November 2007 10-Year Assessment
www.atc10yearplan.com

Projects Section

Project classifications

In our 10-Year Assessments and Updates, projects are identified that address reliability issues, economic benefits, loss savings, transmission service issues, generation interconnections or some 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 other issues such as obsolete substation equipment, poor line facility condition, line relocations and most distribution interconnections. The projects referenced in the project tables PR-2 through PR-26 generally include only those projects that at least in part address system performance issues.

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. 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;
- project may be under construction or in construction planning phase; and
- project typically is included in power flow models used to analyze transmission service requests.

Proposed projects:

- ATC planning is not complete;
- ATC has not yet pursued regulatory approvals;
- project represents ATC's preliminary preferred project alternatives from a system performance perspective; and
- project typically is not included in power flow models used to analyze transmission service requests.

Provisional projects:

- ATC planning is not complete;
- ATC has not yet sought regulatory approvals;
- project does not necessarily represent ATC's preliminary preferred project alternative, but does reflect meeting the need identified; and
- project is not included in power flow models used to analyze transmission service requests.

November 2007 10-Year Assessment
www.atc10yearplan.com

In the 2001-2007 10-Year Assessments and Updates, we identified or assumed responsibility for 600 projects that address system performance issues. Figure PR-6 illustrates the status of all projects ATC has considered from 2001-2007.

The categories outlined in Figure PR-6 can be defined as follows:

- Replaced - number of projects replaced by another alternative since our inception
- Cancelled - number of projects cancelled since our inception
- Complete - number of projects completed since our inception
- Regulatory - number of projects either regulatory approved or currently under review by the PSCW
- Under construction - number of projects currently being constructed
- Planned, Proposed and Provisional- refer to the above classifications

Regarding Figure PR-6, it is worthwhile to note that:

- ATC has completed 228 projects and another 12 are under construction. Notable projects most recently completed are listed in Table PR-1. Projects under construction range from capacitor bank installations to the Arrowhead-Weston/Gardner Park transmission line project.
- 85 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 120 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.
- 167 future projects are in various stages of evaluation or development (Planned (which includes Regulatory and Under Construction), Proposed or Provisional).

Projects completed since 2006 Assessment
Transmission projects significantly affecting system performance that have been completed since the 2006 Assessment was issued in November 2006 are listed in Table PR-1.

Most notable include:

- Constructed Gardner Park-Stone Lake 345-kV line
- Constructed Venus-Metonga 115-kV line
- Converted Kegonsa-McFarland-Femrite and Sycamore-Reiner-Sprecher to 138 kV and new Femrite-Sprecher 138-kV line and
- Constructed new Werner West 345/138-kV Substation.

New in 2007
Summary of Planned, Proposed and Provisional additions, 2007-2016
The transmission facilities that we are proposing based on this 2007 Update are listed in Tables PR-2 through PR-21, and shown graphically by zone in Figures PR-1 through PR-5.

Changes to the 2006 Assessment are listed in Table PR-22. Finally, Table PR-23 describes operations, maintenance and protection projects greater than $0.5 million for the years 2007-2011.

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. Often the year 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.

Tables PR-2 through PR-11 show the facilities planned by year for 2007-2016. Table PR-12 shows provisional facilities where the in-service date is yet to be determined.

Tables PR-13 through PR-17 show the facilities planned by zone.

Table PR-18 provides a list of planned transmission lines involving new right-of-way for 2007-2016. 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-19 provides a list of proposed transmission line rebuilds, line reconductoring and uprates on existing right-of-way.

Table PR-20 provides a list of proposed new substations and transformer additions (excluding transmission-to-distribution transformers).

Table PR-21 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 contingency conditions (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.

Condition: 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 is met (see Planning criteria), or to improve stability response of generation.

Import capability: Facility will enhance import capability of our transmission system.

Economics: Preliminary and partial list of facilities 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 and are currently in design or under construction are listed in Table PR-24. Most notable include:

- construction of the Arrowhead-Stone Lake 345-kV line and Arrowhead 345-kV Substation
- construction of the Gardner Park-Hwy 22 and Morgan-Werner West 345-kV lines, and
- construction of the Cranberry-Conover 115-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 with regulatory approval

Transmission projects that will significantly affect system performance and which have received regulatory approval but have not commenced construction are listed in Table PR-25.

The most notable projects in this category are:

- construction of the Jefferson-Lake Mills-Stony Brook (Waterloo) 138-kV line
- construction of the Rubicon-Hustisford 138-kV line and
- construction of the North Madison-Huiskamp 138-kV line.

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-26.

Notable projects include:

- construction of the Paddock-Rockdale 345-kV line
- construction of the Verona-Oak Ridge (Fitchburg) 138-kV line
- construction of the Elm Road Phase 2 generation projects, and
- construction of the Rockdale-West Middleton 345-kV line.

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 87 percent of the estimated total 2001-2007 capital costs, with future projects accounting for the remaining 13 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 categories outlined in Figure PR-7 can be defined as follows:

- Replaced – cost of projects replaced by another alternative since our inception
- Cancelled - cost of projects cancelled since our inception

- Complete - cost of projects completed since our inception
- Regulatory - cost of projects either regulatory approved or currently under review by the PSCW
- Under construction - cost of projects currently being constructed
- Planned, Proposed and Provisional- costs related to ATC traditional classifications

The cost estimate for all 2007 10-Year Assessment Update projects to be placed in-service through 2016 is approximately $1.4 billion, which is $300 million less than the 2006 Assessment estimate. Figure PR-8 categorizes the current $1.4 billion 2007 Update project dollars by status. Planned projects (including those projects in licensing and under construction) account for 68% of the Assessment dollars, proposed projects account for 7% of the dollars, and provisional projects account for the remaining 25% of the dollars. Other anticipated projects, including substation equipment replacements, pole and conductor replacements, most T-D interconnections, road relocations and generation interconnections not included in the 2007 10-Year Assessment, make up the remaining $1.4 billion of the $2.8 billion in capital expenditures that ATC projects through the year 2016.

Interconnections

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, 2007, 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 Attachment X process, interconnection impacts are assessed using up to three interconnection studies. The first study, called a *feasibility study*, includes a determination of thermal overload or voltage level impacts created by the new generator. The second study, called an *impact study*, includes a determination of whether the proposed generator and other nearby generators will remain stable under various disturbance situations, like line trips and equipment failures. It also includes a fault study analysis to determine whether existing system equipment can accommodate the increased short circuit fault duty caused by the new generator. It also identifies solutions for any thermal, stability or fault duty problems. If problems are identified in the impact study, a

third study, called a *facility study*, is conducted to settle on solutions and provide cost and time estimates for construction. Delivery impacts are assessed during 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 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 included in our Assessment models 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, ten new generators have gone into service and one uprate to an existing generator has been completed, totaling 2,780 MW. These generators are shown in Table PR-27.

Table PR-28 lists the proposed generators in the generation queue for our service territory as of July 1, 2007. 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 5,213.5 MW. Of that proposed capacity, 44 percent reflects new coal units; wind units reflect 43 percent; combined cycle (natural gas) units reflect 12 percent; and the remaining 1 percent is comprised of simple cycle (natural gas) turbines (see Figure PR-10). Of this generation, 37 percent is proposed in Zone 5, 23 percent in Zone 3, 22 percent in Zone 4, 12 percent in Zone 1, and 6 percent in Zone 2.

The developer's projected in-service date listed in Table PR-28 is the last official commercial operation in-service date provided by the developer for that request. A developer may, per the Midwest ISO's Attachment X procedures, suspend their Interconnection Agreement which may delay the project. A developer is not required to update their official in-service date as part of this suspension.

The following requests have been suspended:

- G282 – 99 MW wind farm, Line X-14 in Lafayette County, Wisconsin
- G366 – 80 MW wind farm, Friesland Substation in Columbia County, Wisconsin
- G376 – 160 MW wind farm, Line X-4 in Green Lake County, Wisconsin
- G384 – 99 MW wind farm, Line Y-51 in Manitowoc County, Wisconsin
- G427 – 98 MW wind farm, Cypress Substation in Fond du Lac County, Wisconsin
- G483 – 50 MW wind farm, Line Y-33 in Green County, Wisconsin
- G546 – 100 MW wind farm, Line 6541 in Walworth County, Wisconsin

Generation interconnection requests previously in the generation queue, which have been cancelled or removed from the queue since January 31, 2007 (because the developer withdrew the request or missed contractual milestones), are summarized in Table PR-29.

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 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 siting 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 largely would be a function of where the power from the generation is to be delivered.

The northern portion of Zone 1, the Rhinelander Loop, 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 cost-effective as a transmission-deferral mechanism would depend on a number of factors. The need for additional reinforcements outside of the Loop would be a function of where the power from the generation is to be delivered.

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

Zone 1 completed generation studies:

Request	Size	Type	County, State
GIC044	500 MW	Coal	Marathon County, Wisconsin
G522	550 MW	Coal	Portage County, Wisconsin
G523	550 MW	Coal	Marathon County, Wisconsin
G588	55/60 MW	Combustion turbine	Wood County, Wisconsin

Zone 2

We have completed studies of three generation interconnection requests in Zone 2. Although these three 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.

The most logical generation locations from a transmission infrastructure standpoint would be near the existing Presque Isle Power Plant or the Plains Substation due to the number of 138 kV lines emanating from these substations. However, any significant generation development at or near the Presque Isle Power Plant likely would require transmission reinforcements or additions due to the existing stability and thermal issues there. The completion of the Northern Umbrella Plan, however, will result in a much more robust 138-kV network at Plains Substation that could accommodate a reasonable amount 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. The MISO generation interconnection queue contains two proposed wind farms for Zone 2 totaling 320 MW. The studies for these requests are still in progress and required transmission reinforcements have not yet been identified.
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.

Zone 2 completed generation studies:

Request	Size	Type	County, State
G567-568	165 or 300 MW	Coal	Delta County, Michigan
G583	19 MW	Biomass	Ontonagon, Michigan

Zone 3

In Zone 3, generation has been proposed in various locations, but over half have been in the southern-most counties in Zone 3. Generation could be beneficial in a few areas depending on the capacity of such generation and the exact location.

We are projecting that the Dane County electric system could become subject to thermal overloads, low voltages or voltage collapse, significant load shed risk, and restrictions on power imports into the county as early as 2011. We believe that extending the 345-kV network to the west side of the Madison metropolitan area, coupled with additional 138-kV reinforcements within the city and reactive support will resolve these issues over the long term.

Sauk County, though we are currently reinforcing the system, is projected to need additional transmission reinforcements in the future to ensure reliable operation. Smaller-scale generation (< 100 MW) in certain locations could be beneficial to improving the voltage profile in the area 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
G281	130 MW	Wind	Green County, Wisconsin
G282	99 MW	Wind	Lafayette County, Wisconsin
G338	54 MW	Wind	Dodge County, Wisconsin
G366	80 MW	Wind	Columbia County, Wisconsin
G371	100 MW	Wind	Columbia County, Wisconsin
G483	50 MW	Wind	Green County, Wisconsin
G527	280 MW	Coal	Grant County, Wisconsin
G528	550 MW	Coal	Columbia County, Wisconsin
G546	100 MW	Wind	Walworth County, Wisconsin
G550	24 MW	Simple cycle/gas	Jefferson County, Wisconsin
G553	280 MW	Coal	Columbia County, Wisconsin
G706	99 MW	Wind	Columbia County, Wisconsin
G724	99 MW	Wind	Dane County, Wisconsin
G747	99 MW	Wind	Rock County, Wisconsin
G749	99 MW	Wind	Lafayette County, Wisconsin

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. Given the nature of the issues in Zone 4, however, it is unlikely that new generation in Zone 4 will significantly alter the need for the major transmission reinforcements contemplated in that zone.

One area where generation could defer the need for transmission reinforcements is in Door County, provided such generation is small-scale (< 50 MW) and appropriately located. Currently, the northern portion of the county is served radially, and electric service is subject to interruption for the loss of the single 69-kV line serving the area. The voltage profile in Door County is projected to precipitate the need for reinforcements in the future. Small-scale generation potentially could defer certain of these reinforcements.

One area in Zone 4 that cannot accommodate any additional generation without significant transmission reinforcements is the area around the Point Beach and Kewaunee nuclear plants. 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
G240	55 MW	Steam	Manitowoc County, Wisconsin
G338	54 MW	Wind	Dodge County, Wisconsin
G353-4	160 MW	Wind	Fond du Lac County, Wisconsin
G368	200 MW	Wind	Fond du Lac County, Wisconsin
G376	160 MW	Wind	Green County, Wisconsin
G384	99 MW	Wind	Manitowoc County, Wisconsin
G410	99 MW	Wind	Kewaunee County, Wisconsin
G421	50 MW	Wind	Brown County, Wisconsin
G427	98 MW	Wind	Fond du Lac County, Wisconsin
G486	10.5 MW	Wind	Manitowoc County, Wisconsin
G507	98 MW	Wind	Fond du Lac County, Wisconsin
G590	98 MW	Wind	Calumet County, Wisconsin
G611	99 MW	Wind	Calumet County, Wisconsin

Zone 5

Two major generation additions have been proposed in Zone 5. The first addition is at Port Washington Power Plant, which has been approved by the Public Service Commission of Wisconsin. Two groups of units will be installed. The first phase went in service in 2005 and the second phase is under construction to go in service in 2008. Rebuilding existing transmission lines in the Port Washington area is required to support this new generation. In order to accommodate the two units of generation at Port Washington, the two Port Washington–Rangeline 138-kV lines and the three Port Washington–Saukville 138-kV lines were rebuilt in 2005. The final project is rebuilding the Saukville–Pleasant Valley–Arthur Road–St. Lawrence 138-kV line. This line rebuild project will start in fall 2007 and be completed before June 2008 at a cost of approximately $10 million.

The other site for new generation is the Oak Creek Power Plant. The PSCW has approved two units at the 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
G051	1950 MW	Coal/steam	Milwaukee County, Wisconsin
GIC027	1200 MW	Combined cycle	Ozaukee County, Wisconsin
G510	90 MW	Combined cycle	Ozaukee County, Wisconsin

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.

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.

All of the T-D interconnection requests that are being implemented, designed or evaluated by ATC 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.

Table PR-1
Projects Placed In Service Since 2006 10-Year Assessment

Project	Zone
Construct new Eagle River Muni distribution substation directly adjacent to the existing Cranberry 115-kV Substation	1
Install a 345/161-kV transformer at Stone Lake Substation (temporary installation for construction outages)	1
Construct Gardner Park-Stone Lake 345-kV line	1
Increase size of existing Summit Lake 115-kV capacitor bank from 11.3 to 16.9 MVAR	1
Upgrade Kelly-Whitcomb 115-kV line conductor clearances to 300F	1
Reconductor Weston-Northpoint 115-kV line	1
Reconductor Stratford-McMillan 115-kV line (MEWD portion)	1
Uprate Metomen-North Fond du Lac 69-kV line terminal equipment	1
Rebuild Weston-Sherman St. and Sherman St.-Hilltop 115-kV lines as double circuits with a new Gardner Park-Hilltop 115-kV line	1
Install 2-24.5 MVAR capacitor banks at Wautoma 138-kV Substation and one-16.33 MVAR capacitor bank at 69 kV	1
Construct Venus-Metonga 115-kV line	1
Relocate Brule Substation (Aspen)	2
Install 1-8.16 MVAR capacitor bank at Lincoln 69 kV	2
Uprate Victoria-Ontonagon 69-kV line clearance to 135 degrees F	2
Uprate Victoria-Mass 69-kV line clearance to 135 degrees F	2
Uprate Mass-Winona 69-kV line clearance to 135 degrees F	2
Uprate Winona-Atlantic 69-kV line clearance to 135 degrees F	2
Uprate White Pine-Victoria 69-kV line clearance to 200 degrees F	2
Uprate Victoria-Ontonagon 69-kV line clearance to 185 degrees F	2
Uprate Victoria-Mass 69-kV line clearance to 185 degrees F	2
Install 2-8.16 MVAR capacitor banks at Ontonagon 138-kV Substation	2
Uprate Empire-Forsyth 138-kV line terminal equipment	2
Increase ground clearance of Atlantic-Osceola (Laurium #2) 69-kV line from 120 to 167 degrees F	2
Construct new 138-kV line from North Beaver Dam to East Beaver Dam Substation	3
Uprate Colley Road-Park Ave Tap 69-kV line to 95 MVA	3
Reconnect the 138/69-kV transformers at Kilbourn Substation on separate breakers to operate individually	3
Install 138/69-kV transformer at Femrite Substation	3
Construct Sprecher-Femrite 138-kV line	3
Convert Kegonsa-McFarland-Femrite 69-kV line to 138 kV	3
Install 138/69-kV transformer at Reiner Substation	3
Convert Sycamore-Reiner-Sprecher from 69 kV to 138 kV	3
Uprate Darlington-Rock Branch 69-kV line	3

Table PR-1
Projects Placed In Service Since 2006 10-Year Assessment (continued)

Project	Zone
Uprate Brodhead-South Monroe 69-kV line	3
Uprate North Lake Geneva-Lake Geneva 69-kV line to 84 MVA	3
Install 2-16.33 MVAR capacitor banks at Rubicon 138-kV Substation	3
Uprate Rock River 138/69-kV transformer to 65 MVA and uprate Rock River-Turtle 69-kV line to 94 MVA	3
Y42 voltage support (was New Glarus capacitor bank)	3
Install 2-16.33 MVAR capacitor bank at South Monroe 69-kV Substation and remove existing 10.8 MVAR bank	3
Construct new 69-kV line from Columbia to Rio to feed the proposed Wyocena Substation	3
Uprate Janesville-McCue 69-kV line to 92 MVA	3
Construct a 345/138-kV switchyard at a new Werner West Substation; install a 345/138-kV transformer. Loop existing Rocky Run to North Appleton 345 kV and existing Werner to White Lake 138-kV lines into Werner West	4
Uprate Lakefront-Revere 69-kV line	4
Install 2-16.3 MVAR capacitor bank at Canal-69 kV Substation	4
Construct a 138-kV substation at a new Forward Energy Center Substation; loop existing Butternut-South Fond du Lac line into Forward Energy Center	4
Construct double circuit 138-kV line from Forest Junction/Howards Grove/Charter Steel to Plymouth #4 Substation	4
Improve clearance on Kenosha-Lakeview 138-kV line KK9341	5
Rebuild Stiles-Amberg double circuit 138-kV line	2 & 4

Table PR-2
Transmission System Additions for 2007

System additions	System need year	Projected In-service year	Planning zone	Need category	Planned, Proposed or Provisional	Cost Estimate - Refer to *Funding Project* and *Sum of Total (2007-2016)* in Financial Table
Construct a 345-kV substation at new Cypress; loop existing Forest Junction-Arcadian line into new Cypress Substation	2006	2007	4	new generation	Planned	F1513
Relocate Mishicot 138-kV Substation	2007	2007	4	new generation	Planned	F2035
String a new Ellinwood-Sunset Point 138-kV line on existing structures	2007	2007	4	reliability	Planned	F1353
Uprate North Appleton-Lawn Road-White Clay 138-kV line	2007	2007	4	reliability	Planned	F1601
Upgrade St. Martins 138-kV bus to 2000A	2007	2007	5	reliability	Planned	F2131
Upgrade St. Lawrence 138-kV bus	2007	2007	5	reliability	Planned	F2160

