



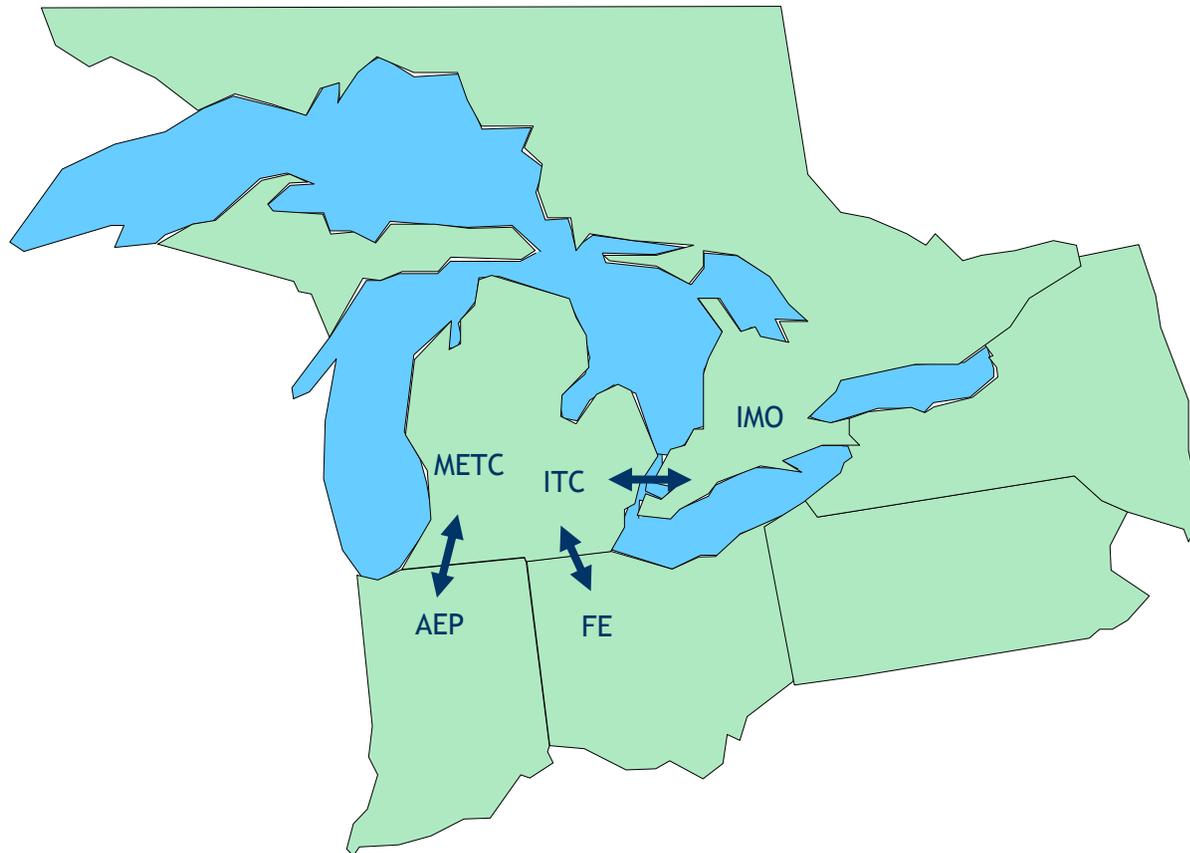
Regional Loop Flow Problems Possible Solution

DOE Transmission
Bottleneck Workshop
July 14, 2004
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International Transmission Company (ITC)

- Independent, Transmission Company
 - **Asset owner only**
 - **Operated by the MISO RTO**
 - **Operate the MECS control area jointly with METC**
- Regulated by the FERC
- We have data and knowledge of system
- We can build the infrastructure needed by our ultimate customers

Michigan is a peninsula with seven 345kv ties to the south and four 230kV ties to Canada. Loop flow is parallel path flow or unscheduled flow on an ac system.

