Carbon Direct

The Inflation Reduction Act, one year in

A guide to climate innovation tax credits



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Executive Summary

The Inflation Reduction Act (IRA) fosters significant investment in clean technology and renewable energy to reduce and remove carbon emissions. This policy includes a range of tax credits to incentivize companies to engage in the budding, low-carbon economy. To support these companies, the Carbon Direct policy team analyzed the top eight tax credits with the highest potential for large-scale climate and business impact. The result is a comprehensive resource, including overviews of tax incentive timelines, eligibility, stackability, and accessibility, to help guide a climate and sustainable technology innovation strategy.



Introduction

The Inflation Reduction Act (IRA) of 2022 is one of the most transformative policies ever enacted to address the climate crisis. Designed to foster economic growth and stability through major investments in sustainable infrastructure, the IRA is already having a profound impact—investment and innovation in clean technology is driving carbon emissions reductions across industries, lowering the cost of renewable energy, and adding green-sector jobs.

Even just one year in, this landmark legislation has fostered a new era of global competition aimed at tackling the urgent climate crisis. Growing private-sector investments in renewable energy technologies, energy-efficient infrastructure, and engineered carbon removal are reshaping U.S. economy. These developments will not only contribute to a healthier planet but also support economic growth and job creation, making the U.S. a leader in sustainable development.

ADVANCING CLEAN TECHNOLOGY INVESTMENT

The Inflation Reduction Act's visionary approach to incentivizing private sector engagement is central to its success in spurring the adoption of clean technology. The legislation incorporates a range of tax credits designed to galvanize scientists, corporations, and investors to direct their resources toward emerging innovations, such as clean hydrogen and sustainable aviation fuel. By establishing a stable and supportive policy environment, the IRA fosters an ecosystem conducive to the research, development, and commercialization of clean technologies.

Under the IRA, companies embracing green initiatives are eligible for a number of tax incentives, thereby stimulating investment in clean energy, domestic manufacturing, and sustainable transportation solutions. The clear and consistent incentives provided by the act are instrumental in steering capital flows toward long-term and environmentally responsible projects.

UNLEASHING THE POTENTIAL OF RENEWABLE ENERGY

One of the central pillars of the Inflation Reduction Act is its emphasis on renewable energy sources as a cornerstone of the transition to a low-carbon economy. By accelerating the deployment of solar, wind, hydro, geothermal, and other clean energy technologies, the IRA scales up renewable energy projects and reduces reliance on fossil fuels.

Supply increases will continue to drive down the costs of renewable energy production and storage, enabling a more competitive environment for renewable energy. This ensures the widespread adoption of cleaner alternatives for both producers and consumers.

REDUCING AND REMOVING CARBON EMISSIONS

The IRA encourages industries to actively embrace and invest in carbon removal and sequestration projects such as direct air capture. When coupled with the $3.5 billion for direct air capture hubs provided for in the Infrastructure Investment and Jobs Act passed two years ago, the moment is ripe for a rapid scale-up of this critical carbon removal approach.

Additionally, the IRA provides grant, loan, and research support for a range of other carbon removal and reduction methods, such as forest restoration and agricultural practices that increase soil carbon. The full range of approaches, both engineered and nature-based, will be required to draw down atmospheric carbon to the levels needed to hit our global climate targets.

A MORE SUSTAINABLE FUTURE

One year since its passage, the Inflation Reduction Act continues to be a transformative milestone driving environmental sustainability in the U.S. and spurring other countries to take action. By incentivizing investment in cleantech and reducing carbon emissions, the IRA forges a path towards a greener and more prosperous future. As nations unite to tackle climate change, the significance of this legislation cannot be understated—it stands as a beacon of what is possible, demonstrating that responsible economic policies can coexist with a commitment to safeguarding the planet for generations to come.

Overview of Available Credits

The IRA contains a number of new and/or expanded tax credits across a range of technologies and industries. This document goes into detail on the following selection of tax credits included in the Inflation Reduction Act of 2022 (IRA) that are most relevant to wide-scale environmental impact.

40B Sustainable Aviation Fuel Credit
40B provides 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.

45Q Carbon Oxide Sequestration Credit
45Q provides a tax credit for each ton of carbon that is sequestered or utilized. The credit amount varies depending on whether the carbon is captured from point sources or through direct air capture and whether the carbon is sequestered or utilized, with higher credits for direct air capture and sequestration.

