

Title: Toward Standards for Dynamics in Electric Energy Systems (S-55)

Duration: 2012-present

Sponsor: PSERC

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Description:

This project introduces systematic wide-area measurement systems (WAMS)-based control/protection requirements to ensure no system-wide instabilities or large power/voltage swings. Structure-preserving models are derived in support of control and protection standards. These models enable one to specify standards in terms of ACE-like criteria to be met by groups of system users; these standards are shown to be necessary for system-wide stability and coordination of inter-area dynamics. Illustrations of stabilizing effects of fast control designed according to the proposed standards and a comparison with the effects of today's Special Protection Schemes (SPSs) are studied. In particular, test cases are simulated to demonstrate how such control can prevent a dynamic system collapse by stabilizing unacceptable swings between the electrically distant locations. Estimates of reduced system-level dynamic reserve requirements when the proposed standards are enforced are provided.