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 2008

System additions	System need year	Projected In-service year	Planning zone	Need category	Planned, Proposed or Provisional	Cost Estimate - Refer to *Funding Project* and *Sum of Total (2007-2016)* in Financial Table
Construct Stone Lake-Arrowhead 345-kV line	1997	2008	1	service limitation, reliability, import capability & Weston stability	Planned	F1191
Construct the new permanent Stone Lake 345/161-kV Substation	2008	2008	1	reliability, import capability & Weston stability	Planned	F1556
Install 1-75 MVAR capacitor bank and 1-45 MVAR inductor at Stone Lake 345 kV	2008	2008	1	achieve transfer capability associated with Arrowhead-Gardner Park	Planned	F1195
Construct new Arrowhead 345-kV Substation, install 2-75 MVAR capacitor banks, 1-800 MVA PST and 1-800 MVA 345/230-kV transformer	2008	2008	1	achieve transfer capability associated with Arrowhead-Gardner Park	Planned	F1196
Construct Cranberry-Conover 115-kV line	2008	2008	1	reliability, transfer capability	Planned	F1363
Upgrade 4.1 MVAR capacitor bank to 8.2 MVAR and upgrade the 5.4 MVAR capacitor bank to 10.8 MVAR at Berlin 69-kV Substation	2008	2008	1	reliability	Planned	F2163
Rebuild Atlantic-Osceola 69-kV line (Laurium #1)	2006	2008	2	reliability, condition	Planned	F1684
Install 1-4.08 MVAR capacitor bank at Roberts 69-kV Substation	2007	2008	2	reliability	Proposed	F1849
Construct 138 kV bus and install 138/115-kV 150 MVA and 138/69-kV 60 MVA transformers at Conover Substation	2008	2008	2	reliability, transfer capability	Planned	F1363
Install 2-4.08 MVAR capacitor banks at Munising 69-kV Substation	2008	2008	2	reliability	Proposed	F1820
Uprate Mass-Winona 69-kV line clearance to 185 degrees F	2008	2008	2	generation	Planned	F1735
Uprate Winona-Atlantic 69-kV line clearance to 185 degrees F	2008	2008	2	generation	Planned	F1735
Uprate Empire-Forsyth 138-kV line to 302 MVA	2008	2008	2	reliability	Planned	TBD
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	2008	2	reliability	Proposed	F1282
Construct new line from Southwest Delavan to Bristol at 138 kV and operate at 69 kV	2007	2008	3	T-D interconnection	Planned	F1667

Table PR-3 (continued)
Transmission System Additions for 2008

System additions	System need year	Projected In-service year	Planning zone	Need category	Planned, Proposed or Provisional	Cost Estimate - Refer to *Funding Project* and *Sum of Total (2007-2016)* in Financial Table
Uprate Portage 138/69-kV transformer to 143 MVA	2007	2008	3	reliability	Planned	
Install 2-8.16 MVAR 69-kV capacitor bank at South Lake Geneva Substation	2007	2008	3	reliability	Planned	F2084
Construct a Rubicon-Hustisford 138-kV line	2008	2008	3	reliability	Planned	F0956
Rebuild Hustisford-Horicon 69 kV to 138 kV	2008	2008	3	reliability	Planned	F0956
Construct 138/69 kV substation at a site near Horicon and install a 138/69-kV transformer	2008	2008	3	reliability	Planned	F0956
Uprate Brick Church-Zenda 69-kV line to 115 MVA	2008	2008	3	reliability	Proposed	F1417
Uprate X-17 Eden-Spring Green 138-kV line to 167 degrees F	2008	2008	3	reliability	Planned	F1474
Install temporary 24.5 MVAR capacitor bank at Boxelder 138-kV Substation	2008	2008	3	reliability	Proposed	F2209
Uprate Portage-Trienda 138-kV line to 339 MVA	2008	2008	3	reliability	Proposed	F2098
Expand the Menominee 69-kV Substation and install 138 kV terminals. Loop the West Marinette-Bay De Noc 138-kV line into the Substation	2008	2008	4	reliability	Proposed	F1621
Install 138/69-kV transformer at the expanded Menominee Substation	2008	2008	4	reliability	Proposed	F1621

Table PR-3 (continued)
Transmission System Additions for 2008

System additions	System need year	Projected In-service year	Planning zone	Need category	Planned, Proposed or Provisional	Cost Estimate - Refer to *Funding Project* and *Sum of Total (2007-2016)* in Financial Table
Install 2-1.2 MVAR distribution capacitor banks at Sister Bay 69 kV	2008	2008	4	reliability	Proposed	F1920
Construct a 138-kV substation at new Cedar Ridge; loop existing Ohmstead-Kettle Moraine 138-kV line into new Cedar Ridge Substation	2008	2008	4	new generation	Planned	F2019
Uprate North Appleton-Mason Street 138-kV line	2008	2008	4	reliability, service limitation	Proposed	F2229
Uprate North Appleton-Lost Dauphin 138-kV line	2008	2008	4	reliability, service limitation	Proposed	F2229
Reconductor Saukville-St Lawrence 138-kV line	2008	2008	5	new generation	Planned	F1324

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 2009

System additions	System need year	Projected In-service year	Planning zone	Need category	Planned, Proposed or Provisional	Cost Estimate - Refer to *Funding Project* and *Sum of Total (2007-2016)* in Financial Table
Construct Gardner Park-Hwy 22 345-kV line	2009	2009	1	service limitation, reliability, import capability and Weston stability	Planned	F0301
Construct new Hwy 22 345-kV Substation	2009	2009	1	service limitation, reliability, import capability and Weston stability	Planned	F0301
Install 1-4.08 MVAR capacitor bank at L'Anse 69 kV	2008	2009	2	reliability	Proposed	F1819
Relocate Cedar Substation (North Lake)	2005	2009	2	reliability, condition	Proposed	F1605
Install 2-16.33 MVAR capacitor bank at Perkins 138-kV Substation	2009	2009	2	reliability	Proposed	F2220
Install 1-16.33 MVAR capacitor bank at Hiawatha 138-kV Substation	2009	2009	2	reliability	Proposed	F2222
Install 2-8.16 MVAR capacitor banks at the 9 Mile 69-kV Substation	2009	2009	2	reliability	Proposed	F2221
Uprate Chandler-Cornell 69-kV line clearance from 120 to 167 deg F	2009	2009	2	reliability	Proposed	F2016
Install second 345/138-kV transformer at Plains Substation	2009	2009	2	reliability, transfer capability	Proposed	F1568
Construct a Jefferson-Lake Mills-Stony Brook 138-kV line	2006	2009	3	reliability	Planned	F0924
Convert Rock River to Bristol to Elkhorn 138-kV operation; rebuild Bristol with a new 138 kV bus	2008	2009	3	reliability	Planned	F1690
Uprate Rockdale to Jefferson 138-kV line	2008	2009	3	reliability	Planned	F0924
Uprate Rockdale to Boxelder 138-kV line	2008	2009	3	reliability	Planned	F0924
Uprate Boxelder to Stony Brook 138-kV line	2008	2009	3	reliability	Planned	F0924

Table PR-4 (continued)
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 *Funding Project* and *Sum of Total (2007-2016)* in Financial Table
Construct a new 138-kV line from North Madison to Huiskamp (was Waunakee)	2009	2009	3	reliability	Planned	F1626
Construct a new 138/69-kV substation near Huiskamp and install a 187 MVA 138/69-kV transformer	2008	2009	3	reliability	Planned	F1626
Install 3-16.33 MVAR 138-kV capacitor banks at North Beaver Dam Substation	2005	2009	3	reliability	Proposed	F1847
Uprate North Lake Geneva-Lake Geneva 69-kV line to 115 MVA	2009	2009	3	reliability	Proposed	F2155
Uprate Walworth- North Lake Geneva 69-kV to 69 MVA	2009	2009	3	reliability	Proposed	F2154
Install 2-24.5 MVAR 138 kV capacitor banks at Kilbourn Substation and install 2-24.5 MVAR 138-kV capacitor banks at Artesian Substation	2009	2009	3	reliability	Proposed	F1712
Install 12.45 MVAR 69-kV mobile capacitor bank at Brick Church Substation	2008	2009	3	reliability	Proposed	TBD
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	2009	2009	3	reliability	Proposed	F2102
String a new 138-kV line from Clintonville-Werner West primarily on Morgan-Werner West 345-kV line structures	2004	2009	4	reliability, service limitation	Planned	F0823
Construct Morgan-Werner West 345-kV line	2004	2009	4	reliability, service limitation	Planned	F0823
Rebuild Crivitz-High Falls 69-kV double circuit line	2009	2009	4	reliability	Planned	F1357
Rebuild 2.37 miles of 69 kV from Sunset Point to Pearl Ave with 477 ACSR	2009	2009	4	reliability	Proposed	F1361
Replace relaying on 230-kV circuits at Oak Creek	2009	2009	5	new generation	Planned	F0283

Table PR-4 (continued)
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 *Funding Project* and *Sum of Total (2007-2016)* in Financial Table
Replace two 345-kV circuit breakers at Pleasant Prairie Substation on the Racine and Zion lines with IPO breakers and upgrade relaying	2009	2009	5	new generation	Planned	F0283
Expand Oak Creek 345-kV switchyard to interconnect one new generator	2009	2009	5	new generation	Planned	F0283
Reconductor Oak Creek-Ramsey 138-kV line	2009	2009	5	new generation	Planned	F1729
Reconductor Oak Creek-Allerton 138-kV line	2009	2009	5	new generation	Planned	F0763
Install second 500 MVA 345/138-kV transformer at Oak Creek Substation	2009	2009	5	new generation	Planned	F0763
Loop Ramsey5-Harbor 138-kV line into Norwich and Kansas to form a new line from Ramsey-Norwich and Harbor-Kansas 138-kV lines	2009	2009	5	new generation	Planned	F0763
Replace CTs at Racine 345-kV Substation	2009	2009	5	new generation	Planned	F1165
Construct a 138-kV bus at Hale Substation to permit third Brookdale distribution transformer interconnection	2009	2009	5	T-D interconnection	Proposed	F2097
Construct a 138-kV bus at Pleasant Valley Substation to permit second distribution transformer interconnection	2009	2009	5	T-D interconnection	Proposed	F2086

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 2010

System additions	System need year	Projected In-service year	Planning zone	Need category	Planned, Proposed or Provisional	Cost Estimate - Refer to *Funding Project* and *Sum of Total (2007-2016)* in Financial Table
Replace 138/69-kV transformer at Metomen Substation	2010	2010	1	reliability	Provisional	F1867
Construct Brandon-Fairwater 69-kV line	2010	2010	1	T-D interconnection	Proposed	F1844
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 Iron Grove Substation	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
Relocate Iron River Substation (Iron Grove)	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
Construct new Oak Ridge-Verona 138-kV line and install a 138/69-kV transformer at Verona	2009	2010	3	reliability	Planned	F1407
Construct second Paddock-Rockdale 345-kV line and replace 345/138-kV transformer T22 at Rockdale Substation	2010	2010	3	access initiative	Planned	F1981
Install 2-16.33 MVAR capacitor banks at Spring Green 69-kV Substation	2010	2010	3	reliability	Provisional	F1476
Upgrade the existing 2-8.16 MVAR to 2-16.33 MVAR capacitor banks at South Lake Geneva Substation	2010	2010	3	reliability	Provisional	F2159
Install two 69-kV breakers at Beardsley Street Substation	2010	2010	4	reliability	Provisional	F2082
Expand 345-kV switchyard at Oak Creek to interconnect one new generator	2010	2010	5	new generation	Planned	F0763

Table PR-5 (continued)
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 *Funding Project* and *Sum of Total (2007-2016)* in Financial Table
Uprate Oak Creek-Root River 138-kV line	2010	2010	5	new generation	Planned	F0763
Uprate Oak Creek-Nicholson 138-kV line	2010	2010	5	new generation	Planned	F0763
Install 200 MVAR capacitor bank at Bluemound Substation	2010	2010	5	reliability	Provisional	F2085
Uprate Arcadian-Waukesha 138-kV lines KK9942/KK9962	2010	2010	5	reliability	Proposed	F2142
Install 2-32 MVAR capacitor banks at Summit 138-kV Substation	2009	2010	5	reliability	Proposed	F2256

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 2011

System additions	System need year	Projected In-service year	Planning zone	Need category	Planned, Proposed or Provisional	Cost Estimate - Refer to *Funding Project* and *Sum of Total (2007-2016)* in Financial Table
Upgrade 4.1 MVAR capacitor bank to 8.2 MVAR and install a new 8.2 MVAR capacitor bank at Ripon 69-kV Substation	2011	2011	1	reliability	Provisional	F1476
Uprate McCue-Milton Lawns 69-kV line	2011	2011	3	reliability	Provisional	F1686
Rebuild the Verona to Oregon 69-kV line Y119	2008	2011	3	reliability, maintenance	Proposed	F1731
Rebuild Brodhead to South Monroe 69-kV line	2011	2011	3	generation interconnection, reliability	Proposed	F1635
Install 2-16.3 MVAR capacitor bank at Mears Corners 138-kV Substation	2011	2011	4	reliability	Provisional	F1924
Install 2-16.3 MVAR capacitor bank at Rosiere 138-kV Substation	2011	2011	4	reliability	Provisional	F1925
Replace the 400 amp metering CT at North Mullet River 69-kV Substation	2011	2011	4	reliability	Provisional	F1164
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	2011	5	T-D interconnection	Provisional	F2095
Install 2-32 MVAR capacitor banks at Mukwonago 138-kV Substation	2011	2011	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-7
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 *Funding Project* and *Sum of Total (2007-2016)* in Financial Table
Construct Monroe County-Council Creek 161-kV line	2012	2012	1	access initiative, reliability	Provisional	F1727
Install a 161/138-kV transformer at Council Creek Substation	2012	2012	1	access initiative, reliability	Provisional	F1727
Uprate Council Creek-Petenwell 138-kV line	2012	2012	1	access initiative, reliability	Provisional	F1727
Uprate Gardner Park-Black Brook 115-kV line - scope TBD	2012	2012	1	reliability	Provisional	F1355
Construct a North Lake Geneva-White River 138-kV line	2012	2012	3	T-D interconnection	Provisional	F1609
Uprate Brick Church-Walworth 69-kV line to 115 MVA	2012	2012	3	reliability	Provisional	F2153
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

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 2013

System additions	System need year	Projected In-service year	Planning zone	Need category	Planned, Proposed or Provisional	Cost Estimate - Refer to *Funding Project* and *Sum of Total (2007-2016)* in Financial Table
Upgrade Mckenna 6.3 MVAR capacitor bank to 10.8 MVAR and install a second new 10.8 MVAR capacitor bank	2013	2013	1	reliability	Provisional	F1476
Construct a 69-kV line from SW Ripon to the Ripon-Metomen 69-kV line	2013	2013	1	T-D interconnection	Provisional	F2053
Rebuild Blaney Park-Munising 69 kV to 138 kV	2013	2013	2	reliability, condition	Provisional	F0365
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 Columbia 345/138-kV transformer T-22 to 527 MVA	2013	2013	3	reliability	Provisional	F2135
Loop Nine Springs-Pflaum 69-kV line into Femrite Substation	2006	2013	3	reliability	Provisional	F2088
Install a 138/69-kV transformer at Bass Creek Substation	2010	2013	3	reliability	Provisional	F1869
Rebuild/reconductor Town Line Road-Bass Creek 138-kV line	2010	2013	3	reliability	Provisional	F1869
Replace the existing 46 MVA Hillman 138/69-kV transformer with a 100 MVA transformer	2013	2013	3	reliability	Provisional	F0339
Construct a Lake Delton-Birchwood 138-kV line	2013	2013	3	reliability	Provisional	F1638
Uprate Sheepskin-Dana 69-kV line to 95 MVA	2013	2013	3	reliability	Provisional	F1868
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	2013	2013	3	reliability	Provisional	F1476

Table PR-8 (continued)
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 *Funding Project* and *Sum of Total (2007-2016)* in Financial Table
Rebuild/convert Holmes-Chandler 69 kV to 138-kV operation	2013	2013	2 & 4	reliability, condition	Provisional	F1269

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 2014

System additions	System need year	Projected In-service year	Planning zone	Need category	Planned, Proposed or Provisional	Cost Estimate - Refer to *Funding Project* and *Sum of Total (2007-2016)* in Financial Table
Construct Fairwater-Mackford Prairie 69-kV line	2014	2014	1	reliability	Provisional	F2105
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	2014	2014	1	reliability	Provisional	F2105
Construct a Horicon-East Beaver Dam 138-kV line	2014	2014	3	reliability	Provisional	F1640
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	2014	2014	3	reliability	Provisional	F2093
Uprate X-67 Portage-Trienda 138-kV line to 373 MVA	2014	2014	3	reliability	Provisional	F2092
Install 2-16.33 MVAR 69-kV capacitor banks at Eden Substation	2014	2014	3	reliability	Provisional	F1476
Install 2-16.33 MVAR 69-kV capacitor banks and 2-24.5 MVAR capacitor banks at Femrite substation	2014	2014	3	reliability	Provisional	F1476
Install 2-12.25 MVAR 69-kV capacitor banks at Mazomanie Substation	2014	2014	3	reliability	Provisional	F1476
Install 2-16.33 MVAR capacitor banks at Montrose Substation	2014	2014	3	reliability	Provisional	F1476
Install a second 138/69-kV transformer at McCue Substation	2014	2014	3	reliability	Provisional	F1637

Table PR-9 (continued)
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 *Funding Project* and *Sum of Total (2007-2016)* in Financial Table
Loop the Deforest to Token Creek 69-kV line into the Yahara River Substation and install a 138/69-kV transformer at Yahara River	2014	2014	3	reliability	Provisional	F1641
Uprate Yahara River-Token Creek 69-kV line	2014	2014	3	reliability	Provisional	F1641
Replace the existing 138/69-kV transformer at South Sheboygan Falls Substation with 100 MVA transformer	2014	2014	4	reliability	Provisional	F1681
Replace two existing 138/69-kV transformers at Glenview Substation with 100 MVA transformers	2014	2014	4	reliability	Provisional	F2079
Replace the 1200 A breaker at Edgewater T22 345/138-kV transformer	2014	2014	4	reliability	Proposed	F1714
Uprate the Melissa-Tayco to 229 MVA (300F)	2014	2014	4	reliability	Provisional	F1874
Install 138/69-kV transformer at Custer Substation	2014	2014	4	reliability	Provisional	F2081
Construct Shoto to Custer 138-kV line	2014	2014	4	reliability	Provisional	F2081
Construct a 345-kV bus at Bain Substation	2008	2014	5	reliability	Provisional	F0033

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 2015

System additions	System need year	Projected In-service year	Planning zone	Need category	Planned, Proposed or Provisional	Cost Estimate - Refer to *Funding Project* and *Sum of Total (2007-2016)* in Financial Table
Install a second 138/69-kV transformer at Wautoma Substation	2015	2015	1	reliability	Provisional	F0817
Install 2-16.3 MVAR capacitor bank at Aviation Substation	2015	2015	4	reliability	Provisional	F1923
Install 28.8 MVAR capacitor bank at Butternut 138-kV Substation	2015	2015	4	reliability	Provisional	F1403
Reconductor Pulliam-Danz 69-kV line	2015	2015	4	reliability	Provisional	F1622
Reconductor Danz-Henry Street 69-kV line	2015	2015	4	reliability	Provisional	F1622
Reconductor Pulliam-Van Buren 69-kV line	2015	2015	4	reliability	Provisional	F1622
Replace two existing 138/69-kV transformers at Sunset Point Substation with 100 MVA transformers	2015	2015	4	reliability	Provisional	F2080

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

Table PR-11
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 *Funding Project* and *Sum of Total (2007-2016)* in Financial Table
Install a 12.2 MVAR capacitor bank at Hilltop 69-kV Substation	2016	2016	1	reliability	Provisional	F1476
Construct new 138-kV bus and install a 138/69-kV 100 MVA transformer at South Lake Geneva Substation	2016	2016	3	reliability	Provisional	F1609
Uprate the Royster to Sycamore 69-kV line to 115 MVA	2016	2016	3	reliability	Provisional	F1871
Construct Evansville-Brooklyn 69-kV line	2016	2016	3	reliability	Provisional	F1848
Construct new 138-kV line from South Lake Geneva to White River Substation	2016	2016	3	reliability, T-D interconnection	Provisional	F1609
Rebuild/Convert Bayport-Suamico-Sobieski-Pioneer 69-kV line to 138 kV	2016	2016	4	reliability, condition	Provisional	F1619 & F1830
Construct a second Dunn Road-Egg Harbor 69-kV line	2016	2016	4	reliability	Proposed	F0181
Construct a Northside-City Limits 138-kV line	2016	2016	4	reliability	Provisional	F1406

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 with To Be Determined In-Service Dates

