

MTEP06

Growing the Grid



EXECUTIVE SUMMARY

An up-to-date transmission system is vital to the continued reliability of the Midwest's electrical system. And updates are clearly needed in many areas. A special report issued by a global rating agency put it this way: "*The power delivery system in the United States is characterized by an aging infrastructure, significant underinvestment and technology that was developed in the 1950s or earlier.*"¹

A robust transmission system is necessary to accommodate growth within the Midwest ISO region, both in terms of the number of customers and the number of megawatts of energy consumed. To these ends, the Midwest ISO prepared the Midwest ISO Transmission Expansion Plan 2006 (MTEP 06), which describes the transmission needs that are currently recommended within the Midwest ISO Transmission System².

MTEP 06, the Midwest ISO's third regional expansion plan, will substantially improve electric power grid performance in the Midwest by ensuring continued compliance with national electric reliability standards, by relieving the most significant points of congestion on the grid, and by facilitating the development of new base load and renewable generation resources.

MTEP 06 Highlights

Highlights of the plan include:

- \$2.1 billion in committed projects by participating Transmission Owners through the year 2011 and forecast of an additional \$1.5 billion for the same period.
- Elimination of 22 of the top 30 constraints to market operations.
- Five recommended expansion plans specifically addressing constraints in the newly identified Narrowly Constrained Area in Eastern Iowa and Minnesota.
- Facilitation of new generation entry by providing expansions to accommodate 14,400 MW of new generation supply, 5,100 MW of which is base load supply and 2,810 MW of renewable resources through 2011.
- Provision for footprint-wide expansions at all transmission voltage levels including commitments for three new 345 kV and two 230 kV lines for service by 2011. This infrastructure includes 345 kV lines from Gardner Park into central Wisconsin to accommodate new generation, and in northeast Wisconsin to support the Green Bay area. It also includes investments in Michigan to maintain reliability in the Detroit area. The two 230 kV lines are both in the western part of the footprint improving capacity in northern Minnesota and the Minnesota-South Dakota boarder area.

¹ "*Frayed Wires: U.S. Transmission System Shows Its Age,*" Fitch Ratings, October 25, 2006

² In accordance with the Transmission Owners' Agreement (TOA), approval of the Midwest ISO Plan by the Board certifies MTEP 06 as the Midwest ISO's plan for meeting the transmission needs of all stakeholders subject to any required approvals by federal or state regulatory authorities.

The \$3.6 billion in expansion plans are in addition to the \$13 billion in existing transmission investment within the Midwest ISO, and represent a \$700 million increase in identified investment since the prior plan was issued in June 2005. The Midwest ISO projects that the annual transmission cost of about \$500 million these expansions represent will result in avoided market-wide generation production costs of over \$2 billion annually when compared to generation costs without the expansions.

For the first time, the Midwest ISO tariff will allocate cost between Transmission Owners on a formula basis that will result in a closer match between who benefits from and who pays for these investments. Approximately \$770 million of the committed investment will be cost-shared in this manner.

MTEP 06 also identifies additional regional expansion concepts of 345 kV and higher that are under consideration. These expansions, which are designed to provide additional longer term benefits to the Midwest grid, are being considered in the areas of Minnesota, eastern Iowa, Wisconsin, northern Indiana, southern Indiana and Michigan.

These expansions concepts are in addition to a long-term Vision Plan that could enable development and delivery of 16,000 MW of new renewable energy resources to the Midwest and other load centers to the east of the Midwest ISO. Future Midwest ISO regional plans will continue the evaluation of these regional expansion concepts.

Successes to Date

MTEP 03, the Midwest ISO's first region-wide transmission plan, was approved in June 2003. MTEP 03 identified 407 transmission facility additions and enhancements, with an estimated investment of \$1.9 billion through 2008.

MTEP 05 built on that original plan, and identified 615 planned or proposed transmission facility additions and enhancements, representing an investment of \$2.91 billion through 2009.

As of early 2007, nearly \$1 billion dollars in improvement projects have been completed. More than 460 miles of new transmission lines have been built, nearly 2,400 miles of transmission lines have been upgraded, and numerous improvements to substations and other transmission facilities have been completed or are in progress.

INTRODUCTION

MTEP 06, approved by the Midwest ISO's Board of Directors in February 2007, identifies 416 projects comprised of 738 planned or proposed facility additions or enhancements, representing an investment of \$3.6 billion through 2011. In addition to these facilities, the report describes other major system expansions under development but that are not yet at the stage where they can be recommended for implementation.

These recommended expansions, together with prior MTEP projects, provide for a reliable system for the 2011 timeframe. They also address many of the most heavily-binding constraints identified during the first year of market operations.

MTEP 06 marks the first regional expansion plan under which regional cost sharing for Baseline Reliability Projects is in effect. When fully approved by the Board, the plan will include an identification of cost allocation for all eligible expansions. A robust value-driven planning process that is currently being developed with the assistance of the Planning Advisory Committee will provide the mechanism to implement additional market efficiency expansion plans eligible for regional cost sharing when related tariff revisions filed on November 1, 2006 are approved by FERC.

The Midwest ISO's transmission owners are expected to make the investments necessary to implement the recommended projects listed in Appendix A³ to this regional expansion plan, unless alternative funding is provided for under the tariff.

