

# **ATC Access Initiative Status Report and Update**

**PSC Docket #137-EI-100  
March 25, 2005**

## **Executive Summary**

ATC commenced its Access Initiative in 2004 to determine the value of expanding the transmission system to provide ATC's customers with (i) greater access to low-cost energy outside of ATC's service territory and (ii) improved ability to transfer energy within the ATC system where it is needed to serve retail customers. As directed by the Commission in its Notice of Investigation dated February 14, 2005, this Status Report provides a summary of the efforts that ATC has undertaken with interested stakeholders during 2004 and of the key findings from the analyses conducted to date. It also describes ATC's current plans for this initiative in 2005. The Access Initiative has resulted in the identification of a number of alternatives that would provide significant economic and reliability benefits to ATC's customers. The alternatives that are most promising produce a simultaneous total transfer capability of about 5,000 MW into ATC.

## **Making Cost-Effective and Timely Transmission Investments to Improve Access**

A number of events are converging that make docket #137-EI-100 timely.

First, as of April 1<sup>st</sup>, 2005, MISO will begin operating with an Energy Market Tariff (EMT). Under this tariff customers will be directly exposed to transmission congestion charges and ATC will no longer implement its "Attachment K" to socialize redispatch costs among ATC customers.

Second, the Midwest ISO (MISO) Independent Market Monitor (IMM) has designated Wisconsin Upper Michigan Systems (WUMS, which is effectively ATC) and Northern WUMS as the only two Narrowly Constrained Areas (NCAs) in the MISO footprint once the "Day 2" market begins. The NCA designation means that WUMS (ATC) and Northern WUMS are "load pockets" in which the risk of anticompetitive bidding behavior is higher. Also, as a result of a FERC ruling in the MISO EMT proceeding, the customers within the NCA are given a five-year grace period during which they are held harmless from certain congestion charges associated with pre-existing external (firm) resources. However, this protection does not apply to new transactions (bilateral contracts) during the grace period or to any transactions after the five-year period.

Third, due to the expected congestion into and within WUMS (ATC), ATC customers run the risk of paying much higher wholesale energy prices under this tariff. During congested hours, the market-clearing price at generator nodes could increase up to the MISO bid cap, exposing ATC customers to energy prices significantly higher than those in the broader, more competitive markets outside the ATC footprint.

### **MISO Day 2 Market**

The new MISO market structure will significantly change the way in which transmission service for wholesale electric supply is provided. Currently, when entities want to buy or sell power, they request transmission service via the web-based Open Access Same-time Information System (OASIS). If MISO grants the requested service, the entities involved have the right to implement their transaction based on the nature of the service granted. If system security becomes compromised after the service is granted, depending on the nature of the service granted, (i) the service may be curtailed or interrupted, in priority order, to ensure that system security is maintained, or (ii) the system may be reconfigured or generation may be redispatched out of economic order, to ensure system security and maintain the service granted.

Under the new market structure, if system security becomes compromised, a “congestion” charge, determined by the difference in marginal costs of energy (referred to as the “locational marginal price”, or LMP) between the buyer and seller, is charged to allow the transaction to continue. Entities will be allocated a certain amount of “firm transmission rights” (FTRs) that are intended to act as hedges against congestion charges.

Transactions for which FTRs have not been allocated will be subject to congestion charges (except under reliability emergencies, during which TLR procedures would still be used). For new transactions that do not have FTRs, if it is determined that one or more “flowgates” (transmission facilities that may constrain transactions) would be adversely affected and system security would be unacceptably compromised, either system reinforcements may be warranted or congestion charges may be imposed. Although the nature of a Day 2 market is such that most nodes will pay at least a small congestion charge, some nodes in heavily congested areas like WUMS are more likely to see very high congestion charges that would increase the price of electricity to end-users.

The manner in which transmission service is provided for new generation will also change under the MISO EMT. Currently, a new generator or the customer of the generator requests transmission service for a specified amount, for a specified period, to a specified service territory. Studies are conducted to determine whether any system impacts are expected to occur and, if so, which facilities would need to be constructed or which operating procedures would need to be implemented to grant the transmission service.

Under the Day 2 market, MISO will be implementing a new method currently in use by PJM that tests whether a generator is deliverable to the entire MISO system, rather than to a specific customer(s). This new method does not insulate customers from congestion;

even if a generator passes the deliverability test, there may be congestion charges assessed for delivery of the output, even to the customers in the service territory of the power plant.

