Application “Power oscillation monitoring”

Power oscillation monitoring is the algorithm used for the detection of power swings in a high voltage power system. The algorithm is fed with selected voltage and current phasors. By processing these input phasors, it detects the various swing (power oscillation) modes. The algorithm quickly identifies the frequency and the damping of swing modes. It deploys adaptive Kalman filtering techniques.

PSGuard on-line display:
Estimation of frequency, damping and magnitude of oscillation.

PSGuard off-line analysis.

EGAT is the very first utility in Asia to monitor its grid with PSGuard WAMS*

Customer statements:
“PSGuard provides us with very useful on-line information for operation, protection and control. This helps us to optimize transmission as well as to detect and counteract power system instabilities. Furthermore, the information is used to perform off-line studies and grid modelling, which enables us to improve stabilizing and control measures to avoid major disturbances in the future, says Mr. Charin, Leader of the PSGuard project at EGAT.

EGAT utilizes the many benefits of ABB’s PSGuard Wide Area Monitoring System (WAMS):
- Operator support for optimizing power flow and maintaining grid integrity
- Dynamic grid condition monitoring with early warning to prevent the spreading of disturbances
- Improved transmission network operation with applications like power oscillation monitoring
- High quality data for grid modelling and enhancement of control measures

For more information please refer to the responsible ABB sales engineer for your country or to the address mentioned below.

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The Customer

The Electricity Generating Authority of Thailand (EGAT) was founded in 1969. With an installed capacity of some 25 000 MW presently, EGAT accounts for around 60% of the countries total. It also develops, owns and operates the national transmission network covering the entire country and operating at voltage levels of 115, 230 and 500 kV. The grid is linked to LAOS via 115 and 230 kV lines and to Malaysia via 132kV lines as well as new 300 kV HVDC lines for energy exchange. These transfers via a link with limited capacity bring about heavy power flows between the southern and the central region. In case of critical system conditions, the networks may encounter stability problems.

The Challenge

In weak power systems with remote generation, power oscillations caused by interactions between generators responding differently to changing system conditions and insufficient damping often limit the transmitted power and jeopardize system stability. In order to safely increase power flow through congested and disturbance-sensitive corridors, also called bottlenecks, an on-line system based on highly accurate dynamic phasor measurements like PSGuard is ideally suited to assess instabilities.

EGAT is the first utility in Asia to deploy the Wide Area Monitoring technology in its grid. In a first phase, GPS-synchronized PMUs installed in substations in Bang Saphan and Surat Thani will transmit their data to the System Monitoring Centre located in the Head Office at Nonthaburi, Here engineers are provided with on-line information enabling them to monitor the power transfer and voltage phase angles. The frequency of oscillations is identified and determined, as well as their damping. This information enables the power system operators to swiftly take well-informed decisions and counteract potential instabilities. Operators can thus avoid potential cascade tripping and system islanding.
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**ABB's solution**

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