

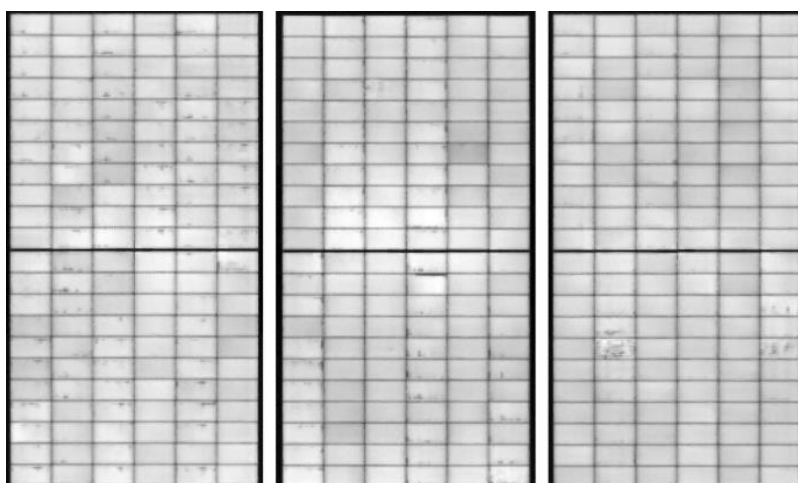
ILLUSTRATIVE CLIENT DELIVERABLE

Sample Drone EL Inspection Report

Electroluminescence inspection of a utility-scale photovoltaic array

Inspection evidence for informed follow-up.

An anonymised example showing inspection coverage, reported EL features, regional patterns and recommended verification actions.



Representative EL imagery reproduced from the source inspection report.

Inspection and source analysis	Quantified Energy Labs Pte. Ltd.
Sample presentation	Sky-Futures Africa
Document reference	SFA-QE-EL-SAMPLE-01
Sample issue / revision	19 October 2026 / Version 1.0
Document status	Anonymised sample for capability demonstration

Project identity, inspection dates and original asset references are withheld. This sample is not a site-specific instruction, warranty determination or new technical sign-off.

01 Executive summary

This sample presents findings reported from a night-time drone electroluminescence inspection. The recorded method used a DJI M350 with a QE EL payload and a nominal injection current of 5.0 A. The purpose was to identify and locate EL-visible features for further assessment.

Scope	Reported result
Defined inspection population	13 regions; 298 strings; 28 modules per string
Modules within the defined scope	8,344
Modules with assessable EL results	8,232
Modules without EL emission	112 across four complete strings

Principal observations

Finger-defect indications: 310 modules (3.8% of the measured population). Of these, 276 are in anonymised Regions R05 and R06, representing 89% of this class. This is a useful basis for targeted investigation; it does not establish a common production or installation cause.

Other reported classes: inhomogeneous cells on 21 modules; dark busbar indications on six; cracked-cell indications on five; and dark bleed on one. Four of the six dark-busbar cases occur in R04. The counts are too small to establish a shared cause.

Additional features: cells with dark edges on 39 modules and dark cells at the source classification threshold on eight. These labels are recorded observations, not a demonstrated severity ranking.

Measurement exceptions: the four non-emitting strings require verification of the test setup and electrical condition. No EL emission alone does not confirm the location or cause of an electrical fault.

Decision supported

Prioritise verification of the four non-emitting strings; investigate the regional grouping of finger-defect indications; and maintain a traceable record of the remaining findings for targeted checks and repeat inspection.

Power or energy loss has not been quantified. Counts describe reported classifications and must not be interpreted as confirmed failed modules. The category overlap needed to calculate a unique total of affected modules is not supplied.

02 Findings and actions

The sequence below is a proposed investigation order for this sample. It is not a safety rating or a repair instruction. Site personnel should confirm urgency using operating conditions, electrical measurements and the applicable site procedures.

