Accurate and efficient solar energy assessment
We help the solar power industry to better manage weather-related risks

We provide our customers with accurate and reliable data on weather and solar electricity potential during the whole lifecycle of a solar power plant — from prospection to development and operation. Hundreds of organisations worldwide use our data, online software, and consultancy services to reduce uncertainty and optimise management of solar power assets. Solargis global database includes high-resolution solar resource and meteorological data. The database serves as a base for our online software and consultancy services.

About Solargis

Solutions for entire solar project lifecycle

Each phase of solar energy project has unique energy assessment requirements. Solargis solutions have been optimised to cover each use case, from prospecting to forecasting.

Prospect
Screen and benchmark project opportunities

Evaluate
Make detailed assessment of electricity production for planned power plants

Monitor
Make an independent performance assessment of operational assets on a regular basis

Forecast
Forecast solar power production for optimized asset management

Solar Roadmap
Services to help governmental agencies, utilities, and grid operators plan and implement strategy for national or regional solar development

Accurate solar resource data
Solargis data has the best accuracy and reliability amongst available solar databases. This has been confirmed by several independent studies.

Solutions from planning to operation
Solargis data are available for past, present, and future time periods. It is updated in real time. Therefore, we can meet your energy assessment needs from project conception to routine daily management.

High level of detail for improved energy modelling
High resolution data (250 m spatial resolution and subhourly temporal resolution) better represent typical and extreme weather, and improve accuracy of solar energy simulations.

Extensively validated
Up to now, Solargis data has been validated at more than 200 locations globally, and the model validation is systematically expanding. Uncertainty of Solargis data can be easily estimated for different climate regions.
Prospect

Fast and reliable project pre-feasibility

Overview

In the prospecting or conceptual phase, the objective is to collect information that can be used for site selection and comparison of technical configurations. Project due diligence is a process that can take up significant amount of time and money. Having quick access to reliable information upfront at a reasonable cost helps effectively prioritise development opportunities.

Solargis prospecting tools and services offer the most reliable data and user-friendly tools for selection of solar sites and preliminary yield assessment.

Solargis prospecting solutions

Reduce early-stage development risk
Solargis data have been validated globally and are known to have the lowest uncertainty amongst available solar radiation data sources.

Maximize profitability
We offer high resolution data (with grid resolution of up to 250 metres) to help you identify the most promising sites within the focus region.

Save time with user friendly tools
Solargis prospecting tools are very easy to use. Data is also offered in various map formats that can be customized as per customer needs.

Ensure consistency
Solargis data is also available as hourly and sub hourly time series that are useful in due diligence. Use of the Solargis data in pre-feasibility helps to maintain consistency of results.

Key features

Updated solar resource and meteo data layers
The solar resource and meteo data has been re-calculated using the latest version of Solargis models. The updated data represent time period up to 31 Dec 2018.

Daily averaged profiles
In addition to monthly averages, key data parameters, such as PVOUT, GHI, DNI, TEMP are now also available as 12 x 24 (12 months x 24 hours) average profiles. Such information is particularly useful when value of solar electricity varies by time of day - for example when maximising yield at particular time of the day is more important that maximizing the annual yield.

New data parameters
We are introducing 17+ solar resource, meteo and geographic data layers to make it easier to understand impact of environmental factors on PV power generation and operation of the assets. New parameters, which include relative humidity, precipitable water, rainfall, snow days, wind speed and albedo help to accurately estimate temperature losses, soiling and snow losses, and bifacial gain. Heating and cooling degree days and solar resource seasonality help to better understand the climate conditions of a site.

Relevant products and services

Prospect
High-resolution interactive map tool and PV simulator for solar project pre-feasibility

Accurate estimation of solar energy potential is crucial in the pre-feasibility phase. Besides accurate results, it is also desired that the pre-feasibility study is done efficiently. Solargis prospecting tools, iMaps and pvPlanner, provide fast access to reliable solar yield estimates. The new Prospect tool further increases accuracy of estimates and makes it easier to collaborate efficiently on development of solar projects.

