



Partners in Business Meeting September 18, 2007

Agenda



Introductions

- ❖ Tom Wrenbeck, Manager of Stakeholder Relations

Update on 765 kV Project

- ❖ Carlo Capra, Principal Engineer

Regulatory/Legislative Update

- ❖ Mike Taylor, Regulatory Analyst

Meeting Wrap up and Golf

- ❖ Jeff Dorr, Account Representative, Stakeholder Relations

Update on 765kV Project

- ❖ Carlo Capra, Principal Engineer – Long Range Planning



Agenda

- **The Project - Review**

- **ITC/AEP Technical Study Results**

- **Conclusions**

- **Next Steps**
 - RTO Analysis
 - Other Studies

Addressing Michigan's Needs



- **ITC and AEP are evaluating a 765 kV loop to link Ohio and Michigan**
 - Three legs totaling approximately* 700 miles of new 765 kV facilities
 - Roughly 60% in Michigan and 40% in Ohio
- **Connects four new stations with two existing 765 kV stations in Ohio and Michigan**
- **High level cost estimates* at this time are in the \$2.6 billion range in 2007 dollars**
- **Project implementation can be completed in phases over many years**
- **Because a 765-kV loop is expected to provide substantial interregional benefits, the costs for such a project may be eligible for regional cost recovery, which would reduce Michigan's share**

* All estimates (mileage and cost) are very preliminary and are subject to change based on several things including but not limited to; actual routing, ROW procurement, construction timing, project design, and the cost of raw materials.



