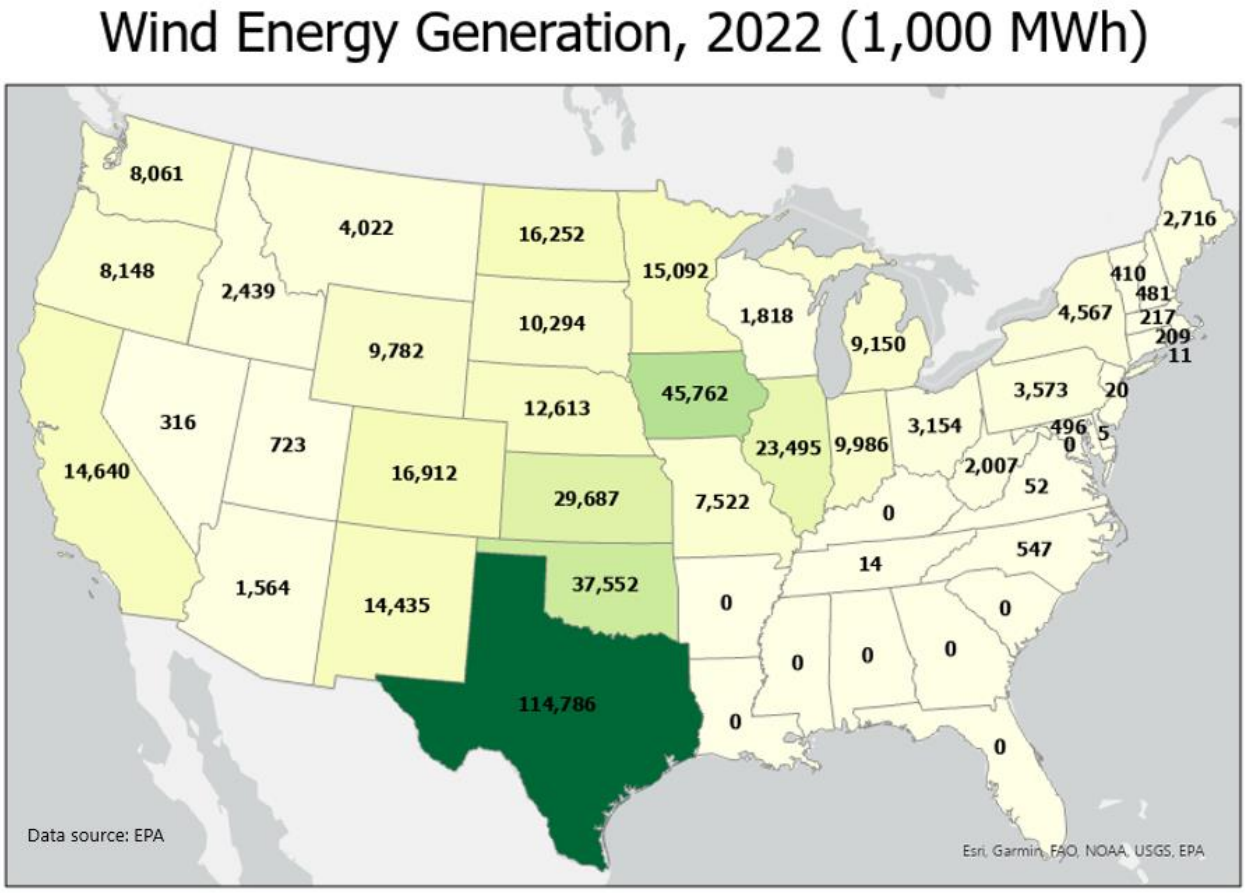


Figure 45. Wind Energy Generation, 2022 (1,000 MWh)

U.S. Solar energy net generation at utility scale facilities, all sectors, totaled 143,797 thousand MWh in 2022, up 24.8% from the previous year. Overall, wind energy generation at utility scale facilities, all sectors, made up 3% of total electricity generation in 2022.

The top three states in terms of solar energy net generation in 2022 were California (37,789 thousand MWh, 27%), Texas (22,442 thousand MWh, 16%), and North Carolina (11,264 thousand MWh, 8%) (see Figure 46).

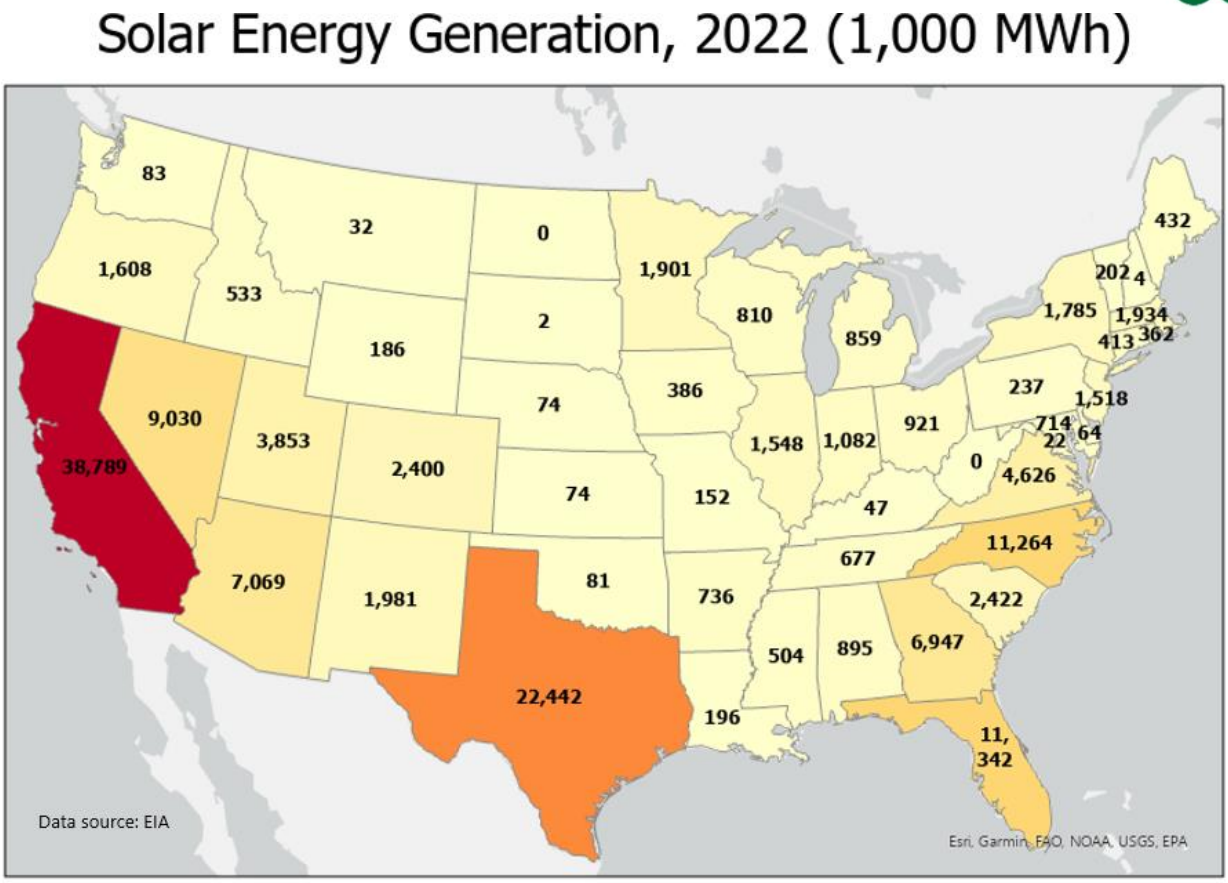


Figure 46. Solar Energy Generation, 2022 (1,000 MWh)

Figure 47 shows the combined total energy generation from wind and solar sources in 2022.

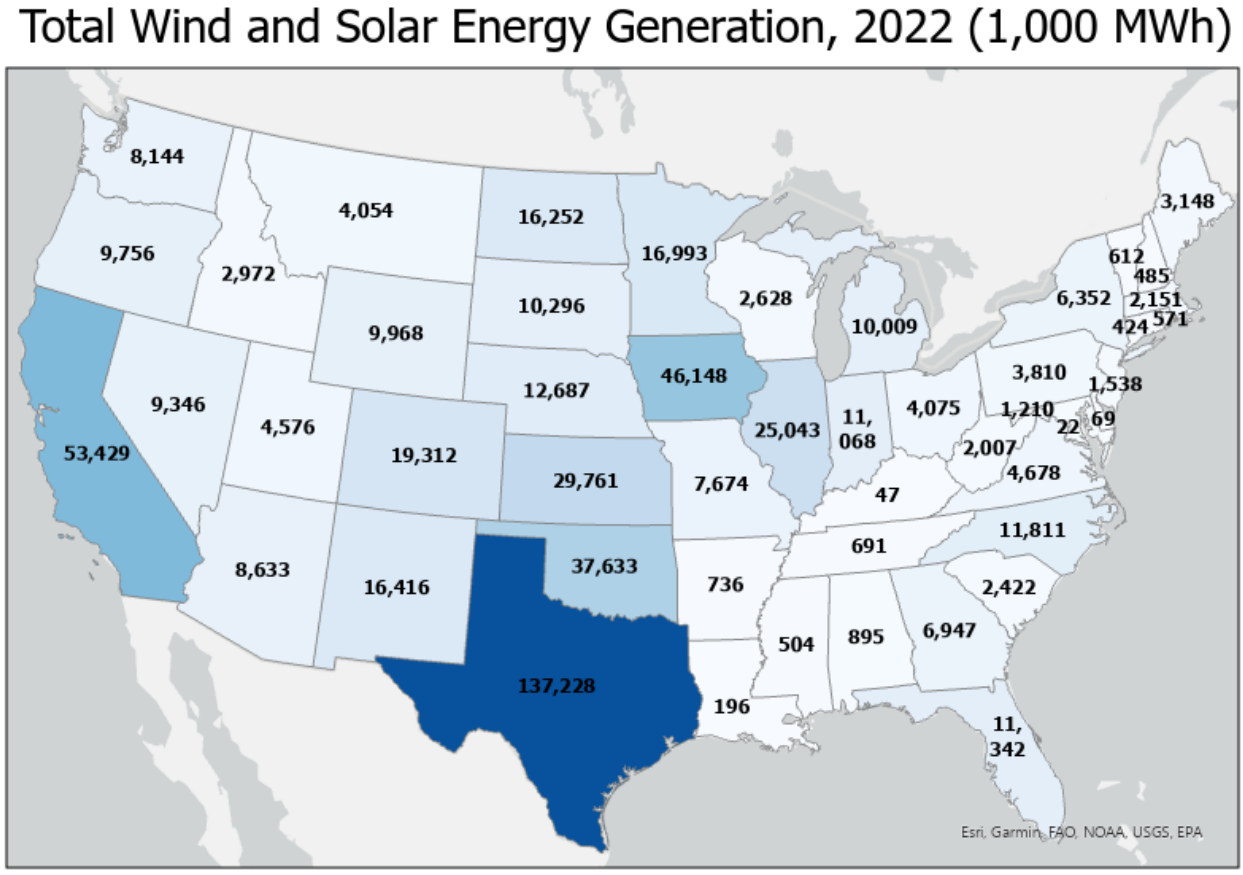


Figure 47. Total Wind and Solar Energy Generation, 2022 (1,000 MWh)

10 Economic Impact Assessment of Future Pathways, Including HEFA, ETJ and PTF[10]

The following economic contribution study was conducted using a combination of IMPLAN, Microsoft Excel, and other sources. IMPLAN is an input-output model used to understand industry relationships and conduct economic assessments for specified local economies. IMPLAN datasets are constructed annually and are derived from many different sources, including the U.S. Bureau of Labor Statistics (BLS), the U.S. Bureau of Economic Analysis (BEA), the U.S. Bureau of Economic Analysis Benchmark Input-Output Account of the U.S., the BEA output estimates, the U.S. Census Bureau's economic censuses and surveys, the U.S. Department of Agriculture's census, and more.

Within IMPLAN, the effects of an economic impact or contribution event are expressed in terms of direct, indirect, and induced effects. These different effect types are defined as follows:

- **Direct Effects** – The economic activity directly attributable to the industry under analysis; in this study, the production of ethanol and SAF from a variety of feedstocks.
- **Indirect Effects** – The effects of local inter-industry spending throughout the supply chain, for example, the seed, equipment, fertilizer, and other inputs used by a farmer to produce corn for an ethanol plant or soybeans for soybean oil processing and feedstock for HEFA-SAF
- **Induced Effects** – The results of employees of the directly and indirectly affected industries spending their income throughout the local economy
- **Total Effect** – The sum of direct, indirect, and induced effects

All results shown throughout the report are in current (2023) dollars. The results of this economic contribution study are reported using the following economic measures:

- **Output:** The broadest measure of economic activity – also commonly referred to as "sales." Output refers to the total value of all sales of an industry within a study area without any deductions for the cost or origination of inputs that were used in the production process.
- **Value Added:** A component of output, this measure includes the total sales minus the costs of inputs. Alternatively, value added is calculated as the sum of labor income (further defined below), taxes on production and imports, and other property-type income. An industry's value added is equivalent to its contribution to GDP.
- **Labor Income:** A subset of value added, includes the sum of employee compensation (i.e., wages and benefits) and proprietor income (i.e., income of self-employed workers). Labor income is the largest portion of household income (which includes non-labor incomes such as interest, dividends, and transfer payments).
- **Employment (Jobs):** A measure of part- and full-time job positions, including contract workers, without regard to their full-time equivalence. Since it is not representative solely of full-time

[10] While FT technologies will be part of the overall pathway for SAF through 2050, development of geographic dispersion of new FT-SAF facilities is beyond the scope of this study. Thus, it will not be included in the economic impact assessment.

positions or full-time equivalents, care must be made when drawing comparisons to other measures of employment.

10.1 Economic Impact Assessment for the U.S.

Table 10 shows the estimated total (annual) operations impact from SAF and associated ethanol production. Once the facilities for SAF production from ETJ and HEFA are fully operational, the SAF production industry has the potential to support more than 375,000 jobs and provide more than $15 billion in labor income, more than $32 billion in total value added, and more than $100 billion in total output (sales).

Table 10. U.S. Combined Operations Impact Summary

U.S. Operations Impact Summary				
Event	Employment	Labor Income ($M)	Value Added ($M)	Output ($M)
New Ethanol Production	308,352	$ 12,261.4	$ 25,732.1	$ 79,135.7
SAF from ETJ	32,528	$ 1,684.4	$ 1,682.8	$ 6,281.7
SAF from HEFA	35,842	$ 1,656.4	$ 5,020.9	$ 14,784.7
Total	**376,722**	**$ 15,602.3**	**$ 32,435.7**	**$ 100,202.1**

Table 11 shows the estimated total (one-time) impact from the construction of all new ethanol and SAF production facilities across the U.S. Around $19 billion in labor income, $29 billion in value added, and $55 billion in output is projected to be generated as these facilities are constructed. If the build-out of SAF (and ethanol) production facilities takes place over 25 years, this results in an average impact of $785 million in labor income, $1.2 billion in value added, and $2.2 billion in output each year over that period.

Table 11. U.S. Combined Construction Impact Summary

U.S. Construction Impact Summary				
Event	Employment	Labor Income ($M)	Value Added ($M)	Output ($M)
New Ethanol Production	172,417	$ 12,245.8	$ 18,108.2	$ 34,379.3
SAF from ETJ	78,582	$ 5,630.2	$ 8,339.5	$ 15,653.8
SAF from HEFA	24,276	$ 1,740.5	$ 2,579.6	$ 4,831.9
Total	**275,275**	**$ 19,616.5**	**$ 29,027.4**	**$ 54,865.0**

10.1.1 HEFA-SAF

Six new HEFA-SAF facilities are projected to be built across the U.S., in addition to conversions of current renewable diesel plants. These six facilities are estimated to directly employ 1,206 workers and have a value added of more than $1.5 billion. When accounting for indirect and induced effects, the total economic impact of these new HEFA-SAF facilities is 35,842 jobs created or supported, more than $1.6 billion in labor income, and more than $5.0 billion in value added (Table 12).

Table 12. HEFA-SAF Operations Impact Summary, U.S.

Impact Summary - National SAF Production from New HEFA Facilities				
Impact Type	Employment	Labor Income ($M)	Value Added ($M)	Output ($M)
Direct	1,206	$ 46.2	$ 1,536.0	$ 5,702.3
Indirect	21,867	$ 1,114.4	$ 2,571.2	$ 7,456.3
Induced	12,769	$ 495.8	$ 913.7	$ 1,626.0
Total	**35,842**	**$ 1,656.4**	**$ 5,020.9**	**$ 14,784.7**

The industries most impacted by HEFA-SAF production are mostly those that provide feedstocks for the HEFA process, such as oilseed farming, oilseed processing, and rendering (Table 13). The "other basic organic chemical manufacturing" industry primarily represents the value added attributable directly to the operations of the HEFA-SAF facilities.

Table 13. HEFA-SAF Operations Top Industries Impacted, U.S.

Top Industries Impacted - National SAF Production from New HEFA Facilities		
Industry	Total Value Added ($M)	
Other basic organic chemical manufacturing	$	1,583.9
Oilseed farming	$	793.1
Soybean and other oilseed processing	$	202.2
Petrochemical manufacturing	$	150.9
Truck transportation	$	140.7
Monetary authorities and depository credit intermediation	$	107.4
Rendering and meat byproduct processing	$	107.2
Owner-occupied dwellings	$	97.3
Wholesale - Other nondurable goods merchant wholesalers	$	80.3
Other real estate	$	75.6

The construction of six new HEFA-SAF facilities is estimated to have a total (one-time) impact of 24,276 jobs, $1.7 billion in labor income, $2.6 billion in value added, and $4.8 billion in total sales (output). This is around $290 million in labor income and $430 million in value added per new facility (Table 14).

Table 14. HEFA-SAF Construction Impact Summary, U.S.

Impact Summary - New National HEFA Facility Construction				
Impact Type	Employment	Labor Income ($M)	Value Added ($M)	Output ($M)
Direct	11,420	$ 806.9	$ 910.2	$ 1,717.0
Indirect	4,541	$ 390.0	$ 679.6	$ 1,360.0
Induced	8,315	$ 543.5	$ 989.8	$ 1,754.9
Total	**24,276**	**$ 1,740.5**	**$ 2,579.6**	**$ 4,831.9**

Table 15shows the industries most impacted by the construction of new HEFA-SAF facilities. As with the construction of ETJ-SAF and ethanol facilities, some of the most affected industries are equipment and other goods providers, management, and legal services.

Table 15. HEFA Construction Top Industries Impacted, U.S.

Top Industries Impacted - New National HEFA Facility Construction	
Industry	Total Value Added ($M)
Construction of new manufacturing structures	$ 910.2
Wholesale - Machinery, equipment, and supplies	$ 163.6
Owner-occupied dwellings	$ 111.3
Monetary authorities and depository credit intermediation	$ 49.8
Other real estate	$ 48.4
Management of companies and enterprises	$ 40.1
Hospitals	$ 39.7
Wholesale - Other durable goods merchant wholesalers	$ 31.6
Legal services	$ 31.3
Employment services	$ 31.0

10.1.2 ETJ-SAF

A total of 32 ETJ-SAF facilities (each with an average distillate production of 264 million gallons) are projected to be built across the U.S. Once these facilities are fully operational, they are estimated to directly employ more than 6,000 workers and provide more than $400 million in labor income annually. Once indirect and induced effects are added, the estimated total impact of SAF production from the ETJ pathway is 32,528 jobs and nearly $1.7 billion in total value added (Table 16). Note that this impact does not include the production of ethanol for these facilities; that impact is estimated separately below.

Table 16. ETJ Operations Impact Summary, U.S.

Impact Summary - National SAF Production Using Ethanol				
Impact Type	Employment	Labor Income ($M)	Value Added ($M)	Output ($M)
Direct	6,048	$ 400.8	$ (917.4)	$ 1,247.7
Indirect	13,252	$ 769.8	$ 1,652.5	$ 3,347.0
Induced	13,228	$ 513.8	$ 947.7	$ 1,687.0
Total	**32,528**	**$ 1,684.4**	**$ 1,682.8**	**$ 6,281.7**

The industries most affected in terms of value added by ETJ production of SAF are largely a part of the energy and transportation sectors (Table 17). Note that the shown industries are those most impacted according to relationships that exist in 2022. It is likely that these relationships will change by 2050, especially if the processes involved in manufacturing ETJ-SAF become more efficient as the industry scales up production.

Table 17. ETJ-SAF Operations Top Industries Impacted, U.S.

Top Industries Impacted - National SAF Production Using Ethanol	
Industry	Total Value Added ($M)
Natural gas distribution	$ 223.0
Electric power transmission and distribution	$ 193.3
Monetary authorities and depository credit intermediation	$ 157.8
Electric power generation	$ 111.5
Owner-occupied dwellings	$ 100.3
Wholesale - Other nondurable goods merchant wholesalers	$ 91.1
Oil and gas extraction	$ 62.0
Management of companies and enterprises	$ 55.2
Truck transportation	$ 51.1
Other local government enterprises	$ 50.0

Table 18 shows the impact from the construction of the ETJ facilities. While operations impacts occur annually, construction impacts are a one-time impact (although for this report, the construction activities are cumulative over the period of 2024-2050. The construction of 32 ETJ-SAF facilities across the U.S. supports an estimated total 78,582 jobs and provides a total of $8.3 billion in total value added to the economy. If, for example, the buildout period for ETJ-SAF facilities was 20 years, this would be an average of nearly 4,000 jobs supported and $417 million in value added in each of those years.

Table 18. ETJ-SAF Construction Impact Summary, U.S.

Impact Summary - National ETJ Facility Construction				
Impact Type	Employment	Labor Income ($M)	Value Added ($M)	Output ($M)
Direct	37,056	$ 2,618.5	$ 2,953.5	$ 5,571.5
Indirect	14,626	$ 1,253.5	$ 2,184.0	$ 4,405.3
Induced	26,899	$ 1,758.2	$ 3,202.1	$ 5,677.0
Total	**78,582**	**$ 5,630.2**	**$ 8,339.5**	**$ 15,653.8**

The industries most impacted by the construction of ETJ facilities equipment providers, management, and legal services (Table 19).

Table 19. ETJ Construction Top Industries Impacted, U.S.

Top Industries Impacted - National ETJ Facility Construction		
Industry	Total Value Added ($M)	
Construction of new manufacturing structures	$	2,953.5
Wholesale - Machinery, equipment, and supplies	$	462.8
Owner-occupied dwellings	$	359.9
Monetary authorities and depository credit intermediation	$	162.0
Other real estate	$	156.7
Management of companies and enterprises	$	128.5
Hospitals	$	128.3
Wholesale - Other durable goods merchant wholesalers	$	108.0
Legal services	$	103.6
Employment services	$	101.1

A total of 68 new ethanol plants (each with an average production capacity of 200 million gallons) are projected to be built across the U.S. Once fully operational, these facilities are estimated to directly employ more than 5,700 workers and provide a labor income of $278 million. Ethanol production has a large indirect effect due to the large quantities of inputs required. Once indirect and induced effects are considered, the estimated total impact of new ethanol production is more than 300,000 jobs supported and more than $25 billion in value added to the economy (Table 20).

Table 20. Ethanol Operations Impact Summary, U.S.

Impact Summary - New National Ethanol Production				
Impact Type	Employment	Labor Income ($M)	Value Added ($M)	Output ($M)
Direct	5,712	$ 277.7	$ 2,274.0	$ 24,814.1
Indirect	207,362	$ 8,284.1	$ 16,638.4	$ 42,184.6
Induced	95,279	$ 3,699.6	$ 6,819.7	$ 12,137.0
Total	**308,352**	**$ 12,261.4**	**$ 25,732.1**	**$ 79,135.7**

The industry most impacted by new ethanol production is grain farming, with an estimated value-added impact of $4.2 billion. Other affected industries include real estate, agricultural support activities, and banking (Table 21).

Table 21. Ethanol Operations Top Industries Impacted, U.S.

Top Industries Impacted - New National Ethanol Production		
Industry	Total Value Added ($M)	
Grain farming	$	4,263.2
Support activities for agriculture and forestry	$	2,400.5
Other real estate	$	1,145.8
Monetary authorities and depository credit intermediation	$	1,137.2
Other basic organic chemical manufacturing	$	1,081.7
Wholesale - Other nondurable goods merchant wholesalers	$	1,072.3
Petrochemical manufacturing	$	904.6
Natural gas distribution	$	732.4
Owner-occupied dwellings	$	725.4
Oil and gas extraction	$	533.1

Table 22 shows the impact from the construction of the new ethanol facilities. The construction of 68 ethanol facilities across the U.S. supports an estimated total 172,417 jobs and provides a total of $18.1 billion in total value added to the economy over the course of the construction period. If, for example, the buildout period for ethanol facilities was 20 years, this would be an average of 8,600 jobs supported and $905 million in value added in each of those years.

Table 22. Ethanol Construction Impact Summary, U.S.

Impact Summary - New National Ethanol Facility Construction				
Impact Type	Employment	Labor Income ($M)	Value Added ($M)	Output ($M)
Direct	82,315	$ 5,752.6	$ 6,488.4	$ 12,240.0
Indirect	31,217	$ 2,644.3	$ 4,610.3	$ 9,712.1
Induced	58,886	$ 3,848.9	$ 7,009.5	$ 12,427.2
Total	**172,417**	**$ 12,245.8**	**$ 18,108.2**	**$ 34,379.3**

Table 23 shows the industries most affected by the construction of the new ethanol facilities.

Table 23. Ethanol Construction Top Industries Impacted, U.S.

Top Industries Impacted - New National Ethanol Facility Construction	
Industry	Total Value Added ($M)
Construction of new manufacturing structures	$ 6,488.4
Owner-occupied dwellings	$ 788.0
Monetary authorities and depository credit intermediation	$ 366.5
Other real estate	$ 342.8
Wholesale - Other durable goods merchant wholesalers	$ 303.1
Hospitals	$ 280.8
Management of companies and enterprises	$ 266.2
Legal services	$ 252.5
Wholesale - Machinery, equipment, and supplies	$ 239.0
Truck transportation	$ 237.7

10.1.3 PTF-SAF

A total of 31 PTF-SAF facilities that convert CO2 recovered from ethanol plants are projected to be built across the U.S. These facilities are estimated to employ 3,286 workers with a total labor income of $131 million annually (Table 24). It should be noted that the direct value-added for PTF-SAF is negative reflecting a situation in which costs are much greater than value and the need for large subsidies for PTF-SAF production given current operational relationships.

PTF is an emerging technology that currently exists in experimental and relatively small-scale production and is not considered economically viable at this time for large-scale production. An operations impact for PTF is attempting to model economic relationships that do not currently exist at the magnitude projected for 2050. Because of this, only the direct estimate of SAF production by PTF is shown in the table below. This result reflects only the operations of the PTF plants themselves and does not include further effects produced by input industries.

Table 24. PTF-SAF from Ethanol CO2 Operations Impact Summary, U.S.

Impact Summary - National SAF Production Using Captured Ethanol CO2				
Impact Type	Employment	Labor Income ($M)	Value Added ($M)	Output ($M)
Direct	3,286	$ 131.5	$ (4,905.3)	$ 9,259.6

The industries likely to be most affected by operations of the PTF-SAF facilities are the manufacturing of renewable (green) hydrogen, electric power transmission and distribution, and electrical generation. If hydrolyzation of renewable hydrogen becomes significantly more efficient than current processes[11], then the economic impacts will change dramatically for PTF-SAF.

The construction of PTF-SAF facilities in the U.S. is estimated to have a total (one-time) direct impact of 223,096 jobs, $15.6 billion in labor income, and $17.7 billion in value added (Table 25Table 25). If construction of the PTF-SAF production facilities were to happen over a period of 10 years (roughly 3 facilities per year), this would result in an average annual impact of around 22,300 jobs supported, $1.6 billion in labor income, and $1.8 billion in value added per year over that period. These values are rough estimates, as the precise requirements to build a large-scale PTF facility are not currently known.

Table 25. PTF Construction Impact Summary, U.S.

Impact Summary - National PTF Facility Construction				
Impact Type	Employment	Labor Income ($M)	Value Added ($M)	Output ($M)
Direct	223,096	$ 15,608.7	$ 17,690.2	$ 33,452.1

10.2 Economic Impact Assessment for the 12 Midwestern States

Table 26 shows the estimated total (annual) operations impact from SAF and associated ethanol production in the Midwest. Once the facilities for SAF production from ETJ, HETA, and PTF are fully

[11] Bloom Energy has begun generating hydrogen from the world's largest solid oxide electrolyzer installation at NASA's Ames Research Center, the historic Moffett Field research facility in Mountain View, Calif. This high-temperature, high-efficiency unit produces 20-25% more hydrogen per megawatt (MW) than commercially demonstrated lower temperature electrolyzers such as proton electrolyte membrane (PEM) or alkaline. Source: https://www.bloomenergy.com

operational, the SAF production industry has the potential to support more than 224,000 jobs and provide more than $9 billion in labor income, nearly $20 billion in total value added, and more than $71 billion in total output (sales) within the region.

Table 26. Midwest Operations Impact Summary

Midwest Operations Impact Summary				
Event	Employment	Labor Income ($M)	Value Added ($M)	Output ($M)
New Ethanol Production	184,115	$ 7,339.6	$ 15,692.2	$ 56,403.0
SAF from ETJ	22,610	$ 1,140.9	$ 724.3	$ 4,289.3
SAF from HEFA	17,716	$ 840.6	$ 3,277.8	$ 10,449.7
Total	**224,440**	**$ 9,321.1**	**$ 19,694.2**	**$ 71,142.0**

Table 27 shows the estimated total (one-time) impact from the construction of all new ethanol and SAF production facilities in the Midwest. More than $15.5 billion in labor income, $22 billion in value added, and $41.6 billion in output is projected to be generated within the region as these facilities are constructed. If the build-out of SAF (and ethanol) production facilities takes place over 25 years, this results in an average impact of $620 million in labor income, $882 million in value added, and $1.7 billion in output each year over that period.

Table 27. Midwest Construction Impact Summary

Midwest Construction Impact Summary				
Event	Employment	Labor Income ($M)	Value Added ($M)	Output ($M)
New Ethanol Production	139,066	$ 9,513.6	$ 13,493.0	$ 25,600.3
SAF from ETJ	64,960	$ 4,505.4	$ 6,424.6	$ 12,070.0
SAF from HEFA	21,456	$ 1,490.2	$ 2,127.8	$ 3,990.4
Total	**225,482**	**$ 15,509.2**	**$ 22,045.4**	**$ 41,660.6**

10.2.1 HEFA-SAF

All six of the projected new HEFA-SAF facilities are expected to be built in the Midwest. These six facilities are estimated to directly employ 1,206 workers and provide $46.2 million in labor income annually. When accounting for indirect and induced effects, the total annual economic impact on the Midwest of these new HEFA-SAF facilities is 17,716 jobs created or supported, more than $840 million in labor income, and more than $3.2 billion in value added (Table 28).

Table 28. HEFA Operations Impact Summary, Midwest

Impact Summary - Midwest SAF Production from New HEFA Facilities				
Impact Type	Employment	Labor Income ($M)	Value Added ($M)	Output ($M)
Direct	1,206	$ 46.2	$ 1,536.0	$ 5,702.3
Indirect	10,829	$ 592.9	$ 1,370.6	$ 4,084.0
Induced	5,681	$ 201.4	$ 371.3	$ 663.4
Total	**17,716**	**$ 840.6**	**$ 3,277.8**	**$ 10,449.7**

As with the results at the national level, the industries most impacted by HEFA-SAF production are largely those that provide feedstocks for the HEFA process, such as oilseed farming, oilseed processing, and rendering (Table 29).

Table 29. HEFA-SAF Operations Top Industries Impacted, Midwest

Top Industries Impacted - Midwest SAF Production from New HEFA Facilities		
Industry	Total Value Added ($M)	
Other basic organic chemical manufacturing	$	1,552.1
Oilseed farming	$	539.4
Soybean and other oilseed processing	$	146.0
Truck transportation	$	83.0
Rendering and meat byproduct processing	$	50.1
Monetary authorities and depository credit intermediation	$	49.2
Owner-occupied dwellings	$	47.2
Wholesale - Other nondurable goods merchant wholesalers	$	45.0
Other real estate	$	37.7
Petroleum refineries	$	28.6

The construction of six new HEFA-SAF facilities is estimated to have a total (one-time) impact of 21,456 jobs, $1.5 billion in labor income, $2.1 billion in value added, and nearly $4.0 billion in total sales (output) (Table 30).

Table 30. HEFA-SAF Construction Impact Summary, Midwest

Impact Summary - New Midwest HEFA Facility Construction				
Impact Type	Employment	Labor Income ($M)	Value Added ($M)	Output ($M)
Direct	11,451	$ 801.1	$ 908.0	$ 1,717.0
Indirect	3,712	$ 311.1	$ 532.8	$ 1,052.1
Induced	6,294	$ 378.0	$ 687.0	$ 1,221.3
Total	**21,456**	**$ 1,490.2**	**$ 2,127.8**	**$ 3,990.4**

Table 31 shows the industries most impacted by the construction of new HEFA-SAF facilities. As with the construction of ETJ-SAF and ethanol facilities, some of the most affected industries are equipment and other goods providers, management, and legal services.

Table 31. HEFA-SAF Construction Top Industries Impacted, Midwest

Top Industries Impacted - New Midwest HEFA Facility Construction	
Industry	Total Value Added ($M)
Construction of new manufacturing structures	$ 908.0
Wholesale - Machinery, equipment, and supplies	$ 160.7
Owner-occupied dwellings	$ 91.6
Hospitals	$ 40.5
Monetary authorities and depository credit intermediation	$ 37.6
Other real estate	$ 34.7
Management of companies and enterprises	$ 30.4
Offices of physicians	$ 24.3
Employment services	$ 24.1
Truck transportation	$ 23.4

10.2.2 ETJ-SAF

Of the 32 ETJ-SAF facilities projected to be built across the U.S., 30 are projected to be built in the Midwest. Once these facilities are fully operational, they are estimated to directly employ more than 5,600 workers and provide more than $375 million in labor income annually. Once indirect and induced effects are added, the estimated total impact of SAF production from the ETJ pathway on the Midwest is 22,6610 jobs and $724 million in total value added (Table 32). Note that this impact does not include the production of ethanol for these facilities; that impact is estimated separately below.

Table 32. ETJ-SAF Operations Impact Summary, Midwest

Impact Summary - Midwest SAF Production Using Ethanol				
Impact Type	Employment	Labor Income ($M)	Value Added ($M)	Output ($M)
Direct	5,670	$ 375.7	$ (860.1)	$ 1,169.7
Indirect	9,100	$ 486.9	$ 1,071.2	$ 2,202.7
Induced	7,840	$ 278.3	$ 513.1	$ 916.9
Total	**22,610**	**$ 1,140.9**	**$ 724.3**	**$ 4,289.3**

The industries most affected in terms of value added by ETJ-SAF production are largely a part of the energy and transportation sectors (Table 33). Other highly impacted industries include monetary authorities (banking) and owner-occupied dwellings[12].

[12] The owner-occupied dwellings industry in IMPLAN captures the economic impact of homeownership. It includes property taxes, the interest portion of mortgage payments, and home repair and maintenance.

Table 33. ETJ-SAF Operations Top Industries Impacted, Midwest

Top Industries Impacted - Midwest SAF Production Using Ethanol		
Industry	Total Value Added ($M)	
Electric power transmission and distribution	$	155.9
Natural gas distribution	$	148.8
Monetary authorities and depository credit intermediation	$	96.5
Electric power generation	$	88.4
Wholesale - Other nondurable goods merchant wholesalers	$	73.0
Owner-occupied dwellings	$	64.6
Truck transportation	$	43.6
Management of companies and enterprises	$	35.9
Retail - Nonstore retailers	$	28.5
Other local government enterprises	$	27.8

Table 34 shows the impact from the construction of the ETJ-SAF facilities in the Midwest. While operations impacts occur annually, construction impacts are a one-time impact. The construction of 30 ETJ-SAF facilities across the Midwest supports an estimated total 64,940 jobs and provides a total of $4.5 billion in total value added to the economy. If the construction of these new ETJ-SAF facilities occurs across a 25-year time frame, then the average annual impact would be approximately 2,600 new jobs, $180 million in annual labor income, $257 million in value-added activities and increased GDP, and $483 million in increased sales output each year.

Table 34. ETJ-SAF Construction Impact Summary, Midwest

Impact Summary - Midwest ETJ Facility Construction				
Impact Type	Employment	Labor Income ($M)	Value Added ($M)	Output ($M)
Direct	34,835	$ 2,437.2	$ 2,762.2	$ 5,223.3
Indirect	11,096	$ 925.3	$ 1,585.3	$ 3,154.2
Induced	19,029	$ 1,142.9	$ 2,077.2	$ 3,692.4
Total	**64,960**	**$ 4,505.4**	**$ 6,424.6**	**$ 12,070.0**

The industries most impacted by the construction of ETJ facilities equipment providers, management, and healthcare services (Table 35).

Table 35. ETJ-SAF Construction Top Industries Impacted, U.S.

Top Industries Impacted - Midwest ETJ Facility Construction	
Industry	Total Value Added ($M)
Construction of new manufacturing structures	$ 2,762.2
Wholesale - Machinery, equipment, and supplies	$ 425.3
Owner-occupied dwellings	$ 276.8
Hospitals	$ 122.6
Monetary authorities and depository credit intermediation	$ 114.4
Other real estate	$ 104.9
Management of companies and enterprises	$ 90.4
Wholesale - Other durable goods merchant wholesalers	$ 74.5
Truck transportation	$ 74.2
Offices of physicians	$ 73.5

The vast majority of the new ethanol plants (63 out of 68) are projected to be built in the Midwest. Once fully operational, these facilities are estimated to directly employ nearly 5,300 workers and provide a labor income of $257.3 million. Once indirect and induced effects are considered, the estimated total impact of new ethanol production on the Midwest is more than 184,000 jobs supported and more than $15 billion in value added (Table 36).

Table 36. Ethanol Operations Impact Summary, Midwest

Impact Summary - New Midwest Ethanol Production				
Impact Type	Employment	Labor Income ($M)	Value Added ($M)	Output ($M)
Direct	5,292	$ 257.3	$ 2,106.8	$ 22,989.6
Indirect	129,400	$ 5,329.8	$ 10,355.4	$ 27,642.3
Induced	49,422	$ 1,752.4	$ 3,230.0	$ 5,771.2
Total	**184,115**	**$ 7,339.6**	**$ 15,692.2**	**$ 56,403.0**

Similar to the impact at the national level, the industry most impacted by new ethanol production is grain farming, with an estimated value-added impact of $3.9 billion (Table 37).

Table 37. Ethanol Operations Top Industries Impacted, Midwest

Top Industries Impacted - New Midwest Ethanol Production		
Industry	Total Value Added ($M)	
Grain farming	$	3,910.1
Other basic organic chemical manufacturing	$	2,141.9
Other real estate	$	802.8
Wholesale - Other nondurable goods merchant wholesalers	$	650.2
Monetary authorities and depository credit intermediation	$	634.0
Natural gas distribution	$	444.8
Owner-occupied dwellings	$	410.3
Support activities for agriculture and forestry	$	359.5
Electric power transmission and distribution	$	271.0
Pesticide and other agricultural chemical manufacturing	$	252.5

Table 38 shows the impact from the construction of the new ethanol facilities. The construction of 63 ethanol facilities across the U.S. supports an estimated total 139,066 jobs and provides a total of $9.5 billion in labor income within the Midwest over the course of the construction period. If, for example, the buildout period for ethanol facilities was 20 years, this would be an average of 6,950 jobs supported and $475 million in labor income in each of those years.

Table 38. Ethanol Construction Impact Summary, Midwest

Impact Summary - New Midwest Ethanol Facility Construction							
Impact Type	Employment	Labor Income ($M)		Value Added ($M)		Output ($M)	
Direct	76,469	$	5,291.2	$	5,996.8	$	11,340.0
Indirect	22,107	$	1,790.5	$	3,076.6	$	6,404.0
Induced	40,489	$	2,431.8	$	4,419.6	$	7,856.3
Total	**139,066**	**$**	**9,513.6**	**$**	**13,493.0**	**$**	**25,600.3**

Table 39 shows the industries most affected by the construction of the new ethanol facilities.

Table 39. Ethanol Construction Top Industries Impacted, Midwest

Top Industries Impacted - New Midwest Ethanol Facility Construction	
Industry	Total Value Added ($M)
Construction of new manufacturing structures	$ 5,996.8
Owner-occupied dwellings	$ 589.1
Hospitals	$ 260.7
Monetary authorities and depository credit intermediation	$ 252.3
Other real estate	$ 222.4
Wholesale - Other durable goods merchant wholesalers	$ 207.9
Wholesale - Machinery, equipment, and supplies	$ 206.6
Truck transportation	$ 195.5
Management of companies and enterprises	$ 175.5
Legal services	$ 172.8

10.2.3 PTF-SAF

Of 31 PTF-SAF facilities that are projected to be built across the U.S., 29 are expected to be built in the Midwest. These facilities are estimated to employ 3,074 workers with a total labor income of $123 million annually. PTF-SAF requires many inputs including carbon dioxide, hydrogen, and substantial amounts of renewable electricity. Note that these estimates do not include the economic impact of additional ethanol production, as those effects were already considered in Table 20.

Table 40. PTF-SAF from Ethanol CO2 Operations Impact Summary, Midwest

Impact Summary - Midwest SAF Production Using Captured Ethanol CO2				
Impact Type	Employment	Labor Income ($M)	Value Added ($M)	Output ($M)
Direct	3,074	$ 123.1	$ (4,588.8)	$ 8,662.2

It should be noted that the direct value-added for PTF-SAF is negative reflecting a situation in which costs are much greater than value and the need for large subsidies for PTF-SAF production given current operational relationships.

PTF is an emerging technology that currently exists in experimental and relatively small-scale production and is not considered economically viable at this time for large-scale production. An operations impact for PTF would be attempting to model economic relationships that do not currently exist at the magnitude projected for 2050. Because of this, only the direct estimate of SAF production by PTF is shown in the table below. This result reflects only the operations of the PTF plants themselves and does not include further effects produced by input industries.

The construction of PTF facilities in the Midwest is estimated to have a direct total (one-time) impact of 208,700 jobs, $14.6 billion in labor income, and $16.5 billion in value added (Table 41). If the PTF-SAF construction were to happen over a period of 10 years (roughly 3 facilities per year), this would result in an average annual impact of around 20,870 jobs supported, $1.46 billion in labor income, and $1.65 billion in value added per year over that period. These values are rough estimates, as the precise requirements to build a large-scale PTF facility are not currently known.

Table 41. PTF-SAF Construction Impact Summary, Midwest

Impact Summary - Midwest PTF Facility Construction				
Impact Type	Employment	Labor Income ($M)	Value Added ($M)	Output ($M)
Direct	208,702	$ 14,601.7	$ 16,548.9	$ 31,293.9

10.3 Corn Basis Impacts

In this analysis, a long-term "stable price" for corn was used to model SAF supplies from a variety of feedstocks with the relative pricing between the various feedstocks remaining stationary. In the absence of new ETJ, and assuming trendline corn yields, excess corn production will accrue across the Midwest and prices will fall to stimulate acreage reductions in subsequent years. A 2023 study of the economic impact of CO2 pipelines in South Dakota by the Dakota Institute reported that average basis premiums at reporting ethanol plants were 13 cents per bushel higher than elevators in South Dakota, 12 cents per bushel higher than elevators in Iowa, 14 cents per bushel higher than elevators in Minnesota, 16 cents per bushel higher than elevators in North Dakota, and 28 cents per bushel higher than elevators in Nebraska. A prior study[13] by DIS found that corn basis in Iowa has increased more than 20 cents per bushel since 2001 with most of the increase seen in areas that have significant ethanol production. That same study reported that in February 2023, Iowa corn basis at ethanol plants was 7 cents per bushel higher than other elevators or feedmills, basis in Minnesota at ethanol plants was 14 cents per bushel higher, South Dakota ethanol plants 16 cents per bushel higher, and Nebraska ethanol plants 18 cents per bushel higher. It is expected that at least these amounts of advantages would carry forward to new ethanol capacity that is built to supply ethanol for ETJ.

As shown in Figure 30, to fully utilize the corn production from trendline yields, there could be 63 more 200-million-gallon ethanol plants built in the Midwest between now and 2050 with 14 of those in Illinois, 12 in Nebraska, 11 in Iowa, 7 in Minnesota, 5 in Kansas, 4 in Indiana, 2 each in South Dakota, Wisconsin, Missouri, and Ohio, and one in Michigan. The impact on corn basis locally will depend on the specific location in the state in which these ethanol plants would be built, and for each 200-million-gallon ethanol plant there is demand for approximately 70 million bushels of corn. If Iowa, for instance, builds 11 new ethanol plants that each use 70 million bushels, that is $59 million of basis premium added to Iowa corn farmers revenues beyond the average price that corn sells for without the ethanol premium. For Illinois, the addition of 14 new ethanol plants that would be producing ethanol for ETJ, and assuming a 10-cent premium for ethanol plant corn bids would add $98 million per year in basis premium being paid to farmers. In South Dakota, the basis premium at ethanol plants is averaging 16 cents per bushel and if 2 new 200-million-gallon plants are added in South Dakota, the basis premium from these plants would add $22 million per year to corn farmer revenues. Across the Midwest, 63 new ethanol plants each using 70 million bushels of corn annually with an average basis premium of 10 cents per bushel would add $441 million of additional income to farmers who merchandise corn to these ethanol plants. And this is beyond the economic impacts of standard returns for producing those 4.41 billion bushels of additional corn beyond what is being produced in 2023. For a 1,000-acre farm with 50/50 corn and soybeans and trendline national yields, this would mean $11,760 more income in 2050.

[13] Comparative Economics of Carbon Sequestration for Iowa Ethanol Plants, Decision Innovation Solutions, February 2023

11 Methodology

The above economic impact analysis was conducted using the IMPLAN modeling system. All operations events were modeled based off the "other basic organic chemical manufacturing" industry in IMPLAN, while all construction events were modeled using the "construction of new manufacturing structures" industry. For the events relating to the production of SAF and construction of relevant facilities, the input industry sales, value added, labor income, and employees were set according to values from the operational models described in Section 5. Additionally, the industry spending pattern for each event was modified to reflect the inputs more closely from the operational models.

The inputs for the ethanol operations and construction events were based off the Iowa State ethanol profitability model. These inputs were adjusted using DIS estimates of ethanol revenue and costs for plants sequestering CO2 and receiving the 45Z tax credit and for plants capturing CO2 for use and receiving the 45Q tax credit. Three ethanol events were analyzed, and the model outputs presented in the report reflect a weighted average of conventional (unadjusted) ethanol production (10%), ethanol production with a 45Z tax credit (45%) and ethanol production with a 45Q tax credit (45%).

All models in IMPLAN were run using the most recent data available (2022). Construction events were run and output in current (2023) dollars. This assumes that the inflation rate for construction costs is roughly similar to the general rate of inflation moving forward until 2050. The operations events are meant to capture the full extent of the SAF production industry once all facilities are fully operational in 2050. These events were output from IMPLAN at dollar year 2050 using the built-in inflation modifiers within IMPLAN and adjusted back to 2023 dollars assuming a 2% average inflation rate.

12 Research Implications/Suggestions for Further Research

Estimation of the interactive aspects of changes in corn supply and demand for multiple years in the future would provide greater understanding of how supply/demand balances would affect other users of corn such as livestock producers and exports as well as how other crops might adjust to the changes occurring in corn production and utilization. A multi-year, general equilibrium or partial equilibrium model would assist in such estimates and reduce some of the uncertainty around long-term forward estimates.

As the SAF production industries advance and more scaled-up production comes online, the uncertainty surrounding the indirect and induced impacts of SAF production should be able to be reduced. Updates with more complete estimates of these impacts could be developed as the industry matures.

13 References

Argonne National Labs (2022). GREET Aviation Module.

ASTM. Standard Specification for Aviation Turbine Fuel Containing Synthesized Hydrocarbons (Nov 4, 2022). D7566 Standard Specification for Aviation Turbine Fuel Containing Synthesized Hydrocarbons (astm.org).

ASTM. Standard Specification for Aviation Turbine Fuels (Nov 14, 2022). D1655 Standard Specification for Aviation Turbine Fuels (astm.org)

Blanshard A, McCurdy M, Chokhani S (2022). Fueling net zero: How the aviation industry can deploy sufficient sustainable aviation fuel to meet climate ambitions. ICF Report for ATAG Waypoint 2050 Fueling net zero: How the aviation industry can deploy sufficient sustainable aviation fuel to meet climate ambitions | ICF.

Brandt, K., Geleynse, S., Martinez-Valencia, L., Zhang, X., Garcia-Perez, M., and Wolcott, M. P. (2021a). Alcohol to Jet Techno-Economic Analysis. doi:10.7273/ 000001461

Brandt, K., Tanzil, A. H., Martinez-Valencia, L., Garcia-Perez, M., and Wolcott, M. P. (2021b). Fischer Tropsch Techno-Economic Analysis. doi:10.7273/000001459

Brandt, K., Tanzil, A. H., Martinez-Valencia, L., Garcia-Perez, M., and Wolcott, M. P. (2021c). Hydroprocessed Esters and Fatty Acids Techno-Economic Analysis. doi:10.7273/000001460

Chong, C.T. & Ng, J-H (2021). Biojet fuel production pathways. In: Biojet Fuel in Aviation Applications. Elsevier. Accessed 11/02/2023. https://www.sciencedirect.com/topics/engineering/fischer-tropsch-process. Also https://www.sciencedirect.com/book/9780128228548/biojet-fuel-in-aviation-applications?via=ihub=

Ernst and Young (2022). Economic Contributions of Summit Carbon Solutions. https://summitcarbonsolutions.com/wp-content/uploads/2022/04/Full-Report.pdf

Greenberg SE, McKaskle R. Insights into Cost of CCS Gained from the Illinois Basin-Decatur Project. Carbon Sequestration Leadership Forum; Washington, DC: 2016.

Herron S, Zoelle A, Summers WM. Cost of Capturing CO2 from Industrial Sources. Natl Energy Technology Lab; Pittsburgh, PA: 2014.

Hofstrand, D (2023). Tracking Ethanol Profitability. Iowa State University Extension and Outreach. File D1-10. Tracking Ethanol Profitability | Ag Decision Maker (iastate.edu)

ICAO (2023). SAF rules of thumb. Adapted from word at Washington State University. https://www.icao.int/environmental-protection/Pages/SAF_RULESOFTHUMB.aspx

Kelly, S (2023). Honeywell announces tech to turn hydrogen and CO2 into lower-carbon aviation fuel. Reuters. https://www.reuters.com/business/sustainable-business/honeywell-announces-tech-turn-hydrogen-co2-into-lower-carbon-aviation-fuel-2023-05-10/

McCurdy, M (2023). “2023 – A Season of Change” The SAF Leadership Summit ABLC 2023. Presentation.

Muller, John. (2022). Heartland Greenway Pipeline – Regional Economic Impact Study.

Psarras PC, et al. Carbon capture and utilization in the industrial sector. Environ Sci Technol. 2017; 51:11440–11449.

Sanchez DL, Johnson N, McCoy ST, Turner PA, Mach KJ. Near-term deployment of carbon capture and sequestration from biorefineries in the United States. Proc Natl Acad Sci U S A. 2018 May 8;115(19):4875-4880. doi: 10.1073/pnas.1719695115. Epub 2018 Apr 23. Erratum in: Proc Natl Acad Sci U S A. 2018 Oct 16;115(42): E9991. PMID: 29686063; PMCID: PMC5948974. Near-term deployment of carbon capture and sequestration from biorefineries in the United States - PMC (nih.gov)

Taheripour, F., Sajedinia, E., Karami, O., & Chepeliev, M. (2023). Land use change implications of power-to-liquid fuels. Selected poster prepared for presentation at the 2023 Agricultural & Applied Economics Association.

Annual Meeting, Washington DC; July 23-25, 2023

Tekeste, MZ, Ebrahimi, E, Hanna, MH, Neideigh, ER, Horton, R. Effect of subsoil tillage during pipeline construction activities on near-term soil physical properties and crop yields in the right-of-way. Soil Use and Management. 2021; 37: 545– 555. https://doi.

Trucent (2019). Consistently Increasing Distillers Corn Oil Extraction in Ethanol Plants. https://www.trucent.com/consistently-increasing-distillers-corn-oil-extraction-in-ethanol-plants/

U.S. Department of Agriculture Foreign Agricultural Service (2023). Quick Stats Database.

U.S. Department of Agriculture National Agricultural Statistics Service (2023). Production, Supply, and Distribution Database.

U.S. Department of Energy, Alternative Fuels Data Center (2023). Sustainable Aviation Fuel. Alternative Fuels Data Center: Sustainable Aviation Fuel (energy.gov)

U.S. Department of Energy. SAF Grand Challenge Road Map (Sep 23, 2022). Sustainable Aviation Fuel Grand Challenge Roadmap: Flight Plan for Sustainable Aviation Fuel Report | Department of Energy

U.S. Energy Information Association (2023). Annual Energy Outlook 2023.

Wang, W-C & Tao, L. (2016). Bio-jet conversion technologies. *Renewable and Sustainable Energy Reviews*. *53: 801-822*. Accessed 11/02/2023. Bio-jet fuel conversion technologies (sciencedirectassets.com)

Zang, Guiyan Sun, Pingping, Elgowainy, Amgad A., Bafana, Adarsh, and Wang, Michael. Performance and cost analysis of liquid fuel production from H2 and CO2 based on the Fischer-Tropsch process. Journal of CO2 Utilization, Volume 46, April 2021.

14Appendix

14.1 Jet Fuel Specifications[14]

Jet fuel specifications are defined in ASTM D1655, Standard Specification for Aviation Turbine Fuels (ASTM 2019a). ASTM has defined the steps for qualification and approval of new aviation turbine fuels in ASTM D4054, Standard Practice for Evaluation and Approval of New Aviation Turbine Fuels and Fuel Additives (ASTM 2019b). Finally, there is a specification for SAF, ASTM D7566, Standard Specification for Aviation Turbine Fuels Containing Synthesized Hydrocarbons (ASTM 2019c). A fuel meeting these specifications is fully fungible. Maintaining jet fuel properties is critical. Meeting the specifications outlined in ASTM D7566 Table 1, Parts 1 and 2, and the associated D7566 annex ensures the necessary performance and operability requirements are met (ASTM 2019c).

Fuel properties needed in SAF must meet three general requirements: (1) performance, (2) operability, and (3) drop-in compatibility.

Figure 48 provides a graphical illustration of the four families of hydrocarbons in jet fuel and a summary of the properties imparted by each hydrocarbon class.

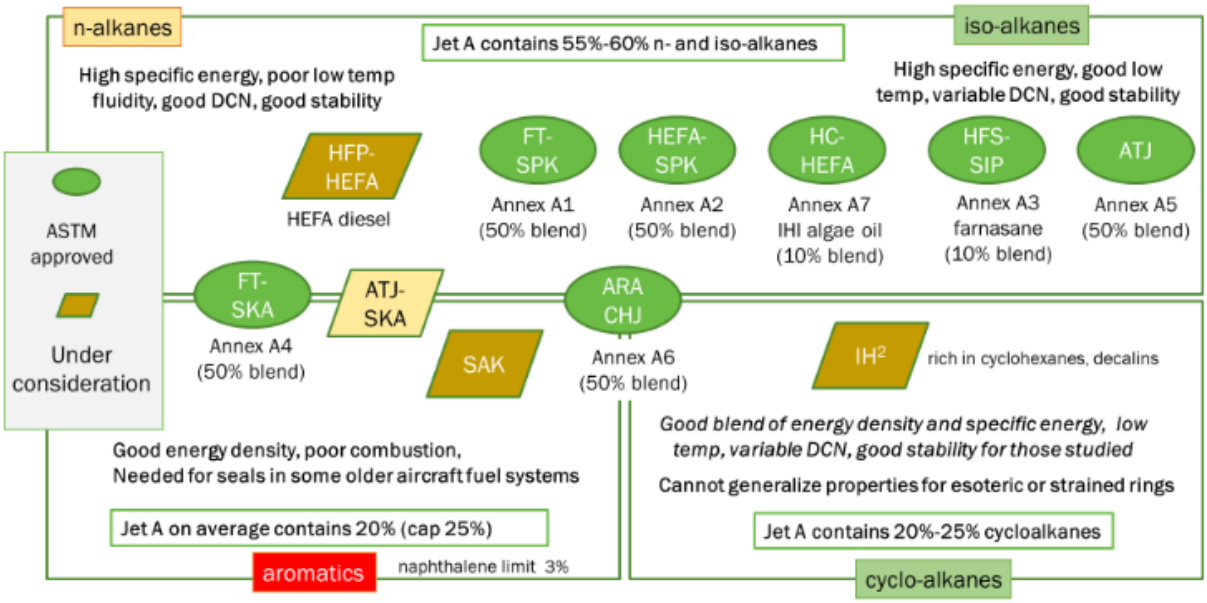


Figure 48. Summary of Four Classes of Hydrocarbons

14.2 How Is Jet Fuel Similar to and Different from Other Transportation Fuels?

Gasoline, jet, and diesel fuels are mostly blended mixtures of several hundred different hydrocarbon molecules. Molecules in gasoline fuel range from those containing 4 carbon atoms to those containing 12 carbon atoms. Gasoline has an initial boiling point at atmospheric pressure of about 35°C and a final boiling point of about 200°C. Molecules in jet fuel range from those containing 8 carbon atoms to those

[14] Chapter 2 Jet Fuel Specifications from https://www.energy.gov/sites/prod/files/2020/09/f78/beto-sust-aviation-fuel-sep-2020.pdf

containing 16 carbon atoms. Jet fuel has an initial boiling point at atmospheric pressure of about 125°C and a final boiling point of about 290°C. Molecules in diesel fuel range from those containing 8 carbon atoms to those containing 23 carbon atoms. Diesel has an initial boiling point at atmospheric pressure of about 150°C and a final boiling point of about 380°C.

As shown in Figure 49, jet fuel is the middle distillate product between gasoline and diesel. There is significant overlap in the boiling point range of gasoline and jet fuel, and almost complete overlap in the boiling point range between jet fuel and diesel. These overlaps have several implications from the perspective of fuel producers.

First, if a process produces molecules that have a broad range of boiling points spanning those of gasoline, jet, and diesel, then collection of the jet fuel fraction through distillation will need to be done in a way so neither the gasoline nor diesel stream is compromised, which can affect the amount of jet fuel recovered. Otherwise, the gasoline fraction is left with only light volatile components (4–8 carbons in length) and the diesel fraction is composed of a distribution with the heaviest fractions.

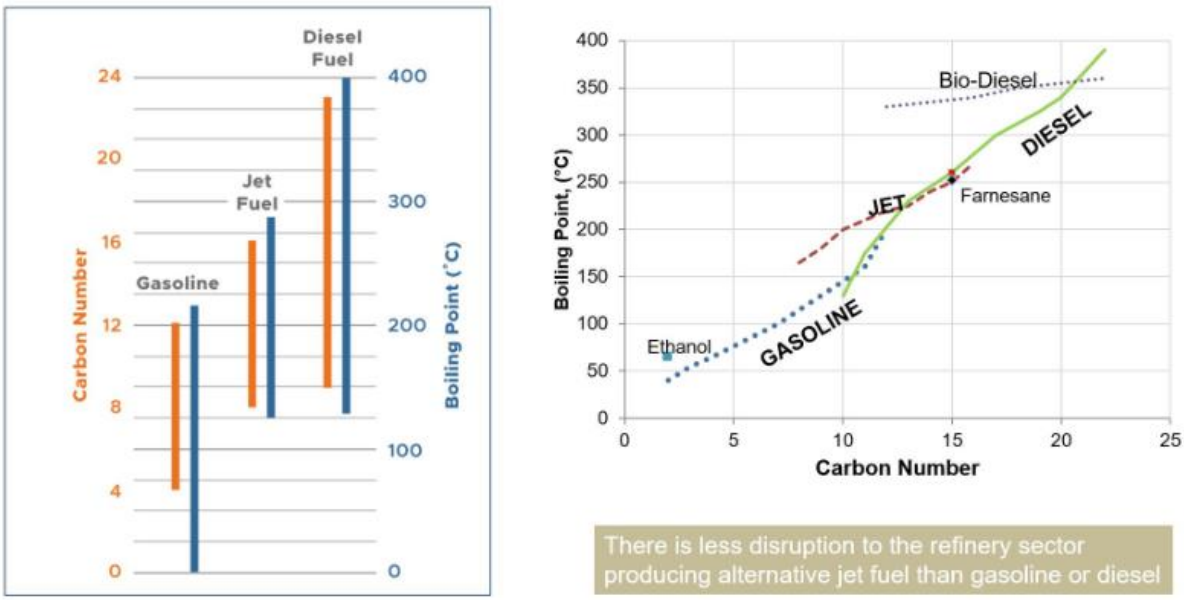


Figure 49. Carbon Numbers and Boiling Points for Gasoline, Jet, and Diesel Fuels

Second, the almost complete overlap of the boiling point ranges of jet fuel and diesel allows a refinery to select which product to make depending on market conditions and other incentives. For example, if the market value of diesel is higher than that of jet fuel, then a refinery would be incentivized to produce diesel rather than jet fuel. This would be particularly true if a refinery can have good control of the boiling point range and does not have to distill out the lower-value heavy components. Today, biorefiners are producing renewable diesel at the expense of renewable jet fuel.

Third, if all jet fuel were replaced with SAF (in a long-term scenario), refiners would still have a home for all the fractions they produce. Today, many refineries do not produce jet fuel. Figure 4 shows 2018 domestic biofuel production. U.S. production of renewable diesel exceeded 300 million gallons. SAF, made with the same technology, was two million gallons. While there is some difference in production cost, the difference in renewable diesel production and SAF production is driven by policy.

14.3 SAF Production Pathways

The pathways below from the U.S. Department of Energy, Alternative Fuels Data Center, represent only those currently approved by ASTM. Processes and tests exist for the approval of other feedstocks, fuel molecules, and blending limits, and the types of approved fuels will increase as these are evaluated through this process.

Pathway	Approved Name	Blending Limitation	Feedstocks	Chemical Process
Fischer-Tropsch (FT) Synthetic Paraffinic Kerosene (SPK)	FT-SPK, ASTM D7566 Annex A1, 2009	50%	Municipal solid waste, agricultural and forest wastes, energy crops	Woody biomass is converted to syngas using gasification, then a Fischer-Tropsch synthesis reaction converts the syngas to jet fuel. Feedstocks include various sources of renewable biomass, primarily woody biomass such as municipal solid waste, agricultural wastes, forest wastes, wood, and energy crops. ASTM approved in June 2009 with a 50% blend limit.
Hydroprocessed Esters and Fatty Acids (HEFA)	HEFA-SPK, ASTM D7566 Annex A2, 2011	50%	Oil-based feedstocks (e.g., jatropha, algae, camelina, and yellow grease)	Triglyceride feedstocks such as plant oil; animal oil; yellow or brown greases; or waste fat, oil, and greases are hydroprocessed to break apart the long chain of fatty acids, followed by hydroisomerization and hydrocracking. This pathway produces a drop-in fuel and was ASTM approved in July 2011 with a 50% blend limit.
Hydroprocessed Fermented Sugars to Synthetic Isoparaffins	HFS-SIP, ASTM D7566 Annex A3, 2014	10%	Sugars	Microbial conversion of sugars to hydrocarbons. Feedstocks include cellulosic biomass feedstocks (e.g., herbaceous biomass and corn stover). Pretreated waste fat, oil, and greases also can be eligible feedstocks. ASTM approved by ASTM in June 2014 with a 10% blend limit
FT-SPK with Aromatics	FT-SPK/A, ASTM D7566 Annex A4, 2015	50%	Municipal solid waste, agricultural and forest wastes, energy crops	Biomass is converted to syngas, which is then converted to synthetic paraffinic kerosene and aromatics by FT synthesis. This process is similar to FT-SPK ASTM D7566 Annex A1, but with the addition of aromatic components. ASTM approved in November 2015 with a 50% blend limit.

Alcohol-to-Jet Synthetic Paraffinic Kerosene	ATJ-SPK, ASTM D7566 Annex A5, 2016	30%	Cellulosic biomass	Conversion of cellulosic or starchy alcohol (isobutanol and ethanol) into a drop-in fuel through a series of chemical reactions—dehydration, hydrogenation, oligomerization, and hydrotreatment. The alcohols are derived from cellulosic feedstock or starchy feedstock via fermentation or gasification reactions. Ethanol and isobutanol produced from lignocellulosic biomass (e.g., corn stover) are considered favorable feedstocks, but other potential feedstocks (not yet ASTM approved) include methanol, iso-propanol, and long-chain fatty alcohols. ASTM approved in April 2016 for isobutanol and in June 2018 for ethanol with a 30% blend limit.
Catalytic Hydrothermolysis Synthesized Kerosene	CH-SK or CHJ, ASTM D7566 Annex A6, 2020	50%	Fatty acids or fatty acid esters or lipids from fat oil greases	(Also called hydrothermal liquefaction), clean free fatty acid oil from processing waste oils or energy oils is combined with preheated feed water and then passed to a catalytic hydrothermolysis reactor. Feedstocks for the CH-SPK process can be a variety of triglyceride-based feedstocks such as soybean oil, jatropha oil, camelina oil, carinata oil, and tung oil. ASTM approved in February 2020 with a 50% blend limit.
Hydrocarbon-Hydroprocessed Esters and Fatty Acids (HEFA)	HC-HEFA-SPK, ASTM D7566 Annex A7, 2020	10%	Algal oil	Conversion of the triglyceride oil, derived from *Botryococcus braunii*, into jet fuel and other fractionations. *Botryococcus braunii* is a high-growth alga that produces triglyceride oil. ASTM approved in May 2020 with a 10% blend limit.
Fats, Oils, and Greases (FOG) Co-Processing	FOG Co-Processing ASTM D1655 Annex A1	5%	Fats, oils, and greases	ASTM approved 5% fats, oils, and greases coprocessing with petroleum intermediates as a potential SAF pathway. Used cooking oil and waste animal fats

				are two other popular sources for coprocessing.
FT Co-Processing	FT Co-Processing ASTM D1655 Annex A1	5%	FT biocrude	In association with the University of Dayton Research Institute, ASTM approved 5% Fischer-Tropsch syncrude coprocessing with petroleum crude oil to produce SAF.
Source: U.S. Department of Energy, Alternative Fuels Data Center				

14.3.1 HEFA (Hydro-processed Esters and Fatty Acids)

HEFA-SPK, is an important type of sustainable aviation fuel produced from lipids. In a chemical process (Figure 50), triglyceride feedstocks including plant oil; animal oil; yellow or brown greases; or waste fat, oil, and greases are hydroprocessed to break apart the long chain of fatty acids. The next steps in the process are hydroisomerization and hydrocracking. The HEFA pathway manufactures a drop-in fuel, which was ASTM approved in July 2011 with a top blend of 50% (Alternative Fuels Data Center: Sustainable Aviation Fuel (energy.gov)).

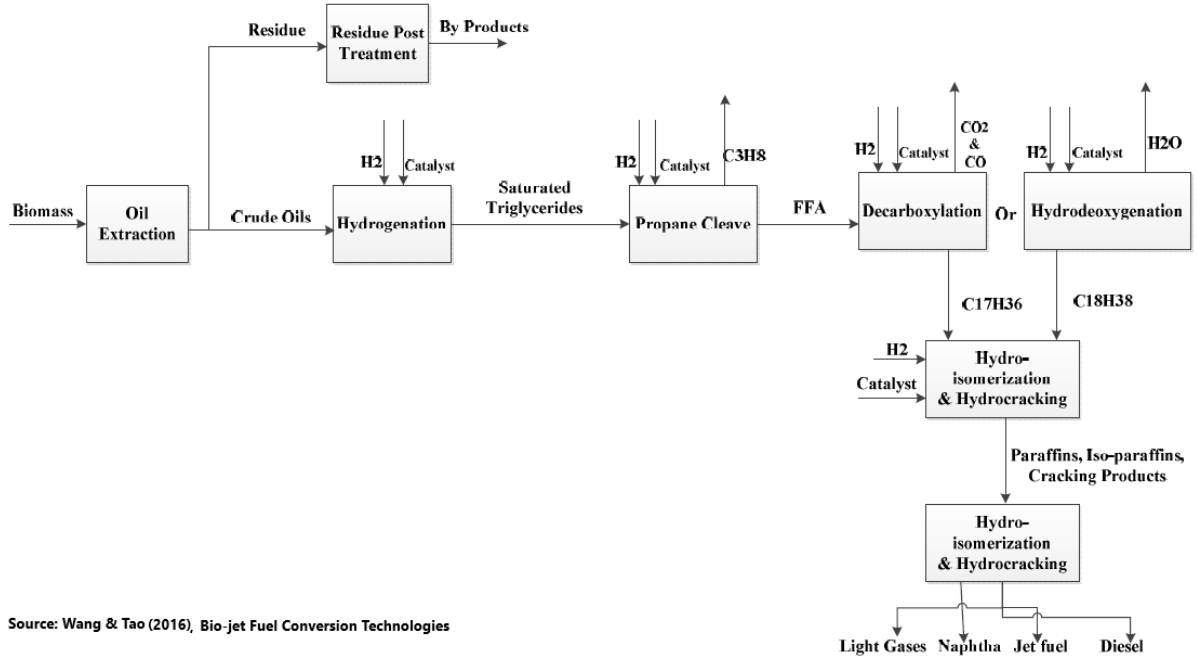


Figure 50. Hydro-processed Renewable Jet HRJ, Also Known as HEFA, Process[15]

Based on SAF Grand Challenge Roadmap: Flight Plan for Sustainable Aviation Fuel Report (energy.gov), the lipids feedstocks to produce SAF through the HEFA pathway will make up the bulk of the feedstock used to reach the US. goal of 3 billion gal/year by 2030. Yet, other pathways such as starch-and-sugar-based feedstocks are arising as prospective near-term feedstock for SAF thought the ATJ pathway.

14.3.2 Ethanol to Jet (ETJ)

Pathway: Alcohol-to-Jet Synthetic Paraffinic Kerosene

[15] Source: Wang & Tao (2016). Bio-jet fuel conversion technologies (sciencedirectassets.com)

Alcohol to Jet (ATJ fuel), also called alcohol oligomerization, is fuel converted from alcohols, such as methanol, ethanol, butanol, and long-chain fatty alcohols. The maximum use of ethanol is 10-15% for the majority of gasoline-powered vehicles on the road today, which creates a blend wall that makes it difficult to achieve further market penetration of ethanol as a blend stock for gasoline. Therefore, upgrading ethanol to jet fuel blend stock presents a potential pathway for developing drop-in or fungible fuels for the jet fuel market.

The process (Figure 51) of producing ethanol to jet fuel involves the conversion of cellulosic or starchy alcohol (isobutanol and ethanol) into a drop-in-fuel by a series of chemical reactions. The alcohols are obtained from cellulosic feedstock or starchy feedstock via fermentation or gasification reactions. Favorable feedstocks to produce ethanol and isobutanol are lignocellulosic biomass (e.g., corn stover) and the maximum blend ratio is 30%. ASTM specification D7566 Annex A4 (Alternative Fuels Data Center: Sustainable Aviation Fuel (energy.gov)). The pathway was approved in 2015.

The process includes alcohol dehydration, oligomerization, distillation, and hydrogenation. According to Wang & Tao (2016), all the steps in the ethanol to jet fuel process described below have been demonstrated on a commercial relevant scale and the risk of scale-up is expected to be reduced.

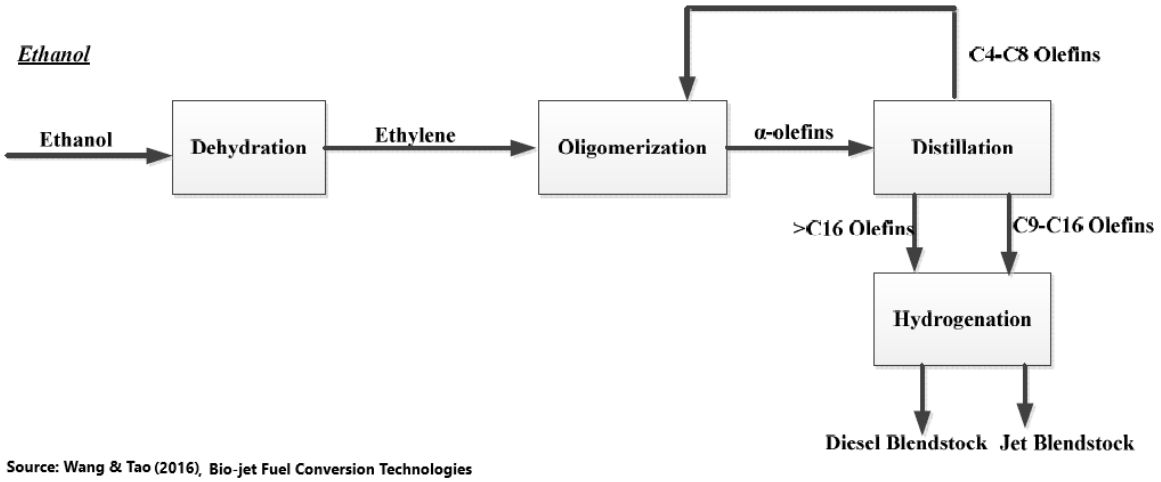


Figure 51. Ethanol to Jet Fuel Process

According to U.S. Department of Energy's Sustainable Aviation Fuel Grand Challenge Roadmap: Flight Plan for Sustainable Aviation Fuel report, the current corn ethanol industry has large potential in the short run to expand SAF production quantities using the ATJ pathway if carbon capture and sequestration is enabled. Lowering the carbon intensity and expanding the carbon efficiency of corn ethanol are important hurdles to overcome to accomplish this potential.

14.3.3 Other alcohol to Jet processes

There are two other alcohol-to-jet (ATJ) processes that have been approved. One is taking N-Butanol (Figure 52) to Jet and the other is taking isobutanol (Figure 53) to jet fuel.

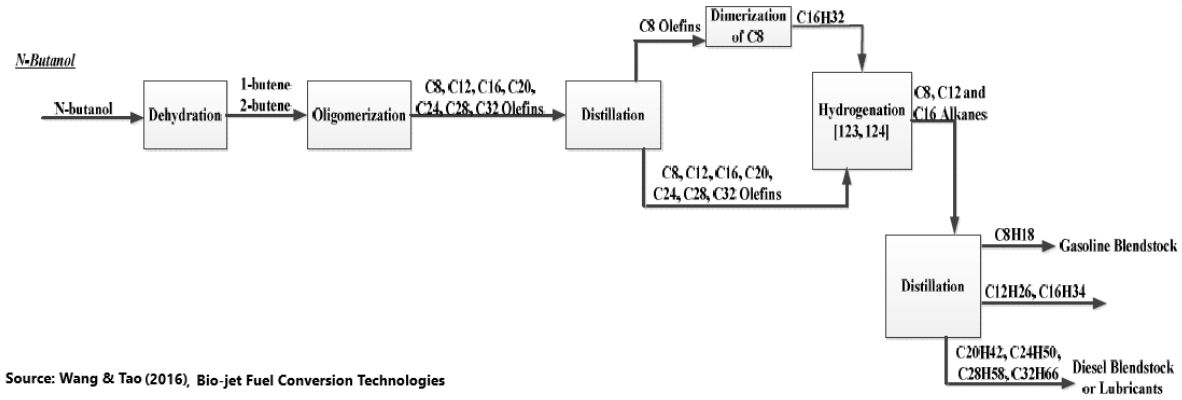


Figure 52. N-Butanol to Jet Process

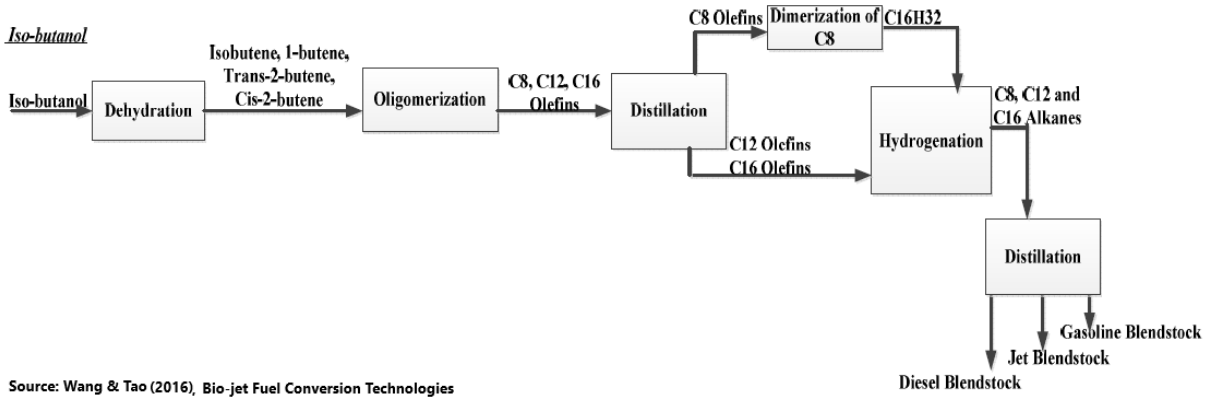


Figure 53. Iso-butanol to Jet Process

14.3.4 Power-to-Fuel (PTF) – from CO2 and Renewable Energy

The power-to-Fuel (PTF) also called Power-to-Liquid jet fuel (PtL) process produces fuels using electrolysis of renewable electricity and direct-air capture and conversion of atmospheric CO2. The process involves large volumes of electricity from low carbon sources such as solar and wind power to bring down emissions (Taheripour et al (2023)). The resulting fuel is a lower carbon intensity alternative to conventional fuels. The PTF simplified diagram is shown in Figure 54. Using renewable energy, the mixing of carbon captured CO2 and hydrogen produces SAF.

According to Taheripour et al (2023), increasing renewable sources of energy could potentially lead to an increase in land demand and result in land use changes and generate land use change emissions, which should be considered as it has been considered for biofuel production[16].

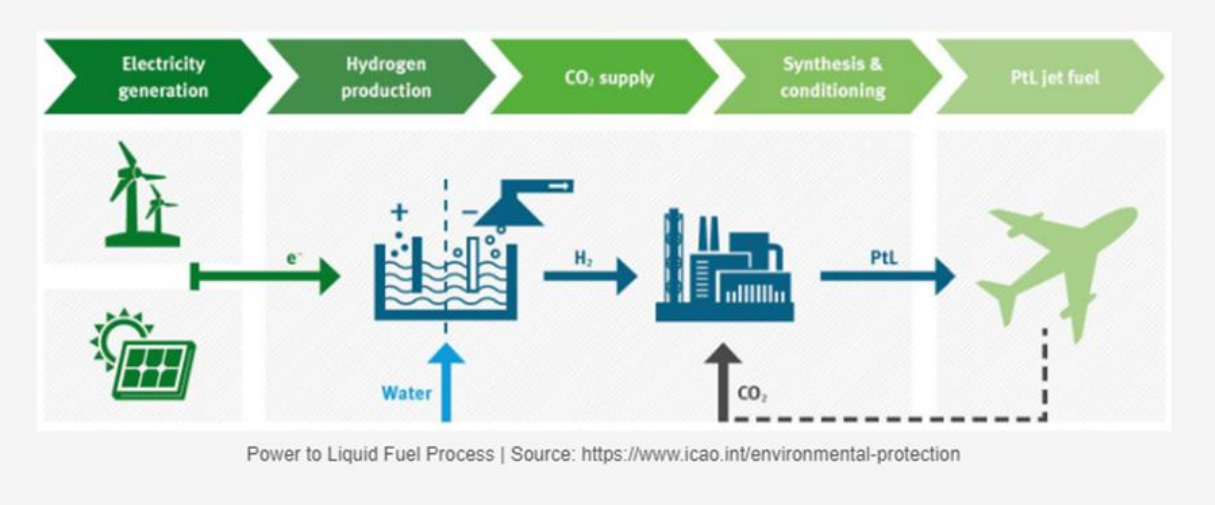
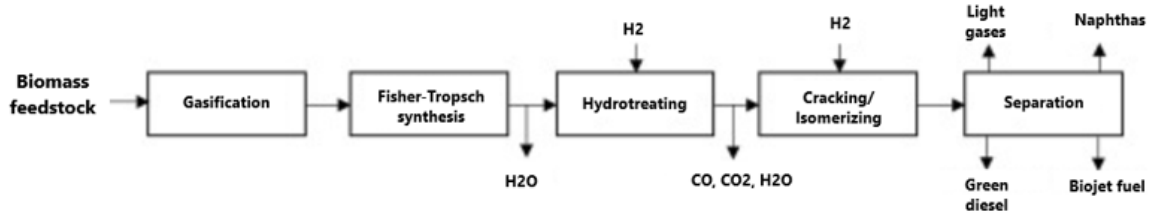


Figure 54. Simplified Description of Power-to-Liquid Fuel for SAF[17]

14.3.5 Fischer-Tropsch (FT) Synthetic Paraffinic Kerosene (SPK)

In this process of producing jet fuel, woody biomass is converted to syngas using gasification. The Fischer-Tropsch synthesis reaction converts syngas to jet fuel (Figure 55 and Figure 56). There are several feedstocks used in this process including various sources of renewable biomass, particularly woody biomass such as municipal solid waste (MSW), agricultural wastes, forest wastes, wood, and energy crops. ASTM approved in June 2009 and there is a 50% blend limit *(*Alternative Fuels Data Center: Sustainable Aviation Fuel (energy.gov)*).*

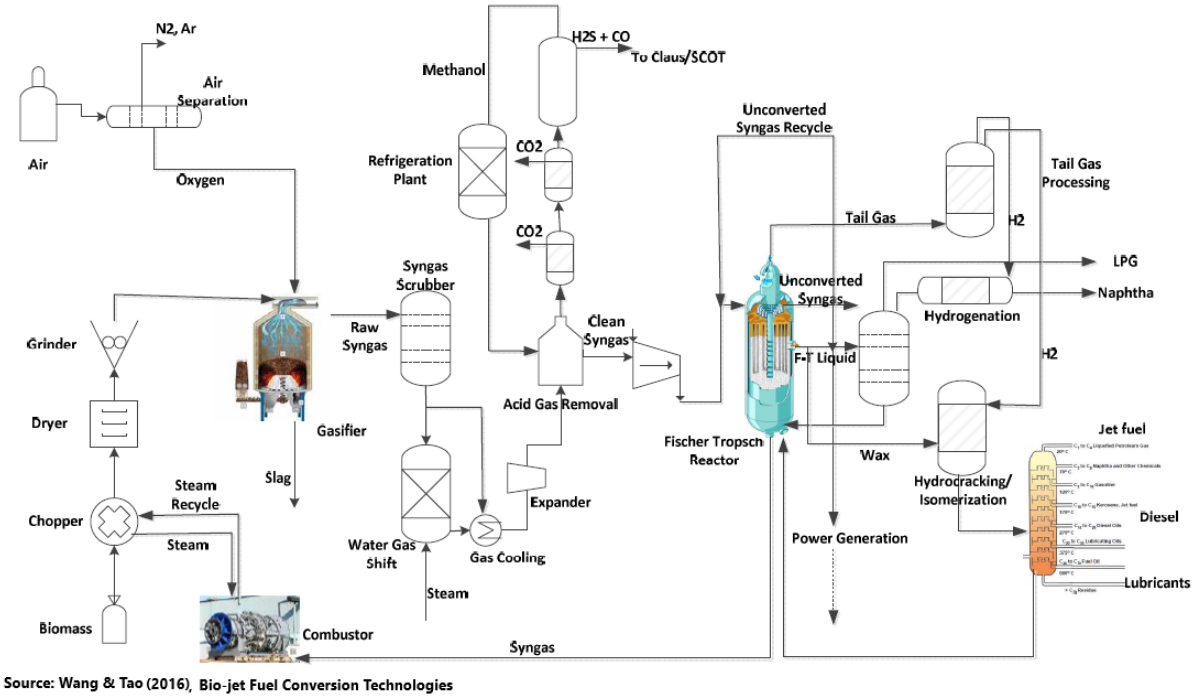


Source: Chong & Ng (2021), Biojet fuel production pathways (in Biojet fuel in aviation applications

[16] Land use change implications of Power-to-Liquid Fuels (umn.edu)

[17] Chart source: Sustainable Review. Power-to-Liquid Fuel for Sustainable Aviation — Sustainable Review

Figure 55. Fisher Tropsch Biomass to Liquid Fuel Process: Simplified Diagram[18]



Source: Wang & Tao (2016), Bio-jet Fuel Conversion Technologies

Figure 56. Fisher Tropsch Biomass to Liquid Process[19]

14.3.6 Gasification and Pyrolysis

Using lignocellulosic feedstock from MSW, woody biomass, forest operation residuals, mill waste, agricultural residuals have the possibility to add marginally to the 2030 feedstock pool utilizing the gasification and pyrolysis SAF conversion pathways (SAF Grand Challenge Roadmap: Flight Plan for Sustainable Aviation Fuel Report (energy.gov)).

The following table from Wang & Tao (2016) research shows a list of flight test with bio-jet fuels using different conversion pathways by commercial airlines (Table 42). As the table indicates, the most commonly used conversion pathway in these tests was based on oil to jet fuel.

[18] Chong & Ng (2021). Biojet Fuel Production Pathways. https://www.sciencedirect.com/topics/engineering/fischer-tropsch-process

[19] Source: Wang & Tao (2016). Bio-jet fuel conversion technologies (sciencedirectassets.com)

Table 42. Flight Tests with Bio-Jet Fuels Through Different Conversion Pathways by Commercial Airlines

Commercial Airline	Aircraft	Partners	Year	Feedstocks	Bio-jet Fuel Content	Conversion Pathway
Virgin Atlantic	B747-400	Boeing, GE Aviation	2008	Coconut & Babassu	20%	Oil to Jet
Air New Zealand	B747-400	Boeing Ralls-Royce, UOP	2008	Jatropha	50%	Oil to Jet
Continental Airlines	B737-800	Boeing, GE Aviation, CFM, Honeywell UOP	2009	2.5% Algae & 47.5% Jatropha	50%	Oil to Jet
JAL	B747-400	Boeing , Pratt & Whitney, Honeywell UOP, Nikki Universal	2009	42% Camelina, 8% Jatropha/Algae	50%	Oil to Jet
KLM	B747-400	GE, Honeywell UOP	2009	Camelina	50%	Oil to Jet
KLM	B737-800		2011	Waste cooking oil	50%	Oil to Jet
TAM Airlines	A-320	Airbus, CFM	2010	Jatropha	50%	Oil to Jet
Jet Blue Airways	A-320	Airbus, IAE, Honeywell UOP	2010	TBC		Oil to Jet
Boeing	B747-8F		2011	Camelina	15%	Oil to Jet
Interjet	A-320	CFM, Safran, EADS, Airbus, Honeywell UOP	2011	Jatropha, Halophyte	30%	Oil to Jet
Air France	A-321		2011	Waste cooking oil	50%	Oil to Jet
Honeywell	Gulfstream G450		2011	Camelina	50%	Oil to Jet
Finnair	A-319		2011	Waste cooking oil	50%	Oil to Jet
Air Mexico	B777-200		2011	Jatropha		Oil to Jet
Thomson Airways	B757-200	SkyNRG	2011	Waste cooking oil		Oil to Jet
Porter Airlines	Bombardier Q400		2012	Camelina		Oil to Jet
Air China	B747-400	Boeing, PetroChina	2012	Jatropha	50%	Oil to Jet
NRC Canada	Falcon 20, T-33	Aemetis, AFRL, Rolls-Royce, FAA-CLEEN, Agrisoma Biosciences, Applied Research Assoc., Chevron Lummus Global	2012	Carinata	100%	Oil to Jet (CH)
Lufthansa	A-321	Neste Oil	2011	Jatropha, camelina & animal fats	50%	Oil to Jet
Azul Airlines	E195 Jet	Amyris, Embraer, GE	2012	Sugarcane		Sugar to Jet
Continental Airlines	B737-800	Solazyme, United Airlines	2011	Algae		Alcohol to Jet
Alaska Airlines	B737, Bombardier Q400	Dynamic Fuels, Horizon Air	2011	Algae & waste cooking oil	20%	Oil to Jet
Virgin Atlantic		Lanza Tech, Swedish Biofuels	2011	Industrial waste gas		Gas to Jet (gas fermentation)
Etihad Airways	B777-300ER		2012	vegetable oil		Oil to Jet
British Airways	TBD	Solena	TBD	Factory waste	TBD	Gas to Jet (F-T)
Paramus Flying Club	Cessna 182		2013	Waste cooking oil	50%	Oil to Jet

Source: Wang & Tao (2016), Bio-jet Fuel Conversion Technologies

14.4 SAF Production Pathways - Categorization

LEK categorized the four predominant production pathways for sustainable aviation fuels with each pathway characterized by different constraints on either technological readiness, feedstock availability and current limitations on blending.

