

S&P Global

Commodity Insights

SAF Policy Issues for 2024

Iowa Renewable Fuels Summit

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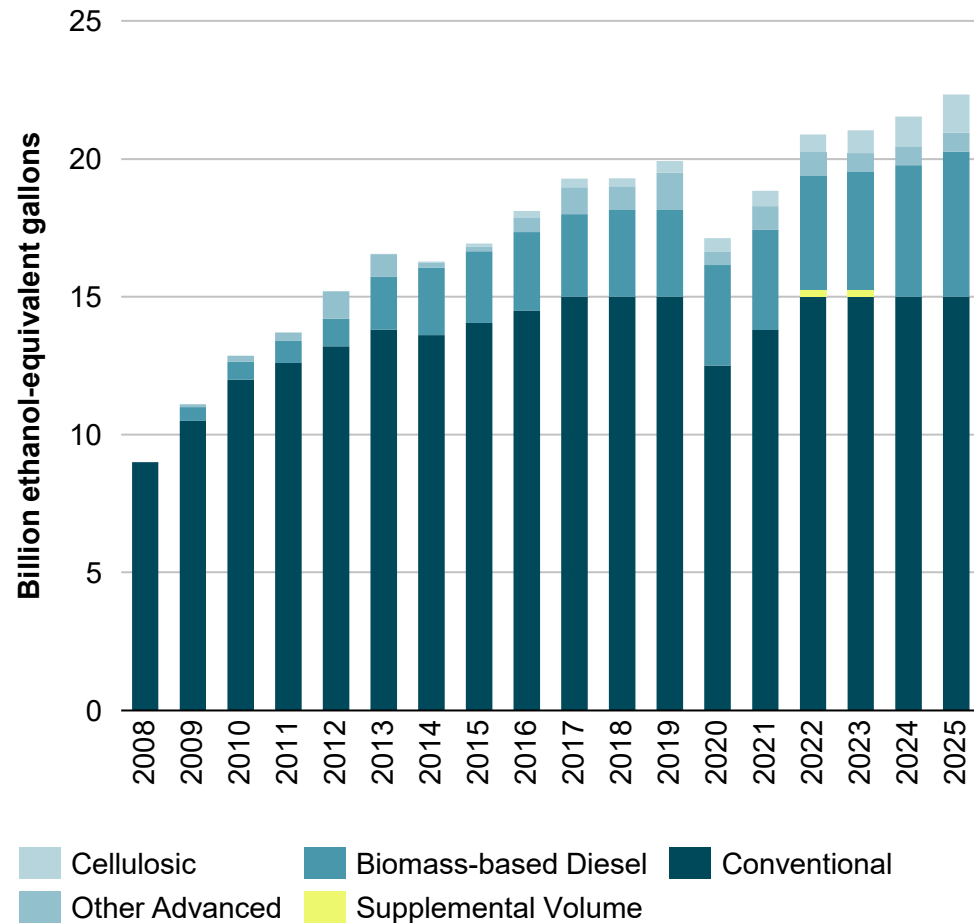
S&P Global Commodity Insights

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EPA's mandates for 2023-2025 were much less than the expected supply of biodiesel and renewable diesel; SAF not mandated, but it generates D4 RINs

RFS Mandates



(Billion Gallons)	Total Renewable Fuels*	Advanced Biofuels			Supp. Volume ¹	Conventional Biofuels ^{***}
		Total Advanced Biofuels*	Cellulosic Biofuels*	Biomass-Based Diesel**		
2020	17.13	4.63	0.51	2.43	-	12.5
2021	18.84	5.05	0.56	2.43	-	13.79
2022	20.88****	5.63	0.63	2.76	0.25	15
2023	21.19****	5.94	0.84	2.82	0.25	15
2024	21.54	6.54	1.09	3.04	-	15
2025	22.33	7.33	1.38	3.35	-	15

* Ethanol-equivalent gallons ** Actual gallons
 *** Difference of Total Renewable Fuels and Total Advanced Biofuels
 **** Includes 250-million-gallon supplemental volume

Source: S&P Global Commodity Insights, EPA.

