



# 10-Year Assessment

An annual report summarizing proposed additions and expansions to the transmission system to ensure electric system reliability.

# 2010

September 2010 10-Year Assessment  
[www.atc10yearplan.com](http://www.atc10yearplan.com)

## Regional planning

ATC is involved in various regional planning efforts that address regional, inter-regional and Eastern Interconnection-wide needs that could impact our transmission system. There continues to be proposed legislation at the national level that call for significant changes such as enhanced renewable portfolio standards and green-house gas emission reductions. While Wisconsin's Clean Energy Jobs Act was not passed into law in 2010, ATC continues to undertake internal analyses and participate in regional studies to anticipate future demands on the transmission system from enhanced renewable standards and to identify facilities that will potentially be required.

### ❑ MISO Regional Generation Outlet Study (RGOS)

The Midwest ISO (MISO) initiated the RGOS Phase I as a targeted planning study. The study was completed in 2009 and a report was issued in 2010. The report identified both 345 kV solutions, 765 kV solutions and combination solutions to facilitate the delivery of 28-34 GWs of wind based on the Renewable Portfolio Standard (RPS) requirements in four states - Illinois, Iowa, Minnesota and Wisconsin. RGOS Phase I also continues to support the Upper Midwest Transmission Development Initiative (UMTDI). UMTDI is a collaborative effort by Wisconsin, Minnesota, Iowa, South Dakota and North Dakota to develop a transmission plan and a corresponding cost sharing methodology, particularly for facilities needed to satisfy the states' RPS. ATC's understanding is that the UMTDI cost sharing approach will depend on the filing that was made by MISO in July 2010.

In May of 2009, the Midwest ISO kicked-off RGOS Phase II, which continues to work to identify the transmission alternatives needed to implement new or expanded renewable portfolio standards and other renewable goals not necessarily addressed in the RGOS Phase I study, such as RPSs in Michigan and Ohio.

RGOS Phase II is considering the wind generation required to satisfy state RPSs and goals beyond those focused on in Phase I. The study is examining three main scenarios with varying locations of wind generation in the Midwest ISO footprint. The wind MISO is including in the study is approximately 40 GWs.

The wind zones being modeled are shown below in Figure RP-1.