14.4.1 HEFA

On a scale of 1 to 10, HEFA-SAF is rated 8-9 for technological maturity. The processes are known, and the technology exists to convert hydroprocessed esters and fatty acids into SAF. The most limiting factor for HEFA-SAF will be feedstock availability. Plant-based oil production (soybeans, canola, palm, etc.) can be increased, but the level of such increase is quite limited. Animal fat production supplements the available fat supplies but growth in animal-based fats is even more limited than plant-based oils.

14.4.2 ATJ

Alcohol to Jet as defined by LEK includes both alcohols from cellulosic production and corn-based ethanol. LEK characterizes the technological maturity of alcohol-to-jet as 7-8. In the U.S. the corn-based ethanol production of alcohol probably rates a technological maturity of 9-10 with the primary limitation technology-wise being the permitting of CO2 capture and sequestration via pipelines. Again, this is not

so much a technological limiting factor as it is a geo-political factor. For cellulosic alcohol to jet, the limitations are more cost-related as the processes that now exist are technologically feasible, but they are generally not cost competitive with corn-based alcohols. Feedstock availability is a limiting factor for both corn-based ETJ and for cellulosic ATJ, although corn yields are likely to increase sufficiently to allow current uses of corn with trend line use increases to continue with enough "extra" corn to eventually provide enough ethanol for nearly 9 billion gallons of ETJ-SAF by 2050. Feedstock limitations for other ATJ (cellulosic-based alcohols) include cost of transport and limitations on agricultural and forest residuals.

14.4.3 FT

LEK characterizes gasification through Fischer-Tropsch processes as a 6-7 for technological maturity. While technically feasible, somewhat similar to cellulosic ATJ, the cost of the process tends to be higher than making fuels from HEFA or from corn-based ethanol. Feedstock supplies are limited and tend to be costly to transport or can lead to environmental degradation if the residuals are fully removed from the land. Use of municipal solid waste does offer some expansion of the available feedstocks but even this supply stream has a number of logistical limitations.

14.4.4 PtL or PTF

Power-to-Liquid or PTF-SAF has the lowest technological maturity rating according to LEK with a rating of 6. With technological advances it is expected that PTF-SAF will become much more cost competitive in the next 15-20 years. The technology to extract hydrogen via electrolysis and combine that hydrogen with CO2 that is either captured (such as from ethanol production or other industrial streams) offers great promise. In the short term, CO2 captured from ethanol production offers the most cost-effective supply of CO2 although this supply route needs development of advanced carbon capture to enable sufficient scale. In the long term, the supply of industrial-based CO2 is limited but a nearly unlimited supply of CO2 can be obtained through direct air capture. The technology for direct air capture of CO2 is very immature at present.

14.5 Global SAF Pathway(s)

Prior to the COVID pandemic, jet fuel demand globally was running very close to 8 million barrels per day (bpd) which converts to approximately 122 billion gallons per year (gpy). Total commercial flights have returned to pre-pandemic levels, but improvements in fuel efficiency of the jet fleet and higher average load capacity of the planes in use has jet fuel consumption running nearly 13% below the levels of late 2019, early 2020. S&P Global Commodity[20] Insights expects daily jet fuel consumption to return to 8 million bpd in 2027.

Thunder Said Energy[21] projects a quicker recovery of jet fuel use to pre-pandemic levels with 2023 consumption being projected slightly above 2019 consumption levels. Thunder Said Energy projects growth in jet fuel use by nearly every region of the globe with the greatest absolute consumption increases arising from China and other Asian countries. Their projection of jet fuel use in 2050 is just under 18 million barrels per day which is approximately 274 billion gallons per year.

[20] https://www.spglobal.com/commodityinsights/en/market-insights/latest-news/oil/051923-global-jet-fuel-recovery-lags-air-travel-as-flights-return-to-pre-pandemic-levels
[21] https://thundersaidenergy.com/downloads/global-jet-fuel-demand-by-region-and-forecasts/

For the forecasts of jet fuel use globally by 2050, one of the major factors that affects the level of consumption in 2050 is the assumption regarding technological improvements as expressed in per-year fuel efficiency improvements. As shown in Figure 57, the baseline for total jet fuel consumption reaches approximately 840 million metric tons (mmt) [277 billion gallons] of consumption by 2050. With a 1.39% per year improvement in fuel efficiency, the consumption only rises to 580 mmt [192 billion gallons] and if a 2% per year annual improvement in fuel consumption efficiency is achieved then consumption only rises to 139 billion gallons. The greater the fuel efficiency achieved, the more likely that biojet fuels such as SAF can replace a significant portion of jet fuel use by 2050.

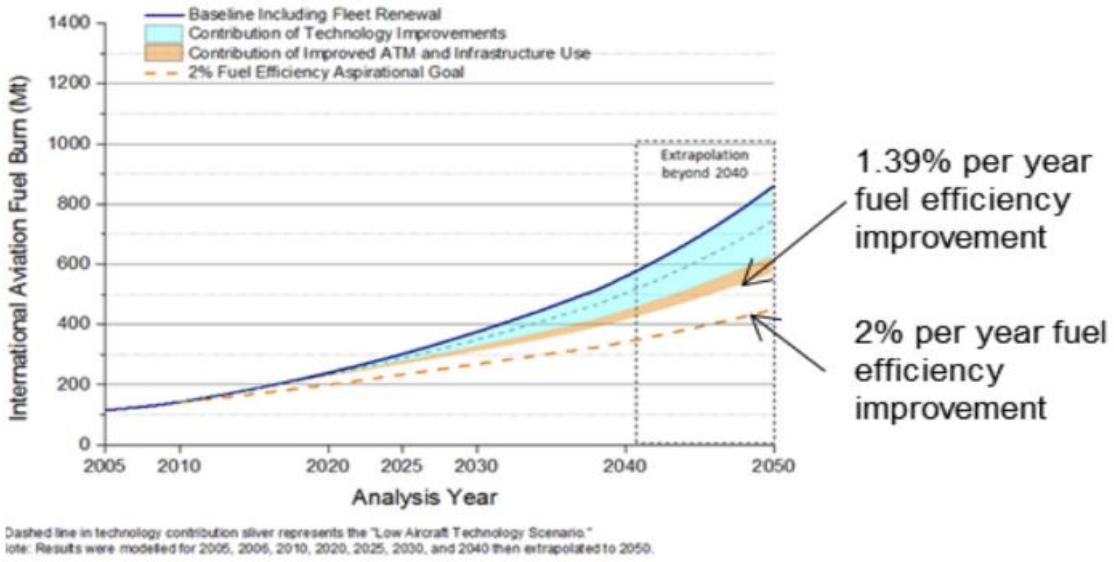


Figure 57. Full Flight Fuel Burn[22]

14.6 Distribution of SAF

SAF must be blended with Jet A prior to use in an aircraft. If SAF is co-processed with conventional Jet A at an existing petroleum refinery, the fuel would flow through the supply chain in a business-as-usual model via pipeline to terminals and/or airports (Figure 58). It is expected that SAF produced at biofuels facilities would be blended with Jet A at existing fuel terminals and then delivered to airports by pipeline. There would be no change to airport fuel operations as the investment and blending would occur upstream at a fuel terminal. While it is possible to blend fuels at an airport, it is not ideal due to the need for additional equipment, staff, and insurance. Due to strict fuel quality standards, it is preferable to certify SAF as ASTM D1655 upstream of an airport.

[22] Environmental Trends in Aviation to 2050, Gregg G. Fleming, USDOT, https://www.icao.int/environmental-protection/Documents/EnvironmentalReports/2016/ENVReport2016_pg16-22.pdf

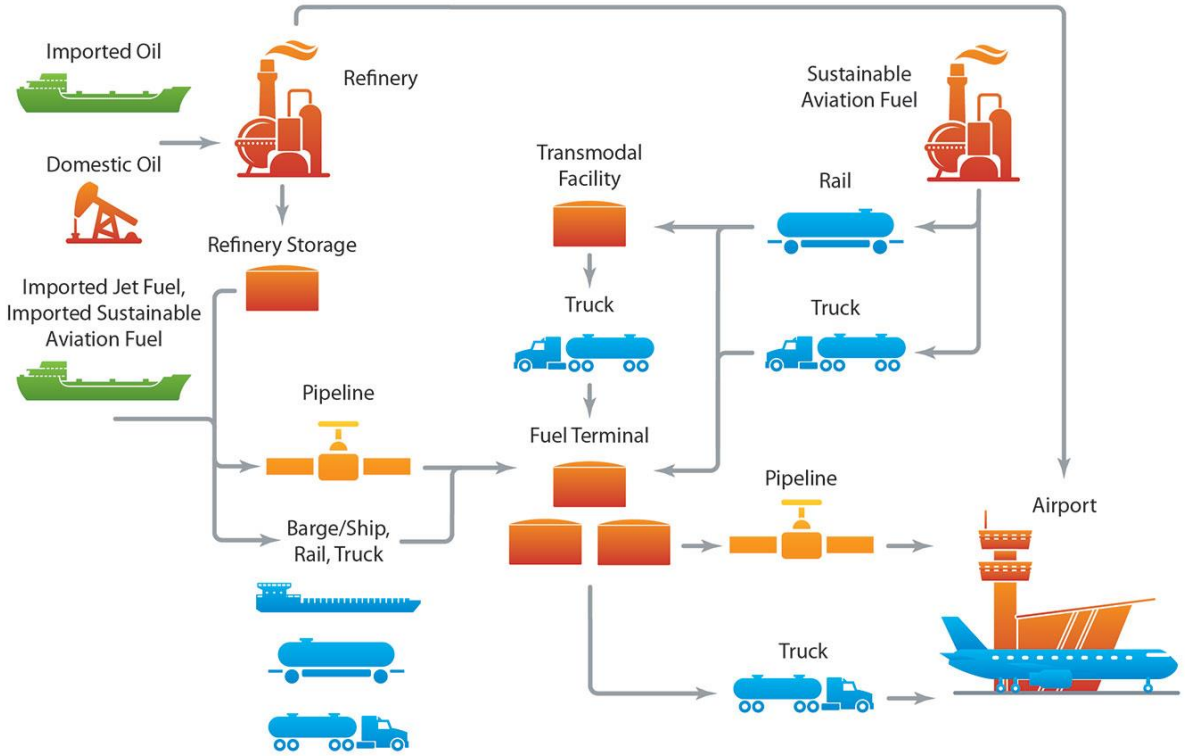


Figure 58. Distribution Model for SAF to Airports; Source: Alternative Fuels Data Center

Figure 59 shows the map of current major jet fuel pipelines that send jet fuel to major airports.



Figure 59. Pipeline Distribution of Jet Fuels; Source: https://www.energy.gov/sites/prod/files/2020/09/f78/beto-sust-aviation-fuel-sep-2020.pdf

Railways are also expected to be instrumental in the distribution of SAF. In 2023, Montana Renewables was the largest producer of SAF in North America and uses rail to distribute SAF to major airports in the western U.S. and in western Canada (Figure 60). SAF production that is being planned for southeastern Kansas will also use rail as a primary delivery mechanism for its SAF.

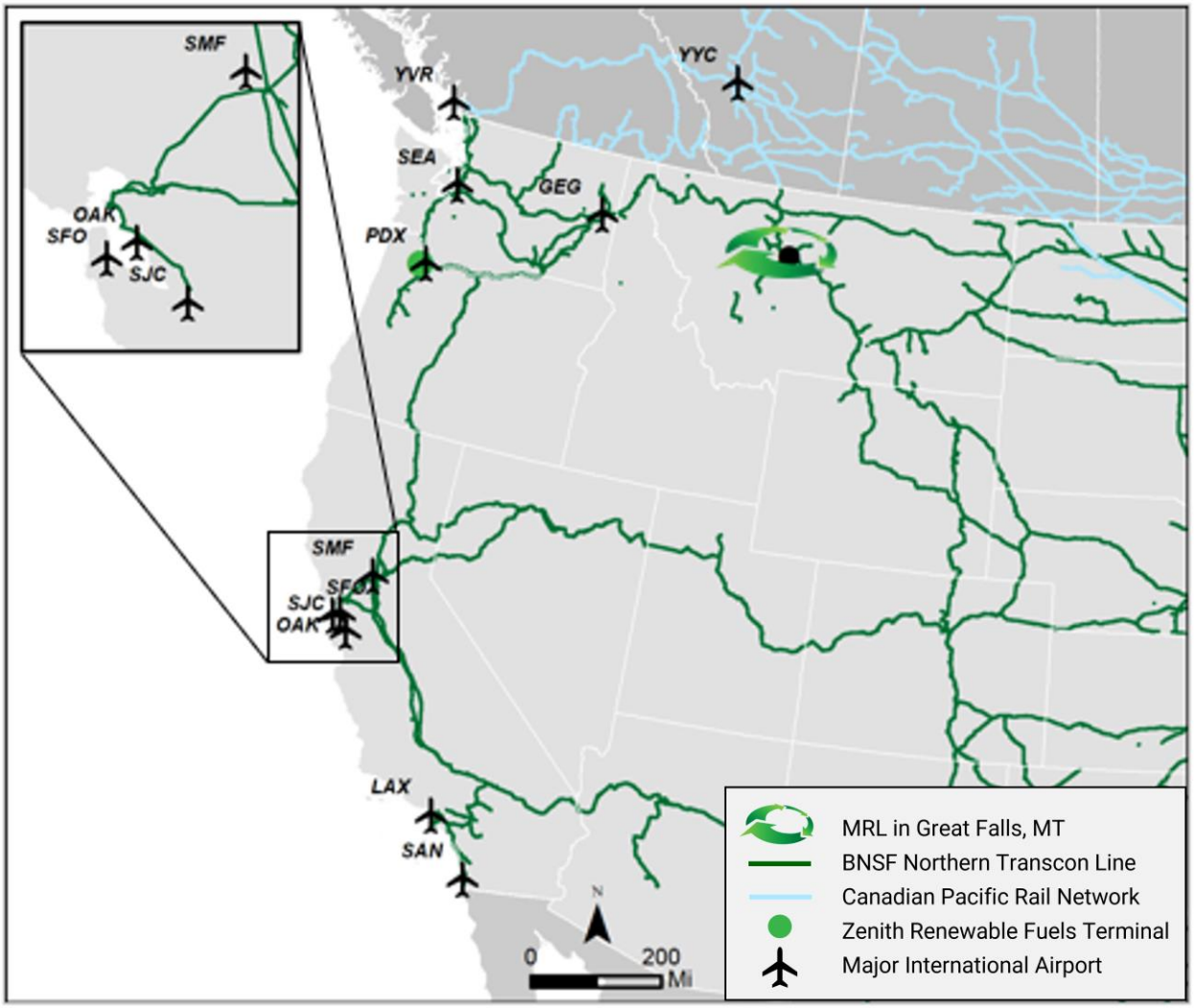


Figure 60. Railway Distribution of SAF from Montana Renewable Fuels

14.7 Fischer-Tropsch SAF (FT-SAF) Pathway

There are currently 3 approved FT-SAF processes. These processes convert solid biomass (including residual waste) into a synthetic gas and then processes the gas into a mixture of hydrocarbons including road and aviation fuels (often referred to as Biomass-to-Liquid - BtL). The feedstocks for FT-SAF are limited and the process of collecting, transporting, and processing solid biomass into a syngas and then into FT-SAF can be relatively costly compared to other pathways. McCurdy and ICF in a presentation at the 2023 SAF Leadership Summit presented a pathway for FT-SAF that begins with less than 10 million gallons of FT-SAF in 2023 and grows to about 300 million gallons of FT-SAF om 2030 and then rises to approximately 2.7 billion gallons of FT-SAF by 2050. For this report we have modeled the DIS FT-SAF pathway similar to the pathway presented by McCurdy and ICF at the 2023 SAF Leadership Summit (Figure 61).

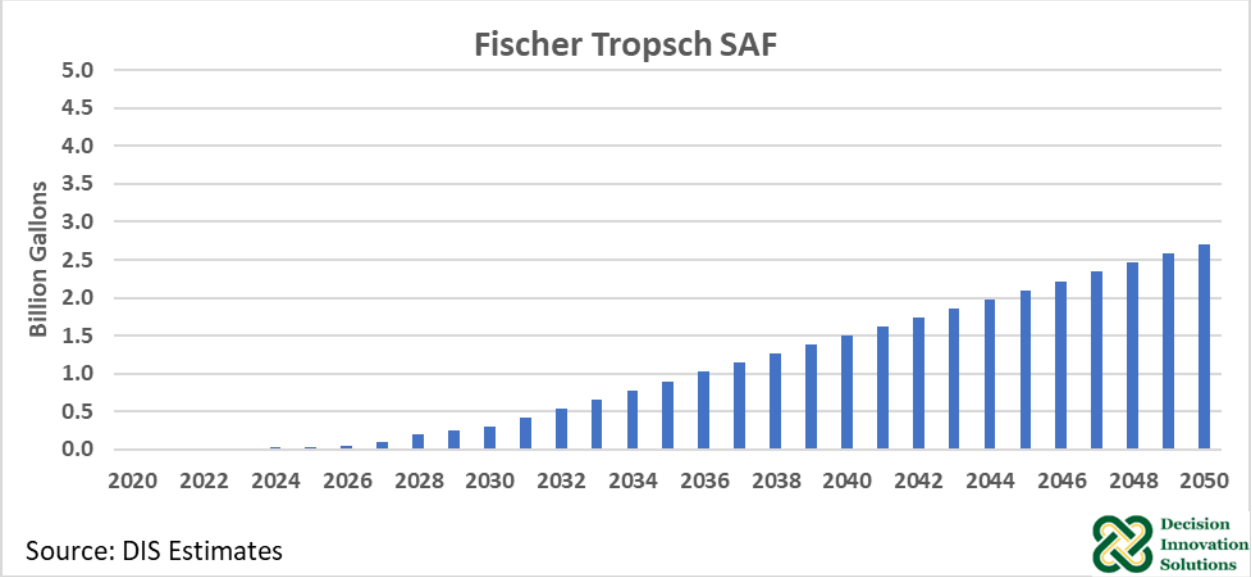


Figure 61. Fischer Tropsch SAF

14.8 Other Alcohol to Jet (ATJ-SAF) Pathway

There are a variety of global projections on the adoption of ATJ-SAF from non-corn ethanol feedstocks. McCurdy – ICF in their presentation at the 2023 SAF Leadership Summit presented a global pathway for SAF fuels that a very rapid expansion of ATJ-SAF after 2040 and nearly 14 billion gallons of ATJ-SAF by 2050 and suggested that ATJ-SAF could represent more than 50% of global SAF by 2050. We believe that pathway is too aggressive for ATJ-SAF adoption. Most of these pathways assume that cellulosic ethanol or cellulosic alcohols will be readily available and cost competitive with HEFA-SAF and ETJ-SAF.

The history of cellulosic alcohol production from agricultural wastes (corn stalks, grasses, straw), wood chips and other lignocellulosic materials has been one of under-performance, especially relative to corn-based alcohol production. In the Energy Independence and Security Act of 2007 (EISA), the original target was for cellulosic biofuel to reach 16 billion gallons of production by 2022. EPA has consistently reduced the cellulosic biofuel RIN volumes and the final RIN volume for cellulosic biofuels in 2023 is 0.84 billion RINs. Assuming a crediting rate of 1.7 D3 or D7 RINs for each gallon of cellulosic biofuels, this implies that there will be about 500 million gallons of cellulosic biofuels produced in 2023. This suggests that cellulosic biofuels make up about 2.4% of biofuels in 2023.

LanzaJet has developed an ATJ technology for commercial production of both sustainable aviation fuel and renewable diesel. Their process converts ethanol to Synthetic Paraffinic Kerosene (SPK) and Synthetic Paraffinic Diesel (SPD) (Figure 62). Their process is an approved pathway to produce SAF. The LanzaJet ATJ technology can process any source of sustainable ethanol, including ethanol produced from municipal waste, agricultural residues, industrial off-gases, and biomass. The Lanzajet flagship commercial facility, Freedom Pines Fuels located in Soperton, GA, is a 10 million gallon per year facility scheduled to be completed in late 2023 and begin fuel production in 2024.

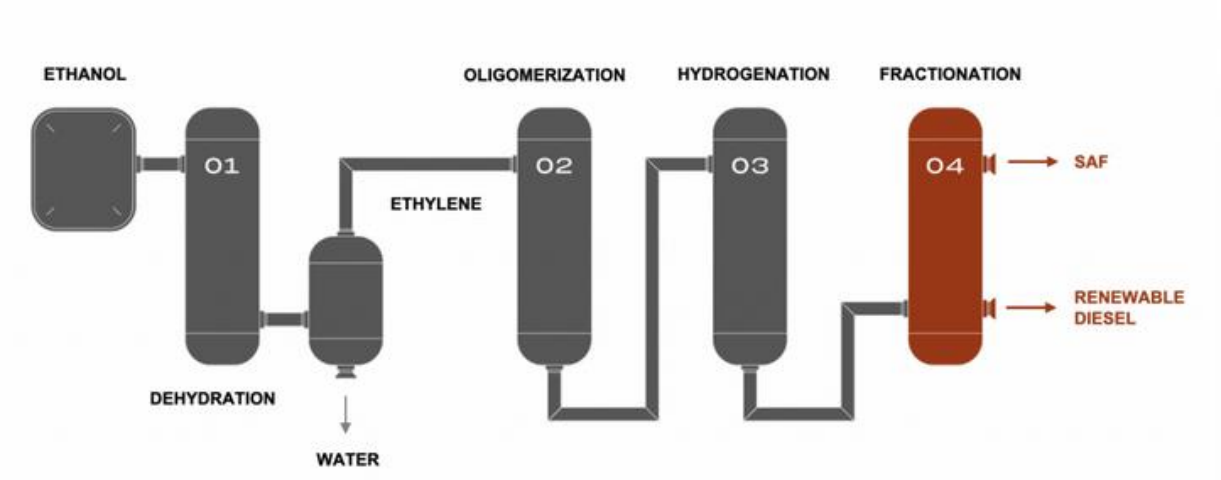


Figure 62. LanzaJet Process for Conversion of Alcohol to SAF and RD; Source: https://www.lanzajet.com/what-we-do/#technology

The DIS pathway for other ATJ_SAF Is significantly less aggressive with regards to inclusion of ATJ-SAF in our pathway to 2050 than the pathway put forward by McCurdy & ICF. DIS projects that 10 million gallons of ATJ-SAF will be produced in 2024 and that production of ATJ-SAF increases slowly to 70 million gallons of ATJ-SAF by 2040 and then increases to 100 million gallons of ATJ-SAF by 2033 and then stays at that level through the 2050 time period (Figure 63).

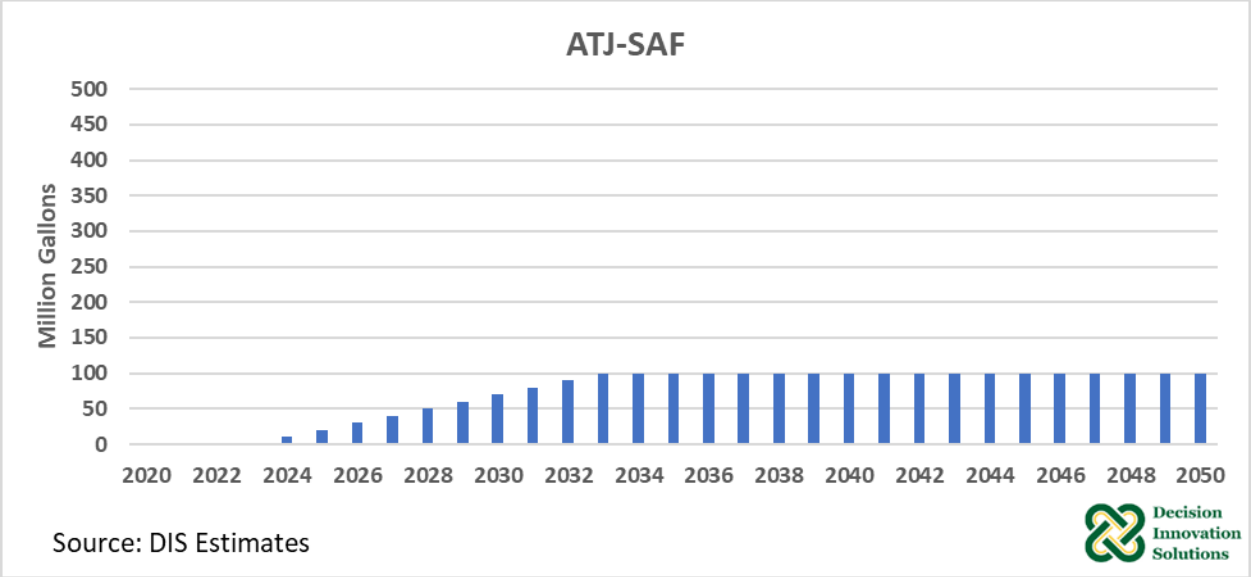


Figure 63. ATJ-SAF

14.9 PTF-SAF from non-corn ethanol feedstock sources

Air Company, Brooklyn, NY is currently producing small quantities of alcohols, chemicals, and fuel products from their trademarked process. The CO2 they use is captured from industrial plants prior to it being emitted into the atmosphere. Currently, it arrives at their facility in tanks after it has been cooled, pressurized and liquified. They create their own green hydrogen through on-site electrolysis with renewable energy. They use an electrolyzer to split water into hydrogen and oxygen with the oxygen gas being released as clean air into the atmosphere and the hydrogen gas being fed into a reactor with the

captured CO2 and converted into reactor liquid that is composed of alcohols, alkanes and water. They then distill the reactor liquid into alcohols (ethanol and methanol), alkanes, and water. The alcohols and alkanes can then be converted into PTF-SAF.

Figure 64 depicts the DIS projected pathway for PTF-SAF from non-ethanol sourced CO2. Dis projects that 4 million gallons per year of PTF-SAF (non-ethanol) can come online in 2024, grow to 85 million gallons per year by 2030, and really begin to ramp up in 2042 as the supplies of CO2 from ethanol plants reaches utilization maturity and non-ethanol sources of CO2 are needed. DIS expects CO2 capture at ethanol plants to be relatively less costly than generation of CO2 from the atmosphere or capture of CO2 at other industrial facilities.

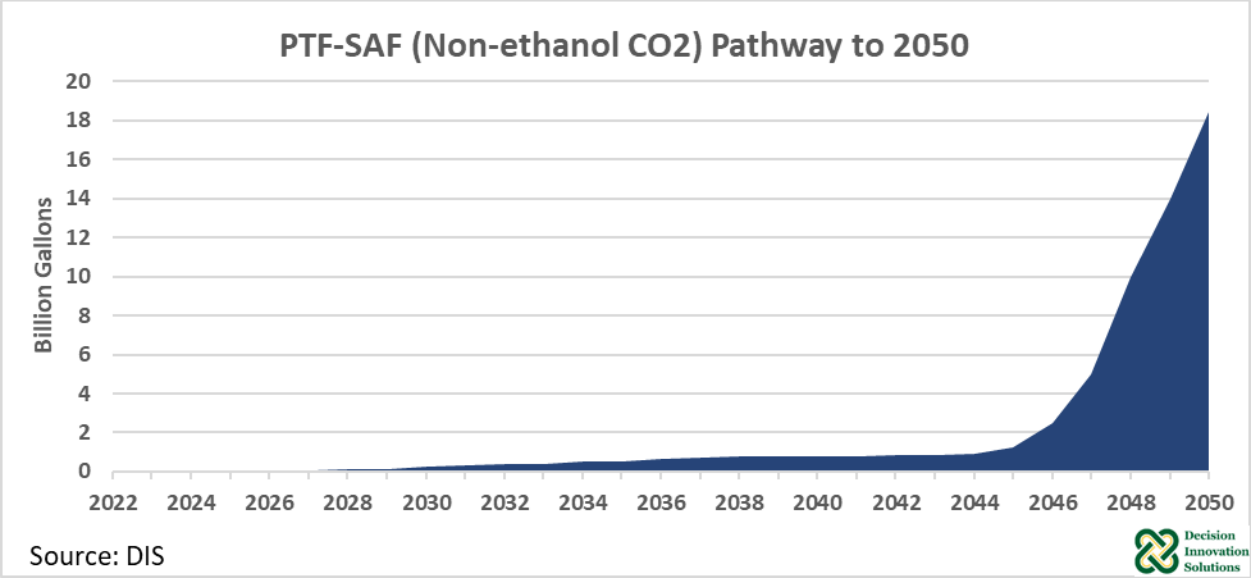
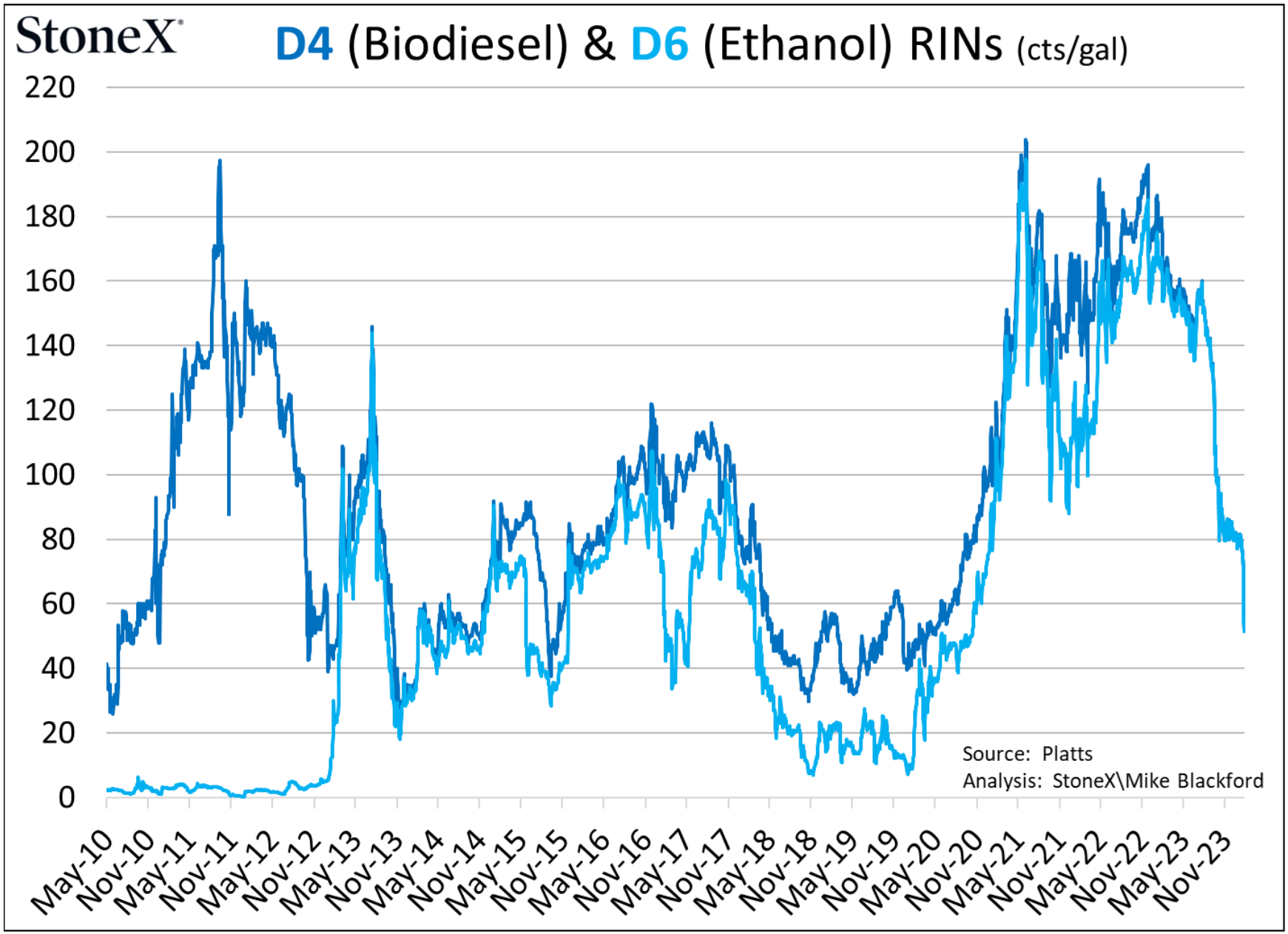


Figure 64. PTF-SAF (Non-ethanol CO2) Pathway to 2050

3b. Federal Issues Update
i. RFS2


StoneX
D4 (Biodiesel) & D6 (Ethanol) RINs (cts/gal)
220
200
180
160
140
120
100
80
60
40
20
0
May-10
Nov-10
May-11
Nov-11
May-12
Nov-12
May-13
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May-18
Nov-18
May-19
Nov-19
May-20
Nov-20
May-21
Nov-21
May-22
Nov-22
May-23
Nov-23
Source: Platts
Analysis: StoneX\Mike Blackford

Monte Shaw

From: Jake Barron <jbarron@growthenergy.org>
Sent: Tuesday, January 9, 2024 6:04 AM
To: Monte Shaw
Subject: Growth Energy Files Petitions for Rehearing in Response to Fifth Circuit's SRE Ruling

Growth Energy™
Expanding America's Bioeconomy

FOR IMMEDIATE RELEASE
January 9, 2024
GrowthEnergy.org/press

PRESS CONTACT
Jake Barron, 410-218-1927
JBarron@GrowthEnergy.org

Growth Energy Files Petitions for Rehearing in Response to Fifth Circuit's SRE Ruling

NEW ORLEANS, LOUISIANA—Growth Energy, the nation's largest biofuels trade association, this week filed two petitions for rehearing with the Fifth Circuit Court of Appeals regarding the Court's 2023 decision on small refinery exemptions (SREs) under the Renewable Fuel Standard (RFS).

The RFS allows small refiners to request exemptions from the program's fuel blending obligations if they can demonstrate to the U.S. Environmental Protection Agency (EPA) that compliance with the RFS would impose a "disproportionate economic hardship." EPA has denied several of these requests over the past few years, reflecting numerous well-established analyses that have shown that refineries nearly always recoup their RFS compliance costs. However, in November, the Fifth Circuit sided with a group of six refineries, ruling that EPA improperly denied their SRE requests.

"As we noted in November, this lawsuit was never about the purported economic hardship faced by a small group of refineries—its ultimate goal was to allow those refineries not to comply with

the law, and to block consumer access to lower-cost, lower-carbon fuel options at the pump," said Growth Energy CEO Emily Skor. "In its opinion, the Fifth Circuit made procedural and substantive errors and failed to consider the record, which demonstrates that EPA's decision to deny the refinery exemptions was correct and well within its authority."

"We hope that the rehearing petition will prompt the court to revisit and revise its opinion to allow EPA to continue to properly implement the nationwide SRE program, and ensure the integrity of the Renewable Fuel Standard, which spurs the production of American-made biofuels to bolster our rural economy, ensure national and energy security, lower carbon emissions, and save consumers money."

Copies of the petitions are available here and here.

###

ABOUT GROWTH ENERGY

Growth Energy is the leading voice of America's biofuel industry. Our members operate and support biomanufacturing facilities at the heart of America's bioeconomy, delivering a new generation of plant-based energy and climate solutions. For more information, visit us at GrowthEnergy.org, follow us on X (formerly Twitter) at @GrowthEnergy, or connect with us on Facebook.

701 8th St NW Suite 450, Washington, D.C. 20001

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Marianette J Miller Meeks
.....
(Original Signature of Member)

118TH CONGRESS
1ST SESSION

H. R. _____

To amend the Clean Air Act to include fuel for ocean-going vessels as additional renewable fuel for which credits may be generated under the renewable fuel program.

IN THE HOUSE OF REPRESENTATIVES

Mrs. MILLER-MEEKS introduced the following bill; which was referred to the Committee on _____

A BILL

To amend the Clean Air Act to include fuel for ocean-going vessels as additional renewable fuel for which credits may be generated under the renewable fuel program.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE.

This Act may be cited as the ''Renewable Fuel for Ocean-Going Vessels Act''.

SEC. 2. RENEWABLE FUEL FOR OCEAN-GOING VESSELS.

(a) DEFINITIONS.—Section 211(o)(1)(A) of the Clean Air Act (42 U.S.C. 7545(o)(1)(A)) is amended by

striking ''fossil fuel present in home heating oil or jet fuel'' and inserting ''fossil fuel present in home heating oil, fuel for ocean-going vessels, or jet fuel''.

(b) APPLICABILITY.—The amendment made by subsection (a) shall apply beginning with respect to the first calendar year beginning after the date of enactment of this Act.

(c) REGULATIONS.—Not later than 365 days after the date of enactment of this Act, the Administrator of the Environmental Protection Agency shall promulgate such regulations as may be necessary to implement the amendment made by subsection (a).

(d) REPORT TO CONGRESS.—Not later than 365 days after the date of promulgating the final regulations required under subsection (c), the Administrator of the Environmental Protection Agency shall submit a report to the Committee on Energy and Commerce of the House of Representatives and the Committee on Environment and Public Works of the Senate on the implementation of the amendment made by this Act and the regulations promulgated thereunder.

Monte Shaw

From: alertsadmin@opisnet.com
Sent: Wednesday, February 28, 2024 11:17 AM
To: Monte Shaw
Subject: BIOFUELS UPDATE: ***Senate Bill Would Offer RIN Access to Ocean-Going Vessels

2024-02-28 12:16:30 EST
***Senate Bill Would Offer RIN Access to Ocean-Going Vessels

A bipartisan pair of Midwest senators introduced a measure on Tuesday that would allow companies to accrue and sell Renewable Identification Number credits from using biodiesel and renewable diesel in ocean-going vessels.

Under the Renewable Fuel for Ocean-Going Vessels Act, introduced by Republican Pete Ricketts of Nebraska and Democrat Sherrod Brown of Ohio, the provisional language the federal government utilizes to administer RIN credits under the RFS would be altered to expand the definition of "additional renewable fuel"
under the program -- which currently only applies to heating oil and jet fuel
-- to include biodiesel and renewable diesel.

That provisional change could open up a significant tax market for cruise lines and shipping companies, who under current regulations must retire any RINs accrued from burning either of the biofuels in international waters using a Class 3 engine. The senators noted in their release that implementation of that rule last year resulted in 6.8 million retired D4 RINs.

A sister version of the bill was introduced to the House of Representatives in early December 2023, where it has since sat before the Energy and Commerce's Subcommittee on Environment, Manufacturing, and Critical Materials.

Introduction of the measure was swiftly praised on Tuesday afternoon by Kurt Kovarik, vice president of federal affairs at Clean Fuels Alliance America, who said the, "commonsense legislation will enable biodiesel and renewable diesel producers to meet the low-carbon fuel demand from shipping companies operating on both coasts and the Great Lakes."

"It will open new markets to American clean fuel producers and their farmer partners," Kovarik said in a release.

That view was shared by soybean associations from Ohio, Michigan, Nebraska, Illinois and Indiana, who praised the measure for the market opportunities that it would offer those states.

Rusty Goebel, president of the Ohio Soybean Association, said in a Tuesday release that the group's partners in the shipping industry are "ready to transition to these fuels."

"Senator Brown's legislation is a win for farmers, a win for the economy and a win for the environment," Goebel said.

--Reporting by Patrick Newkumet, pnewkumet@opisnet.com; Editing by Jordan Godwin, jgodwin@opisnet.com

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3b. Federal Issues Update
ii. E15

Iowa Renewable Fuels Association

January 23, 2024

Press Contact: Emma Koehler
515-252-6249

Midwest Renewable Fuels Groups Call on Biden Administration to Finalize Year-Round E15 Fix

Still No Action a Year and a Half Past Legal Deadline

JOHNSTON, IOWA – Today, the Iowa Renewable Fuels Association (IRFA) and seven additional Midwest renewable fuels groups asked the Biden Administration's Office of Management and Budget (OMB) to finalize the Midwest Governors' Year-Round E15 fix. The fix has now been delayed for a year and a half past the legal deadline, with the final rule sitting at the OMB for over a month.

"The deadline to finalize the E15 fix was a year and a half ago," said IRFA Executive Director Monte Shaw. "There is simply no excuse to further hold up finalization. Quick adoption of the rule will ensure that motorists do not face fewer options and higher prices at the pump this summer."

The eight Midwest governors submitted their requests on April 28, 2022. The EPA is required to take action within 90 days. Defying the Congressional deadline, EPA waited until March 6, 2023, almost a year after receiving the petition, to propose approval of the request. After taking public comment, the draft rule was only sent to the OMB for inter-agency review in December of 2023.

While the EPA took emergency action to allow continued sales of E15 during the summer of 2023, a long-term solution would provide stability for 2024 and beyond.

The letter, signed by renewable fuels groups from the eight states with pending requests, stated: "During recent court filings on this topic, the Department of Justice stipulated that the governors had the power to make the requests, that the governors made the requests properly, that the governors submitted proper documentation with their requests, and that the EPA should have acted within 90 says. There are no questions regarding the law or science in their matter… It is critical that the Biden Administration move swiftly to finalize the governors' requests to provide certainty for this summer and to ensure motorists don't lose the lowest-cost fuel option for most vehicles."

Joining IRFA in signing the letter were: Illinois Renewable Fuels Association, Minnesota Bio-fuels Association, Missouri Renewable Fuels Association, Ohio Corn & Wheat

Growers Association, Renewable Fuels Nebraska, South Dakota Ethanol Producers Association, and Wisconsin BioFuels Association

A copy of the letter can be found here.

The Iowa Renewable Fuels Association represents the state's liquid renewable fuels industry and works to foster its growth. Iowa is the nation's leader in renewable fuels production with 42 ethanol refineries capable of producing 4.5 billion gallons annually – including 34 million gallons of annual cellulosic ethanol production capacity – and 11 biodiesel facilities with the capacity to produce 410 million gallons annually. For more information, visit the Iowa Renewable Fuels Association website at: www.IowaRFA.org.

###

January 23, 2024

The Honorable Shalanda D. Young
Director Office of Management and Budget
725 17th Street N.W.
Washington, D.C. 20503

Dear Director Young:

We write today to urge quick finalization of the outstanding regulatory action to remove the 1-psi volatility waiver for gasoline-ethanol fuel blends in eight Midwest states. The final rule has now been at the Office of Management and Budget (OMB) for over a month. Quick adoption of the rule will ensure that motorists do not face fewer options and higher prices at the pump this summer.

Midwest governors submitted their requests on April 28, 2022, and under the Clean Air Act, the EPA should have promulgated the appropriate regulation within 90 days. That deadline passed a year and a half ago this week. Further delay is simply not justified.

During recent court filings on this topic, the Department of Justice stipulated that the governors had the power to make the requests, that the governors made the requests properly, that the governors submitted proper documentation with their requests, and that the EPA should have acted within 90 days. There are no questions regarding the law or science in this matter.

While some have argued that the governors' requests could lead to supply challenges, ample evidence exists to dismiss this claim. More importantly, the Clean Air Act does not allow the EPA to consider the impact on supply and price regarding the governors' requests. The law leaves that to governors to evaluate before exercising their power. Clearly, the governors see how their constituents routinely save 10 to 20 cents per gallon with ethanol blends like E15. The governors know the real risk to gasoline prices is not from implementing this rule, but rather from barring E15 as a fuel option this summer driving season.

With no outstanding issues to adjudicate, there is no excuse for further delaying a rule that is already a year and a half late. This rule will allow E15 to be sold year-round. E15 lowers tailpipe emissions, carbon emissions, and fuel costs. It is critical that the Biden Administration move swiftly to finalize the governors' requests to provide certainty for this summer and to ensure motorists don't lose the lowest-cost fuel option for most vehicles.

Sincerely,

Dave Loos
Illinois Renewable Fuels Association

Monte Shaw
Iowa Renewable Fuels Association

Brian Werner
Minnesota Bio-fuels Association

Lane Howard
Missouri Renewable Fuels Association

Tadd Nicholson
Ohio Corn & Wheat Growers Association

Dawn Caldwell
Renewable Fuels Nebraska

Walt Wendland
South Dakota Ethanol Producers Association

Robert Welch
Wisconsin BioFuels Association

CC:

The Honorable Michael S. Regan
Administrator
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, N.W.
Washington, DC 20460

The Honorable Tom Vilsack
U.S. Secretary of Agriculture
1400 Independence Avenue, S.W.
Washington, D.C., 20250

The Honorable Jennifer Granholm
U.S. Secretary of Energy
1000 Independence Ave. S.W.
Washington, D.C. 20585

Iowa Renewable Fuels Association

February 22, 2024

Press Contact: Monte Shaw
515-252-6249

Unnecessary Delay in Final Approval of Requests by 8 Governors for Year-Round E15 Leaves Consumers Facing Fewer Choices and Higher Gas Prices This Summer

E15 Solution for Summer of 2024 Remains a Priority

JOHNSTON, IOWA – Today, the EPA finalized a rule implementing the decision by a bipartisan group of eight Midwest governors to allow year-round sales of E15. Already over a year and a half past the statutory deadline to take action, in EPA's final rule the agency delayed implementation from 2024 to 2025, essentially making it two and a half years late.

"Obviously we're glad there's a final rule implementing the governors' action under the Clean Air Act to allow year-round sales of E15," said IRFA Executive Director Monte Shaw. "But the last-minute delay in implementation means motorists face fewer options and higher prices at the pump this summer. This further delay is unnecessary and unjustified. During recent court filings on this topic, the Department of Justice stipulated that the governors had the power to make the requests, that the governors made the requests properly, that the governors submitted proper documentation with their requests, and that the EPA should have acted a year and a half ago. This additional delay feels like a slap in the face to Midwest motorists."

The eight Midwest governors submitted their requests on April 28, 2022. The EPA was required by law to take action within 90 days. Defying the Congressional deadline, EPA waited until March 6, 2023, almost a year after receiving the petition, to propose approval of the request. After taking public comment, the draft rule was only sent to the OMB for inter-agency review in December of 2023.

"With the rule final, our attention now turns to both a solution to protect consumers during this summer as well as a national fix in Congress," stated Shaw. "While our work is not done, it's important to note that we wouldn't have the progress today without the leadership of Iowa Governor Kim Reynolds, who organized the bipartisan group of 8 governors to exercise their authority under the Clean Air Act back in 2022. IRFA members are deeply thankful for her unrelenting work on this issue. We also want to thank Iowa Attorney General Brenna Bird who sued the EPA to protect the governors'

rights. We know they will be with us as we continue to work on a 2024 summer solution and to take this Midwest victory nationwide."

The Iowa Renewable Fuels Association represents the state's liquid renewable fuels industry and works to foster its growth. Iowa is the nation's leader in renewable fuels production with 42 ethanol refineries capable of producing 4.5 billion gallons annually – including 34 million gallons of annual cellulosic ethanol production capacity – and 11 biodiesel facilities with the capacity to produce 410 million gallons annually. For more information, visit the Iowa Renewable Fuels Association website at: www.IowaRFA.org.

###

Monte Shaw

From: Press Releases from Iowa Governor's Office <IowaGovernorsOffice@public.govdelivery.com>
Sent: Thursday, February 22, 2024 3:40 PM
To: Monte Shaw
Subject: RELEASE: Gov. Reynolds Statement on EPA's Delay of Year-Round E15 Sales until 2025

Follow Up Flag: FollowUp
Flag Status: Flagged

OFFICE OF THE GOVERNOR
Governor Kim Reynolds ★ Lt. Governor Adam Gregg

FOR IMMEDIATE RELEASE: Thursday, February 22, 2024
CONTACT: Kollin Crompton, (515) 745-2840, Kollin.Crompton@Governor.Iowa.gov

Gov. Reynolds Statement on EPA's Delay of Year-Round E15 Sales until 2025

DES MOINES – Governor Reynolds issued the following statement after the EPA posted its final rule implementing year-round sales of E15 fuel:

"After continuous delays by the EPA to allow year-round sales of E15 fuel, consumers across the country can finally look forward to lower-cost, cleaner-burning year-round E15 in 2025. Nearly two years ago, I organized a bipartisan coalition of eight Midwest governors to join me in challenging the EPA's refusal to allow E15 sales during summer months. Finally, our request is approved, however, the EPA's unjustified delays come at a cost for drivers and the environment.

"As governor of the nation's top ethanol producing state, I'm pursuing a waiver to continue offering drivers the option to purchase lower-cost, cleaner-burning E15 in Iowa this summer, and I won't stop fighting for year-round E15 until it's available nationwide. The solution to making America energy independent is growing in the Heartland."

###

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GOVDELIVERY

(F) The permit conditions and systems to receive special protection will be determined by the local Federal fisheries manager in consultation with ADF&G.

(xix) The Klawock River drainage is closed to the use of seines and gillnets during July and August.

(xx) The Federal public waters in the Makhnati Island area, as defined in §____.3(b)(5) are closed to the harvest of herring and herring spawn, except by federally qualified users.

(xxi) Only federally qualified subsistence users may harvest sockeye salmon in Neva Lake, Neva Creek, and South Creek.

(xxii) The Federal public waters of Kah Sheets Creek are closed from July 1 to July 31, except by federally qualified users.

Amee Howard,

Acting Assistant Regional Director, U.S. Fish and Wildlife Service.

Gregory Risdahl,

Subsistence Program Leader, USDA–Forest Service.

[FR Doc. 2024–04056 Filed 2–28–24; 8:45 am]

BILLING CODE 4333–15–P; 3411–15–P

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 1090

[EPA–HQ–OAR–2022–0513; FRL–9845–02–OAR]

RIN 2060–AV73

Request From States for Removal of Gasoline Volatility Waiver

AGENCY: Environmental Protection Agency (EPA).

ACTION: Final rule.

SUMMARY: Pursuant to provisions specified by the Clean Air Act (CAA), the Governors of Illinois, Iowa, Minnesota, Missouri, Nebraska, Ohio, South Dakota, and Wisconsin submitted petitions requesting that EPA remove the 1-pound per square inch (psi) Reid vapor pressure (RVP) waiver for summer gasoline-ethanol blended fuels containing 10 percent ethanol (E10). EPA is acting on those petitions by removing the 1-psi waiver in those States effective April 28, 2025. This action also finalizes regulatory amendments to implement the removal of the 1-psi waiver for E10 in those States, as well as a regulatory process by which a State may request to reinstate the 1-psi waiver. Finally, consistent with a decision issued by the United States Court of Appeals for the D.C. Circuit on July 2, 2021, this action removes regulations that extended the 1-psi waiver to gasoline-ethanol blends between 10 and 15 percent ethanol (E15).

DATES: This rule is effective on April 29, 2024.

ADDRESSES: EPA has established a docket for this action under Docket ID No. EPA–HQ–OAR–2022–0513. All documents in the docket are listed on the *https://www.regulations.gov* website. Although listed in the index, some information is not publicly available, *e.g.,* confidential business information (CBI) or other information whose disclosure is restricted by statute. Certain other material is not available on the internet and will be publicly available only in hard copy form. Publicly available docket materials are available electronically through *https://www.regulations.gov.*

FOR FURTHER INFORMATION CONTACT: For questions regarding this action, contact Lauren Michaels, Office of Transportation and Air Quality, Compliance Division, Environmental Protection Agency, 2000 Traverwood Drive, Ann Arbor, MI 48105; telephone number: (734) 214–4640; email address: *michaels.lauren@epa.gov.*

SUPPLEMENTARY INFORMATION:

Does this action apply to me?

Entities potentially affected by this final rule are those involved with the production, distribution, and sale of transportation fuels, including gasoline and diesel fuel. Potentially affected categories include:

Category	NAICS [1] code	Examples of potentially affected entities
Industry	211130	Natural gas liquids extraction and fractionation.
Industry	221210	Natural gas production and distribution.
Industry	324110	Petroleum refineries (including importers).
Industry	325110	Butane and pentane manufacturers.
Industry	325193	Ethyl alcohol manufacturing.
Industry	325199	Manufacturers of gasoline additives.
Industry	424710	Petroleum bulk stations and terminals.
Industry	424720	Petroleum and petroleum products wholesalers.
Industry	447110, 447190	Fuel retailers.
Industry	454310	Other fuel dealers.
Industry	486910	Natural gas liquids pipelines, refined petroleum products pipelines.
Industry	493190	Other warehousing and storage—bulk petroleum storage.

[1] North American Industry Classification System (NAICS).

This table is not intended to be exhaustive, but rather provides a guide for readers regarding entities likely to be affected by this action. This table lists the types of entities that EPA is now aware could potentially be affected by this action. Other types of entities not listed in the table could also be affected. To determine whether your entity would be affected by this action, you should carefully examine the applicability criteria in 40 CFR part 1090. If you have any questions regarding the applicability of this action to a particular entity, consult the person listed in the **FOR FURTHER INFORMATION CONTACT** section.

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K. Congressional Review Act (CRA)

I. Executive Summary

In this action, EPA is responding to petitions from eight State Governors to remove the 1-psi (pound per square inch) waiver for gasoline-ethanol blends containing 10 percent ethanol (E10). The Governors made their requests pursuant to Clean Air Act (CAA) section 211(h)(5), which provides that EPA shall remove the 1-psi waiver by regulation upon a demonstration by a Governor that the 1-psi waiver increases emissions in their State.

After review of the modeling results presented by the Governors in their petitions, on March 6, 2023, EPA proposed to remove the 1-psi waiver with an effective date of April 28, 2024—and sought comment on delaying the effective date to April 28, 2025—in the following eight States: Illinois, Iowa, Nebraska, Minnesota, Missouri, Ohio, South Dakota, and Wisconsin.[1] On March 21, 2023, EPA held a public hearing on the proposal, at which various perspectives on the proposed action were presented, and subsequently many comments were submitted to EPA on the proposed action. After the close of the public comment period, EPA also received numerous petitions to delay the proposed effective date of the removal of the 1-psi waiver.[2] Following review of public comments on the proposal and the extension petitions received, in this action EPA is removing the 1-psi waiver and instead applying the 9.0 psi RVP (Reid Vapor Pressure) standard under CAA section 211(h)(1) effective April 28, 2025, in the following eight States: Illinois, Iowa, Nebraska, Minnesota, Missouri, Ohio, South Dakota, and Wisconsin.

Throughout this document we discuss key comments provided by stakeholders on the proposal and provide our response. Additional detail is provided in the Response to Comments (RTC) document and Technical Support Document (TSD)[3] for this action.

II. Volatility Control Background and History

EPA first took regulatory action to control the volatility of gasoline in 1987.[4] Because higher gasoline volatility leads to higher evaporative emissions, EPA regulates the RVP—a measure of fuel volatility—of gasoline during summer months in order to reduce volatile organic compound (VOC) emissions that contribute to the formation of smog (ground-level ozone).[5] The volatility of fuel depends on the refinery's decisions in formulating its gasoline. Subsequent to EPA's actions, Congress enacted the CAA Amendments of 1990, which included statutory volatility provisions for summer gasoline. These provisions largely codified EPA's regulatory approach, including establishing a 9.0 psi RVP standard for gasoline volatility in the summer.[6] Because blending ethanol into gasoline increases the volatility of the resulting fuel blend due to chemical differences between ethanol and gasoline, Congress also codified a 1-psi waiver for E10, allowing such blends to have a 1.0-psi higher RVP than otherwise allowed for gasoline, consistent with EPA's prior regulatory approach.[7] This allowance only applies to gasoline-ethanol blends containing between 9 and 10 percent ethanol, and does not extend to gasoline-ethanol blends containing greater than 10 percent ethanol.[8] The 1-psi waiver also does not apply to reformulated gasoline (RFG).

At the time the provision was enacted, the 1-psi waiver applied to a relatively small portion of the gasoline sold in the United States. Today, however, almost all gasoline sold is E10, and thus the 1-psi waiver increases the volatility of most gasoline.

On April 28, 2022, the Governors of Illinois, Iowa, Kansas, Minnesota, Nebraska, North Dakota, South Dakota, and Wisconsin submitted a petition for the removal of the 1-psi waiver for E10 in their States beginning in the summer of 2023, pursuant to CAA section 211(h)(5).[9] On June 10, 2022, the Governor of Ohio also submitted a petition requesting the removal of the 1-psi waiver in that State.[10] On July 21, 2022, the Governor of Kansas notified EPA that they were rescinding their petition for removal of the 1-psi waiver in Kansas.[11] On October 13, 2022, the Governor of North Dakota notified EPA that they were rescinding their petition for removal of the 1-psi waiver in North Dakota.[12] On December 21, 2022, the Governor of Missouri submitted a petition requesting the removal of the 1-psi waiver in that State.[13] This action refers to the eight remaining States of Illinois, Iowa, Minnesota, Missouri, Nebraska, Ohio, South Dakota, and Wisconsin as the "petitioning states." The petitions included modeling results indicating reductions in VOCs, nitrogen

[1] 88 FR 13758.

[2] We refer to these petitions as "extension petitions" throughout this preamble.

[3] "Request From States for Removal of Gasoline Volatility Waiver: Technical Support Document and Cost Analysis," available in the docket for this action.

[4] See 52 FR 31274 (August 19, 1987); Subsequent regulatory actions occurred in 1989 and 1990. 54 FR 11868 (March 22, 1989); 55 FR 23658 (June 11, 1990).

[5] Gasoline must have volatility in the proper range to prevent driveability, performance, and emissions problems. If the volatility is too low, the gasoline will not ignite properly; if the volatility is too high, the vehicle may experience vapor lock. Importantly for this action, excessively high volatility also leads to increased evaporative emissions from the vehicle. Vehicle evaporative emission control systems are designed and certified on gasoline with a volatility of 9.0 psi RVP. Higher volatility gasoline may overwhelm the vehicle's evaporative control system, leading to a condition described as "breakthrough" of the cannister and mostly uncontrolled evaporative emissions.

[6] CAA section 211(h)(1). CAA section 211(h)(1) requires EPA to establish volatility requirements—that is, a restriction on RVP—during the high ozone season. To implement these requirements, EPA defines "high ozone season" or "summer season" at 40 CFR 1090.80 as "the period from June 1 through September 15 for retailers and wholesale purchaser consumers, and May 1 through September 15 for all other persons, or an RVP control period specified in a state implementation plan if it is longer." In general practice by industry and for purposes of this preamble, the high ozone season is referred to as the "summer" or "summer season" and gasoline produced to be used during the high ozone season is called "summer gasoline." EPA's regulations do not impose any volatility requirements on any type of blend of gasoline outside of the summer season.

[7] CAA section 211(h)(4).

[8] The statutory 1-psi waiver is codified at 40 CFR 1090.215(a).

[9] "April 28, 2022 Letter from Eight States," available in the docket for this action.

[10] "June 10, 2022 Letter from Ohio," available in the docket for this action.

[11] "July 21, 2022 Letter from Kansas," available in the docket for this action.

[12] "October 12, 2022 Letter from North Dakota," available in the docket for this action.

[13] "December 21, 2022 Letter from Missouri," available in the docket for this action.

oxides (NO_X), and carbon monoxide (CO).

III. Statutory Authority and Provisions To Remove the 1-psi Waiver

This rulemaking modifies EPA's fuel quality regulations in 40 CFR part 1090 to remove the 1-psi waiver that is applicable to fuel blends containing gasoline and 10 percent ethanol for the petitioning States. While we proposed to make such a change effective for the summer of 2024, after further careful consideration of comments and consultation with various agencies we are instead finalizing removal of the 1-psi waiver in these States beginning April 28, 2025.

CAA section 211(h)(1) requires EPA to ''promulgate regulations making it unlawful . . . during the high ozone season . . . to sell . . . or introduce into commerce gasoline with a Reid Vapor Pressure in excess of 9.0 pounds per square inch (psi).'' For nonattainment areas, CAA section 211(h)(1) also allows EPA to set a lower (*i.e.,* more stringent) RVP standard, as well as to define the term ''high ozone season.'' CAA section 211(h)(4) provides in relevant part that ''[f]or fuel blends containing gasoline and 10 percent denatured anhydrous ethanol, the Reid vapor pressure limitation under this subsection shall be one pound per square inch (psi) greater than the applicable Reid vapor pressure limitations established under [section 211(h)(1)].'' CAA section 211(h)(5), which was enacted as part of the Energy Policy Act of 2005 (EPAct), provides in relevant part that ''[u]pon notification, accompanied by supporting documentation, from the Governor of a State that the [waiver in section 211(h)(4)], will increase emissions that contribute to air pollution in any area of the State, the Administrator shall, by regulation, apply, [the volatility limit under section 211(h)(1)].'' Thus, regulatory action under CAA section 211(h)(5) would remove the 1-psi waiver for E10 and generally apply the RVP standard under CAA section 211(h)(1).

Prior to the April 28, 2022 petition, no Governor had ever submitted a petition under CAA section 211(h)(5) to EPA, and thus we are interpreting this statutory provision for the first time in this action. In this context, we find that the use of the prescriptive statutory language ''shall'' provides limited, if any, discretion for EPA to consider other issues such as economic impacts of removing the 1-psi waiver. Such impacts may instead be taken into consideration by a Governor when deciding whether to submit a petition to EPA.[14] Here, EPA's role is only to evaluate the supporting documentation provided by the Governors.[15] If EPA concludes that the supporting documentation, as required by the statute, demonstrates emissions increases with the 1-psi waiver in place, then CAA section 211(h)(5) requires EPA to promulgate regulations to remove the 1-psi waiver as requested.

In response to the proposal, we received comments suggesting that the Governors cannot meet the statutory criteria in CAA section 211(h)(5) because E10 is now the dominant fuel in the marketplace. Commenters suggested that the statutory language that the 1-psi waiver ''will increase emissions'' cannot be satisfied, because any emissions impacts from the 1-psi waiver have already occurred. We disagree with the comment. CAA section 211(h)(5)(A)—which was promulgated in 2005—requires EPA to remove the 1-psi waiver if it ''will increase emissions that contribute to air pollution . . . during the high ozone season.'' The term ''will'' connotes consideration of emissions that are expected in the future and as relevant here during the ''high ozone season.'' [16] Further, as instructed in CAA section 211(h)(1), we have defined ''high ozone season'' as the period from ''June 1 through September 15 for retailers and [whole purchaser consumers], and May 1 through September 15 for all other persons.'' [17] We therefore read the phrase as calling for the consideration of emissions that are expected in the petitioning States during future high ozone seasons and conclude that because the Governors have demonstrated that the 1-psi waiver will increase VOC emissions during the high ozone season, the statutory criteria for removal of the 1-psi waiver has been met. We further address this comment in the RTC document.

Additionally, as we posited in the proposal, we do not interpret this provision as requiring a demonstration of a reduction in emissions of all pollutants that contribute to air pollution in the petitioning States, as advocated for by some commenters. Such a demonstration could not have been contemplated by Congress, as lowering the volatility of fuel was specifically the intent set out in CAA section 211(h)(1), which calls for EPA to set RVP standards to address ''evaporative emissions.'' As such, reducing the volatility of gasoline would be expected to have differing impacts on emissions of different pollutants.[18] Further, Congress was silent on the air pollutants that EPA should consider in responding to petitions for removal of the 1-psi waiver. Specifically, under CAA section 211(h)(5), EPA is to remove the 1-psi waiver if it ''increase[s] emissions that contribute to air pollution.'' This contrasts with, for example, CAA section 110(a)(2)(D)(i), which prohibits sources in a State from emitting ''any air pollutant which will contribute significantly to nonattainment'' in another State. Air pollution could result from a myriad of sources, including listed hazardous air pollutants, criteria pollutants, and greenhouse gases, and thus would appear to be a rather expansive term. Reducing RVP, however, is a volatility control measure as explained earlier in Section II. In short, CAA section 211(h)(1) requires EPA to set RVP standards to address ''evaporative emissions.'' Additionally, EPA has consistently explained that adding 10 percent ethanol to gasoline causes roughly a 1.0 psi RVP increase in the blend's volatility, which is the premise for the 1-psi waiver contained in CAA section 211(h)(4) and the subject of this action.[19] EPA is of the view, therefore, that it is reasonable to consider ''air pollution'' emanating from emissions of such gasoline and thus, that it may be most appropriate to evaluate the impact of the 1-psi waiver for E10 on VOC emissions in addressing petitions to remove the 1-psi waiver under CAA section 211(h)(5). We thus find that demonstration of increased VOC emissions with the 1-psi waiver in place is sufficient to grant the petitions for

[14] Considerations like this were cited by the Governors of Kansas and North Dakota in rescinding their petitions.

[15] Legislative history suggests that the supporting documentation need not be as stringent as that called for under CAA section 211(c)(4)(C). See Senate Report 106–426 at 12 (September 28, 2000). Under CAA section 211(c)(4)(C) a state must make a ''necessity'' showing prior to EPA approval of a fuel measure into the state implementation plan. The ''Guidance on Use of Opt-in to RFG and Low RVP Requirements in Ozone SIPs,'' August 1997, gives further guidance on factors EPA is likely to consider in making a finding of ''necessity'' under CAA section 211(c)(4)(C).

[16] This reading is like, for example, our reading of ''will'' in CAA section 110(a)(2)(D)(i). (The term ''will'' in CAA section 110(a)(2)(D) means that State implementation plans are required to eliminate the appropriate amounts of emissions that presently, or that are expected in the future, contribute significantly to nonattainment downwind. 63 FR 57375 (October 27, 1998)).

[17] 40 CFR 1090.80.

[18] For an example of analysis and modeling of emission impacts available at the time CAA section 211(h)(5) was enacted, see ''User's Guide to MOBILE6.1 and MOBILE6.2: Mobile Source Emission Factor Model,'' EPA–420–R–02–028, October 2002.

[19] See, *e.g.,* 52 FR 31274 at 31292 (August 19, 1987).

removal of the waiver. Even were EPA to look at the modeled emissions impacts on several other pollutants (*e.g.*, CO and NO_X), those reductions, in addition to the reduction in VOCs, also satisfy the requirements of the statute and justify granting the petitions.

Further, EPA views the Motor Vehicle Emissions Simulator (MOVES) as an appropriate tool for use in modeling the emission impacts required by CAA section 211(h)(5). The MOVES runs performed by the petitioning States compared emissions from motor vehicles and nonroad vehicles and equipment with and without the 1-psi waiver for E10 in each State in the summer. In the past, similar analyses have been used to support prior EPA actions for Federal and State fuel programs.[20]

IV. Petitions for Removal of the 1-psi Waiver and Supporting Documentation

A. Petition Background and History

During the fall of 2021, EPA received several letters from States requesting that EPA engage in a dialogue about mechanisms to provide parity between E10 and E15 with respect to gasoline volatility standards.[21] Specifically, the letters referred to CAA section 211(h)(5) and inquired about as to what type of ''supporting documentation'' should accompany such a request. EPA organized and participated in a series of meetings with representatives from various Midwestern States that had expressed interest in removing the 1-psi waiver. In those meetings, EPA indicated that MOVES modeling would be an appropriate tool to use for this purpose given its ability to model the emissions impacts of changes in gasoline volatility and given our past reliance on MOVES modeling runs in similar contexts.

On April 28, 2022, the Governors of Illinois, Iowa, Kansas, Minnesota, Nebraska, North Dakota, South Dakota, and Wisconsin submitted a joint petition to EPA for the removal of the 1-psi waiver for E10 in their respective States. The petition specifically requested the removal of the 1-psi waiver for E10 as a permanent solution for providing year-round E15 in those States beginning in the summer of 2023. As accompanying documentation, the petition provided quantified reductions in VOC, NO_X, and CO emissions as a result of removing the 1-psi waiver in each State based on MOVES modeling. Subsequent to this submittal, the Governors of Kansas and North Dakota rescinded their petitions to remove the 1-psi waiver for E10 in those States.[22] Therefore, we are not taking any action on the 1-psi waiver for E10 in Kansas and North Dakota in this action.

On June 10, 2022, the Governor of Ohio also submitted a petition requesting the removal of the 1-psi waiver for E10 beginning in the summer of 2023. The petition provided quantified reductions in VOC, NO_X, and CO emissions in Ohio based on MOVES modeling.

On December 21, 2022, the Governor of Missouri also submitted a petition requesting the removal of the 1-psi waiver for E10 beginning in the summer of 2023. The petition provided quantified reductions in VOC, NO_X, and CO emissions in Missouri based on MOVES modeling.

Subsequent to submission of the petitions, all petitioning States except Missouri provided EPA with additional emissions modeling documentation, including for particulate matter (PM) and benzene.[23] The original data submitted showed a decrease in VOC, NO_X, and CO emissions with removal of the 1-psi waiver for E10, while the additional data demonstrated an increase in PM for both nonroad and on-road emissions with removal of the 1-psi waiver. The benzene results demonstrated an increase in benzene on-road emissions and a decrease in benzene nonroad emissions. While the additional data on modeled emissions impacts on other pollutants may not be necessary to make the statutory demonstration, it does provide additional information about the potential emissions impacts of this action.

All the petitioning States requested removal of the 1-psi waiver in all areas within their State where the limitation under CAA section 211(h)(4) applies. Therefore, the requests did not include areas within the States where RFG is required because the 1-psi waiver does not apply to RFG. The petitioning States also requested that the removal of the 1-psi waiver should take effect for the 2023 high ozone season, without further discussion. The States noted that rescinding the 1-psi waiver for E10 would support year-round sales of E15.

B. Evaluation of Petitions for Removal of the 1-psi Waiver

The petitioning States provided technical documentation with their petitions to demonstrate the reduction of emissions with the removal of the 1-psi waiver as required by CAA section 211(h)(5) in the form of MOVES modeling results.[24] The results for each State were based on a single day in July 2023, which is during the high ozone season. Comparative results demonstrate the change in emissions from the current 10.0 psi RVP standard to the alternative 9.0 psi RVP standard as contemplated by the statute.[25] A summary of the emissions impacts of removing the 1-psi waiver for E10 for each State is provided in Table V–1.[26]

[20] For example, on June 7, 2017, EPA published a final rule to relax the federal 7.8 psi RVP standard in the Nashville, TN area (82 FR 26354) and on March 12, 2021, EPA published two final rules that removed approved regulations from the Kansas and Missouri SIPs that required the sale of 7.0 psi RVP gasoline in the Kansas City, KS–MO area (86 FR 14000 and 86 FR 14007).

[21] See ''October 13, 2021 Letter from Kansas,'' and ''November 4, 2021 Letter from Seven States,'' available in the docket for this action.

[22] See ''July 21, 2022 Letter from Kansas,'' and ''October 12, 2022 Letter from North Dakota,'' available in the docket for this action.

[23] See ''Emissions Impacts of the Elimination of the 1-psi RVP Waiver for E10,'' May 9, 2022; and ''Emissions Impacts of the Elimination of the 1-psi RVP Waiver for E10 in Ohio,'' June 10, 2022, available in the docket for this action. While we did not receive additional information from Missouri about other pollutants as we received from the other petitioning states, we anticipate directionally similar trends as shown in the information from the other states. RVP reduction is a volatility control measure and EPA has consistently explained that adding 10 percent ethanol to gasoline causes roughly a 1.0 psi RVP increase in the blend's volatility. As EPA explained in its rulemakings to regulate volatility of fuel that preceded enactment of CAA section 211(h), evaporative hydrocarbon emissions are VOCs and contribute to the formation of ozone in the atmosphere, particularly in the summer months due to direct sunlight and high ambient temperatures. EPA regulated the volatility of gasoline to control the emissions of VOCs. Congress, in enacting CAA section 211(h), which largely codified EPA's volatility regulations, thus also logically intended to address VOCs by requiring volatility controls. It is therefore reasonable and most appropriate to evaluate the impact of the 1-psi volatility waiver for E10 on VOC emissions in addressing petitions to remove the 1-psi waiver under CAA section 211(h)(5). See also 52 FR 31274 (August 19, 1987); 54 FR 11868 (March 22, 1989); and 55 FR 23658 (June 11, 1990).

[24] EPA developed MOVES to estimate air pollution emissions from on-road and nonroad mobile sources.

[25] Further information about the MOVES runs, including inputs and nonroad data, is available in the docket for this action.

[26] EPA's evaluation of the MOVES model input data and assumptions, and results, can be found in the TSD.

TABLE V–1—CHANGE OF MOBILE SOURCE EMISSIONS IN 2023 MOVES3.01 SOURCES FROM 10.0 psi TO 9.0 psi RVP

State	Pollutant/precursor								
	VOCs (percent)	CO (percent)	NO_X (percent)	$PM_{2.5}$ (percent)	PM_{10} (percent)	Benzene (percent)	Toluene (percent)	Ethylbenzene (percent)	Xylene (percent)
Illinois	−0.9	−0.19	−0.05	0.09	0.10	−0.2	−1.5	−0.9	−0.9
Iowa	−1.8	−0.44	−0.09	0.14	0.15	−0.1	−3.3	−2.1	−2.1
Minnesota	−2.7	−0.52	−0.09	0.15	0.16	−1.3	−4.2	−3.0	−3.1
Missouri	−0.66	−0.41	−0.14	N/A	N/A	N/A	N/A	N/A	N/A
Nebraska	−2.6	−0.48	−0.09	0.17	0.18	−0.6	−4.4	−2.9	−3.0
Ohio	−1.6	−0.45	−0.13	0.30	0.32	0.08	−2.8	−2.0	−2.0
South Dakota	−2.9	−0.53	−0.06	0.08	0.08	−1.1	−4.8	−3.4	−3.3
Wisconsin	−1.7	−0.44	−0.10	0.21	0.22	−0.3	−2.7	−1.8	−1.8

As with the proposal, we have assessed the supporting documentation provided by the petitioning States and find that the MOVES modeling results submitted to EPA demonstrate a reduction in emissions of multiple pollutants (*e.g.,* VOCs, CO, and NO_X) that contribute to air pollution within each State upon removal of the 1-psi waiver for E10, as required under CAA section 211(h)(5).[27] We note that the same documentation also shows an increase in emissions of other pollutants such as PM. As discussed in Section III, we do not interpret the statute as requiring reductions in all pollutants. Documentation of air pollutant emissions reductions—particularly VOCs—is sufficient. While some commenters suggested that EPA should not focus on particular pollutants and ignore others, we instead conclude that demonstration of a decrease in VOC emissions is sufficient to satisfy the statutory requirements and justify granting the petitions.

Therefore, based on the Governors' petitions and the supporting documentation provided, we are removing the 1-psi waiver for E10 sold in the petitioning States and, as required by CAA section 211(h)(5), promulgating the 9.0 psi RVP standard contained in CAA section 211(h)(1) for the petitioning States. For the reasons discussed in Section VIII., such a change will be effective on April 28, 2025, given our determination of insufficient supply in 2023 and the renewal of that extension for one year based on a determination of insufficient supply in 2024.

[27] Evaporative emissions from gasoline—specifically VOCs—are precursors to the formation of tropospheric ozone and contribute to the nation's ground-level ozone problem. NO_X and CO can also be ozone precursors. Exposure to ground level ozone can reduce lung function (thereby aggravating asthma or other respiratory conditions), increase susceptibility to respiratory infection, and may contribute to premature death in people with heart and lung disease.

V. Fuel System Impacts

In this section, we discuss the potential impacts of removing the 1-psi waiver in the petitioning States on the fuel production and distribution system, including impacts that would potentially affect gasoline refineries, pipelines, fuel terminals, retail outlets, and, ultimately, consumers.[28] Significant portions of this discussion were provided in the proposal, and have now been updated based on additional information provided from commenters and discussions with industry. We received comment from ethanol interests suggesting that gasoline supply concerns were overstated and manageable, even for 2023. We also received comment and supporting analysis from refining and pipeline stakeholders expressing concern over the gasoline supply and resulting cost and price impacts in support of their requests to further delay implementation of the 1-psi waiver removal, as well as additional petitions requesting delay to 2025 or later. The discussion in this section is not specific to a particular year or determination of sufficiency of supply. Section VI provides our determination of insufficient supply for 2024.

In short, this action will require a lower-volatility conventional gasoline before oxygenate blending (CBOB)[29] to be produced by refineries and distributed by pipelines and terminals, resulting in a lower-volatility blended fuel ultimately sold at retail outlets in the petitioning States.[30]

We first note that volatility controls for gasoline differ across various States and regions within States. Summer gasoline for use in the continental U.S. must comply with either the Federal RVP standard of 9.0 psi or the more stringent RVP standard of 7.8 psi, unless the summer gasoline is either for use in an RFG covered area, is subject to California's gasoline regulations, or EPA has waived preemption and approved a State request to adopt a more stringent RVP standard into a State Implementation Plan (SIP). Most of the U.S. utilizes "conventional gasoline," for which the Federal RVP standard is 9.0 psi, with a 1.0 psi waiver for gasoline blended with 10 percent ethanol. There are also areas that utilize conventional gasoline for which the Federal RVP standard is 7.8 psi, and in such regions, the 1.0 psi waiver also applies for gasoline blended with 10 percent ethanol.[31] Several States have "boutique" low-RVP fuel programs or SIP programs[32] that allow the 1-psi waiver for gasoline blended with 10 percent ethanol.[33] Some boutique fuel programs, or SIP-approved fuel programs, however, disallow the 1-psi waiver for gasoline blended with 10 percent ethanol and in those areas, such gasoline must meet the applicable State RVP standard of either 9.0 psi, 7.8 psi, or 7.0 psi.[34] Additionally, approximately 30 percent of the

[28] Further detail on this topic is available in the TSD.

[29] Gasoline before oxygenate blending (BOB) means gasoline for which a gasoline manufacturer has accounted for oxygenate (*e.g.,* denatured fuel ethanol) added downstream. See 40 CFR 1090.90. BOB is subject to all requirements and standards that apply to gasoline under EPA's fuel quality regulations, and refineries typically formulate their BOBs with the intent that it will be blended downstream with ten percent ethanol content to maintain compliance with EPA and industry specifications. Conventional BOB (CBOB) is BOB produced or imported for areas outside of RFG areas otherwise known as conventional areas.

[30] Because the gasoline distribution system has been configured to utilize 10 percent ethanol and optimized to utilize the octane value of ethanol, we expect ethanol will be blended at least at the same levels it is blended today. Thus, we anticipate that E10 will continue to be the dominant form of gasoline supplied to the region, but will now be blended into a lower-volatility blendstock produced by refineries.

[31] 40 CFR 1090.215(a)(2) and (b)(1).

[32] Of particular note for this action, seven counties in southeast Michigan that border Ohio have an RVP standard of 7.0 psi in the summer, with a 1-psi waiver for E10.

[33] See *https://www.epa.gov/gasoline-standards/state-fuels.*

[34] 40 CFR 1090.215(b)(3). See also *https://www.epa.gov/gasoline-standards/state-fuels.*

gasoline sold in the U.S. is RFG, which must meet a 7.4 psi RVP standard.[35] The 1-psi waiver does not apply to RFG, and thus E10 that is sold in RFG areas must meet the 7.4 psi RVP standard. This action removes the 1-psi waiver only for conventional gasoline that is sold in the petitioning States and does not apply to gasoline sold in RFG or SIP program areas. However, due to the interconnected nature of gasoline distribution, and the changes required for a new fuel type, impacts on gasoline quality and supply are expected to extend beyond the petitioning States, as further described below.

Before discussing the various steps required to produce and distribute the new lower-volatility gasoline,[36] it is useful to describe the gasoline fuel supply system that is interdependent on its different parts to bring a fuel to market. The first step is fuel production, in which refineries refine crude oil using various processing units and then blend the various blendstocks together in finished gasoline tanks. The next step is fuel distribution, in which the gasoline in these tanks is transported through the fuel distribution system to the final market, mostly by pipelines.[37] These pipelines transport a wide variety of fuels and other products (*e.g.,* gasoline, diesel fuel, jet fuel, heating oil, petroleum blendstocks, etc.), including an array of different grades and types of gasoline (*e.g.,* conventional gasoline, RFG, boutique fuels, and regular and premium grades of each). Each grade and type of gasoline must be segregated from other grades and types to preserve the physical properties of each product. When a pipeline reaches a juncture where it branches out to two different pipelines serving different gasoline markets, a set of short-term storage tanks (''breakout tanks'') are necessary to offload the fuel from the upstream pipeline to enable scheduling the various fuels through the two downstream pipelines. Pipeline systems often have many branches from upstream to downstream pipelines to enable moving the fuel to the downstream markets, and breakout tanks serve an important function in the fuel distribution system. For example, there are approximately 110 breakout tank locations within the petitioning States alone. Pipeline transportation of gasoline to market also involves downstream product terminals and bulk plants, which accumulate gasoline from pipelines and other bulk distribution systems and distribute the gasoline to retail outlets via tank trucks loaded at terminal racks. Each rack can load a premium grade and regular grade gasoline, but some racks can load additional grades and types of gasoline.

To minimize other impacts and enable production and distribution of low-RVP gasoline, refiners and fuel distributors will need time to make capital investments to optimize the fuel production and distribution system to replace the gasoline solely in the petitioning States with low-RVP gasoline. Without capital investments, which can take two years or more to complete, the limited availability of additional storage tanks for the new low-RVP gasoline grades—particularly at pipeline breakout tank locations, but also at refineries and downstream terminals—may result in low-RVP gasoline being sold within both the petitioning States and the immediately adjacent non-petitioning States. This would increase the volume of low-RVP gasoline needed to be produced and distributed to satisfy demand. Over time, we expect refiners and fuel distributors to invest in and optimize the fuel production and distribution system to more efficiently target low-RVP gasoline solely to the petitioning States.

A. Production

Refiners will need to make modifications to their refinery operations to supply low-RVP gasoline. There are 11 petroleum refineries located within the petitioning States; that number increases to 40 when refineries located in States that border the petitioning States are included. Further, additional refineries outside of the immediate region may also modify their operations to provide low-RVP gasoline, as some of the gasoline supply for the petitioning States also historically comes from refineries located further west, east, and south, such as refineries in the Gulf Coast.[38] For example, gasoline sold in Iowa is often produced by refineries located in Texas and distributed via pipeline. Therefore, this action could result in changes in refinery operations both within and outside of the petitioning States and extend to refineries in the Gulf Coast. Prior to the implementation of this rule, most refineries producing gasoline for use in the petitioning States produce a CBOB with an RVP of 9.0 psi during the summer season, with the 1-psi waiver allowing the final gasoline-ethanol blend to meet an RVP standard of 10.0 psi when 10 percent ethanol is added to the CBOB downstream. With the removal of the 1-psi waiver and to enable the final gasoline-ethanol blend to comply with the resulting 9.0 psi RVP standard, refineries that choose to continue producing CBOB for use within the petitioning States will need to make changes to their operations to reduce the volatility of the CBOB distributed to these States to ~8.0 psi.[39] For most refineries operating within and near the petitioning States, removal of the 1-psi waiver will likely result in the refinery choosing to only produce low-RVP CBOB. Refineries operating outside the petitioning States will choose to either produce only low-RVP CBOB for distribution to the petitioning and adjacent States, continue to produce only the current ~9.0 psi RVP CBOB for distribution to areas outside the petitioning States, or both. The limited availability of existing blending/storage tanks at a refinery to handle both gasoline types may prevent the refinery from producing both blendstocks without further capital investment.[40] One commenter submitted a survey with data from refiners in and around petitioning States, which provided information regarding what refiners may have to do to meet the 9.0 psi RVP standard and is further discussed below.[41] Nevertheless, at this time, we cannot predict which of the refineries that currently produce fuel for use in the petitioning States will choose to produce low-RVP CBOB for use in the petitioning States and potentially the

[35] 40 CFR 1090.215(a)(3). The Chicago and St. Louis areas are such RFG areas.

[36] We refer to this new lower-volatility gasoline as ''low-RVP gasoline'' throughout this preamble.

[37] If all gasoline in the country was required to shift to low-RVP gasoline, the impacts would be limited to just refineries. The rest of the fuel distribution system would merely distribute the replacement low-RVP gasoline instead. However, since this action only applies to the eight petitioning states, a new additional type of gasoline is required for the distribution system to also handle.

[38] According to the Energy Information Administration (EIA), 64 million barrels of gasoline were shipped from Petroleum Administration for Defense District (PADD) 3 (Gulf Coast) into PADD 2 (Midwest), which corresponds to about 8 percent of the volume of gasoline consumed in PADD 2. EIA, ''Petroleum & Other Liquids; Movements by Pipeline, Tanker, Barge and Rail between PAD Districts; PADD 3 to PADD 2,'' *https://www.eia.gov/dnav/pet/pet_move_ptb_dc_R20-R30_mbbl_m.htm.*

[39] We refer to this new lower-volatility CBOB as ''low-RVP CBOB'' throughout this preamble.

[40] Certain areas within the petitioning states and other states already have more stringent RVP standards during the summer. Gasoline that refineries produce for these areas would be unaffected by this final rule. Refineries that produce 6.8 psi RVP CBOB for 7.8 psi RVP areas, or 6.4 psi RVP RBOB for RFG areas, could expand production of these gasoline types for use in the petitioning states rather than create a new gasoline type at 8.0 psi RVP. This may reduce distribution cost complexity, but in exchange increase refinery production cost and lower gasoline production volume.

[41] Comment submitted by the American Fuel and Petrochemical Manufacturers (AFPM), Docket Item No. EPA–HQ–OAR–2022–0513–0077.

surrounding States. Unlike a nationwide change to the RVP of CBOB, the regional nature of this action means that not all refineries must adjust their refining processes to reduce the RVP of their CBOB. While it is highly likely that refineries that supply gasoline only to the petitioning States will adjust their refinery processes to reduce the RVP of their CBOB, these refineries could choose to avoid the necessary investments and provide 9.0 psi RVP CBOB to non-petitioning States instead if they are able to reach those markets.

Throughout the year, refineries must adjust the volatility of their gasoline—typically lowering the volatility of the gasoline in the summer and increasing the volatility in the winter by adjusting the quantity of light hydrocarbons in their gasoline. Refineries typically control gasoline volatility by adjusting the amount of butane in gasoline, but sometimes they need to also modify the amount of pentane or natural gas liquids (NGLs). Refineries providing fuel to the petitioning States will have to modify their summer gasoline production operations and potentially add capital equipment to accommodate the 9.0 psi RVP standard. A refinery's ability to adapt to the 9.0 psi RVP standard and the time that it takes to do so depends on the refinery's structure, operations, and the mix of crude oil types that it processes.[42]

In addition to contributing to gasoline's volatility, butane also contributes to gasoline's octane and volume. Thus, when removing butane, refineries must also make other changes to replace the lost octane to keep the gasoline consistent and in compliance with EPA regulations and industry specifications. Refineries could produce more alkylate or reformate, which are two high octane gasoline blendstocks, to make up the lost octane. We estimate that the amount of butane that would have to be removed to produce a gasoline 1-psi lower in RVP amounts to about two volume percent of the volume of gasoline. However, comments from the refining industry described how at least some refineries would need to not only remove butane, but some less-volatile hydrocarbons as well (*e.g.,* light straight run naphtha (LSR) or NGLs). Since LSR and NGLs are less volatile than butane, refineries would need to remove significantly more of those hydrocarbons to realize the same 1-psi reduction in RVP, perhaps up to 10 volume percent. Such a change would have a smaller reduction in octane, however. Removing butane and these other light hydrocarbons from the summer gasoline sold in the petitioning States would reduce the supply of gasoline in those States.

