



Solar Resource Monitoring

Key Benefits

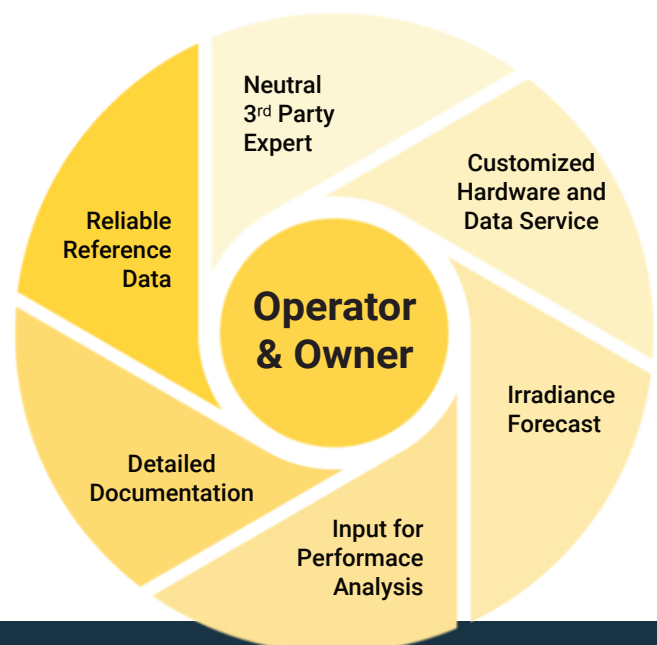
Reliable **measurement of available solar resources** is an important aspect for large solar power plants to **verify plant performance and detect potential for optimization**.

We offer comprehensive measurement equipment and services that provide **high-quality data for performance analysis**. Plant operators can focus on the most important activities and rely on accurate solar irradiance data.

CSP Services is a **recognized independent expert in third-party measurements**. This can be of great value when commissioning the plant. Disagreements between the owner and the EPC about the power plant's performance are much easier to resolve when the reference data comes from a high-quality service provider offering a complete and transparent documentation.

This service integrates seamlessly with our Q4cast system, which can help optimize intraday market participation and avoid penalties for inaccurate production planning.

Q4cast detects production drops caused by approaching clouds as soon as they become visible on the horizon and provides **accurate short-term solar irradiance forecast**.





Full Scope Service

- Design, configuration and delivery of meteorological equipment according to project-specific requirements
- Compatible with IEC 61724-1
- Installation and commissioning of the equipment on site
- Integration into the SCADA systems of the power plant
- Staff training (maintenance, safety, handling, etc.)
- Continuous data quality control and operation supervision
- Supervision and documentation of sensor cleaning
- Regular inspection and maintenance
- Sensor calibration in required intervals
- Online access to measurement data and visualization
- International best practices reporting and documentation

| Customized Hardware | AWS-TIER 1 | | AWS-TIER 2 | |
|------------------------------|--|--|---|--|
| |  | |  | |
| Technical specifics | High quality weather station with sun tracker | | Robust low-maintenance weather station | |
| Solar irradiance measurement | Global Horizontal Irradiance (GHI), Diffuse Horizontal Irradiance (DHI), Direct Normal Irradiance (DNI) | | | |
| Solar sensors | ISO9060 Class A spectrally flat pyrheliometer and (ventilated) pyranometers | | ISO9060 Class A spectrally flat pyranometer, Rotating Shadowband Irradiometer (RSI) | |
| Meteorological sensors | Temperature and humidity, wind speed and direction, barometric pressure, rain | | | |
| Maintenance | 3-7 cleaning & visual checks per week | | 1-2 cleaning & visual checks per week | |
| Power supply | Autonomous PV with battery or grid connection | | | |
| Optional | PV: Albedo, Global Tilted Irradiance (GTI), module soiling, module temperature CSP: Mirror soiling, atmospheric attenuation, sunshape | | | |
| Connectivity | Ethernet, RS-232, RS-485, 4G modem | | | |