System additions	System need year	Projected In-service year	Planning zone	Need category	Planned, Proposed or Provisional	Cost Estimate - Refer to *Funding Project* and *Sum of Total (2007-2016)* in Financial Table
Construct new Mackinac 138/69-kV Substation	TBD	TBD	2	reliability	Provisional	F1284
Rebuild Hiawatha-Pine River 69-kV line ESE_6908	TBD	TBD	2	maintenance	Provisional	F2075
Increase ground clearance of M38-Atlantic 69-kV line from 120 to 167 degrees F	TBD	TBD	2	reliability	Provisional	F2017
Convert Indian Lake-Hiawatha 69-kV line to double-circuit 138-kV operation, construct new Hiawatha 138-kV Substation	TBD	TBD	2	reliability	Provisional	F1354
Uprate overhead portions of Straits-McGulpin 138-kV circuits #1 & #3 to 230 F degree summer emergency ratings	TBD	TBD	2	reliability	Provisional	TBD
Install 2-5.4 MVAR capacitor banks at Osceola 69 kV	TBD	TBD	2	reliability	Provisional	F1823
Install 2-8.16 MVAR capacitor banks at M38 69 kV	TBD	TBD	2	reliability	Provisional	F1822
Install 1-5.4 MVAR capacitor bank at MTU or Henry Street 69-kV Substation	TBD	TBD	2	reliability	Provisional	F1866
Construct West Middleton-Blount 138-kV line	TBD	TBD	3	reliability	Provisional	F1222
Replace two overhead Blount-Ruskin 69-kV lines with one underground 69-kV line	TBD	TBD	3	negotiated agreement with Madison	Provisional	TBD
Construct West Middleton-North Madison 345-kV line	TBD	TBD	3	reliability, access initiative	Provisional	F1458

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 for Zone 1

System additions	System need year	Projected in-service year	Planning zone	Need category	Planned, Proposed or Provisional
Construct Stone Lake-Arrowhead 345-kV line	1997	2008	1	service limitation, reliability, import capability & Weston stability	Planned
Construct the new permanent Stone Lake 345/161-kV Substation	2008	2008	1	reliability, import capability & Weston stability	Planned
Install 1-75 MVAR capacitor bank and 1-45 MVAR inductor at Stone Lake 345 kV	2008	2008	1	achieve transfer capability associated with Arrowhead-Gardner Park	Planned
Construct new Arrowhead 345-kV Substation, install 2-75 MVAR capacitor banks, 1-800 MVA PST and 1-800 MVA 345/230-kV transformer	2008	2008	1	achieve transfer capability associated with Arrowhead-Gardner Park	Planned
Construct Cranberry-Conover 115-kV line	2008	2008	1	reliability, transfer capability	Planned
Upgrade 4.1 MVAR capacitor bank to 8.2 MVAR and upgrade the 5.4 MVAR capacitor bank to 10.8 MVAR at Berlin 69-kV Substation	2008	2008	1	reliability	Planned
Construct Gardner Park-Hwy 22 345-kV line	2009	2009	1	service limitation, reliability, import capability and Weston stability	Planned
Construct new Hwy 22 345-kV Substation	2009	2009	1	service limitation, reliability, import capability and Weston stability	Planned
Replace 138/69-kV transformer at Metomen Substation	2010	2010	1	reliability	Provisional
Construct Brandon-Fairwater 69-kV line	2010	2010	1	T-D interconnection	Proposed
Upgrade 4.1 MVAR capacitor bank to 8.2 MVAR and install a new 8.2 MVAR capacitor bank at Ripon 69-kV Substation	2011	2011	1	reliability	Provisional
Construct Monroe County-Council Creek 161-kV line	2012	2012	1	access initiative, reliability	Provisional
Install a 161/138-kV transformer at Council Creek Substation	2012	2012	1	access initiative, reliability	Provisional
Uprate Council Creek-Petenwell 138-kV line	2012	2012	1	access initiative, reliability	Provisional
Uprate Gardner Park-Black Brook 115-kV line - scope TBD	2012	2012	1	reliability	Provisional
Upgrade Mckenna 6.3 MVAR capacitor bank to 10.8 MVAR and install a second new 10.8 MVAR capacitor bank	2013	2013	1	reliability	Provisional

Table PR-13
Transmission System Additions for Zone 1 (continued)

System additions	System need year	Projected in-service year	Planning zone	Need category	Planned, Proposed or Provisional
Construct a 69-kV line from SW Ripon to the Ripon-Metomen 69-kV line	2013	2013	1	T-D interconnection	Provisional
Construct Fairwater-Mackford Prairie 69-kV line	2014	2014	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	2014	2014	1	reliability	Provisional
Install a second 138/69-kV transformer at Wautoma Substation	2015	2015	1	reliability	Provisional
Install a 12.2 MVAR capacitor bank at Hilltop 69-kV Substation	2016	2016	1	reliability	Provisional

Table PR-14
Transmission System Additions for Zone 2

System additions	System need year	Projected in-service year	Planning zone	Need category	Planned, Proposed or Provisional
Rebuild Atlantic-Osceola 69-kV line (Laurium #1)	2006	2008	2	reliability, condition	Planned
Install 1-4.08 MVAR capacitor bank at Roberts 69-kV Substation	2007	2008	2	reliability	Proposed
Construct 138 kV bus and install 138/115-kV 150 MVA and 138/69-kV 60 MVA transformers at Conover Substation	2008	2008	2	reliability, transfer capability	Planned
Install 2-4.08 MVAR capacitor banks at Munising 69-kV Substation	2008	2008	2	reliability	Proposed
Uprate Mass-Winona 69-kV line clearance to 185 degrees F	2008	2008	2	generation	Planned
Uprate Winona-Atlantic 69-kV line clearance to 185 degrees F	2008	2008	2	generation	Planned
Uprate Empire-Forsyth 138-kV line to 302 MVA	2008	2008	2	reliability	Planned
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	2008	2	reliability	Proposed
Install 1-4.08 MVAR capacitor bank at L'Anse 69 kV	2008	2009	2	reliability	Proposed
Relocate Cedar Substation (North Lake)	2005	2009	2	reliability, condition	Proposed
Install 2-16.33 MVAR capacitor bank at Perkins 138-kV Substation	2009	2009	2	reliability	Proposed
Install 1-16.33 MVAR capacitor bank at Hiawatha 138-kV Substation	2009	2009	2	reliability	Proposed
Install 2-8.16 MVAR capacitor banks at the 9 Mile 69-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 second 345/138-kV transformer at Plains Substation	2009	2009	2	reliability, transfer capability	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 Iron Grove Substation	2010	2010	2	reliability, transfer capability	Planned

Table PR-14
Transmission System Additions for Zone 2 (continued)

System additions	System need year	Projected in-service year	Planning zone	Need category	Planned, Proposed or Provisional
Construct 138 kV bus and install a 138/69 kV, 60 MVA transformer at Aspen Substation	2010	2010	2	reliability	Planned
Relocate Iron River Substation (Iron Grove)	2010	2010	2	reliability	Planned
Install 1-16.33 MVAR capacitor bank at Indian Lake 138-kV Substation	2010	2010	2	reliability	Proposed
Rebuild Blaney Park-Munising 69 kV to 138 kV	2013	2013	2	reliability, condition	Provisional
Rebuild/convert Holmes-Chandler 69 kV to 138-kV operation	2013	2013	2 & 4	reliability, condition	Provisional
Construct new Mackinac 138/69-kV Substation	TBD	TBD	2	reliability	Provisional
Rebuild Hiawatha-Pine River 69-kV line ESE_6908	TBD	TBD	2	maintenance	Provisional
Increase ground clearance of M38-Atlantic 69-kV line from 120 to 167 degrees F	TBD	TBD	2	reliability	Provisional
Convert Indian Lake-Hiawatha 69-kV line to double-circuit 138-kV operation, construct new Hiawatha 138-kV Substation	TBD	TBD	2	reliability	Provisional
Uprate overhead portions of Straits-McGulpin 138-kV circuits #1 & #3 to 230 F degree summer emergency ratings	TBD	TBD	2	reliability	Provisional
Install 2-5.4 MVAR capacitor banks at Osceola 69 kV	TBD	TBD	2	reliability	Provisional
Install 2-8.16 MVAR capacitor banks at M38 69 kV	TBD	TBD	2	reliability	Provisional
Install 1-5.4 MVAR capacitor bank at MTU or Henry Street 69-kV Substation	TBD	TBD	2	reliability	Provisional

Table PR-15
Transmission System Additions for Zone 3

System additions	System need year	Projected in-service year	Planning zone	Need category	Planned, Proposed or Provisional
Construct new line from Southwest Delavan to Bristol at 138 kV and operate at 69 kV	2007	2008	3	T-D interconnection	Planned
Uprate Portage 138/69-kV transformer to 143 MVA	2007	2008	3	relability	Planned
Install temporary 24.5 MVAR capacitor bank at Boxelder 138-kV Substation	2008	2008	3	reliability	Proposed
Install 2-8.16 MVAR 69-kV capacitor bank at South Lake Geneva Substation	2007	2008	3	reliability	Planned
Construct a Rubicon-Hustisford 138-kV line	2008	2008	3	reliability	Planned
Rebuild Hustisford-Horicon 69 kV to 138 kV	2008	2008	3	reliability	Planned
Construct 138/69 kV substation at a site near Horicon and install a 138/69-kV transformer	2008	2008	3	reliability	Planned
Uprate Brick Church-Zenda 69-kV line to 115 MVA	2008	2008	3	reliability	Proposed
Uprate X-17 Eden-Spring Green 138-kV line to 167 degrees F	2008	2008	3	relability	Planned
Uprate Portage-Trienda 138-kV line to 339 MVA	2008	2008	3	reliability	Proposed
Construct a new 138-kV line from North Madison to Huiskamp (was Waunakee)	2008	2009	3	reliability	Planned
Construct a new 138/69-kV substation near Huiskamp and install a 187 MVA 138/69-kV transformer	2008	2009	3	reliability	Planned
Construct a Jefferson-Lake Mills-Stony Brook 138-kV line	2006	2009	3	reliability	Planned
Convert Rock River to Bristol to Elkhorn 138-kV operation; rebuild Bristol with a new 138 kV bus	2008	2009	3	reliability	Planned
Uprate Rockdale to Jefferson 138-kV line	2008	2009	3	reliability	Planned
Uprate Rockdale to Boxelder 138-kV line	2008	2009	3	reliability	Planned
Uprate Boxelder to Stony Brook 138-kV line	2008	2009	3	reliability	Planned
Install 3-16.33 MVAR 138-kV capacitor banks at North Beaver Dam Substation	2005	2009	3	reliability	Proposed
Uprate North Lake Geneva-Lake Geneva 69-kV line to 115 MVA	2009	2009	3	reliability	Proposed

Table PR-15
Transmission System Additions for Zone 3 (continued)

System additions	System need year	Projected in-service year	Planning zone	Need category	Planned, Proposed or Provisional
Uprate Walworth- North Lake Geneva 69-kV to 69 MVA	2009	2009	3	reliability	Proposed
Install 2-24.5 MVAR 138 kV capacitor banks at Kilbourn Substation and install 2-24.5 MVAR 138-kV capacitor banks at Artesian Substation	2009	2009	3	reliability	Proposed
Install 12.45 MVAR 69-kV mobile capacitor bank at Brick Church Substation	2008	2009	3	reliability	Proposed
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	2009	2009	3	reliability	Proposed
Construct new Oak Ridge-Verona 138-kV line and install a 138/69-kV transformer at Verona	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	access initiative	Planned
Install 2-16.33 MVAR capacitor banks at Spring Green 69-kV Substation	2010	2010	3	reliability	Provisional
Upgrade the existing 2-8.16 MVAR to 2-16.33 MVAR capacitor banks at South Lake Geneva Substation	2010	2010	3	reliability	Provisional
Rebuild the Verona to Oregon 69-kV line Y119	2008	2011	3	reliability, maintenance	Proposed
Uprate McCue-Milton Lawns 69-kV line	2011	2011	3	reliability	Provisional
Rebuild Brodhead to South Monroe 69-kV line	2011	2011	3	generation interconnection, reliability	Proposed
Construct a North Lake Geneva-White River 138-kV line	2012	2012	3	T-D interconnection	Provisional
Uprate Brick Church-Walworth 69-kV line to 115 MVA	2012	2012	3	reliability	Provisional
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 Columbia 345/138-kV transformer T-22 to 527 MVA	2013	2013	3	reliability	Provisional

Table PR-15
Transmission System Additions for Zone 3 (continued)

System additions	System need year	Projected in-service year	Planning zone	Need category	Planned, Proposed or Provisional
Loop Nine Springs-Pflaum 69-kV line into Femrite Substation	2006	2013	3	reliability	Provisional
Install a 138/69-kV transformer at Bass Creek Substation	2010	2013	3	reliability	Provisional
Rebuild/reconductor Town Line Road-Bass Creek 138-kV line	2010	2013	3	reliability	Provisional
Replace the existing 46 MVA Hillman 138/69-kV transformer with a 100 MVA transformer	2013	2013	3	reliability	Provisional
Construct a Lake Delton-Birchwood 138-kV line	2013	2013	3	reliability	Provisional
Uprate Sheepskin-Dana 69-kV line to 95 MVA	2013	2013	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	2013	2013	3	reliability	Provisional
Construct a Horicon-East Beaver Dam 138-kV line	2014	2014	3	reliability	Provisional
Loop the Deforest to Token Creek 69-kV line into the Yahara River Substation and install a 138/69-kV transformer at Yahara River	2014	2014	3	reliability	Provisional
Uprate Yahara River-Token Creek 69-kV line	2014	2014	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	2014	2014	3	reliability	Provisional
Uprate X-67 Portage-Trienda 138-kV line to 373 MVA	2014	2014	3	reliability	Provisional
Install 2-16.33 MVAR 69-kV capacitor banks at Eden Substation	2014	2014	3	reliability	Provisional
Install 2-16.33 MVAR 69-kV capacitor banks and 2-24.5 MVAR capacitor banks at Femrite substation	2014	2014	3	reliability	Provisional
Install 2-12.25 MVAR 69-kV capacitor banks at Mazomanie Substation	2014	2014	3	reliability	Provisional
Install 2-16.33 MVAR capacitor banks at Montrose Substation	2014	2014	3	reliability	Provisional

Table PR-15
Transmission System Additions for Zone 3 (continued)

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 McCue Substation	2014	2014	3	reliability	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
Uprate the Royster to Sycamore 69-kV line to 115 MVA	2016	2016	3	reliability	Provisional
Construct Evansville-Brooklyn 69-kV line	2016	2016	3	reliability	Provisional
Construct new 138-kV line from South Lake Geneva to White River Substation	2016	2016	3	reliability, T-D interconnection	Provisional
Construct West Middleton-Blount 138-kV line	TBD	TBD	3	reliability	Provisional
Replace two overhead Blount-Ruskin 69-kV lines with one underground 69-kV line	TBD	TBD	3	negotiated agreement with Madison	Provisional
Construct West Middleton-North Madison 345-kV line	TBD	TBD	3	reliability, access initiative	Provisional

Table PR-16
Transmission System Additions for Zone 4

System additions	System need year	Projected in-service year	Planning zone	Need category	Planned, Proposed or Provisional
Construct a 345-kV substation at new Cypress; loop existing Forest Junction-Arcadian line into new Cypress Substation	2006	2007	4	new generation	Planned
Relocate Mishicot 138-kV Substation	2007	2007	4	new generation	Planned
String a new Ellinwood-Sunset Point 138-kV line on existing structures	2007	2007	4	reliability	Planned
Uprate North Appleton-Lawn Road-White Clay 138-kV line	2007	2007	4	reliability	Planned
Expand the Menominee 69-kV Substation and install 138 kV terminals. Loop the West Marinette-Bay De Noc 138-kV line into the Substation	2008	2008	4	reliability	Proposed
Install 138/69-kV transformer at the expanded Menominee Substation	2008	2008	4	reliability	Proposed
Construct a 138-kV substation at a new Cedar Ridge; loop existing Ohmstead-Kettle Moraine 138-kV line into new Cedar Ridge Substation	2008	2008	4	new generation	Planned
Install 2-1.2 MVAR distribution capacitor banks at Sister Bay 69 kV	2008	2008	4	reliability	Proposed
Uprate North Appleton-Mason Street 138-kV line	2008	2008	4	reliability, service limitation	Proposed
Uprate North Appleton-Lost Dauphin 138-kV line	2008	2008	4	reliability, service limitation	Proposed
String a new 138-kV line from Clintonville-Werner West primarily on Morgan-Werner West 345-kV line structures	2004	2009	4	reliability, service limitation	Planned
Construct Morgan-Werner West 345-kV line	2004	2009	4	reliability, service limitation	Planned
Rebuild Crivitz-High Falls 69-kV double circuit line	2009	2009	4	reliability	Planned
Rebuild 2.37 miles of 69 kV from Sunset Point to Pearl Ave with 477 ACSR	2009	2009	4	reliability	Proposed
Install two 69-kV breakers at Beardsley Street Substation	2010	2010	4	reliability	Provisional
Install 2-16.3 MVAR capacitor bank at Mears Corners 138-kV Substation	2011	2011	4	reliability	Provisional

Table PR-16
Transmission System Additions for Zone 4 (continued)

System additions	System need year	Projected in-service year	Planning zone	Need category	Planned, Proposed or Provisional
Install 2-16.3 MVAR capacitor bank at Rosiere 138-kV Substation	2011	2011	4	reliability	Provisional
Replace the 400 amp metering CT at North Mullet River 69-kV Substation	2011	2011	4	reliability	Provisional
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
Rebuild/convert Holmes-Chandler 69 kV to 138-kV operation	2013	2013	2 & 4	reliability, condition	Provisional
Replace the existing 138/69-kV transformer at South Sheboygan Falls Substation with 100 MVA transformer	2014	2014	4	reliability	Provisional
Replace two existing 138/69-kV transformers at Glenview Substation with 100 MVA transformers	2014	2014	4	reliability	Provisional
Replace the 1200 A breaker at Edgewater T22 345/138-kV transformer	2014	2014	4	reliability	Proposed
Uprate the Melissa-Tayco to 229 MVA (300F)	2014	2014	4	reliability	Provisional
Install 138/69-kV transformer at Custer Substation	2014	2014	4	reliability	Provisional
Construct Shoto to Custer 138-kV line	2014	2014	4	reliability	Provisional
Install 2-16.3 MVAR capacitor bank at Aviation Substation	2015	2015	4	reliability	Provisional
Install 28.8 MVAR capacitor bank at Butternut 138-kV Substation	2015	2015	4	reliability	Provisional
Reconductor Pulliam-Danz 69-kV line	2015	2015	4	reliability	Provisional
Reconductor Danz-Henry Street 69-kV line	2015	2015	4	reliability	Provisional
Reconductor Pulliam-Van Buren 69-kV line	2015	2015	4	reliability	Provisional
Replace two existing 138/69-kV transformers at Sunset Point Substation with 100 MVA transformers	2015	2015	4	reliability	Provisional
Rebuild/Convert Bayport-Suamico-Sobieski-Pioneer 69-kV line to 138 kV	2016	2016	4	reliability, condition	Provisional
Construct a second Dunn Road-Egg Harbor 69-kV line	2016	2016	4	reliability	Proposed

Table PR-16
Transmission System Additions for Zone 4 (continued)

System additions	System need year	Projected in-service year	Planning zone	Need category	Planned, Proposed or Provisional
Construct a Northside-City Limits 138-kV line	2016	2016	4	reliability	Provisional