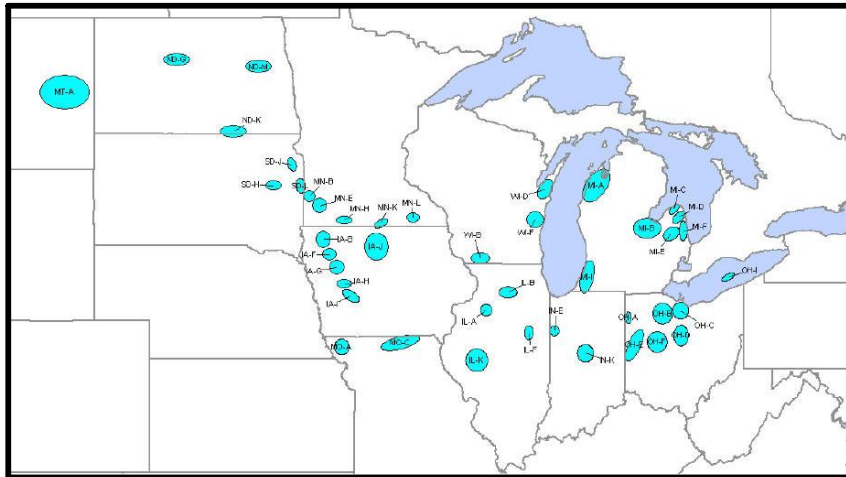
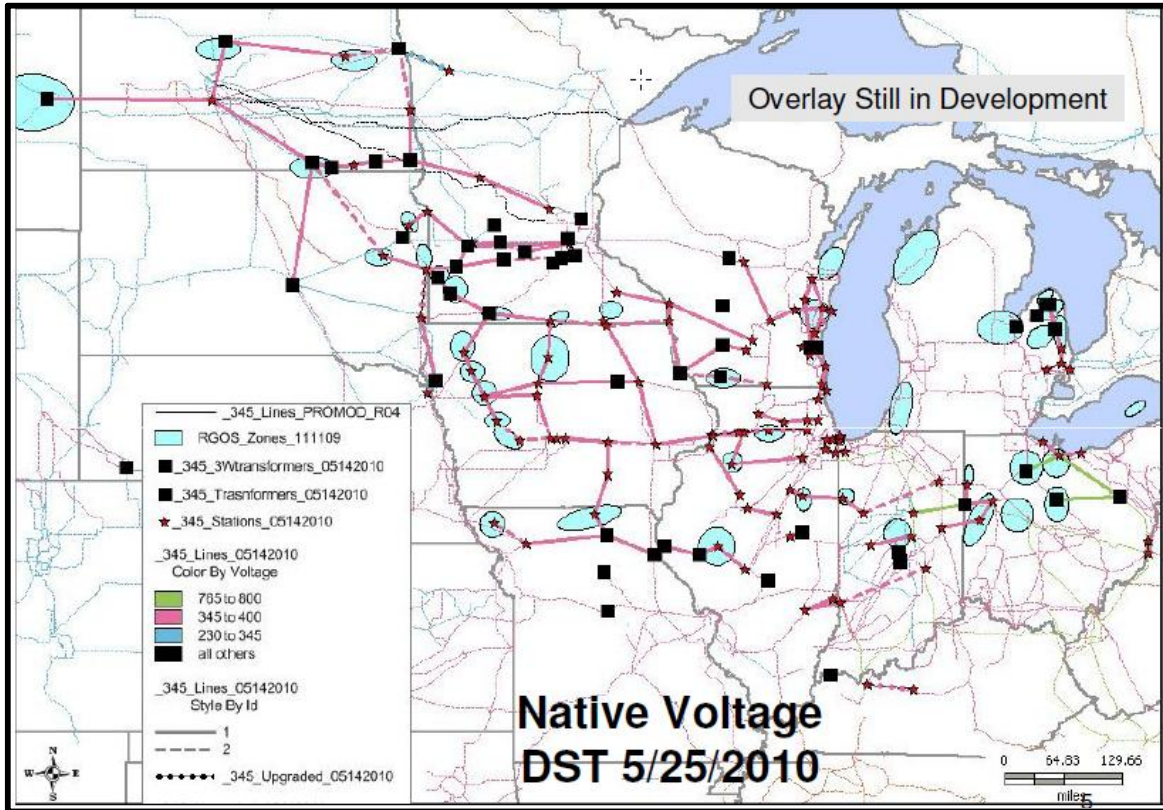


Figure RP-1  
 RGOS Phase II Wind Zones

Thus far, wind zones have been finalized for Phase II of RGOS and in July 2009 a workshop was held to design indicative transmission plans for the three scenarios. Phase II of the RGOS study is expected to be completed by first quarter of 2010.

MISO has developed three transmission designs to move the wind. One is a 345 kV design which is entirely Alternating Current. One is a 765 kV design which is also entirely AC and the third is a 345 kV design which combines Alternating Current lines with High Voltage Direct Current (HVDC) lines. Each of the designs has been evaluated for their ability to provide the wind generations while maintaining system reliability. They are also being evaluated economically to determine which design will provide the most cost efficient dispatch of resources across MISO's footprint. The different designs, along with the cost of the transmission, are shown below.

Below in Figure RP-2 is the 345-kV design without High Voltage Direct Current Lines. It is known as the “Native Voltage” solution. Its estimated cost is \$14.9 billion.



*Figure RP-2*  
 345-kV (“Native Voltage”) design without HVDC lines



Figure RP-3 shows the 345-kV design with the HVDC lines. Its estimated cost is \$19.9 billion.