Regardless of how a refinery is modified to reduce the RVP of its gasoline, it will result in additional output of the removed butane or other light hydrocarbons. If excess onsite butane storage capacity is available, the refinery has the option of saving excess butane on-site for use in winter gasoline production, which would minimize the cost impact of producing low-RVP CBOB. However, if excess butane storage is not available, the refinery would then need to store it offsite (*e.g.,* in caverns), sell it, or export it. This may require additional butane railcars and refinery upgrades for handling railcars to transport the butane. Refineries may also utilize some portion of the butane as a feedstock to their alkylation unit. In the near term, the large influx of excess butane may exceed the existing storage capacity, transport capacity, amount desired in the markets, or alkylation unit capacity. Without an outlet for the excess butane, this could then limit the refinery's ability to produce low-RVP CBOB, further reducing the supply of low-RVP gasoline. If a refinery is removing LSR or NGLs from its gasoline, these gasoline blendstocks could be sold to another refinery that could blend them into its gasoline, but the purchasing refinery would then need to remove butane to compensate for the RVP impact of the LSR or NGLs. This gasoline blendstock switching would help to offset the volume reductions associated with producing low-RVP CBOB.

Given the high demand for gasoline in the summer months, refineries often begin producing summer gasoline for storage well ahead of the upcoming high ozone season. This process can begin as early as December of the year prior to the applicable high ozone season, and thus storage of a differing volatility of fuel could impact the refinery's ability to utilize the fuel the next summer without further modification.

B. Distribution

As discussed above, removal of the 1-psi waiver will require refineries that distribute gasoline to the petitioning States to produce low-RVP CBOB. There are three primary groups within the distribution chain that will be impacted: refineries, pipelines (with their breakout terminals), and downstream product terminals.

1. Refinery Distribution

Most refineries have an onsite terminal with numerous product storage tanks wherein they accumulate and store the range of products that they produce prior to placing the products into the distribution system. Once a refinery accumulates a sufficient volume of a gasoline type and confirms that it meets the applicable gasoline specifications, the refinery then schedules the shipment of that batch of gasoline to downstream markets. Shipment can occur via an onsite product terminal analogous to that discussed in Section V.B.3 where trucks load product and deliver to retail outlets. However, most gasoline produced by refineries is loaded onto product pipelines for delivery to downstream product terminals. In some cases, refineries also distribute product by rail or barge. For those refineries that distribute most or all of their gasoline to the petitioning States, removal of the 1-psi waiver will have little impact on their distribution operations. They can switch over their existing product tanks to hold only low-RVP CBOB. Instead of transitioning from winter CBOB RVP levels (up to 15 psi) to a 9.0 psi RVP CBOB in the summer, they would instead transition to low-RVP CBOB. However, refineries that produce gasoline for both petitioning and non-petitioning States will likely need additional tanks, pipes, manifolds, and control systems to store the additional grades of gasoline. The time needed to plan, design, permit, and construct additional tankage is typically on the order of two or more years. Until this can be accomplished, a refinery that lacks the additional tankage will likely need to shift all its production to low-RVP CBOB. However, this can be avoided if unused systems already exist or other products are discontinued.[43] The market may go through a ''sorting out'' process, wherein some refineries shift their historic markets, with some changing to producing only low-RVP CBOB and others continuing to produce only 9.0 psi RVP CBOB. This could result in some low-RVP CBOB flowing in from outside the petitioning States (*e.g.,* from Gulf Coast refineries). Due to tankage and logistical limitations, some refineries serving both markets may initially shift all their production to low-RVP CBOB. This would result in low-RVP CBOB being distributed to the surrounding States, which would ease gasoline supply availability concerns,

[42] Further discussion of the changes we expect from refineries associated with removal of the 1-psi waiver is available in the TSD.

[43] Alternatively, some refineries may shift all premium grade fuel to low-RVP CBOB, while producing both 9.0 psi and low-RVP CBOBs for regular grade fuel.

but at the same time add to the overall reduction of gasoline supply due to butane and other light hydrocarbon removal. Terminals servicing low-RVP CBOB outside the petitioning States that have butane blending facilities could purchase some of the excess butane being removed by refineries and inject it into their CBOB to bring the fuel up to 9.0 psi RVP since the gasoline in their area would not require the low-RVP fuel.

For those refineries that have excess tankage or invest in new tankage to allow the production of both 9.0 psi and low-RVP CBOB, they would also need to adjust their operations and schedules for loading gasoline blendstock onto pipelines, barges, or rail to split their production into separate product streams. These logistical changes would initially take some period of time in order to occur smoothly and safely, but should streamline over time.

2. Pipelines and Pipeline Breakout Terminals

Most fuel in the U.S. flows from refineries to consumer markets via pipeline systems. As described in the TSD, there are several pipeline systems serving the petitioning States, the vast majority of which serve both petitioning and non-petitioning States. Consequently, the addition of the low-RVP CBOB in the petitioning States will require significant changes in the operations of the pipeline systems. What is currently one large conventional fuel market distributing primarily 9.0 psi RVP CBOB will also need to distribute the new low-RVP CBOB. There will thus be a period where the pipeline systems go through a planning and optimization process to assess what gasoline type must be supplied to the pipeline to comply with the new fuel requirement. If a pipeline primarily serving the petitioning States is only equipped with breakout tanks compatible with a single gasoline type, the pipeline company will likely mandate that refiners solely provide that gasoline type. Decisions from refineries on whether they will supply low-RVP CBOB, and at what volumes, will be necessary to inform the planning and optimization process by pipeline systems. All of this can have impacts on gasoline supply not only to the petitioning States, but also to the surrounding States in the short term. Having the wrong fuel types in the wrong volume can result in an inability for the pipeline to move fuel in and out of tankage as needed, which, in turn, can result in significant supply disruption not only for the gasoline type in question, but also for all the fuels shipped on the pipeline. For the longer term, due to the market splitting into different types, some areas in the petitioning States may lose access to available markets of supply, which may then lead to more frequent shortfalls in supply during times of disruption (*e.g.,* refinery fire, pipeline outage, hurricane, etc.).

Some pipeline companies operate a fungible distribution system. This allows them to collect a standard type of gasoline from refineries into their system, ''transport'' the barrels virtually, and draw out identical barrels at their destination. The barrels delivered are not actually the purchased barrels from the refinery, but rather the same product from a different refinery meeting the same product specifications. An additional type of gasoline would disrupt their ability to function as efficiently using the fungible system. This increases the complexity associated with ensuring products can be distributed to locations in the timeframe needed to ensure supply to the market.

The most significant impact on pipeline operations caused by the removal of the 1-psi waiver, however, will be on pipeline breakout tankage operations. Breakout tankage is required at junctions where pipelines connect with other pipelines that have differing schedules and flow rates. Thus, the pipelines typically need tankage to store every grade and type of product distributed on the pipeline, with the size and configuration of the tankage matched to the product and pipeline batch sizes. If new regular and premium grades of low-RVP CBOB need to be shipped on the pipeline, then it may require the addition of new tankage at these breakout tank facilities. The planning, permitting, and construction of such additional tankage would require two or more years and is likely to be an issue at many breakout tankage facilities both inside and outside the petitioning States. Until this additional breakout tankage can be brought into service, an impacted pipeline serving the petitioning States may be restricted to solely distributing either 9.0 psi or low-RVP CBOB, limiting gasoline supply to either the petitioning States or the surrounding States, and in turn restricting what the refineries shipping on the pipeline are able to produce if the pipeline restrictions do not allow for the distribution of a particular type of gasoline. Some pipelines may opt to carry one fuel type and some the other, limiting the product offerings at the various downstream product terminals. As with the refineries, it may be that due to tankage and logistical limitations, pipelines currently serving both petitioning and non-petitioning States will have to initially shift all the gasoline they carry to low-RVP CBOB, which is fungible in both markets. This will result in low-RVP CBOB being supplied in the surrounding States and additional reduction in supply of gasoline due to the necessary removal of butane and other light hydrocarbons. Pipelines would have the option to blend in butane during gasoline transport to the States with the 1-psi waiver that are located at the end of the pipeline systems (*e.g.,* North Dakota and Michigan). This would provide a market for some of the excess butane from refineries producing low-RVP CBOB and could reduce consumer costs in the border States by blending up to 9.0 psi RVP CBOB. It could also allow more low-RVP CBOB to be produced if there are constraints in the markets for butane. However, like refineries, many pipeline and terminal facilities do not currently have the existing infrastructure to utilize butane blending. Additional tankage and equipment may be needed to maximize the potential of this opportunity.

3. Product Terminals

The potential impact of the removal of the 1-psi waiver on product terminals varies depending on whether the terminals provide gasoline only to the petitioning States, or to non-petitioning States as well. Those terminals that only provide gasoline to the petitioning States will be little impacted, as they will simply take delivery of replacement grades of low-RVP CBOB beginning in the spring leading into the summer season. They will not have to contend with adding additional fuel grades and types and the tankage and logistics associated with them. This will most likely not be the case for terminals that serve areas both within and outside the petitioning States. If such terminals do not have sufficient onsite tankage capacity to handle the additional regular and premium grades of low-RVP CBOB, then they will need to either add the tankage or choose to serve one market or the other. The decision to serve a particular market or fuel type may also be dictated by a fuel marketer on the retail side. Both options could have gasoline supply, cost, and price impacts both within the petitioning States and in the surrounding areas the terminals serve. Approximately 75 such terminals are located close to the borders (*i.e.,* 30 miles) between petitioning States and

non-petitioning States.[44] These terminals are more likely to provide gasoline to both petitioning and non-petitioning States and will need to change their gasoline distribution patterns if they lack extra tankage to handle the additional low-RVP CBOB grades. Since terminals can serve gasoline markets up to 200 miles away, the number of terminals impacted could be significantly greater. If limitations in the fuel distribution system cause low-RVP CBOB to be sold in a significant portion of the surrounding States to improve fungibility of gasoline near the petitioning States, the potential impact on terminals will be reduced.

Regardless of whether a terminal serves only the petitioning States, or also non-petitioning States, all terminals will be impacted to some degree by a somewhat more challenging transition in the spring from winter to summer fuel due to the removal of the 1-psi waiver, particularly in the first year. While this transition occurs every year as the terminals blend down the volatility of the CBOB they have in storage from the higher RVP of winter CBOB to the lower RVP of summer CBOB, the change of having to blend down an additional 1.0 psi to accommodate low-RVP CBOB instead of 9.0 psi RVP CBOB will require some additional time and incur additional cost. In order to achieve the volatility of low-RVP CBOB, pipelines and terminals will likely need to blend down their winter CBOB with a summer CBOB that has an RVP as low as 6.0 psi during this transition period. Additionally, terminals will likely take steps to ensure their tanks are drained as low as possible prior to receiving a low-RVP CBOB to ensure the finished gasoline will comply with the 9.0 psi RVP standard, which could result in additional delays before the low-RVP CBOB begins moving to markets. This will likely occur more frequently at terminals located within and near the border of the petitioning States.

4. Tank Trucks

Moving gasoline to market also involves tank trucks that deliver the gasoline to retail outlets. For terminals located within the petitioning States, their operations should be little impacted by the removal of the 1-psi waiver; they will simply pick up a different type of gasoline from the product terminal than they did before and can transport it to market, even outside the petitioning States if the terminal normally covers the area. However, depending on the changes in product offering at the terminals, there may still be considerable stress on their operations. If some refineries, pipelines, or terminals limit their product offering to either 9.0 psi or low-RVP CBOB, especially in the near term, then the tank trucks would need to shift their operations accordingly. In some cases where there is a loss of fuel fungibility, this is expected to increase the distances traveled, which may in turn require the purchase of additional tank trucks and hiring of additional drivers. As with the rest of the fuel distribution system, this can all be accomplished, but will take some time for the market to respond and optimize around the new norms.

C. Retail Operations

The removal of the 1-psi waiver and resulting transition from 10.0 psi RVP gasoline to 9.0 psi RVP gasoline received from the terminal should be minor for retail outlets—they will simply take delivery of the lower-volatility gasoline from the terminal. The most noticeable effects will be seen at retail outlets near the borders of States maintaining the 1-psi waiver, as the cost of 9.0 psi RVP gasoline within the petitioning States is likely to be higher than that of 10.0 psi RVP gasoline across the border in non-petitioning States. Retailers within the petitioning States may have to charge higher prices to recoup this cost, which could result in consumers preferentially choosing to refill at stations across the border when possible.[45] Retail operations located near State lines on the border of petitioning and non-petitioning States may have issues scheduling gasoline shipments to their retail outlets if tank trucks are shipping their gasoline from terminals located further away and if there is an initial shortage of tank truck operators, particularly at the beginning of the transition to the new 9.0 psi RVP gasoline. As with the rest of the distribution system, this can all be accomplished, but will take some time for the market to respond and optimize around the new norms.

VI. Implementation and Effective Date

A. Statutory Provisions

Under CAA section 211(h)(5)(C), the regulations removing the 1-psi waiver shall take effect on the later of: (1) The first day of the first high ozone season for the area that begins after the date of receipt of the notification; or (2) 1 year after the date of receipt of the notification. The high ozone season is defined in EPA's regulations as ''June 1 through September 15 for retailers and [wholesale purchaser consumers (WPCs)], and May 1 through September 15 for all other persons,'' which includes gasoline distribution terminals.[46]

In applying this provision for the petition dated April 28, 2022, the later date is April 28, 2023. Therefore, the earliest date on which the removal of the 1-psi waiver for Illinois, Iowa, Nebraska, Minnesota, South Dakota, and Wisconsin could have been effective was April 28, 2023. This date would have been in advance of the high ozone season beginning May 1, 2023. For the petition from Ohio, dated June 10, 2022, the later date is June 10, 2023. This would have placed the effective date within the 2023 high ozone season (*i.e.,* 10 days after the beginning of the high ozone season for retailers and WPCs, and 41 days after the beginning of the high ozone season for all other parties). Finally, for the petition from Missouri, dated December 21, 2022, the later date is December 21, 2023.[47] This would have placed the effective date after the 2023 high ozone season.

Further, under CAA section 211(h)(5)(C), the effective date can be extended if EPA, on its own motion or on petition from any person, after consultation with the Secretary of Energy, determines there would be an insufficient supply of gasoline in a State that has requested the removal of the 1-psi waiver for E10.[48] Section 211(h)(5)(C) further provides that the effective date can be extended for not more than one year, and that EPA may renew the extension for two additional periods, each of which shall not exceed one year.

As described above, EPA is allowed to extend the effective date of the removal of the 1-psi waiver upon a finding of ''insufficient supply of gasoline in the [petitioning] state'' that would result from ''the promulgation of the regulations [to remove the 1-psi waiver].'' [49] ''Insufficient supply of gasoline'' is not defined in the statute, and thus EPA is interpreting and applying the phrase in a manner that is consistent with the structure of the statute, historical application of similar

[44] EIA, U.S. Energy Atlas—Oil and Natural Gas Maps, *https://www.eia.gov/maps.*

[45] This phenomenon is observed today in SIP and RFG areas.

[46] 40 CFR 1090.80. We note that given the current definition of ''high ozone season,'' the later date will always be one year after receipt of the request from a Governor.

[47] We recognize that the Missouri petition requested that the removal take effect for the 2023 high ozone season. However, such an effective date was not permissible under CAA section 211(h)(5)(C).

[48] CAA section 211(h)(5)(C)(ii).

[49] CAA section 211(h)(5)(C).

or related provisions, and congressional intent. We interpret ''insufficient supply of gasoline'' to require a demonstration that gasoline supply disruptions would result from removal of the 1-psi waiver, such that the necessary quantities of gasoline may not be available in the States at the time they are required. It is particularly appropriate in this case to consider the possibility of supply disruptions because this action calls for a different type of gasoline to be physically produced and transported to and within the petitioning States. CAA section 211(h)(5) also indicates that our analysis of ''insufficient supply'' should be ''in the State'' petitioning for the removal of the 1-psi waiver. That is, if there was insufficient supply only in a single State, we could extend the effective date for that State only. This contrasts with CAA section 211(c)(4)(C)(iii)(I), which calls for consideration of supply constraints in ''the smallest geographic area.'' Therefore, our analysis properly considers any state-specific factors, and examines the supply in the State.

In considering the likelihood of supply disruptions, we look to the entire production and distribution chain, from the refineries where gasoline is produced, through distribution systems such as pipelines and trucking, and ultimately to the retail outlets. This reading is also similar to EPA's interpretation of other provisions in CAA section 211 that call for consideration of constraints on fuel supply when EPA is acting on petitions within the fuels program. For instance, CAA section 211(k)(6)(A)(ii) allows EPA, after consultation with the Department of Energy, to extend the effective date for a State that has petitioned to opt into the RFG program for a period that is up to one year from the date of receipt of the petition upon a finding of insufficient domestic capacity to produce RFG. A related provision in CAA section 211(k)(6)(B)(iii) allows EPA to extend the effective date for areas within the ozone transport region established under CAA section 184 that opt into RFG, upon a finding of insufficient capacity to supply RFG. Like the phrase ''insufficient supply of gasoline'' in CAA section 211(h)(5)(C), the statute does not define either ''insufficient domestic capacity'' or ''insufficient capacity to supply RFG.'' But in acting on petitions to opt into the RFG program, EPA has explained that setting the effective date allows EPA to consider any sudden and unexpected increases in the demand for RFG on the local supply and distribution system that is caused by an opt-in.[50]

EPA's reading of ''adequate supply'' in CAA section 211(c)(4)(C)(ii) comports with our interpretation of CAA section 211(h)(5)(C) given that Congress intended for EPA to act in certain unique emergency circumstances to relieve supply disruptions within the ''motor fuel distribution system.'' [51] And while ''motor fuel distribution system'' is not defined in the statute, EPA's historical practice in granting waivers under CAA section 211(c)(4)(C)(ii) has been to consider all stages of the gasoline production and distribution system within States that are experiencing emergency circumstances.

In contrast, the phrase ''insufficient supply of gasoline'' differs from other sub-provisions of CAA section 211 allowing for waivers of applicable requirements as well as implementation delays that use language such as ''inadequate domestic supply.'' [52] The D.C. Circuit has provided guidance on the meaning of ''inadequate domestic supply'' in CAA section 211(o)(7)(A)(ii), finding that EPA may properly consider ''supply side factors—such as production and import capacity,'' but not downstream effects.[53] The court, in viewing the statutory scheme of the RFS program, further specified that the supply of renewable fuel to refiners, blenders, and importers properly considers the factors necessary to get renewable fuel to refiners, blenders, and importers, but not to market actors ''downstream from refiners, importers, and blenders.'' We find that the analysis under CAA section 211(h)(5) extends to include market actors downstream from refiners, importers, and blenders, as the gasoline distribution system is a key component to the availability of gasoline in the State.[54] The analysis properly considers production factors, as well as the distribution of fuel from the refinery, through the distribution chain (including pipelines and terminals) to the ultimate endpoint of the gasoline distribution chain—the retail outlet. Further, CAA section 211(h)(5) explicitly contemplates the ''supply of gasoline in the State.''

Finally, we note that consideration of the effective date for this action properly considers supply to the ultimate consumer given the statutory language ''in the State.'' Therefore, our analysis of ''insufficient supply of gasoline'' properly considers all stages of the gasoline production and distribution system, from the refinery to the retail outlet.

B. Finding of Insufficient Supply for 2024 and Renewal of Extension of Effective Date

CAA section 211(h)(5)(C)(ii)(I) requires a determination of insufficient supply of gasoline in order to extend the effective date of the removal of the 1-psi waiver. We determined that a 2023 implementation date would result in insufficient supply of gasoline and proposed an effective date of April 28, 2024, for removal of the 1-psi waiver in all petitioning States.[55] We also sought comment on renewing the extension of the effective date for removal of the 1-psi waiver for an additional year (*i.e.,* until the summer of 2025).[56] We received comments for and against the proposed effective date. Commenters against the proposed dates argued that we could still implement the rule for the 2023 summer season, despite the mere two weeks between the end of the comment period and the beginning of the 2023 summer season for terminals and refiners. Commenters in support of the proposed delay argued that a 2023 effective date would be either ''impractical'' or ''impossible.''

Further, in response to and after the proposal, we received petitions from numerous stakeholders requesting a delay of the proposed effective date until either 2025 or 2026. These stakeholders posited that the extension of the effective date would be supported by the Administrator's finding of insufficient supply of gasoline pursuant to CAA section 211(h)(5)(C)(ii)(I).[57]

[50] 62 FR 30261, 30263 (June 3, 1997) (''Section 211(k)(6)(A) of the Act gives the Administrator discretion to 'establish an effective date * * * as he deems appropriate* * *.' EPA interprets this provision to mean that it has broad discretion to consider any factors reasonably relevant to the timing of the effective date. This would include factors that affect industry and the potential opt-in area. The factors that affect industry could include productive capacity and capability, other markets for RFG, oxygenate supply, cost, lead time, supply logistics for the area, potential price spikes, and potential disruption to business.'')

[51] CAA section 211(c)(4)(C)(iii)(V).

[52] CAA sections 211(m)(3)(C) and (o)(7)(A)(ii).

[53] *Americans for Clean Energy* v. *EPA,* 864 F.3d 691, 710 (2017).

[54] CAA section 211(h)(5)(C) explicitly contemplates the ''supply of gasoline in the State.''

[55] At proposal, we further explained that the effective date for Ohio, would have been within the 2023 high ozone season (*i.e.,* 10 days after the beginning of the high ozone season for retailers and WPCs, and 41 days after the beginning of the high ozone season for all other parties), while the effective date for Missouri would have been December 21, 2023, or after the 2023 high ozone season. 88 FR 13762 (March 6, 2023).

[56] 88 FR 13767 (March 6, 2023).

[57] Petition from Magellan (September 16, 2022); Petition from API (September 23, 2022); Petition from Flint Hills Resources (September 29, 2022); Petition from Phillips 66 (September 29, 2022); Petition from AFPM and other parties (October 14, 2022); Petition from HF Sinclair (October 17, 2022);

Continued

After consideration of comments and extension petitions, EPA is acting on its own motion to renew the extension of the proposed effective date for an additional year from April 28, 2024, to April 28, 2025. In sum, the circumstances that justified a finding of insufficient supply of gasoline and extension of the effective date for 2023 have not attenuated. Additionally, we have consulted with the Department of Energy, consistent with the CAA section 211(h)(5)(C)(ii)(I). We are not acting on petitions that requested a 2026 effective date, and these petitions remain pending. In this section we discuss our finding that there would be an insufficient supply of gasoline in 2024.

At proposal, we provided the rationale for our determination of insufficient supply for 2023; we assessed the following three supply constraints: (1) Low gasoline inventories; (2) The limited time available for coordination between various parties to make the necessary physical changes to the gasoline production and distribution infrastructure; and (3) The physical loss of supply necessary to produce low-RVP CBOB. We determined that these constraints would likely have led to supply disruptions in the petitioning States in 2023.[58]

We have now assessed gasoline supply impacts associated with an effective date in 2024 and updated our analyses of these supply constraints.[59] As discussed further in detail below and in the TSD, our updated analyses found: (1) Continued low gasoline inventories in PADD 2; (2) The limited time available after the promulgation of this action for coordination between various parties to make the necessary physical changes to the gasoline production and distribution infrastructure; and (3) Greater reduction in supply as a result of the removal of the 1-psi waiver than estimated at the time of the proposal. We also considered the following: (1) The lack of sufficient time to make the capital investments and physical changes to refineries and the fuel distribution system; and (2) Less flexibility within the fuel distribution system than had been anticipated to adequately mitigate the supply reduction until such time as the capital and physical changes can be made. We are therefore renewing the extension of the delay of the effective date for an additional year to April 28, 2025.

Since proposal, we have conducted an updated analysis to quantify the reduction in gasoline supply that would result from the removal of the 1-psi waiver. At proposal, we estimated the reduction in supply as 20 thousand barrels per day (kbpd) based on the removal of light hydrocarbons—mostly butane—to reduce the volatility of CBOB.[60] In response to our proposal, AFPM commissioned a study of supply reductions that quantified the reduction in gasoline supply at 88–120 kbpd.[61] We also conducted a series of meetings with refiners regarding the supply impacts associated with the removal of the 1-psi waiver in the petitioning States.[62] As further described in the TSD, based on our discussions with refiners and our review of the comments, we now estimate that gasoline production by refineries supplying gasoline to the petitioning States would likely decrease by 30–80 kbpd as a result of the transition to low-RVP CBOB. Our estimate increased from the proposal primarily because a significant number of refineries that choose to produce low-RVP CBOB will need to reduce other less-volatile hydrocarbons (*e.g.,* NGLs), which will have a larger impact on gasoline supply. On average, refineries producing low-RVP CBOB are estimated to produce 3–4 percent less gasoline compared to producing 9.0 psi RVP CBOB, particularly when removal of the 1-psi waiver is first implemented. We acknowledge that the possibility of drawing down gasoline inventories, increasing gasoline supply from other regions (*e.g.,* Gulf Coast), and reblending some higher-volatility gasoline blendstocks at terminals in non-petitioning States could mitigate the supply reduction to some extent. However, we believe that these mitigating actions would fall far short of offsetting the projected supply reductions for the 2024 summer season.

Further, at proposal we noted that while the gasoline inventories in PADD 2 (the affected region) was low, we believed that it would likely return closer to historic levels due to the previously shut-down Midwest refineries returning to operation. However, even though these refineries have since come back online—increasing gasoline production in the region—the gasoline inventories in PADD 2[63] have continued to be at levels of concern.[64] Furthermore, we have been made aware of the fact that refiners have had a heavy maintenance season at their refineries in the fall of 2023 and are planning a heavy maintenance season for the first quarter of 2024. This means that gasoline production capacity will be taken offline for several months at a key time during the winter season when gasoline inventories are typically replenished prior to the next summer season.[65] Additionally, gasoline demand is still expected to increase. EIA estimates that national gasoline demand will increase by 60 kbpd in 2024 compared to 2023, further straining gasoline inventories and supply.[66] Thus, we anticipate that gasoline inventories in PADD 2 will not recover sufficiently by the 2024 summer season to alleviate the estimated loss of gasoline supply that would occur when low-RVP CBOB is produced. Further, due to a separate and unrelated regulatory action, the prohibition on sale of conventional gasoline in the Denver metropolitan area began on November 7, 2023. This means that

Petition from Magellan (August 19, 2023); Petition from Kevin Stitt, Governor of Oklahoma (August 25, 2023); Petition from API (September 29, 2023); Petition from AFPM (September 29, 2023); Petition from Sarah Huckabee Sanders, Governor of Arkansas (October 9, 2023); Petition from Superior Refining (October 13, 2023); Petition from Phillips 66 (October 18, 2023); Petition from CountryMark (October 25, 2023); Petition from Yesway (November 1, 2023); Petition from HF Sinclair (November 15, 2023).

[58] Our detailed finding of insufficient supply for 2023 can be found at 88 FR 13767 (March 6, 2023).

[59] EPA also received several petitions for further delay beyond 2024. See Petition from Magellan (August 25, 2023); Petition from Kevin Stitt, Governor of Oklahoma (August 25, 2023); Petition from API (September 29, 2023); Petition from AFPM (September 29, 2023); Petition from Sarah Huckabee Sanders, Governor of Arkansas (October 9, 2023); Petition from Superior Refining (October 13, 2023); Petition from Phillips 66 (October 18, 2023); Petition from CountryMark (October 25, 2023); Petition from Yesway (November 1, 2023); Petition from HF Sinclair (November 15, 2023).

[60] "Technical Support Document for the Proposed Removal of the 1-psi Waiver," available in the docket for this action.

[61] Baker and O'Brien, "Midwest States Gasoline RVP—1 psi Waiver Study, Report for American Fuel and Petrochemical Manufacturers," February 24, 2023. Submitted as part of comments from AFPM, Docket Item No. EPA–HQ–OAR–2022–0513–0077.

[62] Memorandum to the Docket: Meeting Log for Requests from States to Remove the Gasoline Volatility Waiver.

[63] Low gasoline inventories in PADD 2 were an additional bases for the emergency fuel waivers issued under CAA section 211(c)(4)(C)(ii)(I) during the summer of 2023. See Letter from EPA Administrator to Governors, "May 1, 2023, E15 Reid Vapor Pressure Fuel Waiver," April 28, 2023 ("The Midwest region—the region that has the most ability to increase supply with blending an increased percentage of ethanol—has gasoline stocks below the five-year seasonal average for this time of year.").

[64] Based on our discussions with EIA, gasoline supply begins to be a concern when gasoline inventories drop below the 5-year minimum for any particular PADD.

[65] Bloomberg News, "Nearly 2.5 Million Barrels a Day of US Refining Capacity to Shut for Fall Maintenance," October 2, 2023, *https://www.bnnbloomberg.ca/nearly-2-5-million-barrels-a-day-of-us-refining-capacity-to-shut-for-fall-maintenance-1.1979186.*

[66] EIA, Annual Energy Outlook (AEO) 2023, Table 11, *https://www.eia.gov/outlooks/aeo.* AEO 2023 also estimates that gasoline demand will decrease by 140 kbpd in 2025 relative to 2024.

gasoline sold in that area must comply with a 7.4 psi RVP requirement beginning with the 2024 summer season.[67] This is expected to cause an additional 5–10 kbpd reduction in gasoline supply in the same 2024 summer season. Although Denver is not in a petitioning State, some gasoline is currently supplied to this region from refineries that also produce gasoline for the petitioning States, resulting in additional strain on gasoline supply in the region.

As also described in Section V and the TSD, capital investments will be necessary for some refiners and fuel distributors to accommodate a transition to low-RVP CBOB in the petitioning States. This includes investments for the storage of additional gasoline types and grades, storage of excess butane and LSR, and associated measures for piping, pumping, and spill containment. We also anticipate that refineries would need to debottleneck debutanizers and octane-producing units to enable the production of low-RVP CBOB.[68] These capital investments typically require time to come online. For example, projects to debottleneck existing refinery units typically require 2–2.5 years to engineer, design, purchase, permit and install. Under an assumption that refiners and fuel distributors could have begun the planning process for debottlenecking a refinery unit or installing a gasoline storage tank after the first State filed its petition in April 2022, or after EPA proposed to remove the 1-psi waiver in the petitioning States in early 2023, there would be insufficient time prior to the summer of 2024 to complete the desired capital additions. However, based on discussions with refiners, pipeline operators, and terminal operators, as well as public comments, many of the needed capital investments were not initiated in 2022 due in part to: (1) The uncertainty created by several States rescinding their petitions during 2022; (2) The emergency fuel waivers under CAA section 211(c)(4)(C)(ii)(I) extending the 1-psi RVP waiver to E15 during the 2023 summer season;[69] and (3) Potential congressional action that would extend the 1-psi waiver to E15 nationwide.[70] Without initiation in 2022, many of the necessary capital investments are unlikely to be completed by the summer of 2024.

In addition, supplying the new low-RVP CBOB will require coordinated investments, planning, and actions between refineries, pipelines and other fuel distribution companies, terminals, and retail outlets. Typically, this coordination occurs before winter to provide the fuel production and distribution system a chance to make the proper preparations; we are now past the point in the calendar when such coordination typically occurs. We are also entering into the timeframe when most refineries have already started producing summer gasoline. As such, refineries will not have sufficient and appropriate notice to begin modifying their fuel supply for the summer of 2024.

Finally, we assumed at proposal that flexibility within the fuel production and distribution system could allow refiners and fuel distributors to mitigate the projected 2024 summer season supply reduction until such time as capital and physical changes could be completed. However, based on subsequent comment and analysis, we now believe that the existing flexibility would not be sufficient, particularly in light of the larger anticipated supply reduction and lingering low gasoline inventories in PADD 2.

For the above-mentioned reasons, supported by additional detail and analysis in the TSD, we are making a determination that there will be an insufficient supply of gasoline in the petitioning States in the 2024 summer season and, therefore, are renewing the extension of the effective date of the removal of the 1-psi waiver by an additional year to April 28, 2025.[71]

VII. Cost and Price Impacts

There are associated costs with the changes to the refining and gasoline distribution systems described in Sections V and VI. Part of the costs will be incurred by the refining sector, while another portion will be incurred by the gasoline distribution system. Gasoline refining costs will increase due to several factors, the largest portion of which is the lost opportunity cost for refiners having to sell the removed light hydrocarbon material at lower market prices instead of blending this material into high value summer gasoline. To the extent that refiners and distributers install capital equipment, there are also additional capital and associated operating costs that will need to be recouped over time. These costs will be passed along to consumers in the petitioning and surrounding States in the form of higher gasoline prices.

With respect to consumer fuel prices, while fuel prices generally reflect fuel costs in the competitive gasoline market, this may not be the case when removal of the 1-psi waiver is first implemented, as gasoline supply will be reduced and not yet recovered. Due to the reduced supply, there will likely be a reduction in PADD 2 gasoline inventories, which could further increase gasoline prices. Due to the challenges that some refiners may have in producing low-RVP CBOB and the associated impacts on gasoline inventories, fuel prices will likely exceed fuel costs because the marginal cost producer will set the fuel price. This will likely affect gasoline prices in both petitioning and non-petitioning States and result in higher gasoline prices at the pump for consumers. The potential cost and price impacts due to the removal of the 1-psi waiver are discussed in more detail in the TSD.

As discussed above, under the relevant CAA provisions, upon receiving a petition from a State Governor that is accompanied by a successful demonstration of emissions increases as a result of the 1-psi waiver, EPA is required to remove the 1-psi waiver in the areas requested by the Governor. In deciding whether to grant the petition, the statute does not provide EPA with the authority to consider fuel cost or price impacts and we assume that any fuel cost or price impacts to consumers were taken into consideration by the Governors of the petitioning States in submitting their petitions. Therefore, regardless of the magnitude of the impact of this action on fuel costs or prices, EPA has not considered them in this action.

VIII. Associated Regulatory Provisions

In the NPRM, we proposed changes to the fuel quality regulations at 40 CFR part 1090 to implement the removal of the 1-psi waiver in the petitioning States. Specifically, we proposed to include new designation and associated product transfer document (PTD) language requirements and a regulatory

[67] 87 FR 60926, 60932–33 (October 7, 2022).

[68] Capital grassroots projects typically require 3–4 years to engineer, design, purchase, permit and install. Smaller projects that can "debottleneck" individual refinery units (*e.g.*, replacing a furnace, heat exchanger, or reactor) typically require 2–2.5 years to complete, while much smaller projects (*e.g.*, replacing a valve or pump or adding or increasing the size of piping) may be designed and completed in a year or less. These types of capital investments can help a refinery produce additional low-RVP CBOB. Shell, "Thriving in the new reality: Refinery revamp projects FAQ; Shell Catalysts and Technologies," *https://www.shell.com/business-customers/catalysts-technologies/resources-library/refinery-revamp-faq.html.*

[69] From April 28, 2023, to August 28, 2023, EPA issued a waiver under CAA section 211(c)(4)(C)(ii)(I) that facilitated E15 sales during the summer of 2023.

[70] See, *e.g.*, comments from Magellan (Docket Item No. EPA–HQ–OAR–2022–0513–0042), API (Docket Item No. EPA–HQ–OAR–2022–0513–0056), and HF Sinclair (Docket Item No. EPA–HQ–OAR–2022–0513–0076).

[71] Discussion of the supply circumstances in the summer of 2025 is available in TSD Section 7.

mechanism for States to request the reinstatement of the 1-psi waiver under CAA section 211(h)(5). We are finalizing these changes as proposed, and we respond to comments received on the proposed regulatory changes in the RTC document.

A. New Designation and Associated PTD Language

We are finalizing as proposed a new designation and associated PTD language for summer CBOB in States where the 1-psi waiver for E10 has been removed under CAA section 211(h)(5).[72] Designations and PTD language requirements help ensure that batches of fuel are distributed and used in a manner consistent with EPA's fuel quality requirements. Without proper designation, summer gasolines with different volatilities intended for use in different areas may get commingled in a fungible system, causing the introduction and use of non-compliant gasoline in areas that require lower-volatility fuels in the summer. Similarly, PTD language serves to ensure that parties in the fuel distribution chain are aware of the designation of the fuel and accompanying Federal requirements for the distribution and use of the fuel. Because we are finalizing requirements for a new type of summer CBOB in this action, we need to create a new designation and accompanying PTD language to ensure that the new CBOB is distributed and used consistent with the RVP requirements.

In this action, we are requiring gasoline manufacturers to designate summer CBOB for use in States where we have removed the 1-psi waiver as "Low-RVP Summer CBOB." We are also finalizing as proposed related changes to the PTD language requirements so that gasoline manufacturers that produce Low-RVP Summer CBOB can accurately and consistently describe the fuel designation. All other designation and PTD provisions will still apply (*e.g.,* those designations related to the blending of ethanol). We believe this approach is the most straight-forward method for updating the designation and PTD requirements for Low-RVP Summer CBOB.

B. Regulatory Reinstatement Mechanism

We are finalizing as proposed a regulatory mechanism for States to request the reinstatement of the 1-psi waiver under CAA section 211(h)(5). This regulatory mechanism will be available for the petitioning States, as well as any other State for which EPA removes the 1-psi waiver under CAA section 211(h)(5) in the future. The regulations provide all States with criteria under which such a request could be made and granted. We modeled the regulatory mechanism for reinstatement of the 1-psi waiver on the regulations in 40 CFR 1090.295 that allow for the removal of 7.8 psi RVP standard.[73] Under the reinstatement mechanism, we are requiring that the State only has to request the reinstatement of the 1-psi waiver in order for EPA to reinstate it; however, if the State has relied on the 1-psi waiver removal in a SIP, either pending or approved, EPA, in consultation with the State, must determine if such a SIP must be revised. If a revision is necessary, the State must revise the SIP and EPA must approve the revision prior to the effective date of the reinstatement of the 1-psi waiver. Such requests must include a requested effective date, and any such effective date must be at least 90 days after EPA's written notification to the State that their request has been approved.

IX. Removal of the 1-psi Waiver for E15

This action also amends 40 CFR part 1090 to reflect the 2021 court decision in *American Fuel and Petrochemical Manufacturers (AFPM)* v. *EPA,* 3 F.4th 373 (D.C. Cir. 2021), vacating the 1-psi volatility waiver for E15 in 40 CFR 1090.215(b)(2). The Administrative Procedure Act, 5 U.S.C. 553(b)(3)(B), provides that, when an agency for good cause finds that notice and public procedures are impracticable, unnecessary, or contrary to the public interest, the agency may issue a rule without providing notice and an opportunity for public comment. EPA has determined that there is good cause for amending these provisions without prior proposal and opportunity for public comment because the correction of 40 CFR part 1090 is a ministerial act to effectuate the court order and public notice and comment is unnecessary and would serve no useful purpose. Modification of the regulations to eliminate the 1-psi waiver for E15 at 40 CFR 1090.215(b)(2) has no legal effect beyond fulfilling the court's vacatur in *AFPM* v. *EPA* and is ministerial in nature. The court issued its mandate on September 17, 2021, at which point the vacatur became effective.

A. Background

In June 2019, EPA finalized a rule modifying volatility regulations for gasoline-ethanol blends containing more than 10 and up to 15 percent ethanol to provide a 1-psi RVP volatility "waiver." The rule was challenged in the D.C. Circuit by AFPM and other groups in June 2019. The court issued its decision on July 2, 2021, vacating the volatility rule, and subsequently issued the mandate for its decision on September 17, 2021.

This action updates our regulations to reflect the court's vacatur of the volatility rule. Subsequent to the promulgation of the volatility rule and the corresponding regulations at 40 CFR 80.27, in December 2020, EPA finalized its fuels regulatory streamlining effort and transposed the regulations, with minor changes, to 40 CFR 1090.215.[74] We are now making the necessary amendments to the regulations at 40 CFR 1090.215 to be consistent with the court's vacatur.

We are also clarifying the status of the "substantially similar" determination for gasoline made in the same action. Because the 2019 interpretative rule [75] was promulgated solely for the purpose of providing the 1-psi waiver to E15, and because the court vacated the entire volatility rule, the 2019 interpretative rule is rescinded.[76] Thus, the only "substantially similar" determinations for gasoline are: (1) The 1991 interpretative rule,[77] and (2) The 2008 interpretative rule.[78]

Finally, in the same rulemaking action, EPA promulgated regulations related to the RFS credit or "RIN" market.[79] These regulations were not challenged, were severable from the action to extend the 1-psi waiver to E15, and remain in place. EPA is noting this for informational purposes only; we are not reopening these RFS regulations here.

B. Affected Provisions

This final rule amends the fuel quality regulations at 40 CFR part 1090, subparts C and R, to remove the 1-psi waiver for E15 contained in 40 CFR 1090.215(b)(2) and 1090.1720(e) by replacing the phrases "15 volume percent" and "15 percent" with "10 volume percent" and "10 percent,"

[72] The designation and PTD language requirements for gasoline are located at 40 CFR 1090.1010 and 1090.1110, respectively.

[73] We are not reopening the regulations associated with removal of a federal 7.8 psi low-RVP program in a given area (40 CFR 1090.295) or the regulations that allow states to opt-out of the federal RFG program (40 CFR 1090.290).

[74] 85 FR 78412 (December 4, 2020).

[75] 84 FR 26980 (June 10, 2019).

[76] See 84 FR 26980, 26983 (June 10, 2019) ("In sum, all actions we are taking today constitute a single, cohesive effort, and as such we do not intend for any of these individual actions to be severable").

[77] 56 FR 5352 (February 11, 1991).

[78] 73 FR 22277 (April 25, 2008).

[79] 84 FR 26980 (June 10, 2019).

respectively. As explained above, removal of the 1-psi waiver for E15 corrects the CFR to conform to the court's order in *AFPM* v. *EPA,* has no legal effect beyond fulfilling the court's vacatur, and is ministerial in nature. The court issued the mandate for its decision on September 17, 2021, at which point the vacatur became effective.

X. Statutory and Executive Order Reviews

Additional information about these statutes and Executive Orders can be found at *https://www.epa.gov/laws-regulations/laws-and-executive-orders.*

A. Executive Order 12866: Regulatory Planning and Review and Executive Order 14094: Modernizing Regulatory Review

This action is a ''significant regulatory action,'' as defined under section 3(f)(1) of Executive Order 12866, as amended by Executive Order 14094. Accordingly, EPA submitted this action to the Office of Management and Budget (OMB) for Executive Order 12866 review. Documentation of any changes made in response to the Executive Order 12866 review is available in the docket. EPA prepared an analysis of the potential costs and benefits associated with this action. This analysis is presented in the TSD, available in the docket for this action.

B. Paperwork Reduction Act (PRA)

This action does not impose any new information collection burden under the PRA. OMB has previously approved the information collection activities contained in the existing regulations and has assigned OMB control number 2060–0731. This action removes the 1-psi waiver in eight States. It does not alter practices used by the existing recordkeeping and reporting requirements, nor does it change the number or type of respondents and the manner in which they satisfy the fuel designation and PTD requirements.

C. Regulatory Flexibility Act (RFA)

I certify that this action will not have a significant economic impact on a substantial number of small entities under the RFA. The small entities subject to the requirements of this action are small refiners (which are defined at 13 CFR 121.201) that produce or distribute gasoline in Illinois, Iowa, Minnesota, Missouri, Nebraska, Ohio, South Dakota, or Wisconsin. This action removes the 1-psi waiver for E10 in these States. EPA is not aware of any small refiner that operates in these States. However, EPA is aware of at least one small refiner that distributes a portion of the gasoline it produces to some of the petitioning States, and thus will be affected this action. Therefore, to evaluate the impacts of this action on small entities, we have conducted a screening analysis to assess whether we should make a finding that this action will not have a significant economic impact on a substantial number of small entities.[80] Currently available information shows that the impact on small entities from implementation of this rule will not be significant. As discussed in Section VII and the TSD, we expect that refiners, including small refiners, will be able to recover the cost associated with the removal of the 1-psi waiver through higher gasoline prices in the petitioning and surrounding States. Even if we were to assume that the cost of producing low-RVP CBOB was not recovered by refiners, a cost-to-sales ratio test shows that the costs to small refiners of the removal of the 1-psi waiver are far less than 1 percent of the value of their sales. Furthermore, the removal of the 1-psi waiver in these States does not substantively alter the regulatory requirements on parties that make and distribute gasoline. We have therefore concluded that this action will not have any significant adverse economic impact on directly regulated small entities.

D. Unfunded Mandates Reform Act (UMRA)

This action does not contain an unfunded mandate of $100 million or more as described in UMRA, 2 U.S.C. 1531–1538, and does not significantly or uniquely affect small governments. This action implements mandates specifically and explicitly set forth in CAA section 211(h)(5) and we believe that this action represents the least costly, most cost-effective approach to achieve the statutory requirements.

E. Executive Order 13132: Federalism

This action does not have federalism implications. It will not have substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government.

F. Executive Order 13175: Consultation and Coordination With Indian Tribal Governments

This action does not have Tribal implications as specified in Executive Order 13175. This action will be implemented at the State level and would affect gasoline refiners, blenders, marketers, distributors, and importers. Tribal governments would be affected only to the extent they produce, purchase, and use gasoline. Thus, Executive Order 13175 does not apply to this action.

G. Executive Order 13045: Protection of Children From Environmental Health Risks and Safety Risks

EPA interprets Executive Order 13045 as applying only to those regulatory actions that concern environmental health or safety risks that EPA has reason to believe may disproportionately affect children, per the definition of ''covered regulatory action'' in section 2–202 of the Executive Order. Therefore, this action is not subject to Executive Order 13045 because it implements specific standards established by Congress in statutes.

H. Executive Order 13211: Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use

This action is not a ''significant energy action'' because it is not likely to have a significant adverse effect on the supply, distribution, or use of energy. This action removes the 1-psi waiver for eight States. As discussed in Section V, it will require changes to the production and distribution of gasoline, which is expected to have some short- and long-term impacts on gasoline supply and cost in the affected areas, but we believe the market will be able to accommodate the change without any significant disruption.

I. National Technology Transfer and Advancement Act (NTTAA) and 1 CFR Part 51

This action does not involve technical standards.

J. Executive Order 12898: Federal Actions To Address Environmental Justice in Minority Populations and Low-Income Populations

EPA believes that the human health and environmental conditions that exist prior to this action do not result in disproportionate and adverse effects on communities with environmental justice concerns. Numerous studies have found that environmental hazards such as air pollution are more prevalent in areas where people of color and low-income populations represent a higher fraction of the population compared to the general population. In addition, there is ample evidence that people who reside in close proximity to major roadways are disproportionately represented by

[80] See TSD Section 8.

people of color and people with low income.

EPA believes that this action is not likely to result in new disproportionate and adverse effects on communities with environmental justice concerns. This is because any emissions impacts of this action are small. As described in Section IV.B, MOVES modeling performed by the States in support of their petitions demonstrated a reduction in VOCs, CO, and NO_X, as well as potential increases in emissions of pollutants such as PM. This action is being implemented at the request of the Governors of the petitioning States and EPA lacks discretion to deny such requests as described in Section III.

EPA additionally identified and addressed EJ concerns by providing the relevant emissions information in this rulemaking action and providing an opportunity for public comment on this rule. We received no comments related to EJ concerns.

The information supporting this Executive Order review is contained in this preamble and the ''Evaluation of MOVES Modeling and Results,'' available in the docket for this action.

K. Congressional Review Act (CRA)

This action is subject to the CRA, and the EPA will submit a rule report to each House of the Congress and to the Comptroller General of the United States. This action meets the criteria set forth in 5 U.S.C. 804(2).

List of Subjects in 40 CFR Part 1090

Environmental protection, Administrative practice and procedure, Air pollution control, Fuel additives, Gasoline, Petroleum, Renewable fuel.

Michael S. Regan,

Administrator.

For the reasons set forth in the preamble, EPA amends 40 CFR part 1090 as follows:

PART 1090—REGULATION OF FUELS, FUEL ADDITIVES, AND REGULATED BLENDSTOCKS

■ 1. The authority citation for part 1090 continues to read as follows:

Authority: 42 U.S.C. 7414, 7521, 7522–7525, 7541, 7542, 7543, 7545, 7547, 7550, and 7601.

Subpart C—Gasoline Standards

■ 2. Amend § 1090.215 by:

■ a. In paragraph (b)(2), removing the text ''than 15'' and adding in its place the text ''than 10''; and

■ b. Revising paragraph (b)(3).

The revision reads as follows:

§ 1090.215 Gasoline RVP Standards.

* * * * *

(b) * * *

(3)(i) RFG and SIP-controlled gasoline that does not allow for the ethanol 1.0 psi waiver does not qualify for the special regulatory treatment specified in paragraph (b)(1) of this section.

(ii) Gasoline subject to the 9.0 psi maximum RVP per-gallon standard in paragraph (a)(1) of this section in the following areas is excluded from the special regulatory treatment specified in paragraph (b)(1) of this section:

TABLE 2 TO PARAGRAPH (b)(3)(ii)—AREAS EXCLUDED FROM THE ETHANOL 1.0 psi WAIVER

State	Counties	Effective date
Illinois	All	April 28, 2025.
Iowa	All	April 28, 2025.
Minnesota	All	April 28, 2025.
Missouri	All	April 28, 2025.
Nebraska	All	April 28, 2025.
Ohio	All	April 28, 2025.
South Dakota	All	April 28, 2025.
Wisconsin	All	April 28, 2025.

* * * * *

■ 3. Add § 1090.297 to read as follows:

§ 1090.297 Procedures for reinstating the 1.0 psi RVP allowance for E10.

(a) EPA may approve a request from a State asking to reinstate the ethanol 1.0 psi waiver specified in § 1090.215(b)(1) for any area (or portion of an area) specified in § 1090.215(b)(3)(ii) if it meets the requirements of paragraph (b) of this section. If EPA approves such a request, an effective date will be set as specified in paragraph (c) of this section. EPA will notify the State in writing of EPA's action on the request and the effective date of the reinstatement upon approval of the request.

(b) The request must be signed by the Governor of the State, or the Governor's authorized representative, and must include all the following:

(1) A geographic description of each area (or portion of such area) that is covered by the request.

(2) A description of all the means in which emissions reduction from the removal of the ethanol 1.0 psi waiver are relied upon in any approved SIP or in any submitted SIP that has not yet been approved by EPA, if applicable.

(3) For any area covered by the request where emissions reductions from the removal of the ethanol 1.0 psi waiver are relied upon as specified in paragraph (b)(2) of this section, the request must include the following information:

(i) Identify whether the State is withdrawing any submitted SIP that has not yet been approved.

(ii)(A) Identify whether the State intends to submit a SIP revision to any approved SIP or any submitted SIP that has not yet been approved, which relies on emissions reductions from the removal of the ethanol 1.0 psi waiver, and describe any control measures that the State plans to submit to EPA for approval to replace the emissions reductions from the removal of the ethanol 1.0 psi waiver.

(B) A description of the State's plans and schedule for adopting and submitting any revision to any approved SIP or any submitted SIP that has not yet been approved.

(iii) If the State is not withdrawing any submitted SIP that has not yet been approved and does not intend to submit a revision to any approved SIP or any submitted SIP that has not yet been approved, describe why no revision is necessary.

(4) A requested effective date of the reinstatement of the ethanol 1.0 psi waiver.

(5) The Governor of a State, or the Governor's authorized representative, must submit additional information needed to administer the reinstatement of the ethanol 1.0 psi waiver upon request by EPA.

(c)(1) Except as specified in paragraph (c)(2) of this section, EPA will set an effective date of the reinstatement of the ethanol 1.0 psi waiver as requested by the Governor, or the Governor's authorized representative, but no less than 90 days from EPA's written notification to the State approving the reinstatement request.

(2) Where emissions reductions from the removal of the ethanol 1.0 psi waiver are included in an approved SIP or any submitted SIP that has not yet been approved, EPA will set an effective date of the reinstatement of the ethanol 1.0 psi waiver as requested by the Governor, or the Governor's authorized representative, but no less than 90 days from the effective date of EPA approval of the SIP revision that removes the emissions reductions from the ethanol 1.0 psi waiver, and, if necessary, provides emissions reductions to make up for those from the ethanol 1.0 psi waiver reinstatement.

(d) EPA will publish a document in the **Federal Register** announcing the approval of any ethanol 1.0 psi waiver reinstatement request and its effective date.

(e) Upon the effective date for the reinstatement of the ethanol 1.0 psi waiver in a subject area (or portion of a subject area) included in an approved

request, the ethanol 1.0 psi waiver will apply in such subject area.

Subpart K—Batch Certification and Designation

■ 4. Amend § 1090.1010 by redesignating paragraph (a)(2)(iii) as (a)(2)(iv) and adding a new paragraph (a)(2)(iii) to read as follows:

§ 1090.1010 Designation requirements for gasoline and regulated blendstocks.

(a) * * *

(2) * * *

(iii) If the CBOB is excluded from the special regulatory treatment for ethanol under § 1090.215(b)(3)(ii), Low-RVP Summer CBOB.

* * * * *

Subpart L—Product Transfer Documents

■ 5. Amend § 1090.1110 by redesignating paragraph (b)(2)(i)(C) as (b)(2)(i)(D) and adding a new paragraph (b)(2)(i)(C) to read as follows:

§ 1090.1110 PTD requirements for gasoline, gasoline additives, and gasoline regulated blendstocks.

* * * * *

(b) * * *

(2) * * *

(i) * * *

(C) ''Low-RVP CBOB. This product does not meet the requirements for summer reformulated gasoline.''

* * * * *

Subpart R—Compliance and Enforcement Provisions

§ 1090.1720 [Amended]

■ 6. Amend § 1090.1720, in paragraphs (e) introductory text and (e)(2), by removing the text ''15 percent'' and adding in its place the text ''10 percent''.

[FR Doc. 2024–04023 Filed 2–28–24; 8:45 am]

BILLING CODE 6560–50–P

FEDERAL COMMUNICATIONS COMMISSION

47 CFR Part 73

[MB Docket No. 22–227; FCC 23–72; FR ID 203619]

Establishing Rules for Full Power Television and Class A Television Stations

AGENCY: Federal Communications Commission.

ACTION: Final rule; announcement of effective date.

SUMMARY: In this document, the Commission announces that the Office of Management and Budget (OMB) has approved the information collection requirements under OMB Control Numbers 3060–1121, 3060–1320, 3060–0009, 3060–0386, 3060–0175, 3060–0178, 3060–0182, 3060–0190, 3060–0320, 3060–0113, and 3060–1321 associated with the rules adopted in the *Report and Order,* FCC 23–72, adopting several rule updates for full power and Class A television stations that no longer have any practical effect given the completion of the transition from analog to digital-only operations and the post incentive auction transition to a smaller television band with fewer channels. This document is consistent with the *Report and Order,* which states that the Media Bureau will publish a document in the **Federal Register** announcing the effective date for these revised rule sections and revising the rules accordingly.

DATES: The amendments to 47 CFR 73.619; 73.625; 73.1250; 73.1350; 73.1560; 73.1615; 73.1620; 73.1635; 73.1675; 73.1690; 73.1740; 73.1750; 73.2080; 73.3540; 73.3544; 73.3549; 73.3550; 73.3598; 73.5006; 73.6024; 73.6025, published at 89 FR 7224 on February 1, 2024, are effective March 4, 2024.

FOR FURTHER INFORMATION CONTACT: Cathy Williams, Office of the Managing Director, Federal Communications Commission, at (202) 418–2918 or *Cathy.Williams@fcc.gov.*

SUPPLEMENTARY INFORMATION: This document announces that OMB approved the information collection requirements in 47 CFR 73.619; 73.625; 73.1250; 73.1350; 73.1560; 73.1615; 73.1620; 73.1635; 73.1675; 73.1690; 73.1740; 73.1750; 73.2080; 73.3540; 73.3544; 73.3549; 73.3550; 73.3598; 73.5006; 73.6024; 73.6025 on February 2, 2024, and February 14, 2024, respectively. These rule sections were adopted in the *Report and Order,* FCC 23–72, published at 89 FR 7224 on February 1, 2024. The Commission publishes this document as an announcement of the immediate effective date for these revised rules.

Synopsis

As required by the Paperwork Reduction Act of 1995 (44 U.S.C. 3507), the Commission is notifying the public that it received final OMB approvals on February 2, 2024 and February 14, 2024, respectively, for the information collection requirements contained in 47 CFR 73.619; 73.625; 73.1250; 73.1350; 73.1560; 73.1615; 73.1620; 73.1635; 73.1675; 73.1690; 73.1740; 73.1750; 73.2080; 73.3540; 73.3544; 73.3549; 73.3550; 73.3598; 73.5006; 73.6024; 73.6025. Under 5 CFR part 1320, an agency may not conduct or sponsor a collection of information unless it displays a current, valid OMB Control Number.

No person shall be subject to any penalty for failing to comply with a collection of information subject to the Paperwork Reduction Act that does not display a current, valid OMB Control Number. The OMB Control Numbers for the information collection requirements in 47 CFR 73.619; 73.625; 73.1250; 73.1350; 73.1560; 73.1615; 73.1620; 73.1635; 73.1675; 73.1690; 73.1740; 73.1750; 73.2080; 73.3540; 73.3544; 73.3549; 73.3550; 73.3598; 73.5006; 73.6024; 73.6025 are 3060–1121, 3060–1320, 3060–0009, 3060–0386, 3060–0175, 3060–0178, 3060–0182, 3060–0190, 3060–0320, 3060–0113, and 3060–1321.

The foregoing notice is required by the Paperwork Reduction Act of 1995, Public Law 104–13, October 1, 1995, and 44 U.S.C. 3507.

The total annual reporting burdens and costs for the respondents are as follows:

OMB Control Number: 3060–1320.

OMB Approval Date: February 2, 2024.

OMB Expiration Date: February 28, 2027.

Title: Section 73.1750, Discontinuance of operation; Section 73.3549, Request for extension of time to operate without required monitors, indicating instruments, and EAS encoders and decoders; § 73.3550, Requests for new or modified call sign assignments.

Form Number: N/A.

Respondents: Business or other for-profit entities; not for-profit institutions.

Estimated Number of Respondents and Responses: 300 respondents and 300 responses.

Estimated Time per Response: 0.50 hours.

Frequency of Response: Recordkeeping requirement; on occasion reporting requirement.

Obligation to Respond: Required to obtain or retain benefits. The statutory authority for this information collection is contained in Sections 154(i) and 325(a) of the Communications Act of 1934, as amended.

Estimated Total Annual Burden: 150 hours.

Total Annual Cost: No cost.

Needs and Uses: The Commission adopted on September 18, 2023, the *Report and Order* (*R&O*), Amendment of Part 73 of the Commission's Rules to

Congress of the United States

Washington, DC 20515

March 1, 2024

The Honorable Joseph R. Biden
President of the United States
1600 Pennsylvania Avenue N.W.
Washington, D.C. 20500

Dear President Biden,

For the past two years members of Congress have requested your administration to issue an emergency waiver to allow for the summertime sale of E15. Since the invasion of Ukraine on February 24, 2022, Russia has weaponized energy resources against Ukraine, Europe, and the United States.

Additionally, in April of 2023, the Organization of the Petroleum Exporting Countries (OPEC) as well as ten other major oil producing countries announced they would be cutting crude oil production to artificially manipulate the supply of oil.

For these reasons, as well as the additional choice given to consumers at the pump and the additional energy independence that comes from ethanol, your administration has approved emergency waivers for the summertime sale of E15 for the past two years.

Recently, on February 22, 2024, the Environmental Protection Agency finalized its rule following a petition from eight Midwest governors, led by Iowa Governor Kim Reynolds, requesting the year-round sale of E15. This rule was finalized 574 days later than what is statutorily required. We, the Congressional Delegation of Iowa, were still encouraged to see it finalized. However, we were disappointed that it will not come into effect until 2025.

As we expressed to Administrator Regan earlier this week, we remain concerned that delaying implementation until 2025 will have devastating effects on biofuels producers, farmers, and families across the country, and especially in Iowa. Additionally, Russia continues to weaponize its energy resources, and the OPEC+ cartel is still artificially manipulating supplies to hurt American families.

We the undersigned urge you to once again issue an emergency waiver to allow for the summertime sale of E15, extending the Reid vapor pressure (RVP) waiver from June 1 through September 15. The summertime sale of E15 has supported farmers, created and sustained jobs, reduced our dependence on foreign oil, and given consumers a choice at the pump.

Thank you for your swift consideration on this request to utilize the strength of American agriculture to fight for American energy independence.

Sincerely,

Charles E. Grassley
United States Senator

Joni K. Ernst
United States Senator

Mariannette Miller-Meeks, M.D.
United States Representative

Ashley Hinson
United States Representative

Zach Nunn
United States Representative

Randy Feenstra
United States Representative

Congress of the United States

Washington, DC 20515

March 11, 2024

The Honorable Mike Johnson
Speaker
U.S. House of Representatives
Washington, DC 20515

The Honorable Hakeem Jeffries
Minority Leader
U.S. House of Representatives
Washington, DC 20515

The Honorable Cathy McMorris Rodgers
Chair
House Energy and Commerce Committee
2188 Rayburn House Office Building
Washington D.C. 20224

The Honorable Frank Pallone
Ranking Member
House Energy and Commerce Committee
2322A Rayburn House Office Building
Washington, DC 20515

Dear Speaker Johnson, Leader Jeffries, Chair McMorris Rodgers, and Ranking Member Pallone:

We write to express our support for swift passage of a legislative solution which would allow motor vehicle fuel containing 15 percent ethanol (E15) to be voluntarily sold year-round throughout the country. In light of the recent Environmental Protection Agency (EPA) final rule allowing the year-round sale of E15 in eight Midwestern states beginning in 2025, governors, agriculture producers, ethanol refiners, oil refiners, retailers, and the automotive industry have all recognized the need for permanent law which provides needed certainty for producers and consumers in every state.

Congress must move forward with legislation to address a much-needed update to the Clean Air Act (CAA) that has prevented the use and sales of gasoline containing 15 percent ethanol (E15) in the summer. Currently, the CAA restricts the sale of E15 during the summer driving season (June 1 to September 15) in most of the country. Although E15 has a lower Reid Vapor Pressure (RVP) volatility than fuel containing 10 percent ethanol (E10), E15 is unable to be sold under the year-round sale waiver provided to E10 because the U.S. Court of Appeals for the District of Columbia Circuit found that the EPA does not have the statutory authority to allow the sale of E15 under the legislative waiver provided to E10.

In the absence of legislative action allowing for year-round E15 sales, in April of 2022, eight Midwest governors exercised their authority under the CAA to request the removal of the 1 psi RVP waiver for E10 in their states. On February 29, 2024, the EPA announced a final rule in response to these requests to allow the year-round sale of E15 in these eight states beginning April 28, 2025. While we are encouraged that the EPA has finally responded to these requests, not having certainty nationwide will require fuel refiners and retailers to provide a different grade of gasoline unique to these states, which is different than the fuel produced for the rest of the United States. This change could lead to increased gasoline prices around the country.

Passage of legislation supported by all stakeholders allowing the voluntary year-round sale of E15 nationwide would provide parity in treatment of E10 and E15 across the country, increase consumer choice for those who choose to purchase E15, and avoid the inflationary impacts of state-specific or regional fuel specifications. This important legislation would provide certainty to the entire industry—including farmers, renewable fuel producers, fuel marketers, and retailers.

We urge you to support bipartisan legislative efforts to ensure that E15 can be voluntarily sold year-round and avoid potential fuel supply issues that will occur if E15 is only allowed in certain states. Addressing these two issues will provide much-needed certainty to entities looking to make investments in lower carbon fuels and to the broader fuel value chain. Most importantly, this legislative fix is needed to ensure consumers have access to lower cost, consistently available, fuel during the summer months.

Thank you for your continued leadership on these critical issues impacting our nation's fuel supply. We look forward to working with you on this issue and to finding a prompt resolution to avoid higher energy prices and supply disruptions.

Sincerely,

Mariannette Miller-Meeks,
M.D.
Member of Congress

Nikki Budzinski
Member of Congress

Adrian Smith
Member of Congress

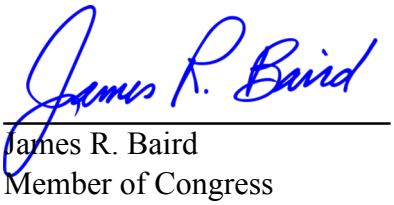
Mark Pocan
Member of Congress



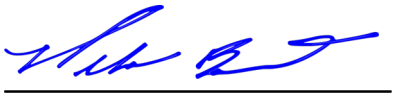
Mark Alford
Member of Congress



Don Bacon
Member of Congress



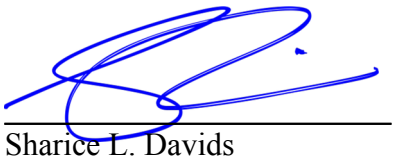
James R. Baird
Member of Congress



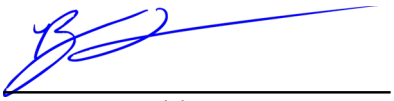
Mike Bost
Member of Congress



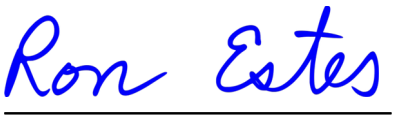
Stephanie Bice
Member of Congress



Sharice L. Davids
Member of Congress



Byron Donalds
Member of Congress



Ron Estes
Member of Congress



Randy Feenstra
Member of Congress



Brad Finstad
Member of Congress



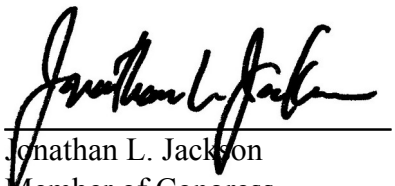
Michelle Fischbach
Member of Congress



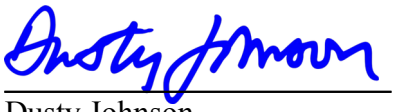
Mike Flood
Member of Congress



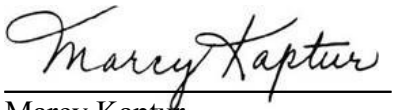
Ashley Hinson
Member of Congress



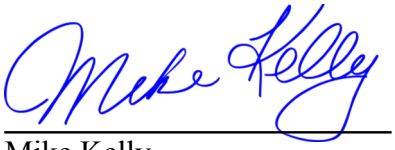
Jonathan L. Jackson
Member of Congress



Dusty Johnson
Member of Congress



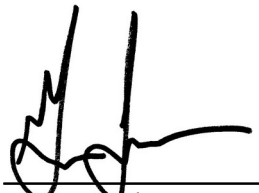
Marcy Kaptur
Member of Congress



Mike Kelly
Member of Congress



Darin LaHood
Member of Congress



Greg Landsman
Member of Congress



Jake LaTurner
Member of Congress

Tracey Mann
Member of Congress

Dan Meuser
Member of Congress

Mary E. Miller
Member of Congress

Max L. Miller
Member of Congress

Zach Nunn
Member of Congress

Derrick Van Orden
Member of Congress

Ann Wagner
Member of Congress

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3b. Federal Issues Update
iii. Low Carbon/Higher Blends/FFVs

Monte Shaw

From: alertsadmin@opisnet.com
Sent: Wednesday, February 7, 2024 1:56 PM
To: Monte Shaw
Subject: BIOFUELS UPDATE: ***Biden Admin Should Revise Tailpipe Proposals in Favor of Biofuels: Farmers

2024-02-07 02:56:11 EST
***Biden Admin Should Revise Tailpipe Proposals in Favor of Biofuels: Farmers

A group of several thousand farmers told President Joe Biden on Tuesday that his administration should consider altering its push to incentivize the electric vehicle industry, arguing that in doing so it has overlooked the potential benefits of crop-based renewable fuels.

The nearly 3,500 farmers wrote a letter urging the president to take a "multi-pronged" approach to fuel policy that would tap into the ethanol market, "which offers an immediate climate solution."

"While the use of electric vehicles is one tool in the nation's toolkit for fighting climate change, consumers are not readily adopting this technology,"
the group said.

They cited a recent poll from the National Corn Growers Association and Morning Consult that found Americans remain concerned over the relative lack of domestic charging infrastructure, among other issues with the EV market.

"Negative news coverage highlighting the weaknesses of EVs, such as the recent articles about charging difficulties and delays during extreme cold spells, only exacerbates these perceptions," the group said.

To shift the pendulum back toward crop-based biofuels, the group said the administration should consider revising fuel economy standards for 2027 through
2032 proposed by the Department of Transportation's National Highway Traffic Safety Administration. Those standards would mandate a 2% rise each year in the fuel efficiency of passenger cars from model years 2027 through 2032, alongside a 4% increase per year for light trucks over the same period.

The standards were first proposed in July 2023 and were preceded in April by Environmental Protection Agency rules on tailpipe emissions that were intended to bolster electrification of the national vehicle fleet.

The farmers told Biden that both standards "could significantly limit [his] administration's ability to immediately lower greenhouse gas emissions and put the nation on a climate-smart path."

"As a low-carbon, clean energy source and an affordable, homegrown fuel, ethanol serves as a critical pathway for agriculture and rural America to contribute to a sustainable future," the group said. "We hope you will join us in fully embracing this technology as we all do our best to fight the causes and effects of climate change."

--Reporting by Patrick Newkumet, pnewkumet@opisnet.com; Editing by Aaron Alford, aalford@opisnet.com

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Congress of the United States

Washington, DC 20515

February 22, 2024

The Honorable Joseph R. Biden, Jr.
President of the United States
The White House
1600 Pennsylvania Avenue, NW
Washington, D.C. 20500

The Honorable Shalanda D. Young
Director
Office of Management and Budget
725 17th Street, NW
Washington, D.C. 20503

Dear President Biden and Director Young,

We write today to urge you to immediately halt and reject the implementation of the Environmental Protection Agency's (EPA) proposed rule entitled "Multi-Pollutant Emissions Standards for Model Years 2027 and Later Light-Duty and Medium-Duty Vehicles" that was sent to the Office of Management and Budget on Thursday, January 18, 2024.[1] Additionally, we write to highlight the failures of this Administration's hasty and costly transition to electric vehicles (EVs).

This proposed rule, which would require 67% of new light-duty vehicles and 46% of medium-duty vehicles to be electric by 2032, amounts to a de facto mandate for EVs and phase out of the internal combustion engine vehicle. The U.S. House of Representatives, in a bipartisan manner, voted to overturn this burdensome rule in December (H.R. 4468), and similar efforts are currently being pursued in the Senate.

Additionally, this rule is contradictory to all conventional predictions about where the automobile industry is headed in the coming years, including this Administration's own Department of Energy. As reported in the U.S. Energy Information Administration's Annual Energy Outlook in 2021, 4 of 5 new vehicles will still run on liquid fuels in 2050,[2] making this rule not just absurd to the average citizen, but to your own agencies as well. In fact, recent reporting from sources inside your Administration indicates that EPA now intends to ease the rule's requirements through 2030 to give automakers more time to comply. This again shows that even your own agencies know this mandate is absurd and unrealistic, and threatens to harm both industry and consumers.[3]

The reality is that most Americans still prefer the internal combustion engine vehicle,[4] and EPA's proposed rule unnecessarily restricts consumer choice and forces expensive EVs onto Americans at a time when they can least afford it. Major U.S. automakers have recently lowered their targets and pulled back planned investments in EVs due to low consumer demand and struggling EV units.[5] Further, automobile dealers across the country have said EVs continue to sit unpurchased on dealership lots, despite automakers accepting massive losses and unsustainable government incentives.[6]

Over the past few weeks, parts of the country experienced temperatures below zero with wind chills of nearly 40 below. This cold snap has once again highlighted that this Administration's mandates will not work when

[1] https://www.reginfo.gov/public/do/eoDetails?rrid=366862
[2] https://www.eia.gov/outlooks/aeo/pdf/AEO_Narrative_2021.pdf
[3] https://www.nytimes.com/2024/02/17/climate/biden-epa-auto-emissions.html
[4] https://www.pewresearch.org/short-reads/2023/07/13/how-americans-view-electric-vehicles/
[5] https://www.reuters.com/business/autos-transportation/ford-withdraws-2023-forecast-warns-ev-results-2023-10-26/
[6] https://www.wsj.com/articles/car-dealers-letter-to-biden-electric-vehicles-fd413d98

EVs are unreliable,[7] especially during the harsh winter months. In many areas, drivers were left stranded waiting hours for batteries to charge or searching for a nearby charging station.[8]

Your Administration continues to degrade liquid fuels and combustion engines in order to implement its costly Green New Deal agenda that harms our families and businesses, increases our gas prices, and makes us more dependent on foreign supply chains—particularly China.[9]

Therefore, we strongly urge you to halt and reject the implementation of the EPA's proposed tailpipe rule. These last few weeks, with EVs leaving people stranded, have underscored the reason why an EV-only approach is wrong. The EPA's proposed rule is burdensome and inconsistent with the reality of the industry and needs to be rejected for the good of American families and businesses.

cc. Administrator Michael Regan, Environmental Protection Agency

Sincerely,

Randy Feenstra
Member of Congress

Mike Crapo
United States Senator

Elise M. Stefanik
Member of Congress

Gary J. Palmer
Member of Congress

Guy Reschenthaler
Member of Congress

Glenn "GT" Thompson
Member of Congress

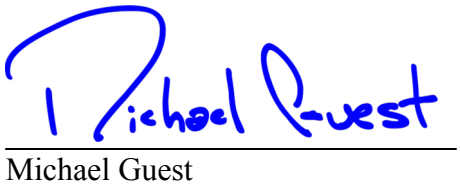
Lisa C. McClain
Member of Congress

Sam Graves
Member of Congress

[7] https://www.consumerreports.org/cars/car-reliability-owner-satisfaction/who-makes-the-most-reliable-cars-a7824554938/
[8] https://www.foxnews.com/media/chicago-area-tesla-owners-detail-winter-disaster-dead-batteries-charging-station-failures
[9] https://www.foxnews.com/media/retired-navy-captain-warns-bidens-ev-push-threatens-national-security-fundamentally-wrong



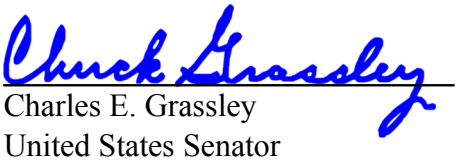
Bryan Steil
Member of Congress



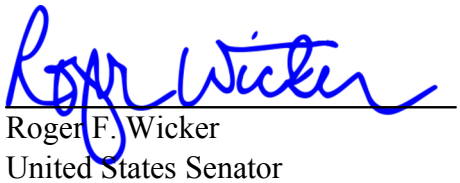
Michael Guest
Member of Congress



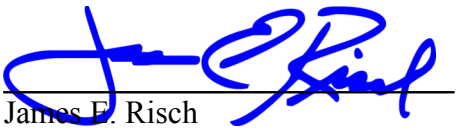
Charles J. "Chuck" Fleischmann
Member of Congress



Charles E. Grassley
United States Senator



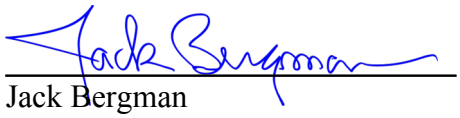
Roger F. Wicker
United States Senator



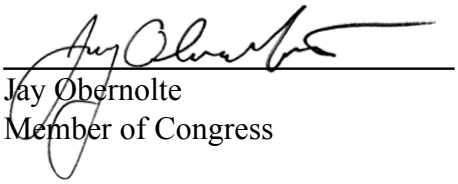
James E. Risch
United States Senator



Mike Carey
Member of Congress



Jack Bergman
Member of Congress



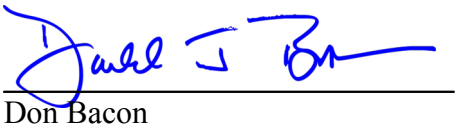
Jay Obernolte
Member of Congress



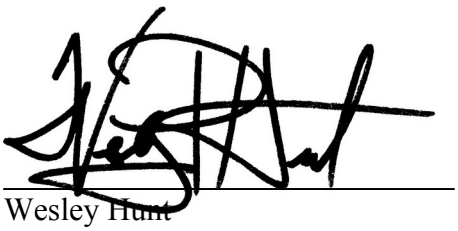
Mike Ezell
Member of Congress



John R. Moolenaar
Member of Congress



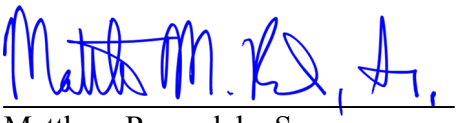
Don Bacon
Member of Congress



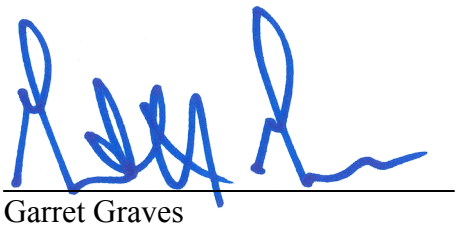
Wesley Hunt
Member of Congress



Mark Alford
Member of Congress



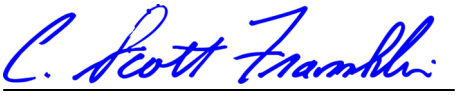
Matthew Rosendale, Sr.
Member of Congress



Garret Graves
Member of Congress



Glenn Grothman
Member of Congress



C. Scott Franklin
Member of Congress



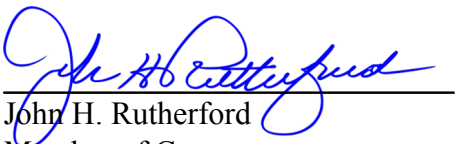
John S. Duarte
Member of Congress



Brad Finstad
Member of Congress



Adrian Smith
Member of Congress



John H. Rutherford
Member of Congress



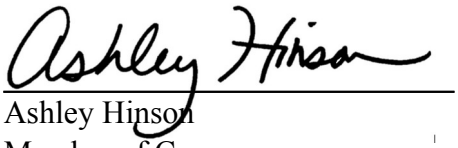
Mike Flood
Member of Congress



Harriet M. Hageman
Member of Congress



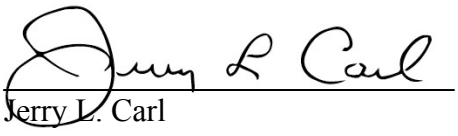
Dusty Johnson
Member of Congress



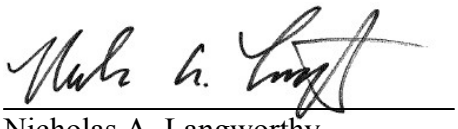
Ashley Hinson
Member of Congress



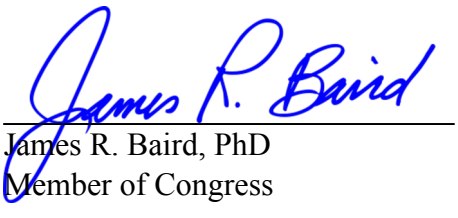
Russ Fulcher
Member of Congress



Jerry L. Carl
Member of Congress



Nicholas A. Langworthy
Member of Congress



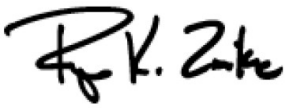
James R. Baird, PhD
Member of Congress



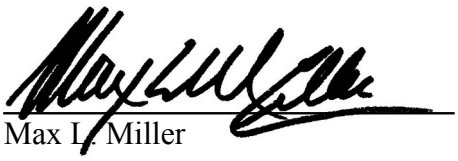
Eric Burlison
Member of Congress



Paul A. Gosar, D.D.S.
Member of Congress



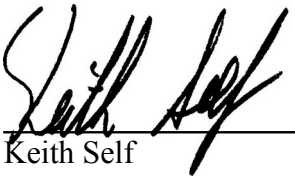
Ryan K. Zinke
Member of Congress



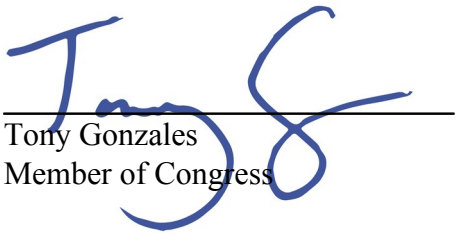
Max L. Miller
Member of Congress



Tim Burchett
Member of Congress



Keith Self
Member of Congress



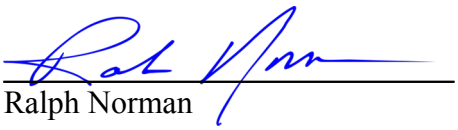
Tony Gonzales
Member of Congress



Aaron Bean
Member of Congress



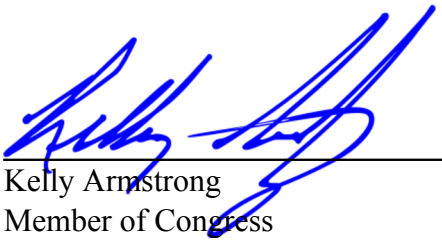
Bill Posey
Member of Congress



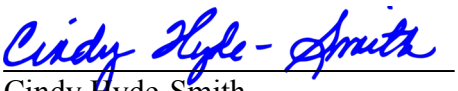
Ralph Norman
Member of Congress



Michael Cloud
Member of Congress



Kelly Armstrong
Member of Congress



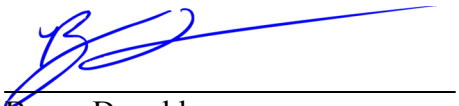
Cindy Hyde-Smith
United States Senator



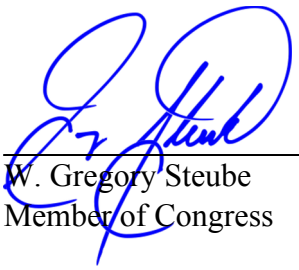
Rich McCormick, MD, MBA
Member of Congress



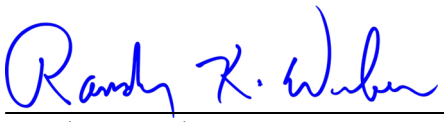
Dan Sullivan
United States Senator



Byron Donalds
Member of Congress



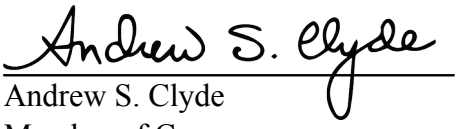
W. Gregory Steube
Member of Congress



Randy K. Weber, Sr.
Member of Congress



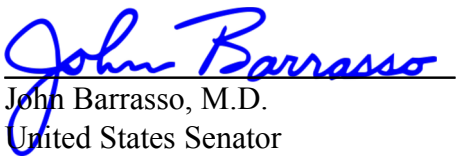
Mike Bost
Member of Congress



Andrew S. Clyde
Member of Congress



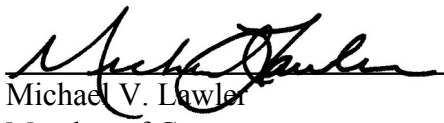
David G. Valadao
Member of Congress



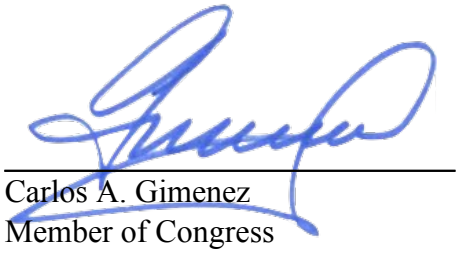
John Barrasso, M.D.
United States Senator



Pete Sessions
Member of Congress



Michael V. Lawler
Member of Congress



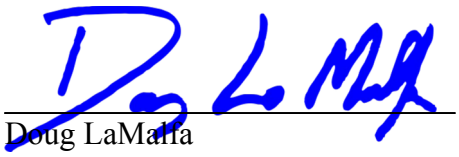
Carlos A. Gimenez
Member of Congress



Pete Ricketts
United States Senator



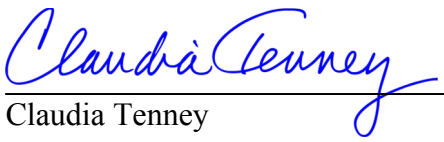
Scott DesJarlais, M.D.
Member of Congress



Doug LaMalfa
Member of Congress



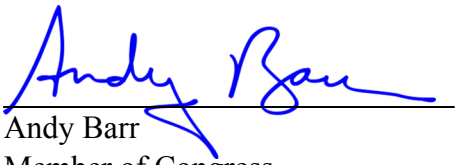
Alex X. Mooney
Member of Congress



Claudia Tenney
Member of Congress



Trent Kelly
Member of Congress



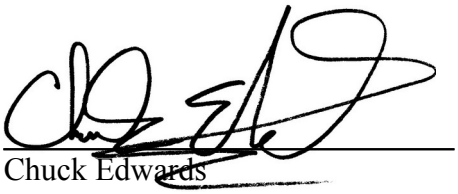
Andy Barr
Member of Congress



Mike Collins
Member of Congress



Roger Marshall, M.D.
United States Senator

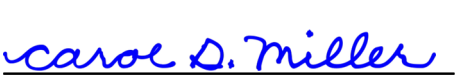


Chuck Edwards
Member of Congress

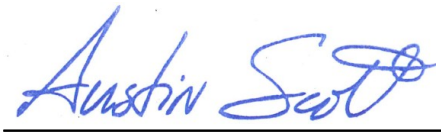
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Member of Congress



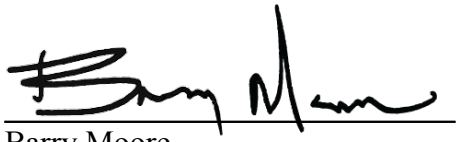
Mary E. Miller
Member of Congress



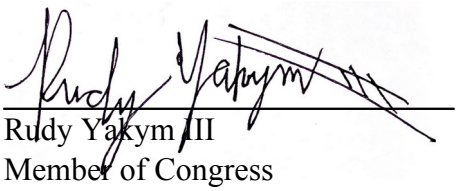
Carol D. Miller
Member of Congress



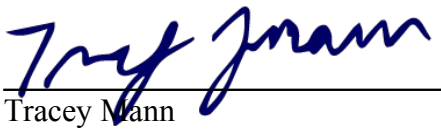
Austin Scott
Member of Congress



Barry Moore
Member of Congress



Rudy Yakym III
Member of Congress



Tracey Mann
Member of Congress



Jake LaTurner
Member of Congress



James Comer
Member of Congress



Gus M. Bilirakis
Member of Congress



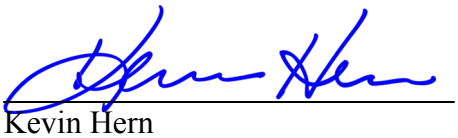
Troy E. Nehls
Member of Congress



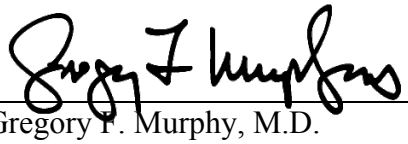
Mike Kelly
Member of Congress



Dan Newhouse
Congressional Western Caucus
Chairman



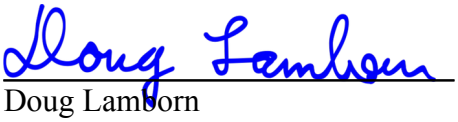
Kevin Hern
Member of Congress



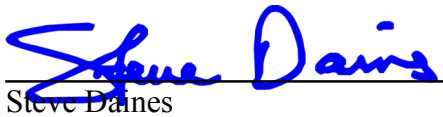
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Member of Congress



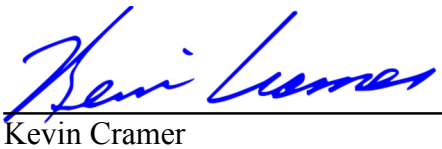
Earl L. "Buddy" Carter
Member of Congress



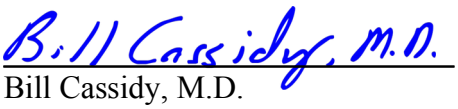
Doug Lamborn
Member of Congress



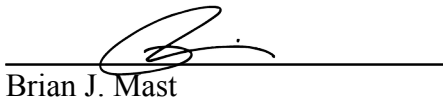
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United States Senator



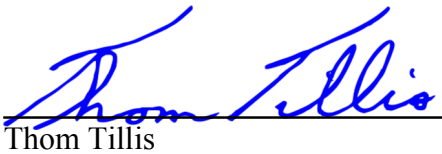
Kevin Cramer
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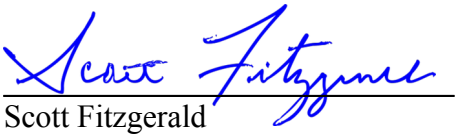
Bill Cassidy, M.D.
United States Senator



Brian J. Mast
Member of Congress



Thom Tillis
United States Senator



Scott Fitzgerald
Member of Congress



Brad R. Wenstrup, D.P.M.
Member of Congress



Derrick Van Orden
Member of Congress



Lauren Boebert
Member of Congress



Zach Nunn
Member of Congress



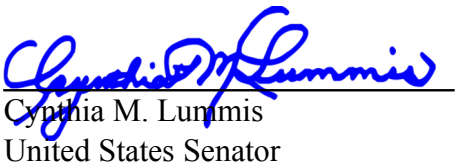
Ronny L. Jackson
Member of Congress



Tom McClintock
Member of Congress



Dan Crenshaw
Member of Congress



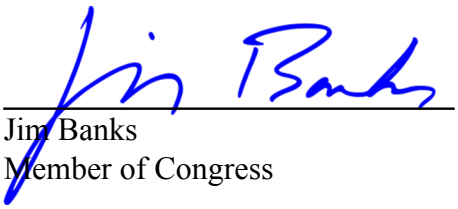
Cynthia M. Lummis
United States Senator



Bob Good
Member of Congress



Markwayne Mullin
United States Senator



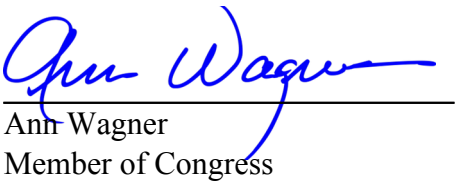
Jim Banks
Member of Congress



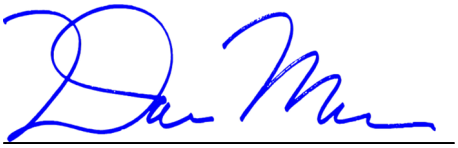
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Member of Congress



Pete Stauber
Member of Congress



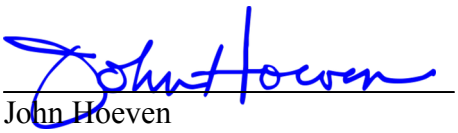
Ann Wagner
Member of Congress



Dan Meuser
Member of Congress



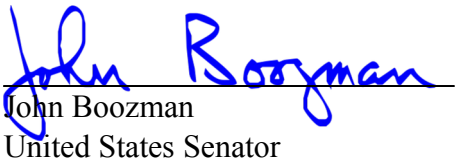
Darin LaHood
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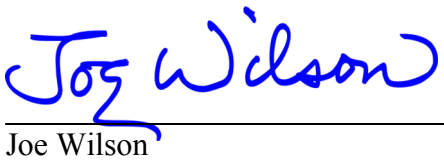
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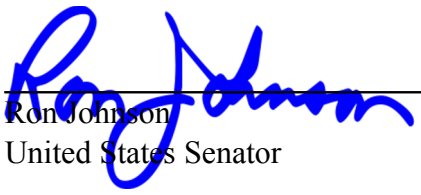
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United States Senator



John Boozman
United States Senator



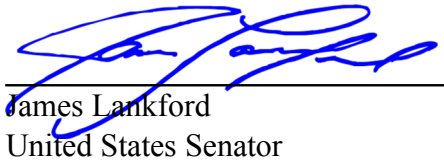
Joe Wilson
Member of Congress



Ron Johnson
United States Senator



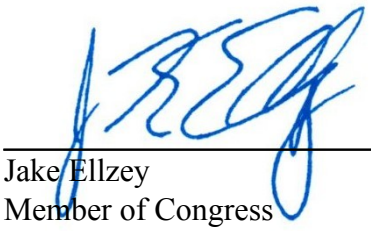
Diana Harshbarger
Member of Congress



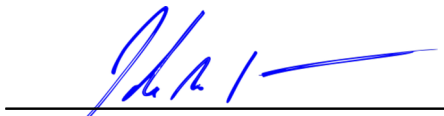
James Lankford
United States Senator



Marsha Blackburn
United States Senator



Jake Ellzey
Member of Congress



John R. Curtis
Member of Congress



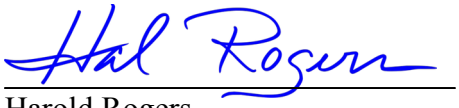
Michelle Fischbach
Member of Congress



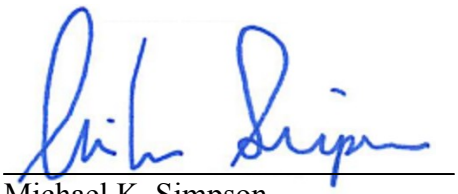
Brandon Williams
Member of Congress



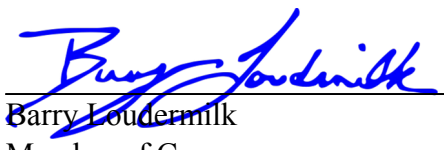
Mike Braun
United States Senator



Harold Rogers
Member of Congress



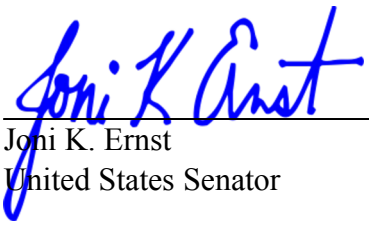
Michael K. Simpson
Member of Congress



Barry Loudermilk
Member of Congress



Dan Bishop
Member of Congress



Joni K. Ernst
United States Senator



Erin Houchin
Member of Congress



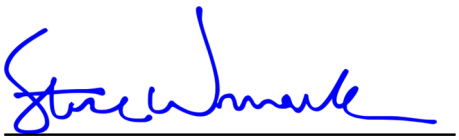
Anthony D'Esposito
Member of Congress



Roger Williams
Member of Congress



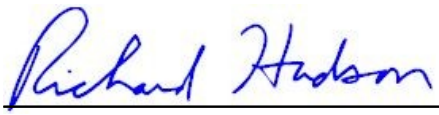
Andrew Ogles
Member of Congress



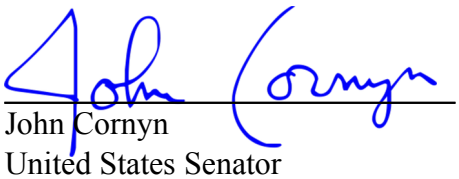
Steve Womack
Member of Congress



Brian Babin, D.D.S.
Member of Congress



Richard Hudson
Member of Congress



John Cornyn
United States Senator



Cliff Bentz
Member of Congress



Stephanie Bice
Member of Congress



Tim Scott
United States Senator



Tom Cotton
United States Senator

2024-03-13 10:43:40 EDT
***White House Issues Zero-Emission Corridor Plan for Medium, Heavy-Duty Trucks

The Biden administration has released a national strategy to speed the development of an electric and hydrogen fueling infrastructure for medium- and heavy-duty trucks between now and 2040.

