advertendo®

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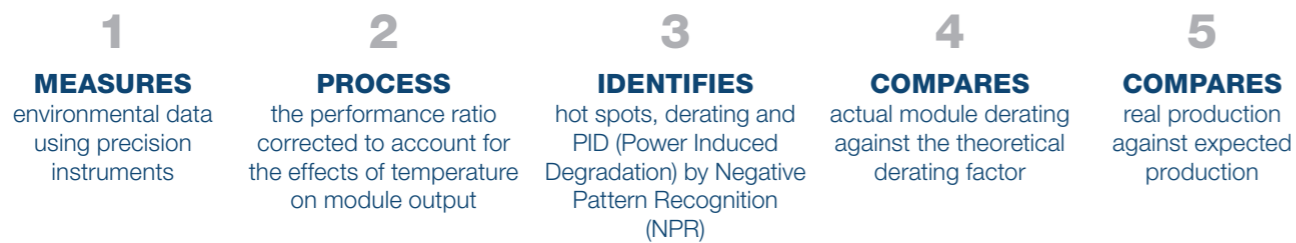
www.esapro.it

SOLARBUG:
MEASURES
PROCESSES
BOOSTS

Real production vs potential production

Complete mapping of the main elements making up the system and measurement of radiation data allow SolarBug to determine theoretical system daily production data. This parameter allows the operator to check that expected production is being reached or to quantify any shortfalls in production on a daily basis, and consequently to promptly implement appropriate corrective actions.

REAL PRODUCTION VS OPTIMUM PRODUCTION

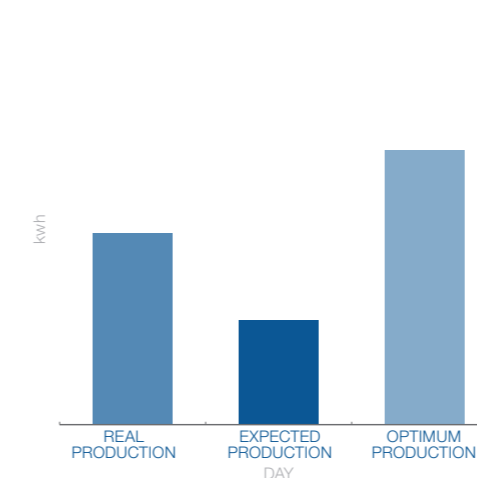DERATING FROM DATASHEET VS DERATING ESTIMATED BY CPRh

Figure 2. Real production vs optimum production.
SolarBug compares real production against expected production based on the specifications provided by the manufacturer of the main system components, and against optimum production according to actual derating.
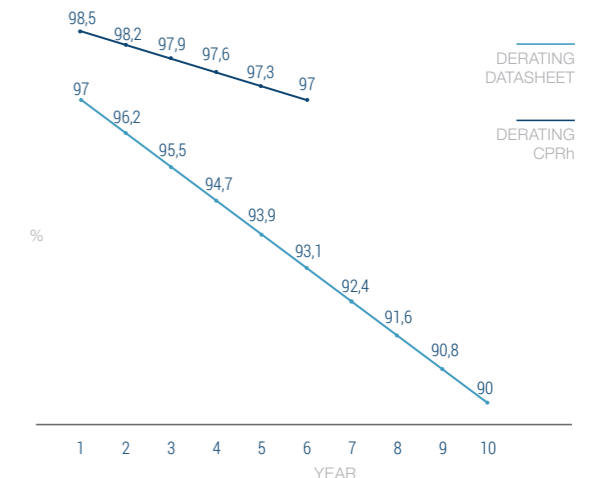
Figure 3. Actual derating of the photovoltaic modules.
The trend in CPRh is used to estimate effective annual decline in photovoltaic module output and provide a true indication of performance.

SolarBug and SolarBug Plus

Both versions provide access to the SolarBug portal for displaying system performance indicators.

SOLARBUG
Monthly performance check
This involves installation of a precision monitoring station for calculating actual solar radiation. SolarBug, thanks to the possibility to send photovoltaic system production counter data over a remote connection, can provide monthly performance indicators to monitor system performance and identify any inefficiencies and their possible causes.

SOLARBUG PLUS
Daily performance check
This involves installation of a precision monitoring station for calculating actual solar radiation, and Rogowski probes to measure instant system power output. SolarBug Plus can display all the performance indicators on a daily basis, and instantly receive any performance alarms.

SolarBug Plus also offers access to the optional supervision service and management of O&M activities.
Using this service, Esapro can monitor trends in system performance on behalf of the customer, ensure service providers are performing correctly, and coordinate appropriate O&M activities.

COMPARISON BETWEEN SOLARBUG AND SOLARBUG PLUS

SolarBug		SolarBug Plus
YES	WEB PORTAL BASED	YES
	K.P.I.	
Month	CORRECTED PR	Day
Month	PRODUCTION	Day
YES	THEORETICAL PRODUCTION	YES
Static	NPR	Dynamic
YES	ACTUAL RADIATION	YES
	FUNCTIONS	
Month	ALARMS	Instant
Month	DATA UPDATE	Instant
Month	MONITORING KPI	Instant
	HARDWARE	
NO	ROGOWSKI PROBE	YES
YES	WEATHER STATION	YES
	OPTIONAL	
YES	QUALITATIVE ANALYSIS	YES
YES	HISTORICAL TRENDS	YES
YES	BENCHMARK	YES
NO	O&M MANAGEMENT	YES

SolarBug

Tells the truth about your system

The decline in performance of photovoltaic systems below their effective potential means a significant reduction in cost-effectiveness for investors.
Traditional monitoring systems simply signal faults on individual components in the power station or generate system productivity reports, without providing information useful in identifying the causes of such inefficiencies.
To respond to the needs of investors for immediate information on system power output, real performance and the technical causes of inefficiencies, Esapro has developed SolarBug, an analysis tool based on a proprietary algorithm.

1
MEASURES
environmental data using precision instruments

2
PROCESS
the performance ratio corrected to account for the effects of temperature on module output

3
IDENTIFIES
hot spots, derating and PID (Power Induced Degradation) by Negative Pattern Recognition (NPR)

4
COMPARES
actual module derating against the theoretical derating factor

5
COMPARES
real production against expected production

CPR determination (Corrected Performance Ratio)

The performance of a photovoltaic system decreases as working temperature increases. SolarBug returns performance ratio values that are corrected to account for the effects that ambient temperature has on system components, defining a corrected performance ratio – CPR.

Negative Pattern Recognition (NPR)*

When using a traditional monitoring system, it is impossible to determine whether a reduction in performance is due to environmental factors (high ambient temperature) or faults in the main system components.
By continuously sampling CPR, SolarBug can formulate trend analyses and consequently perform Negative Pattern Recognition (NPR) so as to highlight any problem relating to hot spots, PID, derating or dirty modules.

* Patent pending

IDENTIFICATION OF: HOT SPOT · PID · DERATING

Figure 1. Negative Pattern Recognition
The first box shows the normal trend in hourly corrected performance ratio (CPRh); the following boxes, in clockwise order, show patterns that identify problems relating to hot spots, PID and excessive derating.