



MISO Saves US\$31 Million with Use of DSATools TSAT Module

The Midcontinent Independent System Operator, Inc. (MISO) saved \$31 million in 2016 in annual savings as a result of reduced congestion costs made possible by use of Powertech's Transient Security Assessment Tool (TSAT) for on-line transient security assessment in grid operations.

A case study analysis conducted by MISO on real-time market binding on one stability-limited interface showed the impact of applying on-line stability limit calculations versus off-line analyses.¹ At this critical interface, when power transfer limits were implemented with off-line stability assessment in 2014, the real-time transmission congestion costs due to interface binding were \$31 million. With implementation of limits from on-line assessment, costs dropped to \$0.7 million in 2015, and were further reduced to \$0.1 million in 2016. This savings is expected to be continued for future years, and to result in higher total savings.

The study also included several real-time market cases, using sample data from the unit dispatch system, and compared cases based on off-line calculation to those calculated from the on-line system with TSAT. Results showed average production cost savings of \$7,187/hour.

MISO implemented the on-line TSAT package in 2012 to perform calculations in real-time and determine stability limits on-line. Since implementation, MISO has consistently observed higher transmission interface limits. Thus higher amounts of generation can be reliably integrated into the grid, which would otherwise have been curtailed based on conservative limits from the off-line studies. Due to higher transfer limits and

better assessment of individual generator stability limits, the amount of internal, as well as market-to-market, binding has reduced significantly, which has a direct impact on production costs and congestion cost savings.

Application of TSAT replaces another tool MISO had previously used for many years, and is part of the ISO's ongoing objective to find efficiencies, reduce defects, and improve outcome quality.

POWERTECH'S TSAT

TSAT was developed by Powertech for transient stability analysis in planning and operation studies in off-line and/or on-line modes. Its core technology is a nonlinear time-domain simulation engine that enables security assessment based on criteria for transient stability, damping, transient voltage/frequency, and relay margins. TSAT includes leading-edge features such as advanced modeling capabilities, automatic stability limit determination, and distributed computations. It is widely used by ISOs, utilities, and others around the world as part of Powertech's DSA Tools™ suite of state-of-the-art power system analysis tools.

MISO

MISO acts as an Independent System Operator (ISO) for 15 states in the mid-western United States and one Canadian province, serving 42 million people. It schedules power on an electric grid that connects 65,800 miles of transmission lines and more than 180 GW of generation capacity.

1 Thappetaobula, R., et al. "Maximizing Transmission Utilization with Online Stability Assessment." 2017 IEEE Power & Energy Society General Meeting, 16-20 July, Chicago, Illinois.

ABOUT POWERTECH LABS:

Powertech Labs Inc. is one of the largest testing and research laboratories in North America, situated in beautiful British Columbia, Canada. Our 11-acre facility offers 15 different testing labs for a one-stop-shop approach to managing utility generation, transmission and distribution power systems.

Outside of the utilities industry, Powertech provides routine testing capabilities, product development, research and consulting services to support an array of industrial-type operations, electrical equipment manufacturers and automotive original equipment manufacturers.

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