Conceptual 765 kV Loop

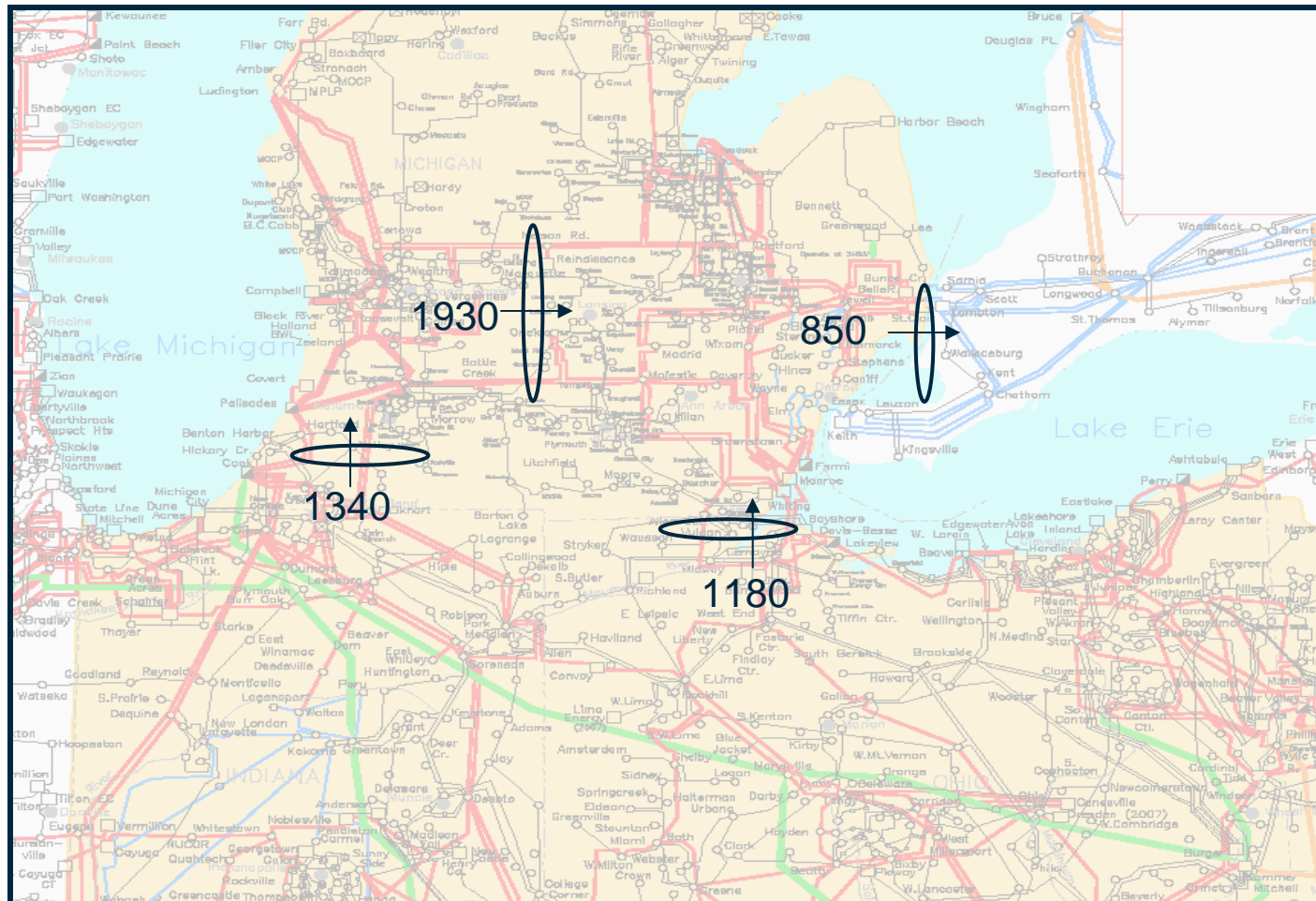


Technical Study Overview

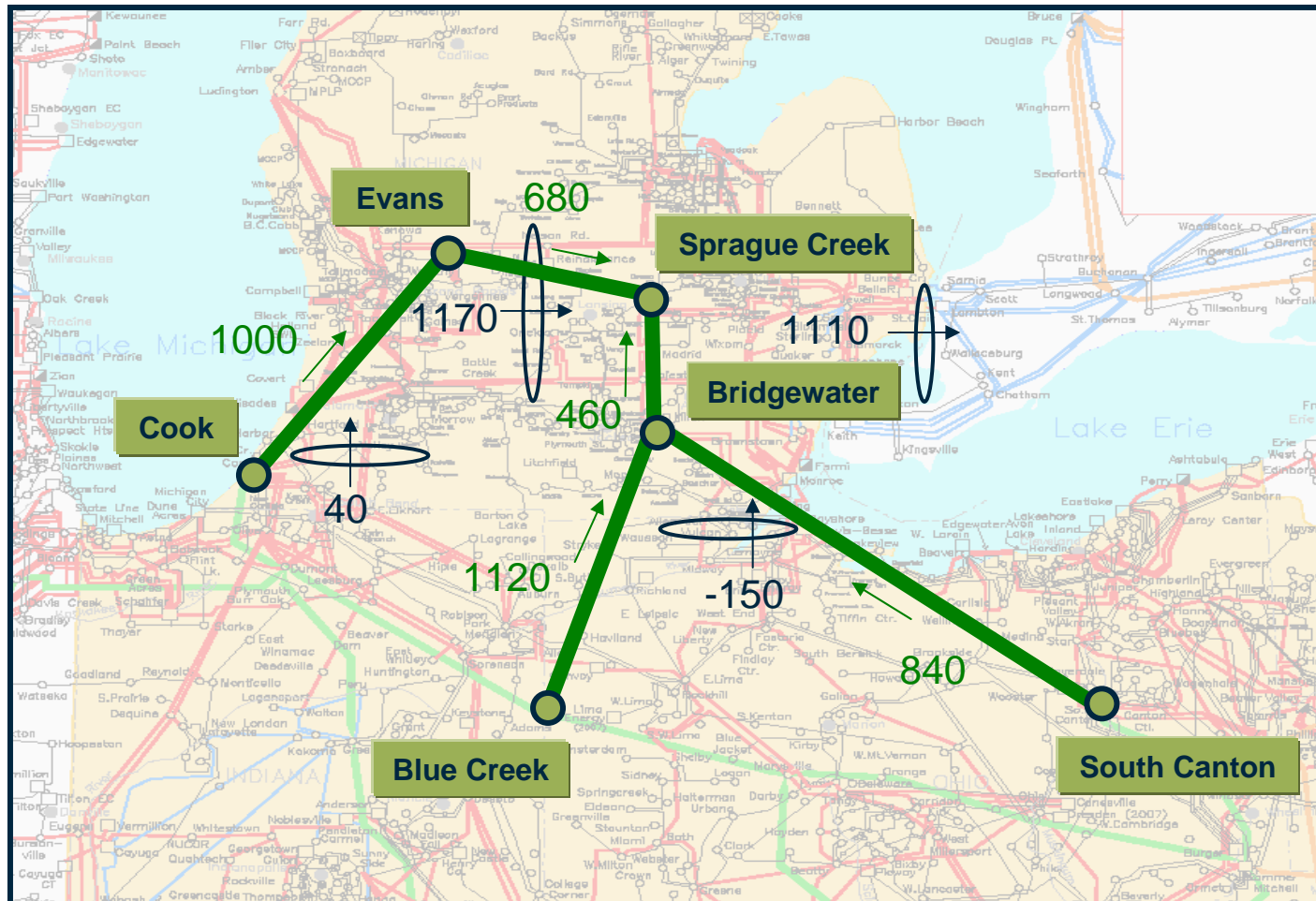


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- **Mutual effort between ITC and AEP (input from FE & NIPSCO)**
 - **Project studied as “stand alone” - focused on MI/IN/OH**
 - **Technical Aspects of Planning Study:**
 - Transcription Diagrams (System Flow Diagrams)
 - Loss Savings
 - Thermal First Contingency Incremental Transfer Capability (FCITC)
 - Thermal Higher-Level Contingency Analysis
 - Voltage Screening (Single Contingency) Analysis
 - PV-Curve Voltage Analysis
 - Cascading Analysis
 - 8-14-03 Blackout Prevention – Not part of Technical Report
 - **Report includes a discussion of Siting Feasibility & Costs performed by ITC and AEP Engineering**

Difference in Flows in Base Case – without 765 kV



Difference in Flows in Base Case – with 765 kV



Base Case Loss Savings



		System with 765 kV		System As Planned			
AREA	Area Name	MW	MVAR	MW	MVAR	DELTA MW	DELTA MVAR
202	FIRSTENE	367.5	5193.8	424.8	5706.7	57.3	512.9
205	AEP	836.7	10359.1	923.3	11265.5	86.6	906.4
208	CIN	560.5	6501.3	569.7	6588.1	9.2	86.8
209	DPL	129.7	1460.3	137	1533.7	7.3	73.4
217	NIPS	55.3	529.4	65.7	588.9	10.4	59.6
218	METC	434.3	4739.9	511.1	5661.4	76.8	921.5
219	ITC	368.3	4950.2	374.3	5013.8	6	63.6
291	New 765	13.7	336.6	0	0	-13.7	-336.6
292	New 345	2	186.4	0	0	-2	-186.4
Total for Selected Areas						237.9	2101.2
Total for All Areas						244	2206

■ **The addition of the 765 kV project would provide significant MW and MVAR loss savings:**

- Negate the need for one to several peaking units
- Free up significant dynamic MVAR reserves
- Overall reduction in strain on the system
- Loss savings noted here based on one system “snapshot”
- Could be greater with heavy system transfers

Thermal Transfer Capability



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- **While imports into the ITC and MECS footprints were the main focus, many source/sink pairs were used for the FCITC analysis:**
 - Import Zones – ITC, MECS, NIPSCO, FE, ITC & FE, MECS & FE
 - Export Zones – MAIN, WUMS, MAAC, TVA, VCAR, MISO, PJM, Various Combinations
 - Transfers – west to east, east to west, north to south, south to north, and other various combinations

 - **Significant benefits were observed for imports into ITC, MECS, ITC/FE and MECS/FE**
 - Imports into FE and NIPSCO were limited by facilities outside of the scope of the 765 kV project and were not notably impacted by the project
 - Cross system transfers (i.e. WI to East Coast and so on) were limited by facilities outside of the 765 kV umbrella and not impacted significantly by the addition of the 765 kV project
 - Hard to just quote a number without an explanation sending/receiving end limits

