AMERICAN TRANSMISSION COMPANY®
THE ENERGY ACCESS COMPANY

2005

10-Year Transmission System Assessment Summary Report

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

September 2005

www.atc10yearplan.com

AMERICAN TRANSMISSION COMPANY®
THE ENERGY ACCESS COMPANY

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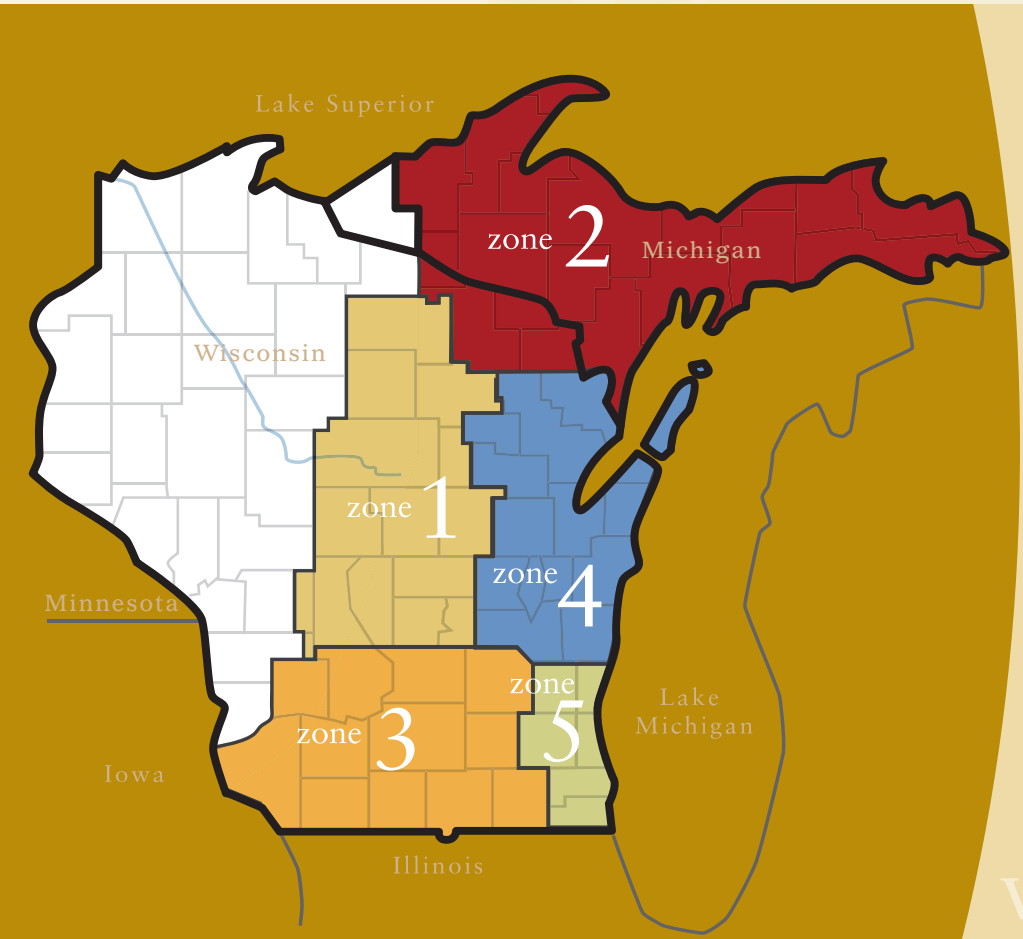

ATC at a glance

- Formed in 2001 as the first multi-state, **transmission-only utility**.
- Owner and operator of approximately **8,900 miles of transmission line** and **460 substations**.
- Meeting electric needs of approximately **five million people**.
- Transmission facilities in **66 counties** in Wisconsin, Michigan and Illinois.
- **$1.3 billion** in total assets.
- **Seven offices** in the communities of Cottage Grove, De Pere, Madison, Waukesha and Wausau, Wis.; Kingsford, Mich.; and Washington DC.

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About this Summary Report

Planning for a reliable electric future

For the fifth year, we have produced a 10-Year Transmission System Assessment. This assessment, developed by our transmission planners, covers the years 2005 through 2015. Our planners continually conduct engineering studies on the electric transmission system looking for potential problems that may affect the future performance of the system. Our studies identify and begin to prioritize future projects needed to improve the adequacy and reliability of the electric transmission system for our customers and all electricity users in the region we serve.

In this report, you can find out about the vital role electric transmission plays in our everyday lives, the conditions driving our plans for transmission upgrades and expansion, the criteria for locating transmission facilities, considerations for the environment, your opportunities to influence projects, the importance of improving access on the transmission grid, the cost of electric system reliability and projects potentially impacting your community.

This Summary Report and our Full Report also are available at www.atc10yearplan.com

www.atc10yearplan.com

Understanding electric transmission

The electric transmission system serves as the vital link in bringing power to people, businesses and communities. It connects electric generation with electric distribution systems; it provides access to diverse and more economic sources of power; and it plays a critical supporting role in the vitality and growth of communities and businesses.

Electric transmission is the vital link to …

Everyday life – Electric transmission serves as the vital link in bringing power to people and places – reliably, safely and efficiently. At home or work; in schools, hospitals, libraries and airports, electricity quietly plays a major part in bringing convenience, automation, efficiency, technology and security to people's lives and their livelihoods.

Power producers and power users – The transmission system is the necessary connection between where power is produced and where power is used. The transmission grid is a network of high-voltage wires that link the many sources of electric generation to the lower-voltage electric distribution systems that deliver power to homes and businesses via a local utility.

