TECH OFFER

AI-Powered Digital Solutions for Solar Photovoltaic (PV) Health Check

KEY INFORMATION

TECHNOLOGY CATEGORY:
Energy - Solar
Infocomm - Artificial Intelligence

TECHNOLOGY READINESS LEVEL (TRL): TRL9
COUNTRY: SINGAPORE
ID NUMBER: TO175317

OVERVIEW

As global solar adoption grows, photovoltaic (PV) system underperformance and degradation remain key challenges, impacting energy yield and financial returns. Solar PV systems degrade over time due to factors related to manufacturing defects, environmental exposure and poor maintenance. While targeted interventions exist to mitigate specific degradation mechanisms, the primary challenge lies in accurate diagnosis. Traditional diagnostic methods, such as drone-based thermal imaging and on-site inspection, are often hardware-intensive and costly, limiting their scalability for large solar portfolios.

To address these challenges, the technology owner has offered an AI-powered hardware-agnostic software platform that analyzes inverter data to identify degradation mechanisms and assess PV system health. Leveraging advanced machine-learning algorithms, the platform can evaluate degradation rate, system inefficiencies, and root causes of underperformance, providing solar asset owners with real-time insights and actionable recommendations to optimize system performance. The solution goes beyond simple diagnostics, it integrates financial modeling and power output forecasting to help users make data-driven decisions to maximize energy yield and their solar investment returns.

The technology owners are actively seeking collaborations with solar operation & maintenance (O&M) providers aiming to enhance their maintenance packages with AI-driven PV health check and predictive diagnostics.

TECHNOLOGY FEATURES & SPECIFICATIONS

- **No Additional Hardware Required:** Utilizes existing inverter data, eliminating the need for extra hardware and associated costs
- **AI-Driven Diagnosis:** Proprietary machine-learning models analyze historical power output data to identify degradation mechanisms and root causes, ensuring timely and precise assessment
- **Financial Modeling & Projections:** In-depth economic assessments help users evaluate cost-effective remedial actions
- **Automated Health Reports:** Users can upload inverter data and receive comprehensive system report detailing system's health, degradation rates and optimization opportunities
- **Actionable Insights:** Based on expert analysis, provides a list of tailored actions to rectify identified issues, facilitating effective system optimization
- **Seamless O&M Integration:** Solar O&M providers can incorporate the software into their service offerings to enhance customer engagement and operational efficiency

POTENTIAL APPLICATIONS

- Solar O&M Providers: Enhance maintenance packages by providing clients detailed system health reports, including degradation insights, power output analysis, and system optimization recommendations, enhancing customer engagement and their service differentiation
- Solar Asset Owners & Investors: Enables independent system assessment and data-driven decision-making to improve solar PV performance and maximize long-term returns
- Renewable Energy Consultants: Leverage the software for advanced solar PV performance audits and system health diagnostics

UNIQUE VALUE PROPOSITION

- **Hardware-Agnostic:** Extracts insights directly from existing inverter data, eliminating the need for costly hardware like drone imaging
- **Cost-Effective & Scalable:** Offers an affordable, scalable alternative for health assessments without high-cost diagnostics
- **Proactive Maintenance & Optimization:** Identifies early warning signs to minimize downtime and operational disruptions
- **Data-Driven Decision Support:** Provides actionable insights and financial projections to empower informed decision-making