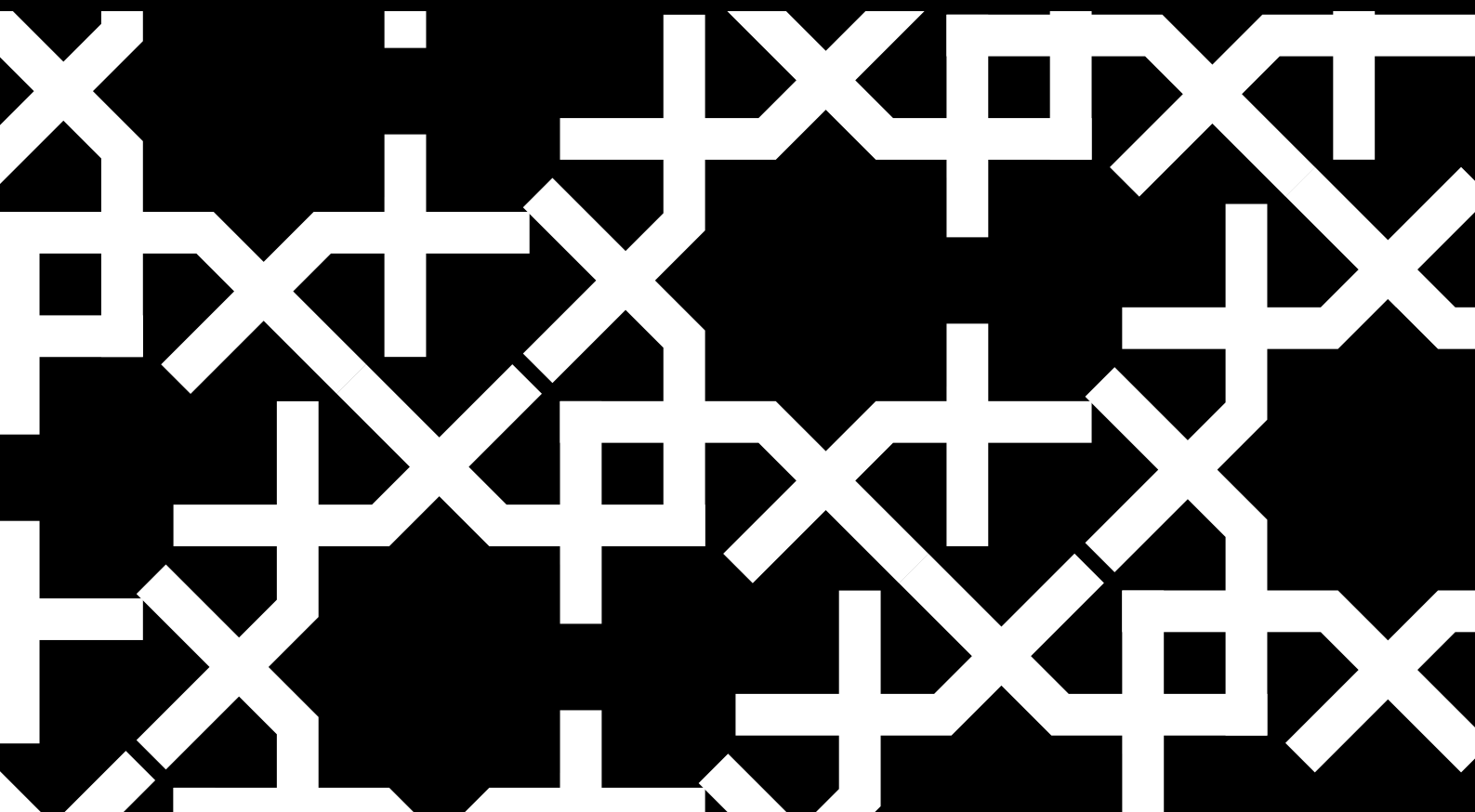
crux

The ultimate guide to advanced manufacturing tax credits



Investment in clean energy is on the rise, fueled in part by the growth of the US clean energy manufacturing industry. Investments in domestic manufacturing, driven by valuable new tax credits, are fueling a virtuous cycle. The Inflation Reduction Act introduced the 45X advanced manufacturing production tax credit, which incentivizes the production of solar, wind, or battery components, inverters, and critical minerals. Manufacturers have several monetization options for their tax credits, including transferability, which permits the tax credit to be sold for cash to an unrelated party.

This paper outlines the 45X tax credit program and its value; commercial standards and monetization options for 45X-eligible manufacturers, including transferability; and the current status of the US clean energy manufacturing industry.