A robust grid is one of the best available means of mitigating these risks of high congestion charges and increased energy prices. The current PSC policy docket is timely because it will provide ATC and its customers with needed policy guidance on the appropriate levels of transfer capability into and within the ATC region. ATC can then apply that policy guidance in completing its Access Initiative and identifying specific actions that need to be taken to improve access for Wisconsin customers.

### **Summary of 2004 Access Initiative Activities**

ATC held eight meetings at or near its Pewaukee office during 2004 to discuss the Access Initiative with customers and stakeholders. At the first two meetings, ATC introduced the concepts we planned to explore, discussed factors we intended to take into consideration, listed preliminary alternatives we planned to evaluate, and then invited customer/stakeholder input. At subsequent meetings, ATC provided key results of analyses conducted, presented and refined a Decision Matrix developed to compare alternatives, and solicited comments on what was presented. At the last two meetings held in 2004, ATC focused on soliciting input on what alternatives should be considered going forward. The meeting dates are listed below:

- ▶ April 7
- ▶ April 21 (Radisson Hotel)
- ▶ June 2
- ▶ July 7
- ▶ August 3
- ▶ September 1
- ▶ October 1
- ▶ December 1

All of the meeting materials, including presentations and meeting minutes, are posted on the atcllc.com web page at:

[http://www.atcllc.com/oasis/Customer\\_Notices/Access.html](http://www.atcllc.com/oasis/Customer_Notices/Access.html)

A copy of the index of that page is shown in Table 1 and a copy of all the materials is included on a CD supplied with this Report.

### ***Factors considered***

ATC took into account appropriate factors for conducting a screening-level evaluation of Access alternatives. ATC also utilized new analytical tools to further the understanding of the relative economic and technical merits of Access alternatives. The factors considered and the methods by which they were considered are listed below.

### *Economic factors*

Capital-cost estimates of Access alternatives and levelized annual carrying costs based on those estimates were developed by ATC. These cost estimates, though at a conceptual level, reflect the latest information available to ATC based on recent construction projects. The levelized annual carrying costs were developed using a simple fixed charge rate that accounts for the cost of obtaining the capital dollars, plus taxes and depreciation.

Offsetting these costs to varying degrees were projected reductions in energy production costs achieved with each of the project alternatives. ATC utilized PROMOD software (developed by New Energy Associates) that models the transmission system and determines the lowest cost hourly generation dispatch without violating system planning criteria for known flowgates (i.e., ensuring that transmission facilities are not overloaded with one other facility out of service). The difference in energy production costs between the simulations with and without an Access alternative reflects the projected production cost savings. ATC simulated projected system conditions in 2012 to evaluate potential energy production costs associated with each alternative relative to the Base Case (i.e. a simulation without an Access alternative).

In addition, the projected system loss reduction was determined and the value of the reduction in capacity losses (loss reduction during peak load conditions) and energy losses (loss reduction projected throughout the year) was estimated over a 20-year period.

### *Other factors considered*

Other technical and non-technical factors were considered. These factors included:

- *transfer capability* – the increase in simultaneous transfer capability projected to be achieved by each Access alternative. This projection reflects the maximum amount of power that can be imported into the ATC service territory during system peak conditions and is derived without regard to the economic feasibility of such transfers as in the case of the PROMOD simulations.
- *LMP comparability* – the average load-weighted locational marginal price (LMP) for the six largest ATC customers over the study year (2012). This factor reflects how LMPs vary for these ATC customers with each Access alternative.
- *reliability-LOLE improvements* – the reduction in loss of load expectation (LOLE) achieved by each Access alternative. This factor reflects how the increase in transfer capability for each Access alternative affects the ability of the transmission system utilizing the generation fleet outside the ATC system along with the generation fleet within the ATC service territory to meet the expected load within the ATC service territory. LOLE is a probabilistic reliability index.
- *reliability-EUE improvements* – the reduction in expected unserved energy (EUE) achieved by each Access alternative. This factor reflects how each Access alternative affects the ability of the ATC transmission system to meet the

expected load within the ATC service territory under a variety of potential outage conditions. EUE is another probabilistic reliability index.