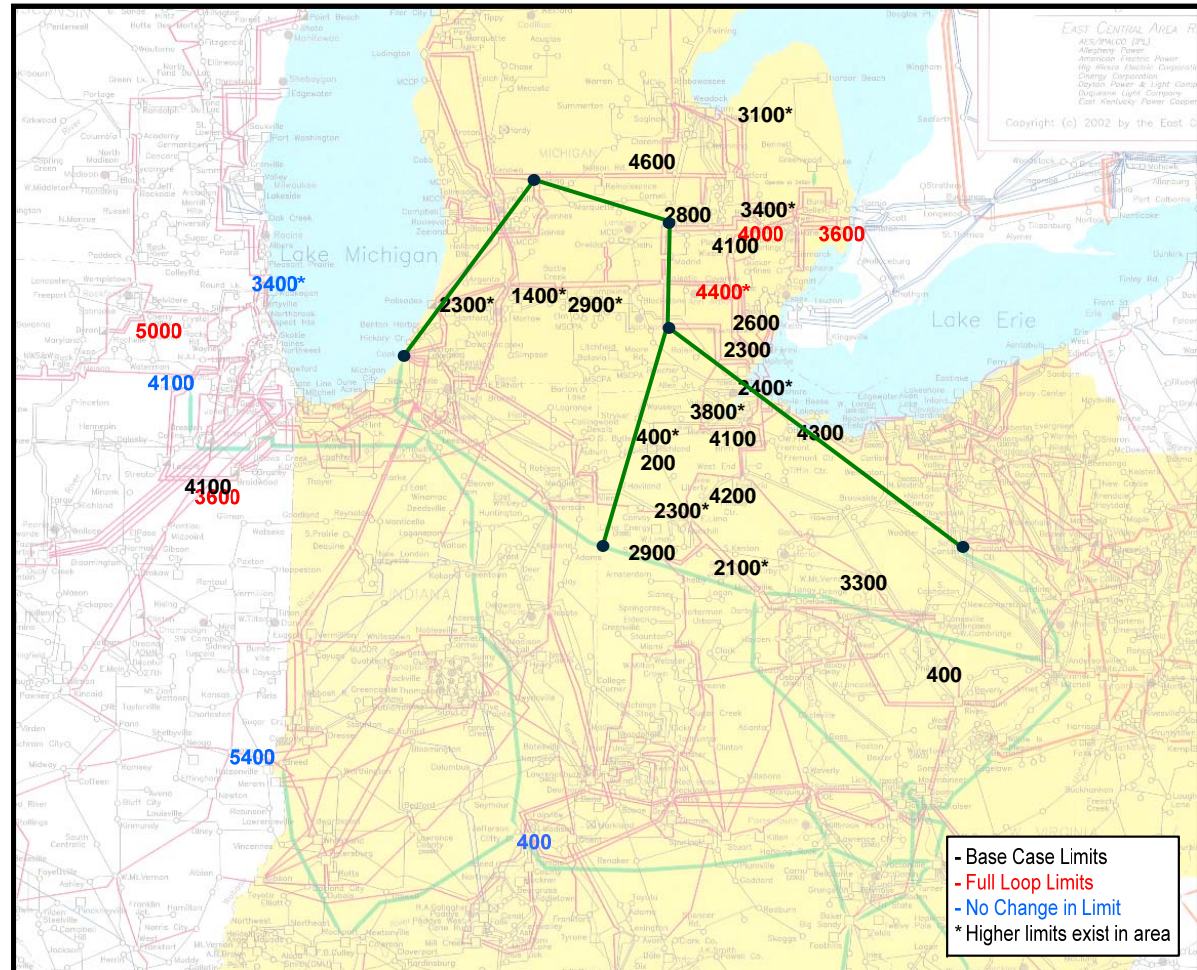
 - **Sending and receiving end limits, not within 765 kV umbrella, limited other transfer scenarios**

 - **Second contingency (N-2) incremental transfer capability showed similar results**

