



10-Year Assessment

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

2008

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Executive Summary

American Transmission Co.'s 2008 10-Year Transmission System Assessment (Assessment) provides current results of planning activities and analyses of the company's transmission facilities. These activities and analyses identify needs for transmission system enhancement and potential projects responsive to those needs. This 2008 report is based on updated information provided by local distribution companies, the latest transmission service requirements, distribution and generation interconnection requests, recent analyses conducted by ATC, input from various stakeholders at ATC-sponsored meetings and other events.

Since 2001, we have engaged in open and collaborative efforts to share information and solicit input on our plans. We believe that in making our planning efforts transparent and available to the public, the proposals for needed facilities can be more readily understood and accepted by communities that stand to benefit from them. In recent years the federal government has taken additional steps to ensure that transmission-owning utilities have produced and shared planning information with the public and local stakeholders. The underlying principles of an open, transparent and collaborative planning approach are now required from all utilities that own and plan for new transmission lines. An overview of our planning process is available [here](#).

The updated information in this report provides further foundation for continued public discussions on the transmission planning process, identified transmission needs and limitations, possible resolutions to those needs and coordination with other public infrastructure planning processes.

The rest of this summary:

- provides links to the two planning initiatives ([Economic Planning](#) and [Policy & Regional Analyses](#)) continuing at ATC.
- summarizes the current project projections
- describes the status of ATC economic benefits analysis and
- summarizes the 10-year capital cost of the potential expansion plan.

In the years 2008 and beyond, ATC will be conducting additional public outreach, gathering input from our stakeholders early in the 10-Year Assessment process to include in our assumptions and models. This process is intended to provide even more openness and transparency and result in better planning.

Economic Analysis

ATC operates its transmission system in the Midwest regional market, the purpose of which is to allow customers access to the least expensive available power, both within and



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outside of Wisconsin. However, transmission system constraints can block customers from access to low-cost generation.

Traditionally, ATC has developed transmission projects based on system reliability needs, but all transmission projects have both reliability and economic impacts. Many projects serve to increase customer access to low-cost generation, which can reduce the cost of serving load in the ATC footprint. In certain cases, expected economic benefits may be the primary driver of a project.

In ATC's economic analysis, a computer simulation model is used to predict energy costs savings derived from transmission projects. The economic analysis of projects may be used in the prioritization and staging of projects. To this end, an attempt is made to capture all relevant factors in determining the economic benefits of a project.

In order to provide a thorough analysis of large projects, ATC tests these projects against multiple plausible futures for Wisconsin's electric industry, such as robust or slow economic growth, additional environmental regulation, and fuel supply volatility. The futures are based upon key drivers such as load growth, generation retirement and expansion, fossil-fuel costs, use of renewable energy, and increased environmental regulation. After consultation with stakeholders, ATC specifies futures which are designed to broadly cover most if not all plausible futures. During the 40-year life of a project, it is expected that actual events will fall somewhere within the defined futures. The premise of this approach, known as Strategic Flexibility, is that if a project performs well in all or most of these futures, it is a robust project that will produce benefits for ratepayers. The specific futures to be analyzed in 2008 include: Robust Economy, High Power Plant Retirements, Increased Environmental Regulation, Slow Economic Growth, 20% Energy from Wind, and Fuel Supply Disruption/Project Delays.

More details about economic benefits can be found on our [Economic Planning](#) section.

Policy & Regional Analyses

In addition to providing updated need and project information, the 2008 Assessment report presents information on ATC Planning involvement in regional transmission system studies. In addition to conducting transmission system planning studies internal to the ATC footprint, ATC is also involved in transmission planning studies to address regional needs that can impact the ATC system.

Midwest developments

There have been a number of developments in the Upper Midwest that could affect us and/or our customers. Among the more relevant of these include potential changes in state regulations, renewable portfolio standards (RPS), exploratory transmission initiatives being investigated by MISO and generation developments.



