



Project classifications

In our 10-Year Assessments and Updates, projects are identified that address system reliability issues, economic benefits, regional issues, loss savings, transmission service issues, generation or distribution interconnections, or any combination of the above. In general, these projects address system performance issues identified using the governing system planning criteria or economic benefits for customers. We have numerous other projects under way or under evaluation that address asset renewal including reliability improvement and end-of-life equipment issues. The projects referenced in the project tables PR-2 through PR-26 generally include only those projects that at least in part address system reliability issues. Projects referenced in tables AR-1 through AR-3 detail our asset renewal efforts.

To facilitate an understanding of the status of the various future projects, we classify projects into one of three possible categories – Planned, Proposed or Provisional. Please note that the classifications of Asset Renewal projects are underway and thus are not depicted in Tables AR-1 through AR-3.

Each classification has specific criteria based on the status of the project as outlined below:

Planned projects:

- ATC planning is complete;
- if required, we have applied for regulatory approvals, which may be pending or have been issued; and
- project may be under construction or in construction planning phase.

Proposed projects:

- ATC planning is not complete;
- ATC has not yet pursued regulatory approvals; and
- project represents ATC's preliminary preferred project alternatives from a system performance perspective.

Provisional projects:

- ATC planning is not complete;
- ATC has not yet sought regulatory approvals; and
- project reflects meeting the need identified, but does not necessarily represent ATC's preliminary preferred project alternative.

In the 2001-2009 10-Year Assessments and Updates, we identified 656 projects that address system reliability issues. Projects that address equipment reliability issues are not included in these statistics. Figure PR-6 illustrates the status of system reliability and economic projects ATC has considered from 2001-2009. Regarding Figure PR-6, it is worthwhile to note that:

- ATC has completed 302 projects and another 8 are in design or under construction. Notable projects most recently completed are listed in Table PR-1. Projects under construction include capacitor bank installations, the Conover-Plains rebuild and conversion, and the Paddock-Rockdale transmission line project.



- 84 projects have been replaced with alternate project solutions. It is not unusual that the status of certain projects will change or evolve since customer needs and uses of the transmission system continually are changing.
- ATC canceled 151 projects that were identified in previous Assessment reports due to changing needs and up-to-date information. Most of these projects were relatively minor projects, involving only replacement of equipment at existing substations.
- 119 future projects are in various stages of evaluation or development (Planned *which includes projects In Design/Under Construction, Proposed or Provisional*).

Projects completed since 2008 Assessment

Transmission projects significantly affecting system performance that have been completed since the 2008 Assessment was issued in October 2008 are listed in Table PR-1.

Most notable include:

- Construct Gardner Park-Highway 22 345-kV line,
- Construct Morgan-Werner West 345-kV line,
- String a new 138-kV line from Clintonville-Werner West primarily on Morgan-Werner West 345-kV line structures,
- Convert Rock River to Bristol to Elkhorn to 138-kV operation; rebuild Bristol with a new 138-kV bus,
- Construct a North Madison-Huiskamp 138-kV line, and
- Expand Oak Creek 345-kV switchyard to interconnect one new generator.

Summary of 2009-2024 Projects

The transmission facilities that we are proposing based on this Assessment are listed in Tables PR-2 through PR-22, and shown graphically by zone in Figures PR-1 through PR-5. Changes that have occurred since the 2008 Assessment are listed in Table PR-23. Please also refer to our Asset Renewal section for a list of our larger asset renewal projects.

In each of these tables, there is a column indicating the planned in-service year for each particular facility and a column indicating the year the facility is needed. Sometimes the year that facilities are needed precedes the planned in-service year. There are a variety of reasons for this, including:

- The preferred alternative to address a particular need may take several years to implement.
- The need had been addressed with operating procedures that are becoming less effective or ineffective, necessitating a permanent solution.
- The preferred alternative to address a particular need may need to be implemented in phases, thus delaying completion of the entire project.
- New data or information affected the nature of the need or limitation, necessitating a change in the preferred alternative and introducing a delay in implementation.
- The need for a project was based on load or generation development that was uncertain.
- Stakeholder input necessitated a change in the alternative to be implemented, introducing a delay in implementation.



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Tables PR-2 through PR-12 show the facilities planned by year for 2009-2019. Table PR-13 shows provisional facilities where the in-service date is yet to be determined or beyond the 2019 timeframe.

Tables PR-14 through PR-18 show the facilities planned by zone.

Table PR-19 provides a list of planned transmission lines involving new right-of-way for 2009-2024. Since ATC intends to solicit public input on the identification of ultimate solutions through its public planning process, these particular projects may be modified in the future.

Table PR-20 provides a list of proposed transmission line rebuilds, line reconductoring and uprates on existing right-of-way.

Table PR-21 provides a list of proposed new substations and transformer additions (excluding transmission-to-distribution transformers).

Table PR-22 provides a list of other proposed substation equipment additions or replacements.

Need categories

Within these tables, the need for each project is identified. Need categories include the following:

Reliability: Facility (line, transformer, substation equipment) normal rating is exceeded under normal system conditions or emergency rating is exceeded under single contingency conditions, or bus voltage is not within 5 percent of nominal voltage under normal system conditions or is not within 10 percent of nominal voltage under single or multiple contingency conditions, or the contingency creates a cascading outage risk (see [Planning criteria](#)). Impending overload or voltage violations are noted as appropriate.

New generation: In our generation interconnection studies and related transmission service studies, the facility has been identified as necessary to accommodate new generation.

T-D interconnection: Facility is required to interconnect to a new transmission- distribution substation needed by a distribution company served by ATC.

Asset renewal: We have identified the facility as needing repair or replacement.

Stability: We have identified the facility as needed to ensure that our dynamic stability criteria are met (see [Planning criteria](#)), or to improve stability response of generation.

Economics: Preliminary and partial list of projects emerging from our economic planning studies that may be beneficial in reducing congestion, enhancing system transfer capability and producing economic benefit.



Projects in design or under construction

Transmission projects that will significantly affect system performance, have regulatory approval if required and are currently in design or under construction are listed in Table PR-24. Most notable include:

- Rebuilding/converting Conover-Plains 69-kV line to 138 kV,
- Constructing the Paddock-Rockdale 345-kV line and replacement of the 345/138-kV transformer T22 at Rockdale Substation,
- Designing the Rockdale-West Middleton 345-kV project, and
- Constructing the Jefferson-Tyrannena-Stony Brook 138-kV line.

Because of the number of projects in certain areas, finding sufficient outage opportunities has become an issue. We are striving to more accurately predict the potential cost implications of construction/connection outages and schedule outages to minimize such potential costs.

Projects pending regulatory review/approval

Transmission projects that are pending issuance of a Certificate of Authority (CA) or a Certificate of Public Convenience and Necessity (CPCN) from the Public Service Commission of Wisconsin are listed in Table PR-25. It should be noted that no projects are pending at this time.

Notable projects include:

- None

Project costs

The estimated capital costs for all of the projects reflected in Figure PR-6 are shown in Figure PR-7. The figure shows that the combined capital costs for 10-Year Assessment projects that are completed, canceled, replaced, in licensing and under construction account for roughly 88 percent of the estimated total 2001-2009 capital costs, with future projects accounting for the remaining 12 percent of the total. The estimated capital costs depicted in Figure PR-7 are based only on those projects listed in the previous and current Assessment(s) that affect system performance.

The total 10-year capital expenditure described in this Assessment is \$2.5 billion. The cost estimate for all 2009 10-Year Assessment system reliability and economics projects to be placed in-service is approximately \$1.0 billion, which is \$300 million less than the 2008 Assessment estimate. Figure PR-8 categorizes the current \$1.0 billion 2009 Assessment system reliability and economics project dollars by status. Planned projects (including those projects in design and under construction) account for 49% of the Assessment dollars, proposed projects account for 13% of the dollars, and provisional projects account for the remaining 38% of the dollars.

Asset renewal project costs as outlined in our Asset Renewal section account for approximately \$750 million of the total \$2.5 billion. Other anticipated projects, including road relocations, generation and distribution interconnections, and unspecified network projects make up the remaining \$750 million of the total \$2.5 billion.



Generation Interconnections

The size and location of new or expanded power plants can have significant impacts on the transmission system. These impacts can range from very positive (adding voltage support in a weak area of the system) to very negative (aggravating loading problems and/or causing generator instability). Information on the status, as of July 1, 2009, of ATC's portion of the Midwest Independent System Operator generation interconnection queue is provided in this section. There continues to be significant activity in ATC's portion of this queue, ranging from newly proposed generation projects to cancellation of previously proposed generation projects.

There are two key aspects in determining the total impacts a proposed new generator may have on the transmission system:

- impacts of interconnecting the new generator to the transmission system and
- impacts of using the transmission system to deliver power from the new generator.

Per the Midwest ISO Revised Attachment X process, A generator interconnection study is usually performed in three stages: Interconnection Feasibility Study (Application Review Phase), Interconnection System Impact Study (System Planning and Analysis and/or Definitive Planning Phase), and an Interconnection Facilities Study (Definitive Planning Phase).

The *Interconnection Feasibility Study* includes a determination of thermal overload or voltage level impacts created by the new generator. This study process is now performed by MISO approximately five to six times per calendar year and provides a qualitative screen of the affected facilities, indicating if there is ample capacity on the system to support the new interconnection. Depending on the results of the study, the request may either enter into the Definitive Planning Phase (DPP), System Planning and Analysis Phase (SPA) or Customer Not Ready Phase of the System Impact study.

The *System Impact Study* includes a determination of whether the proposed generator and other nearby generators will remain connected to the system under various disturbance situations, such as line trips and equipment failures and includes a fault duty analysis to determine whether existing system equipment can accommodate the increased short circuit fault duty caused by the new generator. Finally, the System Impact Study will identify solutions for any thermal, stability or fault duty problems.

Delivery impacts are assessed during the DPP portion of the interconnection study process using the Midwest ISO deliverability methodology, which determines whether a new generator is deliverable to the Midwest ISO Day 2 market and to what percent if not wholly deliverable. Whatever portion of the new generator that is deliverable may then be used as a Network Resource by Network Customers through the Midwest ISO's Module E Resource Adequacy procedures.

The facility study is conducted in the DPP process phase to specify and estimate the time and cost of the equipment, engineering, procurement and construction of the system upgrades identified in the earlier interconnection studies.



The results of the interconnection studies are needed to develop a comprehensive picture of the transmission facilities that will be required for a proposed generator. This is why we include in our Assessment those proposed generators for which interconnection studies have been completed.

The first portion of this section provides the status of the generation queue within our service territory. The second portion of this section describes the transmission system additions associated with various proposed generation projects for which final interconnection studies have been completed. The third portion of this section describes some of the implications associated with interconnecting generation at various locations within our service territory.

ATC Generation Queue

Since ATC's inception, sixteen new generators have gone into service and two updates to existing generators have been completed, totaling 4,293 MW. These generators are shown in Table PR-26.

Table PR-27 lists the proposed generators in the generation queue for our service territory as of July 1, 2009. This table lists each proposed generation project and summarizes them by zone and MW amount. These proposed projects also are shown by approximate location in Figure PR-9. As shown, the total capacity of proposed generators in the queue is 2,944 MW. Of that proposed capacity, 44 percent reflects new coal units; wind units reflect 47 percent; biomass reflect 3 percent; nuclear updates reflect 4 percent and the remaining 2 percent is comprised of simple cycle (natural gas) turbines (see Figure PR-10). Of this generation, 44 percent in Zone 5, 28 percent in Zone 4, 21 percent is proposed in Zone 3, 3 percent in Zone 2, and 4 percent in Zone 1.

The developer's projected in-service date listed in Table PR-27 is the last official commercial operation in-service date provided by the developer for that request. Under the Midwest ISO's former Attachment X procedures, a developer could suspend their Interconnection Agreement which could delay the project. They were not required to update their official in-service date as part of this suspension.

The following requests have been suspended:

- G427 – 98 MW wind farm, Cypress Substation in Fond du Lac County, Wisconsin
- G546 – 100 MW wind farm, Line 6541 in Walworth County, Wisconsin
- G590 – 98 MW wind farm, Line 971K91 in Calumet County, Wisconsin

Generation interconnection requests previously in the generation queue, which have been cancelled or removed from the queue since January 31, 2008 (because the developer withdrew the request or missed contractual milestones), are summarized in Table PR-28.

Link to publicly posted generation queue:

http://oasis.midwestiso.org/documents/ATC/Cluster_8_Queue.html

Transmission associated with proposed generation interconnections

Prior to the start of the MISO Day 2 Market, transmission service for new generators was handled separately through an OASIS transmission service request(s). For generators listed below that had



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studies completed prior to Day 2 start-up, system reinforcements were identified through both generator interconnection and transmission service studies.

Implications of generation development

Availability of fuel, water and transmission interconnections are among the key aspects to be considered when sighting generation.

From a transmission perspective, the ability of the transmission system to accommodate new generation is a function of stability, power flow and short circuit analyses. For certain generation technologies, harmonics and voltage fluctuations may need to be considered as well. In most instances, new generation will require certain transmission system reinforcements to interconnect and deliver the generation output. In a few specific instances, new generation can be beneficial to the transmission system, perhaps even deferring or eliminating the need for transmission reinforcements that would be necessary absent the new generation. The ability of generation to defer or eliminate the need for transmission reinforcements also can be a function of the generation location, number of generators and/or expected generator capacity factor.

In this section, a very general zone-by-zone evaluation of the likelihood of needing or deferring transmission reinforcements for various generator locations is provided. The purpose of these evaluations is to provide a very cursory indication to the generation market of the likely magnitude of the impact and the transmission reinforcements that would likely be needed by general location.

Zone 1

Within Zone 1, generation has been proposed in various locations, but most of the proposals have involved generation located in the vicinity of the 345-kV infrastructure. Based on studies that we have conducted for proposed generation interconnections and transmission service from this area to date, some transmission reinforcements are likely to be required for any significant (>100 MW) generation development. The extent and nature of the reinforcements is also a function of where the power from the generation is to be delivered.

The Rhinelander Loop located in the northern portion of Zone 1 is a potential candidate for moderate-sized (up to 150 MW, depending on location) generation development, provided generator stability can be maintained, and provided it can be located in the northern portion of the Loop. Whether this generation would be effective as a transmission-deferral mechanism depends on a number of factors. The need for additional reinforcements outside of the Loop could also be a function of where the power from the generation is to be delivered.

The transmission infrastructure in the central portion of Zone 1 includes three new 345-kV lines which make up the GCMW corridor (Gardner Park – Highway 22, Morgan – Highway 22, and Highway 22 – Werner West). These additional lines were essential for the new Weston 4 coal plant to interconnect to the ATC transmission system, bringing much needed support to the area for both stability and thermal considerations for the Weston facility. While it has not been evaluated in any G-T requests, it is possible that this new infrastructure has improved the area such that the transmission system has the potential to support additional small- to medium-size generation development depending on actual physical location of the facility.



The infrastructure in the southern portion of Zone 1 consists of five 138-kV lines and several 69-kV lines. Only smaller generation projects (typically <25 MW) could be accommodated with minimal transmission reinforcements. The existing infrastructure in this portion of Zone 1 is not suitable for significant generation development.

Zone 1 completed generation studies:

Request	Size	Type	County, State	Status
G144	550 MW	Coal	Marathon County, WI	In-Service
G522	550 MW	Coal	Portage County, WI	Out of Queue
G523	550 MW	Coal	Marathon County, WI	Out of Queue
G588	55/60 MW	Combustion Turbine	Wood County, WI	In-Queue

Zone 2

We have completed studies of five generation interconnection requests for the Zone 2 area. Even though the first four requests are no longer active in the queue, they have helped us build a base of knowledge similar to what we have in other zones relating to likely generation interconnection impacts.

ATC is beginning to see substantial interest in siting wind turbine generators in the Upper Peninsula of Michigan. ATC has completed studies related to three wind farms located in Marquette, Houghton and Delta counties totaling 521 MW. One of the major challenges wind farms proposed for the Upper Peninsula will face is the limited transmission infrastructure to interconnect and deliver the energy produced by these power plants. Since the Upper Peninsula transmission grid was primarily designed to serve local load, substantial transmission upgrades are required to accommodate these proposed plants. The completion of the Northern Umbrella Plan, however, will result in a much more robust 138-kV network at Plains Substation that could potentially accommodate a reasonable amount (< 100 MW) of generation in the future at or near Plains.

It is likely that given the scarcity of 138-kV infrastructure in the Upper Peninsula there are virtually no other locations in Zone 2 that are ideal candidates for significant generation development. Generation studies have indicated substantial reinforcements are required to site large amounts of generation throughout the Upper Peninsula.

There are areas in Zone 2, such as on the western end of the Upper Peninsula, which are or will be in need of transmission reinforcements where smaller generation projects could be beneficial in terms of deferring transmission expenditures. The allowable capacity of such generation would depend on the location. However, other potential impacts (stability, fault duties) would need to be evaluated on a location-by-location basis.



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Zone 2 completed generation studies:

Request	Size	Type	County, State	Status
G567-568	165 or 300 MW	Coal	Delta County, MI	Out of Queue
G583	19 MW	Biomass	Ontonagon County, MI	Out of Queue
G750	201 MW	Wind	Marquette County, MI	Out of Queue
G799	120 MW	Wind	Houghton County, MI	Out of Queue
G937	29 MW*	Wind	Delta County, MI	In Queue

** was initially studied at 200 MW*

Zone 3

In Zone 3, generation has been proposed in various locations, but over half have been in the southernmost counties. Generation could be beneficial in a few areas depending on the capacity of such generation and the exact location. Smaller-scale generation (< 100 MW) in certain locations of Zone 3 could be beneficial to improving the voltage profile in the area(s) and potentially deferring transmission reinforcements. Stability analysis would need to be conducted to ensure stable operation of such generation.

Similarly, the southeast portion of Zone 3 is heavily loaded and will require transmission reinforcements in the future to ensure reliable operation. Small-scale generation in certain locations could be beneficial to changing power flow patterns and improving the voltage profile in the area.

Zone 3 completed generation studies:

Request	Size	Type	County, State	Status
G281	130 MW	Wind	Green County, WI	Out of Queue
G282	99 MW	Wind	Lafayette County, WI	In Queue
G338	54 MW	Wind	Dodge County, WI	In Service
G366	80 MW	Wind	Columbia County, WI	In Queue
G371	100 MW	Wind	Columbia County, WI	Out of Queue
G483	50 MW	Wind	Green County, WI	Out of Queue
G506	100 MW	Wind	Monroe County, WI	Out of Queue
G527	280 MW	Coal	Grant County, WI	Out of Queue
G528	550 MW	Coal	Columbia County, WI	Out of Queue
G546	100 MW	Wind	Walworth County, WI	In Queue
G550	24 MW	Simple cycle	Jefferson County, WI	In Service
G553	280 MW	Coal	Columbia County, WI	Out of Queue
G706	99 MW	Wind	Columbia County, WI	In Queue
G724	99 MW	Wind	Dane County, WI	Out of Queue
G747	99 MW	Wind	Rock County, WI	Out of Queue
G749	50 MW	Wind	Lafayette County, WI	In Queue
G793	100 MW	Wind	Rock County, WI	Out of Queue
G901	600 MW	Wind	Winnebago County, IL	Out of Queue
G902	600 MW	Wind	Winnebago County, IL	Out of Queue
G953	49.5 MW	Wind	Grant County, WI	Out of Queue



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Zone 3 completed generation studies (continued):

Request	Size	Type	County, State	Status
G954	49.5 MW	Wind	Grant County, WI	Out of Queue
H012	150 MW	Wind	Columbia County, WI	In Queue
H024	48 MW	Wind	Columbia County, WI	In Queue

Zone 4

Generation has been proposed in various locations in Zone 4. Generation could be beneficial in a few areas depending on the capacity of such generation and exact location.

The northern portion of Door County is a potential candidate for small-scale (< 50 MW) generation development, provided generator stability can be maintained and it can be appropriately located. Currently, the northern portion of the county is served by a single radial 69-kV circuit, and electric service is subject to interruption for the loss of this radial circuit. The voltage profile within Door County is projected to precipitate the need for reinforcements in the future. Whether this generation would be effective as a transmission-deferral mechanism depends on a number of factors. The need for reinforcements outside of Door County could also impact where the power from the generation is to be delivered.

One area in Zone 4 that may not accommodate any additional generation without transmission reinforcements is the area around the Point Beach and Kewaunee nuclear plants, east of Lake Winnebago. In this area, existing transmission lines have little excess capacity. As the system evolves, stability margins at those plants may become a concern. Additional generation may require transmission reinforcements to meet our stability criteria.

