QUALITY ASSURANCE FOR PV POWER PLANTS IN THE FIRST DEVELOPMENT STAGES

The initial phases of a photovoltaic power plant project are very important for its success. We offer professional quality assurance services for project development and engineering.

Our service for quality assurance starts with the evaluation of the potential project site, the analysis of the environmental conditions and the estimation of the energy yield potential. Plant design and selection of the components also play an important role for achieving maximum yield and are assessed by the Fraunhofer ISE experts.

Solar Resource Assessment and Environmental Stress Analysis
In the beginning, we collect climatic data from various geographic information systems (GIS) and use high quality meteorological and solar irradiation data for the evaluation of the specific site. Furthermore, the local environmental conditions are crucial for the system lifetime and resulting power output. We investigate the following stress factors for the specific location:
- ultraviolet irradiance
- high temperatures
- humidity and temperature cycles
- atmospherically induced corrosion
- airborne salinity
- soiling
- natural hazards, like sand storms or floods

Design Review and Optimizations
At Fraunhofer ISE we have developed a procedure which determines the performance ratio with high accuracy. It helps us to check the plant design and give recommendations for improvements. The models have been developed and validated over two decades, based on our own high-quality monitoring data from more than 200 photovoltaic power plants operating worldwide.
Energy Yield Assessment

Yield prediction reports by Fraunhofer ISE have a very high reputation and are prepared for our customers to assure project bankability. To this end, all specific components (modules, inverters, transformers) as well as the overall structure and circuitry of the particular PV power plant are considered in detail. The yield assessment includes the following results:

- prediction of specific yield and annual output in the first year and over 25 years
- degradation factor and uncertainties
- possible future trends in irradiance
- detailed uncertainty assessment and documentation of all uncertainty factors (P50, P75 and P90)

All gains and losses are quantified and included in our yield assessment pursuant to the state of the art. The inclusion of realistic uncertainty indications is also an integral part of our assessment.

Component Benchmarking

We comparatively characterize different modules selected by the customer, taking into account the most important quality aspects. With a special test procedure, we verify module performance considering data sheet specifications and module reliability. The results are compared to the quality criteria of the customer.

The component benchmarking consists of the following tests:

- power verification
- electroluminescence imaging to identify hidden defects
- power rating according to IEC 61853-1 including low light performance
- reliability testing (e.g. sensitivity for cell cracks, potential induced degradation, specific climatic loads, corrosion)
- material testing (e.g. investigation of gel content, peel strength)
- module characterization before and after stress tests

Comprehensive Quality Assurance

The first phases of a PV power plant project are very important to ensure economic viability. The support of experts during the project development and engineering phase helps you to receive a high quality, effective system.

Furthermore we offer comprehensive testing for entire power plants. On-site analyses with visual checks, thermal imaging and the collection of real output data provide insights into the quality of an installation and help to identify faults.

Quality assurance services for all phases of a PV power plant project.