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Updated GREET model provides clearer picture for Section 45Z clean fuel credits

July 7, 2026

In brief

What happened?

In June 2026, the Department of Energy (DOE) released updated guidelines (DOE Guidelines) and the 45ZCF-GREET model (June 2026 model) for calculating lifecycle greenhouse gas (GHG) emissions for the Section 45Z clean fuel production credit. The update incorporates statutory changes from the One Big Beautiful Bill Act (OBBBA) that align with proposed regulations published by Treasury and the IRS earlier this year. It also features technical improvements, officially updating the backend of the model to link directly with R&D GREET 2025 Rev. 1 data. The update provides a single, synchronized baseline for regulatory compliance.

Why is it relevant?

The June 2026 model provides producers with more information for determining emissions rates—and therefore credit values—under Section 45Z. Several amendments to Section 45Z enacted by OBBBA fundamentally reshape the calculations contained in the model: feedstocks are restricted to North America after 2025, indirect land-use change (ILUC) no longer factors into emissions scores, and negative emissions rates generally reset to zero except for animal-manure pathways. These statutory changes directly affect which fuel pathways qualify, at what credit levels, and therefore, the economic viability of projects. For producers making investment decisions, planning supply chain logistics, and navigating compliance, understanding how these statutory changes translate into model mechanics is essential.

Actions to consider

Producers should consider running the June 2026 model against current and planned fuel pathways to assess impact on credit values. Those with fiscal years spanning 2025 and 2026 are directed to run the

model separately for fuel produced before and after the transition, creating a bifurcated compliance requirement. Feedstock sourcing, documentation, and supply-chain arrangements also warrant review to comply with the post-2025 North American feedstock restriction and the substantiation, reporting, and compliance requirements outlined in the proposed regulations.

In detail

Background

As amended by the OBBBA, Section 45Z replaced prior excise tax fuel incentives with a general business credit for low-emissions transportation fuel produced domestically after December 31, 2024, and sold by December 31, 2029. The credit generally applies to fuel suitable for use in a highway vehicle or aircraft, provided the fuel's lifecycle GHG emissions do not exceed the applicable statutory threshold and the producer satisfies registration, certification, and other requirements.

OBBBA made several changes that affect Section 45Z planning:

- Extended the credit through 2029;
- Limited post-2025 feedstocks to those produced or grown in the United States, Mexico, or Canada;
- Eliminated the higher credit rate for Sustainable Aviation Fuel (SAF) for fuel sold after 2025;
- Excluded indirect land-use (ILUC) change from post-2025 lifecycle emissions calculations; and
- Generally disallowed negative emissions rates after 2025 (except for specified animal-manure pathways).

Credit value depends on fuel type, prevailing wage and apprenticeship (PWA) compliance, and the fuel's emissions factor relative to a 50 kg CO2e/mmBTU baseline. Satisfying PWA requirements multiplies the credit by five. The Section 45Z credit may be monetized through credit transferability.

On February 4, 2026, Treasury and the IRS published proposed regulations under Section 45Z that address qualification, emissions-rate methodology, certification, registration, qualified sales, and claim procedures. While the proposed regulations provide the requirements for a taxpayer to claim the Section 45Z credit, the updated 45ZCF-GREET model (June 2026 model) and DOE guidelines incorporate the OBBBA statutory changes and provide methodology for calculating lifecycle GHG emissions rates required to claim the Section 45Z credit.

The June 2026 model also delivers important technical updates and enhanced functionality:

- Updated model now runs on R&D GREET 2025 Rev. 1;
- Refined treatment of behind-the-meter electricity inputs split into facility-integrated sources and those requiring energy attribute certificate (EAC) substantiation;
- Expanded carbon capture sequestration (CCS) modeling for both RNG and coal mine methane (CMM) pathways;

- Corrected CMM flaring efficiency assumption 98% (previously overstated at 99.85%); and
- Dual-period emissions outputs for fuel produced in 2025 versus fuel produced after December 31, 2025, resolving planning complexity for producers operating across the transition date.