Zone 4 completed generation studies:

Request	Size	Type	County, State	Status
G240	54 MW	Steam	Manitowoc County, WI	In Service
G353-4	145 MW	Wind	Fond du Lac County, WI	In Service
G368	129 MW	Wind	Fond du Lac County, WI	In Service
G376	160 MW	Wind	Green County, WI	In Queue
G384	99 MW	Wind	Manitowoc County, WI	Out of Queue
G410	99 MW	Wind	Kewaunee County, WI	Out of Queue
G421	50 MW	Wind	Brown County, WI	Out of Queue
G427	98 MW	Wind	Fond du Lac County, WI	In Queue
G486	10.5 MW	Wind	Manitowoc County, WI	Out of Queue
G507	68 MW	Wind	Fond du Lac County, WI	In Service
G524	550 MW	Coal	Brown County, WI	Out of Queue
G590	98 MW	Wind	Calumet County, WI	In Queue
G611	99 MW	Wind	Calumet County, WI	In Queue
G773	150 MW	Wind	Brown County, WI	In Queue
G833	53 MW	Nuclear	Manitowoc County, WI	In Queue
G834	53 MW	Nuclear	Manitowoc County, WI	In Queue
G927	1.5 MW	Wind	Calumet County, WI	In Queue
G987	400 MW	Wind	Brown County, WI	Out of Queue



Zone 5

Major generation additions will be completed in Zone 5 over the next few years. The PSCW has approved two units near the existing Oak Creek Power Plant, with the first unit going into service in 2009 and the second unit in 2010.

Studies of other proposed generation projects that are no longer in the generation queue indicate that additional generation in certain areas of Zone 5 would pose stability problems. In particular, larger-scale generation interconnecting to the 345-kV network could pose stability issues.

Smaller-scale generation in certain locations in Washington and Waukesha counties potentially could be accommodated without the need for transmission reinforcements if located appropriately.

Zone 5 completed generation studies:

Request	Size	Type	County, State	Status
G051	1300 MW	Coal/steam	Milwaukee County, WI	In Queue
G093/G510	1200 MW	Combined cycle	Ozaukee County, WI	In Service

Transmission to distribution interconnections

We have received numerous requests from distribution companies for new transmission to distribution interconnections. These interconnection requests generally are categorized into one of three different types of projects:

1. *Constructing new T-D substations.* Typically, these new interconnections involve constructing a new T-D substation adjacent to an existing transmission line and looping the transmission line into the new substation. In some instances, the new substation cannot be sited adjacent to the transmission line and we are required to construct a transmission line to the new substation site. Since this type of interconnection is a way for a distribution company to redistribute load between the two existing substations, it typically does not materially affect transmission system performance. In some instances, however, the optimum site for the new substation, from a distribution planning perspective, is such that a new transmission line from two substations that were not previously interconnected is warranted, forming a new network line, which can materially affect transmission system performance.
2. *Adding T-D transformers at existing substations.* These new interconnections involve expanding an existing T-D substation to accommodate a new T-D transformer. Typically, this type of interconnection is a way for a distribution company to improve reliability by providing redundancy, lowering the loading on existing T-D transformers and meeting increasing customer demand.
3. *Replacing existing T-D transformers at existing substations.* These are not technically new interconnections since no expansion is required at the existing T-D substation; it's merely a means of increasing transformer capacity. This type of project is a way to reliably serve increasing customer demand.



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In some instances, the reason for a new T-D interconnection request is driven by a large new customer load, such as a new industry with a large demand for electricity. In these instances, there may be a need for other transmission system reinforcements to reliably serve the new load.

Several economic development projects in ATC's territory have prompted new D-T interconnections:

- a new manufacturing facility in the Michigan Upper Peninsula Keweenaw area,
- a new mine development north of Marquette (under construction),
- a gas separation facility in the Janesville area (recently completed),
- a large natural gas pumping facility to support a pipeline extension to the Fox Valley (ATC facilities are complete),
- several ethanol plants in various stages of development, and
- several oil pumping substation expansions for oil pipeline load increases.

T-D interconnection requests that have been jointly evaluated to the point of Best Value Planning agreement between ATC and the LDC are shown in Figures PR-11 through PR-15 for Zones 1-5, respectively. A corresponding list of these interconnection requests is available on ATC's Web site: www.atcllc.com. For the most part, those shown are on the Planning and Project Management worksheets of the D-T queue.

*Table PR-1
Projects Placed In Service Since 2008 10-Year Assessment
As of September 28, 2009*

Project	Zone
Construct Gardner Park-Highway 22 345-kV line	1
Construct new Highway 22 345-kV Substation	1
Uprate the North Bluff-Gladstone 69-kV line summer normal and emergency ratings from 120 deg F to 167 deg F	2
Uprate the Masonville-Gladstone 69-kV line summer normal and emergency ratings from 120 deg F to 167 deg F	2
Install 2-4.08 MVAR capacitor banks at Munising 69-kV Substation	2
Construct 138 kV bus and install a 138/69 kV, 60 MVA transformer at Iron Grove Substation	2
Relocate Iron River Substation (Iron Grove)	2
Relocate Cedar Substation (North Lake)	2
Uprate the Delta-North Bluff 69-kV line summer normal and emergency ratings from 120 deg F to 167 deg F	2
Install 2-16.33 MVAR capacitor banks at Perkins 138-kV Substation	2
Install 2-24.5 MVAR 138-kV Kilbourn capacitor banks	3
Install 3-16.33 MVAR 138-kV capacitor banks at North Beaver Dam Substation	3
Convert Rock River to Bristol to Elkhorn 138-kV operation; rebuild Bristol with a new 138 kV bus	3
Construct Butler Ridge 138-kV Substation	3
Install 2-24.5 MVAR 138 kV capacitor banks at Artesian Substation	3
Uprate Y-152 North Lake Geneva-Lake Geneva 69-kV line to achieve a 115 MVA summer emergency rating	3
Rebuild Stoughton Substation bus	3
Install a total of 6.3 MVAR distribution capacitor banks at Dickinson Substation	3
Uprate 58751 Boxelder to Stony Brook 138-kV line	3
Install one temporary 12.24 MVAR 69-kV mobile capacitor bank at Spring Green Substation	3
Construct a new 138-kV line from North Madison to Huiskamp	3
Construct a new 138/69-kV substation near Huiskamp and install a 138/69-kV transformer with a 187 MVA summer emergency rating	3
Uprate 6632 Rockdale to Jefferson 138-kV line	3
Expand the existing 69-kV capacitor bank from 5.4 to 8.1 MVAR at Richland Center Olson Substation and install 1-7.8 MVAR 12.4-kV capacitor bank at Brewer Substation	3
Install 5.7 MVAR distribution capacitor bank at Union Townline 69-kV Substation	3
Install 138/69-kV transformer at the expanded Menominee Substation	4
Expand the Menominee 69-kV Substation and install 138 kV terminals. Loop the West Marinette-Bay De Noc 138-kV line into the Substation	4
Rebuild Crivitz-High Falls 69-kV double circuit line	4
String a new 138-kV line from Clintonville-Werner West primarily on Morgan-Werner West 345-kV line structures	4
Construct Morgan-Werner West 345-kV line	4
Expand Oak Creek 345-kV switchyard to interconnect one new generator	5
Loop Ramsey5-Harbor 138-kV line into Norwich and Kansas to form a new line from Ramsey-Norwich and Harbor-Kansas 138-kV lines	5

*Projects Placed In Service Since 2008 10-Year Assessment
As of September 28, 2009*

Project	Zone
Replace current transformers at Racine 345-kV Substation	5
Reconductor Oak Creek-Ramsey 138-kV line	5
Construct 138-kV bus section at Shorewood	5
Install second 500 MVA 345/138-kV transformer at Oak Creek Substation	5
Reconductor Oak Creek-Allerton 138-kV line	5
Replace two 345-kV circuit breakers at Pleasant Prairie Substation on the Racine and Zion lines with IPO breakers and upgrade relaying	5
Replace relaying on 230-kV circuits at Oak Creek	5
Construct a 138-kV bus at Brookdale Substation to permit third distribution transformer interconnection	5
Reconductor Oak Creek-Allerton 138-kV line	5

Table PR-2
Transmission System Additions for 2009

System Additions	System Need Year	Projected In-Service Year	Planning Zone	Need Category	Planned, Proposed or Provisional	Cost Estimate - Refer to <i>Funding Project</i> and <i>Sum of Total (2009-2018)</i> in <i>Financial Table</i>
Uprate the Chandler-Masonville 69-kV line summer normal and emergency ratings from 120 deg F to 167 deg F	2009	2009	2	reliability	Proposed	F2532
Install 1-4.08 MVAR capacitor bank at L'Anse 69 kV	2008	2009	2	reliability	Proposed	F1819
Construct ring bus at the Pine River 69-kV Substation and replace 1-5.4 MVAR capacitor bank with 2-4.08 MVAR banks	2008	2009	2	reliability, condition	Proposed	F1282
Install 1-8.16 MVAR capacitor banks at the M38 138-kV Substation	2009	2009	2	reliability	Proposed	F2485
Uprate Chandler-Cornell 69-kV line clearance from 120 to 167 deg F	2009	2009	2	reliability	Proposed	F2016
Install 1-8.2 MVAR capacitor bank at Hiawatha 138-kV Substation	2009	2009	2	reliability	Proposed	F2222
Install 1-4.08 MVAR capacitor banks at Osceola 69 kV	2009	2009	2	reliability	Proposed	F2468
Uprate the Chandler-Delta #1 69-kV line summer emergency rating from 120 deg F to 167 deg F	2009	2009	2	reliability	Proposed	F2534

Table PR-2
Transmission System Additions for 2009 (continued)

System Additions	System Need Year	Projected In-Service Year	Planning Zone	Need Category	Planned, Proposed or Provisional	Cost Estimate - Refer to <i>Funding Project</i> and <i>Sum of Total (2009-2018)</i> in Financial Table
Uprate the Chandler-Delta #2 69-kV line summer emergency rating to from 120 deg F 167 deg F	2009	2009	2	reliability	Proposed	F2535
Construct a Jefferson-Tyranena-Stony Brook 138-kV line	2006	2009	3	reliability	Planned	F0924
Uprate X-8 Rockdale to Boxelder 138-kV line	2008	2009	3	reliability	Planned	F0924
Uprate Y-41 Walworth- North Lake Geneva 69-kV to achieve a 69 MVA summer emergency rating	2009	2009	3	reliability	Planned	F2154
Install a second 138-kV reserve auxiliary transformer (RAT) at Kewaunee and remove tertiary auxiliary transformer (TAT)	2009	2009	4	reliability	Proposed	F2371

Defined in Previous 10-Year Assessment
Revised in scope from Previous 10-Year Assessment
New to this 10-Year Assessment

Table PR-3
Transmission System Additions for 2010

System Additions	System Need Year	Projected In-Service Year	Planning Zone	Need Category	Planned, Proposed or Provisional	Cost Estimate - Refer to <i>Funding Project</i> and <i>Sum of Total (2009-2018)</i> in <i>Financial Table</i>
Rebuild Arpin-Rocky Run 345-kV line	2010	2010	1	condition	Planned	F2252
Construct 69-kV line from new Warrens Substation to the Council Creek-Tunnel City 69-kV line	2010	2010	1	T-D interconnection	Planned	F2173
Construct Brandon-Fairwater 69-kV line	2010	2010	1	T-D interconnection	Planned	F1844
Replace Metomen 69-kV breaker	2010	2010	1	reliability, condition	Planned	F2398
Rebuild/convert Conover-Plains 69-kV line to 138 kV	2010	2010	2	reliability, transfer capability	Planned	F1363
Construct 138-kV bus and install a 138/69-kV, 60 MVA transformer at Aspen Substation	2010	2010	2	reliability	Planned	F1363
Install 1-16.33 MVAR capacitor bank at Indian Lake 138-kV Substation	2010	2010	2	reliability	Proposed	F2223
Uprate Y-61 McCue-Lamar 69-kV line to achieve 300 deg F line ratings and install 2-12.45 MVAR 69-kV capacitor banks at Lamar Substation	2008	2010	3	reliability	Proposed	F2324
Uprate X-23 Colley Road-Marine 138-kV line terminals*	2014	2010	3	reliability	Proposed	F1670
Construct new Oak Ridge-Verona 138-kV line and install a 138/69-kV transformer at Verona with a 100 MVA summer normal rating	2009	2010	3	reliability	Planned	F1407

Table PR-3
Transmission System Additions for 2010 (continued)

System Additions	System Need Year	Projected In-Service Year	Planning Zone	Need Category	Planned, Proposed or Provisional	Cost Estimate - Refer to <i>Funding Project</i> and <i>Sum of Total (2009-2018)</i> in <i>Financial Table</i>
Upgrade Sheepskin capacitor bank from 10.8 MVAR to 16.2 MVAR	2009	2010	3	reliability	Planned	F2248
Construct second Paddock-Rockdale 345-kV line and replace 345/138-kV transformer T22 at Rockdale Substation	2010	2010	3	economics	Planned	F1981
Install 2-16.33 MVAR 69-kV capacitor banks at Spring Green Substation	2010	2010	3	reliability	Planned	F2327
Uprate the Royster Substation terminals	2010	2010	3	reliability	Planned	F2317
Uprate Point Beach-Sheboygan Energy Center 345-kV circuit L111 to 167 degrees F	2010	2010	4	economics	Proposed	F1988
Install 2-32 MVAR capacitor banks at Summit 138-kV Substation	2010	2010	5	reliability	Proposed	F2256
Expand 345-kV switchyard at Oak Creek to interconnect one new generator	2010	2010	5	new generation	Planned	F1729
Uprate Oak Creek-Root River 138-kV line	2010	2010	5	new generation	Planned	F2140
Uprate Oak Creek-Nicholson 138-kV line	2010	2010	5	new generation	Planned	F2112
Upgrade Bain-Albers 138-kV line	2010	2010	5	reliability	Proposed	F2461

Table PR-3
Transmission System Additions for 2010 (continued)

System Additions	System Need Year	Projected In-Service Year	Planning Zone	Need Category	Planned, Proposed or Provisional	Cost Estimate - Refer to <i>Funding Project</i> and <i>Sum of Total (2009-2018)</i> in <i>Financial Table</i>
Construct a 138-kV bus at Pleasant Valley Substation to permit second distribution transformer interconnection	2010	2010	5	T-D interconnection	Planned	F2086
Construct second Shorewood-Humboldt 138-kV underground cable*	2012	2010	5	reliability	Proposed	F2487

Defined in Previous 10-Year Assessment
Revised in scope from Previous 10-Year Assessment
New to this 10-Year Assessment

Table PR-4
Transmission System Additions for 2011

System Additions	System Need Year	Projected In-Service Year	Planning Zone	Need Category	Planned, Proposed or Provisional	Cost Estimate - Refer to <i>Funding Project</i> and <i>Sum of Total (2009-2018)</i> in <i>Financial Table</i>
Install 1-4.08 MVAR capacitor bank at North Bluff 69-kV Substation	2010	2011	2	reliability	Provisional	F2490
Replace two overhead Blount-Ruskin 69-kV lines with one underground 69-kV line	2010	2011	3	Completion of earlier project per agreement with the City of Madison	Proposed	F2628
Rebuild the Y-119 Verona to Oregon 69-kV line	2008	2011	3	reliability, condition	Proposed	F2469
Rebuild Y-33 Brodhead to South Monroe 69-kV line	2011	2011	3	generation interconnection, reliability	Planned	F2526
Uprate terminal limitations at McCue for the Y-79 McCue-Milton Lawns 69-kV line	2011	2011	3	reliability	Proposed	F2405
Install 2-24.5 MVAR 138-kV capacitor bank and 1-18 MVAR 69-kV capacitor bank at Brick Church substation	2011	2011	3	reliability	Provisional	F2404
Reconfigure Kewaunee 345/138-kV switchyard and install a second 500 MVA 345/138-kV transformer	2011	2011	4	reliability, condition	Proposed	F2437
Rebuild 2.37 miles of 69 kV from Sunset Point to Pearl Ave with 477 ACSR	2011	2011	4	reliability	Planned	F1361

Defined in Previous 10-Year Assessment
Revised in scope from Previous 10-Year Assessment
New to this 10-Year Assessment

Table PR-5
Transmission System Additions for 2012

System Additions	System Need Year	Projected In-Service Year	Planning Zone	Need Category	Planned, Proposed or Provisional	Cost Estimate - Refer to <i>Funding Project</i> and <i>Sum of Total (2009-2018)</i> in <i>Financial Table</i>
Construct 115-kV line from new Woodmin Substation to the Clear Lake Substation	2012	2012	1	T-D interconnection	Proposed	F2495
Uprate overhead portions of Straits-McGulpin 138-kV circuits #1 & #3 to 230 F degree summer emergency ratings	2012	2012	2	reliability	Provisional	TBD
Rebuild/convert Straits-Pine River 138-kV lines 6904/5	2012	2012	2	reliability	Provisional	F2833
Install 138/69-kV 150 MVA transformer at Pine River	2012	2012	2	reliability	Provisional	F2834
Install 138/69-kV 150 MVA transformer at Nine Mile	2012	2012	2	reliability	Provisional	F2834
Install 138/69-kV 150 MVA transformer at Lakehead Rapid River	2012	2012	2	reliability	Provisional	TBD
Construct tap from the Kinross load to Pine River/Nine Mile 69-kV line	2012	2012	2	T-D interconnection, reliability	Provisional	F2836
Construct/convert Pine River-Nine Mile 138/69-kV double-circuit line	2012	2012	2	reliability	Provisional	F2836
Rebuild part of the Y-8 Dane-Dam Heights 69-kV line*	2015	2012	3	reliability, asset renewal, potential T-D interconnection	Provisional	F1602
Uprate Y-40 Gran Grae-Boscobel 69-kV line to achieve a 99 MVA summer emergency rating*	2017	2012	3	reliability	Proposed	F1444

Table PR-5
Transmission System Additions for 2012 (continued)

System Additions	System Need Year	Projected In-Service Year	Planning Zone	Need Category	Planned, Proposed or Provisional	Cost Estimate - Refer to <i>Funding Project</i> and <i>Sum of Total (2009-2018)</i> in <i>Financial Table</i>
Construct Canal-Dunn Road 138-kV line	2012	2012	4	reliability	Proposed	F1358
Install 60 MVA 138/69-kV transformer at Dunn Road	2012	2012	4	reliability	Proposed	F1358
Install 3-75 MVAR capacitor banks at Bluemound Substation	2012	2012	5	reliability	Proposed	F2650

Defined in Previous 10-Year Assessment
Revised in scope from Previous 10-Year Assessment
New to this 10-Year Assessment

Table PR-6
Transmission System Additions for 2013

System Additions	System Need Year	Projected In-Service Year	Planning Zone	Need Category	Planned, Proposed or Provisional	Cost Estimate - Refer to <i>Funding Project</i> and <i>Sum of Total (2009-2018)</i> in <i>Financial Table</i>
Construct Monroe County-Council Creek 161-kV line and Timberwolf 69-kV switching station	2013	2013	1	economics, reliability	Proposed	F2454
Install a 161/138-kV transformer at Council Creek Substation	2013	2013	1	economics, reliability	Proposed	F2454
Uprate Council Creek-Petenwell 138-kV line	2013	2013	1	economics, reliability	Proposed	F2849
Upgrade Mckenna 6.3 MVAR capacitor bank to 12.25 MVAR and install a second new 12.25 MVAR capacitor bank	2013	2013	1	reliability	Provisional	F2519
Install second Chandler 138/69-kV transformer	2013	2013	2	reliability	Provisional	TBD
Increase ground clearance of M38-Atlantic 69-kV line from 120 to 167 degrees F	2009	2013	2	reliability	Provisional	TBD
Uprate Fitchburg-Nine Springs 69-kV and Royster-Pflaum 69-kV lines and move AGA load to the Royster-Femrite 69-kV line	2006	2013	3	reliability	Proposed	F2088
Rebuild Y-32 Colley Road-Brick Church 69-kV line	2013	2013	3	reliability, condition	Provisional	F1670
Install 2-16.33 MVAR 69-kV capacitor banks at Nine Springs Substation	2013	2013	3	reliability	Proposed	F2088
Install a 138/69-kV transformer at Bass Creek Substation	2010	2013	3	reliability	Proposed	F1869

Table PR-6
Transmission System Additions for 2013 (continued)

System Additions	System Need Year	Projected In-Service Year	Planning Zone	Need Category	Planned, Proposed or Provisional	Cost Estimate - Refer to <i>Funding Project</i> and <i>Sum of Total (2009-2018)</i> in <i>Financial Table</i>
Uprate X-12 Town Line Road-Bass Creek 138-kV line to 300 deg F	2010	2013	3	reliability	Proposed	F1869
Construct 345-kV line from Rockdale to West Middleton	2013	2013	3	reliability	Planned	F1435
Construct a 345-kV bus and install a 345/138 kV 500 MVA transformer at West Middleton Substation	2013	2013	3	reliability	Planned	F1435
Uprate Y-61 Sheepskin-Dana 69-kV line to 95 MVA	2013	2013	3	reliability	Proposed	F2583
Uprate Arcadian-Waukesha 138-kV lines KK9942/KK9962	2010	2013	5	reliability	Provisional	F2142
Replace two existing 345/138-kV transformers at Arcadian Substation with 1-500 MVA transformer	2010	2013	5	reliability	Provisional	F2539