Table PR-17
Transmission System Additions for Zone 5

System additions	System need year	Projected in-service year	Planning zone	Need category	Planned, Proposed or Provisional
Upgrade St. Martins 138-kV bus to 2000A	2007	2007	5	reliability	Planned
Upgrade St. Lawrence 138-kV bus	2007	2007	5	reliability	Planned
Reconductor Saukville-St Lawrence 138-kV line	2008	2008	5	new generation	Planned
Replace relaying on 230-kV circuits at Oak Creek	2009	2009	5	new generation	Planned
Replace two 345-kV circuit breakers at Pleasant Prairie Substation on the Racine and Zion lines with IPO breakers and upgrade relaying	2009	2009	5	new generation	Planned
Expand Oak Creek 345-kV switchyard to interconnect one new generator	2009	2009	5	new generation	Planned
Reconductor Oak Creek-Ramsey 138-kV line	2009	2009	5	new generation	Planned
Reconductor Oak Creek-Allerton 138-kV line	2009	2009	5	new generation	Planned
Install second 500 MVA 345/138-kV transformer at Oak Creek Substation	2009	2009	5	new generation	Planned
Loop Ramsey5-Harbor 138-kV line into Norwich and Kansas to form a new line from Ramsey-Norwich and Harbor-Kansas 138-kV lines	2009	2009	5	new generation	Planned
Replace CTs at Racine 345-kV Substation	2009	2009	5	new generation	Planned
Construct a 138-kV bus at Hale Substation to permit third Brookdale distribution transformer interconnection	2009	2009	5	T-D interconnection	Proposed
Construct a 138-kV bus at Pleasant Valley Substation to permit second distribution transformer interconnection	2009	2009	5	T-D interconnection	Proposed
Uprate Arcadian-Waukesha 138-kV lines KK9942/KK9962	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
Install 200 MVAR capacitor bank at Bluemound Substation	2010	2010	5	reliability	Provisional

Table PR-17
Transmission System Additions for Zone 5

System additions	System need year	Projected in-service year	Planning zone	Need category	Planned, Proposed or Provisional
Install 2-32 MVAR capacitor banks at Summit 138-kV Substation	2009	2010	5	reliability	Proposed
Install 2-32 MVAR capacitor banks at Mukwonago 138-kV Substation	2011	2011	5	reliability	Provisional
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	2011	5	T-D interconnection	Provisional
Construct a 345-kV bus at Bain Substation	2008	2014	5	reliability	Provisional

Table PR-18
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			
reduce service limitations, relieve overloads or low voltages under contingency, improve transfer capability & Weston stability	Construct Stone Lake-Arrowhead 345-kV line	70	36.6	1997	2008	1
relieve overloads or low voltages under contingency, transfer capability	Construct Cranberry-Conover 115-kV line	14	14	2008	2008	1
T-D interconnection request	Construct new line from Southwest Delavan to Bristol at 138 kV and operate at 69 kV	3.5	3.5	2007	2008	3
relieve overloads or low voltages under contingency	Construct a Rubicon-Hustisford 138-kV line	5	5	2008	2008	3
relieve overloads or low voltages under contingency	Construct a new 138-kV line from North Madison to Huiskamp (was Waunakee)	5	5	2008	2009	3
relieve overloads or low voltages under contingency	Construct a Jefferson-Lake Mills-Stony Brook 138-kV line	12	12	2006	2009	3
relieve overloads or low voltages under contingency, reduce service limitations	String a new 138-kV line from Clintonville-Werner West primarily on Morgan-Werner West 345-kV line structures	16	2	2004	2009	4
relieve overloads or low voltages under contingency, reduce service limitations	Construct Morgan-Werner West 345-kV line	47	47	2004	2009	4
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	9	3	2009	2010	3
T-D interconnection request	Construct a North Lake Geneva-White River 138-kV line	1.4	1.4	2012	2012	3
T-D interconnection request	Construct a 69-kV line from SW Ripon to the Ripon-Metomen 69-kV line	1.5	1.5	2013	2013	1
relieve overloads or low voltages under contingency	Construct 345-kV line from Rockdale to West Middleton	35	35	2013	2013	3
relieve overloads or low voltages under contingency	Construct a Lake Delton-Birchwood 138-kV line	5	5	2013	2013	3
s or low voltages under contingency, repla	Rebuild/convert Holmes-Chandler 69 kV to 138-kV operation	54	14	2013	2013	2 & 4
ve overloads or low voltages under contin	Construct Fairwater-Mackford Prairie 69-kV line		5	2014	2014	1
relieve overloads or low voltages under contingency	Construct a Horicon-East Beaver Dam 138-kV line	9	9	2014	2014	3

Table PR-18
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	Loop the Deforest to Token Creek 69-kV line into the Yahara River Substation and install a 138/69-kV transformer at Yahara River	1	1	2014	2014	3
e overloads or low voltages under contin	Construct Shoto to Custer 138-kV line	9.94	9.94	2014	2014	4
relieve overloads or low voltages under contingency	Construct Evansville-Brooklyn 69-kV line	8	8	2016	2016	3
relieve overloads or low voltages under contingency, T-D interconnection request	Construct new 138-kV line from South Lake Geneva to White River Substation	3	3	2016	2016	3
	Construct second Dunn Road-Egg Harbor 69-kV line	12.66	12.66	2016	2016	4
relieve overloads or low voltages under contingency, access initiative	Construct West Middleton-North Madison 345-kV line	20	20	TBD	TBD	3

Table PR-19
Transmission Line Rebuilds/Reconductors, New Circuits and Voltage Conversions on Existing Right-of-Way

Identified need	Lines to be rebuilt/reconductored on existing ROW	Approx. mileage of rebuilt, reconductored or uprated lines	System need year	Projected In-service year	Planning zone
relieve overloads or low voltages under contingency	String a new Ellinwood-Sunset Point 138-kV line on existing structures	3.58	2007	2007	4
relieve overloads or low voltages under contingency	Uprate North Appleton-Lawn Road-White Clay 138-kV line	29.8	2007	2007	4
relieve overloads or low voltages under contingency, replace aging facilities	Rebuild Atlantic-Osceola 69-kV line (Laurium #1)	13.7	2006	2008	2
relieve overloads or low voltages under contingency	Rebuild Hustisford-Horicon 69 kV to 138 kV	8	2008	2008	3
relieve overloads or low voltages under contingency, reduce service limitations	Uprate North Appleton-Mason Street 138-kV line	21	2008	2008	4
relieve overloads or low voltages under contingency, reduce service limitations	Uprate North Appleton-Lost Dauphin 138-kV line	12	2008	2008	4
accommodate new generation	Reconductor Saukville-St Lawrence 138-kV line	7	2008	2008	5
reduce service limitations, relieve overloads or low voltages under contingency, improve transfer capability and Weston stability	Construct Gardner Park-Hwy 22 345-kV line	47	2009	2009	1
relieve overloads or low voltages under contingency	Convert Rock River to Bristol to Elkhorn 138-kV operation; rebuild Bristol with a new 138 kV bus	27.74	2008	2009	3
relieve overloads or low voltages under contingency	Rebuild Crivitz-High Falls 69-kV double circuit line	14.5	2009	2009	4
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	2009	2009	4
accommodate new generation	Reconductor Oak Creek-Allerton 138-kV line	5.41	2009	2009	5
accommodate new generation	Loop Ramsey5-Harbor 138-kV line into Norwich and Kansas to form a new line from Ramsey-Norwich and Harbor-Kansas 138-kV lines	5.72	2009	2009	5

Table PR-19
Transmission Line Rebuilds/Reconductors, New Circuits and Voltage Conversions on Existing Right-of-Way

Identified need	Lines to be rebuilt/reconductored on existing ROW	Approx. mileage of rebuilt, reconductored or uprated lines	System need year	Projected In-service year	Planning zone
accommodate new generation	Reconductor Oak Creek-Ramsey 138-kV line	8.5	2009	2009	5
relieve overloads or low voltages under contingency, transfer capability	Rebuild/convert Conover-Plains 69-kV line to 138 kV	73	2010	2010	2
access initiative	Construct second Paddock-Rockdale 345-kV line and replace 345/138-kV transformer T22 at Rockdale Substation	35	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, maintenance	Rebuild the Verona to Oregon 69-kV line Y119	11	2008	2011	3
generation interconnection, relieve overloads or low voltages under contingency	Rebuild Brodhead to South Monroe 69-kV line	18	2011	2011	3
T-D interconnection request	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	8	2011	2011	5
access initiative, relieve overloads or low voltages under contingency	Construct Monroe County-Council Creek 161-kV line	20	2012	2012	1
access initiative, relieve overloads or low voltages under contingency	Uprate Council Creek-Petenwell 138-kV line	32	2012	2012	1
relieve overloads or low voltages under contingency	Construct Canal-Dunn Road 138-kV line	7.64	2012	2012	4
relieve overloads or low voltages under contingency, replace aging facilities	Rebuild Blaney Park-Munising 69 kV to 138 kV	50	2013	2013	2
relieve overloads or low voltages under contingency	Rebuild/reconductor Town Line Road-Bass Creek 138-kV line	9	2010	2013	3
ve overloads or low voltages under contin	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	5	2014	2014	1
ve overloads or low voltages under contin	Reconductor Pulliam-Danz 69-kV line	3	2015	2015	4

Table PR-20
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			
accommodate new generation	Construct a 345-kV substation at new Cypress; loop existing Forest Junction-Arcadian line into new Cypress Substation	N/A	N/A	2006	2007	4
accommodate new generation	Relocate Mishicot 138-kV Substation	N/A	N/A	2007	2007	4
achieve transfer capability associated with Arrowhead-Gardner Park	Construct new Arrowhead 345-kV Substation, install 2-75 MVAR capacitor banks, 1-800 MVA PST and 1-800 MVA 345/230-kV transformer	800	0	2008	2008	1
relieve overloads under contingency, improve transfer capability & Weston stability	Construct the new permanent Stone Lake 345/161-kV Substation	N/A	N/A	2008	2008	1
relieve overloads under contingency, transfer capability	Construct 138 kV bus and install 138/115-kV 150 MVA and 138/69-kV 60 MVA transformers at Conover Substation	210	0	2008	2008	2
relieve overloads under contingency	Construct 138/69 kV substation at a site near Horicon and install a 138/69-kV transformer	100	0	2008	2008	3
relieve overloads under contingency	Install 138/69-kV transformer at the expanded Menominee Substation	100	0	2008	2008	4
accommodate new generation	Construct a 138-kV substation at new Cedar Ridge; loop existing Ohmstead-Kettle Moraine 138-kV line into new Cedar Ridge Substation	N/A	N/A	2008	2008	4
reduce service limitations, relieve overloads under contingency, improve transfer capability and Weston stability	Construct new Hwy 22 345-kV Substation	N/A	N/A	2009	2009	1
relieve overloads under contingency, transfer capability	Install second 345/138-kV transformer at Plains Substation	500	0	2009	2009	2
relieve overloads under contingency, replace aging facilities	Relocate Cedar Substation (North Lake)	N/A	N/A	2005	2009	2
relieve overloads under contingency	Construct a new 138/69-kV substation near Huiskamp and install a 187 MVA 138/69-kV transformer	187	0	2008	2009	3
accommodate new generation	Install second 500 MVA 345/138-kV transformer at Oak Creek Substation	500	0	2009	2009	5
T-D interconnection request	Construct a 138-kV bus at Hale Substation to permit third Brookdale distribution transformer interconnection	N/A	N/A	2009	2009	5
relieve overloads under contingency	Replace 138/69-kV transformer at Metomen Substation	100	47	2010	2010	1

Table PR-20
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, transfer capability	Construct 138 kV bus and install a 138/69 kV, 60 MVA transformer at Iron Grove Substation	60	0	2010	2010	2
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	Relocate Iron River Substation (Iron Grove)	N/A	N/A	2010	2010	2
access initiative, relieve overloads under contingency	Install a 161/138-kV transformer at Council Creek Substation	100	0	2012	2012	1
relieve overloads under contingency	Install 60 MVA 138/69-kV transformer at Dunn Road	60	0	2012	2012	4
relieve overloads under contingency	Replace the existing 46 MVA Hillman 138/69-kV transformer with a 100 MVA transformer	47	0	2013	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	Install a 138/69-kV transformer at Bass Creek Substation	100	0	2010	2013	3
relieve overloads under contingency	Install a second 138/69-kV transformer at McCue Substation	100	0	2014	2014	3
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	2014	2014	3
relieve overloads under contingency	Replace the existing 138/69-kV transformer at South Sheboygan Falls Substation with 100 MVA transformer	100	60	2014	2014	4
relieve overloads under contingency	Replace two existing 138/69-kV transformers at Glenview Substation with 100 MVA transformers	200	116	2014	2014	4
relieve overloads under contingency	Install 138/69-kV transformer at Custer Substation	100	0	2014	2014	4
relieve overloads under contingency	Construct a 345-kV bus at Bain Substation	N/A	N/A	2008	2014	5
relieve overloads under contingency	Install a second 138/69-kV transformer at Wautoma Substation	100	0	2015	2015	1
relieve overloads under contingency	Replace two existing 138/69-kV transformers at Sunset Point Substation with 100 MVA transformers	200	142	2015	2015	4
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	3

Table PR-20
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 new Mackinac 138/69-kV Substation	N/A	N/A	TBD	TBD	2

Table PR-21
Substation Equipment Additions and Replacements

Identified need	Potential additions or replacements	Capacitor bank Capacity (MVAR)	System Need Year	Projected In-Service Year	Planning Zone
ieve overloads or low voltages under contingen	Upgrade St. Martins 138-kV bus to 2000A	N/A	2007	2007	5
relieve overloads or low voltages under contingency	Upgrade St. Lawrence 138-kV bus	N/A	2007	2007	5
achieve transfer capability associated with Arrowhead-Gardner Park	Install 1-75 MVAR capacitor bank and 1-45 MVAR inductor at Stone Lake 345 kV	75	2008	2008	1
achieve transfer capability associated with Arrowhead-Gardner Park	Construct new Arrowhead 345-kV Substation, install 2-75 MVAR capacitor banks, 1-800 MVA PST and 1-800 MVA 345/230-kV transformer	150	2008	2008	1
relieve overloads or low voltages under contingency	Upgrade 4.1 MVAR capacitor bank to 8.2 MVAR and upgrade the 5.4 MVAR capacitor bank to 10.8 MVAR at Berlin 69-kV Substation	9.5	2008	2008	1
generation	Uprate Mass-Winona 69-kV line clearance to 185 degrees F	N/A	2008	2008	2
relieve overloads or low voltages under contingency	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	2008	2
generation	Uprate Winona-Atlantic 69-kV line clearance to 185 degrees F	N/A	2008	2008	2
relieve overloads or low voltages under contingency	Install 2-4.08 MVAR capacitor banks at Munising 69-kV Substation	8.16	2008	2008	2
relieve overloads or low voltages under contingency	Install 1-4.08 MVAR capacitor bank at Roberts 69-kV Substation	4.08	2007	2008	2
relieve overloads or low voltages under contingency	Uprate Empire-Forsyth 138-kV line to 302 MVA	N/A	2008	2008	2
relieve overloads or low voltages under contingency	Uprate Brick Church-Zenda 69-kV line to 115 MVA	N/A	2008	2008	3
relability	Uprate X-17 Eden-Spring Green 138-kV line to 167 MVA	N/A	2008	2008	3
relieve overloads or low voltages under contingency	Install 2-8.16 MVAR 69-kV capacitor bank at South Lake Geneva Substation	16.32	2007	2008	3
relability	Uprate Portage 138/69-kV transformer to 143 MVA	N/A	2007	2008	3
relieve overloads or low voltages under contingency	Uprate Portage-Trienda 138-kV line to 339 MVA	N/A	2008	2008	3
relieve overloads or low voltages under contingency	Install a temporary 24.5 MVAR 138-kV capacitor bank at Boxelder Substation	24.5	2008	2008	3

Table PR-21
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	Expand the Menominee 69-kV Substation and install 138 kV terminals. Loop the West Marinette-Bay De Noc 138-kV line into the Substation	N/A	2008	2008	4
ieve overloads or low voltages under contingen	Install 2-1.2 MVAR distribution capacitor banks at Sister Bay 69 kV	12	2008	2008	4
relieve overloads or low voltages under contingency	Install 1-4.08 MVAR capacitor bank at L'Anse 69 kV	4.08	2008	2009	2
ieve overloads or low voltages under contingen	Uprate Chandler-Cornell 69-kV line clearance from 120 to 167 deg F	N/A	2009	2009	2
ieve overloads or low voltages under contingen	Install 2-16.33 MVAR capacitor bank at Perkins 138-kV Substation	32.66	2009	2009	2
ieve overloads or low voltages under contingen	Install 2-8.16 MVAR capacitor banks at the 9 Mile 69-kV Substation	16.32	2009	2009	2
ieve overloads or low voltages under contingen	Install 1-16.33 MVAR capacitor bank at Hiawatha 138-kV Substation	16.33	2009	2009	2
relieve overloads or low voltages under contingency	Uprate Rockdale to Jefferson 138-kV line	N/A	2008	2009	3
relieve overloads or low voltages under contingency	Uprate Rockdale to Boxelder 138-kV line	N/A	2008	2009	3
relieve overloads or low voltages under contingency	Uprate Boxelder to Stony Brook 138-kV line	N/A	2008	2009	3
relieve overloads or low voltages under contingency	Install 2-24.5 MVAR 138 kV capacitor banks at Kilbourn Substation and install 2-24.5 MVAR 138-kV capacitor banks at Artesian Substation	98	2009	2009	3
relieve overloads or low voltages under contingency	Install 3-16.33 MVAR 138-kV capacitor banks at North Beaver Dam Substation	49	2005	2009	3
relieve overloads or low voltages under contingency	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	10.86	2009	2009	3
relieve overloads or low voltages under contingency	Uprate Walworth- North Lake Geneva 69-kV to 69 MVA	N/A	2009	2009	3
relieve overloads or low voltages under contingency	Uprate North Lake Geneva-Lake Geneva 69-kV line to 115 MVA	N/A	2009	2009	3
relieve overloads or low voltages under contingency	Install 12.45 MVAR 69-kV mobile capacitor bank at Brick Church Substation	12.45	2008	2009	3
accommodate new generation	Replace relaying on 230-kV circuits at Oak Creek	N/A	2009	2009	5

Table PR-21
Substation Equipment Additions and Replacements

Identified need	Potential additions or replacements	Capacitor bank Capacity (MVAR)	System Need Year	Projected In-Service Year	Planning Zone
accommodate new generation	Replace two 345-kV circuit breakers at Pleasant Prairie Substation on the Racine and Zion lines with IPO breakers and upgrade relaying	N/A	2009	2009	5
accommodate new generation	Replace CTs at Racine 345-kV Substation	N/A	2009	2009	5
T-D interconnection request	Construct a 138-kV bus at Pleasant Valley Substation to permit second distribution transformer interconnection	N/A	2009	2009	5
accommodate new generation	Expand Oak Creek 345-kV switchyard to interconnect one new generator	N/A	2009	2009	5
ieve overloads or low voltages under contingen	Install 1-16.33 MVAR capacitor bank at Indian Lake 138-kV Substation	16.33	2010	2010	2
ieve overloads or low voltages under contingen	Install 2-16.33 MVAR capacitor banks at Spring Green 69-kV Substation	32	2010	2010	3
relieve overloads or low voltages under contingency	Upgrade the existing 2-8.16 MVAR to 2-16.33 MVAR capacitor banks at South Lake Geneva Substation	16.33	2010	2010	3
relieve overloads or low voltages under contingency	Install two 69-kV breakers at Beardsley Street Substation	N/A	2010	2010	4
relieve overloads or low voltages under contingency	Uprate Arcadian-Waukesha 138-kV lines KK9942/KK9962	N/A	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
relieve overloads or low voltages under contingency	Install 200 MVAR capacitor bank at Bluemound Substation	200	2010	2010	5
ieve overloads or low voltages under contingen	Install 2-32 MVAR capacitor banks at Summit 138-kV Substation	64	2009	2010	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	2011	2011	1
relieve overloads or low voltages under contingency	Uprate McCue-Milton Lawns 69-kV line	N/A	2011	2011	3
relieve overloads or low voltages under contingency	Replace the 400 amp metering CT at North Mullet River 69-kV Substation	N/A	2011	2011	4
ieve overloads or low voltages under contingen	Install 2-16.3 MVAR capacitor bank at Mears Corners 138-kV Substation	32.6	2011	2011	4
ieve overloads or low voltages under contingen	Install 2-16.3 MVAR capacitor bank at Rosiere 138-kV Substation	32.6	2011	2011	4

