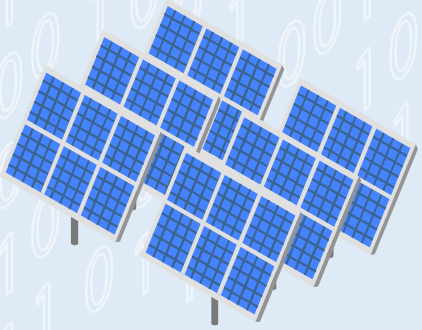
SUPER

SOLAR UTILIZATION PERFORMANCE RELIABILITY
BENCHMARKING APPLICATION

Supplemental Project Notice

PROJECT HIGHLIGHTS

- Benchmark performance and reliability across the PV industry
- Automated performance reports
- Interactive visualization tools
- Intake of funder data
- NERC GADS integration
- Standardized formulas and analyses
- Collaborate through SUPER user-group meetings



Background, Objectives, and New Learnings

Utility-scale solar is rapidly growing in the U.S. and across the globe. Solar technology continues to advance, achieving higher efficiency and lower cost through new module and system innovations. In the quickly changing PV industry, standards and metrics to measure performance and reliability are developing, but not yet established.

A vast amount of data is being collected by individual owners, yet without standardized metrics and anonymized sharing, it is difficult to derive value. Understanding performance and reliability at the fleet and individual plant level is essential for achieving targets and for continued improvement and growth.

The Solar Utilization Performance and Reliability (SUPER) benchmarking effort seeks to collect and analyze data in a standardized approach, to measure and compare key performance indicators and metrics across the PV fleet.

By measuring perfomance and reliability across the industry, owners and operators can better understand the impacts of technology innovations, design choices, environmental factors, and O&M effectiveness.

Key Research Questions

Through fleet-scale benchmarking, owners/operators can find answers to such questions as:

- How does my fleet perform relative to others?
- How are individual plants performing compared to plants with similar designs and environments?
- How accurate are initial performance estimates (P50)?
- How much energy is lost due to inverter downtime (availability)?
- What are the impacts of technology, design, and location specifics, such as bifaciality, tracking, snow or soiling?
- What is the rate of performance loss over time?

Benefits

Funders will benefit from the ability to visualize and compare the performance and reliability of solar fleets and individual plants against each other. Funders may use SUPER to evaluate technology and design choices, optimize and target maintenance activities, and improve upfront energy production models and forecasts. The public will benefit from increased performance and lower cost across the PV industry through standardization and accessibility of knowledge of solar generation. Results from the collected data will add to the ongoing research studies on efficiency and reliability.

Data Privacy

- Plant and fleet identification are **anonymized** when viewed by those outside your organization.
- Owners can see the plant identification (names, attributes, and metrics) for **only their plants**.

Project Approach and Summary

Funders are expected to contribute their plant specifications and data. Data requirements and formatting templates can be found at https://epri.box.com/v/SUPER-Data-Requirements. EPRI collects data from funders and from additional sources. Analysis and benchmarking are performed on both high-resolution SCADA data and monthly summary data. High-resolution analysis gives more insight into causes of underperformance. For high-resolution data, EPRI will assist in automating data transfer by providing example scripts to pull and send data. The funder is responsible to send data according to the specifications for inclusion in the database. EPRI will analyze data for quality control and compute metrics including:

- Capacity factor and yield
- Availability
- Baseline performance index (actual vs predicted)
- All-in performance index (actual vs expected)
- Regular performance index (downtime excluded)
- Performance loss rate (system degradation)

Results are accessible through SUPER.epri.com and through periodic automated reports specific to each owner's fleet. The web tool enables comparisons across all plants in the database, which can be filtered by specific attributes. The plant view gives in-depth inverter-level analysis of each owner's plants.

A failure database is in development. EPRI is gathering data and developing failure recording best practices.

Deliverables

- Access to the interactive benchmarking application.
- Analysis of funder's PV fleet. Speed of intake depends on the funder's ability to send data and metadata in the requested format. EPRI will assist in data transfer through example scripts and guidance.
- Periodic automated performance reports for funder's fleet.
- Inclusion in SUPER users group forum.
- Access to documentation describing KPI formulas.

Project Status and Schedule

Participation in SUPER spans the calendar years specified in the funding agreement. SUPER funders gain access to the benchmarking website and user group meetings. The website is updated on a regular and as-needed basis. Analysis of funder-provided performance data is expected within 6 months after EPRI receives formatted data and plant specifications. For larger fleets, intake may take longer. Expediated data intake can be requested for an additional cost.

Who Should Join

Utilities and companies that own/operate solar farms with a desire to increase performance and reliability of existing and future plants.

Price of Project

The annual price for the project is $18,000. An expediated data intake option can be requested for an additional cost. Participants must be part of the Solar Owners League (SOL) or the Solar Generation Program (P207).

Contact Information

For more information, contact the EPRI Customer Assistance Center at 800.313.3774 (askepri@epri.com).

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