



Section 45X Advanced Manufacturing Production Tax Credit Guidance

Agency: Department of the Treasury

Action: Notice of proposed rulemaking and public hearing

Comment Deadline: February 13, 2024

Public Hearing: February 22, 2024

Federal Register Notice: [Here](#)

Key Links:

- [Inflation Reduction Act Text Amending 45X Credit](#) (p.414)
- [United States Code at 26 USC 45X as amended by IRA](#)
- [Treasury Request for Comments on Energy Security Tax Credits for Manufacturing Under Sections 48C and 45X](#) (Fall 2022)
- [ZETA Statement](#) (December 2023)

ZETA Written Comments:

- [Comments to Treasury on 45X Implementation](#) (November 2022)

Background

The Section 45X Advanced Manufacturing Production Tax Credit provides \$35 per kWh in each battery cell, \$10 per kWh in each battery module, and covers 10% of the costs of “production” of the applicable critical materials incurred by the taxpayer.

In the case of an eligible component sold during calendar year 2030, 2031, and 2032, the phase-out percentages are 75 percent, 50 percent, and 25 percent, respectively. In the case of an eligible component sold after December 31, 2032, the phase-out percentage is zero percent. Thus, current law provides no section 45X credit after 2032 for eligible components other than for applicable critical minerals.

Overview

The Treasury Department is issuing proposed regulations to implement the Section 45X Advanced Manufacturing Production tax credit. The regulations are organized into four sections, proposed Section 45X-1 through 45X-4:

1. **45X-1** provides general rules applicable to the section 45X credit, including the definition of the term “produced by the taxpayer” for both primary and secondary production. Primary production involves producing an eligible component using non-recycled materials, while secondary production involves producing an eligible component using recycled materials.
2. **45X-2** provides rules for sales to unrelated persons through a person related to the taxpayer, including the rules for a taxpayer to make an election to treat sales of eligible

components to related persons (Related Person Election) as if made to unrelated persons.

- 3. **45X-3** provides definitions and credit amounts for certain eligible components, including solar energy components, wind energy components, inverters, qualifying battery components, and phase-out rules.
- 4. **45X-4** provides definitions and credit amounts for applicable critical minerals that are eligible components.



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Relevant Section Summaries

45X-1 General rules applicable to the advanced manufacturing production credit.

(a). Overview

45X-1(a) provides an overview of the general rules regarding 45X.

(b). Credit amount

45X-1(b) explains how to calculate the amount of the credit provided under section 45X for any taxable year.

(c). Definition of produced by the taxpayer

45X-1(c) defines the term **produced by the taxpayer** for both primary and secondary production in addition to several key implementing provisions:

- A general definition of the term produced by the taxpayer and illustrative examples.
 - General definition: The term produced by the taxpayer means a process conducted by the taxpayer that substantially transforms constituent elements, materials, or subcomponents into a complete and distinct eligible component that is functionally different from that which would result from mere assembly or superficial modification of the elements, materials, or subcomponents.
- Partial transformation that does not result in a substantial transformation of inputs into a complete and distinct eligible component is not included in the definition.
- Neither minor assembly of constituent inputs nor superficial modification of a final eligible component is included in the definition.
- A special rule for applying the definition of produced by the taxpayer for solar grade polysilicon, electrode active materials, and applicable critical minerals.
 - For these components, the term produced by the taxpayer means processing, conversion, refinement, or purification of source materials, such as brines, ores, or waste streams, to derive a distinct eligible component.
- The taxpayer claiming a section 45X credit must be the person that performs the actual production activities that bring about a substantial transformation resulting in the eligible component and that sells such eligible component to an unrelated person.
- If the production of an eligible component is performed in whole or in part subject a **contract manufacturing arrangement**, then the party to such contract that may claim the 45X credit is the taxpayer that performs the actual production activities that bring about a substantial transformation resulting in the eligible component.
- Defines the term **contract manufacturing arrangement** to mean any agreement providing for the production of an eligible component if the agreement is entered into before the production of the eligible component to be delivered under the contract is completed.

- A routine purchase order¹ for off-the-shelf property is not treated as a contract manufacturing arrangement.
- An agreement will be treated as a routine purchase order for off-the-shelf property if the contractor is required to make no more than de minimis modifications to the property to tailor it to the customer's specific needs, or if at the time the agreement is entered into, the contractor can satisfy the agreement out of existing stocks or normal production of finished goods.
- A special rule allowing parties to a contract manufacturing arrangement to agree on which party to the contract will claim the section 45X credit for eligible components produced subject to such contract, including relevant certification requirements and illustrative examples.
- The requirements for the timing of production and sale of eligible components, including illustrative examples.

