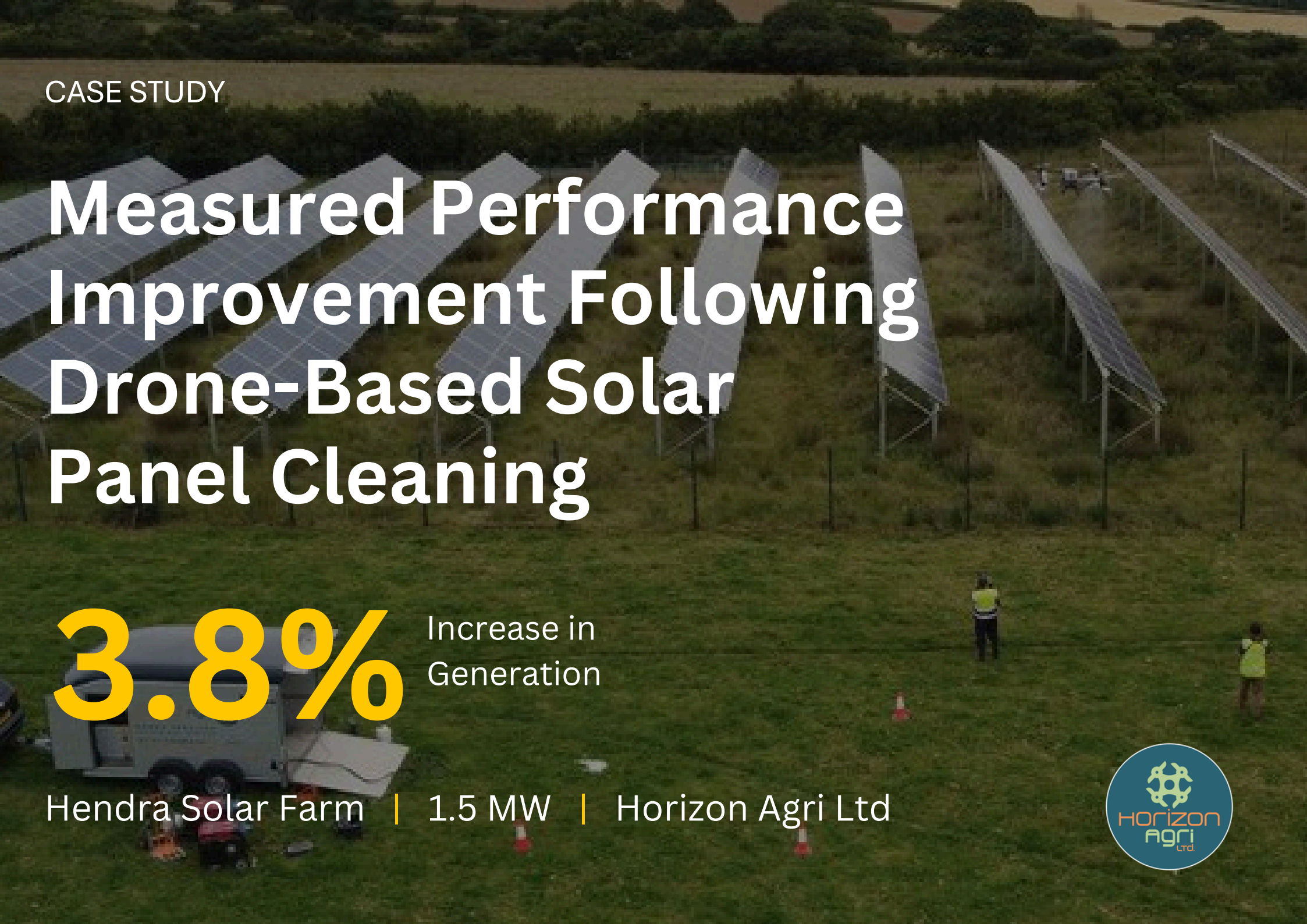

CASE STUDY

Measured Performance Improvement Following Drone-Based Solar Panel Cleaning

3.8% Increase in Generation

Hendra Solar Farm | 1.5 MW | Horizon Agri Ltd

EXECUTIVE SUMMARY

Controlled Comparison. Measurable Results

Horizon Agri Ltd carried out a controlled drone-based cleaning trial at Hendra Solar Farm, a 1.5 MW ground-mounted installation comprising three independent inverters. One inverter was cleaned using a DJI Agras T50 applying biodegradable solar panel cleaning solution, while the other two remained untreated as controls. Pre-clean analysis showed the cleaned inverter and the control average were effectively identical, with only a 0.06% difference in normalised generation. Following cleaning, the cleaned inverter demonstrated a 3.8% improvement relative to the two controls.

TRIAL AT A GLANCE

Site
Hendra Solar Farm

Installed capacity
1.5 MW

Trial design
1 cleaned / 2 controls

Drone
DJI Agras T50

Cleaning solution
Biodegradable solar panel cleaning solution

Measured uplift
3.8%