Table PR-21
Substation Equipment Additions and Replacements

Identified need	Potential additions or replacements	Capacitor bank Capacity (MVAR)	System Need Year	Projected In-Service Year	Planning Zone
ieve overloads or low voltages under contingen	Install 2-32 Mvar capacitor banks at Mukwonago 138-kV Substation	64	2011	2011	5
relieve overloads or low voltages under contingency	Uprate Gardner Park-Black Brook 115-kV line - scope TBD	N/A	2012	2012	1
relieve overloads or low voltages under contingency	Uprate Brick Church-Walworth 69-kV line to 115 MVA	N/A	2012	2012	3
ieve overloads or low voltages under contingen	Upgrade Mckenna 6.3 MVAR capacitor bank to 10.8 MVAR and install a second new 10.8 MVAR capacitor bank	15.3	2013	2013	1
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	2013	2013	3
relieve overloads or low voltages under contingency	Uprate Sheepskin-Dana 69-kV line to 95 MVA	N/A	2013	2013	3
relieve overloads or low voltages under contingency	Loop Nine Springs-Pflaum 69-kV line into Femrite Substation	N/A	2006	2013	3
relieve overloads or low voltages under contingency	Uprate Columbia 345/138-kV transformer T-22 to 527 MVA	N/A	2013	2013	3
relieve overloads or low voltages under contingency	Install 2-16.33 MVAR 69-kV capacitor banks at Eden Substation	32.66	2014	2014	3
relieve overloads or low voltages under contingency	Install 2-16.33 MVAR 69-kV capacitor banks and 2-24.5 MVAR capacitor banks at Femrite substation	81.66	2014	2014	3
relieve overloads or low voltages under contingency	Install 2-12.25 MVAR 69-kV capacitor banks at Mazomanie Substation	24.5	2014	2014	3
relieve overloads or low voltages under contingency	Install 2-16.33 MVAR capacitor banks at Montrose Substation	32.66	2014	2014	3
ieve overloads or low voltages under contingen	Uprate Yahara River-Token Creek 69-kV line	N/A	2014	2014	3
relieve overloads or low voltages under contingency	Uprate X-67 Portage-Trienda 138-kV line to 373 MVA	N/A	2014	2014	3
relieve overloads or low voltages under contingency	Replace the 1200 A breaker at Edgewater T22 345/138-kV transformer	N/A	2014	2014	4
relieve overloads or low voltages under contingency	Uprate the Melissa-Tayco to 229 MVA (300F)	N/A	2014	2014	4
relieve overloads or low voltages under contingency	Install 28.8 MVAR capacitor bank at Butternut 138-kV Substation	28.8	2015	2015	4
ieve overloads or low voltages under contingen	Install 2-16.3 MVAR capacitor bank at Aviation Substation	32.6	2015	2015	4

Table PR-22

Summary of Cancellations, Deferrals, Changes, Possible Changes and New Projects for the 2007 10-Year Assessment

PROJECTS CANCELLED	Former In-Service Date	Planning Zone	Reason for Removal
Rebuild/reconductor Petenwell-Saratoga 138-kV line	2010	1	Updated study results
Uprate M38 138/69-kV transformer	TBD	2	Revised load/model information
Install 1-5.4 MVAR capacitor bank at Sawyer 69 kV	TBD	2	Replaced with distribution capacitor bank solution
Construct Huiskamp-Blount 138-kV line	2012	3	Further studies needed to determine scope and in-service date
Uprate North Monroe-Idle Hour 69-kV line	2012	3	Updated study results
Install series reactor at Cornell Substation	2007	5	Updated study results
Expand Oak Creek 345-kV switchyard to interconnect three new generators plus one new 345-kV line and 138-kV switchyard to accommodate new St. Martins line	2013	5	Elm Road generation Phase 3 cancellation
Construct a 345/138-kV switchyard at Hale (Brookdale) to accommodate two 345-kV lines, a 500 MVA 345/138-kV transformer and 4-138-kV lines plus three 138-26.2 kV transformers	2013	5	Elm Road generation Phase 3 cancellation
Install two 345-kV line terminations at Pleasant Prairie Substation and loop Zion-Arcadian 345-kV line into Pleasant Prairie	2013	5	Elm Road generation Phase 3 cancellation
Construct an Oak Creek-Hale (Brookdale) 345-kV line installing 4 mi. new structures, converting 16.2 mi. of non-operative 230 kV and 5 mi. 138 kV	2013	5	Elm Road generation Phase 3 cancellation
Construct Oak Creek-St. Martins 138-kV circuit #2 installing 16.6 mi. conductor on existing towers	2013	5	Elm Road generation Phase 3 cancellation
Construct a Hale (Brookdale)-Granville 345-kV line converting/reconductoring 5.6 mi. 138 kV, rebuilding 7 mi. 138 kV double circuit tower line and converting/reconductoring 3 mi. 138 kV on existing 345-kV structures	2013	5	Elm Road generation Phase 3 cancellation
Reconductor Cornell-Range Line 138-kV line	2014	5	Updated study results

Table PR-22 (continued)			
Summary of Cancellations, Deferrals, Changes, Possible Changes and New Projects for the 2007 10-Year Assessment			
PROJECTS DEFERRED	**New date**	**Planning Zone**	**Reason for Deferral**
Construct a 345-kV substation at new Cypress; loop existing Forest Junction-Arcadian line into new Cypress Substation	2007	4	Was 2006; revised construction schedule
Construct new line from Southwest Delavan to Bristol at 138 kV and operate at 69 kV	2008	3	Was 2007; revised construction schedule
Construct North Madison-Huiskamp 138-kV line	2009	3	Was 2008; revised construction schedule
Install 1-4.08 MVAR capacitor bank at L'Anse 69 kV	2009	2	Was 1-5.4 MVAR bank in 2008; revised construction schedule
Relocate Cedar Substation (North Lake)	2009	2	Was 2008; deferred due to resource availability
Install second 345/138-kV transformer at Plains Substation	2009	2	Was 2008; revised load/model information
Construct a Jefferson-Lake Mills-Stony Brook 138-kV line	2009	3	Was 2008; deferred due to route contention
Uprate Rockdale to Jefferson 138-kV line	2009	3	Was 2008; deferred because route contention
Uprate Rockdale to Boxelder 138-kV line	2009	3	Was 2008; deferred because of route contention
Uprate Boxelder to Stonybrook 138-kV line	2009	3	Was 2008; deferred because of route contention
Rebuild Crivitz-High Falls 69-kV double circuit line	2009	4	Was 2008; resource availability
Construct Brandon-Fairwater 69-kV line	2010	1	Was 2008; customer's decision to defer
Rebuild/convert Conover-Plains 69-kV line to 138 kV, construct 138-kV bus and install transformers at Iron Grove and Aspen, and relocate Iron River Substation (Iron Grove)	2009	2	Was 2008; deferred due to regulatory delays
Construct new Oak Ridge-Verona 138-kV line and install a 138/69-kV transformer at Verona	2010	3	Was 2009; regulatory delay
Rebuild the Verona to Oregon 69-kV line Y119	2011	3	Was 2008; route overlap complications and associated regulatory delay for portion from Verona to Sun Valley (due to Oak Ridge to Verona delay) and Rockdale to West Middleton overlap for entire route
Install 200 MVAR capacitor bank at Bluemound Substation	2010	5	Was 2008; detailed study in progress to determine scope and in-service date

Table PR-22 (continued)			
Summary of Cancellations, Deferrals, Changes, Possible Changes and New Projects for the 2007 10-Year Assessment			
PROJECTS DEFERRED (continued)	**New date**	**Planning Zone**	**Reason for Deferral**
Rebuild Brodhead to South Monroe 69-kV line	2011	3	Was 2008; updated study results and resource availability
Construct Monroe County-Council Creek 161-kV line	2012	1	Was 2010; resource availability
Install a 161/138-kV transformer at Council Creek Substation	2012	1	Was 2010; resource availability
Uprate Council Creek-Petenwell 138-kV line	2012	1	Was 2010; resource availability
Construct a 69-kV line from SW Ripon to the Ripon-Metomen 69-kV line	2013	1	Was 2012; customer's decision to defer
Rebuild Blaney Park-Munising 69 kV to 138 kV	2013	2	Was 2012; Asset Management review
Construct 345-kV line from Rockdale to West Middleton	2013	3	Was 2011; updated study results
Construct a 345-kV bus and install a 345/138 kV 500 MVA transformer at West Middleton Substation	2013	3	Was 2011; updated study results
Uprate Columbia 345/138-kV transformer T-22 to 527 MVA	2013	3	Was 2008; revised rating information
Loop Nine Springs-Pflaum 69-kV line into Femrite Substation	2013	3	Was 2010; delayed due to resource availability
Install a 138/69-kV transformer at Bass Creek Substation	2013	3	Was 2010; delayed due to resource availability
Rebuild/reconductor Town Line Road-Bass Creek 138-kV line	2013	3	Was 2010; delayed due to resource availability
Replace the existing 46 MVA Hillman 138/69-kV transformer with a 100 MVA transformer	2013	3	Was second transformer in 2010; updated study results
Loop the Deforest to Token Creek 69-kV line into the Yahara River Substation and install 138/69-kV transformer at Yahara River	2014	3	Was 2011; delayed due to updated study results
Uprate Yahara River-Token Creek 69-kV line	2014	3	Was 2011; delayed due to updated study results
Install 138/69-kV transformer at Custer Substation	2014	4	Was 2012; updated study results
Construct Shoto to Custer 138-kV line	2014	4	Was 2012; updated study results
Construct a 345-kV bus at Bain Substation	2014	5	Was 2009; further study needed to determine scope and in-service date

Table PR-22 (continued)			
Summary of Cancellations, Deferrals, Changes, Possible Changes and New Projects for the 2007 10-Year Assessment			
OTHER PROJECT CHANGES AND POSSIBLE CHANGES	**Date**	**Planning Zone**	**Nature of Change or Update**
Upgrade 4.1 MVAR capacitor bank to 8.2 MVAR and upgrade the 5.4 MVAR capacitor bank to 10.8 MVAR at Berlin 69-kV Substation	2008	1	Was total of 12.8 MVAR upgrade
Install 1-4.08 MVAR capacitor bank at Roberts 69-kV Substation	2008	2	Was 5.4 MVAR capacitor bank
Install 2-4.08 MVAR capacitor banks at Munising 69-kV Substation	2008	2	Was 2-5.4 MVAR banks
Install 2-8.16 MVAR 69-kV capacitor bank at South Lake Geneva Substation	2008	3	Was 1-16.33 MVAR bank
Expand the Menominee 69-kV Substation and install 138 kV terminals. Loop the West Marinette-Bay De Noc 138-kV line into the Substation	2008	4	Was provisional, now proposed
Install 138/69-kV transformer at the expanded Menominee Substation	2008	4	Was provisional, now proposed
Install 2-1.2 MVAR distribution capacitor banks at Sister Bay 69 kV	2008	4	Was 2-4.1 MVAR banks on transmission side, was provisional and now is proposed
Construct Gardner Park-Hwy 22 345-kV line	2009	1	Central Wisconsin was renamed Hwy 22
Construct new Hwy 22 345-kV Substation	2009	1	Central Wisconsin was renamed Hwy 22
Uprate Chandler-Cornell 69-kV line clearance from 120 to 167 deg F	2009	2	Was provisional in 2010; now proposed in 2009
Install 3-16.33 MVAR 138-kV capacitor banks at North Beaver Dam Substation	2009	3	Was provisional, now proposed; was 2-24.5 MVAR banks
Install 2-24.5 MVAR 138 kV capacitor banks at Kilbourn Substation and install 2-24.5 MVAR 138-kV capacitor banks at Artesian Substation	2009	3	Was 2-16.33 capacitor banks at Kilbourn and 2-24.5 at Artesian
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	2009	3	Was 2-8.16 MVAR banks at Brewer
Construct second Paddock-Rockdale 345-kV line and replace 345/138-kV transformer T22 at Rockdale Substation	2010	3	Added the transformer replacement
Upgrade the existing 2-8.16 MVAR to 2-16.33 MVAR capacitor banks at South Lake Geneva Substation	2010	3	Was second16.33 MVAR bank
Construct new Mackinac 138/69-kV Substation	TBD	2	Was Proposed in 2011, now Provisional and TBD
Rebuild Hiawatha-Pine River 69-kV line ESE_6908	TBD	2	Was Proposed in 2009; now Provisional and TBD
Construct West Middleton-North Madison 345-kV line	TBD	3	Was proposed in 2016; now Provisional and TBD

Table PR-22 (continued)			
Summary of Cancellations, Deferrals, Changes, Possible Changes and New Projects for the 2007 10-Year Assessment			
NEW PROJECTS	In-Service Date	Planning Zone	Reason for Project
Relocate Mishicot 138-kV Substation	2007	4	new generation
Upgrade St. Martins 138-kV bus to 2000A	2007	5	reliability
Upgrade St. Lawrence 138-kV bus	2007	5	reliability
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	2	reliability
Uprate Empire-Forsyth 138-kV line to 302 MVA	2008	2	reliability
Uprate Portage 138/69-kV transformer to 143 MVA	2008	3	reliability
Uprate X-17 Eden-Spring Green 138-kV line to 167 degrees F	2008	3	reliability
Install temporary 24.5 MVAR capacitor bank at Boxelder 138-kV Substation	2008	3	reliability; Jefferson-Stony Brook project delay
Construct a 138-kV substation at new Cedar Ridge; loop existing Ohmstead-Kettle Moraine 138-kV line into new Cedar Ridge Substation	2008	4	accommodate new generation
Install 2-16.32 MVAR capacitor bank at Perkins 138-kV Substation	2009	2	reliability
Install 1-16.33 MVAR capacitor bank at Hiawatha 138-kV Substation	2009	2	reliability
Install 12.45 MVAR 69-kV mobile capacitor bank at Brick Church Substation	2009	3	reliability
Install 2-32 Mvar capacitor banks at Mukwonago 138-kV Substation	2009	5	reliability
Install 2-4.08 MVAR capacitor banks at the 9 Mile 69-kV Substation	2010	2	reliability
Install 1-16.33 MVAR capacitor bank at Indian Lake 138-kV Substation	2010	2	reliability
Replace two overhead Blount-Ruskin 69-kV lines with one underground 69-kV line	TBD	3	negotiated agreement with Madison
Install 2-32 MVAR capacitor banks at Summit 138-kV Substation	2010	5	reliability
Uprate Arcadian-Waukesha 138-kV lines KK9942/KK9962	2010	5	reliability

Table PR-23
Maintenance, Operations or Protection Projects over $0.5 Million (2008-2012)

Project Description	System Need Year	In-Service Year	Initiated	Planning Zone	Need Category	Planned, Proposed or Provisional	Capital Cost Estimate (in Millions)
Laurium 69-kV line rebuild	2008	2008	Maintenance	2	Poor condition	Planned	7.5
Hillman-Nelson Dewey (X15) line rebld	2008	2008	Maintenance	3	Poor condition	Planned	4.6
Elkhart-Fredonia (Blaw Knox)	2007	2008	Maintenance	4	Poor condition	Planned	3.4
Plains substation upgrades	2008	2008	Protection	2	Improve protection	Planned	3.1
Whitcomb substation relay upgrades	2006	2008	Protection	1	Improve reliability	Planned	2.9
Straits substation relay upgrades	2008	2008	Protection	3	Improve protection	Planned	2.0
North Monroe substation upgrades	2008	2009	Protection	3	Improve protection	Planned	1.7
L6908-L6909 line clearance	2008	2008	Maintenance	2	Poor condition	Planned	1.3
Portage substation upgrades	2008	2008	Protection	3	Improve protection	Planned	1.6
Boscobel 69-kV substation upgrades	2008	2008	Maintenance	3	Poor condition	Planned	1.1
Academy breaker replacement	2008	2008	Maintenance	3	Poor condition	Planned	1.0
Chaffee Creek substation upgrades	2008	2008	Maintenance	1	Poor condition	Planned	0.9
Deer Trail breaker replacement	2008	2008	Maintenance	1	Poor condition	Planned	0.8
Fredonia-Saukville (Blaw Knox) line rebuild	2008	2008	Maintenance	4	Poor condition	Planned	0.7
Pine River substation upgrades	2008	2009	Maintenance	2	Poor condition	Planned	7.5
Chaffee Creek-Kilbourn (Y100) line	2006	2009	Maintenance	1	Poor condition	Planned	3.9
Chaffee Creek-Hancock (Y90) line rebuild	2009	2009	Maintenance	1	Poor condition	Planned	3.2
Mt Horeb-Rock Branch (Y135) line rebuild	2007	2009	Maintenance	3	Poor condition	Planned	3.2
Spring Green-Stagecoach (Y62) line rebuild	2008	2009	Maintenance	3	Poor condition	Planned	2.8
Deforest substation upgrades	2008	2009	Protection	3	Improve protection	Planned	1.6
Sheepskin SS relay upgrades	2008	2009	Protection	3	Improve protection	Planned	1.1
L6952 line upgrades	2009	2009	Maintenance	2	Poor condition	Planned	1.0
Butte Des Mort relay upgrades	2009	2009	Maintenance	4	Poor condition	Planned	0.9
Iola breaker replacement	2008	2009	Maintenance	1	Poor condition	Planned	0.9
Boscobel-Hillside (Y40) line rebuild	2010	2010	Maintenance	3	Poor condition	Planned	2.0
Spring Green-Kirkwood (X18) line rebuild	2010	2010	Maintenance	3	Poor condition	Planned	1.8
Dam Heights-Dane (Y8) line rebuild	2008	2010	Maintenance	3	Poor condition	Planned	1.0
Rozelleville-Sigel (Y107) line rebuild	2009	2010	Maintenance	1	Poor condition	Planned	0.7
Colley Road substation upgrades	2006	2010	Maintenance	3	Poor condition	Provisional	0.7

Table PR-24
Projects In Design or Construction

Project	Zone
Construct Stone Lake-Arrowhead 345-kV line	1
Construct the new permanent Stone Lake 345/161-kV Substation	1
Install 1-75 MVAR capacitor bank and 1-45 MVAR inductor at Stone Lake 345 kV	1
Construct new Arrowhead 345-kV Substation, install 2-75 MVAR capacitor banks, 1-800 MVA PST and 1-800 MVA 345/230-kV transformer	1
Construct Cranberry-Conover 115-kV line	1
Upgrade 4.1 MVAR capacitor bank to 8.2 MVAR and upgrade the 5.4 MVAR capacitor bank to 10.8 MVAR at Berlin 69-kV Substation	1
Construct Gardner Park-Hwy 22 345-kV line	1
Construct new Hwy 22 345-kV Substation	1
Construct new line from Southwest Delavan to Bristol at 138 kV and operate at 69 kV	3
Construct Morgan-Werner West 345-kV line	4
String a new 138-kV line from Clintonville-Werner West primarily on Morgan-Werner West 345-kV line structures	4
String a new Ellinwood-Sunset Point 138-kV line on existing structures	4

Table PR-25
Projects That Have Obtained Regulatory Approval, but Construction has not Commenced

Project	Zone
Construct a Rubicon-Hustisford 138-kV line	1
Construct a new 138 kV line from Rock River Substation connecting to Y3 and convert 69 kV path from Turtle to Elkhorn to 138 kV operation	3
Construct Jefferson-Lake Mills-Stony Brook 138-kV line	3
Construct a new 138-kV line from North Madison to Huiskamp	3
Rebuild Crivitz-High Falls 69-kV double circuit line	4
Reconductor Saukville-St Lawrence 138-kV line	5

Table PR-26
Projects Awaiting Regulatory Review/Approval

Project	Zone
Construct second Paddock-Rockdale 345-kV line and replace 345/138-kV transformer T22 at Rockdale Substation	3
Construct Rockdale-West Middleton 345-kV line	3
Construct new Oak Ridge-Verona 138-kV line and install a 138/69-kV transformer at Verona	3
Elm Road Generating Station – Phase 2 (various projects)	5

Table PR-27
Former Generator Requests Now In-Service

Date	Requests on-line	Megawatts
2000	IC006 (Eden/Little Badger)	31
2001	G074 (Combined Locks)	53
6/1/2003	G111 (Pulliam CT), G148 (Petenwell/Big Pond)	105
3/19/2004	G165 & G383 (Kewaunee uprate)	43
6/1/2004	G225 (Kaukauna CT)	60
6/15/2004	G035 & G072 (Riverside)	655
5/1/2005	G096 & G160 (West Campus)	150
6/1/2005	G044 (Fox Energy)	602
6/2/2005	G103 (Sheboygan)	370
7/16/05	G014 & G093 (Port Washington)	600
9/1/2006	G510 (Port Washington increase)	45
4/1/2007	G240 (Manitowoc)	54
5/2007	G550 (Concord uprate)	12

