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*Examination of Power Grid Cascading Failure Through Simulation*

In electrical grids worldwide, the decay of aging hardware in power lines and buses is becoming a cause of large scale failures. By creating and using a computer simulation, this study examined the effectiveness of varying network topologies, as well as repair strategies, on minimizing the commonality of massive power blackouts. As previous studies were performed by examining the preexisting electrical grids, they were unable to determine the general effects of many variables. This study was capable of varying the ways in which a network is structured and repaired, thereby determining the effects of these variances. It was found that a more distributed electrical grid (more mesh-like, rather than a branching structure) is preferable to a grid in which the loads are concentrated around the generation sites. With this information in mind, it would be beneficial to slowly modify the established power networks in North America, Europe, and other developed countries such that loads are more evenly distributed, as opposed to the now common branching structure. New power networks could also benefit from implementing this grid structure.