(d). Produced in the United States

45X-1(d) affirms the 45X credit is only for eligible components produced within the United States or territory. Also clarifies that constituent elements, materials, and subcomponents used in the production of eligible components are not subject to the domestic production rule. It would also be permissible for elements, materials, and subcomponents used in the production of eligible components to be recycled rather than newly created elements, materials, and subcomponents.

(e). Production and sale in a trade or business

45X-1(e) states that an eligible component must be produced and sold in a trade or business of the taxpayer.

(f). Integrated, incorporated, or assembled

45X-1(f) states that a taxpayer is treated as having produced and sold an eligible component to an unrelated person if such component is **integrated, incorporated, or assembled** into another eligible component that is then sold to an unrelated person.

The section further defines the term “integrated, incorporated, or assembled” to mean the production activities by which eligible components that are constituent elements, materials, or subcomponents are substantially transformed into another complete and distinct eligible component functionally different from that which would result from mere assembly or superficial modification of the eligible components used as elements, materials or subcomponents and other elements, materials or subcomponents.

A taxpayer may claim a section 45X credit for each eligible component the taxpayer produces and sells to an unrelated person, including any eligible component the taxpayer produces that was used as a constituent element, material, or subcomponent and integrated, incorporated, or assembled into another complete and distinct eligible component or another complete and distinct product that the taxpayer also produces and sells to an unrelated person.

¹ Based on the definition found in §1.263A2(a)(1)(ii)(B)(2)(ii)

The section also provides illustrative examples of 45X eligibility of a sale of a product with incorporated eligible components to an unrelated person.

(g). Interaction between sections 48C and 45X

45X-1(g) provides that for purposes of 45X, an eligible component must be produced at a section 45X facility and can not include any property produced at a facility that is taken into account for purposes of a credit allowed under section 48C (section 48C credit) after August 16, 2022.

A section 45X facility includes all tangible property that comprises an independently functioning production unit that produces one or more eligible components. A section 48C facility includes all eligible property included in a qualifying advanced energy project for which a taxpayer receives an allocation of section 48C credits and claims such credits after August 16, 2022.

(h). Pass-thru from estates and trusts

The Treasury Department and the IRS intend to provide additional rules in the final guidance addressing how the 45X credit applies in the case of pass-thru from estates and trusts. The Treasury Department and the IRS request comments on how such rules should be implemented and whether there are any special considerations for estates and trusts claiming the 45X credit.

(i). Anti-abuse rule

45X-1(i) provides a general anti-abuse rule that would make the 45X credit unavailable in extraordinary circumstances in which, based on a consideration of all the facts and circumstances, the primary purpose of the production and sale of an eligible component is to obtain the benefit of the section 45X credit in a manner that is wasteful, such as discarding, disposing of, or destroying the eligible component without putting it to productive use.

45X-2 Sale to An Unrelated Person.

(a). Overview

45X-2(a) states that the amount of the 45X credit for any taxable year is equal to the sum of the credit amounts determined under section 45X(b). The credit is determined with respect to each eligible component that is produced by a taxpayer and sold by the taxpayer to an unrelated person during the calendar year in question. Applicable Federal income tax principles apply to determine whether a transaction is in substance a sale (or the provision of a service, or some other disposition).

(b). Definitions

45X-2(b) defines the following terms:

- A “**Person**” is an individual, a trust, estate, partnership, association, company or corporation, as provided in section 7701(a)(1) of the Code. For purposes of this section, an entity disregarded as separate from a person (for example, under §301.7701-3 of this chapter) is not a person.

- For the purposes of a transaction, a “**Related person**” is an individual or entity who would be treated as a single employer under section 52(b) of the Code. For example, two members of a group of trades or businesses under common control under section 52(b) are considered related.
- An “**Unrelated person**” is an individual or entity who does not fall under the definition of a related person.

(c). Special rule for sale to related person

Under the special rule described in 45X-2(c), if someone related to the taxpayer sells an eligible component to someone who is not related to the taxpayer, the regulation considers the sale as if the taxpayer themselves sold the eligible component to an unrelated person.

(d). Related person election

45X-2(d) provides that a taxpayer can elect to treat a sale of an eligible component to a related person as if it was sold to an unrelated person.

(1) Availability of election

This election must be made by “**Members of a consolidated group**” (as defined in §1.1502-1(h)). A member of a consolidated group that sells eligible components in an intercompany transaction may make the Related Person Election to claim the section 45X credit in the year of the intercompany sale.