45V Clean Hydrogen Production Credit
45V was established by the passage of the IRA and provides credits up to $3.00 per kilogram of hydrogen, as long as lifecycle emissions equal less than 4 kilograms of CO_2e per kilogram.

45X Advanced Manufacturing Production Credit
45X was established by the passage of the IRA and provides financial support for domestic manufacturers of solar photovoltaic (PV) modules and subcomponents, wind turbines and subcomponents, inverters, tracking systems, batteries, and critical minerals pertinent to the clean energy supply chain.

45Y Clean Electricity Production Credit
45Y provides a production tax credit for certain qualifying electricity generation facilities placed in service after December 31, 2024.

45Z Clean Fuel Production Credit
45Z was established by the passage of the IRA and provides financial support to domestic producers of clean transportation fuels with an emissions factor at or below 50 kg CO_2e/MMBtu.

48C Advanced Energy Project Investment Credit
The passage of the IRA renewed and expanded Section 48C of the U.S. 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).

48E Clean Electricity Investment Credit
48E provides an investment tax credit for certain qualifying electricity generation facilities. This tax credit is available starting in 2023 but will be replaced starting January 1, 2025 by the Clean Electricity Investment Credit [48E(h)].

Timeline of IRA Credits: Availability and Phase-Out

The window of accessibility for each of the tax credits in the IRA varies significantly. For credits such as the Carbon Oxide Sequestration Credit (45Q) and the Clean Hydrogen Production Credit (45V), the value of funding remains consistent throughout the ten-year period of its availability. For some credits, including the Advanced Manufacturing Production Credit (45X), the value of the credit gradually decreases in the last three years of its availability. Some of the credits introduced in the IRA serve as a replacement for existing tax credits: the Clean Electricity Production Credit (45Y) replaces the existing Production Tax Credit for Electricity from Renewables Credit (45) and the Clean Electricity Investment Credit (48E) replaces the existing Clean Energy Property Credit (48) starting in 2025. Other credits are new mechanisms coming online for the first time.

Not included in this table is the Advanced Energy Project Investment Tax Credit (48C), which has a different financial support release structure; see page 25 for more details.

Table 1. Timeline for the rollout of IRA Credits

Year → / Credits ↓	2023	2024	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%			
40B Sustainable Aviation Fuel Credit													
45Z Clean Fuel Production Credit													
45 Production Tax Credit for Energy from Renewables													
45Y Clean Electricity Production Credit												75%	50%
48 Clean Energy Property Credit													
48E Clean Electricity Investment Credit												75%	50%

Stackability of Credits

The IRA's new and revised tax credits featured here include several limitations on how they may be combined or "stacked" with one another. Below is a table that describes which credits include explicit limitations on stackability with one another.

Table 2. IRA Credit Stackability

	40B Sustainable Aviation Fuel 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
40B Sustainable Aviation Fuel 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 Legislation silent on stacking

Transferability & Direct Pay

On June 14, 2023, the IRS issued proposed regulations and FAQs describing elective pay options and proposed and temporary rules for the transfer of certain credits. Temporary regulations were also issued to provide rules that relate to a mandatory IRS pre-filing registration process which will be through an electronic portal. The pre-filing registration process must be completed and a registration number received prior to making an elective payment election or an election to transfer eligible credits.

The financial support of the tax credits in the IRA can be utilized in one of three ways: apply the credit as a reduction on the entity's taxes, opt-in to receive the value of the credits as a direct payment, or elect to transfer the tax credits.

Direct pay refers to the option of receiving the value of the tax credits in the form of direct payments to the eligible entity. Allowing for direct pay, rather than claiming a tax credit on end-of-year returns, yields cash payment for companies. The option to receive direct pay or transfer the value of the tax credit is generally only available to certain tax-exempt organizations, state and local government entities, as well as tribal governments.[1] **However, the direct pay election applies to all taxpayers for section 45Q carbon capture credits**, to the new credits for clean hydrogen in section 45V, and clean energy manufacturing in section 45X—**but generally only for the first five years of the credit period, after which the credits again become nonrefundable for those taxpayers.**[2]

Transferability is the election to sell all or a portion of eligible tax credits. Allowing certain tax credits to be transferable expands the options for eligible entities to utilize these credits. **Section 6418 generally permits credits to taxpayers who are not eligible for the direct payment election described above to elect to transfer all or a portion of their credits for any taxable year to an unrelated taxpayer.** Any payment made by the transferee taxpayer would not be deductible to the transferee nor includable as income for the transferor.