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- ❑ *State regulations* – The Public Service Commission of Wisconsin (PSCW) compiles information on utility plans every other year in its Strategic Energy Assessment (SEA). As a result of the SEA, the Commission opened a docket to review Wisconsin’s generation reserve margin which would impact the amount of generation built in this state. The SEA evaluates the plans of utilities for the following seven years. In addition, the PSCW is considering methods for better integrating generation and transmission planning efforts. ATC also works closely with the Michigan Public Service Commission and the Minnesota Public Utilities Commission regarding transmission needs, opportunities and projects.
- ❑ *Midwest Governors Association (MGA) – Energy Security and Climate Stewardship Platform for the Midwest* – In November 2007, the MGA held a security and climate stewardship summit. At that summit, the MGA committed to a goal of maximizing energy resources and economic advantages and opportunities of Midwestern state while reducing emissions of atmospheric CO₂ and other greenhouse gases. In order to achieve that goal, the MGA developed objectives and strategies. A key strategy is to develop regional electric transmission and energy delivery capacity sufficient to accommodate the substantial increases needed in low- and zero-carbon energy production. ATC actively participates in committees and activities to support efforts to develop regional transmission to meet the objectives and strategies outlined by the MGA.
- ❑ *CapX2020 (Capacity Expansion - by the year 2020)* The CapX Utilities announced four projects for which they are seeking regulatory approval. We have been participating in this effort to determine what impact these plans would have on transmission development in and around Wisconsin. Please refer to the Policy & Regional analyses section for more information.
- ❑ *ATC Energy Collaborative-Michigan*
ATC has completed or has under construction a series of significant upgrades across the Upper Peninsula (U.P.). The most notable projects completed as part of this effort are the Eastern U.P. Reliability and Operating Enhancement Phase 1 (EUROPE) projects completed in 2006 and the Northern Umbrella Projects (NUP) scheduled for completion in 2010. ATC recently completed three urgent projects in the Eastern U.P. in the winter of 2007-08 to hedge the risk of low water availability for hydroelectric generation. Even with these significant upgrades, operational challenges remain in this region due to the delicate balance among generation, load, market flows and transmission that currently exists.

To vet our planning assumptions for the intermediate (3-5 year) and long term (10-15 year) periods before future projects are proposed, we are engaging stakeholders in a



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collaborative process across the U.P. to examine the bounds of several plausible futures. From this process, ATC intends to develop a plan that will provide more operational flexibility and may impact the Lower Peninsula of Michigan or Canada as well as the U.P. and northern Wisconsin.

❑ T-T developments

ATC engages with its neighboring transmission owners on a regular basis to share planning expertise and to jointly plan the transmission system. The Arrowhead-Gardner Park 345-kV line, put into service in early 2008, is an example of a particular Transmission-Transmission line that was developed over many years by neighboring transmission owners. ATC is meeting with Xcel Energy, ITC, and Hydro One regarding a strategic transmission plan for the Upper Peninsula of Michigan and with Dairyland Power Cooperative regarding market flow and reliability issues in western Wisconsin.

❑ Wind Development

Wind on the water -- In June 2008, the Wisconsin Public Service Commission (PSCW) opened a docket (05-EI-45) to consider the potential of developing wind resources in Lake Michigan and Lake Superior. The investigation began based on a recommendation from the Governor's Task Force on Global Warming issued on February 19, 2008. The investigation will include an assessment of the economic and financial parameters for off-shore wind installations in Wisconsin, identify potential environmental impacts and identify what local, state or federal regulations may come into play. ATC is participating in the investigation efforts through the task forces that have been set up to conduct the assessments.

❑ Governor Doyle's Task Force - A Global Warming Task Force appointed by Governor Doyle is examining numerous policies that will reduce carbon emissions by changing electric generation sources and increasing energy efficiency. Such policies could affect the need for and location of future transmission lines, especially if more renewable energy is to be imported from other states. ATC has advised work groups about the need for careful, wide-area studies of transmission that will enable the state to increase its use of renewable resources. Another major focus of task force report, with possible implications for ATC, are recommendations concerning energy efficiency and conservation that may stabilize or reduce overall electric energy use in Wisconsin over the long term.

