

The IRA, Three Years Later: Navigating OBBB Tax Credit Changes

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Acronyms and abbreviations

CCS: carbon capture and storage

CO₂: carbon dioxide

CO₂e: carbon dioxide equivalent (of other greenhouse gas emissions)

DAC: direct air capture

DOE: Department of Energy (United States)

EOR: enhanced oil recovery

FEOC: foreign entity of concern

FIE: foreign influenced entities

IRA: Inflation Reduction Act

IRS: Internal Revenue Service

kg: kilogram

kWh: kilowatt hour

MMBtu: million British thermal units

OBBA: One Big Beautiful Bill Act (also called H.R.1)

SAF: sustainable aviation fuel

SFE: specified foreign entities

Executive summary

The passage of the Inflation Reduction Act (IRA) in August 2022 established the United States' largest investment in climate and clean energy policy, and represented nearly \$400 billion in potential federal funding by 2030. In July 2025, **H.R.1**, commonly referred to as the "One Big Beautiful Bill Act" (OBBA), passed into law. It significantly repeals, revises, or rescinds many of the IRA's tax incentives for clean energy deployment and manufacturing. The OBBA accelerates timelines to commence construction or operation of many tax-credit-eligible energy projects. The law also establishes a myriad of complex foreign entity of concern (FEOC) provisions, which create new restrictions on the material components and entities that can qualify for energy tax credits established or enhanced through the IRA. The OBBA also rescinds funding for a range of other clean energy and climate grant or loan programs that were appropriated under the IRA.

Clean energy developers and investors will need to navigate these federal policy changes to ensure that projects meet these new requirements. To support these efforts, the Carbon Direct policy team analyzed clean energy tax credits affected by the OBBA and identified changes with large-scale climate and business impact. The result is a comprehensive resource, including overviews of tax incentive timelines, eligibility, stackability, and accessibility. This resource is meant to help guide innovative strategies for climate mitigation, decarbonization, and sustainable technology, even in a dynamic policy landscape.

Introduction

The IRA of 2022 had the potential to be one of the most transformative policies ever enacted to address climate change. Upon passage, the IRA (in conjunction with other laws and regulations) was projected to [reduce US emissions in 2035 by 37–41%](#) relative to 2005. In comparison, following the passage of the OBBB, current policy is expected to [increase US emissions by 7%](#) in 2035 relative to 2005 levels. Further, the bill's FEOC provisions and accelerated phaseout of tax credits are expected to increase commercial and home energy costs, while also reducing total electricity generation and reliability.

To navigate this significant national policy shift, developers and investors must evaluate how changes to tax credits and other funding opportunities will impact their project development timelines, financing configurations, and supply chains. Three years into implementation, the IRA has already stimulated significant [private sector investment](#), both committed and planned, in manufacturing and clean energy. Businesses must now assess the feasibility of their projects and business models against changes the OBBB makes to deadlines for commencing construction and operations, new restrictions it places on foreign and foreign-influenced entities, and revisions it makes to credit values for qualified facilities.

This report details the OBBB's impacts on key investment and production tax credits enhanced or established through the IRA, with a focus on the tax credits that would have generated the most significant energy production, climate, and private investment outcomes.

Unforeseen threats to clean energy supply chains

The OBBB expands and complicates FEOC restrictions initially introduced in the IRA for the 30D New Clean Vehicle Tax Credit, a credit which was terminated under the OBBB. These extensive new FEOC restrictions apply to many clean energy tax credits—including restrictions regarding ownership, investment, and material sourcing—and will require clean energy project developers seeking to qualify for tax credits to thoroughly assess their supply chains. The Internal Revenue Service (IRS) will provide updated guidance on the precise implications of these restrictions for each tax credit. However, taxpayers seeking to claim credits under the new FEOC restrictions should proactively assess supply chain and ownership vulnerabilities that may impact eligibility.

Advancing phaseout schedules and elimination of safe harbors

The OBBB accelerates phaseout schedules for many clean energy tax credits, which has been a primary point of concern for many project developers and investors. Following the passage of the OBBB, the White House released an executive order: [Ending Market Distorting Subsidies for Unreliable, Foreign Controlled Energy Sources](#). This executive order explicitly directs the Secretary of the Treasury to strictly enforce the termination deadlines for the 45Y and 48E credits for wind and solar facilities. It was followed by [new guidance](#) from the Treasury Department (issued on August 15, 2025), which introduces further restrictions on the eligibility of solar and wind project developers that are seeking these tax credits. For wind and solar facilities whose construction did not begin before September 2, 2025, the Five Percent Safe Harbor (demonstrated spending of $\geq 5\%$ of total project costs) is no longer available. Previously, safe harbor assurances provided taxpayers with additional certainty from the IRS that a facility would be eligible for appropriate tax credits. This executive order and Treasury guidance, compounded with the new FEOC restrictions introduced in the OBBB, may pose additional challenges specifically for utility-scale wind and solar project developers.