MTEP 06 includes sections devoted to the following topics:

- ❑ Evolution of the Midwest ISO Planning Process
- ❑ Trends in Resource Adequacy, New Technologies, and Operational Performance
- ❑ Review and status of the projects identified in MTEP 05
- ❑ Detailed study methodology
- ❑ Analyses of system performance against reliability standards
- ❑ Market efficiency and exploratory studies
- ❑ Summary of transmission investment

³ *Appendix A* is included with the full MTEP 06 report but is not included in this synopsis. The full *Midwest ISO Transmission Expansion Plan 2006* is posted at <http://www.midwestmarket.org/page/Expansion+Planning>

THE MIDWEST ISO PLANNING OBJECTIVES AND PROCESS

Objectives

The objective of the Midwest ISO regional transmission expansion planning process is to develop a comprehensive expansion plan that meets both reliability and economic expansion needs. This process has been evolving since the Midwest ISO issued its first Transmission Expansion Plan – MTEP 03 – in June 2003. MTEP 03 provided extensive analysis of a variety of regional expansion concepts that would enable access to new generation that would come on-line within the Midwest ISO footprint. MTEP 03 endeavored to provide electricity consumers a high-level overview of regional transmission and regional planning, and an understanding of the economic value these functions bring.

This initial planning report was followed in June 2005 with MTEP 05. MTEP 05 was the first plan in which the Midwest ISO was in a position to provide comprehensive independent analyses of system reliability needs. This is a critical part of the planning process for the Midwest ISO.

As a Regional Transmission Organization (RTO) as well as a Planning Authority under the NERC functional model, one of the Midwest ISO's obligations is to independently verify that the Transmission System is being planned efficiently to meet reliability needs. MTEP 05 developed a process to inform the Midwest ISO of transmission owners' plans to meet their local load serving obligations reliably. MTEP 05 also developed a process to test those plans to ensure they are sufficient to address applicable reliability standards.

Early in 2006, the Midwest ISO Board of Directors enumerated five planning principles to guide the Midwest ISO regional plan:

1. Make the benefits of a competitive energy market available to customers by providing access to the lowest possible electric energy costs,
2. Provide a transmission infrastructure that safeguards local and regional reliability,
3. Support state and federal renewable energy objectives by planning for access to all such resources (e.g., wind, biomass, demand-side management),
4. Create a mechanism to ensure investment implementation occurs in a timely manner, and
5. Develop a transmission system scenario model and make it available to state and federal energy policy makers to provide context and inform the choices they face.

MTEP 06 is the next step toward implementation of these principles.

MTEP 06 Scope and Process

A scope of analysis for MTEP 06, consistent with the Board's Planning Principles, was developed by the Midwest ISO staff in late 2005 with input from a working group of the Midwest ISO Advisory Committee. The process was also heavily influenced by the requirements of the new regional transmission cost sharing tariff approved by FERC in February 2006. This cost-sharing tariff is the result of the RECB I stakeholder process.

The scope of analysis called for the following elements to be addressed:

- ❑ Initial Identification of Reliability Needs
- ❑ Optimization of Reliability Solutions
- ❑ Identification of Opportunities for More Efficient Dispatch
- ❑ Identification of Commercially Beneficial Regional Expansions
- ❑ Expectations of FTR Coverage Under the Proposed Regional Plan

MTEP 06 addresses each of these elements to varying degrees. Progress on each of these aspects is addressed in the body of the report. As the MTEP process is a dynamic process in which expansion needs are continually identified, the Midwest ISO will continue to move forward with implementation of these elements and of the Board's Planning Principles.

Multi-Phased Testing

New to MTEP 06 is the implementation of regional cost allocation for certain transmission expansions identified within the plan. Appendix A identifies expansion projects that are recommended by the Midwest ISO for implementation under the terms of the Transmission Owners' Agreement (TOA). It also contains the associated cost allocation for each project⁴. To be able to properly categorize expansion projects consistent with the new cost-sharing tariff, the Midwest ISO must review each of the projects submitted by the Transmission Owners to independently verify that the projects are needed and to determine whether they qualify for regional cost sharing.

This independent validation process involves several iterations or phases of reliability testing. Phase I is a test of the plan year (2011) without any of the projects included in the simulation models. This identifies system reliability issues that must be resolved. Phase II of the validation process then matches projects that resolve the identified needs. The system is then re-tested with these potential solutions in place. If there are any further unresolved issues, additional expansion projects are identified through discussions with the transmission owners. The final proposed system is tested again against the most likely contingent conditions such as a forced outage of a generation or transmission asset. This process yields an independently validated expansion plan that meets NERC reliability standards.

⁴ MTEP 06 entails a two-part approval process. The plan was approved by the Midwest ISO Board of Directors in February 2007 for expansions required to meet system needs. The staff will evaluate these needed projects for their eligibility for cost sharing and cost allocation and vet these findings during a 90 day period following Board Approval of the projects. The Staff will seek Board approval of the cost allocations a subsequent Board meeting.