Defined in Previous 10-Year Assessment
Revised in scope from Previous 10-Year Assessment
New to this 10-Year Assessment

Table PR-7
Transmission System Additions for 2014

System Additions	System Need Year	Projected In-Service Year	Planning Zone	Need Category	Planned, Proposed or Provisional	Cost Estimate - Refer to <i>Funding Project</i> and <i>Sum of Total (2009-2018)</i> in <i>Financial Table</i>
Construct a 69-kV line from SW Ripon to the Ripon-Metomen 69-kV line	2014	2014	1	T-D interconnection	Provisional	F2053
Uprate Munising-Seney-Blaney Park 69-kV line to 167 degrees F	2014	2014	2	reliability	Provisional	TBD
Construct Gwinn-Forsyth second 69-kV line	2014	2014	2	reliability	Provisional	TBD
Install 2-16.33 MVAR 69-kV capacitor banks and 2-24.5 MVAR 138-kV capacitor banks at Femrite Substation	2014	2014	3	reliability	Provisional	F2516
Install 1-16.33 MVAR 69-kV capacitor bank at Verona Substation	2014	2014	3	reliability	Provisional	F2520

Defined in Previous 10-Year Assessment
Revised in scope from Previous 10-Year Assessment
New to this 10-Year Assessment

Table PR-8
Transmission System Additions for 2015

System Additions	System Need Year	Projected In-Service Year	Planning Zone	Need Category	Planned, Proposed or Provisional	Cost Estimate - Refer to <i>Funding Project</i> and <i>Sum of Total (2009-2018)</i> in <i>Financial Table</i>
Replace the existing 46 MVA Hillman 138/69-kV transformer with a 100 MVA transformer	2015	2015	3	reliability	Provisional	F0339
Install 1-8.16 MVAR capacitor bank at Boscobel 69-kV Substation and upgrade existing 5.4 MVAR bank with an 8.16 MVAR bank	2015	2015	3	reliability	Provisional	F2518
Upgrade Columbia 345/138-kV transformer T-22 to 527 MVA	2015	2015	3	reliability	Provisional	F2135
Upgrade Oak Creek-Pennsylvania 138-kV line	2015	2015	5	reliability	Provisional	F2473

Defined in Previous 10-Year Assessment
Revised in scope from Previous 10-Year Assessment
New to this 10-Year Assessment

Table PR-9
Transmission System Additions for 2016

System Additions	System Need Year	Projected In-Service Year	Planning Zone	Need Category	Planned, Proposed or Provisional	Cost Estimate - Refer to <i>Funding Project</i> and <i>Sum of Total (2009-2018)</i> in <i>Financial Table</i>
Upgrade 4.1 MVAR capacitor bank to 8.2 MVAR and install a new 8.2 MVAR capacitor bank at Ripon 69-kV Substation	2016	2016	1	reliability	Provisional	F2477
Install a second 138/69-kV transformer at Spring Green with a 100 MVA summer normal rating	2016	2016	3	reliability	Provisional	F2445
Uprate X-67 Portage-Trienda 138-kV line to 373 MVA	2016	2016	3	reliability	Provisional	F2092
Construct new 138-kV line from North Lake Geneva to South Lake Geneva Substation	2016	2016	3	reliability, T-D interconnection	Provisional	F2587
Construct new 138-kV bus and install a 138/69-kV 100 MVA transformer at South Lake Geneva Substation	2016	2016	3	reliability	Provisional	F2587
Install 2-16.33 MVAR 69-kV capacitor banks at Eden Substation	2016	2016	3	reliability	Provisional	F2515
Install 4-49 MVAR 138-kV capacitor banks at Concord Substation	2016	2016	3	reliability, economics	Provisional	F2489
Uprate the 6986 Royster to Sycamore 69-kV line to 115 MVA	2016	2016	3	reliability	Provisional	F2471
Install 2-16.33 MVAR 69-kV capacitor banks at Sun Prairie	2016	2016	3	reliability	Provisional	F2475
Replace two existing 138/69-kV transformers at Glenview Substation with 100 MVA transformers	2016	2016	4	reliability	Provisional	F2079

Table PR-9
Transmission System Additions for 2016 (continued)

System Additions	System Need Year	Projected In-Service Year	Planning Zone	Need Category	Planned, Proposed or Provisional	Cost Estimate - Refer to <i>Funding Project</i> and <i>Sum of Total (2009-2018)</i> in <i>Financial Table</i>
Construct second Dunn Road-Egg Harbor 69-kV line	2016	2016	4	reliability	Provisional	F0181

Defined in Previous 10-Year Assessment
Revised in scope from Previous 10-Year Assessment
New to this 10-Year Assessment

Table PR-10
Transmission System Additions for 2017

System Additions	System Need Year	Projected In-Service Year	Planning Zone	Need Category	Planned, Proposed or Provisional	Cost Estimate - Refer to <i>Funding Project</i> and <i>Sum of Total (2009-2018)</i> in <i>Financial Table</i>
Install a second 138/69-kV transformer at Wautoma Substation	2017	2017	1	reliability	Provisional	F2480
Replace 138/69-kV transformer at Metomen Substation	2017	2017	1	reliability	Proposed	F1867
Uprate Castle Rock-Mckenna 69-kV line	2017	2017	1	reliability, economic benefits	Provisional	F2491
Uprate Y159 Brick Church-Walworth 69-kV line to 115 MVA	2017	2017	3	reliability	Provisional	F2153
Construct West Middleton-Blount 138-kV line	2017	2017	3	reliability	Provisional	F2466
Construct a Lake Delton-Birchwood 138-kV line	2017	2017	3	reliability	Provisional	F1638
Install 2-12.25 MVAR 69-kV capacitor banks at Mazomanie Substation	2017	2017	3	reliability	Provisional	F2517
Construct 69-kV double-circuit line between McCue and Lamar substations	2017	2017	3	reliability		F2558

Table PR-10
Transmission System Additions for 2017 (continued)

System Additions	System Need Year	Projected In-Service Year	Planning Zone	Need Category	Planned, Proposed or Provisional	Cost Estimate - Refer to <i>Funding Project</i> and <i>Sum of Total (2009-2018)</i> in <i>Financial Table</i>
Install 2-16.33 MVAR 69-kV capacitor banks at Dam Heights	2017	2017	3	reliability	Provisional	F2474

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Revised in scope from Previous 10-Year Assessment
New to this 10-Year Assessment

Table PR-11
Transmission System Additions for 2018

System Additions	System Need Year	Projected In-Service Year	Planning Zone	Need Category	Planned, Proposed or Provisional	Cost Estimate - Refer to <i>Funding Project</i> and <i>Sum of Total (2009-2018)</i> in <i>Financial Table</i>
Convert Necedah distribution substation from 69 kV to 138 kV	2018	2018	1	reliability	Provisional	F2560
Construct Fairwater-Mackford Prairie 69-kV line	2018	2018	1	reliability	Provisional	F2105
Install 2-16.33 Mvar 69-kV capacitor banks at North Monroe	2018	2018	3	reliability	Provisional	F2472
Construct Spring Valley-Twin Lakes-South Lake Geneva 138-kV line	2018	2018	3	T-D interconnection, reliability	Provisional	F2570
Replace two existing 138/69-kV transformers at Sunset Point Substation with 100 MVA transformers	2018	2018	4	economic benefits	Provisional	F2080

Defined in Previous 10-Year Assessment
Revised in scope from Previous 10-Year Assessment
New to this 10-Year Assessment

Table PR-12
Transmission System Additions for 2019

System Additions	System Need Year	Projected In-Service Year	Planning Zone	Need Category	Planned, Proposed or Provisional	Cost Estimate - Refer to <i>Funding Project</i> and <i>Sum of Total (2009-2018)</i> in <i>Financial Table</i>
Construct a Horicon-East Beaver Dam 138-kV line	2019	2019	3	reliability	Provisional	F1640
Install 2-32 MVAR capacitor banks at Mukwonago 138-kV Substation	2019	2019	5	reliability	Provisional	F2493

Defined in Previous 10-Year Assessment
Revised in scope from Previous 10-Year Assessment
New to this 10-Year Assessment

Table PR-13
Transmission System Additions beyond 2019

System Additions	System Need Year	Projected In-Service Year	Planning Zone	Need Category	Planned, Proposed or Provisional	Cost Estimate - Refer to <i>Funding Project</i> and <i>Sum of Total (2009-2018)</i> in <i>Financial Table</i>
Install 28.8 MVAR capacitor bank at Butternut 138-kV Substation	2020	2020	4	reliability	Provisional	F1403
Uprate the Melissa-Tayco to 229 MVA (300F)	2020	2020	4	reliability, economics	Provisional	F2434
Install 138/69-kV transformer at Custer Substation	2020	2020	4	reliability, economics	Provisional	F2081
Construct Shoto to Custer 138-kV line	2020	2020	4	reliability, economics	Provisional	F2081
Rebuild/Convert Bayport-Suamico-Sobieski-Pioneer 69-kV line to 138 kV	2020	2020	4	reliability, condition	Provisional	F1619
Reconfigure the North Randolph-Ripon 69-kV line to form a second Ripon-Metomen 69-kV line and retire the circuit between Metomen and the Mackford Prairie tap	2021	2021	1	reliability	Provisional	F2105
Construct a 345-kV bus, install a 345/138-kV 500 MVA transformer at North Randolph and loop the Columbia to South Fond Du Lac 345-kV line into the substation	2021	2021	3	reliability	Provisional	F2093
Install 2-16.33 MVAR 69-kV capacitor banks at Rio	2022	2022	3	reliability	Provisional	F2557
Install a 12.2 MVAR capacitor bank at Hilltop 69-kV Substation	2023	2023	1	reliability	Provisional	F2476

Table PR-13
Transmission System Additions beyond 2019

System Additions	System Need Year	Projected In-Service Year	Planning Zone	Need Category	Planned, Proposed or Provisional	Cost Estimate - Refer to <i>Funding Project</i> and <i>Sum of Total (2009-2018)</i> in <i>Financial Table</i>
Reconductor Ramsey-Harbor 138-kV line	TBD	TBD	5	reliability	Provisional	TBD

Defined in Previous 10-Year Assessment
Revised in scope from Previous 10-Year Assessment
New to this 10-Year Assessment

Table PR-14
Zone 1 Transmission System Additions

System Additions	System Need Year	Projected In-Service Year	Planning Zone	Need Category	Planned, Proposed or Provisional
Rebuild Arpin-Rocky Run 345-kV line	2010	2010	1	condition	Planned
Construct 69-kV line from new Warrens Substation to the Council Creek-Tunnel City 69-kV line	2010	2010	1	T-D interconnection	Planned
Construct Brandon-Fairwater 69-kV line	2010	2010	1	T-D interconnection	Planned
Replace Metomen 69-kV breaker	2010	2010	1	reliability, condition	Planned
Construct 115-kV line from new Woodmin Substation to the Clear Lake Substation	2012	2012	1	T-D interconnection	Proposed
Construct Monroe County-Council Creek 161-kV line and Timberwolf 69-kV switching station	2013	2013	1	economics, reliability	Proposed
Install a 161/138-kV transformer at Council Creek Substation	2013	2013	1	economics, reliability	Proposed
Uprate Council Creek-Petenwell 138-kV line	2013	2013	1	economics, reliability	Proposed
Upgrade Mckenna 6.3 MVAR capacitor bank to 12.25 MVAR and install a second new 12.25 MVAR capacitor bank	2013	2013	1	reliability	Provisional
Construct a 69-kV line from SW Ripon to the Ripon-Metomen 69-kV line	2014	2014	1	T-D interconnection	Provisional
Upgrade 4.1 MVAR capacitor bank to 8.2 MVAR and install a new 8.2 MVAR capacitor bank at Ripon 69-kV Substation	2016	2016	1	reliability	Provisional

Table PR-14 (continued)
Zone 1 Transmission System Additions

System Additions	System Need Year	Projected In-Service Year	Planning Zone	Need Category	Planned, Proposed or Provisional
Install a second 138/69-kV transformer at Wautoma Substation	2017	2017	1	reliability	Provisional
Replace 138/69-kV transformer at Metomen Substation	2017	2017	1	reliability	Proposed
Uprate Castle Rock-Mckenna 69-kV line	2017	2017	1	reliability, economic benefits	Provisional
Convert Necedah distribution substation from 69 kV to 138 kV	2018	2018	1	reliability	Provisional
Construct Fairwater-Mackford Prairie 69-kV line	2018	2018	1	reliability	Provisional
Reconfigure the North Randolph-Ripon 69-kV line to form a second Ripon-Metomen 69-kV line and retire the circuit between Metomen and the Mackford Prairie tap	2021	2021	1	reliability	Provisional
Install a 12.2 MVAR capacitor bank at Hilltop 69-kV Substation	2023	2023	1	reliability	Provisional

Table PR-15
Zone 2 Transmission System Additions

System Additions	System Need Year	Projected In-Service Year	Planning Zone	Need Category	Planned, Proposed or Provisional
Uprate the Chandler-Masonville 69-kV line summer normal and emergency ratings from 120 deg F to 167 deg F	2009	2009	2	reliability	Proposed
Install 1-4.08 MVAR capacitor bank at L'Anse 69 kV	2008	2009	2	reliability	Proposed
Construct ring bus at the Pine River 69-kV Substation and replace 1-5.4 MVAR capacitor bank with 2-4.08 MVAR banks	2008	2009	2	reliability, condition	Proposed
Install 1-8.16 MVAR capacitor banks at the M38 138-kV Substation	2009	2009	2	reliability	Proposed
Uprate Chandler-Cornell 69-kV line clearance from 120 to 167 deg F	2009	2009	2	reliability	Proposed
Install 1-8.2 MVAR capacitor bank at Hiawatha 138-kV Substation	2009	2009	2	reliability	Proposed
Install 1-4.08 MVAR capacitor banks at Osceola 69 kV	2009	2009	2	reliability	Proposed
Uprate the Chandler-Delta #1 69-kV line summer emergency rating from 120 deg F to 167 deg F	2009	2009	2	reliability	Proposed

Table PR-15 (continued)
Zone 2 Transmission System Additions

System Additions	System Need Year	Projected In-Service Year	Planning Zone	Need Category	Planned, Proposed or Provisional
Uprate the Chandler-Delta #2 69-kV line summer emergency rating to from 120 deg F 167 deg F	2009	2009	2	reliability	Proposed
Rebuild/convert Conover-Plains 69-kV line to 138 kV	2010	2010	2	reliability, transfer capability	Planned
Construct 138 kV bus and install a 138/69 kV, 60 MVA transformer at Aspen Substation	2010	2010	2	reliability	Planned
Install 1-16.33 MVAR capacitor bank at Indian Lake 138-kV Substation	2010	2010	2	reliability	Proposed
Install 1-4.08 MVAR capacitor bank at North Bluff 69-kV Substation	2010	2011	2	reliability	Provisional
Uprate overhead portions of Straits-McGulpin 138-kV circuits #1 & #3 to 230 F degree summer emergency ratings	2012	2012	2	reliability	Provisional
Rebuild/convert Straits-Pine River 138-kV lines 6904/5	2012	2012	2	reliability	Provisional
Install 138/69-kV 150 MVA transformer at Pine River	2012	2012	2	reliability	Provisional
Install 138/69-kV 150 MVA transformer at Nine Mile	2012	2012	2	reliability	Provisional
Install 138/69-kV 150 MVA transformer at Lakehead Rapid River	2012	2012	2	reliability	Provisional

Table PR-15 (continued)
Zone 2 Transmission System Additions

System Additions	System Need Year	Projected In-Service Year	Planning Zone	Need Category	Planned, Proposed or Provisional
Construct tap from the Kinross load to Pine River/Nine Mile 69-kV line	2012	2012	2	T-D interconnection, reliability	Provisional
Construct/convert Pine River-Nine Mile 138/69-kV double-circuit line	2012	2012	2	reliability	Provisional
Install second Chandler 138/69-kV transformer	2013	2013	2	reliability	Provisional
Increase ground clearance of M38-Atlantic 69-kV line from 120 to 167 degrees F	2009	2013	2	reliability	Provisional
Uprate Munising-Seney-Blaney Park 69-kV line to 167 degrees F	2014	2014	2	reliability	Provisional
Construct Gwinn-Forsyth second 69-kV line	2014	2014	2	reliability	Provisional

Table PR-16
Zone 3 Transmission System Additions

System Additions	System Need Year	Projected In-Service Year	Planning Zone	Need Category	Planned, Proposed or Provisional
Construct a Jefferson-Tyrannena-Stony Brook 138-kV line	2006	2009	3	reliability	Planned
Uprate X-8 Rockdale to Boxelder 138-kV line	2008	2009	3	reliability	Planned
Uprate Y-41 Walworth- North Lake Geneva 69-kV to achieve a 69 MVA summer emergency rating	2009	2009	3	reliability	Planned
Uprate Y-61 McCue-Lamar 69-kV line to achieve 300 deg F line ratings and install 2-12.45 Mvar 69 kV capacitor banks at Lamar Substation	2008	2010	3	reliability	Proposed
Uprate X-23 Colley Road-Marine 138-kV line terminals	2014	2010	3	reliability	Proposed
Construct new Oak Ridge-Verona 138-kV line and install a 138/69-kV transformer at Verona with a 100 MVA summer normal rating	2009	2010	3	reliability	Planned
Upgrade Sheepskin capacitor bank from 10.8 MVAR to 16.2 MVAR	2009	2010	3	reliability	Planned
Construct second Paddock-Rockdale 345-kV line and replace 345/138-kV transformer T22 at Rockdale Substation	2010	2010	3	economics	Planned
Install 2-16.33 MVAR 69-kV capacitor banks at Spring Green Substation	2010	2010	3	reliability	Planned
Uprate the Royster Substation terminals	2010	2010	3	reliability	Planned

Table PR-16 (continued)
Zone 3 Transmission System Additions

System Additions	System Need Year	Projected In-Service Year	Planning Zone	Need Category	Planned, Proposed or Provisional
Replace two overhead Blount-Ruskin 69-kV lines with one underground 69-kV line	2010	2011	3	completion of earlier project per agreement with the City of Madison	Proposed
Rebuild the Y-119 Verona to Oregon 69-kV line	2008	2011	3	reliability, condition	Proposed
Rebuild Y-33 Brodhead to South Monroe 69-kV line	2011	2011	3	generation interconnection, reliability	Planned
Uprate terminal limitations at McCue for the Y-79 McCue-Milton Lawns 69-kV line	2011	2011	3	reliability	Proposed
Install 2-24.5 MVAR 138-kV capacitor bank and 1-18 MVAR 69-kV capacitor bank at Brick Church substation	2011	2011	3	reliability	Provisional
Rebuild part of the Y-8 Dane-Dam Heights 69-kV line	2015	2012	3	reliability, asset renewal, potential T-D interconnection	Provisional
Uprate Y-40 Gran Grae-Boscobel 69-kV line to achieve a 99 MVA summer emergency rating	2017	2012	3	reliability	Proposed
Uprate Fitchburg-Nine Springs 69-kV and Royster-Pflaum 69-kV lines and move AGA load to the Royster-Femrite 69-kV line	2006	2013	3	reliability	Proposed
Rebuild Y-32 Colley Road-Brick Church 69-kV line	2013	2013	3	reliability, condition	Provisional

Table PR-16 (continued)
Zone 3 Transmission System Additions

System Additions	System Need Year	Projected In-Service Year	Planning Zone	Need Category	Planned, Proposed or Provisional
Install 2-16.33 MVAR 69-kV capacitor banks at Nine Springs Substation	2013	2013	3	reliability	Proposed
Install a 138/69-kV transformer at Bass Creek Substation	2010	2013	3	reliability	Proposed
Uprate X-12 Town Line Road-Bass Creek 138-kV line to 300 deg F	2010	2013	3	reliability	Proposed
Construct 345-kV line from Rockdale to West Middleton	2013	2013	3	reliability	Planned
Construct a 345-kV bus and install a 345/138 kV 500 MVA transformer at West Middleton Substation	2013	2013	3	reliability	Planned
Uprate Y-61 Sheepskin-Dana 69-kV line to 95 MVA	2013	2013	3	reliability	Proposed
Install 2-16.33 MVAR 69-kV capacitor banks and 2-24.5 MVAR 138-kV capacitor banks at Femrite Substation	2014	2014	3	reliability	Provisional
Install 1-16.33 MVAR 69-kV capacitor bank at Verona Substation	2014	2014	3	reliability	Provisional
Replace the existing 46 MVA Hillman 138/69-kV transformer with a 100 MVA transformer	2015	2015	3	reliability	Provisional
Install 1-8.16 MVAR capacitor bank at Boscobel 69-kV Substation and upgrade existing 5.4 MVAR bank with an 8.16 MVAR bank	2015	2015	3	reliability	Provisional
Uprate Columbia 345/138-kV transformer T-22 to 527 MVA	2015	2015	3	reliability	Provisional

