Quality Assurance in PV Power Plant Projects in Asia

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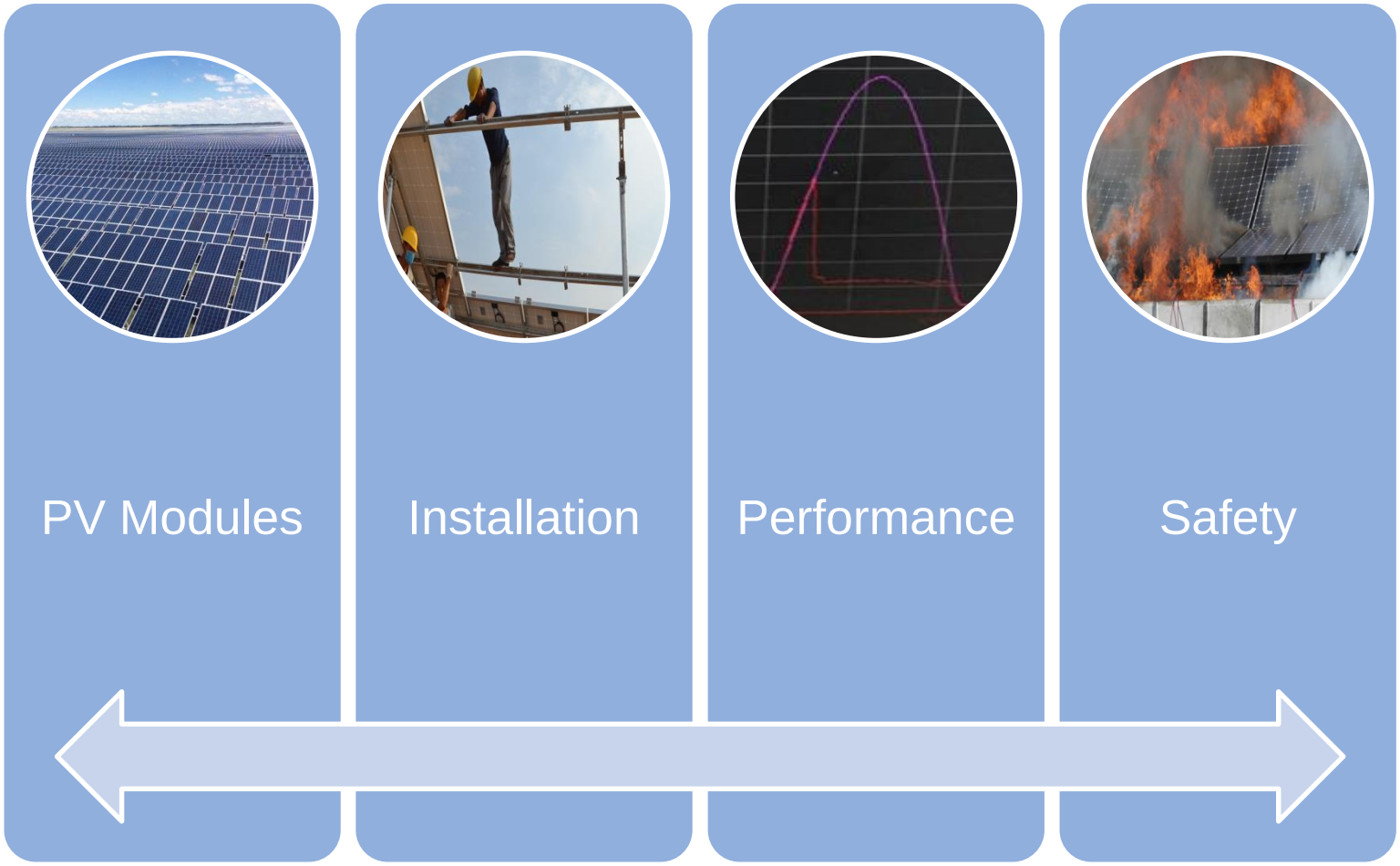
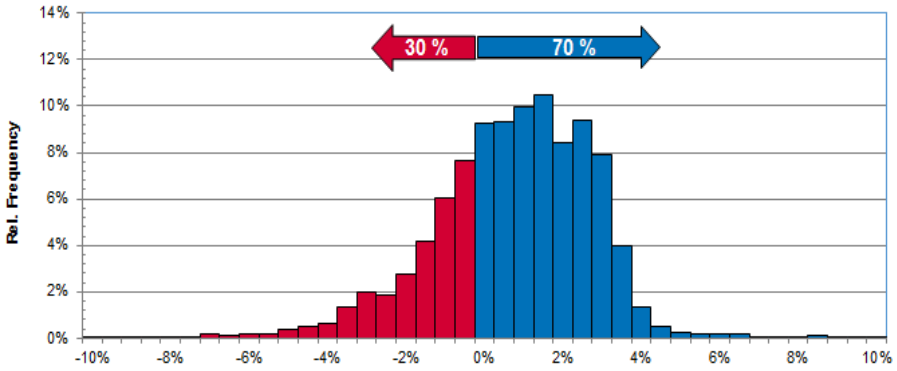
TÜVRheinland®
Precisely Right.