Single diode model
Compare tool
Updated terrain and horizon
Project management
Better collaboration
Multi-lingual support
Economic calculator
Account administration

Maps & GIS data

Customized solar energy potential maps and GIS data in various data formats

Regional context of solar, climate or geographic data is important in planning, monitoring or forecasting for solar energy projects. Maps are an effective way of visualising various types of Solargis data. They often reveal knowledge, which cannot be derived from tables full of numbers or overcrowded graphs. Furthermore, if you are familiar with GIS software, you are becoming master of your data.
Evaluate

Make a detailed assessment of power production

Overview
The requirements for energy assessment change as a project moves from pre-feasibility to due diligence phase, and eventually to the operational phase. In the due diligence and operational phases, aggregated solar potential information, collected in the prospecting phase, is typically not sufficient. For thorough financial analysis and performance evaluation of operational projects, more detailed energy assessment is required. A detailed energy assessment is made possible by use of Solargis time series data, which has a high temporal resolution, unmatched accuracy, and long temporal coverage. Solargis also offers Typical Meteorological Year (TMY) data for use in external simulation software.

Solargis monitoring solutions
Increase certainty of long-term energy estimates
An important component of the risk assessment is the confidence that can be placed in estimated energy production. Use of Solargis time series data for energy modelling reduces uncertainty, reduces the perceived long-term resource risk and helps to achieve better terms for project financing.

Quantify uncertainty in revenues for a given year and lifetime of a project
Banks and investment firms often require energy output expressed as P90 and other probability of exceedance values to determine the risk associated with a project’s ability to service its debt obligations and other operating costs. Solargis time series data are used to make detailed cash flow analysis and model energy estimates for different probability scenarios over the operating lifetime of the project.

Get realistic revenue estimates when the valuation of PV output is time-dependent
In the post feed-in-tariff era where valuation of PV power can be dependent on when the electricity is generated, accurate representation of power generation profile is critical. Solargis time series data enable calculating detailed and accurate assessment of the intra-day electricity generation profile of a PV system.

Independently evaluate performance for operational power plants
Solargis time series data is available also for a recent time period, allowing to independently check the performance of any operational PV system.

Relevant products and services

Time series and TMY data
For advanced energy modelling and design optimization of solar power plants

Solar resource assessment study
In-depth analysis of solar resource and meteorological conditions at a project site, regionally validated and documented in a bankable report

PV yield assessment study
Independent energy yield assessment study with detailed reporting of uncertainties related to the estimation of energy yield

Operational PV yield assessment study
Obtain a revised and more accurate estimate of long-term energy yield. Additionally, detect underperformance and take corrective measures to maximise energy yield

Quality assessment of solar radiation measurements
Independent validation and quality control of ground measurements of solar resource

Site adaptation of Solargis model data
Use of ground-based solar resource measurements to improve the accuracy of Solargis data at a project site
Monitor

Evaluate performance of operational projects on a regular basis

Overview

Solargis monitoring solutions make PV monitoring workflows more efficient and data analysis more reliable. Traditionally the solar industry has relied primarily on solar sensors for collecting weather data necessary for performance monitoring of PV systems. However, on-site measurements present several challenges – even more so, if they are used for managing a large portfolio of PV systems. By complementing existing monitoring solution with Solargis data services, there is no need to worry about gaps in the data, or unrealistic performance indicators, which often lack transparency.

Solargis monitoring solutions

Validate and gap-fill ground measured data

Maintaining systematic solar resource monitoring at high quality and without gaps is challenging, due to potential issues in data acquisition, storage and transmission. Data from ground-mounted sensors are prone to errors for reasons such as shading, misalignment of instruments, calibration issues, irregular or insufficient cleaning, missing data, etc. Solargis data allows for quality control, error detection and data gap filling.

Increase transparency and reliability of your performance metrics

Solargis data make it possible to independently confirm the validity of performance ratio calculations based on ground measurements. As the satellite data come from an independent service provider, they can also be used for settling contractual arguments relating to doubts about measurements from pyranometers.

Enable performance monitoring of residential and commercial photovoltaic systems

Installing and maintaining the pyranometers is relatively expensive and challenging. Therefore, it is typically not an option for residential and small commercial photovoltaic (PV) projects. In a case of portfolio of smaller systems, use of Solargis data is a practical approach for performance evaluation.

Understand annual or seasonal variability of solar resource and PV power

It is often asked to what extent a particular month or year had received higher or lower solar radiation compared to the long-term average. Solargis data are the most suitable for such an exercise as they record stable, high-resolution, map based historical archive of up to 25 years.

Relevant products and services

pvSpot

Receive regular updates of Solargis data for performance monitoring of PV systems

Ground based measurements often have obvious or hidden errors. Use of satellite-derived irradiation data promotes transparency in performance reporting. Solargis pvSpot service simulates PV power production. This function directly compare actual PV power production with expected production for any period of interest.

