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Unlocking hidden solar asset risks: AI, Back-of-Module, and 3D tracker inspection



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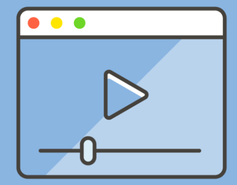
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Send them via the Q&A tab. We aim to answer as many as we can today!
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PV MAGAZINE WEBINAR

Unlocking Hidden Solar Asset Risks

Back-of-Module and 3D Tracker Inspection

2 November 2026 16:00–17:00 CET

Today's Speakers



Fran García

Solutions Manager for Geospatial, Zeitview



Fan Zhang

Senior Technical Product Specialist, Zeitview



Ryan Kennedy

Senior Editor, pv magazine · Moderator

Agenda

01	Expanding Asset Visibility	Fan
02	Back-of-Module Inspection	Fan
03	Row-Level 3D Tracker Mapping	Fran
04	Choosing the Right Inspection	Fan & Fran
—	Q&A	Ryan

01

Expanding Asset Visibility

Where conventional aerial inspections stop, and what lies beyond them

EXPANDING ASSET VISIBILITY

What Front-of-Module Thermal Inspection Misses

Visible from above

Cell heatings

Sub-module/bypass diode issues

Module, string, combiner, and inverter outages

Broken glass, soiling, shading and vegetation

Tracker Misalignment

Beyond traditional view

Back glass/backsheet breakage

Defects on connectors and junction boxes

Wire damage

Cable Management

Issues on tracker tubes

If tracker positions are optimized and the energy loss

EXPANDING ASSET VISIBILITY

360-Degree Panel Visibility





Back-of-Module Inspection

Rear-side condition of modules, wiring and connectors

Solar Optimization

Row-level 3D mapping of tracker angle and site geometry

02

Back-of-Module Inspection

Rear-side condition monitoring within a comprehensive O&M strategy

BACK-OF-MODULE INSPECTION

Why the Back Side Matters Now

Trend 01

Bifacial everywhere

The back side now generates energy. Damage, vegetation and soiling behind the module cost energy, not just maintenance.

Trend 02

Trackers in motion

Every row rotates daily, flexing cables and connectors. Once damaged, they become a safety risk: arcing, ground faults and fire.

Trend 03

Fleets at scale

Site walks are slow and sample-based. Across hundreds of MW, most of what sits behind the module goes unseen.

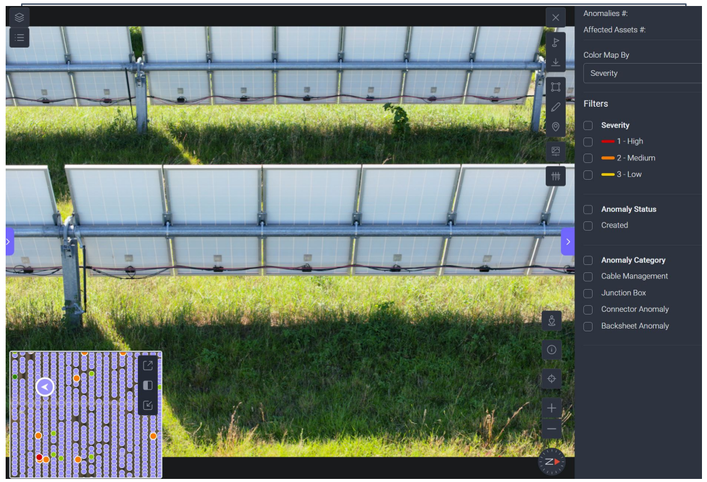
What this means

The back of the module is now part of how the plant performs, so it needs the same systematic, repeatable inspection as the front.

