



SOLAR & STORAGE QA & TECHNICAL ADVISORY SERVICES

The 4 overlooked steps to reduce PV modules failures



Alexandre Minuzzo, CEO · PV ModuleTech USA - June 2026

SCOPE REQUIRES PLANNING

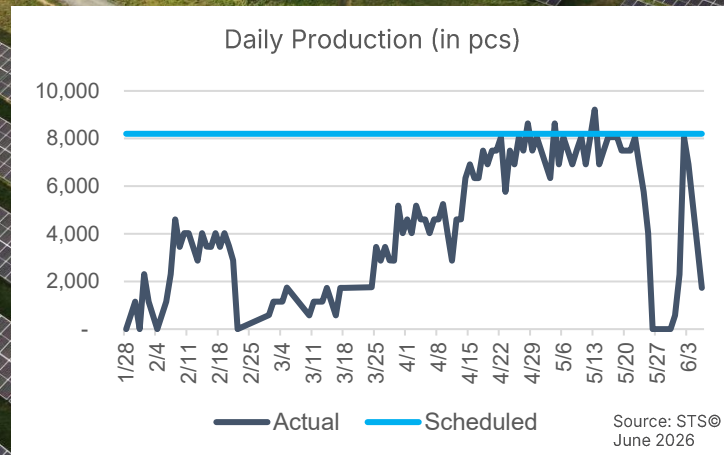
Early Quality Assurance prevents future project delays

Scope

- Manufacturing location
 - Outside US
- Factory audit ordered
 - 1 week before production start

Results

- 293 findings over 2 days audit
- 1 month production start delay
- 3 months to reach mass production

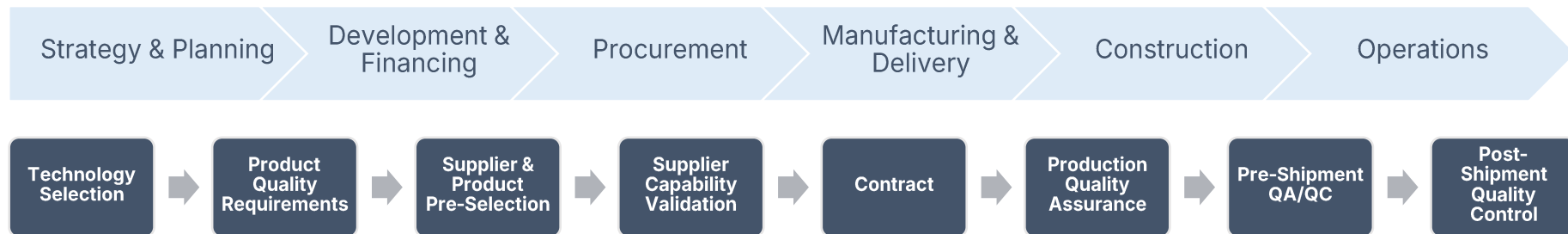


US Project (2026)

