Paris Session 2022

Solving Renewable Integration Challenges With WAMPAC Solutions

Study Committee B5, PS 3 Q3.03: What are power system challenges you face in protection application that could be solved by the application of system wide protection schemes?

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Managing renewables & power electronic transition: CHALLENGES

Oscillations

- Inter-area oscillations
- Torsional oscillations
- Series compensation causing sub-synchronous oscillations
- Power electronic control causing small signal oscillations

Reduced Inertia

- Large local rate of change of frequency
- Large frequency excursions
- Network phase angles diverging
- System separation

Weakened System strength

- Voltage stability issues
- Control stability issues
- Power electronic inter-oscillations

Managing renewables & power electronic transition: SOLUTIONS

	Oscillations	Reduced Inertia	Weakened System Strength
NEED & CHARACTERISTICS	❖ Early warning signs of subsynchronous oscillations	❖ Speed required for frequency response ❖ System constraints (inertia vs loss limit) ❖ Settings for frequency control methods	❖ Constrain-on generation ONLY when required ❖ Support planning decisions & need for new SCC solutions
SOLUTIONS	➢ Network interconnection protection ➢ System oscillation defense	➢ Locational fast balancing ➢ Out of step protection ➢ HVDC services for AC grid	➢ Power electronic stability ➢ Volt-VAR management

❑ To ensure system integrity following a disturbance, discrete protection at grid level may not be adequate to counter the “newer” challenges of integrating renewable energy.

❑ Wide area measurements to aid in local decision making will become a necessity at system level.