[1] https://www.irs.gov/credits-deductions/elective-pay-and-transferability-frequently-asked-questions-transferability

[2] https://www.mcguirewoods.com/client-resources/Alerts/2023/6/irs-issues-guidance-direct-payments-energy-tax-credits

Table 3. Transferability and Direct Pay Eligibility of IRA Tax Credits
The table below illustrates the eligibility of IRA tax credits for transfer or direct pay by eligible entities (as of June 14, 2023):[3]

IRA Tax Credits	Eligible for Transferability	Eligible for Direct Pay
40B Sustainable Aviation Fuel Credit	No	No
45Q Carbon Oxide Sequestration Credit	Yes	Yes
45V Clean Hydrogen Production Credit	Yes	Yes
45X Adv. Manufacturing Production Credit	Yes	Yes
45Y Clean Energy Production Tax Credit	Yes	Yes
45Z Clean Fuel Production Credit	Yes	Yes
48C Qualified Advanced Energy Project Credit	Yes	Yes
48E Clean Energy Investment Credit	Yes	Yes

Recent Updates & What's to Come

Over the course of the last year, the IRS has periodically sought input from the public on how to administer these incentives and address complex issues for carbon accounting, site operations, and the nuances of particular technologies. A few months after these calls, the IRS issued guidance on specific tax credits, including eligibility, the applicability of direct pay and transferability options, relevant forms, and data requirements. While most credits have been covered by the IRS, there are several outstanding, including Clean Hydrogen Production (45V), Clean Energy Production (45Y), Clean Fuel Production (45Z) and Clean Electricity Investment (48E). With the exception of 45V, all of these credits come online in 2025 and the IRS should provide guidance later in 2023 or early 2024.

[3] Table modeled off of CAP table.
https://www.americanprogress.org/article/understanding-direct-pay-and-transferability-for-tax-credits-in-the-inflation-reduction-act/

On August 3, 2023, the Department of Energy (DOE) closed the first call for concept notes for qualified advanced energy (48C) projects. This call covered $4 billion of the $10 billion appropriation for 48C; there will be at least one other request for concept notes. Following review of concept notes, the DOE will issue letters encouraging certain applicants to submit a full proposal. Even those receiving letters of discouragement in response to their concept note are still permitted to submit a full application. Guidance on scoring criteria and priority focus areas is available from the DOE.

As needed, the IRS may issue additional guidance, update forms, and clarify technical aspects of the incentives over the lifetime of the credits. Tax filers and other interested parties should also keep a careful eye on Congress and the White House for possible extensions or expansions of the credits, as well as potential roll-backs, as was attempted earlier this year. Highlighting the positive climate and economic impacts of the IRA credits and the underlying technologies will be essential to institutionalizing this suite of incentives well into the future.

GUIDE TO INDIVIDUAL CREDITS

40B Sustainable Aviation Fuel Credit

Description: The Section 40B Sustainable Aviation Fuel Credit is the first part of the IRA's two-phase approach to sustainable aviation fuel (SAF). This credit expires at the end of 2024 at which point the Section 45Z Clean Fuel Production Credit will take over.

Under 40B, producers of SAF that reduce greenhouse gas emissions by 50% are eligible for a tax credit of $1.25 per gallon, with an additional $0.01 per gallon for each percent point exceeding 50%, for a maximum credit of $1.75 per gallon.[4]

Sustainable aviation fuel is defined as meeting the following requirements:

1. Either: ASTM International Standard D7566, or the Fischer Tropsch provisions of ASTM International Standard D1655, Annex A1
2. Is not derived from coprocessing an applicable material (or materials derived from an applicable material) with a feedstock that is not biomass
3. Is not derived from palm fatty acid distillates or petroleum
4. Has a lifecycle greenhouse gas emissions reduction percentage of at least 50%

The reduction in greenhouse gas emissions is compared to a baseline emissions profile of petroleum-based jet fuel. The law defines the lifecycle greenhouse gas emissions of petroleum-based jet fuel as equal to 89 grams of carbon dioxide equivalent per megajoule of energy (gCO_2e/MJ) as the baseline. This is the standard adopted by the International Civil Aviation Organization (ICAO) under the most recent Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA). The law also allows for the possibility of alternative models to be used to calculate carbon intensity.