Sample Result – Thermal Transfer Capability



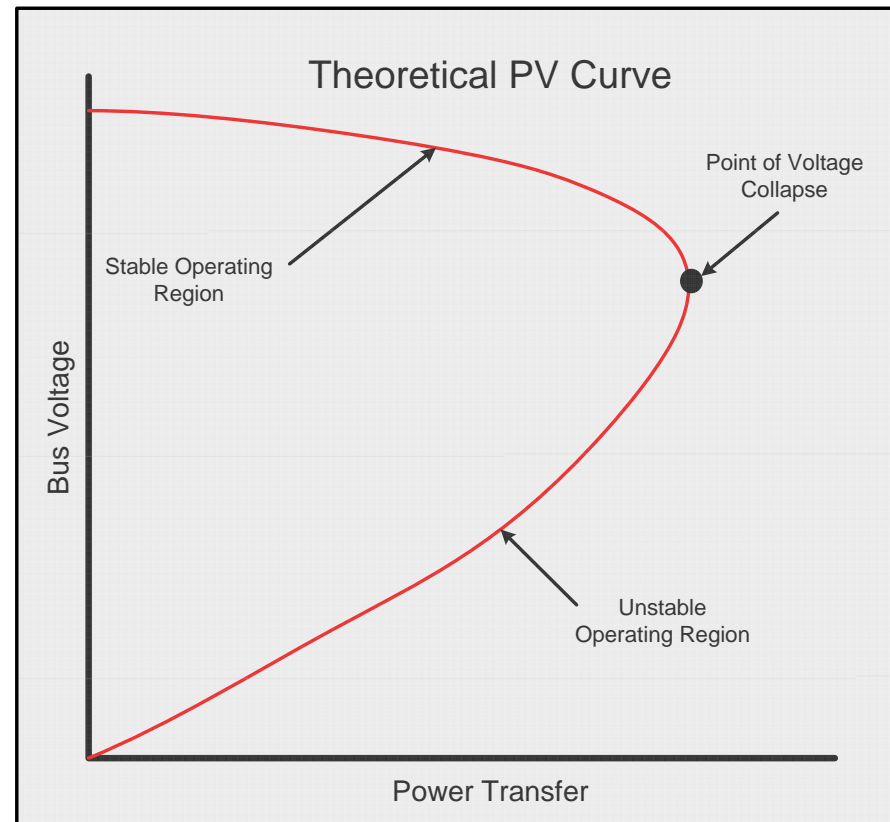
- Example is for transfers from generation in the MISO and PJM markets to generators in Michigan
- Limits in black exist prior to the addition of the 765 kV project
- Blue limits are unaffected by the addition of the 765 kV project
- Red limits are aggravated by the addition of the 765 kV project



PV Curve Analysis



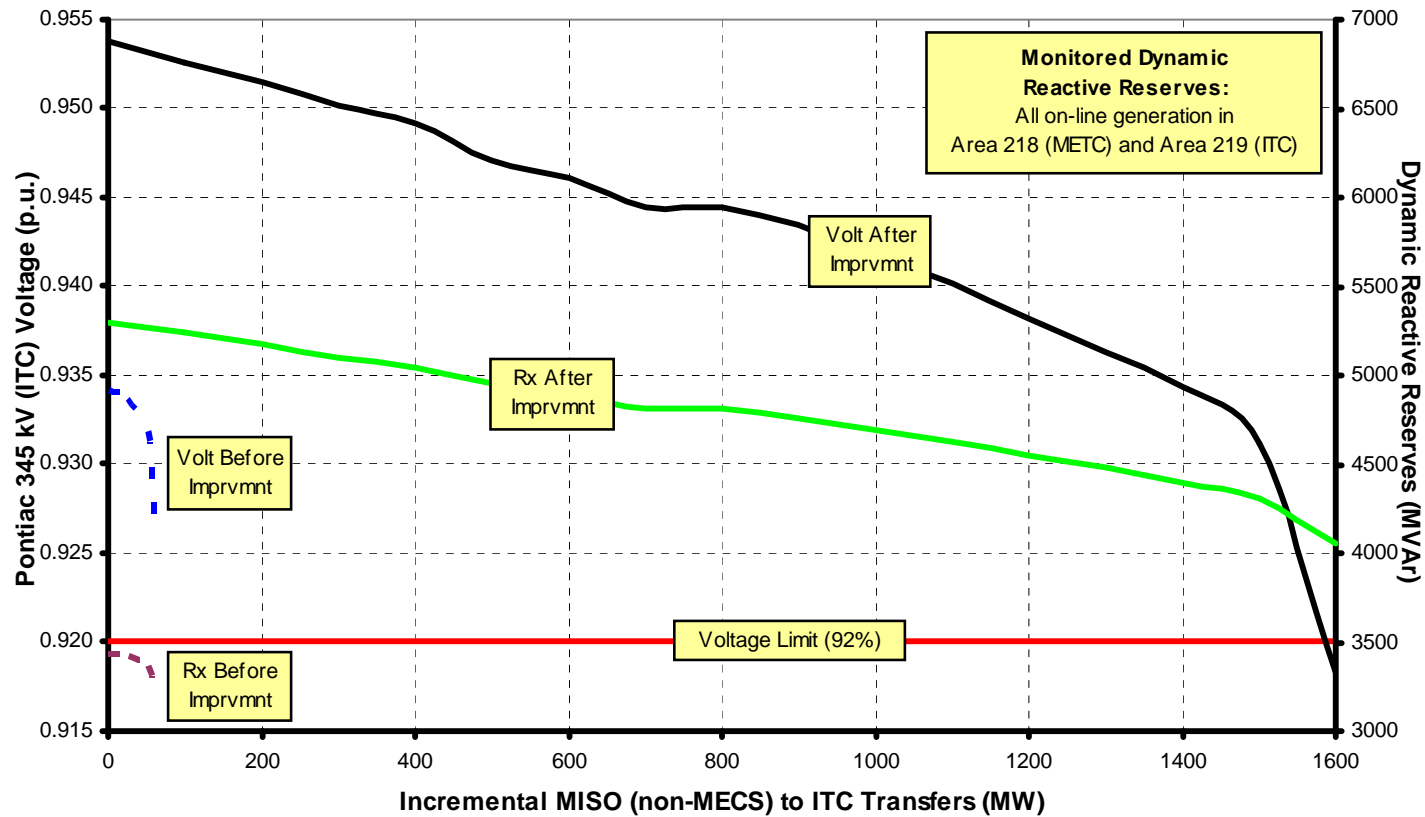
- PV Curves help to measure the system's ability to transfer power while ensuring voltages stay intact (i.e. no voltage collapse).
- PV Curves were developed for several severe contingency transfer scenarios per the historical RFC/ECAR analysis and/or local TO experience.
- The addition of the 765 kV project significantly improved voltage performance for most of the specific transfer scenarios analyzed via the PV Curve methodology
 - Allowed for higher transfer capabilities w/o the possibility for voltage collapse for more severe contingencies
- Voltage screening was also performed for a large number of N-1 contingencies to ensure the addition of the 765 kV project would not create high system voltages



