Sourcing for a US Solar Factory: A Guide to UFLPA-Compliant Supply Chains

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Content Partner: J. v. G. technology GmbH

Turnkey solar module production lines — since 1997

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Technical Overview: UFLPA-Compliant Supply Chains for US Solar Factories

Created as part of the PVKnowHow Knowledge Network

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European specialists in turnkey solar module production lines

Key Project Data

USA	UFLPA	CBP	3+
Region	**Regulatory Focus**	**Key Risk**	**Sourcing Regions**
United States — domestic solar module assembly factory	UFLPA-compliant supply chain strategy	Import restrictions and shipment detention at US ports	Diversified, traceable sourcing: US, EU, Malaysia

Factory type: Solar module assembly (USA) · Focus: UFLPA-compliant supply chain · Key risk: Import restrictions / CBP detention · Supply strategy: Diversified, traceable sourcing · Source: PVKnowHow / J.v.G. Technology GmbH

The Problem: Shipment Detention & UFLPA Risk

What Is Happening

- Solar module shipments detained at US ports of entry by CBP
- Detention triggered by suspected links to forced labor in Xinjiang, China
- Importers issued a Withhold Release Order (WRO) with limited time to respond
- If evidence is insufficient, shipments can be seized or re-exported

Scale of Enforcement

- CBP reviewed more than 16,700 shipments valued at ~$3.7 billion since June 2022
- UFLPA Entity List now includes 144 designated entities
- Number of detentions rose 51% in FY2025 vs. FY2024
- Denial rates for China-origin shipments reached 77% in 2025

Market Context: Global Solar Supply Chain Dependency

Polysilicon Concentration

- ~50% of global polysilicon supply originates in Xinjiang, China
- More than 90% of global ingots and wafers produced in China
- Deep upstream dependency makes full traceability structurally challenging

Module Import Dependency

- ~80% of solar panels used in US projects historically sourced from abroad
- Southeast Asia (Malaysia, Vietnam, Thailand) serves as major intermediate hub
- "Made in Malaysia" label alone is no longer sufficient for UFLPA compliance

IRA-Driven Domestic Push

- The Inflation Reduction Act (IRA) incentivizes US-based solar manufacturing
- New domestic factories generate soaring demand for verifiably compliant components
- UFLPA compliance and IRA incentives are directly interlinked

Understanding the UFLPA: "Rebuttable Presumption"

The Legal Mechanism

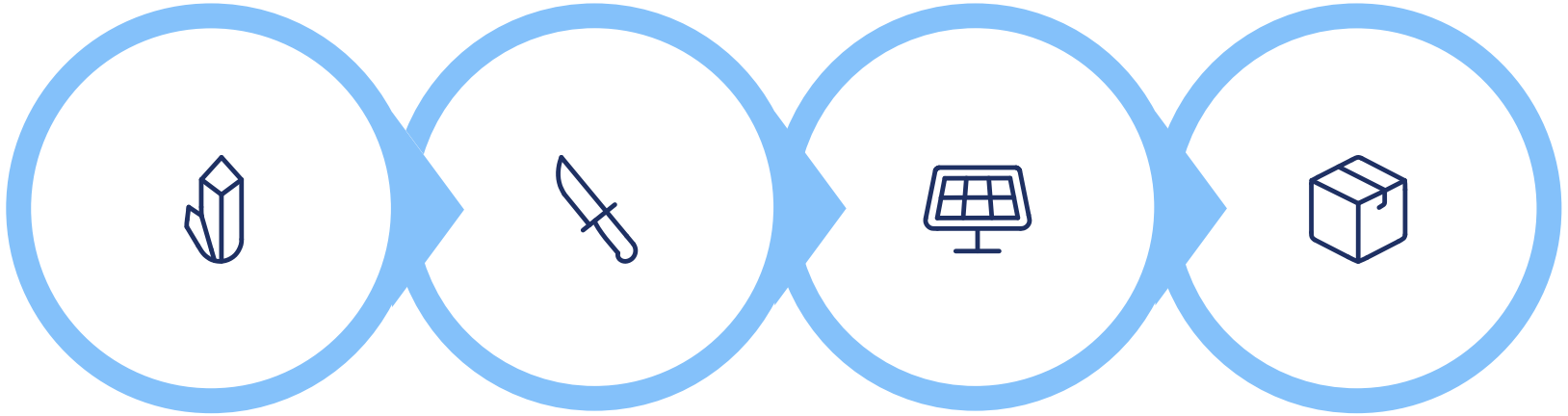
- Signed into law December 2021; enforced from June 2022
- Establishes a **rebuttable presumption**: any goods produced wholly or in part in Xinjiang are presumed to involve forced labor
- Presumption also applies to any entity on the UFLPA Entity List, regardless of geography
- Burden of proof falls entirely on the importer — not on CBP

What Importers Must Prove

- Must provide **clear and convincing evidence** that goods were not made with forced labor
- CBP triggers detention based on reasonable suspicion — a deliberately low threshold
- Supplier attestations alone are insufficient; independent verification required
- Applies to all tiers of the supply chain, not just final assembly

⚠ A "Made in Malaysia" or "Assembled in Vietnam" label does not shield an importer if upstream materials have a nexus to prohibited sources.