BACK-OF-MODULE INSPECTION

How Back-of-Module Inspection Works





Backsheet Anomaly

Anomaly	Description	Priority
Backsheet breakage	A visible breakage on the backsheet of the PV module, including crack, delamination, bubbling, or blistering	High
Backsheet burn mark	A visible burn mark on the backsheet of the PV module	High
Backsheet discoloration	Discoloration on the backsheet	Low

Broken Module

Anomaly	Description	Priority
Glass breakage - back	A visible breakage on the back glass of the PV module	High

Cable Management

Anomaly	Description	Priority
Connector Strain or Tension	Connector in strain or tension due to improper wiring placement	High
Cable/Connector contacting metal parts	Cable or connector contacting metal part of the panel such as frames or tracker tube, indicating potential safety issue	High
Loose or unsupported cables	Cables are not properly secured, leaving them unsafe in wind events	Medium
UV damaged or brittle wire ties	Wire ties defect or wear, potentially due to sunlight	Medium

01

Drone collection

Rear-side imagery captured row by row

02

Data process and expert review

Data and anomalies are identified, classified, and reviewed

03

Prioritized findings

Severity tier and recommended action for every finding

The Back-of-Module Anomaly Dictionary

Major Types for Back-of-module Inspection

new anomaly types not detectable by front-of-module thermal inspection

- Backsheet Anomaly
- Junction Box Anomaly
- Broken Module
- Racking/Tracker Anomaly
- Cable Management
- Foreign Object
- Connector Anomaly
- Missing Component

Field Example: Loose/unsupported cables



Finding

The hanger that should secure the cables is missing

Severity tier

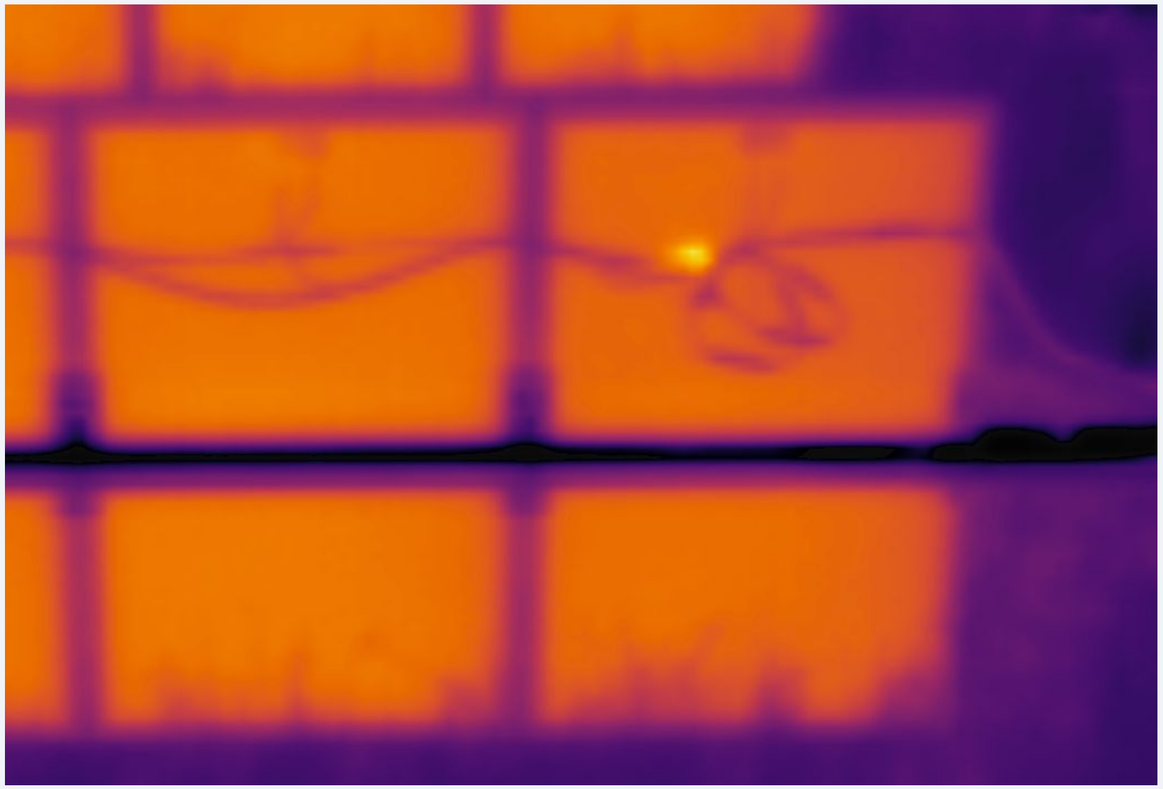
Medium Priority

Recommended action

Secure the cables with UV-rated ties or clips and restore proper routing to prevent movement, abrasion, and connector strain.