[4] Request for Comments on §40B
https://www.irs.gov/pub/irs-drop/n-23-06.pdf

As part of the ongoing deliberations in the run-up to the release of official guidance, the Treasury Department is deciding on whether to instead use the U.S. Department of Energy's Greenhouse Gases, Regulated Emissions and Energy Use in Technologies (GREET) model. The GREET model is favored by the ethanol industry because it would be less likely to exclude ethanol-based SAF compared to CROSIA due to the way it evaluates the emissions of indirect land-use change and the displacement of existing farmland.

Eligibility
Producers and blenders of SAF-kerosene fuel mixtures for aviation. Qualified SAF mixture must be made in the United States, and fueling of the aircraft must occur in the United States.

Timeframe
The 40B credit covers sustainable aviation fuel sold or used after December 31, 2022, and prior to January 1, 2025.

Stackability
Cannot stack with Carbon Oxide Sequestration (45Q) or the Extension of Tax Credits for Biodiesel and Renewable Diesel (40A).

Bonus credits
As outlined above, producers of SAF fuels are eligible for an additional $0.01 credit per gallon for each percentage point of greenhouse gas emissions reduction above 50%, up to an extra $0.50 per gallon.

Not eligible for Energy Community Tax Credit Bonus[5]

Pay methods
Not eligible for transfer or direct pay.

Required IRS Forms
In order to apply for 40B credits, eligible entities can complete the IRS Form 637. Instructions for completing this form can be found on the IRS website here.

[5] https://energycommunities.gov/funding-opportunity/sustainable-aviation-fuel-credit-26-u-s-code-%C2%A4-40b/

45Q Credit for Carbon Oxide Sequestration

Description: The 45Q Carbon Oxide Sequestration Credit provides a tax credit for each ton of carbon 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 capture amount (see below), and allowing for direct pay. The IRA also raised the rates to $85 per ton for sequestration, $60 per ton for utilization from point-source capture, $180 per ton for sequestration, and $130 per ton for utilization from direct air capture systems, provided recipients satisfy the prevailing wage and apprenticeship requirements.

Minimum capture amounts

The capture threshold for credit-eligible power generation facilities was decreased in the IRA from 500,000 tonnes of CO_2 per year to 18,750 tonnes.

For industrial facilities, the threshold was decreased from 100,000 tonnes of CO_2 per year to 12,500 tonnes.

For direct air capture facilities, the threshold was decreased from 100,000 tonnes captured per year to 1,000 tonnes per year.

Power generation facilities seeking to qualify for the credit must meet a capture design capacity requirement of not less than 75% of the baseline CO_2 emitted from an electricity generating unit that will install capture equipment.

Eligibility

U.S. facilities within minimum volumes: 1,000 metric tons of CO_2 per year for direct air capture facilities; 18,750 metric tons for electricity generating facilities (with carbon capture capacity of 75% of baseline CO_2 production); 12,500 metric tons 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.

Stackability

Cannot stack with Sustainable Aviation Fuel Credit (40B), Clean Hydrogen Production (45V), and Clean Fuel Production (45Z) credits.

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

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.

Not eligible for Energy Community Tax Credit Bonus.[6]

Pay methods

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 option 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 can complete the IRS Form 8933. Instructions for completing this form can be found on the IRS website here.

[6] https://energycommunities.gov/funding-opportunity/credit-for-carbon-oxide-sequestration-26-u-s-code-%c2%a4-45q/

45V Clean Hydrogen Production Credit

Description: The IRA introduces 45V to the US Tax Code, which establishes the Clean Hydrogen Production Tax Credit. The Clean Hydrogen Production Credit provides producers of clean hydrogen a base rate credit value of $0.60 per kilogram of hydrogen (which is adjusted for inflation), which can be multiplied by the applicable percentage, ranging from 20% to 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 CO_2e/kg of hydrogen are eligible to receive a credit value of up to $3.00 per kilogram of hydrogen produced.

Eligibility
The IRS is still considering the electrical source matching requirements for these credits. In the most restrictive case, hourly matching will be required between an identifiable/verifiable electricity source and the use in the production system. The least restrictive case would be a yearly matching requirement.