Supply Chain Complexity: Polysilicon to Module



Each stage typically crosses national borders and involves different companies. Xinjiang-origin polysilicon can enter this chain at the very first step, creating exposure that flows invisibly through every downstream stage — including the final module imported into the US.

Core Challenge: Traceability & Commingling

The Commingling Problem

- Polysilicon from multiple global sources is routinely mixed at the ingot and wafer stage
- Once commingled, it becomes near-impossible to segregate by origin
- A batch containing even partial Xinjiang-origin polysilicon triggers UFLPA presumption

Documentation Demands

- CBP requires traceability from module back to quartzite and metallurgic-grade silicon
- Supply chain maps, worker lists, factory audit records, and batch certificates required
- Invoices alone are not considered sufficient proof of origin linkage

Audit Access Constraints

- Independent third-party audits cannot be conducted in Xinjiang
- Sites inaccessible to unsupervised visits are classified as high-risk by default
- Due-diligence firms operating in China face increasing operational restrictions

Strategic Solution: Supply Chain Mapping

1

Step 1 — Map Every Tier

Identify all suppliers at each stage: polysilicon → ingot → wafer → cell → module

Document company name, country, and production site for every node

2

Step 2 — Obtain Third-Party Traceability Audits

Commission independent auditors to verify each supplier's material origin

Audit currency: verification within the last 2 years is recommended as a baseline

3

Step 3 — Establish Batch-Level Traceability

Implement systems linking each production batch to verified raw material sourcing

Maintain records sufficient to respond to a CBP detention within the required timeframe

4

Step 4 — Monitor Continuously

UFLPA Entity List changes; supplier risk profiles evolve

Ongoing monitoring is required — past compliance does not guarantee future clearance

Supplier Due Diligence & Audits

Qualification Audits

- Establish baseline ESG and traceability practices before supplier approval
- Include on-site factory inspection at key supply chain nodes
- Assess labor conditions, sourcing records, and chain-of-custody systems

Batch / Production Audits

- Ongoing sampling-based audits during active production runs
- Verify that material flows match pre-approved sourcing declarations
- Cannot be done for every module — traceability systems must be independently validated

Documentation Standards

- Invoices alone are insufficient; full chain-of-custody documentation required
- CBP requires records covering quartzite, polysilicon, ingot, wafer, cell, and module tiers
- Independent verification supersedes supplier self-attestation

Diversified Sourcing Strategy: US, EU, Malaysia

Sourcing Region	United States	European Union	Malaysia
Primary Role	Polysilicon production; lowest UFLPA exposure	High-purity polysilicon; fully auditable supply chains	Wafer and cell manufacturing hub outside China
UFLPA Risk Level	Very Low	Very Low	Low — subject to traceability verification
Key Consideration	Higher cost; strong compliance profile	Higher cost; strong compliance profile	Cost-competitive; CBP scrutiny increasing for transshipment
Strategic Value	Anchor for compliant supply chain	Redundancy and volume flexibility	Scale at moderate cost with managed risk

Cost premium associated with compliant sourcing should be viewed as insurance against shipment seizures, production halts, and reputational damage — not as pure overhead.

Business Advantage of Compliance

1

Competitive Differentiation

A traceable, compliant supply chain is a powerful competitive advantage in the US market — preferred by large-scale project buyers and institutional procurement

2

IRA-Aligned Positioning

IRA incentives favor domestic manufacturing; factories with compliant sourcing are better positioned to access tax credits and preferred-supplier status

3

Resilient Operations

Diversified sourcing reduces single-source dependency and insulates production schedules from sudden CBP enforcement actions

An experienced European turnkey provider integrates supply chain compliance know-how into full-line factory methodology — reducing the learning curve for new manufacturers entering US production.

FAQ Highlights: Risk, Materials & Enforcement

Does UFLPA apply if my module is assembled outside China?

Yes. The act applies to goods "manufactured in whole or in part" using materials with Xinjiang origin. A US-assembled module using non-compliant cells or wafers remains subject to the presumption.

Which materials are covered beyond polysilicon?

Polysilicon is the primary concern, but the UFLPA also covers quartz (used in crucibles for ingot growth) and aluminum (used in frames). CBP guidance continues to expand the materials list.

What happens if a shipment is detained?

A Withhold Release Order (WRO) is issued. The importer has a limited window to submit supply chain evidence. If evidence is deemed insufficient, the shipment may be seized, re-exported, or destroyed — resulting in significant financial loss.

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

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Source:https://www.pvknowhow.com/countries/united-states/uflpa-compliant-supply-chain-us-solar/

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