

Field EL Imaging for PV Modules

Leveraging electroluminescence (EL) imaging to identify latent damage to PV modules, diagnose system underperformance, document insurance claims and recoup lost revenue

Field EL for Force Majeure Events



Fires



Hurricanes



Lightning



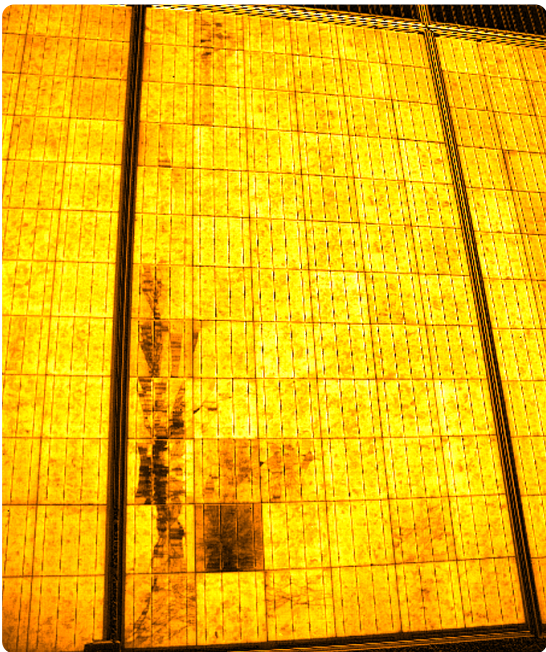
Tornados



Hail



PV module mishandling



The field EL image above shows cracks, microcracks and inactive areas that cannot be seen by eye on the module surface and may not immediately reduce energy yield. However, the defects will result in major power losses and safety issues over time.

Who We Are

PVEL is the leading independent lab of the downstream solar industry. Our services help developers, asset owners, investors, insurers and O&M providers mitigate technology risk and maximize project performance.

How Field EL Works

Field EL is an imaging technique for identifying damage and degradation in solar plants that are underperforming or have been subjected to force majeure events. EL images reveal the full extent of damage to PV modules – even when the damage cannot be seen by eye and the anticipated energy loss is not yet realized.

EL relies on the same principle as a light emitting diode (LED). Current is injected into a solar module, a radiative recombination of carriers causes light emission, and the EL image captures the forward-biased light. The amount of light emitted by a region of the module is proportional to the voltage potential of the region, so inactive regions appear dark on EL images.

Issues detected by field EL include:

- Cracks and microcracks due to transportation, installation or force majeure events
- Manufacturing defects
- Mismatch
- Heat stress
- Potential induced degradation (PID)
- Light and elevated temperature induced degradation (LeTID)

Revenue Protection and Insurance

Insurance policies are written with a narrow timeframe for reporting damage from force majeure events. Asset owners can usually submit only one claim per event. If damage is overlooked in the initial claim, asset owners may not receive compensation for those losses.

PVEL recommends baseline EL imaging early in a project's lifetime to collect evidence of a project's health for future warranty and insurance claims. Submitting claims with baseline and post-incident images helps substantiate claims of damage caused by force majeure events.

Advantages of PVEL's Field EL System

While field EL was once a cost-prohibitive technique, PVEL has fine-tuned an economical approach with three important advantages:

1. Testing occurs during regular daytime working hours.
2. EL imaging is conducted on-site and does not require shipping PV modules to an off-site lab.
3. Testing occurs while modules are installed on racks, eliminating the risk of damage caused by module removal.

The streamlined process maximizes efficiency, reduces labor costs and delivers reliable results. Field EL images can be taken for 100% of the modules or on a reduced sample size targeting particular areas of the site.

To find out more about field EL imaging, contact Andrew Sundling, Head of Downstream Business Development, info@pvel.com

Field EL for Project Health Assessments

- Site acceptance and commissioning following construction
- Documentation of a project's baseline health for future insurance claims
- Module health evaluation prior to project purchase
- Analysis of site underperformance, which may be caused by manufacturing defects such as poor soldering or degradation modes such as PID or LeTID