BACK-OF-MODULE INSPECTION

Field Example: Connector heating



Finding

Connector at a higher temperature than nearby normal connectors

Severity tier

High Severity

Recommended action

Replace the overheating connector, ensuring matched connector types and proper crimping.

Field Example: Backsheet burnt mark



Finding

A visible burnt mark on the backsheet

Severity tier

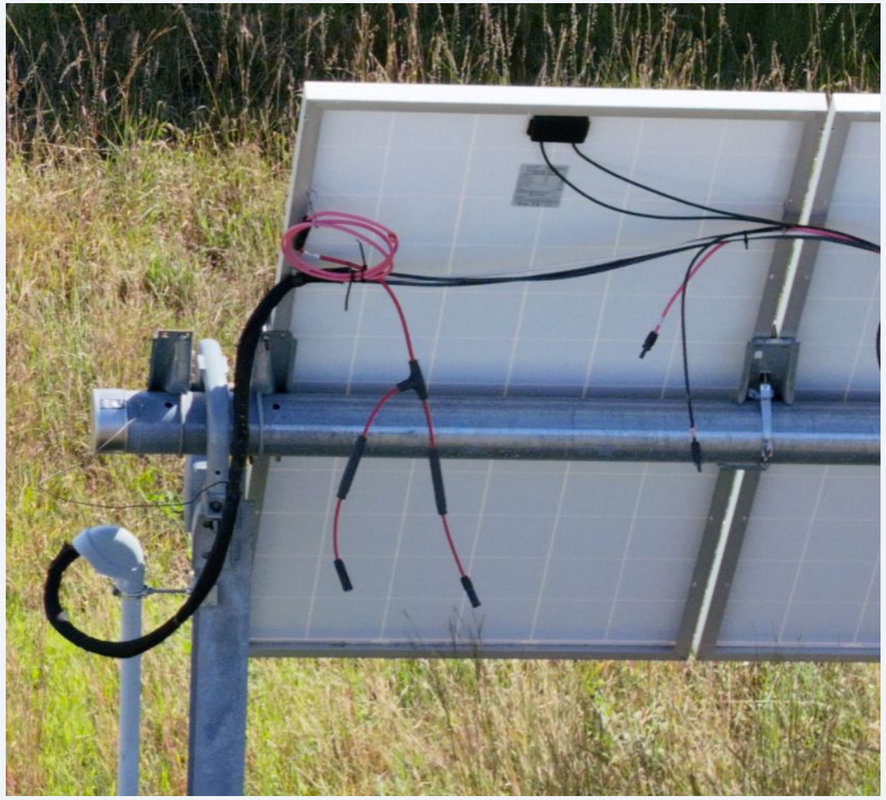
High Severity

Recommended action

Check the burnt mark location and replace the module if insulation is compromised.

BACK-OF-MODULE INSPECTION

Field Example: Open Connection



Finding

Connectors are not connected as in similar locations on site

Severity tier

High Severity

Recommended action

Re-mate or terminate the open connector to restore the circuit, inspecting contacts for moisture or corrosion before reconnecting.

Severity Tiers and Recommended Actions

Tier	Example anomalies	Recommended action
High Severity	Backsheet burnt mark	Check the burnt mark and replace the module if insulation is compromised.
Medium Severity	Loose/unsupported cables	Secure the cables with UV-rated ties or clips and restore proper routing
Low Severity	Visible defect on jbox - minor	Monitor for progression and reassess during future inspections;

