Quality, Reliability and Performance of PV Modules and Systems

ZSW PHOTOVOLTAICS

SOLAB

Module and System Testing

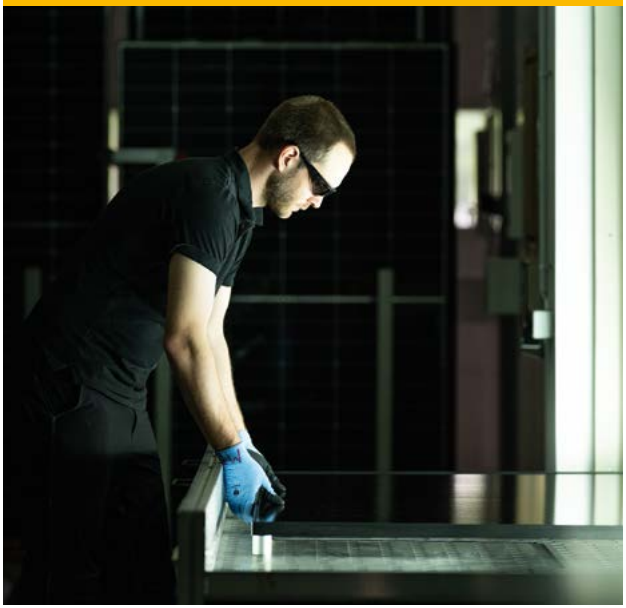
Outdoor Testing Facilities since 1988

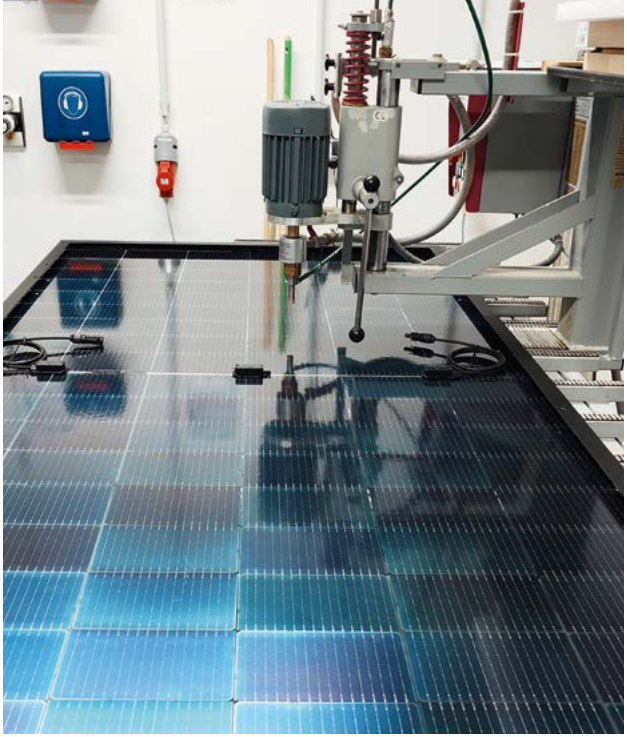
- High-resolution monitoring of meteorological data
- Test beds with individual IV curve monitoring
- Fixed and tracking mounting systems
- Concentration up to 3 times
- Specialized set-up for non-standard modules
- Perovskite Mini-Module Testing
- PV Teststand with integrated DC-coupled storage units and adapted metering system

Operation and Maintenance of PV Plants and Grid Integration

- AI-based methods for optimized operation of PV plants
- Forecasts and predictive control to minimize grid loading and energy costs
- Optimized PV solutions for built and natural environment
- Integration of PV in hybrid energy systems including storage, heat pumps, e-mobility, H2 generation

Our mission is to enable durable and sustainable use of PV modules for our partners and clients.





Indoor Testing Facilities

- IV measurement and EL imaging
- Climatic stress tests for temperature, humidity and UV
- Mechanical load tests
- Electrical isolation tests
- Material analysis of polymers
- Measurement and test protocols according to IEC standards and above
- Traceable calibration of instruments

In-depth Analytics

- Microscopic analysis of PV modules
- Root-cause analysis of degradation & material failures
- Supporting durable, high-quality products
- Methods: FTIR, QE, EDX, ToF-SIMS, and many more

Consulting

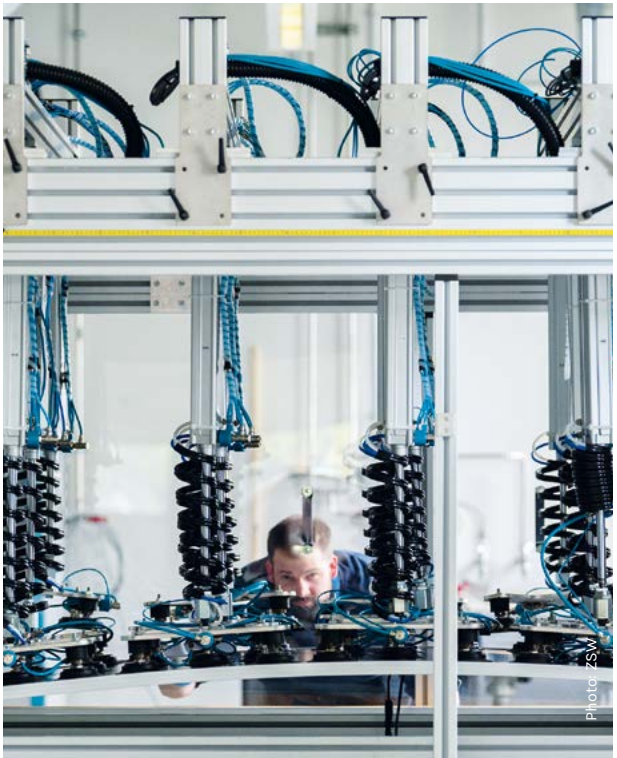
- Technical due diligence
- Factory inspection
- Design and optimisation of non-standard PV systems
- Third party expertise on PV modules and systems
- Yield estimation and site appraisal

The combination of indoor and outdoor testing allows for valuable correlations and comprehensive diagnostic insights. Test protocols are tailored to specific customer needs, with capacities for both commercial and laboratory-scale modules.

Database with 5000+ tested modules

Research and Development

- Performance monitoring and long-term stability
- Accelerated ageing and test-to-failure protocols, adapted to different PV technologies
- Study of particular degradation modes and material faults with focus on new cell technologies
- New test and qualification standards
- Circular economy aspects of PV modules (reuse, repair and requalification)



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