¹ Supplemental Volume requirement: A federal court found that the EPA had improperly reduced the 2016 mandates by 500 million gallons and ordered the EPA to fix the problem. The EPA will add 500 million gallons to the mandates by adding a 250-million-gallon supplemental volume requirement in 2022 and a second 250-million-gallon requirement for 2023.

The Inflation Reduction Act strongly incentivizes the production of clean fuels, including the construction of facilities

The federal Inflation Reduction Act supplements the RFS by providing various tax credits that benefit the clean fuels industry. The IRA contains various tax credits for manufacturing the fuel as well as application-based advanced energy project credits for constructing facilities. The incentives to capture and sequester carbon were also increased.

Code	Credit	Amount	Credit Duration	Notes
45Q	Credit for CO ₂ sequestration	Up to \$85/mt of CO ₂ permanently stored; Up to \$60/ton credit for CO ₂ capture and reuse	12 years starting when equipment is placed in service	The base rates are \$12/mt and \$17/mt, but they get a 5x boost if prevailing wage and apprenticeship requirements are met.
45V	Clean Hydrogen Production Credit	Up to \$3 per kg of hydrogen produced to projects with a lifecycle GHG emissions intensity of less than 0.45 kg CO ₂ e/kgH ₂	10 years starting when the facility is placed into service.	45V does not have bonuses for domestic content or development in energy communities.
45Z	Clean Fuel Production Credit	Calculated using a base credit (\$1 for non-aviation fuel and \$1.75 for SAF) multiplied by an emissions factor	3 years (2025, 2026, 2027), though an extension is possible	Base amounts assume prevailing wage and apprenticeship requirements are met. The fuel must be produced in the U.S. and have an emissions rate of 50 kg of CO ₂ e/MMBTU or less, which translates into ~47.4 carbon intensity (CI) measured in gCO ₂ e/MJ.
48C	Advanced Energy Project Credit* (*Application-based credit)	Each project has a base credit amount of 30% but can earn up to a 70% Investment Tax Credit by fulfilling incremental bonuses based on wages paid, domestic content, and location of facility.	N/A	Base amount assumes prevailing wage and apprenticeship requirements are met. The program provides incentives for clean energy manufacturing and recycling plants. Applicants must submit a concept paper to IRS. Deadline for Round 1 concept papers has already passed, and the IRS will make allocation decisions by March 2024. Round 2 will launch in 2024.

The Section 48 ITC is phasing out after 2024 and being replaced with a clean electricity ITC under §48E..

SAF received new standalone blending credit in 2023; SAF blending credit is more favorable than blending credit for biodiesel and renewable diesel

The SAF blending credit (40B) ranges between \$1.25/gal and \$1.75/gal.



- Base credit is \$1.25/gal for SAF that reduces emissions by at least 50% compared to jet fuel
- An additional cent/gal given for each percentage point >50%
- Emissions reduction percentage defined in accordance with CORSIA or “any similar methodology” that satisfies the Clean Air Act
 - The DOE is collaborating with other federal agencies to develop a modified version of the GREET model that would satisfy the requirements of § 40B(e)(2).
- Fuel derived from co-processing with petroleum or from palm fatty acid distillates is ineligible for the credit
- Credit expires at end of 2024.

