



Why US Solar's Future Depends on Upstream Manufacturing Scale-Up

Moustafa Ramadan, PhD | PV ModuleTech USA 2026

Moustafa.Ramadan@informa.com

David.Hardin@informa.com

Company & Speaker - Introduction

PV Tech, Solar Media & Informa

- PV Tech is a well-known brand within Solar Media.
- Solar Media has been part of Informa Markets since 2024, a division within Informa PLC.
- Informa PLC is an events, digital services & academic research group, LON:INF, FTSE 100, market cap. ca. \$10.25B*
- PV Tech have been covering bankability of suppliers since 2019 in the PV Space and we released the Battery StorageTech Bankability Ratings Report to do a similar thing in the ESS Space.

* As of 7 Nov. 2025

Moustafa Ramadan, Ph.D.

- Head of Market Research, PV Tech.
- Joined PV Tech in 2025 and worked on the PV Bankability and Manufacturing report.
- Qualified in Energy Engineering (BEng, MEng), Energy Finance (MSc, PhD), Energy Law (LLM).
- Worked in large-scale solar development in the UK and Ireland, consulted on renewable energy projects across Africa and the Middle East.
- Completed Acquisition Due Diligence on over 100 renewable energy projects and portfolios.



Agenda

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The Scope of US Trade Restrictions

How 92% of global PV capacity now faces restrictions

02

FEOC Rules & Ownership Structures

The 24.9% threshold reshaping manufacturer partnerships

03

A New Solar Manufacturing Map

Turkey, MENA and sub-Saharan Africa as new hubs

04

The Critical Cell Bottleneck

66GW of module capacity vs 11GW of domestic cells

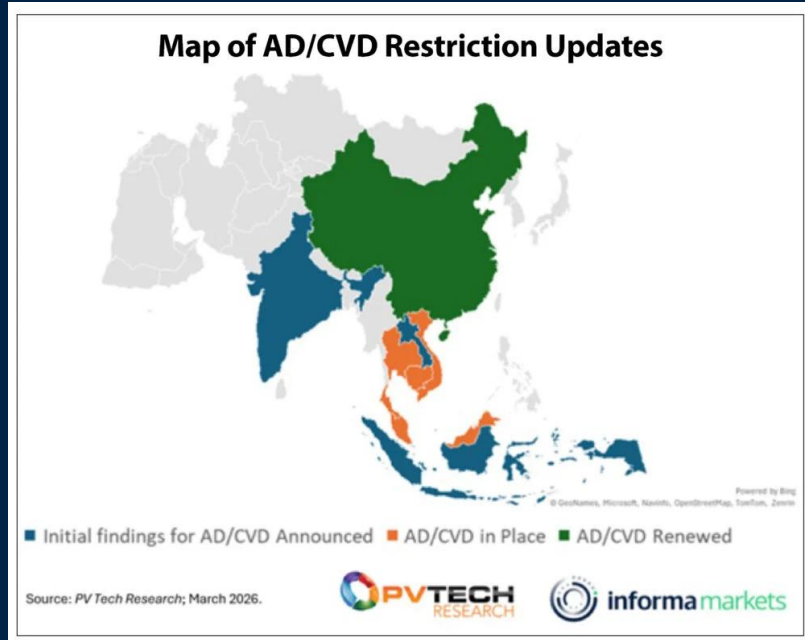
05

Winners, Losers & What's Next

The Section 232 polysilicon wildcard and the road ahead

01

The Scope of US Trade Restrictions



AD/CVD Investigations

China, SE Asia, India, Indonesia, Laos — and now Ethiopia under petition from the Alliance for American Solar Manufacturing

Section 232 Polysilicon

Targets raw material at the base of the supply chain — a fundamental departure from past trade tools

Cascading Uncertainty

Manufacturers cannot determine which supply sources remain viable for US market access

92% of global PV module capacity faces US market restrictions



02

FEOC Rules & Ownership Structures

What is FEOC?

Foreign Entity of Concern (FEOC) rules prohibit clean energy projects from using equipment manufactured, owned, or controlled by entities tied to China, Russia, Iran or North Korea — if they wish to qualify for federal tax credits.

The 24.9% Threshold

25% ownership is presumed to trigger FEOC classification. Companies are structuring JV partnerships just below this level to access US tax credits while maintaining Chinese capital.