Overview of available credits

The IRA, as passed in 2022, contained a number of new or expanded tax credits covering a range of technologies and industries. This report goes into detail on specific IRA tax credits and how they have been reshaped by the OBBB.

40B Sustainable Aviation Fuel Credit

40B provided qualifying producers of sustainable aviation fuel (SAF) a tax credit of up to \$1.75 per gallon, depending on how much they reduce greenhouse gas emissions. This tax credit was available for SAF sold or used after December 31, 2022 and before January 1, 2025. This credit already expired before the passage of the OBBB in July 2025.

45Q Carbon Oxide Sequestration Credit

45Q provides a tax credit for each tonne¹ of carbon that is sequestered or utilized. The credit value varies depending on whether the carbon is captured from point sources or through direct air capture (DAC). Under the IRA, utilization of captured carbon oxides for enhanced oil recovery (EOR) received a lesser credit value than carbon capture and storage (CCS) with permanent storage of captured carbon oxides. However, the OBBB modifies the 45Q credit to provide equal credit values for carbon oxides that are sequestered in secure geological storage and tonnes that are utilized for EOR. Additionally, the OBBB increases the value of the 45Q credit for carbon oxide conversion into products (e.g., concrete, fuels, carbon nanotubes, etc.) to provide the same credit value as tonnes from CCS and DAC with dedicated geological storage (\$85/tonne and \$180/tonne, respectively).

45V Clean Hydrogen Production Credit

45V provides credits up to \$3.00 per kilogram of hydrogen produced, if prevailing wage and apprenticeship requirements are met and as long as lifecycle emissions of the produced hydrogen are less than 4 kg CO₂e² per kilogram of hydrogen produced. The OBBB modifies the timeline for credit eligibility. This modification, along with the OBBB's changes to the 45Y and 48E credits,

1. The imperial system uses the unit of ton (1 ton = 2000 lbs), which differs from the metric system unit of tonne (1 tonne = 1000 kgs = approximately 2200 lbs). The US tax code refers to the metric system's unit as a "metric ton." For clarity, Carbon Direct uses the metric system's spelling, "tonne."

2. kg CO₂e = kilograms of carbon dioxide equivalent.

make the 45V credit more difficult for clean hydrogen producers to claim. Because the OBBB accelerates the deadlines for placing new qualified wind and solar projects into service, green hydrogen producers will face additional challenges in securing low-carbon energy to meet the strict carbon intensity requirements for 45V.

45X Advanced Manufacturing Production Credit

45X provides financial support for domestic manufacturers of solar photovoltaic modules and subcomponents, wind turbines and subcomponents, inverters, tracking systems, batteries, and critical minerals pertinent to the clean energy supply chain. While the OBBB generally maintains this credit, it does establish a phaseout process for the otherwise permanent 45X credits, zeroing the credit value after 2033. However, the OBBB revokes the 45X credit for wind energy equipment sold after December 31, 2027.

45Y Clean Electricity Production Credit

45Y provides a production tax credit for certain qualifying clean electricity generation facilities placed in service starting January 1, 2025. The OBBB specifically targets wind and solar energy projects and advances the “place into service” deadline for these projects to December 31, 2027, while non-wind and solar projects can still claim the credit until it phases out starting in 2034.

45Z Clean Fuel Production Credit

45Z provides financial support to domestic producers of clean transportation fuels with an emissions factor at or below 50 kg CO₂e/MMBtu.³ The OBBB reduces the credit values for SAF producers, extends the credit eligibility period, and modifies parameters for quantifying the carbon intensity of fuels.

48C Advanced Energy Project Investment Credit

The passage of the IRA renewed and expanded Section 48C of the US tax code by providing up to \$10 billion in funding for 48C recipients, with \$4 billion dedicated specifically to projects located in energy communities (i.e., communities affected by the retirement of coal-related infrastructure). In partnership with the Department of the Treasury, the Department of Energy selected projects that would receive funds from the \$10 billion allocation for 48C. However, the OBBB establishes a process to terminate and rescind funds committed to awarded projects that have not been placed into service within two years of the OBBB’s passage (by July 2027).

3. kg CO₂e/MMBtu = kilograms of carbon dioxide equivalent per million British thermal units.

48E Clean Electricity Investment Credit

48E provides an investment tax credit for certain qualifying electricity generation facilities. This tax credit became available starting on January 1, 2025 for qualifying facilities that commence construction before the credit starts to phase out in 2034. Similar to 45Y, the OBBB curtails the eligibility of wind and solar projects that are placed into service after December 31, 2027.

Timeline of IRA credits: Availability and phaseout

The window of accessibility for each of the tax credits in the IRA varies significantly. For credits such as 45V and 45Y (aside from wind and solar projects), the full period of credit eligibility is maintained under the OBBB. However, the deadlines for placing the facility into service or commencing construction are advanced to restrict the credit expenditure. For some credits, such as 45X, the value of the credit gradually decreases in the last three years of its availability for most clean energy equipment, but the OBBB does establish new sales deadlines for products associated with wind power operations. Some of the credits introduced in the IRA served as a replacement for existing tax credits: 45Y replaced the Production Tax Credit for Electricity from Renewables Credit (45) and 48E replaced the Clean Energy Property Credit (48) starting in 2025.

