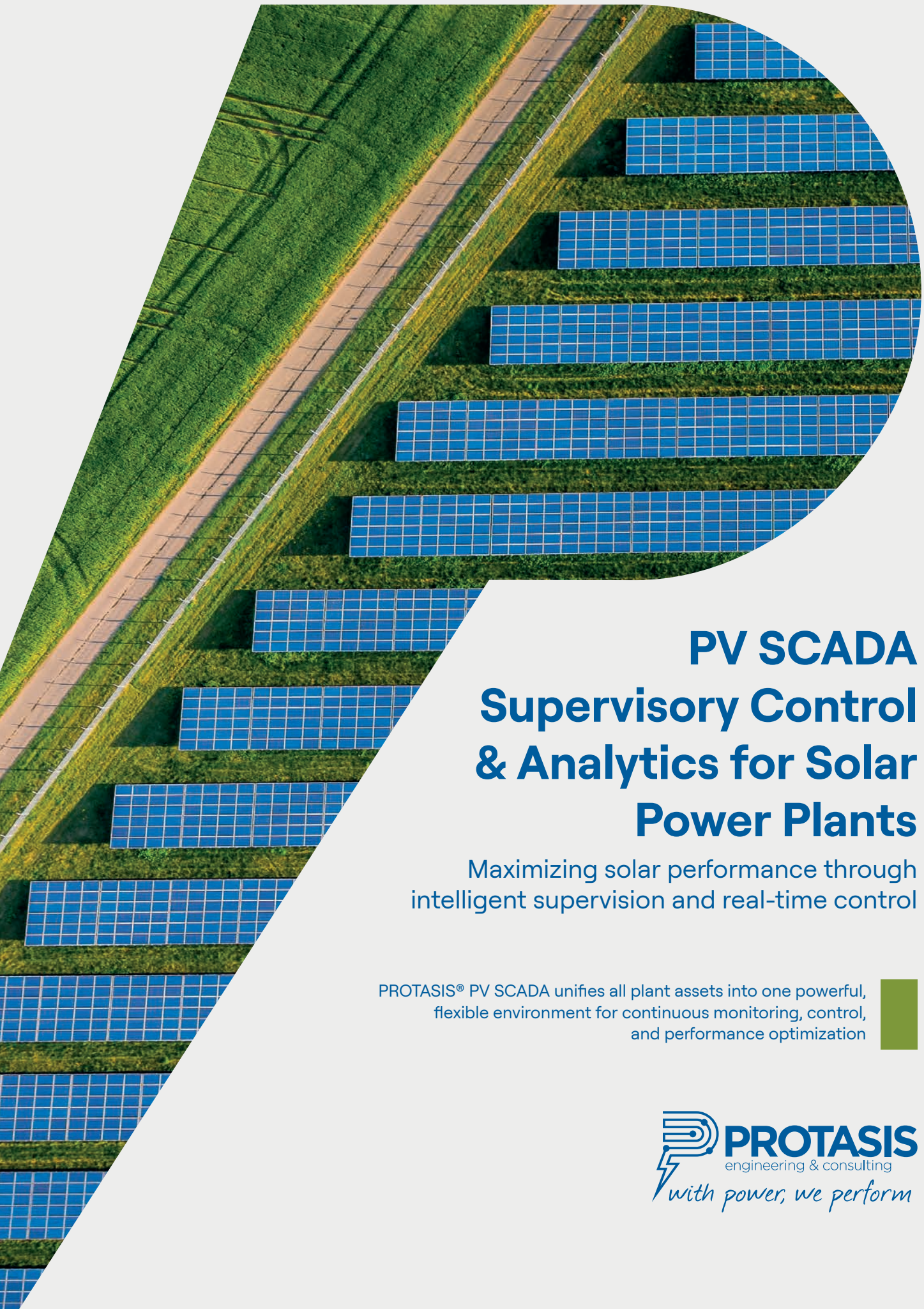

PV SCADA Supervisory Control & Analytics for Solar Power Plants

Maximizing solar performance through intelligent supervision and real-time control

PROTASIS® PV SCADA unifies all plant assets into one powerful, flexible environment for continuous monitoring, control, and performance optimization