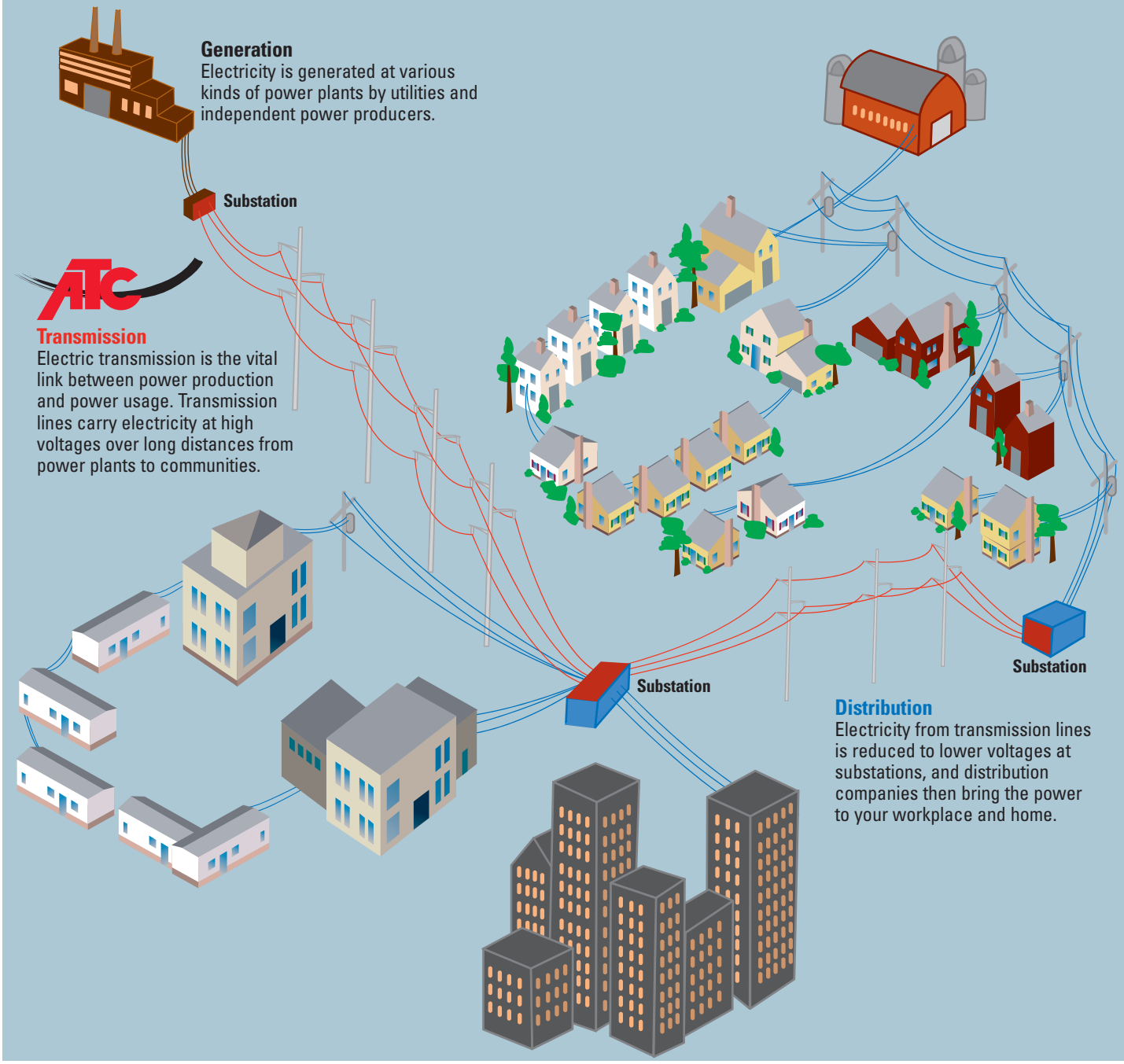
The region – A reliable transmission network provides access to many sources of power, whether they are local or regional. Having multiple paths to get power from producers to consumers lessens the chance that consumers will be negatively affected by planned or unplanned power plant outages. Multiple major transmission lines also give power generators and local utilities the flexibility to access regions where they can sell and buy electricity to control overall costs for everyone.

Green power – Transmission provides the link to electricity produced by renewable resources such as solar, wind or water. The transmission system moves green power from where it's generated to where it's used.

Economic growth – A strong transmission system plays a critical role in the vitality and growth of communities. Areas growing in the number of residents and businesses must have adequate supplies of power and the infrastructure to get it there. Electric transmission provides the pathway for power into communities.

How the electric system works

The electric system is comprised of three components: generating plants, transmission lines and distribution facilities. ATC is a public utility that owns and operates the transmission system which carries electricity from generating plants to load centers or areas where a considerable amount of electricity is needed.



A responsibility to ensure electric system reliability

As a public utility whose infrastructure serves as the link in transporting electricity to millions of energy users, we have duties and responsibilities to:

- **operate** the transmission system reliably,
- **assess** the ability of the system to adequately meet current and future needs,
- **plan** system upgrades to meet those needs in the most efficient, effective and economic ways,
- **construct** upgrades in time to meet those needs and
- **maintain** the transmission equipment and surroundings to minimize opportunity for failures.

We operate, assess, plan, construct and maintain the transmission system according to regional and national industry criteria designed to result in reliable system performance. Our transmission planners continually assess the performance of the system, focusing particularly on areas of past challenges or future growth. Twice each year we issue Assessment reports to present information on needs and potential projects.

As part of the planning that occurs throughout the year, we actively seek input from customers, regulators, community officials, residents and others in an effort to achieve the right balance between the need for a safe and reliable system, and the potential impacts on costs, landowners and the environment.

We commit to carrying out these duties and responsibilities in an expert, honest and inclusive way. Our responsibility as a regional transmission company is to evaluate the transmission needs of our many utility customers, recommend solutions that address multiple problems and lessen impacts, and do so in a cost-effective way. We strive to provide the necessary infrastructure and reliable service required to enable and support the economic development vital to the health of the communities we serve.



