

ITC and PTC Cheat Sheet

A colleague, who is not a tax lawyer, asked for a cheat sheet with key facts about the production tax credit (PTC) and the investment tax credit (ITC) after the Inflation Reduction Act of 2022 (IRA). The chart below is an attempt to do that. It only addresses projects placed in service in 2023 or later.

§ 48 ITC Technologies: Solar Water Heat, Solar Space Heat, Geothermal Electric, Energy Storage, Solar Thermal Electric, Solar Thermal Process Heat, Solar Photovoltaics, Wind (all), Geothermal Heat Pumps, Municipal Solid Waste, Combined Heat and Power (CHP), Fuel Cells using Non-Renewable Fuels, Tidal, Geothermal Direct-Use, Fuel Cells using Renewable Fuels, Microturbines, Offshore Wind, Biogas, Microgrid Controllers, Electrochromic Glass and Interconnection Property for certain small projects.

§ 45 PTC Technologies: Geothermal Electric, Solar Thermal Electric, Solar Photovoltaics, Wind (all), Biomass, Municipal Solid Waste, Landfill Gas, Tidal, Wave and Ocean Thermal.

In 2025, generally the existing § 48 and § 45 credits will be replaced by technology-neutral zero carbon emissions § 45Y Clean Electricity Production Credit and § 48E Clean Electricity Investment Credit, which are similar in structure to the existing PTC and ITC. These credits would start to phase out for projects that begin construction either on or after 2032 or once the aggregate annual greenhouse gas emissions in the U.S. fall by at least 75% from 2022 levels, whichever is later.

§ 45V PTC: Clean Hydrogen

The construction of “qualified clean hydrogen production facility” must begin before January 1, 2033.

<u>Technology Type</u>	<u>Tax Credits</u>	<u>Description</u>	<u>Available Enhancements</u>	<u>§ 45Y Clean Electricity Production Credit</u>	<u>§ 48E Clean Electricity Investment Credit</u>
Solar	ITC and PTC	Under the IRA, solar project may opt for either ITC or PTC. The solar ITC is a one-time up to 30% credit given in the year a project is placed in service. The solar PTC can be claimed every year over the 10-year credit period at the current rate of 2.75¢/kWh for commercial projects, with an annual inflation adjustment going forward.	<u>ITC</u> – base credit is 6% 5x if meets Prevailing Wage and Apprenticeship Requirements (or they are inapplicable) ¹	Yes	Yes

¹ See more information on prevailing wage and apprenticeship requirements [here](#).

+10 percentage points² for Domestic Content / Energy Community bonus available³

+10 or 20 percentage point Low Income Community bonus if allocated by IRS and project is <5 MW

PTC – base credit is \$0.0055/kWh

5x 5 if meets Prevailing Wage and Apprenticeship Requirements (or they are inapplicable)

+10% for Domestic Content / Energy Community bonus available

Transferability – eligible⁴

Direct Pay – eligible (only tax-exempt)⁵

² The adders are one-fifth (e.g., two percentage points, rather than ten percentage points) if the prevailing wage and apprenticeship requirements are not satisfied (or inapplicable due to the “begun construction” date or the project having a capacity below a megawatt).

³ See more information on Energy Communities and Low-Income Communities in an IRA Q&A [here](#).

⁴ See more information on Transferability in this [article](#).

⁵ See more information on Direct Pay in this [article](#).

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Onshore Wind	ITC and PTC		Same as Solar above.		
Offshore Wind	ITC and PTC	Same as onshore wind, with the only difference that offshore wind has a lower domestic content requirement. Generally, at least 40% of a facility's components need to be manufactured in the U.S. to be eligible for the domestic content bonus. However, in the case of offshore wind facilities, only 20% is required to be eligible for the domestic content bonus. ⁶	Same as Solar above.	Yes	Yes
Small Wind	ITC and PTC	Qualified small wind energy property is a property which uses small wind turbine with a nameplate capacity of not more than 100 kilowatts. ⁷	Same as Solar above.	Yes	Yes
Interconnection Property for Solar and Wind Projects less than 5 MW	ITC	<p>Previously, interconnection costs were ineligible for the ITC. Under the IRA, energy projects under five megawatts can include the cost of qualified interconnection property in the project's basis eligible for the ITC.</p> <p>For this purpose, "qualified interconnection property" is defined as tangible property, excluding microgrid controllers, that is part of an addition, modification, or upgrade to a transmission or distribution system to facilitate interconnection, which is originally used by a utility under an interconnection agreement. The cost of "the construction, reconstruction, or erection" the interconnection must be paid or incurred" by the taxpayer.</p>	Same as ITC for Solar above.	No	Yes

⁶ Also, only applicable to facilities that began construction before 2022 and claiming the ITC, offshore wind is not subject to the phaseouts that apply to onshore wind.