Timeframe
45V credits are available for projects that begin construction or modification before the end of 2032. Credit will be available throughout production and over the first years of operation.

Stackability
45V credits **cannot stack** with the Carbon Oxide Sequestration Credit (45Q) for blue hydrogen projects; nor with Qualifying Advanced Energy Project Credits (48C) as an additive project credit; nor with Clean Fuel Production Credits (45Z).

45V **can stack** with Clean Electricity Investment Credits (48E) in the case that a producer is using electrolysis with onsite renewables.

Direct Reference in Statute
I.R.C. § 45V(d)(2)

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 can complete the IRS Form 7210. Instructions for completing this form have not been released by the IRS as of yet. Historically the DOE will provide allocation recommendations and rankings to the IRS who will 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 start and finish of a project.

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45X Advanced Manufacturing Production Credit

Description: The IRA introduces Section 45X to the US Tax Code, which establishes the Advanced Manufacturing Production Tax Credit for domestic manufacturers of solar photovoltaic (PV) modules and subcomponents, wind turbines and subcomponents, inverters, tracking systems, batteries, and critical minerals pertinent to the clean energy supply chain. The manufacturing of these materials must be in the U.S. and sold to an unrelated party. The tax credit values vary based on product type.

Eligibility
In order to be eligible for the 45X tax credit, the clean energy components must be produced and sold by a U.S.-based manufacturer. These clean energy components include the PV 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.[7]

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

Stackability
45X **cannot stack** with the Advanced Energy Project Credit (48C).

Direct Reference in Statute
I.R.C. § 45X(c)(1)(B)

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.

[7] U.S. Department of Energy (2022). Federal Tax Credits for Solar Manufacturers. October 2022. https://www.energy.gov/sites/default/files/2022-10/Federal-Tax-Credits-for-Solar-Manufacturers.pdf

Required IRS Forms

In order to apply for 45X credits, eligible entities can complete the IRS Form 7207. Instructions for completing this form can be found on the IRS website here.

45Y Clean Electricity Production Credit

Description: The new Section 45Y Clean Electricity Production Credit 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 hours (kWh), but the applicable rate can be increased to 1.5 cents/kWh if prevailing wage and apprenticeship requirements are met. A facility may only claim the credit for a maximum of ten years.

The IRS has not yet published guidance on how to apply for this credit, but they have sought public input on implementation tax credit on October 10 and closed the comment period on November 4, 2022.

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
Cannot claim both the Section 48E investment tax credit and the Section 45Y production tax credit for the same facility.

Direct Reference in Statute
I.R.C. § 45Y(b)(1)(D)

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. 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.

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. Eligible for transferability.

Required IRS Forms

Credit valid starting for tax year 2025. As of August 16, 2023, no guidance or IRS forms have been published.

45Z Clean Fuel Production Credit

Description: The IRA introduces Section 45Z to the US Tax Code, which establishes 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 carbon dioxide equivalent per million British thermal units (CO_2e per MMBtu). The IRS considers "clean fuel" to be a fuel with an emissions factor at or below 50 kg CO_2e per MMBtu. Eligible transportation fuels must be produced from applicable biomass material and cannot be derived from coprocessing from a non-biomass feedstock. Among the qualifications for the 45Z credit eligibility, the fuel must be produced in the U.S. but can be sold domestically or exported internationally.

The value of the 45Z credit varies by fuel type and use. For clean transportation fuel, the credit value ranges from $0.20 to $1.00 (max value for meeting prevailing wage and apprenticeship requirements). For sustainable aviation fuel, the credit value ranges from $0.35 to $1.75 (max value for prevailing wage requirements). The 45Z credit value also adjusts with inflation.

Eligibility
The 45Z tax credit is available to U.S.–based, registered producers of fuels with less than 50 kilograms of carbon dioxide equivalent per million British thermal units (CO_2e per MMBtu).

Timeframe
The 45Z tax credit is available for fuel producers for the production of clean fuels produced after December 31, 2024 and used or sold before December 31, 2027. For sustainable aviation fuels, it effectively replaces the 40B tax credit, which expires on January 1, 2025.

Stackability
The 45Z tax credit **cannot stack** with the Clean Hydrogen Production Credit (45V), Clean Energy Property Credit (48), or Carbon Oxide Sequestration (45Q) tax credits.

