Navigating the Inflation Reduction Act (IRA): A Guide to Advanced Manufacturing Production Credits

A Strategic Roadmap to Unlocking Federal Tax Credits and Incentives.

Content Partner: J. v. G. technology GmbH

Turnkey solar module production lines — since 1997

www.jvg-thoma.com

Technical Overview: Advanced Manufacturing Production Credits

Created as part of the PVKnowHow Knowledge Network

Prepared by J.v.G. Technology GmbH

Based on composite case scenarios — figures are illustrative of real market conditions

Key Project Data

$0.07/W	2030	$35	2 Opti...
Module Credit (45X)	**Phase-Out Begins**	**Credit Per Module**	**Monetization Paths**
Per DC watt produced and sold — largest single solar component incentive	Credit reduces 25% per year from 2030 — full expiry after 2032	Per standard 500W module produced and sold domestically	Direct pay (refundable) or transfer to unrelated party

Scale: Industrial solar module production (US-based) · Incentive: Section 45X Advanced Manufacturing Production Credit · Model: Production-based tax credit · Region: United States · Source: PVKnowHow / J.v.G. Technology GmbH

The Market Paradox: Why Manufacture Solar in the US?

The Challenge

- Asian manufacturers dominate global solar production with low cost structures
- US labor and overhead costs are structurally higher than competing regions
- Domestic manufacturers historically struggled to compete on module price alone
- Supply chain concentration creates geopolitical and logistics risk

The Shift

- Section 45X fundamentally changes the US cost equation via production credits
- A $0.07/W module credit directly offsets the manufacturing cost gap
- Production-based model rewards operational output — not just capital deployment
- US domestic content bonus creates built-in demand from solar project developers

The IRA Opportunity: What Is Section 45X?

Legal Basis

- Created by the Inflation Reduction Act (IRA), effective for components produced and sold after Dec. 31, 2022
- Inserts new Section 45X into the Internal Revenue Code (IRC)
- Final IRS regulations published October 2024 — regulatory certainty now established

Core Mechanic

- A production-based tax credit (PTC) — not an investment credit
- Credit is earned per eligible component produced *and* sold to an unrelated party
- No prevailing wage or apprenticeship requirements to access full credit amounts

Scope

- Covers solar energy components, wind components, inverters, battery components, and critical minerals
- Must be produced within the United States — no restriction on ownership nationality
- Mutual exclusivity with Section 48C Advanced Energy Project credit

How Production Credits Work: The Core Logic

1

1 — Produce an Eligible Component in the US

Manufacturing must represent "substantial transformation" — not minor assembly or superficial modification

Production must be completed and sales must occur after December 31, 2022

2

2 — Sell to an Unrelated Party

Component must be sold in the ordinary course of a trade or business

Special related-party election available with IRS pre-registration; contract manufacturing rules apply

3

3 — Calculate the Credit

Multiply the applicable rate (e.g., $0.07/W for modules) by production volume in watts

Example: 500 MW/year × $0.07/W = $35 million annual credit

4

4 — Monetize: Direct Pay or Transfer

Elect direct pay (refundable against tax) for up to five consecutive years

Alternatively, transfer the credit to an unrelated buyer — credits traded at ~92–95 cents on the dollar in 2024

5

5 — File Form 7207

Report eligible component sales annually; pre-filing registration required via IRS IRA/CHIPS tool

Documentation of production, sale quantities, and buyer identity is essential

Eligible Solar Components & Credit Rates

Component	Credit Rate	Basis	Notes
Solar Module	$0.07 / W (DC)	Electrical capacity	Largest single incentive; $35 per 500W module
Photovoltaic Cell	$0.04 / W (DC)	Electrical capacity	Incentivizes domestic cell manufacturing
Photovoltaic Wafer	$12 / m^2	Surface area	Critical upstream component for cells
Solar-Grade Polysilicon	$3 / kg	Weight	Capital-intensive; upstream supply chain anchor
Polymeric Backsheet	$0.40 / m^2	Surface area	Module protection layer; stackable with module credit
Torque Tubes / Fasteners	Varies	Capacity-based	Tracker components; relevant for utility-scale

Credits for individual components can be **stacked** where vertical integration exists (e.g., a manufacturer producing both cells and modules may claim both respective credits).

Financial Impact: Cost & Revenue Effect

Cost Reduction Effect

- $0.07/W module credit directly reduces effective cost of production per watt
- For a 500 MW/yr factory: ~$35 million annual credit revenue
- Offsets structural cost disadvantages vs. lower-cost manufacturing regions
- No capital investment threshold — every watt produced and sold generates the credit

Revenue Enhancement Effect

- Credit is additive to module sales revenue — improves margin per watt shipped
- Domestic content bonus on solar projects creates premium demand for US-made modules
- Transferable credits can be monetized immediately even if tax liability is low
- Congress projects $87.3 billion in total 45X credits claimed by 2028 — broad industry adoption anticipated

US Competitiveness vs. Asia: The New Equation

Without 45X

- US labor, land, and overhead structurally higher than Asian benchmarks
- Module cost gap of $0.05–$0.10/W historically made US production uncompetitive
- Import-dependent supply chain; exposure to tariff and logistics risk

