



# Monitoring and analytics enhances solar plant performance

Solar plants are adopting digital tools to improve site performance, with mixed success. Traditional asset performance management (APM) tools focus primarily on inverter data and DC-side performance issues but pay very little attention to tracker performance. Most tracker analytics are manual and focus mainly on actual versus expected angle trends. With a lack of detailed tracker data, field teams are forced to troubleshoot issues in the field with limited information. The approach is time-consuming, expensive, and full of guesswork. This case study showcases how SUNOPS helped efficiently identify, diagnose, and resolve tracker performance issues at a 100 MWdc solar plant in the Mountain West Region.



SUNOPS is a cloud-based asset monitoring platform that provides advanced tracker analytics and insights. By aggregating all tracker performance data, it gives users immediate visibility into performance issues. Using the platform, asset managers and other stakeholders can remotely detect and diagnose tracker underperformance, eliminating expensive on-site trial and error troubleshooting and enabling field teams to resolve issues efficiently.

**Issue identification**

In January 2022, SUNOPS was monitoring tracker data at a 100 MWdc solar site in the Mountain West Region when it identified a serious performance issue. It provided the following key insights. The plant began to underperform in January 2022; availability hit a low on January 7<sup>th</sup>, at 96%. Over Current Faults were identified as the primary reason for underperformance, and trackers went into safety stow in response to the fault, resulting in a drop in availability.

**Issue resolution**

Using these insights, field crews were dispatched to the site with actionable and prioritised recommendations. Upon arriving in the field, crews were able to log into SUNOPS and easily pinpoint tracker zones and arrays requiring attention. During the in-field inspection, several root causes of the faults were identified, including disconnected motors, miscalibrated tracker inclinometers, structural alignment issues, and inconsistent communications. Through the specific insights and recommendations

gained from SUNOPS, these issues were quickly resolved by the field crews.

**Impact**

Using SUNOPS to troubleshoot a drop in tracker performance, the plant experienced the following outcomes. Repair work completed in just five days. Tracker availability reached 99%+ in the days following the repairs. The plant recovered up to 12 MWh/day of energy that would otherwise have been lost due to tracker underperformance\* and \$11,400/month in revenue\*\*.

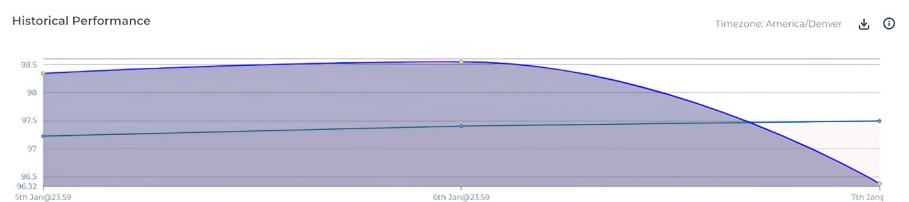


Figure 1: SUNOPS Historical Performance view reveals declining availability

Status ▼	Alerts ▼▼▼	Angle ▼	Mode ▼	PV Voltage ▼	PV Current ▼	Battery Voltage ▼	Battery Current ▼	Last Updated ▼
Online	Over Current Fault	59.24	MANUAL	38.37	0	25.49	0	38 minutes ago
Online	Over Current Fault	60.22	MANUAL	38.59	0.05	25.38	0	29 minutes ago
Online	Over Current Fault	-60.02	MANUAL	37.73	0	25.42	0	22 minutes ago
Online	Over Current Fault	45.38	MANUAL	39.47	0	25.55	0	24 minutes ago
Online	Over Current Fault	-52.9	MANUAL	38.58	0	25.42	0	29 minutes ago
Online	Over Current Fault	-58.94	MANUAL	38.43	0	25.43	0	31 minutes ago
Online	Over Current Fault	-55.72	MANUAL	38.22	0	25.47	0	28 minutes ago
Online	Over Current Fault	46.26	MANUAL	39.21	0	25.39	0	28 minutes ago
Online	Over Current Fault	42.15	MANUAL	38.57	0	25.46	0	35 minutes ago
Online	Over Current Fault	42.01	MANUAL	39.74	0	25.42	0	20 minutes ago

Figure 2: SUNOPS Live Status view shows trackers currently experiencing faults



Figure 3: SUNOPS Model Viewer shows all trackers and arrays, enabling field teams to easily locate the trackers in need of repair

**Looking ahead**

FTC Solar is expanding the SUNOPS platform to encompass inverter and other non-tracker components. Coming developments provide plant stakeholders, from asset managers to O&M providers, with the tools they need to improve workflows and optimise performance.

\* Calculated based on uptime comparison in the 7 days before the fieldwork started and the seven days after work was completed

\*\* Calculated based on an average Power Purchase Agreement (PPA) rate of \$0.0325/kWh

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**Summary**

**Site overview**

Location: Mountain West Region, USA

Project size: 100 MWd

Time period: January 2022

**Challenge**

The plant was experiencing energy losses associated with 2%-5% tracker downtime and was suffering from revenue loss. Traditional APM tools are not sufficient for addressing tracker issues due to:

- Limited tracker data collection
- Minimal tracker domain expertise
- Limited analytics capabilities
- Lack of insight into root cause
- Inability to provide actionable insights

**Solution**

Using SUNOPS, the customer quickly identified which trackers were underperforming and what the associated issues were. Given the specific issues, corrective actions were identified and the subsequent corrective tasks were scheduled for field teams.

For example:

- Intermittent communications were diagnosed as a faulty antenna that required replacement
- Over-current faults from one day to the next were attributed to uncalibrated inclinometers after module cleaning which was fixed with recalibration

Using the SUNOPS Site Model Viewer, the team was able to plan the repair activity based on the most efficient work route.

**Impact**

The plant used SUNOPS to resolve its performance issues. Notable outcomes include:

- Repairs completed in five days
- 99%+ tracker uptime
- 12 MWh/day of otherwise lost production\*
- \$11,400/month in recovered production revenue\*\*