(2) Time and manner of making election

A taxpayer must make an affirmative Related Person Election annually on their timely filed original Federal income tax return. The Related Person Election will be applicable to all sales of eligible components to related persons by the taxpayer for each trade or business that the taxpayer engages in during the taxable year that resulted in a credit claim and for which the taxpayer has made the Related Person Election. On the tax return, the taxpayer must provide all the necessary information (e.g. name(s) and EINs of all related persons; a listing of the eligible components that are sold; and the intended purpose of any sales of eligible components to or from related persons).

(3) Scope and effect of election

The election applies only to such trade or business for which the Related Person Election is made, and the election must be made anew for each new related person sale.

- In the case of a consolidated group’s trade/business, a Related Person Election must be made on behalf of the members claiming the section 45X credit by the agent for the group and filed with the group’s federal income tax return.
- In the case of a partnership, the election applies only to such trade or business for which the Related Person Election is made. An election by a partnership does not apply to any trade/business conducted by a partner outside the partnership.

(4) Anti-Abuse Rule

The election cannot be made if the taxpayer fails to properly disclose the sale. The sale cannot

be made if it's intended outcome is the “**improper use**” of the eligible component—a use that is wasteful, such as discarding, disposing of, or destroying the eligible component without putting it to a productive use by the related person to which the eligible component is sold. Likewise, the sale cannot be made if it involves a “**defective component**” (a component that does not meet the requirements of section 45X and the section 45X regulations).

(e). Sales of integrated components to related person

45X-2(e) provides that a taxpayer who produces and then sells an eligible component to a related person, who then integrates, incorporates, or assembles the component into another complete and distinct eligible component that is subsequently sold to an unrelated person, may claim a section 45X credit in the taxable year in which the related person's sale to the unrelated person occurs.

Under the special rule for this section, a taxpayer can treat the sale of integrated components to a related person as a sale to an unrelated person. In this instance, the taxpayer produces and then sells an eligible component to a related person, who then integrates, incorporates, or assembles the taxpayer's eligible component into another complete and distinct eligible component that is subsequently sold to an unrelated person. Solely for the purpose of 45X, the taxpayer's sale of the eligible component to the related person is treated as if made to an unrelated person.

45X-3 Eligible Components.

(a). Eligible Component in General

45X-3(a) defines **eligible components** as any solar energy component, any wind energy component, any **inverter**, any **qualifying battery component**, and any **applicable critical mineral**.

(d). Inverters

45X-3(d) outlines the guidance around inverters and the types of inverters that qualify. Based on past member questions, ZETA is summarizing the following definitions:

(1) “**inverter**” in general is defined as—

- an end product that is suitable to convert DC electricity from one or more solar modules or certified distributed wind energy systems into AC electricity.
- Includes: central inverter, commercial inverter, distributed wind inverter, microinverter, or residential inverter

(6) “**residential inverter**” means an inverter that—

- Is suitable for a residence;
 - An inverter is suitable for a residence if, in the form sold by the manufacturer, it is capable of serving as a component in a residential system and meets the core engineering specifications for such application
- Has a rated output of 120 or 240 volt single-phase power; and
- Has a capacity expressed on an alternating current watt basis that is not greater than 20 kilowatts.

(e). Qualifying Battery Components

(1) “**qualifying battery component**” as electrode active materials, battery cells, or battery modules:

(2) “**Electrode Active Materials**”

i. Definitions

- A. **In general** includes cathode electrode materials, anode electrode materials, and electrochemically active materials that contribute to the electrochemical processes necessary for energy storage.
Excludes: battery management systems, terminal assemblies, cell containments, gas release valves, module containments, module connectors, compression plates, straps, pack terminals, bus bars, thermal management systems, and pack jackets.
- B. “**Cathode electrode materials**” materials that comprise the cathode of a commercial battery technology, such as binders, and current collectors (for example, cathode foils).
- C. “**Anode electrode materials**” the materials that comprise the anode of a commercial battery technology, including anode foils.
- D. “**Electrochemically active materials**” electrochemically active materials that contribute to the electrochemical processes necessary for energy storage means battery-grade materials that enable the electrochemical storage within a commercial battery technology”
- F. “**Battery grade materials**” processed materials found in a final battery cell or an analogous unit, or the direct battery-grade precursors to those processed materials.

ii. Credit Amount: equal to 10 percent of the costs incurred by the taxpayer with respect to the production of such materials

iii. Production processes:

- A. Conversion (a chemical transformation from one species to another)
- B. Purification (increasing the mass fraction of a certain element.)

iv. Production Costs Incurred

- all costs as defined in §1.263A-1(e) for the production of an applicable critical mineral only
- **EXCLUDES:**
 - direct or indirect materials costs as defined in §1.263A-1(e)(2)(i)(A) and (e)(3)(ii)(E), respectively, and
 - any costs related to the extraction of raw materials.

