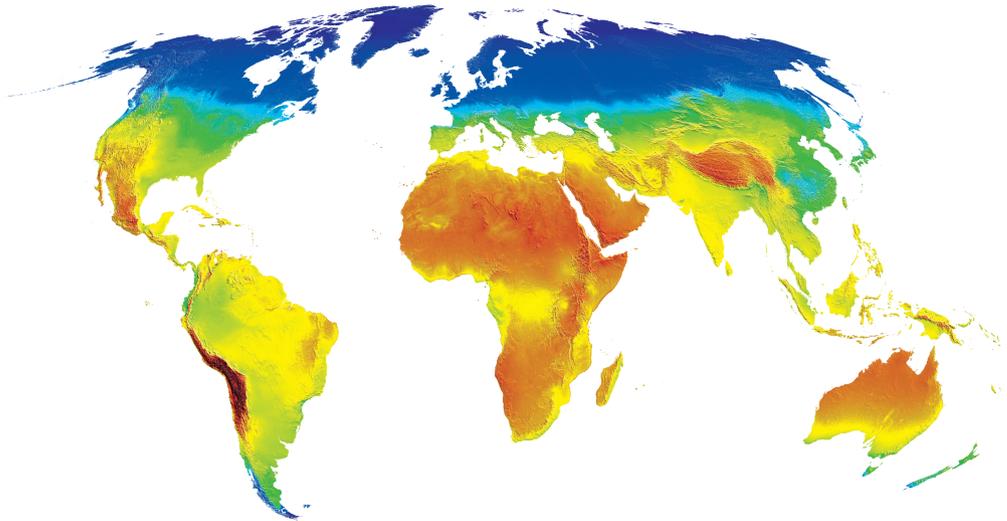


# Solar Energy Assessment & Forecasting



Experts in weather, climate, and renewable energy risk, Vaisala delivers the weather observations and insights necessary to help clients make profitable, sustainable energy decisions across the project lifecycle.

## Project Feasibility

### Project Prospecting & Assessment

The “fuel” of a solar project is the most critical factor driving its commercial success or failure. How much year-to-year power variability is expected? What are the exceedance values at the site? How much energy will I produce on average? Without answers to these questions, it is impossible to assess a project’s feasibility or manage your exposure to risk. We give you the context necessary to make smart development decisions for any project location around the world.

## Energy Marketing

### Forecasting for Energy Scheduling & Trading

Every day more solar power comes onto the grid, making integration and energy trading an ever-greater challenge. Vaisala helps you make quick, risk-based decisions both at individual sites and across broad regions that impact energy production, operational costs, and ultimately profitability by putting the most accurate forecast information at your fingertips.

## Asset Management

### Power Performance Reconciliation & Reforecasting

We help project owners, utilities, and financiers make informed decisions in a challenging energy market. Evaluating existing assets to understand the root cause of under or over performance helps you make timely decisions on maintenance, additional development, or purchase decisions. Our advanced solar deviation analysis combines science and information technology to help mitigate risk and build better economic value.



# Solar Energy Project Feasibility

## Measurement, Resource & Energy Assessment

### Risk Mitigation Process

We provide a full suite of services to help you manage the risk of solar resource variability throughout project development.

<b>Project Prospecting</b> Identify the best areas for project development using quick and low cost data.	<b>Site Feasibility</b> Prepare promising project sites for financing by reducing resource and equipment uncertainty.	<b>Due Diligence &amp; Financing</b> Maximize certainty in a project's long-term performance to secure financing.
<b>Tools:</b> <ul style="list-style-type: none"> <li>• Online subscription to solar and weather time series and TMY data</li> <li>• Multiple datasets</li> <li>• 24 hour delivery time</li> <li>• Annual subscription price</li> <li>• Global dataset with 3km resolution, 10-year average data available online or as a GIS data layer</li> </ul>	<b>Tools:</b> <ul style="list-style-type: none"> <li>• 16+ years of hourly solar and weather data</li> <li>• Bias correction of modeled resource data to local observations</li> <li>• Maximum production capacity site analysis and recommendations</li> <li>• On-site irradiance and weather measurement stations</li> </ul>	<b>Tools:</b> <ul style="list-style-type: none"> <li>• Bankable solar resource data</li> <li>• On-site measurements integrated into energy analysis</li> <li>• Energy production estimates with rigorous performance uncertainty analysis</li> <li>• 3rd party reviews for the due diligence process</li> </ul>

### Quickly Explore Solar Resources Around the World

Save time and money by targeting the best locations for solar energy projects and infrastructure. We let you quickly explore any location around the world directly from your computer. Now you can avoid problem sites and separate successful projects from marginal ones earlier in the process. Our on-demand, initial solar resource data allows you to evaluate project resource risk with 3km maps and 5 different bankable datasets to choose from – all delivered to your desktop in less than 24 hours.

### Turnkey Solar Measurements Designed to Reduce Project Uncertainty

On-site weather observations are an important part of developing and operating utility-scale solar projects. Now, Vaisala offers a ready-to-install solar met station with rugged, state-of-the-art weather sensors designed to perform in all conditions. Integration with our SkyServe data portal enables timely quality control of data even at remote locations. Vaisala's purpose-built stations are designed specifically for solar industry applications and all collected data can be integrated with our industry-leading due diligence services to reduce uncertainty when seeking project financing.

### Maximize Accuracy With State-of-the-Art Science

Improving the quality of resource data reduces the uncertainty of energy estimates during the assessment process. Our energy assessments, use long-term solar resource time series, bias corrected to available on-site observations to model the actual variation in energy output for periods of up to 20 years. The result is significantly reduced uncertainty about future project performance and the long-term bankable production estimates required to secure project capital and favorable financing terms.

### A Trusted Name in Solar

Vaisala has completed solar resource assessment for over \$6 billion dollars in solar investment, including several of the largest utility-scale projects currently in development and in production around the world. We have performed project feasibility studies on all 6 continents and in very challenging climates. In addition, all of our equipment is designed to exacting standards and rigorously tested to withstand harsh conditions while maintaining data accuracy. Our experienced staff can be leveraged at all project phases by the developer or financing party to perform a third party review of an existing assessment.





# Solar Energy Asset Management

## Power Performance Reconciliation & Reforecasting

### Primary Uses

- Reconciling solar project power performance
- Restructuring long-term PPAs and financial agreements
- Performing financial and portfolio analysis
- Optimizing operations and integration

### Project Forensic Studies

Recognizing and resolving underperformance issues as early as possible helps maximize energy production, optimize operations, and proactively restructure financial or capacity obligations. When performance guarantees are not met and a project is in danger of default, we can perform a full forensic evaluation of the project. This helps isolate issues related to weather variability so you can identify the systemic cause of underperformance.

### Portfolio Management

Vaisala puts recent solar performance in context so you understand the risks and implications of weather variability at potential or existing projects across broad production areas. Our irradiance anomaly maps and time series are available at individual sites as well as across entire countries for portfolio review purposes. With this intelligence we can help you optimize and diversify your portfolio of assets and make sure projects are operating at optimum levels.

### Project Performance Reconciliation

Our advanced satellite and measurement techniques capture weather patterns and climate anomalies that impact energy output. With daily updates of irradiance and weather information from our modeled dataset or a solar met station at your site, you gain a clear view of your project's weather-adjusted performance. Through API data feeds, all this information easily integrates directly into the asset management software platform of your choice for ease of use.



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