Incentives Affected by FEOC rules

45X (Advanced Manufacturing Production Tax Credit)

for domestic manufacturers of clean energy components

45Y (Clean Electricity Production Tax Credit)

technology-neutral production tax credit for clean electricity generation

48E (Clean Electricity Investment Tax Credit)

Section 48E is a technology-neutral investment tax credit that supports clean electricity

MACR Rule

≥50% of solar component costs must be sourced from non-FEOC countries for developers to claim credits



The Section 232 Wildcard

Traditional AD/CVD

- Targets finished products: cells, modules
- Applied country-by-country
- Manufacturers can shift production to dodge duties
- Leaves upstream materials largely untouched

Section 232 Polysilicon

- Targets raw polysilicon at the source
- Could apply globally — no country can simply dodge it
- Eliminates need for ongoing AD/CVD rulings
- Results expected H2 2026 — timeline uncertain

 *Prolonged uncertainty has already destabilised the market — manufacturers can't determine which supply sources remain viable.*



03

A New Solar Manufacturing Map

Turkey

1GW → 7GW

Cell capacity by 2027. HIT-30 incentive programme. CW Enerji secured ~\$30M in US cell contracts + \$750M MoU.

MENA

Saudi Arabia
Oman • Egypt

Chinese manufacturers expanding via JVs structured around the 24.9% FEOC threshold.

Sub-Saharan Africa

~11GW

Operational PV cell capacity. Agile, privately-held producers targeting US. High regulatory risk (Ethiopia now under petition).

