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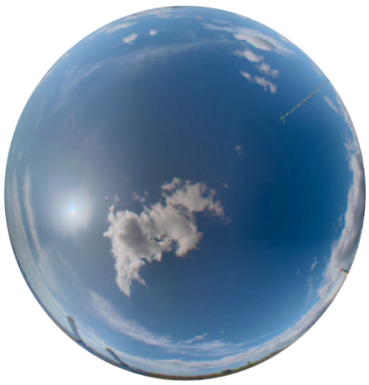
Solar Energy Systems Analytics

TRACKING PV BOOST

Manage cloud coverage situations to increase solar tracker energy yield of solar trackers

Rethink how to measure and forecast the solar resource to optimize the performance of solar tracker power plants



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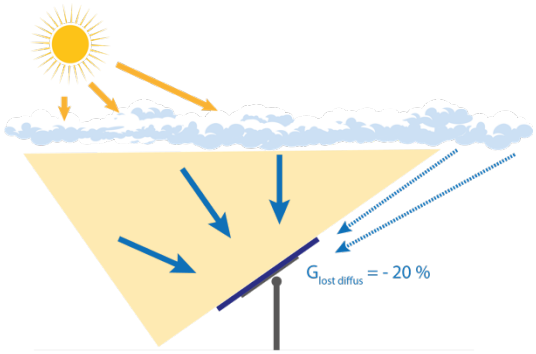
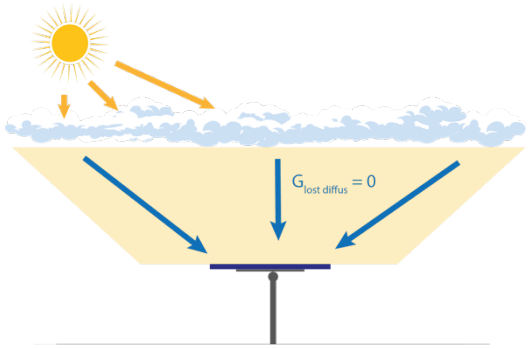
INTRODUCTION

Solar power plants equipped with trackers work according to the principle of orienting, in 1 or 2 axes, the solar panels towards the sun to increase the overall productivity of the plants. Regardless of the weather conditions, current tracking solutions calculate the position of the sun at any time and orient the solar panels of the power plant accordingly. Nevertheless, this "standard" tracking strategy does not allow capturing the maximum of the global available light on the whole sky during overcast situations. It has been observed that about 20% of the uncaptured diffuse irradiance (irradiance reflected by clouds) is lost during cloudy episodes.

At SESA we have decided to tackle this challenge by developing an innovative solution that can forecast and detect specific cloudy intraday sky situations to change the tracking strategy of solar tracker.



Standard Tracking



Tracking PV Boost

HOW DOES TRACKING PV BOOST WORK?