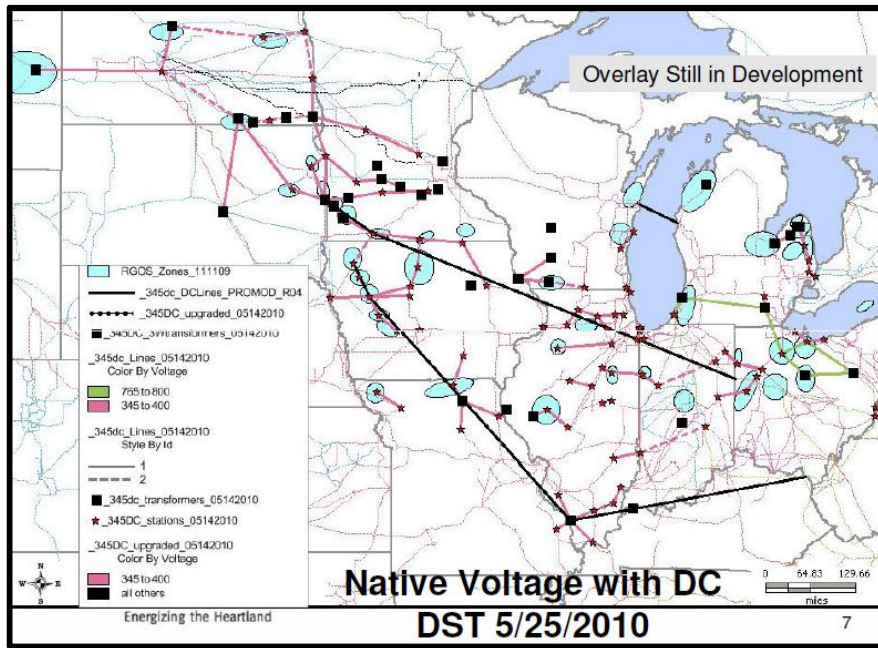


Figure RP-3  
 345-kV design with HVDC lines

Lastly, Figure RP-4 shows the 765-kV transmission overlay. Its estimated cost is \$18.8 billion.

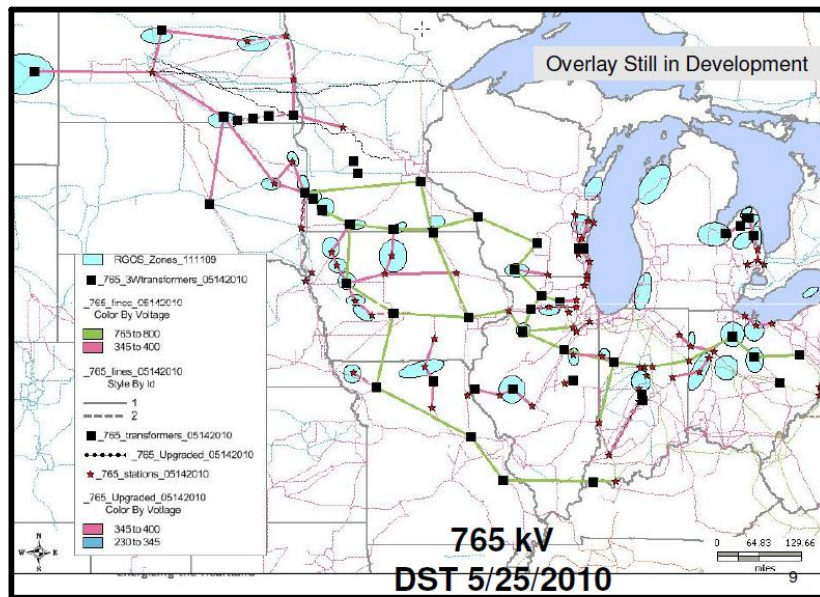


Figure RP-4  
 765-kV transmission overlay



# 10-Year Assessment

An annual report summarizing proposed additions and expansions to the transmission system to ensure electric system reliability.

# 2010

September 2010 10-Year Assessment  
[www.atc10yearplan.com](http://www.atc10yearplan.com)

The Midwest ISO issued a draft Executive Summary identifying a “Starter Set” of projects including a 345-V line from La Crosse – Madison and a 345-kV line from Dubuque-Spring Green-Madison. These projects are being considered for eligibility as Multi-Value Projects under the cost allocation proposal filed by MISO in July 2010. If the projects are designated as Multi-Value Projects, the cost of the projects will be shared across the MISO footprint.