Optimization and the Reliability Dispatch

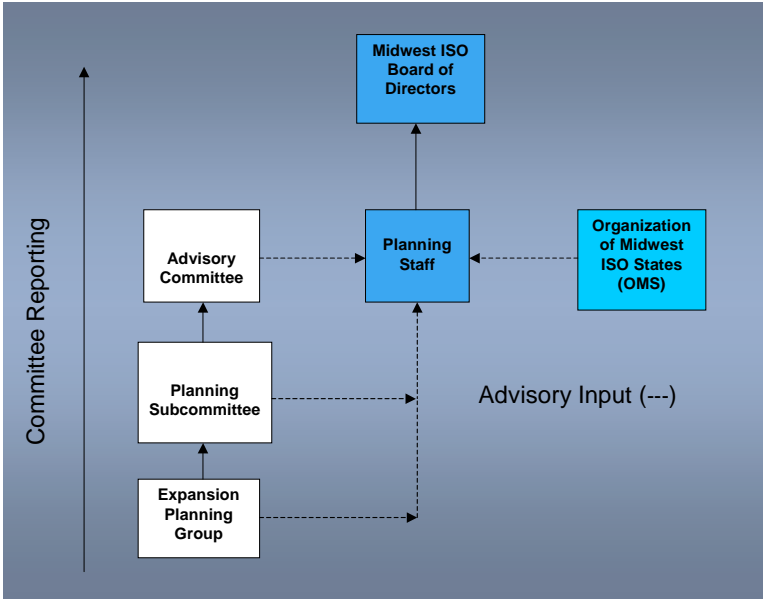
The purpose of reliability testing is to ensure sufficient transmission capacity to serve the expected load under the highest demand conditions. Thus most reliability testing is of a peak load power flow model that has a specified generation dispatch. The dispatch the Midwest ISO applies to establish Baseline Reliability Projects is referred to as a “contractual” dispatch and is representative of an economic dispatch of each load-serving entity’s (LSE) owned and firm contractual resources.

This dispatch is based on the dispatch reflected by LSEs in developing the NERC planning models. This is not the most efficient dispatch that might be desirable under market operations; however, it provides the basis for expansions necessary to allow each LSE to reliably and efficiently deliver its own resources to its load as required under its tariff. It is also a dispatch that is expected to best ensure the simultaneous feasibility of Financial Transmission Rights (FTRs) nominated by market participants as a means of providing congestion hedges against delivery of their most economic resources.

Because it is not the most efficient dispatch that might be desirable under market conditions, an unconstrained “contractual” dispatch would require additional upgrades beyond those necessary under market operations. Therefore, the value of these upgrades in reducing customer costs needs to be evaluated against their costs in the market efficiency planning process. The Midwest ISO is beginning to address these market efficiency issues as described further below.

Stakeholder Review

As with all MTEP efforts, this plan was developed and discussed with numerous Midwest ISO stakeholder committees. There are several stages of stakeholder review of the plan which are intended to provide input to Midwest ISO staff as to the accuracy of the results of analyses in the plan. The stakeholder review process also provides opportunity to comment on the conclusions drawn from those analyses.

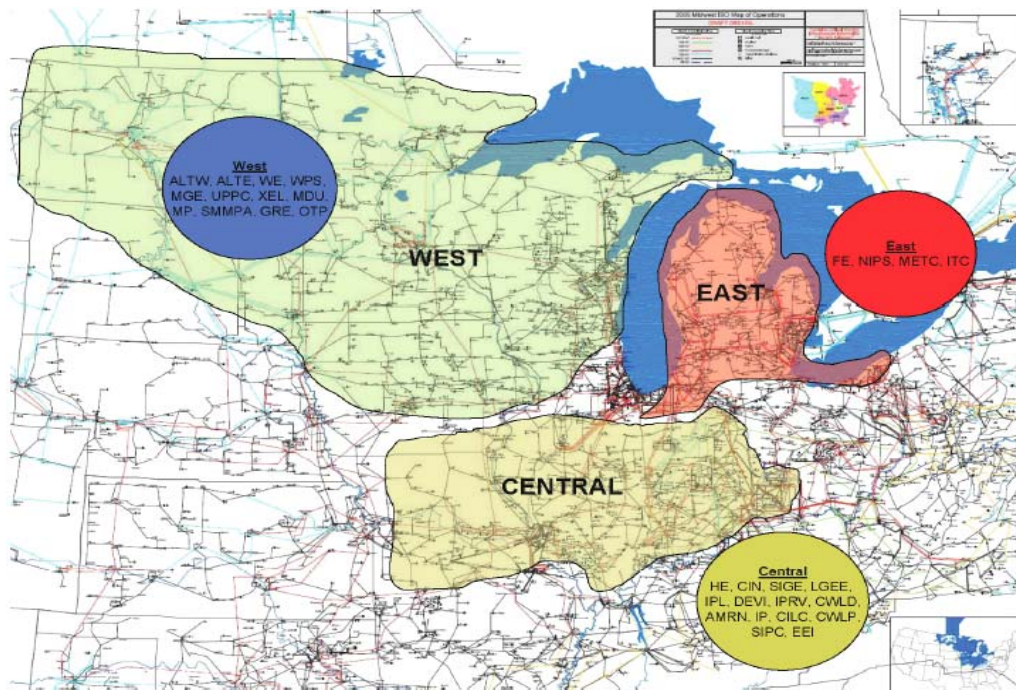


PLANNED AND PROPOSED EXPANSION THROUGH 2011

All Projects

MTEP 06 enumerates 416 planned or proposed projects representing an investment of \$3.6 billion through 2011. 273 of these are listed in Appendix A and are recommended by the Midwest ISO as projects that should be implemented to meet identified system needs. Of these, 226 are new projects, recommended for the first time in MTEP 06. These recommendations for implementation either address a newly identified system need within the 2011 timeframe, or have been identified since the prior MTEP (MTEP 05) as an appropriate solution to a previously identified need.

The Midwest ISO pricing zones have been divided into three planning regions; West, Central, and East. MTEP 06 includes 54 newly-recommended projects in the West region, 60 new projects in the Central region, and 112 in the East region of the Midwest ISO.



