Evaluation of performance, quality and reliability of PV modules

- Testing according to IEC 61215, 61730 and beyond
- Stress by temperature, humidity and light in climate chambers
- Potential-induced degradation (PID)
- STC-Performance measurements with A+ flasher
- Mechanical load, electroluminescence (EL), thermography
- Isolation test, wet leakage test
- Light-induced decgradation (LID, LeTID)
- Risk assessment for backsheets

Outdoor testing facilities for PV modules and PV systems and BIPV

- Since 1988 in Widderstall, Southern Germany
- Highly resolved meteorological data: irradiance (global, direct, diffuse, plane of modules), temp, wind, humidity, spectrum
- Test beds with individual iv-curve monitoring
- Energy yield and performance ratio
- Real module power in outdoor operation
- Temperature coefficients, operation temperature
- Outdoor exposure and operating testing
- Comparative outdoor field testing
- Short- and long-term stability
- Light induced degradation (LID)
- Light soaking effect (CIGS, CdTe)
- Outdoor PID testing, monitoring of leakage currents
- Accelerated outdoor stress with 3x concentrated light (Sahara test)
- Test beds for PV systems with continuous monitoring
- Operation behaviour of PV systems under shaded conditions
- Performance test of micro inverters, optimizers and smart modules
- Operation and testing of BIPV systems

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Development and application of testing methods

- Precise performance and operation measurements of PV modules and systems
- Long-term stability of modules
- Accelerated ageing and test-to-failure
- Correlation of laboratory and outdoor measurements
- Input for standardisation procedures

PV storage systems and grid integration of PV plants

- Characterisation and control of PV storage systems
- Interaction of PV storage systems, heat-pumps and charging stations for e-mobility
- Forecasts and predictive control to minimize grid loading and energy costs
- State-of-the-art protocols and strategies to implement smart grids

Consulting for manufacturers, investors, banks and project developers

- System measurements and acceptance tests
- Yield estimates and site appraisals
- Technical due diligence
- Factory inspections
- Troubleshooting

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