- ❑ **Midwest ISO Market Constraints** – There are three Narrow Constrained Areas (NCAs) identified in the Midwest ISO footprint and two of them are associated with ATC. An NCA is defined as “An electrical area that has been identified by the Independent Market Monitor (IMM) that is defined by one or more Binding Transmission Constraints that are expected to be binding for at least five hundred (500) hours during a given year within which one or more suppliers are pivotal.”<sup>1</sup>. The two NCAs associated with ATC are Wisconsin and Upper Michigan System (WUMS) and Northern WUMS.

During the Midwest ISO’s 2008 transmission expansion planning process, a targeted study was performed to determine if NCAs are mitigated by existing plans. Results demonstrated that the two NCAs associated with ATC’s footprint are mitigated by the existing transmission plans already approved by the MISO Board of Directors to be included in Appendix A of the MISO Transmission Expansion Plan (MTEP). ATC expects that the Paddock-Rockdale line, placed in service in 2010, will aid significantly in reducing congestion and will help eliminate the NCA designations in the ATC footprint. The Technical Review Group for this targeted study recommended that these findings should be forwarded to the Independent Market Monitor. After the identified upgrades are constructed, a formal request to remove the NCAs will be made to the Independent Market Monitor.

- ❑ **Generation Deliverability** – MISO uses an aggregate “deliverability” test, which, rather than studying a specific generator-to-load path, requires showing that the output of a resource is deliverable to the “aggregate” MISO energy pool without overloading the transmission system. If the resource passes the deliverability test, it is able to be designated as a Network Resource by a load serving entity with the Midwest ISO. This deliverability analysis is performed as part of the generator-transmission interconnection process.

- ❑ **Midwest ISO Planning Process**

The MTEP process has adopted an approach that investigates transmission expansions for the long term, short term and for targeted issues/needs. The Midwest ISO footprint is divided into three sub-regions for planning purposes: western, central and eastern. The ATC footprint falls within the western sub-region. The long-term studies are primarily value-based economic studies looking into the ten- to twenty-year horizon. Conceptual transmission overlays are proposed based on a value/economic view of future years utilizing an array of assumptions. This approach is often considered a “top-down” approach. The short-term planning looks into the five- to ten-year horizon and is thus far primarily driven by Transmission Owners’ reliability needs and compliance with NERC reliability standards. To date, the projects that address short-term reliability needs have been proposed to the Midwest ISO by individual Transmission

---

<sup>1</sup> Excerpt from Midwest ISO Transmission Expansion Plan 2008, Section 8.



# 10-Year Assessment

An annual report summarizing proposed additions and expansions to the transmission system to ensure electric system reliability.

# 2010

September 2010 10-Year Assessment  
[www.atc10yearplan.com](http://www.atc10yearplan.com)

Owners. Need drivers and alternatives are then verified through the MTEP process and studies. This approach is often considered a “bottom-up” approach. The targeted studies investigate specific issues and the time frame can be between long- and short-term. The short-term and targeted studies usually follow a one-year planning cycle. The long-term economic studies thus far follow a two-year planning cycle.

### Midwest ISO Transmission Expansion Plan 2010 (MTEP 2010) reliability studies

The ATC Planning staff participates in the Midwest ISO MTEP 10 bottom-up reliability studies to ensure correct representation of the our projects. These activities include:

- Including ATC project information in the Midwest ISO project database,
- Participating in building/reviewing the MTEP models,
- Correlating the needs identified in the Midwest ISO analyses with the specific ATC projects,
- Reviewing and commenting on MTEP study results to ensure successful inclusion of the ATC projects in MTEP Appendix A in a timely manner,
- Actively participating in the Regional Generator Outlet Study, the Cross Border Top Congested Flowgate study and other targeted studies
- Ensuring the appropriate cost allocation for those ATC projects eligible for regional cost sharing,
- Answering questions related to ATC projects at the western Sub-region Planning Meetings (SPM) and other stakeholder forums, and
- Provide suggestions/comments that help improve the MTEP process.

### MISO Transmission Expansion Plan 2010 (MTEP 10) targeted studies

As we’ve done with the RGOS study, ATC Planning staff has participated in other targeted studies in the MTEP 10 cycle, including but not limited to the Midwest ISO’s top constraints study. This study identifies the top constraints in the MISO footprint based on operational historical information and PROMOD economic analysis. The study also will identify projects or portfolios of projects that relieve the constraints and test if the mitigation plans meet criteria for regional cost sharing.