Table PR-28
Proposed Projects Active in the Generation Queue as of July 1, 2007

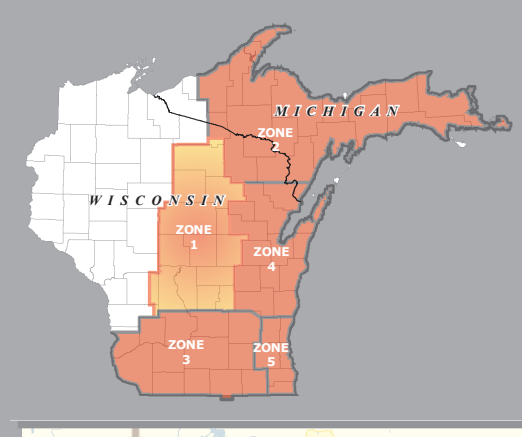
Zone	Queue #	County	Project capacity	Interconnection voltage	Generator technology and fuel	Developer projected in-service date
1	G144	Marathon	550 MW	345 kV	steam/coal	6/08
1	G588	Wood	65 MW	115 kV	simple cycle/gas	3/08
1	Total		615 MW			
2	G750	Marquette	201 MW	138 kV	wind turbine	9/09
2	G799	Houghton	120.5 MW	69 kV	wind turbine	11/09
2	Total		320.5 MW			
3	G282	Lafayette	99 MW	138 kV	wind turbine	12/06 susp.
3	G338	Dodge	54 MW	138 kV	wind turbine	TBD
3	G366	Columbia	80 MW	138 kV	wind turbine	6/06 susp.
3	G483	Green	50 MW	69 kV	wind turbine	12/06 susp.
3	G527	Grant	280 MW	161 kV	steam/coal	3/12
3	G546	Walworth	100 MW	138 kV	wind turbine	12/08 susp.
3	G550	Jefferson	12 MW	138 kV	simple cycle/gas	6/09
3	G553 (alternate to G527)	Columbia	280 MW (not in total below)	345 kV	steam/coal	3/12
3	G706	Columbia	99 MW	138 kV	wind turbine	12/08
3	G724	Dane	99 MW	138 kV	wind turbine	9/08
3	G747	Rock	99 MW	138 kV	wind turbine	8/09
3	G749	Lafayette	99 MW	69 or 138 kV	wind turbine	8/09
3	G793	Rock	100 MW	138 kV	wind turbine	8/09
3	Total		1171 MW			
4	G353	Fond du Lac	80 MW	345 kV	wind turbine	TBD
4	G354	Fond du Lac	80 MW	345 kV	wind turbine	TBD
4	G368	Dodge/Fond du Lac	200 MW	138 kV	wind turbine	12/07
4	G376	Green Lake/Fond du Lac	160 MW	138 kV	wind turbine	12/06 susp.
4	G384	Manitowoc/ Kewaunee	99 MW	138 kV	wind turbine	10/07 susp.
4	G427	Fond du Lac	98 MW	345 kV	wind turbine	6/06 susp.
4	G507	Fond du Lac	98 MW	345 kV	wind turbine	12/07
4	G590	Calumet	98 MW	138 kV	wind turbine	12/07
4	G611	Calumet	99 MW	138 kV	wind turbine	8/08
4	G773	Brown	150 MW	138 kV	wind turbine	12/09
4	Total		1162 MW			
5	G014	Ozaukee	500 MW	138 kV	combined cycle/gas	6/08
5	G051	Milwaukee	1300 MW	345 kV	steam/coal	6/09, 6/10
5	G093	Ozaukee	100 MW	138 kV	combined cycle/gas	6/08
5	G510	Ozaukee	45 MW	138 kV	combined cycle/gas	6/08
5	Total		1945 MW			

Notes:

1. susp = 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-29
Requests Previously in the Generation Queue
Which Have been Withdrawn/Removed between January 31, 2007 and July 1, 2007

Zone	Queue no.	County	Size	Voltage	Type	In-Service Date
1	none					
2	G567	Delta	165 MW	138 kV	steam/coal	1/11
2	G568	Delta	300 MW	138 kV	steam/coal	1/11
2	G583	Ontonagon	14 MW	69 kV	steam/biomass	6/08
3	none					
4	none					
5	G051	Milwaukee	650 MW	345 kV	steam/coal gasification	6/13



Conover
Conover (WE)
Twin Lake
Strawberry Hill
Iron River
Crystal Falls
Peavy Falls Hy
Aspen
Pine Hy
Cranberry
St Germain
Clear Lake (WPS)
Three Lakes
Piehl
Hodag
Highway Eight
Metonga
Venus
Goodman
Silver Cliff
Eastom
Tomahawk - ATC 115kV
Summit Lake (WPS)
Caldron Falls Hy
Thunder
Grandfather Falls Hydro
Mountain
Merrill Mfg.
Pine (WPS)
Blackbrook SW STA
Antigo
Polar
Aurora St
Maine
Norsau
Wausau
Deer Trail
Neopit
Wien SW STA
Cassel
Rothschild
Kelly
Birnamwood
Middle Vlg
Keshena
Bowler
T Corners
Morrison Ave
Wittenberg
Tilleda
Gresham
Shawano
Morgan
Stratford
Kronen
Weston
Whitcomb
Shawano West
White Clay
Caroline
Badger
Cloverleaf
CWEC Tigerton
Marion
Clintonville
Hwy 22
Maplewood
McMillan
Rozellville
Groenier
Hume
CWEC Dewey
Rosholt
Wildwood (MEWD)
Auburndale
Northpoint
Lawn Rd
Arpin
Rudolph
Iola
Pittsville
Vesper
Sigel
Okray
Arnott
Amherst Jct
Manawa
Plover
Hintz
Lakehead Vesper
Coyne SW STA
Golden Sands
Harrison
Waupaca
Ellington
North Appleton
Apple Hills
Hartman Creek
White Lake (WE)
Babock
Baker St
ACEC Grant
Saratoga
Maes
Casaloma
Meadows
Neevin
Tayco
ACEC Plainfield
ACEC Sherwood
Wild Rose
Sand Lake
ACEC Cottonville
Fountain Valley
Winneconne
Vinland
Hancock
Wautoma
Sunset Point
Omro
Oshkosh
Progress
12th Ave
Necedah
Big Pond
ACEC Coloma
ACEC Richford
ACEC Spring Lake
Fox River
Fitzgerald
Aviation
Flare Ave
Council Creek
North Tomah
DPC Whistling Wings
Friendship
ACEC Dellwood
Houghton Rock
Chaffee Creek
Berlin
Cypress SW YD
Camp Douglas
Oakdale DPC
Dorset Corners
Clifton Lake
DPC New Lisbon
Castle Rock
Mckenna
Westfield
ACEC Turtle Lake
Dartford
Ripon
Roeder
Montello
ACEC Chateau
Sadoff Co
Macy St
Ohmstead
Metomen
Neenah Creek
ACEC Winnebago
ACEC Glen
Green Lake SW STA
Brandon
Koch Oil
Oakfield
Mauston
DPC Elroy
Union Center
Wonewoc
Lyndon Station
Endeavor
Markesan
Alto
Waupun
Hillsboro
Kilbourn
Lakehead Portage
Birchwood
ACEC Cambria
Butternut
Auburn
Zobel
Trienda
Portage
Cambria
Fox Lake (ALTE)
Nishan
Lake Delton
Sanborn
Mayville
Reedsburg
Manley Sand
Spring Brook
Kirkwood
Island
Rio Pumping Station
Center St
Horicon

Vilas
Florence
Oneida
Forest
Price
Rusk
Marinette
Oconto
Menominee
Shawano
Lincoln
Langlade
Taylor
Marathon
Clark
Wood
Portage
Waupaca
Brown
Outagamie
Jackson
Waushara
Green Lake
Winnebago
Fond du Lac
Calumet
Monroe
Juneau
Adams
Columbia
Marquette
Vernon
Sauk
Richland
Dodge

Transmission System Additions (May be Planned, Proposed or Provisional)

PLANNING ZONE 1

AMERICAN TRANSMISSION COMPANY
THE ENERGY ACCESS COMPANY

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

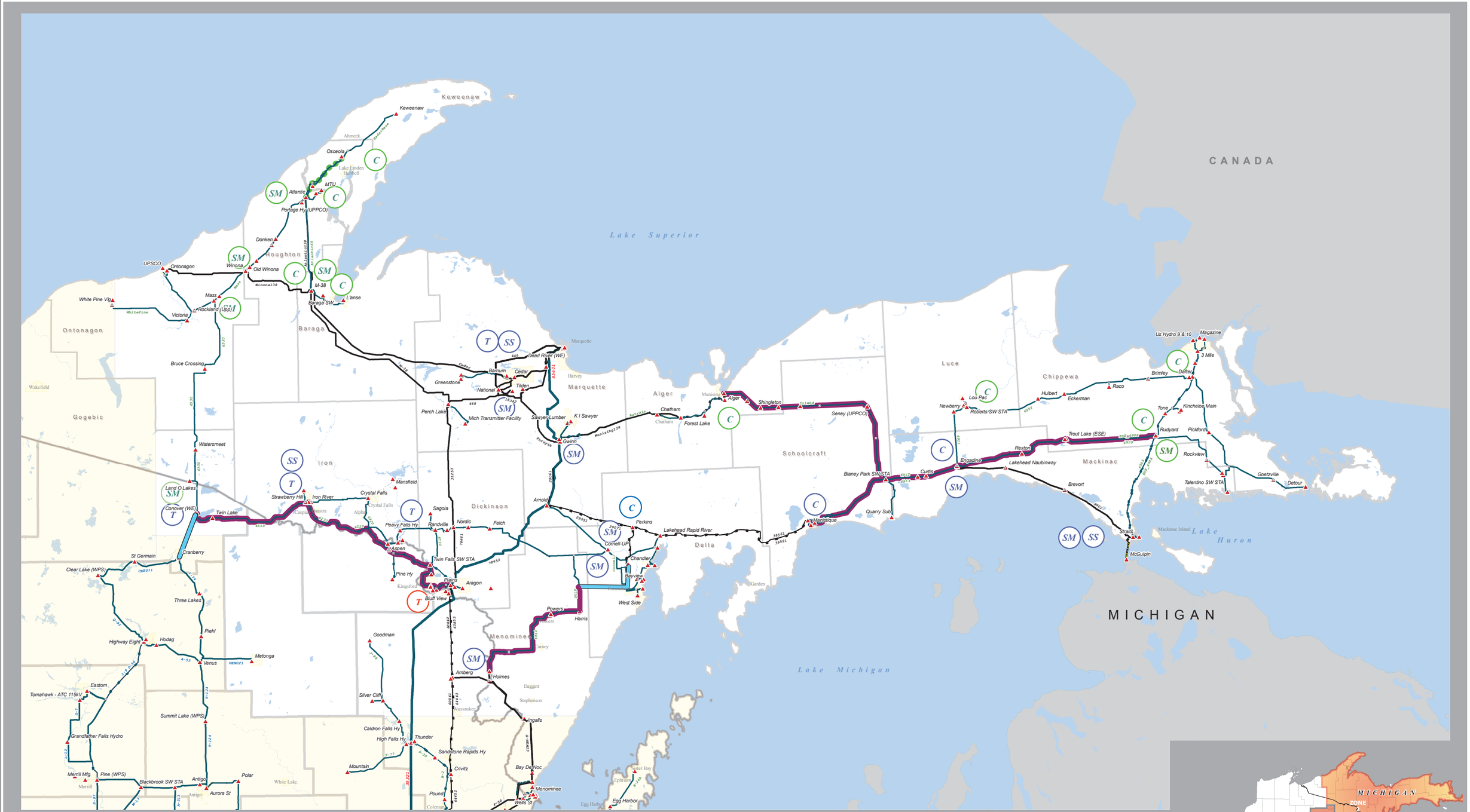
- 345 kV Transmission Line
- 115 or 138 kV Transmission Line
- Rebuilt 115 or 138 kV Transmission Line
- Transmission Line Voltage Conversion
- 69 kV Transmission Line

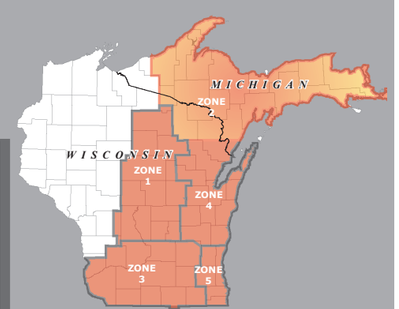
Transmission Related Facilities

- 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.

Modified: August 17,2007





AMERICAN TRANSMISSION COMPANY
THE ENERGY ACCESS COMPANY

Transmission System Additions (May be Planned, Proposed or Provisional)

PLANNING ZONE 2

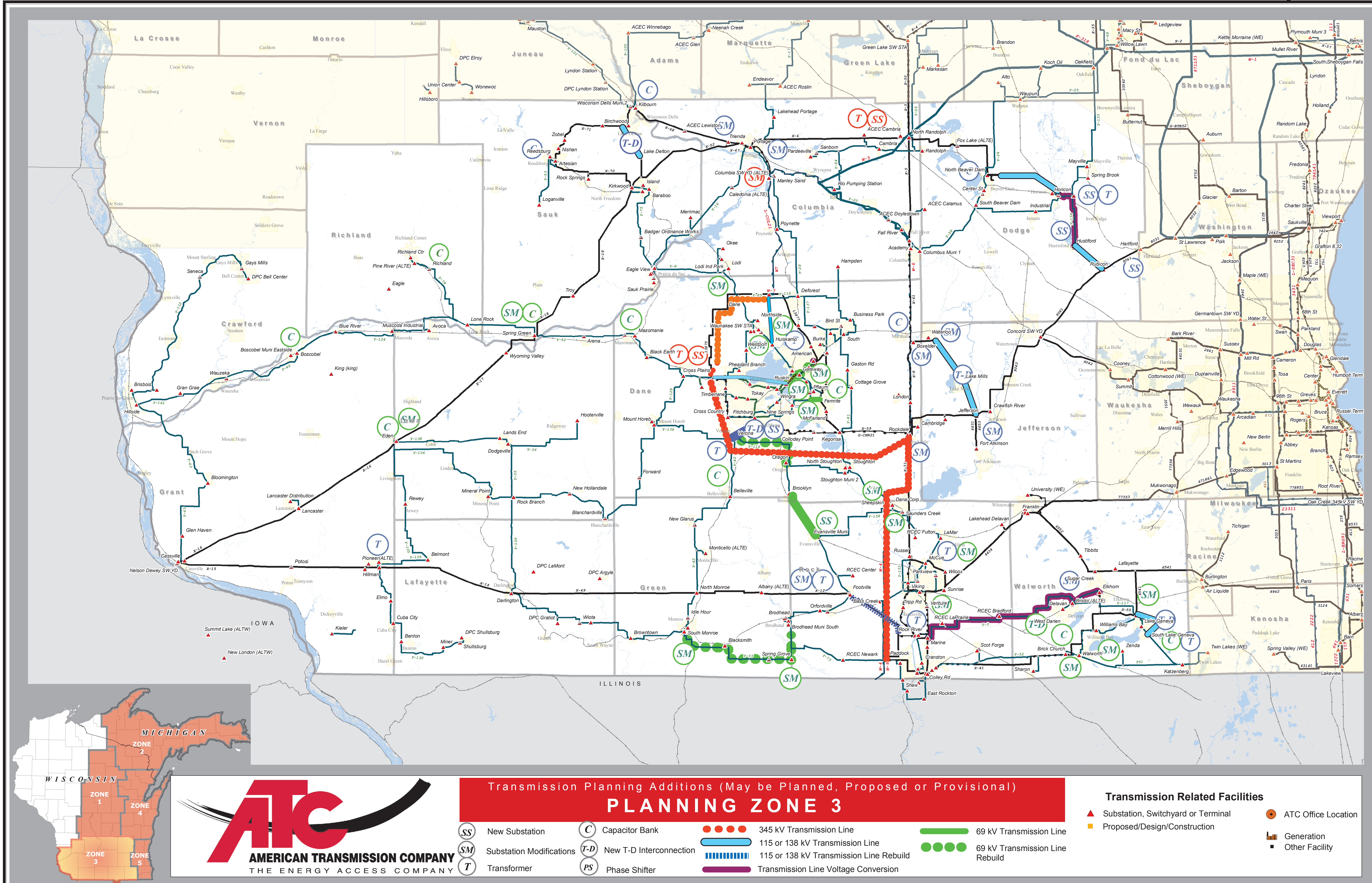
- (SM) Substation Modifications
- (T) Transformer
- (SS) New Substation
- (C) Capacitor Bank
- (T-D) New T-D Interconnection
- Rebuilt 69 kV Transmission
- 115 or 138 kV Transmission Line
- Rebuilt 115 or 138 kV Transmission
- Transmission Line Voltage Conversion
- 69 kV Transmission Line

Transmission Related Facilities

- Substation, Switchyard or Terminal
- Proposed/Design/Construction
- ATC Office Location
- Generation
- Other Facility

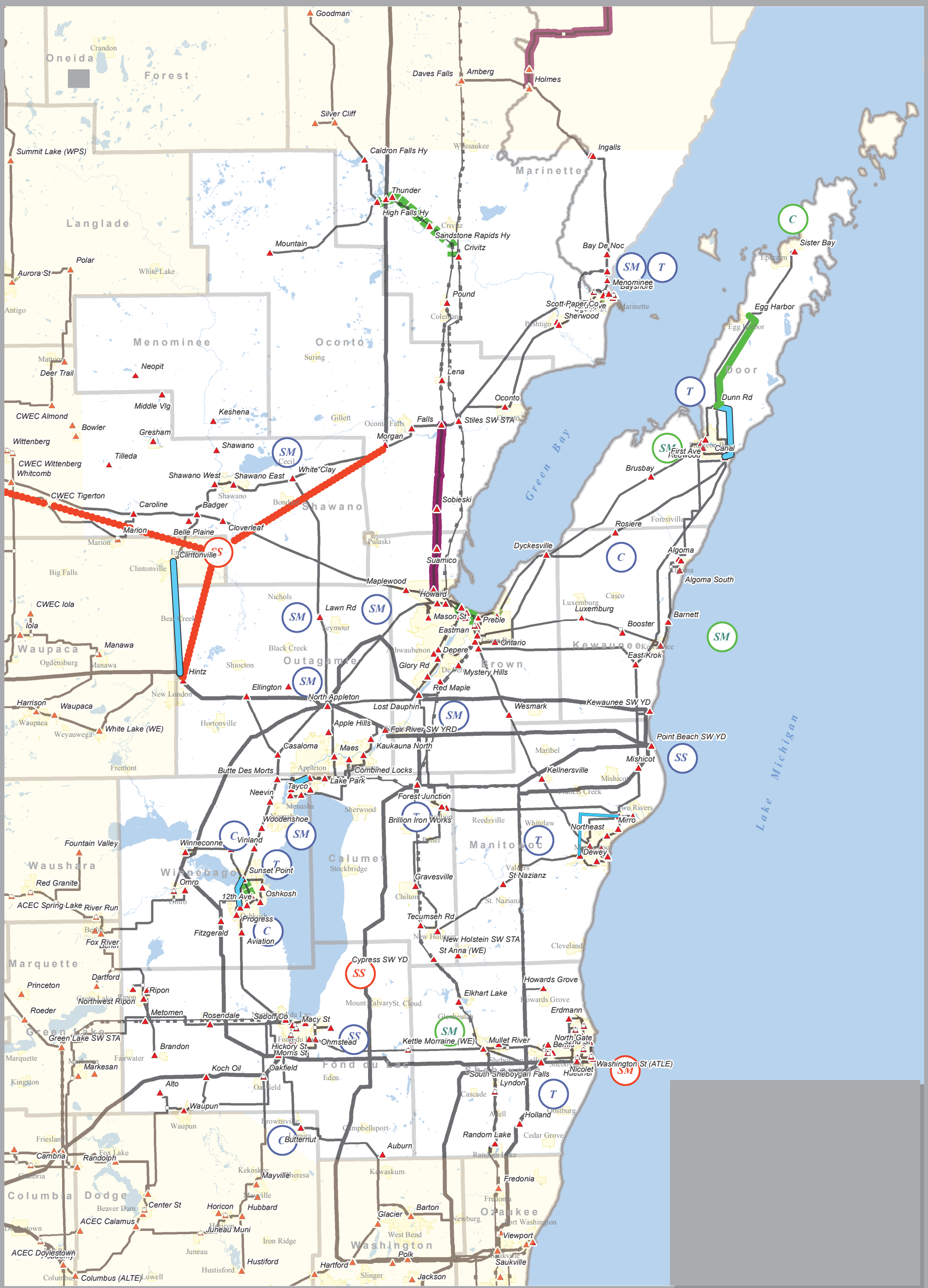
Updated 11/26/2007

Figure PR-3



Modified: August 17, 2007

Figure PR-4



AMERICAN TRANSMISSION COMPANY
THE ENERGY ACCESS COMPANY

Transmission System Additions (May be Planned, Proposed or Provisional)