For comparison, the tables below provide a snapshot of original tax credit timelines under the IRA (**table 1**) and how they are revised under the OBBB (**table 2**). Not included in these tables is 48C, which has a [different financial support](#) allocation structure. See “**48C Advanced Energy Project Credit**” on [page 26](#) for more details.

Table 1. Original IRA tax credit timeline

Year → Credits ↓	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
45Q Carbon Oxide Sequestration Credit											
45V Clean Hydrogen Production Credit											
45X Adv. Manufacturing Production Credit						75%	50%	25%			
45Z Clean Fuel Production Credit											
45Y Clean Electricity Production Credit										75%	50%
48E Clean Electricity Investment Credit										75%	50%

Table 2. Revised IRA tax credit timeline under the OBDD

Year → Credits ↓	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
45Q Carbon Oxide Sequestration Credit											
45V Clean Hydrogen Production Credit											
45X Adv. Manufacturing Production Credit						75%	50%	25%			
45Z Clean Fuel Production Credit											
45Y Clean Electricity Production Credit										75%	50%
45Y Clean Electricity Production Credit (wind and solar)											
48E Clean Electricity Investment Credit										75%	50%
48E Clean Electricity Investment Credit (wind and solar)											

Stackability of credits

The IRA's new and revised tax credits include several limitations on how they may be combined or stacked with one another. These limitations are not changed under OBBB. **Table 3** shows which credits include explicit limitations on stackability with one another.

Table 3. IRA credit stackability

	45Q Carbon Oxide Sequestration Credit	45V Clean Hydrogen Production Credit	45X Adv. Manufacturing Production Credit	45Y Clean Electricity Production Credit	45Z Clean Fuel Production Credit	48C Adv. Energy Project Investment Credit	48E Clean Electricity Investment Credit
45Q Carbon Oxide Sequestration Credit	×						
45V Clean Hydrogen Production Credit		×					
45X Adv. Manufacturing Production Credit			×				
45Y Clean Electricity Production Credit				×			
45Z Clean Fuel Production Credit					×		
48C Adv. Energy Project Investment Credit						×	
48E Clean Electricity Investment Credit							×

Explicit limitation on stacking

×

 N/A

IRS guidance

The Department of the Treasury provided proposed or final guidance for many of the tax credit modifications made with the passage of the IRA. However, alterations made under the OBBB will require updates to this guidance. This updating process will also provide an opportunity for public consultation, which could help address many of the ambiguities present in the current law and exacerbated by changes under the OBBB.

Table 4. IRS guidance for energy tax credits established or enhanced under the IRA

Credit	Most recent guidance (proposed or final) as of August 2025
45Q	IRS Notice 2024-60
45V	IRS RIN 1545-BQ97
45X	IRS RIN 1545-BQ85
45Y	IRS RIN 1545-BR17
45Z	IRS Notice 2025-11, Section 45Z Clean Fuel Production Credit; Emissions Rates IRS Notice 2024-49, Section 45Z Clean Fuel and Production Credit; Registration
48C	IRS Notice 2024-36 (no longer applicable, tax credits fully allocated)
48E	IRS RIN 1545-BR17

Transferability and direct pay

On June 14, 2023, the IRS issued [proposed regulations](#) and [a frequently asked questions](#) guide on elective pay options, as well as proposed and temporary [rules for the transfer](#) of certain credits. The IRS also issued [temporary regulations](#) to provide rules for a mandatory IRS pre-filing registration process, which is completed through an electronic portal. Applicants must complete the pre-filing registration process and receive a registration number prior to electing to receive elective payments or transfer eligible credits. Generally, tax credits that were designated as eligible for transferability under the IRA have remained transferable, even with modifications to tax credits under the OBBB.

Tax credits under the IRA provide financial support that can be utilized in one of three ways. The taxpayer can apply the credit as a reduction on their tax liability, opt in to receive the value of the credits as a direct payment, or elect to transfer the tax credits to another taxpayer.

[Direct pay](#), also referred to as “elective pay,” refers to the option of receiving the value of the tax credits in the form of direct payments to the eligible entity. Taxpayers claiming eligible tax credits may [opt in for a direct pay election](#), for one five-year period. Allowing for direct pay, rather than claiming a tax credit on end-of-year returns, yields a cash payment for eligible entities. For-profit, tax paying entities are limited to one five-year term when making a direct pay election for a given qualified facility. However, state, local, and territorial governments; Tribal and Native entities; rural energy cooperatives; and other [tax-exempt entities are eligible for a direct payment election](#) for the full term of the tax credit. **For the 45Q, 45V, and 45X tax credits, the direct pay election is available to all taxpayers. However, this direct pay option is limited to a single five-year period within the overall credit period, after which the credits revert to being nonrefundable.**

[Transferability](#) refers to the ability to elect to sell all or a portion of eligible tax credits to another entity in exchange for a cash payment. Allowing certain tax credits to be transferable expands the opportunity for eligible entities to utilize these credits. [Section 6418](#) generally permits credits to taxpayers who are not eligible to elect the direct payment option to elect to transfer all or a portion of their credits for any taxable year to a taxpayer unrelated to the qualified facility or equipment. Any payment made by the transferee taxpayer would not be deductible to the transferee nor includable as income for the transferor.

