

Inflation Reduction Act (IRA) Climate Tax Provisions

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Overview of Climate Credits

There are a range of climate tax credits extended, expanded, and created by the Inflation Reduction Act (IRA), including credits to support:

- clean energy generation and storage, and investment in building out clean energy producing facilities
- carbon capture
- alternative transportation fuels
- domestic manufacturing
- transportation/clean vehicles

The electricity generation credits, including the production tax credit (PTC) and investment tax credit (ITC), and the alternative fuels credits are structured in two tiers: extensions and expansions of current technology-specific credits through 2024, then starting in 2025, a shift to a technology-neutral approach where eligibility for the credits will be governed by zero-emission energy generation, regardless of the type of technology.

Most of the credit values are indexed to inflation annually.

Many of the credits have either/or clauses, meaning that oftentimes companies will have to choose the most beneficial credit to their business model, despite eligibility for multiple credits.

For facilities financed with tax-exempt bonds, the credit amount is generally reduced by the lesser of (1) 15%; or (2) the fraction of the proceeds of a tax-exempt obligation used to finance the project over the aggregate amount of the project's financing costs.

Base and Bonus Credit Explainer

The general structure of the credits provides multiple levels of value depending on underlying circumstances of the project (see attached chart for more detail):

- **Base credit:** This is the minimum value of the credit a company can receive if their activity meets the standards for eligibility but none of the bonus criteria.
- **Prevailing wage & apprenticeship bonus:** Facilities that pay prevailing wages during the construction phase and first 10 years of operation and meet registered apprenticeship requirements will be eligible for significantly increased credit values, generally five times the base amount.
 - **Prevailing Wage Requirement:** Laborers and mechanics employed by the taxpayer, contractors and subcontractors in construction, alteration, and repair of a facility must be paid wages not less than prevailing rates as determined by the Secretary of Labor.
 - **Apprenticeship Requirement:** Generally requires that (1) certain labor hour requirements for the construction, alteration or repair work with respect to the facility must be performed by apprentices (15% of total hours after 2023) and (2) for contractors with more than four employees, at least one employee must be a qualified apprentice.
 - **Ability to “Cure” Credits:** Failure to satisfy the wage and apprenticeship requirements may be “cured” through additional payments to the affected workers and to the government. This means companies can still receive the bonus value of credits retroactively if they follow the rules for curing deficiencies. These requirements vary slightly for different credits and exceptions apply.
 - **Exceptions:** Facilities with a maximum net output of less than one megawatt are automatically eligible for the prevailing wage and apprenticeship bonus credits, as are facilities that begin construction before 60 days after the Secretary of the Treasury publishes guidance on the wage and registered apprenticeship requirements.
- **Domestic content bonus:** A ten percentage point bonus for projects that meet domestic content guidelines. To claim the bonus, companies must certify that certain steel, iron, and manufactured products used in the project are domestically produced.
 - To satisfy this requirement, companies must certify that any steel, iron or manufactured product that is a component of the facility was produced in the US. Generally, manufactured products are deemed to have been produced in the US if

40-55% of costs of the manufactured products (depending on the year in which construction begins) are attributed to components mined, produced or manufactured in the US (a lower 20-55% threshold applies for offshore wind facilities).

- **Energy communities bonus:** A ten percentage point bonus for projects that are located in locations designated as “energy communities.” An energy community is defined as:
 - a brownfield site,
 - an area which has or had significant employment related to oil, gas, or coal activities, or
 - a census tract or any adjoining tract in which a coal mine closed after December 31, 1999, or in which a coal-fired electric power plant was retired after December 31, 2009.

5-year Direct Pay for Certain Credits

Direct pay – the ability of startups to monetize credits in the year that they are generated – will be available for the following credits:

- Clean hydrogen PTC under section 45V
- Carbon capture credits under section 45Q (for facilities placed in service after 2022)
- Advanced manufacturing PTC under section 45X

A direct pay election for these credits can be made for the first five years starting with the year a facility is placed in service.

Transferability of Credits

For credits that are not eligible for direct pay, a mechanism is included that will allow companies to transfer all or a portion of their credits to unrelated taxpayers. Previously, a tax investor buying a credit was required to have an ownership interest in the facility receiving the credit. Now, these credits can be sold directly to anyone with tax liabilities.