PROTASIS
engineering & consulting
with power, we perform

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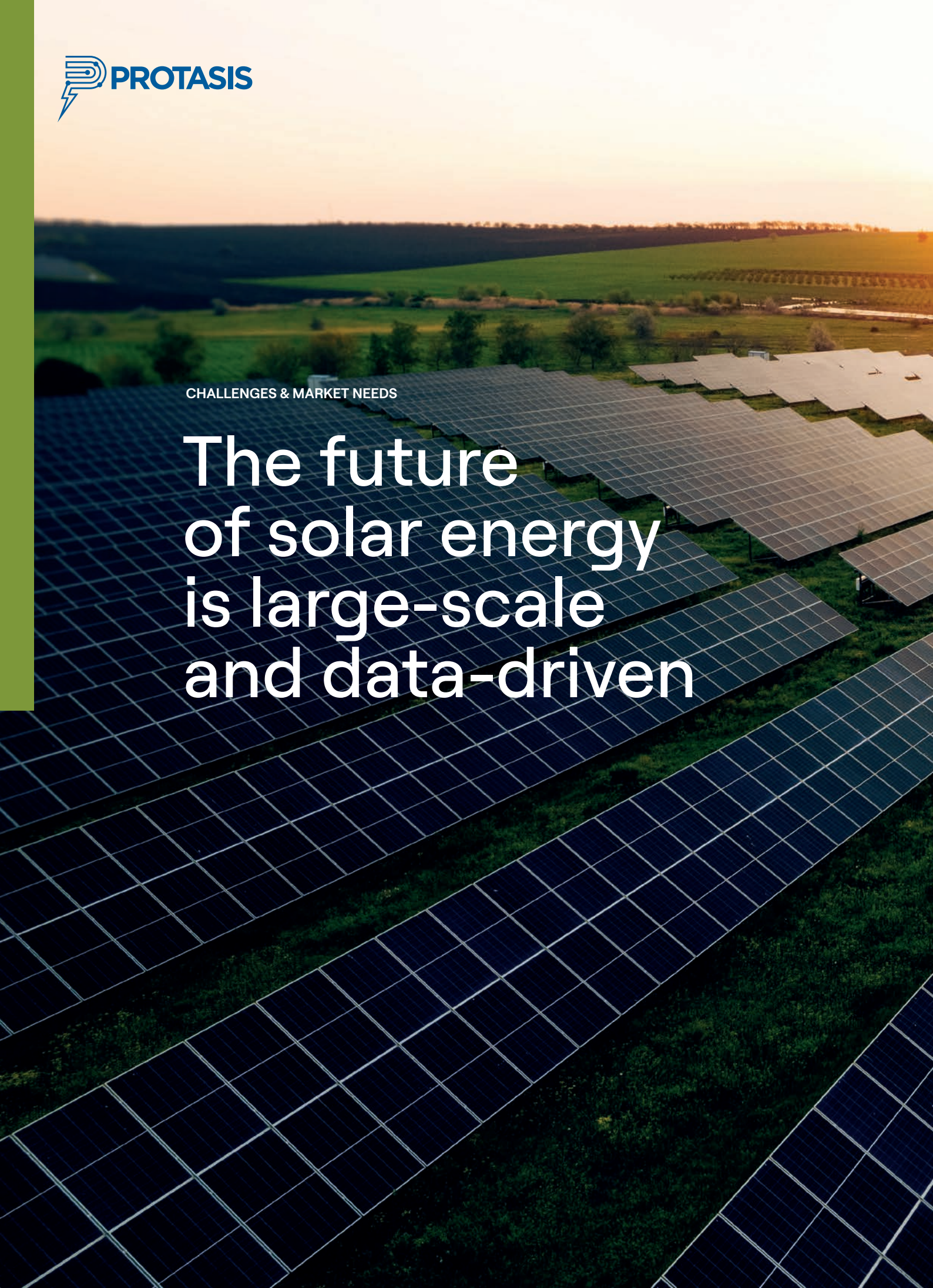


CHALLENGES & MARKET NEEDS

The future of solar energy is large-scale and data-driven

With increasing PV penetration and rising performance expectations, operators face new technical and operational challenges. Maintaining high availability, ensuring accurate performance analysis, and monitoring hundreds of distributed field devices require advanced SCADA solutions built for solar-specific needs.

