SolarAnywhere® SystemCheck®

CASE STUDY: Omnidian & SolarAnywhere® SystemCheck

How Omnidian's Distributed Solar Performance Guarantee Is Built to Scale with SolarAnywhere Real-time Data

OMNIDIAN®

Learn how Omnidian is using best-in-class machine learning tools and SolarAnywhere real-time irradiance data to automate operations and maintenance—delivering 'solar without fear' to a rapidly growing portfolio of more than 1.5 GW of residential and commercial assets located across the U.S.

Protecting Distributed Solar Assets with Omnidian

SolarAnywhere® SystemCheck® Integral to Nation's Leading Solar Asset Management Solution

Solar is not a one-touch proposition: to get the most value out of a residential or commercial solar PV system, it needs to be maintained over its entire 20-plus year lifecycle. As the solar industry matures, homeowners and portfolio owners are increasingly realizing the important of protecting their investments by ensuring optimal performance over time.

Omnidian was founded on this idea, addressing a gap in the solar market by providing 24/7 monitoring, servicing and a performance guarantee that gives owners peace of mind. Using a combination of advanced software technology, machine learning tools and real-time irradiance data, Omnidian can automatically identify PV systems that have a performance issue. As a result, Omnidian is efficiently managing a rapidly growing portfolio of more than 1.5 GW of residential and commercial assets located across the U.S.

For homeowners, Omnidian's performance guarantee translates into a better long-term return on their solar investment with significantly lower risk. For distributed solar portfolio owners, the Omnidian performance guarantee provides a more certain revenue stream, making assets more attractive to financiers and investors. The greatest beneficiaries may be Omnidian Elite Dealers. Solar installers have struggled to "cross the chasm" from early homeowner and business adopters to the more risk averse early majority. Omnidian dramatically reduces performance risk, increases convenience and provides the peace of mind for solar owners that allows the Omnidian Elite Dealer to sell with confidence.

Why Monitor PV Performance?

Without regular monitoring, PV performance issues can remain undetected for extended periods. In a typical residential portfolio, between five and 10 percent of all systems might need remediation at some point each year. Lowered production can have a variety of causes from hardware problems, to shading caused by growth of nearby vegetation or soiling.

Many homeowners stop monitoring their rooftop solar systems and may only notice a problem when electric bills rise unexpectedly, eroding their return on investment. For distributed PV investors, monitoring the performance of their PV portfolios helps them meet performance guarantees and avoid paying damages or penalties, and makes the asset more valuable to financiers.

While monitoring has obvious benefits to solar owners, only recently has the industry turned its attention to finding cost-effective solutions to protecting this asset class. With an installed base of more than two million residential solar PV systems[1] representing about 18GW of generation capacity across the U.S.[2] —plus another 15GW of commercial capacity[3] —the ability to scale performance monitoring across a large geographic area is critical.

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1 Source: www.seia.org/news/united-states-surpasses-2-million-solar-installations
2 Source: www.seia.org/solar-industry-research-data
3 Source: www.seia.org/solar-industry-research-data

SolarAnywhere® SystemCheck® Provides High-quality Reference Data for Effective Performance Monitoring

Omnidian is pioneering solutions that not only monitor performance, but leverage the insight from benchmarking to cost-effectively maintain and service distributed PV systems at scale. The software identifies down or underperforming systems, and with machine learning, diagnoses the reason. Using this information, Omnidian intelligently dispatches service and maintenance calls, and reduces customer service costs.

Monitoring the performance of distributed PV requires two key inputs: production data from the PV system itself, and a high-quality reference to benchmark performance. There are several options for solar benchmark data, including: Typical Meteorological Year (TMY) data; onsite pyranometers or meteorological measuring equipment ("met" stations); or comparing performance to nearby neighbors. Each of these options has drawbacks, as highlighted in Figure 1, ranging from lack of temporal specificity, to high-cost, low-quality data and/or the inability to efficiently scale.

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>
> **- JEFF BERG, OMNIDIAN V.P. OF ENGINEERING**

Early on Omnidian recognized the benefits of using SolarAnywhere® SystemCheck®, a satellite-based solar resource data service from Clean Power Research, as its high-quality reference. SystemCheck offered key features that would scale as Omnidian grew its customer base and geographic range, including:

- **Geographic and temporal resolution –** With up to 1km x 1km precision across North America and most of the world, the data accurately represents the PV system's environs and can be refreshed in near real-time
- **Consistency –** A data stream that behaves in the same way across locations without the need for ongoing, regional calibration or maintenance
- **Reliability and integrability –** Data is delivered via a standardized, web-hosted API service that is integrated with Omnidian's monitoring software
- **Affordability –** The service costs far less than deploying and maintaining onsite pyranometers or other met-station equipment on distributed generation sites

In addition, SystemCheck provides the consistency and transparency needed for Omnidian and their customers to rely on the output. Via the API, Omnidian's monitoring software has near-instantaneous access to the site-specific irradiance and solar simulation data for the systems it monitors, and it can easily add new project locations as Omnidian's customer base grows.

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Figure 1: Comparison of Solar Irradiance Data Sources for Benchmarking Performance

Although there are a variety of reference solar irradiance datasets available for benchmarking, only real-time satellite data such as SolarAnywhere has the temporal specificity, geographic range, data quality, integrability and pricing structure to support highly scalable asset management platforms.