In addition, ATC participated actively in MISO’s Cross Border Top Congested Flowgate Study which is identifying solutions to market congestion issues occurring south of Lake Michigan but that impact our customers’ ability to export power to the market. Increasing our customers’ ability to increase their exports when their generation is more cost effective than generation elsewhere in MISO saves ratepayers money because the earnings from those sales are returned to our customers’ ratepayers.

### Other Midwest ISO planning activities

Our Planning staff also participates in other Midwest ISO planning activities such as the Planning Sub-committee and Planning Advisory Committee. Our involvement includes taking part in various technical and policy discussions and providing feedback concerning the future direction of MTEP activities. ATC also actively participates in other groups including, but not limited to the Midwest ISO Interconnection Process Task Force and observes closely several generation interconnection System Planning Analysis and Definitive Planning Phase group studies.





❑ **Western Wisconsin Study**

ATC is currently leading a joint study effort investigating the long-term reliability issues and transmission needs in the western Wisconsin area, collaborating with the transmission-owning utilities Xcel Energy, Dairyland Power Cooperative, ITC Midwest, Great River Energy, Southern Minnesota Municipal Power Agency and the Midwest ISO. The western Wisconsin area is often impacted by various through flows, e.g., the west to east flow bias, which can stress the area's transmission network. Increasing wind penetration levels in the west contribute to increased flows (in terms of magnitude and frequency) through the western Wisconsin area in real-time system operations.

This emerging reliability concern can become more significant when additional wind generation comes online in future years in the west. The Minnesota-Wisconsin Export interface is currently limited due to voltage stability and transient voltage recovery constraints. Transmission reinforcement in the study area is likely to have a significant positive impact on this critical interface. Local reliability issues and transmission needs will also be evaluated in an integrated fashion in conjunction with the regional flow bias issues.

This study includes two phases: the initial screening and the detailed analysis. The initial screening evaluated the base case and 15 different transmission options using AC contingency analysis. Options that did not have significant impact on the reliability of the western Wisconsin study area were excluded from further detailed analysis. Of the 15 different transmission options that were initially evaluated, seven provided sufficient impact on the reliable operation of the transmission system in the study cases to warrant further detailed evaluation. These are the seven transmission options evaluated in detail:

- Option 1: North La Crosse – Hilltop – Spring Green – Cardinal 345 kV project
- Option 1a: North La Crosse – Spring Green – Cardinal 345 kV project
- Option 1b: North La Crosse – North Madison – Cardinal 345 kV project
- Option 8: Dubuque – Spring Green – Cardinal 345 kV project
- Option 7c: North La Crosse – North Madison – Cardinal and Dubuque – Spring Green – Cardinal 345 kV project
- Low Voltage Option: a collection of 69 kV, 138 kV and 161 kV facilities
- 765 kV Option: Genoa – North Monroe 765 kV project

Study results and the report are expected to be finalized in the fall 2010.

❑ **Eastern Interconnection Planning Collaborative**

ATC is among the NERC-registered Planning Authorities in the Eastern Interconnection that are in the process of forming the “Eastern Interconnection Planning Collaborative” (EIPC). The EIPC consists of a group of 23 Planning Authorities, working with the Department of Energy, formed to develop conceptual Eastern Interconnection-wide transmission plans. ATC has been an active participant in the EIPC, which has submitted a bid to perform eastern interconnection-wide planning in response to a DOE funding opportunity. The DOE has granted an award for \$16 million to the group to develop transmission expansion options for the Eastern



Interconnection under different scenarios. A Stakeholder Steering Committee with representatives from state regulatory bodies, transmission owners, generation owners (including renewables), end users, demand-side businesses, other suppliers, transmission-dependent utilities, public power entities and non-governmental entities has been established. They have just begun the work of developing eight macro scenarios which will be used to ultimately choose three scenarios for which detailed transmission expansion options will be developed. In addition, the EIPC has been working for several months to combine existing transmission plans in the Eastern Interconnection into a single plan. This involves combining existing plans and determining if there are additional transmission projects that would enhance the performance of the entire Eastern Interconnection transmission grid. This work will be completed in 2010.

