# The Fourth Edition of the Best Practices Handbook for Solar Resource Data: An Introduction

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# Authors

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# Overview

**Why**:

- To assist solar energy stakeholders to stay aware of the latest research in solar resource data

**Who**:

- NREL, in collaboration with the International Energy Agency (IEA) Photovoltaic Power Systems Programme (PVPS) Task 16 and the Solar Power and Chemical Energy Systems (SolarPACES) technology programs

**What**:

- The handbook summarizes techniques used to measure and develop estimates of solar resources from radiometers and weather satellite data and numerical model predictions. In this presentation, we show as example the main points of the chapters.

# Solar Resource Handbook: 4th Edition

- 2024: Major Update: 333 → 509 pages; two new chapters (blue)

| |
|---|
| 1.Why Solar Resource Data Are Important to Solar Power |
| 2.Overview of Solar Radiation Resource Concepts |
| 3.Measuring Solar Radiation |
| 4.Data Quality Assessment and Control |
| 5.Further Relevant Meteorological Parameters |
| 6.Solar Resource Variability |
| 7.Modeling Solar Radiation: Current Practices |
| 8.Solar Resource Data |
| 9.Forecasting Solar Radiation and Photovoltaic Power |
| 10.Principles and Practical Methods to Estimate Uncertainty and Evaluation of Solar Irradiance Data |
| 11.Applying Solar Resource Data to Solar Energy Projects |
| 12.Future work |

# Summary

- The solar PV industry has rapidly evolved in the last few years
  - New technologies need additional information (e.g. bifacial modules need reflected radiation / albedo)
- PV installation sizes as well as penetration levels have grown—further enhancing the needs for **accurate** solar data for planning and operation.
- This 4th edition of the handbook updates and enhances the preceding versions and presents **the state of the art in a condensed form** for all of its users.

| | | System Size | | |
|---|---|---|---|---|
| | | Small | Medium | Large |
| Phase | 1. Prefeasibility and planning | • Long-term averages<br>• Monthly data<br>• Solar cadastres/ maps<br>• Simple shading analysis | • TMY<br>• Hourly data<br>• Shading analysis | • Long-term satellite data<br>• Hourly data |
| | 2. Feasibility | | | • Satellite data<br>• Time series (> 10 year)<br>• Ground measurements (> 1 year)<br>• Shading analysis<br>• Further site- and technology-specific meteorological parameters (e.g., albedo, soiling) |
| | 3. Due diligence and finance | | • Satellite data<br>• Time series (> 10 years)<br>• Minutely data<br>• Shading analysis<br>• Further site- and technology-specific meteorological parameters (e.g., albedo, soiling) | • Satellite data<br>• Time series (>10 years)<br>• Ground measurements (> 1 year)<br>• Minutely data<br>• Shading analysis<br>• Further site- and technology-specific meteorological parameters (e.g., albedo, soiling) |
| | 4. Operations and maintenance | • Simple (inverter) monitoring | • Local measurements<br>• Forecasts | • Local measurements<br>• Forecasts |

Solar Irradiance Needs for Different Stages and Sizes of a hypothetical Project