Although the OBBB makes significant modifications to the timelines, values, and eligibility criteria for the majority of the credits summarized in **table 1** and **table 2**, the transferability and direct pay election provisions for these credits, as established under the IRA, are not modified.

Labor and domestic content bonus credit provisions

To claim the highest value of energy tax credits (including for [45Q, 45V, 45Y, 45Z, 48E, and 48C](#)), the IRA required taxpayers to ensure that laborers and mechanics are paid not less than the appropriate [prevailing wage for all construction hours](#) and, in some cases, not less than the prevailing wage for maintenance and repair at the site of the qualified facility. Taxpayers seeking to claim the full credit value must also ensure that a specified number of labor hours are performed by apprentices from a registered apprenticeship program. **The OBBB does not modify these labor requirements for taxpayers intending to claim the highest credit values.**

In addition to prevailing wage and apprenticeship requirements, the IRA also established a [bonus credit for facilities that meet domestic content requirements](#) for steel, iron, or manufactured products that were sourced, produced, or manufactured in the US. Energy projects that meet one of the following requirements received a 10% increase in credit values:

- Project has a maximum output of less than one megawatt of electrical or thermal energy;
- Construction of the project began before January 29, 2023; or
- The project satisfies the prevailing wage and apprenticeship requirements under the IRA.

If none of these three requirements are met, but the energy project does meet the domestic content requirements, the project receives a 2% increase to the applicable energy percentage.

The OBBB makes amendments to the percentages of section 48E, based on the timeframes as written, in regards to the domestic content bonus credit (table 5). These domestic content added percentages for 48E are now consistent with those established for 45Y under the IRA.

Table 5. OBBB changes to the domestic content bonus credit in section 48E

Timeline for construction	Percent (%) domestic content requirements in qualified facilities or energy storage technology
Begins before June 16, 2025	40% (20% for offshore wind facilities)
Begins on or after June 16, 2025, and before January 1, 2026	45% (27.5% for offshore wind facilities)
Begins during calendar year 2026	50% (35% for offshore wind facilities)
Begins after December 31, 2026	55%

Recent updates and details to come

Since the enactment of the IRA, the IRS periodically sought input from the public on how to administer these incentives and address complex issues around carbon accounting, site operations, discouragement of perverse incentives, as well as the nuances of particular technologies and their potential eligibility under multiple credits. The IRS issued guidance on specific tax credits, including further details on the eligibility of qualified investments and products, lifecycle emissions accounting, the applicability of direct pay and transferability options, relevant forms, and data requirements (see **table 4** for more details). The IRS will likely issue additional

guidance, update forms, and provide clarity on technical aspects of the incentives over the lifetime of the credits, especially given the significant revisions made under the OBBB. **Taxpayers intending to claim tax credits that have been modified under the OBBB should monitor and comment on proposed IRS guidance.** This guidance will address and further detail the implications of alterations made to clean energy and manufacturing tax credits under the OBBB.

The OBBB introduces new FEOC limitations that apply to some, but not all, tax credits. These limitations restrict the allocation of credits to projects owned or controlled by prohibited foreign entities. The OBBB expands the IRA's restrictions with respect to FEOC involvement and incorporates these restrictions across a suite of energy tax credits. The OBBB establishes several new terms and tests to determine whether a project is eligible to qualify for tax credits. It does this by introducing and applying new terms to the definition of a prohibited foreign entity. These terms include specified foreign entities (SFE) and foreign influenced entities (FIE).

For 45Q and 48E, new FEOC limitations apply with an exception for those with simple “material assistance,” referring to if the sourcing equipment or other inputs are above a specific threshold (based on the value of the input). For 45Y, FEOC restrictions apply for new construction after December 31, 2025 and SFEs are not eligible for credit transfers. For 45Z, only fuels produced with feedstocks sourced in the US, Canada, and Mexico qualify. FEOC and SFE limitations for 48C are project-specific. No FEOC and SFE restrictions were imposed on 45V.

Tax filers and other interested parties should keep a careful eye on Congress and the White House for possible extensions, expansions, or roll backs of the tax credits. Highlighting the positive climate and economic impacts of the IRA's energy tax credits and their underlying technologies will be essential to institutionalizing this suite of incentives well into the future.