Table PR-16 (continued)
Zone 3 Transmission System Additions

System Additions	System Need Year	Projected In-Service Year	Planning Zone	Need Category	Planned, Proposed or Provisional
Install a second 138/69-kV transformer at Spring Green with a 100 MVA summer normal rating	2016	2016	3	reliability	Provisional
Uprate X-67 Portage-Trienda 138-kV line to 373 MVA	2016	2016	3	reliability	Provisional
Construct new 138-kV line from North Lake Geneva to South Lake Geneva Substation	2016	2016	3	reliability, T-D interconnection	Provisional
Construct new 138-kV bus and install a 138/69-kV 100 MVA transformer at South Lake Geneva Substation	2016	2016	3	reliability	Provisional
Install 2-16.33 MVAR 69-kV capacitor banks at Eden Substation	2016	2016	3	reliability	Provisional
Install 4-49 MVAR 138-kV capacitor banks at Concord Substation	2016	2016	3	reliability, economics	Provisional
Uprate the 6986 Royster to Sycamore 69-kV line to 115 MVA	2016	2016	3	reliability	Provisional
Install 2-16.33 MVAR 69-kV capacitor banks at Sun Prairie	2016	2016	3	reliability	Provisional
Uprate Y159 Brick Church-Walworth 69-kV line to 115 MVA	2017	2017	3	reliability	Provisional
Construct West Middleton-Blount 138-kV line	2017	2017	3	reliability	Provisional
Construct a Lake Delton-Birchwood 138-kV line	2017	2017	3	reliability	Provisional

Table PR-16 (continued)
Zone 3 Transmission System Additions

System Additions	System Need Year	Projected In-Service Year	Planning Zone	Need Category	Planned, Proposed or Provisional
Install 2-12.25 MVAR 69-kV capacitor banks at Mazomanie Substation	2017	2017	3	reliability	Provisional
Construct 69-kV double-circuit line between McCue and Lamar substations	2017	2017	3	reliability	Provisional
Install 2-16.33 MVAR 69-kV capacitor banks at Dam Heights	2017	2017	3	reliability	Provisional
Install 2-16.33 MVAR 69-kV capacitor banks at North Monroe	2018	2018	3	reliability	Provisional
Construct Spring Valley-Twin Lakes-South Lake Geneva 138-kV line	2018	2018	3	T-D interconnection, reliability	Provisional
Construct a Horicon-East Beaver Dam 138-kV line	2019	2019	3	reliability	Provisional
Construct a 345-kV bus, install a 345/138-kV 500 MVA transformer at North Randolph and loop the Columbia to South Fond Du Lac 345-kV line into the substation	2021	2021	3	reliability	Provisional
Install 2-16.33 MVAR 69-kV capacitor banks at Rio	2022	2022	3	reliability	Provisional

Table PR-17
Zone 4 Transmission System Additions

System Additions	System Need Year	Projected In-Service Year	Planning Zone	Need Category	Planned, Proposed or Provisional
Install a second 138-kV reserve auxiliary transformer (RAT) at Kewaunee and remove tertiary auxiliary transformer (TAT)	2009	2009	4	reliability	Proposed
Uprate Point Beach-Sheboygan Energy Center 345-kV circuit L111 to 167 degrees F	2010	2010	4	economics	Proposed
Reconfigure Kewaunee 345/138-kV switchyard and install a second 500 MVA 345/138-kV transformer	2011	2011	4	reliability, condition	Proposed
Rebuild 2.37 miles of 69 kV from Sunset Point to Pearl Ave with 477 ACSR	2011	2011	4	reliability	Planned
Construct Canal-Dunn Road 138-kV line	2012	2012	4	reliability	Proposed
Install 60 MVA 138/69-kV transformer at Dunn Road	2012	2012	4	reliability	Proposed
Replace two existing 138/69-kV transformers at Glenview Substation with 100 MVA transformers	2016	2016	4	reliability	Provisional
Construct second Dunn Road-Egg Harbor 69-kV line	2016	2016	4	reliability	Provisional
Replace two existing 138/69-kV transformers at Sunset Point Substation with 100 MVA transformers	2018	2018	4	economic benefits	Provisional
Install 28.8 MVAR capacitor bank at Butternut 138-kV Substation	2020	2020	4	reliability	Provisional

Table PR-17 (continued)
Zone 4 Transmission System Additions

System Additions	System Need Year	Projected In-Service Year	Planning Zone	Need Category	Planned, Proposed or Provisional
Uprate the Melissa-Tayco to 229 MVA (300F)	2020	2020	4	reliability, economics	Provisional
Install 138/69-kV transformer at Custer Substation	2020	2020	4	reliability, economics	Provisional
Construct Shoto to Custer 138-kV line	2020	2020	4	reliability, economics	Provisional
Rebuild/Convert Bayport-Suamico-Sobieski-Pioneer 69-kV line to 138 kV	2020	2020	4	reliability, condition	Provisional

Table PR-18
Zone 5 Transmission System Additions

System Additions	System Need Year	Projected In-Service Year	Planning Zone	Need Category	Planned, Proposed or Provisional
Construct a 138-kV bus at Pleasant Valley Substation to permit second distribution transformer interconnection	2010	2010	5	T-D interconnection	Planned
Install 2-32 MVAR capacitor banks at Summit 138-kV Substation	2010	2010	5	reliability	Proposed
Expand 345-kV switchyard at Oak Creek to interconnect one new generator	2010	2010	5	new generation	Planned
Uprate Oak Creek-Root River 138-kV line	2010	2010	5	new generation	Planned
Uprate Oak Creek-Nicholson 138-kV line	2010	2010	5	new generation	Planned
Upgrade Bain-Albers 138-kV line	2010	2010	5	reliability	Proposed
Construct second Shorewood-Humboldt 138-kV underground cable	2012	2010	5	reliability	Proposed
Install 3-75 MVAR capacitor banks at Bluemound Substation	2012	2012	5	reliability	Proposed
Uprate Arcadian-Waukesha 138-kV lines KK9942/KK9962	2010	2013	5	reliability	Provisional
Replace two existing 345/138-kV transformers at Arcadian Substation with 1-500 MVA transformer	2010	2013	5	reliability	Provisional

Table PR-18 (continued)
Zone 5 Transmission System Additions

System Additions	System Need Year	Projected In-Service Year	Planning Zone	Need Category	Planned, Proposed or Provisional
Upgrade Oak Creek-Pennsylvania 138-kV line	2015	2015	5	reliability	Provisional
Install 2-32 MVAR capacitor banks at Mukwonago 138-kV Substation	2019	2019	5	reliability	Provisional
Reconductor Ramsey-Harbor 138-kV line	TBD	TBD	5	reliability	Provisional

Table PR-19
Identified Needs and Transmission Lines Requiring New Right-of-Way

Identified need	Potential solutions	Approx. line mileage		System need year	Projected In-service year	Planning zone
		Total	New ROW			
relieve overloads or low voltages under contingency	Construct a Jefferson-Tyranena-Stony Brook 138-kV line	13.9	13.9	2006	2009	35
T-D interconnection request	Construct 69-kV line from new Warrens Substation to the Council Creek-Tunnel City 69-kV line	4.5	4.5	2010	2010	1
T-D interconnection request	Construct Brandon-Fairwater 69-kV line	4	4	2010	2010	1
relieve overloads or low voltages under contingency	Construct new Oak Ridge-Verona 138-kV line and install a 138/69-kV transformer at Verona with a 100 MVA summer normal rating	6.1	3	2009	2010	3
T-D interconnection request	Construct 115-kV line from new Woodmin Substation to the Clear Lake Substation	7.5	7.5	2012	2012	1
T-D interconnection request, relieve overloads or low voltages under contingency	Construct tap from the Kinross load to Pine River/Nine Mile 69-kV line	2	2	2012	2012	2
relieve overloads or low voltages under contingency	Construct 345-kV line from Rockdale to West Middleton	32.4	32.4	2013	2013	3
T-D interconnection request	Construct a 69-kV line from SW Ripon to the Ripon-Metomen 69-kV line	1.5	1.5	2014	2014	1
relieve overloads or low voltages under contingency, T-D interconnection request	Construct new 138-kV line from North Lake Geneva to South Lake Geneva Substation	5.1	5.1	2016	2016	35
relieve overloads or low voltages under contingency	Construct second Dunn Road-Egg Harbor 69-kV line	12.66	12.66	2016	2016	4
relieve overloads or low voltages under contingency	Construct a Lake Delton-Birchwood 138-kV line	5	5	2017	2017	31
relieve overloads or low voltages under contingency	Construct Fairwater-Mackford Prairie 69-kV line	0	5	2018	2018	1
T-D interconnection request,relieve overloads or low voltages under contingency	Construct Spring Valley-Twin Lakes-South Lake Geneva 138-kV line	24.0	15	2018	2018	35
relieve overloads or low voltages under contingency	Construct a Horicon-East Beaver Dam 138-kV line	10	10	2019	2019	34
relieve overloads or low voltages under contingency, economics	Construct Shoto to Custer 138-kV line	9.94	9.94	2020	2020	4

**Table PR-20
Transmission Line Rebuilds/Reconductors, New Circuits and Voltage Conversions on
Existing Right-of-Way**

Identified need	Lines to be rebuilt/reconducted on existing ROW	Approx. mileage of rebuilt, reconducted or uprated lines	System need year	Projected In-service year	Planning zone
asset renewal	Rebuild Arpin-Rocky Run 345-kV line	20	2010	2010	1
relieve overloads or low voltages under contingency, transfer capability	Rebuild/convert Conover-Plains 69-kV line to 138 kV	71	2010	2010	2
economics	Construct second Paddock-Rockdale 345-kV line and replace 345/138-kV transformer T22 at Rockdale Substation	30	2010	2010	3
accommodate new generation	Uprate Oak Creek-Nicholson 138-kV line	6.8	2010	2010	5
relieve overloads or low voltages under contingency	Construct second Shorewood-Humboldt 138-kV underground cable	0.75	2012	2010	5
Completion of earlier project per agreement with the City of Madison	Replace two overhead Blount-Ruskin 69-kV lines with one underground 69-kV line	2	2010	2011	3
relieve overloads or low voltages under contingency, asset renewal	Rebuild the Y-119 Verona to Oregon 69-kV line	11	2008	2011	3
generation interconnection, relieve overloads or low voltages under contingency	Rebuild Y-33 Brodhead to South Monroe 69-kV line	18	2011	2011	3
relieve overloads or low voltages under contingency	Rebuild 2.37 miles of 69 kV from Sunset Point to Pearl Ave with 477 ACSR	2.37	2011	2011	4
relieve overloads or low voltages under contingency	Rebuild/convert Straits-Pine River 138-kV lines 6904/5	50	2012	2012	2
relieve overloads or low voltages under contingency	Construct/convert Pine River-Nine Mile 138/69-kV double-circuit line	40	2012	2012	2
relieve overloads or low voltages under contingency, asset renewal, potential T-D interconnection request	Rebuild part of the Y-8 Dane-Dam Heights 69-kV line	5	2015	2012	31
relieve overloads or low voltages under contingency	Construct Canal-Dunn Road 138-kV line	7.64	2012	2012	4
economics, relieve overloads or low voltages under contingency	Construct Monroe County-Council Creek 161-kV line and Timberwolf 69-kV switching station	17.9	2013	2013	1
economics, relieve overloads or low voltages under contingency	Uprate Council Creek-Petenwell 138-kV line	32	2013	2013	1

Table PR-20
Transmission Line Rebuilds/Reconductors, New Circuits and Voltage Conversions on Existing Right-of-Way

Identified need	Lines to be rebuilt/reconstructed on existing ROW	Approx. mileage of rebuilt, reconstructed or updated lines	System need year	Projected In-service year	Planning zone
relieve overloads or low voltages under contingency	Increase ground clearance of M38-Atlantic 69-kV line from 120 to 167 degrees F	22	2009	2013	2
relieve overloads or low voltages under contingency, asset renewal	Rebuild Y-32 Colley Road-Brick Church 69-kV line	19.7	2013	2013	3
relieve overloads or low voltages under contingency	Construct Gwinn-Forsyth second 69-kV line	1	2014	2014	2
relieve overloads or low voltages under contingency	Upgrade the 6986 Royster to Sycamore 69-kV line to 115 MVA	3.35	2016	2016	3
relieve overloads or low voltages under contingency	Construct West Middleton-Blount 138-kV line	5	2017	2017	3
relieve overloads or low voltages under contingency	Construct 69-kV double-circuit line between McCue and Lamar substations	4.0	2017	2017	3
relieve overloads or low voltages under contingency, asset renewal	Rebuild/Convert Bayport-Suamico-Sobieski-Pioneer 69-kV line to 138 kV	21.2	2020	2020	4
relieve overloads or low voltages under contingency	Reconductor Ramsey-Harbor 138-kV line	8.4	TBD	TBD	5

**Table PR-21
New Substations, Transformer Additions and Replacements**

Identified need	Potential additions or replacements	Transformer Capacity (MVA)		System need year	Projected In-service year	Planning zone
		Install	Replace			
relieve overloads under contingency	Construct 138 kV bus and install a 138/69 kV, 60 MVA transformer at Aspen Substation	60	0	2010	2010	2
relieve overloads under contingency, replace aging facilities	Reconfigure Kewaunee 345/138-kV switchyard and install a second 500 MVA 345/138-kV transformer	500	0	2011	2011	4
relieve overloads under contingency	Install 138/69-kV 150 MVA transformer at Pine River	150	0	2012	2012	2
relieve overloads under contingency	Install 138/69-kV 150 MVA transformer at Nine Mile	150	0	2012	2012	2
relieve overloads under contingency	Install 138/69-kV 150 MVA transformer at Lakehead Rapid River	150	0	2012	2012	2
relieve overloads under contingency	Install 60 MVA 138/69-kV transformer at Dunn Road	60	0	2012	2012	4
economics, relieve overloads under contingency	Install a 161/138-kV transformer at Council Creek Substation	100	0	2013	2013	1
relieve overloads under contingency	Install second Chandler 138/69-kV transformer	0	40	2013	2013	2
relieve overloads under contingency	Install a 138/69-kV transformer at Bass Creek Substation	100	0	2010	2013	3
relieve overloads under contingency	Construct a 345-kV bus and install a 345/138 kV 500 MVA transformer at West Middleton Substation	500	0	2013	2013	3
relieve overloads under contingency	Replace two existing 345/138-kV transformers at Arcadian Substation with 1-500 MVA transformer	500	672	2010	2013	5
relieve overloads under contingency	Replace the existing 46 MVA Hillman 138/69-kV transformer with a 100 MVA transformer	47	0	2015	2015	3
relieve overloads under contingency	Uprate Columbia 345/138-kV transformer T-22 to 527 MVA	527	400	2015	2015	3
relieve overloads under contingency	Install a second 138/69-kV transformer at Spring Green with a 100 MVA summer normal rating	100	0	2016	2016	3
relieve overloads under contingency	Construct new 138-kV bus and install a 138/69-kV 100 MVA transformer at South Lake Geneva Substation	100	0	2016	2016	35
relieve overloads under contingency	Replace two existing 138/69-kV transformers at Glenview Substation with 100 MVA transformers	200	116	2016	2016	4

**Table PR-21
New Substations, Transformer Additions and Replacements**

Identified need	Potential additions or replacements	Transformer Capacity (MVA)		System need year	Projected In-service year	Planning zone
		Install	Replace			
relieve overloads under contingency	Install a second 138/69-kV transformer at Wautoma Substation	100	0	2017	2017	1
relieve overloads under contingency	Replace 138/69-kV transformer at Metomen Substation	100	47	2017	2017	1
relieve overloads under contingency	Convert Necedah distribution substation from 69 kV to 138 kV	N/A	N/A	2018	2018	1
economic benefits	Replace two existing 138/69-kV transformers at Sunset Point Substation with 100 MVA transformers	200	142	2018	2018	4
relieve overloads under contingency, economics	Install 138/69-kV transformer at Custer Substation	100	0	2020	2020	4
relieve overloads under contingency	Construct a 345-kV bus, install a 345/138-kV 500 MVA transformer at North Randolph and loop the Columbia to South Fond Du Lac 345-kV line into the substation	500	0	2021	2021	34

**Table PR-22
Substation Equipment Additions and Replacements**

Identified need	Potential additions or replacements	Capacitor bank Capacity (MVAR)	System Need Year	Projected In-Service Year	Planning Zone
relieve overloads or low voltages under contingency	Uprate the Chandler-Masonville 69-kV line summer normal and emergency ratings from 120 deg F to 167 deg F	N/A	2009	2009	2
relieve overloads or low voltages under contingency	Install 1-4.08 MVAR capacitor bank at L'Anse 69 kV	4.08	2008	2009	2
relieve overloads or low voltages under contingency, asset renewal	Construct ring bus at the Pine River 69-kV Substation and replace 1-5.4 MVAR capacitor bank with 2-4.08 MVAR banks	2.76	2008	2009	2
relieve overloads or low voltages under contingency	Install 1-8.16 MVAR capacitor banks at the M38 138-kV Substation	8.16	2009	2009	2
relieve overloads or low voltages under contingency	Uprate Chandler-Cornell 69-kV line clearance from 120 to 167 deg F	N/A	2009	2009	2
relieve overloads or low voltages under contingency	Install 1-8.2 MVAR capacitor bank at Hiawatha 138-kV Substation	8.2	2009	2009	2
relieve overloads or low voltages under contingency	Install 1-4.08 MVAR capacitor banks at Osceola 69 kV	4.08	2009	2009	2
relieve overloads or low voltages under contingency	Uprate the Chandler-Delta #1 69-kV line summer emergency rating from 120 deg F to 167 deg F	N/A	2009	2009	2
relieve overloads or low voltages under contingency	Uprate the Chandler-Delta #2 69-kV line summer emergency rating to from 120 deg F 167 deg F	N/A	2009	2009	2
relieve overloads or low voltages under contingency	Uprate X-8 Rockdale to Boxelder 138-kV line	N/A	2008	2009	35
relieve overloads or low voltages under contingency	Uprate Y-41 Walworth-North Lake Geneva 69-kV to achieve a 69 MVA summer emergency rating	N/A	2009	2009	3
relieve overloads or low voltages under contingency	Install a second 138-kV reserve auxiliary transformer (RAT) at Kewaunee and remove tertiary auxiliary transformer (TAT)	N/A	2009	2009	4
T-D interconnection request	Construct a 138-kV bus at Pleasant Valley Substation to permit second distribution transformer interconnection	N/A	2010	2010	5
relieve overloads or low voltages under contingency, asset renewal	Replace Metomen 69-kV breaker	N/A	2010	2010	1
relieve overloads or low voltages under contingency	Install 1-16.33 MVAR capacitor bank at Indian Lake 138-kV Substation	16.33	2010	2010	2
relieve overloads or low voltages under contingency	Uprate Y-61 McCue-Lamar 69-kV line to achieve 300 deg F line ratings and install 2-12.45 Mvar 69 kV capacitor banks at Lamar Substation	24.9	2008	2010	3

**Table PR-22
Substation Equipment Additions and Replacements**

Identified need	Potential additions or replacements	Capacitor bank Capacity (MVAR)	System Need Year	Projected In-Service Year	Planning Zone
relieve overloads or low voltages under contingency	Uprate X-23 Colley Road-Marine 138-kV line terminals	N/A	2014	2010	3
relieve overloads or low voltages under contingency	Upgrade Sheepskin capacitor bank from 10.8 MVAR to 16.2 MVAR	5.4	2009	2010	3
relieve overloads or low voltages under contingency	Install 2-16.33 MVAR 69-kV capacitor banks at Spring Green Substation	32	2010	2010	3
relieve overloads or low voltages under contingency	Uprate the Royster Substation terminals	N/A	2010	2010	3
relieve overloads or low voltages under contingency	Install 2-32 MVAR capacitor banks at Summit 138-kV Substation	64	2010	2010	5
accommodate new generation	Expand 345-kV switchyard at Oak Creek to interconnect one new generator	N/A	2010	2010	5
accommodate new generation	Uprate Oak Creek-Root River 138-kV line	N/A	2010	2010	5
economics	Uprate Point Beach-Sheboygan Energy Center 345-kV circuit L111 to 167 degrees F	N/A	2010	2010	4
relieve overloads or low voltages under contingency	Upgrade Bain-Albers 138-kV line	N/A	2010	2010	5
relieve overloads or low voltages under contingency	Install 1-4.08 MVAR capacitor bank at North Bluff 69-kV Substation	4.08	2010	2011	2
relieve overloads or low voltages under contingency	Uprate terminal limitations at McCue for the Y-79 McCue-Milton Lawns 69-kV line	N/A	2011	2011	35
relieve overloads or low voltages under contingency	Install 2-24.5 MVAR 138-kV capacitor bank and 1-18 MVAR 69-kV capacitor bank at Brick Church substation	67	2011	2011	35
relieve overloads or low voltages under contingency	Install 3-75 MVAR capacitor banks at Bluemound Substation	200	2012	2012	5
relieve overloads or low voltages under contingency	Uprate overhead portions of Straits-McGulpin 138-kV circuits #1 & #3 to 230 F degree summer emergency ratings	N/A	2012	2012	2
relieve overloads or low voltages under contingency	Uprate Y-40 Gran Grae-Boscobel 69-kV line to achieve a 99 MVA summer emergency rating	N/A	2017	2012	3
relieve overloads or low voltages under contingency	Upgrade McKenna 6.3 MVAR capacitor bank to 12.25 MVAR and install a second new 12.25 MVAR capacitor bank	15.3	2013	2013	1
relieve overloads or low voltages under contingency	Uprate Fitchburg-Nine Springs 69-kV and Royster-Pflaum 69-kV lines and move AGA load to the Royster-Femrite 69-kV line	N/A	2006	2013	3

