Quarles

Inflation Reduction Act – Project-Related Energy Tax Credit Provisions

At-a-Glance Summary*

Last update: January 3, 2023

Code Section	Short title	General Description	General Calculation	Timing Considerations	Credit Period	Limitations & Adjustments	Bonus Credit	Direct Pay	Transferable	Regs./ Guidance
§45	**Renewable Electricity Production Tax Credit**	Federal tax credit for each kilowatt hour of electricity produced (i) from qualified energy resources (wind, closed-loop biomass, open-loop biomass, geothermal, solar, small irrigation power, municipal solid waste, qualified hydropower production, and marine and hydrokinetic, each as further defined), and (ii) at a qualified facility.	Base credit of 0.3 cents multiplied by the number of kilowatt hours produced and sold to an unrelated person during the taxable year. The credit is multiplied by 5x (1.5 cents) for qualified facilities with maximum net output of less than 1 megawatt, facilities beginning construction before January 30, 2023, or if construction meets applicable prevailing wage and apprenticeship requirements.[1]	Generally, qualified facilities must be placed in service after December 31, 2021, and construction of such qualified facilities must begin prior to January 1, 2025. This existing PTC under §45 is replaced by the new, technology neutral clean energy PTC under §45Y for qualified facilities placed in service after December 31, 2024 -- see immediately below.	10-year period beginning on the date the facility was originally placed in service.	-The credit is reduced by 50% for open-loop biomass facilities, small irrigation power facilities, landfill gas facilities and trash facilities. -The credit is reduced for wind facilities (by a percentage between 20% and 60%, depending on when facility construction began). -The credit is generally reduced by an amount that bears the same ratio as the amount of the credit to the applicable reference price per kilowatt hour of electricity exceeding 8 cents bears to 3 cents. -No production credit under §45 is allowed with respect to any facility that the taxpayer irrevocably elects to treat as a qualified investment credit facility under §48. -The credit is reduced if the facility is financed with tax-exempt bonds.[2]	10% domestic content bonus[3] 10% energy community bonus[4]	Yes: -Direct pay may be elected by "applicable entities" only[5]	Yes[6] (By taxpayers other than "applicable entities")	Pending
§45Y	**Clean Electricity Production Tax Credit**	Federal tax credit for each kilowatt hour of electricity produced at a zero-emissions "qualified facility" and sold by the taxpayer to an unrelated person during the taxable year. To be a "qualified facility" for this purpose, a facility must have a greenhouse gas emissions rate not greater than zero. In general, the greenhouse gas emissions rate is the amount of greenhouse gases emitted expressed as grams of CO2e per kilowatt hour and, for combustion and gasification facilities, is the net rate of emissions taking into account lifecycle greenhouse gas emissions. Qualified carbon dioxide captured per section 45Q(f)(2) and disposed of in secure geological storage or utilized in the manner described in section 45(f)(5) is not included in the amount of greenhouse gas emitted.	Base credit of 0.3 cents multiplied by the relevant number of kilowatt hours. The credit is multiplied by 5x (1.5 cents) for qualified facilities with maximum net output of less than 1 megawatt, facilities beginning construction before January 30, 2023, or if construction meets applicable prevailing wage and apprenticeship requirements.[1]	Qualified facilities must be placed in service after December 31, 2024.	10-year period beginning on the date the facility is placed in service.	-The credit will phase out for facilities beginning construction during the 2nd year (75% credit), 3rd year (50% credit) and 4th and any subsequent year (0% credit) after the later of 2032 and the year in which the Secretary determines that the annual greenhouse gas emissions from the production of electricity in the United States are less than or equal to 25% of the annual greenhouse gas emissions from the production of electricity in the United States. -A qualified facility does not include any facility for which a credit determined under section 45 (renewable electricity), 45J (advanced nuclear), 45Q (carbon capture), 45U (zero emission nuclear), 48 (energy), 48A (advanced coal), or 48E (clean electricity) is allowed under §38 for	10% domestic content bonus[3] 10% energy community bonus[4]	Yes: -Direct pay may be elected by "applicable entities" only[5]	Yes[6] (By taxpayers other than "applicable entities")	Pending Required to be issued no later than January 1, 2025