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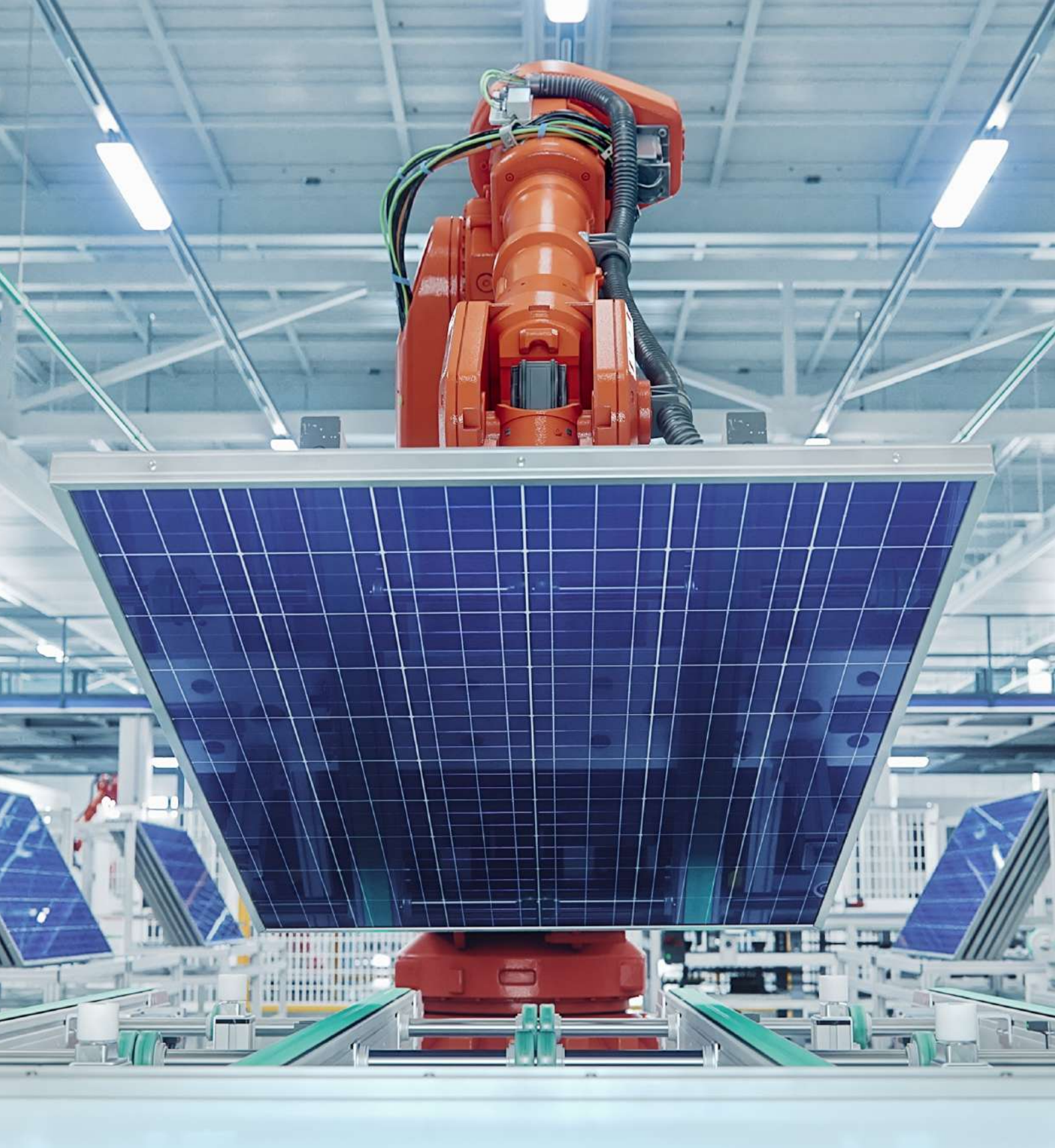


01

What is Section 45X?

What is the 45X tax credit?

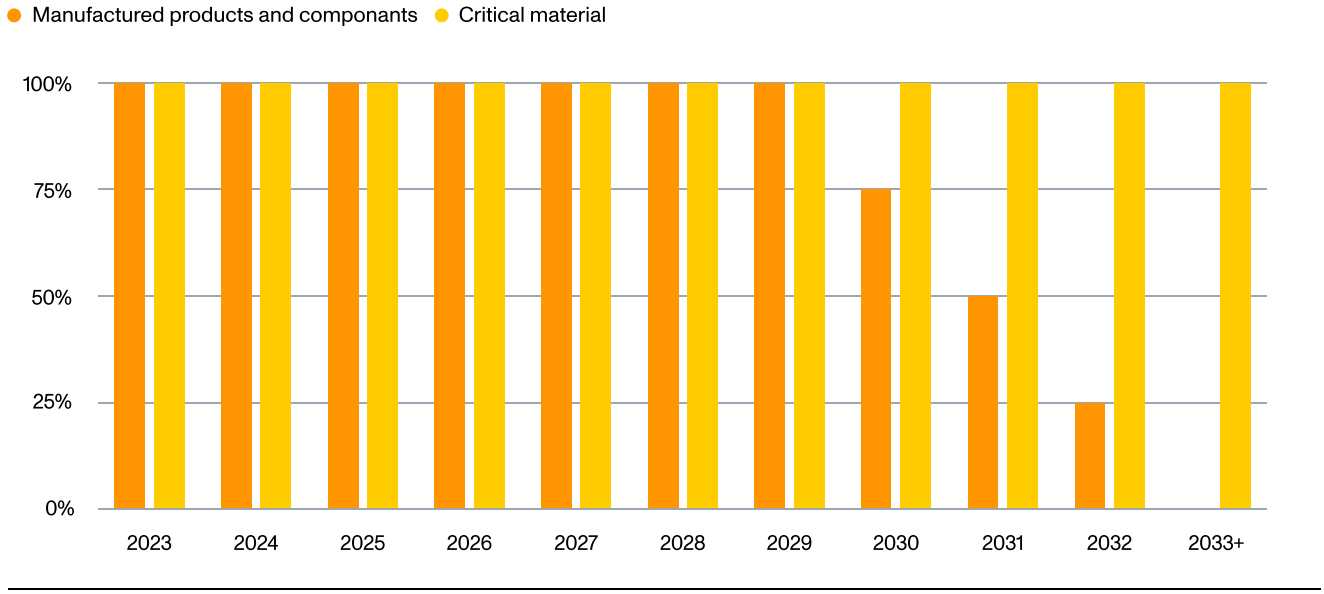
The Inflation Reduction Act (IRA) created a tax incentive for domestic manufacturers under Section 45X of the Internal Revenue Code (IRC). Domestic manufacturing is among the most popular and bipartisan industries, enjoying broad support from both Republicans and Democrats across the US.

The 45X Production Tax Credit and the corresponding 48C Investment Tax Credit have already been incredibly successful in catalyzing manufacturing investments in the United States. Research by the Solar Energy Industries Association shows that solar module manufacturing capacity has increased by four times since the passage of the IRA, and wind energy manufacturing capacity is expanding. Overall, nearly $111 billion in new manufacturing investment has been made over the past two years, according to data compiled by the Department of Energy.

Under the existing 45X incentive, manufacturers are entitled to receive a production tax credit for solar components, wind energy components, battery components, or for refining or recycling critical minerals. The value of the tax credit is calculated based on either a fixed dollar amount per unit of production, per unit of electrical capacity, or as a percentage of the cost of production. 45X tax credits are transferable, and many manufacturers are finding that transferability is a valuable way to maximize the benefit of these tax credits.

Advanced manufacturing production tax credits (AMPTC) went into effect at the beginning of 2023 and run through the end of 2032. For most manufactured goods, the credit value phases down in the later years: to 75% of its value in 2030, 50% of its value in 2031, and 25% in 2032. Critical minerals are not subject to the phase out.