PLANNING ZONE 4

- SS — New Substation
- SM — Substation Modifications
- T — Transformer
- C — Capacitor Bank
- T-D — New T-D Interconnection
- R — Reactor

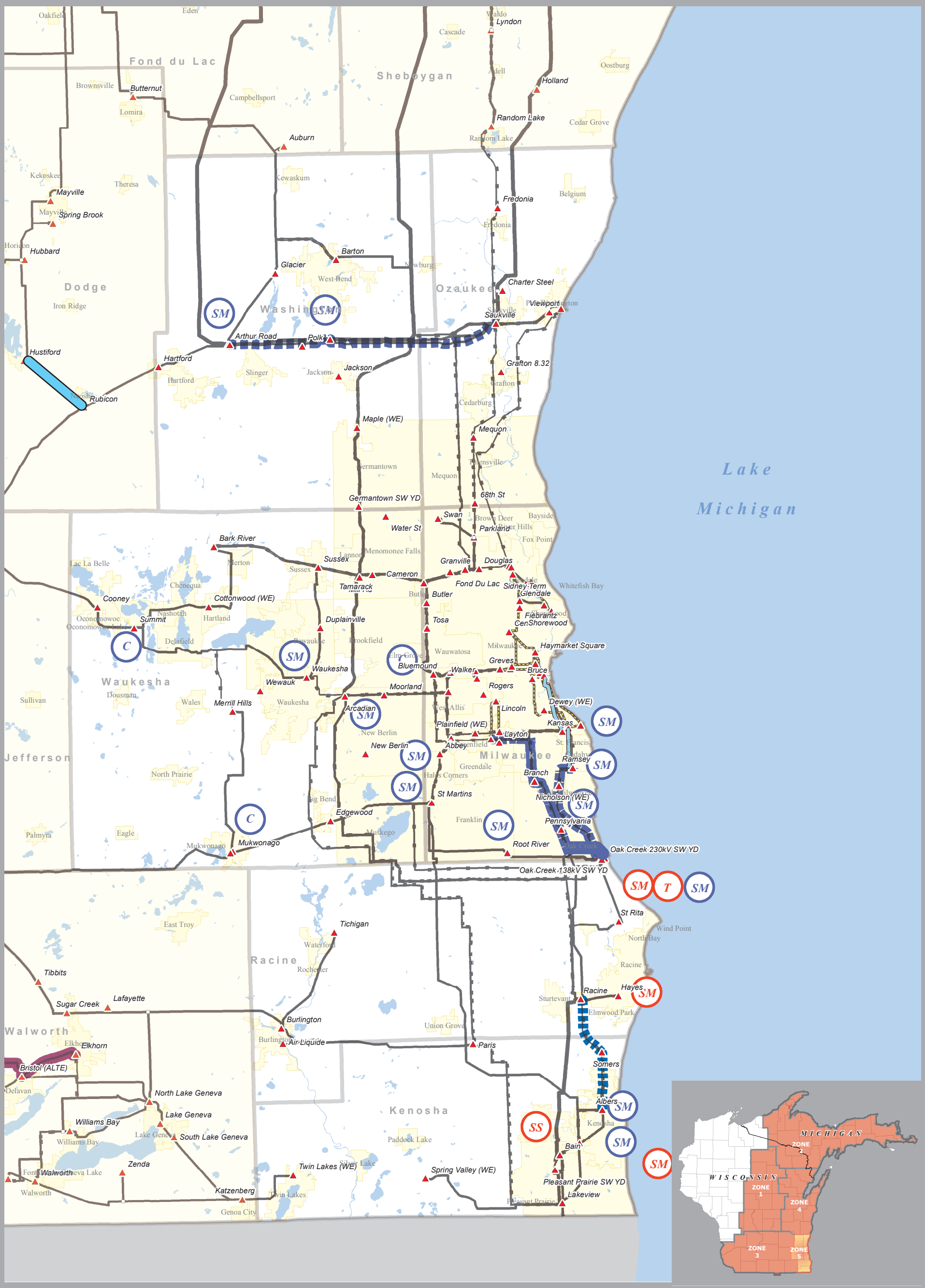
- 345 kV Transmission Line
- 115 or 138 kV Transmission Line
- Rebuilt 115 or 138 kV Transmission Line
- Transmission Line Voltage Conversion
- 69 kV Transmission Line
- Rebuilt 69 kV Transmission Line

Transmission Related Facilities

- Substation, Switchyard or Terminal
- Proposed/Design/Construction
- ATC Office Location
- Generation
- Other Facility

Modified: 11/26/2007

Figure PR-5



AMERICAN TRANSMISSION COMPANY
THE ENERGY ACCESS COMPANY

Transmission System Additions (May be Planned, Proposed or Provisional)

PLANNING ZONE 5

- SS — New Substation
- SM — Substation Modifications
- T — Transformer
- C — Capacitor Bank
- T-D — New T-D Interconnection
- R — Series Reactor

- 345 kV Transmission Line
- 115 or 138 kV Transmission Line
- Rebuilt 115 or 138 kV Transmission Line
- Transmission Line Voltage Conversion

Transmission Related Facilities

- Substation, Switchyard or Terminal
- Proposed/Design/Construction
- ATC Office Location
- Generation
- Other Facility

Modified 8/8/2007

Figure PR-6

American Transmission Company - Number of Projects by Status
10-Year Assessments 2001-2007

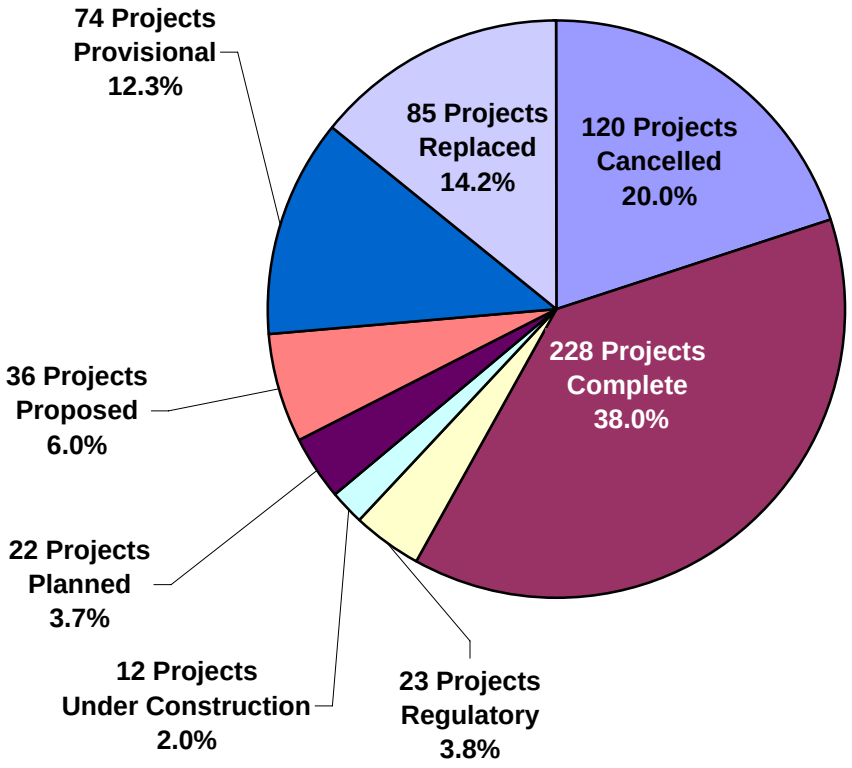


Figure PR-7

American Transmission Company - Cost of Projects by Status
10-Year Assessments 2001-2007

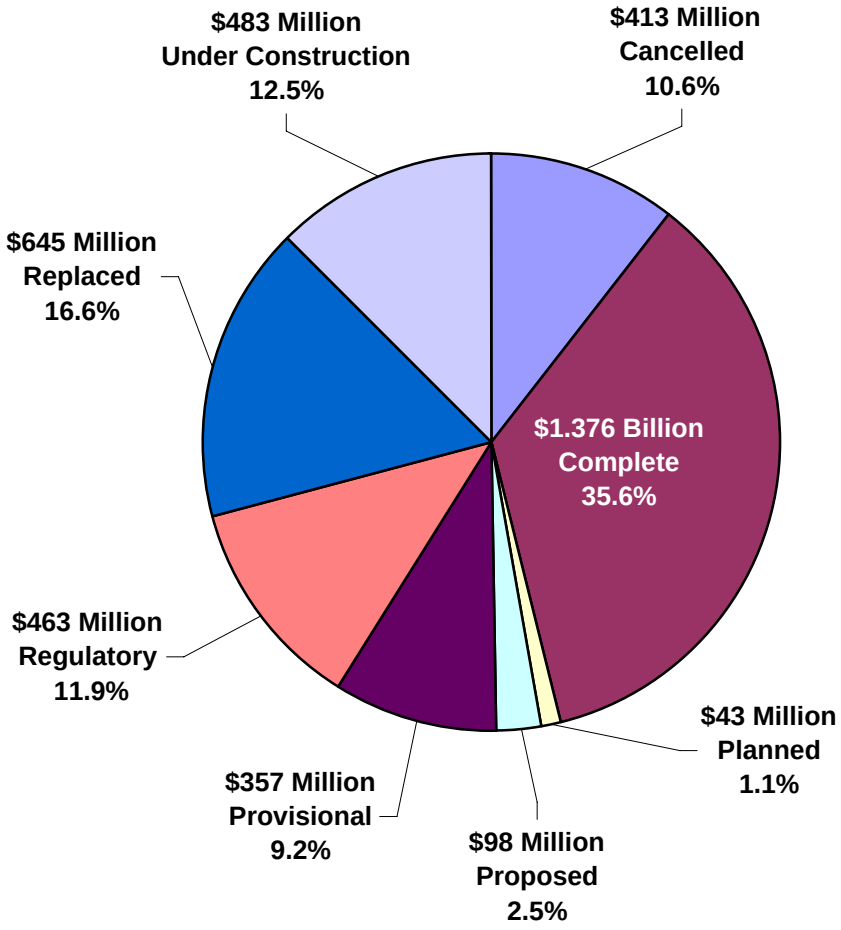


Figure PR-8

American Transmission Company - Cost of Projects by Status
2007 10-Year Assessment Update
Planned, Proposed and Provisional Projects