**Table PR-22
Substation Equipment Additions and Replacements**

Identified need	Potential additions or replacements	Capacitor bank Capacity (MVAR)	System Need Year	Projected In-Service Year	Planning Zone
relieve overloads or low voltages under contingency	Install 2-16.33 MVAR 69-kV capacitor banks at Nine Springs Substation	32.66	2013	2013	3
relieve overloads or low voltages under contingency	Uprate X-12 Town Line Road-Bass Creek 138-kV line to 300 deg F	N/A	2010	2013	3
relieve overloads or low voltages under contingency	Uprate Y-61 Sheepskin-Dana 69-kV line to 95 MVA	N/A	2013	2013	3
relieve overloads or low voltages under contingency	Uprate Arcadian-Waukesha 138-kV lines KK9942/KK9962	N/A	2010	2013	5
relieve overloads or low voltages under contingency	Uprate Munising-Seney-Blanney Park 69-kV line to 167 degrees F	N/A	2014	2014	2
relieve overloads or low voltages under contingency	Install 2-16.33 MVAR 69-kV capacitor banks and 2-24.5 MVAR 138-kV capacitor banks at Femrite Substation	81.66	2014	2014	3
relieve overloads or low voltages under contingency	Install 1-16.33 MVAR 69-kV capacitor bank at Verona Substation	16.33	2014	2014	3
relieve overloads or low voltages under contingency	Install 1-8.16 MVAR capacitor bank at Boscobel 69-kV Substation and upgrade existing 5.4 MVAR bank with an 8.16 MVAR bank	10.8	2015	2015	3
relieve overloads or low voltages under contingency	Upgrade Oak Creek-Pennsylvania 138-kV line	N/A	2015	2015	5
relieve overloads or low voltages under contingency	Upgrade 4.1 MVAR capacitor bank to 8.2 MVAR and install a new 8.2 MVAR capacitor bank at Ripon 69-kV Substation	12.3	2016	2016	1
relieve overloads or low voltages under contingency	Uprate X-67 Portage-Trienda 138-kV line to 373 MVA	N/A	2016	2016	31
relieve overloads or low voltages under contingency	Install 2-16.33 MVAR 69-kV capacitor banks at Eden Substation	32.66	2016	2016	3
relieve overloads or low voltages under contingency, economics	Install 4-49 MVAR 138-kV capacitor banks at Concord Substation	196	2016	2016	35
relieve overloads or low voltages under contingency	Install 2-16.33 Mvar 69-kV capacitor banks at Sun Prairie	32.66	2016	2016	3
relieve overloads or low voltages under contingency, economic benefits	Uprate Castle Rock-Mckenna 69-kV line	N/A	2017	2017	1
relieve overloads or low voltages under contingency	Uprate Y159 Brick Church-Walworth 69-kV line to 115 MVA	N/A	2017	2017	35
relieve overloads or low voltages under contingency	Install 2-12.25 MVAR 69-kV capacitor banks at Mazomanie Substation	24.5	2017	2017	3

**Table PR-22
Substation Equipment Additions and Replacements**

Identified need	Potential additions or replacements	Capacitor bank Capacity (MVAR)	System Need Year	Projected In-Service Year	Planning Zone
relieve overloads or low voltages under contingency	Install 2-16.33 Mvar 69-kV capacitor banks at Dam Heights	32.66	2017	2017	31
relieve overloads or low voltages under contingency	Install 2-16.33 Mvar 69-kV capacitor banks at North Monroe	32.66	2018	2018	3
relieve overloads or low voltages under contingency	Install 2-32 Mvar capacitor banks at Mukwonago 138-kV Substation	64	2019	2019	5
relieve overloads or low voltages under contingency	Install 28.8 MVAR capacitor bank at Butternut 138-kV Substation	28.8	2020	2020	4
relieve overloads or low voltages under contingency, economics	Uprate the Melissa-Tayco to 229 MVA (300F)	N/A	2020	2020	4
relieve overloads or low voltages under contingency	Reconfigure the North Randolph-Ripon 69-kV line to form a second Ripon-Metomen 69-kV line and retire the circuit between Metomen and the Mackford Prairie tap	N/A	2021	2021	1
relieve overloads or low voltages under contingency	Install 2-16.33 Mvar 69-kV capacitor banks at Rio	32.66	2022	2022	34
relieve overloads or low voltages under contingency	Install a 12.2 MVAR capacitor bank at Hilltop 69-kV Substation	12.2	2023	2023	1

Table PR-23

Summary of Cancellations, Deferrals, Changes, Possible Changes and New Projects for the 2009 10-Year Assessment

PROJECTS CANCELED	Former In-Service Date	Planning Zone	Reason for Removal
A second distribution transformer at Somers Substation requires a rebuild of the Racine-Somers-Albers 138-kV line; extend Albers 138-kV bus to permit connecting the Racine-Somers-Albers radial line to the Albers 138-kV bus	2011	5	Updated study results
Construct a 345-kV bus at Bain Substation	2008	5	Updated study results
Install a second 138/69-kV transformer at McCue Substation	2016	3	Updated study results
Upgrade Bain-Kenosha 138-kV line	2013	5	Equipment replaced during construction of another project
Install 2-16.3 MVAR capacitor bank at Mears Corners 138-kV Substation	TBD	4	Updated load/model information
Install 2-16.3 MVAR capacitor bank at Rosiere 138-kV Substation	TBD	4	Updated load/model information
Construct Evansville-Brooklyn 69-kV line	TBD	3	Updated load/model information
Construct Verona-North Monroe 138-kV line	TBD	3	Updated load/model information
Replace the 1200 A breaker at Edgewater T22 345/138-kV transformer	TBD	4	Equipment replaced during construction of another project
Uprate 138-kV line from Kewaunee to East Krok	TBD	4	Updated load/model information
Rebuild Blaney Park-Munising 69 kV to 138 kV	2014	2	Upper Peninsula Collaborative updated study results
Install 2-16.3 MVAR capacitor bank at Aviation Substation	TBD	4	Updated load/model information
PROJECTS DEFERRED	New Date	Planning Zone	Reason for Deferral
Construct a 138-kV bus at Pleasant Valley Substation to permit second distribution transformer interconnection	2010	5	Was 2009; Resource scheduling requirements
Uprate Y-61 McCue-Lamar 69-kV line to achieve 300 deg F line ratings and install 2-12.45 Mvar 69-kV capacitor banks at Lamar Substation	2010	3	Was 2009 and provisional status; now proposed; delay due to resource scheduling requirements
Rebuild 2.37 miles of 69 kV from Sunset Point to Pearl Ave with 477 ACSR	2011	4	Was 2009; Resource scheduling requirements

Table PR-23**Summary of Cancellations, Deferrals, Changes, Possible Changes and New Projects for the 2009 10-Year Assessment**

PROJECTS DEFERRED	New date	Planning Zone	Reason for Deferral
Install 3-75 MVAR capacitor banks at Bluemound Substation	2012	5	Was 2010; Resource scheduling requirements
Construct Monroe County-Council Creek 161-kV line and Timberwolf 69-kV switching station	2013	1	Was 2012; coordination with other entities
Install a 161/138-kV transformer at Council Creek Substation	2013	1	Was 2012; coordination with other entities
Uprate Council Creek-Petenwell 138-kV line	2013	1	Was 2012; coordination with other entities
Rebuild Y-32 Colley Road-Brick Church 69-kV line	2013	3	Was 2012; Resource scheduling requirements
Uprate X-12 Town Line Road-Bass Creek 138-kV line to 300 deg F	2013	3	Was 2012; Resource scheduling requirements
Uprate Arcadian-Waukesha 138-kV lines KK9942/KK9962	2013	5	Was 2010 proposed status, now provisional; updated study results
Replace two existing 345/138-kV transformers at Arcadian Substation with 1-500 MVA transformer	2013	5	Was 2010, Resource scheduling requirements
Install 1-8.16 MVAR capacitor bank at Boscobel 69-kV Substation and upgrade existing 5.4 MVAR bank with an 8.16 MVAR bank	2015	3	Was 2013; updated load/model information
Upgrade Oak Creek-Pennsylvania 138-kV line	2015	5	Was 2014; updated load/model information
Install a second 138/69-kV transformer at Spring Green with a 100 MVA summer normal rating	2016	3	Was 2013; updated load/model information
Uprate X-67 Portage-Trienda 138-kV line to 373 MVA	2016	3	Was 2014; updated load/model information
Construct new 138-kV line from North Lake Geneva to South Lake Geneva Substation	2016	3	Was 2015; updated study results
Construct new 138-kV bus and install a 138/69-kV 100 MVA transformer at South Lake Geneva Substation	2016	3	Was 2015; updated study results

Table PR-23**Summary of Cancellations, Deferrals, Changes, Possible Changes and New Projects for the 2009 10-Year Assessment**

PROJECTS DEFERRED (continued)	New date	Planning Zone	Reason for Deferral
Install 2-16.33 MVAR 69-kV capacitor banks at Eden Substation	2016	3	Was 2014; updated load/model information
Install 4-49 MVAR 138-kV capacitor banks at Concord Substation	2016	3	Was 2011; updated load/model information
Replace two existing 138/69-kV transformers at Glenview Substation with 100 MVA transformers	2016	4	Was 2014; updated load/model information
Replace 138/69-kV transformer at Metomen Substation	2017	1	Was 2013; now a two-phased approach – breaker replaced in 2010, transformer in 2017
Uprate Y159 Brick Church-Walworth 69-kV line to 115 MVA	2017	3	Was 2015; updated load/model information
Construct a Lake Delton-Birchwood 138-kV line	2017	3	Was 2015; updated load/model information
Install 2-12.25 MVAR 69-kV capacitor banks at Mazomanie Substation	2017	3	Was 2014; updated load/model information
Construct a Horicon-East Beaver Dam 138-kV line	2019	3	Was 2014; updated load/model information
Install 2-32 Mvar capacitor banks at Mukwonago 138-kV Substation	2019	5	Was 2014; updated load/model information
Install 28.8 MVAR capacitor bank at Butternut 138-kV Substation	2020	4	Was 2016; updated load/model information
Uprate the Melissa-Tayco to 229 MVA (300F)	2020	4	Was 2016; updated load/model information
Install 138/69-kV transformer at Custer Substation	2020	4	Was 2016; updated load/model information
Construct Shoto to Custer 138-kV line	2020	4	Was 2016; updated load/model information
Rebuild/Convert Bayport-Suamico-Sobieski-Pioneer 69-kV line to 138 kV	2020	4	Was 2016; updated load/model information

Table PR-23**Summary of Cancellations, Deferrals, Changes, Possible Changes and New Projects for the 2009 10-Year Assessment**

PROJECTS DEFERRED (continued)	New date	Planning Zone	Reason for Deferral
Reconfigure the North Randolph-Ripon 69-kV line to form a second Ripon-Metomen 69-kV line and retire the circuit between Metomen and the Mackford Prairie tap	2021	1	Was 2018; updated load/model information
Construct a 345-kV bus, install a 345/138-kV 500 MVA transformer at North Randolph and loop the Columbia to South Fond Du Lac 345-kV line into the substation	2021	3	Was 2018; updated load/model information
Install 2-16.33 Mvar 69-kV capacitor banks at Rio	2022	3	Was 2019; updated load/model information
OTHER PROJECT CHANGES AND POSSIBLE CHANGES	Date	Planning Zone	Nature of Change or Update
Install 1-8.2 MVAR capacitor bank at Hiawatha 138-kV Substation	2009	2	Was 16.33 MVAR capacitor bank
Uprate the Chandler-Delta #1 69-kV line summer emergency rating from 120 deg F to 167 deg F	2009	2	Was 2010 in-service date
Uprate the Chandler-Delta #2 69-kV line summer emergency rating to from 120 deg F 167 deg F	2009	2	Was 2010 in-service date
Replace Metomen 69-kV breaker	2010	1	Metomen xfmr project broken into two pieces; Phase I 2010 and Phase II 2017
Uprate X-23 Colley Road-Marine 138-kV line terminals	2010	3	Was 2014 in-service date
Construct second Shorewood-Humboldt 138-kV underground cable	2010	5	Was 2012 in-service date
Install 1-4.08 MVAR capacitor bank at North Bluff 69-kV Substation	2011	2	Was yet to be determined in-service date
Replace two overhead Blount-Ruskin 69-kV lines with one underground 69-kV line	2011	3	Was yet to be determined in-service date, provisional status now proposed

Table PR-23**Summary of Cancellations, Deferrals, Changes, Possible Changes and New Projects for the 2009 10-Year Assessment**

OTHER PROJECT CHANGES AND POSSIBLE CHANGES (continued)			
	Date	Planning Zone	Nature of Change or Update
Uprate overhead portions of Straits-McGulpin 138-kV circuits #1 & #3 to 230 F degree summer emergency ratings	2012	2	Was yet to be determined in-service date
Rebuild part of the Y-8 Dane-Dam Heights 69-kV line	2012	3	Was 2015 in-service date; now combined with earlier maintenance project
Uprate Y-40 Gran Grae-Boscobel 69-kV line to achieve a 99 MVA summer emergency rating	2012	3	Was 2014 in-service date
Uprate Fitchburg-Nine Springs 69-kV and Royster-Pflaum 69-kV lines and move AGA load to the Royster-Femrite 69-kV line	2013	3	Was loop Nine Springs-Pflaum into Femrite
Construct second Dunn Road-Egg Harbor 69-kV line	2016	4	Was proposed status, now provisional
Uprate Castle Rock-Mckenna 69-kV line	2017	1	Was 2018 in-service date
NEW PROJECTS			
	In-Service Date	Planning Zone	Reason for Project
Uprate Point Beach-Sheboygan Energy Center 345-kV circuit L111 to 167 degrees F	2010	4	Market congestion
Rebuild/convert Straits-Pine River 138-kV lines 6904/5	2012	2	Upper Peninsula Collaborative study results
Install 138/69-kV 150 MVA transformer at Pine River	2012	2	Upper Peninsula Collaborative study results
Install 138/69-kV 150 MVA transformer at Nine Mile	2012	2	Upper Peninsula Collaborative study results
Install 138/69-kV 150 MVA transformer at Lakehead Rapid River	2012	2	Upper Peninsula Collaborative study results
Construct tap from the Kinross load to Pine River/Nine Mile 69-kV line	2012	2	Upper Peninsula Collaborative study results
Construct/convert Pine River-Nine Mile 138/69-kV double-circuit line	2012	2	Upper Peninsula Collaborative study results
Install second Chandler 138/69-kV transformer	2013	2	Upper Peninsula Collaborative study results
Install 2-16.33 MVAR 69-kV capacitor banks at Nine Springs Substation	2013	3	Upper Peninsula Collaborative study results

Table PR-23

Summary of Cancellations, Deferrals, Changes, Possible Changes and New Projects for the 2009 10-Year Assessment

NEW PROJECTS (continued)	In-Service Date	Planning Zone	Reason for Project
Uprate Munising-Seney-Blanney Park 69-kV line to 167 degrees F	2014	2	Upper Peninsula Collaborative study results
Construct Gwinn-Forsyth second 69-kV line	2014	2	Upper Peninsula Collaborative study results

Table PR-24
Projects In Design or Construction

Project	Zone
Rebuild/convert Conover-Plains 69-kV line to 138 kV	1
Construct 138-kV bus and install a 138/69 kV, 60 MVA transformer at Aspen Substation	1
Construct Rockdale-West Middleton 345-kV line	3
Rebuild Brodhead-South Monroe 69-kV line	3
Uprate X-8 Rockdale to Boxelder 138-kV line	3
Construct a Jefferson-Tyrannena-Stony Brook 138-kV line	3
Construct second Paddock-Rockdale 345-kV line and replace 345/138-kV transformer T22 at Rockdale Substation	3
Construct a new 345-kV double-breaker/double bus Kewaunee Switchyard and install a second 345/138-kV transformer.	4

*Table PR-25
Projects Awaiting Regulatory Review/Approval*

Project	Zone
None	

*Table PR-26
Former Generator Requests Now In-Service*

<u>Date</u>	<u>Requests on-line</u>	<u>Megawatts</u>
6/14/01	IC006 (Eden/Little Badger)	31
2001	G074 (Combined Locks)	53
6/1/03	G111 (Pulliam CT)	85
6/1/03	G148 (Petenwell/Big Pond)	19.5
3/19/04	G165 & G383 (Kewaunee uprate)	43
6/1/04	G225 (Kaukauna CT)	60
6/15/04	G035 & G072 (Riverside)	655
5/1/05	G096 & G160 (West Campus)	150
6/1/05	G044 (Fox Energy)	602
6/2/05	G103 (Sheboygan)	370
7/16/05, 9/1/06, 6/1/08,	G014 & G093 (Port Washington) G510 (Port Washington increase)	1200
4/1/07	G240 (Manitowoc)	54
5/07, 6/09	G550 (Concord uprate)	24
4/30/08	G353 & G354 (Cypress)	145
3/31/08	G368 (Forward)	129
6/26/08	G144 (Weston)	550
12/11/08	G507 & G507B (Cedar Ridge)	68
3/16/09	G338 (Butler Ridge)	54

Table PR-27
Proposed Projects Active in the Generation Queue as of July 1, 2009

Zone	Queue #	County	Project capacity	Interconnection voltage	Generator technology and fuel	Developer projected in-service date
1	G588	Wood	55 MW	115 kV	simple cycle/gas	3/08
1	J040	Marathon	50 MW	115 kV	biomass	12/13
1	Total		105 MW			
2	G937	Delta	29 MW	138 kV	wind turbine	12/10
2	J039	Delta	50 MW	69 kV	biomass	12/13
2	Total		79 MW			
3	G282	Lafayette	99 MW	138 kV	wind turbine	5/10
3	G366	Columbia	80 MW	138 kV	wind turbine	12/10
3	G546	Walworth	100 MW	138 kV	wind turbine	12/10 suspended
3	G706	Columbia	99 MW	138 kV	wind turbine	12/10
3	G749	Lafayette	50 MW	69 or 138 kV	wind turbine	8/10
3	H012	Columbia	150 MW	138 kV	wind turbine	12/10
3	H024	Columbia	48 MW	69 kV	wind turbine	12/11
3	Total		626 MW			
4	G376	Green Lake/Fond du Lac	160 MW	138 kV	wind turbine	TBD
4	G427	Fond du Lac	98 MW	345 kV	wind turbine	12/10 suspended
4	G590	Calumet	98 MW	138 kV	wind turbine	12/10 suspended
4	G611	Calumet	99 MW	138 kV	wind turbine	12/10
4	G773	Brown	150 MW	138 kV	wind turbine	12/12
4	G833	Manitowoc	53 MW	345 kV	nuclear	5/11
4	G834	Manitowoc	53 MW	345 kV	nuclear	5/10
4	G927	Calumet	1.5 MW	138 kV	wind turbine	9/09
4	G977	Calumet	49.5 MW	138 kV	wind turbine	8/10
4	H090	Calumet	60 MW	138 kV	wind turbine	9/10
4	J022	Manitowoc	6 MW	345 kV	nuclear	5/10
4	J023	Manitowoc	6 MW	345 kV	nuclear	5/11
4	Total		834 MW			
5	G051	Milwaukee	1300 MW	345 kV	steam/coal	12/09, 8/10
5	Total		1300 MW			

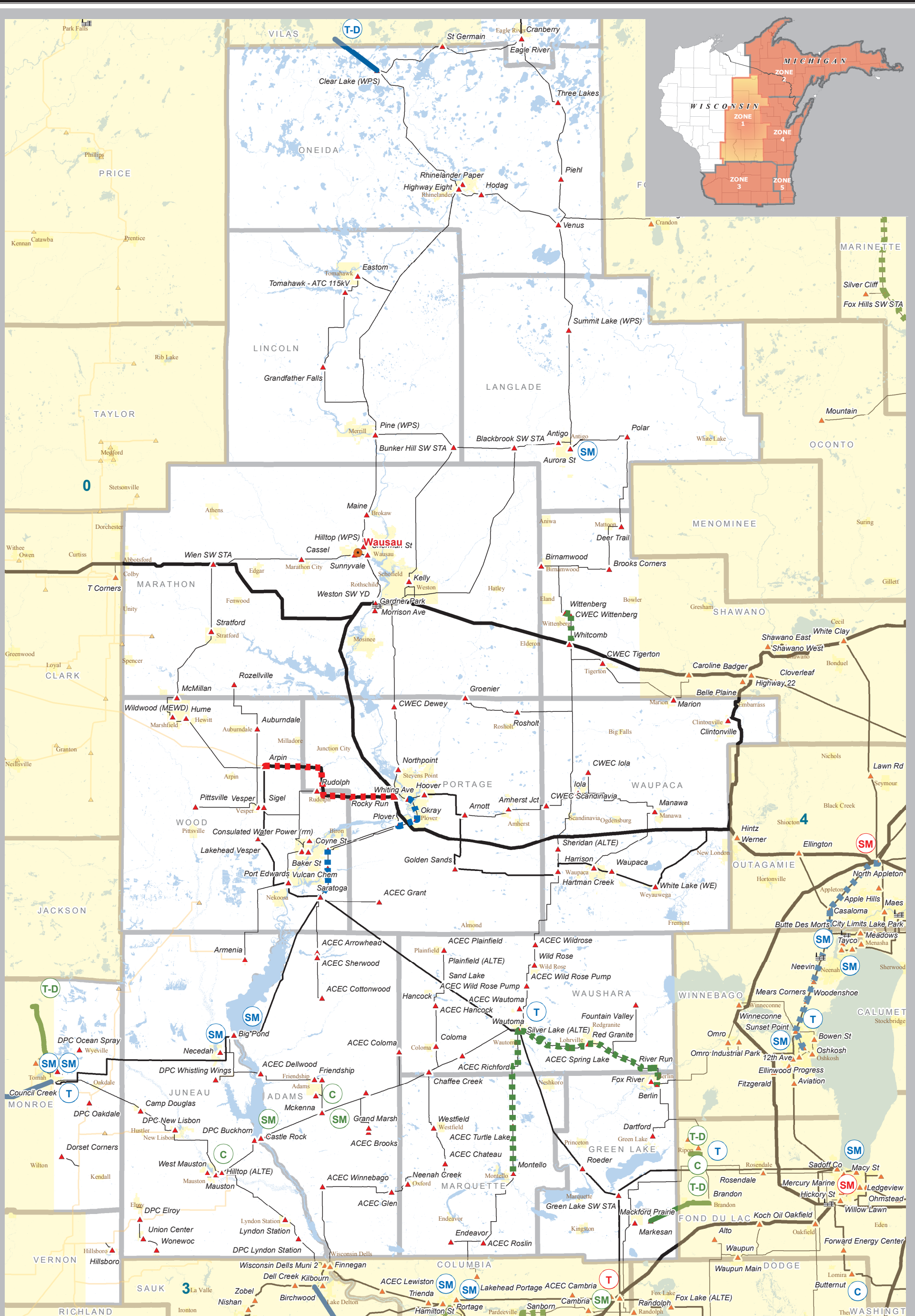
Notes:

1. Suspended = Interconnection Agreement has been suspended by the customer.
2. TBD = Customer has lifted suspension and the new in-service date is to be determined.