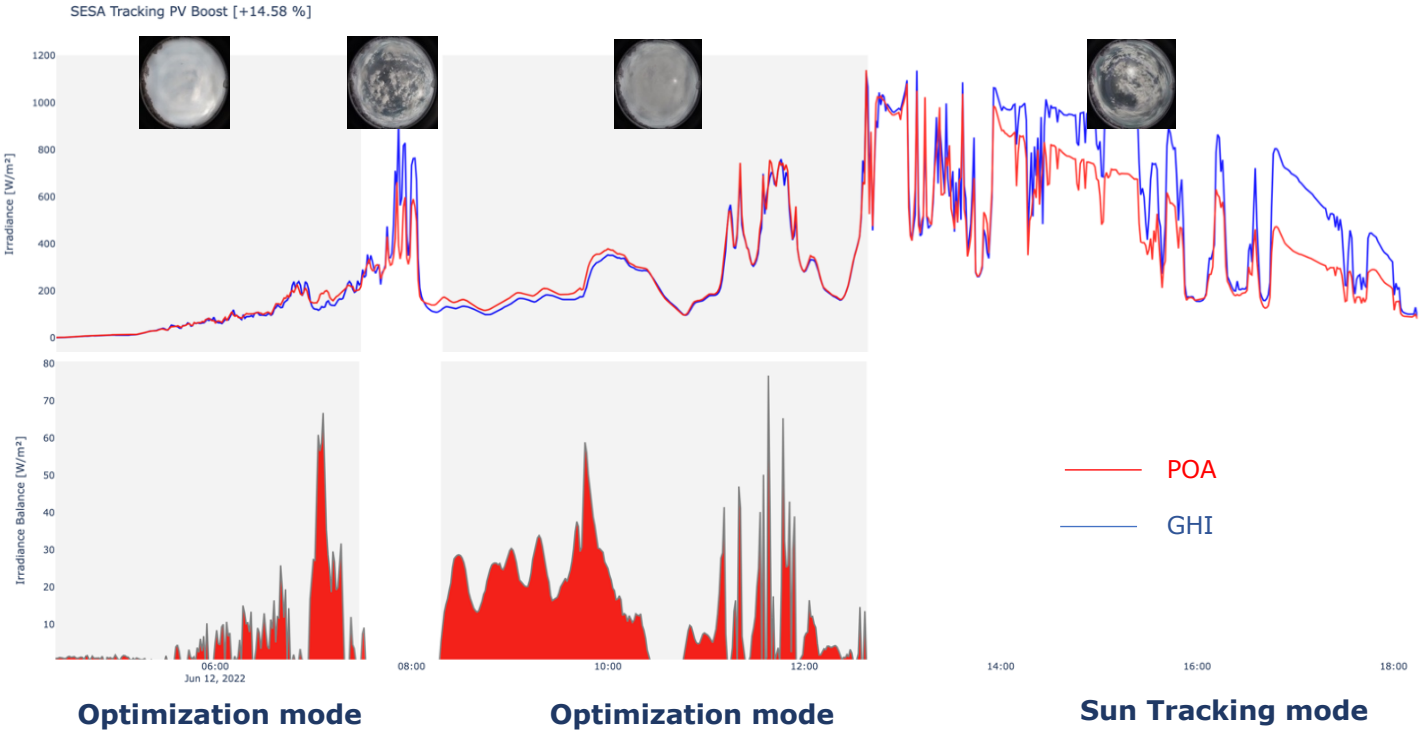
The Tracking PV boost solution is a command and control solution composed of several innovative functionalities that exploit images of the sky captured by a sky imager.

The first feature is a solar resource estimation process based on sky images. This process is protected by a patent and allows to estimate with a high accuracy three components of the solar irradiance (POA, Diffuse and Direct irradiance). It allows to calculate with a great precision, at each moment, the optimal position that the solar tracker must adopt to capture the maximum of irradiance.

The second feature is a short-term solar resource forecasting model used to know the future evolution of the sky condition over the next hour. This information is used to establish a dynamic optimization strategy for the next hour.

The Tracking PV Boost solution sends a command to the plant's tracker motors according to the best coptimization strategy used to capture the maximum amount of reflected light during cloudy episodes.

EXAMPLE OF AN OPTIMIZED DAY



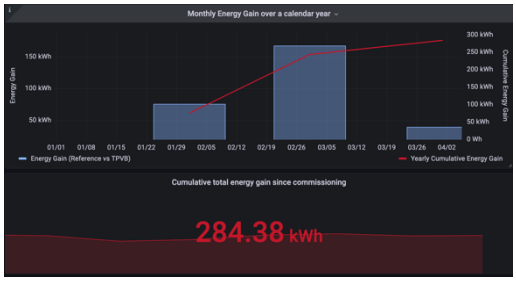
Optimization mode **Optimization mode** **Sun Tracking mode**

TRACKING PV BOOST PERFORMANCE

ACTIVATION PERIOD	**Mediterranean**
Hours per year	1500
Average Gain on Cloudy Periods	~7 %
ANNUAL GAIN	
Energy yield vs Standard Tracking	1-2 %

MECHANICAL SYSTEM SAVING MODE

For specific needs, Tracking PV Boost can be configured to prioritize solar tracker motion savings over performance to reduce maintenance operations. A follow-up of angular motions and tracking PV boost performance are provided to our customer with an access to a monitoring web platform.



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FEATURES

Camera & image	
Resolution	1300 px X 1216 px
Format image	HDR net CDF 16-bit
Pyranometer	ML-02 classe C (ISO 9060 : 2018)
Electrical power	< 3 A @ 12 V DC
Dimension	150 mm x 160 mm x 400 mm
Weight	6 kg
Installation	Flange for circular mast Ø 40 mm to 60 mm

Software	
Type of command	"Slave" with on-site controller
Operating mode	Performance or Mechanical saving
Monitoring	Web platform access
Option	**Solar resource measurement data:** Plan of Array Irradiance (POA). Diffuse Horizontal Irradiance (DHI). Direct Normal Irradiance (DNI).

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