Disclaimer

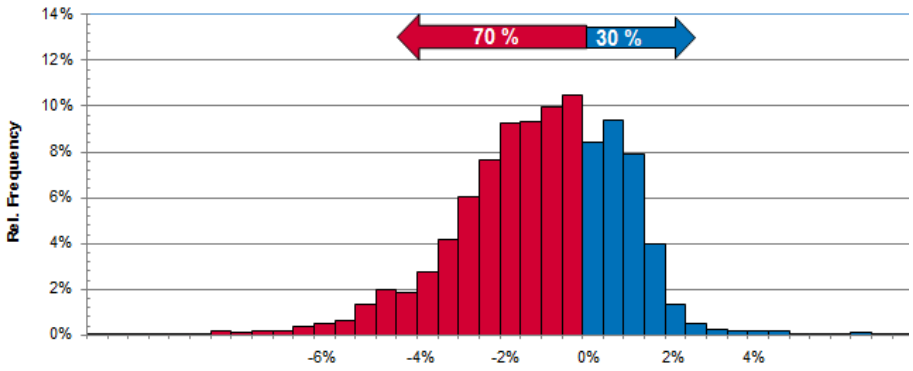
Technical Risks



PV Modules – Performance issue



PMAX Deviation to Low Tolerance Limit [%] before LID



PMAX Deviation to Low Tolerance Limit [%] after LID

Unique SNs: 7179
Unique module classes: 935
Unique manufacturers: 190
Test period: 2015-2016

Bloomberg NEW ENERGY FINANCE

"…We strongly recommend that module purchasers and banks do not use this list [TIER list] as a measure of quality, but instead consult a technical due diligence firm…"