*Table PR-28
Requests Previously in the Generation Queue
Which Have been Withdrawn/Removed between July 1, 2008
and July 1, 2009*

Zone	Queue no.	County	Size	Voltage	Type	In-Service Date
1	none					
2	G750	Marquette	201 MW	138 kV	Wind	9/09
	G799	Houghton	120.45 MW	69 kV	Wind	11/09
3	G483	Green	50 MW	69 kV	Wind	12/10
	G527	Grant	280 MW	138 kV	Coal	3/12
	G553	Columbia	280 MW	345 kV	Coal	3/12
	G724	Dane	99 MW	138 kV	Wind	5/09
	G747	Rock	99 MW	138 kV	Wind	8/09
	G793	Rock	100 MW	138 kV	Wind	8/09
	G901	Winnebago, IL	600 MW	345 kV	Wind	12/10
	G902	Winnebago, IL	600 MW	345 kV	Wind	12/10
	G953	Grant	49.5 MW	69 kV	Wind	9/09
	G954	Grant	49.5 MW	69 kV	Wind	9/10
	G955	Rock	99 MW	138 kV	Wind	9/10
	G956	Walworth	49.5 MW	69 kV	Wind	9/10
	G995	Lafayette	99 MW	138 kV	Wind	12/10
	H036	Columbia	30 MW	138 kV	Wind	6/10
4	G384	Manitowoc/Kewaunee	99 MW	138 kV	Wind	12/10
	G987	Brown	400 MW	345 kV	Wind	12/10
5	none					

Figure PR-1



2009 10-Year Assessment Projects PLANNING ZONE 1

Currently, ATC owns or operates transmission facilities in 50 Wisconsin counties and in 15 Michigan counties. Facilities include:

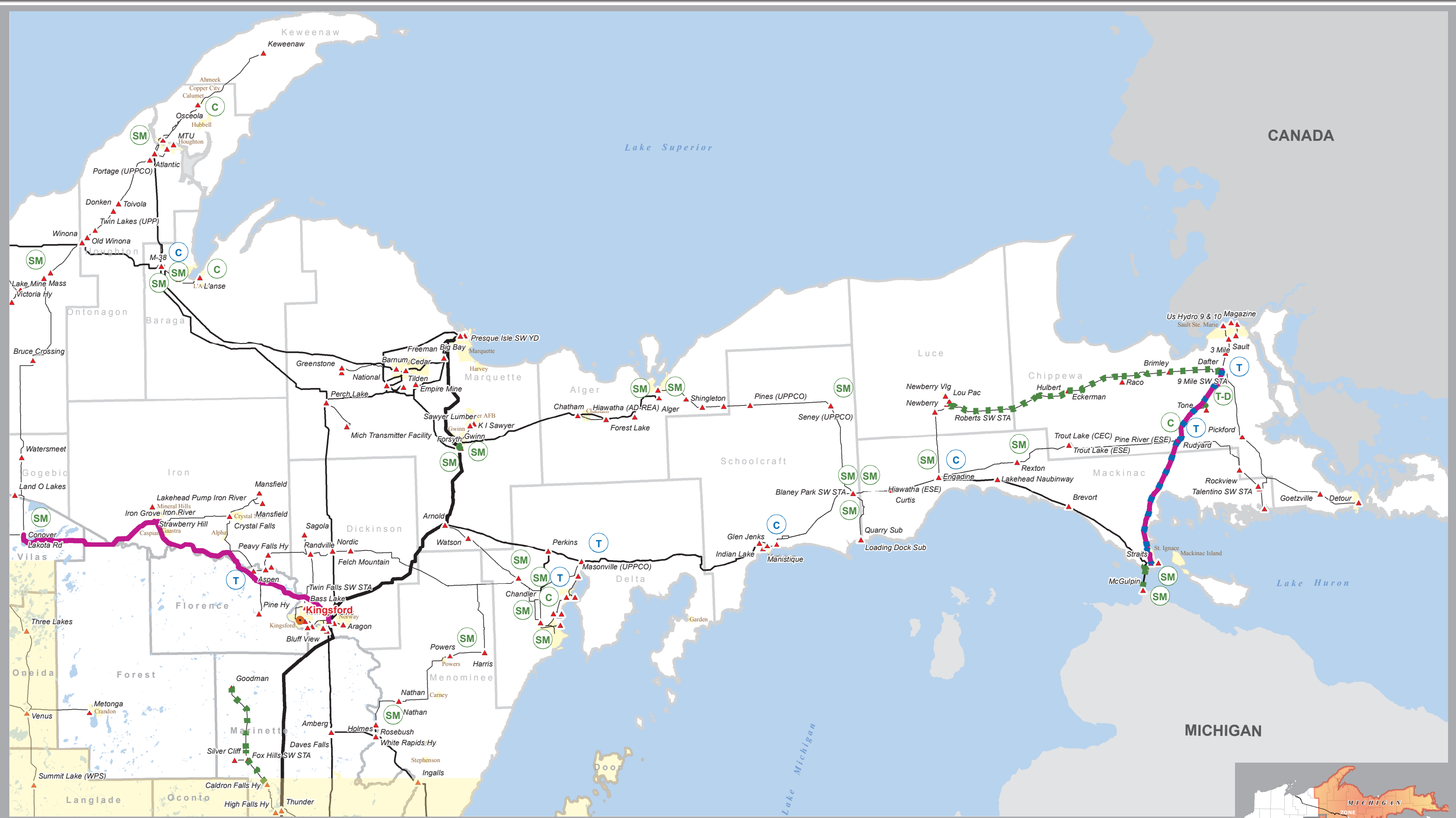
- * Approximately 9425 miles of transmission lines
- * 96 wholly owned substations
- * 410 jointly owned substations
- * ATC offices in Madison, Cottage Grove, Pewaukee, De Pere, Wausau and Kingsford, WI

- New 69kV Transmission Line
- New 115, 138 or 161 kV Transmission Line
- New 345 kV Transmission Line
- - - Rebuilt 69 kV Transmission Line
- - - Rebuilt 115, 138 or 161 kV Transmission Line
- - - Rebuilt 345 kV Transmission Line
- Transmission Line Voltage Conversion

- (SS) New Substation
- (SM) Substation Modifications
- (T-D) T-D Interconnection
- (C) Capacitor Bank
- (T) Transformer

- Existing Transmission Facilities**
- ATC Office Location
 - ▲ ATC Substation, Switchyard or Terminal
 - ▲ Non-ATC Substation, Switchyard or Terminal
 - ☰ Generation
 - ATC Transmission Line (width = voltage)
 - - - Non-ATC Transmission Line

The information presented in this map document is advisory and is intended for reference purposes only. American Transmission Company owned and operated facility locations are approximate.



**2009 10-Year Assessment Projects
PLANNING ZONE 2**

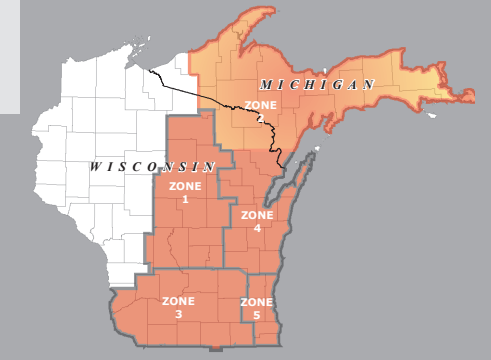
ATC
AMERICAN TRANSMISSION COMPANY

Currently, ATC owns or operates transmission facilities in 50 Wisconsin counties and in 15 Michigan counties. Facilities include:

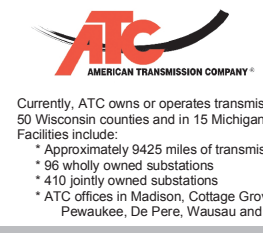
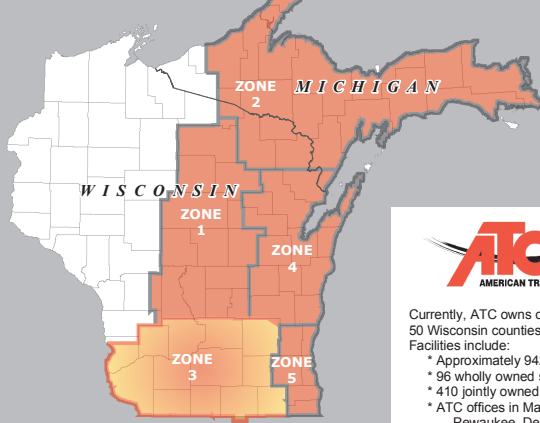
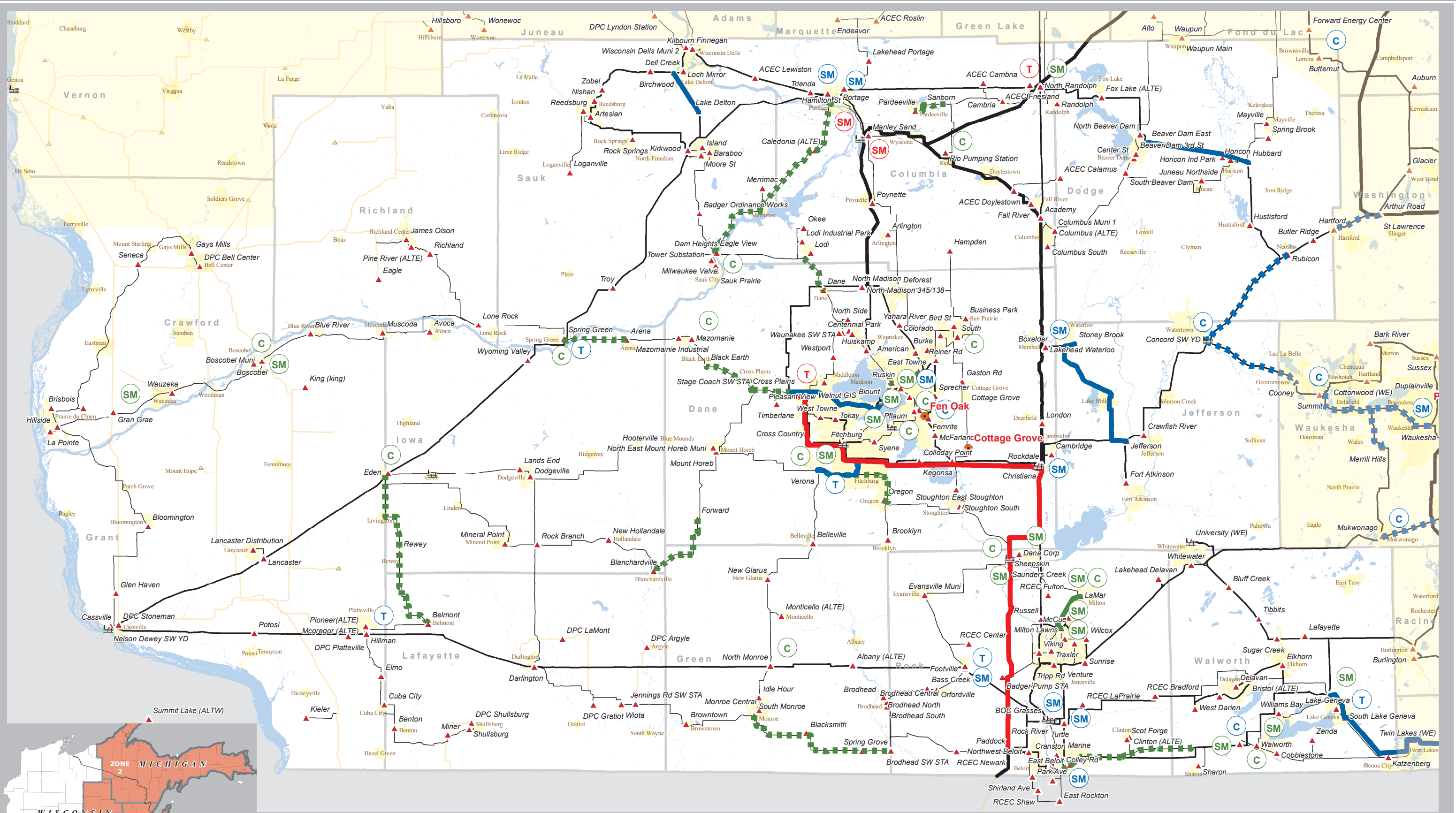
- * Approximately 9425 miles of transmission lines
- * 96 wholly owned substations
- * 410 jointly owned substations
- * ATC offices in Madison, Cottage Grove, Pewaukee, De Pere, Wausau and Kingsford, WI

- | | | | |
|--|--|--------------------------|---------------------|
| New 69kV Transmission Line | Rebuilt 69 kV Transmission Line | New Substation | T-D Interconnection |
| New 115, 138 or 161 kV Transmission Line | Rebuilt 115, 138 or 161 kV Transmission Line | Substation Modifications | Capacitor Bank |
| New 345 kV Transmission Line | Rebuilt 345 kV Transmission Line | Transformer | |
| Transmission Line Voltage Conversion | | | |

- Existing Transmission Facilities**
- ATC Office Location
 - ATC Substation, Switchyard or Terminal
 - Generation
 - ATC Transmission Line (width = voltage)



The information presented in this map document is advisory and is intended for reference purposes only. American Transmission Company owned and operated facility locations are approximate.

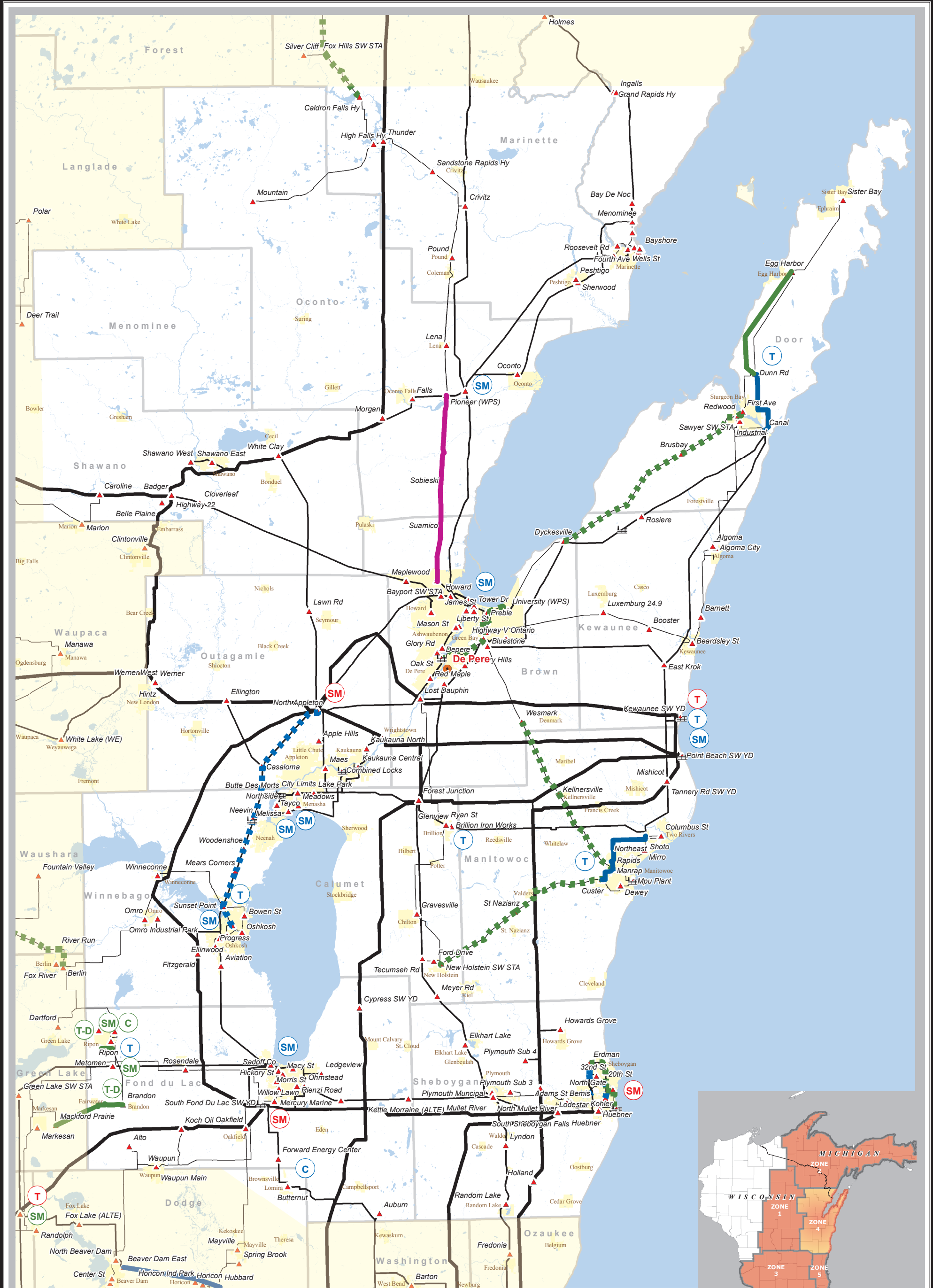


2009 10-Year Assessment Projects
PLANNING ZONE 3

Currently, ATC owns or operates transmission facilities in 50 Wisconsin counties and in 15 Michigan counties. Facilities include:
 * Approximately 9425 miles of transmission lines
 * 96 wholly owned substations
 * 410 jointly owned substations
 * ATC offices in Madison, Cottage Grove, Pewaukee, De Pere, Wausau and Kingsford, WI

- New 69kV Transmission Line
- New 115, 138 or 161 kV Transmission Line
- New 345 kV Transmission Line
- Transmission Line Voltage Conversion
- - - Rebuilt 69 kV Transmission Line
- - - Rebuilt 115, 138 or 161 kV Transmission Line
- - - Rebuilt 345 kV Transmission Line

- (SS) New Substation
- (SM) Substation Modifications
- (T-D) T-D Interconnection
- (C) Capacitor Bank
- (T) Transformer
- Existing Transmission Facilities
- ▲ ATC Office Location
- ▲ ATC Substation, Switchyard or Terminal
- ▲ Non-ATC Substation, Switchyard or Terminal
- ☐ Generation
- ATC Transmission Line (width = voltage)
- Non-ATC Transmission Line