03

Row-Level 3D Tracker Mapping

Solar Optimization: a geospatial 3D digital twin of every tracker row

ROW-LEVEL 3D TRACKER MAPPING

How Row-Level Tracker Mapping Works



Photogrammetry

Panel position and tracker angle, row by row

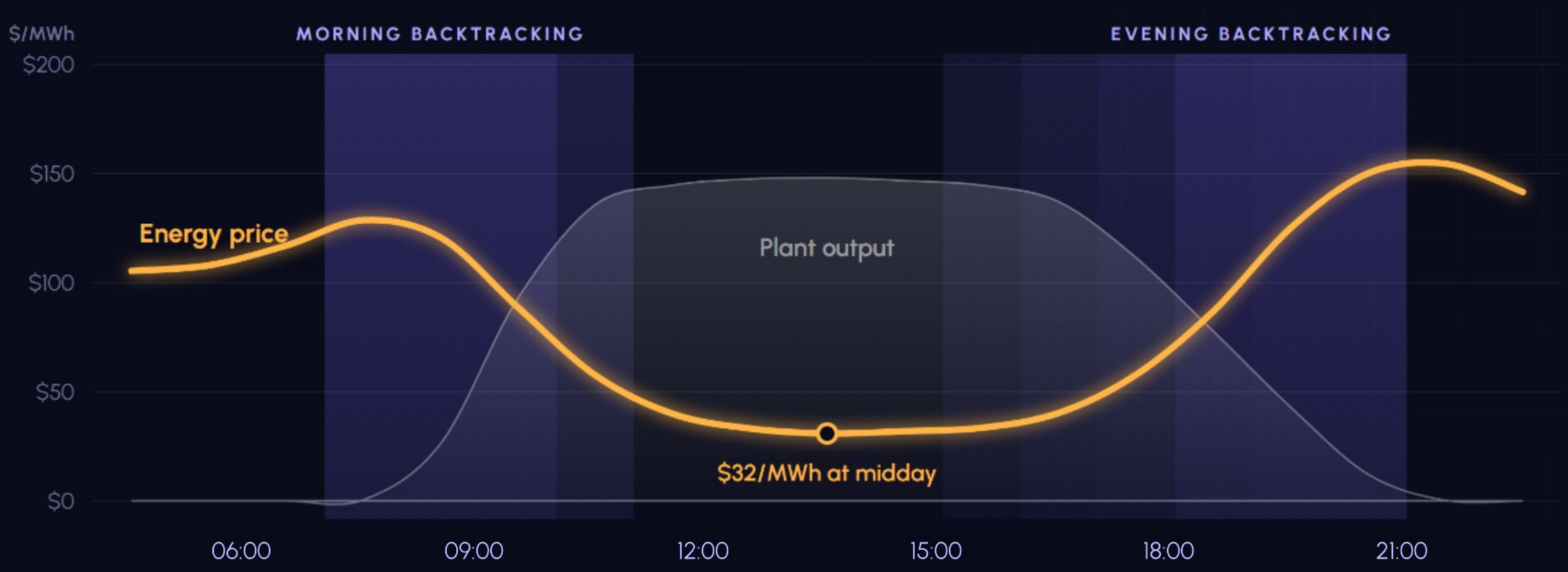
LiDAR

Ground surface and visible structural geometry

ROW-LEVEL 3D TRACKER MAPPING

Why the timing of recovered energy matters

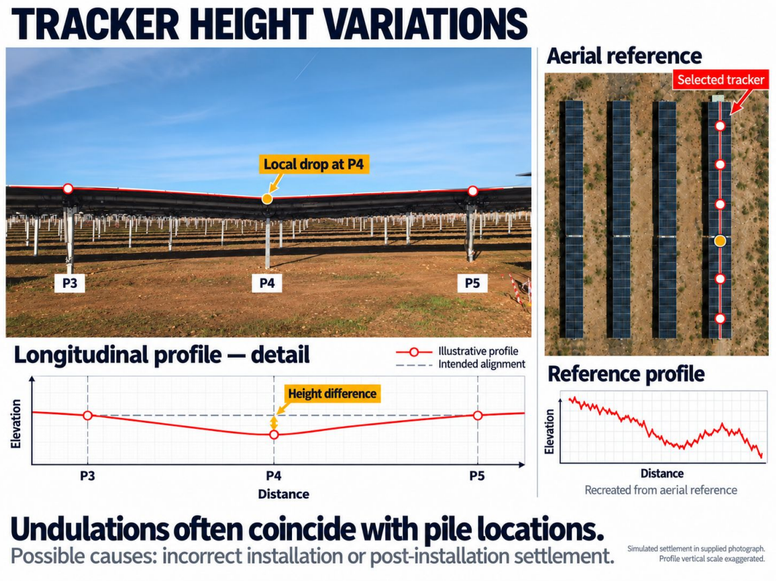
Energy price and plant output across an illustrative day

