

Section 45Z: Clean Fuel Production Credit

Section 45Z Clean Fuel Production Credit is intended to subsidize production of transportation fuel with low or no greenhouse gas (GHG) emissions.

Legislative History

Section 45Z, the Clean Fuel Production Credit, was established in the Inflation Reduction Act (P.L. 117-169) to replace several existing, or “legacy” tax credits for production of various types of fuels. These include tax credits for the production of biodiesel, renewable diesel, second-generation biofuel, sustainable aviation fuel, alternative fuels and fuels mixtures (Section 40, 40A, 40B, 6426, and 6427) that sunset at the end of 2024 as 45Z became available.

The One Big Beautiful Bill Act (OBBBA, P.L. 119-21) extended and expanded the Section 45Z credit. The legislation pushes back the expiration date of the credit from the end of 2027 to the end of 2029, loosens lifecycle GHG assessment standards which will allow first generation biofuels produced from food crops like corn and soybean to qualify, and creates parity between Sustainable Aviation Fuel (SAF) and other transportation fuels. OBBBA prohibits the use of foreign feedstocks for fuels produced after 2025 and imposes new “foreign entity of concern” (FEOC) restrictions that apply to a suite of energy tax credits, including 45Z.

Eligibility

Eligible fuels must be suitable for use in a highway vehicle or aircraft, produced in calendar years 2025 to 2029, and be sold to an unrelated party. Eligible fuels must have an emissions rate that is not greater than 50 grams of carbon dioxide equivalent per million British thermal units (mmBTU) and not be derived from coprocessing specific materials and feedstocks. Eligible producers must register with the IRS and be located within the United States or its territories. Sustainable aviation fuel needs to meet additional requirements like not being derived from palm fatty acid distillates or petroleum and meeting the requirements of either ASTM International Standard D7566 or Fischer Tropsch provisions of ASTM International Standard D1655, Annex A1.

Credit Amount

The 45Z credit is designed as a sliding scale tax credit with a maximum value of \$0.20 per gallon for both SAF and non aviation fuels. The maximum value increases by fivefold if producers meet prevailing wage and apprenticeship requirements. Before the passage of the OBBBA, the maximum credit for SAF was set at \$0.35 per gallon, with an increase up to \$1.75 per gallon for claimants that met wage and apprenticeship requirements, while the maximum credit for non-SAF fuels was \$0.20 per gallon, with an increase up to \$1.00 per gallon for claimants that met wage and apprenticeship requirements.

The actual credit amount is determined by multiplying the maximum credit value with the eligible fuel's emission factor. Therefore, the more GHG intensive a fuel is, the less a producer is qualified to claim.

$$\text{Emission Factor} = (50\text{kg/mmBTU} - \text{Eligible Fuel's Emissions Rate}) / 50\text{kg/mmBTU}$$

$$\text{Credit Amount} = \text{Emission Factor} * \text{Max Credit Amount}$$

For non-aviation fuels, emissions rates should be calculated based on the Greenhouse gases, Regulated Emissions, and Energy use in Transportation model (GREET) developed by Argonne National Laboratory, or a successor model. For aviation fuels, the emissions rate should be determined by the most recent Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) which has been adopted by the International Civil Aviation Organization, or any similar methodology that satisfies the criteria for determining lifecycle GHG under the Clean Air Act.

As a result of the OBBBA, however, emissions caused by “indirect land use change” are no longer allowed to be included in the calculation of the emissions rate. This lower standard makes first-generation, food-based biofuels such as corn ethanol and biodiesel eligible for the Section 45Z credit.

	Assumed Kg of CO2e per mmBTU	Emissions Factor	Does not Meet Prevailing Wage & Apprenticeship (PW&A) Requirements	Does Meet PW&A Requirements
	0kg/mmBTU	1.0	\$0.2	\$1
	10kg/mmBTU	0.8	\$0.16	\$0.8
	25kg/mmBTU	0.5	\$0.1	\$0.5
	40kg/mmBTU	0.2	\$0.04	\$0.2
	50kg/mmBTU	0	\$0	\$0

Source: Adapted from Congressional Research Service (CRS), 45Z Clean Fuel Production Credit.

Taxpayer Costs

The Joint Committee on Taxation estimates that the expansion and modification of the 45Z credit will cost taxpayers \$25.7 billion from FY2025 to FY2034, including \$10.5 billion in FY2029 alone.

Taxpayer Concerns

While taxpayers benefit from activities to decarbonize the transportation fuel industry, the 45Z tax credit risks imposing significant costs on taxpayers, consumers, and the environment by subsidizing the production of high emissions fuels that have negative repercussions for consumers. Guidance on the 45Z tax credit, released January 2025, permits a wide array of fuels—including ethanol, biodiesel, renewable natural gas, hydrogen, propane, and naphtha—to potentially qualify for the credit. OBBBA's modification to exempt “indirect land use change” emissions will likely expand this list of eligible fuels.

Federal subsidies for biofuels and biomass-based transportation fuels—particularly fuels derived from first-generation, food-based biofuels such as corn ethanol and soy biodiesel—distort energy markets,

increase food and feed costs for consumers, and incentivize the conversion of wetlands, grasslands, and forests into biofuel feedstock production areas. Emissions from indirect land use changes can be significant and undercut any emissions reduction that 45Z is intended to achieve. Numerous studies question the GHG reduction potential of food-based biofuels such as soy biodiesel and corn ethanol, with independent analysts finding that they may actually increase climate costs. If the 45Z credit is implemented in a way that subsidizes corn ethanol, not only will Congressional intent fail to be met, but GHG emissions may increase—instead of decrease.

Additionally, the full lifecycle GHG emissions of fuels produced in facilities utilizing biomass sources for heat and/or power should be properly accounted for, and such facilities—and related fuels—should not be considered to be carbon neutral. Facilities burning wood for energy, for instance, cannot be assumed to be carbon neutral or zero-emission, and certain fuels and facilities can be associated with much higher GHG emissions, as compared to petroleum-based fuels. Various factors like feedstocks, alternate fate, time horizon and age of the trees used for fuel, production methods, and forest management regimes impact the emissions intensiveness of fuels.

Hydrogen, which can be used as an input to produce sustainable aviation fuel when combined with carbon dioxide, also carries high costs and potential risks for taxpayers. Hydrogen production, transportation, and storage are still in the early stages of development and are expensive compared to other taxpayer-friendly fuel alternatives. Much of current and anticipated future hydrogen production either draws from the existing grid or adds additional natural gas or coal facilities, which could lead to increased emissions and higher electricity prices for consumers as hydrogen burdens the grid load.

Additionally, the January 2025 guidance on 45Z incorporates the use of carbon capture and storage (CCS) technologies in calculating the fuel's final emissions rate. CCS is a suite of technologies that capture carbon emitted during industrial processes, including the production of transportation fuels. Currently, commercially captured carbon in the U.S. is primarily used to boost oil and gas production through a process called enhanced oil recovery (EOR) but can also be sequestered underground or used to make products. Although the 45Z guidance only considers CCS to lower a fuel's emissions rate if the captured carbon is sequestered underground for long-term storage and not used for increasing oil and gas production, long-term sequestration of carbon still comes with costly public health and environmental liabilities if leakage happens, including the contamination of groundwater.

At a cost of more than \$25.7 billion, policymakers must implement strong taxpayer safeguards to ensure 45Z does not subsidize the production of transportation fuels that create additional costs for taxpayers and consumers.