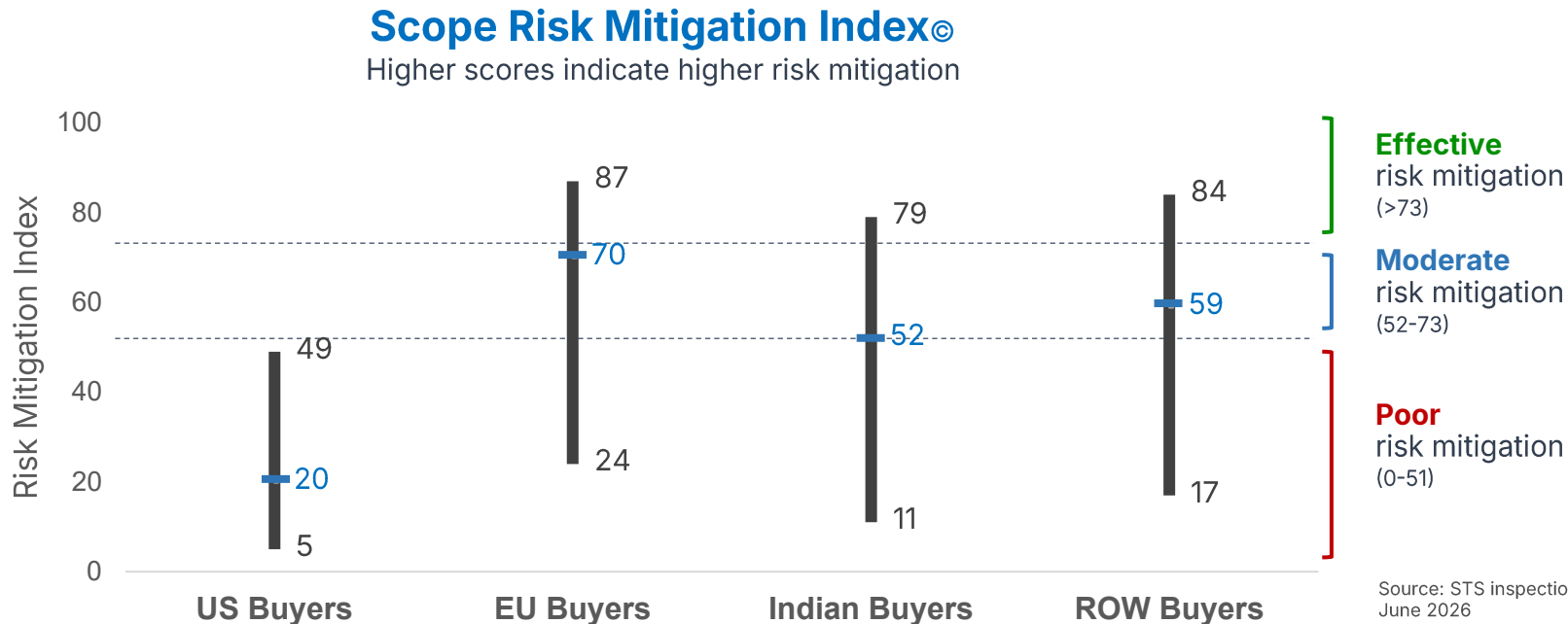
($\$ > 200m$ investment in PV modules)

Reducing failures at site requires the right QA scope.

The key steps to de-risk PV modules procurement.



The scope applied by US buyers is behind other regions.





KEY RECOMMENDATIONS FOR BUYERS

4 Quality Assurance Scope Improvements

4 Quality Assurance Scope Improvements to De-Risk Procurement

01

Product Quality Requirements

- Define quality standards suppliers must meet

02

Supplier Capability Verification

- Verify suppliers can execute your requirements

03

Production Monitoring

- Confirm manufacturing remains under control

04

Loading Monitoring

- Verify the right PV modules are shipped correctly





PRODUCT QUALITY REQUIREMENTS

Set the Right Requirements Before Production Begins

Applying the wrong quality requirements creates gaps

Risks

- Setting the bar too low
- Not agreeing on quality targets
- Not getting access needed to verify effectively

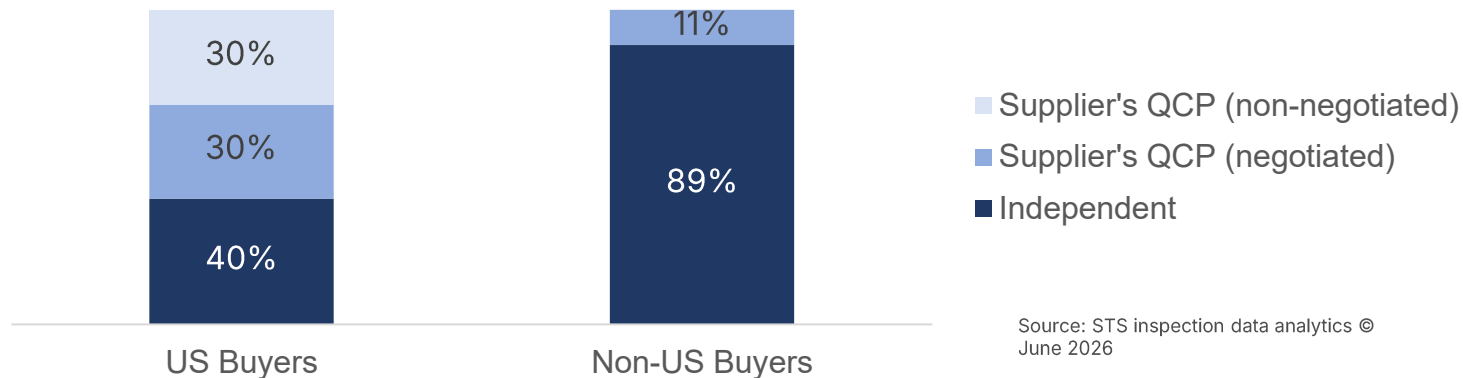
Impact

- Inferior product quality
- Non-compliant products



Many US projects still rely on manufacturers quality control plan

Quality Requirements applied with South-East Asia factories (2024-2025)



Be in control of product quality requirements.