45Q Carbon Oxide Sequestration Credit

Description: Introduced to the US tax code through the Energy Improvement and Extension Act of 2008, 45Q provides a tax credit for each tonne⁴ of carbon oxide that is sequestered or utilized. The IRA made several reforms and enhancements to the credit, including extending the deadline to begin construction of qualified facilities from 2026 to 2032, lowering the minimum annual capture volumes for qualified facilities (see below), and allowing for direct pay for the first five years. The IRA also raised the tax credit rates to \$85 per tonne for sequestration, \$60 per tonne for utilization from point-source capture, \$180 per tonne for DAC with sequestration, and \$130 per tonne for utilization from DAC systems, all provided recipients satisfy the prevailing wage and apprenticeship requirements.

The OBBB raises the credit values for carbon oxide utilization and conversion to match the values that the IRA set for secure geological sequestration. However, the OBBB maintains the differentiated rates for point source emissions (\$85/tonne) and DAC (\$180/tonne).

✓ Eligibility

The OBBB maintains the minimum capture amounts for qualified facilities established under the IRA. This includes US facilities within minimum volumes: 1,000 tonnes of CO₂ per year for DAC facilities; 18,750 tonnes for electricity generating facilities (with carbon capture capacity of 75% of baseline CO₂ production); and 12,500 tonnes for other facilities.

📅 Timeframe

The credit can be realized for 12 years after the carbon capture equipment is placed in service. The credit will be inflation-adjusted beginning in 2027, and indexed to base year 2025. The IRA extended the commence construction window (the date projects must begin physical work to qualify) to before January 1, 2033.

4. The imperial system uses the unit of ton (1 ton = 2000 lbs), which differs from the metric system unit of tonne (1 tonne = 1000 kgs = approximately 2200 lbs). The US tax code refers to the metric system's unit as a "metric ton." For clarity, Carbon Direct uses the metric system's spelling, "tonne."

Stackability

45Q **cannot stack** with 45V, 45Y, 45Z, 48C, or 48E.

Credit reduced for tax-exempt bonds with similar rules as section 45(b)(3).

Direct reference in statute

[I.R.C. § 45Q\(c\)\(1\)](#), [H.R.1 - One Big Beautiful Bill Act](#)

Bonus credits

To receive the full amount of the credit, certain prevailing wage and apprenticeship requirements must be met. Otherwise, the credit value is reduced by 80%. The IRS has [published guidance](#) and the Department of Labor has shared [information on these requirements](#).

Not eligible for [Energy Community Tax Credit Bonus](#).

Pay methods

The credit is eligible for both direct pay and transfer.

Project developers can receive the credit as a fully refundable direct payment, similar to an overpayment of taxes. For-profit, tax-paying entities can only realize the direct pay election for five years after the carbon capture equipment is placed in service. Tax-exempt entities such as states, municipalities, Tribes, and cooperatives can realize the direct pay option for the full 12 years after the carbon capture equipment is placed in service.

Required IRS forms

In order to apply for 45Q credits, eligible entities must complete the IRS Form 8933. Instructions for completing this form can be found on the [IRS website](#).

45V Clean Hydrogen Production Credit

Description: The IRA introduced 45V to the US tax code, establishing the Clean Hydrogen Production Tax Credit. This credit provides producers of clean hydrogen a base rate credit value of \$0.60 per kilogram of hydrogen (adjusted for inflation), which can be multiplied by the applicable percentage, ranging from 20–100% depending on lifecycle greenhouse gas emissions. In addition to meeting wage and apprenticeship requirements, clean hydrogen producers with lifecycle emissions limits of less than 4 kg CO₂e/kg of hydrogen are eligible to receive a credit value of up to \$3.00 per kilogram of hydrogen produced.

The OBBB makes adjustments to the timeline for 45V that may affect eligibility and are expected to increase demand for this credit, potentially creating supply chain and scheduling constraints.

Eligibility

On January 10, 2025, the IRS issued final rules concerning 45V eligibility for hydrogen producers. These rules permit annual emissions matching until 2029, with hourly matching becoming mandatory thereafter, starting in 2030. **The confluence of reduced federal support for renewable energy and amendments to sections 48E and 45Y may complicate the qualification process for hydrogen producers seeking 45V credits. The OBBB makes major adjustments to the timeline of availability of 45V, which significantly reduces the pool of eligible producers.**

Timeframe

The OBBB shifts the commence construction deadline to December 31, 2027 from the deadline of December 31, 2032 under the IRA. The 45V credit terminates on January 1, 2028. However, facilities that have commenced construction by this date can claim the credit for the full decade. **The timeline adjustment is expected to increase demand for 45V credits in the short-term, which could cause supply chain constraints and scheduling bottlenecks as hydrogen project developers rush to begin construction before the end of 2027 to lock in eligibility for the credit.** The credit will be available throughout production and over the first 10 years of operation.

Stackability

45V **cannot stack** with 45Q, 45Z, or 48C.

45V **can stack** with 48E in the case that a producer is using electrolysis with onsite renewables. There are no limitations on stacking 45V with 45X, 45Y, and 48E.

Direct reference in statute

[I.R.C. § 45V\(d\)\(2\), H.R.1 - One Big Beautiful Bill Act](#)

Bonus credits

The 45V credit includes bonus credits of five times the base credit value for meeting prevailing wage and apprenticeship requirements.