Construction – Burying of cables

- Using of adequate embedding material
- Consideration of minimum depths

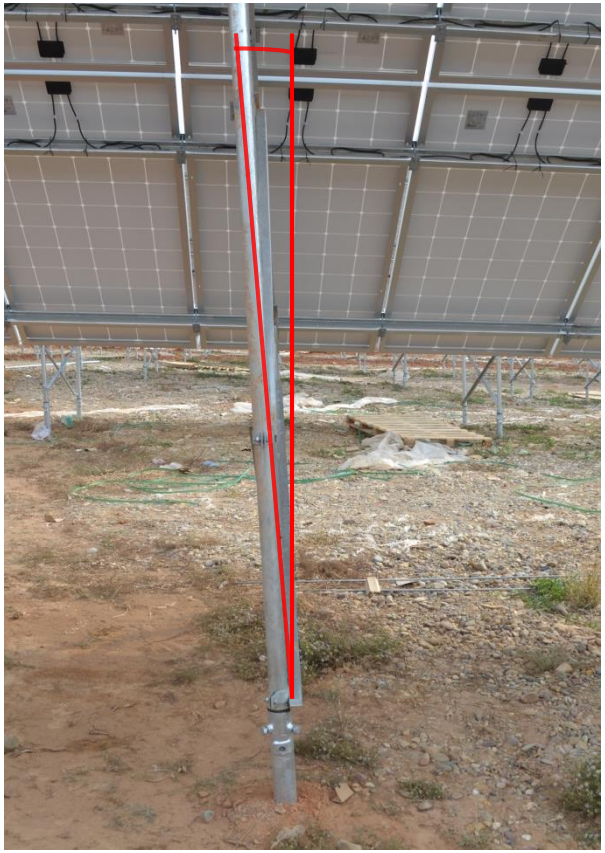
Installation – Erosion Issue

Installation – Foundations/Mounting Structure

Initial Design Screw:
- 1.9m long
- 0.3m above ground
- Thus: 1.6m in soil

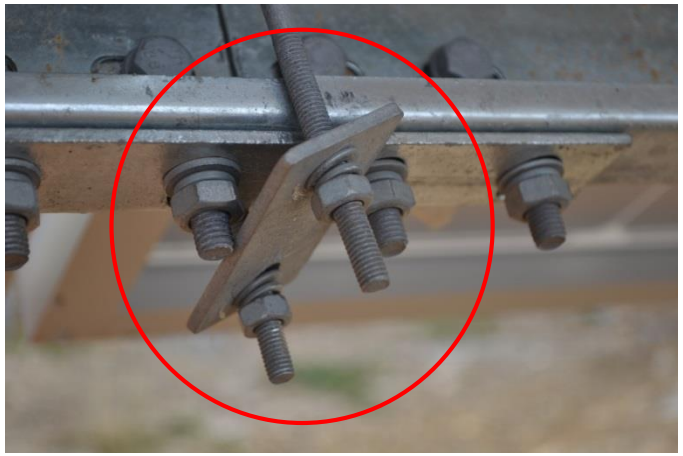
As built:
- 1.85m long (updated design)
- 0.40m above ground
- Thus: 1.45m in soil

- Less 15 cm -> foundations/foundation design need to be checked in detail

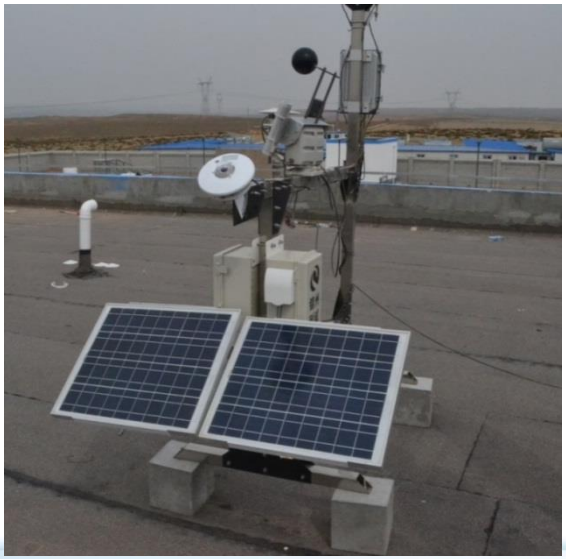


Poles with critical angle >5° from vertical

Installation Works



Technical Risks – Yield Prediction and Performance



- How to predict the Performance Ratio (PR)?
- How to determine the “real” PR, especially in systems with multiple directions and tilts?
- How to implement incentive and penalty schemes in EPC and O&M Contracts?
- What is the “right” equipment for Performance Analysis? Who shall do the analysis?

