Fraunhofer
ISE

FRAUNHOFER INSTITUTE FOR SOLAR ENERGY SYSTEMS ISE

1 *Lithium-ion storage system with high cycle stability (7000 complete cycles).*
2 *Optimal yield is assured for this 1.5 MW roof-top power plant through the application of the full Quality Circle. © Pohlen Solar GmbH.*

QUALITY ASSURANCE FOR COMMERCIAL PV BATTERY SYSTEMS & PV DIESEL GRIDS

The integration of battery storage in photovoltaic (PV) systems or PV diesel mini-grids enables high solar fractions and is often more cost-effective than conventional power supplies relying upon fossil fuels.

With its long-term experience, Fraunhofer ISE offers a wide array of services including the quality assurance of PV systems, battery system technology and battery storage integration in commercial PV applications as well as in hybrid PV diesel mini-grids. Our support ranges from the identification and analyses of load profiles and the design of the entire power system through to the implementation and operation phase of the facility.

Analyses of Load Profiles
Identifying the load profile is crucial for determining diesel savings or battery size. In the best case, load profiles are available, but we also may measure actual load profiles over a certain time. For simulations, a yearly best and worst case load profile under consideration of future development will be defined.

System Dimensioning and Component Selection
With our extensive expertise and our state-of-the-art simulation tools, we are able to identify the optimal design of the PV or hybrid PV system with respect to the generation, storage and energy management components. Furthermore, we advise our clients in selecting the appropriate battery technology and the additional components for the power supply system to match their specific use and load profiles.

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Our services include:

- simulation-based design of optimal battery storage (power and capacity) as well as system design including power electronics
- evaluation and optimization of operating control strategy
- simulation-based determination of levelized cost of electricity of the PV or hybrid PV battery system
- advice on system integration

Characterization of Battery Systems and Additional System Components

- performance tests for battery cells, modules and systems up to 1000 V, 600 A and 250 kW using the relevant standards
- aging tests on cell and module level
- verification of the functionality of system components (battery management, safety devices, cooling, etc.)
- testing of energy management systems
- testing of fuel saver devices

Yield Prediction for the PV Subsystem

Fraunhofer ISE offers yield predictions in an extensive and simple form. The yield assessments take into account the system-specific components (modules, inverters, transformers, etc.), the wiring and the structure of the respective PV subsystem at the planned location.

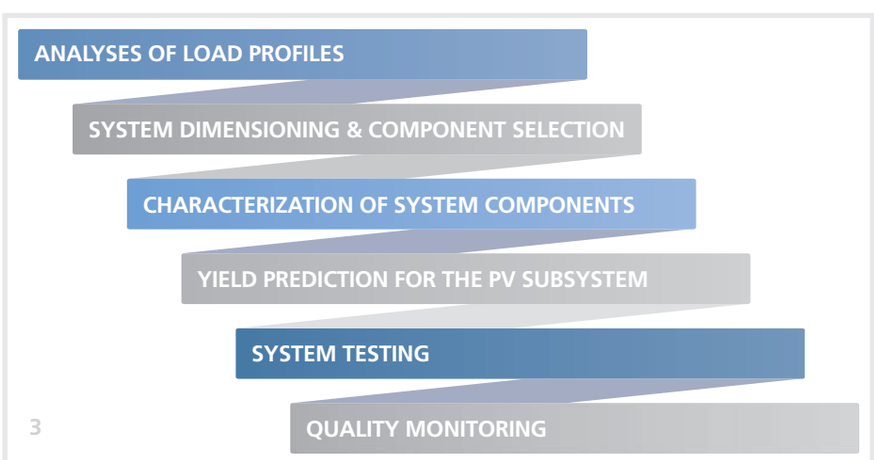
System Testing

To ensure that the PV or hybrid PV battery system meets state-of-the-art quality and provides the promised service, we offer a comprehensive examination of the entire power system:

- visual inspection
- verification of measurement equipment for system monitoring
- thermographic inspection of the PV system
- power measurement of the solar generator
- verification of the battery storage
- verification of auxiliary power generators
- verification of the energy management device
- analysis of the operational data of the overall system

Quality Monitoring

An independent quality assurance check of PV battery systems, hybrid PV mini-grids and their components is highly relevant for manufacturers, Engineering-Procurement-Constructions (EPCs), banks and investors. We provide individual, reliable and accurate PV and battery monitoring solutions for the duration of a few weeks up to many years. Our experts provide high-quality analyses of the operating states of all components of the PV and hybrid PV battery system. This enables early detection of a non-optimal operation, thus securing valuable yields.



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1 Diesel generators in a mini-grid application.
2 PV off-grid system for a seawater desalination plant in Cyprus.
3 Fraunhofer ISE's range of services in the area of quality assurance for commercial PV battery systems and PV diesel grids.