2009 10-Year Assessment Projects PLANNING ZONE 4

Currently, ATC owns or operates transmission facilities in 50 Wisconsin counties and in 15 Michigan counties. Facilities include:

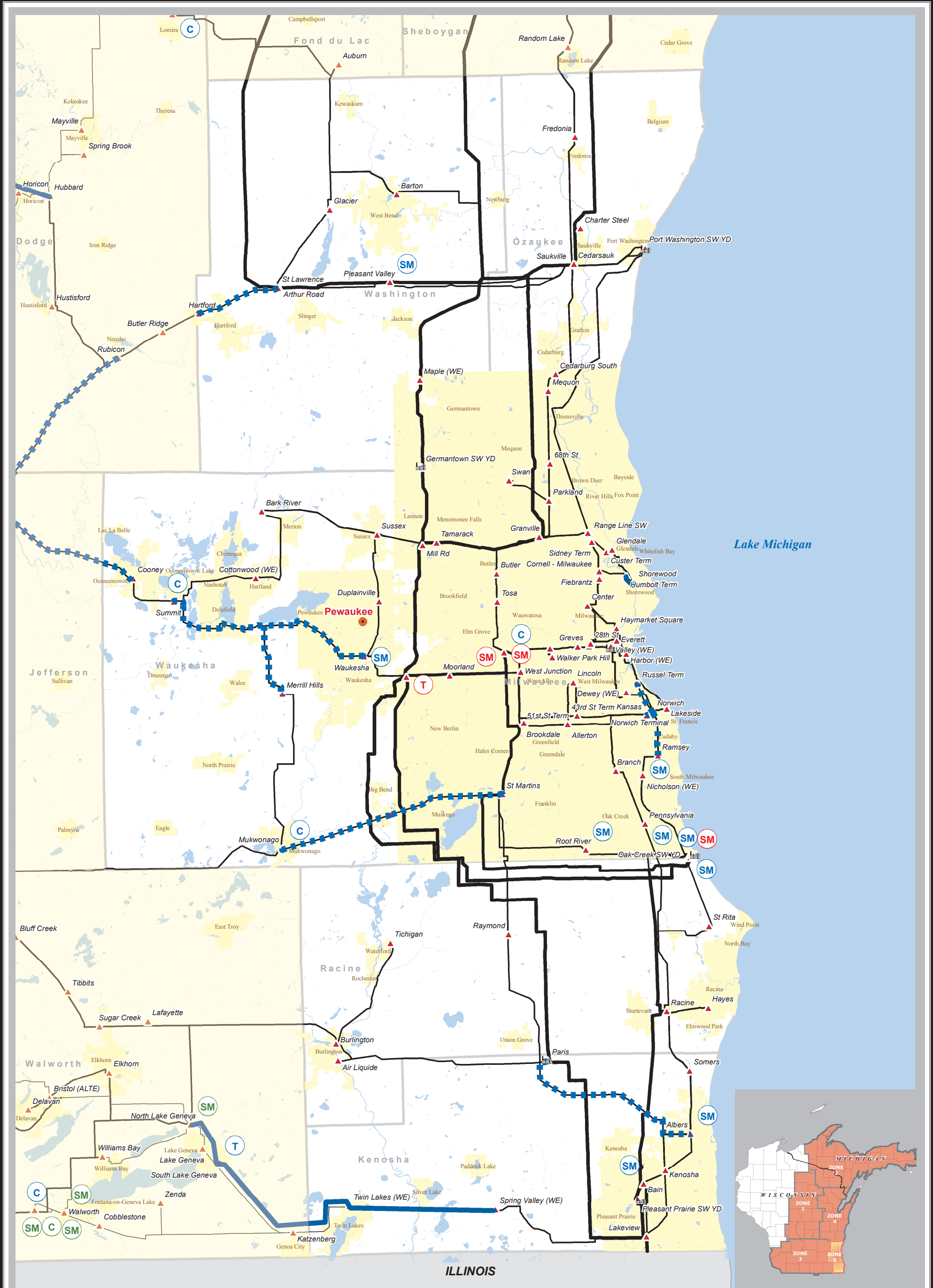
- * Approximately 9425 miles of transmission lines
- * 96 wholly owned substations
- * 410 jointly owned substations
- * ATC offices in Madison, Cottage Grove, Pewaukee, De Pere, Wausau and Kingsford, MI

- New 69kV Transmission Line
- New 115, 138 or 161 kV Transmission Line
- New 345 kV Transmission Line
- - - Rebuilt 69 kV Transmission Line
- - - Rebuilt 115, 138 or 161 kV Transmission Line
- - - Rebuilt 345 kV Transmission Line
- Transmission Line Voltage Conversion

- (SS) New Substation
- (SM) Substation Modifications
- (T-D) T-D Interconnection
- (C) Capacitor Bank
- (T) Transformer

- Existing Transmission Facilities**
- ATC Office Location
 - ▲ ATC Substation, Switchyard or Terminal
 - ⚡ Generation
 - ATC Transmission Line (width = voltage)

The information presented in this map document is advisory and is intended for reference purposes only. American Transmission Company owned and operated facility locations are approximate.



2009 10-Year Assessment Projects PLANNING ZONE 5

Currently, ATC owns or operates transmission facilities in 50 Wisconsin counties and in 15 Michigan counties. Facilities include:

- * Approximately 9425 miles of transmission lines
- * 96 wholly owned substations
- * 410 jointly owned substations
- * ATC offices in Madison, Cottage Grove, Pewaukee, De Pere, Wausau and Kingsford, MI

- New 69kV Transmission Line
- New 115, 138 or 161 kV Transmission Line
- New 345 kV Transmission Line
- - - Rebuilt 69 kV Transmission Line
- - - Rebuilt 115, 138 or 161 kV Transmission Line
- - - Rebuilt 345 kV Transmission Line
- Transmission Line Voltage Conversion
- SS New Substation
- SM Substation Modifications
- T-D T-D Interconnection
- C Capacitor Bank
- T Transformer

- Existing Transmission Facilities**
- ATC Office Location
 - ▲ ATC Substation, Switchyard or Terminal
 - ⚡ Generation
 - ATC Transmission Line (width = voltage)

The information presented in this map document is advisory and is intended for reference purposes only. American Transmission Company owned and operated facility locations are approximate.

Figure PR-6

*American Transmission Company - Number of Projects by Status
10-Year Assessments 2001-2009
System Reliability and Economics Projects Only*

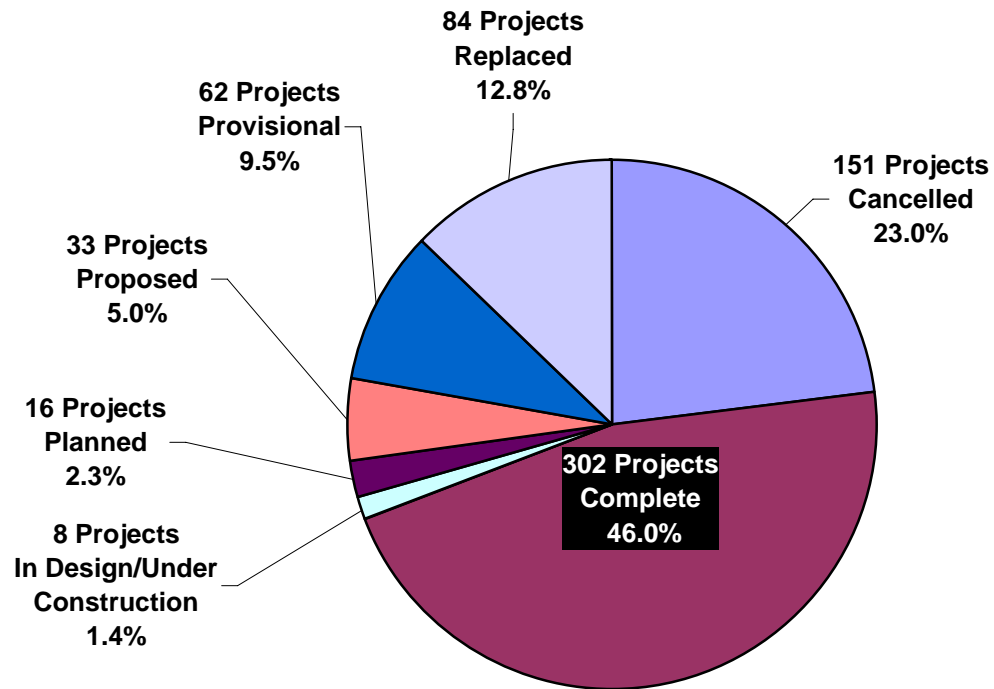


Figure PR-7

*American Transmission Company - Cost of Projects by Status
10-Year Assessments 2001-2009
System Reliability and Economics Projects Only*

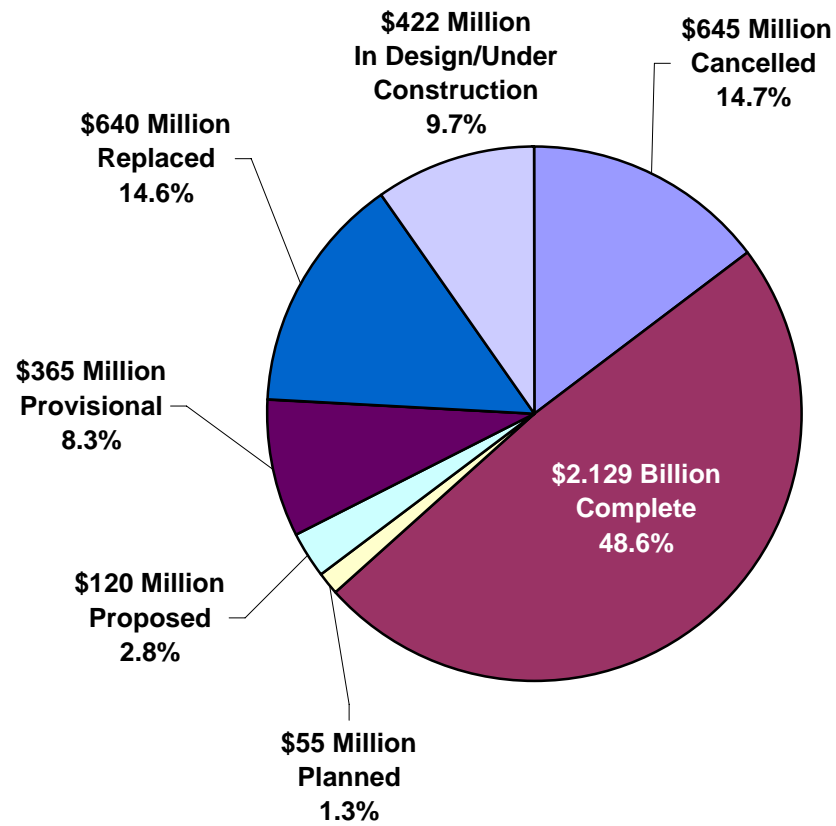


Figure PR-8

*American Transmission Company - Cost of Projects by Status
2009 10-Year Assessment*

Planned, Proposed and Provisional - System Reliability and Economics Projects Only

Total 2008 Assessment (2009-2018) Expenditures = \$1.0 billion (approx.)

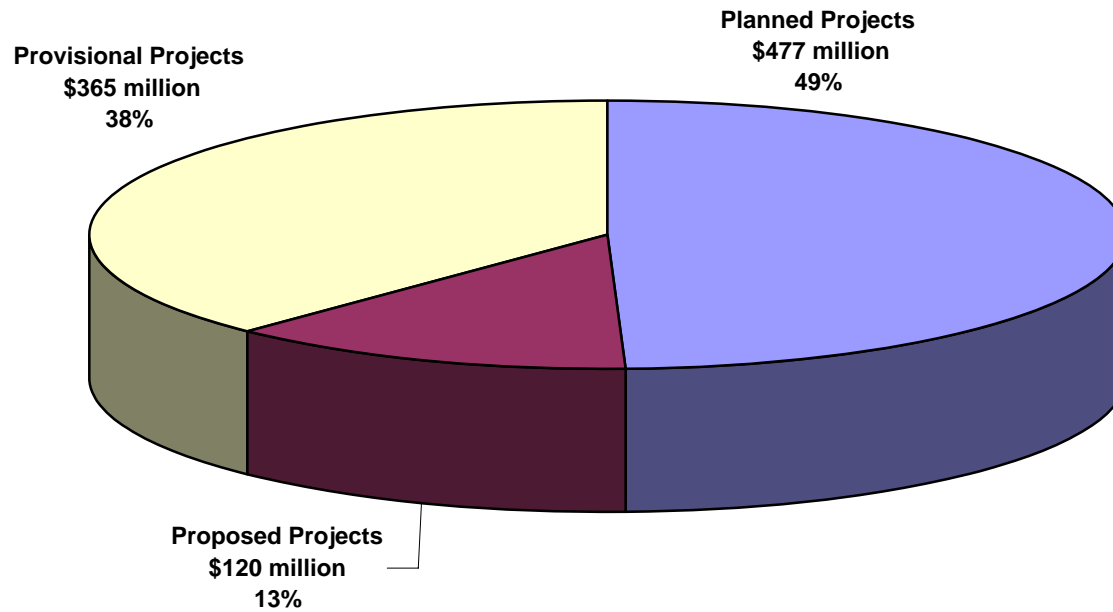


Figure PR-9
 Generation Interconnection Requests
 as of 7/1/09

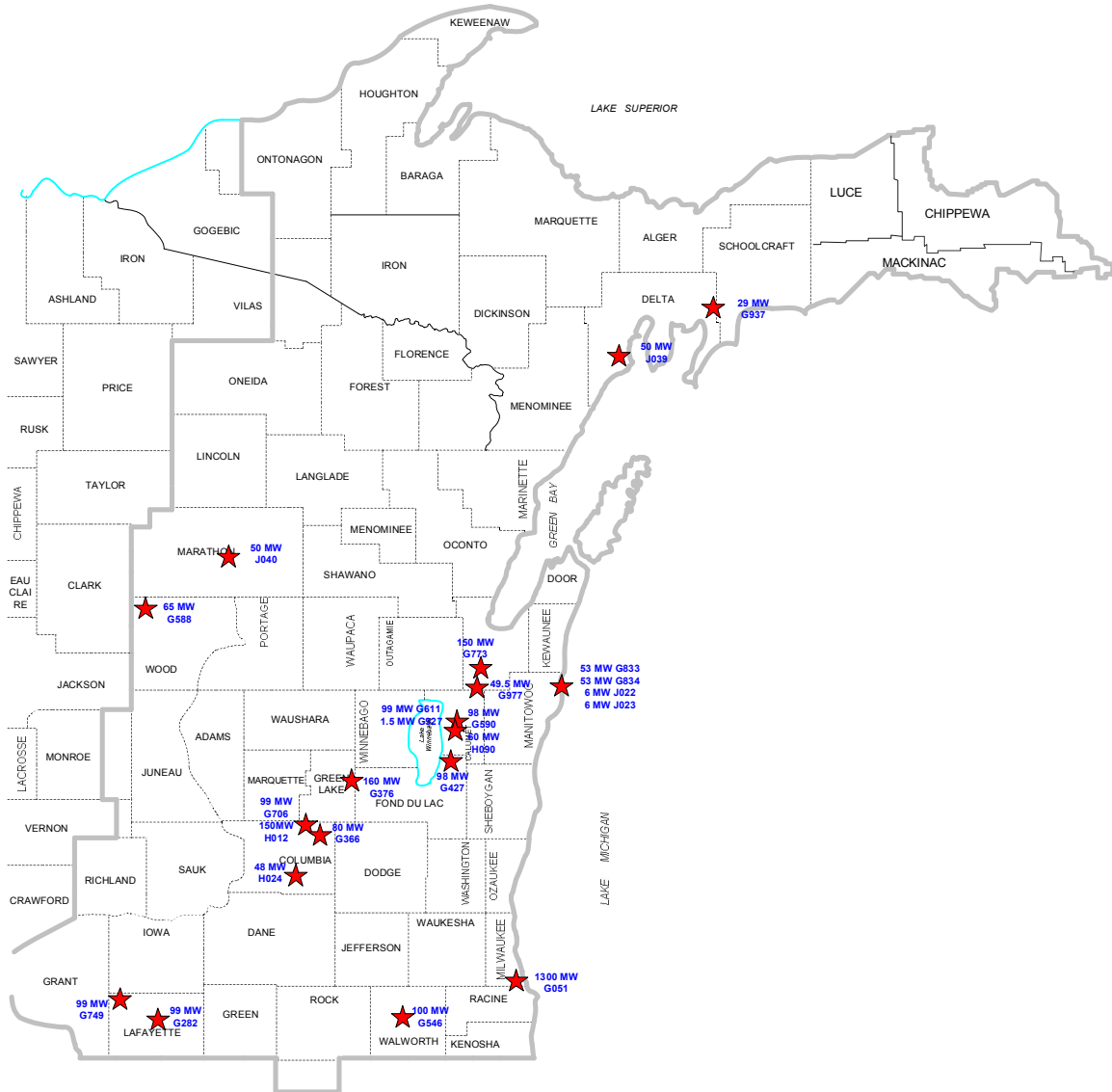
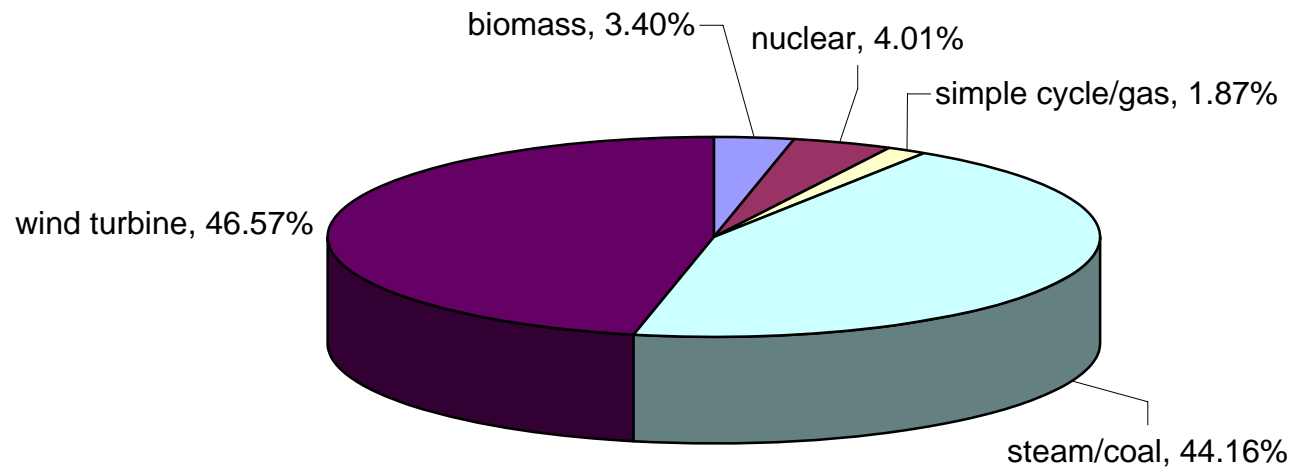
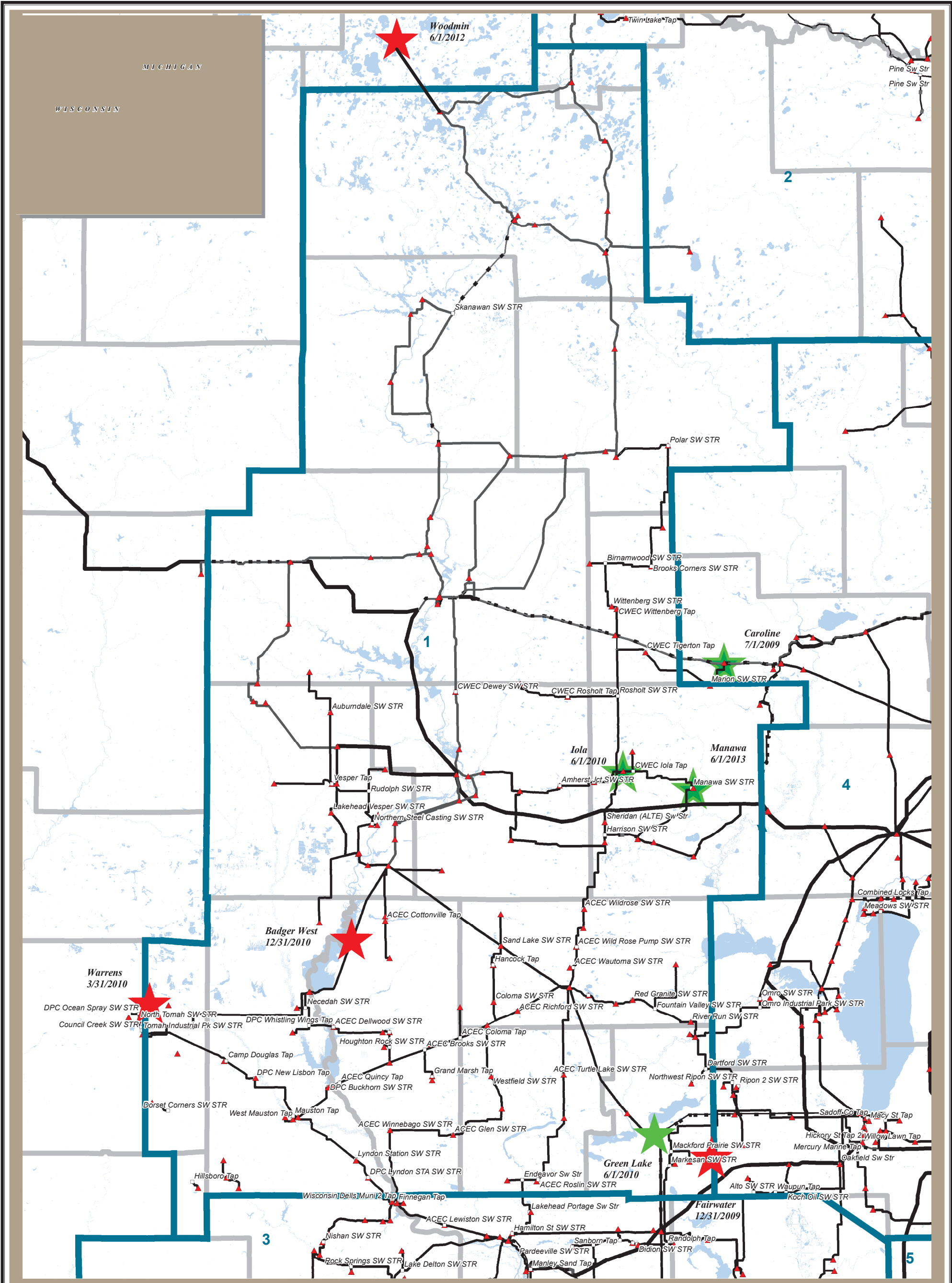