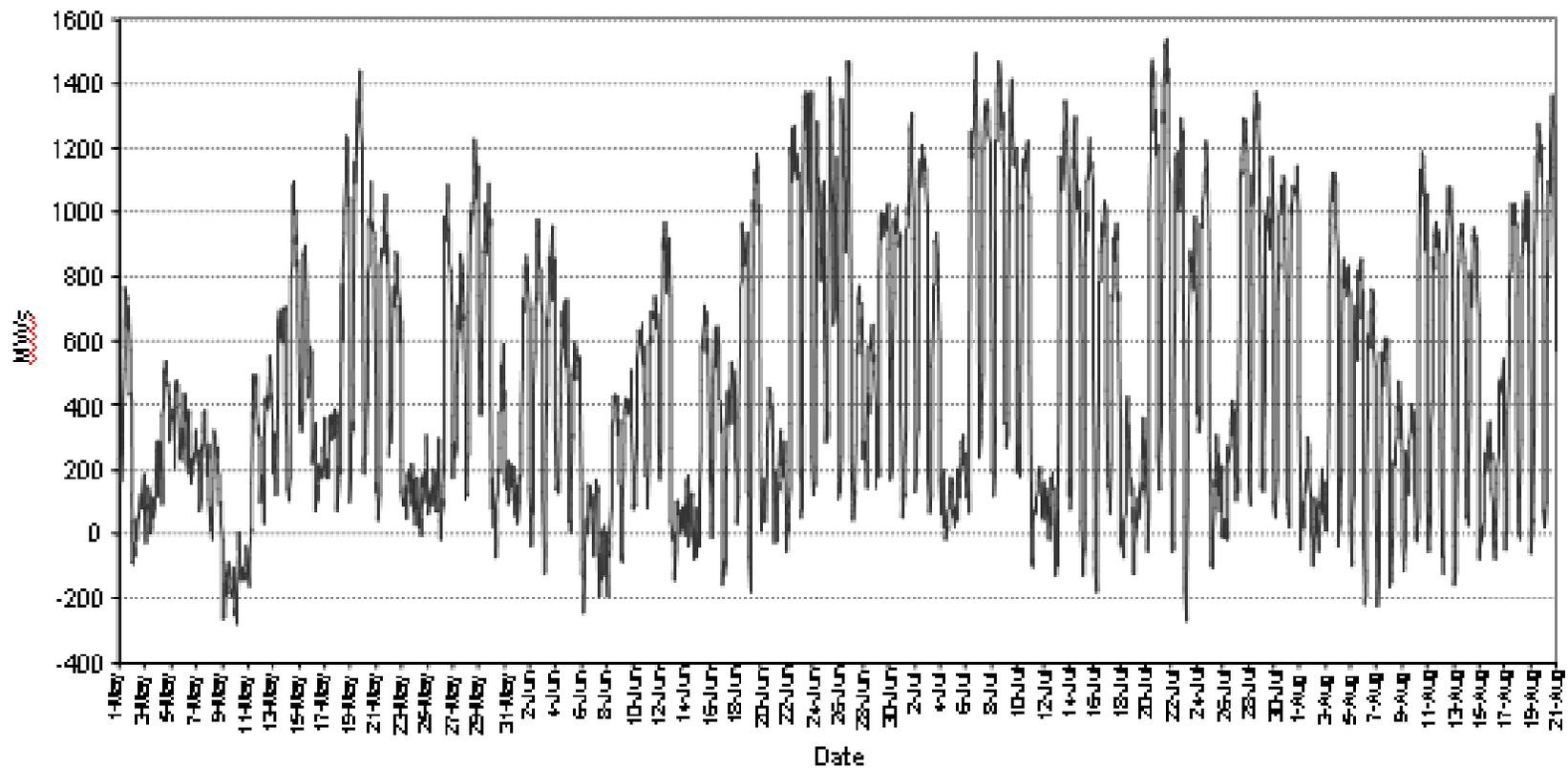


The Michigan ties to Canada experience a significant amount of unscheduled flow.