- *strategic benefits* – this factor encompassed six potential benefits:
  - providing backbone (345 kV) infrastructure
  - providing access to out-of-state renewable resources
  - improving local economic development potential
  - enhancing the value of other planned projects
  - providing benefits to neighboring systems
  - providing geographical diversity of the 345 kV network
- *system performance* – any improvements in angular stability limits and/or voltage security within the ATC system. This factor reflects the voltage performance “strength” of an alternative as compared to the other alternatives.
- *operating flexibility* – the improvement in ability of system operators to schedule outages, reconfigure the system during emergencies and/or reduce or eliminate the number or duration of use of operating guides.
- *societal impacts* – this factor consisted of estimating the potential for existing transmission corridor usage, new rights-of-way likely to be required and the percentages of public and private land for each Access alternative.
- *environmental impacts* – this factor consisted of estimating the relative impact of wetlands, river crossings, endangered species, State natural areas, State parks, national forests and parks, tribal lands and special waters areas for each Access alternative.
- *pricing alternatives* -all analysis assumed that ATC’s customers would pay the entire cost of the project(s). To the extent that the proposals are deemed “regional” by MISO, it is expected that, at a minimum, the directly impacted areas outside of ATC’s footprint would pay some of the cost of the project, commensurate with the benefits received.

ATC regards all of these factors as relevant to determining appropriate Access alternatives. It also recognizes that other factors (such as the value of power-supply optionality and the positive effect of increased access on the potential for regional reserve-sharing) are highly relevant to making policy determinations about the appropriate levels of access for Wisconsin. These policy factors are set forth in greater detail in ATC’s filing letter accompanying this Report.

### ***Access alternatives considered***

As ATC commenced the Access Initiative in early 2004, five representative Access alternatives were conceived to determine the relative merits of each. Those initial alternatives were geographically diverse with the intention of determining which direction(s) were likely to provide the greatest economic and reliability benefits.

#### *Initial Access alternatives*

- **South:** a new Byron-North Monroe-West Middleton-North Madison 345 kV line
- **Southwest:** a new Salem-Spring Green-West Middleton-North Madison 345 kV line

- **West:** a new Adams-Genoa-Columbia 345 kV line
- **East:** a new 450 kV DC line from Ludington to a new substation on the western shore of Lake Michigan (Western Lakeshore) with AC/DC conversion stations at Ludington and Western Lakeshore, with a 345 kV line from Western Lakeshore to Forest Junction.
- **Northeast:** a new Sault Saint Marie-Arnold 345 kV with virtual back-to-back DC tie at Sault Saint Marie

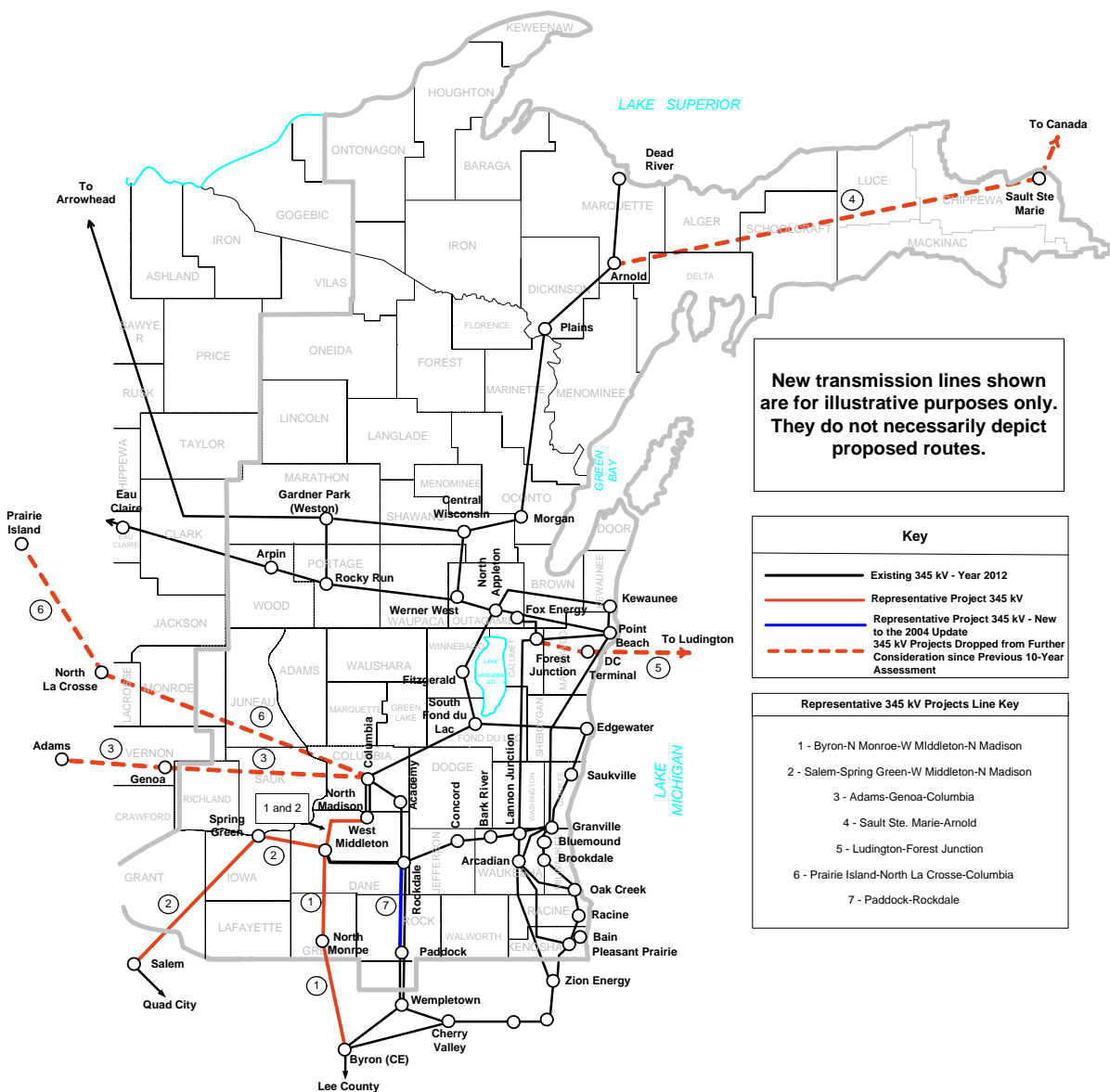
After soliciting feedback from stakeholders and conducting comparative analyses, the list was expanded to include the following alternatives:

- **Lower Voltage Reinforcements (aka “Base Case Plus Two Fixes”):** two lower voltage reinforcements (to fix the two most limiting constraints detected in the base case). The two “fixes” in this alternative are:
  - Installing a second 345/138 kV transformer at the Paddock Substation
  - Rebuilding the Lore-Turkey River-Cassville-Nelson Dewey 161 kV transmission line
- **Lower Voltage Ties:** three lower voltage ties to neighboring systems
- **South:** a new Paddock-Rockdale 345 kV circuit
- **Southwest:** a new Salem-Spring Green-West Middleton-North Madison 345 kV line with an uprate of the Salem-Maquoketa 161 kV line
- **Southwest:** a new Salem-Spring Green-West Middleton-North Madison 345 kV line plus a new Hazelton-Salem 345 kV line
- **West:** a new Prairie Island-North La Crosse-Columbia 345 kV line ( added at the suggestion of Dairyland Power Cooperative)

After conducting the initial round of comparative analyses, ATC proposed eliminating the Northeast and East alternatives from further consideration. The stakeholders agreed to this proposal. The resulting alternatives are shown below and the most promising alternatives are described in further detail in Table 2.

## Representative 345 kV Access Projects for 2004 10-Year Assessment Update

American Transmission Company



### Scenario/sensitivity analyses

A variety of scenarios and sensitivities were considered to evaluate the Access alternatives. Two analyses were conducted: PROMOD was used to determine how the alternatives compared for the various scenarios/sensitivities, and transfer capabilities were determined for each of the alternatives for each scenario.

- High and low internal generation scenarios were developed based on feedback from stakeholders. The high generation scenario reduced the peak load for the ATC service territory so that the internal generation equaled 120% of the peak demand. This is functionally equivalent to adding generation but avoids potentially biasing the analysis, which can be influenced by the location of new generation. The low generation scenario involved adding only committed generation and retirement of select aging generators within the ATC service territory such that internal generation could meet 90% of the net firm peak demand.
- A high wind development scenario was developed based on feedback from stakeholders. This scenario assumed 1,500 MW of new wind generation would be developed in northern Iowa and southern Minnesota with appropriate transmission system additions in those states to ensure reliable delivery.
- High and low natural gas cost sensitivities were analyzed. These sensitivities assumed a 20% increase or a 10% decrease in natural gas prices, respectively.
- PROMOD analyses were conducted assuming an unconstrained ATC system (no constraints to power transfers within ATC) for the Base Case to determine the potential “bound” on benefits if all constraints within the ATC system were independently removed.

### **Summary of Key Findings**

Several key findings were made based on the analyses conducted during 2004. Those findings are summarized below.