Observation: The DOE guidelines and 45ZCF-GREET model exclusively address emissions rate calculations for the Section 45Z credit. The DOE guidelines expressly state that registration, certification, and claims procedures are outside their scope; the application of prohibited foreign entity restrictions to the Section 45Z credit also is not addressed.

Model timing and transitional rules

In its current form, the June 2026 model primarily supports emissions-rate calculations for fuel produced before January 1, 2026. Certain post-2025 results also are displayed where technically feasible given the OBBBA amendments.

The DOE Guidelines note that the current version reflects the OBBBA amendments "where possible;" however, full alignment with every provision of the OBBBA will require a subsequent update.

For taxpayers whose tax year spans December 31, 2025, a dual-run approach is required: one model run for fuel produced on or before that date, and a second for fuel produced after. Because the ILUC exclusion and negative-rate adjustments apply only to post-2025 fuel, these two runs may yield materially different emissions rates for the same pathway.

Observation: Planning for a bifurcated analysis in the transition year is critical particularly for crop-based pathways. Because the OBBBA excludes ILUC (which is generally a positive, rate-increasing value) while retaining the other indirect effects (the "Other Crops" and "Livestock" categories, which can be negative), and separately floors negative emissions rates at zero for all pathways except those derived from animal manures, the post-2025 result for a given pathway could diverge meaningfully from its pre-2026 result. Producers also should note that the model itself does not determine when fuel was "produced;" responsibility for allocating commingled annual production between the two periods--and substantiating that split--falls to the taxpayer.

Fuel and pathway coverage

Non-SAF fuel types currently covered in the June 2026 model include biodiesel, renewable diesel, ethanol, naphtha, hydrogen, propane, and alternative natural gas (from renewable natural gas or coal mine methane). Butanol, dimethyl ether, and methanol are defined as qualifying non-SAF fuels by the proposed regulations under Section 45Z but are not yet included in the June 2026 model.

Within these fuel types, multiple feedstock-pathway combinations are supported:

- Corn starch as a primary feedstock in the fermentation pathway encompass both starch and corn kernel fiber as covered feedstock inputs.
- Brazilian sugarcane ethanol for SAF via the alcohol-to-jet (ATJ) pathway is available for pre-2026 fuel only, consistent with the post-2025 North American feedstock restriction limiting feedstocks to those produced or grown in the United States, Canada, or Mexico.
- Other pathways include HEFA, transesterification, gasification/Fischer-Tropsch, anaerobic digestion + biogas upgrading, CMM capture, and hydrogen (which imports a well-to-gate result from 45VH2-GREET).

Where a fuel type, or a pathway/feedstock combination, is not included in the applicable emissions rate table, the producer may petition the Secretary of the Treasury for a provisional emissions rate (PER).

Observation: For fuels not currently modeled, including butanol, dimethyl ether, and methanol, producers may petition Treasury for a PER, offering a route to support a Section 45Z claim while future model expansions are pending.

Foreground data and emission-reduction options

Electricity inputs

Imported renewable electricity from solar, wind, and hydroelectric sources may be claimed using Energy Attribute Certificates (EACs) in the 2026 model. Future updates may expand the list of qualifying generator types. To qualify, EACs must satisfy three requirements: deliverability, temporal matching, and incrementality—applying rules similar to Reg. 1.45V-4(d)(3)(i).

Behind-the-meter (BTM) electricity that is integrated into the facility is reflected through the energy balance and does not require a separate EAC retirement. Non-integrated BTM power—from a source not directly connected to the facility—does require generation and retirement of qualifying EACs.

Observation: Distinguishing between integrated BTM resources (which flow through the energy balance) and external or non-integrated sources (which require EAC documentation) is a key compliance consideration when claiming the use of low-carbon electricity in a lifecycle GHG analysis to compute a Section 45Z credit. Producers also should confirm that any electricity claimed via EACs is netted out of the grid-electricity input because the model requires this adjustment to prevent double-counting.

