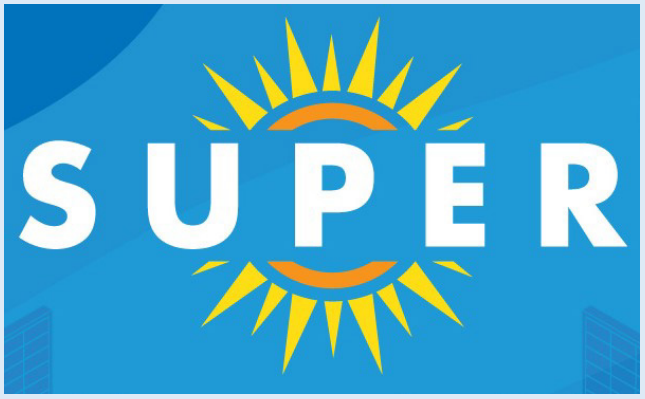
Supplemental Project Notice

SUPER – SOLAR UTILIZATION, PERFORMANCE, AND RELIABILITY BENCHMARKING WEB-BASED TOOL AND USER-GROUP



PROJECT HIGHLIGHTS

- Quantitatively benchmark performance and reliability across the PV industry
- Analysis of participant solar data using innovative data analytical methods
- Interactive visualization tools
- Standardized quality control procedures, formulas, and KPI's
- Industry collaboration through workshops and periodic webcasts

Background, Objectives, and New Learning

The SUPER, or Solar Utilization, Performance, and Reliability benchmarking effort and EPRI's solar research program will continue to address industry solar challenges, including better methodologies to quantify fleet-wide key performance indicators (KPIs) and reliability benchmarking.

In this quickly changing industry, unified metrics are emerging but not fully established. A vast amount of data is being collected by individual owners, but without standardized metrics it is difficult to make comparisons and derive value. Understanding performance and reliability at the fleet- and plant-levels is essential for achieving annual energy production targets, reducing costs, and driving continued improvement and growth.

SUPER seeks to collect and analyze data using a standardized and transparent approach to measure and compare KPIs and other metrics across the PV fleet, while keeping owners and their data anonymous. By measuring performance and reliability across the industry, owners and operators can better understand the impacts of technology innovations, design choices, environmental factors, and O&M effectiveness.

Through fleet-scale benchmarking, owners/operators are expected to be better informed to answer questions such as:

- How do my fleet and individual plants perform relative to the industry?
- How much energy is lost due to specific factors such as inverter downtime, fixed and variable system loss, curtailment, etc.?
- What are the impacts of technology, design, and location specifics, such as bifaciality, tracking, snow or soiling?
- What is the energy impact of specific inverter and module manufacturers and models?
- What is the rate of performance loss over time?

Benefits

Data sharing participants should be able to visualize and compare the performance and reliability of their own solar fleets and individual plants against each other and an anonymized industry database.

Funders may use SUPER to evaluate technology and design choices, optimize maintenance activities, and improve energy production models and forecasts. The public may benefit from increased performance and lower costs across the PV industry through increased efficiency and reliability.

Funders may also benefit from worldwide peer-to-peer networking, technical collaboration, user-group meetings, and joint webcasts.

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 intends to collect data from funders and additional sources. Analysis and benchmarking are performed on high-resolution SCADA data. EPRI intends to assist in automating data transfer by providing example scripts to pull and send data. Funders are responsible for providing data according to the specifications for inclusion in the SUPER database.

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

EPRI expects to analyze data for quality control and compute metrics including:

- Capacity Factor, Yield, Performance Ratio
- Inverter Downtime (Availability), Fixed and Variable System Loss, Curtailment, Irregular Performance
- Benchmark Performance Index (Actual vs Expected)
- Performance Loss Rate (System Degradation)

Results are accessible and downloadable via SUPER.epri.com. The web tool enables comparisons across all plants in the database, which can be filtered by specific attributes.

Deliverables

EPRI expects to offer these deliverables:

- Access to interactive SUPER benchmarking web-based tool
- Analysis of the funder's PV fleet and insights to potentially improve performance
- KPI formulas and documentation
- Annual workshop and periodic webcasts

Price of Project

The annual cost of this project is $18,000 for funders of EPRI Solar Generation (P207), or $28,000 for non-funders.

Project Status and Schedule

The SUPER website is updated with performance and reliability data on a regular and as-needed basis during the year.

The annual workshop is usually held in the Spring or Summer at a U.S.-based location. Multiple webcasts are typically held throughout the year.

Who Should Join

Utilities and companies that own or operate solar farms and seek to improve the performance and reliability of existing and future plants.

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