Pay methods

Eligible entities can elect for direct pay or transfer of the 45V tax credit.

Required IRS forms

In order to apply for 45V credits, eligible entities must complete the [IRS Form 7210](#). Instructions for completing this form have not been released by the IRS as of yet. Historically, the US Department of Energy (DOE) will provide allocation recommendations and rankings to the IRS. The IRS will then provide final consideration, but this process has been subject to a DOE merit review. These allocation recommendations and rankings have followed the standard DOE grant process. All notifications have gone through the DOE for the start and finish of a project.

45X Advanced Manufacturing Production Credit

Description: The IRA introduced Section 45X to the US tax code, which established the Advanced Manufacturing Production Tax Credit for domestic manufacturers of solar photovoltaic modules and subcomponents, wind turbines and subcomponents, inverters, tracking systems, batteries, and critical minerals pertinent to the clean energy supply chain. These materials must be manufactured in the US and sold to an unrelated party. The tax credit values vary based on product type.

The OBBB maintains this credit, but introduces a new eligibility for metallurgical coal production under 45X (Sec. 70514). Where the IRA established a credit value of “10 percent of the costs incurred by the taxpayer with respect to production of [any applicable critical] mineral,” the OBBB introduces a subsidy of 2.5% for metallurgical coal.

Eligibility

In order to be eligible for the 45X tax credit, clean energy components must be produced and sold by a US-based manufacturer. These clean energy components include the photovoltaic module and some of its subcomponents, inverters, tracking system components, batteries, and certain critical minerals. Components that are produced at a facility that received a 48C investment tax credit after August 2022 [are not eligible](#).

Timeframe

The full credit value of 45X runs from 2023 through 2029, begins phasing out in 2030, and runs through the end of 2032.

Stackability

45X **cannot stack** with 48C.

➤ **Direct reference in statute**

[I.R.C. § 45X\(c\)\(1\)\(B\)](#), [H.R.1 - One Big Beautiful Bill Act](#)

⊕ **Bonus credits**

There are no credit bonuses for 45X.

☰ **Pay methods**

Eligible entities can elect for direct pay or transfer of the 45X tax credit.

📄 **Required IRS forms**

In order to apply for 45X credits, eligible entities must complete the IRS Form 7207. Instructions for completing this form can be found on the [IRS website](#).

45Y Clean Electricity Production Credit

Description: 45Y was created under the IRA as the production analogue to the 48E Clean Electricity Investment Credit. It provides a production tax credit for certain qualifying electricity generation facilities placed in service after December 31, 2024. The base production tax credit rate for projects is 0.3 cents per kilowatt hour (kWh), but the applicable rate can be increased to 1.5 cents per kWh if prevailing wage and registered apprenticeship requirements are met. A facility may only claim the credit for a maximum of 10 years. As originally designed under the IRA, the credit was technology neutral and would start to phase out for projects placed in service at either the point when power sector emissions reached 25% of 2022 levels or in 2034, whichever is later.

The OBBB makes significant changes to 45Y. The credits are no longer technology-neutral and greater restrictions are now imposed on solar and wind projects. Under the OBBB, wind and solar facilities placed in service after December 31, 2027 will not be eligible. For non-wind and non-solar facilities, the phaseout timeline is now more strict—set to phase out starting in 2034, regardless of power sector emissions.

The IRS [published guidance for this credit](#) in January 2025, but further guidance from the IRS will be necessary following updates to this credit under the OBBB.

Eligibility

Facilities generating electricity for which the greenhouse gas emissions rate is not greater than zero.

Timeframe

Applies to electricity generating facilities placed in service after December 31, 2024.

Stackability

45Y **cannot stack** with 45Q or 48E.

➤ Direct reference in statute

[I.R.C. § 45Y\(b\)\(1\)\(D\), H.R.1 - One Big Beautiful Bill Act](#)

⊕ Bonus credits

To receive the full amount of the credit, projects must meet certain prevailing wage and apprenticeship requirements. Otherwise, the credit is reduced by 80%. The IRS has [published guidance](#) and the Department of Labor has shared [information on these requirements](#). Another 10% bonus is available for projects that meet [specified domestic content requirements](#). Further information on how to qualify for the domestic content bonus can be found [on the IRS website](#). For entities that qualify for the [Energy Community Tax Credit Bonus](#), producers can receive a bonus of up to 10% for production tax credits or 10% for investment tax credits for projects, facilities, and technologies located in energy communities (i.e., communities affected by the retirement of coal-related infrastructure).

☰ Pay methods

Only tax-exempt organizations; states; political subdivisions; the Tennessee Valley Authority; Indian Tribal governments; Alaska Native Corporations; and rural electricity co-ops are eligible for direct pay. The credit is eligible for transfer.

📄 Required IRS forms

In order to apply for 45Y credits, eligible entities must complete the IRS Form 7211. Instructions for completing this form can be found [on the IRS website](#).