Sample Result PV Curve Analysis



Figure 4.8
 AEP-ITC 765 kV Study, 2011 Summer Conditions
 Hampton - Pontiac 345 kV & Theftord - Jewel 345 kV DCT Outaged,
 Greenwood 1 Outaged



Cascading Analysis



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- **Simulation of “what if” this line trips or this unit is forced off**
 - Assumes lines trip above 130% of emergency ratings
 - Assumes generators trip with station voltages lower than low voltage limits
 - **Cascading analysis was performed for several severe contingency overload scenarios**
 - **The addition of the 765 kV project appears to reduce the possibility of system cascading or voltage collapse as depicted in the example below:**
 - Palisades-Cook / Palisades-Benton Harbor 345kV DCT with Ludington Units in Pumping Mode:
 - Without 765kV Loop
 - All four AEP-METC 345kV interconnection lines tripped
 - Five 69kV lines in AEP/NIPSCO tripped
 - Voltage Collapse in NIPSCO area
 - Cascading limited to northern AEP and NIPSCO area
 - With 765kV Loop
 - No lines, transformers, generators, or load lost

8-14-03 Blackout Prevention



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- An analysis was performed based on the NERC blackout investigation powerflow model
 - Results indicate that loading on several of the heavily overloaded facilities during the sequencing of tripping events would have been significantly reduced by the addition of the proposed 765 kV project
 - Based on this analysis it is reasonable to assume the presence of the proposed 765 kV project could have contained the blackout to within the northern Ohio system and prevented the cross Michigan 345 kV ties from tripping



Transmission's Contribution to Energy Cost and Impact on Reliability

- **Transmission is only a small component of total delivered energy cost; yet, the reliability and economic benefits are considerable.**

■ Value of Robust Transmission

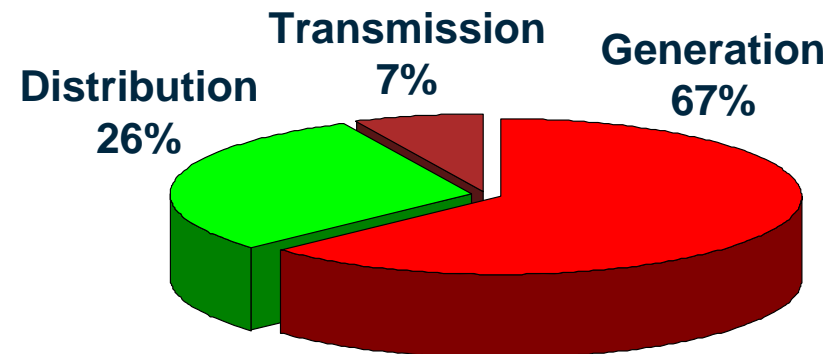
■ Enables and Ensures Reliability

- Sufficient capacity to serve load
- More robust system better able to withstand Aug 14th type events initiated by others
- Less reliant on “perfect” operators and reliability rules
- Provides a hedge against unanticipated events

■ Reduces Energy Costs

- Loss savings
- Reduced congestion
- Keeps the “pie” from getting bigger

Industry Average Breakdown of End Use Customer Electricity Bill



Source: EIA Annual Energy Outlook 2007

The money spent on transmission can be “leveraged” in the sense that increased capacity can allow substantial net savings by reducing the price paid for generation.