Figure PR-10
ATC Generation Queue
Percent of Capacity as of 2009 Assessment





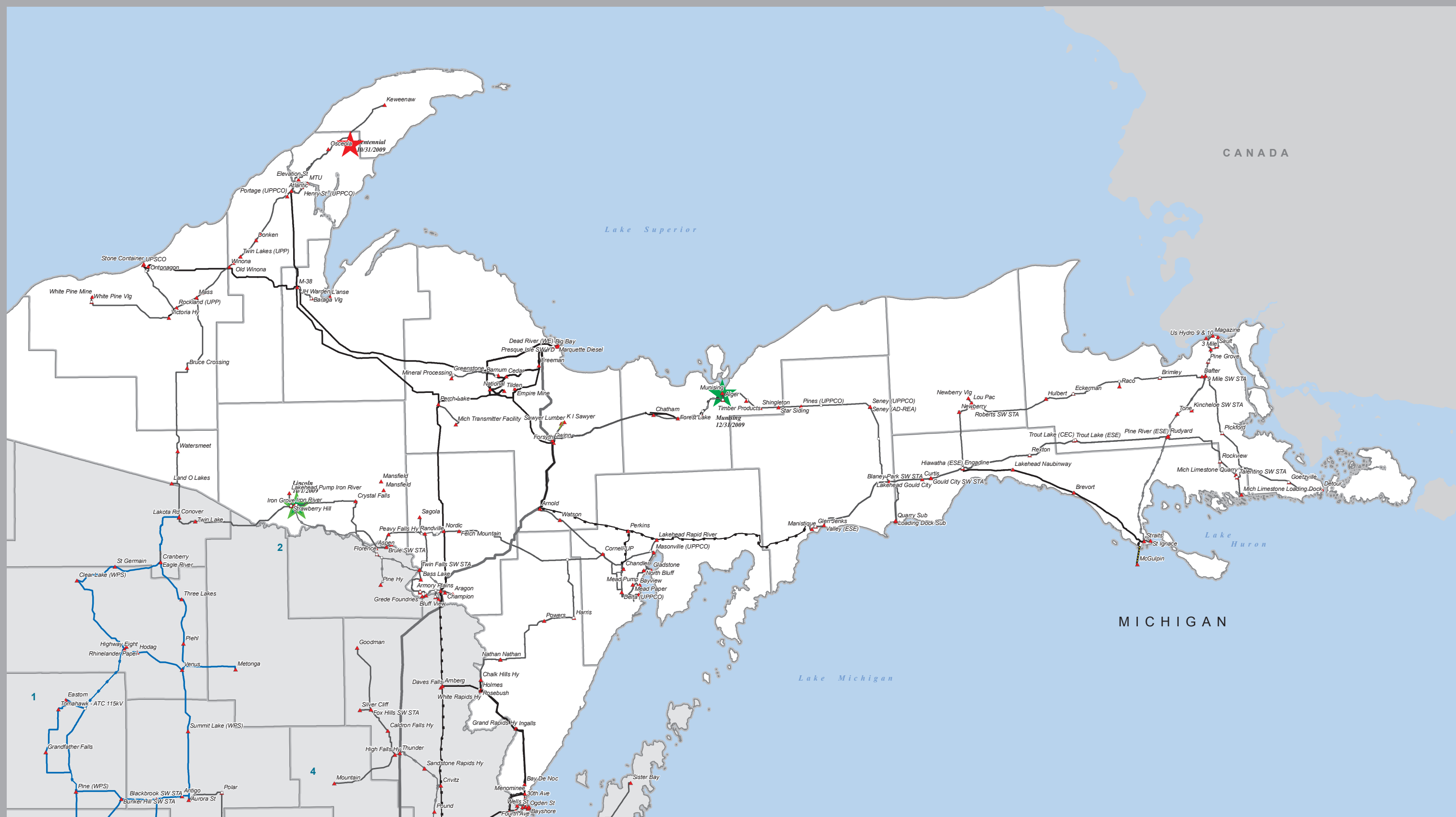
Transmission-Distribution Interconnection Requests PLANNING ZONE 1

Currently, ATC owns or operates transmission facilities in 50 Wisconsin counties and in 15 Michigan counties. Facilities include:

- * Approximately 8900 miles of transmission lines
- * 98 wholly owned substations
- * 358 jointly owned substations
- * Offices in Madison (2), Cottage Grove, Pewaukee, De Pere, Wausau and Kingsford, MI

- | | |
|--|--|
| <ul style="list-style-type: none"> ★ New Substation Interconnection Request ★ Transformer Addition/Replacement | <p>Transmission Related Facilities</p> <ul style="list-style-type: none"> ▲ Substation, Switchyard or Terminal ■ Proposed/Design/Construction ● ATC Office Location ■ Generation ■ Other Facility |
|--|--|

The information presented in this map document is advisory and is intended for reference purposes only. American Transmission Company owned and operated facility locations are approximate.



Transmission-Distribution Interconnection Requests PLANNING ZONE 2

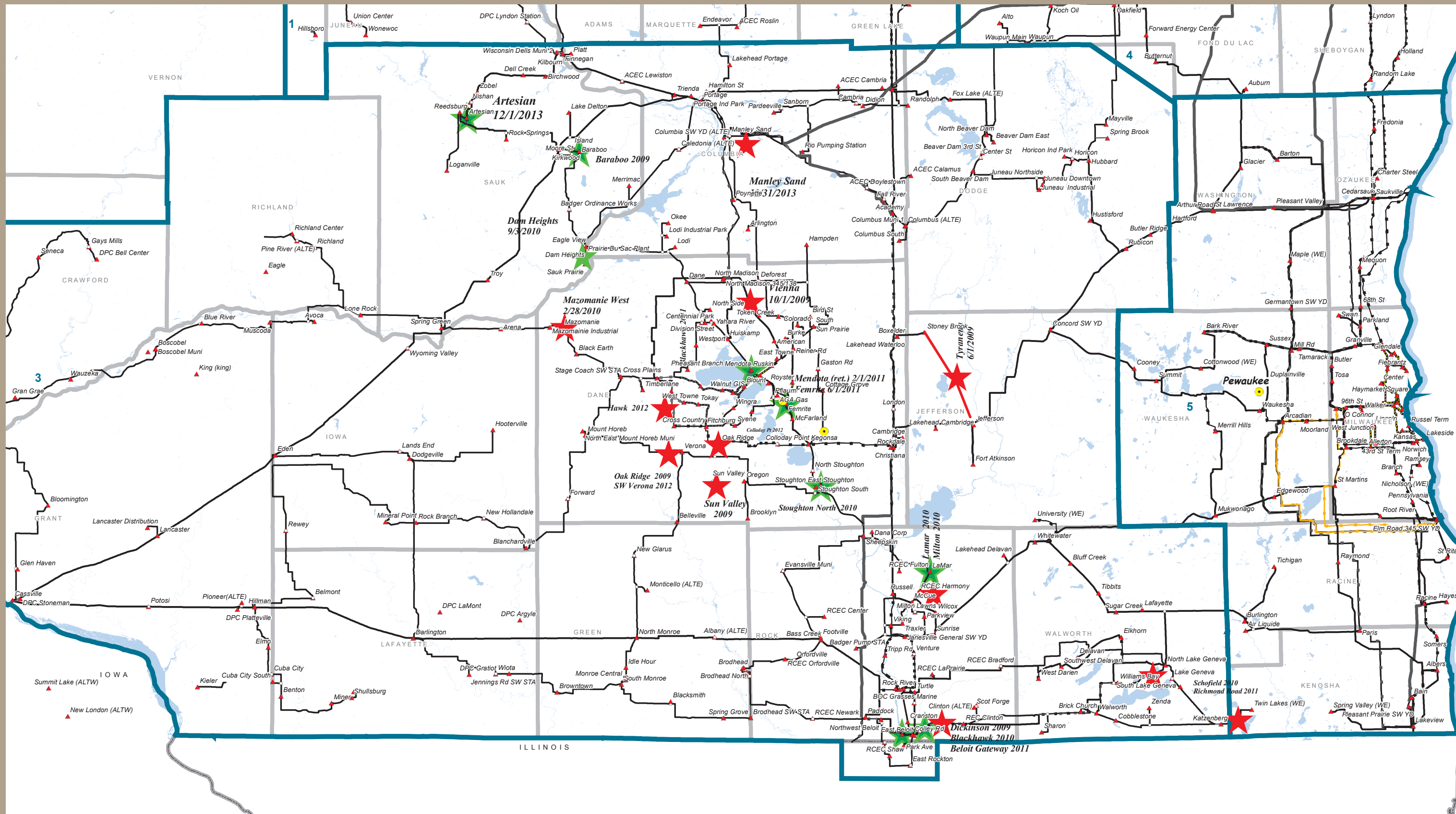
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- * ATC offices in Madison (2), Cottage Grove, Pewaukee, De Pere, Wausau and Kingsford, MI

- ★ New Substation Interconnection Request
- ★ Transformer Addition/Replacement

- Transmission Related Facilities**
- ▲ Substation, Switchyard or Terminal
 - ATC Office Location
 - Proposed/Design/Construction
 - Generation
 - Other Facility

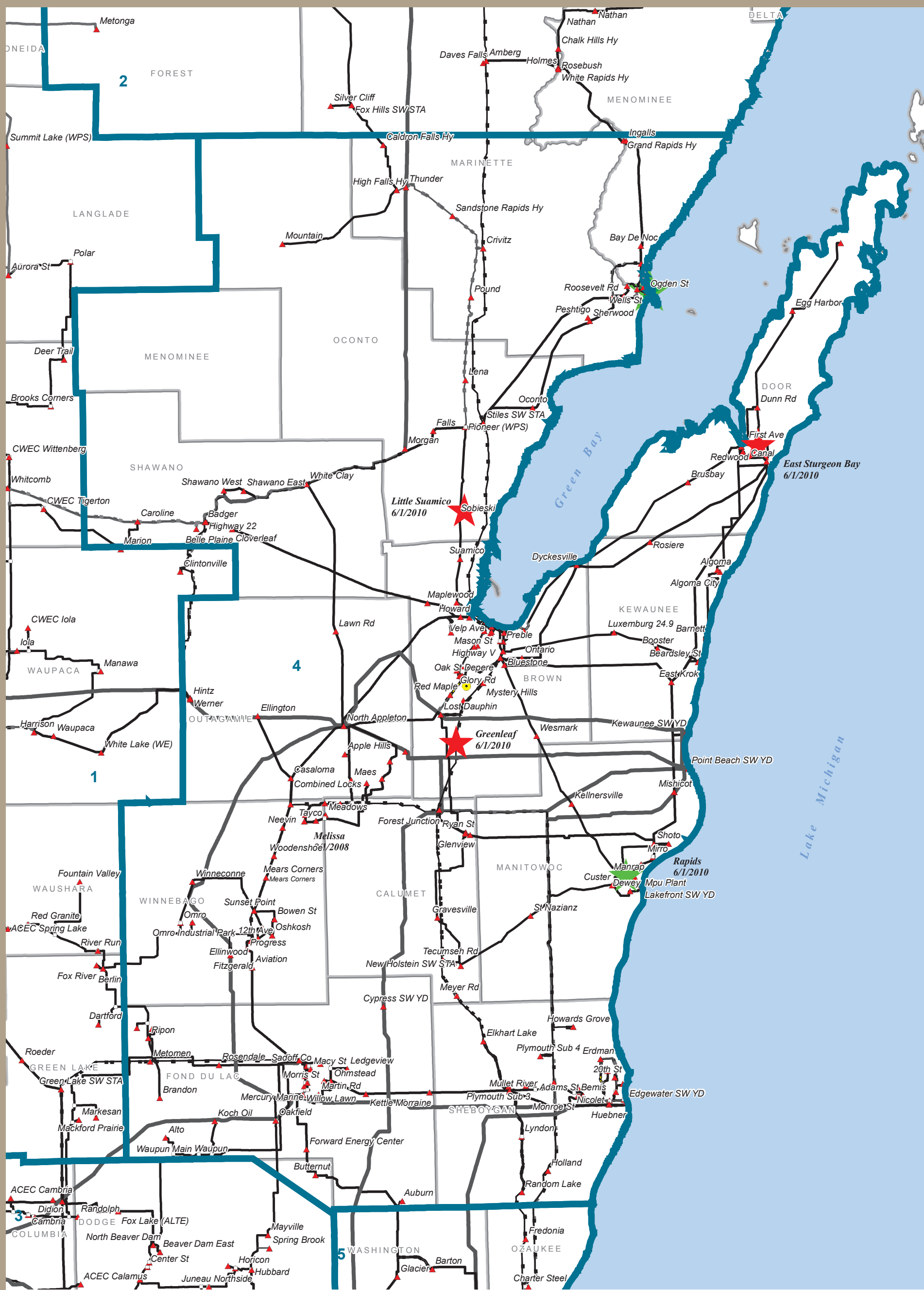
The information presented in this map document is advisory and is intended for reference purposes only. American Transmission Company owned and operated facility locations are approximate.



**Transmission-Distribution Interconnection Requests
PLANNING ZONE 3**

Currently, ATC owns or operates transmission facilities in 50 Wisconsin counties and in 15 Michigan counties. Facilities include:
 * Approximately 8900 miles of transmission lines
 * 98 wholly owned substations
 * 358 jointly owned substations
 * ATC offices in Madison (2), Cottage Grove, Pewaukee, De Pere, Wausau and Kingsford, MI

- Transmission Related Facilities**
- ▲ Substation, Switchyard or Terminal
 - ATC Office Location
 - ★ New Substation Interconnection Request
 - Proposed/Design/Construction
 - ★ Transformer Addition/Replacement
 - Generation
 - Other Facility

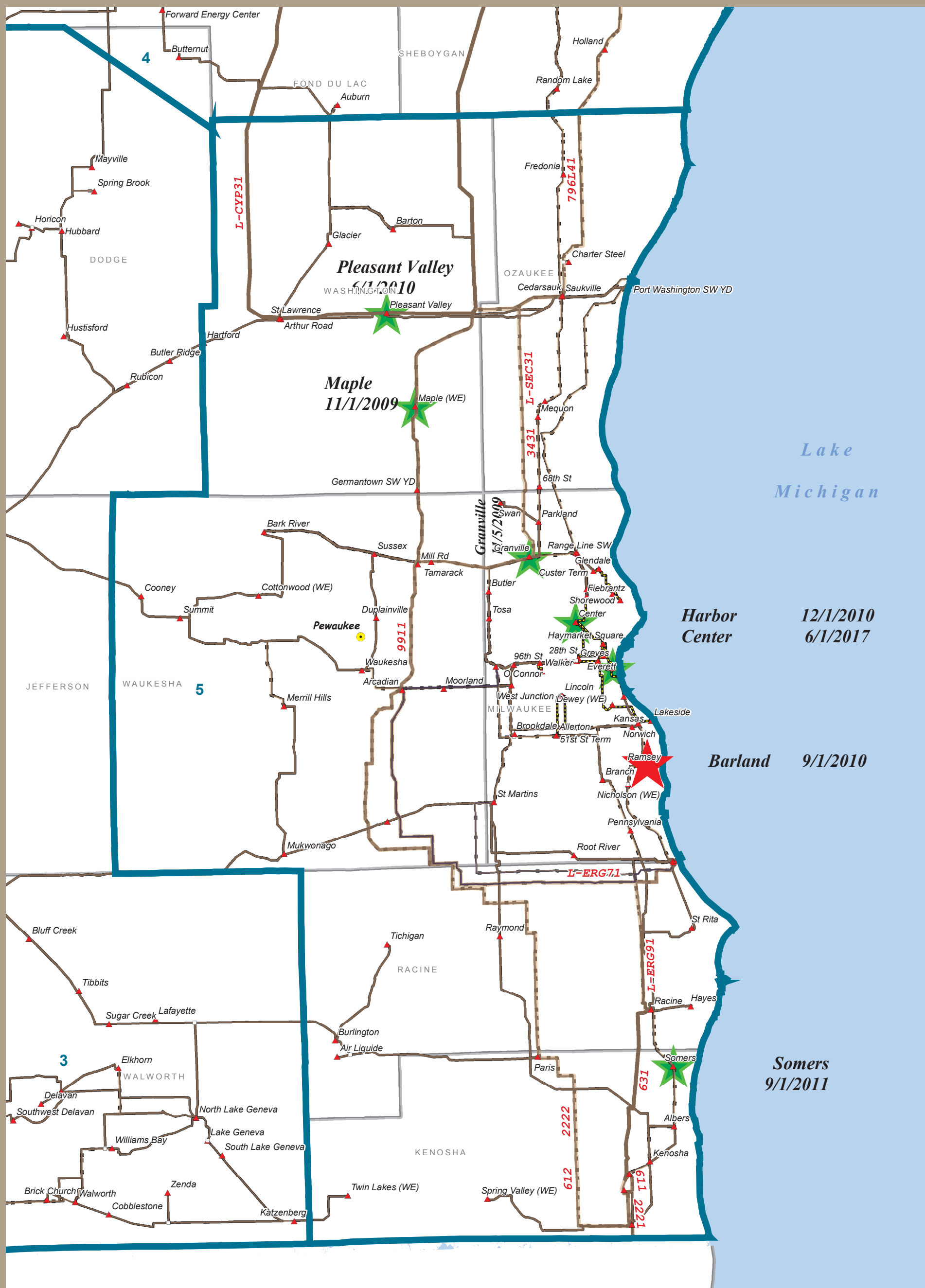


Transmission-Distribution Interconnection Requests
PLANNING ZONE 4

Currently, ATC owns or operates transmission facilities in 50 Wisconsin counties and in 15 Michigan counties. Facilities include:
 * Approximately 8900 miles of transmission lines
 * 98 wholly owned substations
 * 358 jointly owned substations
 * Offices in Madison (2), Cottage Grove, Pewaukee, De Pere, Wausau and Kingsford, MI

- ★ New Substation Interconnection Request
- ★ Transformer Addition/Replacement
- ▲ Substation, Switchyard or Terminal
- Proposed/Design/Construction
- ATC Office Location
- Generation
- Other Facility

The information presented in this map document is advisory and is intended for reference purposes only. American Transmission Company owned and operated facility locations are approximate.



Transmission-Distribution Interconnection Requests
PLANNING ZONE 5

Currently, ATC owns or operates transmission facilities in 50 Wisconsin counties and in 15 Michigan counties. Facilities include:
 * Approximately 8900 miles of transmission lines
 * 98 wholly owned substations
 * 358 jointly owned substations
 * Offices in Madison (2), Cottage Grove, Pewaukee, De Pere, Wausau and Kingsford, MI

- | | | | | | |
|--|--|--|------------------------------------|--|---------------------|
| | New Substation Interconnection Request | | Substation, Switchyard or Terminal | | ATC Office Location |
| | Transformer Addition/Replacement | | Proposed/Design/Construction | | Generation |
| | | | Other Facility | | |

The information presented in this map document is advisory and is intended for reference purposes only. American Transmission Company owned and operated facility locations are approximate.