Major Recommended Improvements to the Bulk Power System

MTEP 06 includes Appendix A, which lists all projects that are recommended by the Midwest ISO to meet system needs⁵. Projects with installed costs of \$5 million or more (or equal to or greater than 5% of the net transmission plant investment for revenue requirements of the zone of construction), and that are driven by NERC or Regional reliability criteria are eligible for regional cost sharing under the Midwest ISO tariff.⁶

⁵ Full report available at <http://www.midwestmarket.org/page/Expansion+Planning>

⁶ As of the February 2006 acceptance by FERC of revisions to the Midwest ISO tariff.

Some projects recommended for completion and included in Appendix A are below the cost threshold for regional cost sharing, but are driven by local area planning criteria. They may also be driven by Generator Interconnections completed prior to February 5, 2006, or by Transmission Service Requests. Although these projects are not eligible for cost sharing, MTEP 06 recommends their implementation, and that costs should be recovered by the Transmission Owner within the associated pricing zone.

Several new projects receive their first recommendation for completion in MTEP 06. The table below lists several projects that provide significant improvements to the bulk power system by providing upgrades at the 345 kV level or above, by providing new base-load or renewable generation sources, or by addressing reliability issues for which there have been related market inefficiencies in the form of binding constraints or Transmission Line-Loading Relief (TLRs).

These 30 key projects represent about \$880 million of new investment. This list is not exhaustive, but is included to provide a representative sampling of the more than 400 expansion projects in development across the Midwest ISO region.

Of these significant expansion projects, 15 are in the West region, five are in the Central region, and eight are in the East region.

Baseline Reliability Projects Eligible for Cost Sharing as of 2/2/2007

Proj. ID	TO	Project Description	Expected Service Date	Estimated Cost	Project Voltage
692	ITC	Bismarck-Troy 345 kV line 15 miles underground cable and Troy 345/120 kV transformer (MI)	May-08	\$ 150,000,000	345
345	ATC LLC	Morgan - Werner West 345 kV line and Clintonville-Werner West 138 kV line	Dec-09	139,778,849	345
352	ATC LCC	Cranberry-Conover 115 kV line 14 miles and Conover-Plains conversion to 138 kV 73 miles (WI)	Dec-09	117,800,000	138
907	ITC	Goodison 345/120 kV Station, Belle River-Goodinson 345 kV line, Pontiac-Goodinson 345 kV line and 120 kV line terminations (MI)	May-08	50,000,000	345
279	XEL, OTP, MP, MPC	Boswell - Wilton 230 kV Line - new 70 mile line (MN)	July-10	35,963,293	230
586	ITC	Stephens - Erin 120 kV line #3 - new underground line (MI)	Dec-07	34,000,000	120
91	CIN	Hillcrest 345/138 substation and new Eastwood to Hillcrest 138 kV line 8 miles (OH)	Jun-08	17,508,284	138
910	ITC	Coventry 230 kV Tr. and lines	Dec-07	25,600,000	230
686	ITC	Majestic 345/120 kV switching station (MI)	Dec-07	13,000,000	120
988	METC	Simpson-Batavia 138 kV new line 30 miles (MI)	Jun-11	13,000,000	138
660	METC	Keystone - Clearwater 138 kV line - rebuild 23 miles (MI)	May-09	10,200,000	138
911	ITC	Placid 345/120 transformer #2 addition (MI)	May-07	10,000,000	120
1453	ATC LLC	St. Lawrence-Pleasant Valley-Saukville 138 kV line reconductor 19 miles (WI)	Jun-08	9,600,000	138
890	FE	North Medina 345/138 kV substation at the junction of the Star-Carlisle 345 kV and Star-West Akron 138 kV lines	Jun-08	8,540,000	138
1416	METC	Tittabawassee-Hemlock Semiconductor 138 kV line reconductor 19 miles (WI)	Jun-08	7,200,000	138
481	METC	Tallmadge 345/138 kV TB3 transformer #3 (MI)	May-07	6,000,000	138
1326	FE	Harding and Juniper 345 kV capacitor banks (OH)	Jun-09	5,454,346	345
728	AmerenIP	Wood- River-Roxford 1502 138 kV line upgrade (IL)	Jun-08	5,264,900	138
1287	ALTW	Salem 345/161 kV transformer replacement with 448 MVA unit (IA)	Jun-08	5,000,000	161
1288	ALTW	Hazleton 345/161 kV transformer #1 replacement with 335 MVA unit (IA)	Jun-09	5,000,000	161

Generator Interconnection Projects Eligible for Cost Sharing as of 2/2/2007

Proj. ID	TO at POI	Project Description	Requested Service Date	Estimated Cost
1366	XEL	G405, Colvill Generating station (MN)	May-08	\$ 13,578,380
1459	GRE	G351, G352; Dakota County	Jan-09	8,385,288
1462	OTP, GRE	G380, Rugby	Sept-07	513,122
1465	METC	G418, Oceana	Oct-07	3,947,619
1470	ATC LLC	G483, Green County	Nov-06	7,413,112
1471	GRE	G518, Jackson County	May-07	125,000
1472	GRE	G536, Jackson County	May-07	125,000
1457	NSP	G287, Nobles County	Dec-10	37,635,000
1458	NSP	G349, Brookings County	Dec-11	29,780,000
1456	NSP	G255, Yankee	Nov-07	2,826,000

SYSTEM PERFORMANCE WITH PLANNED AND PROPOSED PROJECTS

Reliability

An integral part of the MTEP 06 analyses was the testing of the system with all planned and proposed projects in place for compliance with reliability standards. This was referred to as the “Phase 3” model testing. This testing demonstrated that if all Planned and Proposed projects listed in Appendices A and B are implemented prior to 2012, the system will perform within NERC reliability standards, with the following exceptions.