ATC has been an active participant in the EIPC and is one of eight sub-awardees of the DOE funding grant.

#### □ **Strategic Midwest Area Renewable Transmission (SMARTransmission) Study**

ATC, along with co-sponsors Electric Transmission America, a transmission joint venture between subsidiaries of American Electric Power (NYSE: AEP) and MidAmerican Energy Holdings Co., Exelon Corp. (NYSE: EXC), NorthWestern Energy (NYSE: NWE), Xcel Energy (NYSE: XEL), and MidAmerican Energy Co., a subsidiary of MidAmerican Energy Holdings Co., have been performing a comprehensive study of the transmission needed in the Upper Midwest to ensure reliability and support renewable energy development for transport to population and electricity load centers. The study is being performed in two phases, a reliability analysis phase and an economic analysis phase

Phase One reliability results of the study recommend three alternatives for further study based on a rigorous reliability assessment and stakeholder input. One alternative is primarily 765-kV extra-high voltage transmission, another includes 765-kV combined with limited use of high-voltage direct current transmission lines, while the third constitutes a combination of both 345-kV and 765-kV transmission lines. The three alternatives will be evaluated further during the second phase of the study, scheduled for completion during the third quarter of 2010. The Phase One report can be downloaded at [www.smartstudy.biz](http://www.smartstudy.biz).

The sponsors retained Quanta Technology LLC to evaluate extra-high voltage transmission alternatives and provide recommendations for new transmission development in the Upper Midwest. In Phase One, Quanta evaluated eight transmission alternatives designed to support the integration of 56,800 megawatts of nameplate wind generation within the study area including North Dakota, South Dakota, Nebraska, Minnesota, Iowa, Missouri, Wisconsin, Illinois, Indiana, Michigan and Ohio. This translates into enough energy to power more than 15 million households. Quanta assessed and compared transmission alternatives including conducting an economic analysis quantifying the impact and economic benefits of several transmission options.





The SMART Study's goal is to develop a 20-year transmission plan that ensures reliable electricity transport, provides an efficient transmission system to integrate new generators and foster efficient markets, minimizes environmental impacts, and supports state and national energy policies. The study will be completed and released in Fall 2010.

❑ **Regional Transmission Assessments**

ATC is a member of two regional reliability organizations, the Midwest Reliability Organization (MRO) and the ReliabilityFirst Corporation (RFC). ATC participates in regional transmission assessments conducted by the MRO Transmission Assessment Subcommittee (TAS), and the RFC Transmission Performance Subcommittee (TPS). ATC also participates in the Coordinated Seasonal Assessments (CSA) conducted by MISO.

❑ **La Crosse-Madison 345-kilovolt line**

Following approximately two years of study and analysis, American Transmission Co. has determined that a 345-kilovolt transmission line from the La Crosse area to the greater Madison area would provide multiple benefits to the state of Wisconsin including improved electric system reliability, economic savings for utilities and energy consumers, and access to additional renewable energy. As it finalizes its evaluation of the multiple benefits of the project, ATC will begin the public outreach efforts on the proposed Badger Coulee Transmission Line and will host a series of open houses this fall with the public and other stakeholders in the 150-mile area from La Crosse to Madison to explore routing options for the new line.

The Badger Coulee Transmission Line will improve electric system reliability in western Wisconsin by providing increased regional electric transfer capability into Wisconsin and alleviating stability issues in the Upper Midwest. ATC's studies also indicate that building a more efficient high-voltage line offsets the need for approximately \$140 million in lower-voltage upgrades in western Wisconsin communities.

The economic benefits of the Badger Coulee Transmission Line include providing utilities with greater access to the wholesale electricity market by reducing energy congestion. A new 345-kV line in western Wisconsin will give utilities greater capability to buy and sell power within the Midwest when it's economic to do so, and those savings can be passed on to electricity consumers. A 345-kV line also delivers electricity more efficiently than lower voltage or heavily loaded transmission lines and reduces line losses in the delivery of power.