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						the taxable year or any prior taxable year. -Only electricity produced in the United States is eligible for purposes of the credit. -The credit is reduced if the facility is financed with tax-exempt bonds.[2]				
§48	**Energy Investment Tax Credit**	Federal tax credit equal to the energy percentage of the basis of energy property placed in service during the taxable year. Energy property is energy generation equipment placed in service through 2024, including: qualifying solar energy equipment, geothermal power equipment, fuel cell or microturbine property, combined heat and power system property, small wind energy property, thermal energy equipment, waste energy recovery property, energy storage technology, biogas property and microgrid controllers, all as further set forth in and subject to the qualifications of §48. Energy property also includes qualified property that is part of a qualified investment credit facility; i.e., a qualified facility within the meaning of §45 and described in §45(d) paragraphs 1 (wind), 2 (closed-loop biomass), 3 (open-loop biomass), 4 (geothermal or energy), 6 (landfill gas), 7 (trash), 9 (hydropower), or 11 (marine and hydrokinetic) -- which the taxpayer irrevocably elects to treat as a qualified investment credit facility.	The credit (energy percentage) is 6% in the case of specified types of energy property (qualified fuel cell, certain solar and geothermal equipment prior to January 1, 2025, qualified small wind energy, waste energy recovery, energy storage, qualified biogas, microgrid controllers) and 2% for remaining categories of energy property. The credit is multiplied by 5x (30%) for energy projects with maximum net output of less than 1 megawatt, facilities beginning construction before January 30, 2023, or if construction meets applicable prevailing wage and apprenticeship requirements.[1]	Generally, the pertinent energy property must be placed in service prior to January 1, 2025. This existing ITC under §48 is replaced by the new, technology neutral clean electricity ITC under Section 48E for energy property placed in service after December 31, 2024 -- see immediately below.	n/a	-Energy property does not include any property that is part of a facility the production from which is allowed as a credit under **§**45 for the taxable year or any prior table year. -No production credit under §45 is allowed with respect to any facility that the taxpayer irrevocably elects to treat as a qualified investment credit facility under §48. -The credit is reduced for wind facilities (by a percentage between 20% and 60%, depending on when facility construction began). -The credit is reduced if the facility is financed with tax-exempt bonds.[2]	Domestic content bonus (2%, or 10% if prevailing wage or other conditions are met)[3] Energy community bonus (2%, increased to 10% if prevailing wage or other conditions are met)[4]	Yes: -Direct pay may be elected by "applicable entities" only[5]	Yes[6] (By taxpayers other than "applicable entities")	Pending

