

MAR15-2014-020703

Abstract for an Invited Paper  
for the MAR15 Meeting of  
the American Physical Society

**Resiliency of Distribution Systems: State-of-the-Art and the Future**

CHEN-CHING LIU, Washington State University

Recent development of the smart grid significantly enhanced the level of automation in the distribution grids. With a higher level deployment of remote-controlled switches, distribution feeders can be restored more efficiently after power outages. In this presentation, computational algorithms for feeder restoration will be summarized together with their practical implementations. The traditional analytical techniques, however, are not designed for extreme events in the distribution systems. The same is true for widely adopted reliability indices. New thinking of design and operation for resilient distribution systems will be important. Resiliency for a power distribution system depends not only on the electrical and communication connectivity but also the availability and physical capability of the distribution systems to deliver power. The physical behavior of the distribution systems during an extreme operating condition will be discussed. This presentation will cover technical methods and open research issues related to resilient distribution systems. Simulation results using a 4-feeder 1069-node test system with microgrids will be used to validate the feasibility of the proposed methods.