Our progress

Since we were formed in 2001 as a utility solely focused on electric transmission, we have invested $481 million to:

- upgrade more than 565 miles of transmission line,
- improve 79 electric substations and
- build 75 miles of new transmission lines.

A more reliable transmission system has given us the ability to:

- reliably deliver up to 12,765 MW of electricity to customers in Wisconsin, Michigan, and Illinois,
- maintain a 99.96 percent availability rating of transmission equipment for use in delivering power to customers,
- support 828 MW of new peak electric usage,
- connect 1,767 MW of new generation at nine sites,
- increase the ability of our system facilities to import power by 1,000 MW (facilities outside the ATC system may not always allow this level of import capability)
- resolve problems in several counties with 11 specific projects to improve the movement of power into or through our system.
    - Blackhawk-Colley Road (Rock County)
    - Christiana-Kegonsa (Dane County)
    - Eau Claire-Arpin (Wood County)
    - Kewaunee (Kewaunee County)
    - Manistique-Hiawatha (Schoolcraft and Mackinac counties)
    - North Appleton-Lost Dauphin (Outagamie and Brown counties)
    - North Appleton-White Clay (Outagamie and Shawano counties)
    - Paris-St. Martins (Kenosha, Racine and Milwaukee counties)
    - Rhinelander area (Lincoln, Oneida and Langlade counties)
    - Wempletown-Paddock (Rock County and northern Illinois)
    - Whitewater-Mukwonago (Walworth and Waukesha counties)

We have made progress by actively seeking input and making public our plans and proposals. To date, ATC has:

- produced and issued 10 transmission system assessments to the public,
- held more than 100 major public planning and siting meetings, and
- participated in thousands of interactive local, state and industry discussions, both giving and receiving information to carry out our duties and responsibilities.



Planning to meet future needs

Patterns of electricity usage have changed dramatically. In the residential sector, homes are larger and have computers, security systems, multiple televisions and home entertainment systems, central air conditioning, garage door openers and microwave ovens. In the workplace, businesses rely on sophisticated computer systems to function uninterrupted to run equipment, store data, and provide security and safety.

Clearly, a reliable supply of electricity is a necessity. But the reality is that our studies continue to show that the transmission system in many areas is operating at the limits of its capabilities primarily because it is being used in vastly different ways than it was just 10 years ago. Throughout our service territory, increased electricity usage, more power transactions between utilities, new power producers and the condition of existing facilities are driving the need for new and/or upgraded facilities. Our studies have shown that, in general, it is not possible to provide for new usage, or continue to meet existing usage, without new and/or significantly upgraded transmission facilities. Consequently, we have been, and are, developing reinforcements to the transmission system that will serve customers reliably for years to come. We conduct this long-term planning because it generally can take 5 to 10 years to plan, secure approvals, construct and put into service new transmission lines.

Transmission system planning considerations

As a transmission-only utility, we take a broad view of the transmission system. In assessing the system, we begin by looking at singular issues or customer requests, and then study how those needs interact on the system in a broader planning area, then overall on the entire ATC system. We also work closely with the Midwest Independent Transmission System Operator, the regional organization overseeing the regional grid, to coordinate our infrastructure planning efforts with those occurring on a regional and national level. Our analyses further consider the needs and impacts of neighboring utilities.

Our planning integrates requests for new transmission service and for interconnection of new power producers and consumers, as well as the needs to support continued safe and reliable service and accommodate growth for existing customers. In some cases, more than one factor will drive the need for system expansion. The most common expansion drivers are described below along with a summary of what we have completed and what we have planned.

Load growth – Demand for electricity is projected to grow at a rate of more than 2 percent per year across our service territory from 2005 through 2015. However, load growth in some areas is projected to increase as much as 8 percent per year, while no growth is projected in other areas. Areas of high load growth correspond to areas where we are proposing system expansion including Madison, Lake Geneva, Green Bay and Rhinelander. More than 190 projects in this Assessment are planned or proposed for assuring reliability in response to load growth.

Interconnections – Just as the transmission system gets more fully utilized when load growth occurs, this happens on the lower-voltage electric distribution system as well, requiring new interconnections to the transmission system. We have constructed 85 new or improved T-D interconnections since 2001 and expect to construct another 228 in the next 10 years.

Transmission service requests – Virtually all entities that own power plants or provide electric service to customers, or both, seek to buy and sell electricity with other entities. In such cases, these entities must become market participants in the regional wholesale market (as of April 1, 2005) to gain access to the transmission system. In this new market structure, transmission service is obtained through the Real Time and Day Ahead energy markets. The need for submitting transmission service requests has diminished significantly. We have completed 17 projects to meet transmission service requests since 2001 and have 41 projects planned or being constructed. Under the new market structure we are conducting more generator and load delivery studies.

Transmission service limitations – Various situations exist on the transmission system that limit our ability to grant requests for service. Depending on the frequency, the cost, and/or the risk of reconfiguring the system, it may be prudent to expand the transmission system to avoid these types of events. We have addressed 10 transmission service limitations since 2001, and are in the process of planning and/or constructing 23 projects in response to chronic transmission service limitations.

New generation – When a new generating facility is proposed, we conduct an interconnection study and, if requested, a transmission service study. If the system is inadequate to ensure generator stability or reliable transmission service, we will determine what system expansion will be needed. We have constructed transmission facilities to interconnect and provide transmission service for nine new generators since 2001, and are in the process of planning and/or constructing transmission facilities that are needed to interconnect and/or provide transmission service from 28 planned generators.

System repair or replacement – Many components of the transmission system will need to be repaired or replaced in the coming years due to condition or obsolescence. In some cases, the need to reconstruct a transmission line may provide opportunities to increase the capacity of those components and provide future reliability benefits to the system. We have 12 projects in our current plans that are being planned or constructed that address condition or obsolescence issues.