⁷ Also, under the ITC, small wind facilities the construction of which begin after December 31, 2019, and which are placed in service before January 1, 2022, are subject to different phaseouts.

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Standalone Storage	ITC	Standalone Storage must (1) receives, stores, and delivers energy for conversion to electricity (or, in the case of hydrogen, which stores energy), and has a nameplate capacity of not less than 5 kWh, (2) and thermal energy storage property.	Same as Solar ITC above.	No	Yes
Fuel Cells	ITC	A hydrogen Fuel Cell power plant must have a nameplate capacity of at least .5 kW and an electricity-only generation efficiency of greater than 30%.	Same as Solar ITC above.	No	Yes
Geothermal Heat Pumps	ITC	A Geothermal Heat Pump must use the ground or ground water as a thermal energy source to heat a structure or as a thermal energy sink to cool a structure, but only with respect to property the construction of which begins before 1/1/2035. ⁸	Same as Solar ITC above.	No	No
Geothermal Electricity	ITC and PTC	<p><u>ITC</u> - equipment used to produce, distribute, or use energy derived from a geothermal deposit, but only, in the case of electricity generated by geothermal power, up to (but not including) the electrical transmission stage, qualifies as “energy property” for purposes of the ITC.</p> <p><u>PTC</u> - The term “geothermal energy” means energy derived from a geothermal deposits.</p> <p>In the case of a facility using geothermal energy to produce electricity, the term “qualified facility” means any facility owned by the taxpayer for which the construction begins before January 1, 2025.</p>	Same as solar above.	Yes	Yes

⁸ The ITC for geothermal heat pumps is subject to a phase out; (i) for projects that start construction after 2032 and are placed in service before 2034, the rate is 26%, and (ii) for projects that start construction during 2034, the rate is 22%. For the 22% ITC for geothermal heat pumps, there is no placed in service deadline; however, the begun construction rules have a safe harbor of not more than four calendar years to avoid being “closely scrutinize[d]” as to whether continuous efforts or construction were pursued from when construction began until the project was placed in service. [Notice 2022-61](#), § 2.02(3).

<u>Technology Type</u>	<u>Tax Credits</u>	<u>Description</u>	<u>Available Enhancements</u>	<u>§ 45Y Clean Electricity Production Credit</u>	<u>§ 48E Clean Electricity Investment Credit</u>
Biogas Property	ITC	<p>“Qualified biogas property” is any property comprising a system that converts biomass into a gas that is either (1) at least 52% methane, or</p> <p>(2) concentrated by the system into a gas that is at least 52% methane and captures the resulting gas for sale or productive use (and not for disposal by combustion).</p> <p>Qualified biogas property includes property that cleans or conditions the biogas.</p> <p>Biomass is considered any organic material other than coal, oil, natural gas, and any products of the foregoing.</p>	Same as ITC for Solar above.	No	Yes
Municipal Solid Waste	ITC and PTC	<p><u>ITC</u> - A taxpayer may elect to treat qualified property that is part of a qualified investment credit facility in lieu of the PTC.</p> <p><u>PTC</u> - Municipal solid waste is any garbage; refuse; sludge from a waste treatment plant; water supply treatment plant, or air pollution control facility; and other discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations, and from community activities.⁹</p> <p>Municipal solid waste does not include solid or dissolved material in domestic sewage, or solid or dissolved materials in irrigation return flows or</p>	Same as Solar above.	Yes	Yes

⁹ § 45(c)(6) (reference to 42 U.S.C. § 6903).

industrial discharges which are point sources subject to certain permits.¹⁰

Municipal solid waste also does not include paper that is commonly recycled and that has been segregated from other solid waste.¹¹

However note, a facility for which a § 45K credit for producing fuel from a nonconventional source is allowed is not eligible for the PTC.

Combined Heat and Power (CHP)

ITC

CHP must use the same energy source for the simultaneous or sequential generation of electrical power, mechanical shaft power, or both, in combination with the generation of steam or other forms of useful thermal energy (including heating and cooling applications).