India

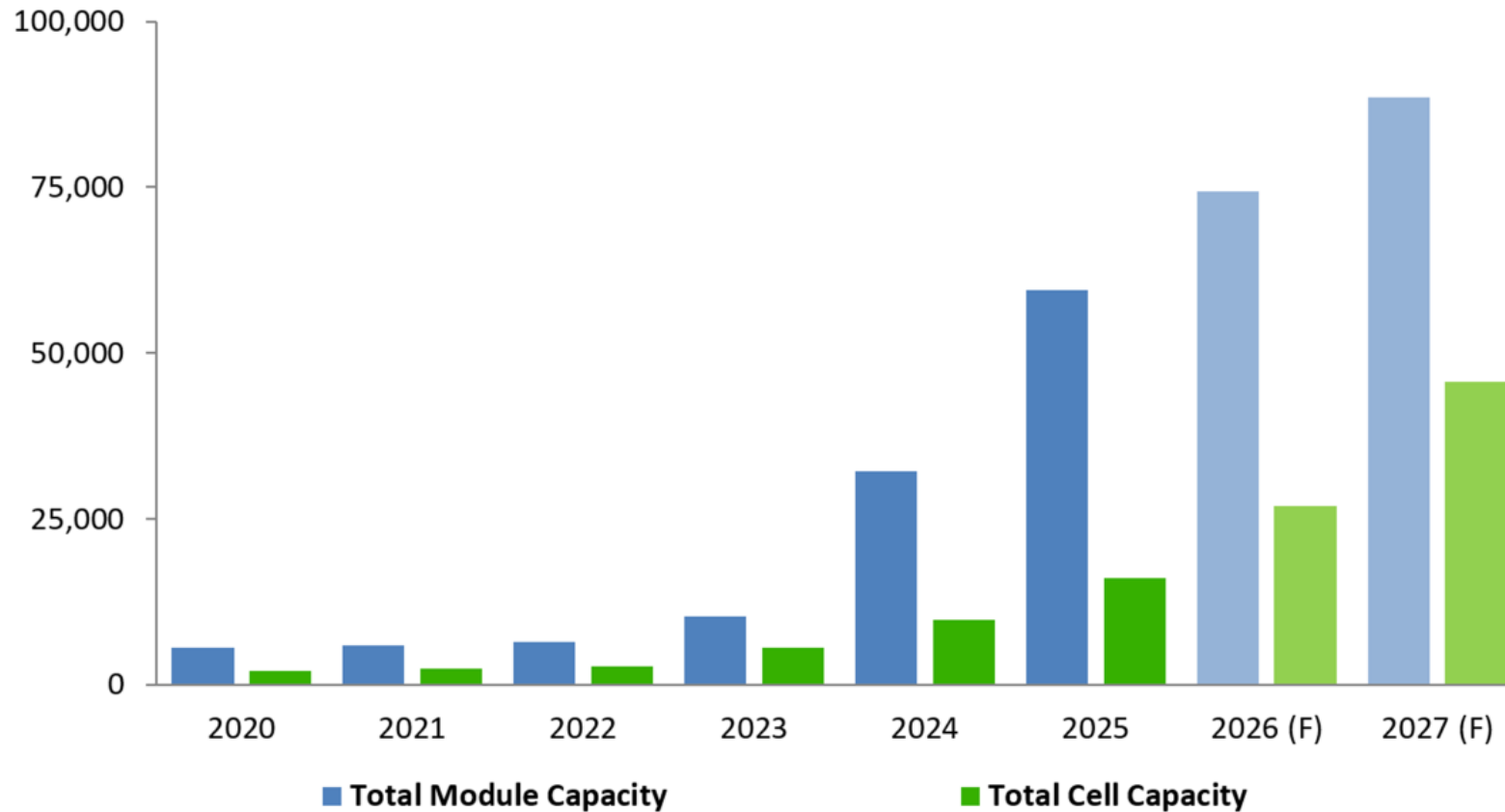
ALMM-II

Potentially FEOC-compliant cells but domestic mandates (June 2026) will limit export availability to US buyers.

04

The Critical Cell Bottleneck

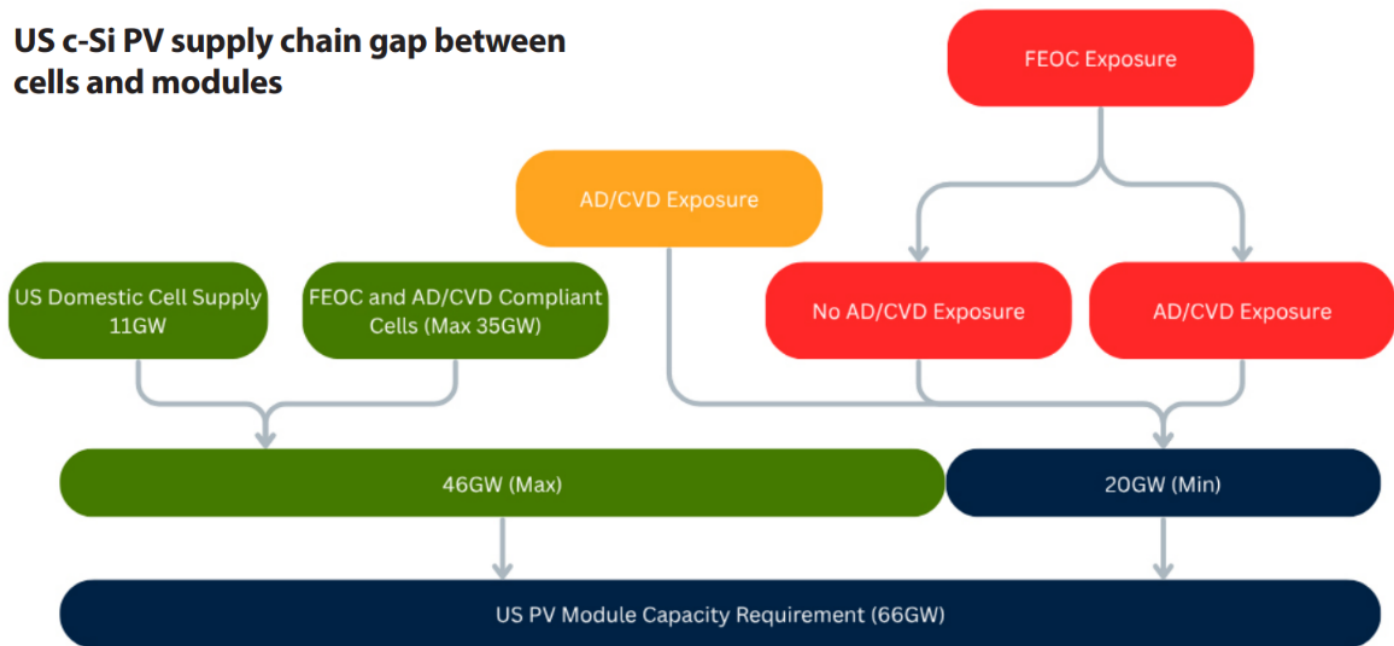
U.S. Cell & Module Capacity (MW)



Source: PV Tech Research; June 2026.

How the gap is being filled?