Economic/strategic system expansion – In recent years, wholesale electricity markets have continued to evolve, renewable generation has gained a larger market share and the generation market, in general, has become more competitive. To remain cost competitive, utilities must have the flexibility to take advantage of trends that have the potential to lower costs. To the extent that low-cost generation development is existing or planned in an adjacent state, it may make sense for a transmission provider to construct transmission facilities that would allow its utility customers to access lower-cost generation. Our Access Initiative is a study of ways to improve access and transfer capability within our system to give our customers ways to lower their costs.

Access Initiative looks beyond current footprint

Strengthening transmission ties to areas beyond ATC's footprint can positively impact future reliability and overall energy costs. Sometimes our customers find it is more economical to buy power from adjacent utilities or other wholesale energy markets and import the electricity via the transmission system. However, our system currently has many limitations preventing the flow of power within our boundaries as well as outside of our boundaries, which impacts our customers' ability to favorably operate under the new market conditions and access regional power sources when it's economic to do so.

We are studying ways to improve transfer capability and are determining the costs associated with developing a major new transmission interconnection with an adjacent area. We are collaborating with customers and other stakeholders to explore all of the different facets and feasibility associated with developing and integrating such a major new interconnection project into our current transmission plan.

New directions for transmission

We have evaluated five geographic directions for a potential new high-voltage transmission line project conceived to improve access by connecting our system to an adjacent region:

- South (Illinois)
- West (Minnesota)
- East (Michigan)
- Southwest (Iowa)
- North (Ontario)

Based on the results of analyses completed to date, we have found:

- Interconnection projects to the south and southwest appear to yield the greatest improvement in access, the greatest level of energy production savings and have the lowest cost/benefit ratios.
- Interconnection projects to the south and southwest appear to yield the greatest reduction in system losses.
- With projects already being planned for completion by 2014, simultaneous import capability considering ATC limits only is expected to remain constant at approximately 3,000 MW. However, the simultaneous import capability when all limits are included, which includes facilities external to ATC, is projected to decrease to approximately 1,000 MW. Considering internal limits only, increased internal load of more than 2,600 MW and the generation dispatch applied to the ATC system for 2014 is primarily responsible for nullifying potential increases in transfer capability that might be achieved with transmission reinforcements planned for addressing system interconnections or performance criteria issues. In addition, these internal load and generation dispatch changes have an impact on the surrounding systems and is partly responsible for the decrease in transfer capability when considering external limits. The remainder of the decrease in transfer capability in considering all limits is due to changes in system loads, transmission system topology and generation dispatch external to the ATC system.

Involving the public in our plans

From the time a project is proposed to the time construction begins can be up to five years or longer. Before a project application is filed with state regulators or other permitting agencies, we take the time to inform the public of our plans and ask for input. Public examination and discussion can improve projects by involving the perspectives of those most familiar with impacted areas. We believe that by working with the people and communities we serve, we can find better solutions that provide access to the energy they need.

Depending on the work to be done, potentially impacted parties may include landowners or residents in the vicinity of a project, local public officials, utility regulators and natural resource agencies, environmental or conservation groups, customers and other interested members of the public. Our public outreach efforts typically include a variety of interactions such as meetings, public open houses, newsletters and other communication activities. Our overall goal is to maintain communication with those who may benefit or be impacted by transmission system plans.

Determining where lines will be located

The process of siting transmission facilities is a sensitive one. We follow a careful and deliberate process that provides guidance for identifying and analyzing potential options for locating transmission facilities. Through input received from government agencies, the public and other stakeholders, we consider options that are appropriate for the location and issues associated with a particular project, consistent with state laws.

State legislation passed in 2003 (2003 Wisconsin Act 89) outlined priorities for considering routes for new transmission lines in Wisconsin. In order of priority, consistent with economic, engineering, reliability and environmental considerations, ATC must consider using existing utility corridors such as transmission and distribution lines, highway and railroad corridors, and recreational trails. We consult with agencies regarding environmental impacts of the proposed projects, develop resource protection goals, identify areas of special interest and conduct studies of the potential environmental impacts of transmission line construction.

After considerable input and study, we include two possible routes in our application to state regulators. If a project is approved, the regulators issue a written order selecting the route the line will take and including construction methods for the protection of environmental, agricultural and other important features.

Working with landowners

Following regulatory approval and before construction begins, we work with landowners to acquire easements for transmission line projects. When a project advances to the construction phase, we must adhere to specific laws regulating construction practices for building transmission lines. Permits also may be required from state and federal environmental regulatory agencies. When we begin construction, we factor in the time of the year, weather conditions and resource protection goals. For example, construction often is conducted during winter months when the ground is frozen, plants are dormant and animals are not reproducing to minimize impacts. Our construction practices also reduce the spread of invasive species and agricultural pests and diseases.

Transmission costs

Improving the reliability of the transmission system and expanding its ability to access other markets for the economic benefit of all users has a price. Based on this 2005 Assessment, the total cost estimate for necessary transmission system improvements is $3.4 billion over the next 10 years (through 2015). Further study and information has brought additional specificity to some of the need projections and estimates made in 2004, and although significant investment has begun, needs now emerging toward the end of this 10-year period, plus projections associated with the Access Initiative and the wholesale energy market, have increased the rolling estimate to $3.4 billion at this time. Projects totaling $2.4 billion are specifically detailed in the 2005 Assessment; the remaining $1 billion covers other projects such as substation equipment replacements, pole and conductor replacements, most T-D interconnections, road relocations and generation interconnections.

Who pays?

