

- ***Question 3.03: What are power system challenges you face in protection application that could be solved by the application of system wide protection schemes?***

A: Standard protections do not have the number of systems measures sufficient to assess systemic phenomena such as instabilities and monitor their evolution over time for decision making (they need to act preventively).

As specific points that compose challenges to their applications, we highlight:

1 - It is critical to highlight a strict requirement in specifications to ensure measurement quality and communication redundancy.

2 - It is recommended to employ special protection systems as a backup logic that responds to system events, usually timed to guarantee coordination with them.

3 – The Special Protection Systems (SPS) are inserted to act in a preventive way, and their actions are previously planned so that the foreseen contingencies do not cause problems in the system.

And as a backup of the SPS, the systemic protections for severe and unforeseen contingencies, or even failures in the SPS, are therefore designed to act because of the contingency and not in a preventive way.

As the SPS must act in a preventive way and need to foresee actions for multiple and severe contingencies, to cover these conditions, there is a need for measurements at various points in the system, requiring speed, quality, and synchronism between these measures, and often their actions. Must be carried out at different points, which requires efficient means of communication to ensure the necessary speed of action.

4 - Telecommunications systems are essential elements of the bulk power system's monitoring, protection, and control processes.

Telecommunications equipment must meet the requirements of information integrity, latency, and reliability demanded by the application to be executed.

This is achieved through careful design, involving the necessary redundancy, adequate speed, sufficient connection stability for the links used, and other additional requirements depending on each case.