Figure 1. Phase out percentage for manufactured components and critical minerals



Source: 26 U.S. Code § 45X(b)(3)

Who qualifies for a 45X tax credit?

Domestic manufacturing requirements

The IRS defines the process of manufacturing as "substantial transformation of inputs into a complete and distinct eligible component," not simply that which would result from "minor assembly" or "superficial modification." In the draft guidance for the AMPTC, the IRS provides a series of examples of scenarios that would not meet the definition of a manufactured good eligible for the AMPTC.

Finished goods must be produced in the US, but subcomponents or constituent elements (for instance, steel, framing, electrical components, etc.) do not need to be sourced in the US. Additionally, manufacturers are not required to meet prevailing wage and apprenticeship (PWA) requirements that are common for other clean energy tax credits.
Finally, the manufactured component must be sold to a third party in order to earn the AMPTC.

Documentation of the manufacturing process, the goods produced, and the record of sale to a third party are key components of ensuring that a manufacturer can reliably calculate the value of their tax credits.

Contract manufacturing arrangements

The IRS makes an allowance for contract manufacturing arrangements under the AMPTC guidance. The owner of a manufacturing facility is entitled to receive the AMPTC. However, if the owner has a contract manufacturing agreement with an unrelated entity, the AMPTCs can alternatively be claimed by the contracting party. IRS defines a contract manufacturing arrangement as "any agreement providing for the production of an eligible component," other than "a routine purchase order for off-the-shelf property."

In the event that a contract manufacturing agreement is in place, the tax credit seller (whether the manufacturer or the contracting party) should ensure that there is clear documentation of which entity is claiming the AMPTCs. IRS regulations require all parties to the contract manufacturing arrangement to sign a certification statement acknowledging who will claim the 45X credits as well as a penalty of perjury statement.

How is 45X calculated for eligible products

45X tax credits are available to any US-based manufacturer of an eligible product. The IRS has articulated a defined tax credit value for each eligible component included in the 45X regulation. Manufacturers must ensure that their products meet the definition of an eligible component and determine the associated PTC value. Finally, the component must be sold to an unrelated third party in order to generate the 45X tax credit.

Solar energy components: solar modules, photovoltaic cells (thin film and crystalline), photovoltaic wafers, solar grade polysilicon, torque tubes (for solar tracking devices), structural fasteners (for solar tracking devices), and polymeric backsheets.

Solar component	Credit value
Thin film or crystalline PV cell	4 cents per watt capacity (DC)
PV wafer	$12 per square meter
Solar grade polysilicon	$3 per kilogram
Polymeric backsheet	40 cents per square meter
Solar module	7 cents per watt capacity (DC)

Wind energy components: blades, nacelles, towers, offshore wind foundations (fixed and floating platforms), and offshore wind vessels.

Wind energy component	Credit value
Related offshore wind vessel	10% of sales price of vessel
Wind turbine blade	2 cents per watt*
Nacelle	5 cents per watt*
Tower	3 cents per watt*
Offshore wind foundation, fixed platform	2 cents per watt*
Offshore wind foundation, floating platform	4 cents per watt*

**for the completed wind turbine for which the component is designed*

Qualifying battery components: battery cells, and battery modules.

Battery component	Credit value
Battery cell	$35 per kWh**
Battery module (that does not include battery cells)	$45 per kWh**
Battery module (including battery cell)	$10 per kWh**

*** kWh capacity shall not exceed a capacity-to-power ratio of 100:1.*

Inverters: includes central inverters, commercial inverters, distributed wind inverters, microinverters, residential inverters, and utility inverters.

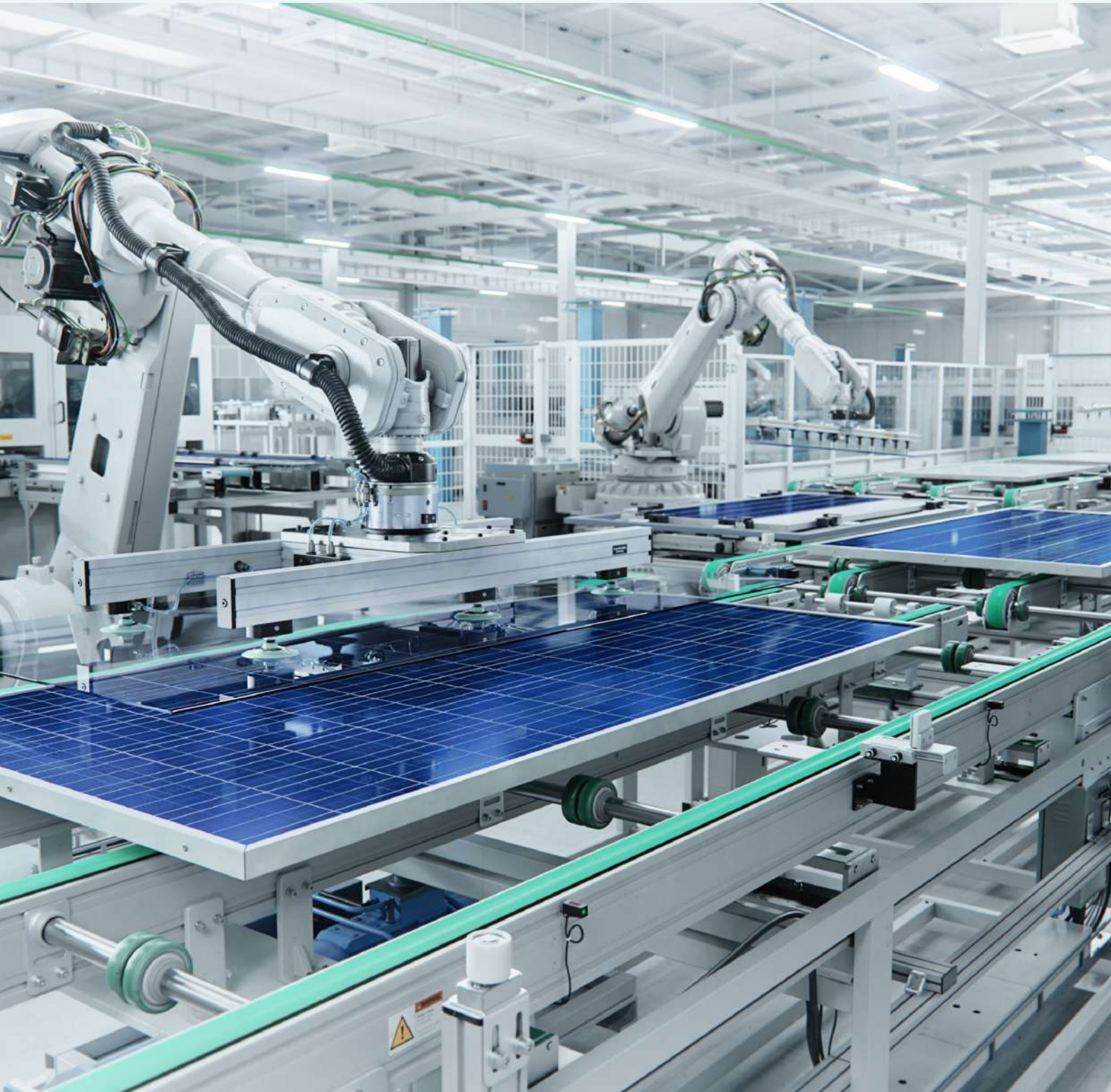
Inverter	Credit value
Central inverter	0.25 cents per watt capacity (AC)
Utility inverter	1.5 cents per watt capacity (AC)
Commercial inverter	2 cents per watt capacity (AC)
Residential inverter	6.5 cents per watt capacity (AC)
Microinverter OR distributed wind inverter	11 cents per watt capacity (AC)