The plan also includes the designation of nationwide EV freight corridors. The blueprint, which was issued on Tuesday, said providing ubiquitous and convenient access to EV charging and hydrogen fueling along freight corridors, high-usage ports and other freight facilities is key to the administration's goal of ensuring that 30% of all freight trucks sold by 2030 are zero-emission vehicles. The plan calls for that percentage to increase to 100% by 2040.

"A core objective of the strategy is to meet freight truck and technology markets where they are today, determine where they are likely to develop next and set an ambitious pathway that mobilizes actions to achieve decarbonization," the administration said in a news release.

Medium and heavy-duty trucks are responsible for about 23% of U.S. greenhouse gas emissions from transportation.

Under the plan, the Federal Highway Administration has designated National EV Freight Corridors along critical interstate highways and other roads as required by the 2021 Bipartisan Infrastructure Law, which authorized up to $108 billion in transportation investments.

The administration said it expects the freight corridor designations to spur more private investment in electric vehicle charging infrastructure, with a focus on the medium and heavy-duty truck market.

"We are grateful that the Biden administration is recognizing the critical link between how freight moves today and the efficient build out of a nationwide network of charging stations for medium and heavy-duty trucks. For this to work, it needs to impose minimal disruption on how businesses operate today. This plan recognizes that," NATSO and SIGMA said in a joint statement Tuesday. The two trade groups represent truck stops, travel centers and fuel marketers.

The administration also said the plan will deliver health benefits and possibly reduce the costs of both battery electric and hydrogen fuel cell power-train technologies.

Hydrogen is considered more suitable for heavy-duty trucks because electric vehicles of that size would require large batteries that would take a significant amount of time to recharge. Hydrogen fuel cell technology, however, is still in its early stages and will require significant investment to commercialize.

The four phases of the National Zero-Emission Freight Corridor strategy are establishing priority hubs based on freight volumes between now and 2027, connecting hubs along critical freight corridors by 2030, expanding corridor connections and starting network development between 2030 and 2035 and achieving a national network by linking regional corridors for ubiquitous access from 2035 to 2040.

--Reporting by Frank Tang, ftang@opisnet.com; Editing by Jeff Barber, jbarber@opisnet.com

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RENEWABLE FUELS ASSOCIATION

January 15, 2024

Mr. Joshua Cunningham
Chief, Advanced Clean Cars Branch
California Air Resources Board
1001 I Street
Sacramento, CA 95814

Re: Comments on the November 15, 2023, Advanced Clean Cars Workshop

Dear Mr. Cunningham,

The Renewable Fuels Association (RFA) thanks you for the opportunity to comment on the workshop held by the California Air Resources Board (CARB) on November 15, 2023, to consider potential amendments to the Advanced Clean Cars (ACC) regulation.

The RFA is the leading national trade association representing U.S. fuel ethanol producers. Its mission is to drive growth in sustainable renewable fuels and bioproducts for a better future. Founded in 1981, RFA serves as the premier forum for industry leaders and supporters to discuss ethanol policy, regulation, and technical issues. RFA's 300-plus members are working daily to help America become cleaner, safer, more energy secure, and economically vibrant.

The 2022 CARB Scoping Plan update recognized the need to increase the supply of low- to zero-carbon liquid fuels to achieve the goal of carbon neutrality by 2045. Tremendous progress has been made on the composition of California's diesel supply, with renewable diesel and biodiesel now accounting for more than 60 percent of total volumes.

However, progress is notably lacking on the light-duty vehicle (LDV) fuel side, as finished gasoline is generally still limited to 10 percent low-carbon renewable ethanol, with the remaining 90 percent consisting of petroleum-based blendstock (CARBOB). While electrification of the LDV fleet is expanding rapidly, significant volumes of liquid fuels will continue to be used for decades to come, and carbon neutrality can only be achieved by displacing a substantial share of those with low- and zero-carbon liquid fuels.

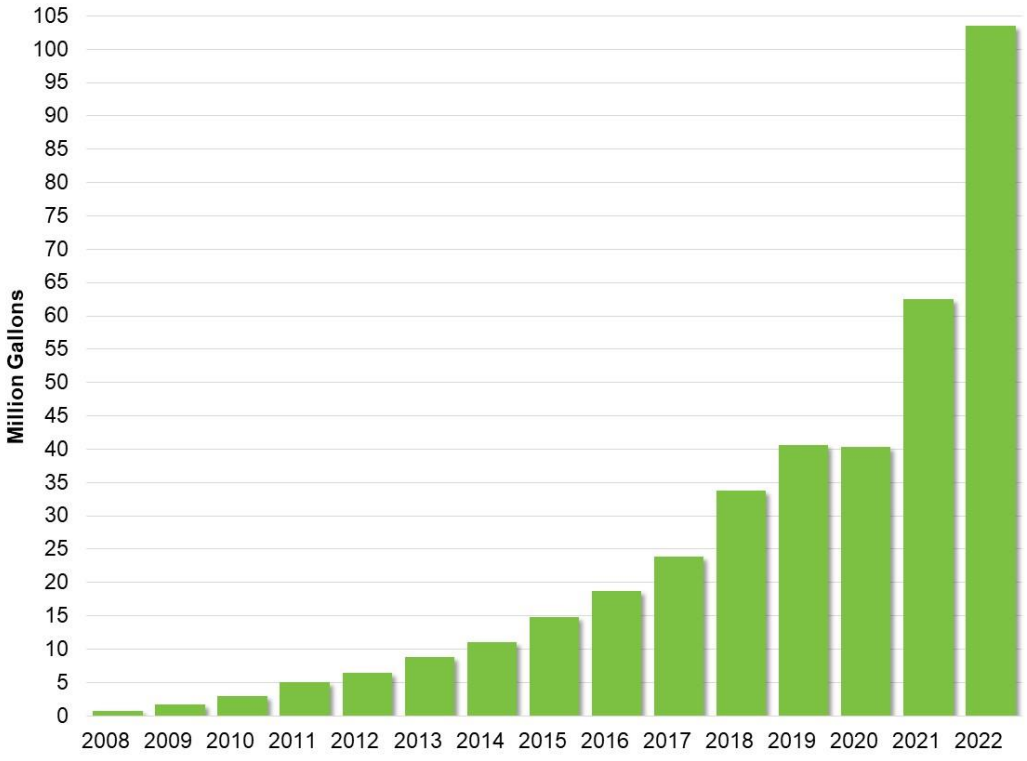
The RFA appreciates CARB staff's recognition of the opportunity for higher blends of ethanol to provide further greenhouse gas (GHG) emissions reductions under the ACC

regulation. The following comments address the specific topics on which CARB solicited feedback in the staff presentation at the November 15 workshop.

E85 Is Becoming Available at an Increasing Number of Stations and Is Proving Popular with California Drivers

E85 is the fastest-growing low-carbon fuel in California, due to the rapid expansion of E85 distribution outlets and the lower cost of E85 relative to gasoline in the state. Sales were less than 6 million gallons when the Low Carbon Fuel Standard was first implemented, but have accelerated rapidly in recent years, exceeding 100 million gallons in 2022, as shown in the figure below. Annualized growth rates averaged 60 percent over the last two years. Data for 2023 is not yet available, but indications are that the pace of growth continued.

Annual E85 Sales Volumes in California



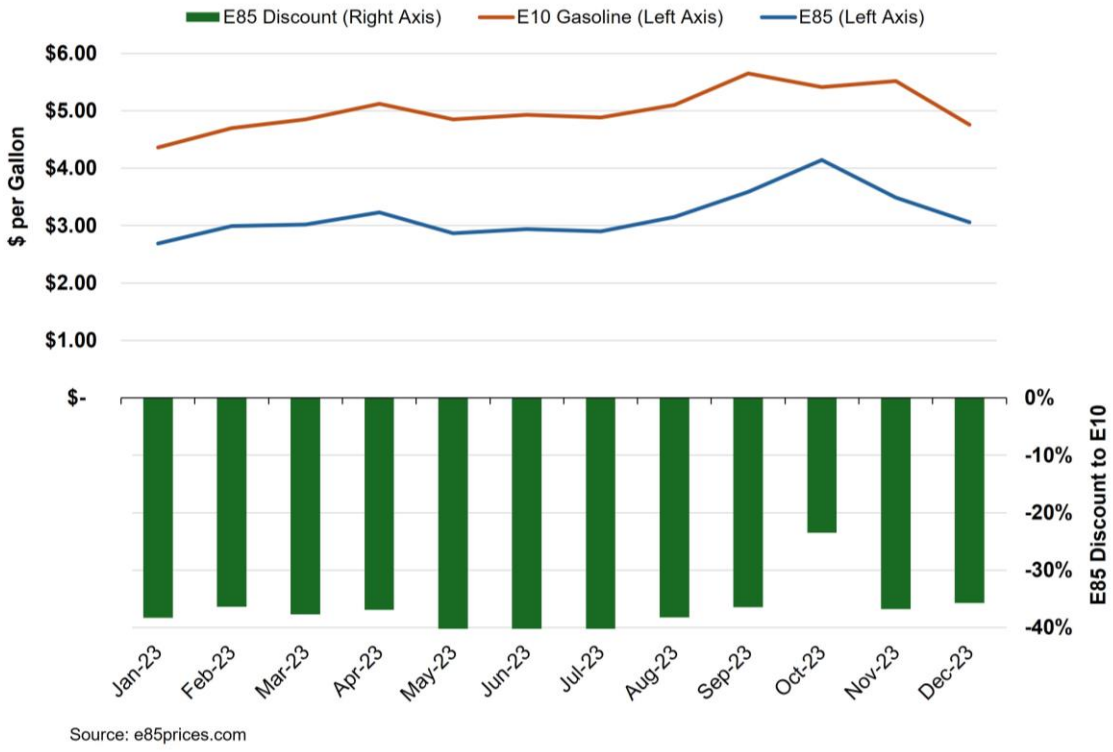
Source: CARB

The number of E85 retail stations has increased rapidly along with the consumption of E85. There are currently over 400 stations offering E85 in California, with approximately another 200 in the permitting or planning process. This is in response to consumer demand and acceptance of E85.

The Inflation Reduction Act (IRA) of 2022 allocated $500 million to the Higher Blends Infrastructure Incentive Program (HBIIP) to support the expansion of infrastructure to distribute and dispense higher blends of both ethanol and biodiesel produced from agricultural products. The first round of $50 million in HBIIP funding has been committed, with $450 million still available over the next several years. California businesses have been utilizing this program to support the growth of E85 distribution.

E85 has consistently sold for a discount to California reformulated gasoline of between $1.50 and $2.00 per gallon, which provides a strong incentive for consumers with flex-fuel vehicles (FFVs) to purchase the product. This is evidenced by the rapid growth of E85 sales even as the number of FFVs in California has remained relatively stable or even declined. The data supports the conclusion that the propensity for California drivers with FFVs to fuel with E85 has increased significantly.

California Monthly Average Retail Prices: E85 vs. E10 Gasoline



Source: e85prices.com

Ethanol Is Reducing GHG Emissions and Providing Air Quality and Equity Benefits, but It Can Do More

On average, the carbon intensity (CI) of ethanol sold in California is approximately 40 percent less than the California gasoline baseline, with some ethanol sold in California approximately 70 percent lower. The CI of ethanol continues to decline with the use of renewable process energy at production facilities, improvements in farm practices, the

deployment of carbon capture and sequestration, and other process efficiency improvements. RFA membership has committed to achieving carbon neutrality from its combined ethanol production no later than 2050 and is on track to achieving this important goal.[1]

Mid- and high-level blends of low-carbon ethanol in the gasoline pool represent the nearest-term and most affordable path for greater reductions of GHG emissions from the LDV fleet. California is the only state in the country that does not certify 15 percent ethanol blends (E15) as a legal fuel, and consequently consumers are paying more at the pump while also suffering higher GHG and criteria pollutant emissions. GHG emissions in 2023 would have been reduced by more than two million metric tons if all the gasoline were E15 rather than the current E10.

E85 results in even greater GHG reductions given the lower CI of ethanol. Using renewable naphtha, a coproduct of renewable diesel production, as the "hydrocarbon" portion of E85 results in a 100 percent renewable fuel that can be comparable to battery electric vehicles in reducing GHG emissions.

In addition, recent emissions testing conducted by the Center for Environmental Research and Technology at the University of California Riverside, which was financially supported in part by CARB, found that replacing E10 with E15 results in significant air quality benefits.[2] Important from a public health perspective is a statistically significant 18-percent decrease in total particulate matter (PM) emissions for E15 compared to E10. The air quality and public health benefits from high-level ethanol blends, specifically E85, would be even greater.

FFVs sell at prices that are comparable to their non-FFV counterparts and that are materially lower than the average price for an electric vehicle in California.[3] In addition, a significant number of FFVs (of various makes and models) are available in the used automobile market, providing an array of clean vehicle options for lower-income families. Combining the GHG and criteria pollutant benefits of FFVs with the lower cost of the vehicle and the fuel offers a compellingly positive equity impact for E85.

A stated goal of the CARB Scoping Plan is to rapidly displace petroleum, which is important for public health. Higher ethanol blends from E15 to E85, as a complement to

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[1] https://ethanolrfa.org/pledge

[2] https://ww2.arb.ca.gov/resources/documents/comparison-exhaust-emissions-between-e10-carfg-and-splash-blended-e15

[3] According to General Motors, adding the capability to run on E85 costs adds $70 to the production cost of each vehicle (see: https://www.reuters.com/article/gm-ethanol/corrected-gm-seeking-more-u-s-ethanol-fueling-stations-idUSN1619509020100216/). However, this cost has not historically been passed on in retail prices for FFVs, which typically have the same MSRP as the non-FFV version of the same vehicle.

electrification, can be a critical component in displacing petroleum in liquid fuels that will be part of California's transportation energy mix for decades to come. Facilitating a more rapid transition to E15 and E85 will not lead to large increases in the amount of ethanol use in California, but rather allow for a more rapid displacement of petroleum as overall liquid fuel consumption declines, as projected in the Scoping Plan.

FFVs Are Cost-Effective

FFVs have been sold in California for years, complying with all relevant California certification requirements. The incremental hardware to produce FFVs is a de minimis cost to automakers.[4] While RFA appreciates that there may be adjustments in emission systems programming for E85 when meeting criteria pollution standards, it is our understanding that these adjustments are manageable both from a cost and compliance perspective. This is particularly true if a substantial portion of light duty vehicles sold in California were FFV capable, as any cost of compliance would be spread over a larger number of vehicles.

It would be beneficial to initiate a dialog with CARB staff and automakers regarding the issues involved with California's certification of FFVs in complying with CARB's emissions standards. From a cost-benefit perspective, any incremental certification costs are offset by the overwhelming GHG, criteria pollutant, and consumer cost advantages that FFVs operating on low- to zero-carbon fuel provide.

CARB Should Require All New Vehicles with Internal Combustion Engines Sold in California to be Flex-Fuel Capable, Beginning as Early as Model Year 2026

Requiring that all LDVs with internal combustion engines (ICE) sold in California be FFVs will enable the remaining fleet of vehicles that use liquid fuels to be capable of running on low- to zero-carbon ethanol over their useful life. Additionally, for the portion of Zero-Emission Vehicle program requirements met through the sale of plug-in hybrid electric vehicles (PHEVs), requiring that PHEVs be FFVs—and therefore able to use both renewable electricity and renewable liquid fuels—will ensure GHG emissions reductions from this practical and affordable option for California consumers.

All automakers have the capability of manufacturing FFVs, and many models were available as FFVs, particularly in the period from model year 2010 to 2016. However, since the corporate average fuels economy (CAFE) and tailpipe GHG emissions credits associated with FFVs were reduced or eliminated, the production of FFVs has dramatically declined. Historical FFV availability across automakers and models is documented in the attachment to this letter.

[4] *Id*.

California has an opportunity to continue its leading position in climate action by requiring flex-fuel capability on all new car sales in the state. Unless new FFV models are available to consumers, the number of FFVs on the road in California will gradually decline, as will E85 sales, reducing the amount of low-carbon liquid fuel consumed in the state.

The recent growth in E85 sales is a prime success story of California's efforts to reduce GHG emissions while simultaneously reducing criteria pollutants, displacing petroleum, and offering consumers an affordable, practical, and equitable option in complementing the state's electrification goals. As part of potential amendments to the ACC regulation, a policy to require flex-fuel capability in new ICE vehicle sales in California is necessary to build on this success and can be a significant component in the state's efforts to achieve carbon neutrality by 2045 and beyond.

RFA appreciates California's leadership on carbon policy and looks forward to continued collaboration with CARB on the development of modifications to the ACC regulation.

Sincerely,



Scott Richman
Chief Economist

CAN YOU FLEX FUEL?

RENEWABLE FUELS ASSOCIATION

Flex Fuel Vehicle (E85) for ALL models of specified engine size

Flex Fuel Vehicle (E85) for FLEET models only of specified engine size

AUTOMAKERS / MODELS	MODEL YEAR														
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
AUDI															
Audi A4 quattro automatic					2.0L	2.0L	2.0L	2.0L							
Audi A5 quattro automatic					2.0L	2.0L	2.0L	2.0L	2.0L						
Audi A5 Cabriolet quattro automatic					2.0L	2.0L	2.0L	2.0L	2.0L						
Audi Allroad quattro automatic					2.0L		2.0L	2.0L							
Audi Q5 quattro automatic					2.0L	2.0L	2.0L	2.0L	2.0L						
BENTLEY															
Bentley Continental Flying Spur/Speed			6.0L	6.0L	6.0L	6.0L	6.0L	6.0L	6.0L						
Bentley Continental GT/Speed			6.0L	6.0L	6.0L	6.0L	6.0L	6.0L	6.0L						
Bentley Continental GTC/Speed			6.0L	6.0L	6.0L	6.0L									
Bentley Continental Supersports/ Convertible/Convertible ISR			6.0L	6.0L	6.0L										
CHRYSLER/DODGE/JEEP															
Chrysler 200							2.4L	2.4L	2.4L						
				3.6L	3.6L	3.6L	3.6L	3.6L	3.6L						
Chrysler 300			3.6L	3.6L	3.6L	3.6L	3.6L	3.6L	3.6L	3.6L	3.6L				
Chrysler Aspen	4.7L														
Chrysler Sebring Convertible	2.7L	2.7L	3.6L												
Chrysler Sebring Sedan	2.7L	2.7L	3.6L												
Chrysler Town & Country	3.3L	3.3L	3.6L	3.6L	3.6L	3.6L	3.6L	3.6L							
Dodge Avenger	2.7L	2.7L	3.6L	3.6L	3.6L	3.6L									
Dodge Caravan		3.3L													
Dodge Challenger			3.6L												
Dodge Charger			3.6L	3.6L	3.6L	3.6L	3.6L	3.6L	3.6L	3.6L	3.6L				
Dodge Dakota	4.7L	4.7L	4.7L												
Dodge Dart					2.0L	2.0L	2.0L	2.0L							
Dodge Durango	4.7L		3.6L	3.6L	3.6L	3.6L	3.6L								
Dodge Grand Caravan	3.3L	3.3L	3.6L	3.6L	3.6L	3.6L	3.6L	3.6L	3.6L	3.6L	3.6L				
Dodge Journey			3.6L	3.6L	3.6L	3.6L	3.6L	3.6L	3.6L	3.6L	3.6L				
Dodge Ram					3.6L	3.6L									
Dodge Ram 1500	4.7L	4.7L	4.7L	4.7L			3.6L	3.6L	3.6L	3.6L	3.6L				
Jeep Cherokee							2.4L	2.4L	2.4L	2.4L					
Jeep Commander	4.7L														
Jeep Grand Cherokee	4.7L		3.6L	3.6L	3.6L	3.6L	3.6L								
Jeep Renegade							2.4L	2.4L	2.4L	2.4L					
FORD/LINCOLN/MERCURY															
Ford Crown Victoria	4.6L	4.6L	4.6L	4.6L											
Ford Escape		3.0L	3.0L	3.0L					2.5L	2.5L	2.5L				
Ford E-Series Commercial Van/Wagon/	4.6L	4.6L	4.6L	4.6L	4.6L	4.6L									
Cutaway	5.4L	5.4L	5.4L	5.4L	5.4L	5.4L					6.2L				
Ford Expedition	5.4L	5.4L	5.4L	5.4L	5.4L	5.4L									
Ford Explorer					3.5L	3.5L	3.5L	3.5L	3.5L	3.5L	3.5L	3.3L			
Ford F-150			3.7L	3.7L	3.7L	3.7L	3.5L	3.5L	3.5L	3.5L	3.5L	3.3L	3.3L	3.3L	3.3L
	5.4L	5.4L	5.0L	5.0L	5.0L	5.0L	5.0L	5.0L	5.0L	5.0L	5.0L	5.0L	5.0L	5.0L	5.0L
Ford Super Duty F-250/F-350			6.2L	6.2L	6.2L	6.2L	6.2L	6.2L	6.2L	6.2L	6.2L	6.2L	6.2L	6.2L	
Ford Super Duty F-450 Chassis Cab							6.2L	6.2L	6.2L	6.2L	6.2L				
Ford Super Duty F-550 Chassis Cab							6.2L	6.2L	6.2L	6.2L					
Ford Focus				2.0L	2.0L	2.0L	2.0L	2.0L	2.0L						
Ford Fusion		3.0L	3.0L	3.0L											
Ford Police Interceptor - Utility							3.5L	3.5L	3.5L	3.5L	3.5L	3.3L	3.3L	3.3L	3.3L
							3.7L	3.7L	3.7L	3.7L	3.7L				
Ford Taurus					3.5L	3.5L	3.5L	3.5L	3.5L	3.5L	3.5L				
Ford Transit							3.7L	3.7L	3.7L	3.7L	3.7L	3.5L	3.5L	3.5L	3.5L
Ford Transit Connect								2.5L	2.5L	2.5L	2.0L	2.0L	2.0L	2.0L	
Lincoln Navigator/Navigator L	5.4L	5.4L	5.4L	5.4L	5.4L	5.4L									
Lincoln Town Car	4.6L	4.6L	4.6L												
Mercury Grand Marquis	4.6L	4.6L	4.6L												
Mercury Mariner		3.0L	3.0L												
Mercury Milan		3.0L	3.0L												
GENERAL MOTORS															
Buick Lacrosse				3.6L	3.6L	3.6L	3.6L	3.6L							
Buick Lucerne	3.9L	3.9L	3.9L												
Buick Regal			2.0L	2.0L	2.0L										
				2.4L											
Buick Verano				2.4L	2.4L										

Verify FFV capability with automaker before using E85.

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AUTOMAKERS / MODELS	MODEL YEAR														
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
GENERAL MOTORS															
Cadillac ATS					3.6L										
Cadillac Escalade/ESV/EXT	6.2L	6.2L	6.2L	6.2L	6.2L	6.2L									
Cadillac SRX				3.6L	3.6L										
Chevrolet Avalanche	5.3L	5.3L	5.3L	5.3L	5.3L										
		6.2L													
Chevrolet Caprice Police				3.6L	3.6L	3.6L	3.6L	3.6L	3.6L						
				6.0L	6.0L	6.0L	6.0L	6.0L	6.0L						
Chevrolet Captiva					2.4L	2.4L	2.4L								
Chevrolet Equinox				2.4L	2.4L	2.4L	2.4L	2.4L	2.4L						
			3.0L	3.0L	3.0L	3.6L									
Chevrolet Express		4.8L	4.8L	4.8L	4.8L										
	5.3L	5.3L	5.3L	5.3L	5.3L	5.3L	5.3L								
		6.0L	6.0L	6.0L	6.0L	6.0L	6.0L	6.0L	6.0L	6.0L	6.0L	6.0L			
Chevrolet HHR	2.2L	2.2L	2.2L												
	2.4L	2.4L	2.4L												
Chevrolet Impala	3.5L	3.5L	3.5L												
				3.6L	3.6L	3.6L	3.6L	3.6L	3.6L	3.6L	3.6L	3.6L			
	3.9L		3.9L												
Chevrolet Malibu		2.4L	2.4L	2.4L											
	3.5L	3.5L													
Chevrolet Silverado		4.8L	4.8L	4.8L	4.8L	4.3L	4.3L	4.3L	4.3L	4.3L					
	5.3L	5.3L	5.3L	5.3L	5.3L	5.3L	5.3L	5.3L	5.3L	5.3L	5.3L	5.3L	5.3L	5.3L	5.3L
	6.2L	6.2L	6.2L	6.2L	6.2L										
Chevrolet Silverado HD					6.0L	6.0L	6.0L	6.0L	6.0L	6.0L	6.0L		6.6L	6.6L	6.6L
Chevrolet Suburban	5.3L	5.3L	5.3L	5.3L	5.3L	5.3L	5.3L	5.3L	5.3L	5.3L	5.3L	5.3L			
		6.2L													
Chevrolet Tahoe	5.3L	5.3L	5.3L	5.3L	5.3L	5.3L	5.3L	5.3L	5.3L	5.3L	5.3L	5.3L			
	6.2L														
GMC Savana		4.8L	4.8L	4.8L	4.8L										
	5.3L	5.3L	5.3L	5.3L	5.3L	5.3L									
		6.0L	6.0L	6.0L	6.0L	6.0L	6.0L	6.0L	6.0L	6.0L	6.0L	6.0L			
GMC Sierra		4.8L	4.8L	4.8L	4.8L	4.3L	4.3L	4.3L	4.3L	4.3L					
	5.3L	5.3L	5.3L	5.3L	5.3L	5.3L	5.3L	5.3L	5.3L	5.3L	5.3L	5.3L	5.3L	5.3L	5.3L
	6.2L	6.2L	6.2L	6.2L	6.2L										
GMC Sierra HD					6.0L	6.0L	6.0L	6.0L	6.0L	6.0L	6.0L		6.6L	6.6L	6.6L
GMC Terrain				2.4L	2.4L	2.4L	2.4L	2.4L	2.4L						
			3.0L	3.0L	3.0L	3.6L									
GMC Yukon	5.3L	5.3L	5.3L	5.3L	5.3L	5.3L	5.3L	5.3L	5.3L	5.3L	5.3L	5.3L			
	6.2L	6.2L	6.2L	6.2L	6.2L	6.2L									
GMC Yukon XL	5.3L	5.3L	5.3L	5.3L	5.3L	5.3L	5.3L	5.3L	5.3L	5.3L	5.3L	5.3L			
	6.2L	6.2L	6.2L	6.2L	6.2L	6.2L									
Hummer H2/SUT	6.2L	6.2L													
Pontiac G6	3.5L														
JAGUAR															
Jaguar XF/XJ/XJL							5.0L								
Jaguar XJ/XJL							3.0L								
MERCEDES-BENZ															
Mercedes-Benz C 300	3.0L	3.0L	3.0L	3.0L	3.5L	3.5L									
Mercedes-Benz C 350				3.5L	3.5L	3.5L									
Mercedes-Benz CLA 250							2.0L	2.0L	2.0L	2.0L	2.0L				
Mercedes-Benz E 350							3.5L	3.5L							
Mercedes-Benz E 350 Cabriolet				3.5L	3.5L	3.5L									
Mercedes-Benz E 350 Coupe				3.5L	3.5L	3.5L									
Mercedes-Benz E 350 Sedan					3.5L	3.5L									
Mercedes-Benz GLA 250							2.0L	2.0L	2.0L	2.0L	2.0L				
Mercedes-Benz GLE 350								3.5L	3.5L	3.5L					
Mercedes-Benz ML 350				3.5L	3.5L	3.5L	3.5L								
NISSAN															
Nissan Armada (+All MYs 8th VIN is "B")	5.6L	5.6L	5.6L	5.6L	5.6L	5.6L	5.6L								
Nissan Frontier									4.0L	4.0L	4.0L				
Nissan Titan (+All MYs 8th VIN is "B")	5.6L	5.6L	5.6L	5.6L	5.6L	5.6L	5.6L								
SAAB															
SAAB 9-3 (+All MYs 8th VIN is "R")				2.0L											
SAAB 9-5 (+All MYs 8th VIN is "R")			2.0L	2.0L											
TOYOTA															
Toyota Sequoia	5.7L	5.7L	5.7L	5.7L	5.7L	5.7L	5.7L	5.7L	5.7L	5.7L					
Toyota Tundra	5.7L	5.7L	5.7L	5.7L	5.7L	5.7L	5.7L	5.7L	5.7L	5.7L	5.7L				
VOLKSWAGEN															
Volkswagen Routan (+All MYs 8th VIN is "G")				3.6L	3.6L	3.6L									

Verify FFV capability with automaker before using E85.

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Monte Shaw

From: Clean Fuels Alliance America <communications@email1.cleanfuels.org>
Sent: Wednesday, March 6, 2024 11:39 AM
To: Monte Shaw
Subject: Clean Fuels Welcomes New Mexico Clean Transportation Fuel Standard

********** WARNING **********
This email was sent from outside the company, but the name shown is of some inside the company.
This email may not really be from the person you think it is.



FOR IMMEDIATE RELEASE
March 6, 2024

For more information, contact:
Heather Buechter at 479-651-7301 or
hbuechter@cleanfuels.org

Clean Fuels Welcomes New Mexico Clean Transportation Fuel Standard

New Mexico becomes the fourth state to pass a clean fuel standard.

JEFFERSON CITY, MO - Clean Fuels Alliance America applauds New Mexico Governor Michelle Lujan Grisham for signing legislation to create a clean transportation fuel standard for the state of New Mexico. This new law will help drive demand and open a new market for biodiesel and renewable diesel, while spurring economic opportunity and creating cleaner air for New Mexicans.

The Clean Transportation Fuel Standard, House Bill 41, tasks the Environmental Improvement Board (EIB) to develop regulations to reduce transportation emissions by 20% from 2018 levels by 2030 and 30% by 2040. This technology and fuel neutral program will generate new opportunities for the renewable fuel industry to help meet these carbon emissions reduction targets.

The achievement is the result of a multi-year effort spearheaded by Rep. Kristina Ortez (D-42) and Sen. Mimi Steward (D-17). Clean Fuels Alliance America worked side-by-side with its member organizations and the Low Carbon Fuels Coalition to

develop science and technical analysis to help educate lawmakers on the positive role renewable fuels provide in low carbon policies.

“New Mexico's passage of the Clean Transportation Fuel Standard marks a pivotal moment in the state’s commitment to a sustainable future,” said Cory-Ann Wind, Clean Fuels Director of State Regulatory Affairs. “Cleaner fuels like biodiesel and renewable diesel will play a significant role in helping New Mexico reach its climate and air pollution goals.”

Jeff Earl, Clean Fuels Director of State Governmental Affairs, highlights that endorsing clean fuels not only supports environmental goals but also contributes to reducing fuel costs.

“A study by the World Agricultural Economic and Environmental Services revealed that the availability of biodiesel increases the fuel supply, resulting in an average annual reduction of 4% in diesel prices at the pump,” Earl said. “We congratulate New Mexico on passing this landmark legislation and express gratitude to Gov. Lujan Grisham for championing its advancement.”

New Mexico becomes the fourth state to pass a clean fuel standard, alongside California, Oregon and Washington.

ABOUT CLEAN FUELS ALLIANCE AMERICA

Made from an increasingly diverse mix of resources such as recycled cooking oil, soybean oil, and animal fats, the clean fuels industry is a proven, integral part of America’s clean energy future. Clean Fuels Alliance America is the U.S. trade association representing the entire biodiesel, renewable diesel and sustainable aviation fuel supply chain, including producers, feedstock suppliers and fuel distributors. Clean Fuels receives funding from a broad mix of private companies and associations, including the United Soybean Board, Nebraska Soybean Board and other state checkoff organizations.

For more information, visit cleanfuels.org.

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Ethanol Producer Magazine
3-7-24

Nissan Starts Trial Of Stationary Power Generation System Fueled By Ethanol



MARCH 7, 2024
BY NISSAN MOTOR CO. LTD.

Nissan Motor Co. Ltd. On March 5 announced that it has developed a stationary, bio-ethanol-fueled system capable of high-efficiency power generation. Trials have begun at Nissans Tochigi Plant in Japan aimed to improve power generation capacity toward full-scale operations from 2030. In 2016 Nissan became the first automotive company in the world to create a vehicular propulsion system powered by a solid oxide fuel cell (SOFC) run by bio-ethanol. Nissan is now applying this SOFC development experience to stationary power generation systems.

Features of SOFC

SOFCs can be easily paired with reformers that operate at high temperatures and can generate electricity using hydrogen obtained by reforming various types of fuels that react with oxygen, including ethanol, natural gas, and LP gas. Operations at high temperatures promote high catalytic activity, enabling the SOFC to achieve a high-power generation efficiency of 70%, compared to 60% for polymer electrolyte fuel cells (PEFCs).

Looking ahead, the development of a metal-supported cell, which is a component of the SOFC stack, will help to enhance cell strength. As a result, start-up and shutdown times can be shortened and load-following operations

can be performed in response to sudden fluctuations in output demand. This will enable effective SOFC system operation in the future, when it is anticipated that the system will be used in conjunction with renewable energy.

Procurement of raw sorghum bio-ethanol

The stationary power generation system will be fueled by bio-ethanol produced from sorghum (sorghum bio-ethanol), which has been jointly developed with Binex Inc., with fuel being procured from Binex. This component will commence from 2025.

Although sorghum bio-ethanol emits CO_2 during SOFC power generation, that CO_2 is absorbed from the atmosphere during the sorghum growth process, contributing to the realization of a carbon neutral cycle where CO_2 increases are effectively reduced to zero.

Characteristics of sorghum

1) Annual herbaceous plant of the grass family that grows quickly and can be harvested in about 3 months, enabling multiple harvests every year when grown in suitable conditions.
2) Given its adaptability to cold and dry regions, it can be grown in a wide range of regions and different soils.
3) The stem is used as a raw material for ethanol and the grain is used for food, meaning that there is no competition with food production.
4) Stem waste after pressing can also be used in biomass power generation.

Kazuhiko Murata, corporate vice president responsible for Powertrain Production Engineering and Development says: “There are major changes occurring in the transition from the internal combustion engine to electric vehicles. Nissan is taking up various technological development challenges in new areas, and SOFC power generation is one of our strengths. We will continue to contribute to the promotion of electrification and efforts toward carbon neutrality with Nissan-unique, innovative technologies.”
Nissan is committed to achieving carbon neutrality across the Company’s operations and product life cycle by 2050.

The goal is to fully electrify plant equipment by 2050 through the introduction of innovative production technologies and by reducing energy use. To achieve carbon neutrality at production plants, all electricity used will be generated from renewable energy sources or generated with onsite fuel cells that use alternative fuels.

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Considering Historical Land Use When Estimating Soil Carbon Stock Changes of Transitional Croplands

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Abstract: Understanding changes to soil organic carbon storage (SOC) requires knowledge of detailed land use history. Many satellite-based analyses of land use change have been conducted over short periods (typically 5 to 10 years) to investigate causality to a demand increase in an agricultural commodity. However, statistically significant changes in SOC are not readily observable during this time and typically require decades for meaningful differences to accrue. This study aimed to determine land use and soil organic carbon stocks on land parcels over 36 years (1985–2021) located in areas where historical land use transitions between cropland and non-cropland are prevalent. Aerial and satellite imagery were analyzed across 25,992 hectares in ten counties across the Corn Belt. Grower interviews were conducted to solicit feedback on the drivers of land use change. Finally, SOC analyses associated with land use changes were determined using two process-based models. Analysis showed that 371 of the parcels had remained in cropland, 611 parcels transitioned into non-cropland, and 18 parcels were identified as non-cropland. The grower surveys indicated that the most common reasons for returning land to crop was the difficulty getting land re-enrolled in the CRP and reduced cattle prices. Both the SALUS and GREET-CCLUB models were parameterized to assess soil carbon changes for the respective land use history, and both models returned consistent SOC increases at the county level over time.

Keywords: land cover change; agriculture; cropland change

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1. Introduction

Evaluating the environmental and economic impacts of land use change (LUC) for land that moves in and out of cropland over decadal time periods is hampered by a lack of 'real world' data and the inherent uncertainty associated with determining SOC stock and changes due to these interconversions. These transitional lands include fallow or idle cropland, unused land, cropland–grassland, cropland–pastureland, and combinations of these. Economic models relied upon by policy decision makers assess land area changes associated with agricultural demand changes (e.g., Purdue's GTAP model [1]). These models rely on transitional land categories (among others) when predicting where LUC occurs. However, determining the impact from these land type conversions on SOC stock changes and subsequent greenhouse gas (GHG) emissions calculations via carbon accounting models is subject to substantial debate [2,3]. For example, several models are employed to account for SOC stock changes due to conversion of land to crop (the most common are AEZ-EF [4], GREET-CCLUB [5], Globiom [6], and IPCC [7]), with results differing widely, primarily due to the SOC release assigned to these transitional lands.

In particular, the conversion from grassland to cropland has received much attention in the literature. Many of these studies focus on a short time period, typically using as a starting year the enactment of the Renewable Fuels Standard in 2008 for increased demand for biofuels and ending in 2012–2016. For instance, Lark et al. used the USDA Cropland

Data Layer (CDL), an annual satellite-based land cover classification of the United States, and identified 2.98 million acres of conversion of natural lands to agriculture [8] for the time period of 2008 to 2012, although Lark et al. later wrote a paper cautioning against the use of the CDL for land use change to crop [9]. Copenhaver et al. analyzed the CDL and found the potential for error was much greater than acres identified as change, again showing that the use of the CDL alone for short-term land use change is questionable [10]. Likewise, the research by Wright et al. [11] and the World Wildlife Fund [12] used annual change in the CDL since 2008 and the CDL from 2006 to 2011, respectively. All of these studies assumed land converted to crop was never in crop prior to the year of conversion. Thus, in previous studies, a short time horizon of only 4–8 years for land use change assessments was often deemed sufficient to inform land use responses to biofuel policies. In contrast, the present study focuses on a much longer time horizon, 1985–2021 (36 years), and investigates broader drivers for land use change. However, it is still challenging to spatially identify and classify transitional land boundaries that allow matching of the land area with associated SOC stock and changes due to land use transitions.

More recent research analyzing longer-term land use change has shown that there has been a net decline in cropland since the 1980s. This would match the statistical data released by the USDA National Agricultural Statistics Service [13]. One study looked at satellite imagery to measure cropland variations from 1992 to 2015 [14]. This study found a decline in cropland in North America, primarily to human settlements. Another study by Auch et al. analyzed satellite imagery for the United States from 1985 to 2016 and found a net decline of 109,233 square kilometers [15].

Studies which have directly discussed the transition of lands from grassland to crop have cited problems delineating transitional areas with satellite imagery. Studies that utilized the CDL for land change assessments cited the low accuracy and the difficulty in separating grassy crops such as hay and alfalfa from grasses [16]. Another study which focused on southeastern South Dakota found that the accuracy for grassland identification could be as low as 38.9% [17].

Current voluntary carbon market initiatives that work with agricultural cropland use different models and methodologies to determine SOC stocks and changes, and as such are also likely to generate different values and payments for the same LUC operations. Moreover, many regulatory low-carbon transportation policies including the California Low Carbon Fuels Standard (LCFS), the Carbon Offset Reduction Scheme for International Aviation (CORSIA), and the European Union's Energy Directive assess induced land use change (iLUC) for individual feedstocks that are converted into biofuels. SOC stock changes are also added to the carbon cycle emissions of the production pathway of a biofuel which then influences its attractiveness as a compliance fuel under a low-carbon fuel standard. The practical significance of the present research is that understanding the associated carbon implications of transitional lands will ultimately help better inform the carbon policies.

To better understand the lands transitioning to crop, this study investigated 1000 land parcels across 10 counties in six Midwestern states, constituting 25,992 hectares (Figure 1). Each parcel was located in areas that have been identified as conversion from grassland to crop in previous studies for transitional land. The present study (a) provides a yearly assessment of each parcel's land use and any LUC based on a novel approach combining three separate remote sensing methods, (b) conducts in-depth grower interviews to gain an understanding of the drivers for the land conversions, and (c) determines corresponding SOC stock and SOC stock changes for the observed land uses and changes using two independent crop models. This study is innovative in that it combines satellite imagery with aerial imagery to determine long-term land use for parcels identified as change from natural lands to cropland in a previous study, which is used in many models to assess SOC changes. It also calculates the new SOC change values for these parcels using two different models to determine how long-term land use impacts these values.

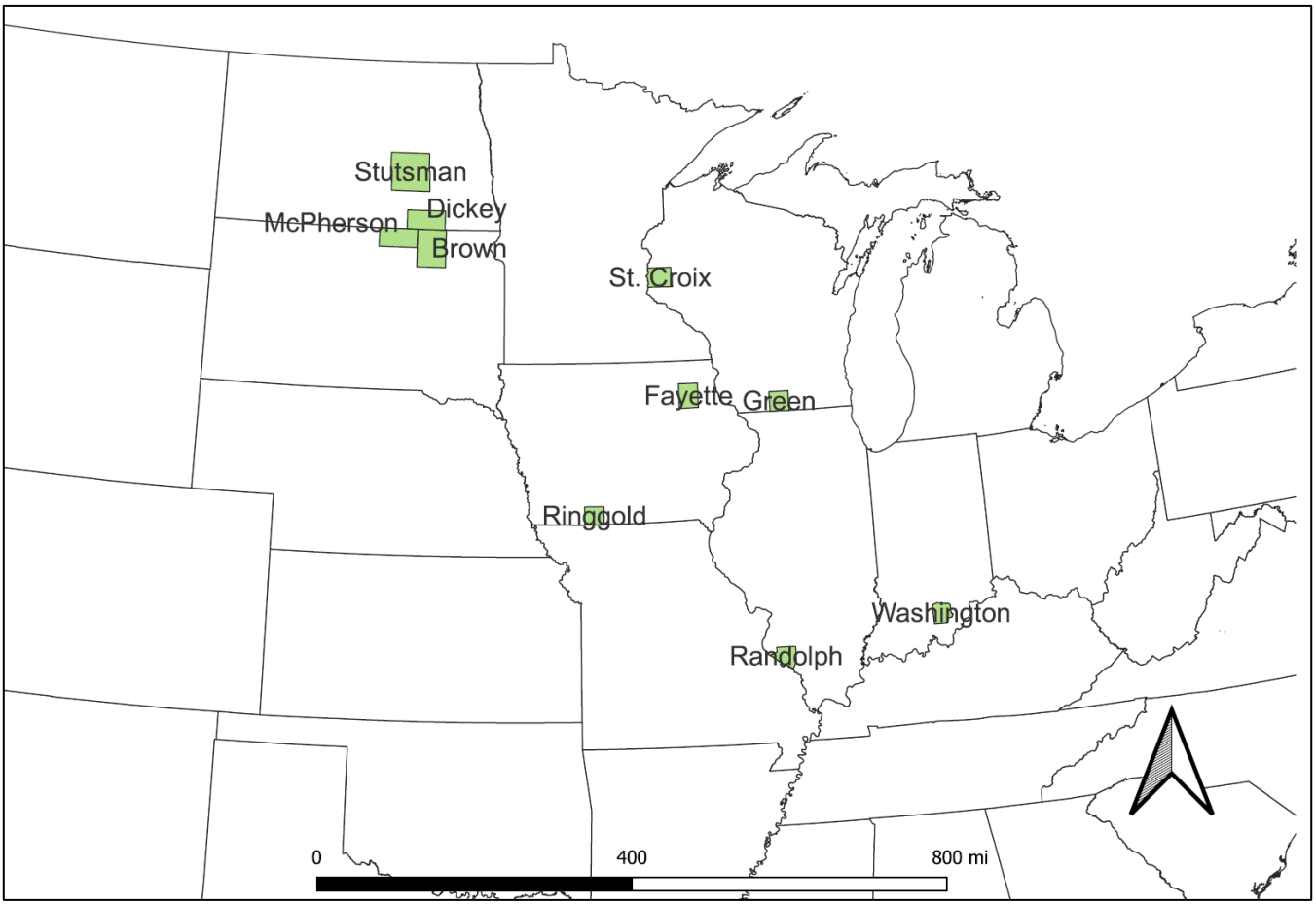


Figure 1. Locations of study counties.

2. Materials and Methods

2.1. Land Use Identification

This study assessed land use for the period from 1985 to 2021 using three separate methods (Figure 2). Aerial imagery from the 1980s and 2000s was visually inspected for land use. Normalized Difference Vegetation Indices (NDVIs) developed from monthly composites of Landsat satellite imagery for the month of June were analyzed for land use. These images display higher values in June where natural vegetation is growing as crops have not emerged yet. Finally, NDVI values developed using the LandTrendr [18] algorithm on Landsat composites for spring, summer, and autumn were analyzed for the parcels. The LandTrendr algorithm was used to develop temporal curves which, when displayed in Google Earth Engine, displayed an averaged NDVI value for each parcel in spring, summer, and autumn for each year from 1985 to 2021. Parcels in crop will typically show a distinctive three-point curve with low spring and autumn values and high summer values. Crop-free fields typically have higher values in the spring and autumn from existing perennial vegetation but lower summer values. After a parcel was assessed using all three methods, a decision was made as to whether the parcel was in crop or in natural vegetation for each year. Figure 2 demonstrates the much higher peaks of the annual, temporal curves for crop and the more subdued curves for natural vegetation.

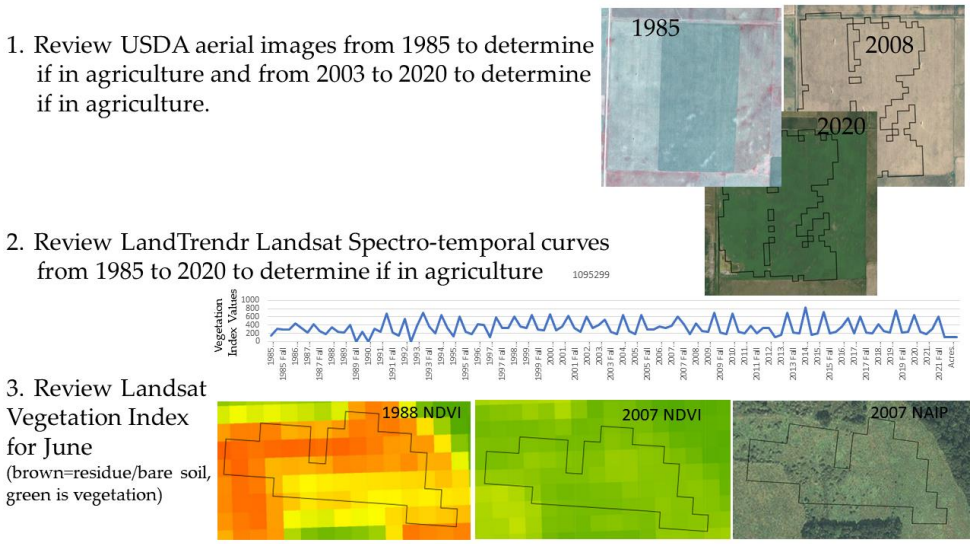


Figure 2. Three methods for estimating land use from 1985 to 2020 for 100 points in each county.

In six states (responsible for 47% of corn planted in the United States in 2022 [13]: Iowa, Illinois, Indiana, North Dakota, South Dakota, and Wisconsin), a total of ten counties (one or two per state) were selected for analysis. Parcels that were previously identified by Lark et al. in a recent paper as grassland-to-cropland changes between 2008 and 2016 were considered [19]. The areas identified by Lark et al. overlap with areas previously identified by another research group for land use change [11]. In the present work, the 100 largest parcels in ten counties identified in the Lark paper for land use change were accessed and analyzed for land use change between a longer time horizon (1985 to 2021) using three different remote-sensing-based methods.

In the first method, USGS and USDA aerial imagery was reviewed for land use (Figure 3). There are several features in aerial imagery that indicate cropland or natural vegetation. Crops will grow uniformly throughout a parcel, while natural vegetation may have different patterns in the parcel and grow in clumps based on the amount and type of plants growing. Crops often have linear features indicative of rows. Natural vegetation may have little circles indicating shrubs or trees. Crops will be green in visible light photography and red in near-infrared photography, while natural vegetation may appear grey or brown in visible light and pink or grey in near-infrared. Also, occasionally, hay fields will have bales of hay somewhere in or near the field.

Imagery from two different government imagery programs was used: the USGS National High-Altitude Photography (NHAP) [20] and the USDA National Agriculture Imagery Program (NAIP) [21]. The NHAP program collected aerial photography from 1980 to 1989. Some of the imagery was black and white, while other imagery was color infrared (a combination of near-infrared and visible bands). The imagery was digitized and is available from the United States Geological Survey (USGS) EarthExplorer website with spatial resolutions from 1 to 4 m. The imagery is not georeferenced. The project used corner coordinates to create an approximate georeferencing to assist with finding parcels. One-meter imagery was available from 1983 to 1985 (depending on state) for all parcels.

The NAIP program offers aerial imagery collected in agricultural states on an annual or biennial basis (Figure 4). The spatial resolution of the imagery ranges from 1 to 2 m, and is either visible bands (red, green, and blue bands) or visible and near-infrared (red, green, blue, and near-infrared bands). For this study, a visual assessment of NAIP from 2003 to 2020 (depending on availability for each state) was used to identify potential land use.

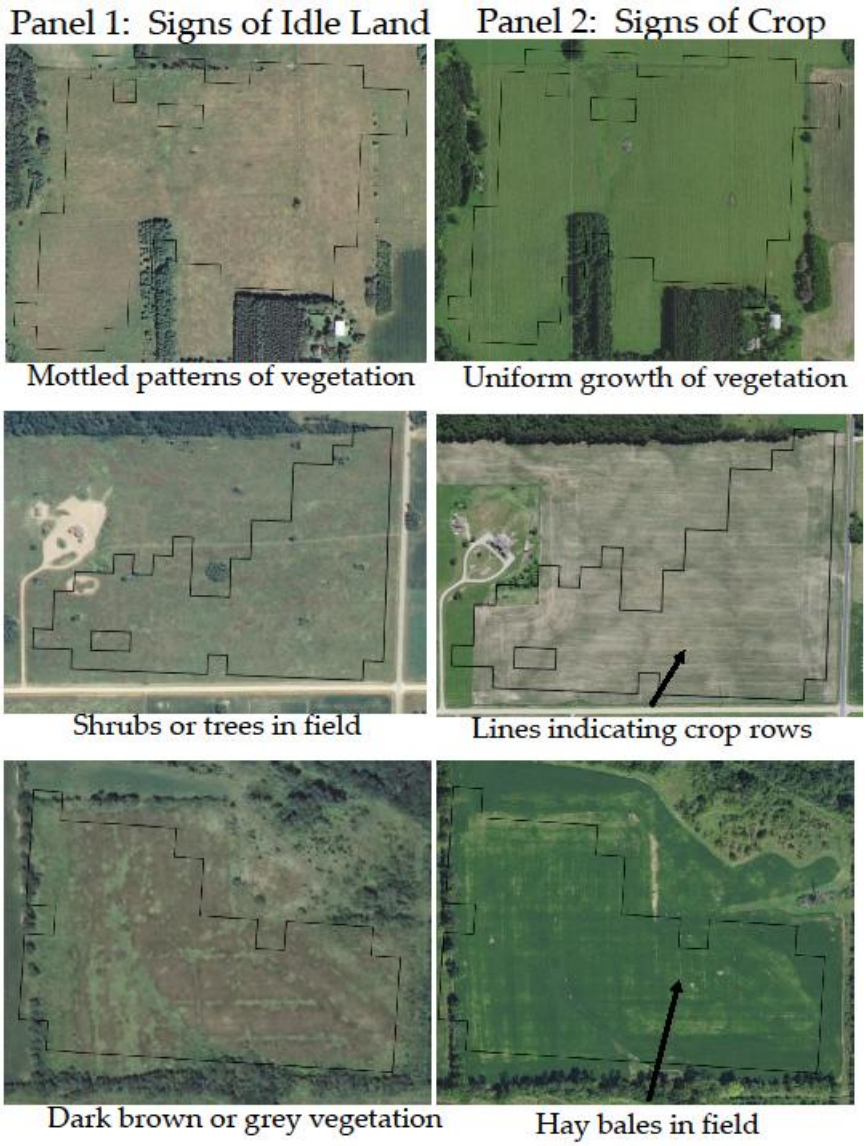


Figure 3. Examples of methods used to delineate crop and idle parcels using USDA NAIP imagery. Arrows indicate location of lines indicating crop rows and locations of hay bales.

States	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Illinois		■	■	■	■		■	■	■	■		■	■		■		■	
Indiana	■	■	■	■	■		■	■		■		■		■		■		■
Iowa		■	■	■	■	■	■	■				■	■		■		■	
South Dakota	■	■	■	■		■		■		■		■		■		■		■
North Dakota	■	■	■	■			■	■		■		■	■	■	■	■	■	■
Wisconsin		■	■	■	■	■		■			■		■		■	■		■

Figure 4. Years with NAIP imagery for each state from 2003 to 2020 (in grey).

A series of Landsat satellites, including Landsat 1 (1972), Landsat 2 (1975), Landsat 3 (1978), Landsat 4 (1982), Landsat 5 (1984), Landsat 6 (1993), Landsat 7 (1999), Landsat 8 (2013), and Landsat 9 (2021), have been launched into orbit. Beginning with Landsat 4 in 1982, the Thematic Mapper instrument was included [22]. The Thematic Mapper offers continuous 30 m imagery in several bands in the visible and near-infrared range. The satellites only scan the same location on the earth's surface once every 17 days and are impacted by cloud cover, sometimes limiting coverage. For the second method in this

study, NDVI images were developed using Landsat 5, 7, and 8 using composite images for June of each year from 1985 to 2021 in Google Earth Engine. The imagery was corrected to surface reflectance removing atmospheric effects and a brown-to-green color scale was applied. Parcels with orange or yellow NDVI values (lower values) in June were crop (bare soil or residue) in June while parcels with green values (higher values) are likely natural vegetation as the vegetation is in the field all year and will start to grow with the warm weather in June (Figure 5).

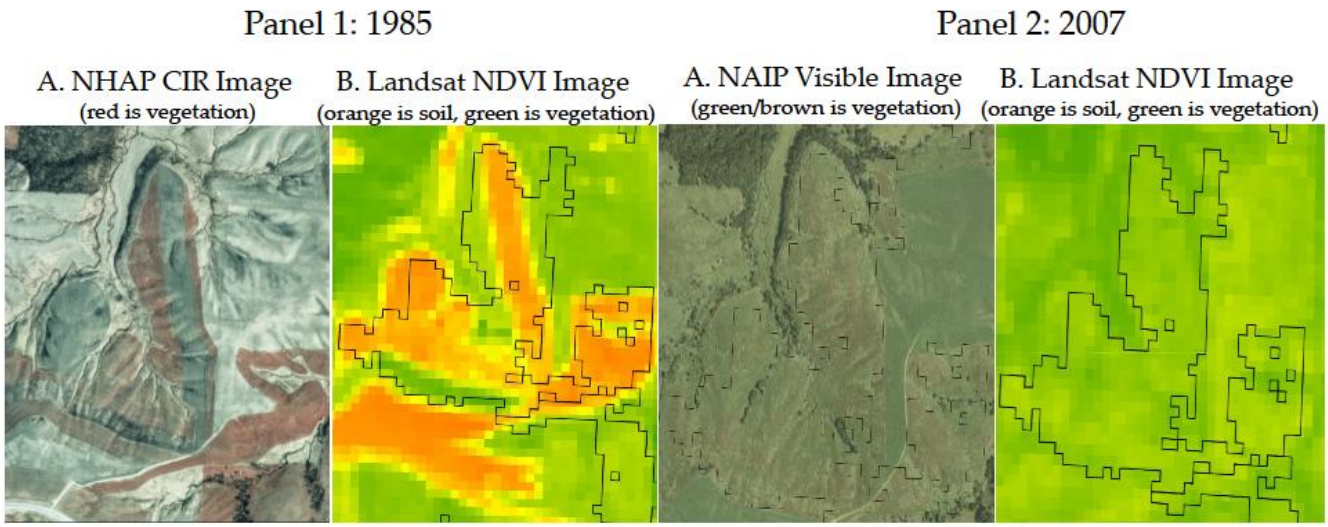


Figure 5. Examples of land in crop and land in vegetation in aerial images and June Landsat NDVI.

For the third step, spectro-temporal curves were analyzed for each year using the LandTrendr algorithm. The LandTrendr algorithm is a time-series analysis technique for remote sensing and land cover change studies. It was developed to automatically detect and quantify changes in satellite imagery over time. By processing multiple temporal images, LandTrendr identifies changes in land cover. The algorithm is based on pixel-level spectral trajectories and can effectively distinguish between long-term land cover trends and short-term disturbances. For this study, spectro-temporal curves were created using LandTrendr in Google Earth Engine for each year from 1985 to 2021 for composite Landsat images in the spring (April–May), summer (mid-July to mid-August), and autumn (mid-October to mid-November). Graphs of these curves were plotted alongside the imagery of each parcel to assist in the land use assessment. Parcels with the lowest values in spring and autumn and highest numbers in summer in a particular year are crop with bare soil in the spring, vibrant vegetation in the summer, and low values after harvest. Parcels with the highest values in spring and fall and lowest values in summer are likely natural vegetation as the parcel are not uniformly planted and do not receive fertilizer and other elements that improve growth in the summer and are growing on the parcel in the spring and autumn (Figure 6). The parcel in Figure 6 has low spring/autumn to high summer LandTrendr values from 1985 to 2000, more subdued curves from 2001 to 2008, and more low spring/autumn LandTrendr values with high summer values from 2009 to 2021. This, combined with the aerial imagery and spring NDVI values for this parcel, led to the parcel being identified as an active crop field from 1985 to 2000, fallow or CRP from 2001 to 2008, followed by a return to crop in 2009.

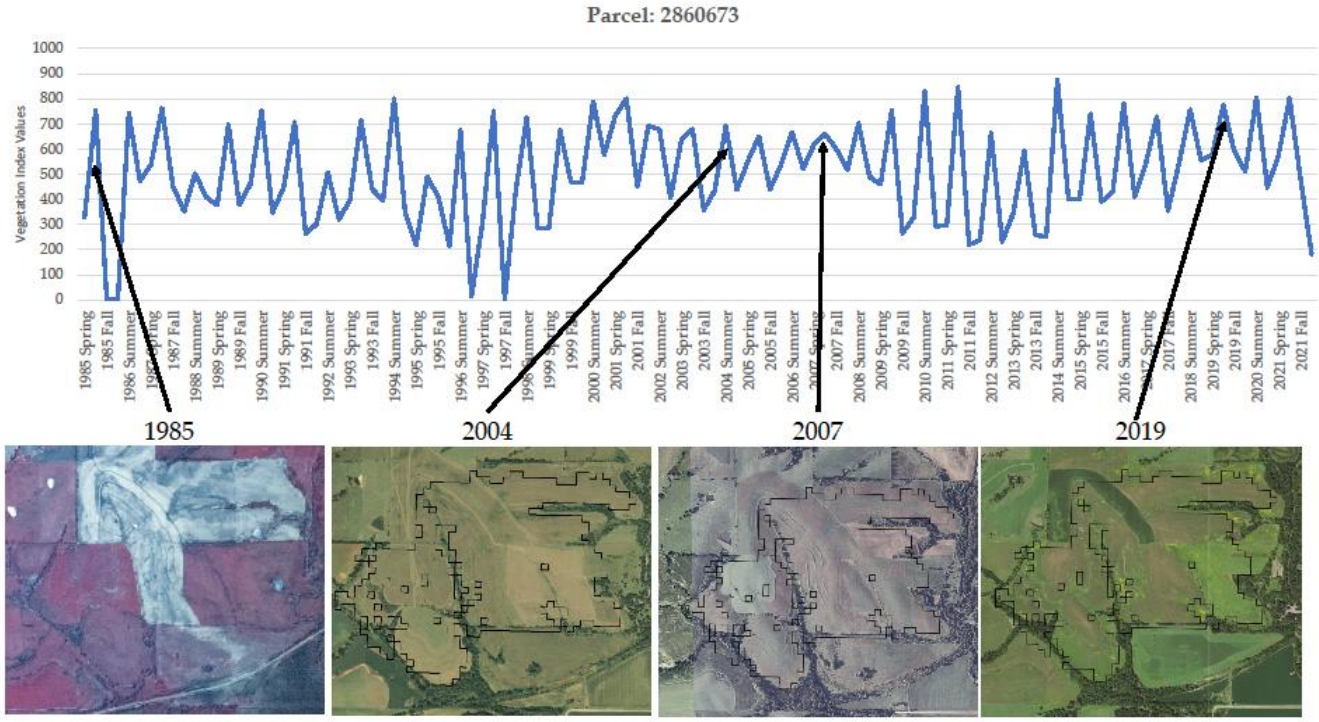


Figure 6. Example of LandTrendr annual spectro-temporal curves for a parcel that transitioned between idle and crop.

2.2. Drivers of Land Use Change

To better understand the drivers for land use change, a list of landowners for parcels identified as change was sent to each respective state corn-grower association involved in the study. The grower associations identified farmers who were members that would be willing to provide an interview and were a good representation of farmers in the area and provided contact information. Detailed interviews were conducted with these growers. In total, nineteen farmers from four states (Stutsman and Dickey counties in North Dakota, Brown County in South Dakota, Fayette County in Iowa, and Washington County, Indiana) were interviewed regarding their land use decisions. Interviewing methods included telephone conversations, video meetings, and a Google Forms questionnaire (Appendix A). This is a small sample size, but it can be difficult to get farmers to discuss their on-farm practices. The Google Forms questionnaire was developed with the cooperation of the state grower associations. The grower associations provided many good questions which were focused specifically on the growers in their state. They also identified privacy concerns for the farmers and requested answers given or data provided by a single farmer not be included in this paper to protect this privacy. Each farmer had one to two parcels identified as conversion constituting close to 400 hectares associated with potential change to crop. The study used telephone and video meetings to follow up and ask more detailed questions after the Google Form was filled out by the farmer. These could last anywhere from 15 min to over an hour depending on the extent of the parcels identified as change, the willingness of the grower to speak, and other answers provided in the Google Forms questionnaire.

2.3. Carbon Change Assessment

The study analyzed SOC change from the parcels' transitions between crop and non-crop using the System Approach to Land Use Sustainability (SALUS) model developed at Michigan State University. SALUS models crop, nutrient, soil, and water conditions at a daily time step using different management techniques. SALUS was parameterized to assess CRP type vegetation species for the non-crop years rotating with reduced-till corn for the crop years [22–24]. Reduced-till corn for the crop year was based on a separate

survey by the USDA which showed a trend that most crop acres have been in some form of reduced tillage system, with 65% of all corn acres farmed under this practice [25,26].

The findings were then compared to the model results from the surrogate soil organic carbon model (SSOC) database that is part of the Carbon Calculator for Land Use and Land Management Change from Biofuel Production (CCLUB) developed by Argonne National Laboratory, which is integrated with the Greenhouse Gas Regulated Emissions in Technologies (GREET) model for greenhouse gas life cycle emissions modeling of biofuel pathways [5]. The SSOC model is originally based on Century, and it models SOC changes from land use change on a county-by-county basis for two different soil depths (30 cm and 100 cm) while averaging values for the two dominant soil textures in each county [27,28]. SSOC and SALUS are both process-based models that take weather, plant biomass, and soil textures into consideration among other variables [29]. SSOC aggregates the resulting carbon assessment by biomass feedstock and management practice to the county level, taking the two dominant soil textures of each county into consideration. SALUS is also a process-based model that measures outcomes down to the sub-field level [30].

3. Results

3.1. Land Use Identification

One thousand parcels of land were analyzed for this study, with results shown in (Figure 7). It was found that between 1985 and 2021, 371 of the parcels (9583 hectares) were in continuous cropland, 611 parcels (15,451 hectares) were transitioned into non-cropland and back to cropland at some point in the 36-year period (1985 to 2021) (CRP, idle, fallow). No parcels transitioned out of and back into crop more than once. Eighteen parcels (1.8%) (888 hectares) in cropland in 2021 did not appear to be in cropland in 1985 and were labeled as grassland-to-crop conversions for SALUS and CCLUB. This contrasts with Lark et al. [8], who found grassland-to-cropland conversion for all 1000 parcels between 2008 to 2016.

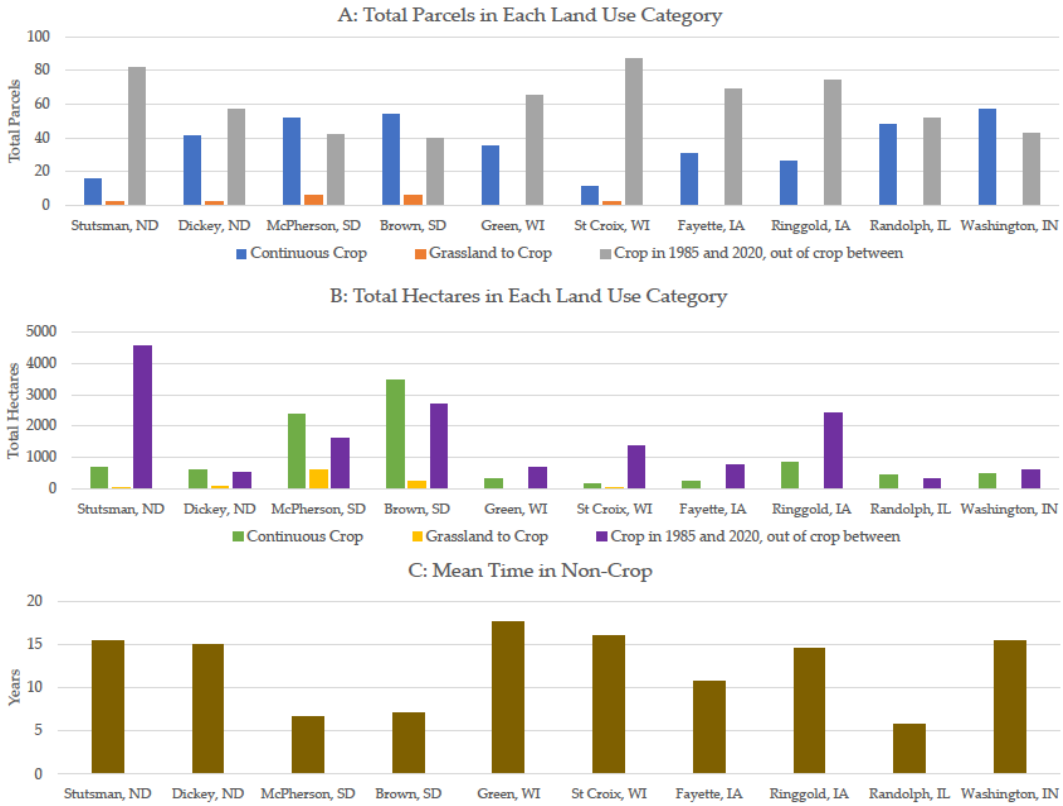


Figure 7. Statistics for land use analysis. Subfigure (**A**) shows total parcels in each land use cate-gory, Subfigure (**B**) shows total hectares for each land use category, and Subfigure (**C**) shows the average number of years parcels were out of crop for counties.

For the parcels with transitions into non-cropland, the average non-crop phase across all parcels lasted 13.3 years. Using Brown County, SD as an example (Figure 8), 42 of the 100 parcels were in non-cropland for some period during 1985–2021. These periods were short (average 7.1 years), with only one parcel in non-cropland longer than in cropland during the full time period.

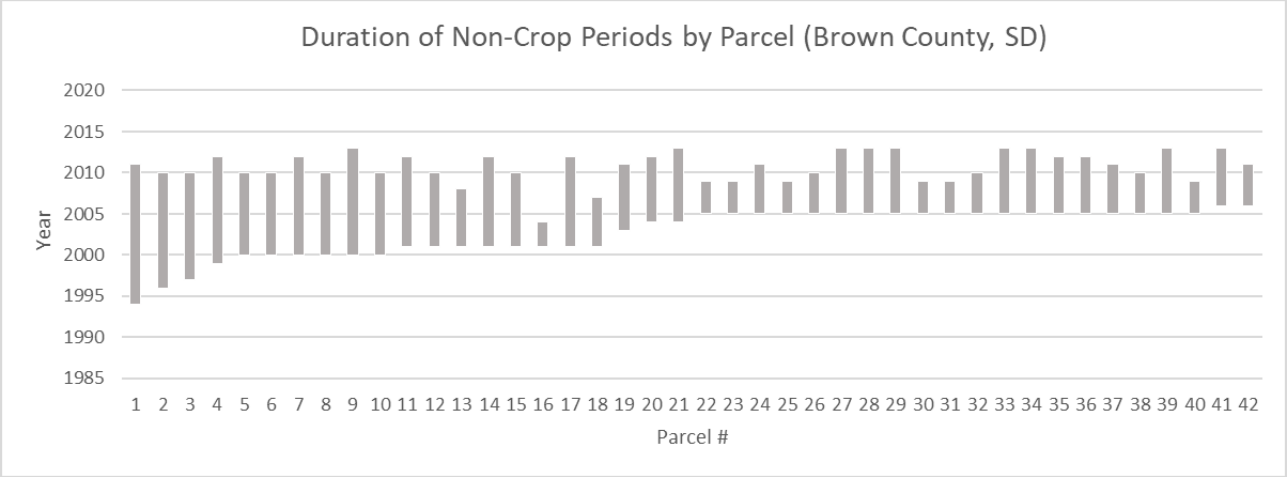


Figure 8. Duration of non-crop periods by parcel in Brown County, South Dakota.

3.2. Farmer Surveys: Drivers of Land Use Change

The study returned nineteen grower surveys from four states (Stutsman and Dickey counties in North Dakota, Brown County in South Dakota, Fayette County in Iowa, and Washington County in Indiana). The surveys and interviews showed that of parcels in non-cropland, those in the Conservation Reserve Program (CRP) were the most likely to be returned to cropland. The most common reason provided for returning this land to active cropland was the difficulty in getting the land re-enrolled in the CRP (Figure 9). Other reasons given for returning land to cropland included low cattle prices when converting pasture and an improved return-on-investment analysis when looking at potential crop yields based on soil quality and increased rainfall patterns in the northwestern Corn Belt. South Dakota farmers cited a 2012 state tax law that taxes land above a given soil fertility calculated value as agriculture whether it is in crop or not. Those interviewees pointed towards a change in circumstances from their current practice rather than increased corn demand for their change in land use. These findings of drivers behind land use change are generally more consistent with Claasen et al. [31], who cite a broad range of often location-specific reasons for land transitions [31]. Importantly, more fields transitioned before 2008 (67%) than after 2008 (33%), indicating that 2008 was not likely a trigger point for additional land use conversion.

However, once changing circumstances confront farmers to return land to agriculture, they cited the use of the productivity index or soil fertility index in making decisions. Some marginal lands have been returned to the CRP or used for buffer strips in the field. The origins of land that was converted shows very little natural grassland. Many stated that they knew some of their land had to be left in grass or trees to reduce erosion and improve drainage. Farmers stated that if land is being returned to production, the parcels considered and chosen will be land previously in crop, as it is easier to clean up (remove rocks and stumps, etc.) than natural lands. Farmers also stated that the cost/return for land previously in agriculture is better known than for native grasslands and is therefore the choice for re-enrollment into agriculture.

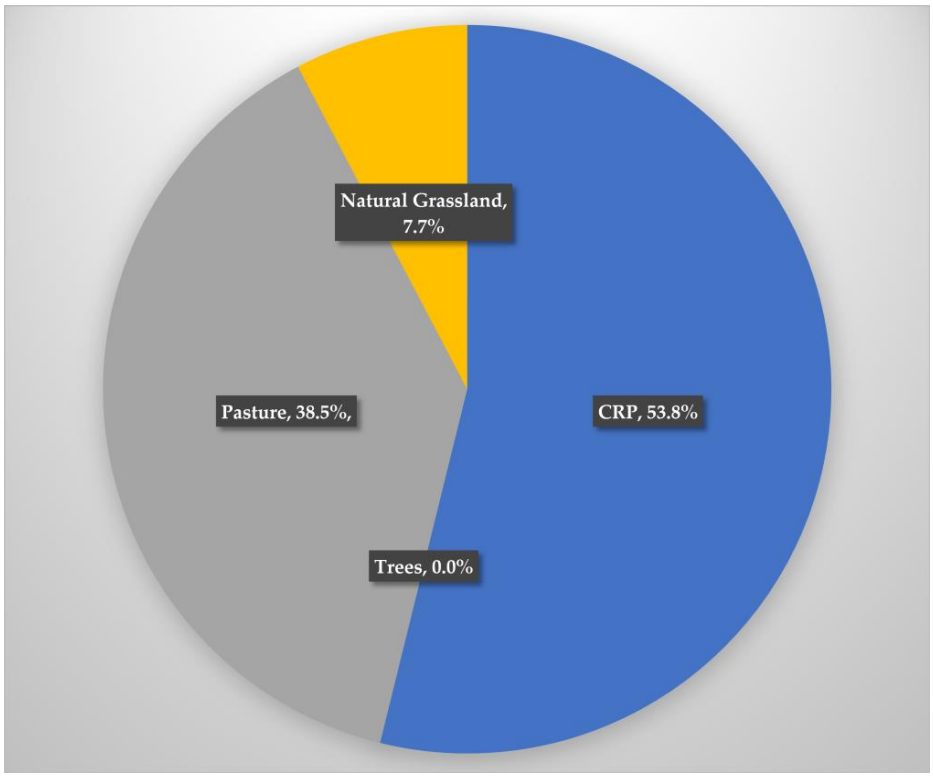


Figure 9. Land conversions by surveyed farmers.

3.3. Carbon Change Implications

The land use was used to parameterize SALUS for carbon stock assessment. SALUS shows mean positive delta soil organic carbon values across all counties and yearly model observations indicating increasing SOC (Table 1) with the larger mean carbon deltas observed for parcels which were "non-crop" for a period of years during the 36-year time period (1985 to 2021) than for "continuously in crop" (Table 2). Soil carbon deltas are sorted for all observed model values from largest losses to largest gains for crop and non-crop parcels and shown in Figure 10. The SOC values for "crop" in SALUS show larger soil carbon deltas, resulting both in larger SOC depletions and SOC gains than the "non-crop" SOC yearly observations.

Table 1. Soil carbon results for different models.

State	County	SALUS Average	Delta kgC/ha-Year^{-1}		SALUS Linear Trendline over Time x	CCLUB
			SALUS Min	SALUS Max		
North Dakota	Stutsman	309	−1204	2899	0.1498x	298
North Dakota	Dickey	374	−1069	3628	0.1815x	371
South Dakota	McPherson	350	−1717	3707	0.1699x	511
South Dakota	Brown	350	−1267	2229	0.1703x	227
Wisconsin	Green	515	−2139	4324	0.2508x	364
Wisconsin	StCroix	408	−1633	4191	0.1985x	259
Iowa	Fayette	572	−1504	4146	0.2782x	321
Iowa	Ringgold	513	−1141	4386	0.2492x	289
Illinois	Randolph	610	−1357	3042	0.2966x	167
Indiana	Washington	571	−659	2780	0.2777x	197

Table 2. Soil carbon results by crop vs. non-crop land use.

	Crop	Non-Crop
Parcels	371	629 *
Number of Annual Model Observations	14,711	21,073
Max (kgC/ha-year^{-1})	4386	3026
Min (kgC/ha-year^{-1})	−1809	−956
Average (kgC/ha-year^{-1})	377	515

* Note: includes 18 parcels that can be considered permanent conversions in non-crop.

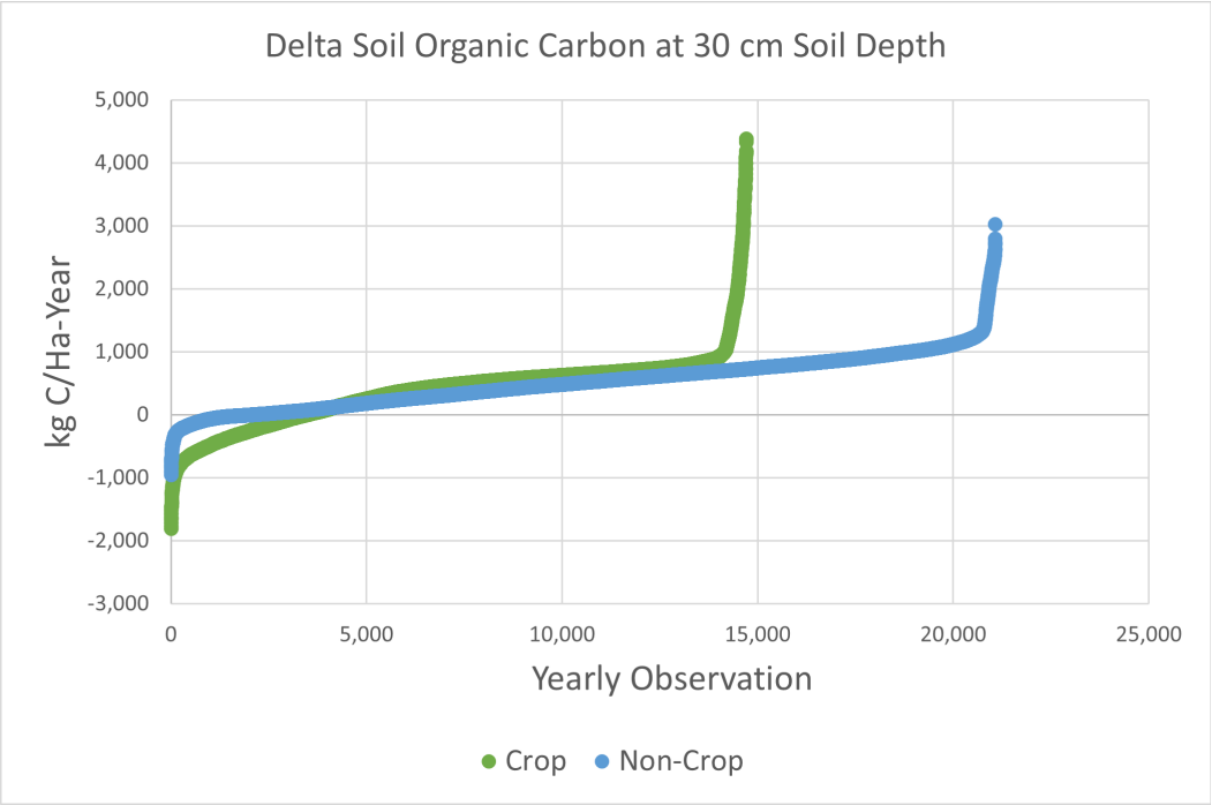


Figure 10. SALUS model soil carbon delta for crop and non-crop parcels.

However, the delta soil organic values are increasing year over year as shown in Figure 11 for Brown County ND as an example county. This finding is consistent across all assessed counties (as indicated by the trendline equation shown for each county in Figure 11. This means that, in the aggregate, the studied parcels, despite their transitionary land use, will not observe soil carbon losses under our modeled assumptions.

The 30 cm SALUS SOC values are compared to the cropland-pasture values transitioning to reduced-till corn at 30 cm soil depth for the respective counties in CCLUB [5] (Figure 1). Despite methodological differences and different forms of spatial aggregation, both models produce similar results when simulating transitionary crop and non-crop areas. Specifically, both models produce mean positive soil carbon deltas at the county-level resolution.