	Description	Accuracy	Recommended Maintenance	Scalability / Data Quality	Cost	Value for Identifying Performance Issues
SolarAnywhere Real-time, Satellite-derived Data	Data is generated from satellite images every 15 minutes	±5% annual, ±8% monthly	None	Available on-demand via API; no data quality control required	$$	✓ ✓ ✓ ✓
Typical Meteorological Year (TMY Data)	Based on long-term average–does not account for recent weather variability	Monthly variance as high as 35%	None	Depends on Source	$	✓
On-site Pyranometer / Met Station Data	Hardware is installed with every PV system and requires ongoing calibration/maintenance to maintain accuracy	Varies by equipment and maintenance. In practice often > ±5% for C&I met stations	Cleaning every 2 weeks & calibration every 2 years	Requires extensive data aggregation and data quality control	$$$$	✓ ✓ ✓
Nearest Neighbor	Compares performance with neighboring system performance	Unknown. Offers only relative performance, and usefulness depends on availability of neighboring systems.	None	Requires extensive data aggregation and data quality control	$$	✓ ✓

Innovative Software that Delivers for Customers and Scales with Omnidian's Growth

Omnidian's monitoring software is the core technology enabling the company to meet its mission of protecting residential and commercial PV investments. From its inception, Omnidian's software platform was designed to organize the workflow of its customer service agents to deliver the most value and meet service level agreements. To accomplish this, the software delivers alerts in the form of prioritized lists that identify under- or non-performing systems. Agents then coordinate service with PV site owners and technicians.

Generating actionable alert lists across a growing customer base is complicated, however, as not all alerts are equal. Causes for down or underperforming systems range from hardware failures such as an inverter or string outage, to problems such as snow-coverage, soiling or shading. Some problems may need a homeowner or business owner to take action, or may not be cost-effective to address (e.g., snow cover). Underperformance can vary with a PV system's location, the time of year and recent weather, further adding to the complexity of diagnosing underperformance. Hardware failures receive the highest priority for service dispatch, so efficiently identifying the cause of failures and filtering out less-actionable alerts is critical to Omnidian's overall ability to meet its service goals.

The use of machine learning in combination with SolarAnywhere SystemCheck has made it possible for Omnidian's software to rapidly diagnose the reason for PV asset underperformance. As a result, alert lists are more actionable, focusing on high-priority failures and less on "noise." Because they provide an initial diagnosis, Omnidian's customer service agents can avoid unnecessary truck rolls and make it more likely problems can be addressed the first time out, reducing field costs and returning more profit to the system owner.

The Omnidian software system also tracks repairs and feeds that information back into the software, building out a database of how each PV system is performing. With this information, the software will be able to better identify problems in the future.

Transparency is also important to Omnidian's workflows. Because SolarAnywhere data is versioned and consistent over years of coverage, it's possible to reproduce historical data that can be used to analyze the performance of a PV system from year to year. In addition, Clean Power Research is constantly improving the global accuracy of SolarAnywhere while maintaining comparability and historical datasets. As a result, Omnidian is confident in its decision-making and investors trust the performance information they receive.

Omnidian continues to innovate its software to improve their processes and efficiency. New capabilities in development include classification of alerts and asset performance history, and attributing root causes to performance problems.

Omnidian also continues to work collaboratively with the SolarAnywhere team to manage emerging performance disruptors, such as smoke from wildfires. After the 2019 and 2020 wildfires in California, the Omnidian team began investigating the role of geography in PV system performance. SystemCheck's ability to normalize data makes it possible to analyze how well an asset is performing and feed that information into a statistical analysis that can be used to more accurately track underperformance due to smoke.

"Recent extreme weather events such as the 2020 wildfires can impact solar generation and shake investor confidence," said Jeff Ressler, CEO of Clean Power Research. "Investor confidence—from the homeowner to portfolio owner—is vital to scaling the industry at the speed required to meet today's challenges. SystemCheck provides unrivaled visibility into the performance of distributed systems, which allows asset managers to mitigate risks, optimize O&M and boost investor confidence."

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- JEFF RESSLER, CEO OF CLEAN POWER RESEARCH

Expanding from Operational Efficiency to Strategic Performance Improvements

Omnidian's ongoing software development is helping the company meet key business objectives, including reducing response time for hardware failures, improving customer service productivity and scaling with the company growth.

"Omnidian is leaning into next-generation technologies to allow for the more efficient and effective management of distributed solar assets," said Mark Liffmann, CEO of Omnidian. "This includes machine learning to more intelligently analyze and diagnose performance issues and the use of SolarAnywhere SystemCheck irradiance data and simulations for benchmarking. We're confident that SystemCheck is getting the investment and innovation it needs to help the Omnidian solution stay best-in-class."

With an intelligent alert system, Omnidian's customer service agents now spend less time reviewing alert lists to identify hardware failures, and are able to dispatch service faster, providing a better product for customers. As a result, Omnidian is able to efficiently give their customers— homeowners, businesses and portfolio investors—assurance that solar will deliver as promised, backed by a performance guarantee. Most importantly, they're maintaining a high-level of service as the company expands its customer base and geographic reach.

Omnidian is also looking to the future and how they can help portfolio owners better understand the performance of their assets and improve future returns. By providing deep insight into what is affecting their assets, investors will be able to include this information in their economic modeling. The information will help them tailor portfolio-specific operational maintenance strategies that will lead to improved performance and returns. By truly delivering "Solar Without Fear" to homeowners and portfolio owners alike, Omnidian has become the premier service for investors looking to maximize their investment in this fast-growing asset class.

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- MARK LIFFMANN, CEO OF OMNIDIAN

SolarAnywhere® SystemCheck®

Comprehensive, on-demand data for distributed solar performance evaluation

SolarAnywhere SystemCheck offers independent estimates of distributed PV energy production in real time, giving owners and operators a critical tool for benchmarking system performance.

SystemCheck makes it possible to evaluate performance of individual PV systems or a fleet of systems to make better asset management and O&M decisions—all at a fraction of the cost of lost energy production, high operational risk or unnecessary truck rolls. Solar owners and operators can easily integrate SystemCheck's API into existing software and tools to scale monitoring across the portfolio.

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