With 45X Credits

- $0.07/W module credit substantially closes or eliminates the cost gap
- Vertical integration (polysilicon → wafer → cell → module) multiplies total credit stack
- Manufacturing investment in solar/wind/battery up 686% from Q2 2022 to Q2 2024

Additional Competitiveness Levers

- Domestic content bonus on ITC/PTC for solar farms drives buyer preference for US-made modules
- Reduced logistics cost and lead time vs. trans-Pacific supply chains
- No foreign ownership restriction — international manufacturers fully eligible

Strategic Implications: Local Production & Vertical Integration

1

Enter at Module Assembly

Lowest capex entry point — $0.07/W credit immediately accessible; proven turnkey manufacturing concepts available

2

Integrate Cell Production

Adding cell manufacturing captures additional $0.04/W — requires higher investment but significantly improves credit stack

3

Full Vertical Integration

Wafer, polysilicon, and backsheet credits further accumulate — each upstream step adds independent credit revenue

An experienced European turnkey provider can integrate full-line process methodology from module assembly through to cell integration — reducing the technical learning curve and time-to-production for new US manufacturers.

Risks: Supply Chain, Regulation & Timing

Regulatory & Political Risk

- 45X is statutory law, but legislative proposals to modify or restrict credits are active
- Foreign entity of concern (FEOC) restrictions may limit supply chain options
- Executive actions have created uncertainty around IRA disbursement timelines

Timing & Phase-Out Risk

- Phase-out begins 2030: 75% credit value in 2030, 50% in 2031, 25% in 2032 — then zero
- Factory ramp-up must occur early enough to capture peak credit years
- Delayed entry materially reduces total credit capture over the investment horizon

Supply Chain & Operational Risk

- Domestic upstream supply (wafers, cells, polysilicon) remains limited — imports still required at many steps
- Documentation and IRS compliance requirements demand robust ERP and traceability systems
- 48C credit and 45X are mutually exclusive — facility planning must segregate qualifying assets carefully

Implementation Considerations

1

Entity Structure & Registration

- Establish a US-based manufacturing entity; register via IRS IRA/CHIPS Pre-filing Tool
- Define who claims the credit in any contract manufacturing arrangement — document in writing

2

Production & Sales Documentation

- Maintain records of component type, production volumes, wattage, and buyer identity for each sale
- Substantial transformation standard must be demonstrable — minor assembly does not qualify

3

Monetization Strategy

- Assess annual tax liability to determine direct pay vs. transfer — both are valid for any five-year window
- Transfer market is liquid: credits traded at ~92–95¢ on the dollar in H1 2024

4

Turnkey Partner Selection

- Proven manufacturing concepts reduce technology and ramp-up risk significantly
- On-site team training critical — prior manufacturing experience not a prerequisite with the right partner

FAQ Highlights

Can a non-US company claim 45X credits?

Yes. Credits are tied to the location of production, not the nationality of the owner. Any entity producing eligible components at a US-based facility and selling to an unrelated party may claim the credit.

Is 45X a PTC or an ITC?

It is a Production Tax Credit (PTC) — earned per unit produced and sold, not based on initial capital investment. This rewards operational scale and output efficiency rather than upfront spending alone.

Can module and cell credits both be claimed?

Yes, where vertical integration exists. A manufacturer producing both cells and modules may claim the $0.04/W cell credit and the $0.07/W module credit independently, stacking total credit value per watt.

What is the domestic content bonus?

Solar farms using a qualifying percentage of US-made components receive an enhanced ITC/PTC bonus credit. This creates direct commercial demand from project developers for 45X-eligible domestically produced modules.

Strategic Conclusion

A Structural Opportunity

- Section 45X fundamentally changes the US solar manufacturing cost equation
- $0.07/W module credit offsets the structural cost gap vs. Asian producers
- Production-based model rewards scale, efficiency, and operational discipline

A Time-Bounded Window

- Phase-out begins 2030 — early movers capture the maximum credit years
- Vertical integration multiplies credit stack and long-term competitiveness
- Proven turnkey manufacturing concepts are available to accelerate market entry

Risk-Adjusted Assessment

- Regulatory and political risks are real but credits remain statutory law
- Financial incentives alone do not build a factory — operational planning and technical execution are equally critical
- Success depends on sound partner selection, compliance infrastructure, and speed to production

The IRA's Section 45X represents a historic, government-backed industrial policy shift. The opportunity is real — but it is time-bounded, execution-dependent, and requires both financial and operational rigor to capture.

About the Content Partner

J. v. G. technology GmbH — The DESERT Company

Founded in 1997 in Bavaria, Germany. Family-owned engineering company specializing in turnkey solar module production lines.

More than 90 factory projects delivered worldwide.
On-site team training included — no prior manufacturing experience required.

Key areas:

Turnkey PV manufacturing lines | DESERT Technology® | TÜV-certified module designs | Factory planning to production

www.jvg-thoma.com

Contact

J.v.G. Technology GmbH

Möningerberg 1a, 92342 Freystadt, Germany

info@jvg-thoma.de | www.jvg-thoma.com

Source: https://www.pvknowhow.com/countries/united-states/inflation-reduction-act-advanced-manufacturing-credits

---

Created with the support of JvGLabs — specialist for AI systems and AI-driven visibility. www.jvglabs.com