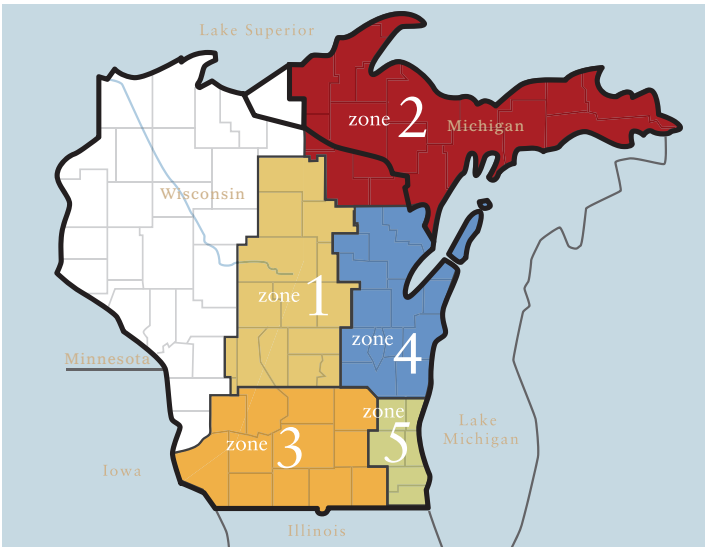
Essentially everyone who benefits from increased system reliability pays for transmission. As a transmission-only utility taking a broad perspective of the transmission system, the improvements we are proposing provide benefits to many of our customers. Our direct customers are utilities, independent power producers and power marketers – those who currently are allowed by law to engage in wholesale power transactions. These entities pay ATC, through the Midwest Independent Transmission System Operator, for transmission delivery service to move their power between generators and distribution systems.

Retail electricity consumers pay for all three elements of the electrical infrastructure (generation transmission and distribution), plus fuel costs, via their monthly electric bill. In ATC's footprint, the transmission costs are the smallest component of a retail consumer's electric bill, currently representing approximately 5 to 7 percent of the total bill. Generation and fuel costs make up the major portion, followed by distribution.

The transmission costs are proportionately small, in part, because ATC's costs are spread over many utilities' retail consumers through a large geographic region. Transmission brings high value by enabling reliability, economic opportunity and the potential for overall lower electricity costs. For example, referring back to the Access Initiative discussion on page 8, since energy costs make up by far the highest proportion of a retail consumer's bill, savings might be enabled by increasing access to adjacent energy markets, allowing lower-cost electricity to be obtained and delivered to consumers.

Plans and proposals for the transmission system

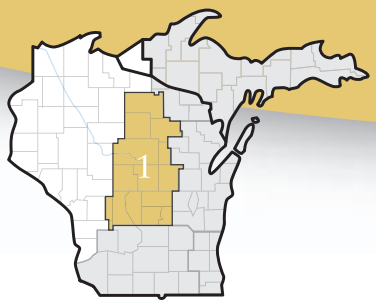
For planning purposes, we divide our service area into five zones representing distinct geographic or usage areas. Within each zone (shown below), we compile and assess the transmission system needs.



Project classifications

Within each zone, we have recommended projects to address system limitations. These projects are classified into one of three possible categories – **Planned, Proposed** or **Provisional** – dependent upon the stage a project may be in. These categories are consistent with those used by the Midwest Independent Transmission System Operator.

	Planned	Proposed	Provisional
Status of ATC planning activities	Studies complete	Studies not complete	Studies not complete
Application for regulatory approval	Application pending or issued	None	None
Project status	Project in construction planning phase or under construction	Project identified as preferred alternative	Placeholder project; not necessarily a preferred project alternative
System solution included in power flow models	Project included	Project not included	Project not included



North Central Wisconsin

ZONE 1 INCLUDES THE COUNTIES OF:

- Adams
- Green Lake
- Juneau
- Langlade
- Lincoln
- Marathon
- Marquette
- Monroe (eastern portion)
- Oneida
- Portage
- Shawano (western portion)
- Vernon (eastern portion)
- Waupaca
- Waushara
- Wood

Transmission system characteristics in Zone 1

ATC delivers power in Zone 1 with various transmission facilities including:

- an east-west 345-kV line extending from Stevens Point to the Appleton area,
- a 345-kV line extending from Weston Power Plant to Stevens Point,
- a 115-kV network in the northern portion of the zone and
- a 138-kV and 69-kV network in the southern portion of the zone.

There are a number of transmission system performance issues in Zone 1 including generator instability, voltage instability, overloaded lines and equipment, low system voltages and the inability to import more power from neighboring states. Driving these issues are steady or rapid growth in certain areas, ATC customer needs for the import of additional power, a new power plant under construction and another power plant application being reviewed by the Public Service Commission of Wisconsin.