Option 1:
Independent set of requirements

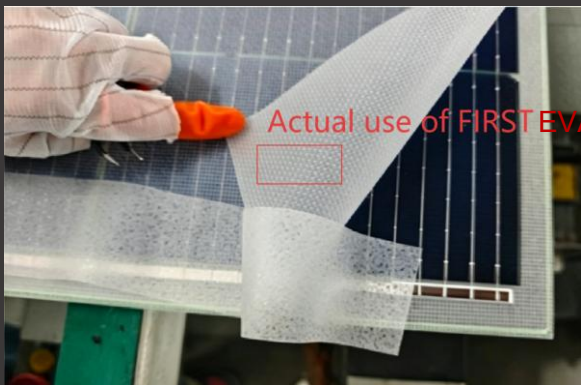
Option 2:
Supplier's requirements + negotiate

Tip:
Advisor advises. Buyer makes decision.



PRODUCTION MONITORING

Detect Problems Before They Become Product Failures



物料号	20.01.001.0760		
批次号	111241206501		
数量	448.8	单位	M2
追溯号	S011206	生产日期	2024-12-06
采购单号	20056198	使用截止日	2025-06-05
卷号	111241206501-501304		
备注	SVK, CO-556, 0.33*1122mm*400M, >220g		

PRODUCTION MONITORING

Not being present during production exposes buyers to most product failures.

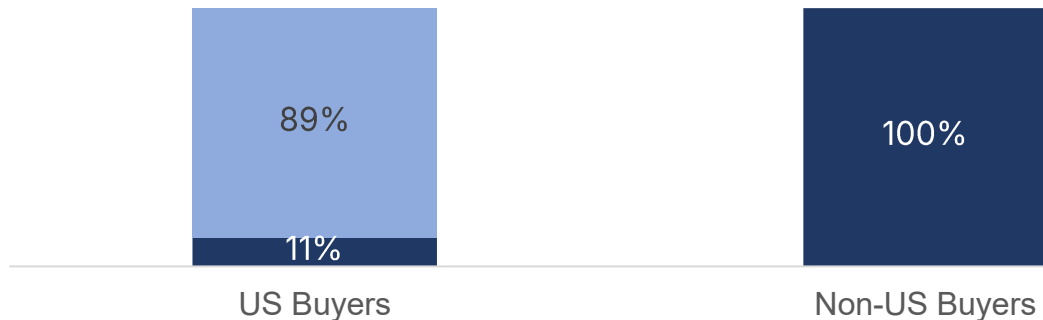
Risks	Impact
- Non-certified materials and combinations - Non-compliant materials origin - Non-compliant manufacturing site	Non-compliant products
- Inferior or non-compatible materials - Untested materials / materials combination - Undetected non-conforming products - Defective manufacturing process - Requalification of non-conforming products	Underperforming products



US buyers are not embracing 24/7 production monitoring while others are.

Production Monitoring at South-East Asia factories (2023-2025)