There were some remaining low voltage conditions on the 161 kV system identified by the Midwest ISO for the Southern Illinois Power Cooperative (SIPC) system in the Central region. Similarly, in the East region there were some relatively minor low voltage conditions identified on the 138 kV systems on the First Energy, Michigan Electric Transmission Company (METC), and Wolverine Power systems. These issues are not expected to be a concern in the immediate future and will be monitored for solutions. In some cases, issues have been identified involving multiple element failure events in which some load could be at risk (but only to the extent permitted by reliability standards.) These conditions have been documented within the report and will continue to be evaluated. Ultimately, either expansion solutions or operating steps will be developed to maintain reliability.

Market Efficiency

The energy market planning analysis portions of the MTEP 06 study evaluated the market performance of the 2011 baseline reliability plan by examining constraints to cost effective delivery of energy to the market. The exploratory portion of the energy market planning analysis also considered state policy objectives, delivery of large blocks of future generation from the generation interconnection queue by integrating the past exploratory studies with studies of our members, and refining the plans using energy market economic analysis. In addition to identifying constraints to efficient delivery of resources to the market, the intent of energy market analysis is to identify transmission solutions (“Regionally Beneficial Projects”) for further analysis, development, and potential inclusion in future MTEPs.

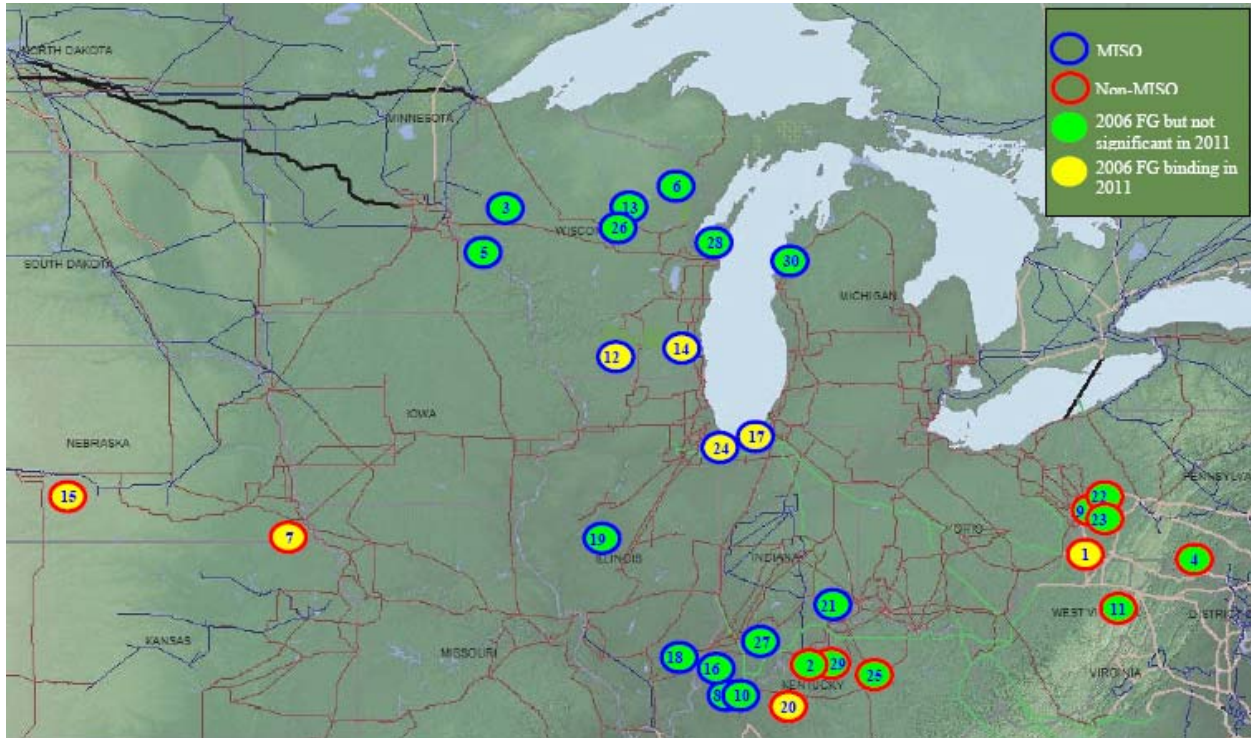
The top 30 binding constraints occurring in market operations during 2006 were reviewed and compared to a 2011 market simulation. This analysis showed that 22 of the 30 most binding constraints were not expected to be significant constraints in the 2011 model due to previously identified expansions to be developed between 2006 and 2011.

***22 of Top 30 2005/06 Real Time Binding Historical Constraints
NOT shown as Significant in 2011 based on PROMOD Simulations***