§48E	**Clean Electricity Investment Tax Credit**	Federal tax credit equal to the applicable percentage of a qualified investment for such taxable year with respect to any qualified facility and/or energy storage technology. A qualified facility is a facility used for the generation of electricity that is placed in service after December 31, 2024 and for which the greenhouse gas emissions rate is not greater than zero. Greenhouse gas emissions rate and CO2e per kilowatt hour have the same meanings given to those terms under §45Y. A qualified investment with respect to a qualified facility is the sum of (a) the basis of any qualified property placed in service during the taxable year that is part of a qualified facility, plus (b) expenditures for qualified interconnection property paid or incurred in connection with a qualified facility with a maximum net output of not greater than 5 megawatts properly chargeable to the capital account of the taxpayer. Energy storage technology is defined under §48(c)(6), and the related qualified investment for any taxable year is the basis of such energy storage technology placed in service by the taxpayer during such taxable year.	The credit (applicable percentage) is 30% for qualified facilities with maximum net output of less than 1 megawatt, facilities beginning construction before January 30, 2023, or facility construction meets applicable prevailing wage and apprenticeship requirements.[1] Otherwise, the credit is 6%.	Qualified facilities must be placed in service after December 31, 2024.	n/a	-The credit will phase out for qualified investments with respect to qualified facilities and energy storage technology during the 2nd year (75% credit), 3rd year (50% credit) and 4th and any subsequent year (0% credit) after the later of 2032 and the year in which the Secretary determines that the annual greenhouse gas emissions from the production of electricity in the United States are less than or equal to 25% of the annual greenhouse gas emissions from the production of electricity in the United States. -A qualified facility shall not include any facility for which a credit determined under section 45 (renewable electricity), 45J (advanced nuclear), 45Q (carbon capture), 45U (zero emission nuclear), 48 (energy), or 48A (advanced coal) is allowed under section 38 for the taxable year or any prior taxable year. -The credit is reduced if the facility is financed with tax-exempt bonds.[2]	Domestic content bonus (2%, or 10% if prevailing wage or other conditions are met)[3] Energy community bonus (2%, increased to 10% if prevailing wage or other conditions are met)[4] Additional increases for certain facilities in low-income communities, low-income residential building/economic benefit projects.	Yes: -Direct pay may be elected by "applicable entities" only[5]	Yes[6] (By taxpayers other than "applicable entities")	Pending Required to be issued no later than January 1, 2025
§45Q	**Carbon Oxide Sequestration Tax Credit**	Federal tax credit for each metric ton of qualified carbon oxide captured by the taxpayer using carbon capture equipment at a qualified facility and is (i) disposed in secure geological storage and not used, or (ii) is used as a tertiary injectant in a qualified enhanced oil or natural gas recovery project and disposed of in secure geological storage, or (iii) otherwise utilized as provided in §45Q(f)(5). Qualified carbon oxide is any carbon dioxide or other carbon oxide captured from an industrial source that otherwise would be released into the atmosphere as industrial emission of greenhouse gas (or, for direct air capture facilities, is captured directly from the air), which is measured at the source of capture and verified at the point of disposal, injection, or utilization. Qualified facilities must capture not less than 12,500 metric tons of qualified carbon oxide during the	Generally, for carbon oxide stored in secure geological storage and not used, the base credit is $17 per metric ton. For carbon oxide used as a tertiary injectant in a qualified enhanced oil or natural gas recovery project, the base credit is $12 per metric ton. For direct air capture facilities, these amounts are $36 and $26, respectively The credit is multiplied by 5x for any qualified facility and/or carbon capture equipment meeting prevailing wage and apprenticeship requirements.[1]	Generally, construction of qualified facilities must begin before January 1, 2033.	12-year period beginning on the date the carbon capture equipment is placed in service; provided that the taxpayer may instead elect to begin the 12-year period on the first day of the first taxable year in which the credit is claimed under certain circumstances.	-Only qualified carbon oxide captured and disposed of or used within the United States is eligible for purposes of the credit. -The credit is attributed to the taxpayer that owns the carbon capture equipment and physically or contractually ensures the capture and disposal or utilization of the qualified carbon oxide. -The credit is reduced if the facility is financed with tax-exempt bonds.[2]	n/a	Yes: -Direct pay may be elected by "applicable entities" <u>**and**</u> taxable taxpayers[5]	Yes[6] (By taxpayers other than "applicable entities")	Pending

		taxable years (1,000 metric tons for direct air capture facilities, and 18,750 for electricity generating facilities).								
§45V	**Clean Hydrogen Production Tax Credit**	Federal tax credit for each kilogram of qualified clean hydrogen produced by the taxpayer during the taxable year at a qualified clean hydrogen production facility during the 10-year period beginning on the date such facility was originally placed in service. Qualified clean hydrogen is hydrogen produced through a process that results in a lifecycle greenhouse gas emissions rate of not greater than 4 kilograms of CO2e per kilogram of hydrogen.	For each kilogram of qualified clean hydrogen, base credit equal to $0.60 multiplied by an applicable percentage. The applicable percentage depends on the lifecycle greenhouse gas emissions of the qualified clean hydrogen production: 20% for 2.5-4 kg of CO2e, 25% for 1.5-2.5 kg of CO2e, 33.4 percent for .045-1.5 kg of CO2e, and 100% for less than 0.45 kg of CO2e.	Construction of a qualified clean hydrogen production facility must begin before January 1, 2033.	10-year period beginning on the date the clean hydrogen production facility was originally placed in service.	-The qualified clean hydrogen must be produced in the United States in the ordinary course of a trade or business of the taxpayer for sale or use, and the production and sale or use must be verified by an unrelated party. -No credit is allowed with respect to any qualified clean hydrogen produced at a facility which includes carbon capture equipment for which a credit is allowed to any taxpayer under Section 45Q (carbon oxide sequestration credit) for the taxable year or any prior taxable year. -The credit is reduced if the facility is financed with tax-exempt bonds.[1]	n/a	Yes: -Direct pay may be elected by "applicable entities" **and** taxable taxpayers[5]	Yes[6] (By taxpayers other than "applicable entities")	Pending – Required to be issued not later than one year after adoption (i.e., by August 16, 2023)
§45Z	**Clean Fuel Production Tax Credit**	Federal tax credit equal to the product of (a) the applicable amount per gallon (or gallon equivalent) with respect to transportation fuel (generally, fuel suitable for use in a highway vehicle or aircraft which meets the requirements of §45Z) which is (i) produced by the taxpayer at a qualified facility and (ii) sold by the taxpayer to an unrelated person for use by such person in the production of a fuel mixture, in a trade or business, or who sells such fuel at retail and places the fuel in the fuel tank of such other person; and (b) the emissions factor for such fuel. A qualified facility is a facility used for the production of transportation fuels, subject to certain limitations. The emissions factor equals the quotient of (50 kilograms of CO2e per MMBtu, minus the emissions rate for such fuel) divided by 50 kilograms of CO2e. Section 45Z requires the Secretary of the Treasury to publish a table setting forth the emissions rate for types and categories of transportation fuels for these purposes.	Base credit of 20 cents, increased to $1.00 if the transportation fuel is produced at a qualified facility that satisfies prevailing wage and apprenticeship requirements.[1] The above amounts are increased to 35 cents and $1.75, respectively, for sustainable aviation fuel as described in §45Z(3).	Effective only for transportation fuel produced after December 1, 2024 and before December 31, 2027.	n/a	-A qualified facility does not include any facility for which a credit is allowed under §45V (clean hydrogen); §46 to the extent such credit is attributable to a clean hydrogen facility the taxpayer has elected to treat as energy property under §48(a)(15); or under §45Q (carbon oxide sequestration). -The credit only applies for fuel produced in the United States.	n/a	Yes: -Direct pay may be elected by "applicable entities" only[5]	Yes[6] (By taxpayers other than "applicable entities")	Pending Required to be issued no later than January 1, 2025