3.8%	61,370 kWh	£12,274	£8,183
MEASURED IMPROVEMENT	EST. ADDITIONAL GENERATION / YEAR	ILLUSTRATIVE VALUE / YEAR	ILLUSTRATIVE VALUE / MW / YEAR

Commercial estimates use 2025 normalised site generation and an illustrative electricity value of £0.20/kWh.

METHODOLOGY AND BASELINE

A Like-for-like Inverter Comparison

TRIAL METHOD

1. Review historical generation data from all three inverters.
2. Confirm that the proposed cleaned inverter tracked the two controls before cleaning.
3. Clean the selected inverter using the DJI Agras T50 and biodegradable solar panel cleaning solution.
4. Continue monitoring all three inverters under the same site conditions.
5. Compare normalised post-clean performance against the average of the two untreated controls.

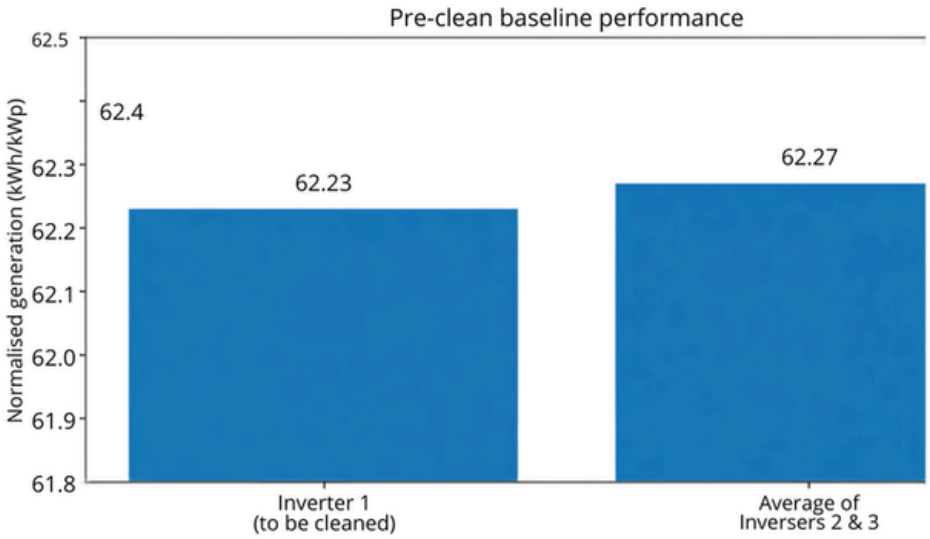

Fig 1. Difference: 0.04 kWh/kWp (approximately 0.06%).

The 0.04 kWh/kWp difference between the inverter selected for cleaning and the control average is negligible. This confirms that the three systems were performing at effectively the same level before the intervention.