We won’t know how much of the value of these credits startups can recoup in the tax credit transfer markets until credits are generated and buying and selling begins at volume. But we do believe a transferability mechanism will make for a more liquid tax credit market for startups to access and will be an improvement over the current tax equity financing system.

Production and Investment Tax Credits

Production Tax Credit (PTC) Extension (Section 13101)

The IRA extends the PTC for wind, biomass, geothermal, solar, landfill gas, trash, qualified hydropower, and marine and hydrokinetic resources through 2024, before the production tax credit transitions to a tech-neutral approach (more below). Qualifying hydropower and marine

and hydrokinetic renewable energy projects, which traditionally have been half-credit technologies, are now allowed the full PTC.

The proposal also extends the option to claim the energy investment tax credit (ITC) in lieu of the PTC.

Investment Tax Credit (ITC) Extension (Section 13102)

IRA extends the ITC is extended through 2024 at a base rate of 6% for solar, fuel cells, waste energy recovery, combined heat and power, geothermal heat pumps, and small wind property, and 2% for microturbine property (see chart for more detail on value, which can reach 50%). The credit then transitions to a tech-neutral approach (more below).

This list of qualifying technologies now also includes energy storage technology, qualified biogas property, electrochromic glass, and microgrid controllers. Linear generator assemblies are now part of the definition of qualifying fuel cells. The credit is also now available for interconnection property.

Bonus ITC for solar and wind facilities located in low-income communities: IRA creates an allocation of 1.8 gigawatts for “environmental justice solar and wind capacity” credits in each of calendar year 2023 and 2024. Companies receiving a capacity allocation may be entitled to these tax credits in addition to otherwise allowed ITCs. Projects receiving an allocation must be located in a low-income community or on tribal land and will be eligible for a bonus investment tax credit of 10 percentage points, while projects that are part of a low-income residential building project or qualified low-income economic benefit project will be eligible for a 20 percentage point bonus investment credit.

- Qualifying solar and wind facilities include those with a nameplate capacity of 5 megawatts or less, and qualifying property includes energy storage property installed in connection with solar and interconnection property.
- Facilities receiving an allocation must have facility placed in service within four years.

Clean Electricity Production and Investment Credits (Section 13701/13702)

Beginning in 2025, the bill transitions the electricity tax credits (PTC/ITC) to a technology-neutral, emissions-based structure, allowing any net-zero power generation to take advantage of either a production or investment tax credit.

The tech-neutral PTC will be for the sale of domestically produced electricity with a greenhouse gas emissions rate not greater than zero. To qualify for a tax credit, electricity will need to be produced at a qualifying facility placed in service starting in 2025, including retrofits to existing facilities that have not previously qualified for energy credits.

The tech-neutral ITC will be for investment in qualifying zero-emissions electricity generation facilities or energy storage technology. Costs of interconnection property will also be eligible for clean electricity projects smaller than 5 megawatts.

Companies will not be able to claim the clean electricity production credit if the facility or electricity produced from the facility claimed certain other energy-related investment or production tax credits. Companies will have to choose between the clean electricity PTC and ITC and cannot claim both.

These tax credits will phase out when emissions reduction target levels are achieved or after 2032 (the later of the two). The emissions target phaseout will begin after the calendar year in which greenhouse gas emissions from the electric power sector are equal to or less than 25% of 2022 electric power sector emissions.

Carbon Capture Credit Extension & Lowered Minimum Scale Requirements (Section 13104)

IRA extends for ten years the carbon capture credits under Section 45Q, increases their values and perhaps most importantly for startups, significantly reduces minimum scale requirements. This tax credits can be claimed for carbon oxide captured during the 12-year period following a qualifying facility's being placed in service.

In one of the biggest wins for startups, the amount of carbon oxide that must be captured in order a facility to be eligible for the credit is reduced to 1,000 metric tons annually for a direct air capture (DAC) facility, down from 25,000 tons.

Other minimum scale requirements include 18,750 metric tons annually for an electricity generating facility (and be designed to capture not less than 75% of the baseline carbon oxide production; 60% in the case of electricity generating facilities not yet or recently placed in service), and 12,500 metric tons for any other facility.

Alternative Fuels Credits

Similar to the electricity generation credits, IRA extends a range of technology-specific alternative fuels credits for two years before transitioning to a technology-neutral fuel credit starting in 2025. Additionally, the bill creates a new credit for clean hydrogen production.