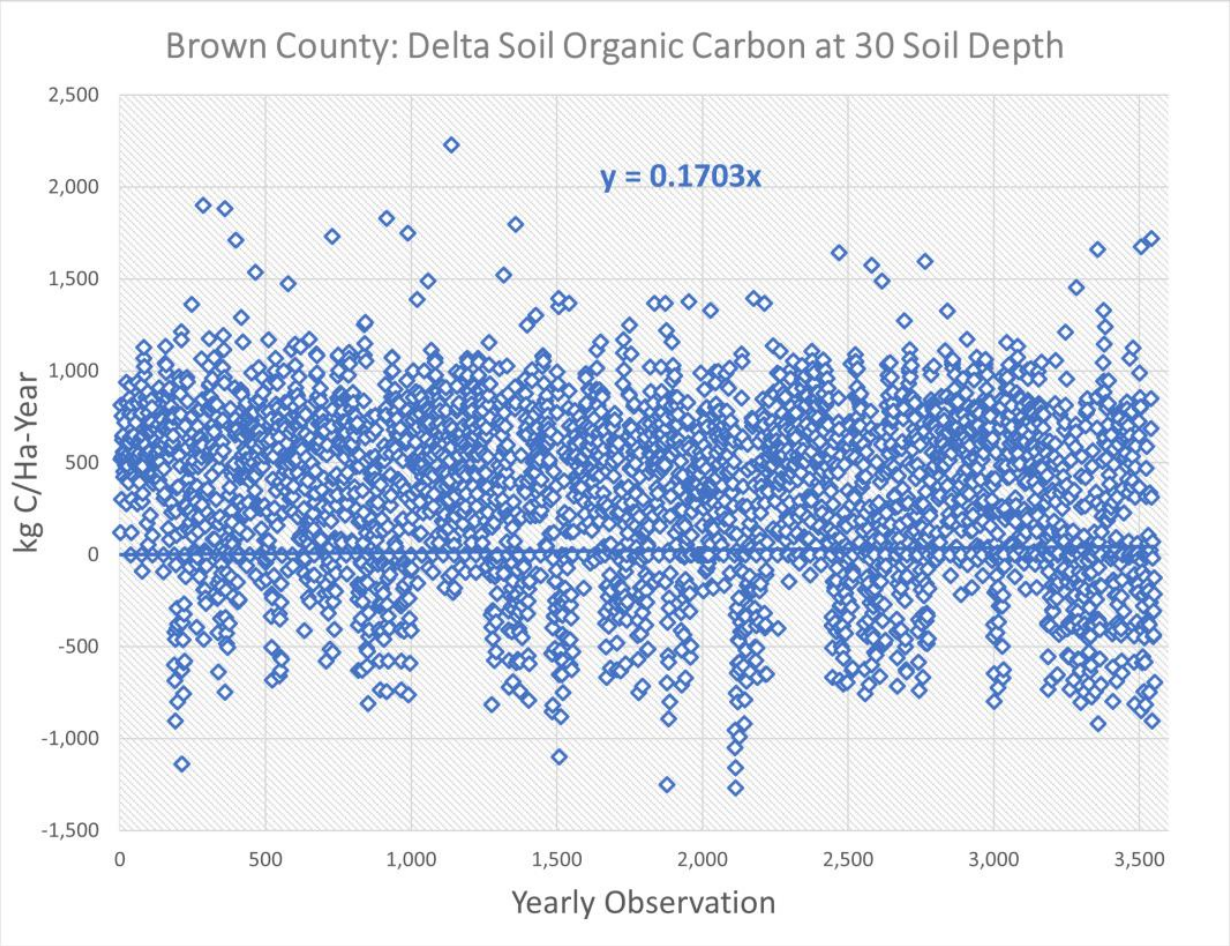


Figure 11. Soil carbon deltas for Brown County.

4. Discussion

4.1. Land Use Identification

Across 1000 analyzed parcels and close to 36,000 yearly observations, the analysis showed that 371 parcels remained continuously in cropland, while 611 parcels did go into "non-crop" (CRP, idle, pasture, or fallow) for a few years from 1985 to 2021. This would make the latter category a subset of a defined land category in computable general equilibrium models termed the cropland–pasture category. This category is often accessed in these models when land conversions in response to price signals are expected. Only 18 parcels (1.8%) appeared to come from land not in crop in 1985 and constitute grassland-to-crop conversions.

All these parcels were delineated as change from natural grassland to crop in the Lark et al. analysis. Lark primarily used the USDA Cropland Data Layer (CDL) to develop the dataset used. Other studies such as Wright and Wimberly [11] and the World Wildlife Fund's Plowprint Report [12] also used the CDL as a primary data source. While part of the issue with the satellite-based CDL is its accuracy for non-agricultural classes, this study has shown that the choice of the time horizon is also significant. Each of the above studies began their analysis in or close to the year when agricultural demand increased and did not consider lands previously in crop that were available for crop production with reduced SOC implications.

4.2. Drivers of Land Use Change

The underlying drivers for land use change were explored with 19 detailed farmer interviews across the studied counties. The study found that the land to be returned to crop

was agricultural land in the Conservation Reserve Program (CRP) followed by pastureland. Reduced cattle prices and changing tax structures (taxing land above a soil quality value as agriculture whether it is in crop or not) and difficulty getting the land re-enrolled in the CRP were key drivers for converting pasture [31,32]. The interviewees pointed towards a change in return from their current practice rather than increased corn demand for their change in land use.

Based on the surveys, farmers take much more into consideration than current demand when determining land use for a given year. Other land uses such as cattle production or conservation, long-term return on investment, and weather play important roles. Also important is that farmers are more likely to use land previously in agriculture when increasing agricultural land. These parcels are typically more productive and easier to convert to crops.

4.3. Carbon Change Assessment

The SOC changes were estimated using both the SALUS and the GREET-CCLUB model. SALUS was specifically parameterized using the crop and non-crop time intervals for each parcel. Both models returned consistent results when parameterized with cropland–pasture type vegetation species rotating in and out of reduced-till corn-on-corn rotations, with both carbon models returning, on average, positive soil carbon deltas. In SALUS, the soil carbon deltas are larger for parcels alternating between "crop" and "non-crop" rotations when compared to parcels that are consistently in "crop". However, lands consistently in "crop" also exhibit mean average positive soil carbon values.

Previous research on the same parcels that the present paper studied focused on a narrow time window (e.g., 2008–2016) and labeled land use change within that time frame as grassland-to-cropland conversions and postulated biofuel production to be the driver of land conversion. The present work, however, finds that 98.2 percent of the same parcels referenced in the literature were in agriculture in 1985 and toggled between crop and non-crop uses based on a variety of drivers. Importantly, the study finds that lands transitioning to agricultural lands from pastureland, idle, fallow, and unused state were agricultural lands in the past and not native grasslands. This is corroborated with farmer interviews who mentioned that land-clearing costs are much lower for previous agricultural lands than for native grasslands.

5. Conclusions

The analysis presented in this paper aims to increase the understanding of transitional land that changes between crop and non-crop uses with respect to the underlying patterns, drivers, and carbon implications. Methodologically, the analysis is based on (a) identifying the land use patterns of 1000 parcels from 1985 to 2021 with a combination of several remote-sensing tools including USDA NAIP imagery analysis combined with satellite-based geospatial evaluations, followed by (b) in-depth grower interviews to understand the drivers for land use change, and (c) an assessment of the carbon implications resulting from the identified land use patterns.

Across 1000 analyzed parcels and close to 36,000 yearly observations, the analysis showed that 371 parcels remained continuously in cropland, while 611 parcels did go into "non-crop" (CRP, idle, pasture, fallow) for a few years from 1985 to 2021. This would make the latter category a subset of a defined land category in computable general equilibrium models termed the cropland–pasture category. This category is often accessed in these models when land conversions in response to price signals are expected. Only 18 parcels (1.8%) appeared to come from land not in crop in 1985 and constitute grassland-to-crop conversions.

The underlying drivers for land use change were explored with 19 detailed grower interviews across the studied counties. The study found that the most likely land to be returned to crop was agricultural land in the Conservation Reserve Program (CRP) followed by pastureland. Reduced cattle prices and changing tax structures (taxing land above a soil quality value as agriculture whether it is in crop or not) and difficulty getting the

land re-enrolled in the CRP were key drivers for converting pasture. Interestingly, the interviewees pointed towards a change in return from their current practice rather than increased corn demand for their change in land use.

The carbon implications were assessed using both the SALUS and the GREET-CCLUB model. SALUS was specifically parameterized using the crop and non-crop time intervals for each parcel. Both models returned consistent results when parameterized with cropland–pasture type vegetation species rotating in and out of reduced-till corn-on-corn rotations, with both carbon models returning, on average, positive soil carbon deltas. In SALUS, the soil carbon deltas are larger for parcels alternating between "crop" and "non-crop" rotations when compared to parcels that are consistently in "crop". However, lands consistently in "crop" also exhibit mean average positive soil carbon values.

Previous research on the same parcels that the present paper studied focused on a narrow time window (e.g., 2008–2016) and labeled land use change within that time frame as grassland-to-cropland conversions and postulated biofuel production to be the driver of land conversion. The present work, however, finds that 98.2 percent of the same parcels referenced in the literature were in agriculture in 1985 and toggled between crop and non-crop uses based on a variety of drivers. Importantly, the study finds that lands transitioning to agricultural lands from pastureland, idle, fallow, and unused state were generally agricultural lands in the past and not native grasslands. This is directly corroborated with grower interviews who mentioned that land-clearing costs are much lower for previous agricultural lands than for native grasslands.

Furthermore, when two prominent process-based soil carbon models were parameterized with the parcels' specific geography and a transition between corn (reduced till) and CRP vegetation species, both models returned increasing soil carbon values across all parcels. In conclusion, the present work points to the need to conduct any land use change analysis over much longer periods of time than is often practiced to fully incorporate a parcel's land use history. Secondly, land that is returned out of the CRP, fallow, idle, or temporary pasture state into a corn cropping pattern (reduced till) will still show, on average, increasing soil carbon levels over time. A key practical significance of this research is that the increase in soil carbon over a longer time horizon for transitional land can now properly be reflected in carbon accounting models that access these transitional lands for additional bioenergy and biofuel feedstock production. Finally, agricultural organizations working with growers should ensure that conservation management practices are continuously encouraged as these practices ensure that the carbon deltas after any land conversion remain continuously positive.

The limitations of this study include the potential for error by the classifier when conducting visual assessments of year-over-year land use and overlap between the spectral response of crops, especially hay, and idle cropland. Future research in this area should include carbon implications from a comprehensive suite of climate smart agricultural practices (cover crops, no-till, and manure application) and include additional parcels in the western Corn Belt where land use drivers may differ.

Author Contributions: Conceptualization, S.M.; Methodology, K.C.; Formal analysis, S.M.; Investigation, S.M.; Writing—original draft, K.C.; Writing—review & editing, S.M.; Supervision, S.M.; Project administration, S.M.; Funding acquisition, S.M. All authors have read and agreed to the published version of the manuscript.

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Data Availability Statement: All data except for individual farmer interviews will be made available upon request.

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Conflicts of Interest: Author Kenneth Copenhaver was employed by the company CropGrower LLC. The remaining author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Appendix A

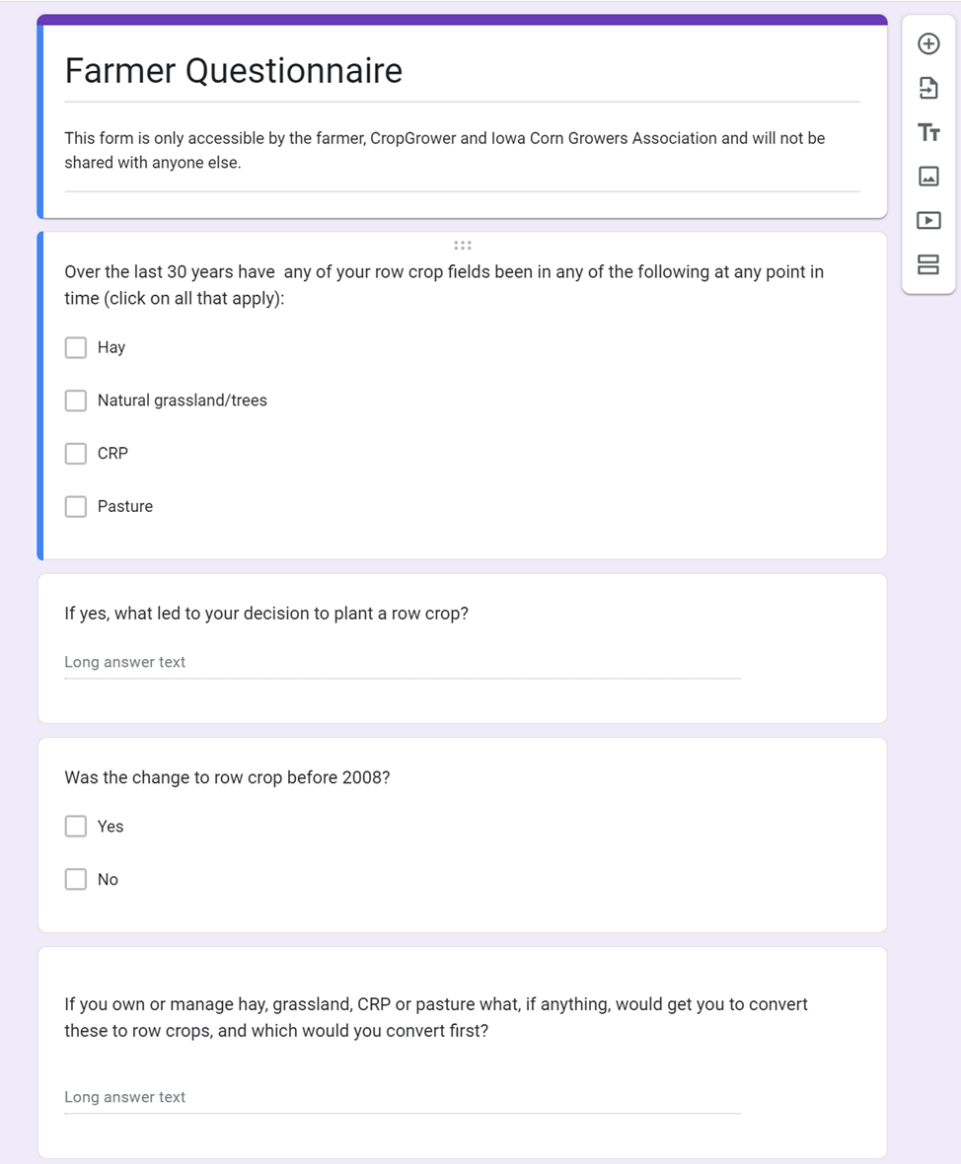


Figure A1. Template for Farmer Questionnaire.

References

1. Tyner, W.; Taheripour, F. Biofuels, policy options, and their implications: Analyses using partial and general equilibrium approaches. *J. Agric. Food Ind. Organ.* **2008**, *6*, 2. [CrossRef]
2. Taheripour, F.; Mueller, S.; Kwon, H.; Khanna, M.; Emery, I.; Copenhaver, K.; Wang, M. Comments on "Environmental Outcomes of the US Renewable Fuel Standard". 2021. Available online: https://greet.es.anl.gov/files/comment_environ_outcomes_us_rfs (accessed on 14 December 2023).
3. Emery, I.; Mueller, S.; Qin, Z.; Dunn, J. Evaluating the Potential of Marginal Land for Cellulosic Feedstock Production and Carbon Sequestration in the United States. *Environ. Sci. Technol.* **2017**, *51*, 733–741. [CrossRef] [PubMed]
4. Plevin, R.; Gibbs, H.; Duffy, J.; Yui, S.; Yeh, S. Agro-Ecological Zone Emission Factor (AEZ-EF) Model 2014. No. 1236-2019-175. Volume 47. Available online: https://ageconsearch.umn.edu/record/283433/ (accessed on 14 December 2023).

BIPARTISAN INFRASTRUCTURE LAW
Funding Opportunities

The Bipartisan Infrastructure Law (BIL) and Inflation Reduction Act (IRA) provide EPA with historic investments of **over $100 billion** combined, designed to deliver a wide range of environmental programs; advance environmental justice by prioritizing low-income and disadvantaged communities; and combat climate change by supporting clean energy investments and reducing greenhouse gas emissions and other air pollutants.

SCAN THIS QR CODE TO ACCESS A SUMMARY OF CURRENT AND UPCOMING FUNDING OPPORTUNITIES

BIPARTISAN INFRASTRUCTURE LAW

The BIL provides EPA with over $60 billion over five years, the bulk of which supports new and existing programs related to water infrastructure, land cleanup, revitalization, recycling, air quality via clean school buses, and pollution prevention.

Water Infrastructure >$50 billion

Provides non-competitive supplemental funding to the Drinking Water ($11.7 billion) and Clean Water ($11.7 billion) State Revolving Funds (SRFs), as well as money for lead service line replacement ($15 billion) and emerging contaminants ($10 billion), including the Water Infrastructure Improvements for the Nation Grant Program. It also provides funding for EPA's Geographic programs ($1.7 billion) and other regional waters programs ($267 million), like the Mississippi River/Gulf of Mexico Hypoxia Task Force.

Clean School Buses $5 billion

Provides funding via rebates and competitive grants for the replacement of existing school buses with zero-emission and low-emission models.

***Eligible Applicants**: States, tribes, local governments, public charter school districts, eligible contractors, and nonprofit transportation associations.*

***Timeline**: The FY 2023 Rebate Program is open now through Jan. 31, 2024. The FY 2023 Grant Program closed Aug. 22, 2023.*

EPA BIL
Funding Opportunities

Land Cleanup, Revitalization, and Recycling $5.4 billion

Funds additional Superfund site cleanup work ($3.5 billion) and brownfields revitalization ($1.5 billion). Other funding supports two new waste management and recycling programs:

Solid Waste Infrastructure for Recycling Grants ($275 million)
Provides competitive grants to implement the National Recycling Strategy to improve post-consumer materials management and infrastructure.
***Eligible Applicants**: States and territories, political subdivisions (e.g., counties, cities, towns), and tribes and intertribal consortia.*
***Timeline**: The solicitation periods for these competitions are currently closed.*

Consumer Recycling Education and Outreach Grants ($75 million) Provides competitive grants for projects that share information about residential/community reuse, recycling, and/or composting programs, including accepted materials, as well as those that increase collection rates and decrease contamination.
***Eligible Applicants**: States, territories, tribes, local governments, nonprofits, and public-private partnerships.*
***Timeline**: The solicitation period for this competition is currently closed.*

Pollution Prevention $100 million

Supports additional funding for EPA's Pollution Prevention (P2) Program and the development of two, new environmental justice P2 competitive grant programs to provide source reduction technical assistance to businesses (e.g., reduce water or energy use) to improve human health and the environment in low-income and disadvantaged communities.
***Eligible Applicants**: States, territories, and tribes and intertribal consortia.*
***Timeline**: The solicitation periods for these competitions are currently closed.*



December 2023

INFLATION REDUCTION ACT
Funding Opportunities

The Bipartisan Infrastructure Law (BIL) and Inflation Reduction Act (IRA) provide EPA with historic investments of **over $100 billion** combined, designed to deliver a wide range of environmental programs; advance environmental justice by prioritizing low-income and disadvantaged communities; and combat climate change by supporting clean energy investments and reducing greenhouse gas emissions and other air pollutants.

SCAN THIS QR CODE TO ACCESS A SUMMARY OF CURRENT AND UPCOMING FUNDING OPPORTUNITIES

INFLATION REDUCTION ACT

EPA received **$41.5 billion*** in Congressionally appropriated funds through the IRA to support **24 new and existing programs**. Six new EPA programs account for 98% of this funding.

EPA also expects to receive approximately **$11.7 billion in revenue from reinstating the Superfund Tax on oil and gas production.*

Greenhouse Gas Reduction Fund $27 billion

Provides competitive grants via three competitions to mobilize financing and leverage private capital for clean energy and climate projects that reduce GHG emissions and other air pollutants.

National Clean Investment Fund ($14 billion) Funds 2-3 national nonprofits to partner with the private sector to finance tens of thousands of clean technology projects nationwide.

***Eligible Applicants**: EPA will not provide grants directly to projects, but to eligible nonprofit recipients. Individuals and organizations seeking financing for qualified projects will need to engage grantees.*

***Timeline**: This competition closed on Oct. 12, 2023. Selected grantees will be announced in spring 2024.*

Clean Communities Investment Accelerator ($6 billion) Funds 2-7 hub nonprofits to build the capacity of community lenders to finance clean technology projects in low-income and disadvantaged communities.

***Eligible Applicants**: EPA will not provide grants directly to projects, but to eligible nonprofit recipients. Individuals and organizations seeking financing for qualified projects will need to engage community lenders supported by grantees.*

***Timeline**: This competition closed on Oct. 12, 2023. Selected grantees will be announced in spring 2024.*

Solar for All ($7 billion) Funds up to 60 grants to deploy and expand access to solar energy for low-income and disadvantaged communities.

***Eligible Applicants**: States, territories, tribes, municipalities, and eligible nonprofit recipients.*

***Timeline**: This competition closed on Oct. 12, 2023. Selected grantees will be announced in spring 2024.*

SCAN THE QR CODES FOR MORE INFORMATION AND UPDATES

December 2023

EPA IRA Funding Opportunities

Climate Pollution Reduction Grants $5 billion

Two-stage program that provides grants to tribes, states, territories, air pollution control agencies, and local governments to develop and implement plans for reducing greenhouse gas emissions and other harmful air pollutants.

Planning Grants ($250 million) Awards non-competitive grants to develop/update climate pollution reduction plans, strategies, and priority activities.
***Timeline**: Award allocations were distributed to eligible entities in summer 2023.*

Implementation Grants ($4.6 billion) Awards competitive grants to implement measures from priority climate action plans developed/updated through the planning grants.
***Timeline**: Two competitions are open now – General (open through April 1, 2024); Tribes and territories only (open through May 1, 2024).*

Methane Emissions Reduction Program $1.55 billion

Funds grants and technical assistance to states to accelerate emission reductions from petroleum and natural gas systems; also establishes a methane waste emissions charge starting at $900/ton in 2024 and increasing to $1,500/ton by 2026.
***Timeline**: One competition closed on Oct. 20, 2023. Others to follow.*

Environmental and Climate Justice Program $3 billion

Funds a wide range of climate and environmental justice activities (e.g., zero-emission technologies, infrastructure improvements) that benefit low-income and disadvantaged communities.
***Timeline:** Competition closes on Nov. 21, 2024. Applications are accepted on a rolling basis.*

Funding to Address Air Pollution at Schools $37 million

Provides grants to monitor and reduce pollution and greenhouse gas emissions at schools in low-income and disadvantaged communities.
***Timeline:** Competition closes on March 19, 2024.*

The following IRA programs are also IN DEVELOPMENT:

Clean Heavy-Duty Vehicle Program $1 billion

Provides grants, rebates, and contract support to replace heavy-duty vehicles with zero-emission alternatives, including necessary infrastructure improvements and workforce development.

Clean Ports Program $3 billion

Awards rebates and grants for ports to purchase and install zero-emission technology and develop climate action plans to reduce air pollution.

December 2023

CAAFI® 2024 Priorities

At a high level, CAAFI's goals and priorities regarding sustainable aviation fuels (SAF) remain unchanged from previous years. They are:

- **Reinforcement of the Value Proposition of SAF**: communications, outreach, stakeholder engagement.
- **Enhancement of the SAF Fuel Qualification Approach**: participate, advise, and facilitate producer engagement in the ASTM qualification process.
- **Alignment of Efforts to Enable Commercial SAF Deployment**: leverage research, partner across U.S. government agencies, facilitate partnerships among supply chain stakeholders, and support innovative fuel acquisition processes.
- **Implementing and Sharing Best Practices**: provide tools, share best practices and integrate information to support communication and understanding among diverse stakeholders.
- **Supporting the Implementation of the SAF Grand Challenge Roadmap:** Leverage the above activities to facilitate the execution of the work streams and activities in the Roadmap.

The U.S. government has released the Sustainable Aviation Fuel (SAF) Grand Challenge Roadmap that lays out the current state and future research, analysis, commercial, and policy needs to reach the SAF Grand Challenge Goals of three billion gallons of SAF per year by 2030 and full replacement of petroleum-based jet by 2050. In light of this effort, CAAFI will continue the activities outlined below in 2024.

CAAFI 2024 Work Plan: Leverage CAAFI strengths to align efforts supporting implementation of the U.S. SAF Grand Challenge Roadmap

Given the ambition of the 2030 goal, CAAFI will focus on the immediate needs to reach three billion gallons of annual SAF production by coordinating current and future activities and managing processes for engaging public and private stakeholders from aviation, energy, and agriculture industries, academia, and government, including:

- **Convening a broad exchange of information among SAF stakeholders** at:
    - Our regularly scheduled CAAFI webinars.
    - Conferences, workshops, and ad hoc meetings.
- **Providing information resources and credible expert technical support** to the SAF community through:
    - An updated and cohesive communications strategy to leverage a range of outlets for technical information and information exchange.
    - An updated CAAFI website with greater functionality, usability across devices, and expanded content.
    - Continued and expanded direct interaction with supply chain participants who seek out CAAFI leadership for information, advice, and coordination with other entities.
    - Continued and expanded dissemination of information through events, conferences, interviews, written articles, and journal publications.

- **Coordinating and aligning with U.S. Government Agencies' activities in support of the SAF Grand Challenge:**
    - Regularly coordinating with the Federal Sustainable Aviation Fuels Interagency Working Group on needs, goals, and priorities.
    - Providing input on SAF Grand Challenge execution and performance tracking and supporting SAF Grand Challenge work team efforts and tasks.
    - Communicating federal funding and program developments to the broader SAF community.
    - Communicating the need for long-term, sustained policy support to meet the SAF Grand Challenge goals.
    - Working with stakeholders to develop key SAF communications and informational materials (e.g., infographics) that:
        - Reference the best available data
        - Highlight the potential economic benefits (employment, etc.), environmental, and social benefits of SAF.
        - Promote consistency for coherent and clear messaging.
- **Facilitating ongoing efforts by ASTM International** on:
    - Development of a specification for synthesized aviation fuels that can be used at higher blend levels up to 100% (complete) synthesized fuels.
    - Assessment of options for a more generalized specification for synthesized fuels based on composition and other characteristics.
    - Evaluation and approval of new synthesized fuel pathways.[1]
    - Establishment of additional specifications leveraging existing refining infrastructure to produce SAF.
    - Support for clearinghouse, prescreening, and other SAF testing for fuel analysis and qualification in collaboration with the FAA-funded ASCENT Center of Excellence.
- **Promoting harmonization of sustainability evaluation approaches and tools** by:
    - Facilitating broader acceptance of methodologies to assess the environmental, social, and economic performance of SAF.
    - Facilitating research, demonstration, and commercial scale projects relating to regenerative agriculture/soil organic carbon sequestration.
    - Fostering integration with developments in carbon capture and sequestration.
    - Identifying concerns about carbon management and permanence with supply chain partners.
- **Continuing and expanding international engagement** through:
    - Input to the International Civil Aviation Organization through events and direct engagement with working group participants.

[1] Synthesized fuels under ASTM D7566 can include any fuels that are sourced from non-petroleum feedstocks, as defined in the annexes. Recently, some parties have used "synthetic" fuels to specifically differentiate power-to-liquid/e-fuels from bio-based fuels. We are using the ASTM terminology of "synthesized fuels" to refer to fuels from a range of feedstocks including biological and waste-based fuels as well as fuels synthesized directly from other carbon and hydrogen sources.

    - Coordination with other CAAFI-like organizations around the globe to align and complement work efforts.
    - Collaboration with global SAF stakeholders on messaging.
- **Leveraging the above efforts to advance the use and commercial production of SAF** by fostering strategic partnerships, identifying opportunities and aligning deployment efforts.
    - Facilitating team development to respond to funding opportunities to develop novel feedstocks, SAF commercialization projects, and supply chains.
    - Supporting the development of commercial agreements across the SAF supply chain to enable SAF production and use.
    - Fostering other supply chain development and deployment partnerships.
    - Developing an approach to collaboration with the established biofuel and energy industry and the agricultural sector.

The CAAFI Quarterly

Q4 2023

This CAAFI Quarterly newsletter describes the CAAFI activities that occurred October through December 2023. In this issue, we share industry updates and CAAFI team accomplishments.

We appreciate questions, comments, and suggestions at any time. Enjoy!

Steve Csonka and the CAAFI Team

A Note from the Executive Director

Celebrating Chris Tindal: It is with mixed emotions that we highlight that Chris Tindal, our good friend and colleague, has retired from his role as CAAFI's Assistant Director, effective at the end of 2023. Chris worked for CAAFI for nearly 6 years following his retirement from a 40 year career in the Navy. In his last role with the Navy, Chris was the Director for Operational Energy underneath the Deputy Assistant Secretary of Navy for Energy, where he facilitated setting energy policy and direction for the Department of the Navy and promoting the adoption of alternative fuels and renewable energy resources. He also had a lead role in execution of the Great Green Fleet deployment in 2016. Chris will continue to be engaged in various SAF development activities in the U.S. and abroad, and will continue to liaise with CAAFI via our Steering Group and State Initiative efforts. We wish him the best as he recalibrates to a retirement-appropriate work-life balance that includes plenty of sailing. Thanks Chris.

Quick Links

⇒ CAAFI is looking to hire!

⇒ Check out "What's New" for a brief review of noteworthy SAF news from the last quarter, including funding opportunities.

⇒ Go to "Ask CAAFI", a segment that highlights and explains relevant topics that impact the SAF industry.

⇒ Get updates regarding the "SAF Grand Challenge".

⇒ Go to "CAAFI Webinars", a segment that highlights and links to webinars that occurred during this period.

⇒ See "CAAFI Team Highlights" for a snapshot of CAAFI work teams' projects and progress last quarter.

⇒ Jump to "SAF State and Regional Efforts" for a summary of select deployment projects around the United States.

Upcoming

⇒ CAAFI Webinars:
- SAF Repository at Paine Field, Jan 30, from 1-2p EST.

⇒ Greater MSP SAF Hub webinar, in conjunction with UT and ASCENT, Jan 31.

⇒ CAAFI / Airline Industry engagements at:
- RSB Innovations Meeting, Feb 07, Cincinnati, OH.
- USDA Annual Agricultural Outlook Forum, Feb 15-16, Arlington, VA and Virtual.
- International Biomass Conference & Expo, Mar 04-06, Richmond, VA.
- CFAA Clean Fuels Conference, Mar 05-08, Fort Worth, TX.
- CFAA 2024 Sustainability Workshop, Mar 11-13, Kansas City, MO.
- ABLC, Mar 13-15, Washington, D.C.
- NREL Sustainable Aviation Conference, Apr 01-03, Dallas, TX.

⇒ Be prepared for two announcements of significance related to R&D funding opportunities for feedstock development;

- USDA NIFA AFRI SAS RFA is expected to be released in the next month. It will likely be very similar to last year's RFA (likely 10 five-year projects at $10M each), with perhaps some language tweaks that reinforce projects targeting SAF. Both CAAFI and USDA staff are available to discuss opportunities and project ideas – please reach out if you're interested in connecting on this topic.
- Replying to this DOE NOI to get on the Teaming Partner List for the pending FOA.

CAAFI is looking to hire new personnel!

Further to the previous announcement about Chris Tindal's retirement, and as we pre-announced in 2Q of 2023, we are now in the process of adding CAAFI resources to help address the expanding scope of SAF development. We're seeking thought leaders who will further foster the development and commercialization of SAF, and ultimately help the entire U.S. aviation industry, government, and public meet the goals of the SAF Grand Challenge. On 22 Jan, 2024, everyone receiving this newsletter also received an email announcement of the job postings for one CAAFI Assistant Director (AD), and up to two Project Directors (PD). The role on which we are most focused at present is the AD role. The PD roles have similar knowledge requirements but will be more focused on specific project/task management and execution, and thus have less stringent expectations for industry experience.

If you have interest in positioning yourself with us as we work to finalize our specific experience requirements, qualifications, and responsibilities, please reach out to info@caafi.org with your interest and resume. Your inquiries will be treated confidentially.

What's New?

We continue to see significant offtake and commercialization announcements, as well as engagement from new producers.

Azure Announces Plans for SAF Facility in Kansas

U.S. DOE Announced Intent to Fund R&D for Low Carbon, Purpose Grown Energy Crops

British Columbia Enacts First SAF Mandate in North America

GE Completes SAF Testing on 10th Aircraft Engine Model

U.S. Department of Treasury and IRS Released Guidance on the SAF Credit Established in the IRA

UK's First Ever DAC to SAF Facility Operational

Infinium Receives Investment Commitment for PtL eFuels Facility

American Airlines Paying to Sequester Carbon

ICAO Members Agree to 5% CO2 Emissions Reduction

Gulfstream Completed Trans-Atlantic Flight on 100% SAF

Virgin Atlantic Flies First Commercial Trans-Atlantic Flight on SAF

Neste Aims to Ramp Up SAF Production Capacity

ICCT Study Examines Feasibility of SAF Grand Challenge Targets

PETRONAS and Idemitsu Sign MOU to Accelerate SAF Development

Indonesia's Pertamina Developing SAF

Garuda Indonesia Completes Test Flight with SAF Derived from Palm Oil

World Energy and Microsoft Announced Long-term Agreement for the Purchase of SAF Certificates

Emirates Signs SAF Deal with Shell

Air Company Demonstration Facility Under Construction

The above are just some of the activities that took place in Q3, but many more can be found (e.g. SAF Magazine, Biofuels Digest, Biofuels International, GreenAir Online, , etc.).

Ask CAAFI

Question: What are CAAFI's priorities in 2024?

Answer: At the end of each year, the CAAFI Leadership team prioritizes CAAFI activities for the coming year.

We base this on feedback from the CAAFI Steering Group and membership, informal feedback from industry and partners, and on our own observations about challenges and needs in the marketplace. Based on this input, at a high level, CAAFI's goals and priorities regarding sustainable aviation fuels (SAF) remain similar to previous years, more details of which can be found here. They are:

- **Reinforcement of the Value Proposition of SAF**
- **Enhancement of the SAF Fuel Qualification Approach**
- **Alignment of Efforts to Enable Commercial SAF Deployment**
- **Implementing and Sharing Best Practices**
- **Supporting the Implementation of the SAF Grand Challenge Roadmap**

The Sustainable Aviation Fuel (SAF) Grand Challenge Roadmap, released by multiple agencies of the U.S. Government, lays out the current state and future research, analysis, commercial, and policy needs to reach the SAF Grand Challenge Goals of three billion gallons of SAF per year by 2030 and full replacement of petroleum-based jet by 2050. In light of this effort, CAAFI will continue to undertake activities supporting these targets in 2024.

SAF Grand Challenge (SAFGC) Update

In addition to the aforementioned DOE RFI, and the FAA NOFO, the agencies participating in the SAFGC are currently involved in multiple activities, e.g.:

⇒ The work on Inventory and gaps analysis of existing funded programs and how such efforts can be folded into SAFGC efforts or form the basis for execution of SAF GC tasks, is completed. This work will be summarized in a SAF Roadmap Implementation Framework Report targeted for publication in early 2024, as will a Biomass Supply Chain plan, and the awaited update of the Billion Ton study.

⇒ SAFGC progress report summarizing the progress under the 6 action areas in development and anticipated to be published in early 2024

⇒ SAFGC metrics tracking plan in development

⇒ SAFGC Roadmap Communication and Engagement Strategy in development

⇒ LCA IWG continuing to support deliberations on LCA methodology. This work led, in part, to the IRS release on GREET modelling updates issued 15Dec'23, with the modified GREET model intended for release in Mar'24.

⇒ Some SAFGC implementation measures have also provided updates to various industry events over the last several months.

⇒ Integration of Executive Order EO 14081 (Advancing Biotechnology and Biomanufacturing Innovation for a Sustainable, Safe, and Secure American Bioeconomy) with the work of the SAFGC

CAAFI Webinars

⇒ Biofuels Induced Land Use Changes: Theory, Modeling Practices, and Historical Observations – Dr. Farzad Taheripour – Purdue University, Oct 19, 2023

⇒ SAF Repository at Paine Field, Jan 30, from 1-2p EST – Dr. Josh Heyne – Washington State University

⇒ Potential Webinar Topics:

Hydrogen Hubs

Billion Ton Update

U.S Perspective on PtL

ASTM Update

If you have other ideas for webinar topics, please let us know: info@caafi.org

Other CAAFI Team Highlights

Business —

New producers, new suppliers, new customers, and many adjacent participants continue to contact us for guidance and assistance (continuing on a weekly basis) or asking for introductions to others who can assist with their commercialization efforts. We would like to remind any producer of this available resource document: **Guidance for Selling Alternative Fuels to Airlines.** Additional tools can be found **here.**
We are very pleased to see this continued level of engagement as we are now at more than 190

companies exploring SAF commercialization. Further, our latest roll up of intended U.S. SAF production capacity (with identified offtake partners) exceeds 2.0B gpy by YE 2028, with others working quietly in the background on additional capacity.

Certification/Qualification —

The work of the Cert/Qual team is aligned with the activities of ASTM's aviation fuel subcommittee, the Aviation Technical Committee of the Coordinating Research Council (CRC), and the now completed National Jet Fuel Combustion Program. It is also supported by periodic OEM meetings in the US and UK and various ASCENT projects. The qualification process is described in a recently issued paper "Qualification of Alternative Jet Fuels". This paper may be found at the Frontiers in Energy Research Sustainable Aviation Fuels "Research Topic.".

The winter meeting of the ASTM Aviation Fuels subcommittee was held in New Orleans from 4-7 December.

- ASTM D7566-23b including a new Annex 8 for ATJ-SKA and iso-butene as an additional allowed feedstock for Annex 5 for ATJ-SPK, is now available.
- Shell announced that they are putting their technical efforts in advance of their IH^2 technology based Cyclo-paraffinic Kerosene (CPK-0) on hold until a commercial partner is identified.

Various qualification activities are in progress:

⇒ The Methanol-to-Jet (MtJ) ASTM task group working with the US Clearinghouse is in the process of collecting property data from fuel technologies advanced by Exxon-Mobil, Honeywell, and Topsoe.

⇒ Hydrodeoxygenation Synthetic Aromatic Kerosene (HDO-SAK) championed by Virent is working to address few remaining requests from the OEMs and expects to ballot a new D7566 annex in 2024.

⇒ Plastics-to-Jet Synthetic Kerosene with Aromatics (PTJ-SKA) promoted by OMV, working with the US Clearinghouse, is in the process of completing property data collection in support of their qualification via the Fast Track process for up to 10% blending.

⇒ Hydroprocessed Esters and Fatty Acids Synthetic Kerosene with Aromatics (HEFA-SKA) advanced by Council of Scientific and Industrial Research The Indian Institute of Petroleum (CSIR-IIP) is completing initial reviews of their research report and proposed new Annex by the US Clearinghouse and J06 Chair before starting the OEM review.

In parallel, fully-formulated and paraffinic-only 100% Synthetic Aviation Turbine Fuel Task Groups are working to progress their efforts towards fully synthetic fuels.

Additionally, the interest in co-processing approaches continues and the related work is in progress. Task groups are working on pyrolysis oil co-processing and waste-plastics co-processing. Another effort is aiming to increase the lipids co-processing limit from a maximum of 5% to 30%.

We continued to see increased engagement from petroleum refiners and suppliers who are interested in increasing the types and maximum blend levels for SAF co-processing at existing refinery installations.

If you have interest in seeing new pathway approval, or simply getting more engaged in the qualification efforts, consider joining ASTM D02 and participating in its activities. You can also reach you to us at info@caafi.org for more information on getting involved.

R&D —

⇒ The R&D team continues to support the execution of CAAFI's webinar series and coordinates with the CAAFI leadership and certification/qualification teams regarding emerging companies and fuel qualification.

⇒ Reach out to Josh Heyne on CAAFI's R&D team if you have interest in new SAF candidate pre-screening efforts.

State and Regional Projects

CAAFI principals continue to participate in and foster regional development activity, on feedstocks, supply chain analysis & establishment, and with various entities.

Previously outlined supply chain building efforts continue in FL, VA, CT, MN, SC and GA. Multiple activities are ongoing in WA state, reflecting the continued building of momentum on SAF that comes from collaboration between exploratory working groups, interested policy makers, academia and

industry. Tune in to CAAFI's next webinar to hear an example of such.

If you are aware of other scenarios that could be appropriate for a regional development effort, please let us know. For more information, see CAAFI's State Initiatives page.

Please check the CAAFI website on a regular basis for more detail on pending activities.

Email peter.herzig@dot.gov with any ideas for CAAFI Quarterly items of interest, caafi.org news suggestions, or inquiries about subscription to the CAAFI Membership group.

Ag-Auto-Ethanol Work Group
Member Update
January 2024

Dear AAE Work Group Members:

Greetings, welcome and thank you for your ongoing leadership and contributions in support of our quest to achieve the AAE vision:

"North American vehicle powertrain technologies, fueled by higher octane/lower carbon fuels, will be deployed at scale to help attain global GHG reduction goals."

We've used various analogies to describe our efforts to achieve this vision, most recently referring to it as a marathon relay race (26 miles 385 yards). We've now come to describe it as an "ultramarathon" race which, according to Wikipedia, can range anywhere from 50 to 100 to 3100 miles! However long our race is, the finish line is not yet in sight, and much work remains if we are to achieve our pragmatic and very much attainable vision and goals.

Timeline:

- **2020:** Future fuels (High octane/low carbon) needed to meet the 2050 transportation sector GHG reduction targets introduced to consumers.
- **2030:** Future fuels to support 2050 fleet are broadly available
- **2030:** All vehicles being manufactured and sold (without incentives) will have the technology incorporated to meet the 2050 GHG reduction target.
- **2030-2050:** Legacy vehicles not capable of meeting 2050 GHG goals will be purged from the North America transportation fleet.

Like all relay races, a baton is passed to fresh runners along the way. With the onset of 2024, the AAE Co-Chair leadership baton has been handed off from Brent Boydston (Bayer Crop Science) to Chris Bliley (Growth Energy). We thank Brent for his dedicated service these past several years and welcome Chris into his new role as AAE Co-Chair, where he and Michael Moore, with Stellantis, will co-lead our work going forward. For additional information on AAE see 24.1.15 AAE Synopsis

An update on these and priorities follows in your January AAE leadership update:

New Developments

2024 promises to be a pivotal year for AAE. Earlier this month we invited the AAE Leadership Team to gaze into their crystal balls for the next twelve months and share what they were seeing. The AAE leaders agreed that several major decisions were looming, and that as 2024 was a Presidential election year, opportunities to remove barriers to the utilization of new vehicle technologies and the improvement of fuel quality to improve vehicle efficiency and reduce carbon emissions are on the table. The following encapsulates what they foresee:

- Legal vulnerabilities abound around the Biden administrations plans to harmonize and finalize vehicle efficiency, multipollutant and petroleum equivalency factor rules before the

Congressional Review Act deadlines that would allow a new administration to overturn rules set by an outgoing administration.

- Efforts to utilize climate action to achieve environmental justice outcomes will continue to provide opportunities to recruit fresh allies.
- Regulatory and/or legislative action to allow for the year-round sale of E15 fuel blends will continue to be top priorities.
- State action to enable additional solution pathways through the adoption of low carbon fuel standards will become increasingly important.
- The finalization of IRA guidance around SAF and Clean Fuel Production Credits can be a catalyst for new actions and partnerships.
- Presidential candidate leadership in support of more than a BEV mandate to achieve GHG emission reduction goals will be useful.

- **New FFV Vehicle Unveiled**
  Three cheers and a standing ovation to General Motors for introducing their first new mid-size flex fuel vehicle in a decade. While the recent trend has been for automakers to scale back or eliminate alternative internal combustion engine technology options, GM's introduction of the Trax mid-size SUV is welcome news and a sign that automakers are responding to consumer demand for flex fuel vehicles. You can read more about GM's new Trax at https://gmauthority.com/blog/2023/12/2025-chevy-trax-to-gain-e85-compatible-engine/

- **RVP E10+ Waiver**
  Work continues to find a national solution from either EPA or the Congress. EPA has agreed as part of a court order to finalize their rule by March 24, 2024, however this may be too late for refiners to meet the 2024 summer driving season changeover timeline. This could require another round of temporary "emergency waives" based on supply and market conditions much like EPA did during the summer 2024 driving season. On the good news front, Montana is now the 49th state in the nation to allow the sale of E15 blend fuels.
  https://ethanolproducer.com/articles/montana-becomes-49th-state-to-approve-the-sale-of-e15
  California is the last remaining state which does not allow the sale of E15.

- **California**
  Speaking of California, through CARB's Advanced Clean Car II (ACC2) workshops, the state is seeking additional comments through February 15, 2024 on the role of ethanol as a GHG reduction pathway. No substantive action is expected until ACC3 is finalized in 2025. AAE stakeholders continue to press for approval of E15 fuel blends. CA recognizes FFVs and E85 as a path to achieve carbon reduction targets after their ICE ban goes into effect in 2035. Automakers expressed concern over any new mandates including FFV directives. CA is still expected to increase their carbon intensity reduction goal from 30% to 40% by 2030 and carbon neutrality by 2045.

- **Next Generation Fuels Act (NGFA)**
  AAE members continue to recruit additional co-sponsors, with the goal of getting House Energy & Commerce Subcommittee to hold a hearing on the measure in early 2024. We are encouraged by growing stakeholder and congressional calls for something other than an all ev approach, with new voices such as the nearly 4500 automobile dealers organized under the "EV Voice of the

Customer" who sent a letter to President Biden late last year urging his administration to slow proposed regulations that would require that two-thirds of new vehicles sold in the U.S. be electric by 2032. The group claims this mandate is unrealistic given the waning EV demand and asked President Biden to "tap the brakes". Last week they followed up with a second letter asking the President to "Hit the brakes" https://www.abc4.com/news/business/ap-business/ap-auto-dealers-up-campaign-urging-biden-administration-to-halt-epa-tailpipe-emission-limits-regulation/

- **EPA Tailpipe and NHTSA CAFE Rules**
  While the House of Representatives has passed a rider on a FY'24 appropriations bill that would prohibit EPA from spending funds to implement their GHG and Multipollutant rules, there is no expectation that the Senate will take similar action. It does however send a strong message that the administration's "EV mandate approach" is not the way to go in reducing GHG emissions in the U.S. transportation sector. A group of Democrats has sent a softer letter to President Biden urging him to reduce carbon emissions as quickly as possible but to not dictate the path for doing so. AAE leaders are anticipating that EPA will likely finalize their GHG tailpipe rule by March '24; NHTSA is expected to follow later in the spring or early summer finalizing their CAFE rule.

- **Fuel Specs**
  Bob McCormick, Co-Chair of AAE''s Fuel Spec Action Team and a researcher at NREL, is advancing a ballot in ASTM seeking the elimination of the current high octane "test" fuel spec and replacing it with a 95/98 RON high octane fuel spec. The ballot is expected to be introduced soon and voted on in the spring of '24.

Reading/Viewing/Listening File

- Our partners at Boyden Gray PLLC have a new piece on the petroleum equivalency factor in the *Journal*: https://www.wsj.com/articles/the-electric-car-cheating-scandal-subsidy-rule-efficiency-falsehood-2798b4ab?st=21htjvo9xlwc8in&reflink=desktopwebshare_permalink
- https://app.criticalmention.com/app/#/clip/public/42e2913f-58ab-4a64-897b-32a6ddca2d21
- Larry Kudlow EV Cheating Scandal 1 18 2024
- NCGA Cob Cast https://megaphone.link/PDM8777282736
- https://arstechnica.com/cars/2023/11/evs-have-79-more-reliability-problems-than-gas-cars-says-consumer-reports/
- 16 Republican Governors' letter to President Biden opposing EV requirements: EV-Joint-Governors-Letter_1-22-24.pdf (sd.gov)

As always, your comments, questions or suggestions are most welcome.

Best Regards,

Michael Moore — *AAE Co-Chair*
Chris Bliley — *AAE Co-Chair*

Ag-Auto-Ethanol Work Group
Member Update
February 2024

Dear AAE Work Group Members:

We are more than halfway through winter, which means the AAE annual spring forum is right around the corner. This year we are looking to meet in May (exact dates to be determined) at the usual place, the Westin Detroit Metropolitan Airport Hotel. The theme for the 2024 convening of AAE members and collaborating partners is "Renewable Fuels: Solutions for Today and Tomorrow". The meeting agenda will include a myriad of topics of interest to AAE members including EPA's tailpipe rule, which we expect will be finalized by the forum, other important rulemakings around vehicle efficiency and carbon emission reductions, infrastructure developments, the latest on health impacts resulting from the incomplete combustion of aromatics in gasoline, and other topics. Stay tuned as more information on the forum will be coming your way soon.

An update on these and priorities follows in your February AAE leadership update:

New Developments

- **RVP E10+ Waiver**
  Stakeholders are still awaiting EPA's decision on the multi-state op-out request allowing them to sell E15 year-round. EPA committed in the consent decree that they signed with Growth Energy to finalize their decision by March 28, 2024, which is now close to one month away. This will likely mean that a decision will not come in time for the summer '24 driving season, requiring the agency to once again issue emergency waivers for the summer season as they did last summer. This continuing problem of regulatory uncertainty is demonstrating the need for a permanent legislative fix, which due to the current state of Congressional impasse, is not likely to happen before the next Presidential election.

- **Next Generation Fuels Act (NGFA)**
  AAE members are continuing to recruit additional congressional co-sponsors and a more diverse set of advocates behind the NGFA (e.g. ICE parts manufacturers). Corn growers will be in DC in March, and this will be a priority topic for their hill visits. If you haven't seen it, NCGA is to be commended for the letter they organized and sent to President Biden calling on him to embrace biofuels as a decarbonization pathway. The letter was signed by over 3500 corn farmers Corn growers letter to President Biden- Biofuel decarbonization pathway.

- **EPA Tailpipe and NHTSA CAFE Rules**
  Automakers are still looking for EPA's Multi-Pollutant rule to be finalized in March. Press reports are circulating that indicate there may be some improvements in the previously proposed rule, perhaps by pushing back the timeline for ramping up the production of electric vehicles https://www.nytimes.com/2024/02/17/climate/biden-epa-auto-emissions.html?unlocked_article_code=1.WE0.dWXF.y14uz_XM1eUZ&smid=nytcore-ios-share&referringSource=articleShare&sgrp=c-cb
  Until it comes out, everyone is guessing what the final rule will entail. One component we do not expect to see included is substantive action or a mandate to "improve fuel quality now", which was the theme of our 2023 annual forum.

- **California**
  The comment period on ACC3 has closed but final decisions will be delayed until state officials get a read on what the federal government will do with light duty vehicle emission and efficiency standards. CA is still expected to increase their CI goal from 30% to 40% by 2030 and carbon neutrality by 2045.

  Comments on California's request for input on their LCFS are due this week. The Low Carbon Fuel Coalition would welcome signers on a letter they are circulating outlining Climate Smart Agriculture (CSA) and Soil Organic Carbon (SOC) recommendations for California's 2024 Low Carbon Fuel Standard Amendments. See LCFC joint letter to CARB on CSA SOC 020824 For more information please contact Graham Noyes at graham@lcfcoalition.com. Below is the first paragraph of the letter for easy reference:

  The signatories of this letter appreciate the opportunity to provide comments regarding the 2024 amendments to the Low Carbon Fuel Standard (LCFS). We strongly support the increased focus by the California Air Resources Board (CARB) on ensuring that the fuels used in the LCFS program are produced in the most sustainable manner. We are strong advocates for rigorous lifecycle accounting (LCA) methods that precisely quantify the lifecycle emissions from biofuels and that recognize and incentivize lower carbon feedstocks. From a LCA perspective, "corn is not just corn." To the contrary, corn and other crops can be grown on soil using a wide variety of techniques and inputs that substantially impact real-world carbon intensity (CI). We encourage the Board to direct staff to dedicate time and resources to analyze the lifecycle issues pertaining to crop-based feedstocks and report back to the Governing Board. This focused research, analysis, and reporting by CARB staff will enable and inform potential expansions to the LCFS regulations to include field-based practices, the recognition of soil organic carbon, and the harnessing of other CI-reducing techniques and technologies with the next update to the LCFS regulations.

- **Fuel Specs**
  The voting period on the ASTM ballot seeking the elimination of the current high octane "test" fuel spec and replacing it with a 95/98 RON high octane fuel spec has closed. Thanks to Bob McCormick, Coleman Jones, Kristy Moore and other members of the AAE Fuel Spec Action team for guiding it through its anticipated successful passage.

Reading/Viewing/Listening File

- Read RFA's new report: CONTRIBUTION OF THE ETHANOL INDUSTRY TO THE ECONOMY OF THE UNITED STATES IN 2023
- Watch Advancing the Bioeconomy in Rural Areas program at last week's USDA Agriculture Outlook Forum.

As always, your comments, questions or suggestions are most welcome.

Best Regards,

Michael Moore — *AAE Co-Chair*
Chris Bliley — *AAE Co-Chair*

3b. Federal Issues Update
iv. Tax Credits (Biodiesel, Cellulosic)

Monte Shaw

From: alertsadmin@opisnet.com
Sent: Thursday, December 14, 2023 8:27 AM
To: Monte Shaw
Subject: BIOFUELS UPDATE: ***Group with Biofuel Interests Asks Congress for Adjustments to 45Q Tax Credit

2023-12-14 09:27:05 EST
***Group with Biofuel Interests Asks Congress for Adjustments to 45Q Tax Credit

The Carbon Capture Coalition (CCC) has joined a group with biofuel interests to pen an open letter to Congress to prioritize a suite of targeted adjustments to the federal Section 45Q tax credit as part of any forthcoming legislative package, it said this week.

The group includes the Renewable Fuels Association, Growth Energy, Summit Carbon Solutions, ADM, Green Plains Inc. and LanzaJet, among others.

The policy priorities cited in the letter include indexing 45Q for inflation beginning immediately.

"Increased credit values provided to projects developed in the industry, power and direct air capture sectors are the cornerstone of the recent enhancements made to the 45Q program in 2022," the letter said. "However, unlike other low- and zero-emissions technology tax credits recently reformed or created by the 117th Congress, the 45Q tax credit value is not adjusted for inflation until 2027.

"Already, much of the value increase realized in recent 45Q enhancements has been eroded due to significant inflation in both capital goods costs and energy price increases. To prevent further reduction of the credit value in today's dollars, 45Q should be adjusted for inflation immediately."

Carbon Capture Coalition Executive Director Jessie Stolark said policies should "ensure 45Q delivers on its emissions reduction and job creation potential."

"Small-scale gaps in federal policy threaten to impede the economy wide deployment" of carbon-management technologies, the letter said, "imperiling American jobs, economic development, energy security and the prospect of urgently needed--and achievable--greenhouse gas emissions reductions."

--Reporting by Michael Schneider, mschneider@opisnet.com; Editing by Jordan Godwin, jgodwin@opisnet.com

The 12th Annual OPIS LCFS & Carbon Markets Workshop is entirely dedicated to delving into the impact of clean fuel regulations on the transportation industry. From Jan. 10-12, 2024, in San Diego, participants can look forward to gaining valuable insights into the latest developments in LCFS and cap-and-trade initiatives, with a special focus on the carbon markets of the West Coast.https://try.opisnet.com/3QfPrbk

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Iowa Renewable Fuels Association

PRESS RELEASE

FOR IMMEDIATE RELEASE
December 15, 2023

Press Contact: Emma Koehler
515-322-0435

Biden Administration Guidance on SAF Tax Credit a Huge Step in Right Direction

With Some Details Still to Be Worked Out, U.S. Treasury Department Says Argonne National Laboratory's GREET Model Will Be an Approved Carbon Intensity Model

JOHNSTON, IOWA – Today, the United States Treasury Department announced an updated carbon intensity model will be approved to determine eligibility for sustainable aviation fuel (SAF) tax credits. The methodology, Argonne National Laboratory's Greenhouse Gases, Regulated Emissions and Energy Use in Technologies (GREET) model, is the model that uses the most current and accurate science.

"First, it's important to note this is a huge victory for science over politics," said Iowa Renewable Fuels Association Executive Director Monte Shaw. "Anti-agriculture agitators both in the U.S. and Europe have been pushing the Biden Administration to only recognize models with outdated data and debunked penalties against farm feedstocks like corn and soybeans. IRFA appreciates the Treasury Department for standing with the best science available."

The Treasury Department first provided SAF credit guidance in December 2022. Today's announcement provides further guidance, in collaboration with additional federal agencies. It is anticipated that a modified version of the GREET model will be released in March of 2024.

"With the GREET model approved, there is now a path available for airlines to meet their carbon reduction targets as SAF from soybean oil and ethanol represents an enormous portion of all possible SAF feedstocks," stated Shaw. "In turn, today's news is incredible for biofuels producers and farmers because the SAF market represents the single biggest opportunity for a rural transformation since the introduction of corn hybrids a century ago. At the same time, we should not forget that the key to unlocking the SAF market for ethanol continues to be carbon capture and sequestration (CCS). Without CCS to reduce the carbon intensity score of ethanol, it is nearly impossible for our home-grown ethanol to qualify for SAF – even with the GREET model."

In addition to ongoing efforts by the Argonne National Laboratory to continuously update and improve the GREET Model, under the direction of Secretary Tom Vilsack, the USDA has invested to ensure that the most up-to-date farming data was available to the modelers.

“Secretary Vilsack has been a constant force inside the administration in educating other departments, insisting on the best science, and pushing back against the anti-agriculture agitators,” said Shaw. “IRFA members owe a debt to Secretary Vilsack and the entire Iowa congressional delegation for using every opportunity to ensure farmers would not be unfairly barred from participating in the massive SAF market.”

The Iowa Renewable Fuels Association represents the state’s liquid renewable fuels industry and works to foster its growth. Iowa is the nation’s leader in renewable fuels production with 42 ethanol refineries capable of producing 4.5 billion gallons annually – including 34 million gallons of annual cellulosic ethanol production capacity – and 11 biodiesel facilities with the capacity to produce 410 million gallons annually. For more information, visit the Iowa Renewable Fuels Association website at: www.IowaRFA.org.

###

Congress of the United States
Washington, DC 20510

February 15, 2024

The Honorable Tom Vilsack
Secretary
U.S. Department of Agriculture
1400 Independence Avenue, SW
Washington, DC 20250

The Honorable Michael Regan
Administrator
Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Washington, DC 20460

The Honorable Jennifer Granholm
Secretary
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585

The Honorable Michael Whitaker
Administrator
Federal Aviation Administration
800 Independence Avenue, SW
Washington, DC 20591

Re: § 40B(e)(2) GREET Model for Sustainable Aviation Fuel Lifecycle Analysis Under the Inflation Reduction Act of 2022

Dear Members of the Sustainable Aviation Fuels Lifecycle Analysis Interagency Working Group (IWG):

We write regarding the implementation of the Department of Energy's (DOE) updated Greenhouse Gases, Regulated Emissions, and Energy Use in Technologies (GREET) model for sustainable aviation fuel (SAF).

As you know, homegrown SAF has the potential to drive economic growth and create jobs across America. We recognize your recent decision to allow the GREET model to serve as a secondary model for sustainable aviation fuel as a step in the right direction. This announcement has the potential to bring us closer to scaling up domestic production of SAF as America looks to fortify its domestic energy supply and decarbonize the aviation fuels sector. Biofuels drive economic growth, create good-paying manufacturing jobs, and strengthen economies across rural America. As you continue to develop a model to determine eligibility, we ask that you take measures to permit every participant in the SAF lifecycle to appropriately participate in the carbon reduction process.

We request that you adopt the updated GREET model as your methodology for determining this eligibility as soon as possible. We also ask that, in the process of doing so, you adhere to the rigorous science on which the model is based. This will accelerate efforts to decarbonize aviation — in line with the Administration's stated goals — by accurately crediting emissions reductions from regenerative farming, climate-smart agriculture, and carbon capture and storage.

Specifically, we ask that you make the following commitments:

1. The updated GREET model must be completed and implemented by the IWG's stated deadline of March 1, 2024. Biofuel producers are eager to begin making investments in

production capacity. If the modeling update misses this deadline, these investments will remain on hold.

2. Any proposed modifications to GREET should be subject to the normal scientific, agency, and public processes. Any modifications to the model must be governed by the latest science at the DOE's Argonne National Lab, who have been recognized as the leaders in developing models to calculate carbon life-cycle analyses.
3. Any modifications must ensure that the model will continue to accurately credit conservation practices and emissions reductions from regenerative farming as well as carbon capture and storage. Exclusion of these factors would omit critical efforts by American farmers to reduce emissions and would represent a missed opportunity to include rural America in the diversification of the aviation fuel sector.
4. Ensure that valuations of indirect land-use changes recognize the contributions of American agriculture and reward modern practices like precision agriculture that lead to higher per-acre yields.

While we recognize your ongoing work to support the production of SAF, the actions above are crucial for ensuring the long-term stability and growth of this field. We stand ready to work with you to implement the updated GREET model as soon as possible, which will unleash the full potential of domestic SAF production and ensure American farmers can fuel the future.

Thank you for your attention to this important issue.

Sincerely,

Amy Klobuchar
United States Senator

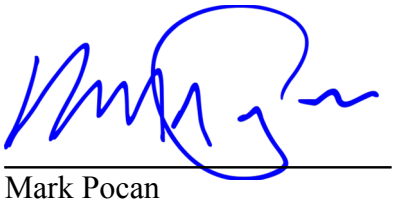
John Thune
United States Senator

Tammy Duckworth
United States Senator

Angie Craig
Member of Congress

Dusty Johnson
Member of Congress

Congress of the United States
Washington, DC 20510



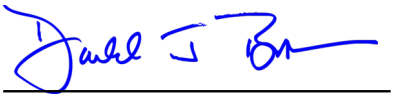
Mark Pocan
Member of Congress



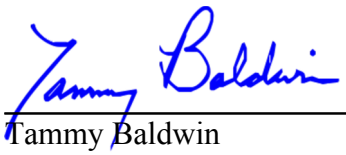
Adrian Smith
Member of Congress



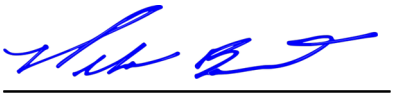
Mark Alford
Member of Congress



Don Bacon
Member of Congress



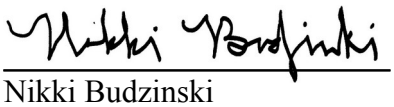
Tammy Baldwin
United States Senator



Mike Bost
Member of Congress



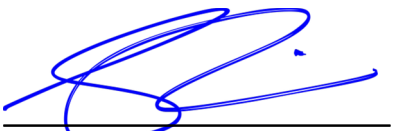
Sherrod Brown
United States Senator



Nikki Budzinski
Member of Congress



Jasmine Crockett
Member of Congress



Sharice L. Davids
Member of Congress

Congress of the United States
Washington, DC 20510

Richard J. Durbin
United States Senator

Joni K. Ernst
United States Senator

Ron Estes
Member of Congress

Randy Feenstra
Member of Congress

Brad Finstad
Member of Congress

Deb Fischer
United States Senator

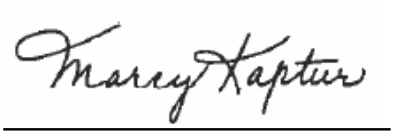
Michelle Fischbach
Member of Congress

Mike Flood
Member of Congress

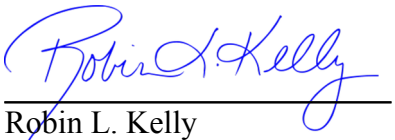
Charles E. Grassley
United States Senator

Ashley Hinson
Member of Congress

Congress of the United States
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Marcy Kaptur
Member of Congress



Robin L. Kelly
Member of Congress



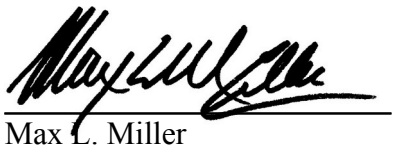
Darin LaHood
Member of Congress



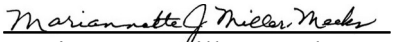
Jake LaTurner
Member of Congress



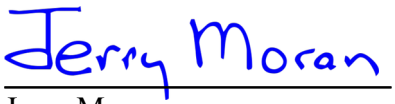
Roger Marshall, M.D.
United States Senator



Max L. Miller
Member of Congress



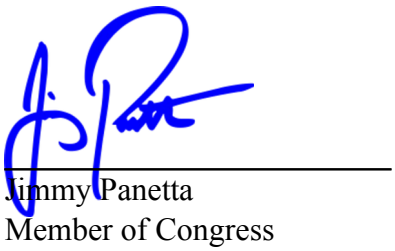
Mariannette Miller-Meeks, M.D.
Member of Congress



Jerry Moran
United States Senator



Zach Nunn
Member of Congress



Jimmy Panetta
Member of Congress

Congress of the United States
Washington, DC 20510

Gary C. Peters
United States Senator

Pete Ricketts
United States Senator

Mike Rounds
United States Senator

Tina Smith
United States Senator

Debbie Stabenow
United States Senator

Elissa Slotkin
Member of Congress

Eric Sorensen
Member of Congress

Derrick Van Orden
Member of Congress

Monte Shaw

From: alertsadmin@opisnet.com
Sent: Friday, March 1, 2024 11:21 AM
To: Monte Shaw
Subject: BIOFUELS UPDATE: ***Treasury Delaying GREET Update by Several Weeks: Vilsack

2024-03-01 12:20:46 EST
***Treasury Delaying GREET Update by Several Weeks: Vilsack

The Treasury Department will miss its Friday deadline for revising a domestic emissions model that, once updated, could allow companies to accrue tax credits when converting ethanol to sustainable aviation fuel.

The news was confirmed on Friday by U.S. Secretary of Agriculture Tom Vilsack, who told attendees at the Commodity Classic in Houston, Texas, that the administration would be delaying the update to Argonne National Laboratory's Greenhouse Gas and Regulated Emissions and Energy Use in Transportation (GREET) model by several weeks.

Treasury had planned in its initial rulemaking from December 2023 to release the updated model by the first of this month, after it concluded its current version "does not satisfy the applicable requirements" for use in the tax scheme. Those requirements were set in August 2022, when President Joe Biden signed into law the Inflation Reduction Act (IRA) which included a $1.25/gal credit for SAF production through Dec. 31, 2024.

Once the model is updated, according to the initial guidance, participants in the tax credit scheme should be able to utilize it for purposes of accruing 40B credits tied to fuel sold after Dec. 31, 2022 and prior to Jan. 1, 2025. That window could offer a significant boon to the ethanol industry, but proponents have been wary in recent months that Treasury might place too stringent of parameters on the updated model, which would effectively shut out many producers from accessing the tax scheme.

Geoff Cooper, president and CEO of the Renewable Fuels Association, said in a Friday release that the group was disappointed with news of a delay, and called on the interagency working group to complete the process "as expeditiously as possible."

"To meet the Biden administration's SAF goals, the marketplace needs certainty and clarity," Cooper said, adding that, "investment and innovation in SAF technologies will remain frozen until the model is finalized and additional guidance is issued."

And Emily Skor, CEO of Growth Energy, said the delay "is frustrating, but we're optimistic that it's happening for a productive reason."

"Ultimately, what's most important is getting it right, and making sure that the resulting updates provide real opportunities for American farmers to contribute to the SAF market," Skor said.

--Reporting by Patrick Newkumet, pnewkumet@opisnet.com; Editing by Jordan Godwin, jgodwin@opisnet.com

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You are currently subscribed to opisethanol as: mshaw@IowaRFA.org.

Monte Shaw

From: Clean Fuels Alliance America <communications@email1.cleanfuels.org>
Sent: Monday, March 4, 2024 10:11 AM
To: Monte Shaw
Subject: New Assessment Shows Value of Soybean Oil as Low-Carbon Feedstock for Clean Fuels

Follow Up Flag: FollowUp
Flag Status: Flagged

********** WARNING **********
This email was sent from outside the company, but the name shown is of some inside the company.
This email may not really be from the person you think it is.



FOR IMMEDIATE RELEASE
March 4, 2024

For more information, contact:
Heather Buechter at 479-651-7301 or
hbuechter@cleanfuels.org

New Assessment Shows Value of Soybean Oil as Low-Carbon Feedstock for Clean Fuels

Study Documents Significant Decrease in Soy's Life Cycle Carbon Footprint from 2015-2021

JEFFERSON CITY, MO - A recent Life Cycle Assessment conducted by Sustainable Solutions Corporation (SSC) for the United Soybean Board (USB) and the National Oilseed Processors Association (NOPA) reveals a significant reduction in the carbon footprint of U.S. Soy throughout its cultivation, harvesting, transportation and processing stages. The assessment highlights a notable 22% decrease in the carbon footprint associated with U.S. production of crude soy oil, which is a key feedstock for U.S. biodiesel, renewable diesel and SAF producers.

Soybean production and oil processing constitute more than 40% of the carbon intensity (CI) score for soy biodiesel. The improvements documented in this report are expected to translate into reductions in CI across the clean fuels industry.

Clean Fuels Alliance America assisted USB and NOPA in ensuring the data collected for processors in the report aligns with data specifications for GREET, so it could be easily integrated into GREET model updates.

"We look forward to working with Argonne National Laboratory through the data quality assessment process to update the GREET model to reflect the latest improvements in the industry," said Veronica Bradley, Environmental Scientist at Clean Fuels Alliance America.

The Life Cycle Assessment of U.S. Soybeans, Soybean Meal, and Soy Oil report can be found here.

Materials supported by the United Soybean Board, soybean farmers and their checkoffs.

About United Soybean Board (USB): United Soybean Board's 77 volunteer farmer-leaders work on behalf of all U.S. soybean farmers to achieve maximum value for their soy checkoff investments. These volunteers create value by investing in research, education and promotion with the vision to deliver sustainable soy solutions to every life, every day across the three priority areas of Infrastructure & Connectivity, Health & Nutrition, and Innovation & Technology. As stipulated in the federal Soybean Promotion, Research and Consumer Information Act, the USDA Agricultural Marketing Service has oversight responsibilities for USB and the soy checkoff. For more information on USB, visit unitedsoybean.org.

About National Oilseed Processors Association (NOPA): Founded in 1930, NOPA is the national trade organization located in Washington, DC representing the U.S. soybean, canola, flaxseed, safflower seed, and sunflower seed crushing industries. Our 15 members operate a total of 62 soybean & 5 softseed solvent extraction plants across 21 states. NOPA members produce meal and oil used in human food, animal feed, fuel and for industrial applications. Collectively, NOPA members process 95 percent of all soybeans in the U.S. which accounts to over 2 billion bushels annually. For more information on NOPA, visit www.nopa.org.

3b. Federal Issues Update
v. USDA/DOE Programs

Iowa Renewable Fuels Association

PRESS RELEASE

FOR IMMEDIATE RELEASE
January 11, 2024

Press Contact: Emma Koehler
515-322-0435

USDA Announces $19 Million in Biofuel Infrastructure Grants in 22 States

88 Iowa Sites Receive Awards

JOHNSTON, IA – Today during the 2024 Iowa Renewable Fuels Summit, Secretary Tom Vilsack announced that the U.S. Department of Agriculture is rewarding $19 million worth of Higher Blend Infrastructure Incentive Program grants in 22 states to upgrade fueling infrastructure and make it possible for fuel retailers across Iowa to offer higher blends of biofuels. In Iowa, 88 retail locations received grants.

In response to today's announcement, Iowa Renewable Fuels Association Executive Director Monte Shaw made the following statement:

"It's because of his track record of innovative programs like this, that Iowa biofuels producers earlier bestowed Sec. Vilsack with the 'Lifetime Champion of Renewable Fuels' award. I want to thank Sec. Vilsack and his team for following through on their commitment to grow consumer access to higher blends around the country. These awards benefit all Iowans by supporting small retailers as they provide consumers with better quality fuel at a lower cost and grow rural America by supporting homegrown fuels like biodiesel and ethanol.

"Finally, IRFA thanks Iowa retailers for stepping up to participate in the program. The 88 Iowa fuel sites receiving grants today are leaders in bringing cleaner-burning lower-cost fuel options to consumers. With millions of funds still available, we encourage all Iowa retailers, big and small, to apply and bring higher blends of ethanol and biodiesel to their customers."

The Iowa Renewable Fuels Association represents the state's liquid renewable fuels industry and works to foster its growth. Iowa is the nation's leader in renewable fuels production with 42 ethanol refineries capable of producing 4.5 billion gallons annually – including 34 million gallons of annual cellulosic ethanol production capacity – and 11 biodiesel facilities with the capacity to produce 410 million gallons annually. For more information, visit the Iowa Renewable Fuels Association website at: www.IowaRFA.org.

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Biden-Harris Administration Announces Awards to Increase Access to Clean, Affordable Domestic Biofuels as Part of President Biden's Investing in America Agenda

$19 Million in Funding from President Biden's Inflation Reduction Act Will Provide More Cost-Effective Options for American Consumers

Release & Contact Info

Press Release
Release No. 0004.24

Contact: USDA Press
Email: press@usda.gov

Altoona, Iowa, Jan. 11, 2024 – U.S. Department of Agriculture (USDA) Secretary Tom Vilsack announced today that USDA is awarding $19 million in grants to U.S. business owners to increase the availability of domestic biofuels in 22 states and give Americans cleaner, more affordable fuel options at gas station pumps as part of President Biden's Bidenomics agenda to lower costs and invest in America.

Blending ethanol into gasoline has helped reduce fuel costs by approximately 25 percent, contributing to falling gas prices across the country. Gas prices are now under $2.99 in more than half of U.S. states and saving the average driver more than $100 per month relative to peak prices. HBIIP increases the number of Americans that benefit from falling prices by expanding the use of ethanol-based fuels at gas stations around the nation.

The Department is making the awards through the Higher Blends Infrastructure Incentive Program (HBIIP), made possible with funding from President Biden's Inflation Reduction Act.

"President Biden's Inflation Reduction Act is giving people in rural areas the historic opportunity to expand clean energy and build an economy that benefits working families," Vilsack said. "By increasing the supply of biofuels made here in the U.S., we

are strengthening our energy independence, lowering costs for American families, creating new streams of income for agricultural producers and bringing good-paying jobs to people in rural communities."

Secretary Vilsack made today's announcement during his visit to the Iowa Renewable Fuels Summit in Altoona. Secretary Vilsack was awarded the Lifetime Champion of Renewable Fuels Award by the Iowa Renewable Fuels Association during the Summit.

Through this most recent tranche of awards, business owners are receiving $19 million to expand access to domestic biofuels in 22 states and strengthen America's energy independence. For example:

- Casey's will use a $5 million grant to install ethanol blend fuel dispensers at 111 fueling stations in Iowa, Illinois, Minnesota, Nebraska and South Dakota. Using these investments, the company aims to increase the amount of biofuels it supplies by 50 million gallons a year.
- Piasa Enterprises Inc. in Illinois will use a $200,000 grant to install two 30,000-gallon biodiesel storage tanks and associated piping at their Hartford fuel distribution center. The company projects an increase in the amount of biodiesel sold by 2 million gallons per year.
- In Maryland, AC&T Inc. will install two ethanol fuel dispensers and one ethanol storage tank. Through this project, AC&T owners aim to expand the amount of ethanol they supply by over 106,000 gallons a year.

The full list of states to receive funding is: Arizona, California, Florida, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Maryland, Michigan, Minnesota, Missouri, Nebraska, Nevada, New Mexico, North Carolina, Ohio, Oklahoma, South Dakota, Texas and Wisconsin.

Since the start of the Biden-Harris Administration, USDA has invested more than $96 million nationwide to increase access to biofuels at fueling stations. $11.6 million of this has been invested in Iowa.

Background: Higher Blends Infrastructure Incentive Program

The Higher Blends Infrastructure Incentive Program (HBIIP) provides grants to fueling station and distribution facility owners, including marine, rail, and home heating oil facilities, to help expand access to domestic biofuels, a clean and affordable source of energy. These investments help business owners install and upgrade infrastructure such as fuel pumps, dispensers and storage tanks. Expanding the availability of

homegrown biofuels strengthens energy independence, creates new revenue for American businesses and brings good-paying jobs to rural communities.

In June 2023, USDA made $450 million available in Inflation Reduction Act funding through the HBIIP to expand the use and availability of higher-blend biofuels. That same month, USDA also announced the first round of Inflation Reduction Act-funded HBIIP awardees.

USDA continues to accept applications for funding to expand access to domestic biofuels. These grants will support the infrastructure needed to reduce out-of-pocket costs for transportation fueling and distribution facilities to install and upgrade biofuel-related infrastructure such as pumps, dispensers and storage tanks. There are three quarterly application windows left, and the program ends Sept. 30, 2024. The next application deadline is March 31, 2024.

For more information, go to the HBIIP webpage.

Background: Inflation Reduction Act

This announcement is part of President Biden's Investing in America agenda to grow the American economy from the middle out and bottom up by rebuilding our nation's infrastructure, driving over $640 billion in private-sector manufacturing investments, creating good-paying jobs and building a clean-energy economy to tackle the climate crisis and make our communities more resilient.

The Biden-Harris Administration championed the Inflation Reduction Act, the nation's largest-ever investment in combatting the climate crisis, a key pillar of Bidenomics and part of the Investing in America agenda. Through the Inflation Reduction Act, the Administration is delivering on its promise to fight climate change and reduce greenhouse gas emissions across America. The Act provides funding to USDA Rural Development to help eligible organizations invest in renewable energy infrastructure and zero-emission systems and make energy-efficiency improvements that will significantly reduce greenhouse gas emissions.

For more information on the Inflation Reduction Act, visit: www.rd.usda.gov/inflation-reduction-act.

Under the Biden-Harris Administration, USDA Rural Development provides loans and grants to help expand economic opportunities, create jobs and improve the quality of life for millions of Americans in rural areas. This assistance supports infrastructure improvements; business development; housing; community facilities such as schools,

public safety and health care; and high-speed internet access in rural, Tribal and high-poverty areas. For more information, visit www.rd.usda.gov.

USDA touches the lives of all Americans each day in so many positive ways. Under the Biden-Harris Administration, USDA is transforming America's food system with a greater focus on more resilient local and regional food production, fairer markets for all producers, ensuring access to safe, healthy and nutritious food in all communities, building new markets and streams of income for farmers and producers using climate-smart food and forestry practices, making historic investments in infrastructure and clean energy capabilities in rural America, and committing to equity across the Department by removing systemic barriers and building a workforce more representative of America. To learn more, visit www.usda.gov.

To subscribe to USDA Rural Development updates, visit the GovDelivery subscriber page.

#

USDA is an equal opportunity provider, employer, and lender.

United States Department of Agriculture

USDA Rural Development
Higher Blends Infrastructure Incentive Program
January 11, 2024
Total: $18,894,333

States	Senators	Representatives	Recipient	Grant Amount	Project Description
CA	Alex Padilla Laphonza Butler	Norma Torres (35)	Tristar FLC Inc.	$3,500,000	This Rural Development investment will be used to create infrastructure to expand the sales and use of renewable fuels. Tristar FLC, Incorporated is a fuel distribution facility company. This project will consist of the construction of a high efficiency transload facility for the receipt, storage, and distribution of biodiesel at one location in California. Facility locations impacted by this grant are: Fontana. This project projects to increase the amount of biodiesel sold by 24,000,000 gallons per year.
IL	Dick Durbin Tammy Duckworth	Nikki Budzinski (13)	Piasa Enterprises Inc.	$200,000	This Rural Development investment will be used to create infrastructure to expand the sales and use of renewable fuels. Piasa Enterprises, Inc is a fuel distribution facility company. This project will consist of installing two 30,000 gallon insulated biodiesel storage tanks and associated piping at one location in Illinois. Facility locations impacted by this grant are: Hartford. This project projects to increase the amount of biodiesel sold by 2,000,000 gallons per year.
IL/IA/NE/MN/SD	Chuck Grassley (IA) Jon Ernst (IA) Richard Durbin (IL) Tammy Duckworth (IL) Amy Klobuchar (MN) Tina Smith (MN) Deb Fischer (NE) Pete Ricketts (NE) John Thune (SD) Mike Rounds (SD)	Don Bacon (NE 02) Mike Bost (IL 12) Tom Emmer (MN 06) Randy Feenstra (IA 04) Michelle Fischbach (MN 07) Mike Flood (NE 01) Ashley Hinson (IA 02) Dusty Johnson (SD 00) Darin LaHood (IL 16) Mary Miller (IL 15) Mariannette Miller-Meeks (IA 01) Zach Nunn (IA 03) Adrian Smith (NE 03)	Casey's General Store Inc.	$4,999,992	This Rural Development investment will be used to create infrastructure to expand the sales and use of renewable fuels. Casey's General Stores, Inc is the owner of more than 10 fueling stations. This project will install 456 E15 dispensers at 111fueling stations located in Iowa, Illinois, Minnesota, Nebraska, and South Dakota. Station locations impacted by this grant are: IA - Alta, Altoona (2), Ames, Ankeny (2), Armstrong, Atlantic, Belmond, Blue Grass, Britt, Brooklyn, Buffalo, Buffalo Center, Camanche, Carroll, Clarinda, Colo, Corning, Dakota City, Des Moines (2), Eddyville, Eldridge (2), Essex, Estherville (2), Fairfield, Fort Dodge, Garner, Gilbert, Gilmore City, Glidden, Gowrie, Grimes, Holstein, Humeston, Huxley, Ida Grove, Indianola (2), Iowa Falls (2), Johnston, Knoxville, Laurens, Le Claire, Lenox, Mapleton, Maquoketa, Marquette, Marshalltown, Mediapolis, Middletown, Monroe, Morning Sun, Moville, Murray, Nevada, Okoboji, Onawa, Oskaloosa, Pleasant Hill, Pomeroy, Princeton, Riceville, Sibley, Sidney, Sloan, Solon, Spencer, St. Ansgar, Storm Lake, Victor, Villisca, Wappello, West Bend, West Des Moines, West Liberty, Winterset, and Woodbine; IL - Carbondale, East Peoria, and Nokomis; MN - Alexandria, Annandale, Belgrade, Crookston, Hoffman, Moorhead, Paynesville, and Sauk Rapids; NE - Cambridge, Columbus (2), Hastings, Juniata, Lincoln (2), McCook, Omaha, Osceola, Pierce, Plainview, South Sioux City, Stromsburg, and West Point; and SD - Sioux Falls and Tyndall. This project projects to increase the amount of ethanol sold by 49,084,590 gallons per year.
KS	Roger Marshall Jerry Moran	Jake LaTurner (02)	Capital City Oil Inc.	$122,521	This Rural Development investment will be used to create infrastructure to expand the sales and use of renewable fuels. Capital City Oil Inc. is the owner of a fleet fueling facility. This project will install retrofit one E15 dispenser and install one E85 dispenser, one B20 dispenser, two ethanol storage tanks, and two biodiesel storage tanks at one fueling location, located in Kansas. Station location impacted by this grant is Topeka. This project aims to increase the amount of biofuels used by 5,280,000 gallons per year.

United States Department of Agriculture

USDA Rural Development
Higher Blends Infrastructure Incentive Program
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States	Senators	Representatives	Recipient	Grant Amount	Project Description
KY/MI/WI/IA/IN	Chuck Grassley (IA) Jon Ernst (IA) Mike Braun (IN) Todd Young (IN) Mitch McConnell (KY) Rand Paul (KY) Debbie Stabenow (MI) Gary Peters (MI) Ron Johnson (WI) Tammy Baldwin (WI)	Mike Gallagher (WI 08) Glenn Grothman (WI 06) Erin Houchin (IN 09) Morgan McGarvey (KY 03) Mariannette Miller-Meeks (IA 01) Gwen Moore (WI 04) Greg Pence (IN 06) Hillary Scholten (MI 03) Elissa Slotkin (MI 07) Bryan Steil (WI 01) Derrick Van Orden (WI 03)	Bulk Petroleum Corporation	$5,000,000	This Rural Development investment will be used to create infrastructure to expand the sales and use of renewable fuels. Bulk Petroleum Corporation is the owner of more than 10 fueling stations. This project will install 73 E15 dispensers, 7 E85 dispensers, 33 B20 dispensers, 31 ethanol storage tanks, and 22 biodiesel storage tanks at 24 fueling stations located in Wisconsin, Iowa, Michigan, Indiana, and Kentucky. Station locations impacted by this grant are: IA - Davenport (2); IN - Columbus, North Vernon, Nineveh, and Bedford; KY - Louisville; MI - Lansing, and Grand Rapids (3); WI - Green Bay (3), Wisconsin Rapids (2), Black River Falls, Sheboygan Falls, Two Rivers, Sturgeon Bay, Milwaukee (2), Oak Creek, Sheboygan, Luxemburg, and Cudahy. This project projects to increase the amount of biofuels sold by 7,841,796 gallons per year.
MD	Ben Cardin Chris Van Hollen	David Trone (06)	A C & T Co Inc.	$128,000	This Rural Development investment will be used to create infrastructure to expand the sales and use of renewable fuels. A C & T Co, Inc is the owner of more than 10 fueling stations. This project will install two E85 dispensers and one ethanol storage tanks at one fueling stations located in Maryland. Station location impacted by this grant is Williamsport. This project projects to increase the amount of ethanol sold by 106,322 gallons per year.
AZ/FL/GA/IA/IL/IN/KS/KY/MO/NC/NE/NM/NV/OH/OK/SD/TX/WI	Kyrsten Sinema (AZ) Mark Kelly (AZ) Marco Rubio (FL) Rick Scott (FL) Jon Ossoff (GA) Raphael Warnock (GA) Chuck Grassley (IA) Joni Ernst (IA) Richard Durbin (IL) Tammy Duckworth (IL) Todd Young (IN) Mike Braun	Rick Allen (GA 12) Mark Amodei (NV 02) Brian Babin (TX 36) Jim Baird (IN 04) Troy Balderson (OH 12) Garland Andy Barr (KY 06) Stephanie Bice (OK 05) Mike Bost (IL 12) Larry Bucshon (IN 08) Michael Burgess (TX 26) Katherine Cammack (FL 03) Mike Carey	Love's Travel Stops & Country Stores Inc.	$4,943,820	This Rural Development investment will be used to create infrastructure to expand the sales and use of renewable fuels. Love's Travel Stops & Country Stores, Inc is the owner of more than 10 fueling stations. This project will retrofit 704 E15 dispensers at 88 fueling stations located in Arizona, Florida, Georgia, Iowa, Illinois, Indiana, Kansas, Kentucky, Missouri, North Carolina, Nebraska, New Mexico, Nevada, Ohio, South Dakota, Texas, and Wisconsin. Station locations impacted by this grant are: AZ - Eloy, Chandler, Gila Bend, Williams, Benson, Joseph, City; FL - Lee, Ocala, Ormond Beach; GA - Waco, Thomson, Brunswick, Richmond Hill, Jackson, Dublin, Tifton, Emerson, Hogansville; IA - Sioux City; IL - Williamsville, Ina, Kankakee, Dwight, Le Roy, Roscoe, Greensvile, Utica; IN - Mooresville, Richmond, Whiteland, Memphis, Gary, Whitestown, Haubstadt, Demotte, Marion, Pittsboro, St. Paul; KS - Ottawa, Ellis; KY - Waddy, Sparta, Horse Cave, Corbin, Richmond, Grayson, Calvert City; MO - St. Joseph, Matthews, Rolla; NC - Dunn, Marion; NE - Aurora; NM - Albuquerque; NV - Fernley, Wells, Las Vegas; OH - Zanesville, Hubbard, Jeffersonville, Perrysburg, Burbank, Baltimore, Dayton; SD - Sioux Falls; TX - Van, Midlothian, Hillsboro, Katy, Luling, Rockwall, Anna, Edna, Three Rivers, Texarkana, Weimar, Hutchins, Seguin, Fairfield, Von Ormy, Weatherford, Mount Vernon, Lufkin, Cleveland, Houston, Fort Worth, Rhome; and WI - Tomah. This project projects to increase the amount of ethanol sold by 86,085,412 gallons per year.