Order	Reported finding	Recommended next action	Close-out evidence
1	No EL emission 4 strings / 112 modules	Qualified electrical personnel to review current/voltage and connection records, verify the test configuration and investigate string continuity as appropriate. Repeat EL when the condition permits.	Verified cause and repeat-test result
2	Finger-defect indications 310 modules; 276 in R05/R06	Review representative source images and acquisition consistency. Compare traceability and batch/installation records where available. Select modules for further electrical testing if warranted.	Verified classification and investigation outcome
2	Dark busbar indications 6 modules; 4 in R04	Review the EL pattern and investigate possible interconnection issues. Correlate with appropriate physical and electrical checks before attributing cause.	Inspection/test record linked to each module
3	Cracked-cell indications 5 modules	Review the full-resolution images and affected cell areas. Retain a baseline and repeat under comparable conditions; assess output separately if required.	Reviewed images and follow-up comparison
3	Inhomogeneous cells / dark bleed 21 / 1 modules	Review the indications and acquisition conditions. Use targeted I-V or other appropriate tests if a power-impact assessment is needed.	Confirmed interpretation and test evidence
3	Dark edges / dark cells 39 / 8 modules	Confirm the classification definitions and retain a comparable baseline. Do not infer low severity from low incidence alone.	Defined class criteria and monitoring record

Deliverable for maintenance teams

A project-specific action register should link each finding to its real asset reference, source image, reviewer, recommended action, responsible person, status and verification evidence. Original module registers and identifiers are intentionally omitted from this sample.

No replacement, shutdown or warranty claim is recommended solely on the basis of the classifications presented here.

03 Scope and asset basis

Defined scope

The reported inspection covers 13 regions from two array blocks. This is a partial-plant campaign, limited to the regions completed during the available inspection period. Findings must not be extrapolated to uninspected areas or presented as whole-plant acceptance.

Parameter	Source-reported information
Facility / asset owner	Withheld for this anonymised sample
Module specification	Canadian Solar CS6.2-66TB-625; bifacial, double-glass; nominal 625 W; 132 half-cells
Inverter model	Sungrow SG320HX-20
Electrical grouping	298 strings of 28 modules across 13 regions
Capture equipment	DJI M350 drone with QE EL payload
Injection method	Nominal 5.0 A DC current, through the QE switch box at the string-inverter connection, string by string
Inspection date	Withheld; sample issue date is not the inspection date

Population boundaries and exclusions

8,344 modules: the defined string-assigned population. Of these, 8,232 have assessable EL results. The remaining 112 modules belong to four strings without EL emission and are excluded from defect-percentage denominators.

248 additional dashboard records: the source describes these as modules without a string assignment and excludes them from its counts. Their relationship to the defined scope is not resolved in the supplied material. They must not be assumed to be additional unique inspected modules, nor silently treated as inspected or out of scope.

One object-related label: excluded by the source as an imaging artefact. No additional module is deducted from the measured population on this basis.

Asset identity and traceability

The source gives a site-level module specification but does not provide serial numbers or a verified module-type register on the dashboard. The stated model is therefore a source-reported site description, not a per-module verification. Anonymous region references R01-R13 replace the original labels.

04 Method and interpretation

Capture and classification

In the reported night-time method, forward-bias current is applied to the PV strings and the emitted EL signal is imaged using the drone payload. The nominal test current is 5.0 A. The recorded images are processed using QE's automated feature classification and held on its dashboard.

The source reports that assessed modules can be addressed by region, string and position, allowing findings to be checked against the original imagery. This sample contains selected figures and aggregate results only; it does not provide access to the project dashboard or the full module register.

What the results support

EL contrast can reveal indications associated with cracks, non-uniform emission and possible electrical interconnection issues. A dark area or non-emitting string is an observation that needs interpretation in the context of the capture conditions and electrical configuration.

The feature names are retained or clarified for consistency with the reported data. They are not, by themselves, proof of a manufacturing defect, installation fault, contractual non-conformity, safety condition or quantified loss.

