Generators and other technical components are in service in power plants for many years. Operation and aging can gradually cause damage to the high-voltage (HV) insulation. If changes in the components can be detected at an early stage under operating conditions through long-term diagnostics, unscheduled and expensive outages may be prevented and measures can be scheduled and taken to extend the service life of generators. For over 20 years, Siemens has implemented systems for monitoring generators and HV components which contribute to the early detection of damage during operation.

Our solution
The SIEMONplus monitoring system, which is offered in two versions, was developed based on these many years’ experience and provides custom solutions for power plant operators.

The following events can be continuously monitored and localized during generator power operation:
- Partial discharges
- Interturn short circuits in the rotor (optional)
- Vibrations in stator end windings (optional)

Siemens also offers service packages that include enhanced diagnosis and analysis by qualified experts. Monitored data can be regularly analyzed and evaluated via secure remote access to allow recommendations to be made for further operation.

SIEMONplus basic monitoring unit for wall-mounting
SIEMONplus advanced server cabinet

SIEMONplus basic
Impending insulation damage often appears as continuously increasing partial discharge phenomena. This can be detected, localized and monitored already in its early stages using radio-frequency measurement methods, enabling the initiation of specific measures to ensure continued operation.

SIEMONplus basic enables data acquisition, storage and visualization of partial discharges as a stand-alone system. The monitoring unit is available as a solution for wall-mounting as a standard (with touchscreen).

SIEMONplus advanced
In comparison with its basic version, SIEMONplus advanced provides remote access via a central server as well as extended visualization and analysis features. The server enables the integration of multiple monitoring units allowing central monitoring of up to twenty generators or high-voltage components.

Answers for energy.
SIEMONplus systems can be retrofitted for generator maintenance:

- Potential maintenance cost reduction due to early and specific condition information (condition-based maintenance)
- Better evaluation of maintenance requirements with trend analyses
- Optimization of maintenance intervals and measures as well as service life of monitored components
- Early notification of potential issues to reduce the risk of unscheduled outages.

In addition to partial discharge measurement, the modular system can be extended with components for monitoring stator end winding vibrations and interturn short circuits in the rotor. This provides operators with more comprehensive condition information. A 19-inch rack design is available as an alternative to the monitoring unit for wall-mounting.

**Features**

SIEMONplus systems can be retrofitted for all generator models.

Pattern analysis and time of flight (ToF) measurements enable more precise localization of the origin of partial discharges. Up to 200 coupling units can be installed and monitored continuously or at regular intervals for this purpose. The systemspecific configuration enables observing not only the generator insulation, but also of HV bushings, transformer windings or grounding brushes.

SIEMONplus also enables the integration of up to 16 fiber-optic accelerometers for vibration monitoring of generator end windings and up to two flux probes for the detection of interturn short circuits in the generator rotor.

**Your benefits**

With SIEMONplus Siemens offers you tailor-made solutions for reliable online monitoring of generators and high-voltage components during operation.

Both the basic and the advanced versions offer the following benefits for your generator maintenance:

- Potential maintenance cost reduction due to early and specific condition information (condition-based maintenance)
- Better evaluation of maintenance requirements with trend analyses
- Optimization of maintenance intervals and measures as well as service life of monitored components
- Early notification of potential issues to reduce the risk of unscheduled outages.

**References**

Currently, more than 100 generators are being monitored with Siemens systems.