ATC's studies further indicate that the Badger Coulee Transmission Line will support the transfer of renewable energy into Wisconsin to help meet public policy goals in Wisconsin and the Midwest region. This is consistent with larger regional studies including the Regional Generator Outlet Study and the SMART *Transmission* Study discussed above.

Announcement of the proposed Badger Coulee Transmission Line kicks off an inclusive and exhaustive process of public involvement and regulatory review. Following public input on routes, ATC currently expects to file an application to build the line with the Public Service Commission of Wisconsin in 2013. If approved by the PSC, construction on the new line would begin in 2015 to meet an in-service date of 2018.



The Badger Coulee line (La Crosse-Madison) has been identified as a “likely” Multi-Value Project under MISO’s new proposed cost allocation methodology (discussed below). This would greatly reduce the cost of the line to ATC customers.

❑ **Midwest ISO’s New “Multi-Value Project” Cost Allocation Methodology**

The Midwest ISO, in addition to performing the Regional Generator Outlet Study, was required by the Federal Energy Regulatory Commission (FERC) to file a new cost allocation methodology to address large regional projects. On July 15<sup>th</sup>, MISO filed a new tariff for approval by FERC which outlined a cost allocation methodology for a new classification of project, Multi-Value Projects (MVPs). The cost allocation methodology allocates costs for Multi-Value Projects over the entire Midwest ISO footprint based on the percentage of energy used in each area. For ATC customers, the percentage that would be paid for MVPs across the MISO footprint is estimated in the 10-15% range.

To be designated as an MVP, a project must meet one of the three following criteria:

1. must be needed to meet a public policy mandate,
2. must provide economic benefits, including regional benefits, sufficient to meet a 1:1 benefit/cost ratio when you compare twenty years of the costs paid by consumers for the project and twenty years of the benefit,
3. must solve a reliability issue and provide economic benefits as described above and specifically includes those costs for lower voltage projects that would not need to be built if a larger regional project were built.

As part of its filing, MISO identified two projects in Wisconsin as “likely” Multi Value Projects:

1. La Crosse-Madison 345 kV (Badger Coulee) line
2. Dubuque-Spring Green-Madison 345-kV line.

The total cost of these two projects was estimated in the MISO filing as \$811 million. ATC is actively working on reducing the costs of the Badger Coulee line to make it as cost effective as possible for ATC ratepayers.

❑ **CapX2020 (Capacity Expansion - by the year 2020)**

ATC also pays close attention to the CapX2020 effort, which is a joint initiative of 11 transmission-owning utilities in Minnesota and the surrounding region. Their objective is to expand the electric transmission grid to ensure reliable and affordable service. CapX2020 includes the following transmission projects:

- ❑ Fargo – St. Cloud – Monticello 345-kilovolt line,
- ❑ Hampton – Rochester – La Crosse 345-kilovolt line,
- ❑ Brookings County – Hampton 345-kilovolt line, and the
- ❑ Bemidji – Grand Rapids 230-kilovolt line.

The Minnesota Public Utilities Commission (MPUC) approved certificates of need for these projects, some with conditions, one of which was to build the projects with the ability to expand.



# 10-Year Assessment

An annual report summarizing proposed additions and expansions to the transmission system to ensure electric system reliability.

# 2010

**September 2010 10-Year Assessment**  
**[www.atc10yearplan.com](http://www.atc10yearplan.com)**

Rather than build single-circuit 345-kV lines, the MPUC required the CapX2020 group to build the projects as double circuit capable, but to only build the initial circuit at this time. The CapX2020 group is pursuing the routing and siting of these projects. Route permit applications for the following lines have been filed:

- Brookings County – Hampton 345-kilovolt project, and the
- Fargo – St. Cloud 345-kilovolt project.
- Hampton-Rochester – La Crosse 345-kilovolt project up to the Minnesota state line.

The CapX2020 group continues to prepare an application to the Public Service Commission of Wisconsin for the Wisconsin portion of the Hampton – Rochester – La Crosse 345-kilovolt line.

Portions of the CapX2020 projects also will require approvals by federal officials and by regulators in North Dakota and South Dakota. More information about the CapX2020 projects and updates can be found on the CapX2020 Web site at [www.capx2020.com](http://www.capx2020.com).