Such system must produce at least 20% of its total useful energy in the form of thermal energy which is not used to produce electrical or mechanical power (or combination thereof), and at least 20% of its total useful energy in the form of electrical or mechanical power (or combination thereof).

In addition, the energy efficiency percentage must exceed 60% and the construction of the system must begin before 2025.

Systems that have a capacity in excess of 50 MW or a mechanical energy capacity in excess of 67,000 horsepower or an equivalent combination of electrical and mechanical energy capacities are not eligible.

Same as ITC for Solar above.

Yes

Yes

¹⁰ See *id.*

¹¹ See *id.*

<u>Technology Type</u>	<u>Tax Credits</u>	<u>Description</u>	<u>Available Enhancements</u>	<u>§ 45Y Clean Electricity Production Credit</u>	<u>§ 48E Clean Electricity Investment Credit</u>
Microturbines	ITC	<p>The qualified microturbine property is a stationary microturbine power plant which (i) has a nameplate capacity of less than 2,000 kW, and (ii) has an electricity-only generation efficiency of not less than 26%.</p> <p>The credit is limited to \$200 for each kW of capacity of such property.</p> <p>“Stationary microturbine power plant” consists of an integrated system comprised of a gas turbine engine, a combustor, a recuperator or regenerator, a generator or alternator, and associated balance of plant components which converts a fuel into electricity and thermal energy.</p> <p>Includes secondary components located between the existing infrastructure for fuel delivery and the existing infrastructure for power distribution, including equipment and controls for meeting power, voltage and frequency standards.</p> <p>The construction of the property must begin before 2025.</p>	Same as ITC for Solar above.	No	Yes
Landfill Gas	ITC and PTC	<p><u>ITC</u> – In case of a landfill gas facility a taxpayer may elect to treat such facility that as part of a qualified investment credit facility in lieu of the PTC.</p> <p><u>PTC</u> – A qualified landfill gas facility includes a facility producing electricity from gas derived from the biodegradation of municipal solid waste.</p>	Same as Solar above.	Yes	Yes

<u>Technology Type</u>	<u>Tax Credits</u>	<u>Description</u>	<u>Available Enhancements</u>	<u>§ 45Y Clean Electricity Production Credit</u>	<u>§ 48E Clean Electricity Investment Credit</u>
Biomass	ITC and PTC	<p><u>ITC</u></p> <p>A taxpayer can elect ITC in lieu of PTC.</p> <p><u>PTC</u></p> <p><u>Closed-loop biomass</u> - means any organic material from a plant which is planted exclusively for purposes of being used at a qualified facility to produce electricity.</p> <p><u>Open-loop biomass</u> – includes any agricultural livestock waste nutrients.</p> <p>Further, it can include any solid, nonhazardous, cellulosic waste material or any lignin material which is derived from:</p> <p>(i) any of the following forest-related resources: mill and harvesting residues, precommercial thinnings, slash, and brush,</p> <p>(ii) solid wood waste materials, including waste pallets, crates, dunnage, manufacturing and construction wood wastes (other than pressure-treated, chemically-treated, or painted wood wastes), and landscape or right-of-way tree trimmings, but not including municipal solid waste, gas derived from the biodegradation of solid waste, or paper which is commonly recycled, or</p> <p>(iii) agriculture sources, including orchard tree crops, vineyard, grain, legumes, sugar, and other crop by-products or residues.</p>	Same as Solar above.	Yes	Yes

<u>Technology Type</u>	<u>Tax Credits</u>	<u>Description</u>	<u>Available Enhancements</u>	<u>§ 45Y Clean Electricity Production Credit</u>	<u>§ 48E Clean Electricity Investment Credit</u>
Microgrid Controllers	ITC	<p>The microgrid the controller is associated with must must meet several requirements to qualify for ITC:</p> <ul style="list-style-type: none"> • Its generation capacity must be between 4 kW and 20 MW. • It must be capable of operating in connection with the electrical grid and as a single controllable entity. • It has to be capable of operating independently and disconnected from the grid. • It cannot be part of the bulk power system, and • It must be under construction by December 31, 2024. 	Same as ITC for Solar above.	No	No
Electrochromic Glass	ITC	<p><u>ITC</u> - The electrochromic glass must use electricity to change its light transmittance properties in order to heat or cool a structure, but only with respect to property the construction of which begins before 2025.</p>	Same as Solar above.	No	No