(3) “**Battery Cells**”

i. Definition:

- A. an electrochemical cell comprised of one or more positive electrodes and one or more negative electrodes
 - B. With an energy density of not less than 100 watt-hours per liter; and
 - C. Capable of storing at least 12 watt-hours of energy.
- ii. *Capacity Measurement:*
- A. capacity of a battery cell must be measured in accordance with a national or international standard, such as IEC 60086-1 (Primary Batteries) or an equivalent standard.
- iii. *Credit amount*
- A. equal to the product of \$35 multiplied by the capacity of such battery cell, subject to the capacity-to-power ratio

(4) “Modules using battery cells”

i. Definition:

- this section with an aggregate capacity of not less than 7 kilowatt-hours
- A module using battery cells, is a module with two or more battery cells that are configured electrically, in series or parallel, to create voltage or current, as appropriate, to a specified end use, meaning an end-use configuration of battery technologies
- An end-use configuration is the product that ultimately serves a specified end-use. It is the collection of interconnected cells, configured to that specific end-use and interconnected with the necessary hardware and software required to deliver the required energy and power (voltage and current) for that use.

ii. Capacity Measurement:

- Taxpayers must measure the capacity of a module using battery cells with a testing procedure that complies with a national or international standard published by a recognized standard-setting organization.
- The capacity of a battery module may not exceed the total capacity of the battery cells in the module.
- Taxpayers must measure the capacity of a battery cell in accordance with a national or international standard, such as IEC 60086-1 (Primary Batteries), or an equivalent standard. Taxpayers can reference the USABC Battery Test Manual for additional guidance.

iii. Credit Amount: equal to the product of \$10 multiplied by the capacity of such battery module, subject to the capacity-to-power limitation

The guidance also includes the definition, capacity measurement, and credit amount for **“Modules with no battery cells”**

(6) LIMITATION “capacity-to-power ratio”

- means, with respect to a battery cell or battery module, the ratio of the capacity of such cell or module to the maximum discharge amount of such cell or module.
- must not exceed a capacity-to-power ratio of 100:1

45X-4 Applicable critical minerals.

(a). In general.

45X-4(a) defines “**applicable critical mineral**” as any of the minerals listed below.

(b). Definitions

45X-4(b) provides definitions for 50 critical minerals:

aluminum, antimony, Barite, Beryllium, Cerium, Cesium, Chromium, Cobalt, Dysprosium, Arsenic, Bismuth, Erbium, Gallium, Hafnium, Holmium, Iridium, Lanthanum, Lutetium, Magnesium, Palladium, Platinum, Praseodymium, Rhodium, Rubidium, Ruthenium, Samarium, Scandium, Tantalum, Terbium, Thulium, Titanium, Ytterbium, Zinc, and Zirconium.

Pertaining to minerals relevant to ZETA Membership:

Critical Mineral	Conversion	Purity Standard
Cobalt	Converted to cobalt sulfate OR	Converted to $\geq 99.6\%$ purity
Graphite (natural or synthetic)	N/A	Converted to $\geq 99.9\%$ purity
Lithium	Converted to lithium carbonate or lithium hydroxide OR	Converted to $\geq 99.9\%$ purity
Manganese	Converted to manganese sulphate OR	Converted to $\geq 99.7\%$ purity
Neodymium	Converted to neodymium-praseodymium oxide	Converted to $\geq 99\%$ purity
	Converted to neodymium oxide OR	Converted to $\geq 99.5\%$ purity
	N/A	Converted to $\geq 99.99\%$ purity
Nickel	Converted to nickel sulfate OR	Converted to $\geq 99\%$ purity

(c). Credit Amount

- (1) In general—equal to 10 percent of the costs incurred by the taxpayer with respect to the production of such mineral
- (2) Production processes
 - i. Conversion
 - ii. Purification
- (3) Production costs incurred
 - i. all costs as defined in §1.263A-1(e) for the production of an applicable critical mineral only
 - ii. **EXCLUDES:**
 - direct or indirect materials costs as defined in §1.263A-1(e)(2)(i)(A) and (e)(3)(ii)(E), respectively, and