ID	Binding Constraint	2005/06 Hours Binding	Related Upgrades/Comments
2	Frankfort East-Tyrone 138 (flo) Ghent-West Lexington 345 (LGEE)	1130	Planned: West Frankfort and Tyrone 138 kV (Proj ID 969)
3	Eau Claire-Arpin 345 KV (Xcel/ATCo)	1107	Planned: Arrowhead-Gardner Park 345 kV (Proj ID 1)
4	Bedington-Black Oak 500 kV (flo) Pruntytown-Mt. Storm 500 kV (PJM)	914	PJM constraint. A merchant transmission solution to increase the thermal limit and reduce congestion significantly.
5	MWSI (Xcel/ATCo)	661	Planned: Arrowhead-Gardner Park 345 kV (Proj ID 1)
6	Flow South (ATCo)	646	Planned: Werner West to Morgan 345 kV (Proj ID 1) and a few other Flow South related upgrades
8	Culley – Grandview 138 kV (flo) AB Brown - Henderson 138 kV (Vectren)	586	Proposed: New 345 kV transmission line Duff-Culley-Smith (Proj 1007)
9	Wylie Ridge tf #7 (flo) Wylie Ridge tf #5 (PJM)	573	PJM constraint. A third transformer planned for 2007 is expected to address congestion.
10	Culley – Grandview 138 kV (flo) Henderson 161/138 kV (Vectren)	539	Proposed: New 345 kV transmission line Duff-Culley-Smith (Proj 1007)
11	Pruntytown-Mt. Storm 500 kV (flo) Bedington-Black Oak 500 kV (PJM)	468	PJM constraint. Upgrades in the area expected to reduce congestion significantly.
13	Kelly - Whitcomb 115kV (flo) North Appleton - Rocky Run 345kV (ATCo)	264	Planned: Kelly-Whitcomb 115 kV uprate (Proj ID 101) and Arrowhead-Gardner Park 345 kV (Proj ID 1)
16	A. B. Brown-Henderson 138 flo Culley-Grandview 138 (Vectren)	197	Now In Service: A B Brown - Henderson 138 and A B Brown - Northwest 138 #2 (Proj 180)
18	Albion-Crossville 138 (flo) Mt. Vernon-E. W. Frankfort 345 kV (Ameren)	191	No direct upgrades. 2011 PROMOD simulations do not show this to be a significant binding constraint. Being reviewed further.
19	Havana - Mason City 138 kV (flo) Havana-Monmouth 138 (Ameren)	183	Same as above
21	Miami Fort 345/138 Xfm flo East Bend-Terminal 345 (DEM)	163	Now in Service: Miami Fort-345/138 ckt 2 (Proj 202)
22	Wylie Ridge tf #7 (flo) Belmont to Harrison 500 kV (PJM)	163	PJM constraint. A third transformer planned for 2007 is expected to address congestion.
23	Wylie Ridge tf #7 (flo) Belmont to Harrison 500 kV (PJM)	161	PJM constraint. A third transformer planned for 2007 is expected to address congestion.
25	Avon 345/138 transformer (EKPC)	147	Non-MISO constraint. 2011 PROMOD simulations do not show this to be a significant binding constraint. Being reviewed.
26	Weston 345/115kV transformer for loss of Weston #3 Unit (ATCo)	147	Planned: Two new transformers at Gardner Park 345/115 kV
27	Newtonville 161/138 (flo) Newtonville – Cloverport 138 kV (Vectren)	141	Now in Service: Install Newtonville 161/138 tf # 2 (Proj 182)
28	Highway V - Preble 138 (flo) Lost Dauphin - Red Maple 138 (ATCo)	131	Planned: Werner West to Morgan 345 kV (Proj ID 345)
29	Frankfort East-Tyrone 138 flo Ghent-West Lexington 345 (LGEE)	121	Planned: West Frankfort and Tyrone 138 kV (Proj ID 969)
30	Tippy - Holdenpyl 138kV (flo) Kestone – Ludington 345 kV(METC)	120	Now in Service: MTEP05- Tippy - Holdenpyl 138kV line rebuild (Proj ID 121)

The picture below shows all 30 historically most binding constraints, indicates which are within the Midwest ISO and which are external, and whether solutions to each constraint have been identified. Of the eight constraints projected to persist into 2011, four are Midwest ISO flowgates. The Midwest ISO is aware of several possible upgrades that would resolve some of these constraints. The Midwest ISO's MTEP economic planning process will continue to work toward solutions to these constraints, both internally and through seams agreements with adjacent systems.

Top 15 2006 Real Time Binding Constraints Expected in 2011



FTR Coverage

Market participants wanted MTEP 06 to provide a view of the degree of FTR coverage afforded by the expansion plan as compared to current allocations, or for potential future nominations. The Midwest ISO has been mapping the 2011 planned system topology to the FTR allocation software application in an effort to provide this information. While the data was not available for inclusion in this MTEP 06 report, it will be presented to stakeholders when it is available.

DEVELOPING EXPANSION PROJECTS

The Midwest ISO will be using the analysis of binding constraints as one means to identify additional high-value constraint relief expansions. Full development of economic projects with regional cost sharing will require completion, with stakeholder input, of the “futures” planning process. This process is required to provide robust justifications for these and other regionally beneficial projects, and to identify the beneficiaries of these improvements. It will also require FERC approval of the November 1, 2006 cost sharing tariff revisions.

Notwithstanding these developing process and tariff issues, the Midwest ISO and its Transmission Owners have been working to develop a range of significant expansions. Although these projects are not yet ready to be recommended for Board approval, they will be brought before the Board when sufficiently justified.