§45X	**Advanced Manufacturing Production Tax Credit**	Federal tax credit for production of eligible components produced by the taxpayer and sold to an unrelated person in the trade or business of the taxpayer. Eligible components are defined to include solar energy components, wind energy components, inverters, qualifying battery components, and applicable critical minerals, each as further defined in §45X. Regarding integrated components, eligible components will be treated as having been sold to an unrelated person if such components are integrated, incorporated, or assembled into another eligible component that is then sold to an unrelated person.	The credit amount is determined based on the type of eligible component (which § 45X(b) lists at length). E.g., in the case of a thin photovoltaic cell, the credit equals 4 cents multiplied by the capacity of such cell; in the case of a solar module, the credit equals 7 cents multiplied by the capacity of such module; in the case of applicable critical minerals (listed at length from aluminum to zirconium), the credit equals 10% of the costs incurred by the taxpayer with respect to production of such minerals.	-These credits are generally phased out for eligible components sold after 2029, with the credit amounts decreasing in 25% increments per year through 2032 and reaching zero after December 31, 2032.	n/a	-Only eligible components produced in the United States or in a possession of the United States qualify for the credit.	n/a	Yes: -Direct pay may be elected by "applicable entities" **and** taxable taxpayers[5]	Yes[6] (By taxpayers other than "applicable entities")	Pending
§48C	**Qualifying Advanced Energy Project Investment Tax Credit**	Competitive federal tax credit program whereby applicants may seek certification by the Secretary of the Treasury of investment tax credits relating to qualifying advanced energy projects. A qualifying advanced energy project is a project certified by the Secretary under §48C(e) which (a) establishes, expands or re-equips an industrial or manufacturing facility for the production or recycling of (i) property producing energy from the sun, water, wind, geothermal deposits or other renewable resources; (ii) fuel cells, microturbines, or energy storage systems and components, (iii) electric grid modernization equipment or components; (iv) property designed to capture, remove, use or sequester carbon oxide emissions; (v) equipment designed to refine, electrolyze, or blend any fuel, chemical or product which is renewable or low-carbon and low-emission; (vi) property designed to produce conservation technologies (including residential, commercial and industrial applications); (vii) light-, medium, or heavy-duty fuel cell vehicles as well as technologies, components, or materials for such vehicles and associated charging or refueling infrastructure; (viii) hybrid vehicles with a gross weight rating of not less than 14,000 pounds and technologies, components, or materials	The credit amount for any taxable year is equal to 6% of the qualified investment for such taxable year with respect to any qualifying advanced energy project of the taxpayer. The credit is increased to 30% for projects meeting prevailing wage and apprenticeship requirements.[1] The qualified investment for any taxable year in the basis of eligible property placed in service by the taxpayer during such taxable year which is part of a qualifying advanced energy project.	-Qualifying advanced energy projects require application by the taxpayer and award/certification by the Secretary of the Treasury.	n/a	-Competitive tax credit program which requires application to and certification by the Secretary of the Treasury; qualified investment shall not exceed the amount certified by the Secretary as eligible for the credit. -An applicant who receives a certification has three years from the date of issuance to place the project in service. -The identities of certification recipients are publicly disclosed. -Total amount of credits under the §45X program is limited to $10 billion, of which $4 billion is set aside for qualifying projects in energy communities.[4] -No credit is allowed under this program for any qualified investment for which a credit is allowed under §§45 (renewable electricity), 48A (advanced coal), 48B (qualifying gasification), 48E (clean electricity), 45Q (carbon capture) or 45V (clean hydrogen).	n/a	Yes: -Direct pay may be elected by "applicable entities" only[5]	Yes[6] (By taxpayers other than "applicable entities")	Pending