US c-Si PV supply chain gap between cells and modules



Source: PV Tech Research, PV Manufacturing and Technology Report, May 2026

>66GW

US domestic module capacity (excl. thin film)

~11GW

US domestic cell capacity

<35GW

FEOC + AD/CVD compliant cell capacity globally

>20GW

Minimum supply gap even in the best-case scenario



Navigating the Cell Supply Tiers

Tier 1

PREMIUM

AD/CVD Compliant + FEOC Compliant

Maximum supply chain security. Full eligibility for 45X (manufacturer) and 45Y/48E (developer) tax credits. Scarce and command premium pricing.

Tier 2

VIABLE

AD/CVD Tariff | FEOC Compliant

Still qualifies for tax credits. AD/CVD tariff must be paid. Viability depends on pricing + tariff rate. India is a key candidate — but ALMM-II domestic mandates may constrain availability.

Tier 3a

RESTRICTED

FEOC Exposure | No AD/CVD

Ineligible for tax credits. Smallest supply category. Comes from FEOC-linked companies building outside home country.

Tier 3b

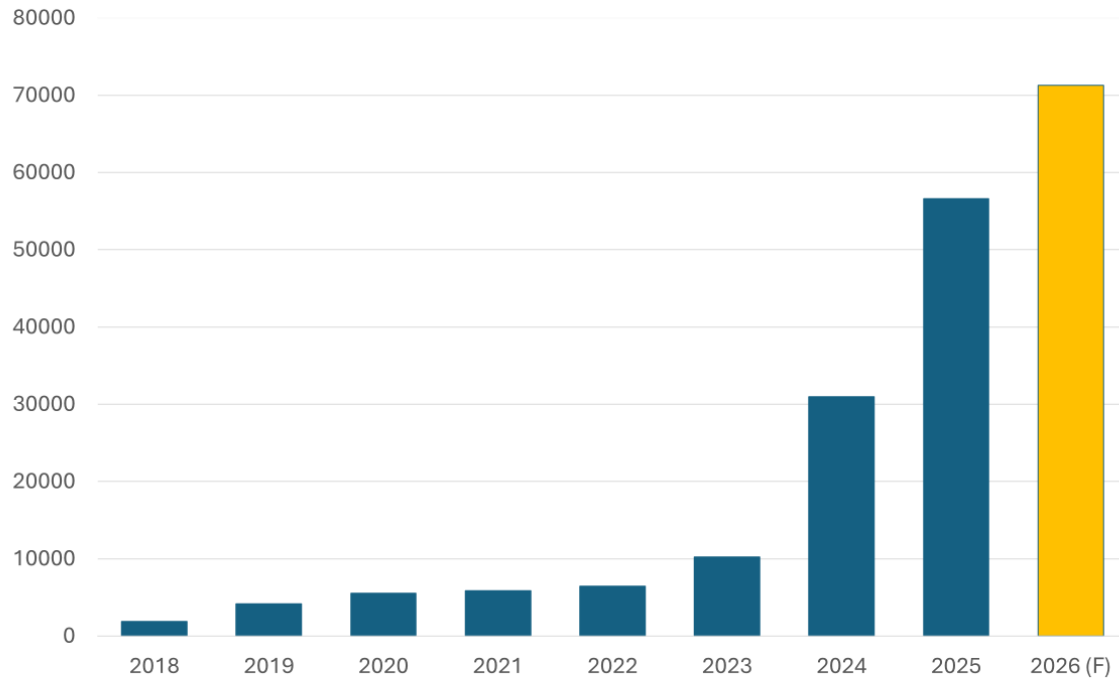
HIGHEST RISK

FEOC Exposure + AD/CVD Tariff

Ineligible for credits. Large tariff burden. Cheapest cells available. Module viability depends entirely on willingness to forego credits.