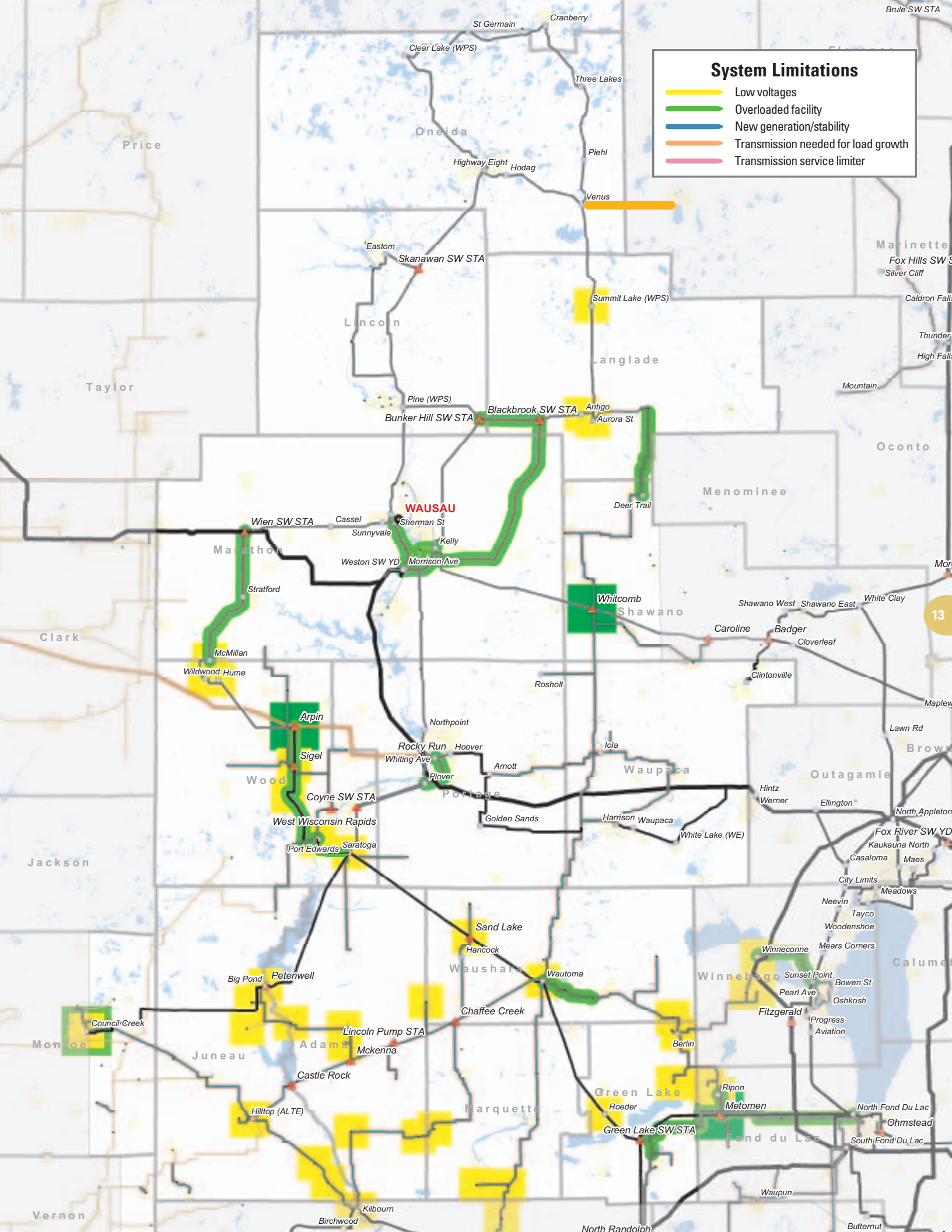
Transmission system limitations in Zone 1

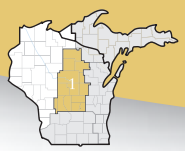
In the 2006 analysis of Zone 1, we identified low voltages, transmission facility overloads and potential generator instability. In addition, when power imports from Minnesota are high, heavily loaded facilities continue to result in the system operating with very little margin.

The most notable low voltages occur in the area north of Wausau toward the Michigan border (the Rhinelander Loop). The most notable facility overloads occur on 115-kV lines, also in the Rhinelander Loop. We are implementing a number of projects to reinforce the Rhinelander Loop. A new transmission line providing a new source to the area will be needed by 2008, and a second source will be needed beyond the 2018 timeframe.

Studies conducted for prior assessments indicate the potential for generation at Weston Power Plant becoming unstable if certain disturbances on the transmission system occur. The expansion of the Weston Substation, in conjunction with the construction of the new Gardner Park Substation to accommodate the planned Arrowhead-Gardner Park 345-kV line, will remedy this issue by 2006.

Accommodating proposed new generation at Weston Power Plant will require significant system reinforcements in Zone 1. Low voltages and overloaded facilities in and around the Wausau area and in the Berlin-Ripon area will necessitate a combination of reinforcements.


System Limitations
Low voltages
Overloaded facility
New generation/stability
Transmission needed for load growth
Transmission service limiter
Brule SW STA
St Germain
Cranberry
Clear Lake (WPS)
Three Lakes
Oneida
Price
Highway Eight
Hodag
Piehl
Venus
Eastom
Skanawan SW STA
Marinette
Fox Hills SW S
Silver Cliff
Summit Lake (WPS)
Caldron Falls
Lincoln
Thunder
High Falls
Langlade
Taylor
Mountain
Pine (WPS)
Bunker Hill SW STA
Blackbrook SW STA
Antigo
Aurora St
Oconto
Menominee
Deer Trail
WAUSAU
Wien SW STA
Cassel
Sherman St
Sunnyvale
Kelly
Marathon
Weston SW YD
Morrison Ave
Stratford
Whitcomb
Shawano
Shawano West
Shawano East
White Clay
13
Caroline
Badger
Cloverleaf
Clark
McMillan
Wildwood
Hume
Clintonville
Rosholt
Maplew
Arpin
Northpoint
Lawn Rd
Rocky Run
Hoover
Whiting Ave
Iola
Sigel
Arnott
Plover
Waupaca
Outagamie
Wood
Portage
Hintz
Werner
Ellington
Coyne SW STA
North Appleton
West Wisconsin Rapids
Golden Sands
Harrison
Waupaca
White Lake (WE)
Fox River SW YD
Kaukauna North
Port Edwards
Saratoga
Casaloma
Maes
Jackson
City Limits
Meadows
Neevin
Tayco
Sand Lake
Woodenshoe
Hancock
Winneconne
Mears Corners
Waushara
Wautoma
Winnebago
Sunset Point
Bowen St
Big Pond
Petenwell
Pearl Ave
Oshkosh
Chaffee Creek
Fitzgerald
Council Creek
Progress
Aviation
Lincoln Pump STA
Monroe
Adams
Berlin
Juneau
Mckenna
Castle Rock
Green Lake
Ripon
Roeder
Metomen
North Fond Du Lac
Hilltop (ALTE)
Marquette
Ohmstead
Green Lake SW STA
Fond du Lac
South Fond Du Lac
Waupun
Vernon
Kilbourn
Birchwood
North Randolph
Butternut