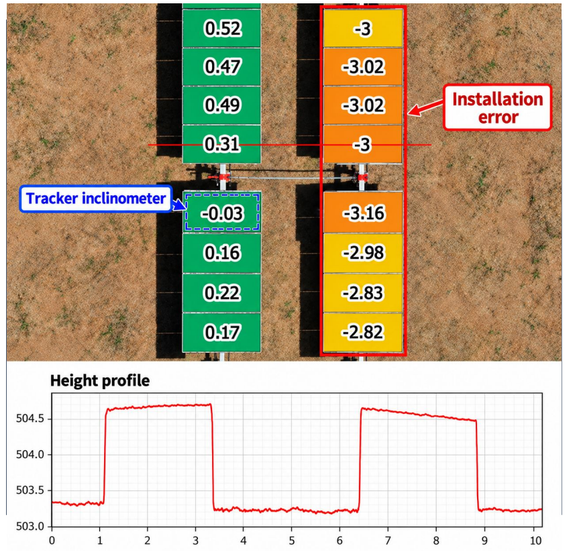


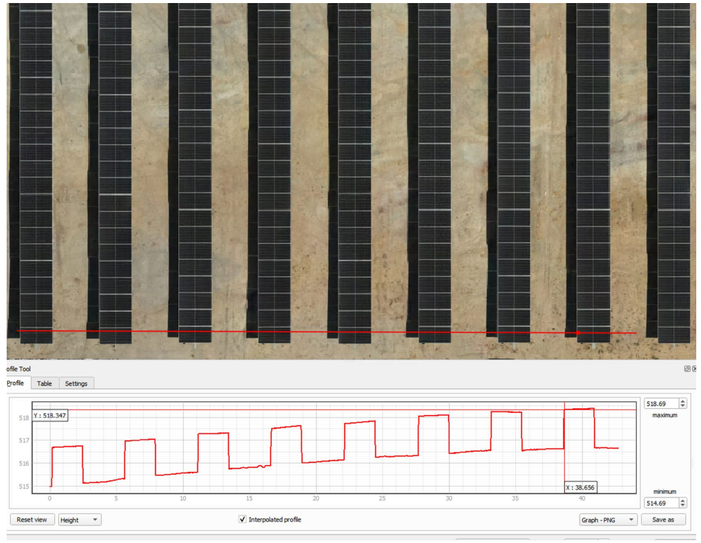
ILLUSTRATIVE MODEL · FIGURES PENDING VALIDATION

ROW-LEVEL 3D TRACKER MAPPING

Field Examples of Tracker Deviation







Local height variation

Check pile alignment on site

Row-angle mismatch

Validate sensor and alignment

Cross-row height variation

Review terrain-aware backtracking

Industry Partners and Standards

PHASE 01 · TODAY

Keeping tracker manufacturers in control

Tracker manufacturers have a direct stake in installation quality: their systems remain in the field for years, and correct positioning and alignment are essential to long-term performance.

As project data passes through multiple teams—from topographic surveys to module installation—we provide the information manufacturers need to maintain visibility and oversight throughout the process. By aligning data formats and positioning references, we help them verify that their systems are installed as intended, establishing a reliable foundation for solar optimization.

PHASE 02 · IN DEVELOPMENT

Process certification

Measurement process certification
Audit preparation.

We are preparing our measurement procedure for certification to give plant owners confidence in the reports they receive.

The goal is to provide a reliable, traceable assessment of whether the measured installation matches the original design specifications within the tolerances agreed by the project stakeholders—supporting informed acceptance decisions and identifying deviations that require attention.

PHASE 03 · LONGER-TERM AIM

Shared geometry reference

Consistent methods and acceptance criteria

04

Choosing the Right Inspection

Evaluating inspection methods by the operational decisions they unlock

CHOOSING THE RIGHT INSPECTION

Achieve More With Advanced Inspections

Inspection	What it surfaces	Decision it unlocks
Aerial thermal	Hot spots, bypass diode issues, string and inverter outages	Prioritize module replacements and electrical repairs
Back-of-module	Wiring, connector, backsheet/back glass, and other rear-side defects	Check module health, schedule connector fixes and wire replacements by tier
Row-level 3D tracker mapping	Tracker angle deviation and site geometry	Correct trackers, support warranty claims, recover production

Q&A

zeitview.com/solar

Fran García Fan Zhang Ryan Kennedy, pv magazine

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Thank you!

For more information visit zeitview.com/solar
Or to schedule a call reach out to Jose Giraldo, jose@zeitview.com

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Thank you for joining today!