

Strategic Implications

for the **One Big Beautiful Bill Act for Ethanol and Sustainable Aviation Fuel**



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EXECUTIVE SUMMARY:

The New Policy Landscape

The enactment of the “One Big Beautiful Bill Act” (OB BB) on July 4, 2025, changes the economics of the 45Z Clean Fuel Production Credit in a way the market will feel quickly. The bill locks in some meaningful wins for ethanol, especially around modeling assumptions and feedstock eligibility. But it also imposes a hard ceiling that effectively creates a near-term winner between road fuel and aviation fuel.

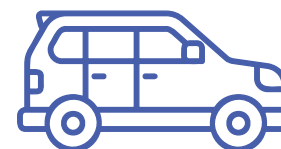
That said, the short-run incentive misalignment doesn't remove the long-term requirement. Aviation still needs scalable sustainable aviation fuel (SAF), and ethanol-to-jet remains one of the few pathways that can plausibly scale. The rational sequencing for producers is therefore:

- 1. Between 2026 through 2029,** maximize 45Z credits by prioritizing deployment of carbon capture and storage (CCS), where available, on road fuel ethanol, and use the resulting cash flow to support low-CI ethanol and SAF infrastructure development.
- 2. 2030 Onward,** leverage the **45Q tax credit** (which is volume-agnostic) to pivot low-CI ethanol volumes into Alcohol-to-Jet (AtJ) production, bypassing the yield penalty that expires with the 45Z window.

This paper outlines the anticipated industry response to the current policy landscape, balancing near-term federal value with the long-term needs of the aviation sector.

Key OB BB Provisions (Effective Jan 1, 2026):

- **Rate Harmonization:** The tax credit cap for Sustainable Aviation Fuel (SAF) is reduced from the previous \$1.75 to \$1.00 per gallon, strictly matching the rate for road transportation fuel.
- **Removal of ILUC:** Indirect Land Use Change (ILUC) penalties are eliminated from Carbon Intensity (CI) scoring.
- **CSA Inclusion:** Under OB BB, climate smart agriculture (CSA) practices like no-till, cover crops, and enhanced-efficiency nitrogen do not get a separate tax credit. Instead, they are expected to lower feedstock CI in 45ZCF-GREET and USDA CI tools, thereby increasing 45Z value for fuel producers **once those tools are formally updated** to include CSA.





The Structural Shift: Why OBBB Favors Road Fuel

Under the previous IRA structure, SAF had a higher effective ceiling that helped offset the physical volume loss in converting ethanol to jet fuel. With OBBB harmonizing the cap at \$1.00/gal for both road fuel and SAF, the policy creates a structural yield/volume penalty for AtJ producers during the 45Z window.

The “Yield/Volume Penalty” Math

AtJ process is not 1:1. It requires roughly **1.6–1.7 gallons of ethanol** to produce **1.0 gallon of SAF**. Conversely, this means 1.0 gallon of ethanol yields ~0.60 gallons of SAF. Because the 45Z credit is paid on the *finished gallon* of fuel, the OBBB’s flat rate penalizes the conversion process:

1 Gallon Feedstock Input	 Road Ethanol 1.0 gal ethanol	\$1.00 Total Revenue
	 SAF (EtJ) 0.6 gal ethanol	\$0.60 Total Revenue

The major implication—Converting ethanol to SAF during the 45Z window can give up roughly 40% of the potential 45Z value per unit of ethanol input, unless the SAF pathway earns enough additional value elsewhere to make up the difference.

***Qualifier on State Incentives:** It is important to note that several states have enacted specific production tax credits for SAF (but not road ethanol). These state-level incentives will help offset the federal “yield penalty” and encourage SAF production, though availability, of course, depends on the SAF production facility location.

The Energy Density Disconnect

A core reason the penalty exists is that the policy pays on liquid gallons, not energy. Ethanol is

an oxygenated molecule; jet fuel is not. The AtJ process removes oxygen and concentrates the fuel into a higher-energy-density product. In plain terms, AtJ upgrades the molecule, but the \$/gal cap doesn’t pay for the upgrade under the harmonized structure.

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While SAF delivers roughly **70% more energy per gallon** than ethanol (approx. 135,000 BTUs/gal vs. ethanol’s ~80,000 BTUs/gal), the OBBB tax credit pays the same \$1.00 for both. Consequently, the policy incentivizes the production of a lower energy density (ethanol) versus its conversion to a higher energy density SAF. Under the previous IRA rules, the \$1.75 SAF cap roughly accounted for this energy density difference, bringing the two fuels closer to economic parity. Under OBBB, that parity is lost.

Analyzing Carbon Intensity to Achieve the Max \$1.00/gal credit

With the removal of indirect land use change (ILUC) and the inclusion of Climate Smart Agriculture (CSA), many producers are asking if a typical U.S. corn ethanol plant can now achieve the maximum \$1.00 credit without Carbon Capture and Storage (CCS).

The 45Z credit is calculated based on how far a producer’s carbon intensity (CI) score falls below the baseline of 50 kg CO₂e/mmBtu. To achieve the full \$1.00, a producer must hit Net Zero (kg CO₂e/MMBTU less than or equal to fossil-based fuel).