- New 345 kV lines to the south (Byron-North Madison or Paddock-Rockdale) and southwest (Salem-North Madison) provided the greatest overall benefits when considering economic, technical and other factors.
- The alternatives that provided the greatest overall benefits also provide a simultaneous total transfer capability into ATC of about 5,000 MW.
- The alternatives to the south provided the highest level of energy production cost savings.
- The alternatives to the south, southwest and west provided the greatest level of comparability of access to the market for ATC customers.
- The alternatives to the northeast, west and south provided the greatest level of operating flexibility based on the factors considered.
- The alternatives to the south and southwest provided the greatest chronic limit relief.
- The alternatives to the southwest, west and south provided the greatest strategic benefits based on the factors considered.
- The alternatives to the south and northeast have the least environmental impact based on the high-level assessment performed and route assumptions made.
- The southwest, east, and Paddock-Rockdale alternatives appeared to have the least societal impacts based on the factors considered and route assumptions made. The southwest alternative also has a great deal of corridor-sharing opportunity.
- The alternatives to the south and southwest provide the greatest reliability benefits based on the factors considered.
- The alternatives to the west and southwest provided the greatest system performance benefits based on the factors considered.

- The alternatives to the south were generally the shortest in length and thus had the lowest capital costs.

A decision to focus on certain alternatives and to refine those alternatives was made as a result of the comparative analysis presented at the customer/stakeholder meetings. ATC's current plan is to analyze further the following project alternatives:

- Base Case Plus Two Fixes (plus combinations of other low voltage alternatives)
- Byron-North Madison 345 kV
- Paddock-Rockdale 345 kV
- Salem-North Madison 345 kV

The Decision Matrix reflecting the above findings is provided in Table 3. It provides a quantitative comparison of the alternatives. For example, economic analysis was performed based on the estimated annual carrying cost of an alternative compared to the estimated annual energy savings.

One of the comments received during the customer/stakeholder meetings was that, since the PROMOD analysis used estimated incremental generator costs rather than actual bids, the economic analysis will underestimate the energy production cost savings from relieving congestion. This is because bids are more likely to be higher in constrained areas than for similar units in unconstrained areas. Hence, an additional economic analysis was performed using a simple "3 times" multiplier to the potential energy production cost savings relative to the base case, and included in the Decision Matrix. This method is based on experience from the California Independent System Operator, comparing their analysis based on incremental generator cost to analysis based on actual bidding behavior in a congested market. The economic analysis is included as a sensitivity only. There was considerable discussion and debate regarding this issue in the customer/stakeholder meetings. At this time, ATC is looking at additional methods to quantify the difference between actual generator cost and bidding behavior for the purposes of evaluating transmission alternatives.

No attempt was made to quantify reliability components on an economic basis. Rather, a ranking system from one through ten, with ten being the best, was used, and a numerical rating of each reliability component was discussed and applied to the alternatives in the Decision Matrix.

### **Planned 2005 Activities**

ATC looks to the Commission in this proceeding for policy direction on the appropriate level of import capability into the WUMS region and for guidance on how it should complete its Access Initiative. Subject to this policy direction, ATC currently plans to perform the following activities during 2005:

- Conduct more detailed analyses of the impacts of projects to the south and southwest (the preferred alternatives). Additionally, conduct more analysis on the low voltage and Base Case alternatives.
- Coordinate technical studies with MISO and neighboring utilities.
- Conduct more detailed analyses of other associated reinforcement projects and their alternatives.
- Refine the capital cost and construction scope estimates for the preferred alternatives.
- Evaluate the implications of the NCA designation for the ATC service territory for the preferred alternatives
- Perform sensitivity analysis to model bidding behavior as opposed to generation at-cost.
- Refine the project “packages” (preferred alternatives and associated reinforcements)
- Select a preferred and an alternate project package and determine ultimate termination points for the package projects.
- Compile relevant information on preferred packages to facilitate future pre-certification efforts.
- Quantify the impact of lowering the 18% reserve requirement in WI to something more in-line with surrounding regions (such as 15%).
- Participate in the MISO RECB efforts to determine the most appropriate means to allocate benefits and therefore costs of facilities deemed regional in nature.

ATC currently plans to host six public meetings during 2005 as it completes the above activities. Some of these meetings may be held other than in Pewaukee to accommodate various stakeholders. The 2005 meeting schedule is:

- ▶ February 14 (already held)
- ▶ April 11
- ▶ June 20
- ▶ August 29
- ▶ October 10
- ▶ December 5

ATC also stands ready to perform any other activities in 2005 that the Commission determines are in the public interest.