Electrode active materials, torque tubes, and structural fasteners: in addition to sub sector-specific components, the IRA includes tax credits for the manufacture of certain items for use in battery production or in the manufacture of solar tracking systems.

Component	Credit value
Electrode active material	10% of the cost of production
Torque tubes	87 cents per kilogram
Structural fasteners	$2.28 per kilogram

Applicable critical minerals: from a list of 50 critical minerals, the corresponding credit value is equal to 10% of the cost of production of each mineral. In draft guidance, the IRS proposed excluding the "direct and indirect" extraction or acquisition costs for the critical mineral, which can include the cost of procurement of the mineral including mining or purchasing. The critical minerals are: Aluminum, antimony, arsenic, barite, beryllium, bismuth, cerium, cesium, chromium, cobalt, dysprosium, erbium, europium, fluorspar, gadolinium, gallium, germanium, graphite, hafnium, holmium, indium, iridium, lanthanum, lithium, lutetium, magnesium, manganese, neodymium, nickel, niobium, palladium, platinum, praseodymium, rhodium, rubidium, ruthenium, samarium, scandium, tantalum, tellurium, terbium, thulium, tin, titanium, tungsten, vanadium, ytterbium, yttrium, zinc, and zirconium.

Cost of production and Section 263A: for all products where credits are determined on the basis of production costs, the draft guidance proposes that the cost of production should include costs capitalized under Section 263A. Section 263A permits producers of a certain product to capitalize direct material costs, direct labor costs, and certain indirect costs that are allocable to the produced property. Indirect costs, in particular mixed service costs (such as general and administrative costs), can require careful accounting to ensure that they are properly allocated for the purpose of calculating 45X.



02

Commercial standards for 45X

How does the 45X tax credit work?

Key dates and deadlines

The 45X credit is generated and claimed on an annual basis. Manufacturers must ensure that the credits claimed are tied to eligible products that were sold to a third party within a given year.

Importantly, products may have been produced in a preceding tax year, but until they are sold the manufacturer is not entitled to claim a 45X credit associated with the good. The IRS has outlined certain exemptions for related persons, which may be eligible for an exemption.

What is the difference between 48C and 45X tax credits?

Manufacturing facilities that are eligible for 45X may also be eligible for an investment tax credit, 48C, for qualifying advanced energy projects. The total value of the 48C program is capped at $10 billion, and the Department of Energy oversees the allocation of these tax credits. 48C is a one time credit worth 30% of the value of an investment in a new manufacturing facility.

Facilities which received an award under the 48C program and claimed the tax credit associated with it are not eligible for 45X tax credits. Some facilities may include multiple production lines, and may earn 48C for some portion of their operations but not for the full facility operation. The portion of a facility that is not covered under the 48C program could still claim 45X tax credits associated with its production of eligible goods through the end of 2032.

What is the 45X related person election?

A key requirement of the 45X program is that the eligible products or components must be sold to an unrelated third party in order to generate the tax credit. However, the IRS has outlined certain circumstances under which a sale to a related person may be treated as a sale to an unrelated person (the "related person election").

Prior to the sale, the related person must make the election with the IRS and may be required to supply information as a condition of the election.

How do you claim a 45X tax credit?

US taxpayers who have determined that they are entitled to claim the 45X tax credit have several options for claiming or monetizing the credit. A company intending to claim the 45X will file IRS Form 7207 with their annual return. A separate form must be completed for each eligible facility that is owned or controlled by the taxpayer. 45X credits are eligible for direct pay and transferability. The process for claiming the credit is similar in both cases, but the method of monetization differs. In both cases, the taxpayer will annually register their facility through the IRS pre-filing registration portal and indicate whether they are taking direct pay or transferring the credits.

Direct pay

Taxpayers may take the 45X credits on their own return and may elect to receive a refund from the IRS if doing so results in overpayment of taxes. This process is often referred to as direct pay. To file for Direct Pay, the taxpayer must complete pre-filing registration for each facility and file Form 3800 with their annual tax return. Companies electing to take direct pay for a tax year are generally presumed to take direct pay for the following four tax years, unless they revoke their election and choose to transfer the credits. Once revoked, the taxpayer cannot re-elect direct pay for any remaining balance of the five-year direct pay entitlement.

Transferring 45X tax credits

45X tax credits are among the most desirable and transactable tax credits in the transferable tax credit market. There are no limitations on the time period that the company can transfer their credits — as long as the credit is generated, it can be sold in the transfer market. Similar to direct pay, in order to transfer credits, the taxpayer must complete the pre-filing registration process, file Form 7207 for each facility and file Form 3800 with their annual returns.