Table 1: 45Z Credit Potential by Technology Stack^{1,2}

Scenario	Technology Configuration	Est. CI Score (kg CO ₂ e/mmBtu)	Est. 45Z Credit (\$/gal)	Strategic Implication
A	Baseline (No CSA, NoCCS)	~52	\$0.00	Fails to meet 50kg baseline; no value created.
B	CSA Only (-10 –15) (No-till, cover crops, etc.)	42-37	\$0.16 – \$0.25	<i>When finalized.</i> Get small % of total possible revenue.
C	CCS (-30) +CSA	12-7	\$0.76 – \$0.86	Essential CCS alone unlocks ~\$0.60/gal in value by lowering CI by ~30 points.

In conclusion, even with favorable OBBB rules, CCS remains the essential lever to unlock the appreciable value of the OBBB credit.

50 kgCO₂e/mmBTU is worth **2 cents** per gallon. This reiterates the impact that installing CCS typically lowers CI by ~30 points.

The Value of Carbon Capture and Storage (2026–2029)

During the 45Z window, CCS is the most direct way to move a producer up the 45Z value curve. Essentially, every 1 point of CI reduction below

Even the financial impact cannot be ignored, as \$0.02 * 30 points = \$0.60 per gallon.

Thus, CCS can be a step-change in CI for many plants, which is why it dominates near-term project screening and capital allocation.



Where Low Carbon Fuel Standard (LCFS) Changes the Calculus

Even though 45Z structurally favors road fuel on a \$/gal basis, LCFS can materially change the net economics, because SAF is energy dense and can generate more LCFS value per finished gallon relative to ethanol depending on CI, baseline, and credit price.

**Note on RINs, while Renewable Identification Numbers (RINs) add meaningful value, they do not economically favor one pathway over the other. The RFS equivalence value (1.6 for jet versus 1.0 for ethanol) largely offsets the volume loss in conversion, leaving RINs essentially neutral in the road-fuel versus SAF comparison.*

Revenue Stack (LCFS): Road vs. Jet

Road-Fuel Ethanol Pathway: For a low-CI corn ethanol producer, the revenue stack is robust and volume-optimized:

- **45Z:** Up to \$1.00 per gallon (on the full volume).
- **LCFS:** Credits earned based on the CI difference vs. the gasoline baseline (CARBOB).

SAF (EtJ) Pathway: SAF is an “opt-in” fuel in the LCFS program. Because SAF is energy-dense, it generates more LCFS credits per gallon than ethanol.

- **45Z:** Up to \$1.00 per gallon (but on 40% less volume).
- **LCFS:** Earns **low carbon** credits vs. the Jet Fuel baseline.
- **Premiums:** Corporate/Airline voluntary premiums and potential CORSIA value.

The “Gap” Analysis

Whether AtJ “wins” in this period depends entirely on the market uplift. SAF loses **federal 45Z dollars** because of lower finished gallons. Therefore, **LCFS + any airline/corporate premium + any CORSIA value + state SAF incentives** must clear a higher hurdle to beat the road pathway during 2026–2029. In this timeframe, it presents a very high financial hurdle to clear.

2030 onward (maximum 12 years)

After 2029, with 45Z expired, producers can still pursue 45Q for captured fermentation CO₂ at \$85/ton (subject to eligibility and prevailing rules), regardless of whether the molecule ultimately ends up as road ethanol or as AtJ SAF. The practical point is that 45Q becomes a more pathway-neutral decarbonization lever.

Note that CCS “facility construction” must begin by 1 Jan 2033 for 45Q to remain available.

CONCLUSION:

Rational sequencing

OBBB’s harmonized credit cap creates a clear yield penalty for integrated AtJ during the 45Z window. But in practice, deployment timelines soften the blow:

- 1. Most AtJ projects won’t be fully commercial before 2030**, so very few integrated producers will face a real choice between “road ethanol under 45Z” and “large-scale AtJ under 45Z.”
- 2. The 45Z window is short**, and even with the OBBB extension, 45Z only applies to fuel sold through December 31, 2029. Using ethanol for SAF instead of road fuel in this period reduces the gallons that can claim 45Z and leaves some credit value on the table.

Rational strategy for an integrated corn ethanol / AtJ producer

Between 2026 through 2029, optimize for low-CI road ethanol (and stack LCFS where available) to maximize the 45Z window while building the low-CI platform.

2030 onward (maximum 12 years), as integrated AtJ production plants come online, combine 45Q (where feasible) with SAF value streams (LCFS, state incentives, airline premiums, and international market mechanisms) to build a more durable SAF revenue stack in a hard-to-abate sector.

References

- ¹ (Rosenfeld et al., 2018) LCA_of_Corn_Ethanol_2018_Report.pdf
- ² U.S. DOE (2025), 45ZCF-GREET User Manual: Clean Fuel Production Credit, Office of Energy Efficiency & Renewable Energy.

$$\text{Total Credit} = \$1.00 \times \left(\frac{50 - \text{CI}}{50} \right)$$

- Maximum credit = \$1.00/gal
- Examples: CI ≤ 0, credit = \$1.00 ; CI ≥ 50, credit = \$ 0.0
- CCS & 45Q: The construction for the qualified facility needs to begin before January 1, 2033.





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