Clean Hydrogen Credit (Section 13204)

IRA creates a new tax credit for the qualified production of clean hydrogen. The credit will be available for qualified clean hydrogen produced during a facility's first 10 years of operation. Facilities existing before 2023 can qualify based on the date that modifications to their facility required to produce clean hydrogen are placed into service.

The applicable percentage will be determined by the lifecycle greenhouse gas emissions rate achieved in producing clean hydrogen:

- The applicable percentage will be 100% for hydrogen achieving a lifecycle greenhouse gas emissions rate of less than 0.45 kilograms of carbon dioxide equivalent (CO₂e) per kg.

- The applicable percentage will be 33.4% for hydrogen achieving a lifecycle greenhouse gas emission rate of less than 1.5 kilograms of CO₂e per kg (but not less than 0.45 kilograms).
- For hydrogen with a lifecycle greenhouse gas emission rate of less than 2.5 kgs of CO₂e per kg (but not less than 1.5), the applicable percentage will be 25%.
- For hydrogen with a lifecycle greenhouse gas emissions rate of less than 4 kgs of CO₂e per kg (but not less than 2.5), the applicable percentage will be 20%.

Companies may claim the credit for electricity produced from renewable resources if the electricity is used at a qualified clean hydrogen facility to produce qualified clean hydrogen.

Companies can elect to claim the PTC/ITC (see above) in lieu of the clean hydrogen production credit.

Companies cannot claim credits for clean hydrogen produced at facilities that also claim credits for carbon capture.

Extension of Credits for Biodiesel, Renewable Diesel, and Alternative Fuels (Section 13201/13202)

IRA extends the existing tax credits for alternative fuels and alternative fuel mixtures, biodiesel and renewable diesel, and second-generation biofuels through 2024. These provisions provide credits for alternative fuels and alternative fuel mixtures, biodiesel and renewable diesel. The biodiesel and renewable diesel mixtures tax credit may be claimed as an immediate excise tax credit against the blender's motor and aviation fuels excise taxes. Credits in excess of excise tax liability may be refunded. The biodiesel and small agri-biodiesel credits may be claimed as income tax credits. The alternative fuels credit can be claimed as an excise tax credit or can be refunded. The alternative fuels mixture credit is an excise tax credit.

There is a special rule for paying claims for tax credits during the period of retroactive eligibility. The biodiesel and renewable diesel credit, alternative fuel credit, alternative fuel mixture credit, and payments for alternative fuels expired at the end of 2021. Those credits can now be claimed for all of 2022. The IRS must create a process for one-time claims for these tax credits. Companies will have 180 days to submit a claim.

Sustainable Aviation Fuel Credit (Section 13203)

IRA creates a new tax credit for the next two years for the sale or mixture of sustainable aviation fuel starting in 2023. The tax credit will have a base amount of \$1.25 per gallon, with a supplemental credit amount of \$0.01 per gallon for each percentage point by which the lifecycle greenhouse gas emissions reduction percentage for the fuel exceeds 50% (with a maximum supplemental credit of \$0.50 per gallon, making the maximum potential per gallon credit \$1.75).

Sustainable aviation fuel is defined as liquid fuel that (1) meets the requirements of either American Society for Testing and Materials (ASTM) International Standard D7566 or the Fischer Tropsch provisions of ASTM International Standard D1655, Annex AI; (2) is not derived

from coprocessing an applicable material with a feedstock which is not biomass; (3) is not derived from palm fatty acid distillates or petroleum; and (4) has been certified to achieve at least a 50% lifecycle greenhouse gas reduction percentage as defined according to the most recent Carbon Offsetting and Reduction Scheme for International Aviation adopted by the International Civil Aviation Organization and agreed to by the United States (or a similar methodology which satisfies criteria in the Clean Air Act Section 211(o)(1)(H)), as compared with petroleum-based jet fuel.

The sustainable aviation fuel credit will require claimants to be registered with the Secretary of the Treasury and could be used to offset fuel excise tax liability or, in the case of insufficient fuel excise tax liability, be received as a payment. Like the tax credit for biodiesel and renewable diesel, there will be a coordinated income tax credit. Credit amounts will be included in a taxpayer's gross income for income tax purposes.