To transfer the tax credits to a buyer, the taxpayer typically will estimate their annual 45X production volume and secure a buyer directly, or through an intermediary (like a financial institution, tax firm, or transparent marketplace). The seller can ensure that their credits are highly transactable by lining up due diligence items, legal memos, and documentation of sales ahead of engaging with prospective buyers.

In general, larger deals (over $50 million in annual credit volume) tend to attract the strongest pricing. It is relatively common for 45X credits to transact around 92-95% of their face value and to settle on a quarterly basis (in arrears, for credits generated during the preceding quarter). Strong credit pricing and timely settlement can make transferability the most cost effective mechanism for a company to claim its 45X credits, when accounting for the time value of money.

What can you expect after the pre-filing registration process?

Pre-filing registration with the IRS is a feature of both the transfer and direct pay methods of claiming the credit. The pre-filing registration portal opened in December 2023. Companies that generate 45X credits should anticipate supplying basic facility information in the pre-filing registration portal. The IRS publishes a detailed guide describing the application process for each tax credit-eligible entity and tax credit type.

In general, the IRS recommends that applicants allow 120 days for processing of the pre-filing registration, though the process can be faster. At the end of the process, the IRS will supply a pre-filing registration number which is required in any tax credit transfer deal or in a direct pay filing. Companies listing their credits on Crux are able to enter the pre-filing registration number, as well as share the status of their application if the number has not yet been received.

Case studies of successful 45X transactions

Crux has facilitated several 45X transactions across a range of technologies, including one of the first deals in this new tax credit category.

Case study 1: multi-year sale of tax credits from an inverter manufacturer

First of its kind

Crux helped EPC Power, a US-based inverter manufacturer to identify a buyer for its 45X tax credits in one of the first such deals in the transfer market. Early leadership on the 45X tax credit category helped pave the way for deal standards to emerge.

Speed to close

The deal closed extraordinarily quickly, as both parties were well-prepared to transact. From the initial bid to signing final docs, the transaction took only 45 days.

Competitive process

EPC was able to solicit multiple bids for their tax credits in the span of only a few days, which allowed them to maximize their deal across a range of terms, including readiness to transact, timing of payment, and price.

Multi-year strip

The tax credit buyer was able to take the sellers 2023-2024 tax credits, allowing them certainty of cash flows for a multi-year period.

Case study 2: optimizing the sale of tax credits for a leading solar module manufacturer

Leading brands

Crux connected Silfab Solar and Schneider Electric to facilitate a transaction in 45X tax credits related to Silfab's solar modules.

Successful process

Both parties were sophisticated, and took advantage of Crux's suite of industry-leading software and breadth of experience. Crux was able to help keep the process running smoothly, to the benefit of both parties.

Driving growth

Selling their tax credits creates more near-term cash flow for Silfab, allowing them to expand their US-based manufacturing facilities.

Transparency into the market

Crux's market intelligence resources and visibility into deal pricing allows our team to provide real-time insight into market pricing and competitive dynamics.

What are the benefits of 45X tax credits for stakeholders?

Benefits for sellers

Transferring tax credits is a relatively straightforward way to maximize the value of 45X tax credits. The 45X incentive is new, having come into effect following the passage of the IRA in 2022, but the long-standing tax credit advisory industry has quickly come to embrace these credits as clear, well-constructed, and simple to diligence in the context of a transaction.

In particular, Crux has observed that the regulatory guidance published by the IRS in December 2023 settled most uncertainties regarding the 45X credit. Average credit pricing observed before and after that guidance was published reflects the market's increasing comfort and familiarity with 45X. Prior to the release of guidance, 45X credits averaged around 89 cents on the dollar in the market (an 11% discount to their face value). After the release of guidance, credits average 92.8 cents (just over a 7% discount to face value).

Figure 2. 45X pricing before and after the release of IRS guidance

Source: Crux Mid-Year Market Intelligence Report

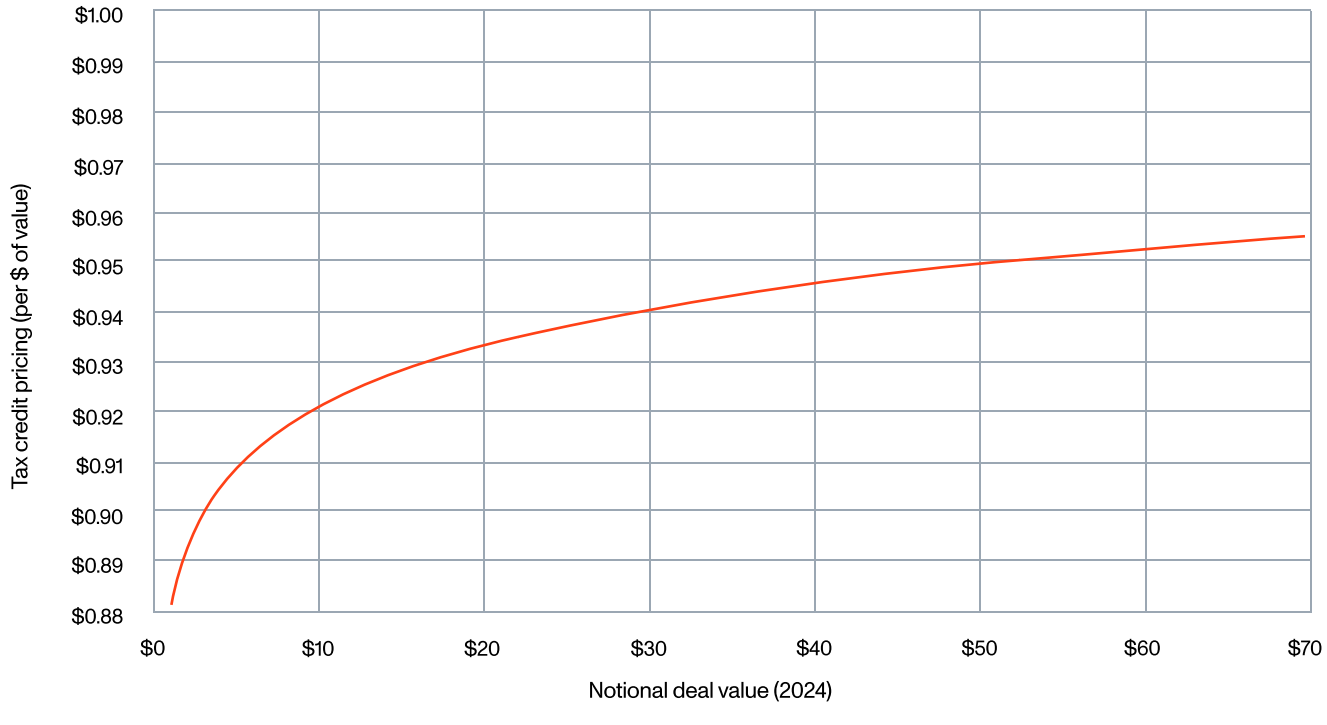
45X credit deals also tend to be quick to execute and simple to diligence for all parties involved. Unlike other common tax credits, such as the Investment Tax Credit (ITC), 45X credits do not incorporate the risk of future recapture of the credit. Once the manufacturer can demonstrate that their products are eligible for 45X credits and that the products have been sold, there is typically little doubt that they can claim and transfer the corresponding tax credit.