Monthly and yearly variability maps and reports

Understand and benchmark performance of your PV portfolio in different regions of a country or the world

It is often asked to what extent a particular month or year had received higher or lower solar radiation compared to the long-term average. Monthly and annual variability maps help to respond to this question as well as understand and explain differences in PV production between PV powerplants driven by interannual and monthly variability of weather.

FTP & web services

Integrate Solargis data into your own applications or effectively request data for a large number of PV power plants

Solargis APIs work through online HTTP or FTP services, which support automation of requesting and receiving Solargis data or methods (calculations). Our APIs support smooth integration of the results into another processing chain. The Solargis model runs in real-time, systematically updating the solar and meteorological database.
Forecast

Forecast solar power production for optimised asset management

Overview

One of the challenges for the development of solar power is its intermittent nature. Accurate solar power forecasting is one of the key tools to mitigate challenges created by intermittent nature of energy generation from solar power systems.

Solargis makes use of Numerical-Weather-Prediction (NWP) models and real-time satellite imagery to provide solar forecasting solutions for a multitude of applications. We offer intraday and days-ahead forecasts for individual PV power plants or distributed solar power systems.

Solargis forecasting solutions

Maximise the value of solar power

Solargis hour ahead and day ahead forecasts mitigate imbalance penalties applied by the energy market operator.

Optimise operating reserve requirements

High penetrations of solar power introduce new challenges for grid operators who need to balance energy supply and demand. Solargis forecasting services help grid operators to be better prepared for variability driven by solar power generation.

Reduce uncertainty of forecasts

Solargis has the capabilities to forecast power production that may not be visible to grid operators – the solar electricity that is generated and self-consumed at households and commercial buildings. Behind the meter solar power forecasts can help improving the accuracy of forecasts in areas with high penetration of distributed PV.

Optimise storage and dispatch

Upfront knowledge of expected solar power generation helps optimize the energy storage dispatch schedule. This brings monetary benefits as result of reduced demand charges as well as increased battery lifetime.

Forecast

Solar Power Forecast for up to 10 days ahead.

Forecast assessment

Our Forecast archive combined with historical archive based on satellite observations allows us to evaluate the accuracy of forecasts for any location, even at locations where no ground measurements or PV power information are available.

FTP and web services

Integrate Solargis data into your own applications or effectively request data for a large number of PV projects.
Global PV Electricity Map

Accurate and detailed map of PV electricity production potential

How do we calculate the data behind the map

The map represents yearly potential electricity production by 1 kW-peak grid-connected photovoltaic (PV) power plant. The PV system configuration considers ground-based free-standing structures with crystalline-silicon PV modules mounted at a fixed position towards the Equator with the optimum tilt to maximize yearly energy yield. The solar electricity calculation is based on the use of high-resolution Solargis database and PV software.

The model takes into account solar radiation, air temperature, and terrain, to simulate the energy conversion losses in the PV modules determined by solar radiation and air temperature. Use of high-efficiency inverters is assumed. The cumulative effect of losses due to dirt, snow, and ice on the PV modules, losses at cables, in inverters, and the transformer is 9%. The power plant availability is considered to be 100%.

The calculation of solar radiation is based on the use of data from five geostationary meteorological satellites (operated by EUMETSAT, NOAA, and JMA), and data from global atmospheric and meteorological models (operated by ECMWF, and NOAA). The meteorological data, such as air temperature, is derived from the numerical weather models operated by NOAA.

The underlying data is calculated at 10, 15 and 30-minute time step for a period of the most recent years, from 1994/1999/2007 (depending on the geographical region) up to the present. The spatial resolution of the grid data in this map is approx. 4 km. The data is available globally, between latitudes 60N and 55S, and it is updated in real time. The model performance has been validated by measurements from 200+ high-quality solar monitoring stations. The uncertainty of yearly values (considering 80% of occurrence) is in the range of ±4 to ±8% for GHI and in the range of ±8 to ±15% for DNI.

Disclaimer: Considering the nature of climate fluctuations, interannual and long-term changes, as well as the uncertainty of the measurements and applied methods, Solargis does not take any responsibility whatsoever, and does not give any warranty on the accuracy of the data that were used to produce this map. Solargis has done its utmost to make an assessment of climate conditions and performance of solar power systems based on the best available data, software, and knowledge. Data source: Solar electricity potential © 2019 Solargis, vector dataset VMAP0 2006. Copyright © 2019 Solargis. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means.
References

Selected list of customers and long-term partners

Public organisations

Energy utilities

Project developers

Technical advisors

Asset managers

EPC & O&M

Integration partners

Meteorological measurements service providers

Universities and research institutions