Total 2007 Assessment Update (2007-2016) Expenditures = $1.44 billion

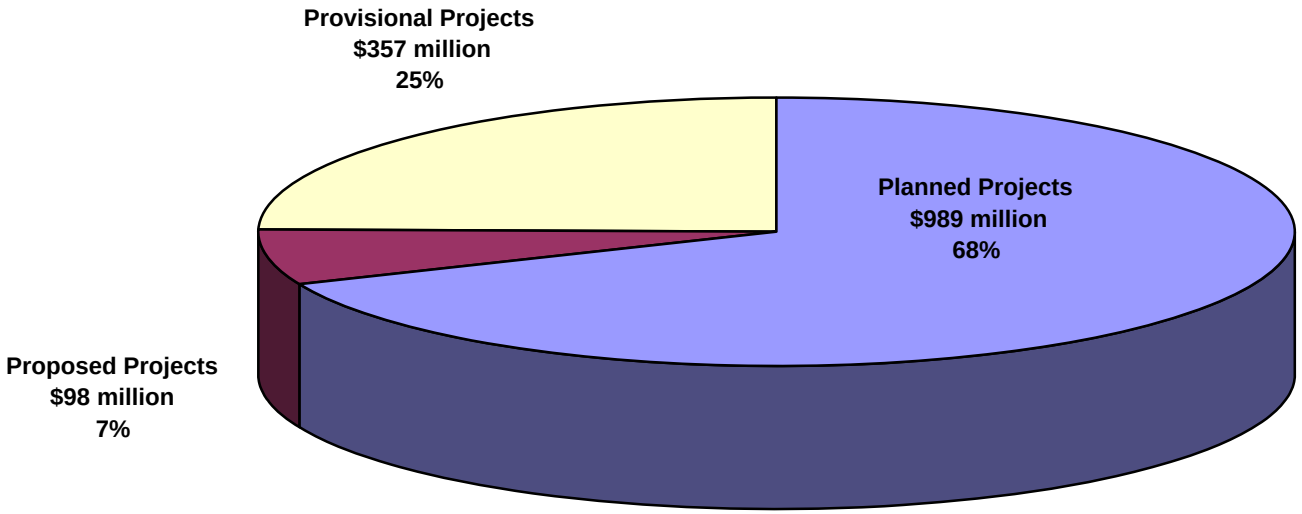


Figure PR-9
Generation Interconnection Requests
as of 7/1/07

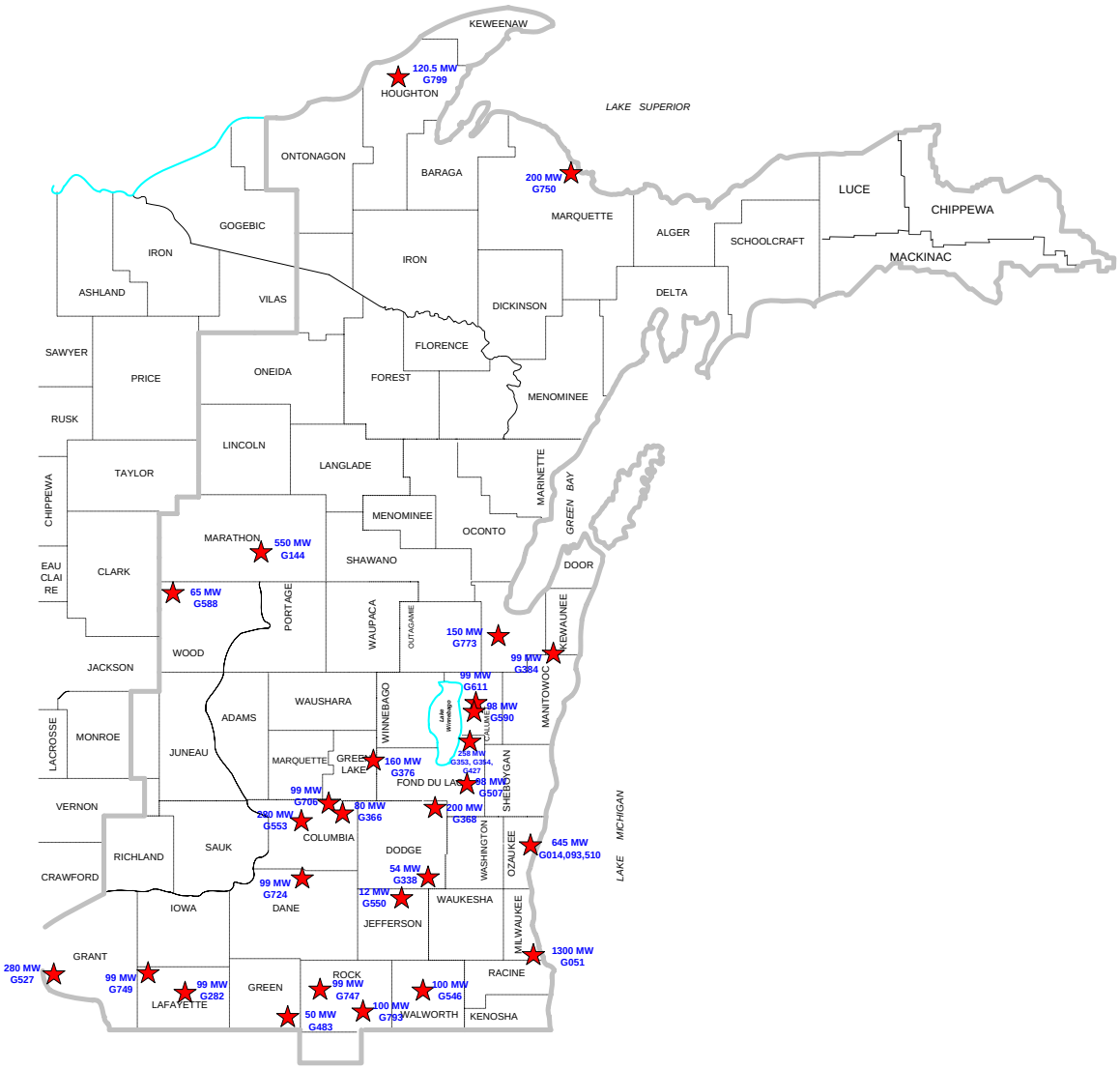


Figure PR-10

ATC Generation Queue

Percent of Capacity as of 2007 Assessment Update

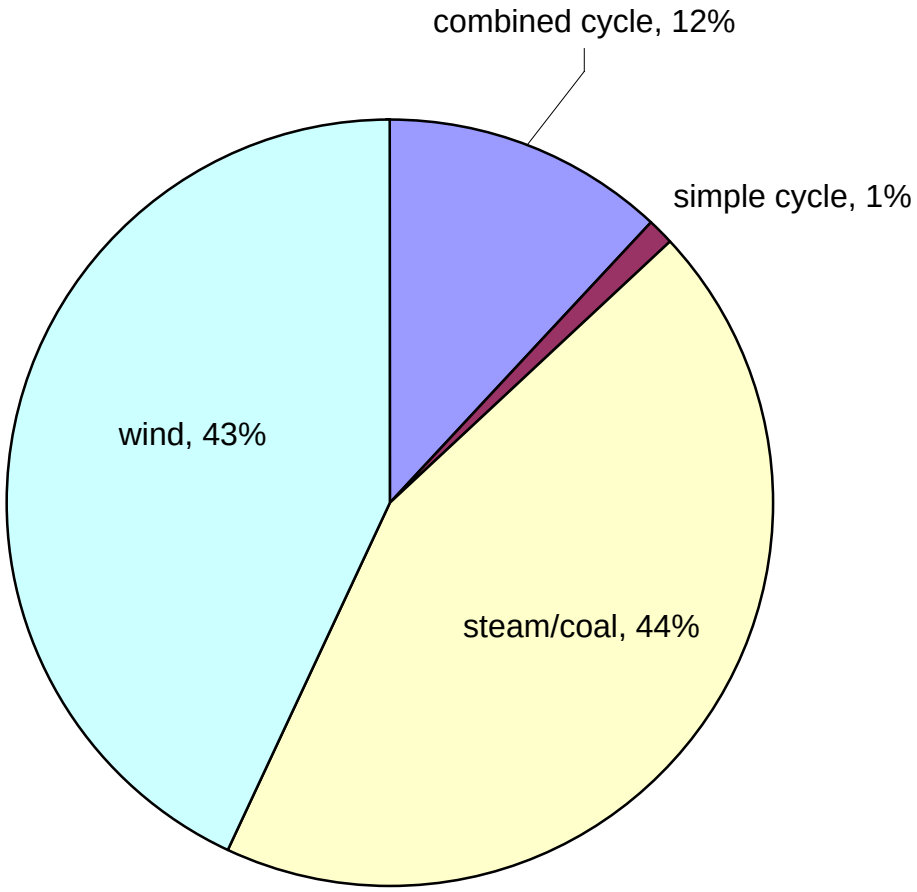
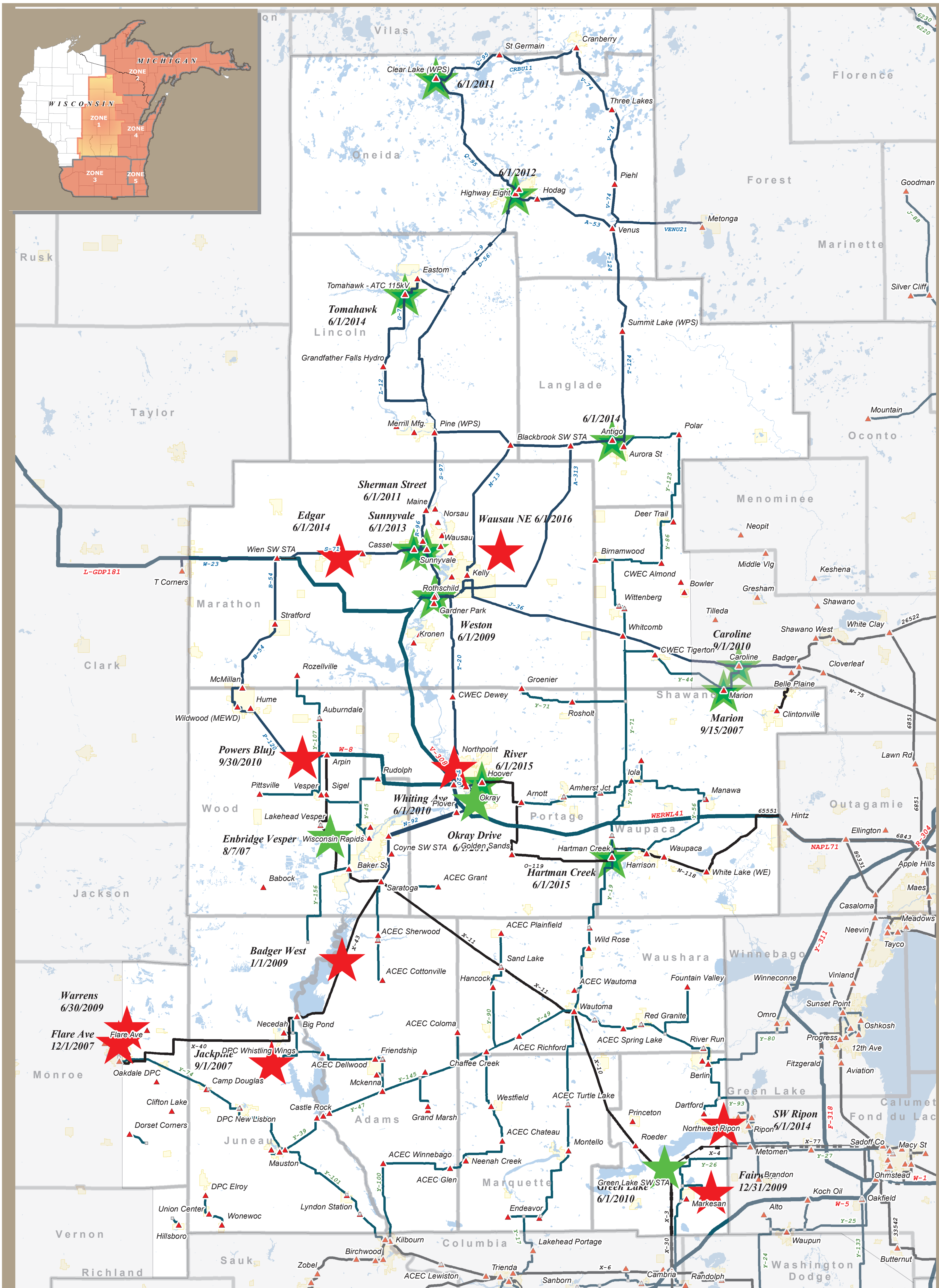


Figure PR-11



Transmission-Distribution Interconnection Requests
PLANNING ZONE 1

AMERICAN TRANSMISSION COMPANY
THE ENERGY ACCESS COMPANY

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

Transmission Related Facilities

Substation, Switchyard or Terminal

Proposed/Design/Construction

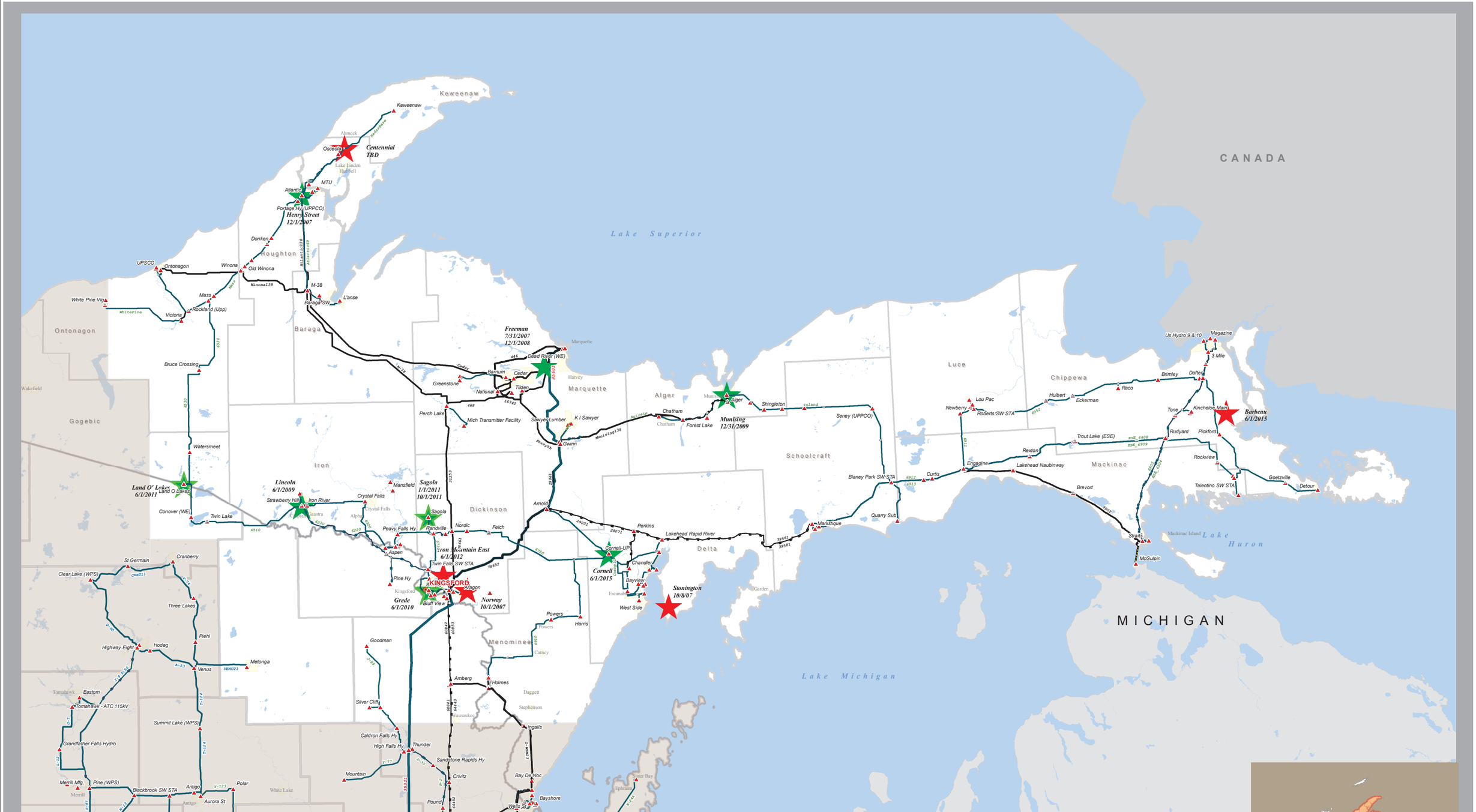
ATC Office Location

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.

Updated September 4, 2007



Transmission-Distribution Interconnection Requests
PLANNING ZONE 2

AMERICAN TRANSMISSION COMPANY
THE ENERGY ACCESS COMPANY

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*

New Substation Interconnection Request

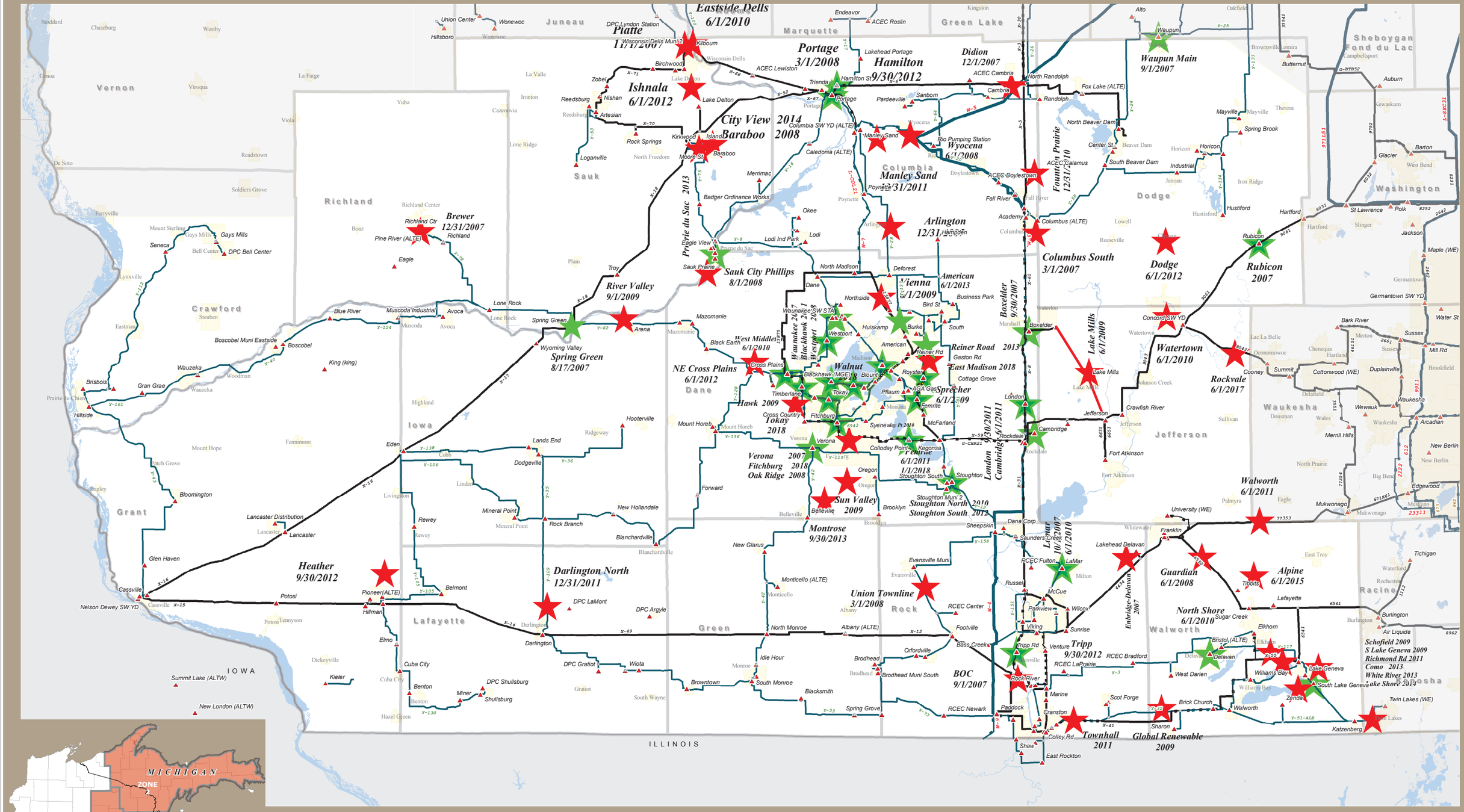
Transformer Addition/Replacement

Transmission Related Facilities

- 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.

Updated August 15, 2007



AMERICAN TRANSMISSION COMPANY
THE ENERGY ACCESS COMPANY

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*

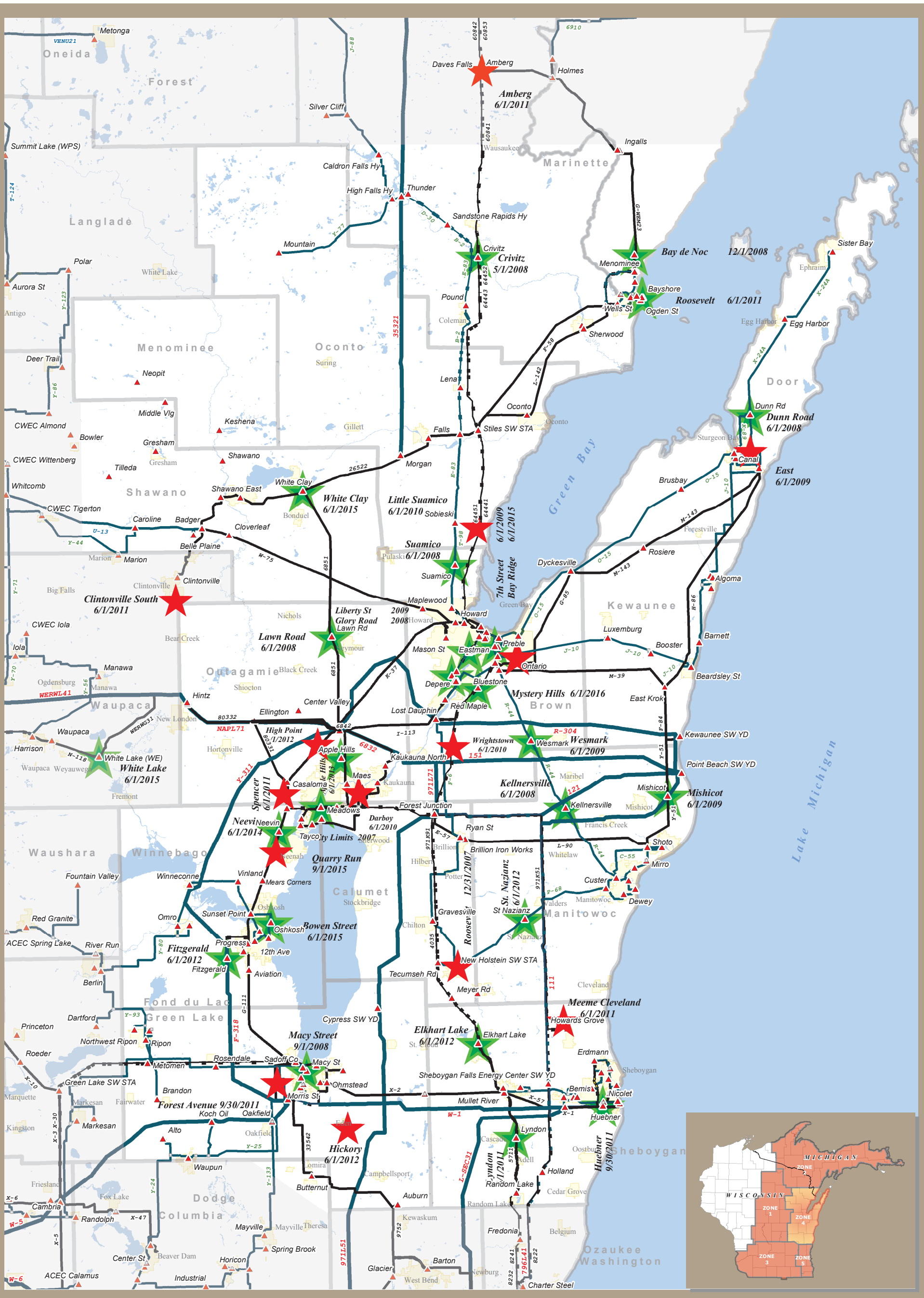
New Substation Interconnection Request

Transformer Addition/Replacement

Transmission Related Facilities

- Substation, Switchyard or Terminal
- Proposed/Design/Construction
- ATC Office Location
- Generation
- Other Facility

Updated November 27, 2007



AMERICAN TRANSMISSION COMPANY
THE ENERGY ACCESS COMPANY

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

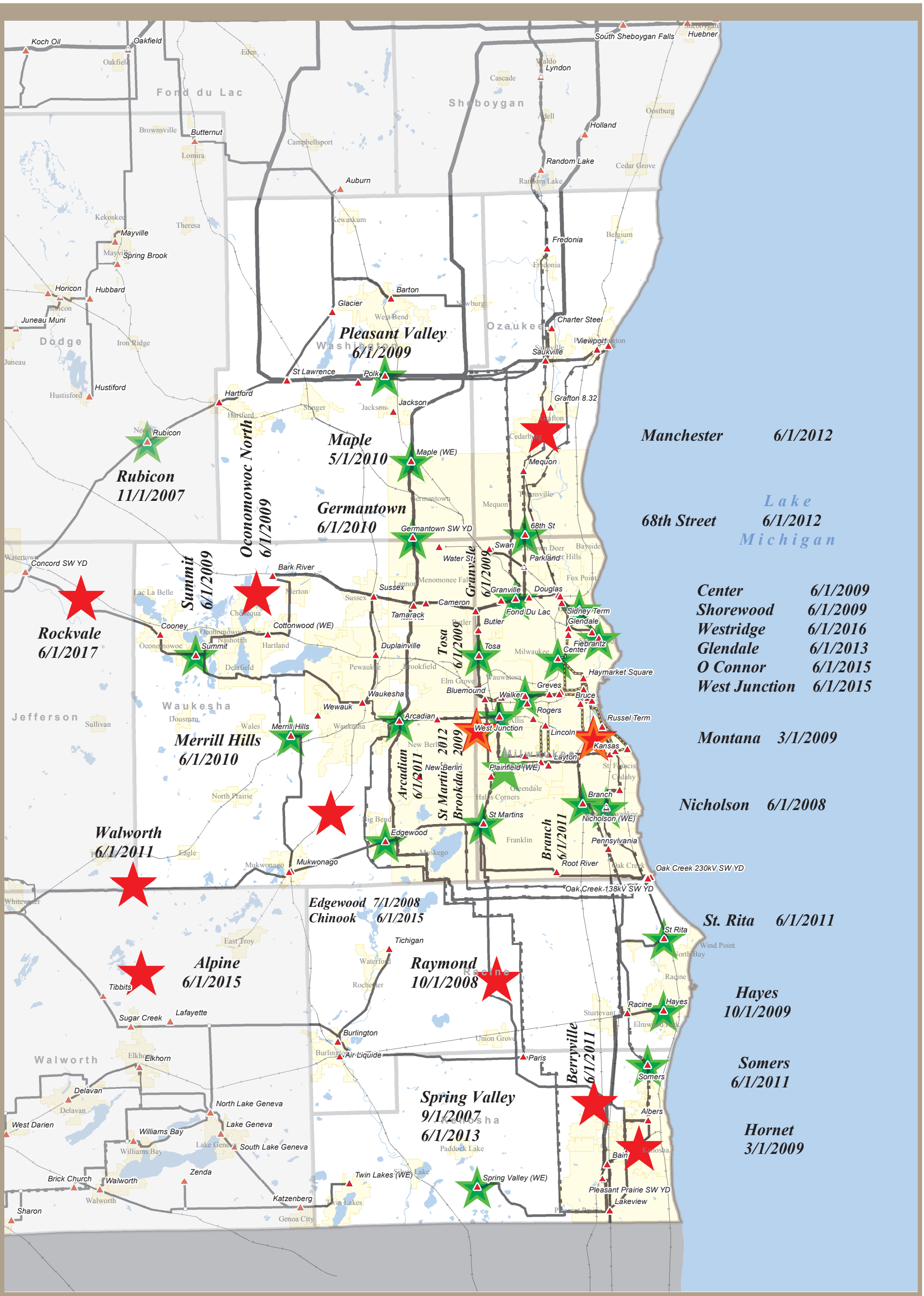
Transformer Addition/Replacement

Transmission Related Facilities

- 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.

Updated November 27, 2007



AMERICAN TRANSMISSION COMPANY
THE ENERGY ACCESS COMPANY

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

Transformer Addition/Replacement

Transmission Related Facilities

- 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.

Updated August 15, 2007