USDA Rural Development
Higher Blends Infrastructure Incentive Program
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States	Senators	Representatives	Recipient	Grant Amount	Project Description
	Mike Braun (IN) Jerry Moran (KS) Roger Marshall (KS) Mitch McConnell (KY) Rand Paul (KY) Josh Hawley (MO) Eric Schmitt (MO) Thom Tillis (NC) Ted Budd (NC) Deb Fischer (NE) Pete Ricketts (NE) Martin Heinrich (NM) Ben Ray Lujan (NM) Catherine Cortez Masto (NV) Jacky Rosen (NV) Sherrod Brown (OH) J.D. Vance (OH) James Lankford (OK) Markwayne Mullin (OK) John Thune (SD) Mike Rounds (SD) John Cornyn (TX) Ted Cruz (TX) Ron Johnson (WI) Tammy Baldwin	Mike Carey (OH 15) Buddy Carter (GA 01) Juan Ciscomani (AZ 06) Michael Cloud (TX 27) Mike Collins (GA 10) James Comer (KY 01) Eli Crane (AZ 02) Jasmine Crockett (TX 30) Henry Cuellar (TX 28) Sharice Davids (KS 03) Monica De La Cruz (TX 15) Neal Dunn (FL 02) Chuck Edwards (NC 11) Jake Ellzey (TX 06) Pat Fallon (TX 04) Randy Feenstra (IA 04) Drew Ferguson (GA 03) Sylvia Garcia (TX 29) Tony Gonzales (TX 23) Lance Gooden (TX 05) Sam Graves (MO 06) Raul Grijalva (AZ 07) Brett Guthrie (KY 02) Steven Horsford (NV 04) Erin Houchin			

United States Department of Agriculture

USDA Rural Development
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States	Senators	Representatives	Recipient	Grant Amount	Project Description
	(WI)	(IN 09) Dusty Johnson (SD 00) David Joyce (OH 14) Marcy Kaptur (OH 09) Robin Kelly (IL 02) Darin LaHood (IL 16) Robert E. Latta (OH 05) Barry Loudermilk (GA 11) Tracey Mann (KS 01) Thomas Massie (KY 04) Michael T. McCaul (TX 10) Mary Miller (IL 15) Max Miller (OH 07) Nathaniel Moran (TX 01) Frank Mrvan (IN 01) Wiley Nickel (NC 13) Greg Pence (IN 06) Harold Rogers (KY 05) Austin Scott (GA 08) Keith Self (TX 03) Pete Sessions (TX 17) Adrian Smith (NE 03) Jason T. Smith (MO 08) Victoria Spartz (IN 05) Melanie Ann Stansbury:			

United States Department of Agriculture

USDA Rural Development
Higher Blends Infrastructure Incentive Program
January 11, 2024
Total: $18,894,333

States	Senators	Representatives	Recipient	Grant Amount	Project Description
		Melanie Ann Stansbury (NM 01) Michael Turner (OH 10) Lauren Underwood (IL 14) Derrick Van Orden (WI 03) Michael Waltz (FL 06) Roger Williams (TX 25)			

Iowa Renewable Fuels Association

January 19, 2024

Iowa Retailers,

On behalf of the Iowa Renewable Fuels Industry and biofuel producers we want to thank you for your work in offering higher blends of biofuels to Iowa consumers. With the recent passage of the Iowa Biofuel Access legislation in 2022, there is a January 1, 2026, deadline to offer E15 from 1 dispenser *if* you had compatible infrastructure. For any newly opened retailer location or locations that are doing a complete remodel, E15 must be offered from at least 50% of dispensers.

The biofuel industry is committed to supporting Iowa retailers in succeeding and offering higher blends. As an industry we want make sure every retailer gets either a waiver from the legislation OR financial support via the Iowa Renewable Fuels Infrastructure Program (RFIP) and the federal Higher Blends Infrastructure Incentive Program (HBIIP.)

Iowa RFIP Grants

For those wanting a grant from Iowa's RFIP, priority has been given to all retailers who don't get exemption from the January 1, 2026, E15 access deadline. In addition, small retailers will be specifically eligible for a higher cost-share grant (roughly $53,250 to up to $63,900.) The Iowa Corn and Iowa Renewable Fuels Association (IRFA) hired a contractor to specifically help small Iowa retailers to apply for RFIP grants free of charge. Please reach out to *Brian Kinney* at the below information to help with your application.

- CELL: 515.689.7965
- EMAIL: e15foriowa@yahoo.com

HBIIP Grants

On top of RFIP, the biofuel industry has worked hard with our federal delegation to fund the Department of Agriculture program, HBIIP. Recently, this effort has paid off with over $500 million being earmarked for HBIIP cost share grants to retailers. Ultimately, any retail business with 10 or less stores can receive up to a 75% cost share grant.

As part of our industry commitment, all the national ethanol trade groups have full-time dedicated grant writers to help retailers apply for HBIIP funding free of charge. Please see their information below and they will help ASAP.

- WHO: Growth Energy
- POC: Jake Comer, VP of Market Development
- CAPACITY: Openings to take over 200+ retailers today (targeting small Iowa retailers)
- CONTACT: jcomer@growthenergy.org AND/OR 515.250.4609

- WHO: Renewable Fuels Association
- POC: Cassie Mullen, Director of Market Development
- CAPACITY: Less availability but willing to help
- CONTACT: cmullen@ethanolrfa.org AND/OR 832.415.7882

- WHO: American Coalition for Ethanol
- POC: Ron Lamberty, Chief Marketing Officer
- CAPACITY: Less availability but willing to help
- CONTACT: rlamberty@ethanol.org AND/OR 605.334.3381 ext. 6001

If you have issues in contacting either Growth Energy, Renewable Fuels Association, American Coalition for Ethanol, please feel free to reach out to Iowa Renewable Fuels Association's Marketing Director, Lisa Coffelt, at lcoffelt@iowarfa.org or Iowa Corn Growers VP of Market Development, Ryan Sauer, rsauer@iowacorn.org.

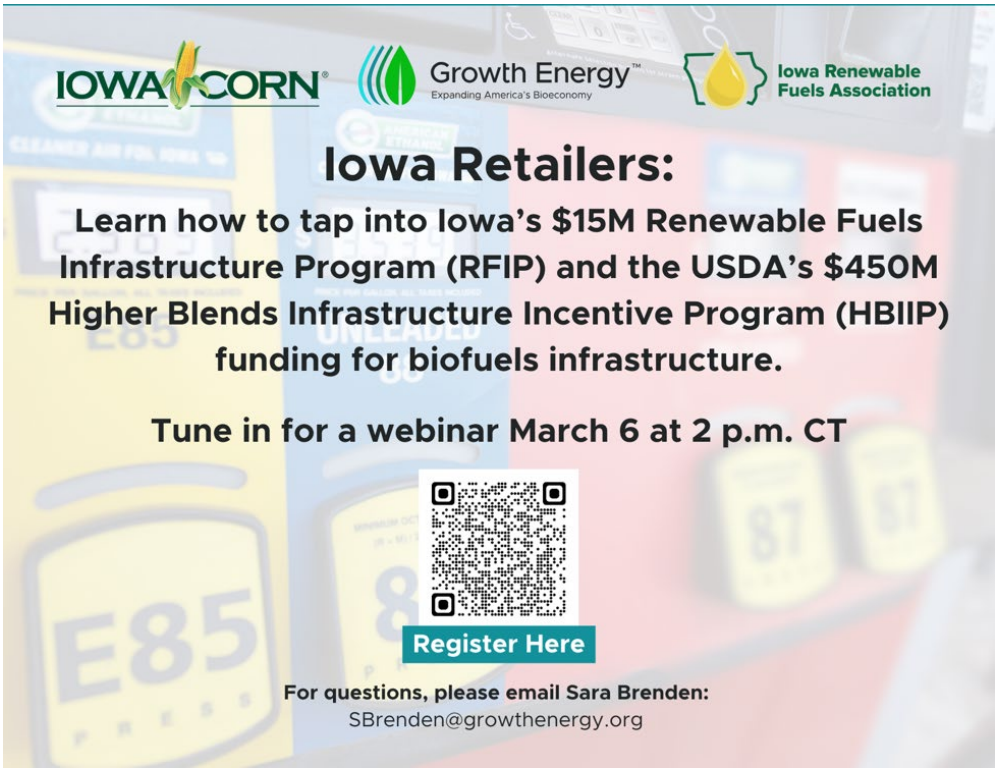
IRFA looks forward to continuing to work with retailers in offering higher blends of biofuels. Please keep an eye out for additional information including Zoom meetings to help guide retailers through this process.

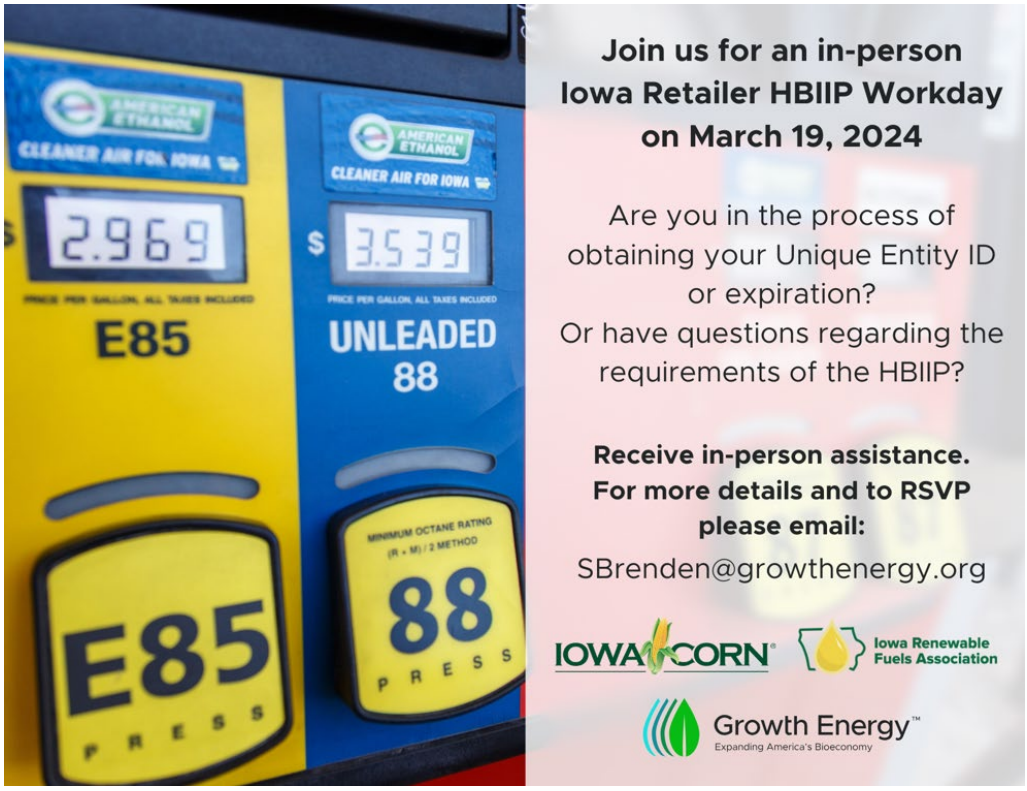
Sincerely,



Lisa Coffelt

Marketing Director, Iowa Renewable Fuels Association


IOWA CORN
Growth Energy
Expanding America's Bioeconomy
Iowa Renewable Fuels Association
Iowa Retailers:
Learn how to tap into Iowa's $15M Renewable Fuels Infrastructure Program (RFIP) and the USDA's $450M Higher Blends Infrastructure Incentive Program (HBIIP) funding for biofuels infrastructure.
Tune in for a webinar March 6 at 2 p.m. CT
Register Here
For questions, please email Sara Brenden:
SBrenden@growthenergy.org


AMERICAN ETHANOL
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88
PRESS
Join us for an in-person Iowa Retailer HBIIP Workday on March 19, 2024
Are you in the process of obtaining your Unique Entity ID or expiration?
Or have questions regarding the requirements of the HBIIP?
Receive in-person assistance. For more details and to RSVP please email:
SBrenden@growthenergy.org
IOWA CORN
Iowa Renewable Fuels Association
Growth Energy
Expanding America's Bioeconomy

Monte Shaw

From: Grassley Press <Grassley_Press@Public.govdelivery.com>
Sent: Tuesday, January 23, 2024 4:02 PM
To: Monte Shaw
Subject: Grassley Works to Bolster Biofuels in Aviation



FOR IMMEDIATE RELEASE
Tuesday, January 23, 2024

Grassley Works to Bolster Biofuels in Aviation

WASHINGTON – Sen. Chuck Grassley (R-Iowa), a senior member of the Senate Agriculture Committee, joined Sens. Jerry Moran (R-Kan.), Joni Ernst (R-Iowa) and Amy Klobuchar (D-Minn.) on legislation to accelerate sustainable aviation fuel (SAF) development through existing U.S. Department of Agriculture (USDA) programs. Their *Farm to Fly Act* would clarify federal SAF language and encourage collaboration between USDA and private sector alternative energy producers.

"Embracing biofuels is positive for Iowa farmers and the environment. By expanding opportunities for investment in sustainable aviation fuels at the USDA, our bill aims to diversify and onshore American energy production while encouraging economic activity," **Grassley said.**

"Sustainable aviation fuel is a promising alternative fuel source that can provide new markets for farmers while increasing our domestic energy production and security," **Moran said**. "This legislation would increase the accessibility of biofuel for commercial use and directly support rural America and its farmers, the agriculture industry and the aviation sector."

"As we work toward energy independence, the U.S. Greenhouse gases, Regulated Emissions, and Energy use in Technologies (GREET) model will play a key role in allowing homegrown, Iowa biofuel to meet the needs of the U.S. aviation industry while also creating new markets for biofuel producers," **Ernst said**. "An investment in the development of sustainable aviation fuel is an investment in our national security, our environment, and our farmers."

"Alternative energies like sustainable aviation fuel create jobs in rural areas, bolster our national security, and reduce carbon emissions from air travel," **Klobuchar said**. "This bipartisan bill with Senators Moran and Ernst will be another step forward in securing new markets for domestically produced biofuel."

Specifically, the *Farm to Fly Act* would:

- Clarify SAF eligibility in USDA Bio-Energy Programs, expanding markets for American agricultural crops through aviation bioenergy;
- Provide for greater collaboration on aviation biofuels throughout USDA agency mission areas, driving private sector partnerships; and
- Establish a common definition of SAF for USDA purposes, ensuring American crops can effectively contribute to aviation renewable fuels.

The legislation has garnered support from stakeholders spanning the agriculture, energy and aviation sectors. Rep. Max Miller (R-Ohio) is leading the House companion bill alongside seven of his colleagues, including Reps. Randy Feenstra (R-Iowa) and Ashley Hinson (R-Iowa).

-30-



This email was sent to mshaw@iowarfa.org using GovDelivery Communications Cloud, on behalf of: Senator Chuck Grassley ·135 Hart Senate Office Building · Washington, DC 20510

GOVDELIVERY

Monte Shaw

From: alertsadmin@opisnet.com
Sent: Thursday, February 15, 2024 3:40 PM
To: Monte Shaw
Subject: BIOFUELS UPDATE: ***ACE Receives $25 Million USDA Grant for Climate-Smart Ag Program

2024-02-15 04:39:54 EST
***ACE Receives $25 Million USDA Grant for Climate-Smart Ag Program

The American Coalition for Ethanol said on Thursday that it recently received a $25 million grant from the U.S. Department of Agriculture's Natural Resource Conservation Service for its conservation program that offers farmers funding to adopt climate-smart agricultural practices.

The funding opportunity for the ethanol industry group's Regional Conservation Partnership Program comes after a $7.5 million grant from the USDA in September 2021.

This new round of funding, ACE said in a Thursday release, will assist farmers in reducing tillage, nutrient management and cover crops over nearly 100,000 acres in 10 states.

Those acres surround 13 different ethanol facilities spread out through Illinois, Indiana, Iowa, Kansas, Minnesota, Missouri, Nebraska, Ohio, South Dakota and Wisconsin.

ACE said it chose the sites "to provide the project's scientific team with statistically significant data regarding the GHG effect of conservation practices in different soil types and climates."

ACE CEO Brian Jennings said in a release that the project will "ensure corn ethanol has a strong future as a meaningful part of the climate solution."

Jennings said the industry group would be collecting data from each of the sites to be later transmitted over to USDA "to pressure test existing models such as GREET to address real and perceived 'information gaps' which currently prevent farmers and ethanol producers from adequately monetizing climate-smart ag practices."

The Department of the Treasury is currently updating the DOE's Greenhouse Gas and Regulated Emissions and Energy Use in Transportation (GREET) model from the Argonne National Laboratory, which is set for release March 1.

Jennings said it is the group's goal "to establish an alternative to burdensome and costly quantification and verification protocols that would discourage farmers and ethanol producers from reaping maximum benefits from these practices in the future."

ACE said the 13 partner facilities receiving funding have the potential to remove over 2.6 million metric tons of carbon dioxide annually, which equals out to roughly 596,346 cars taken off American roads.

"Across the 10-state project area, this could amount to over $500 million per year in estimated maximum value from clean fuel markets -- a $266 per acre benefit for farmers based on the three-year average carbon price in the California Low Carbon Fuel Standard (LCFS)," ACE said in a release.

--Reporting by Patrick Newkumet, pnewkumet@opisnet.com; Editing by Jordan Godwin, jgodwin@opisnet.com

Bioenergy Technologies Office

DOE and EPA Announce $9.4 Million to Spur Development of Advanced Biofuels as Part of President Biden's Investing in America Agenda

FEBRUARY 22, 2024

Bioenergy Technologies Office »

DOE and EPA Announce $9.4 Million to Spur Development of Advanced Biofuels as Part of President Biden's Investing in America Agenda

As part of President Biden's Investing in America agenda, the U.S. Department of Energy (DOE) and the U.S. Environmental Protection Agency (EPA) today released a Funding Opportunity Announcement (FOA), entitled, "***Inflation Reduction Act Funding for Advanced Biofuels***," for up to $9.4 million for the development of advanced biofuels. This investment through a new agreement between EPA and DOE is funded by President Biden's Inflation Reduction Act and will support high-impact biofuel technology projects to improve the performance and reduce the cost of biofuel production technologies, scale up production systems in partnership with industry, and accelerate the nation's bioeconomy. Advancing renewable and sustainable

energy sources is essential to achieving the Biden-Harris Administration's ambitious clean energy and climate goals.

"Investing in bioenergy technologies provides a path forward to meet the growing demand for sustainable aviation fuel and other low-carbon biofuels," **said Jeff Marootian, U.S. Department of Energy Principal Deputy Assistant Secretary for Energy Efficiency and Renewable Energy.** "This joint DOE and EPA investment in a clean energy future is a great example of interagency partnership to further President Biden's whole-of-government approach to tackling the climate crisis."

"EPA is proud to partner with DOE in setting up this funding to advance President Biden's Investing in America agenda" **said Joseph Goffman, Assistant Administrator for EPA's Office of Air and Radiation.** "This investment through the Inflation Reduction Act will spur innovation in the production of advanced biofuels, advancing this Administration's goal to build a stronger clean energy economy."

Biofuels are liquid fuels produced from renewable biological sources, including plants and algae. When responsibly sourced, biofuel production in the U.S. can help strengthen the rural economy, reduce our reliance on foreign sources of oil, and support domestic production of cleaner fuels that can reduce some undesirable environmental impacts of fossil fuel production and use.

The FOA includes up to $9.4 million in federal funding to achieve the above outcomes by supporting two Topic Areas focusing on research and development (R&D) to advance technologies from the bench scale to pilot scale:

- **Topic Area 1: Pre-Pilot Scale Up of Integrated Biorefinery Technologies**
  Topic Area 1 will support the development of scaling up key process step(s) already developed at the bench-top scale. The funding opportunity would require the verification of the work at the bench-top scale, and then support the development of the process step(s) at the pilot-scale. Work would entail designing and building the pilot-scale process step(s) and then performing an operational test. The proposed key step(s) are not required to comprise a fully integrated pilot scale unit by the end of the project, but rather can be utilized to support future integration of the entire process at pilot or demonstration scale.

- **Topic Area 2: Biointermediate Processing Toolbox**

  Topic Area 2 will support the development and pilot-scale testing of key technology innovations for processing biointermediates, which are feedstocks that have been partially converted at one facility but are then sent to a separate facility for their final processing into a renewable fuel; for example, co-processing biocrudes in legacy petroleum refinery infrastructure. Work would entail employing a technology feature to improve biointermediate processing, and then performing a pilot-scale operational test, along with employing a method to measure the biogenic carbon in the co-processed fuel if the biointermediate is co-processed with petroleum.

  DOE's Bioenergy Technologies Office (BETO) has supported enabling work at DOE national laboratories on biocarbon incorporation into transportation fuels via co-processing in refineries and recently provided a public ***Two-Day Webinar Series*** *on the work.*

Domestic businesses, educational institutions, and nonprofits are eligible to apply for the funding, which will be administered by BETO. FOA applicants will be required to explain how their proposed project meets EPA's Renewable Fuel Standard (RFS) definition of an advanced biofuel. DOE envisions awarding one or more financial assistance awards in the form of cooperative agreements lasting approximately 36 months. The FOA concept paper deadline is 5:00 p.m. (ET) on March 22, 2024, and full applications are due at 5:00 p.m. (ET) on May 24, 2024. Learn more about and view the full **FOA** on DOE's Office of Energy Efficiency and Renewable Energy (EERE) exchange to register and apply. The solicitation with additional information on applicant eligibility is also available on **Grants.gov**. Go to **BETO's funding announcement page** for other upcoming funding opportunities.

Informational Webinar

An **informational webinar** for potential applicants will be held on Monday, March 4, 2024, at 3:00 p.m. ET, where participants can hear about the objectives and requirements of the funding opportunity. Panelists will give a presentation on the topic areas and application process. The webinar will be recorded, and the recording will be available shortly afterwards on the FOA landing page. The webinar is optional, and attendance is not a requirement to submit a concept paper. **Register today!**

Teaming Partner List

BETO has compiled a Teaming Partner List to encourage collaboration and facilitate the formation of project teams. The list allows organizations wishing to apply for funding to explore partnering with other prospective applicants. Partnerships can provide additional expertise and resources to successfully meet FOA goals.

Please include the following information in your partner list submission:

- **Topic Field -** Please select ONE of the following topics from the above topic fields. If you would like to be included in partner lists for both topics, please complete two separate submissions.
- **Background, Interests, Capabilities Field -** Please include information about your organization type/characteristics in the "Background, Interest, Capabilities" field to help other participants identify your expertise and resources. BETO also seeks applications from diverse teams of minority-serving institutions (MSIs), including Historically Black Colleges and Universities (HBCUs), Minority Business Enterprises, Minority-Owned Businesses, Woman-Owned Businesses, Veteran-Owned Businesses, and tribal entities); workforce education and training providers; and labor organizations.

Any organization that would like to be included on this list should submit information via the **Teaming Partner List** on EERE Exchange.

> ***Disclaimer:*** *By submitting a request to be included on the Teaming Partner List, the requesting organization consents to the publication of the above-referenced information. By enabling and publishing the Teaming Partner List, EERE is not endorsing, sponsoring, or otherwise evaluating the qualifications of the individuals and organizations that are self-identifying themselves for placement on this Teaming Partner List. EERE will not pay for the provision of any information, nor will it compensate any applicants or requesting organizations for the development of such information.*

Technology Verification

All applications selected for award negotiations under this FOA are required to participate in a verification process led by DOE's identified external third-party non-conflicted verification team. This verification process provides **technical assistance** both the DOE BETO and the project by providing an in-depth analysis of key technical and economic metrics to ensure transparency and increase the likelihood of project success.

About the EPA Renewable Fuel Standard Program

Implemented by EPA, the RFS program is a national regulatory program created by Congress with the goal of reducing greenhouse gas emissions along with expanding the nation's renewable fuels sector while reducing reliance on imported oil. The program requires a certain volume of renewable fuel to replace or reduce the quantity of petroleum-based transportation fuel, heating oil, or jet fuel. The four categories of commonly used renewable fuels are: biomass-based diesel, cellulosic biofuel, advanced biofuel and total renewable fuel. Learn more about EPA's **RFS Program**.

R&D Community Benefits Plan

To support the goal of building a clean and equitable energy economy, IRA-funded projects are expected to (1) invest in America's workforce; (2) advance diversity, equity, inclusion, and accessibility; and (3) contribute to the President's goal that 40% of the overall benefits of certain federal investments flow to disadvantaged communities. To ensure these goals are met, applications must include an R&D Community Benefits Plan that describes how the proposed project would incorporate the three objectives stated above. BETO has recently supported enabling work at the DOE national laboratories to develop tools and processes for considering energy equity and environmental justice in biorefinery siting. The projects include "**Energy Equity in the Transition to Renewables: The Bioenergy Case**," "**Bio-C2G Model for Rapid, Agile Assessment of Biofuel and Co-product Routes,**" and "**Strategic Analysis Support**."

3c. State Trade Association Meeting/Governors' Biofuels Coalition

State Renewable Fuels Trade Association Meeting

January 10th, 2024

Prairie Meadows, Grandquist Room - Boardroom or Zoom

Attendance:

Randy Stookey, Ron Seeber, Dana Hager, Tracie Menke, Brian Werner, Ben Rhodes, Walt Wendland, Kristy Moore, Monte Shaw, and Nathan Hohnstein

12:30 PM	Introductions & Discussion: State Policy Update • Introductions and brief updates on each member's state. Discussion followed.
2:00 PM	Discussion: Midwest SAF Study Update • Monte outlined of upcoming SAF Study Release. Discussion followed.
2:20 PM	Discussion: Year – Round E15 • Attorneys General Lawsuit and Happenings. Discussion followed.
2:30 PM	Discussion: ASTM, NCWM, UL Update • Updates from Kristy on E15 access and new regulations. Encourage weighing in on California LCFS by February 20th. Discussion followed.
3:30 PM	Break
3:45PM	Discussion: Federal Policy Update • Discussion on GREET, Federal Credits, SAF, etc. Discussion followed.
4:00 PM	Discussion: Iowa Caucus Update • Nathan Hohnstein provided update on Iowa Biofuel Vision Project; General discussion followed on upcoming caucus.
4:15 PM	Adjourn • Next meeting around June? FEW? Other host?

3d. International Trade

Monte Shaw

From: alertsadmin@opisnet.com
Sent: Monday, January 29, 2024 4:09 PM
To: Monte Shaw
Subject: BIOFUELS UPDATE: ***Brazilian Biofuels Company to Make SAF, RD Using Honeywell's Technology

Follow Up Flag: FollowUp
Flag Status: Flagged

2024-01-29 05:08:50 EST
***Brazilian Biofuels Company to Make SAF, RD Using Honeywell's Technology

Brazil's Acelen Renewables will make up to 20,000 bbl/day of sustainable aviation fuel and renewable diesel with help from North Carolina-based technology company Honeywell, the companies said last week.

Honeywell's Ecofining process will allow Acelen to make its biofuels from a blend of inedible seeds and waste oils, according to a Jan. 24 news release.
Acelen said the deal was essential to its goal of producing 1 billion liters (about 264 million gal) of renewable diesel and SAF annually beginning in 2026.

"[It] will make our company one of the largest biofuel producers in the world,"
Marcelo Cordaro, Acelen's chief operating officer, said in a statement. "We will show the world Brazil's full capacity to produce the fuel of the future."

Last April, Acelen said it would spend about $2.5 billion on developing its SAF and RD capacity over 10 years, with plans to begin building a production plant at the start of 2024 at its existing refinery at Mataripe, on the Bay of All Saints.

São Paulo-based Acelen is backed by the asset management subsidiary of Mubadala Investment Company, which is based in Abu Dhabi.

Honeywell last week said its deal with Acelen marks the 50th license it has sold for its Ecofining technology. "Of the 50 licenses, eight facilities are already in operation and more than 40 licensed plants are slated to be operational by 2030," according to Honeywell, which said the total capacity of those plants would top 500,000 bbl/day.

-- Reporting by Aaron Alford, aalford@opisnet.com; Editing by Jordan Godwin, jgodwin@opisnet.com

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GB News

Major new fuels could make hybrids 'just as climate-friendly as electric vehicles' in huge breakthrough

By Felix Reeves

Published: 12/02/2024 - 13:37

The fuel could mean drivers can skip the long waiting times for electric vehicles

Major new fuels could play an “important role” in the future of reducing car emissions across its entire life cycle by using renewable ethanol.

According to a new study, “compact” plug-in hybrid vehicles running on E85 fuel – which contains up to 85 per cent renewable ethanol – are “just as climate friendly as battery electric vehicles”.

The research, from French organisation IFPEN, compared the greenhouse gas emissions of vehicles powered solely by petrol, plug-in “flex-fuel” hybrids running on E85 and battery electric cars.

It took into account all emissions in connection with the vehicle and its battery as well as the energy used across production, distribution and combustion.

Based on the data, as well as projections to 2040, shows that plug-in flex-fuel hybrids running on E85 operating 40 per cent of distance

travelled as an electric vehicle are at least as climate-friendly as all-electric vehicles.

The report outlined how hybrids running on E85 have similar carbon neutrality to electric vehicles in terms of achieving carbon neutrality across their lifecycle.

Some petrol station forecourts across France continue to stock E85 fuel, in addition to Finland, Sweden and the United States.

E85 was previously available in the UK at forecourts owned by supermarket giant Morrisons, as well as B30 – which is a mix of 30 per cent biodiesel and 70 per cent standard diesel.

The data stated: “A report published by IFPEN has shown that as of today and in 2040, “compact” plug-in hybrid vehicles running on E85 are just as climate-friendly as all-electric vehicles with a long range.

“This applies even with the French-power mix that’s already low-carbon, provided we measure emissions over the entire life cycle.

“It is even more applicable with the EU-wide power mix with its higher CO2 footprint.”

The research paper, which was published in September 2022, suggested that five million plug-in hybrid vehicles could be running on Superethanol-E85 from local ethanol by 2040.

This type of ethanol already makes up seven per cent of fuel in France, up from four per cent in 2021, while more than a third of service stations have it available, as of 2022.

IFPEN suggests that it would be possible to have over five million flex-E85 hybrids by 2040 – making up between 15 and 20 per cent of vehicles on French roads.

It would also mean that only one per cent of French usable agricultural area would be used to cope with the number of vehicles using ethanol.

Plug-in hybrids could make use of further benefits when using E85 petrol, namely that it will be more readily available at filling stations, removing the need to wait at recharging stations to charge an EV.

According to the report, the compatible batteries in hybrid vehicles are smaller than those used in electric cars.

The report added: “[The batteries] use fewer mineral resources produced outside the EU and less power during manufacturing.”

12 Hailey Road, New Delhi-110001, INDIA
+91 11 46036437 | E-mail: usgcindia@grains.org

U.S. GRAINS COUNCIL

December 7, 2023
Reece H. Cannady
U.S. Grains Council Regional Director, South Asia

MEMORANDUM

Development:

This morning, India's Department of Food and Public Distribution (DFPD) declared that Indian sugar millers are no longer allowed to use cane juice to produce ethanol (Appendix A). The chief driver for this declaration is to maintain sugar prices in the country, as it is a staple food, and there is a national election in late spring 2024.

In 2022/2023, cane juice accounted for 30% of all ethanol produced in India. While it is not in the declaration, the minutes from a government meeting obtained by U.S. Grains Council (USGC) staff (Appendix B) state that the missing supplies will come via grain-based ethanol, with corn to be promoted as the primary feedstock. While the minutes do state that ethanol from B-heavy molasses will also be banned, this does not seem to have materialized in the formal declaration. Last year, B-heavy molasses accounted for 48% of all ethanol produced in India.

Analysis:

This declaration showcases a faltering commitment to India's E20 blend goals to be accomplished by 2025/2026. That said, they will not publicly abandon what they have set out to do, as it would be a sign of weakness by the government. Up until now, the government has been willing to twist facts and words to fit their agenda and showcase an artificially inflated blend rate. This declaration leads us to believe this will happen to a higher degree, as there is no possibility of them achieving the E20 blend via domestically produced grain-based ethanol without importing feedstocks, which the government continues to oppose.

Despite any anticipated shortfall, there will still be a push for corn to be diverted to ethanol plants from animal feed and industrial starch. Before today, the Indian animal feed manufacturing and industrial starch processing industries were facing a corn deficit by 2025/2026, and this development will prepone the shortfall to the upcoming year. The two industries are very disappointed in today's developments, and they are planning to ask for GMO feed grain and co-product access, the abolition of the corn TRQ, and lower duties on corn imports. These industries' corn consumption is growing at over 8% per year, and this declaration will not only send them spiraling into negative growth, but it will also raise consumer prices for poultry, dairy, and other necessary goods. There is a government initiative to see the middle class grow by 1,000% to 450 million people before 2047, and a faltering animal feed sector will hamper any future progress.

Impact on USGC Stakeholders and Strategy:

Fuel Ethanol – Our stakeholders still have a chance at market access via a two-tiered procurement program in the short-term. However, the indicators given by this declaration lead us to believe that the opportunity is smaller than it was yesterday, and it is likely not the best course of action for USGC activities and promotion.

Industrial Ethanol – Industrial ethanol demand should expand for U.S. exporters. Not only is the production of ethanol from cane juice being disallowed, but also all ethanol from B-heavy and C-heavy molasses will be solely dedicated to the fuel supply. USGC will continue to pursue methods of industrial ethanol expansion via cookstove adoption and chemicals produced in India for export.

Feed Grains and Co-Products – This declaration increases market access opportunities for GMO feed grains and co-products. In discussions with USDA and other cooperators, we believe this to be a watershed moment for GMO feedstock access to India, and programming will drastically expand on this front. At this moment, USGC is engaging in rapid response with the animal feed and starch sectors to coordinate a reply to the Indian government.

APPENDIX A: DFPD Declaration to Indian Sugar Millers

F. No. 3(2)/2023-SP
Government of India
Ministry of Consumer Affairs, Food and Public Distribution
Department of Food and Public Distribution
(Directorate of Sugar & Vegetable Oils)
Krishi Bhawan, New Delhi.
Dated: 07th December, 2023

To,

CEOs/MDs of all Sugar Mills/Distilleries.

Subject: Supply of ethanol from sugar/molasses based distilleries-reg.

Sir/Madam,

In exercise of powers conferred under the Essential Commodities Act, 1955, Department Food & Public Distribution (DFPD) monitors the production, sale and stock availability of sugar in the country to ensure sufficient availability of sugar for domestic consumption at stable prices by implementation of the Sugar (Control) Order 1966,

2. In exercise of powers conferred under clause 4 & 5 of the Sugar (Control) Order 1966, **it is directed to all sugar mills and distilleries not to use Sugar Cane Juice/Sugar Syrup for Ethanol in ESY 2023-24 with immediate effect. Supply of ethanol from existing offers received by OMCs from B-Heavy molasses will continue.**

Yours faithfully,

(Sangeet)
Director (Sugar)
Tele: 23383760

Copy to:

1) Secretary, Ministry of Petroleum & Natural Gas Shastri Bhawan, Dr. Rajendra Prasad Road, New Delhi - 110001. **{with a request to issue suitable directions to all the OMCs}**.
2) MD BPCL / MD IOCL /MD HPCL **{for compliance}.**

APPENDIX B: Minutes from DFPD Meeting Held on December 5, 2023

Department of Food and Public Distribution
Record of Decisions taken in Meeting of Committee of Ministers on 05.12.2023

1. In ESY 2023-24, no ethanol from sugarcane juice and B-Heavy will be procured by OMCs with immediate effect. Ethanol from C Heavy will be encouraged.
2. Maize is to be promoted as primary feedstock. In addition to PACS, NAFED/NCCF will also procure maize from open market at MSP and supply to distilleries for ethanol production. One LMT each will be the minimum procurement target this year. In-principle approval was accorded to the 3-year scheme namely 'Scheme for financial assistance to Central Cooperative Agencies viz. NAFED & NCCF for procurement of maize for supplies to distilleries for ethanol production'.
3. Supply of 'Bharat Atta' to be accelerated and augmented through big chain retailers and e-commerce platforms by NAFED/NCCF.
4. More number of wheat Procurement Centers be opened in UP, Bihar and Rajasthan and the operations started from 15 Feb 2024. FCI, NAFED and NCCF may increase procurement centres in such a manner to avoid mutual competition.
5. FCI will undertake wide publicity, with an expenditure of ₹ 25 crore, among farmers in UP, Bihar and Rajasthan for increasing procurement of wheat in these states.
6. The committee took note of the sale of Wheat under OMSS (D). It was informed that the weekly quantity of sale of wheat under the Scheme will be increased to 4 LMT from 20 Dec 2023.

Monte Shaw

From: alertsadmin@opisnet.com
Sent: Thursday, January 11, 2024 3:05 PM
To: Monte Shaw
Subject: BIOFUELS UPDATE: ***CRE's Review of Mexico's NOM-016 Fuel Spec Remains in Limbo: Sources

2024-01-11 04:04:58 EST
***CRE's Review of Mexico's NOM-016 Fuel Spec Remains in Limbo: Sources

Mexican energy regulator CRE's review of a fuel specification rule that would allow the use of higher ethanol blends in gasoline appears to be at a standstill, raising doubts over whether the agency will address the issue this year, sources told OPIS on Thursday.

A source close to the industry said it's unclear whether approving changes to the regulation, known as NOM-016, is a priority for the agency.

Alicia Zazueta, president of the Association of Retail Equipment Suppliers, told OPIS on Wednesday that CRE has yet to provide information about the resumption of discussion groups for the NOM-016 review, which were suspended during the Covid-19 pandemic.

"We are still looking for a dialogue with CRE [and] they have not responded yet," she said.

Government delays in providing incentives for ethanol use have made it difficult to increase the use of it and other biofuels in Mexico, fuel industry representatives have said.

Andres Gutierrez, chief executive of Ciefsa, a company specializing in fuel quality control laboratories across the country, said the industry continues to await updates on whether the sale of E10 will again be permitted in the country, adding that CRE's review was scheduled to be completed in 2021.

Mexico's Supreme Court in 2020 suspended the enforcement of a 2017 update to the specification that allowed the sale of E10 in much of the country. Mexico currently permits ethanol blends in gasoline of no more than 5.8%.

Zazueta said that when CRE does consider changes to the specification, it should include inspections and testing requirements to prove fuel origins and quality specifications.

CRE did not respond to OPIS's request for comment by the time of publication.

--Reporting by Karla Omaña, komana@opisnet.com; Editing by Jeff Barber, jbarber@opsinet.com

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You are currently subscribed to opisethanol as: mshaw@IowaRFA.org.

2024-03-14 09:34:17 EDT
***U.S. Grains Council Visits Mozambique to Discuss 10% Ethanol Fuel Blend Plan

U.S. Grains Council staff traveled to Mozambique and met with government officials to discuss the country's intention to implement a 10% ethanol fuel blend by August, the organization said last week.

USGC signed a memorandum of understanding with the Mozambique Ministry of Mineral Resources and Energy (MIREME) and Pivot Clean Energy Co., it said, in the presence of Xochitl Torres Small, U.S. Department of Agriculture deputy secretary of agriculture, and Peter Vrooman, U.S. ambassador to Mozambique.

Mackenzie Boubin, USGC director of global ethanol export development, called the MOU "a wonderful example of the Council's partnerships with like minded parties as we look to facilitate transitions to ethanol blending in countries around the world."

"This region is enthusiastic about the benefits that ethanol can provide such as rural economic improvement, positive human health impacts, reduced reliance on imported oil and agricultural feedstock demand," Boubin added. "The Council is ready to support this growth in Mozambique and beyond for years to come."

The MOU establishes a cooperative agreement to exchange technical expertise and best practices related to the biofuels industry and clean energy policy development.

USGC said that it will "work closely with the MIREME to strengthen technical and educational support for the country's ethanol initiatives for ground transportation as well as in-home uses such as clean cooking stoves."

Talks centered on ethanol's contribution to greenhouse gas reduction, the global ethanol production chain and pathways for domestic ethanol production, according to USGC.

Mozambican governmental representatives from the energy, environmental and agricultural sectors participated, USGC said, along with representatives from local fuel distributors, technology companies, national refineries and agro-industrial industries.

Mohamed Salah Bouthour, USGC's deputy regional director for Africa, called the event "a major success," adding that participants learned about "ethanol's various benefits, applications and logistical implementation."

"I very much look forward to continued collaboration with the Mozambican government," he said, "as they strive to reduce GHG emissions and improve human health."

--Reporting by Michael Schneider, mschneider@opisnet.com; Editing by Jordan Godwin, jgodwin@opisnet.com

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Monte Shaw

From: alertsadmin@opisnet.com
Sent: Wednesday, January 3, 2024 7:19 AM
To: Monte Shaw
Subject: BIOFUELS UPDATE: ***U.K. Framework for Zero Emission New Cars and Vans by 2035 Becomes Law

2024-01-03 08:18:55 EST
***U.K. Framework for Zero Emission New Cars and Vans by 2035 Becomes Law

The British government's Zero Emission Vehicle (ZEV) mandate, a regulatory framework and pathway to switch all new cars and vans to zero emissions by 2035, has now become law, according to a news release on Wednesday.

The new law, which is claimed to be the most ambitious regulatory framework for electric vehicles (EVs) in the world, was developed in collaboration with industry and car manufacturers, the government said in the news release.

According to the new law, 80% of new cars and 70% of new vans sold in the U.K.
will need to become zero emission vehicles by 2030, increasing to 100% by 2035.
Manufacturers will also receive new annual production quotas for zero emission cars and vans up to 2030.

The ZEV mandate is backed up by over £2 billion ($2.52 billion) of government incentives and investment in charging infrastructure, which has already grown to 50,000 public charge points, up by 44%, year on year. The goal is to reach 300,000 charge points by 2030, the government said.

Previously, in September last year, U.K. Prime Minister Rishi Sunak announced he would delay the ban on new petrol and diesel cars and vans, pushing it back to 2035 from 2030, which he said would time for consumers to make the choice to switch to electric, and to level up the country's charging infrastructure.

However, the government has missed its target of having at least six rapid EV chargers at every motorway service station in England by the end of 2023, according to a news release on Tuesday from the RAC, a U.K. motoring services provider.

Just 46 of 119 motorway service stations in the U.K. reviewed by the RAC have the target number of chargers above 50 kilowatt (KW) to serve the country's growing fleet of battery-electric vehicles.

In March 2022, the government published a document called "Taking charge: the electric vehicle infrastructure strategy", in which it stated it would ensure that every motorway service area has "at least" six rapid chargers by the end of 2023, with some having more than 12. However, 18 service areas in the U.K.
have no rapid charging above 50 KW, and four have no charging facilities at all.

Currently, EVs account for over 16% of the new U.K. car market. According to government statistics some 93,000 zero emission vehicles were registered for the first time in the U.K. in September 2023, an increase of 41% year on year.

--Reporting by Benita Dreesen, bdreesen@opisnet.com; Editing by Rob Sheridan, rsheridan@opisnet.com

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Monte Shaw

From: alertsadmin@opisnet.com
Sent: Wednesday, December 20, 2023 10:52 AM
To: Monte Shaw
Subject: BIOFUELS UPDATE: ***Canada Moves to Ban Sale of New Gasoline and Diesel Vehicles by 2035

2023-12-20 11:52:04 EST
***Canada Moves to Ban Sale of New Gasoline and Diesel Vehicles by 2035

Canada will publish regulations this week that will prohibit the sale of new passenger vehicles powered by gasoline or diesel starting in 2035. That action, along with similar bans in several U.S. states, could impact more than 136 million people in North America.

Canada will join California, Connecticut, Maryland, Massachusetts, New Jersey, New York, Oregon, Rhode Island and Washington in blocking the sale of new vehicles powered by internal combustion engines starting in 2035.

Other U.S. states are considering similar bans as well as less ambitious targets.

The ban may be challenged by business groups and some consumers. It represents the broadest geography targeted worldwide with a target for transitioning from fossil fuels to electric vehicles.

Canadian Environment Minister Steven Guilbeault announced the ban on Tuesday, saying Canada was at a "tipping point."

While the regulations won't be released until later this week, initial plans call for targeting a 20% EV share in 2026 and 23% in 2027. By 2028, the country's share of EV is targeted at 34% with 43% eyed by 2029 and 60% by 2030.

Guilbeault said EVs in British Columbia and Quebec already account for more than 20% of new vehicle sales. Both those provinces, along with Prince Edward Island and Nova Scotia have put in place incentives for purchasing EVs.

The move toward an all-electric vehicle future could have a major impact on Canada's 1.9-million b/d of refining capacity, particularly for inland plants.

The Braya Renewable Fuels refinery in Newfoundland and Irving's 320,000 b/d refinery in St. John New Brunswick rely mostly on export demand and that is also true for Parkland's Burnaby refinery in British Columbia as well as a small refinery in Prince George, British Columbia. Valero Energy's Jean-Gaulin refinery in Quebec also occasionally exports transportation fuels.

But that still leaves about 1.5 million b/d of Canadian refining capability spread across Quebec, Ontario, Saskatchewan and Alberta.

Investors and operators of those complexes may worry that those facilities could become stranded assets within the next decade. Shell Canada has quietly been shopping its 75,000 b/d refinery in St. Clair, Ontario, for years but has yet to find a buyer.

The move to EVs has its critics. Alberta Premier Danielle Smith, who has supported efforts to move toward lower-emission vehicles, said she believes the "government has no legal or moral authority to tell Albertans what vehicles they can and cannot buy."

She said the planned regulation amounts to "an unconstitutional edict with a bizarrely impossible timeline."

Smith said her government would "do everything within its legal jurisdiction to thwart implementation of these unconstitutional regulations" in the province.

--Reporting by Tom Kloza, tkloza@opisnet.com; Editing by Jeff Barber, jbarber@opisnet.com

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To find out more about OPIS visit us @ http://www.opisnet.com

Ethanol A-Team Minutes

Wednesday, December 14th 2023, 10am EST
Virtual

Call to order – Doug Berven

- Introductions and agenda overview.

Brazil Updates: ANP Renovabio Comments, CAMEX Tariff and Acidity Specification Changes– Juan Diaz

- Juan gave an overview of USGC's recent engagement with the A-team and industry about our upcoming Renovabio comments on aggregate compliance that are due December 18, 2023. The current program has eligibility criteria that requires producers to demonstrate no deforestation, which is difficult for U.S. producers to accommodate for that would be accepted by ANP. With this new resolution that would allow for aggregate compliance, almost all U.S. corn that is devoted for ethanol production would be eligible. RenovaCalc default numbers are not anticipated to change outside minor adjustments. What is not clear within the new resolution is the role of importers. A public comment hearing will take place on February 7, 2024 with the final document released within March-April 2024 timeline.
- ABICOM (Brazil association of fuel importers) in Brazil formally requested to drop the tariff duties on U.S. ethanol due to the S&P study that demonstrated undue hardship on Brazilian consumer of an extra 11 cents a gallon due to the tariff. This now will open up a space for a CAMEX (Foreign Trade Chamber at the Brazil Ministry of the Economy) consultation and comment submission sometime in December 2023 or January 2024 that will allow for public comment submission. Once public comments submission become open, there will be 45 days to finalize comment contributions. Final decisions that would take public comments into consideration are estimated to be released in May or June 2024. Widespread participation between U.S. industry and government is highly encouraged to show significant support for the removal or reduction of the tariff. USGC will supply a draft comment document for the A-team to utilize for their individual comments as well as details required for comment submission. Assistance will be needed from domestic entities to secure Congressional and legislative comments on this issue.
- The issue of ethanol specification harmonization for acidity purging for ethanol exports into Brazil was also brought up. USGC was made aware of the opportunity to fund a due diligence aspect of ASTM finalization that would create similar purge acidity standards that are currently practiced within the United States that would also conform now for Brazilian import standards. This would allow for additional U.S. supply to be eligible for Brazilian exports. Brazil has a unique acidity spec to their country and this new step to update their purge standards would harmonize their market access in-line with other export markets. Total costs would equate to around $55,000 for a 6 month specification change in order to finalize the required ASTM procedures.

MY 2023/2024 export numbers and countries in focus – Mackenzie Boubin

- Mackenzie gave an overview of the current MY23/24 numbers that include September and October 2023 monthly export numbers for U.S. ethanol. 237 million gallons between the first two months of the marketing year, which is up 60 million gallons year on year.
- Canada remains the top ethanol destination and is averaging over 60 million gallons a month as a result of CFR implementation. E15 in Canada remains a top priority for 2024 in encouraging retail stations to begin offering the fuel blend as a compliance mechanism.
- The EU and the UK are anticipating an 7.5% increase in ethanol consumption year on year, with E10 expansion in Poland, Czech Republic, Ireland and Austria giving a boost for demand. The EU and the UK are short 550 million gallons of ethanol for this growing demand for 2024, despite the EU producers running at full capacity. Export opportunities for US producers will be more advantageous in the first half of 2024, with the last half of 2024 transferring more towards Brazil imports due to current market dynamics. The EU and the UK average a 7.5% ethanol blend with USGC pursuing and encouraging an EU wide E10 to continue to increase ethanol demand. USGC remains engaged on the EU surveillance mechanism and the legal requirements recommended to avoid any possible repercussions or CVD fears in the near term.
- With India's recent announcement to ban domestic ethanol production from cane juice, which represents 30% of their production feedstock, the US is poised to possibly benefit for immediate industrial ethanol exports due to domestic industrial producers shifting towards fuel grade production to meet India's blend targets.
- Despite the loss of the CVD case in early 2023 to Colombia, increased ethanol exports to the country are a result of their increased blend level from 5 to 6% in 2023. Colombia instituted a voluntary ethanol blend from 0-7% and this increase in ethanol blending as a resulted in increased US imports.

Regional Agricultural Promotion Program (RAPP) Updates – Cary Sifferath

- Cary gave an update on USGC's application for the RAPP funding opportunity released on November 29, 2023. Applications will be due to FAS on February 2, 2024 with the first funding notice worth $300 million to agricultural cooperators over 5 years and additional funding years worth $200-300 million each for 5 years. Ineligible markets include China, Canada, Mexico and the EU. Given the significant ethanol programs in those respective markets, USGC will shift other governmental and members funds towards those regions while RAPP funds will cover significant programming efforts in the remaining USGC geographic areas.
- There will be a 10% match required from USGC members with 8% of overall funding allowed for domestic administration costs.
- As a result USGC has submitted new office positions for the boards consideration during the February board meeting, which include a new international accounting position, a manager of industry relations administration, a global programs coordinator and a specific EU/UK and Canada ethanol portfolio manager.
- New International positions will include a new Latin American regional deputy director, a Latin American program manager, a South East Asia programs manager, a South Asia Marketing Manager and a Sub-Saharan African accounting assistant.

- This a welcome and timely infusion of potential funds for USGC as our ATP funding expires September 31, 2024 so these new funds will provide a continuation of current programs and a possible expansion of ethanol strategic projects and international engagement. Stay tuned!

Q4 2023 Mission Recaps – Team members: Josh Roe, Ryan Sauer, Brian Hutchens, Hagan Rose, Chris Kopelke, Alex Marquis, Mike Lorenz and Doug Berven

- Josh Roe gave a quick update on his recent participation in the Chile ATM. Opportunities abound with decarbonization efforts however Chile is of the mindset that they need to engage in their own analysis and research associated with compatibility. USGC is engaged on these efforts to ensure confidence for the Chilean government to move forward for ethanol implementation.
- Ryan Sauer provided an overview of his participation in the Vietnam Agricultural Cooperators Conference. Vietnam wants to achieve E5 by 2030 however is extremely concerned about consumer acceptance, with USGC engaging in a consumer campaign in the coming months to address this issue. Additional engagement in a feed ingredient conference to showcase DDGS and corn sales from the US as a result of business to business buyer meetings.
- Brian Hutchens told of his India mission participation on E20 feasibility and implementation that showcased the challenges India is facing towards reaching E20, with significant feedstock sourcing issues both for domestic sugar supplies and internal maize production. USGC remains poised to assist the Indian government and stakeholder on expanded corn ethanol production and industrial ethanol import supply.
- Chris Kopelke and Hagan Rose gave an update on their mission to Nigeria, whose Dangote refinery, when completed will be one of the largest refinery in the world, is finalizing their construction and rollout. Ensuring ethanol storage and successful ethanol policy will be critical to achieving an E10 implementation. Encouraging Nigeria to secure the right ethanol specification, ethanol access and ethanol blend rate all contribute to E10 viability. USGC has Nigeria has a top 3 target country for Q1 and Q2 of 2024. Nigeria is one of the fastest growing fuel markets and represents an immediate opportunity for fuel ethanol exports.
- Alex Marquis discussed Marquis's participation in USGC's SAF symposium in Japan where Marquis conveyed the carbon benefits of U.S. corn ethanol as well and the transport and trade benefits associated with hydrous versus anhydrous ethanol. Japan continues to be a top market priority with particular focus on ATJ SAF.
- Doug Berven and Mike Lorenz were apart of the COP28 mission to Dubai and updated the A-team on agricultural increasing importance as a viable decarbonization solution within the international climate rhetoric. Strong Brazilian presence and visibility were noted, with encouragement for U.S. and our A-team farmers to engage within this international forum to showcase and be in the room when climate policy is crafted and discussed. Ethanol will not be considered without our participation and presence.

Other Business Items – Mackenzie Boubin

- Mackenzie gave an overview of USGC's upcoming events for our February member meeting that will take place in Guatemala from February 14-16 2024 and our summer meeting occurring in Salt Lake City from July 29-31 2024. February topic requests should be sent directly to Mackenzie or Stella for the upcoming meeting.

- Mackenzie conveyed that our new SAF consultant will start on January 8, 2024, this is an highly anticipated position that came about from our July 2023 team meeting as a board recommendation.
- There are many pilot programs that USGC will lead and initiate for 2024 are in the works and ethanol sourcing and trader engagement will be critical to ensure success for these pilot rollouts. If there is any appetite to supply and source U.S. ethanol for these pilot programs, please reach out to Mackenzie for your interest to assist.
- Doug Berven called the meeting concluded at 11:49am EST.

PARTICIPANTS

- Mackenzie Boubin
- Doug Berven
- Nick Bowdish
- Gary Porter
- Josh Roe
- Montgomery Shaw
- Barb Kastner
- Carl Jardon
- Chris Kopelke
- Jan TenBensel
- Kathy Frahm
- David Flakne
- Ed Hubbard
- Ron Lamberty
- Mike Lorenz
- Alex Marquis
- Rick Schwarck
- John Swanson
- Hagan Rose
- Jeremy Mall
- Walter Wendland
- Craig Willis
- Ryan Sauer
- Steve Rust
- Tim Burrack
- Jason Dale
- Jolene Riessen

Ethanol A-Team Quarterly Update Call

December 14, 2023

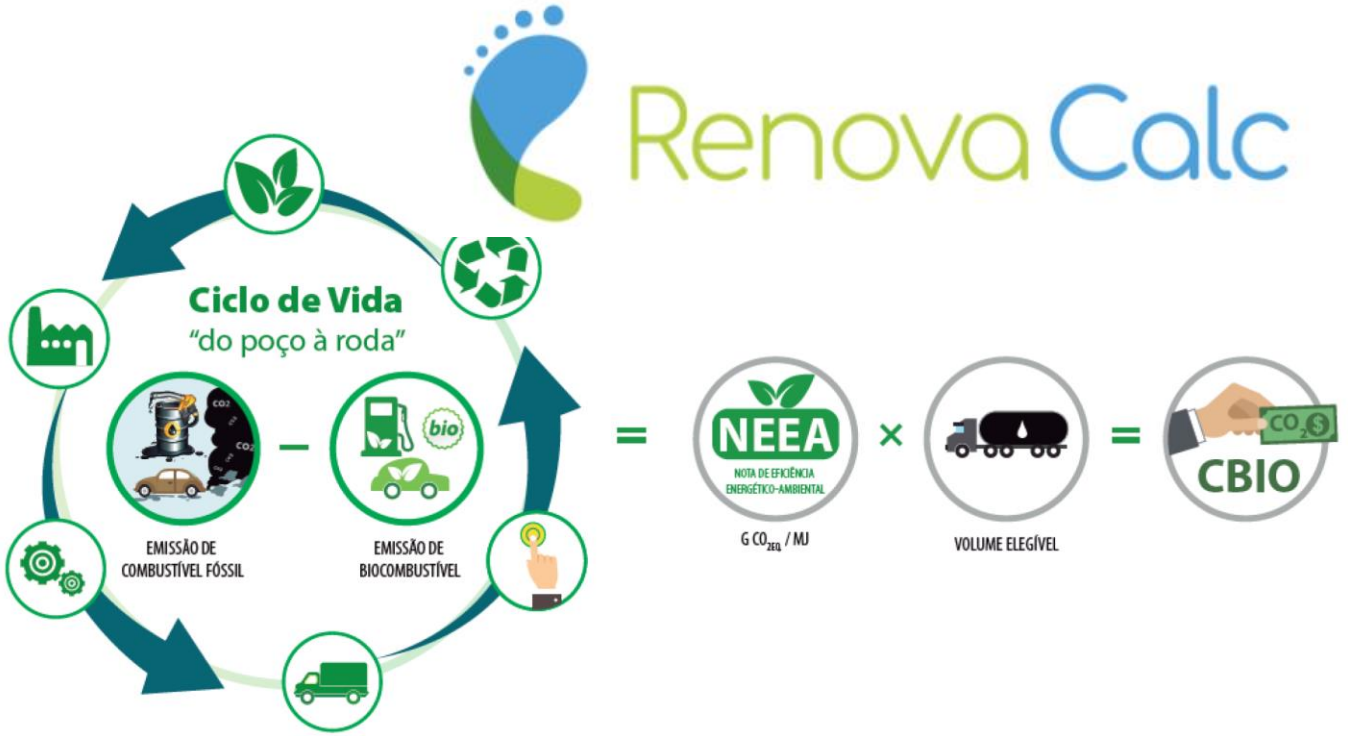
U.S. GRAINS COUNCIL

Agenda

- 10:00am Welcome and Agenda – Doug Berven
- 10:05am Brazil Updates: ANP Renovabio Comments, CAMEX Tariff Opening and Water Specification Updates – Juan Diaz
- 10:35am MY 2023/24 export numbers and countries in focus - Mackenzie Boubin
- 10:45am Feedback from Members on Recent Missions- India, COP, Chile, Nigeria, Japan
- 11:05am Regional Agricultural Promotion Program Update – Cary Sifferath
- 11:15am Other Business
- 11:25am Adjourn

Comments on Renovabio Draft Resolution that will replace Res 758/18





U.S. GRAINS COUNCIL

Comments on Renovabio Draft Resolution that will replace Res 758/18

The acceptance of the **aggregated compliance** approach in the new regulation is positive and should facilitate the entrance of new agents in the program.

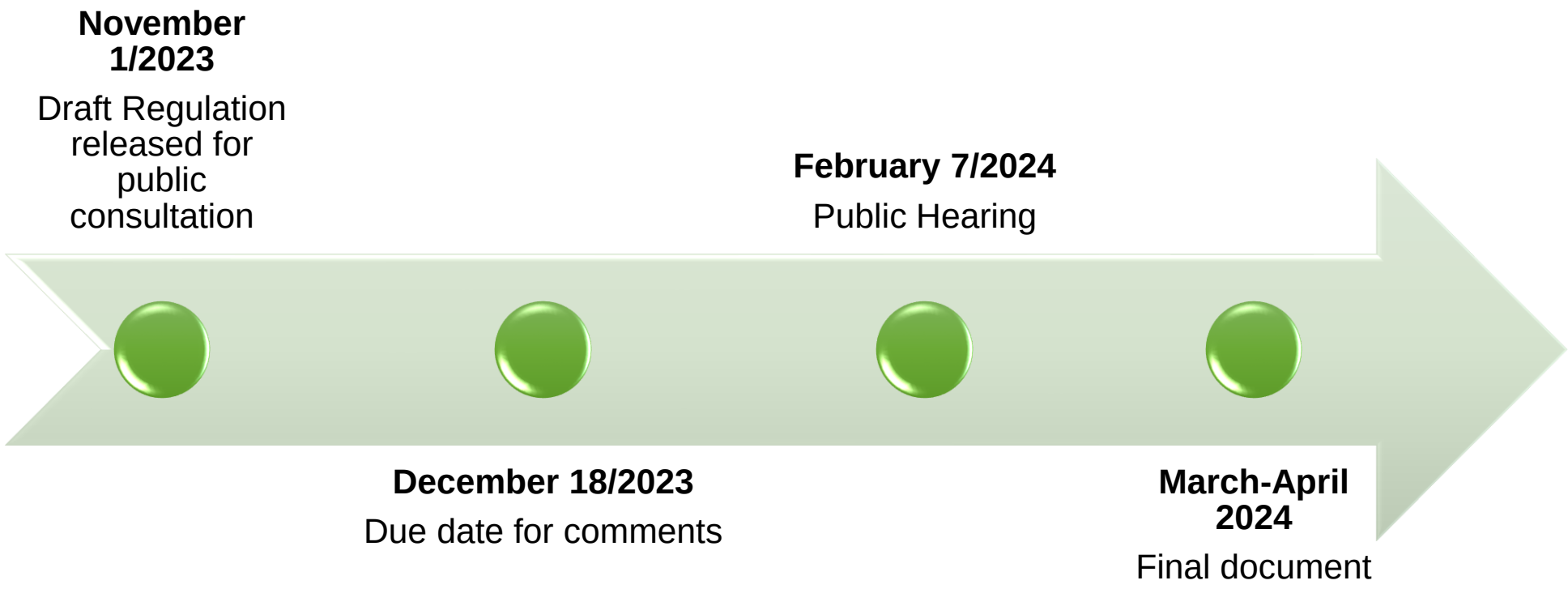
mass balance concepts must be applied when there is intermediation of raw material that constitutes the formation of a chain of custody.

Confidentiality of the information.

Role of importers: Foreign producer qualification; suspension or cancellation of the Certificate and CBios trade.

U.S. GRAINS COUNCIL

Comments on Renovabio Draft Resolution that will replace Res 758/18



U.S. GRAINS COUNCIL

Request to eliminate duties on ethanol

abicom
ASSOCIAÇÃO BRASILEIRA DOS IMPORTADORES DE COMBUSTÍVEIS

Historically, imports are necessary to fulfill the demand in the Northeast region. There is an **annual deficit of 528 million gallons** in the Northeast.

The decision significantly impacts the entire sector, especially importers, who have already incurred an **additional cost of $151 million** due to the application of the tariff.

Between 2019-2023 final consumer paid **extra $0.11/gallon** due to the tariffs applied to ethanol (reaching $0.15/gallon in 2021)

Brazilian industry will prioritize sugar production due to strong international market impacting ethanol production. **Corn ethanol domestically produced is the one attending the NE demand** and Brazil does not require to maintain any measures that would jeopardize the bilateral trade.

U.S. GRAINS COUNCIL

Request to eliminate duties on ethanol

October 30, 2023: Formal request to CAMEX

November 2023: CAMEX requested extra documents including ABICOMs registration and to fill extra forms.

December 11-15, 2023: ABICOM registration and presentations of the forms

Third parties have **45 days** to offer contributions to the requests. Once the deadline is finished, the STRAT will analyze the information.

March 15, 2024 (T): Document analysis by STRAT (Commercial Strategy Undersecretariat)
(90 days, extendable for another 90)

April 2024 (T): Discussion of the request inside CAMEX.

May-June 2024 (T): after the public consultation analysis, the GECEX will issue and publish a final decision

Discussion Ethanol Specifications

Update and approve the acidity methodology for anhydrous ethanol (purged methods) commonly used in the U.S.

Auto titrator and a purge step in the standard test method, D7795 (Test Method for Acidity in Ethanol and Ethanol Blends by Titration), have significantly improved the measurement and reporting of true acidity levels in ethanol for fuel applications.

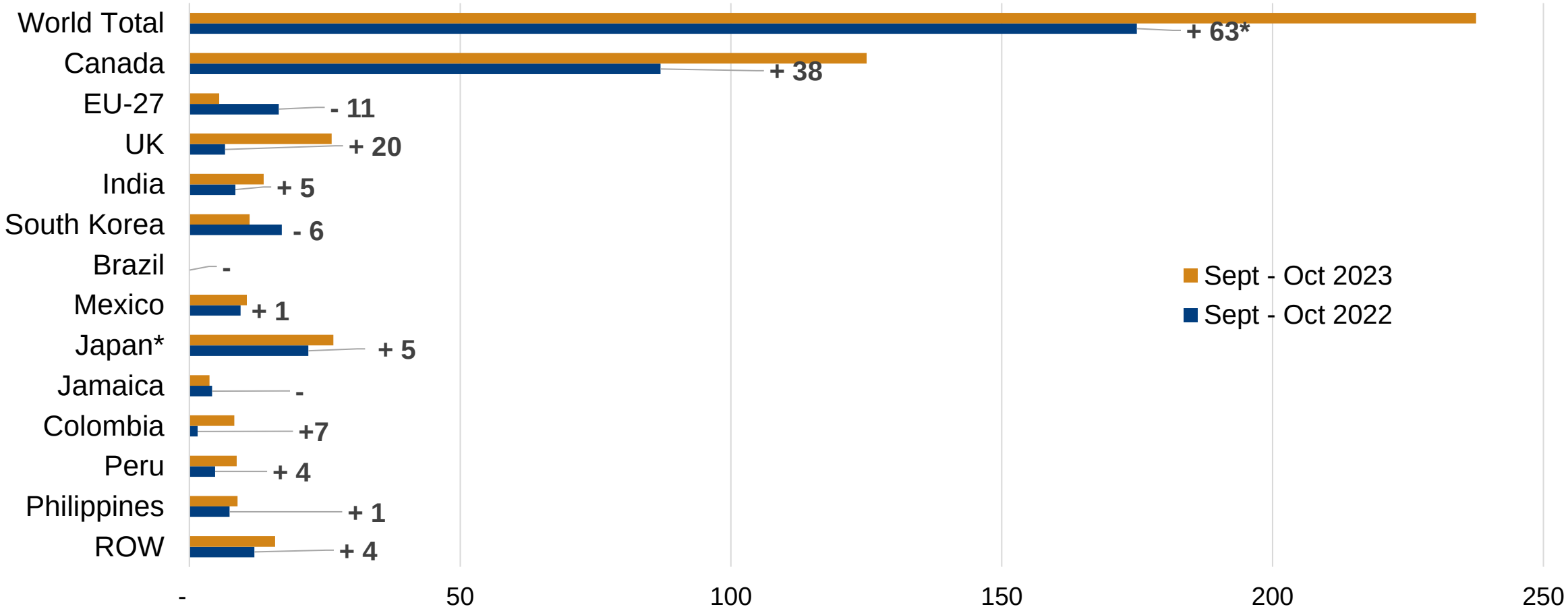
Brazilian tight acidity specs have affected US ethanol producers for reaching the market.

Anhydrous Fuel Ethanol Specifications

ASTM Fuel Ethanol, D4806-21a**	ANP#19 (2015), #764 (2018)
• Ethanol, min%: 92.1 (v)	• Ethanol, min%: 98.0(v)
• Methanol, max%: 0.5(v)	• Methanol, max%: 0.5(v)
• Water, max%: 1.0 (vol.)*	• Water, max%: 0.7 (wt.)*
• Acidity, max, mg/L: 56	• Acidity, max, mg/L: 30
• pHe: 6.5-9.0	• pHe: 6.0-8.0
• Sulfur, max: 30 (wt.)	• Sulfur: Report
• Denaturant: NMT 2.0% (EPA)	• Denaturant: 3%
• Other parameters to ensure highest quality.	• Other parameters to ensure highest quality.

* Greatest difference is the water content. 0.7% (wt) = 0.56% (v).
** There is no similar specification at ASTM for hydrous ethanol.

Exports of U.S. ethanol total 237 million gallons in the two month of MY 2023/24, up over 60 million gallons from last



Source: USDA Global Agricultural Trade System & *USGC estimates for Japan

Ethanol A-Team Recent Mission Feedback

- Chile Agricultural Trade Mission
- Vietnam Agricultural Cooperators Conference
- India Ethanol Assessment and E20 Feasibility
- Nigeria Ethanol Pilot and Policy Mission
- Japan Sustainable Aviation Fuel Symposium
- Dubai and COP28

Regional Agricultural Promotion Program (RAPP)

- Notice of Funding Opportunity (NOFO) released on November 29, 2023
- Applications due to FAS on February 2, 2024
- First NOFO is for $300 million ($25 million allocated for Africa)
- Expect NOFO for additional $200-$300 million each year for 5 years.

Now Confirmed Ineligible Markets (less than originally thought)

- China (including Hong Kong and Macau)
- Canada
- Mexico
- EU

RAPP Regulations

1. A blend of ATP and FMD regulations
2. Minimum of 10% match
3. Multiyear grants
4. Duration of first batch of funding: June 1, 2024, to September 30, 2029. No extensions beyond this
5. Performance measures will be for 5 years in length
6. We can bill overseas office operations, including staff (similar to FMD)
7. We can use **8%** of total funding for domestic (US) Administration – up from 6% in ATP
8. Demonstration projects are allowed – ie equipment purchase (with conditions) – ***new***
9. “Legal fees incurred in resolving trade issues with foreign countries” – this is new and a result of USGC’s efforts with ATP

RAPP Submission Timeline

- **December** – All the proposals are drafted *(International offices and DC staff responsible)*
- **December 29th** – All proposals should be submitted in Teams so DC staff can start editing and preparing for submission
- **January 2 – 12th** – DC staff edits and gives feedback to International offices
- **January 16th** – start uploading the documents into the online UES system
- **January 29th** – Final review and form submissions
- **February 1** – RAPP application submitted *(Feb 2, back-up date if there are any problems)*

DC Office New Positions

- Manager of International Accounting/RAPP Accounting
- Manager of Industry Relations Administration
- EU/UK & Canada Ethanol Policy & Program Manager
- Additional Global Programs Coordinator

New Positions in International Offices

- LTA Regional Deputy Director *(in Panama or within LTA region)*
- LTA Regional Programs Manager *(based in Panama office)*
- SEA/Oceana Regional Programs Manager *(based in KL office)*
- South Asia Marketing Manager *(based in New Delhi, local hire)*
- Admin & Accounting Assistant for Sub-Saharan Africa *(based in Tunis, local hire)*

Other Business Items

- <u>Upcoming Events</u>
- February 14-16 2024
  Guatemala: International Marketing Conference
- July 29-31 2024
  Salt Lake City: Annual Board of Delegates Meeting

- EU Surveillance
- Nigeria Pilot Program
  - 2024 Pilot Support
- USGC SAF Consultant
- India Sugar Announcement
- Clean Edge Mission
- February Meeting Agenda Requests?

Ethanol A-Team February 2024 Agenda

Advisory Team Leader
Doug Berven

USGC Staff Liaison
Mackenzie Boubin

Wednesday, February 14, 2024 1:45 – 5 pm

1:45 – 2:00 Call to order, Introductions and agenda review……...Doug Berven
2:00 – 2:30 Japan program update ……..Tommy Hamamoto
2:30 – 3:00 Korea market update……..Haksoo Kim
3:00 – 3:30 Break
3:30 – 4:15 Southeast Asia market update ……Caleb Wurth/Chris Markey
4:15 – 5:00 Canada and EU program update …….Isabelle Ausdal/Alberto Carmona

Thursday, February 15, 2024 10 am – noon & 1:30 – 5:00pm

10:00 –10:20 Mexico market update ……Heidi Bringenberg
10:20 – 10:50 Latin American market update ……..Juan Diaz/Federico Salcedo
10:50 – 11:10 China market update……Manuel Sanchez
11:10 – 11:30 Taiwan market update ……Michael Lu
11:30 – 12:00 Middle East/Africa Market update ……Ramy Taieb
12:00 – 1:30 Lunch
1:45 – 2:30 India market update ……Reece Cannady
2:30 – 3:15 A-Team feedback on priority markets bubble chart and RAPP funding
3:15 – 3:30 Break
3:30 – 4:30 Misc Discussions

- On-Road Fuel Ethanol Pilot Assistance
- Global Media Strategy and Engagement Direction
- SAF Engagement Strategy and Feedback
- Sustainability Markets and Low Carbon Recognition
- Mission Debrief and Follow-up Format
- Planned 2024 Missions
- Clean Cooking Highlight and Overview
- External Stakeholder Approaches

4:30 – 5:00 Report and Action Items

- Finalize recommendations to board of delegates
- Action items for board of directors

U.S. GRAINS COUNCIL

Agribusiness Sector Agenda

Sector Director
Greg Hibner
Craig Willis

USGC Staff Liaison
Ellen Zimmerman

THURSDAY, FEBRUARY 15 8:00 - 9:30 A.M. • ROOM: ATITLAN

8:00 Call To Order . . . . . **Greg Hibner & Craig Willis**

8:05 Brazil Presentation . . . . . **Greg Hibner & Craig Willis**

8:35 The Latest On Soy Crush Capacity . . . . . **Chris Arnold**

9:05 USGC Bylaw Change . . . . . **Ellen Zimmerman**

9:20 Reminders . . . . . **Ellen Zimmerman**

9:25 Wrap-Up, Closing Comments . . . . . **Greg Hibner & Craig Willis**

9:30 Adjourn

October 2023 Monthly Management Report

Middle East, Africa, and Europe Regional Update

Global Ethanol Summit, October 14-21, 2023:

Thirty key Officials and Senior-level industry leaders, Ethanol producers, importers & exporters, and refiners from Europe, the Middle East, and Africa traveled to Reston, VA to attend the Global Ethanol Summit. This event allowed the Council and the Tunis & DC office staff and consultants to build new and close relationships with new key Ethanol Counterparts in EMEA.

As an example, the Nigerian delegation had a key side meeting with the USDA Deputy Undersecretary Hafemeister, about the subsidy cut and in-country increasing prices of gasoil at the pump. They discussed the commercial and environmental benefits of E10 using case studies and Nigeria's current infrastructure challenges and the investment required to fill the existing gaps.

Also, a technical meeting took place with Kristy Moore and another one with John Mayes and Rowena Ortez Ordonez, discussing the research conducted recently by TMC, and showing that the introduction of an E10 policy or standard in Nigeria could lead to savings of up to USD 9.32 for every barrel of petrol mixed with 10% bioethanol; which could increase to USD 18.65pb for E20.

During the second day, the concurrent sessions featured several panel discussions and topics such as new use applications for biofuels, biofuel infrastructure and compatibility, and environmental and human health benefits of renewable fuels. The event culminated in a series of memorandum of understanding signings between the Council and key ethanol stakeholders from around the world including the Ministry of Energy of Ghana Republic.

Following the Summit, and after an early morning roundtable with the Bioethanol associations around the world, two groups of participants from EMEA, dispersed to ethanol-producing states (Ohio and Missouri) where they spent the next two days viewing the biofuel value chain firsthand and infrastructure before heading back to their home countries.

Comments: This summit brings a mixture of buyers/importers, traders, blenders, and producers/refiners from several companies which builds new relationships that didn't exist before. They will continue in future cooperation, even producing Ethanol, importing U.S. Ethanol into Europe, blending and exporting to neighboring and SSA countries. Having a mixture of these government/private, high-level managers/directors from major Ethanol/refinery companies across Europe and MEA is always a benefit for U.S. Ethanol market growth in this region.

Council's bioethanol mission in EU, Germany and Poland, October 23-27, 2023:

USGC staff; Mackenzie Boubin, Director of global ethanol export development and Isabelle Ausdal, manager of ethanol policy and economics; traveled to Germany and Poland between October 23 and 27, 2023 to expand support for bioethanol within the European Union (EU) and explore potential markets in the region.

In the 2022/2023 marketing year, the European Union (EU) emerged as the second-largest market for U.S. bioethanol, and the U.S. Grains Council (USGC) is continuously working at the

EU Commission- and member-state levels to build alliances and increase awareness of bioethanol and its benefits in the region.

This mission comes at a time when individual member-state countries are becoming more vocal about the challenges and barriers associated with meeting EU Commission-level policies such as the hotly debated phase-out of the new sales of combustion engines by 2035 and the implementation of the newest Renewable Energy Directive III (RED III). In Leipzig, Germany, Council staff participated in the 7th Business Meeting of the International Energy Agency (IEA) Technology Collaboration Platform's (TCP) Task 39 on biofuels, where member countries and USGC met to discuss joint projects coming in the next three-year term.

Comments: Exploring markets like Poland and continuing work with the IEA enhances the Council's role in global bioethanol promotion while it serves as the trusted and passionate ambassador for free and fair trade between the U.S. bioethanol industry and stakeholders around the world.

MARKET INFORMATION

U.S. Ethanol Exports to Europe, Middle East and Africa:

In MY 2023, the Middle East, Africa, and Europe region accounted for 22 percent of U.S. ethanol exports, totaling around 273 million gallons (97 million in corn bushel equivalent), mainly to:

- EU is the 2nd largest export destination, with 121 million gallons, despite competition from SAM

- UK is the 3rd largest export destination, with 111 million gallons, up 135% year on year

- Nigeria with 21 million gallons, down 60% year on year, due to competition from Brazil

- and the Arabian Peninsula with 20 million gallons (primarily KSA, UAE, and Egypt), due to tough competition from Pakistan.

Beginning 2024, the Dangote refinery in Nigeria will start the phased ramp-up to 650,000 barrels per day of petrol. Ethanol blending and storage infrastructure at the Dangote Refinery represent the single largest ethanol blending capability globally with an existing infrastructure enabling blending at scale. Dangote GMD sees the clear economic and environmental case for E10 and the refinery can load into trucks directly to retail stations, or into vessels into the existing depot infrastructure. Current preference to prioritize trucks but significant wider industry concerns about the viability of the transport infrastructure being able to handle 2,900 truck outs per day.

Mexico Regional Update

MARKET RELATED NEWS

Luis Chavarría, CEO de Kepler Oil and Gas, points out that the main mistake of the current federal administration is the construction of the Dos Bocas refinery, as its cost will be double what was initially forecasted. The refinery's production in its initial phase will be less than 100,000 barrels per day, primarily consisting of diesel and gasoline (BOB). This implies the need to blend it with ethanol or MTBE for oxygenation. The government has two options: "Send the BOB gasoline to refineries in Tula, Salamanca, or Madero to complete the process." "Export

the BOB gasoline to other countries like Brazil, where it can be mixed with ethanol."
https://www.efinf.com/clipviewer/38d72df2a586d8673c2e5d219e337132?file

Roberto Díaz de León stated that gas stations in Mexico can operate with gasoline blended up to E15. However, it will be necessary to invest in infrastructure and modify the NOM-016 regulation. Currently, the NOM only allows for a 5.8% ethanol blend. Diana Olivares, president of the National Chamber of Air Transport in Mexico (CANAERO), mentioned that they are currently working on creating a foundational document to present the industry's needs to all presidential candidates. She also asserted that Mexico needs a public policy to produce Sustainable Aviation Fuel (SAF).
https://www.efinf.com/clipviewer/files/d9fa25ef5d3a3ecfcbb383c63bf6605d.pdf

PROGRAM REPORTS

Global Ethanol Sumit 2023 U.S. Grains Council invited 25 people from the industry to participate in the Global Ethanol Summit 2023, a space for analysis and exchange of ideas among experts to explore the environmental benefits of ethanol use, an important alternative to contribute to the decarbonization of the transportation sector with the use of clean and sustainable fuels. The topics addressed during the congress included global policies currently being implemented to promote the use of ethanol, trends and the status of biofuels, implementation logistics, success stories, questions, and answers with experts, as well as panels where discussions about the future of the sugar-energy industry took place.

After the summit ends the delegation went on site visits in a planned post tour to Denver Colorado where they visited GEVO (Renewable Chemicals/Advanced Biofuels Company) a company that supplies sustainable fuel and chemical products with low Carbon Intensity (CI); Colorado State University, National Renewable Energy Laboratory (NREL) and a Powerhouse Energy Campus.

South Asia Regional Update

GENERAL REMARKS

GOI is focused on its ethanol production and blending target and clearing new ethanol production projects from grain. In April 2022 13.7 billion liters from various feed stocks were cleared, and another 60 projects with a total capacity of 2 billion liters is being cleared. New projects are primarily corn-based, and there is a plan to augment grain/corn supplies.

PROGRAM REPORTS

USGC South Asia Team at GES 2023 An Indian delegation traveled to attend the Global Ethanol Summit and surrounding activities. The team consisted of a diverse group of ethanol associations, ethanol producers, and oil marketing companies. The team took part in a pre-tour hosted by the Illinois Corn Growers, followed by the Global Ethanol Summit during the second half of the trip. The team flew to St. Louis, MO where they visited the National Corn Growers Association (NCGA) on the first day of travel. At NCGA, the team was greeted by Bayer Crop Science, where they were able to discuss GMO adoption and what it means for future corn yields. The team then visited the Danforth Center in Missouri.

The second day of programming consisted of meetings with Kristy Moore, during which there was excellent discussion, and Green Plains Renewable Energy (GPRE). The meeting with

GPRE was of great interest to the team, as the ethanol producers are looking for better corn-based technology. The third day of programming led the team to the National Corn to Ethanol Research Center where the team learned about the evolution of the U.S. ethanol industry, as well as saw experiments firsthand that showcase how clean ethanol burns. The team then traveled to a regional blending terminal and saw retail stations in the U.S. that allowed them to see the discounts available to consumers when buying higher blends of ethanol. The final day of the pre-tour led the team to a farm operation in southern Illinois. The team learned the mentality of American farmers and their marketing strategies. The team was very impressed with the scale of operations seen in the U.S.

The following day, the team traveled to Reston, VA to attend the Global Ethanol Summit. At the three-day summit, there were three Indian panelists that showcased India's example as an aspiring world leader in biofuel adoption. There were also many side meetings with private industry that touched on two-tiered procurement systems, carbon intensity scores, vehicle conversion kits, and the ethanol industry's impact on the American farm economy.

US – India Strategic Partnership Forum Global Biofuels Alliance Roundtable

Council staff recently attended a roundtable discussing potential outcomes of the Global Biofuels Alliance formalized at September's G20 Summit in Delhi. Below are relevant notes taken at the event:

1.Cooperation for E20 and Carbon Ecosystem:

- Mr. Rajnath Ram of NITI discussed the E20 goal using corn and identified roadblocks.
- Emphasized the potential for cooperation between the US and India to maximize India's infrastructure and corn yields for E20.
- NITI Aayog is also working on developing a carbon ecosystem, including trade, sequestration, and monetization.

2. Global Demand for Biofuels and India's Export Strategy:

- Ms. Esha Srivastava of MoPNG estimated a global demand for up to 200 billion liters of biofuels.
- Three top producers account for 80 percent of the global share.
- The Alliance includes governments of G20 and non-G20 nations, industry, and biofuel organizations.
- India aims to export its ethanol blending model to other nations.

3. Ethanol Progress and Collaboration with IOCL:

- SSV Ramakumar, an IOCL advisor, referred to ethanol as the "oxygenate of choice."
- Mentioned the widespread availability of E20 at retail outlets across India.
- Anticipated 2G and 3G technology and the launch of IOCL's next-gen plants.
- India aims to become a Sustainable Aviation Fuel (SAF) hub, with a commercial-scale SAF plant in the works.
- IOCL R&D seeks collaboration with the US on enzymes for 2G production and indigenization of enzymes.

4. Industry Perspective and Challenges:

- Industry representatives discussed the way forward and acknowledged feedstock availability issues.
- Noted the absence of a sustainable industry growth roadmap.
- This roundtable marked the first meeting with the industry since the GBA launch at the G20 summit.

5. Balancing the Supply and Demand of Ethanol:

- Highlighted the need for policy action on the demand side, including taxation benefits for consumers.
- A speaker stated that ethanol in India has reached a point of no return, indicating its irreversible growth.

6. Leadership Role in SAF:

- Sahil Gupta of Boeing urged India to take a leadership role in Sustainable Aviation Fuel (SAF).
- Identified standards, best practices, and technology as significant opportunities for the future.

MARKET INFORMATION

India:

For the ethanol supply year (ESY) 2022-23 (December 2022 – November 2023), ethanol supplies were set at 6.51 billion liters, and the demand was set at 5.99 billion liters to achieve a 13% blend rate. As of 15 October, informal data projects supplies at 4.75 billion liters, hitting a blend rate of 11.07%. Provisional gasoline sales are at 42 billion liters.

The new ethanol tender for ESY 2023-24 has also been put out requesting 8.25 billion liters, looking at a blend rate of 15%. The higher demand is set based on the premise that grain-based ethanol manufacturers will be able to supply more ethanol. It is also important to understand that due to less rains in the monsoon, supply of sugar-based ethanol (cane juice and B-heavy molasses) from Maharashtra, Karnataka, and Gujarat could be an issue, and supplies could be much less than expected. Oil marketing companies have also extended the supply date for ESY 2022-23 for some more time as the prices of sugar-based ethanol have not been decided yet, and unless that happens, ethanol producers may not quote for supplies for ESY 2023-24.

Taiwan Regional Update

PROGRAM REPORTS

2023 Global Ethanol Summit:

USGC held “2023 Global Ethanol Summit” in Washington, D.C. (Reston) from Oct. 16 ~ 18, 2023. The Global Ethanol Summit is an invite only meeting for ministerial-level officials from agriculture, environment and energy, senior level industry leaders, ethanol producers and

refiners, ethanol and fuels buyers and traders around the world to discuss environmental, human health and economic benefits of ethanol use with industry leaders, while fostering collaboration and trade. More than 350 ministerial-level officials and industry leaders, bioethanol producers and refiners from more than 40 countries are attending this year's event to learn about the numerous environmental and human health benefits of globally expanding the use of biofuels. The Council Taiwan office organized a seven-member delegation, composed of representatives from the Executive Yuan's Office of Energy and Carbon Reduction, Energy Administration of Economic Affairs, Ministry of Environment, CPC Corporation, and academia. The attendee's list is as follows:

1) Mr. Jin-Sheng Su, Director, Office of Energy and Carbon Reduction, Executive Yuan

2) Dr. Jyuung-Shiauu Chern, Senior Technical Specialist, Energy Policy and Climate Change Division, Energy Administration, Ministry of Economic Affairs

3) Shu-Li Wang, Division Director, Fuel & Lubricant Dept. of CPC Corporation, Taiwan

4) Chung-Hao Hsu, Section Chief, Department of Atmospheric Environment, Ministry of Environment

5) Jiun-Horng Tsai, President, Environment and Development Foundation

6) Li-Ning Chen, Manager, Jet-Go Consulting Group

7) Michael Lu., Country Director, U.S. Grains Council

The purpose of this meeting is to elevate bioethanol's international visibility and ongoing successful initiatives as a viable decarbonization solution within the transportation and emerging new uses sectors. At the summit, the delegation learned from global policy makers and lowcarbon gasoline experts about policies and industry trends and discussed how to apply them to improve Taiwan's pathways toward the 2050 net-zero carbon emissions goal. A 3-side meeting was arranged with Jason Hafemeister, Acting Deputy Under Secretary of the U.S. Department of Agriculture (USDA), to discuss the possibility of expanding the use of E3 gasoline in Taiwan to E10 to strengthen U.S.-Taiwan cooperation in response to climate change. Hafemeister mentioned the electrification of transportation vehicles is a global trend, but countries also recognize the importance of diversifying carbon reduction pathways, and that low-carbon gasoline blended with bioethanol has been used in the U.S. for many years, and it is an immediate and effective solution to reduce emissions. Bioethanol has been widely used in the U.S. for decades to replace environmentally harmful MTBE which is one of the diversified carbon-reducing pathways to help Taiwan accelerating the progress of net-zero emissions.

After the summit, the Taiwan delegation traveled to North Dakota to visit the industrial chain of bioethanol, from corn harvesting, factory production, transportation, and storage to the retail at gas station. After being warmly welcomed by Jean Henning, Executive Director of the North Dakota Corn Utilization Council, the Taiwan delegation met with Carson Klosterman, a local corn farmer and Vice President of the North Dakota Corn Utilization Council, Hankinson Renewable Energy, a bioethanol manufacturer, David Ripplinger, a bioenergy economist at North Dakota State University, and Kent Satrang, CEO of PetroServe USA, to discussed the latest technology in how emission reduction is synchronized with carbon capture and sequestration (CCS) in the bioethanol production process.