❑ JCSP/DOE 20% wind study

The Joint Coordinated System Plan (JCSP) is joint study between MISO and other regional entities including PJM, SPP, TVA, MAPP and NYISO. MISO is coordinating the study. The study is being performed in coordination with the DOE Eastern Wind Integration Transmission Study and it will identify transmission infrastructure under two scenarios:



1. Scenario 1: Reference Future - This scenario models the power system as it exists today with reference values and trends based on recent historical data while preserving existing standards for resource adequacy, existing renewable mandates and environmental legislation.
2. Scenario 2: 20% Wind Mandate Future - This future requires 20% of the energy consumption be provided from wind by the year 2024.

The JCSP study is expected to be completed at the end of 2009.

In April 2008, the Department of Energy (DOE) issued its 20% wind by 2030 study. The report examines the costs and challenges of generating 20% of the country's energy from wind by 2030. The modeling done for the report estimates that wind power installations with capacities of more than 300 GW will be needed for the 2030 20% scenario. The report describes the significant changes in transmission infrastructure that would be required to provide this level of wind energy under the assumption that 10% of the existing transmission grid capacity is available. The report contains a full section on transmission infrastructure and the integration of wind energy and includes conceptual information regarding the amount of transmission needed to optimize wind power in local area(s) where it is generated. In addition, conceptual details are provided regarding the location and/or type of transmission infrastructure needed to transfer power from high wind production areas to high demand centers.

❑ MISO Regional Generation Outlet Study

MISO has initiated a study to evaluate transmission infrastructure needs for wind generation located in the western footprint of MISO. The study is focused on delivering wind to the nearby states in MISO's territory that have renewable portfolio standards (RPS) – Illinois, Iowa, Minnesota and Wisconsin. The study will look at potential generation sites and potential transmission infrastructure solutions. MISO will identify a variety of options for transferring the energy from wind generation, including delivering wind energy only to the RPS states and also to other locations within the MISO footprint.

The study process began in April, 2008 and is expected to be completed by April, 2009. MISO expects to have alternative transmission expansion solutions identified in the study and anticipates that transmission owners will consider the identified solutions to develop transmission projects that can be included in MTEP 09.

Interconnections

Generation developments

- ❑ Since ATC's inception, the trend in generation development in Wisconsin has moved away from just natural-gas fired generation, which dominated the development picture in the last 15 years, to include coal-fired and wind generation. Thus far, two 650-MW coal-fired units and another 550-MW unit have been approved. In addition, Alliant Energy has filed for a Certificate of Public Convenience and Necessity (CPCN) from the



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PSCW to construct a new base load coal unit at Nelson Dewey. The application is in process and a decision is expected by the end of 2008. We have identified the transmission expansion requirements and improvements to accommodate these units.

Currently, there are over 30 proposals to install more than 6,000 MW of wind turbines in Wisconsin in the MISO generation queue. For more on generation developments in Wisconsin and Michigan's Upper Peninsula, see [Generation Interconnections](#).

Distribution developments

- ❑ Several previously unforecasted large customer interconnections have recently developed in ATC's service territory. Ethanol plants have been interconnected within the last two years. A large gas distributor is installing a pumping station for a pipeline extension to northeast Wisconsin. In addition, several economic development opportunities in Michigan's Upper Peninsula require new distribution interconnection facilities. Distribution interconnections are also being developed to support pollution control equipment that is being added at two coal fired power plants.

Current Projections

Based on anticipated changes to the ATC 10-Year system expansion plan since the November 2007 10-Year Assessment, ATC now estimates that it will build 212 miles of new transmission lines on new rights-of-way and will make improvements to 605 miles of lines on existing rights-of-way over the next ten years (refer to [Table ES-1](#)). A graphical representation of the transmission system reinforcements included in this year's Assessment is shown in [Figure ES-1](#). Please refer to the tables in [Projects](#) for details on each of the particular projects reflected in this figure.

Details of the specific changes to ATC plans from those listed in the November 2007 report are provided in the [Summary of Changes](#) (Table PR-23) table. Several of the changes are due to proposed new generation projects meeting criteria for inclusion that will require the construction of new transmission facilities. Other changes are attributable to further analyses of project alternatives done by ATC. Still other changes are due to updated load forecast information provided by ATC customers.