Key challenges:

- Large asset volume requiring unified visibility
- Communication instability and data losses impacting KPIs and reporting
- Need for precise, real-time performance assessment (PR, losses, availability)
- Asset interoperability across multiple vendors and protocols
- Cybersecurity requirements for remote access and plant-to-cloud data flows
- Growing expectations for automated reporting and analytics
- Need for high availability, redundant architectures to secure uninterrupted operation

THE SOLUTION

PROTASIS® PV SCADA
The digital backbone of modern solar plants

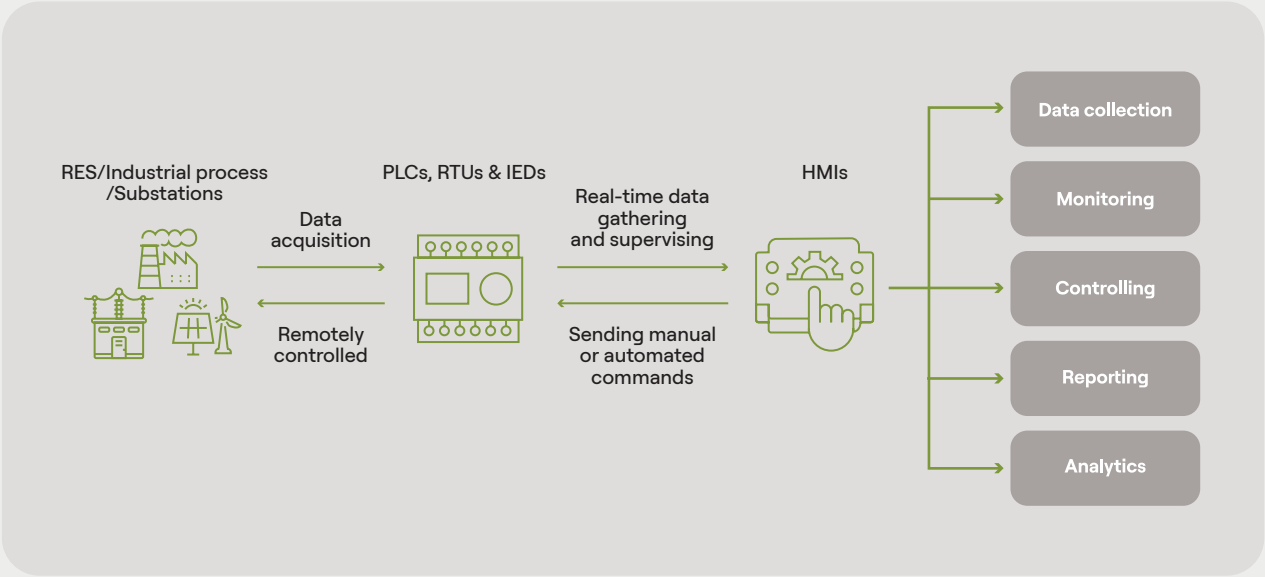
From small installations to hyperscale PV assets

PROTASIS® PV SCADA is an intelligent, modular, and fully scalable platform designed to supervise, control, and optimize photovoltaic installations. Built on a flexible front- and back-end architecture, it integrates every subsystem, such as inverters, trackers, substations, weather sensors, and auxiliary equipment, into one secure and reliable environment.

It ensures high-quality data acquisition, seamless communication, and advanced performance analytics to maximize plant availability and transparency.

01 | **Core functionalities:**

- Real-time monitoring and control of all PV assets
- High availability architecture with redundant active-active SCADA servers
- Active supervision of communication networks (RSTP, MRP, PRP) with automatic failover
- Advanced KPI calculations (PR, availability, efficiency, losses), as per IEC 61724
- Full HV-MV substation integration with Automatic Line Coloring (ALC)
- Sophisticated alarm management with suppression logic and equipment modeling
- Remote access with full web-client functionality



02 | Technical Highlights:

- Supports 300+ communication protocols, including Modbus SunSpec, IEC 61850, DNP3, OPC UA
- Embedded process gateway for secure data exchange with third-party platforms
- Smart Objects with integrated driver, logic, Graphical User Interface (GUI), and variables for each asset
- Fast expansion: modifying a Smart Object updates all related data points instantly
- Fully customizable GUI, reports, dashboards, and KPIs
- Supports SQL or integrated historian for long-term storage and analysis
- HTML5 and web client interfaces for local and remote operation
- Cybersecure architecture aligned with IEC 62443-4.1

03 | Applications:

- Utility-scale PV plants
- Commercial/industrial PV installations
- Hybrid renewable plants where PV is the dominant source
- Multi-site PV portfolios requiring centralized monitoring
- Plants requiring advanced analytics and automated reporting

PROTASIS® PV SCADA provides one unified supervisory platform to maximize PV plant efficiency, transparency, and operational uptime.