RESULTS

The Cleaned Inverter Outperformed the Controls

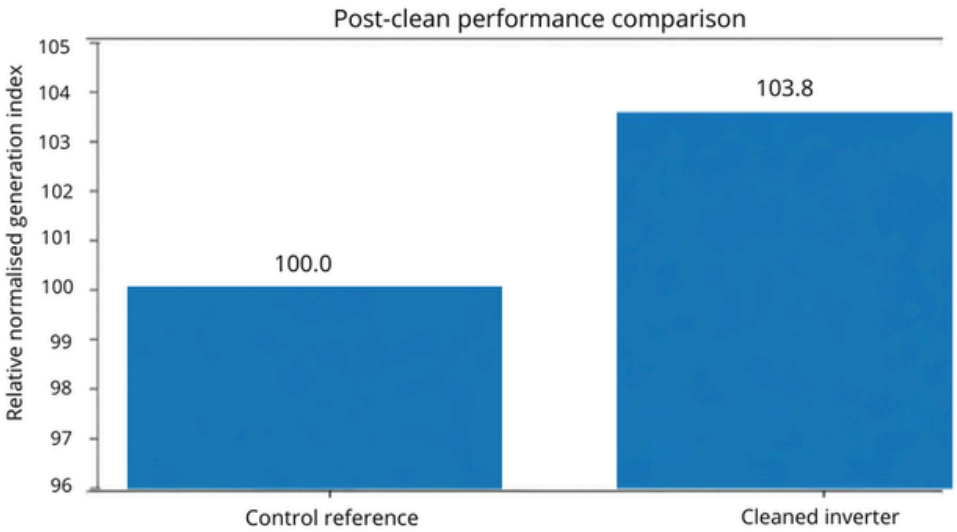

Fig 2. Measured uplift: + 3.8%

3.8%

MEASURED IMPROVEMENT

Normalising generation and comparing against two untreated inverters reduces the influence of changing weather and irradiance. The post-clean difference therefore indicates a measurable performance response associated with the cleaning intervention.

Panels were described as only lightly soiled before cleaning.

The result should be interpreted as a site-specific controlled trial rather than a universal cleaning uplift. The financial value of cleaning will vary with soiling level, electricity value, system performance, weather, cleaning frequency and the duration for which the recovered output is maintained.

COMMERCIAL INTERPRETATION

Translating the Measured Uplift Into Value

2025 normalised annual generation	1,614,990 kWh
Measured performance improvement	3.8%
Estimated additional generation	61,370 kWh/year
Illustrative electricity value	£0.20/kWh
Illustrative additional annual value	£12,274/year
Equivalent illustrative value	£8,183/MW/year

CALCULATION BASIS

1,614,990 kWh x 3.8% = approximately 61,370 kWh of additional annual generation. At an illustrative value of £0.20/kWh, this is approximately £12,274 per year, equivalent to approximately £8,183 per installed MW.

These figures are an annualised illustration based on the measured trial result. They are not a guarantee of future revenue.

Hendra Solar Farm | Cornwall, UK

CONCLUSION

Evidence-led Cleaning Decisions

The Hendra trial demonstrated a measurable 3.8% improvement in normalised generation from the cleaned inverter relative to two untreated controls. The pre-clean baseline showed that all three inverters were operating at virtually identical levels, providing a credible basis for the comparison.

This case study demonstrates that Horizon Agri Ltd drone cleaning workflow can deliver measurable improvements in solar generation under real-world operating conditions. The controlled comparison provides evidence that the observed uplift was a result of the cleaning process rather than natural variation in system performance.

" Seamus and Horizon Agri Ltd were great to work with; the drone cleaning was carried out efficiently with no disruption to site operations. Our generation data afterwards showed a clear, measurable improvement over the untreated arrays and has given us solid evidence to base future cleaning decisions on ."

Benjamin Dumpleton,
Park Services Manager,
Hendra Holiday Park

Drone services for agriculture, horticulture & solar assets

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