Clean Fuel Production Credit (Section 13704)

Starting in 2025 and running through 2027, the IRA creates a technology-neutral tax credit for domestic clean fuel production. The tax credit per gallon of transportation fuel will be calculated as the applicable amount multiplied by the emissions factor of the fuel. To qualify, the fuel must be produced by the company at a qualified facility (excluding facilities that receive credits for producing clean hydrogen or carbon oxide sequestration, or the investment credit for energy produced in clean hydrogen facilities). Qualified producers must be registered with the IRS.

The "emissions factor" will be calculated according to the following formula:

- $[(50 \text{ kilograms of CO}_2\text{-equivalent (CO}_2\text{e) global warming potential per metric million British Thermal Units (mmBTU) – emissions rate of fuel produced}) / 50 \text{ kilograms of CO}_2\text{e per mmBTU}]$.

The Treasury Secretary will publish tables of emissions rates for various fuel types to be used for the calculation. Qualifying transportation fuel will be fuel with an emissions rate not greater than 50 kilograms of CO₂e per mmBTU.

Domestic Manufacturing Credits

Advanced Manufacturing Production Credit (Section 13502)

IRA creates a new production tax credit for the domestic production and sale of qualifying solar, wind, and energy storage components.

Credits for solar components include:

- for a thin film photovoltaic cell or crystalline photovoltaic cell, 4 cents per direct current watt of capacity;
- for photovoltaic wafers, \$12 per square meter;
- for solar grade polysilicon, \$3 per kilogram;
- for polymeric backsheets, 40 cents per square meter; and

- for solar modules, 7 cents per direct current watt of capacity.

For wind energy components, if the component is an offshore wind vessel, the credit amount is 10% of the sales price. Otherwise, credits for wind components will be computed as an applicable amount times the total rated capacity of the completed wind turbine for which the component was designed:

- The applicable amount is 2 cents for blades, 5 cents for nacelles, 3 cents for towers, 2 cents for fixed platform offshore wind foundations, and 4 cents for floating platform offshore wind foundations.
- The credit for torque tubes and longitudinal purlin is \$0.87 per kg, and the credit for structural fasteners is \$2.28 per kg.
- The credit for inverters is based on the inverter's capacity, with different types of inverters eligible for specified credit amounts ranging from 1.5 cents to 11 cents per watt.
- For electrode active materials, the credit is 10% of the production cost. Battery cells could qualify for a credit of \$35 per kilowatt hour of capacity, and battery modules could qualify for a credit of \$10 per kilowatt hour of capacity (or \$45 in the case of a battery module which does not use battery cells).
- A credit of 10% is also available for the production of critical minerals.

Credits for battery storage components include:

- For a battery cell, \$35 multiplied by the capacity of such battery cell expressed on a kilowatt hour basis.
- For a battery module, an amount equal to the product of \$10 multiplied by the capacity of such battery module expressed on a kilowatt hour basis.
 - For battery modules that don't use cells, rate is increased to \$45.
- The capacity cannot exceed a capacity to power ratio (the ratio of the capacity of such cell or module to the maximum discharge amount of such cell or module) of 100:1.

The credit phases out for components sold after 2029. Components sold in 2030 will be eligible for 75% of the full credit amount. Components sold in 2031 and 2032 will be eligible for 50% and 25% of the full credit amount, respectively. The credit fully phases out after 2032. The phaseout does not apply to the production of critical minerals.

The credit cannot be claimed for components produced at a facility for which a credit was claimed under Section 48C.

Reinstatement/Expansion of the Advanced Energy Project Credit (48C) (Section 13501)

IRA reinstates the qualified advanced energy manufacturing tax credit with a new \$10B infusion, a fourfold increase from the original Obama-era iteration which allocated \$2.3B in credits. The program is a competitive grant-like 30% tax credit for investments that are selected by Treasury through an application process in projects that reequip, expand, or establish certain energy manufacturing and industrial facilities.

At least \$4 billion of the credits must be allocated to energy communities (as defined in the extended PTC, Section 13101). Credits cannot be allocated to projects located in census tracts in which projects having received prior allocations under Section 48C are located.