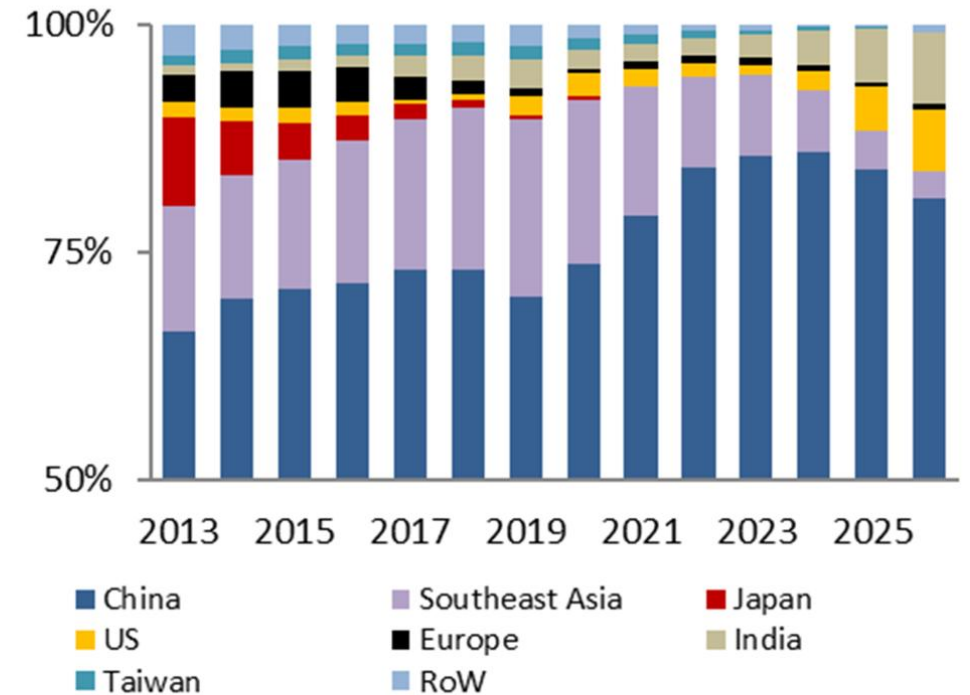
It is doable – the module example

US PV Module Production Capacity by year (MW)



Source: PV Tech Research; May 2026.

Module Production (c-Si & TF)



Source: PV Tech Research; May 2026.

The Domestic Cell Ramp-Up

A timing mismatch — module capacity is here, cell capacity is coming

PVTECH NEWS
TOYO announces 1.5GW US HJT cell line weeks after AD/CVD hits Ethiopia factory
By Will Norman
June 8, 2026

PVTECH NEWS
Suniva boosts US cell production to 5.5GW with new facility
By Ben Willis
April 15, 2026

PVTECH NEWS
T1 Energy begins construction at 2.1GW TOPCon cell manufacturing facility in Texas
By JP Casey
December 17, 2025

PVTECH NEWS
Swift Solar acquires Meyer Burger's US HJT manufacturing assets and patents
By JP Casey
March 12, 2026

PVTECH NEWS
MSolar to build US\$23.7 million solar glass, cell and module factory in Virginia
By JP Casey
June 8, 2026

PVTECH NEWS
How Talon PV plans to crack America's TOPCon solar cell challenge
By Ben Willis

Until domestic cell production reaches scale, the market faces serious volatility across trade compliance, procurement tiers and supply availability.



05

Winners, Losers & What's Next

WINNERS

- US manufacturers with vertically integrated domestic value chains
- Companies with FEOC-compliant JV structures in Turkey & MENA
- Turkish manufacturers under HIT-30 with US supply contracts
- Domestic cell producers (ES Foundry, T1, Suniva) ramping capacity

UNDER PRESSURE

- Manufacturers reliant on SE Asia (Indonesia/Laos routes now restricted)
- US module assemblers without compliant upstream cell supply
- Companies in new countries potentially facing new AD/CVD petition
- Supply chains exposed to both FEOC and AD/CVD simultaneously



The Bigger Picture

Energy Demand is Surging

US reindustrialisation and the AI compute race are driving unprecedented electricity demand — solar must scale to compete.

Supply Chain = Strategic Asset

A successful solar manufacturing industry is no longer defined by cost alone, but by control — ownership structure, trade compliance and political alignment.

Module Assembly Is Not Enough

Building module capacity without upstream capability creates dangerous dependency. Cells, wafers, ingots and polysilicon must follow.

Policy Risk Is Permanent

Compliant locations can become non-compliant overnight. Regulatory agility and supply chain diversification are now core competencies.



KEY TAKEAWAY

Building module capacity alone is no longer sufficient.

- Secure domestic production of cells, wafers, ingots and polysilicon
- Structure partnerships to comply with FEOC thresholds
- Diversify geographically — today's compliant location may not be tomorrow's
- Watch Section 232 polysilicon results — the most disruptive policy yet