Quality and review basis

Item	Basis for this sample
Recorded acquisition information	Drone/payload description, nominal injection current and night-time method
Information not documented in the supplied report	Actual current/voltage logs, image-quality acceptance thresholds, repeat-capture records and detailed capture conditions
Human verification	The source does not specify the extent of manual checking, a named technical reviewer or an approval record
Reconciliation performed for the sample	Regional totals and displayed percentages were checked against the figures in the supplied report
Independent validation	The underlying dashboard and full-resolution dataset have not been independently reassessed for this sample

Limits on interpretation

No power or yield loss is quantified. Root cause remains provisional. Factory EL, serial-number traceability, installation records and suitable electrical testing may support further investigation; they do not automatically resolve every causal question.

Reference context: IEA PVPS, Qualification of Photovoltaic Power Plants using Mobile Test Equipment, T13-24:2021, Sections 2 and 8 and Table 33. Cited for interpretation limits; no claim of standards compliance is made.

05 Coverage and feature counts

Region	Strings	In scope	EL assessed	No emission
R01	24	672	672	-
R02	24	672	672	-
R03	24	672	616	56
R04	24	672	672	-
R05	24	672	644	28
R06	24	672	672	-
R07	24	672	672	-
R08	24	672	644	28
R09	24	672	672	-
R10	24	672	672	-
R11	24	672	672	-
R12	10	280	280	-
R13	24	672	672	-
Total	298	8,344	8,232	112

No-emission strings: two adjacent strings in R03, one in R05 and one in R08. These are measurement exceptions, not 112 confirmed module failures.

Reported EL features

Reported class	Modules	Share of 8,232
Cells with dark edge	39	0.47%
Dark cells [source 50% threshold]	8	0.10%
Finger-defect indications	310	3.8%
Inhomogeneous cells	21	0.26%
Dark busbar indications	6	0.07%
Cracked-cell indications	5	0.06%
Dark bleed	1	0.01%

The source label for dark busbar indications is "soldering defects". Its causal interpretation remains provisional. "50%" is retained as a source classifier label; its precise threshold definition is not provided. Counts may overlap; no combined affected-module percentage is calculated.

06 Finger and cell-emission findings

Finger-defect indications | 310 modules

The reported pattern comprises short dark features associated with the cell fingers. The source records one to three affected cells on 207 of the 310 modules; some have ten or more. R05 contains 116 affected modules (18.0% of its assessed population), and R06 contains 160 (23.8%).

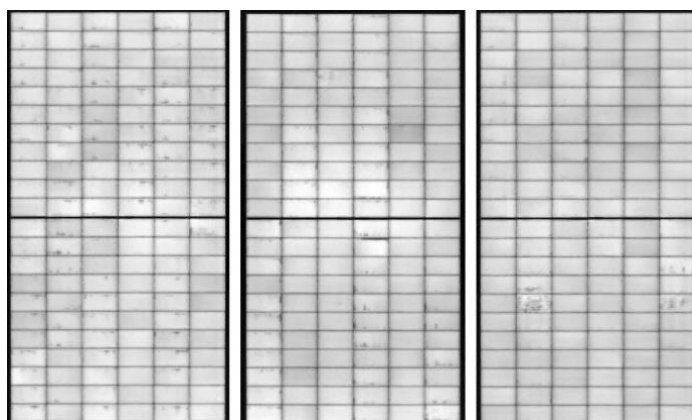


Figure 1. Source examples classified as finger defect. Individual asset identifiers are omitted.

Interpretation and action: the regional grouping warrants targeted image review and checks of batch, installation and acquisition records. A common cause has not been established. The associated power impact is unquantified.

Inhomogeneous cells | 21 modules

Uneven EL emission is reported across eight regions. R09 has the largest count, with seven modules. Potential explanations should be evaluated using the source imagery, test conditions and appropriate follow-up measurements.

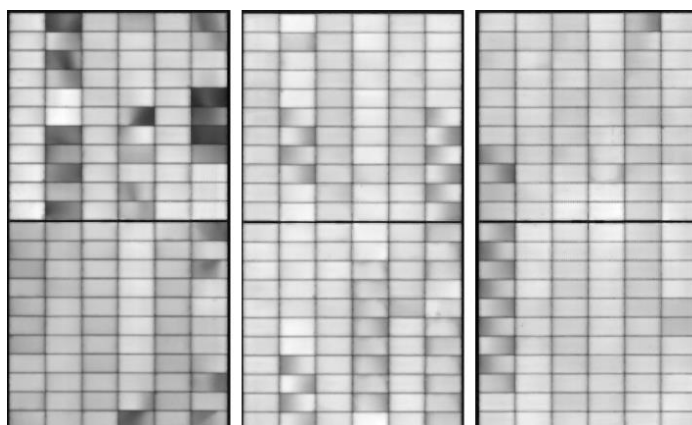


Figure 2. Source examples showing non-uniform cell emission.

