



SOLAR MALFUNCTION CASE STUDY

Rapid Detection of Solar Malfunction:
Preventing Weeks of Lost Generation

At a Glance

01 **0 kWh**
Solar Export

02 **Clear Skies**
Weather

03 **2 Days**
Resolve Time

04 **20 Days**
Previous Resolve Time

Issue:

On 5 April 2025, solar export at a Wigton farm collapsed to 0 kWh under clear skies, risking weeks of lost generation and revenue.

The Root Cause:

A silent inverter malfunction produced a sudden DC current spike (from ~30 A to ~500 A) and AC voltage surge (peaking at 6,550 V), shutting off solar output without triggering onboard alarms.

What the data showed:

OAK's dashboard logged normal generation through 4 April, a flat-line crash on 5 April despite no weather change, zero on-site export, critical electrical outliers, and a recovery beginning on 7 April after a targeted system reset—capping energy loss at 475 kWh and limiting costs to £73.

The Solution

Real-time exception alerts from OAK enabled technicians to pinpoint and reset the faulty inverter within 48 hours, preserving £518 in generation value and preventing an estimated £591 loss and 377 kg CO₂e that a typical 20-day delay would have incurred.

 [Learn More here](#)

Issue

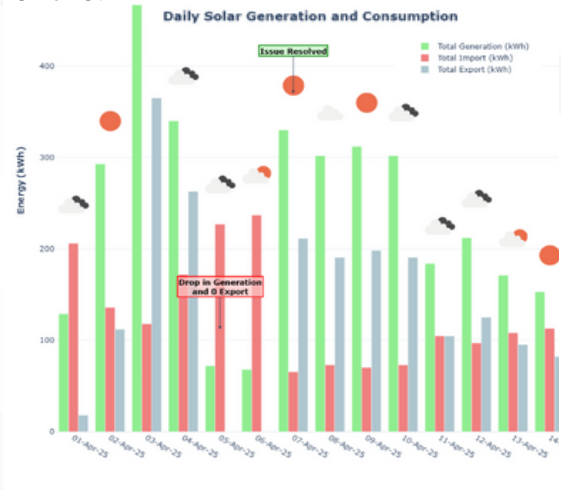
0 kWh

Solar Generation under Clear Skies risking weeks of lost generation

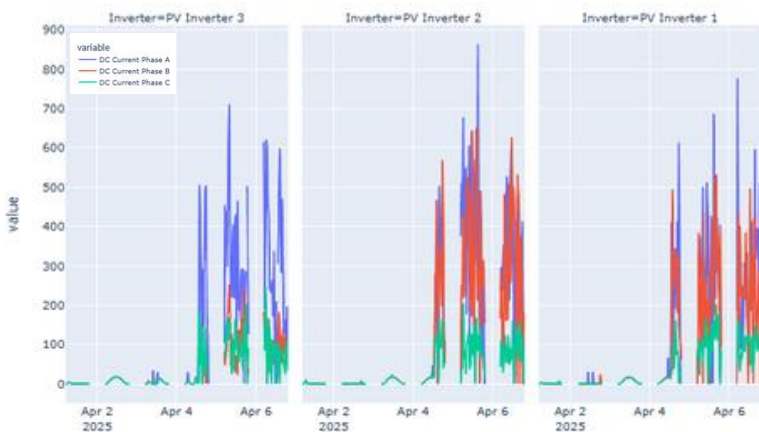


The Root Cause

A hidden inverter fault caused internal DC currents to spike from ~30 A to 500 A and AC voltage on Phase A to leap from 250 V to over 6,000 V, well beyond safe limits. Because these electrical anomalies occurred inside the inverter, its own alarms never tripped—only OAK's external monitoring system detected and diagnosed the failure.

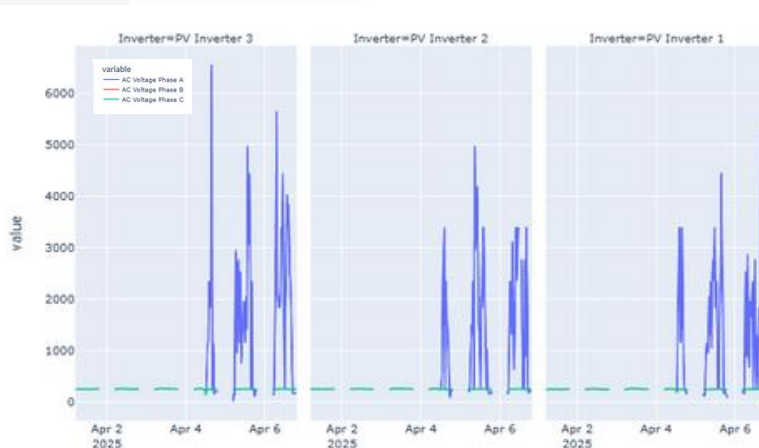


What the Data Showed



DC Current Spike:

Prior to 5th April, the three inverters operated normally, with DC currents averaging around 30 A. On 5th April, OAK's sensors detected a sudden surge to an average of 500 A, signaling a severe electrical fault inside the inverter system.




AC Voltage Abnormality:


Alongside this, the AC voltage on Phase A increased sharply from a stable average of 250 V to over 3000 V, peaking at 6550 V — values far beyond the equipment's normal operating range. This spike is a classic indicator of inverter malfunction or electrical isolation failure.

Cost Comparison


By resolving the issue in just 2 days, the site preserved approximately £518 in value — a 710% improvement in avoided losses.

 Disclaimer: Potential 20-day generation loss was estimated using local weather and solar performance trends during the same period.

Detection	Detection Time	(kWh) Loss	(£) Impact	CO ₂ Emissions (kg)
Early	2 days	475	73	62
Delayed	20 days	2,813	591	377



Impact



Fix



£518 protected in potential solar generation value



Set automatic performance baselines to catch hidden issues



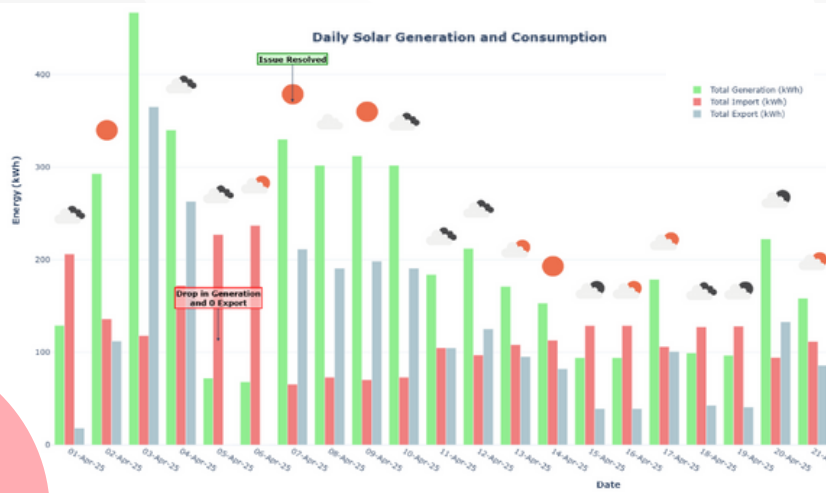
16 Day loss avoided, enabled same-week resolution



Insights ensuring asset uptime and maximise return from renewables

Resolve

By continuously tracking these key electrical parameters, OAK's system flagged these critical outliers within hours — enabling technicians to target the precise failure point without delay. This real-time electrical insight was vital to the swift 2-day resolution and prevention of extended downtime.



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hello@oak-network.com



+44 736 158 8061