Direct Reference in Statute
I.R.C. § 45Z(d)(4)

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 on the application details for 45Z is currently outstanding by the IRS.

GUIDE TO INDIVIDUAL CREDITS

48C Advanced Energy Project Credit

Description: The IRA renewed and expanded Section 48C, the Advanced Energy Project Tax Credit, which was originally enacted by the American Recovery and Reinvestment Act of 2009. The IRA allocates a total of $10 billion in funding for 48C recipients, with $4 billion dedicated specifically to projects located in energy communities (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.

Eligibility

Entity 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."[8]

Timeframe

Funding availability went into effect on January 1, 2023 and the release of the funding is not time-bound. Projects have two years from the date of application acceptance to provide evidence of meeting certification to the Secretary.

Stackability

48C **cannot stack** with the Gasification Project Credit (48B), the Clean Energy Investment Credit (48E), the Clean Hydrogen Production Credit (45V), the Carbon Oxide Sequestration Credit (45Q), or 45X Advanced Manufacturing Production Credit (45X).

Direct Reference in Statute

I.R.C. § 48C(f)

[8] https://www.whitehouse.gov/wp-content/uploads/2022/12/Inflation-Reduction-Act-Guidebook.pdf

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 can complete the IRS Form 3468. Instructions for completing this form can be found on the IRS website here. The DOE will provide allocation recommendations and rankings to the IRS who 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. Concept papers were due on August 4th 2023.

48E Clean Electricity Investment Credit

Description: The new Section 48E Clean Electricity Investment Credit 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. The IRS has not yet published guidance on the provision. The IRS sought public input on the implementation of this tax credit on October 10 and closed the comment period on November 4, 2022.

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

Timeframe
48E begins in 2023 and ends when the 48E(h) Clean Electricity Investment Tax Credit becomes available in 2025 through 2032.

Stackability
Cannot claim both the Section 48E investment tax credit and the Section 45Y Clean Energy Production Tax Credit for the same facility. 48E **cannot stack** with 45J, Carbon Oxide Sequestration (45Q), or the Zero-Emission Nuclear Power Production (45U) credits.

Direct Reference in Statute
I.R.C. § 48E(b)(3)(C)

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. 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.

Pay methods (direct pay and transferability)
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. Eligible for transferability.

Required IRS Forms
Credit valid starting for tax year 2025. As of August 16, 2023, no guidance or IRS forms have been published.

Conclusion

While the Inflation Reduction Act is proving to be an effective catalyst for green manufacturing, we must acknowledge that the path toward a sustainable economy that can address the climate crisis is far from complete. Transforming the global infrastructures to one that supports sustainable fuels and clean energy grids demands continued and accelerated efforts across multiple fronts. The global community must remain resolute in its commitment to sustainable practices, investing in research, innovation, and the deployment of cutting-edge technologies.

The next crucial steps involve forging stronger international collaborations, implementing comprehensive policy frameworks, and fostering greater action worldwide. The IRA may be a source of international tension or it may be a catalyst for a new age of climate action; arrangements like the EU-US Inflation Reduction Act Task Force may help ensure that it is the latter and not the former.

At the same time, global competition stemming from the IRA can be a positive force, with the EU revealing its Green Deal Industrial Plan in response to the IRA in February 2023, Canada announcing a range of new tax credits for clean energy projects in March 2023, and the UK following close behind with the release of its Green Day proposals. Regardless of the exact details or approach, the lessons learned from the Inflation Reduction Act can serve as a blueprint for designing and enacting further impactful legislation, including at the state, federal, and global levels. By building upon the foundation of the IRA and redoubling our commitment to a sustainable future, we can not only mitigate the adverse effects of climate change but also pave the way for a more resilient, equitable, and prosperous world for generations to come.

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About Carbon Direct

Carbon Direct helps organizations go from climate goal to climate action. We combine technology with deep expertise in climate science, policy, and carbon markets to deliver carbon emission footprints, actionable reduction strategies, and high-quality carbon dioxide removal. With Carbon Direct, clients can set and equitably deliver on their climate commitments, streamline compliance, and manage risk through transparency and scientific credibility.

Our expertise is trusted by global climate leaders including Microsoft, American Express, and Alaska Airlines, as well as by the World Economic Forum, which selected Carbon Direct as an Implementation Partner for the First Movers Coalition. To learn more, visit www.carbon-direct.com.

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