The definition of qualifying advanced energy projects includes the following projects:

- Reequipping, expanding, or establishing a manufacturing or industrial facility for the production or recycling of renewable energy property;
- Energy storage systems and components;
- Grid modernization equipment and components;
- Property designed to remove, use, or sequester carbon oxide emissions;
- Equipment designed to refine, electrolyze, or blend any fuel, chemical, or product which is renewable or low-carbon and low-emission;
- Property designed to produce energy conservation technologies;
- Electric or fuel-cell vehicles, including technologies, components, or materials for such vehicles and the associated charging infrastructure;
- Hybrid vehicles weighing less than 14,000 pounds, including technologies, components, or materials for such vehicles;
- Reequipping an industrial manufacturing facility with equipment designed to reduce greenhouse gas emissions by at least 20%;
- Reequipping, expanding, or establishing an industrial facility for the processing, refining or recycling of critical materials.

The Secretary of the Treasury will establish an application process to award credits to qualifying advanced energy projects with the:

- Greatest domestic job creation potential.
- Greatest net impact on emissions and air pollutants.
- Greatest potential for innovation and commercial deployment.
- Shortest time from certification to completion.

Applicants accepting certifications for credits have two years to provide evidence that the requirements of the certification have been met and to place property in service.

Transportation

Alternative Fuel Refueling Property Credit (Section 13404)

IRA provides a ten-year extension for the alternative fuel refueling property credit, a tax credit worth up to 30% of the cost of qualified alternative fuel vehicle refueling property installed at a business or a principal residence. The total credit value limited to \$30,000 for businesses at each separate location with qualifying property, and \$1,000 for residences.

The definition of qualifying property is modified to include bidirectional charging equipment. The credit can also be claimed for electric charging stations for two- and three-wheeled vehicles that are intended for use on public roads.

Starting in 2023, charging or refueling property will only be eligible if it is placed in service within a low-income or rural census tract.

Clean Vehicles (Section 13401)

IRA replaces the existing electric vehicle credit with the Clean Vehicle Credit. Buyers of clean vehicles will receive a credit of up to \$7,500 for the purchase. Clean vehicles include plug-in electric vehicles with a battery capacity of at least 7 kilowatt hours and fuel cell vehicles.

Qualifying vehicles must have final assembly occur in North America. Only vehicles made by qualified manufacturers who secure written agreements with Treasury qualify for the credit.

This provision allows a larger universe of clean vehicles to qualify and eliminates the per-manufacturer limit from the original EV credit.

Qualifying vehicles are prohibited from having battery components manufactured or assembled by a foreign entity of concern (as defined in 42 U.S.C. §18741). Starting in 2024, qualifying vehicles must not have sourced applicable critical minerals in the vehicle's battery from a foreign entity of concern.

To receive the \$3,750 critical minerals portion of the credit, the vehicle's battery must contain a threshold percentage (in value) of critical minerals that were extracted or processed in a country with which the United States has a free trade agreement, or recycled in North America. The threshold percentage will be 40% through 2023, increasing to 50% in 2024, 60% in 2025, 70% in 2026, and 80% after 2026.

To receive the \$3,750 battery components portion of the credit, the percentage of the battery's components manufactured or assembled in North America must meet threshold amounts. For vehicles placed in service through 2023, the percentage will be 50%. The percentage increases to 60% for 2024 and 2025, 70% for 2026, 80% for 2027, 90% for 2028, and 100% after 2028.

The credit is disallowed for households with adjusted gross income exceeding \$300,000 for married taxpayers (\$225,000 in the case of head of household filers; \$150,000 in the case of other filers).

Credits are only allowed for vehicles that have a manufacturer's suggested retail price of no more than \$80,000 for vans, SUVs, or pickup trucks, and \$55,000 for other vehicles.

Starting in 2024, taxpayers purchasing eligible vehicles can elect to transfer the tax credit to the dealer, so long as the dealer meets registration, disclosure, and other requirements. Treasury must establish a program to make advance payments to dealers for transferred credits. Amounts provided as direct spending will be grossed-up (increased) by 6.0445%.

Other Credits

There are also several other energy credits included in the IRA that we did not analyze due to lack of feedback about them. List is included below. Let us know if you are interested in learning more about any of them:

- Previously-owned clean vehicle credit
- Zero-emission nuclear power production credit
- Residential energy efficiency credit
- Energy efficient commercial buildings deduction
- Energy efficient home credit

Important Resources

Links to legislative text and other program summaries:

- [Legislative text](#) of the Inflation Reduction Act
- Senate Finance Committee [Section-by-Section](#) of Climate Tax Provisions
- Congressional Research Service [summary](#) of tax provisions in the Inflation Reduction Act