<u>Technology Type</u>	<u>Tax Credits</u>	<u>Description</u>	<u>Available Enhancements</u>	<u>§ 45Y Clean Electricity Production Credit</u>	<u>§ 48E Clean Electricity Investment Credit</u>
Hydropower	ITC and PTC	<p><u>ITC</u> – A taxpayer can elect to claim the ITC in lieu of the PTC on a qualified hydropower facility.</p> <p><u>PTC</u> – “qualified hydropower production” is defined as (i) in the case of any hydroelectric dam which was placed in service on or before the date of the enactment, the incremental hydropower production for the taxable year, and (ii) in the case of any nonhydroelectric dam, the hydropower production from the facility for the taxable year.</p>	Same as Solar above.	Yes	Yes
Marine and Hydrokinetic (including tidal)	ITC and PTC	<p><u>ITC</u> - A taxpayer may elect to treat qualified property that is part of a qualified investment credit facility in lieu of the PTC. For this purpose, an investment credit facility includes any marine and hydrokinetic renewable energy facility.</p> <p><u>PTC</u> — the term “marine and hydrokinetic renewable energy” means energy derived from—</p> <ul style="list-style-type: none"> (i) waves, tides, and currents in oceans, estuaries, and tidal areas, (ii) free flowing water in rivers, lakes, and streams, (iii) free flowing water in an irrigation system, canal, or other man-made channel, including projects that utilize nonmechanical structures to accelerate the flow of water for electric power production purposes, (iv) differentials in ocean temperature (ocean thermal energy conversion), or (v) pressurized water used in a pipeline (or similar man-made water conveyance) which is operated-- <ul style="list-style-type: none"> (I) for the distribution of water for agricultural, municipal, or industrial consumption, and 	Same as Solar above.	Yes	Yes

(II) not primarily for the generation of electricity.

However, marine and hydrokinetic renewable energy does not include any energy which is derived from any source which utilizes a dam, diversionary structure, or impoundment for electric power production purposes.

Marine and Hydrokinetic renewable energy facility means any facility owned by the taxpayer (A) which has a nameplate capacity rating of at least 25 kW, and (B) which is originally placed in service on or after the date of the enactment of this paragraph and the construction of which begins before January 1, 2025.

Is property which (1) receives, stores, and delivers energy for conversion to electricity (or, in the case of hydrogen, which stores energy), and has a nameplate capacity of not less than 5 kWh, and (2) and thermal energy storage property.

<u>Technology Type</u>	<u>Tax Credits</u>	<u>Description</u>	<u>Available Enhancements</u>	<u>§ 45Y Clean Electricity Production Credit</u>	<u>§ 48E Clean Electricity Investment Credit</u>
Clean Hydrogen	§ 45V- Credit for Production of Clean Hydrogen	<p>45V provides a 10-year PTC for U.S. production of hydrogen and sale to or use by an unrelated person. The four-tiered incentive in any taxable year is calculated at an amount equal to \$0.60/kilogram (kg) of qualified clean hydrogen produced multiplied by an applicable percentage, see below, based on the resulting lifecycle greenhouse gas emissions rate.</p> <p>Kgs of CO2e Produced QCH per kg of Applicable Percentage</p> <p>2.5 – 4 kg of CO2e = 20%</p> <p>1.5 – 2.5 kg of CO2e = 25%</p> <p>0.45 – 1.5 kg of CO2e = 33.4%</p> <p>0 kg – 0.45 kg of CO2e = 100%</p> <p>The hydrogen must be produced through a process resulting in lifetime greenhouse gas emissions rate of no more than 4 kgs of CO2e per kg of hydrogen.</p> <p>Taxpayers may use electricity from facilities qualifying for a § 45 credit or the proposed § 45U nuclear credit to produce qualified clean hydrogen.</p> <p>No credit may be taken for qualified clean hydrogen produced at a facility that includes carbon capture equipment for which a credit is allowed to any taxpayer under § 45Q for the taxable year or any prior taxable year. However, a taxpayer who uses electricity produced at a PTC- or ITC-eligible facility to produce clean hydrogen may claim both the PTC/ITC and the § 45V production tax credit (with the PTC's requirement that electricity be sold to an unrelated person deemed satisfied).</p> <p>Alternatively, taxpayers may opt for the ITC.</p>	<p>5x if meets Prevailing Wage and Apprenticeship Requirements</p> <p>No adders available</p> <p>Direct Pay – eligible (for both tax-exempt and tax payers)</p> <p>Transferability – eligible</p>	No	No