Taiwan delegation fully understood the practical benefits of bioethanol from the policy, technical, and economic perspectives through this trip. Low-carbon gasoline blended with bioethanol can enable existing fuel vehicles to immediately contribute to emissions cut and maintain Taiwan's engine industry advantage. It is suggested that the government should also consider lowcarbon gasoline a strategy for ensuring just transition in carrying out the climate change policies.

Southeast Asia Regional Update

ETHANOL PROGRAM REPORTS

2023 Southeast Asia Agricultural Co-operators Conference:

To help deliver specific policy and commercial goals in the region, Council staff welcomed two teams – focused on corn/ethanol and sorghum – to Vietnam ahead of ACC to take part in side missions. The missions included high-level government meetings in Hanoi aimed at furthering the Council's ethanol policy objectives in Vietnam in addition to meetings with culinary chefs in Ho Chi Minh City as the Council develops its new food sorghum promotion programs. "These missions coincided with the historic double upgrading of U.S. diplomatic relations with Vietnam. Our simultaneous government and commercial engagements in Hanoi and Ho Chi Minh City, capstoned by the ACC in DaNang, shows the vigorous effort of the Council to facilitate new opportunities for mutual trade and development in Vietnam," Wurth said. Vietnam continues its journey toward its sustainable development objectives to fully utilize ethanol in its road transportation sector as well as provide market access for high premium consumer goods.

Philippines Update:

Regarding ethanol supply, OIMB indicated that PTT is the primary supplier they are in contact with. USGC recommended exploring other sources to manage supply risks. OIMB inquired about the possibility of receiving a test unit from CAMPI for the "Validation Run," though no formal offer had been conveyed. USGC urged OIMB to clearly outline the requirements and components of the "Validation Run" to facilitate support. On a different note, there was discussion about the Global Ethanol Summit, with Director Abad expressing interest in attending or designating a representative. In conclusion, both parties agreed to work towards refining the MOA, with plans to further discuss and improve its content during the week of October 23rd.

Malaysia Update: Engagement with Greensage:

Greensage is moving forward in partnership with Molindo to build a PKC to ethanol plant in Surabaya. The plant will be retrofitted with Molindo's corn fed production equipment which is currently mothballed. Greensage expects production to commence in 2H 2024 with production capacity of 5,000 mt/month of ethanol. Greensage estimates the pricing of the ethanol to be around 30-40% cheaper than molasses based domestic ethanol. However, Greensage notes that the biggest variable for the economics projection is the demand for PKC-DDGS.

In addition, Greensage is also developing another plant in Kalimantan in partnership with an established palm oil entity but the project is expected to be ready earliest by 2025 given that the plant will be completely built up. USGC sees an opportunity to collaborate with Greensage for

ethanol events where PKC-ethanol technology can contribute to the national interest of Indonesia. However, USGC needs to be mindful on PKC-DDGS competing with corn DDGS in the future although corn DDGS has the advantage of having higher acceptance as a proven feed ingredient.

In Malaysia, Greensage is in discussion with the Sarawak government to develop agribusiness in the state. The PKC-ethanol proposition is attractive to Sarawak given its palm production but there is uncertainty for ethanol demand. Greensage is keen to collaborate with USGC to propose ethanol for gasoline blending in Sarawak as it is one of the leading states pushing for use of renewable energy.

Thailand Update: 2023 Sugar & Ethanol Asia Conference:

The 16th Sugar & Ethanol Asia, a prestigious event that brings together millers, producers, and buyers from Asia was held in Bangkok, Thailand during 3-5 October 2023. It is part of the Global Sugar & Ethanol Conference Series. Sugar And Ethanol Asia is attended by many professional exhibiting participants, looking to showcase different types of reliable, safe and high-quality sugar crop and ethanol development techniques to the visitors at the show. Second generation biofuel supplies are also put on exhibit here. Alternative energy supplies that can be applied in the sugar and ethanol sectors are also showcased during the event. USGC travelled to Bangkok to attend this event and capitalize on Asia's expanding role as a major player in the global sugar and ethanol marketplace.

USGC met two Axens representatives at the conference:

• Pierre-Yves Martin (Principal Technology Advisor)

• Jeff Caton (Commercial Director – APAC)

Pierre Martin confirmed that Idemitsu is indeed using Axens tech for their ETJ SAF plant – the reason for choosing hydrous is purely driven from the client (Idemitsu) as their ETJ tech includes an optional module to dehydrate the ethanol. According to Pierre, the additional cost for dehydration is not significant but this is also specific to the plant design (capacity, space etc).

• Axens is partner with GEVO in the US on an ETJ SAF plant.

• In Thailand, Axens is speaking to PTT on adding ETJ SAF module for a refinery located in Rayong. This is at early stages but there is a JV partner (ethanol industry related) with PTT on this.

• In Malaysia, Axens is talking to Loken who have signed an agreement with Axens on phase 1a of their SAF plant which is HEFA based. Phase 1b will be ATJ based so it will be good to reconnect with Loken once we are back (it is odd that they’re looking at both HEFA/ATJ processes for 1 plant, so will be good to understand more on this). Will also arrange a meeting with Jeff Caton since he’s based in KL so we can have a wider discussion on what they’re doing in the region.

2023 Global Ethanol Summit: Australia, Indonesia, & Malaysia:

A total of 14 delegates from Malaysia, Indonesia and Australia attended GES in Washington DC followed by post tour in Kansas. Delegates included:

• Harsono Budi Santoso, Director of Planning & Business Development, Pertamina (self-pay)

• Sigit Setiawan, VP of Planning & Business Development, Pertamina (self-pay)

• Yusnur Rainday Ahmad, Executive of Planning & Business Development, Pertamina (self-pay)

• Edi Wibowo, Director of Bioenergy EBTKE, Indonesia Ministry of Energy & Mineral Resources

• Elis Heviati, Coordinator for Bioenergy Business Service and Supervision EBTKE, Indonesia Ministry of Energy & Mineral Resources

• Susianti Ateng, Finance Director, PT Indonesia Ethanol Industry

• Azis Holidi, Technical Director, PT Indonesia Ethanol Industry (self-pay)

• Suhendri, Director, PT Sinergi Gula Nusantara

• Edwin Risananto, Head of the Engineering and Processing Division, PT Sinergi Gula Nusantara (self-pay)

• Harlina Pikri, Head of Strategic Planning & Business Development, PETRONAS

• Syahidah binti Muhamed Nor, Strategic Planning & Business Development, PETRONAS

• Hafizul Hayazi, Strategic Planning & Business Development, PETRONAS

• Charlotte Wundersitz, Senior Policy Officer, National Farmers Federation (Austalia)

• Hendra Setiawan, Manager, PT Molindo (not attending Kansas post tour)

Next Steps:

Work with Pertamina on developing base gasoline specs and collaborate with EBTKE to proposed new specs for approval from DG Migas. Pertamina is also interested in conducting an ethanol technical workshop for its internal employees ranging from product quality to storage and handling practices. To engage Rowena to conduct workshop with additional policy sharing conducted by Dr Rex from UPLB. Target for workshop to be in Feb-Mar 2024 as Rowena will be in SEA on a personal trip. Pertamina is also interested in conducting a feasibility study on ethanol storage options for its terminals.

Petronas is interested to move forward with TMC to conduct a study on feasibility of ethanol blending in its refineries. Further discussion with Petronas and TMC is needed to determine scope of study as Petronas is interested in additional aspects such as GHG avoidance and circular economy contribution. Petronas will first require NDA to be signed with USGC/TMC and any other relevant party to facilitate information transfer. 26

Engage MSOE through SGN to offer ethanol related resources in particular to support the roadmap for sugar self-sufficiency. From observing the US ethanol industry, SGN understands the need for imports to support the growth of Indonesia’s domestic ethanol industry. Engagement with MSOE will later focus on removing barriers of imports and identifying opportunities to ensure ethanol blending by Pertamina is sustainable.

Following the Summit in Virginia, the delegation travelled to Kentucky and Tennessee with influential industry stakeholders and policymakers from Vietnam as they sought to learn more

about the environmental and economic benefits of bioethanol blending. The delegation visited farms, gasoline retail stations, ethanol plant, fuel terminal, and had commercial meetings with ethanol traders.

Comments from the delegation included the following:

Domestic Ethanol Producers:

• Interested to explore suppliers of feedstocks for their production process – US corn – as they began to understand the advantages of US corn over other sources in the ethanol production process.

• Want to be updated with technology to be able to improve DDGS production.

• Wishes to learn and adopt the Philippines model of ensuring use of domestically produced ethanol for fuel blending before importation to fulfil the overall national demand.

Pelio:

• Have a better understanding of the trend of biofuels development after this trade mission.

• Pelio have the desire to trade and blend bio-gasoline from refineries to ensure supply to the market but is restricted to not having a blending license from the government.

• Vietnam currently only allows ethanol to be blended into gasoline domestically. Only a few license holders are allowed to import ethanol to be blended with gasoline i.e. Petrolimex, PV Oil, Saigon Petro. This results in unfair competition between 28 enterprises that are allowed to blend and small businesses must thus buy biofuel blended gasoline from these licensed blenders.

Overall, it was clear to see how active and curious the attendees were in learning about U.S. bioethanol production as Vietnam is considering multiple avenues to decrease its climate footprint, including wider adoption of biofuels. Engagement activities like this helps in solidifying the relationship and support from the stakeholders and government officials in valuing how we can help them achieve their biofuels roadmap goals.

Philippines & Thailand Delegation:

USGC sponsored 14 delegates from the Philippines (Department of Energy, Board of Investments, ethanol industry, fuel industry, and academia) and three delegates from Thailand (PTT, Thailand Ethanol Manufacturers Association, and Ministry of Energy) to travel to the United States for the 2023 Global Ethanol Summit and an tour of the U.S. ethanol supply chain in Wisconsin.

The mission included meetings with USDA and technical experts (infrastructure & vehicle compatibility), and visits to farms, ethanol plants, fuel terminals, and fuel stations.

Key takeaways from the Philippines delegates:

• DOE left the U.S. more confident on E20 infrastructure compatibility and rollout. 29

• DOE’s main priority and concern is vehicle fleet compatibility with E20. This will be the biggest factor affecting the pace of E20 implementation. Key takeaways from the Thailand delegates:

• Support the Department of Alternative Energy & Efficiency Development in the rollout of their SAF strategy report in 2024.

• Continue to engage the ethanol producers association in their foray into bioplastics and position U.S. corn ethanol as a potential substrate source to supplement local supply.

• Monitor Thailand ethanol consumption in the coming years to determine the potential for Thailand ethanol exports that would compete with U.S. volumes in Southeast Asia

South Korea Regional Update

PROGRAM REPORTS

MARKET INFORMATION

49.7 million gallons of U.S. ethanol were imported in Jan- Sep 2023, with a 27.5% YoY decrease:

Korea imported a total of 84.2 million gallons of ethanol from January to September 2023, with a decrease of 20.4 percent compared to the same period last year. Of 84.2 million gallons, 49.7 million gallons of U.S. ethanol were imported for industrial consumption, decreased by 27.5 percent and U.S. ethanol has captured 59.0 percent of total ethanol imports, while 29.9 million gallons of Brazilian ethanol (35.5%), 4.6 million gallons of other origins (5.5%) were imported. This statistic is import data for domestic consumption, excluding transshipment exports through Ulsan Port, and shows a significant decline in U.S. ethanol imports in 2023. During the period, imports of U.S. ethanol decreased by 27.5%, while imports of ethanol from Brazil, which is mainly used as a drinking alcohol, increased by 2%. The main reason for the decline in US ethanol imports is that as US ethanol prices continued to remain strong for a long time, the price of industrial materials such as ethyl acetate, which is made from US ethanol, rose, leading to a decrease in consumption of these products

Japan Regional Update

PROGRAM REPORTS

Conference on future possible role of ethanol at a local university:

The Council held a seminar on future possible role of ethanol in Japan in Sapporo on October 3, 2023. The seminar was conducted as a part of local university, Sapporo University, lecture on October 3, 2023. The conference presented the outcome of the biofuel report by 7 people expert committee. Sapporo University students (about 60 students) 3rd and 4th year liberal arts students attended the conference as a part of the "Local Public Finance" class. In the conference, the council gave a basic explanation of ethanol.

Participation in Global Ethanol Summit:

The Council organized a team of Japanese bioethanol stakeholders to travel to the United States to attend Global Ethanol Summit, a Ministerial level meeting organized by the U.S. Grains Council on October 15-18. Following the Summit, part of the team visited the State

of Iowa to visit corn producers' organization, farm, ethanol plant and fuel terminal on October 18-21. Throughout this trip, the team could gain a lot of useful information and also had an opportunity to explain to the people concerned in the U.S. about latest status of our activities to introduce Ethanol for E10/SAF/e-fuel to the Japanese market in near future. The trip was effective in deeply learning about the U.S. ethanol industry and policy situation. The team also included the Council ethanol promotion consultants that helped them for the future lobbying work. The Iowa post tour covered a wide range of interests from production of feedstock corn, ethanol manufacturing, transportation and distribution, and exports. The tour also contained ample time for Q&A and discussion about fundamentals to specific questions and in-depth discussions on ethanol between the participants and Iowa Corn experts.

Ethanol NEED: NEED met Diet members to discuss on how ethanol blending can be introduced in Japan:

NEED, an ethanol consulting firm hired by the Council, continued meetings with ethanol stakeholders. There were a series of meetings with Diet members in the month of October

- October 18: Diet member Ooka to discuss on the direction of lobbying work, suggested to them to consult with Diet members Fumiaki Kobayashi and Akira Amari
- October 24: Diet member Soichiro Imaeda to ask him to provide guidance how to bring the issue to METI
- October 26: Diet member Fumiaki Kobayashi, one of PM Kishida's 3 closest brains who supports ethanol saying he would take bioethanol as a topic for the Regulatory Reform Conference as one of its members
- October 27: Diet member Akira Amari to discuss on (1) why Energy Agency seems to be hesitating about introducing bioethanol, (2) where the bioethanol will come from when E10 is introduced, and (3) what is the likely sales price of E10 in Japan

November 2023 Monthly Management Report

Latin America Regional Update

NOVEMBER KEY ISSUES

Sugar production in the second half of November totaled 1.40 million MT. This quantity, as compared to the one registered in the 22/23 crop de 1.04 MMT, represents an increase of 35.04%. In the accumulated, April 1st to December 1st, sugar production totaled 40.82 million MT, face the 33.05 million MT of last season (+23.50). In spite of the increase, the productive mix, in the 2nd half of November, favored ethanol production over that of sugar. This change is common, at this stage of the crop, when the quality of the raw material deteriorates and the TRS becomes to be composed by a larger percentage of reducing sugars, which impedes sugar manufacturing.

Ethanol production in the second half of November reached 1.25 billion liters (0.33 billion gallons) an increase of 40.02% over same period last crop. From the ethanol produced, hydrous reached 779 million liters (205.8 million gallons) and anhydrous totaled 470 million liters (124.2 million gallons), increase of +98.72% and decrease of -6.00%, over last crop, respectively. In the accumulated, from April 1st to December 1st (23/24 crop), ethanol production reached 29.85 billion liters (7.89 billion gallons), increase of 11.88% over last cycle, being 17.71 billion of hydrous (4.68 billion gallons) and 12.14 billion of anhydrous (3.21 billion gallons), increases of 14.74% and 7.95%, respectively.

Ethanol Sales:

In November 2023, the sales of ethanol totaled 2.82 billion liters (0.74 billion gallons) which represents an increase of 16.13% in relation to same period last crop. From the volume sold in November 1.72 billion liters were of hydrous (0.45 billion gallons) and 1.11 billion liters of anhydrous (0.29 billion gallons), increases, respectively of 28.61% and of 0.94%.

In the domestic market, the hydrous ethanol sales, in November, totaled 1.59 billion liters (0.42 billion gallons), a positive variation of +27.21% in relation to same period last crop. Data of ethanol prices, released from ANP (National Agency for Petroleum, Natural Gas and Biofuels), for the week ended on November 04, indicated that in the cities representing 61% of Brazilian fuel consumption, the hydrous ethanol had competitive advantage over gasoline. In the State of Sao Paulo, this percentage reaches 100% of the consumption. Regarding anhydrous sales, the total was 938.96 million liters (248.04 million gallons), a decrease of 1.86%.

In the total 23/24 crop (April 1st to December 1st), ethanol sales totaled 21.04 billion liters (5.56 billion gallons) which represents an increase of 5.79%. Hydrous registered sales of 12.40 billion liters (3.28 billion gallons) an increase of 7.32%, while anhydrous reached 8.64 billion liters (2.28 billion gallons), an expansion of 3.67%.

Ethanol Exports:

In November 2023, Brasil exported 201.10 million liters (53.13 million gallons) being 15.6 % of this volume to the US (31.43 million liters = 8.30 million gallons). The volume exported in November 23 was 13.3% inferior to October 23. The volume exported in Jan-Nov 2023 was 4.2 % more than same period last crop 2022 (2.21 billion liters = 0.58 billion gallons X 2.12 billion liters = 0.56 billion gallons), in the same period, the participation of the US decreased 28.6%, going from 464.28 million liters (122.65 million gallons) down to 331.64 million liters (87.61 million gallons). The share of US on Brazilian exports increased from 0.7% in October to 15.6% in November, an increase of 1,721.9%. The appreciated R$ (Brazilian Real) and high sugar quotations have reduced ethanol consumption and production. Mills are more focused in sugar production and exports.

Main buyers of Brazilian Ethanol:

Ethanol exports in Jan-Nov 2023 totaled 2.21 billion liters (0.58 billion gallons), an increase of 4.2%, in relation to the same period in 2022. November saw the return of some good buyers of Brazilian ethanol, just the Philippines did not import any ethanol from Brasil. In November, Brasil exported 201.10 million liters (53.13 million gallons) – South Korea and The Netherlands were the largest importers in November with 62.73 million liters (16.57 million gallons) and 35.28 million liters (9.32 million gallons), respectively. A new customer, India, repeated the impetus, importing 14.56 million liters (3.85 million gallons). Among the 64 countries that imported from Brasil just three, South Korea, the Netherlands and the Unites States were responsible for 73.0% of the total purchases. Average price in Jan-Nov (US$ / m^3) was 646.42 about 1.3% lower than Jan-Oct.

Ethanol Imports:

The volume of ethanol imported in the last 12-month period (Dec 22-Nov 23) was 74.54 million liters (16.69 million gallons) being 0.62% from the US, 463 thousand liters (122.31 thousand gallons). The volume imported in November 2023 was 4.05 million liters (1.07 million gallons) with 1.22% coming from the US, 49 thousand liters (12.94 thousand gallons). Contrary to what happened in October when ethanol imports increased 27,000% in relation to September, November saw a retraction in imports of the order of 59.7%. The main reason was a decrease in sales of anhydrous in the domestic market plus more sugar being produced in detriment of ethanol.

Obs.: Due to the very small values for imports and some large differences between months, the data was plotted on the graphic on a logarithm scale.

Main origin of the Brazilian imported ethanol:

In Jan-Nov 2023 Brasil imported 59.54 million liters (15.73 million gallons) this volume was 80.2% lower than the 300.77 million liters (79.46 million gallons) registered in the same period last year. In November, only Paraguay exported fuel ethanol (4.0

million liters = 1.06 million gallons) or 98.739% of all imports. All the ethanol imported from other countries were of non-fuel specialty alcohols. 0.74% of all ethanol imported was from the US but it was also not fueling ethanol. Demand in the period was very weak. Considering the increase in ethanol from corn and the present demand for sugar, we do not see much chance of Brasil increasing the importation of fuel ethanol. The picture may change if 2024 sees a large depreciation of the Brazilian Real (R$).

Ethanol Trade Balance (Brasil x US):

In January-November 2023, Brasil exported 331.63 million liters (87.61 million gallons) to the US for US$ 220.87 million (US$ 666.02/m^3) and imported 439.7 thousand liters (115.12 thousand gallons) for US$ 0.631 million (US$ 1,434.75/m^3) resulting in a trade surplus of US$ 220.24 million for Brasil.

South Asia Regional Update

PROGRAM REPORTS

USGC South Asia hosts ethanol team from U.S:

During the beginning of November, USGC's Delhi office hosted a three-person delegation from the U.S., including Mackenzie Boubin, USGC Director of Global Ethanol Export Development, Mark Heckman, Eco Engineers Ethanol Services Director, and Brian Hutchens, Valero Renewables Director of Trading.

The team visited with ethanol buyers and manufacturers, hoping to find ways to increase industrial ethanol demand in India. The team found that the demand for Indian-produced chemicals which are derived from U.S. ethanol are continuing to grow, while also noting the importance of the chemical production industries on FOREX for India's economy. The team also met with Indian oil marketing companies and noted that there seems to be mismatched information between the industry at large and government-owned companies. While the industry is certain of their upcoming shortfall in ethanol supplies, the government is unwilling to admit any potential supply issues. In the eyes of the fuel blenders, there would be little room for imports. The oil marketing companies noted that the E20 rollout has begun in over 10% of fuel stations around the country and that no cost benefit will be transferred to the consumer, which is a stark contrast to U.S. fuel marketers that offer higher ethanol blends.

A few unexpected discussions arose from the visit. The first was the potential for ethanol demand in clean burning cookstoves. The demand estimates are vast, noting that 100% adoption by the Indian public could lead to an additional 12 billion liters of industrial ethanol demand. The second discovery noted by the team was that, even as India pushes to build a carbon trading scheme, their outdated equipment will put them at a much higher carbon intensity than U.S. corn-based ethanol. This is important to

note because if India would like to implement a carbon trading platform, the U.S. should have the upper hand against India’s sugarcanebased ethanol.

MARKET INFORMATION

India:

In response to the new tender for ethanol in October 2023, the industry has approached the government of India (GOI) and oil marketing companies (OMCs) to increase the prices of ethanol for various raw materials. While the tender of GOI-owned OMCs is for 8.25 billion liters, the demand of ethanol from private OMCs is an additional 0.75 billion liters, making the total demand 9 billion liters. Preliminary supply estimates are 5.6 billion liters; however, the final number could be 6.5 billion liters. There are apprehensions on the supply of ethanol from the sugar industry due to drop in sugar cane production, expected in Maharashtra, Karnataka, and Gujarat.

Special Report: What India’s Ethanol Push Means for American Agriculture

A growing GDP at 6 – 6.5% in India is likely to increase ethanol demand due to higher vehicle ownership, industrial activity, rising disposable incomes, government initiatives promoting ethanol use, investments in infrastructure, and a growing focus on renewable energy sources. This could lead to increased demand for ethanol in transportation, manufacturing, and other sectors. As India embarks on its current journey outlined in the Ethanol Blending Program (EBP) of achieving a 20% blend in fuel ethanol by 25-26, the following are the key points that emerge:

A. Ethanol Production and Trade: As India increases its ethanol production or changes its import policies related to ethanol/industrial ethanol, it could affect the global ethanol market. This, in turn, might impact the demand for ethanol produced in the United States, where ethanol is a significant component of the agricultural sector, particularly for corn farmers.

B. Competition for Resources: Changes in India's ethanol policies may impact the demand for feedstocks such as sugarcane, corn, or other crops used in ethanol production. This could lead to increased competition for these resources globally, affecting prices and potentially influencing American farmers.

C. Global Agricultural Prices: Any significant changes in India's agricultural policies can have ripple effects on global commodity prices. If there are shifts in demand for certain crops due to ethanol production, it could influence the prices of those crops in international markets, affecting American farmers who produce similar crops.

D. Trade Relations: Alterations in India's ethanol policies have the potential to influence diplomatic and trade relations between the United States and India. Trade disputes or changes in import/export regulations can have consequences for American agricultural exports, potentially affecting farmers' income.

E. Environmental Impact: Ethanol is often promoted as a cleaner and more sustainable alternative to traditional fossil fuels. If India's ethanol policies contribute to increased global demand for ethanol, it could have positive 6 environmental implications. However, the environmental impact would depend on various factors, including the source of feedstocks and the overall lifecycle assessment of ethanol production.

Southeast Asia Regional Update

ETHANOL PROGRAM REPORTS

INDONESIA UPDATE

E5 Pilot Project Update:

In continuation of the upward price trend observed from July to October 2023, Pertamax Green 95 has experienced a decline in prices from October to December 2023. This adjustment aligns with the pricing trend of MOPS92, which Pertamina uses as a reference for calculating its non-subsidized fuel products.

Initially, Pertamina PN set a sales estimate of 6,000 liters/day. However, due to the price increase in August and September, demand decreased to 4,000 liters/day. Pertamina PN anticipates a sales recovery to 5,000 – 7,000 liters/day in November and December. This expectation is based on the lower prices during these months and an increased awareness and acceptance of the product by consumers.

Follow-Up to Global Ethanol Summit:

The Pertamina PN team, led by Budi Harsono, Director of Marketing, is proactively advancing the establishment of a standardized fuel specification for base gasoline (i.e., BOB) to be blended with ethanol. To facilitate this initiative, we will organize a virtual discussion involving Rowena Torrez and representatives from Pertamina PN. During this session, Rowena will present key insights into the fundamental properties of ethanol that influence gasoline blends. Concurrently, Pertamina PN will contribute valuable input regarding their blending considerations, specifically addressing import and production limits for their BOB, which is intended to serve as the established standard.

South Korea Regional Update

MARKET INFORMATION

56 million gallons of U.S. ethanol were imported in Jan-Oct, with a 22.5% YoY decrease:

Korea imported a total of 97.1 million gallons of ethanol from January to October 2023, with a decrease of 14.1 percent compared to the same period last year. Of 97.1

million gallons, 56.0 million gallons of U.S. ethanol were imported for industrial consumption, decreased by 22.5 percent and U.S. ethanol has captured 57.7 percent of total ethanol imports, while 34.2 million gallons of Brazilian ethanol (35.2%), 3.1 million gallons of Pakistani ethanol (3.2%), 2.1 million gallons of South African ethanol (2.2%), and 1.7 million gallons of other origins (1.7%) were imported. This statistic is import data for domestic consumption, excluding transshipment exports through Ulsan Port, and shows a significant decline in U.S. ethanol imports in 2023. The main reason for the decline in U.S. ethanol imports is that U.S. ethanol prices have remained strong for a long time, leading to a decrease in the consumption of industrial materials such as ethyl acetate made from U.S. ethanol and an increase in the consumption of substitute products. However, as U.S. ethanol prices have fallen to early 2021 levels since October, the competitiveness of U.S. ethanol is recovering, and imports of U.S. ethanol are expected to gradually recover from December.

Japan Regional Update

PROGRAM REPORTS

The Council held a conference on November 30, 2023, on future potential and possibility of ethanol for SAF and on-road uses. Co-hosted with the U.S. Department of Agriculture and attended by FAS Associate Administrator Elaine Trevino, the conference invited about 90 key Japanese government officials, academic researchers, environment NGO's, industry leaders and influential media and provided information and updates on U.S. corn ethanol industry, supply, demand and outlook of corn ethanol, advancement of technologies for use of ethanol for SAF, U.S. government supports and measures for utilization of ethanol in the transportation sector, and international and U.S. regulations for gasoline blending and SAF. The conference had two presentations from the Japanese side on these topics.

Presentations centered on how the various stages of bioethanol production contribute to its carbon reduction benefits and the versatility of bioethanol in fuel and chemical manufacturing. Additional programming featured speeches on the decarbonization potential of SAF in Japan and the role of U.S.-Japan cooperation in bioethanol use, key factors that affect the carbon intensity of U.S. bioethanol, land use considerations for growing corn in the U.S. and the latest on agricultural sustainability certifications.

On December 1, the U.S. expert presenters met with a group of stakeholders including representatives from the Japanese government and SAF experts to follow up and discuss the benefits ethanol can bring to the Japanese transport industry, SAF production specifics and implementation factors.

Meeting on publicizing bioethanol's benefits through various means:

The Council met with Professor Masayoshi Honma, Asian Growth Research Institute, on the future expansion possibility of the "Biofuel Study Committee", which

discussed publicizing bioethanol's benefits to consumers in plain language. The meeting proposed the second phase of the study and how to present the report outcomes. The opportunities would include seminars, journal articles, university lectures, public fora and publication as a book. The Council should continue discussion with Professor Honma to identify the best way to publicize the study group report contents.

ATP02 Ethanol NEED: NEED helped the Council to coordinate a presentation by an influential opinion leader at the SAF conference:

NEED, an ethanol consulting firm hired by the Council, continued meetings with ethanol stakeholders in the government including Mr. Matsuyama, Deputy Commissioner, Energy Agency. NEED also helped the Council to coordinate a presentation by Professor Kashiwagi, an influential opinion leader at the SAF conference.

Ethanol BGA Japan: BGA warns risks of exclusion of U.S. ethanol from incentives of SAF and uncertainty of direct blending policy:

BGA, an ethanol consulting firm hired by the Council, analyzed that Japan's SAF and on-road ethanol use as follows. The SAF policy has been making steady strides. Nevertheless, considering the perspective of the USGC, there's a need for cautious observation regarding forthcoming policy specifics. This pertains particularly to Japan's intention to diversify the supply chain of SAF raw materials, such as bioethanol, to Southeast Asia and the potential exclusion of US-produced bioethanol for SAF from tax incentives based on the involvement level of Japanese companies. Conversely, the policy to expand bioethanol in automobiles towards E10 has hit a roadblock, with the government showing reluctance in setting concrete numerical targets. This passive approach is rooted in the possibility that Japan's commitment to doubling domestic bioethanol demand, which was agreed between PM Kishida and President Biden in 2022, could be nearly fulfilled through bioethanol solely for SAF, leading to a lack of proactive target-setting for other uses.

December 2023 Monthly Management Report

Middle East and Africa Regional Update

PROGRAM REPORTS

COP28: United Nations Climate Change Conference and U.S. Ethanol promotion, Dubai, UAE, December 8-11, 2023:

Between December 8 and 11, 2023, U.S. Grains Council (USGC) ethanol delegation; led by USGC Vice Chairwoman Verity Ulibarri and Doug Berven, USGC Ethanol A-Team lead; bent to Dubai, United Arab Emirates (UAE), to participate in the 28th Conference of Parties (COP28) to the United Nations Framework Convention on Climate Change (UNFCCC). Held annually, the COP meetings bring together representatives from countries that are Parties to the UNFCCC to discuss and negotiate ways to address global climate change and environmental issues.

During the event, Carlos Suarez, USGC manager of sustainability, policy and innovation, took part in a panel led by U.S. Secretary of Agriculture Tom Vilsack on Day 10 of COP28 - Food, Agriculture and Water Day. During the panel, Suarez showcased the U.S. ethanol industry and the American farmer's role in decarbonization, job creation and the importance of robust and creditable sustainability verification methods, like the Council's Corn Sustainability Assurance Protocol (CSAP).

Comments: The Council was able to highlight ethanol and its role in global decarbonization efforts, goals and Paris Agreement commitments on an international stage. The networking allowed the USGC delegation to integrate biofuels and ethanol into the global decarbonization conversation at a pivotal time and where they have been historically absent.

MARKET INFORMATION

Europe, Middle East, and Africa Ethanol Markets Updates:

Europe: Unlike in the past months, December prices on a FOB ethanol basis have been almost in parity FOB Gulf and FOB Brazil. This may put some pressure in prices when European prices react, and exports economics are positive. In any case, we have seen US product being hedged in Europe when export economics were positive. USGC regional Ethanol consultant expects Q4'23 and Q1'24 imports into Europe to have more presence from the US and marginal from Brazil who is not able to hedge in advance.

U.K.: Sales of Bioethanol sales decreased by 3,000 MT year on year to 276,000 MT in Q3 and made-up 8.5 percent of total gasoline sales. Conversely, sales of gasoline increased by 7.3 percent, compared to the same quarter of 2022, while diesel sales fell by 2.4 percent. In September 2021, the government introduced new guidelines, which set a new E10 standard sold at the pump. These changes applied to gasoline only, diesel fuel remains the same.

Romania: Clariant will shut down its "sunliquid" ethanol production in Podari, Romania, due to continued losses and tough economic situation in country.

Oman: Key competitor Brazil exported 3.8 mill gal to Middle East (Oman) of anhydrous grade which is similar to ASTM spec but zero to Africa. The Middle East trade is somehow strange as US ethanol has constantly been more competitive than Brazilian one

South Asia Regional Update

MARKET INFORMATION

India**:** In December 2023, the Indian government banned the use of cane juice for making ethanol and would allow only b-heavy and c-heavy molasses to make ethanol. In 2022-2023, almost 30% of ethanol came from cane juice and 48% from b-heavy. The primary reason for the order is low sugar production in India. In 2023-2024, sugar production is estimated to be 28.5 MMT against earlier estimates of 33 MMT. In mid-December 2023, however, the Indian government overturned the rule under pressure from the sugar sector and allowed 1.7 MMT of sugar (in the form of cane juice) to be diverted to ethanol production, which equates to 1.114 billion liters of ethanol. Despite this, it will only be 12% of the 9 billion liter demand set by the Indian government for 2023-2024. In addition, two agencies, PACS and NAFED, have each been identified to procure 0.1 MMT of corn (0.2 MMT total) from the corn farmers at a minimum support price of $245/MT and sell it to ethanol manufacturers. While this may be a small quantity today, if the program is successful, it can be expanded to 0.5 – 1 MMT. Other end users are likely to approach the Indian government protesting the order and claiming special treatment is being given to the ethanol sector.

Forced by sugar-based ethanol producers, oil marketing companies increased the price of ethanol from c-heavy molasses to $2.53/gallon, from prior prices of $2.22/gallon. The industry wanted the price to be increased to $2.75/gallon but was only able to achieve $2.53. The Indian government also plans to impose an export duty of 50% on molasses exports, which will keep molasses available for ethanol production.

Taiwan Regional Update

Ethanol Policy Advocacy Update: Key Issue and Market Update in Taiwan:

1) China Airlines has announced that this year it is expanding the implementation of sustainable demonstration flights, becoming the first national carrier to declare the addition of SAF for passenger and cargo flights. The related carbon reduction performance has grown fifteenfold.

2) During a seminar on power engineering, Deputy Minister of MOEA Tseng Wen-sheng delivered a keynote speech on "Promoting the Power Industry to Become a High-tech Industry." He mentioned that large gas-fired power plants in the western part of Taiwan will be transformed into four functions: gas, offshore wind power, hydrogen production, and carbon capture.

3) The Industrial Technology Research Institute (ITRI) stated that the upcoming trend of electric vehicles is driving international automakers to actively transform. Coupled with government incentives for electric vehicles, the global sales of electric cars are expected to surpass 14 million units by 2030.

4) Oil-producing countries will strive to promote carbon capture technology to offset the GHG emissions generated by the petrochemical industry, enabling its continued expansion. The challenge lies in the fact that the technology for removing GHG from the air has not yet undergone large-scale verification, and the cost is high. It remains uncertain whether it can truly be used to help address climate change issues.

5) In the analysis of the cost of emission reduction quotas for projects that have submitted proposals from 2012 to October 12, 2023, it was found that the anticipated emission reduction from low-carbon fuel conversion is slightly higher than low-carbon transportation, but the average costs is much lower.

6) Minister of the MOENV, Shieu Fuh-sheng, stated that in response to the COP28 resolution, Taiwan will continue to increase the proportion of low carbon energy, accelerate the construction of renewable energy, gradually reduce the use of fossil energy.

7) Chao Chia-wei, assistant professor from National Taiwan University (NTU), also point out that the COP28 resolution emphasizes the importance of eliminating subsidies for fossil fuels. Taiwan should initiate the process of reforming fossil fuel subsidies when implementing the carbon fee next year. Otherwise, it may significantly offset the carbon pricing's carbon reduction benefits.

8) The MOENV has announced a draft of the "Greenhouse Gas Emission Reduction Quota Trading, Auction and Transfer Management Regulations," outlining the subjects of domestic carbon credit trading. Additionally, the three major trading methods include pricing transactions, agreement transactions, and auctions. Transactions or auctions are limited to a one-time occurrence, and purchased quotas cannot be resold to prevent speculation.

9) Taiwan has proposed a policy to reduce the commodity tax for vehicles in the transportation sector, aiming to promote energy efficiency and carbon reduction. However, the effectiveness of this policy is debatable. The lack of incentives for transitioning to new energy vehicles has led to a continuous increase in the total number of fuel vehicles domestically. As a result, the consumption of gasoline and diesel has not decreased.

10)The Civil Aviation Administration of MOTC has enacted legislation on carbon reduction for national airlines. Using the carbon emissions of 2019 as the baseline, from 2024 to 2035, airlines must reduce emissions to 85% of the 2019 level.

11)As of the end of October this year, there are over 50,000 electric compact cars on the road, nearly double the number from January last year. However, there are just over 8,000 public charging stations. Scholars estimate that by 2025, the number of charging stations needs to exceed 12,000 to establish a comprehensive electric vehicle charging network.

South Korea Regional Update

PROGRAM REPORTS

Korea Director attended Quarterly USDA Cooperators Meeting: January 10

The Council Korea director attended the quarterly USDA cooperators meeting held on January 10 and updated information on FAS' major policy issues and programs for the first quarter of 2024. Korea director introduced the results of the council's programs and requested support from FAS Seoul on the ethanol pilot project will be conducted by the MOTIE and oil refining industry.

MARKET INFORMATION

61 million gallons of U.S. ethanol were imported in Jan-Nov, with a 25.7% YoY decrease:

Korea imported a total of 107.5 million gallons of ethanol from January to November 2023, with a decrease of 17.1 percent compared to the same period last year. Of 107.5 million gallons, 61.0 million gallons of U.S. ethanol were imported for industrial consumption, decreased by 25.7 percent and U.S. ethanol has captured 56.7 percent of total ethanol imports, while 38.8 million gallons of Brazilian ethanol (36.1%), 3.5 million gallons of Pakistani ethanol (3.3%), 2.4 million gallons of South African ethanol (2.2%), and 1.8 million gallons of other origins (1.7%) were imported. This statistic is import data for domestic consumption, excluding transshipment exports through Ulsan Port, and shows a significant decline in U.S. ethanol imports in 2023. The main reason for the decline in U.S. ethanol imports is that U.S. ethanol prices have remained high throughout 2013, leading to a decrease in the consumption of industrial materials such as ethyl acetate made from U.S. ethanol and an increase in the consumption of substitute products. However, as U.S. ethanol prices have fallen to early 2021 levels since October, the competitiveness of U.S. ethanol is recovering, and imports of U.S. ethanol are expected to gradually recover in 2024.

Japan Regional Update

PROGRAM REPORTS

Series of ethanol industry meetings towards the end of the year

The Council met with new and existing contacts from the ethanol industry stakeholders towards the end of the year. The Council met Mitsui & Co. who imports ethanol for SAF production, Hitachi who manufactures biochemical production equipment, Axens who designs equipment for oil refinery, SAF and biochemical plants, Toyota Motors, Honda Motors, Idemitsu and Sekisui Chemical Co. It is a common practice to visit and meet with business partners towards the end of the year to thank their partnerships.

Ethanol NEED: NEED continued meetings with industry and government ethanol stakeholders

NEED, an ethanol consulting firm hired by the Council, continued meetings with ethanol stakeholders. NEED collected information on the discussion at the 54th Basic Policy Subcommittee Meeting of the Advisory Committee for Natural Resources and Energy held on December 18, 2023. NEED also recognized the 39th Resources & Fuels Subcommittee meeting of Advisory Committee for Natural Resources & Energy held on December 22, 2023. The Council keeps working with NEED to have the “expansion of bioethanol introduction such as

E10 introduction" stipulated in the "Seventh Basic Energy Plan," which will be finalized in FY2024.

Southeast Asia Regional Update

INDONESIA UPDATE

On December 15, 2023, USGC hosted a virtual ethanol technical workshop in collaboration with Pak Sigit Setiawan, who participated in GES 2023. The workshop, led by Rowena Torrez, attracted 16 participants from various teams, including business development, storage & distribution, and refinery. Notably, Ibu Christina Simorangkir, who has taken over from Pak Abdul Hafid and now oversees the ethanol pilot project, was among the attendees. Rowena's presentation was well-received, sparking constructive discussions on the challenges confronting Pertamina in expanding its ethanol program. Pertamina highlighted several key concerns, including:

• A significant amount of gasoline is transported by barge due to Indonesia's archipelago geography, raising concerns about water separation for gasoline blended with ethanol during barge transportation. Rowena proposed that ethanol blending should occur only at the final point of sale to minimize water separation issues. However, standard operating procedures (SOPs) have been developed and can be implemented for situations with a higher risk of water separation. Pertamina will need to identify and segregate its storage and distribution networks, classifying operations according to the level of risk involved. Mitigation measures can then be applied accordingly. Rowena emphasized the importance of segregating different levels of risk, noting that the most stringent mitigation SOPs may not be feasible for Pertamina's entire distribution network.

• Compatibility of Pertamina's existing storage and pipeline infrastructure, both at terminals and retail outlets, with ethanol is a critical concern. Pertamina will need to conduct a comprehensive study on the materials used in its current infrastructure, cross-referencing them with the API database or manufacturers' guides to determine compatibility with ethanol. Rowena suggests that most gasoline-related components manufactured from 2000 onwards are highly likely to be compatible with ethanol, such as the steel underground tanks used by Pertamina's retail stations.

• Pertamina plans to develop its own BOB (Blendstock for Oxygenate Blending) standards for blending with ethanol. Therefore, they are interested in analyzing the BOB standards and samples used in the US and other countries in the region. We have provided Pertamina with BOB standards for Vietnam and the Philippines for their reference.

MALAYSIA UPDATE

Following discussions with John Mayes at GES 2023, we held a follow-up meeting with Petronas to understand the senior management's position regarding further exploration of ethanol application. The Petronas team indicated a stronger likelihood of considering ethanol for gasoline blending, as any Sustainable Aviation Fuel (SAF) application would be a longerterm horizon (2027 onwards), with the current focus on developing Used Cooking Oil (UCO) and palm based SAF. The RMT business development team will need to submit a proposal to senior

management to demonstrate that ethanol blending would have a net positive impact on its overall business, including refining, retail, and MTBE production. To accomplish this, we proposed engaging TMC to conduct a comprehensive study, incorporating inputs from Petronas. Therefore, the RMT team will require approval to proceed with this study with TMC. Petronas highlighted the necessity of an NDA as a baseline requirement to facilitate the exchange of information.

Subsequently, we conducted a call with TMC to discuss the scope required by Petronas, which would be an extension of the report produced for Indonesia. TMC confirmed their ability to cover the additional scope but emphasized the importance of sufficient input from Petronas to ensure the report remains focused and does not encompass too many scenarios, which could dilute the findings and recommendations. We propose a formal discussion between TMC and Petronas regarding the scope and expectations of the report once Petronas has obtained management approval to proceed with the study.

China Regional Update

PROGRAM REPORTS

Global Ethanol Summit:

The 2023 Global Ethanol Summit (GES) aimed to elevate bioethanol's international visibility and ongoing successful initiatives as a viable decarbonization solution within the transportation and emerging new uses sectors. GES 2023 featured senior-level officials from agriculture, environment, and energy ministries worldwide to discuss ethanol use's environmental, human health, and economic benefits with industry leaders while fostering collaboration and trade.

More than 450 ministerial-level officials and senior-level industry leaders, ethanol producers, and refiners from over 40 countries (including three from China) gathered in Reston, Virginia, the week of October 14th, 2023, to hear the latest information on bioethanol. Furthermore, the U.S. Grains Council hosted a delegation from China to visit Missouri after the Global Ethanol Summit. The team also had the opportunity to discuss with industry experts regarding the U.S. ethanol industry's efforts to achieve net zero through CCUS and other deep-decarbonization strategies (SAF)

ETHANOL

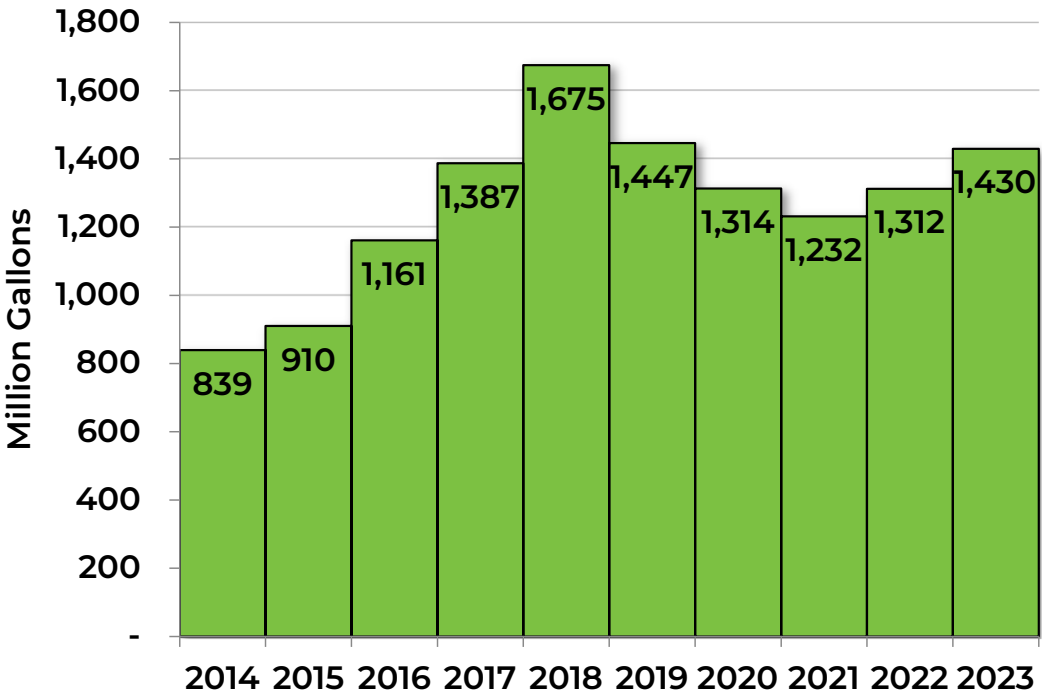
2023 U.S. TRADE STATISTICAL SUMMARY

RFA
RENEWABLE FUELS ASSOCIATION



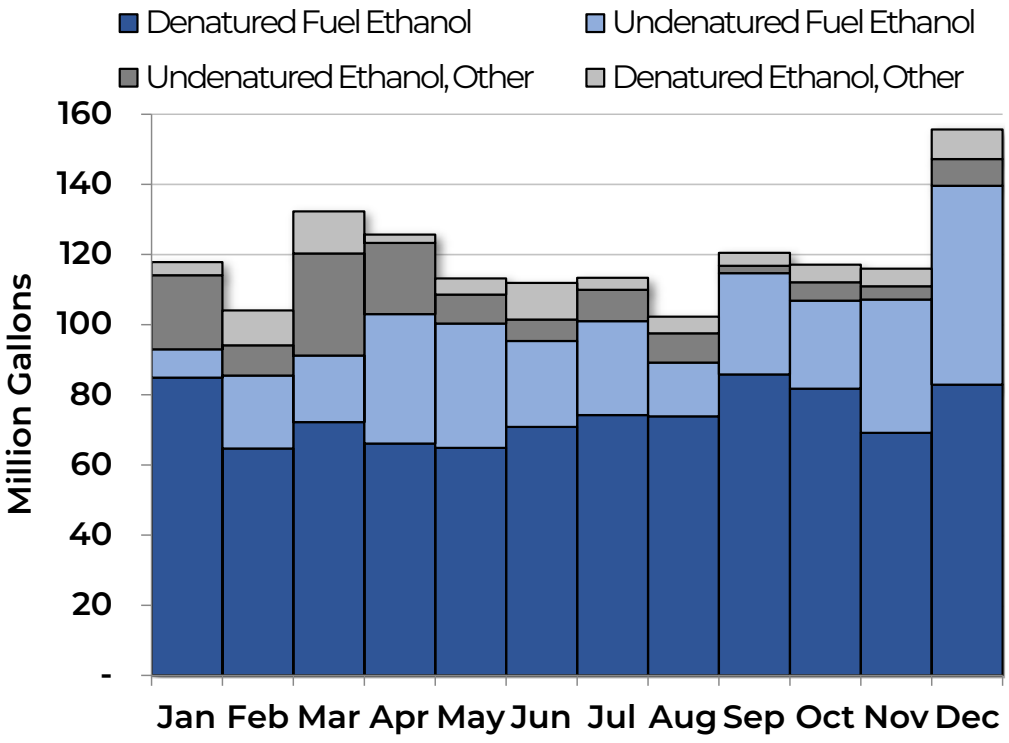
2023 U.S. ETHANOL EXPORTS

U.S. Ethanol Exports



U.S. ethanol exports continued to grow in 2023, hitting **1.43 billion gallons**—the **third-highest volume** on record. American-made ethanol was exported to **83 countries** on all six inhabited continents.

Monthly U.S. Ethanol Exports, by Type



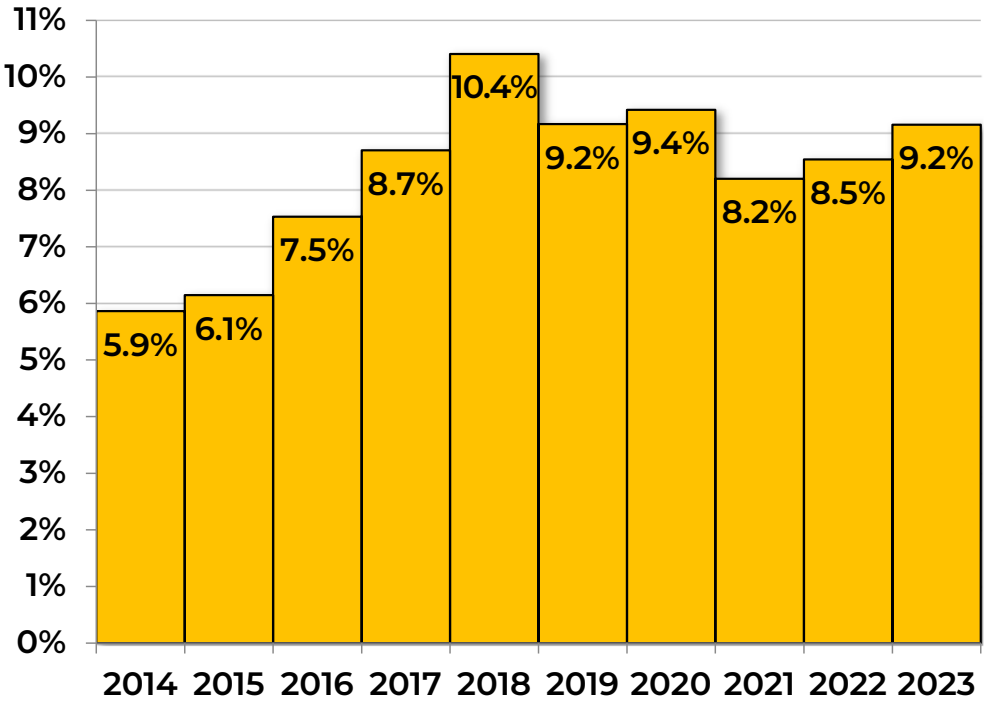
Denatured ethanol accounted for **73% of fuel ethanol exports,** spurred by shipments to Canada. **Exports exceeded 100 million gallons each month in 2023** and closed the year with a **particularly strong December**, as purchases by other top destinations such as the United Kingdom, European Union, and India accelerated.

Source: U.S. Census Bureau, Department of Commerce

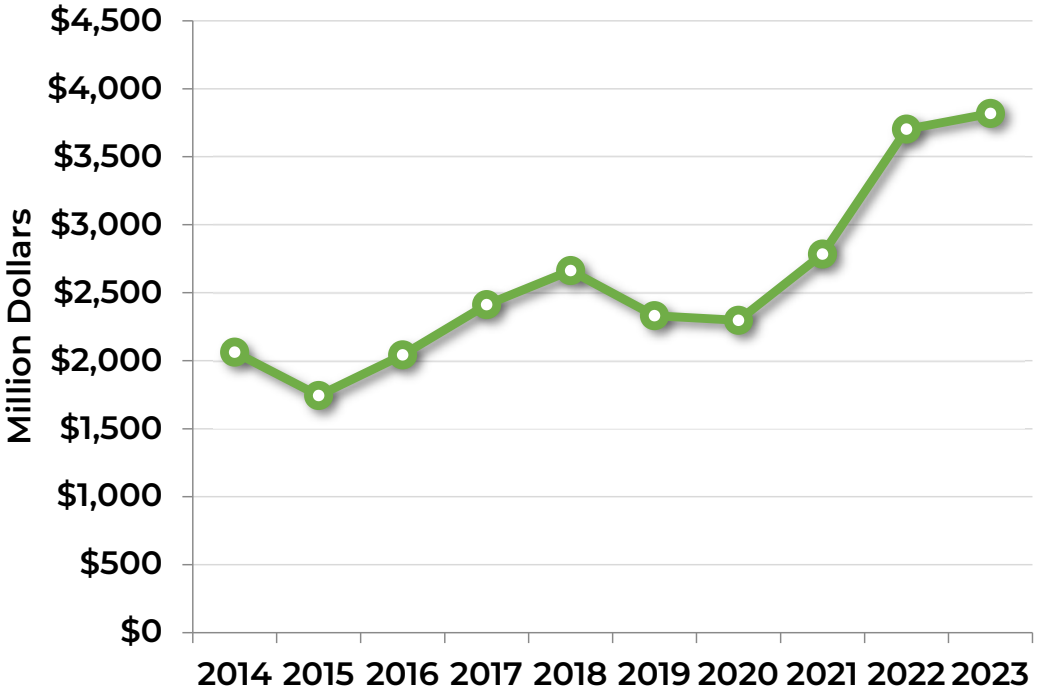
2023 U.S. ETHANOL EXPORTS

Export markets were a **vital source of demand** for the U.S. ethanol industry, with **more than 9% of production shipped to foreign countries**—a high share by historical standards.

Export Share of Ethanol Production



Value of Ethanol Exports

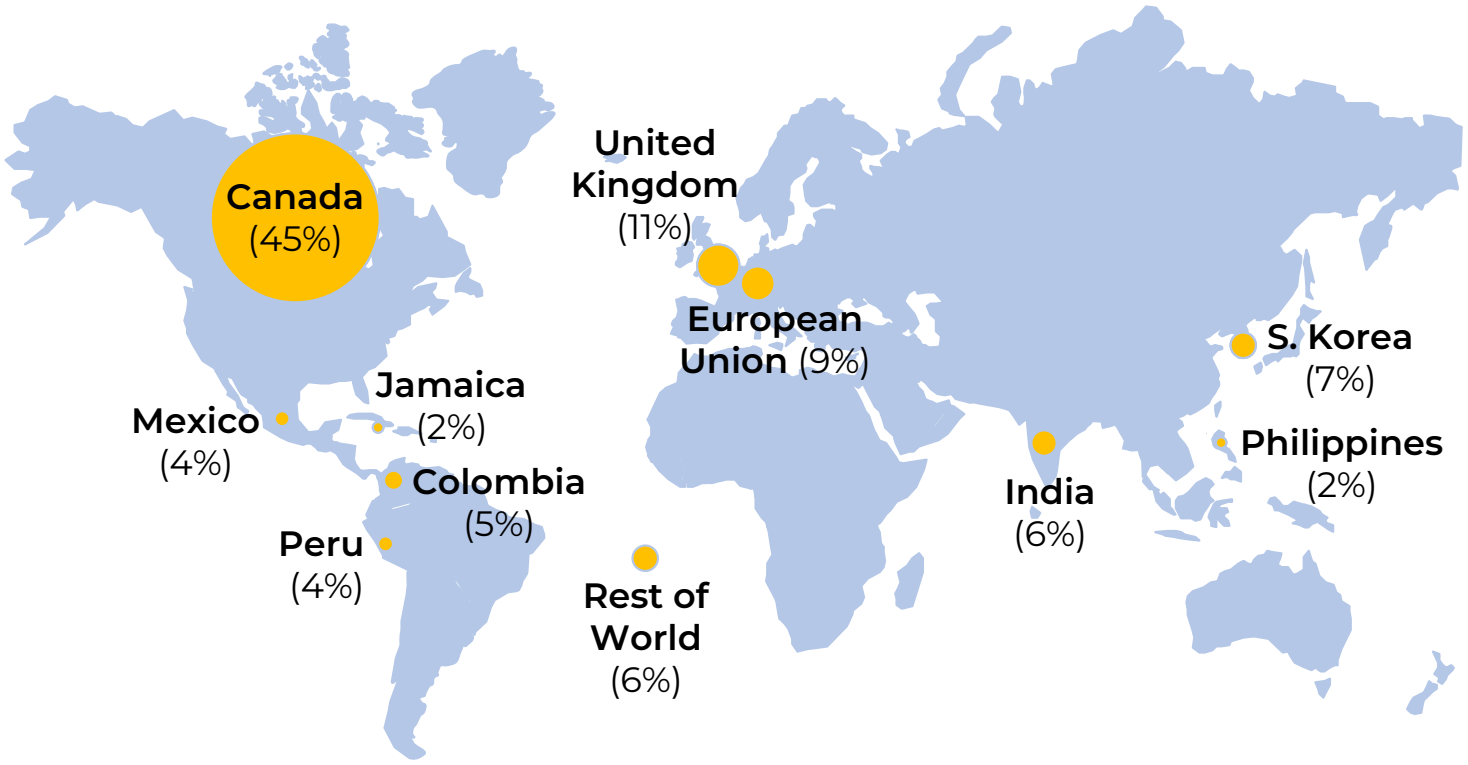


The **value** of U.S. ethanol exports **hit a record $3.82 billion** in 2023, eclipsing the previous high-water mark set a year earlier, as **global fuel prices remained elevated**.

Source: U.S. Census Bureau, Department of Commerce

2023 ETHANOL EXPORTS:
TOP MARKETS

U.S. Ethanol Export Markets



Ethanol export volumes to the top 10 markets in 2023 are shown below. All figures are shown in millions of gallons, unless otherwise noted.

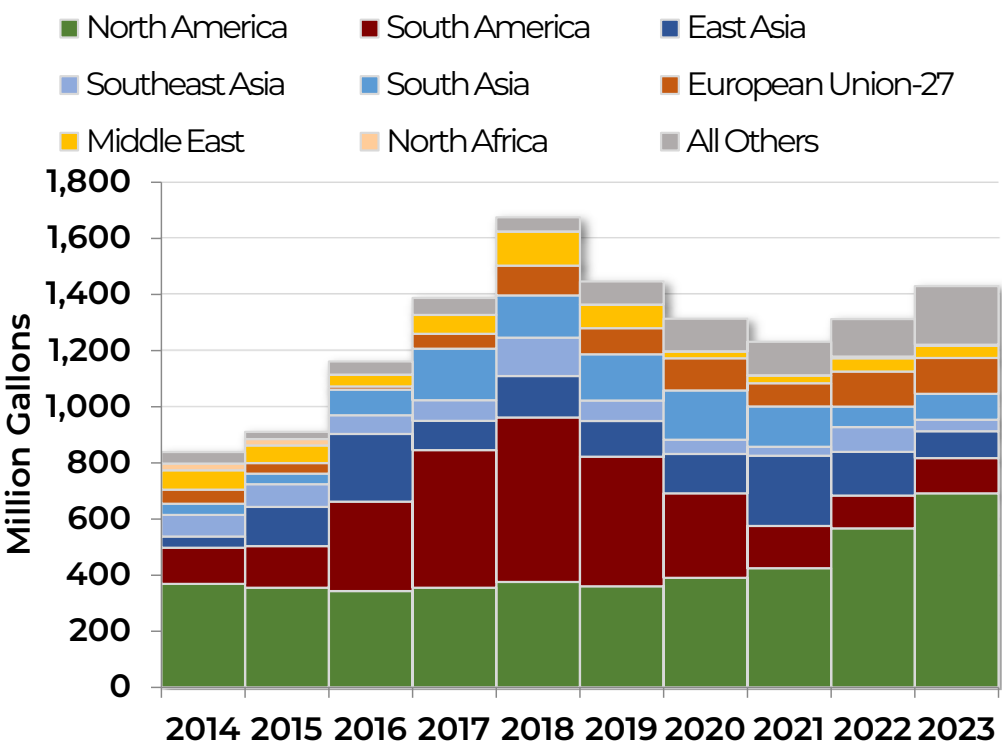
Country	Den. Fuel	Und. Fuel	Den. Other	Und. Other	2023 Total	2022 Total	Change
Canada	590.6	1.6	34.0	12.4	**638.6**	503.5	27%
United Kingdom	87.1	72.9	0.0	0.0	**160.1**	66.8	140%
European Union	63.4	50.9	0.4	12.9	**127.6**	125.3	2%
South Korea	34.5	35.0	7.2	17.8	**94.6**	153.8	-39%
India	27.2	24.7	5.9	34.9	**92.7**	72.8	27%
Colombia	18.9	45.3	1.7	7.3	**73.2**	10.3	614%
Mexico	1.1	25.2	4.6	22.0	**52.9**	63.3	-16%
Peru	21.9	26.0	4.5	0.0	**52.3**	38.9	34%
Philippines	5.5	20.7	0.0	3.8	**30.0**	41.7	-28%
Jamaica	1.3	19.0	5.3	0.0	**25.6**	24.2	6%

Sources: U.S. Census Bureau, Department of Commerce

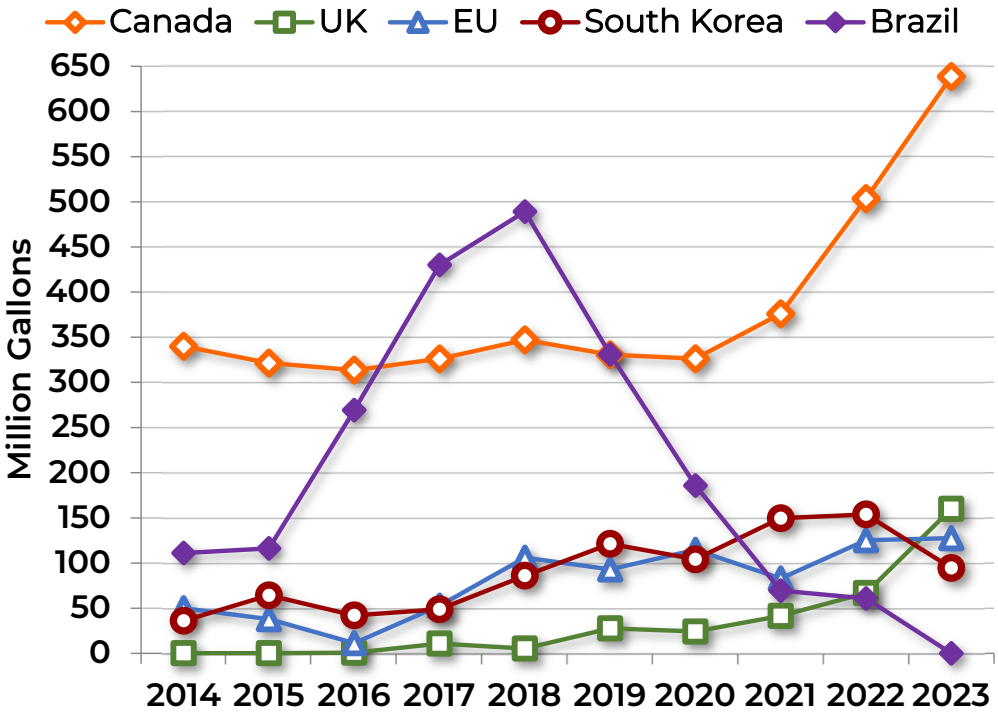
ETHANOL EXPORT DESTINATIONS

North America was by far the **largest regional destination** for U.S. exports in 2023. There were **substantial shipments** to the **European Union and South America**, while those to **East Asia receded.**

U.S. Ethanol Exports by Region



Changing U.S. Ethanol Export Markets

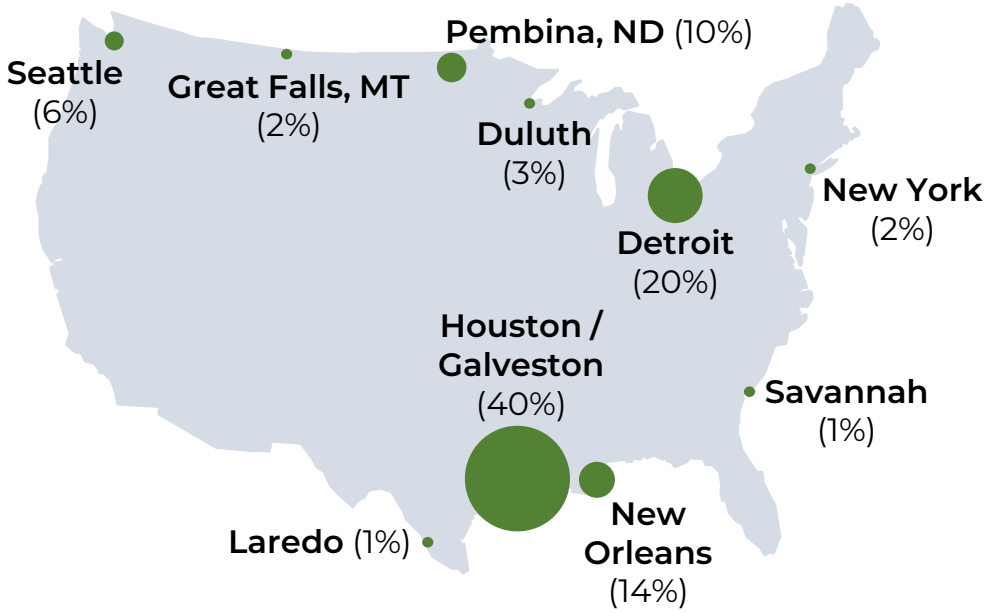


Exports to **Canada** set a **single-year record for any destination.** The **United Kingdom** became the second-largest market in the aftermath of its introduction of a 10-percent ethanol blend. However, **shipments to Brazil were negligible** due to a **punitive 16-percent tariff** that was in place most of the year.

Sources: U.S. Census Bureau, Dept. of Commerce, Dept. of Agriculture

2023 NET EXPORTS AND HUBS

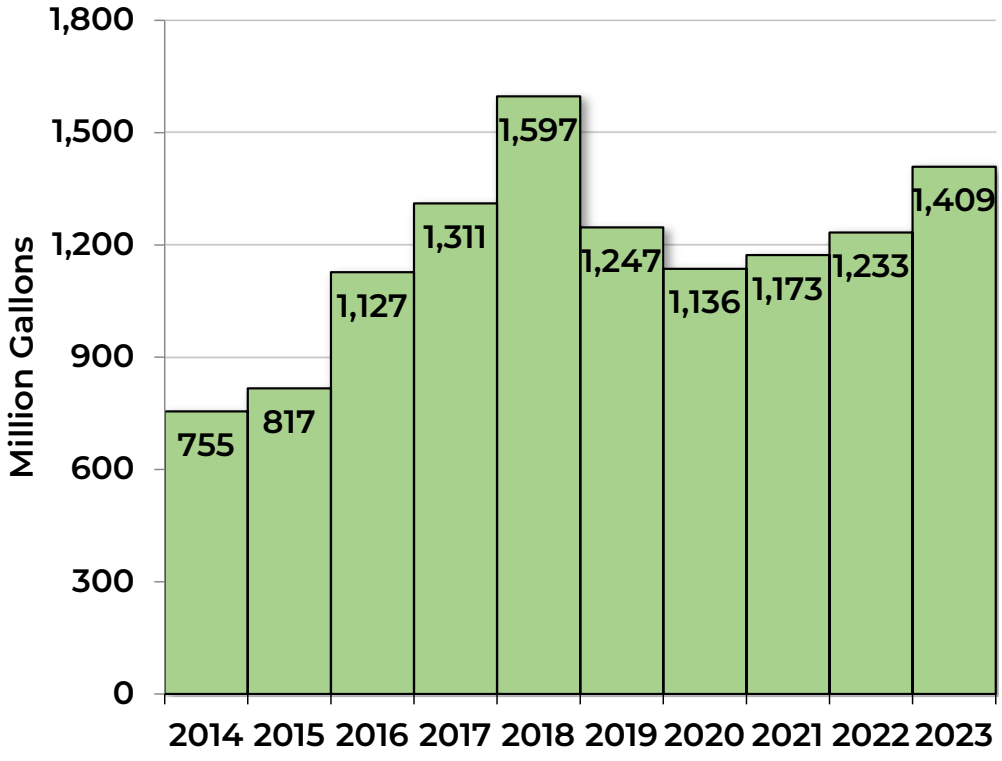
Top Ports/Districts of Exit for Ethanol Exports



More than half of U.S. ethanol exports departed via the Gulf of Mexico. Shipments via Detroit increased significantly as a gateway to Canada. Volumes were also shipped from the Pacific Northwest, Northern Tier and East Coast.

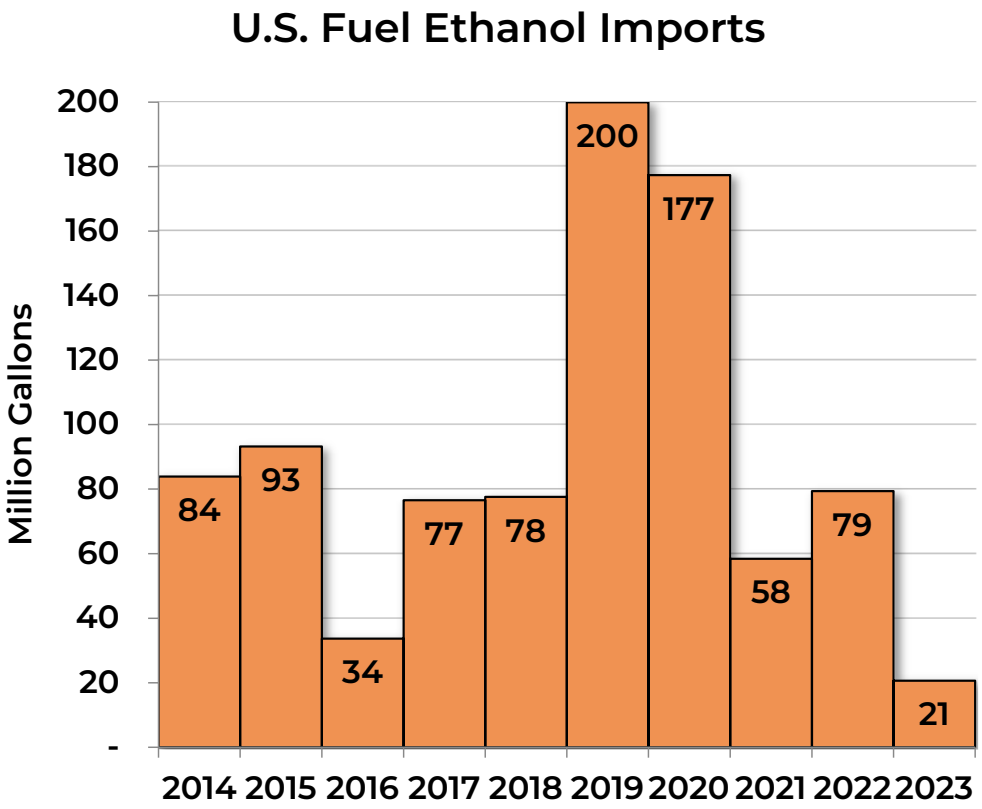
Net exports of ethanol were the second highest ever in 2023, as exports rose and imports fell. The U.S. was a net exporter for the 14th straight year.

U.S. Net Ethanol Exports

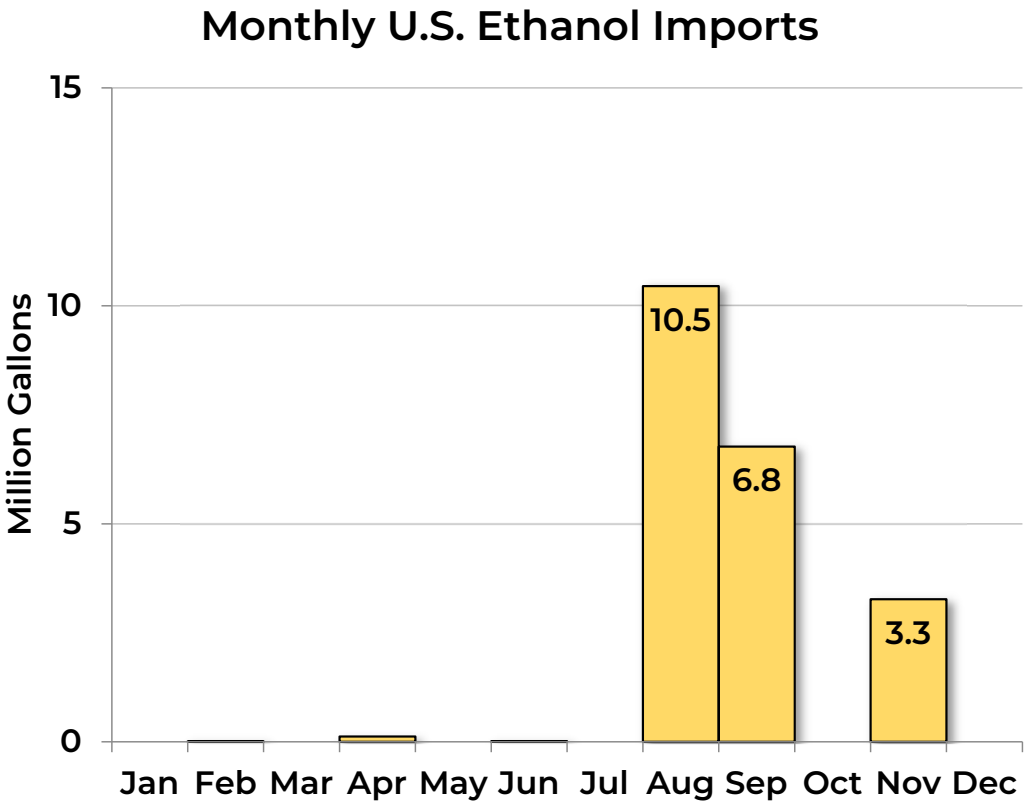


Source: U.S. Census Bureau, Department of Commerce

2023 U.S. ETHANOL IMPORTS



U.S. **imports** of fuel ethanol **fell** to **21 million gallons** in 2023, the **lowest level in more than a decade.**

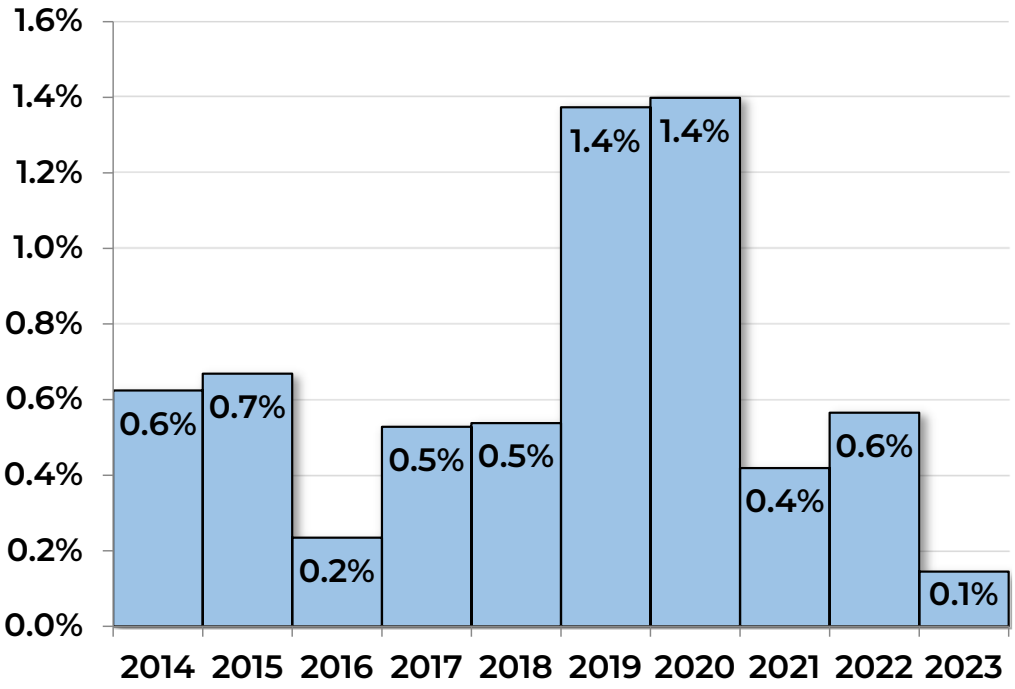


Virtually all fuel ethanol **imports** continued to come from **Brazil**, the second-largest producer in the world, behind only the U.S.

Source: U.S. Census Bureau, Department of Commerce

2023 U.S. ETHANOL IMPORTS

Ethanol Imports: Share of Total U.S. Ethanol Usage



Ethanol enhanced America's energy security, as **imports accounted for a negligible share** of U.S. ethanol consumption in 2023.

California received **half** of the fuel ethanol **imported** into the U.S. in 2023, due to favorable treatment under the state's Low Carbon Fuel Standard. Significant volumes also were imported into the **Northeast**.

Top Ports of Entry for Ethanol Imports



Source: U.S. Census Bureau, Department of Commerce

ABOUT THE DATA IN THIS REPORT

U.S. Ethanol Export Data

- The export data in this report includes exports classified under the following Harmonized Tariff Schedule (HTS) codes:
    - **2207200010**: Ethyl alcohol and other spirits, denatured, of any strength: For fuel use
    - **2207106010**: Undenatured ethyl alcohol of an alcoholic strength by volume of 80 percent vol. or higher: For non-beverage purposes: For fuel use
    - **2207200090**: Ethyl alcohol and other spirits, denatured, of any strength: Other
    - **2207106090**: Undenatured ethyl alcohol of an alcoholic strength by volume of 80 percent vol. or higher: For non-beverage purposes: Other
- 2207200090 and 2207106090 are included in this report because there is anecdotal evidence that exports of ethanol intended for fuel use are sometimes classified under these codes. In any case, ethanol classified under these codes represented 14% of the 2023 U.S. exports discussed in this report.

U.S. Ethanol Import Data

- The import data in this report includes imports classified under the following Harmonized Tariff Schedule (HTS) codes:
    - **2207200010**: Ethyl alcohol and other spirits, denatured, of any strength: For fuel use
    - **2207106010**: Undenatured ethyl alcohol of an alcoholic strength by volume of 80 percent vol. or higher: For non-beverage purposes: For fuel use

Sources

- All data in this report comes from the U.S. Census Bureau, Department of Commerce

The Renewable Fuels Association publishes **monthly** summaries of export and import data for ethanol and distillers dried grains in its Trade Monitor.

This report was prepared by Scott Richman, who may be contacted at srichman@ethanolrfa.org or 636.594.2284.

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3e. ASTM/NCWM Updates

January 2024

Chuck Corr, CC Consulting, LLC

NCWM Interim meeting

The January, 2024, NCWM Interim meeting was held in New Orleans, LA. The meeting was well attended. I would say it is back to pre-pandemic levels attendance and number of proposals to consider.

Proposals to change Handbook 130

There was one item of interest to renewables. In 2022 I proposed modifications to Handbook 130 related to middle distillate type fuels. Some proposals were to the Method of Sale (MOS) section and some to the Fuels and Lubricant Regulation (FLR) section of the handbook. There was significant interest in the proposals with many comments. The MOS and FLR proposals were combined into a block and assigned to FALS. I chaired a FALS focus group to further develop the proposals. In the fall of 2023, the focus group finalized the recommendations for the block. The final proposals were presented at the full FALS meeting at the Interim NCWM meeting. FALS supported the proposals with a recommendation that the block be given voting status. The L&R committee did give this block voting status. I expect the block will be approved at the July meeting.

Proposal to change how NCWM votes on items

A big item of interest on the Board of Directors (BOD) agenda related to a proposal to move NCWM from voting once a year to twice a year voting. This concept came up several years ago. The BOD provided additional examples of how the twice a year voting would work. I believe this will be voted on at the July meeting. Industry has supported this effort. There is not universal support among the regulators but the item is fully developed. The vote will occur in July.

The BOD is considering a slight change to the name of the organization. There has been confusion that a conference is a specific meeting. The proposal is to change the name from the National Conference of Weights and Measures to the National Council of Weights and Measures. The NCWM initials remain unchanged. I spoke in favor of this change. The item will be voted on at the July meeting.

December 2023

Chuck Corr, CC Consulting, LLC

December ASTM Meeting Updates

The December 2023 ASTM meeting was held in New Orleans, LA. The attendance was excellent at this meeting. Several of the smaller committees (such as E48), subcommittees and work groups still used hybrid meetings. The D02 and E48 meetings were fairly uneventful.

Gasoline Subcommittee – The ballot to lower the T50 of fuels containing ethanol passed this semester. The updated standard should publish late winter or early spring.

The terminology ballot I had this semester received 6 negatives. I was planning to adjudicate the negatives at the in-person meeting. I had not sufficiently studied the ASTM regulations concerning adjudications. There was confusion at the meeting when one negative voter asked that each point in his negative be adjudicated separately. Due to the confusion the adjudication could not continue. The SC chair and I declared the negatives persuasive and the ballot goes back to the task force for another concurrent ballot in the spring semester. This work will continue but I want to do some additional background research before the task force convenes again. I spoke with several people that supported the ballot and I think support is building for the proposed change.

I announced the Information Relevance task force is considering removing the altitude and temperature adjustment discussion in the appendix of D4814. Some of the oils are reluctant to remove this information. I have recruited additional participation from OEMs in this effort. This effort will address octane in the gasoline standard. These will be exciting discussions. The next task force meeting is in January.

Kristy has proposed changes to the standard for denatured fuel ethanol, D4806. This effort will extend the scope beyond D4814 and include other applications for the material.

There have been some changes to the leadership in SC A with the addition of stakeholders from renewables.

Chevron again mentioned adding low carbon considerations in the gasoline standard. They do not have specific proposals, but we will keep an eye on this to make sure they are not just adding fluff to increase the confusion. CRC is working on considerations for lower carbon fuels.

Diesel Subcommittee - There was an announcement in SC E that there will be an effort to copy the information from the B6 to B20 standard (D7467) into the main diesel specification (D975) which currently allows up to 5% biodiesel. This will be an interesting effort that I will support. This change mirrors a proposal I am working on for Handbook 130 at NCWM.

Aviation Subcommittee - The subcommittee continues to develop standards for jet fuels with renewable carbon. These efforts are continuing with great interest from the OEMs.

E48, *Bioenergy and Industrial Chemicals from Biomass.* The E48 meeting was well attended and is growing. I am leading an effort to update the terminology standard in this committee, which includes a review of the terminology in all of the E48 standards. An afternoon workshop was held to discuss the new efforts on co-products from ethanol production.

4a. Ethanol Promotion Committee

Drive Clean 2024 Marketing Strategy Action Items

Encourage, Educate and Empower

Objective: Develop a marketing strategy for Drive Clean (UNL88) targeting young drivers
Message: Save Money. Save the Planet. Support local farmers.

Action Items:

1. Transition away from Bing Bang: January 15, 2024. Working with Bing Bang to put all graphics, media kits, videos, and B-roll files on hard drive.
2. Job Posting for part time social media "development director". This position would be for 10hr/week (5 hrs. posting, 5 hrs. social listening). This role would schedule posts, track, engage with followers and be in tune with trends.
3. Hire intern to manage social media.
4. 3 Content Creation Ambassador Representatives. (from UNI, ISU, and U of I). This role would post 1-2 times a month and hold at least 1 local event for brand awareness.
5. InFUELncers. 4H and FFA. Engage using Scott's Johnson List CYC (county youth coordinator). Develop release forms. Give gas cards and create social media content. (like hummingbird format)
6. Hold 3 marketing events at local stations, promote through high schools. Fill up with UNL88, get free drink/slice of pizza/snack.
7. Iowa 4H Foundation.
    a. State Science and Technology Fair of Iowa (April 4-5) 800+
    b. State Conference (June 25-27) 600+
8. Clean up existing & expand website:
    a. Contact Webspec for website domain management.
    b. Re arrange to put fuel finder closer to top of page.
    c. Update fuel finder locations.
    d. Eventually develop tabs for teachers, young drivers, UNL88 locations, and ambassador programs.
9. At pump advertising. (Stu Heifetz) Kwik Trip
10. Geofence campaign targeting HS and UNL88 stations. (Next Step Advertising

Iowa Renewable Fuels Association

The trade association representing Iowa's biodiesel and ethanol producers has an opening for a part-time spring semester marketing intern to assist with development and management of social media platforms such as Instagram and TikTok. This position would initiate and manage social media content for our DriveCleanIowa campaign, which encourages young drivers to use Unleaded 88 when filling up their cars.

This position will also assist with industry research and statistics, graphics creation, and engagement in other key projects. Applicants should possess strong oral and written communication skills. In addition, the intern will assist with all association activities, promotions, and other duties.

This position would coincide with the applicant's spring semester and there is the possibility the internship may be extended through summer 2024. Minimum 10 hours per week during the school year, with a preference for candidates that could work 15 hours. The internship will provide the successful applicant an opportunity to be part of a fast-paced work environment, be responsible for building and maintaining a social media campaign, and to make connections through the Iowa ag and biofuels space.

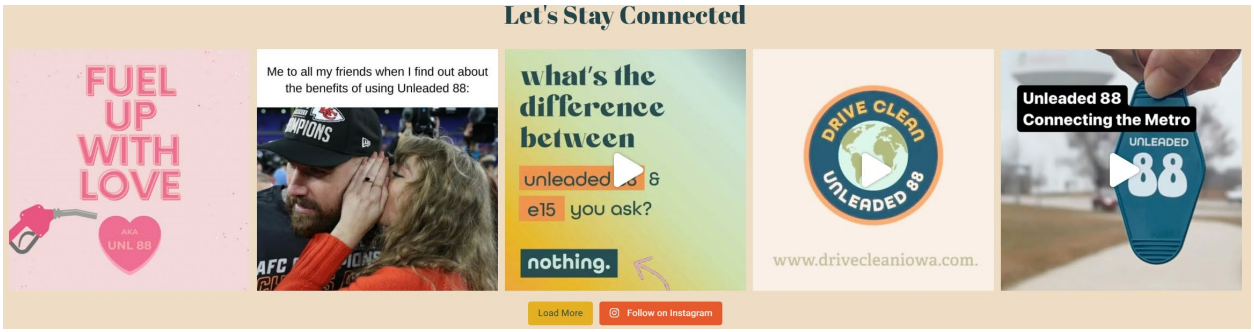
Qualifications: Applicant should have a strong interest in renewable fuels. Potential interested majors: Ag Studies, Communications, Marketing, Environmental Science, Sustainability Studies & Political Science

Hourly Wage: $15/hr

The position is based out of Johnston office. In office is preferred but remote work candidates will also be considered.

Cover letter and resume may be submitted online to: lcoffelt@iowarfa.org.

Application deadline is February 16th.