		for such vehicles, or (ix) other advanced energy property designed to reduce greenhouse gas emissions as may be determined by the Secretary; and (b) which re-equips an industrial or manufacturing facility with equipment designed to reduce greenhouse emissions by at least 20% through the installation of designed technologies; or (c) which establishes, expands or re-equips an industrial facility for the processing, refining, or recycling of critical materials.								
§45U	**Zero Emissions Nuclear Production Tax Credit (for Existing Plants)**	Federal tax credit for the amount by which the product of 0.3 cents multiplied by the per kilowatt hour of electricity produced by the taxpayer at a qualified nuclear power facility and sold by the taxpayer to an unrelated person exceeds the reduction amount for such taxable year. The reduction amount is 16% of the excess of the gross receipts of any electricity produced by the facility sold to an unrelated person over the product of 2.5 cents multiplied by the kilowatt hours of electricity produced and sold to an unrelated person, whichever is lesser.	0.3 cents The credit is multiplied by 5x (1.5 cents) for qualified nuclear power facilities meeting prevailing wage and apprenticeship requirements.[1]	The credit applies only with respect to qualified nuclear power facilities placed in service before the enactment of the Inflation Reduction Act.	§45U does not apply to taxable years beginning after December 31, 2032.	-Amounts received from a zero-emission credit program with respect to the qualified nuclear power facility may count as gross receipts for the purpose of the reduction amount.	n/a	Yes: -Direct pay may be elected by "applicable entities" only[5]	Yes[6] (By taxpayers other than "applicable entities")	Pending

[1] See IRS Notice 2022-61, published November 30, 2022.

[2] The credit for any year is reduced by the lesser of (1) 15% or (2) a fraction, the numerator of which is the sum (for the year and all prior years) of bonds exempt under Section 103 used to finance the qualified facility, and the denominator if which is the aggregate amount of additions to the capital account of the qualified facility for the year and all prior years.

[3] The credit is increased by 10% if, generally, a certain percentage of the total cost of components (steel, iron and manufactured products) is mined, produced or manufactured in the United States (20% for offshore wind facilities and 40% for most other facilities). The Secretary must provide exceptions if the components are not produced domestically or if these requirements would increase the overall cost of construction by more than 25%.

[4] An energy community is (i) a brownfield site; (ii) a metro or statistical area with a qualifying level of employment or local tax revenues attributable to coal, oil or natural gas, and unemployment above the national average; or (ii) a census tract (or directly adjoining census tract) in which a coal mine has closed after 12-31-99 or a coal-fired electric generating unit has been retired after 12-31-09.

[5] Section 6417 allows "applicable entities" to make an election to treat "applicable credits" as a direct payment of tax by such entity for the taxable year with respect to which such credit was determined. "Applicable entities" generally includes only tax-exempt entities including tax-exempt entities, States and political subdivisions, Indian Tribal governments, Alaska Native Corporations and REMCs. However, for credits under Sections 45V (clean hydrogen production), 45Q (carbon oxide sequestration) and 45X (advanced manufacturing production), any taxpayer may elect for the direct payment of such credits, but for the first five years only. Per §39(a), the applicable credits may be carried back for three years and unused credits are allowed to be carried forward 22 years.

[6] Section 6418 allows an "eligible taxpayer" to transfer all or a portion of eligible tax credits (as shown in the table above). Any taxpayer other than an "applicable entity" under section 6417 may be an eligible taxpayer. Eligible credits may not be transferred more than once. Payments for the transfer must be made in cash and are not included in the gross income of the selling taxpayer, nor are they deductible by the transferee.