PROTASIS

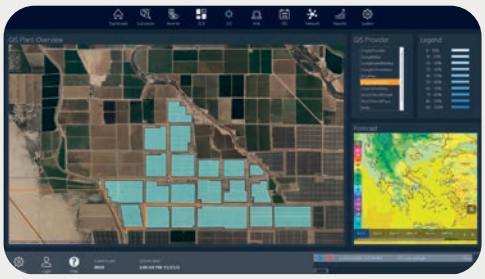
PRODUCT FUNCTIONALITIES & BENEFITS

Smart Supervision & Advanced Analytics for every PV asset

Why choose PROTASIS® PV SCADA?

01 | High data Integrity & Reliability

- Redundant servers ensure uninterrupted operation and zero data loss
- Secure, supervised communication networks with automatic switchover
- Real-time Sequence of Events (SoE) for accurate operational tracing



02 | Performance & Efficiency optimization

- Dynamic heatmaps for instant identification of underperforming areas
- Integrated analytics for trend evaluation and performance benchmarking
- Automated reporting for production, KPIs, and seasonal comparisons

03 | Flexibility & Interoperability

- Supports hundreds of standard and proprietary protocols
- Smart Object architecture for rapid deployment and easy system expansion
- Vendor-agnostic integration with inverters, substations, trackers, and auxiliary equipment

04 | Advanced Visualization & Control

- Next-generation GUI with dynamic dashboards
- Full MV-HV substation and switchgear visualization
- Multilingual interface with instant language switching
- Full remote control and monitoring through HTML5 and web clients

PROTASIS, and its operations, are certified according to the latest applicable international standards, regarding the respective Management Systems

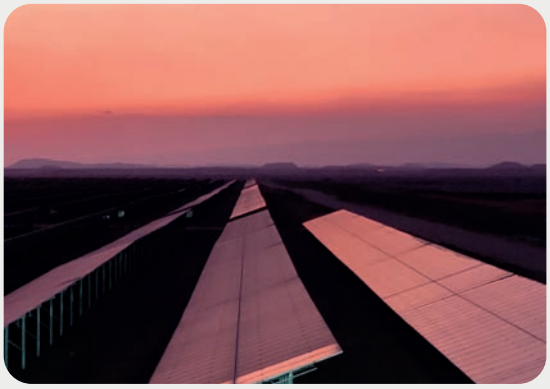
ISO 9001 : 2015 | ISO 14001 : 2015 | ISO 37001 : 2017 | ISO 45001 : 2018 | ISO 27001 : 2022

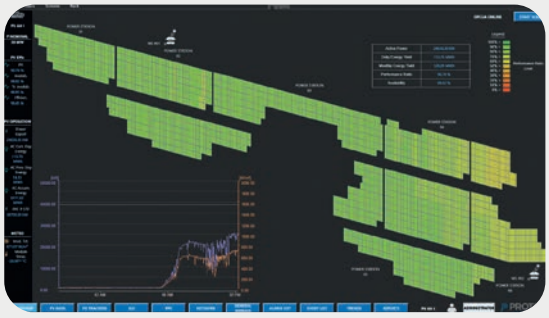
SUCCESS STORY

Zafarana 50 MWp PV Project, a benchmark for large-scale PV SCADA performance

The Zafarana PV plant stands as a flagship solar installation, supported by an advanced PROTASIS® PV SCADA solution that integrates all inverters, string combiner boxes, weather sensors, and HV/MV substations into one unified digital ecosystem.

The system ensures high operational transparency, stable performance, and efficient fault management across the entire PV field.





01 | **Responsibilities of the PV SCADA System:**

- Real-time centralized monitoring and control of all installed PV assets
- Acquisition and evaluation of PR, availability, efficiency, and losses
- Structured alarm management with intuitive asset modeling
- User-role-based access and control for operators, supervisors, and engineers
- Operational continuity through local SCADA clients on site
- Secure remote visibility (web clients + HTML interface via any browser)
- Centralized reporting and long-term data analytics

By structuring the monitoring hierarchy and alarm logic, PROTASIS improved system responsiveness, reduced downtime, and enhanced plant availability.

02 | **Technological Strengths & Benefits:**

- Unified visualization and KPI-driven performance insights
- Granular user management aligned with safety requirements
- Scalable architecture accommodating future expansion and new KPIs
- Secure remote access identical to local SCADA functionality

Zafarana PV project demonstrates how a dedicated PV SCADA platform enhances plant reliability, streamlines workflows, and empowers local and remote teams with real-time intelligence, supporting long-term operational excellence.

COPA-DATA Gold Partner

PROTASIS is a gold partner of COPA-DATA, symbolizing a longstanding partnership that continues to strengthen over time.

Elevate PV plant operations with a secure, intelligent SCADA platform that provides real-time visibility, enhanced performance, and maximum uptime

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with power, we perform

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