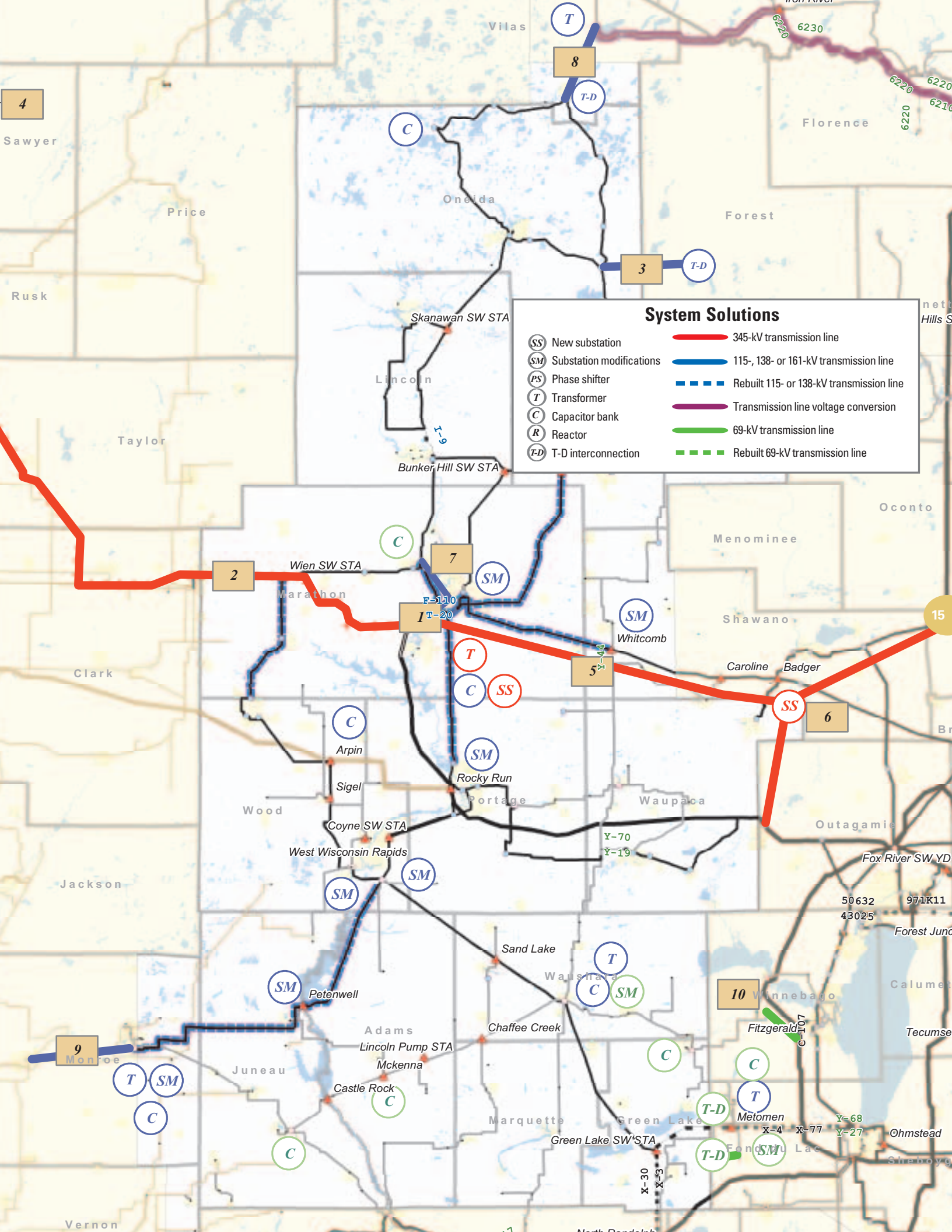


North Central Wisconsin

We have implemented four projects in Zone 1 since the 2004 Assessment, most notably the rebuild of Skanawan-Highway 8 115-kV line from single circuit to double-circuit 115 kV to improve reliability in the Rhinelander Loop.

Our current plans in Zone 1 include more than 45 projects between 2005 and 2015. These projects are in various stages of development. The most notable planned, proposed and provisional projects in Zone 1, along with their projected year of completion and the factors driving the need for the projects, are listed below.

	Project description	In-service year	Need driver
	Planned projects		
1	Construct new Gardner Park Substation	2006	Accommodates Arrowhead-Gardner Park line and Weston 4 generator, addresses stability limitations for existing Weston generation and load growth
2	Arrowhead-Stone Lake-Gardner Park 345-kV line	2006/2008	Improves reliability, helps increase import capability, reduces reliance on operating guides, lowers system losses
3	Construct Venus-Metonga 115-kV line	2007	Transmission-distribution interconnection
4	Stone Lake 345/161-kV Substation	2008	Improves operation of Arrowhead-Gardner Park line, improves reliability in northwestern Wisconsin
5	Gardner Park-Central Wisconsin 345-kV line	2009	Needed to deliver output of Weston 4 generation
6	Central Wisconsin 345-kV Substation	2009	Needed to deliver output of Weston 4 generation
	Proposed Projects		
7	Weston-Sherman St.-Hilltop 115-kV line rebuild to include a new Gardner Park-Hilltop 115-kV line	2007	Addresses potential overloads of existing line, needed to accommodate output of Weston 4 generation
8	Cranberry-Conover 115-kV line	2008	Along with Conover-Plains 138-kV line upgrade (Zone 2), addresses low voltages/voltage collapse in Rhinelander Loop area, improves Wisconsin-Michigan UP transfer capability, improves voltages in western UP
	Provisional Projects		
9	Monroe County-Council Creek 161-kV line	2010	Addresses low-voltage situation in the area, improves import capability, avoids need to reconfigure system during emergencies
10	Fitzgerald-Omro Industrial 69-kV line	2015	Improves reliability in the area