Specific system areas where expansion planning work continues toward the development of either reliability or economic expansions include:

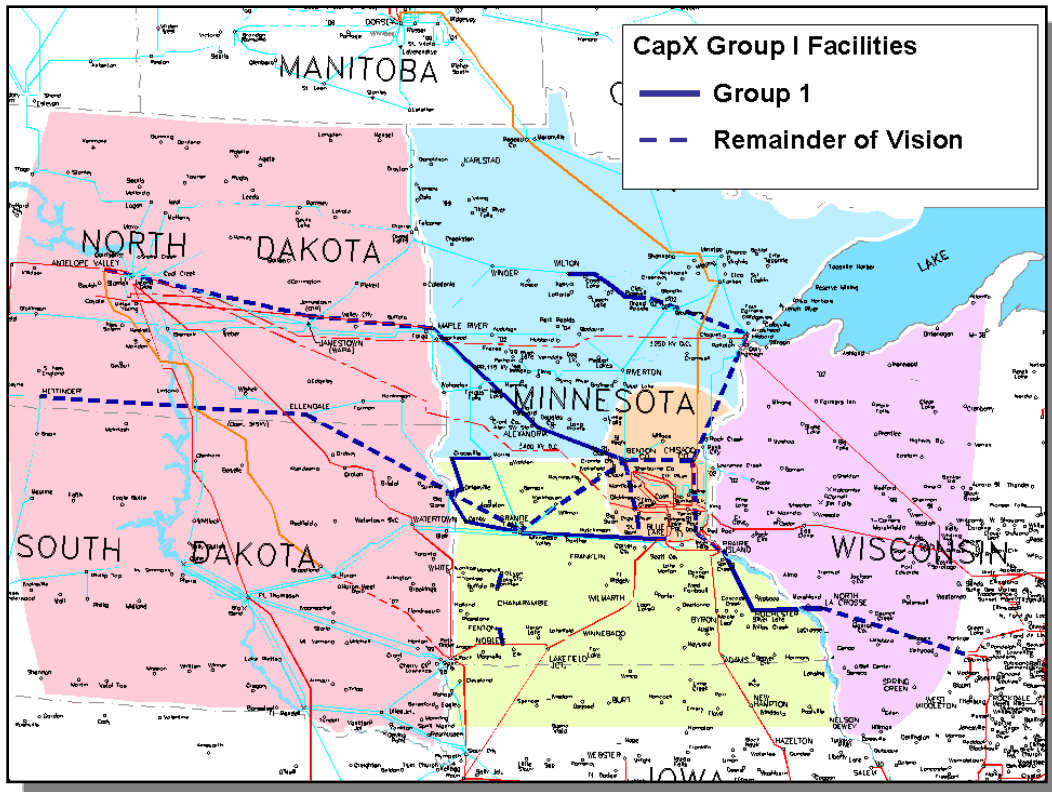
The CAPX Expansion Projects in Minnesota and the Dakotas

The CAPX group consists of a number of transmission owners in the upper Midwest that have been developing a comprehensive plan to meet load serving needs through the 2020 timeframe. The participating utilities are:

- ❑ Dairyland Power Cooperative
- ❑ Great River Energy
- ❑ Midwest Municipal Transmission Group
- ❑ Minnesota Power
- ❑ Minnkota Power Cooperative
- ❑ Missouri River Energy Services
- ❑ Otter Tail Power Company
- ❑ Rochester Public Utilities
- ❑ Southern Minnesota Municipal Power Agency
- ❑ Wisconsin Public Power Incorporated
- ❑ Xcel Energy
- ❑ Basin Electric Power Cooperative

The CAPX proposed expansions involve three groups of projects, with the Group 1 projects expected to be needed in 2011 and 2012. These projects include four new transmission lines:

- ❑ SE Twin Cities-Rochester-LaCrosse WI / 345kV
- ❑ Bemidji-Grand Rapids / 230 kV
- ❑ Fargo-St. Cloud/Monticello area / 345 kV
- ❑ Brookings, S.D.-SE Twin Cities / 345 kV



The Bemidji-Grand Rapids / 230 kV project (between the Boswell and Wiltont substations) is Project 279 on the current MTEP 06 recommended project list. The Midwest ISO has worked closely with the CAPX group during the development of these plans, both to meet the longer term load serving needs of the area and to coordinate these plans with other expansion concepts underway in Iowa and Wisconsin. The Midwest ISO expects to complete its review of these plans in coordination with the CAPX group and include them in the regional MTEP with appropriate categorization during 2007.

Eastern Iowa Area Upgrades

The Midwest ISO has identified a number of expansion projects needed to address reliability issues in the eastern Iowa system. Six projects totaling about \$28 million are recommended in MTEP 06 for completion between 2006 and 2011. These projects address a number of single and multiple contingency system reliability problems projected for the area. They also address a historically chronically-constrained area that has resulted in a high number of pre-market TLR events and post-market binding constraint hours.

The Midwest ISO's initial analysis has also identified an additional project of significance for the area. The Salem – Hazelton 345 kV transmission line may have considerable value in addressing reliability issues in the area while simultaneously providing significant economic value to market participants. This project would support the local load service in the area and would provide a bulk power path around the low voltage facilities in this area for regional bulk power transfers. The Midwest ISO is working with area Transmission Owners to fully justify this major expansion.

ATC Access Initiative

American Transmission Company, LLC (ATC) began an Access Initiative in 2004 to determine the potential value of expanding the transmission system to provide ATC's customers with:

1. Greater access to low-cost energy outside of its service territory, and
2. Improved ability to transfer energy within ATC's transmission system where it is needed to serve retail customers.

The Access Initiative projects also may provide significant benefits that are not easily quantifiable, such as locational marginal price (LMP) comparability, enhanced backbone infrastructure, local economic development, improved access to renewable resources, benefits to neighboring systems, and increased operating flexibility. Further, the Access Initiative projects have the potential to help dismiss the Wisconsin Upper Michigan System (WUMS) and Northern WUMS areas as Narrow Constrained Areas as defined by the Midwest ISO's Independent Market Monitor (IMM).

The Midwest ISO is working with ATC to coordinate the development of these expansions.