45Z Clean Fuel Production Credit

Description: The IRA introduced Section 45Z to the US tax code, establishing the Clean Fuel Production Tax Credit. 45Z provides a tax credit for domestic producers of clean transportation fuels with an emissions factor at or below 50 kg CO₂e per MMBtu. Eligible transportation fuels must be produced from applicable biomass material and cannot be derived from coprocessing with a non-biomass feedstock. Among the other qualifications for the 45Z credit eligibility, the fuel must be produced in the US but can be sold domestically or exported internationally.

The OBBB modifies the 45Z credit in a few ways. The OBBB adjusts the calculation of the emissions rate to “exclude any emissions attributed to indirect land use change.” This gives an advantage to corn-based ethanol producers and other dedicated bioenergy crops (as opposed to waste feedstocks). For SAF producers, the OBBB reduces the maximum value of the 45Z credit from \$1.75 to \$1.00. However, this only applies to SAF produced after December 31, 2025.

Eligibility

The 45Z tax credit is available to US-based, registered producers of fuels with an emissions factor of less than 50 kg CO₂e per MMBtu.

Timeframe

The 45Z tax credit is available for fuel producers for the production of clean fuels produced after December 31, 2024. **The OBBB extends the window of availability of the 45Z credit to apply to clean fuels used or sold before December 31, 2029 (previously December 31, 2027). For SAF, this means 45Z effectively replaces the 40B tax credit, which expired as of January 1, 2025.**

Stackability

45Z **cannot stack** with 45Q or 45V.

➤ **Direct reference in statute**

[I.R.C. § 45Z\(d\)\(4\)](#), [H.R.1 - One Big Beautiful Bill Act](#)

⊕ **Bonus credits**

The 45Z credit includes bonus credits of five times the base credit value for meeting prevailing wage and apprenticeship requirements.

☰ **Pay methods**

Eligible entities can elect for direct pay or transfer of the 45Z tax credit.

📄 **Required IRS forms**

Further guidance from the IRS on application details for 45Z is currently outstanding.

48C Advanced Energy Project Credit

Description: The IRA renewed and expanded Section 48C, which was originally enacted by the American Recovery and Reinvestment Act of 2009. The IRA unlocked a total of \$10 billion in funding for 48C recipients, with \$4 billion dedicated specifically to projects located in energy communities (i.e., communities impacted by the retirement of coal-related infrastructure). The funding amount of each tax credit equates to 6% or 30% of qualified investment costs for projects. The exact amount is dependent on whether a project meets prevailing wage requirements. There is no maximum dollar amount per 48C credit.

The OBBB makes a minor amendment to section 48C(e)(3)(C): The IRA and the OBBB both state that project certification is invalidated if the Secretary of Treasury is not notified within two years of issuance that the project is in service. Under the OBBB, 48C does not allow a reallocation of funds from projects that miss the two-year, placed-in-service deadline. Instead, those funds will be withdrawn from the total pool of \$10 billion allocated for the credit.

✓ Eligibility

Applicants for 48C must demonstrate that the advanced energy project “(1) re-equips, expands, or establishes an industrial or manufacturing facility for the production or recycling of a range of clean energy equipment and vehicles; (2) re-equips an industrial or manufacturing facility with equipment designed to reduce greenhouse gas emissions by at least 20 percent; or (3) re-equips, expands, or establishes an industrial facility for the processing, refining, or recycling of critical materials.”

📅 Timeframe

Funding availability went into effect on January 1, 2023 and the release of the funding is not time bound. Selected projects have two years from the date of allocation to provide evidence of meeting certification to the Department of Treasury.

Stackability

48C **cannot stack** with 45Q, 45V, 45X, or 48E.

Direct reference in statute

[I.R.C. § 48C\(f\)](#), [H.R.1 - One Big Beautiful Bill Act](#)

Bonus credits

The 48C credit includes bonus credits of five times the base credit value for meeting prevailing wage and apprenticeship requirements.

Pay methods

Eligible entities can elect for direct pay or transfer of the 48C tax credit.

Required IRS forms

In order to apply for 48C credits, eligible entities must complete the IRS Form 3468. Instructions for completing this form can be found on the [IRS website](#). The DOE will provide allocation recommendations and rankings to the IRS. The IRS will provide final consideration. This process has been subject to a DOE merit review. These have followed the standard DOE grant process. All notifications have gone through the DOE for the launch and completion of a project.

48E Clean Electricity Investment Credit

Description: 48E was created under the IRA as the investment analogue to the 45Y Clean Electricity Production Credit. It provides an investment tax credit for certain qualifying electricity generating facilities placed in service after December 31, 2024. The base investment tax credit rate for projects is 6%, but the applicable percentage can be increased to 30% if prevailing wage and apprenticeship requirements are met. A facility may only claim the credit for a maximum of 10 years. As originally designed under the IRA, the credit was technology neutral and would start to phase out for projects placed in service at either the point when power sector emissions reached 25% of 2022 levels or in 2034, whichever is later.

