An Approach for the Direct Inclusion of Weather Information in Electric Grid Analysis

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Thomas Overbye

Department of Electrical and Computer Engineering
Texas A & M University

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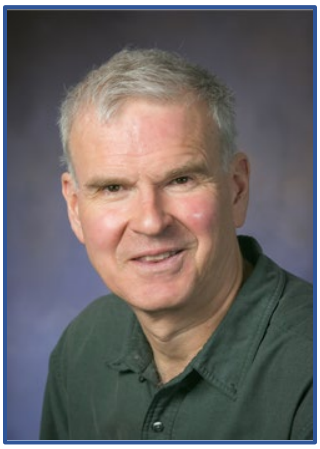
OVERVIEW

While it is widely recognized that weather impacts electric grid operations, historically weather information has only been implicitly included in common grid analysis packages. This presentation provides an approach for the direct inclusion of weather information in the power flow and the optimal power flow. Key issues addressed include the availability of weather information sufficient for power flow analysis, the mapping of weather information to electric grid components, a flexible and extensible modeling approach for relating weather values to the power flow models, and the visualization of the weather impacts on the results. The approach is demonstrated on several different electric grids ranging in size from 7,000 to 82,000 buses covering geographic footprints up the contiguous US. Results are shown using weather data from several thousand stations ranging between the 1940's and present day including comparing looking at the cold weather that impacted Texas in 2021, and historical wind and solar resource droughts.



BIO

Dr. Thomas J. Overbye is a Professor and holder of the O'Donnell Foundation Chair III in the Department of Electrical and Computer Engineering at Texas A&M University (TAMU). Prior to joining TAMU he was a Professor at the University of Illinois at Urbana-Champaign. He received his BS, MS, and Ph.D. degrees in Electrical Engineering from the University of Wisconsin-Madison. Before starting his academic career, he was employed with Madison Gas and Electric Company. He is the original developer of PowerWorld Simulator, a co-founder of PowerWorld Corporation, an author of a widely used Power System Analysis and Design book, and is a member of the US National Academy of Engineering.