Conclusions



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- **The 765kV loop project represents a decisive step towards stabilizing Michigan’s electricity future over the long term**
 - Leverages the existing 765-kV transmission infrastructure to facilitate future expansion
 - Frees up significant capacity on the existing lower voltage systems
 - Enables up to 5000 MWs of additional power to be generally transportable throughout Lower Michigan, and Northern Ohio
 - Enables additional generation in Michigan to reach both the MISO and PJM markets
 - Minimal right-of-way versus lower voltage lines for the same level of electric power carrying capacity
 - Significant MW and MVAR loss savings – the ultimate “green energy”
 - Provides a robust transmission backbone into the Lower Peninsula of Michigan
 - Enhanced regional reliability and security, promoting a “self-healing” grid that only transmission can ensure
 - Fits into MISO’s vision plan allowing renewable resources and lower cost generation to reach the broader market

What's Next...



■ MISO/PJM study and approval processes

- The report has been given to MISO & PJM for review
- Project will be analyzed in MISO Futures Studies currently under way as part of the MTEP 08
- A joint MISO/PJM review will also be performed

■ Other Studies

- Impacts on ITC/IESO interface
 - Detailed N-2 Contingency Analysis – Shutdown + Contingency
 - Detailed Voltage Studies (sizing shunt reactors)
 - Short Circuit Studies
 - Dynamic Stability Analysis
- **Study Posted to the ITC Home Page on the MISO OASIS:**
- <http://oasis.midwestiso.org/OASIS/Deco>

Questions?



Regulatory/ Legislative Update

❖ Mike Taylor, Regulatory Analyst

Regulatory Update: FERC



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- MISO's first implementation of regional cost allocation and recovery under RECB resulted in a complaint filed by the vertically integrated transmission owners.
 - The complaint stems from the fact that not all transmission owners use the same Attachment O formula rate when calculating annual transmission revenue requirements resulting in instances where for some owners the costs of projects are recovered regionally yet the facilities are not yet used and useful.

 - ITC *Transmission*/METC received authorization to reimburse generators for 100% of the cost of network upgrades required to interconnect such generators.
 - Governor Granholm, MPSC, Wolverine Power Supply Coop, Electric Power Supply Association (EPSA), American Wind Energy Association (AWEA) and Legislators filed in support.
 - Proposal was protested by incumbent utilities (Detroit Edison, Consumers Energy and Michigan Public Power Agency).



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- Jointly filed with Wolverine Power Supply Coop and American Transmission Company a competing regional rate design proposal to take effect February 1, 2008 at the end of the MISO's six-year transition period.
 - If approved, the proposal would remove the regional cost recovery inclusion criteria developed in RECB and allocate the costs of transmission projects 500 kilovolts and above on a postage stamp basis across the entire MISO footprint.

 - MISO's initiative to establish an ancillary services market by spring 2008 was rejected by FERC without prejudice for failure to include a market power analysis or readiness plan.
 - The majority of ITC *Transmission*/METC responsibilities as a Balancing Authority will transition to MISO when the ancillary services market commences.

Regulatory Update: MPSC



- Detroit Edison and Consumers Energy allowed to intervene in the Bismarck Troy Certificate of Public Convenience and Need Proceeding.
 - MPSC Staff testimony claims the application is weak and gives credence to the alternative generation solution advanced by Detroit Edison.

- Responded to Hartland Township and Homeowner's Request for Rehearing in the Genoa Prizm Certificate of Public Convenience and Need.
 - Grass roots dissatisfaction with the MPSC ruling continues.

Web Site Information



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- Please sign up for the *ITC Transmission/METC Partners* in Business Email distribution list
1. Go to www.itctransco.com
 2. Select the “Partners in Business” tab on top row
 3. Select the “Sign up” option in the drop down window then fill out and submit the form
 4. You can also acquire copies of the Partners in Business presentations under this tab at any time



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