The simplicity of 45X contributes to the competitiveness of these credits among buyers and helps accelerate transaction timeline. Crux has observed that 30% of 45X credits listed on the platform receive bids within the first day, and 100% of credits receive a bid in the first 3 days after listing. 45X credits typically get multiple bids, as well, contributing to a seller's ability to optimize the transaction across a range of terms – counterparty readiness to transact, timing of payment, insurance, and, of course, overall price.

Even so, it is important to approach the market with realistic price expectations. Deals with notional value under $50 million per year, or sellers who desire a multi-year commitment from a buyer may experience less robust demand for their credits. Buyers typically expect that the seller will cover the costs associated with due diligence (up to a negotiated cap) as well as any insurance that may be required to backstop the seller's indemnities (or in place of indemnities).

The high water mark for pricing in the tax credit market is around 96 cents per dollar of credit. This pricing is typically realized for the largest deals, where the seller is a large company with a strong credit rating. Deals in the mid to low 90s for 45X credits remain common, related to the notional value of the deal. Figure 3 illustrates the market pricing curve for 45X tax credits from Crux's 2024 mid-year analysis of tax credit deals, derived from $6.8 billion in total tax credit transactions.

Figure 3. Market pricing curve for 45X tax credits, cents per dollar of tax credit value



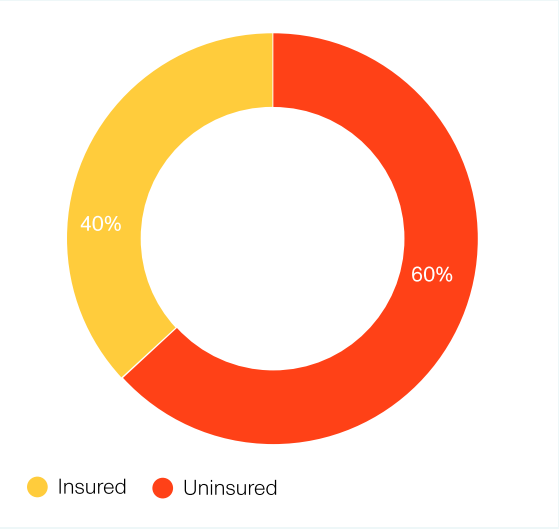
Source: Crux 2024 Mid-Year Market Intelligence Report

Benefits for buyers

Tax credit buyers have developed a strong appetite for 45X tax credits due to their relative abundance, simplicity, and the integral role that the 45X program plays in supporting the US manufacturing industry.

The due diligence process (discussed more fully in the next section covering transaction risks) is typically a straightforward and facts-based analysis. It has become increasingly common for manufacturers to indemnify their tax credit deals in lieu of obtaining insurance. Crux has observed that in the first half of 2024, about 40% of 45X deals included some form of insurance while 60% included a parent guarantee. Insurance is generally widely available to cover 45X transactions, as well, and some buyers prefer the comfort that insurance affords.

Figure 4. Prevalence of insurance on 45X transactions in 1H2024



45X PTCs are generated on an ongoing basis and buyers have the option to enter into a multi-year contract for tax credits, also called purchasing a “strip” of tax credits. Unlike other PTCs, where it can be common to contract for tax credits on a ten-year basis, shorter-term 2-3 year strips are more common for 45X deals. This shorter-duration strip can be attractive to buyers who may not be able to take a view of their future tax liabilities a decade ahead of time.

For intermediaries

Intermediaries play an important role in facilitating tax credit transactions. It is increasingly common for 45X credits to seek multiple bids for their credits. Sellers typically indicate that they prefer counterparties who are ready to transact and have experience dealing with 45X credits. Since the credit category is so new, buyers do not necessarily have this experience.

Engaging with experienced advisors can help buyers climb the learning curve more quickly, put together a competitive and timely bid for 45X credits, and demonstrate their preparedness for a transaction. Advisors and intermediaries should help their clients recognize the competitiveness of the marketplace, particularly for in-demand credits like 45X, and encourage them to bid competitively and respond quickly to communication from the seller.

Crux can serve as a neutral source of information and a sounding board for intermediary parties and their clients, as well. Data from more than $10 billion of transferable tax credit transactions, including over $2 billion in 45X deals, provide valuable insight into pricing and commercial terms.

What are the risks with 45X tax credits and how are they mitigated?

Like many of the tax credit programs established in the IRA, the 45X program is new and there are some inherent uncertainties regarding how the program will be overseen and administered by the IRS in the long-term.

The most material and foreseeable risk for a given 45X transaction relate to the eligibility and calculation of the tax credit. Buyers and sellers will evaluate several important factors in the context of due diligence for a 45X deal.

First, parties must ensure that an eligible product is being produced and that the manufacturing process includes the substantial transformation of the eligible product (not mere assembly). Tax credit sellers typically provide summaries of the manufacturing stages, including information on any subcomponents and their sourcing, the manner in which they are transformed and the nature of the finished product. For instance, if the tax credit for a given component is calculated on a per-watt basis, the seller should supply information validating the electrical capacity of the final product. A legal memo may be supplied which summarizes this information.

