



1. Transmission system expansion drivers

There are numerous factors that can drive the need for transmission system expansion. In some cases, more than one factor will signal the need for system expansion. The most common expansion drivers are described below and include:

- Electric load growth
 - Transmission-distribution interconnections
 - New generation
 - Transmission service requests
 - System repair or replacement
 - Regional needs
 - Economic strategic expansion
- Electric load growth** – The load growth driver in this Assessment is slightly lower than in the previous Assessment. Demand for electricity during peak load periods is projected to grow at a rate of 1.4 percent across our service territory from 2010 through 2020. However, load growth rates in some areas are projected to grow by as much as 8 percent, while no growth is projected in other areas. Not surprisingly, many areas of high load growth correspond to areas where we are proposing system enhancements and/or expansion.

Figure PF-1 shows the projected growth in peak demand, in MW, from 2010 through 2020 for various areas of our system. Note that most of the high growth (greater than 20 MW) is in the metropolitan Milwaukee, Madison and Fox Valley areas. While these higher-growth areas may require system expansion, there is considerably more existing transmission infrastructure in these areas. Of equal or greater concern is high growth in areas where there is much less existing transmission infrastructure because the capacity of the existing system may be reaching its limits, perhaps requiring additional infrastructure.

Figure PF-2 shows the projected rates of growth on our system. This is perhaps more revealing as it shows what areas are experiencing high rates of growth, regardless of the magnitude of load that exists today. Certain areas of our system have more transmission infrastructure today and are not as likely to need infrastructure additions to support expected load growth. Note that the high rates of growth in and around Madison, Lake Geneva, Green Bay, Rhinelander, Wis., and Marquette, Mich. were not depicted as being among the highest MW growth areas in Figure PF-1. These areas of high growth rates actually are better indicators of when and where system expansion is likely to be needed.



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Many of the line or transformer overloads or low voltages during peak load are due to electric load growth. System expansion is required to ensure that the transmission system can operate reliably – mitigating overloads and low voltages.

- ❑ **Transmission-distribution interconnections** – A natural extension of load growth is the need for additional transmission-distribution interconnections (TDIs). As the capacity of the transmission system gets more fully utilized when load growth occurs, similarly this often happens on the distribution systems as well, requiring new interconnections to the transmission system.

In most cases, distribution companies will attempt to unload existing distribution facilities by siting a new TDI near an existing transmission line and redistributing some of the load in the area to the new TDI. In some instances, however, it makes more sense to construct transmission closer to where the load growth is occurring.

A list of all of the planned TDIs on ATC’s system can be found at:
<http://www.atcllc.com/oasis/liqueue.xls>. Please refer to our Transmission-Distribution Interconnections section for more information.

- ❑ **New generation** – When entities plan to construct new generating facilities, there are two key considerations from the transmission owner’s perspective:
 - Can the proposed generating facilities be interconnected and remain stable during system disturbances, and will nearby generating facilities remain stable?
 - Can the electricity produced by the generating facilities be delivered reliably to the ultimate customer(s)?

For each entity that plans to construct a new generating facility, the transmission provider will conduct an interconnection study. If the existing transmission system is inadequate to ensure generator stability or reliable transmission service, the transmission provider will determine what system expansion will be needed.

We have constructed and are in the process of planning and/or constructing transmission facilities that are needed to interconnect and/or provide transmission service from new generators. The transmission facilities being planned or constructed to accommodate new generation can be found in Tables PR-2 through PR-23. In the Need Category column, look for “new generation.” Also, see Generation interconnections.

- ❑ **Transmission service requests** – In the Midwest Independent System Operator, Inc. (MISO) Day 2 Market, transmission services requests are used less but still are an available option. Power plant owners and local distribution companies can transact with other entities to buy and sell electricity. Power plant owners with surplus generating



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capacity may attempt to sell that surplus capacity. Entities serving end-use customers may attempt to lower their costs by accessing and purchasing low-cost electricity. In addition to the Day 2 Market another way in which these entities gain access to the transmission system to make these transactions is by making transmission service requests. Transmission service providers, or transmission owners like ATC, evaluate those requests to determine whether the transmission system can be operated reliably if the request is granted. If the request can't be granted, the transmission service provider may determine how the transmission system needs to be expanded to grant the request. The types of requests that would require some sort of system expansion are longer-term requests (transactions lasting longer than one year) and which start at some point in time in the future. Requests for service in the near future may have to simply be denied because system expansion facilities can't be constructed in time.

We have constructed and are in the process of planning and/or constructing, transmission facilities that are required to grant transmission service requests. The transmission facilities being planned or constructed to meet transmission service requests can be found in Tables PR-2 through PR-23. In the Need Category column, look for "service limitation."

- ❑ **System repair or replacement** – Many components of our transmission system will need to be repaired or replaced in the coming years due to condition or obsolescence. In some cases, the need to reconstruct a transmission line may provide opportunities to increase the capacity of those components and improve reliability. Facilities being planned or constructed to address condition or obsolescence issues can be found in Tables PR-2 through PR-23. In the Need Category column, look for "condition." Please also refer to Tables AR-1 through AR-3 for a listing of our asset renewal projects.
- ❑ **Regional needs** - Our transmission system is interconnected directly with neighboring systems and is operated in conjunction with all transmission systems within MISO and ultimately the eastern interconnection. Because these transmission systems work together and not independently, regional planning to identify and plan for needs at a regional level is necessary.

ATC provides its system plan to MISO for coordination within MISO's regional plan, known as MISO's Transmission Expansion Plan (MTEP). ATC and MISO collaborate to facilitate MISO's review of the projects. MISO reviews the transmission projects and alternatives where applicable, submitted by ATC to verify the reliability or economic needs, to ensure they do not have an adverse affect over the MISO footprint and to determine if they could be combined in conjunction with transmission projects from other transmission owners to develop the most cost-effective alternatives.



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ATC also participates in regional studies that investigate transmission needs across footprints of multiple transmission owners. For example, ATC participates in regional studies coordinated by MISO such as the Regional Generation Outlet Study (RGOS) that investigates transmission plans to integrate wind generation that supports the MISO state Renewable Portfolio Standard (RPS) requirements and beyond. ATC also meets with adjacent transmission owners to coordinate planning in an effort to develop transmission solutions that resolve reliability issues that impact multiple transmission owners at the lowest reasonable cost. Please refer to the Regional Analyses section for more information on ATC's participation in regional planning activities.

- **Economic/strategic system expansion** – In the electric utility industry, change has become more of the norm rather than the exception. For example, in recent years, wholesale electricity markets have continued to evolve, renewable generation has gained a larger market share, and the generation market, in general, has become more competitive. In addition, because both residential and business customers are more mobile, migration of electric customers to other areas is a greater risk consideration for utilities. In order for utilities to remain cost competitive and compliant, they must have the flexibility to take advantage of trends that have the potential to lower costs and to comply with renewable portfolio requirements. To the extent that low-cost generation development is occurring in an adjacent state, it may make sense for a transmission provider to construct transmission facilities that would allow its utility customers better access to that low-cost generation.

Along these lines, we have been investigating ways to take advantage of certain potential developments in the electricity industry to give its customers more ways to lower costs. The primary outgrowth of this effort is outlined further in our Economic Planning section.