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Cascade Failures in Power Grids with Distributed Generation¹ ANTONIO SCALA, CNR-ISC, SAKSHI PAHWA, CATERINA SCOGLIO, Kansas State University, ISC INSTITUTE FOR COMPLEX SYSTEMS TEAM, DEPART-MENT OF ELECTRICAL AND COMPUTER ENGINEERING TEAM — Power grids are nowadays experiencing a transformation due to the introduction of Distributed Generation based on Renewable Sources. At difference with classical Distributed Generation, where local power sources mitigate anomalous user consumption peaks, Renewable Sources introduce in the grid intrinsically erratic power inputs. By introducing a simple schematic (but realistic) model for power grids with stochastic distributed generation, we study the effects of erratic sources on the robustness of several IEEE power grid test networks with up to 2×10^3 buses. We find that increasing the penetration of erratic sources causes the grid to fail with a sharp transition. We compare such results with the case of failures caused by the natural increasing power demand.

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