Technical Risks – Safety

Wrong Design

Wrong assumptions

Not enough conservative assumptions

Extreme weather conditions not considered

Wrong calculation

Wrong Execution

Execution does not follow design

Different material used

Source：北极星太阳能光伏网

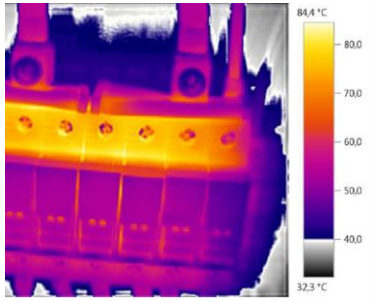
Consequences

Destruction of PV system

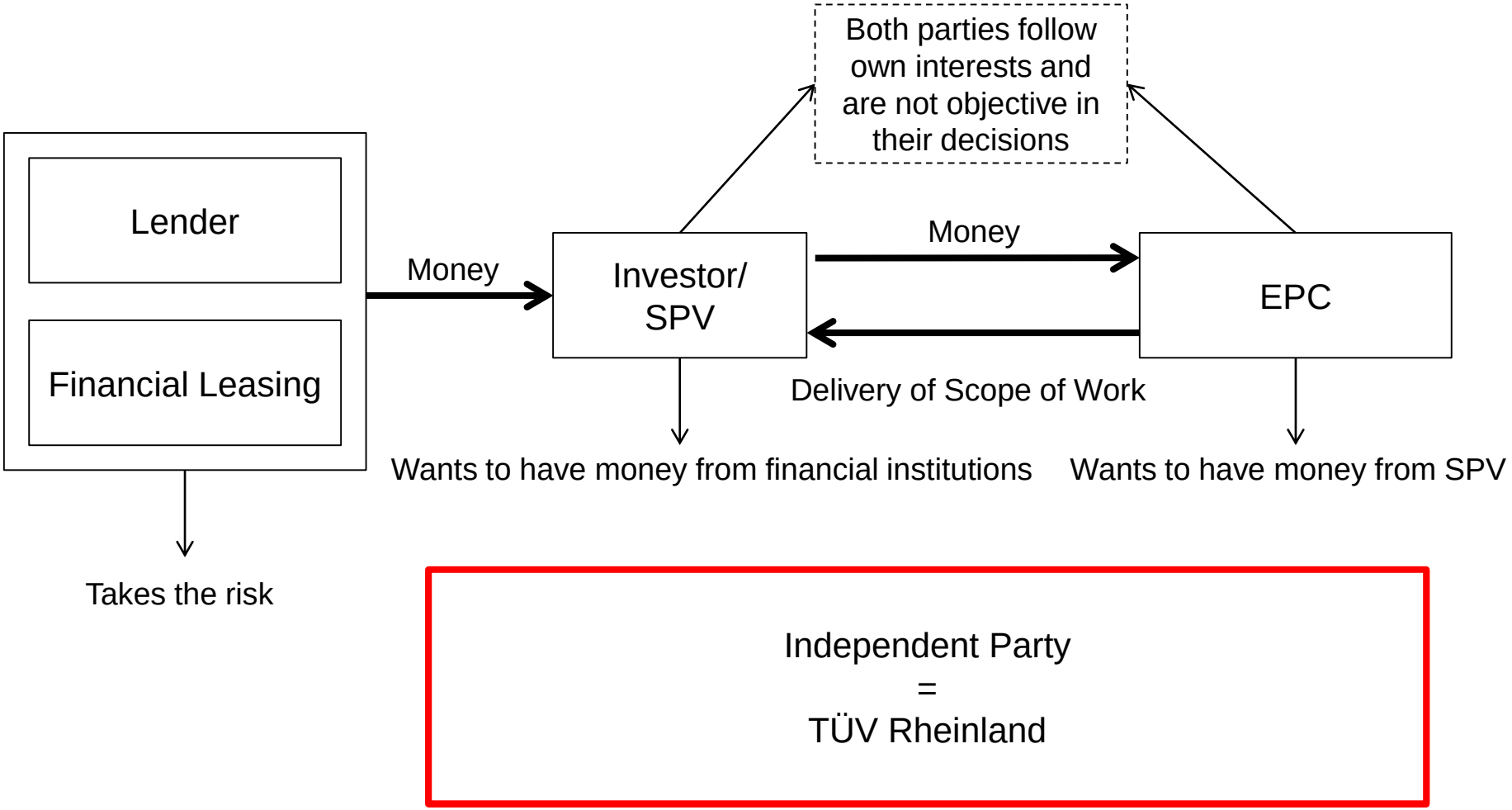
Destruction/damage of building

Threat of life

Loss of permits



Quality Assurance Mechanism



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Thank you!

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