For the CFPC (45Z), the fuel must be produced in the US and have a lifecycle GHG emissions rate of 50 kg of CO₂e per mmBTU or less (~47.4 g CO₂e/MJ)



The amount of the credit is equal to the product of the base amount per gal of the fuel produced at a qualified facility and the emissions factor for the fuel

$$CFPC = \text{Base amount} \times \frac{(50 \text{ kg of CO}_2\text{e per mmBTU} - \text{emissions rate of fuel})}{50 \text{ kg of CO}_2\text{e per mmBTU}}$$

Base Amount	Are prevailing wage and apprenticeship requirements satisfied?	
	Yes	No
Non-aviation fuel	\$1	\$0.20
SAF	\$1.75	\$0.35

- The U.S. Dept. of Treasury will set the emissions rates for fuels
- The credit values will be adjusted for inflation each year

Biofuel facilities are not eligible for both the 45Q Carbon Capture Provisions and the Clean Fuel Production credits

CCUS (45Q)

- The IRA extended and expanded the tax credit for CCUS for projects that begin construction between 2023-2032
- 45Q tax credits are based on the volume of qualified carbon oxides captured and sequestered

	Value of 45Q credit for carbon oxide disposed in geological storage	Min. volume threshold for industrial facility to qualify for credits
Pre-IRA	\$37.85/mt in 2022	100,000 mt/yr.
Post-IRA	\$85/mt*	12,500 mt/yr.

*\$17/mt if prevailing wage and apprenticeship requirements are not met



CCUS Calculations (45Q)

- Under 45Q, one metric ton of sequestered (non-EOR) CO₂ is worth \$85
- It takes about 345 gallons of ethanol to emit one metric ton of biogenic CO₂ from fermentation
- Accordingly, this credit yields \$0.246 per gallon of ethanol



Clean Fuel Production Credit (45Z)

- Under 45Z, a company will receive \$0.02/gal for every CI point under 50 kg of CO₂e per mmBTU for ethanol
 - Example: 49 kg of CO₂e per mmBTU
 - Calculation: $1 * ((50-49)/50) = 1 * (1/50) = 0.02$
- For SAF, a company will receive \$0.035/gal for every CI point under 50 CI
 - Example: 49 kg of CO₂e per mmBTU
 - Calculation: $1.75 * ((50-49)/50) = 1 * (1/50) = 0.035$

Source: The Inflation Reduction Act of 2022

In addition to federal incentives, three states provide additional incentives for SAF meeting certain criteria



Illinois

Illinois Governor Pritzker signed a \$1.50/gal SAF purchase credit into law in 2023.

The law went into effect on June 1, 2023 and will last through Jan. 1, 2033.

Applies to SAF sold to or used by an air carrier, certified by the carrier to be used in IL.

Prior to June 2028, the SAF must be derived from biomass resources, waste streams, renewable energy sources or gaseous carbon oxides. Afterward, the SAF must be derived from domestic biomass resources.

Palm derivatives are not allowed.

Min. 50% GHG emissions savings over petroleum-based jet fuel.

No credit can be earned once air carriers have collectively purchased SAF containing 10 million gallons of soybean oil per year.



Washington

Washington Governor Inslee signed legislation favoring both SAF production and use.

Companies making or selling SAF will get a preferable business & occupation tax rate of 0.275%.

\$1/gal credit for each gallon of SAF (min 50% less CO₂ emissions):

- Sold by a SAF producer located in a qualifying county; or
- Sold by a business's designated SAF blender located in Washington, or
- Purchased by a business for use in flights departing in the state.

The credit amount increases 2¢ for each additional 1% reduction in emissions beyond 50%, up to \$2/gal.

Co-processed SAF is eligible for the credit.

The law is triggered if one or more facilities start operating in the state with a cumulative production capacity of at least 20 million gallons/year of SAF



Minnesota

Minnesota Governor signed a \$1.50/gal SAF tax credit into law as part of a larger transportation omnibus bill.

The SAF must be:

- Produced in Minnesota or blended with aviation gasoline or jet fuel in Minnesota; and
- Sold in Minnesota to a purchaser that certifies that the SAF is for use as fuel in an aircraft departing from an airport in Minnesota.

A qualifying taxpayer may claim a credit for blending or producing sustainable aviation fuel, but not both.

The fuel cannot be derived from palm fatty acid distillates.

Minimum 50% GHG emissions savings over petroleum-based jet fuel.

The law applies to SAF sold after June 30, 2024, and before July 1, 2030.