■ 24/7 ■ Non-24/7

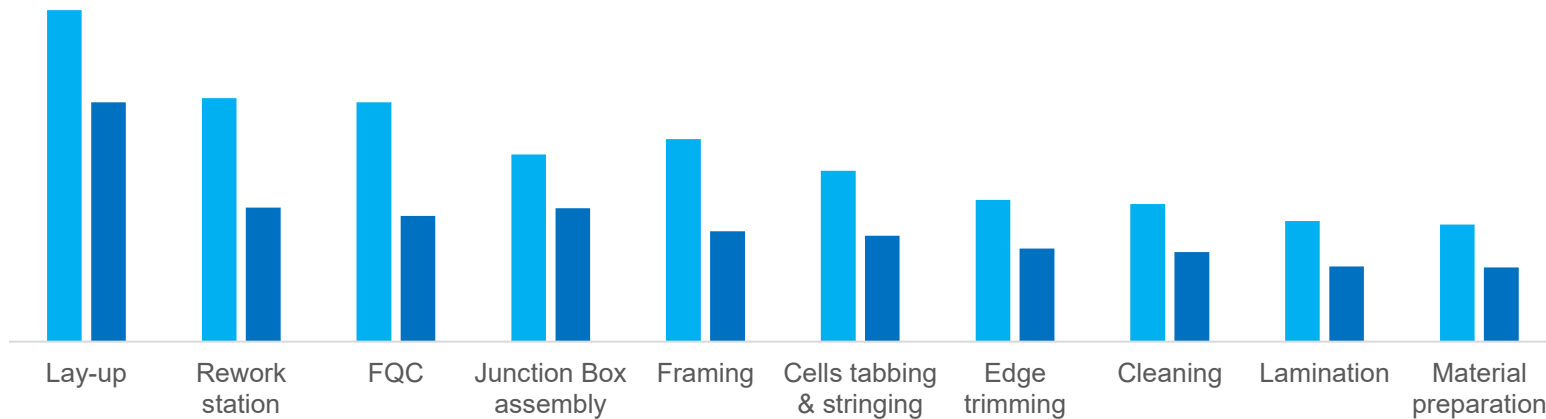


Source: STS inspection data analytics © June 2026

37% of non-conformities are identified at night.

Top 10 failing manufacturing processes in 2025

■ Day ■ Night



Implement the right level of production monitoring

Tips:

- ✓ Include detailed conditions of production monitoring in your purchase contract
- ✓ Encourage supplier's transparency





LOADING MONITORING

Verify the Right Products Are Shipped Correctly

Risk during loading is often underestimated



Risks

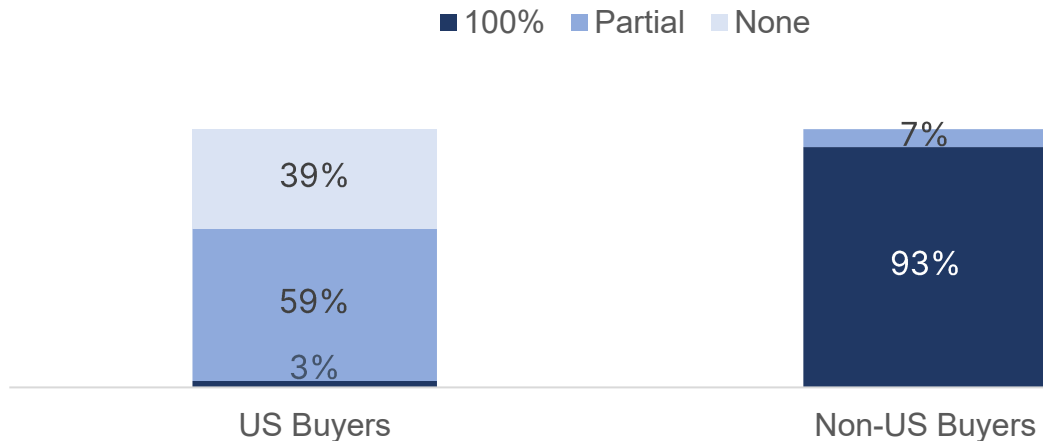
- Degraded pallets
- Damage during loading
- Wrong products stacking (horizontal)
- Poorly stabilized pallets

Impact

- **Damaged products on arrival**
- **Wrong products loaded**
- **Wrong products received**
- **Non-compliant products**

US buyers are neglecting loading monitoring.

Loading Monitoring at South-East Asia factories (2023-2025)



Source: STS inspection data analytics ©
June 2026

Don't Let Months of Quality Control Be Undone in a Single Day of Loading

Recommendations:

- 100% loading monitoring
- Flash List validation before/after shipment



Revisit these 4 aspects of your QA Scope to de-risk your PV modules procurement more effectively

01

Product Quality Requirements

- Define quality requirements that suppliers must meet

03

Production Monitoring

- Ensure that manufacturing failures are addressed

02

Supplier Capability Verification

- Verify if suppliers can execute your requirements

04

Loading Monitoring

- Verify that the right PV modules are shipped correctly





GET IN TOUCH

Reach out to de-risk your projects more effectively.

STS brings 16+ years of independent quality assurance expertise to every engagement. Whether you're sourcing modules, commissioning a BESS, or managing a multi-GW portfolio — we're your buyer-side partner.

Contact Us

Alexandre Minuzzo, CEO

Our Services

Technical Advisory · QA/ QC ·
Factory Inspection · Field Testing ·
Market Intelligence

Our Credentials

ISO/IEC 17020 Type A · ISO 9001:2015 · 80+GW Solar · 15+GWh BESS

