

The Fragile Grid: Security and Resilience Challenges in Low-carbon Power Systems

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Low-carbon power systems are likely to be much more 'fragile' (that is, sensitive and vulnerable) to various active and reactive power disturbances, and consequently more prone to cascading. In more fragile grids, even relatively normal events with high probability of occurrence can lead to unexpected cascading, with eventually high impact. The concepts of operational security (to deal with relatively "credible", low-impact high-probability events) and resilience (to deal with more "extreme", high-impact low-probability events) thus become more intertwined, and new operational and market tools are needed. Motivated by real case studies in Australia and based on different projects conducted with the Australian System Operator, Energy Regulator, and Market Commission, this talk will illustrate key challenges of low-carbon grids and potential technical and commercial solutions that are being considered to deal with the fragility of power systems dominated by renewables and distributed energy resources.