Michigan and East Region Expansions

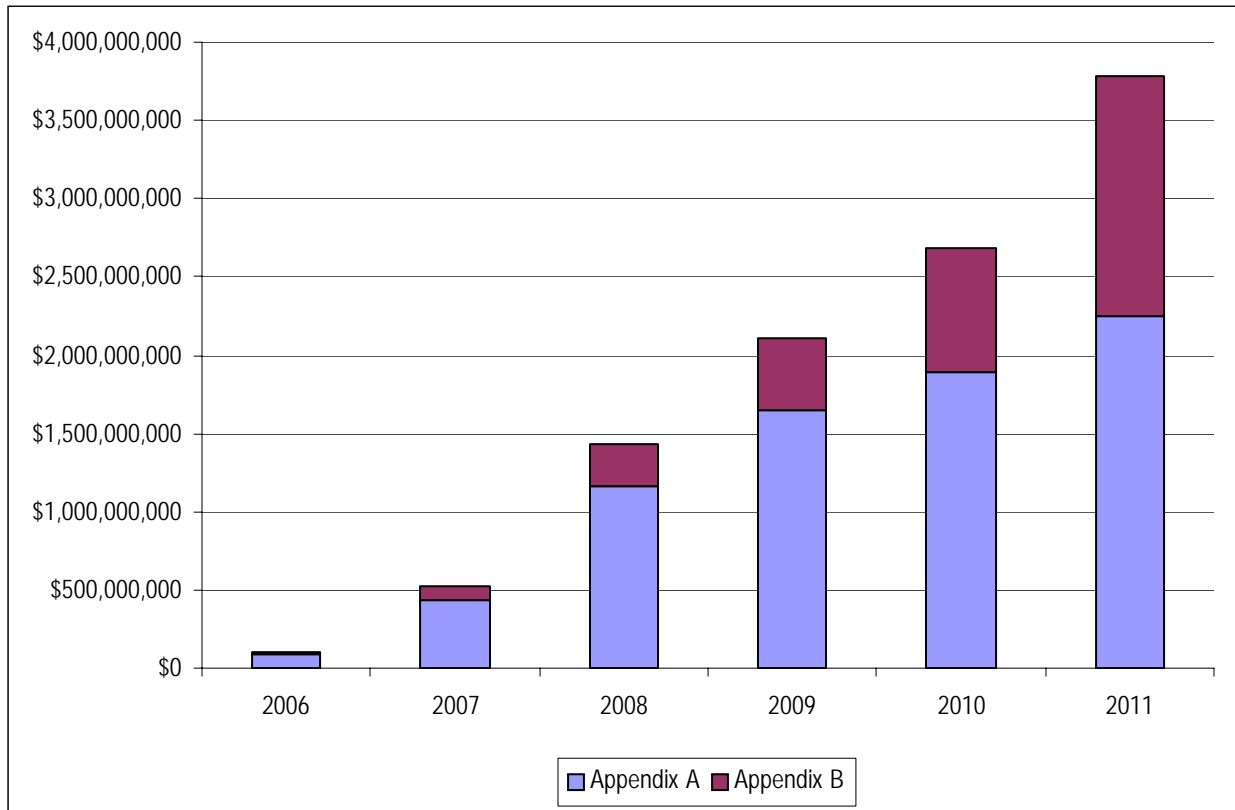
Michigan loads are expected to lack sufficient import capability as early as 2009. The Midwest ISO has worked with the Michigan PSC in the state's Capacity Needs Forum to evaluate resource capacity needs for both the near and longer terms, including possible transmission alternatives. There are several proposed expansions for the near term to address the expected import deficiencies, and Section 7 of MTEP 06 discusses some options for major transmission expansion in the area that are being considered as long term solutions to address reliability needs. In addition, these projects could provide economic value to customers. Such long-term plans would potentially form part of a longer-term "vision" for a 765 kV backbone overlay grid covering much of the Midwest ISO. Exploratory work on this Vision Concept is also described in Section 7 of the full MTEP 06 report.

Total Expected Investment Through 2011

The total estimated direct cost of the Planned and Proposed facilities plus the facilities is \$3.6 billion for the six-year period of 2006 to 2011. This is substantially above the \$2.9 billion that was estimated for the five-year period 2005-2009 in MTEP 05. Of these projects, approximately \$2.1 billion are considered Planned in Appendix A. \$1.5 billion in projects are considered Proposed and will continue to be reviewed.

The cumulative expected spend over the 2006-2011 period is shown below.

Cumulative Projected Spending All Projects



About 2,200 miles of transmission line upgrades are projected through 2011. This represents about 4% of the approximately 53,000 miles of existing higher voltage transmission lines throughout the Midwest ISO area. About 4% of the recommended line upgrades, however, involve lines on new transmission corridors. About 60% of the expected total transmission line and substation enhancements are at 230 kV and above.

Implementation and Follow-Up

The Midwest ISO monitors progress on all projects identified in MTEP, and reports quarterly to its Board of Directors on progress. As major projects move from conceptual to proposed to planned or recommended status, the Midwest ISO will bring these projects before the Board at regularly scheduled Board meetings to include these projects in the regional plan.

The MTEP is subject to change as system conditions change. Changes in load growth, changes in usage patterns, development of new generation interconnections, changes in projected service dates of interconnection plans, delays in regulatory approvals of transmission projects, or ongoing development of preferred plans or other factors could cause changes to the overall Midwest ISO plan. The MTEP will be updated as needed to incorporate the impacts of such changes on the overall regional plan.

Content provided in this publication is designed for informational purposes only.

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