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Capital Cost of ATC Expansion Plan

Based on this 2008 Assessment, the total cost estimate for needed transmission system improvements is about \$2.7 billion over the next 10 years (through 2017). Included in this total cost is \$1.3 billion for projects specifically detailed in this Assessment. The remaining \$1.4 billion include costs for interconnecting other proposed generators, asset renewal projects, infrastructure replacements and relocations, unspecified network projects, and other smaller network reliability improvements. The total \$2.7 billion in projects can be broken down into the following categories.

Category	2007 Update 10-year capital estimate in billions	2008 10-year capital estimate in billions
10-Year Assessment projects	\$1.44	\$1.30
Asset Maintenance	\$0.44	\$0.46
Generator interconnections	\$0.23	\$0.29
Distribution interconnections	\$0.17	\$0.16
Asset Protection & control	\$0.13	\$0.08
Network	\$0.11	\$0.10
Unspecified network projects	\$0.22	\$0.23
Other *	\$0.10	\$0.09
Total expenditures	\$2.84	\$2.71

* Other includes Administration & General, Asset Acquisition, Asset Contribution, and Infrastructure Relocation.

The total cost trends of the last five Assessments and Updates are as follows:

	March 2005	Sept 2005	March 2006	Nov 2006	Nov 2007	Sept 2008
Specified 10-Year Assessment Projects	\$2.1B	\$2.4B	\$2.1B	\$1.7B	\$1.4B	\$1.3B
Other Capital Expenditures	\$0.7B	\$1.0B	\$1.3B	\$1.4B	\$1.4B	\$1.4B
Total 10-Year Capital Cost	\$2.8B	\$3.4B	\$3.4B	\$3.1B	\$2.8B	\$2.7B



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In the 2008 Assessment, ATC continues to project a decreasing total cost estimate for all needed transmission system improvements over a rolling ten year period. Additionally the proportionate share of cost of projects specifically detailed in the Assessments continues to decrease relative to the total ten year capital cost. The issues that can influence the total 10-year cost up or down as each future Assessment is completed can include the following factors:

- Completion of prior projects that improve reliability and renew assets,
- Changing load forecast,
- Changes in generation and distribution interconnection projects,
- Improved resource planning to manage construction projects,
- Changes in mandatory reliability standards,
- Additional projects that are driven by economic benefits and
- Increasing equipment and labor costs.

Referring to the breakdown of the 2008 total cost, Unspecified Network Projects are defined as those projects which may shift into the 10-year timeframe because of factors listed earlier. This \$226 million represents anticipated costs from projects not defined in the Assessment but potentially driven by some combination of the following issues that we continue to analyze:

- Reliability impacts to our customers, both short- and long-term
- Economic impacts to our customers
- Multiple outage impact solutions.

Future Assessments will continue to define these unspecified costs as issues are further defined in the continuing planning process.

Table 2008 Financial outlines the costs of both the Assessment projects and ATC construction projects overall.

Table ES-1
Summary of American Transmission Co.'s
2008 Transmission System Assessment

	2007 Assessment Update	2008 Assessment
	(November 2007)	(September 2008)
<i>New Transmission Lines Requiring New Right-of-Way</i>		
345 kV	4 lines / 139 miles	2 lines / 82 miles
138 kV	12 lines / 73 miles	10 lines / 84 miles
115 kV	1 line / 14 miles	1 line / 7 miles
69 kV	6 lines / 32 miles	6 lines / 36 miles
<i>Transmission Lines to be Constructed, Rebuilt, Reconductored or Upgraded on Existing Right-of-Way</i>		
345 kV	2 lines / 82 miles	3 lines / 102 miles
161 kV	1 line / 20 miles	1 line / 20 miles
138 kV	22 lines / 433 miles	17 lines / 320 miles
69 kV	11 lines / 96 miles	11 lines / 107 miles
<i>New Transformers to be Installed</i>		
<i>(# of transformers / total increase in capacity)</i>	23 transformers / 4,459 MVA	23 transformers / 3,373 MVA
<i>New Capacitor Banks to be Installed</i>		
<i>(# of installations / capacity)</i>	38 installations / 1,307 MVAR	39 installations / 1,412 MVAR