Second, if the taxpayer is claiming 45X credits generated by a contract manufacturer (where they are either the contracting party or the manufacturer), the seller must ensure that there is documentation of the assignment of the 45X credit. The commercial structure of the seller should be reviewed carefully, in any scenario, to ensure that they are entitled to generate and transfer the tax credits.

Finally, the seller and buyer will review records of sale to affirm that the product has been sold to a third party, thereby generating the tax credit. Receipt by the buyer of the product may be delayed from the point at which the seller indicates that a product has been sold, and this timing difference may come into play when determining the volume of tax credits generated at the end of a given year. Sellers should use consistent methods to determine that a product has been sold — i.e. the point at which a customer attains control of a product or the point when the product has left the premises of a manufacturing facility (whether or not the seller is responsible for delivery of the product).

Buyers carefully consider risks throughout the transaction process primarily through due diligence. Mitigation strategies typically involve indemnification for the buyer against any risks that surface in due diligence. Indemnification can involve third-party insurance or a parent guarantee from the seller.

Crux has prepared a proprietary due diligence checklist and workflow software specifically designed to support 45X transactions. The due diligence checklist has been tested and utilized in the context of hundreds of millions of dollars worth of 45X deals. Including one of the first 45X transactions and a recent transaction between Schneider Electric and Silfab Solar.

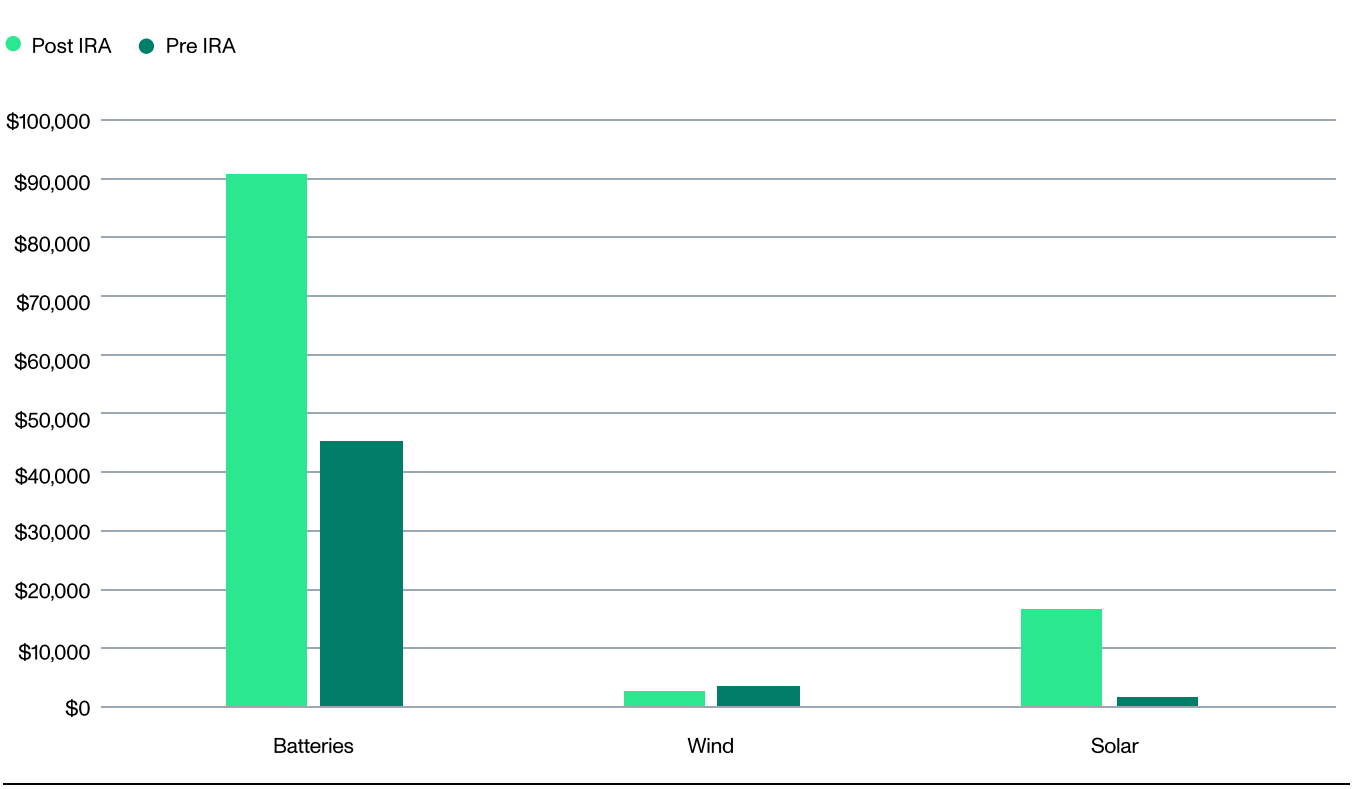
02

US manufacturing industry overview

US manufacturing industry overview

The US clean energy manufacturing supply chain is expanding rapidly due to the growing demand for clean energy components and the incentives under the 45X program. Investment in the components supported by 45X has increased 117% since the passage of the Inflation Reduction Act, according to data compiled by the Department of Energy. The battery sector is benefiting from the largest share of investment, followed by solar and wind power.

Figure 5. Aggregate investment in clean energy manufacturing since the passage of the IRA (versus the preceding period)

