

Real-Time Path Rating Relieves Grid Congestion

CHALLENGE

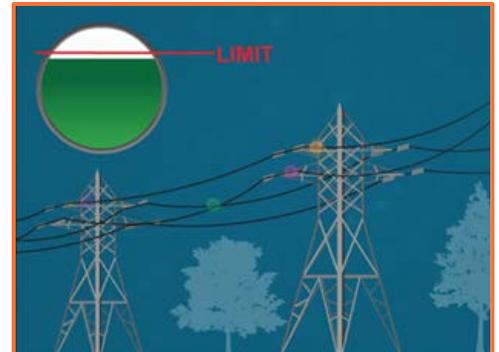
Congestion on the nation's over-taxed power grid worsens when abnormal spikes in demand or renewable energy sources come online and press the existing transmission path limits. However, the limits—or path ratings— of many key transmission lines are overly-conservative, making them artificially congested. In addition, today's commercial software tools take so much processing time to perform the rating calculation, it's nearly impossible for operators to receive timely path rating simulations. Adding new transmission lines to increase the limits is not an easy solution due to financial and environmental constraints.

SOLUTION

With funding from ARPA-E, PNNL and partners at Bonneville Power Administration, PowerWorld, and Quanta Technology used high performance computing techniques to develop a “real-time path rating” software tool that allows operators to maximize the use of today's transmission assets and tap into unused capacity. Using multiple computer processors to run many analyses at the same time, this parallel processing technique allows operators to perform path rating studies using real-time conditions under massive contingency scenarios, continuously in 10-minute intervals, compared with hours and weeks in today's industry practice. The significantly enhanced speed of this new software tool reduces conservativeness and allows the power grid to operate more efficiently and closer to its true limits.

IMPACT

Real-time path rating allows operators to complete all required simulations of the transmission path ratings within minutes, instead of hours or longer. With near real-time information, grid operators can tap into unused capacities and use transmission assets up to 30 percent more efficiently. The ultimate benefit is hundreds of millions of dollars in savings each year by reducing congestion costs and deferring new transmission investments.



The real-time path rating software allows operators to simulate transmission path ratings quickly and accurately.

In November 2014 the U.S. Department of Energy launched the GMLC, a strategic partnership between DOE and the national laboratories to bring together leading experts and resources to collaborate on national grid modernization goals.

This integrated effort builds on prior individual projects at the national laboratories to deliver grid-related advancements, such as **real-time path rating**.

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