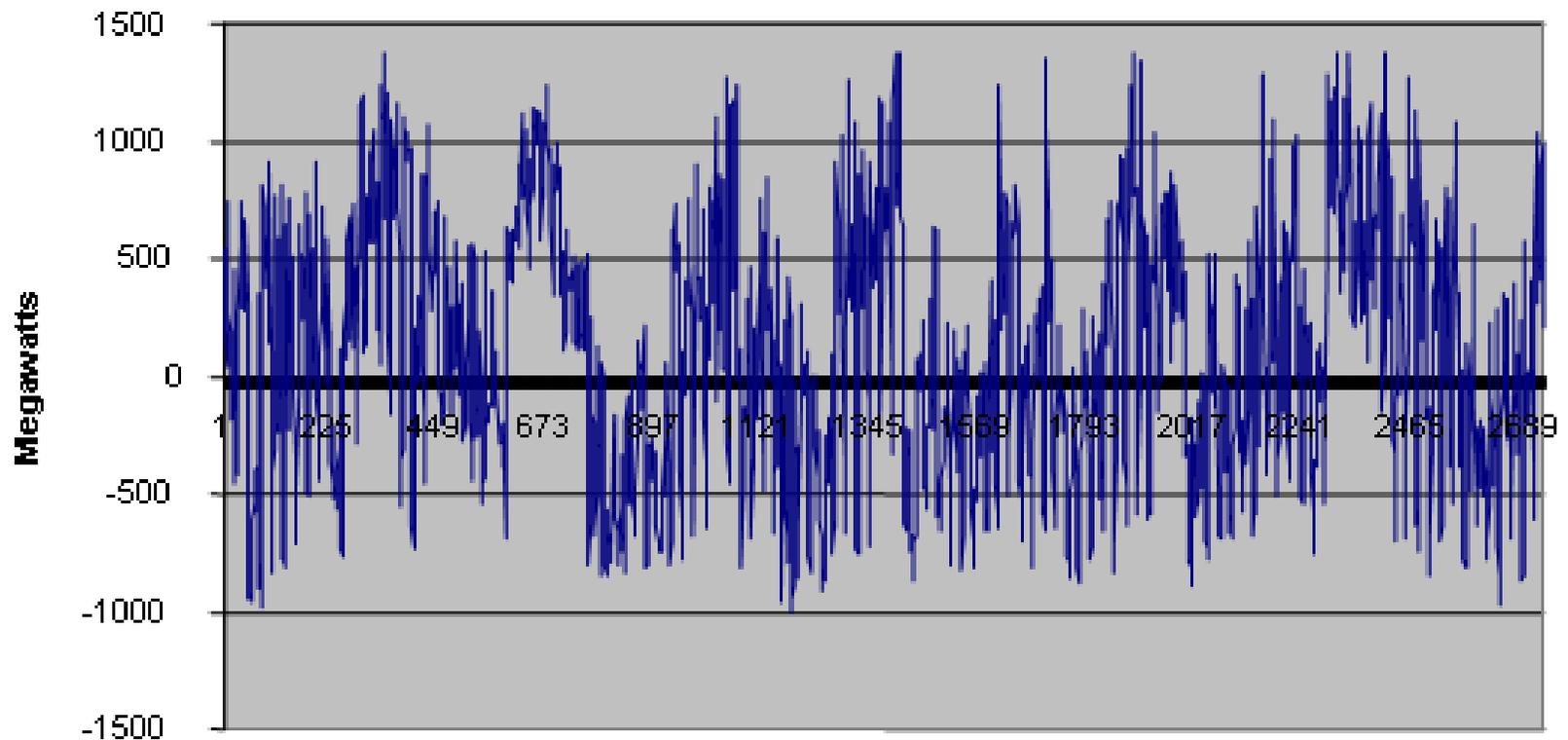
Historic Data - Lake Erie Circulation

LEC1 vs. Time -- All Hours May 1, 1998 to August 21, 1998



Unscheduled Flow of the Michigan-Canada Interface With LMP Markets – Simulation Results for 2009

Unscheduled Flow Simulation



Under abnormal conditions (8/14), the power surge through Michigan-Canada Interface (which by definition is unscheduled flow) reached 3900 MW.



There is an opportunity for a technology solution to reduce the risk of another Blackout.

- **Potential Solution -- Installation of back to back direct current (DC) devices in series in key parts of the grid.**

Two 1000MW ties at northern part of Detroit; 400MW tie at southern part of Detroit.

- **Power surges that occurred on August 14th can't happen with the installation of the back to back DC device.**

Controls the schedule to scheduled value or to value based on system conditions.

- **All existing grid capacity will continue to be available.**

If this device were in place on 8/14

- PJM-NY interface would not have opened.
- Ontario would not have blacked out.
- Flow through Michigan would have been mitigated.
- Detroit would have potentially remained whole.
 - In conjunction with the DC device, with the installation of special software, ITC's service area would certainly not have experienced a blackout.
- Although Northern Ohio would have experienced an outage, restoring service would have been less challenging since surrounding systems would be available to assist.

Summary

1. Loop flow is not a problem in and of itself.
2. Loop flow is a problem when it is a consequence of insufficient transmission or when it interferes with commerce. The extent to which loop flow is a problem is indicative of the need for additional transmission.
3. A technology solution is possible that reduces the risk of another widespread blackout, but does not take away the need to build additional transmission and eliminate bottlenecks.