Next action: review representative cases and use suitable I-V testing if an assessment of associated output loss is required.

07 Dark busbar and localised findings

Dark busbar indications | 6 modules

The source classifies these as soldering defects. Four occur in R04, one in R06 and one in R08. The images show dark bands associated with busbar or interconnection regions. This pattern suggests an interconnection issue for investigation; it does not confirm a production-stage soldering failure.

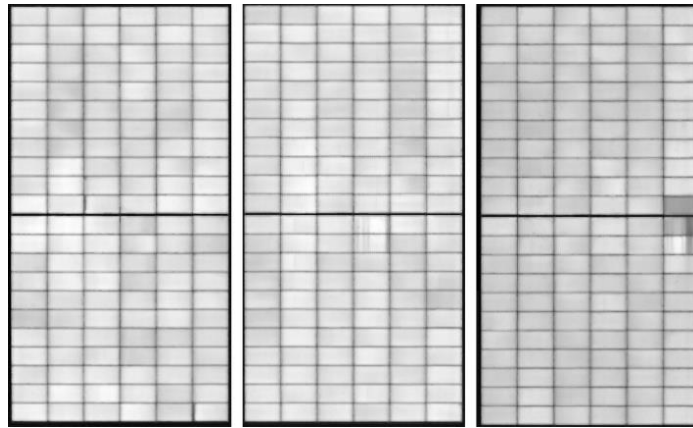


Figure 3. Source examples labelled as soldering defects / dark busbars.

Next action: verify the classification in the original images and correlate with appropriate physical and electrical checks. The grouping in R04 should be recorded, while recognising that six cases are insufficient to establish a shared cause.

Dark bleed | 1 module

One module in R04 shows a localised dark area extending from a cell edge. No mechanism is assigned. The original string and position reference is withheld in this sample.

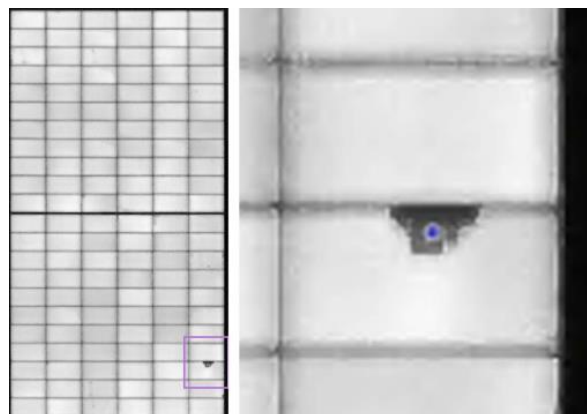


Figure 4. Source module view and enlarged detail of the localised dark area.

Next action: review the source image, retain a baseline and investigate further if corroborating electrical evidence or subsequent change warrants it. No power impact has been quantified.

08 Cracked-cell indications

Five modules: two in R01, two in R12 and one in R06. The source describes short crack-like lines or branches confined to one or two cells per module and reports no isolated cell fragment in the assessed examples.