The OBBB makes significant changes to the 48E investment tax credit. The credits are no longer technology-neutral and greater restrictions are now imposed on solar and wind projects. Under the OBBB, wind and solar facilities placed in service after December 31, 2027 will not be eligible for the 48E credit. For non-wind and non-solar facilities, the phaseout timeline is now stricter and is set to phase out starting in 2034, regardless of power sector emissions.

Eligibility

Facilities generating electricity for which the greenhouse gas emissions rate is not greater than zero and qualified energy storage technologies.

Timeframe

The 48E investment tax credit is available for qualifying facilities placed in service after December 31, 2024. Facilities that qualify and commence construction service between 2025 and when the credit starts to phase out in 2034 have the option to choose between 45Y or 48E.

Stackability

48E **cannot stack** with 45Q, 45Y, or 48C.

➤ Direct reference in statute

[I.R.C. § 48E\(b\)\(3\)\(C\), H.R.1 - One Big Beautiful Bill Act](#)

⊕ Bonus credits

To receive the full amount of the credit, certain prevailing wage and apprenticeship requirements must be met. Otherwise, the credit is reduced by 80%. The IRS has [published guidance](#) and the Department of Labor has [shared information on these requirements](#). Another 10% bonus is available for projects that meet specified [domestic content requirements](#). Further information on how to qualify for the domestic content bonus can be found [on the IRS website](#). For entities that qualify for the [Energy Community Tax Credit Bonus](#), producers can receive a bonus of up to 10% for production tax credits or 10 percentage points for investment tax credits for projects, facilities, and technologies located in energy communities (i.e., communities affected by the retirement of coal-related infrastructure).

☰ Pay methods

Only tax-exempt organizations; states; political subdivisions; the Tennessee Valley Authority; Indian Tribal governments; Alaska Native Corporations; and rural electricity co-ops are eligible for direct pay. The credit is eligible for transfer.

📄 Required IRS forms

In order to apply for 48E credits, eligible entities must complete the IRS Form 3468. Instructions for completing this form can be found [on the IRS website](#).

Rescinded funds from loan and grant programs

While modifications to tax credits have dominated news coverage of the OBBB, the reconciliation package also repeals and rescinds many other IRA provisions.

The bill pulls back unobligated IRA funding for multiple federal initiatives and programs, including:

- Rescission of all unobligated IRA-appropriated balances at the DOE Loan Programs Office, Energy Infrastructure Reinvestment Financing, Tribal Energy Loan Guarantee Program, Transmission Facility Financing, and Offshore Wind Planning, Modeling, and Analysis (Sec. 50402)
- Rescission of all unobligated funds appropriated for the Greenhouse Gas Air Pollution Plans and Implementation Grants (Sec. 60013)
- Rescission of all unobligated funds provided to decarbonize Federal Buildings (Sec. 60020)
- Rescission of all unobligated funds from the Advanced Industrial Facilities Deployment Program (Sec. 50402)

A complete list of rescissions of energy-related funding is outlined in [Sections 60001-60024 and 50402 of the law](#).

These rescissions represent tens of billions of dollars in lost climate investments made under the IRA, which would have provided funds to state, local, and Tribal governments, federal agencies, non-profits, and commercial project developers to reduce emissions and update critical infrastructure.

Conclusion

Over the past three years, the IRA effectively catalyzed clean energy manufacturing and deployment, inciting major investments from the private sector. The OBBB significantly alters many of these tax credit incentives, reduces the volume of eligible projects, and rescinds billions in unobligated funds from a portfolio of grant and loan programs.

The OBBB drastically changes the policy landscape for decarbonization. Developers will need to act quickly to meet updated commence construction and place into service timeline requirements, though circumstances are technology specific (e.g., safe harbor updates to 48E and 45Y). Tax credits generally have advanced commence construction and operational deadlines, resulting in a strong first-movers advantage. Companies should also review their supply chains and revise equipment and material procurement sourcing plans as necessary to address restrictions put in place by the OBBB.

An [executive order](#) issued on July 7, 2025 will further complicate how companies proceed. In the order, the President directs his administration to “strictly enforce the termination of [...] 45Y and 48E [...] for wind and solar facilities.” On August 15, 2025, the IRS issued [guidance](#) that tightens the thresholds for when a wind or solar project has “commenced construction,” but the Administration will also likely issue extremely strict FEOC requirements in other forthcoming tax credit guidance issued by the Department of the Treasury. These moves will probably face litigation.

New restrictions being proposed by the Administration—including specific details on FEOC, qualified equipment, commence construction, and other reporting requirements—will require additional guidance from the IRS and provide an opportunity for engagement through public comment. **It is important that impacted companies weigh in during these public comment periods, not only to help inform and influence the final rules issued by the Administration, but also to build an administrative record that could support litigation efforts.**

Carbon Direct will continue to monitor and synthesize the impacts of new guidance and implementation related to the OBBB and their impacts for businesses. To stay up to date on the latest developments, visit Carbon Direct’s [blog](#), [Climate Policy Hub](#), [research and reports](#), and sign up for our upcoming [webinars](#).

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