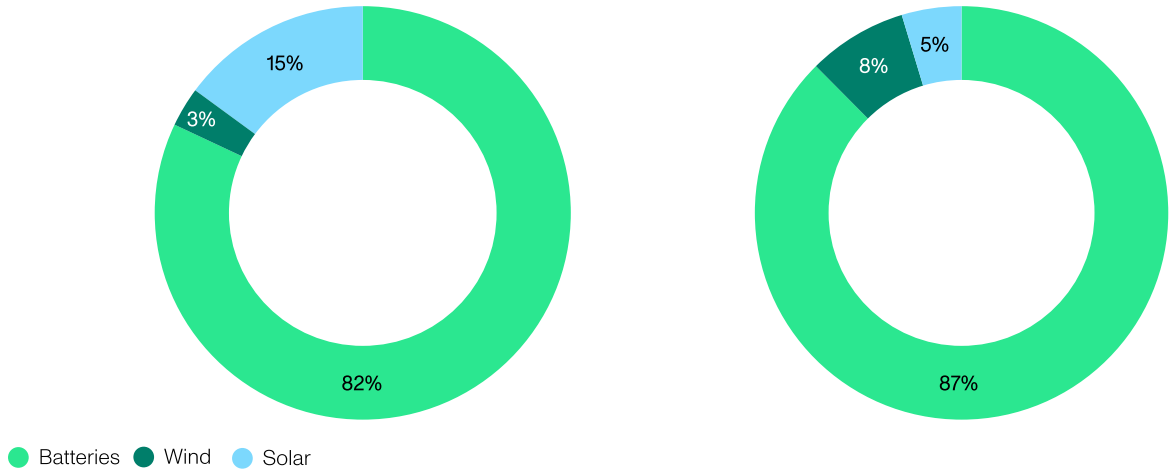


Source: Energy.gov/Invest tracker of investment announced since the start of the Biden Administration (January 2021)

While the battery industry continues to draw the largest share of investment in clean energy manufacturing, investment has become more diverse. Solar manufacturing has attracted 15% of investment spending in the years since the IRA passed and battery investment as a share of the total has declined to 82% from 87% (while increasing overall).

Wind energy manufacturing investment is the only segment that has declined since the IRA passed, both overall and as a share of overall clean energy manufacturing investment (falling to 2% from 6%). This reflects a pull back in investment in offshore wind manufacturing, and is likely a cyclical sector that is dependent on a variety of policy and economic factors.

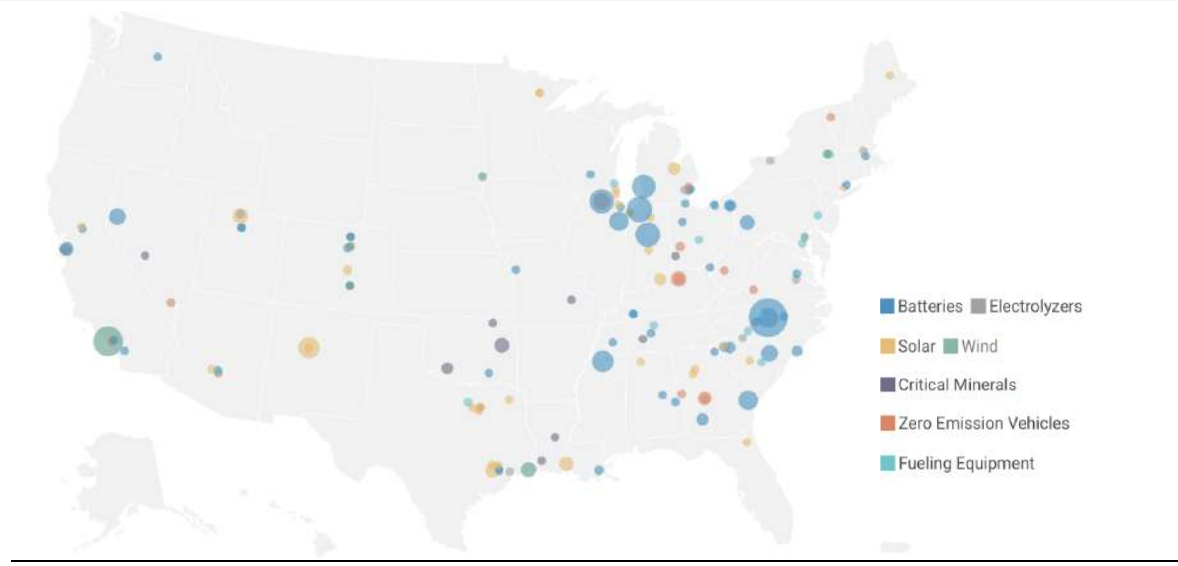
Figure 6. Investment as a share of total after (left) and before (right) passage of the IRA



Source: Energy.gov/Invest tracker of investment announced since the start of the Biden Administration (January 2021)

The investments in clean energy manufacturing facilities are supporting significant job growth. The DOE reports that the announced manufacturing investment since 2022 will support nearly 90,000 jobs, an increase of 81% from the period before the IRA. These jobs and facilities are distributed across 36 states, according to the Clean Investment Monitor, who also tracks investment in clean energy projects and manufacturing.

Figure 7. Map of announced investments in clean manufacturing



Source: Clean Investment Monitor

Building on the effectiveness of the 45X program in boosting manufacturing investment, policymakers on both sides of the political aisle see room to go further. The 2024 Republican Party Platform emphasizes the importance of reshoring manufacturing supply chains, with repeated references to domestic manufacturing. At a campaign stop in September 2024, Vice President Kamala Harris proposed an additional $100 billion in manufacturing credits for "industries of the future" including low-emission steel and iron production, biotechnology, new sustainable materials, AI data centers, further investment in clean energy manufacturing and innovation, semiconductors, aerospace, and other industries.

The 45X tax credit is supporting broad-based investment in domestic manufacturing supply chains and job growth. 45X credits are relatively straightforward to calculate and diligence and are attractive to both buyers and sellers of tax credits.

Get guidance and support on 45X tax credits from Crux

A central purpose of the IRA is to drive investments in new domestic manufacturing capacity for clean energy technologies such as solar products and components, wind components, battery components, inverters, and critical minerals. To that end, Congress created section 45X of the tax code to award tax credits for the production and sale of these products.

45X tax credits are among the most valuable and popular credits in the new transferable tax credit market. These credits are supporting billions of dollars of new investment in US manufacturing capacity. Transferability enables manufacturers to economically and efficiently monetize their tax credits. The diligence process for a tax credit transaction is relatively straightforward and a deal can create a valuable and predictable source of cash flow for the manufacturer.

Crux has successfully executed some of the first 45X transactions and continues to be a leader in the development of the burgeoning tax credit market. Get in touch with us today to learn more about maximizing the value of your 45X tax credits.

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Learn more about 45X tax credits

Tune into our upcoming webinar with Evercore ISI to dive deeper into the rapidly growing market for 45X transferable tax credits and their impact on job creation, clean energy production, and domestic manufacturing in the U.S.

October 16 at 2pm ET

Join our webinar

Register today

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