Natural gas and renewable natural gas (RNG)/CMM pathways

Alternative natural gas pathways cover RNG from landfill gas, wastewater sludge, and animal manure, as well as coal mine methane (CMM). For the animal-manure RNG pathway, current model calibration assumes facilities processing manure mixed with up to 5% non-manure material.

Gas EACs and book-and-claim accounting for RNG are not available for 45ZCF-GREET purposes.

Observation: Physical delivery or direct pipeline injection is currently the only acceptable basis for substantiating RNG feedstock claims. Tradable gas certificates and book-and-claim mechanisms cannot be relied upon at this time.

Hydrogen

Rather than modeling all hydrogen production inputs directly, 45ZCF-GREET relies on a well-to-gate analysis provided by 45VH2-GREET. It then layers on transportation, compression, and end-use-stage emissions to produce a complete well-to-wheel lifecycle GHG emissions score for hydrogen used as transportation fuel.

After 2025, any negative hydrogen emissions rate is adjusted upward to zero, consistent with the broader treatment of negative scores under the OBBBA.

Observation: It is necessary for hydrogen producers to coordinate 45VH2-GREET and 45ZCF-GREET analyses, since the Section 45Z credit calculation involves both models working in sequence.

Carbon capture and storage

CO2 that is captured and geologically stored in a permitted Underground Injection Control (UIC) Class II or Class VI well may reduce a fuel's lifecycle GHG emissions rate. Covered CCS pathways in the 2026 model include domestic ethanol production, RNG processing, and gasification/Fischer-Tropsch fuel production.

Utilization of captured CO2 in products does not qualify as an emissions-rate reduction option under these guidelines. Only permanent geological storage counts.

Observation: Before investing in CCS infrastructure to support Section 45Z credit value, producers should confirm both that their pathway is covered and that storage will occur in a permitted UIC Class II or Class VI well. CO2 use in manufactured products will not improve a fuel's emissions rate.

Co-product accounting

Specified co-product accounting rules are applied within the June 2026 model, with the approach varying by pathway. Depending on the production process, the June 2026 model uses different allocation or system-expansion methods to attribute emissions among the primary fuel and its co-products. Across all pathways, no displacement credit is available for exported electricity.

Supply chain documentation

Background data within the June 2026 model covers standard transport distances, fuel conditioning, finished fuel transport, and end-use emissions—producers do not need to enter foreground data for those elements. The model offers no default foreground values. Producers must supply facility-specific inputs, which generally include:

- Feedstock origin, category, and eligible volumes;
- Facility energy consumption inputs;
- Fuel and co-product output quantities;
- Low-carbon electricity substantiation (EACs or BTM documentation);
- RNG or CMM sourcing and delivery records;
- Hydrogen production inputs (from 45VH2-GREET); and
- Carbon capture and storage records.

Observation: Because the June 2026 model supplies background assumptions for logistics and downstream activities, detailed terminal-level or transport-route data generally is not a required producer input. Focusing documentation efforts on the foreground elements listed above will align with the June 2026 model's architecture and substantiation requirements. Note that the recordkeeping, certification, and supply-chain traceability requirements for claiming the credit fall outside the DOE Guidelines and are governed by the applicable IRS guidance, so the foreground-input list should not be treated as a complete substantiation checklist.

Climate-smart agriculture and USDA data

Farm-level emissions data for conventional farming practices is treated as background data within the June 2026 model. Producers do not enter facility or farm-specific agricultural inputs. The DOE Guidelines note that verifying detailed practices at each farm or crushing facility is impractical for certification.

Observation: Until separate USDA guidance is finalized and incorporated, climate-smart agriculture practices will not affect current Section 45Z fuel emissions rates. Producers should avoid building Section 45Z credit projections on assumed future feedstock-level adjustments.

Let's talk

For a deeper discussion of how this development might affect your business, please contact us:

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