Solar Plant Performance Analysis Report

Problematic Daily PR Records

Record for Plant S (2025-05-29)

Record Time	2025-05-29
Plant Name	Plant S
Anomaly Type	soiling_impact|data_quality_issue
Severity	critical

PR Metrics

Daily PR Percent	80.33
Daily PR Temp Corrected Percent	86.52
PR Temperature Difference	6.19

Contributing Factors

Daily Availability Percent	1.00
Plant Soiling Loss Percent	232.42
Plant Curtailment KW	0
Average Cell Temperature C	31.31
Daily Slope Radiation KWH/m²	3.15

Performance Analysis

PR Deviation from 7-day Average	N/A (single day data)
Expected PR Range	80-90%
Temperature Correction Impact	6.19
Radiation PR Correlation	Moderate radiation, PR at 80.33% with critical soiling anomaly.

Yield Impact

Daily Yield KWH	2507.14
Estimated Yield Loss KWH	142.9
Yield Loss Percentage	5.39

Analysis Overview

Summary

The analysis for Plant S on 2025-05-29 identified a critical data quality issue with the reported plant_soiling_loss_percent of 232.42%, which is physically impossible. This suggests either a severe sensor malfunction or an erroneous data point. The daily_pr_percent was 80.33%, which is on the lower side of typical performance but not critically low on its own. However, this PR value, combined with the anomalous soiling data, indicates that actual performance might be significantly impacted by unmeasured soiling or that the soiling sensor issue is masking the true cause of any PR deviation. Availability was 100%, and there was no curtailment. Temperature correction showed a notable difference of 6.19% between standard and temperature-corrected PR, indicating some temperature influence.

Analysis Period

Start Date	2025-05-29
End Date	2025-05-29
Total Days Analyzed	1

Plant Information

Plant Name	Plant S

PR Performance Summary

Average Daily PR	80.33
Average Temp Corrected PR	86.52
Lowest Daily PR	80.33
Highest Daily PR	80.33
PR Trend	Stable (single day)
Temperature Correction Effectiveness	Shows a notable difference of 6.19%, indicating temperature impact.
PR Standard Deviation	N/A (single day data)

Anomaly Breakdown

Total Anomalies Found	1
Critical Issues	1
High Priority	0
Medium Priority	0
Low Priority	0

Root Cause Analysis

Primary Causes	• Soiling sensor malfunction or data error • Potential actual soiling accumulation impacting PR
Soiling Impact Days	1
Curtailment Affected Days	0
Low Availability Days	0
High Temperature Impact Days	0

Performance Trends

Daily PR Trend	Cannot determine from single day data
Seasonal Patterns	Cannot determine from single day data
Degradation Rate Estimate	0
Temperature Correlation	Moderate

Recommendations

- Immediately investigate the plant_soiling_loss_percent sensor for Plant S for potential malfunction or data error, as the reported value of 232.42% is impossible and indicates a critical issue.
- Conduct a visual inspection for soiling on Plant S's panels to verify the actual soiling condition.
- If significant soiling is observed, implement a panel cleaning schedule.
- Monitor daily PR closely for Plant S in the coming days to identify any consistent low performance or further anomalous soiling readings.

Estimated Financial Impact

Total Yield Loss KWH	142.9
Estimated Revenue Loss	Estimated revenue loss of 142.9 kWh based on an assumed ideal PR of 85%. The anomalous soiling data makes precise calculation challenging.
Performance Improvement Potential	Significant, pending resolution of the soiling data issue and potential actual soiling. Addressing the soiling (or sensor issue) could improve PR and yield.

Metadata

Analysis Timestamp	2025-05-29T12:00:00Z

Data Quality

Total Records Analyzed	1
Records with Anomalies	1
Data Completeness	100.0
Missing Data Days	0

Analysis Parameters

PR Threshold Critical	70%
PR Threshold Warning	80%
Trend Analysis Window	7 days
Temperature Difference Threshold	10%
Radiation Threshold KWH/m²	4.0