

# Sub-Group System Protection & Dynamics

Transmission systems have to be permanently analyzed from steady-state and from a dynamic point of view. Whereas the results of steady-state analyses show the final outcome of an event (e.g. outage, disturbance), the dynamic analyses try to find out what happens in the meantime from the beginning of the event until the establishment of a “steady” situation (which is normally a very short period of time mostly measured in milliseconds). For the TSOs, it is of outmost importance to know the dynamic behaviour of the transmission system (which is inherently grid wide and concerns all synchronously connected TSOs), because it may be endangered by instantaneous instability.

The main tasks of the Sub-Group System Protection & Dynamics of the Regional Group Continental Europe (SG SP&D) refer to system dynamics and protections, and system studies expertise development.

Within the scope of the system dynamics and protections the Sub-Group analyzes and proposes improvements of damping of low frequency inter-area oscillations, elaborates recommendations for the improvement of the power system stability, analyzes selected events from the perspective of dynamic behaviour of the system, and elaborates and sets guidelines for operational dynamic security assessment tools (visualization of power management units, stability calculation).

Moreover, the group aims to analyze, coordinate and facilitate the operation of wide area measurement systems (WAMS), and to monitor and report on WAMS continuously.

Its task is to work out a common protection concept in terms of principles and settings, recommend common procedures, principles and alternative infrastructures and/or new tools for relays data collection, for systematic event recording, disturbance analysis, faults and operations statistics. The sub-group also assesses Special Protection Schemes, works out the concept and coordinated measures for defence and restoration plan, defines technical requirements for grid users (generators and DSOs) specific for RG CE, and defines common perception on selective islanding policy.

As to the system studies expertise development, the SG SP&D defines common methods for protection studies (max, min regime, n-1 criterion, etc.) taking into account operational rules established by the System Operations Committee and Working Group European Operational Standards (WG EOS). The SG SP&D justifies and promotes alternative or additional, not common protection principles, such as line differential or circuit breaker failure function or double bus bar differentials, where necessary. It also assesses new protection rules and methods.

In line with its main tasks the Sub-Group supports new technologies and/or new requirements mentioned in Grid Codes and elsewhere like fault ride through capabilities of wind parks, etc. It provides on-line support for the operators concerning protection and stability issues (experience and practice exchange, applications), advises the Project Groups dealing with system extension in the area of transient and small signal stability, and analyzes the impact of Flexible AC Transmission Systems (FACTS) devices in order to increase power system stability and power system transmission capability.