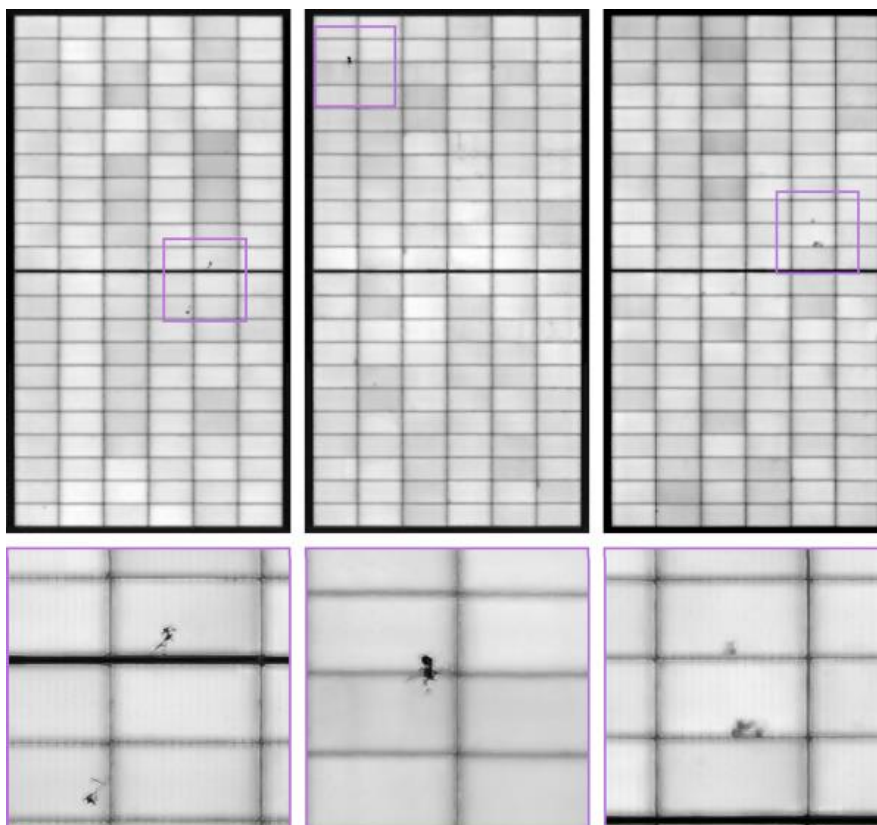


Figure 5. Source module examples above; enlarged details below. Existing source annotations are retained.

Interpretation

These findings warrant review as cracked-cell indications. Image appearance alone does not establish when the damage arose or whether manufacturing, handling, installation, operation or another mechanism was responsible. The associated power impact has not been quantified.

Recommended follow-up

Review the full-resolution images, preserve the baseline and repeat imaging under comparable conditions where monitoring is appropriate. Use suitable electrical measurements when a performance assessment is needed. The responsible technical reviewer should set the follow-up timing from site conditions and corroborating evidence.

A visually small indication is not automatically a low-severity finding. Classification, electrical effect, consequence and recommended action should be recorded separately.

09 Distribution and traceability

Region	EL assessed	Finger count (%)	Uneven cells	Dark busbars	Cracked cells	Dark bleed
R01	672	-	3	-	2	-
R02	672	4 (0.6%)	4	-	-	-
R03	616	-	1	-	-	-
R04	672	13 (1.9%)	-	4	-	1
R05	644	116 (18.0%)	-	-	-	-
R06	672	160 (23.8%)	1	1	1	-
R07	672	4 (0.6%)	1	-	-	-
R08	644	2 (0.3%)	-	1	-	-
R09	672	2 (0.3%)	7	-	-	-
R10	672	1 (0.1%)	2	-	-	-
R11	672	1 (0.1%)	2	-	-	-
R12	280	3 (1.1%)	-	-	2	-
R13	672	4 (0.6%)	-	-	-	-
Total	8,232	310 (3.8%)	21	6	5	1

What the distribution tells us

R05 and R06 contain 276 of the 310 finger-defect indications. Four of the six dark-busbar cases occur in R04. The remaining classes have low absolute counts. These observations guide where to investigate; they do not establish the origin, timing or system-wide extent of a failure mechanism.

Traceability for a commissioned inspection

The final project deliverable should connect each confirmed finding to a real asset identifier, source image, classification, review record and agreed follow-up action. Serial-number matching, where available, supports comparison with factory and earlier inspection records.

The original location map, project identity, inspection dates and module registers are omitted. This sample retains the reported figures and examples with qualified interpretation.

Discuss your inspection programme

Louw Bonthuys | Sky-Futures Africa

lbonthuys@sky-futures.com | +27 64 970 7708