2024 State Science and Technology Fair of Iowa
Hilton Coliseum, Iowa State University, Ames, Iowa

JUNIOR & SENIOR HIGH EVENT

Day 1
Thursday, April 4th, 2024

7:00 – 8:30 am	**Exhibitor Registration & Project Set-Up**	Registration Desk, *Outer Concourse* *(Enter Through South Doors)*
7:00 – 8:30 am	**Project Reviews** **SRC Violation Clearance** **Display and Safety (DSC) Reviews/Clearance**	Floor/Outer Concourse of Hilton SRC Booth DSC Booth
8:30 – 9:00 am	**Welcome Ceremony & Orientation**	Stage, *Floor Level*
8:30 – 9:00 am	**Project Viewing (Judges ONLY)** Floor MUST be clear of ALL Exhibitors!	Floor of Hilton
9:00 – 12:00 pm	**Interview Judging**	
9:00 – 12:00 pm	**Iowa FFA Agriscience Fair Judging (7th, 8th & HS)**	
9:00 – 3:00 pm	**Seminar Competition Judging**	
9:00 – 9:45 am	**Hall of Fame Reception**	Pete Taylor Media Room
9:45 - 10:30 am	**Teacher Workshop –** *Required for all teachers*	Pete Taylor Media Room
12:00 – 1:15 pm	**Lunch with a Scientist** *Included for all students & teachers*	Stage, *Floor Level*
1:00 – 3:00 pm	**Educational Booths**	Floor Level
1:00 – 2:45 pm	**Interview Judging Continues**	
3:00 – 4:30 pm	**Educational Outreach/Tours**	Iowa State University
5:00 – 7:00 pm	**SPECIAL AWARDS CEREMONY**	Stage, *Floor Level*

Current as of 10/30/2023 – *Schedule Subject to Change

Iowa Renewable Fuels Association

Ethanol Promotion Committee Minutes

February 23, 2024

Draft

Meeting was called to order by Lisa Coffelt at 1:32 P.M.

Members Participating:

Corn LP	Elizabeth McOllough	
Veolia Water Technologies & Solutions	Greg Hoffpauir	
H2O Innovation	Jerry Tegels	
IFF	Hans Foerster	
Lincolnway Energy	Bill Couser	
Iowa Renewable Fuels Association	Lisa Coffelt	Marketing Director

IRFA Anti-Trust Policy

Coffelt reviewed IRFA's Anti-Trust Policy Information.

"IRFA and its officers, directors, and employees fully support and intend to comply with all applicable federal and state antitrust laws and shall not engage in anti-competitive conduct or practice, nor allow IRFA to be used by any member or other party for anti-competitive or unlawful purpose, including but not limited to the following kinds of prohibited conduct:

Any discussions or effort to directly or indirectly fix, raise, lower, control, recommend, suggest, or maintain prices on products or inputs.

Any contract, combination, conspiracy, discussions, or effort to divide or allocate markets or customers.

Any discussions or effort to engage in any boycott or considered refusal to deal.

Any discussions or effort through unsanctioned industry standards, restrictions, or any other method, to injure the business or trade of anyone.

Minutes will be kept of all meetings of the Board of Directors, the Executive Committee and Standing Committees. These minutes shall summarize accurately and concisely the action taken at the meeting."

- Minutes

Motion by McOllough, second by Tegels to approve November 29, 2023 minutes. Motion carried.

- Drive Clean – Teen Drivers Promotion

Coffelt reviewed the 2024 marketing strategy including transitioning away from Bing Bang, hiring an intern to support the social media campaign, partnering with FFA and 4H for InFUELincers, as well as continued marketing at UNL88 stations with at the pump advertising and geofencing.

- 4H Partnership

Coffelt gave a brief overview of upcoming involvement at the State Science and Technology Fair. Drive Clean will have a booth as well as participate as a panelist for Lunch with a Scientist.

- Retailer Outreach

Coffelt presented a letter from IRFA with information for RFIP and HBIIP grant assistance to Iowa retailers, and also mentioned the upcoming webinar and workday with Growth Energy and Iowa Corn.

The meeting was adjourned at 1:58 P.M.

4b. Biodiesel Promotion Committee

Biodiesel Activites

On Farm Biodiesel Program final 2023

147 Farmers
B11 = 113,271 gallons (67 farmers)
B20 = 106,636 gallons (79 farmers)

2024 Budget

IRFA- $20,000 + $5000 rollover ???

The program provides fuel credits to Iowa farmers filling an on-farm bulk tank in Iowa, and being used in an agricultural operation. The credit is 25-cents per gallon for B11 and 50-cents per gallon for B20 and above. There is a maximum of $500 in fuel credit reimbursement per diesel end user. The user must submit information below and an itemized receipt including the type of fuel purchased and number of gallons.

NOTE: If applicants have previously received a credit, they are eligible for an additional credit if: 1) applicant submits a testimonial for biodiesel use in farm equipment or 2) applicant previously received a credit for B11 and is now applying for a B20 credit.

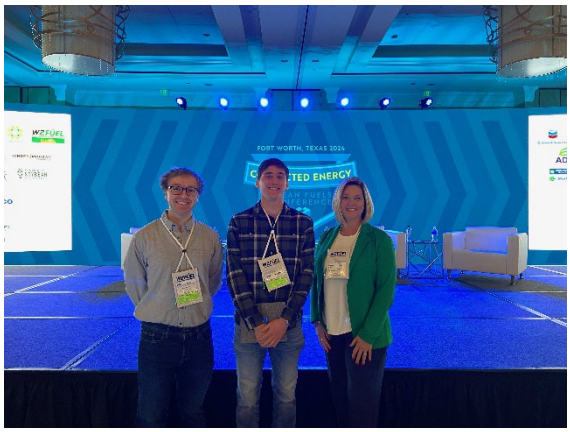
Biodiesel Suppliers Outreach

Al's Corner Oil Co.
Bogler Oil Co.
Diamond Oil
Farmers Union Cooperative
Fencil Oil
Fivestar Coop
Miller Fuel & Oil
Mulgrew Oil
Pro Cooperative
Quick Oil (74)
Reif Oil Company
Wessel's Oil Company

Program Partners:

Clean Fuels Alliance America Annual Meeting Feb. 5th – 8th

Keegan Fogarty & Ethan Hassler
Solace Biotech, LLC







Humboldt CSD Case Study





Logan Hansch, and **Mattias Schwartzkopf** with Growmark will review the benefits of using Biodiesel: Humboldt CSD Case Study.

Growmark is working with Leo Reigelsberger, Humboldt Transportation Director conducting a study comparing buses running on B20 and buses running on diesel. Leo will be providing diagnostic information, and there will be some environmental health benefits to the kids.



Protect Children's Health!



Biodiesel burns cleaner than petroleum diesel and reduces smog, making the air cleaner for children to breathe.

Iowa Renewable Fuels Association

BIODIESEL America's Advanced Biofuel

Contact Iowa Renewable Fuels Association at 515-252-6249 to learn more!

Iowa Renewable Fuels Association

Biodiesel Promotion Committee Minutes

February 28, 2024

Draft

Meeting was called to order by Lisa Coffelt at 1:36 P.M.

Members Participating:

Chevron Renewable Energy Group	Steve Klein, Daniel Floss	
Iowa Soybean Association	Karen Long	
Lincolnway Energy	Bill Couser	
Iowa Renewable Fuels Association	Lisa Coffelt	Marketing Director

IRFA Anti-Trust Policy

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Any discussions or effort to engage in any boycott or considered refusal to deal.

Any discussions or effort through unsanctioned industry standards, restrictions, or any other method, to injure the business or trade of anyone.

Minutes will be kept of all meetings of the Board of Directors, the Executive Committee and Standing Committees. These minutes shall summarize accurately and concisely the action taken at the meeting."

- Minutes

Coffelt referred the committee to the meeting minutes in the committee packet.

Motioned by Couser, seconded by Klein to approve the minutes from the committee meeting on November 17, 2023. Motion carried.

- On-Farm Biodiesel Credit Program

Coffelt gave metrics on 2023 program. Coffelt noted IRFA budgeted monies for 2024 program. Coffelt recommended credits be approved only to NEW applicants for 2024, and continue with 25-cents per gallon for B11 and 50-cents per gallon for B20. Coffelt noted she would be reaching out to additional biodiesel producers. Klein requested a letter requesting additional funds.

There was a consensus to continue program into 2024 with same credit levels, however, only NEW applicants will be considered.

- Clean Fuels Alliance America Sponsorships

Coffelt gave brief summary of recipients for the sponsorships, Keegan Fogarty and Ethan Hassler. Coffelt has been able to support Fogarty and Hassler with follow up connections to their ongoing patent for biofuel technology.

- Humboldt CSD Case Study

Coffelt noted that Growmark and Humbolt Schools have decided to continue the study for 1 year. The data will be presented again at the annual Iowa Pupil Transportation Association meeting in July 2024. Coffelt is working with Chevron REG for a potential plant tour during the July IPTA meeting. Coffelt noted Growmark is talking with Algona and Carroll School Districts to also participate in the study.

Coffelt adjourned the meeting at 2:02 P.M.

4c. Membership Committee

Iowa Renewable Fuels Association

March 19th Networking Event
Magee's Irish Pub

Thank you to our sponsors!

h2o innovation®

ICM®

iff

KURITA

Leaf by Lesaffre

IRFA New Members

Alison Newell | Account Manager, Process Systems and Solutions
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CIBO Technologies creates farm-focused sustainability programs on a mission to accelerate regenerative agriculture.

Iowa Renewable Fuels Association

Producer Membership Roster

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4d. IRFA PAC Committee

IRFA PAC Report

Beginning Balance: $155,862.25 (11/30/2023)

Checks

- Pre – Session Donations - $9,800
  - Congressman Zach Nunn
  - State Sen. Jack Whitver
  - State Sen. Amy Sinclair
  - State Sen. Waylon Brown
  - State Sen. Annette Sweeney
  - State Sen. Mike Bousselot
  - State Sen. Dawn Driscoll
  - State Rep. Matt Windschitl
  - State Rep. Norlin Mommsen
  - State Rep. Mike Bergen
  - State Rep. Chad Ingels

Deposits

- Holiday Reception - $1,380

Current Balance: $147,442.25 (02/29/2024)

4e. Co-Products Committee

28th Distillers Grains Symposium

St. Louis, MO

November 11 - 13, 2024

Exhibiting & Sponsorship Opportunities Available

CHECK BACK!



SAVE THE DATES:

April 14-16, 2025 - 29th Distillers Grains Symposium in Bloomington, MN
April 13-15, 2026 - 30th Distillers Grains Symposium in Indianapolis, IN

Joseph W. Ward, Ph.D. l Executive Director
Distillers Grains Technology Council
1190 9th Avenue l Marion, IA 52302
Tel: (1) 319-361-3047
E-Mail: joe.ward@distillersgrains.org

DISTILLERS GRAINS

2023 U.S. TRADE STATISTICAL SUMMARY

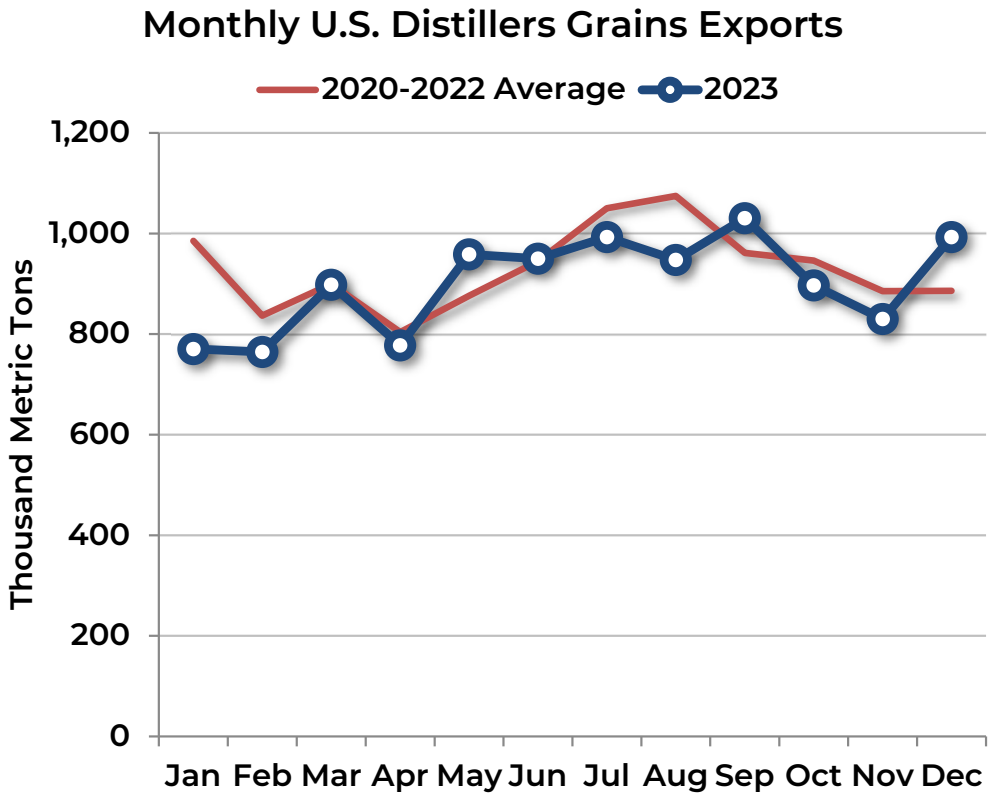
RFA
RENEWABLE FUELS ASSOCIATION



2023 DISTILLERS GRAINS EXPORTS



U.S. exports of **distillers grains** (DGs)—a high-quality feed ingredient produced by dry-mill ethanol facilities—decreased slightly to **10.8 million metric tons** (MMT) in 2023. DGs were exported to **more than 50 countries**.



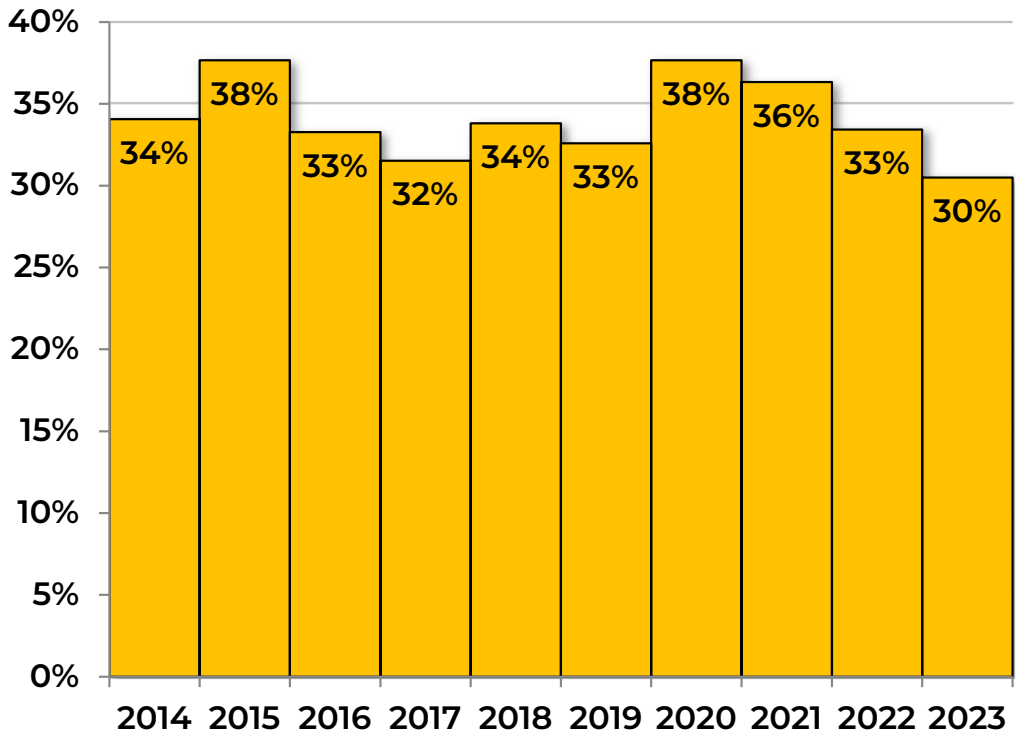
Exports began the year slowly but ended on a high note. Shipments **exceeded 1 MMT** in **September** and **December** as prices receded.

Source: U.S. Census Bureau, Department of Commerce

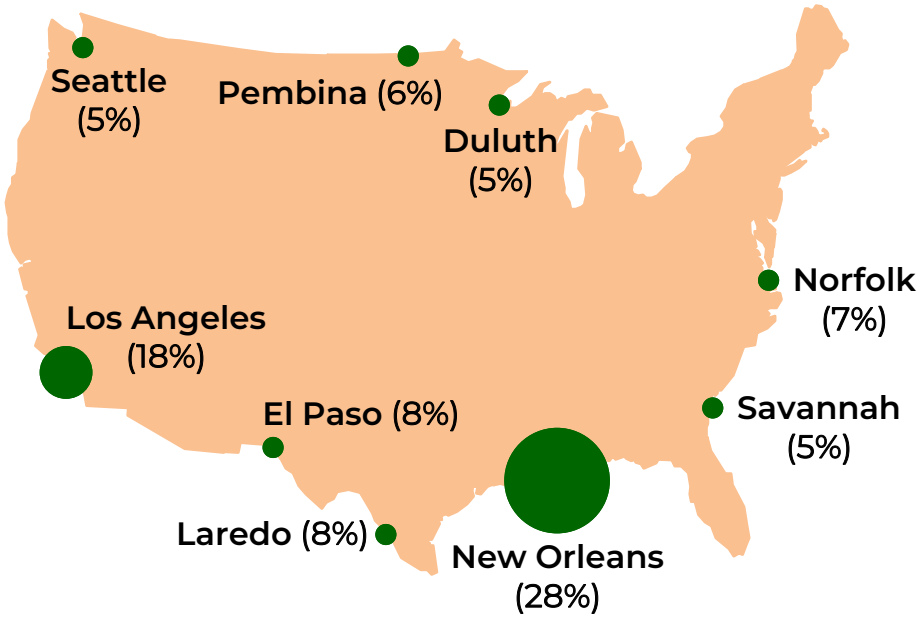
2023 DISTILLERS GRAINS EXPORTS

As U.S. DG production has grown over time, the development of **export markets** has been **essential**. Nearly **one-third of DG output** was **exported** in 2023.

Export Share of U.S. DG Production



Top Ports/Districts of Exit for DG Exports

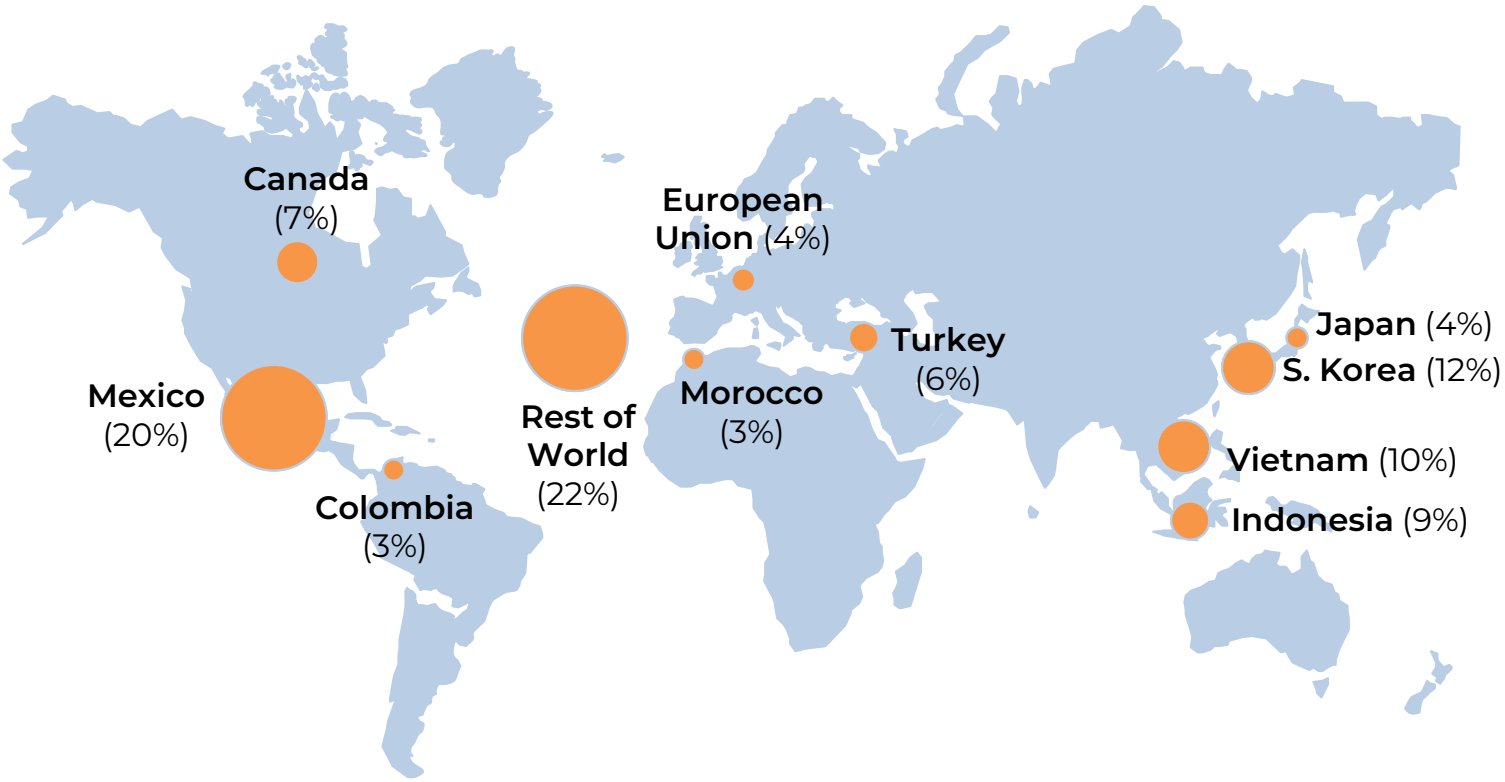


U.S. DG exports left the country through **26 ports and exit points** (the top ones by volume are shown on the map). **New Orleans** again handled the most tonnage, followed by **Los Angeles**.

Source: U.S. Census Bureau, Department of Commerce

2023 DISTILLERS GRAINS EXPORTS: TOP MARKETS

U.S. Distillers Grain Export Markets



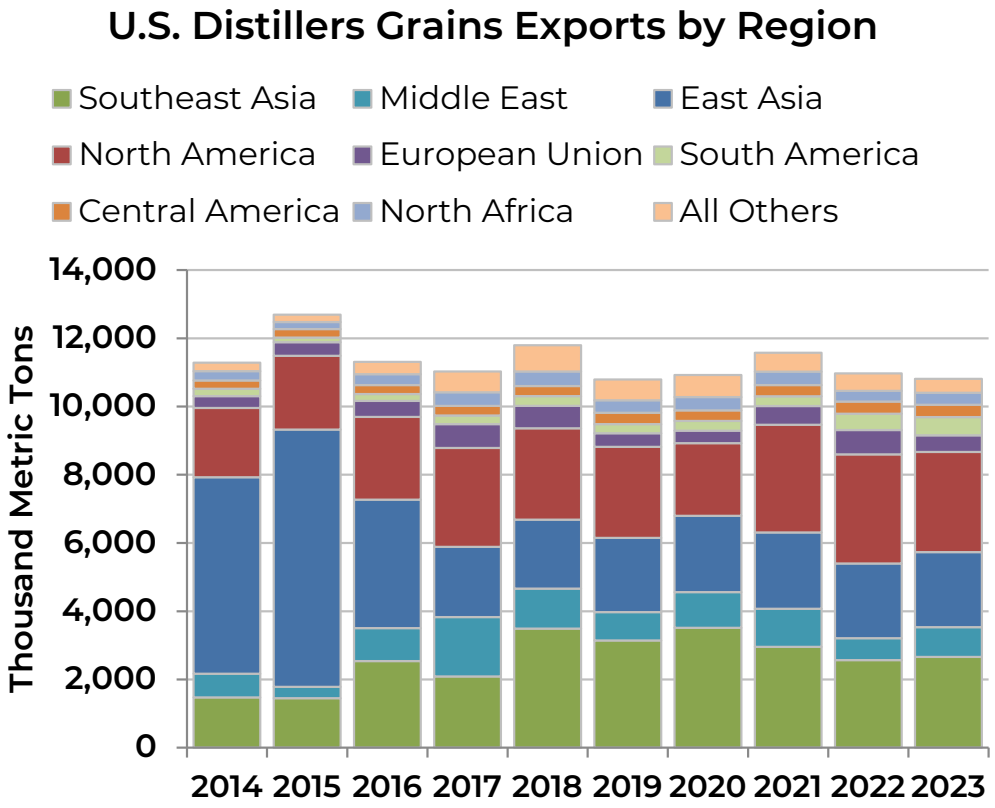
Country	2023 Total	2022 Total	Change
	000 Metric Tons		*%*
Mexico	**2,196.4**	2,230.8	-2%
South Korea	**1,280.2**	1,263.9	1%
Vietnam	**1,100.5**	1,279.0	-14%
Indonesia	**932.9**	835.1	12%
Canada	**736.4**	967.5	-24%
Turkey	**627.8**	422.9	48%
European Union	**484.6**	710.3	-32%
Japan	**402.5**	496.9	-19%
Colombia	**352.7**	360.7	-2%
Morocco	**283.1**	203.8	39%

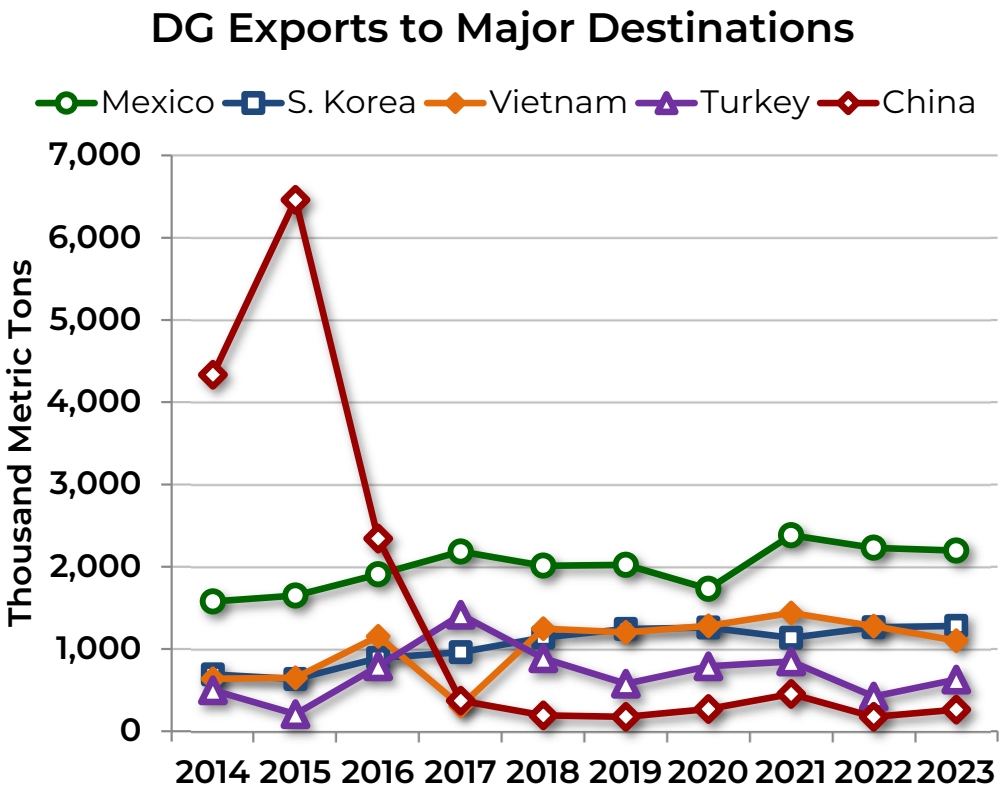
The **top three destinations** for U.S. DG exports—**Mexico, South Korea, and Vietnam**—remained the same in 2023. **Mexico accounted for 20%** of total shipments. Exports to **Indonesia, Turkey, and Morocco** exhibited **strong growth.**

Source: U.S. Census Bureau, Department of Commerce

DISTILLERS GRAINS EXPORT DESTINATIONS

Regionally, other **North American** countries represented the **largest export market** for DGs in 2023, **followed closely by Southeast Asia**. Shipments to **East Asia** also remained **substantial**.



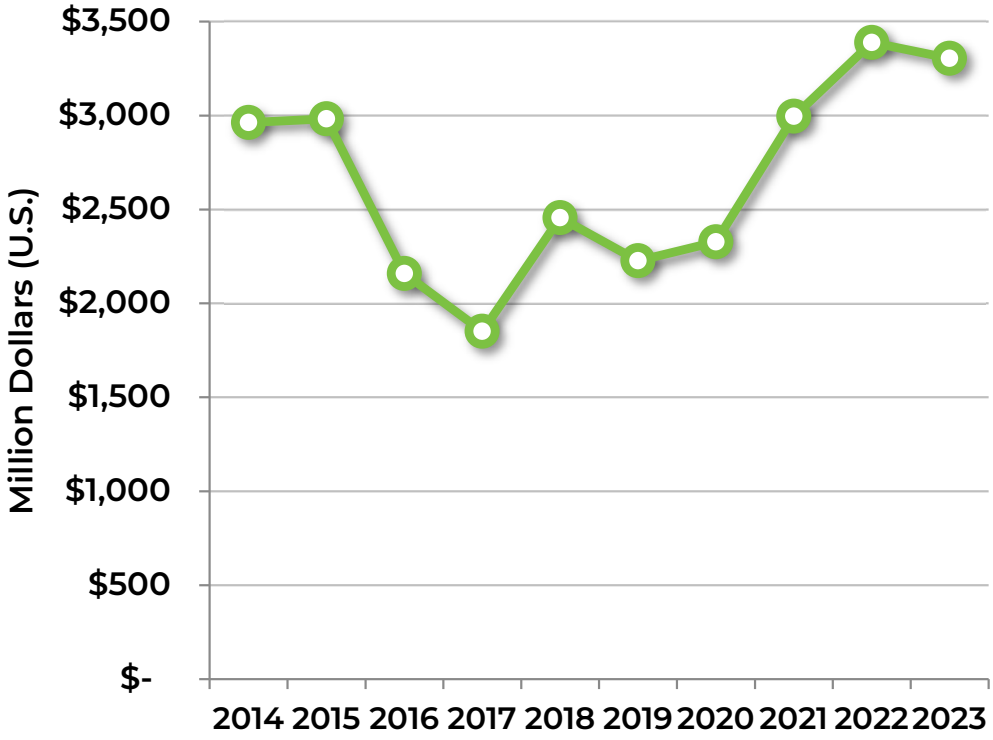


Although shipments to **China remained far lower** in 2023 than a decade ago, the export **market is now considerably more diversified**. Sales to **other Asian countries and Mexico have grown** over time.

Sources: U.S. Census Bureau, Dept. of Commerce, Dept. of Agriculture

DISTILLERS GRAINS EXPORT VALUE

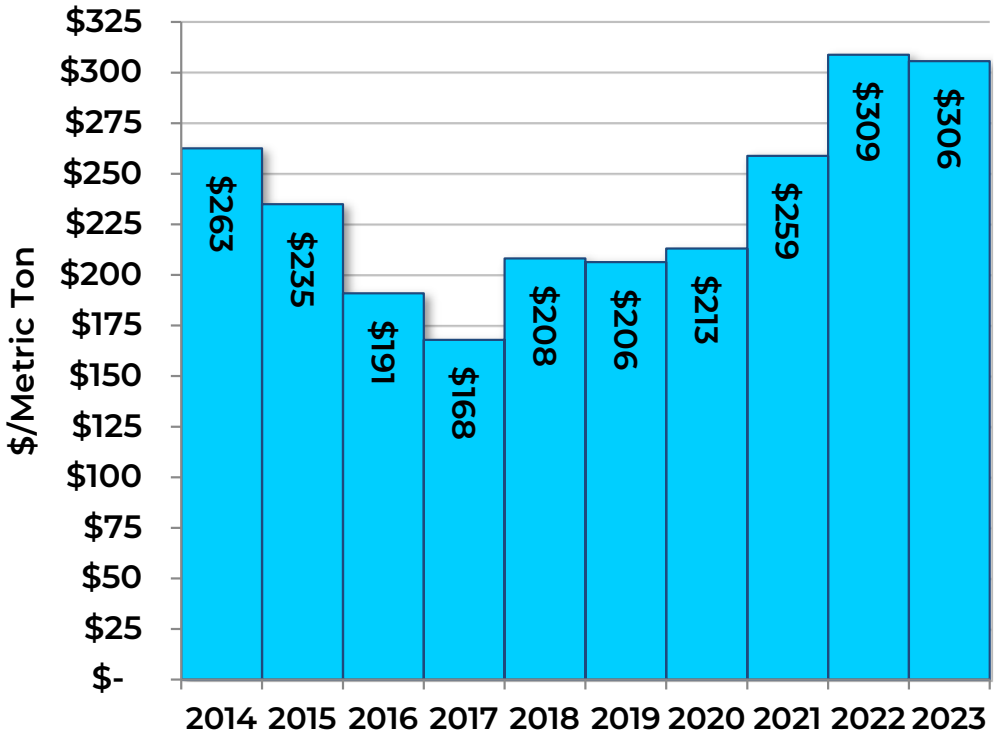
Value of U.S. Distillers Grains Exports



The value of U.S. DG exports was **$3.3 billion** in 2023, **just short of the record** hit a year earlier. DGs continue to be an **important revenue source** for dry-mill ethanol facilities.

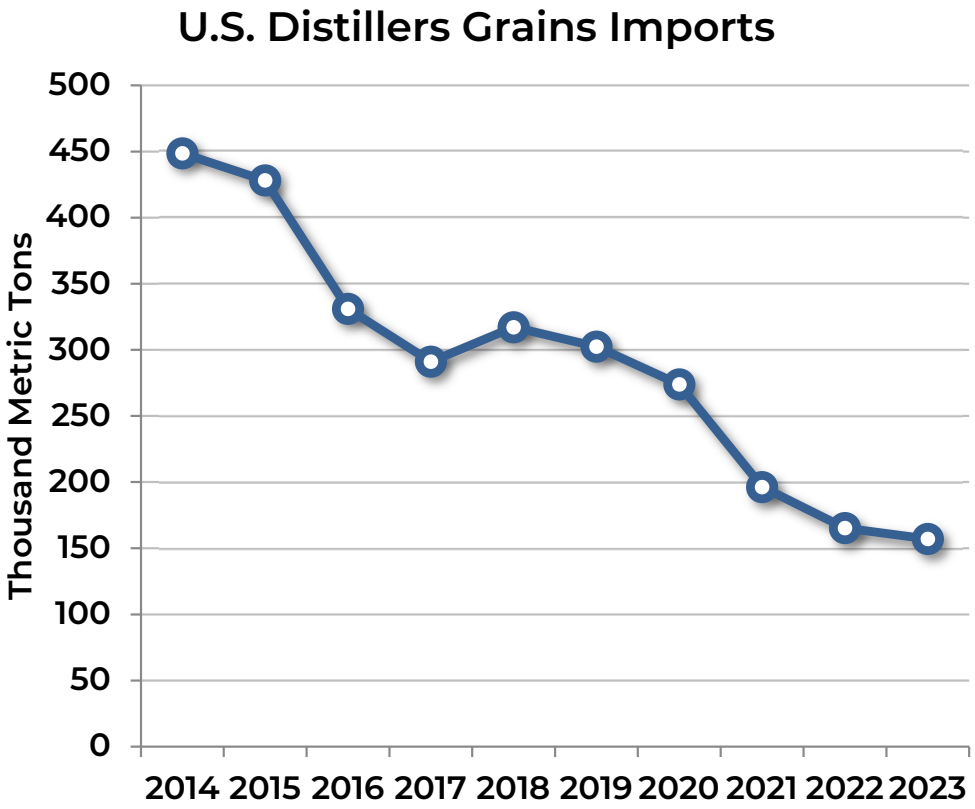
Distillers Grains Export Price

The unit value of U.S. DG exports averaged **$306 per MT** in 2023, similar to the 2022 level. Prices were **strong during the first half** of the year but **fell during the second half**, as a **record corn crop** was harvested.



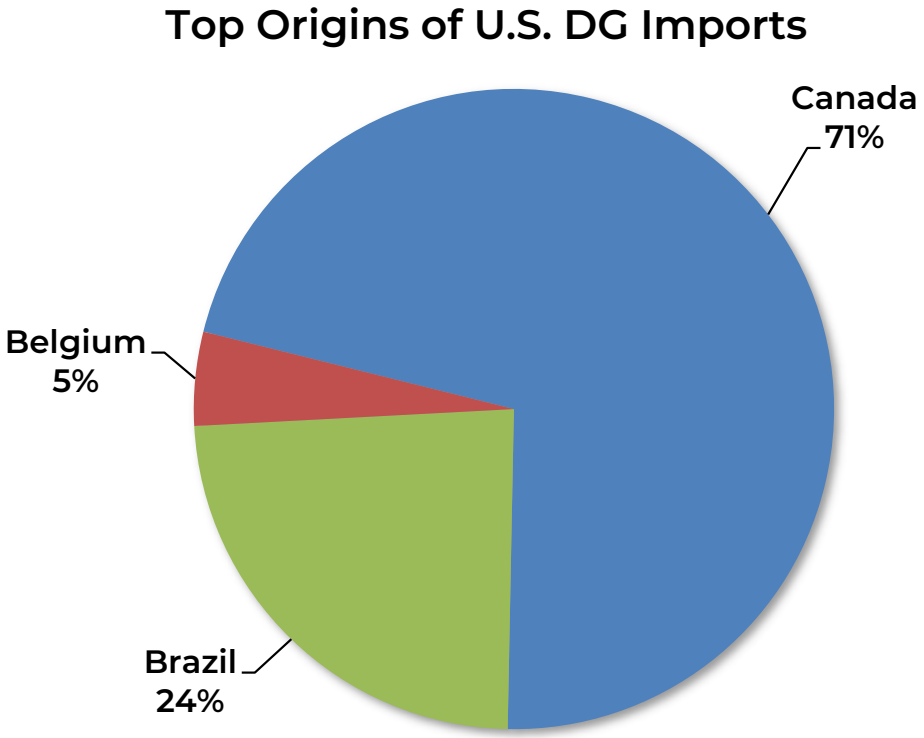
Source: U.S. Census Bureau, Department of Commerce

2023 DISTILLERS GRAINS IMPORTS



U.S. **imports** of DGs **fell to 157,000 MT** in 2023, continuing the **downward trend** of the last decade. Imports accounted for **less than 1% of U.S. DG consumption**.

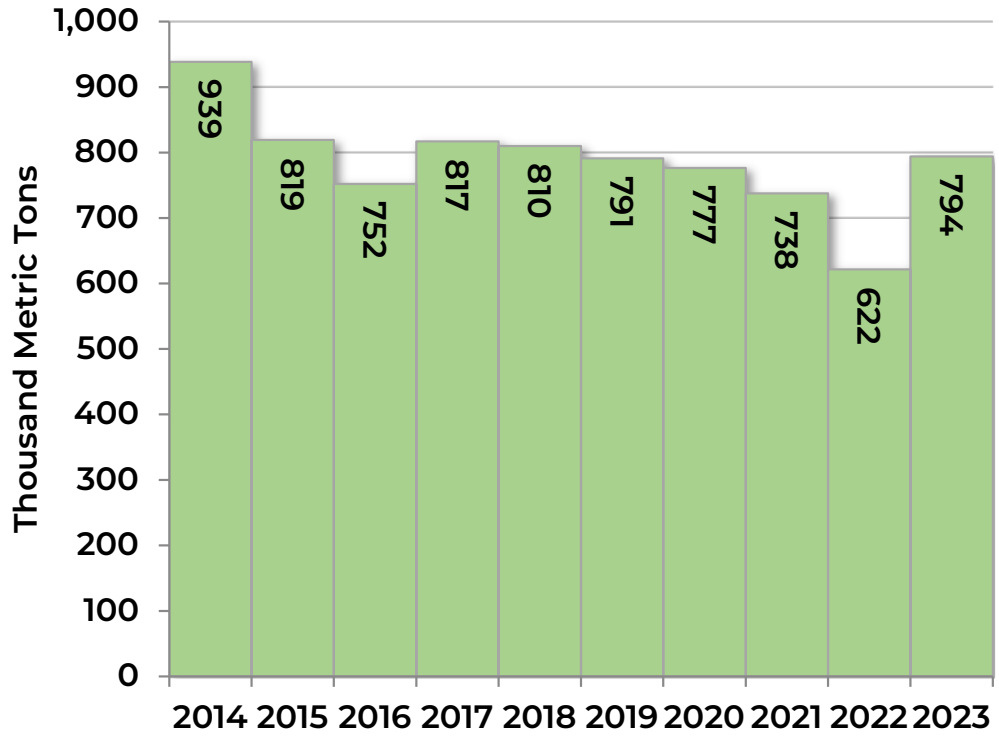
Canada was again the **top supplier** of DGs to the U.S., accounting for **nearly three-quarters** of import volumes. **Brazil** was the **only other significant origin** for DGs entering the U.S. market.



Source: U.S. Census Bureau, Department of Commerce

2023 EXPORTS OF OTHER CO-PRODUCTS

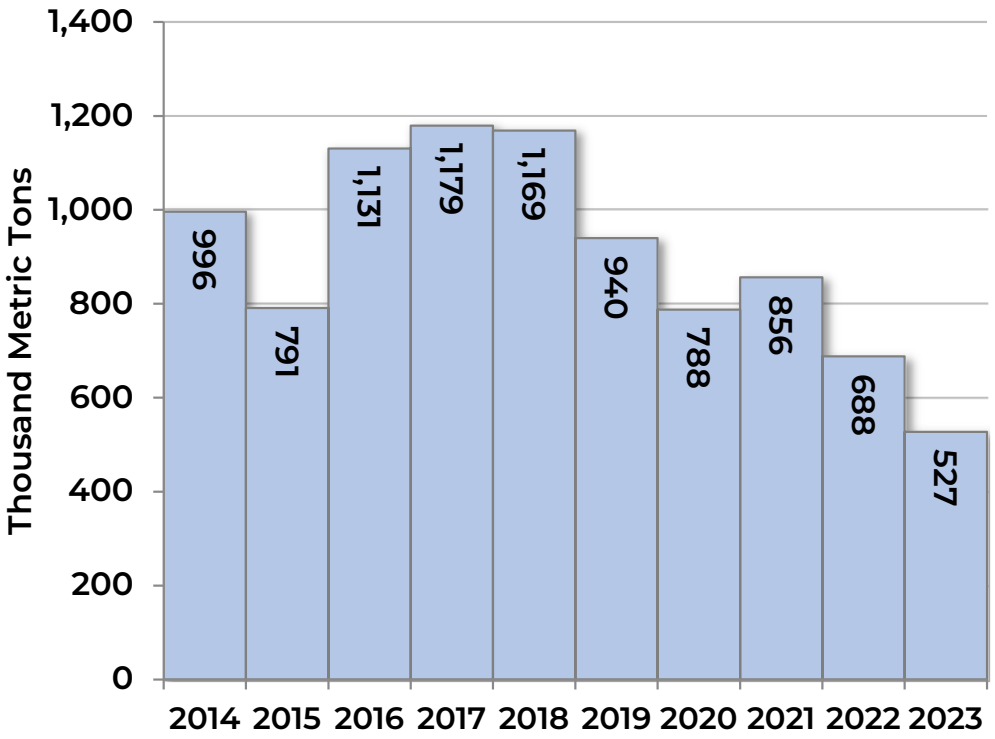
U.S. Corn Gluten Meal Exports



U.S. exports of **corn gluten meal**—a feed co-product made by ethanol wet mills—**rose to 794,000 MT** in 2023, the highest level in five years. **Chile, Indonesia, and Colombia** remained the top destinations.

U.S. Corn Gluten Feed Exports

U.S. exports of **corn gluten feed**—also a co-product made by wet-mill ethanol facilities—**fell to 527,000 MT**, mainly due to a drop in shipments to **Ireland**, the largest destination.



Source: U.S. Census Bureau, Department of Commerce

ABOUT THE DATA IN THIS REPORT

U.S. Co-product Export and Import Data

- The export and import data in this report include products classified under the following Harmonized Tariff Schedule (HTS) codes:
    - **2303300000**: Brewing or distilling dregs and waste (Distillers Grains)
    - **2303100010**: Residues of starch manufacture and similar residues: Corn gluten feed
    - **2303100020**: Residues of starch manufacture and similar residues: Corn gluten meal

Sources

- All data in this report come from the U.S. Census Bureau, U.S. Department of Commerce, and U.S. Department of Agriculture.

The Renewable Fuels Association publishes **monthly** summaries of export and import data for ethanol and distillers dried grains in its Trade Monitor.

This report was prepared by Scott Richman, who may be contacted at srichman@ethanolrfa.org or 636.594.2284.

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4f. Safety / Environmental Compliance Task Force

Iowa Renewable Fuels Association

Environmental Compliance/Safety Task Force Meeting

January 24th, 2024

9:02 am – 11:45 am – IRFA Office/Zoom

Attendance: Chris Downs – Iowa OSHA, Lisa Schmidt – Trinity Consultants, Dan Deatsch – Trinity Consultants, Jenna Kube – Trinity Consultants, Lauren Taylor – PROtect, David Butler – Chevron REG, Brenda Duppong – Lincolnway Energy, Jill McBreen – POET, Jenny Etheredge – Corn LP, Will Adler – Siouxland Energy, Vonnie Wareham – Western Iowa Energy, Tyler Schwarck – Absolute Energy, Deb Cronin – Little Sioux Corn Processors, Ryan Rezac – Green Plains, Dan Velasquez – Southwest Iowa Renewable Energy, Nathan Hohnstein – IRFA

9:02 Welcome – Nathan Hohnstein, IRFA
1. Introductions

9:06 Informal Group Gathering
1. Discuss incidents, concerns, best practices, etc.

9:10 **Update on Ozone Depleting Substances (ODS) Rule & PM2.5 – Dan Deatsch, Senior Consultant – Trinity Consultants**

9:58 **Proposed RCRA Empty Container Regulations – Jenna Kube, Senior Consultant – Trinity Consultants**

10:20 Break

10:32 **How to plan for Sustainable Aviation Fuel (SAF) Projects – Lauren Taylor, EHS Consultant – PROtect**

11:05 **SAF Economic Impact Study for Iowa – Nathan Hohnstein, Policy Director, Iowa Renewable Fuels Association**

11:20 **Chris Downs, Iowa OSHA**
1. Mental Health Guidance & ITA Requirements

11:43 Other Topics - Open
1. Dates for rest of 2024 Meetings
    a. *June 19th & October 16th*
2. Potential Guest Speakers/Topics
    a. TSCA Chemical Data Reporting
    b. LDAR Compliance
    c. RMP & PSM Compliance

11:45 Meeting Adjourned – Lunch

5a. DNR

i.Iowa Comprehensive Petroleum Underground Storage Tank Fund

IOWA UNDERGROUND STORAGE TANK FUND

Douglas M. Beech, *Chairperson* James R. Gastineau, *Administrator*

Board Members: Roby Smith, Joseph D. Barry, Austin Brinks, Kayla Lyon, Timothy L. Gartin, Lisa Coffelt, Patricia Beck, John Maynes

NOTICE OF PUBLIC MEETING

(Amended December 11, 2023)

The Iowa Comprehensive Petroleum Underground Storage Tank Fund Board will hold a meeting at 10:00 a.m., on Thursday, December 14, 2023. The meeting will be held at the Iowa State Capitol Building, Room G15 (Legislative Dining Room), 1007 E. Grand, Des Moines, IA and may be attended electronically. To call in, participants must dial (754) 900-4617 prior to the meeting. When prompted, enter conference code PIN 978 292 965, followed by the # key.

The tentative agenda for the meeting is as follows:

10:00 a.m. Call to Order

1. Approval of Prior Board Minutes
    (a) Minutes for September 15, 2023 meeting
    (b) Minutes for November 9, 2023 meeting
2. Closed Session Discussion of Pending and Imminent Litigation (To adjourn by 10:30 am)
3. Public Comment Period
4. Board Issues
    A. UST Fund Program, Options
    B. Claim Review: Dittmer's Service, Davenport
    C. Claim Review: Westside Petro, Kalona
    D. Fund Lien, Wunshel Property: Petition to transfer property
    E. RFP, RBCA 2310-01, Contract Award
    F. UST Operator Training, Vendor Agreements
    G. DNR Update
5. Approval of Program Billings
6. Monthly Activity Report and Financials Reviewed
7. Attorney General's Report
8. Claim Payment Approval
9. Contracts Entered Into Since September 15, 2023 Board Meeting
10. Other Issues as Presented
11. Correspondence and Attachments

502 E 9th St, Des Moines IA 50319

Phone: 515-725-8450 Fax: 515-725-8202

5b. IDALS

i. Renewable Fuels Infrastructure Program

IOWA DEPARTMENT OF AGRICULTURE & LAND STEWARDSHIP

Renewable Fuels Infrastructure Program

	May 2023 (4th Qtr of FY2023)	July 2023 (1st Qtr of FY2024)	October 2023 (2nd Qtr of FY2024)	January 2024 (3rd Qtr of FY2024	Total Projects FY2024 YTD
Projects					
Ethanol Blenders/E85/E15	12	7	10	74	91 Year to Date
Retail Biodiesel Dispensers	0	27	0	0	27 Year to Date
Retail Biodiesel Blender Dispensers	0	0	0	0	0 Year to Date
Biodiesel Blending Terminals	3	1	0	1	2 Year to Date
TOTAL PROJECTS FY 2020	15	35	10	75	120 Year to Date
FUND BALANCE	**3,855,343.79**	**16,952,851.68***	**16,510,551.68**	**13,382,086.29****	

*1,250,000 Annual allotment for biodiesel has been met for FY2024

** 35 Biodiesel Applications are in the cue for FY2025 Funding

Iowa Locations Receiving Quarterly Renewable Fuels Infrastructure Program Grants - January 2024

Project Type	Name	Location	City	Amount
E15	Nu Way K & H Cooperative	175 Hwy 17 South	Goldfield	$63,900.00
E15	Sinclair Service	109 W. 1st Street	Leon	$63,900.00
E15	Sinclair Service	2769 Highway 69	Weldon	$63,900.00
E15	Sinclair Service	102 E. McLane	Osceola	$63,900.00
E15	Roc Stop Cardtrol	505 NW Road	Shenandoah	$53,250.00
E15	Thomsen's Filling Station LLC	122 W. Main Street	Oxford Junction	$53,250.00
E15	Mid 5 LLC	1532 Osborne Street	Burlington	$53,250.00
E15	Nading's Service & Sporting Goods	201 Commercial Street	Strawberry Point	$53,250.00
E15	New Century FS	3168 Highway 63	Malcom	$50,000.00
E15	First Cooperative Association	To Be Determined	Marcus	$50,000.00
E15	Roc Stop	1310 W. Sheridan Avenue	Shenandoah	$50,000.00
E15	Elliott Oil Company	1147 N. Jefferson Street	Ottumwa	$50,000.00
E15	Stratford Country Store	810 Highway 175	Stratford	$50,000.00
E15	Otter Creek Stop	18820 Bellevue-Cascade Road	Zwingle	$50,000.00
E15	Farmers Union Cooperative	1913 County Road B32	Ossian	$50,000.00
E15	Kwik Star	110th St. and S. Divison Street	Stuart	$50,000.00
E15	Kwik Star	Forevergreen Road & I-380	North Liberty	$50,000.00

Iowa Locations Receiving Quarterly Renewable Fuels Infrastructure Program Grants - January 2024

Project Type	Name	Location	City	Amount
E15	Kwik Star	Sunset & Chatham	Norwalk	$50,000.00
E15	Kwik Star	Highway 71 & 202nd Street	Milford	$50,000.00
E15	Kwik Star	Overpass Drive	Webster City	$50,000.00
E15	Kwik Star	Merle Hay Road	Johnston	$50,000.00
E15	Kwik Star	Hickman Road & SE Legacy Pointe	Clive	$50,000.00
E15	Kwik Star	Highway 71 & 320th Street	Spencer	$50,000.00
E15	Kwik Star	NE 12th Street & NE 62nd Avenue	Mitchellville	$50,000.00
E15	Kwik Star	Kerper Court & Kerper Blvd	Dubuque	$50,000.00
E15	Kwik Star	Middle Road & 53rd Avenue	Bettendorf	$50,000.00
E15	Kwik Star	S. Lewis Blvd & Glenn Avenue	Sioux City	$50,000.00
E15	Kwik Star	301 Main Street	Lansing	$50,000.00
E15	Kwik Star	115 E. Main Street	New Hampton	$50,000.00
E15	Kwik Star	400 E. Bremer Avenue	Waverly	$50,000.00
E15	Kwik Star	705 N. Public Road	Shell Rock	$50,000.00
E15	Kwik Star	410 E 6th St., County Road 40	Readlyn	$50,000.00
E15	Kwik Star	811 Barrick Road	Janesville	$50,000.00
E15	Kwik Star	841 South Street	Jesup	$50,000.00
E15	Kwik Star	810 S. 3rd Avenue	Marshalltown	$50,000.00
E15	Kwik Star	109 E. Dike Road	Dike	$50,000.00
E15	Kwik Star	605 IA 57	Parkersburg	$50,000.00

Iowa Locations Receiving Quarterly Renewable Fuels Infrastructure Program Grants - January 2024

Project Type	Name	Location	City	Amount
E15	Kwik Star	201 N. 15th Street	Fort Dodge	$50,000.00
E15	Kwik Star	2500 S. Center St. Suite B	Marshalltown	$50,000.00
E15	Kwik Star	911 S. 14th Street	Clinton	$50,000.00
E15	Kwik Star	803 7th Avenue	Camanche	$50,000.00
E15	Kwik Star	341 S. State Street	Denver	$50,000.00
E15	Kwik Star	813 S. Canfield	Dunkerton	$50,000.00
E15	Kwik Star	825 W. Milwaukee St	New Hampton	$50,000.00
E15	Kwik Star	4923 Merle Hay Road	Des Moines	$50,000.00
E15	Kwik Star	210 South Street	Dumont	$50,000.00
E15	Kwik Star	400 E. Bremer Avenue	Waverly	$50,000.00
E15	Kwik Star	1105 Cedar Bend Street	Waterloo	$50,000.00
E15	Kwik Star	205 N. Maryville Street	Calmar	$50,000.00
E15	Kwik Star	125 Main Street	McGregor	$37,558.67
E15	Kwik Star	1000 W. Main Street	Manchester	$50,000.00
E15	Hy-Vee	630 Lincoln Way	Ames	$5,589.28
E15	Hy-Vee	1310 West Burlington	Fairfield	$26,213.30
E15	Hy-Vee	8607 Douglas Avenue	Urbandale	$27,007.87
E15	Hy-Vee	1710 S.W. Oralabor Road	Ankeny	$1,300.00
E15	Hy-Vee	1103 North Dodge Street	Iowa City	$26,903.31

Iowa Locations Receiving Quarterly Renewable Fuels Infrastructure Program Grants - January 2024

Project Type	Name	Location	City	Amount
E15	Hy-Vee	1025 E. Hickman Road	Waukee	$27,124.98
E15	Hy-Vee	3290 Crosspark Road	Coralville	$2,571.58
E15	Hy-Vee	5902 Merle Hay Road	Johnston	$27,220.61
E15	Hy-Vee	3215 SE 14th Street	Des Moines	$26,868.31
E15	Hy-Vee	1421 1st Avenue	Newton	$3,045.14
E15	Quik Trip	2945 E. University Avenue	Des Moines	$50,000.00
E15	Quik Trip	4021 Fleur Drive	Des Moines	$50,000.00
E15	Quik Trip	1424 E. Euclid Avenue	Des Moines	$50,000.00
E15	Quik Trip	614 University Avenue	Des Moines	$50,000.00
E15	Quik Trip	849 Army Post Road	Des Moines	$50,000.00
E15	Quik Trip	1451 22nd St.	West Des Moines	$50,000.00
E15	Quik Trip	1501 E. Grand Ave	Des Moines	$50,000.00
E15	Quik Trip	2300 MLK Jr. Parkway	Des Moines	$50,000.00
E15	Quik Trip	2428 Hubbell Ave	Des Moines	$50,000.00
E15	Quik Trip	901 SW 63rd Street	Des Moines	$50,000.00
E15	Quik Trip	4575 NW 2nd St.	Des Moines	$50,000.00
E15	Southside Fuels LLC	808 S. Washington	Bloomfield	$50,000.00
Biodiesel Terminal	New Century FS	2004 County Road E-29	Toledo	$50,000.00

Record $3.4 Million in Quarterly Biofuels Grants Will Expand E15 Availability

Iowa's Renewable Fuels Infrastructure Program Board approves 74 grants to fuel retailers in 38 counties

DES MOINES, Iowa (Feb. 7, 2024) – The Iowa Renewable Fuels Infrastructure Program (RFIP) Board approved 74 project applications totaling more than $3.4 million in cost-share funding for Iowa fuel retailers during its quarterly board meeting last week. 73 ethanol cost-share projects were awarded, an all-time record for one quarter, which will lead to the installation of new ethanol infrastructure to increase Iowans' access to lower cost, cleaner burning E15. The board also approved one application for a new biodiesel terminal project. Once completed, these projects will expand fueling options for E15 and biodiesel blends in 38 different Iowa counties.

The RFIP helps fuel retailers provide higher blends of homegrown, more affordable biofuels to consumers by incentivizing the installation, replacement and conversion of ethanol and biodiesel dispensing and storage infrastructure. Incentives to upgrade biodiesel terminal and storage facilities are also available. While the Iowa Department of Agriculture and Land Stewardship manages the program, a board appointed by the Governor and confirmed by the Iowa Senate determines grant allocations on a quarterly basis.

"Iowans are fueling their vehicles with lower cost E15 at record levels, Iowa plants are producing record volumes of ethanol, and Iowa is setting records for ethanol infrastructure investment," said Iowa Secretary of Agriculture Mike Naig. "The Renewable Fuels Infrastructure Program is truly driving biofuels momentum, and that is important because this industry supports rural jobs, creates markets for farmers and helps us secure our energy future. With significant state and federal cost-share assistance available, there has never been a better time for fuel retailers to help Iowa drivers save money at the pump by upgrading their fueling infrastructure."

38 counties had locations receiving one or more of the project grants, including the following: Adair, Allamakee, Black Hawk, Bremer, Buchanan, Butler, Cherokee, Chickasaw, Clarke, Clayton, Clinton, Dallas, Davis, Decatur, Delaware, Des Moines, Dickinson, Dubuque, Grundy, Hamilton, Jackson, Jasper, Jefferson, Johnson, Jones, Marshall, Page, Polk, Poweshiek, Scott, Story, Tama, Wapello, Warren, Webster, Winneshiek, Woodbury, and Wright. **The complete list of locations awarded at the January 30 RFIP board meeting can be found here**.

Additionally, in October 2023, ten RFIP awards totaling $442,300 were approved for E15 infrastructure projects in 8 different counties. Those counties receiving one or more cost-share grants for RFIP projects include the following: Clay, Clinton, Dickinson, Jackson, Jefferson, Linn, Polk, and Scott. **The complete list of locations awarded at the October 2023 meeting can be found here**.

To date, $5,483,555.57 of funding for this fiscal year has been awarded to 119 biofuels infrastructure projects. The program also leverages significant private investment by

the participating fuel retailers.
The breakdown of total RFIP funding awarded during this current fiscal year is as follows:

- $103,250 to 3 E85 projects
- $3,998,803 to 87 E15 projects
- $1,281,503 to 27 Biodiesel projects
- $100,000 to 2 Biodiesel Terminal projects

The Renewable Fuels Infrastructure Board will consider additional RFIP grant applications during its next quarterly meeting in the spring of 2024. The RFIP grant application is available on the Iowa Department of Agriculture and Land Stewardship's website.

Over the history of the program, the state has invested over $80 million while private industry has invested over $240 million. To learn more about the Renewable Fuels Infrastructure Program, visit the program's webpage on the Iowa Department of Agriculture and Land Stewardship's website.

###

About the Iowa Department of Agriculture and Land Stewardship

Led by Secretary Mike Naig, the Department of Agriculture and Land Stewardship serves the rural and urban residents that call Iowa home. Through its 14 diverse bureaus, the Department ensures animal health, food safety and consumer protection. It also promotes conservation efforts to preserve our land and enhance water quality for the next generation. Learn more at iowaagriculture.gov.

Media Contact:
Don McDowell
Communications Director
515-281-3375
Don.McDowell@IowaAgriculture.gov

Iowa Renewable Fuels Association

PRESS RELEASE

FOR IMMEDIATE RELEASE
January 29, 2024

Press Contact: Emma Koehler
515-322-0435

IRFA Thanks Iowa Secretary of Agriculture Naig for Supporting Consumer Access to Higher Renewable Fuels Blends

JOHNSTON, IA – Today Iowa Secretary of Agriculture Mike Naig highlighted key legislative priorities for the Iowa Department of Agriculture and Land Stewardship during a meeting of the Iowa House Agriculture and Natural Resources Budget Subcommittee, specifically asking for continued support for the Renewable Fuels Infrastructure Program (RFIP). In response to this announcement, Iowa Renewable Fuels Association Executive Director Monte Shaw made the following statement:

"We applaud Secretary Naig for reinforcing the critical role renewable fuels play in Iowa's economy. Supporting RFIP grows biofuels production, is crucial in allowing consumers to benefit from fuel choice, and saves them money at the pump."

The Iowa Renewable Fuels Association represents the state's liquid renewable fuels industry and works to foster its growth. Iowa is the nation's leader in renewable fuels production with 42 ethanol refineries capable of producing 4.5 billion gallons annually – including 34 million gallons of annual cellulosic ethanol production capacity – and 11 biodiesel facilities with the capacity to produce 410 million gallons annually. For more information, visit the Iowa Renewable Fuels Association website at: www.IowaRFA.org.

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Iowa Renewable Fuels Association

PRESS RELEASE

FOR IMMEDIATE RELEASE
January 30, 2024

Press Contact: Emma Koehler
515-322-0435

Iowa's Renewable Fuels Infrastructure Program Awards $3.4 Million in Funds to Retailers to Offer Higher Biofuel Blends

Program Awarded 75 Projects Statewide

JOHNSTON, IA – Today, Iowa's cost-share Renewable Fuels Infrastructure Program (RFIP) awarded $3.4 million in grants for 74 applicants that will add E15 to retail sites and one applicant to add a biodiesel terminal in Iowa.

"This type of demand is incredibly encouraging as Iowa works to implement the Governor's E15 Access Standard," said Iowa Renewable Fuels Association (IRFA) Executive Director Monte Shaw. "If you annualized this quarterly figure, demand for the E15 grants is well over the traditional funding level of $10 million per year. We expect demand will only grow as the E15 Access Standard deadline approaches on January 1, 2026. IRFA encourages the Legislature to fully fund the RFIP program as we cannot afford to run short of funds when they are needed the most."

Before today, the program has distributed more than $50 million to help fund ethanol and biodiesel infrastructure across Iowa. RFIP reimbursement can be up to 90 percent of the installation costs, with up to a maximum of $64,300 per project for small retailers.

RFIP provides Iowa fuel retailers with cost-share grants to add the necessary equipment to their stations to offer higher blends of biofuels. The program has led to millions of dollars of private economic investment and hundreds of new stations offering E15, E85, and biodiesel blends at the pump.

The Iowa Renewable Fuels Association represents the state's liquid renewable fuels industry and works to foster its growth. Iowa is the nation's leader in renewable fuels production with 42 ethanol refineries capable of producing 4.5 billion gallons annually – including 34 million gallons of annual cellulosic ethanol production capacity – and 11 biodiesel facilities with the capacity to produce 410 million gallons annually. For more information, visit the Iowa Renewable Fuels Association website at: www.IowaRFA.org.

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5b. IDALS

ii. E15 Access Standard Implementation

E15 Access Standard Implementation

Waiver Request Status
March 10, 2024

Tier 1 Waiver – "Old Tanks"

Six submitted – Tanks confirmed with DNR – no final action, but they should be granted.
One request – denied because it was the wrong type to request, but it has not been resubmitted.

Tier 2 Waiver – "Cost of Upgrade"

Ten submissions – no final action.

Small Retailer Wavier – "300K or less in annual sales"

Nine submitted – Gallons confirmed with Dept. of Revenue – seven granted and two denied.

5c. Department of Revenue
i. Biodiesel Production Tax Credit

Iowa Renewable Fuels Association

Biodiesel Production Tax Credit

Based on data released by the Iowa Department of Revenue

Quarter	Number of Plants	Total Gallons	Total Dollars
2023 Q4	3	3,816,164*	$152,647
2023 Q3	6	43,164,917*	$1,726,596
2023 Q2	9	80,180,296*	$3,207,213
2023 Q1	8	66,861,045	$2,674,441
2022 Q4	5	16,379,234*	$327,585
2022 Q3	6	44,637,741*	$892,755

**One or more facilities reached the maximum of 25 million gallons eligible for the credit annually.*

Thank you for the submission of the Iowa Project Questionnaire for [ethanol plant] CO2 compression project and allowing our team to review.

While we understand the importance of capturing CO2 from ethanol production and the potential future opportunities with pipeline access, this is not an investment we are looking to provide assistance for through the High Quality Jobs program.

Thank you,

MAICIE POHLMAN | Project Manager

IOWA ECONOMIC DEVELOPMENT AUTHORITY
1963 Bell Avenue, Suite 200 | Des Moines, Iowa 50315
+1 (515) 348-6161 | maicie.pohlman@iowaeda.com

5d. Iowa Utilities Board/CO2 Projects

S.D. Legislature passes attempted balance between landowners and carbon pipeline project

BY: **JOSHUA HAIAR (IOWA CAPITAL DISPATCH)** - MARCH 6, 2024 8:51 PM

Years of debate about a proposed carbon dioxide pipeline came to a head Wednesday at the South Dakota state Capitol as lawmakers passed three bills intended to strengthen landowner protections while maintaining a regulatory path forward for the project.

The bills passed the state House of Representatives and Senate and now head to the governor's desk for final consideration.

Gov. Kristi Noem issued a statement saying she plans to sign the bills to "provide new protections for landowners and allow for economic growth to move forward through a transparent process."

Rep. Jon Hansen, R-Dell Rapids, who voted against all three bills, said lawmakers should do more to protect landowners. He pointed to Democratic-dominated Minnesota, where he said carbon sequestration pipelines can't use eminent domain to access land.

Eminent domain is a legal power the pipeline company could use to cross land if landowners don't grant voluntary easements. Legislative efforts to block the use of eminent domain failed each of the last two sessions.

"We should be ashamed by that," Hansen said.

He alleged the bills' proponents are "paving the golden road" for the project.

House Majority Leader Will Mortenson, R-Fort Pierre, was the prime sponsor of the bills with Senate Majority Leader Casey Crabtree, R-Madison. Mortenson said lawmakers opposing the legislation were offering a "do nothing solution."

"They'd rather give speeches and go get likes on Facebook than roll up your sleeves, get everyone around the table and put the policies in place that help our farmers," Mortenson said.

The bills are related to an $8 billion pipeline proposed by Summit Carbon Solutions, which is headquartered in Iowa. It would collect carbon dioxide from 57 ethanol plants in South Dakota and neighboring states and pipe it to North Dakota for underground storage.

The project would take advantage of up to $18 billion in federal tax credits that incentivize the removal of heat-trapping carbon dioxide from the atmosphere. Some ethanol backers have said the project is needed to reduce carbon emissions from ethanol production and keep the corn-based fuel viable in a future where governments and consumers are demanding lower climate impacts.

Summit plans to apply again for a permit in South Dakota after its initial application was denied by the Public Utilities Commission, in part due to conflicts with county ordinances that require minimum distances known as "setbacks" between pipelines and other features. The commission of three elected officials is responsible for pipeline permitting in the state.

The project has faced opposition from landowners concerned about property rights and safety, including health risks associated with potential leaks.

The three bills that passed Wednesday address issues including surveying, easement agreements, and compensation for landowners.

What the bills say

What the bills' backers have dubbed a "Landowner Bill of Rights" was recently added to the bottom of one of the bills. It lays out the new landowner benefits and protections offered by the three pieces of legislation.

Carbon capture pipeline operators will have to pay $500 for access to survey land. Counties through which the pipelines run could collect a surcharge of up to $1 per linear foot, with at least half of the surcharge allocated for property tax relief for affected landowners. The remaining funds could be used at the county's discretion.

The bills ensure the pipeline companies, rather than landowners, are liable for damages caused by the projects. Companies also must submit an impact mitigation plan and bury pipelines at least 4 feet deep. One of the bills mandates public disclosure of modeling to gauge the impact of a pipeline rupture.

The bills restrict easement durations, terminating them if a pipeline does not secure a Public Utilities Commission permit within five years or if the easement goes unused for the same period. Additionally, easements cannot extend beyond 99 years and must be documented in writing and recorded in a county register of deeds office.

Landowners are entitled to land survey notices and results, examination findings, and contact information for the inspection supervisor. Landowners are given the right to contest and try to stop surveys by going to court within 30 days of receiving written notice of the planned survey.

In response to controversy about out-of-state contractors working for the pipeline company, one of the bills says a land agent acting on behalf of a carbon pipeline project must be a pipeline facility employee, a resident of the state, or a real estate agent licensed in the state.

Current law says the Public Utilities Commission may overrule counties' pipeline setbacks (although the commission has so far declined to do so). Earlier versions of one bill would have altered that power, first giving setback authority solely to the state, and then in a later version leaving it with counties but saying the commission would have to overrule any overly burdensome setbacks.

The final, approved version of the legislation says the commission's permitting process overrules local setbacks and other local rules regarding

pipelines, unless the commission requires compliance with any of those local regulations.

Sen. Al Novstrup, R-Aberdeen, said the Summit project alone will not lower the planet's temperature one degree; therefore, "the reason for CO2 capture fails." He said diverting would-be federal tax revenue to incentivize the project will only worsen the national debt, and he encouraged fellow lawmakers to "say no to a Washington, D.C., boondoggle."

The tax credits for the project have been around since at least 2008 and were expanded under former President Donald Trump. Congress and President Joe Biden upped the credits to $85 per metric ton of carbon sequestered annually.

Some opponents outside the Legislature are also unhappy.

South Dakota Farmers Union President Doug Sombke said the legislation does not put landowners in a better position. He said the state is dominated by large special interest groups, to the detriment of family farmers whose land could be crossed by the pipeline.

"Unless this state can elect 15 or more Democrats to balance the political powers in Pierre, we will never stop this abuse of our legislative system," he said. There are 11 Democrats in the 105-member Legislature.

Meanwhile, the South Dakota Ethanol Producers Association applauded the bills and said they will "provide the nation's first Landowner Bill of Rights along with needed regulatory certainty for CO2 pipelines."

"We applaud the South Dakota legislators who supported farmers, landowners and ethanol with this compromise," said Walt Wendland, the association's board president. "This legislation is pro-landowner, pro-business, pro-farmer and pro-ethanol. It's a win-win for all South Dakotans."

Summit wins on local ordinance issue in North Dakota

Vote removes barrier for that state's regulators to reconsider pipeline route

By Jeff Beach - North Dakota Monitor

Feb. 8, 2024 9:53 am, Updated: Feb. 8, 2024 11:23 am

A tanker truck in 2019 sits outside the POET ethanol biorefinery in Gowrie. The plant is one of 17 POET sites — 12 of them in Iowa — that Summit Carbon Solutions said would be added to its proposed carbon dioxide sequestration pipeline. (Daniel Acker/Bloomberg)

Summit Carbon Solutions and other pipeline companies scored a victory this week when the North Dakota Public Service Commission decided that state rules preempt local ordinances on pipeline zoning issues.

That decision paves the way for a rehearing on Summit's application for a pipeline permit in North Dakota, which the state's commission denied last year.

The proposed pipeline would run through Iowa, Minnesota, Nebraska and South Dakota before ending in North Dakota. Hearings in Iowa have concluded, and the Iowa Utilities Board is now charged with deciding whether the company is eligible for a permit and for eminent domain authority in the state, according to the **Iowa Capital Dispatch**. Summit has obtained easements for about three-quarters of its over 680-mile route in Iowa.

North Dakota Public Service Commission Chair Randy Christmann said hearings on Summit's revised application there would be at latest four weeks away.

On local ordinances, Christmann said the state's law, which was changed in 2019, is clear: "the approval of a route permit for a gas or liquid transmission facility automatically supersedes and preempts local land use or zoning regulations except for road use agreements."

The three-member commission met in a work session Jan. 26 to discuss the issue and commissioners indicated they would support an order giving state rules preemption over those set by counties and other local governments.

Wednesday's unanimous vote confirmed the commission's position.

At a hearing in December, attorneys for Emmons and Burleigh counties in North Dakota argued that local ordinances should take precedence and that pipeline zoning rules passed in those counties are not unduly restrictive.

Summit Carbon Solutions requested a decision on the preemption issue as it continues to seek a permit for the North Dakota portion of its pipeline route.

Before 2019, the law said state rules may supersede local ordinances, if the local ordinances are deemed unreasonably restrictive. "We used to have flexibility on this. That changed in 2019," Christmann said.

Summit wants to lay about 350 miles of pipe in North Dakota to transport carbon dioxide emissions from ethanol plants in five states to underground storage areas in Mercer and Oliver counties.

Summit calls its project the world's largest carbon capture and storage project. It says the project will benefit the environment, the ethanol industry and the farmers who grow corn for the ethanol plants.

Summit says it has about 80 percent of the North Dakota pipeline route secured, but some landowners have refused to sign voluntary easements despite being offered payments from Summit. Opponents question the environmental benefits of the pipeline and have voiced concerns about safety and damage to property values and farmland.

Summit could attempt to use the legal power of eminent domain to force landowners to provide right of way easements, which some landowners adamantly oppose.

North Dakota regulators last year denied Summit's pipeline siting application for that state. Summit has since proposed changes to its route around Bismarck and an appeal is pending before the commission.

Christmann called the case file around the pipeline “enormous,” and said 2,000 pages of filings had been added just in the last eight days. He said staff and commissioners need time to review those filings before more hearings can be set.

“It’s going to take some time. I don’t know how long yet,” Christmann said.

Summit in 2021 said it had planned to begin construction in 2023 and be operational by 2024, but it has yet to obtain the needed pipeline route permits.

Tharaldson Ethanol at Casselton is the only North Dakota plant on the pipeline route. Iowa-based Summit recently announced the addition of 17 ethanol plants — 12 of them in Iowa — owned by POET, based in Sioux Falls, S.D., to the proposed carbon pipeline network.

This article first appeared in the **North Dakota Monitor**.

5e. USDA NRCS State Technical Committee

USDA STATE TECHNICAL COMMITTEE MEETING

Neal Smith Federal Building
210 Walnut Street, Room 693
NRCS Hugh Hammond Bennett Conference Room
Des Moines, Iowa

MICROSOFT TEAMS

December 7, 2023
1:00 P.M. – 3:00 P.M.

Minutes

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Welcome Comments – Jon Hubbert

- Introductions
  - Thank you to Jaia Fischer and Neil Dominy for stepping in as Acting State Conservationist while away on detail to NE Region.
  - Jon introduced Keiko Sampson as his new executive assistant.
  - Ashley Utt with Pathfinders RC&D, Fairfield, IA. Introduced herself. Replacing Penny Brown Huber.
  - Participants in the room introduced themselves. Online participants were asked to type their name into the chat. Attendance list is below.

- Approval of minutes from September 21, 2023 *(attached)*
  - Unanimous approval as printed.

- Agency Updates – General
  - DNR – Steve Hopkins
    - IA Nonpoint Source Management Program Plan
    - Completed vision document on IDNR Watershed Improvement webpage.
    - Iowa 5-year Nonpoint Source Program Plan is being updated – accepting public comments through December 2023.
    - EPA also updating 319 guidelines – draft posted on IDNR Watershed Improvement webpage – requesting public comments through December 2023.
  - NRCS – Jon Hubbert
    - Initial advisory allocation to move into FY2024 under a current continuing resolution – have funds to move forward with Farm Bill Program delivery.
    - FY 2024 funding for IRA has come in and we are able to obligate all FY 2023 funds – payment scenarios should be finalized for FY 2024 by 12/8/2023.
    - RCPP – 81 new projects nationwide totaling $1.1 billion – 5 of these included Iowa (3 AFA and 2 Classic).
    - New At-A-Glance was finalized.
  - FSA – Curt Goettsch
    - Similar situation as NRCS regarding budget – have allocations for the continuing resolution.
    - Continuing to fill open positions as possible.
    - Farm Bill extension as part of most recent continuing resolution.
    - ARC/PLC sign up coming.
    - Continuous CRP announcement coming.
    - CRP rental rate review upcoming.
    - General sign-up announced after CRP rental rate review completed.

        - Question: is the $300/acre cap statutory?
        - Answer: it is for Continuous CRP and not statutory. There is a $240 cap on General CRP that is also not statutory. The statutory rental rate cap is 90% on Continuous CRP and 85% at County level that comes off before any incentives.
- Local Workgroup Feedback
    - None received.

Public Participation – Jon Hubbert

- Guest opportunity to address and present opinion and recommendations. Written report encouraged but not required.
- Jon opened for public comment. None received.

Presentation – Margaret Chamas, Livestock Viability Manager, Practical Farmers of Iowa (PFI)

- Grazing Infrastructure – CIG
    - Margaret Chamas from PFI introduced herself.
    - PFI was awarded a Conservation Innovation Grant (CIG)
    - Margaret presented: Improved Water Quality and Landscape Change through Novel Investment in Grazing Infrastructure
    - Question: In the next round of the project will you be planning more in-depth economic analysis, especially around cover crop grazing?
    - Answer: Not in the next round, because it will be focused on peri-urban folks with less cover crops. Have applied for Federal CIG that would look at economics more thoroughly.
    - Comment: ICM conference had presentation about grazing cover crops vs. just planting cover crops and there wasn't a cost benefit. Nice to see some positive numbers that the practices can work and be economically viable.
    - Link to PFI research and analysis found here: https://practicalfarmers.org/2021/10/research-highlights-the-economic-advantage-of-grazing-cover-crops/
    - Comment: the work that PFI is doing can increase adoption of cover crops with other well-intended benefits. There are no planning tools, but they are in development that will help farmers and producers to determine how much forage area they need.

Presentation Follow-Up – Jon Hubbert

- Role of committee is to provide input on Farm Bill Programs. Having presentation to full committee has potential as an asset or tool.
- Would like input if having presentations is valuable and proper use of time.
- Please follow-up with Jon with feedback and thoughts regarding how to handle requests for presentations moving forward.

Technical Topics Submitted by STAC Members

- Climate-Smart update – Mike Henderson
    - Provided links to Climate Smart websites:
    - https://www.nrcs.usda.gov/conservation-basics/natural-resource-concerns/climate/climate-smart-mitigation-activities
        - Reasoning and basis for Climate Smart activities
    - https://www.nrcs.usda.gov/sites/default/files/2023-10/NRCS-CSAF-Mitigation-Activities-List.pdf
        - These are the activities that have been selected for FY2024
        - All activities in this list have the practices and CSP Enhancements available.
        - Orange/yellow is new for this year.
        - If asterisk next to the activity, it is provisional.

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        - Some practices on list are very specific in nature.
        - List is fluid – if there is a practice that someone thinks should be on the list, a request to add it can be made. It will need justification as to how the practice mitigates greenhouse gas emissions. Best to get data or background information before requesting that it be added.
        - Notes on the website relating to facilitating practices.
        - Also lists practices and enhancements that were removed with reasoning.
    - https://www.nrcs.usda.gov/sites/default/files/2023-10/NRCS_CLIMATE_AdditionalPlannerGuidance_Factsheet_24.pdf
    - https://www.usda.gov/climate-solutions/climate-smart-commodities
        - Agreements that are getting implemented this year.
        - Project Dashboard link will take you to a map that can be navigated by state showing projects/practice, commodities, or lead partner.
    - Comment: IRA funding statutorily required to be mitigation, not adaptation or resiliency.
        - NRCS must report back on greenhouse gas reductions and there must be data showing reductions.
        - For Producers – it does not matter if climate mitigation is the driving force.
    - Question: How is process carried out to identify provisional activities? Would practices added to the list be provisional?
    - Answer: Scientific data from research (university and independent research) and looking at how that fits into the comment and our tools to see how they line up.
    - Question: At the state level you can add practices, and would they go on as provisional?
    - Answer: We can request that practices be added, but practices can't be added to the list without national approval. Activity list is national list and may include some practices not adopted in IA.
    - Question: Is there an opportunity to connect to RCPP funding coming from IRA?
    - Answer: Yes, Climate Smart Activities list can be used for IRA through EQIP, CSP, RCPP, and ACEP-IRA funding.
    - Question: EQIP 590 – even though it results in reduced nitrous oxide emissions, it hasn't been used to address air quality. Looking at CSP codes, there is nothing about nitrous oxide benefits of EQIP 590. Could national list be improved with this addition?
    - Answer: EQIP 590 is looking at proper management of nutrient application. If proper nutrient management, there is a benefit to reduced nitrous oxide. You are managing the nutrient according to a crop need. The 590 standard doesn't have anything outside of this to address nitrous oxide and therefore doesn't currently count as a CSP enhancement.
    - Question: Another CPS field operations and emission reduction – could this qualify if national reviews?
    - Answer: Not related to fertilizer management at all, related directly to the operation. It could be a practice that Mike could ask about.

Status of Farm Bill Programs

- Programs Report – John Paulin
    - See attached report.
    - Question: To clarify - $6.7 million for general WRE that is Farm Bill money and unknown amount for IRA?
    - Answer: Correct, IRA funds controlled by National.
    - Question: For organizations that might want to assist with easement monitoring, is that voluntary or funded or reimbursable?
    - Answer: looking at all options. In past have had cooperative agreements with outside entities to assist with offsite monitoring. Evaluating all options due to current staffing levels and open to suggestions. Will be one of the components for Iowa Partners for Conservation funding opportunity that will be announced later.

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- Comment: Regarding National IRA – a lot of applications coming in for those easement types. We have a favorable GARC (Geographic Area Rate Cap) rate and are likely seeing record number. We do have some support from national headquarters. Already have 64 applications. Many are multi-landowner and will require thought process change. National was not thinking about multi-landowner.
- Question: Do you think this is because multi-landowner projects have been too large for IA allocation cap?
- Answer: GARC rate likely a factor. Also, a National Office interpretation of policy from an eligibility perspective. We have been making case that if we strictly adhere to definition of restorable on a single-parcel level, it will impact the ability to enroll future easements in IA.
- Comment: Rather than drawing a hardline between IRA and the programs, need to view IRA as a tool. It is another avenue for funding.
- Question: Where can we find the rates for ACT NOW for IA?
- Answer: Rates are the same, ACT NOW eliminates need to wait if ranking high enough.
- Question: Are threshold scores different for each practice?
- Answer: The are different for each funding pool, not each practice.

- Partnerships Report – Robert Mier
  - See attached report.
  - One RCPP Classic is missing from report – 2857 W Nishnabotna Water Quality and Infrastructure
  - There will be three more RCPPs that we will be partner states on: two from Illinois and one from South Dakota.
  - Question: Do you have any rough timeline for IPC?
  - Answer: Getting templates together now. Looking at end of February 2024, roughly.

Subcommittee Reports

- CSP – Kate Hansen
  - See attached report.
- EQIP – Nick Baumgarten
  - Did not have meeting last quarter.
  - Will have more to report at next meeting.
- ACEP-WRE – Kelly Smith
  - See attached report.
  - Recommendation: continue FY23 GARC values for FY24
    - No comments or concerns – Jon will consider and act.
- ACEP-ALE – Ryan Smith
  - Did not meet past quarter.
  - Will have more to report at next meeting.
- CRP - Sean McMahon
  - Met September 11, 2023 and reported at September 21, 2023 meeting.
- CRP update – Curt Goettsch
  - 1.6 million acres on 102,401 contracts enrolled in CRP.
  - Paid $402 Million in CRP rental payments.
  - Net increase of 225 with net decrease of 3,686 acres.
  - Have 27 million acre cap and nationally we are close to 25 million acres currently.
- SWP – Christina Murphy
  - Did not meet this quarter.
- Urban Ag – Tim Palmer
  - See attached report.
  - Recommendation: Add small-scale farming to the definition with urban ag to broader define areas we can go as districts/agencies.

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- Comment: focus on not limiting definition to "urban" or within city limits, but more on practices. Better to include now.
- Comment: Will need to define the location of urban and small-scale producers. Some producers may not have a farm or tract number.
- Comment: Appreciate recommendation of including small-scale in the definition. It is a struggle at the national level. Jon wants to keep it as broad as possible from IA perspective. Some small-scale producers are coming to farmer's markets and that connectivity makes sense for IA. This is also concern in other states.
- Comment: regarding how to locate, USDA likely still going to use farm and tract numbers. Will be able to assign a farm/tract number to a yard. Can do down to 1/100th of an acre.
- Comment: As we try to expand program delivery, a strong part will be how to do outreach so new customers are aware of programs. Any help with outreach will be appreciated. Needs of many producers go beyond just conservation.
- Question: Is it possible to think about who small-scale producer's product might be serving?
- Answer: Something we need to consider, but not sure how. Sometimes small-scale producers are supplying products that are culturally important and not available in normal markets.
- Comment: Have some experience on Conservation District level of doing outreach, not necessarily urban community, but with specialized farmers, PFI, FSA.
- Comment and Question: When we added high tunnels to EQIP there was a lot of learning. Payment rate per acre may not make it worth an urban or peri-urban farmer to come to the NRCS office to get cost-share for practices. Do we know if there has been work to be more welcoming to producers that are not traditionally coming into NRCS/FSA offices?
- Answer: Payment scenarios are being explored and should better reflect small-scale producers. Will have a sub-acre measurement. CSP minimum payment amount has been increased and this will hopefully make it more enticing to some producers. There has been training related to acceptance – always need to work and improve. Want to figure out how to have people act as ambassadors for new people. Want to get staff to point of being openly accepting and invitational, not rushed. Want staff to be responsive and attentive to all customers.

Reports from Committee Members

- No additional reports given.

Future Meeting Dates

March 21, 2024

Please contact Jon with any ideas that will help us move forward. Input is appreciated. Thank you to everyone for coming.

Attendance

In Person

Jon Hubbert, NRCS
Mike Henderson, NRCS
Nicky Williams, NRCS
Pat Chase, NRCS
Keiko Sampson, NRCS
Shawn Richmond, Iowa Farm Bureau Federation
Sean McMahon, IAWA
Robert Mier, NRCS
Ryan Smith, Iowa Wildlife Federation
Joe McGovern, INHF
John Paulin, NRCS
Kelly Smith, IDNR
Will Myers, IDALS

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Online
Lori Altheide, NRCS
Carlee Sabus, CDI
Sarah Nizzi, Xerces Society
Kate Hansen, Center for Rural Affairs
Dien Judge, CDI
Paige Frautschy, The Nature Conservancy
Nick Baumgarten, IDNR
Curt Goettsch, Iowa FSA
Todd Bogenschutz, IDNR
Steve Hopkins, IDNR
Steve Konrady, IDNR
Amy Fischer, NRCS
Andrew DiAllesandro, USFWS
Amber Rhode, St. Paul Regional RMA Office
Matthew Dvorak, IDNR
Greg Thessen, USDA, NASS
Ashley Utt, Pathfinders, RC&D
Courtney Nicks, Ducks Unlimited
Julie McMichael, NRCS
Travis Sieve, EPA
Bruce Barnhart, IA LICA
Catherine DeLong, ISU Extension
Margaret Chamas, PFI, Guest
Christina Murphy, Iowa Association of Water Agencies and West Des Moines Water Works
Scott Moats, The Nature Conservancy
Thanos Papanicolaou, ARS
Tim Palmer, NACD
Joan Flecksing, Meskwaki Tribe
Vince Sitzmann, IDALS
Chuck Isenhart, State Representative
Katrina Ferry, EPA
Joe Dierickx, Iowa Farm Bureau Federation

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5f. ISU Iowa Grain Quality Initiative Advisory Committee