System Solutions
SS New substation
SM Substation modifications
PS Phase shifter
T Transformer
C Capacitor bank
R Reactor
T-D T-D interconnection
345-kV transmission line
115-, 138- or 161-kV transmission line
Rebuilt 115- or 138-kV transmission line
Transmission line voltage conversion
69-kV transmission line
Rebuilt 69-kV transmission line
Vilas
Florence
Sawyer
Price
Oneida
Forest
Rusk
Lincoln
Taylor
Oconto
Menominee
Marathon
Shawano
Clark
Wood
Portage
Waupaca
Outagamie
Jackson
Adams
Juneau
Monroe
Marquette
Green Lake
Vernon
Winnebago
Calumet
Skanawan SW STA
Bunker Hill SW STA
Wien SW STA
Whitcomb
Caroline
Badger
Arpin
Sigel
Rocky Run
Coyne SW STA
West Wisconsin Rapids
Petenwell
Sand Lake
Waushara
Chaffee Creek
Lincoln Pump STA
Mckenna
Castle Rock
Fitzgerald
Tecumseh
Metomen
Green Lake SW STA
Ohmstead
Fox River SW YD
Forest Junc
50632
43025
971K11
F-110
T-20
Y-44
Y-70
Y-19
C-107
Y-68
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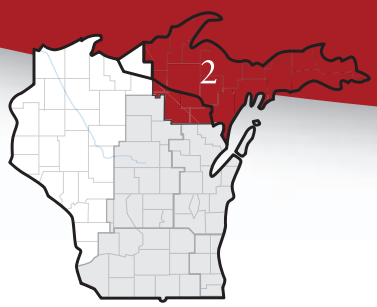


Michigan's Upper Peninsula and Northern Wisconsin

Transmission system characteristics of Zone 2

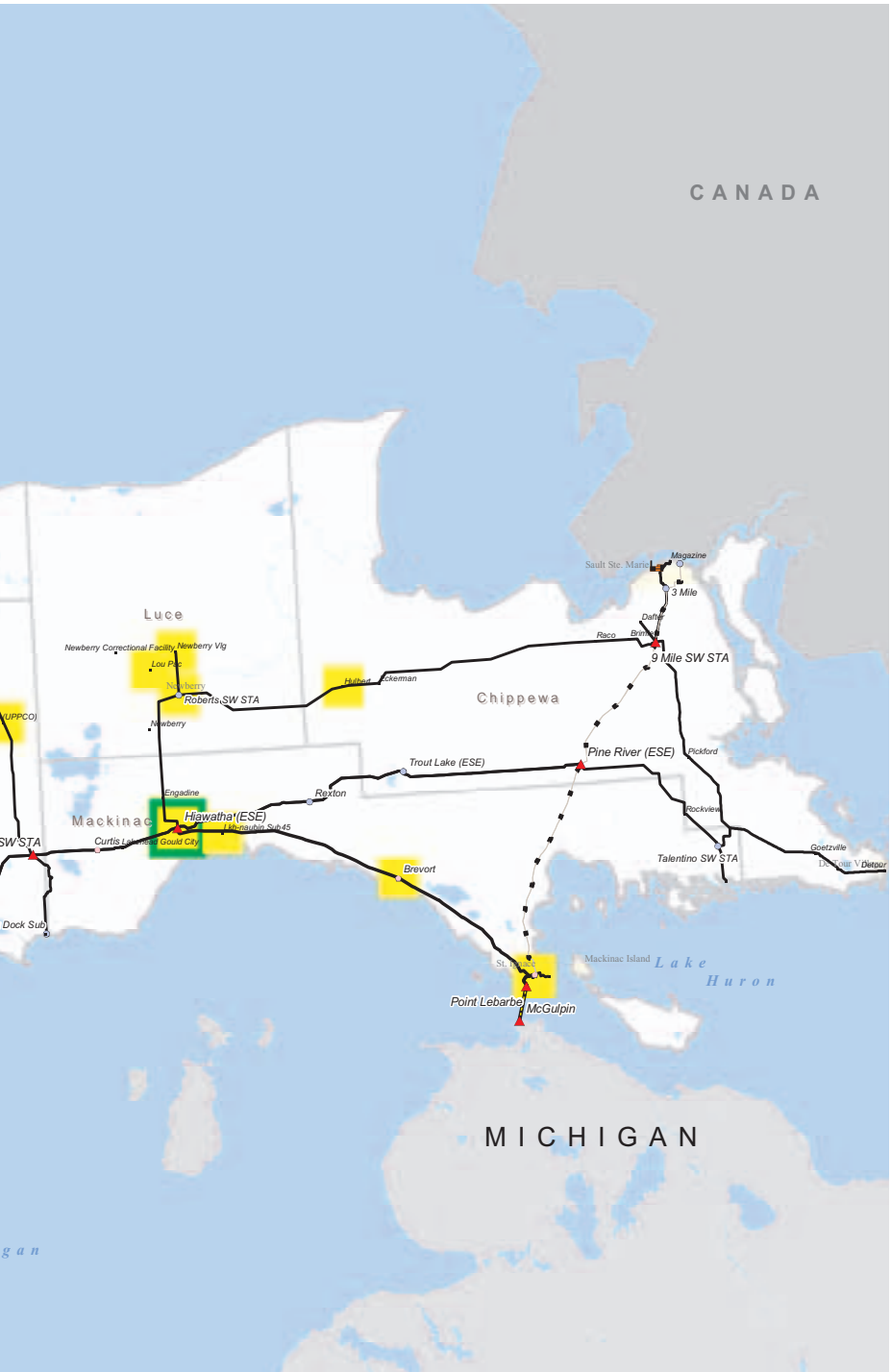
ATC delivers power in Zone 2 with various transmission facilities including:

- a north-south 345-kV line extending from near Marquette to Iron Mountain and southwest to Oconto,
- 138-kV lines from Arnold to the Manistique area,
- a 138/69-kV network in the western portion of the zone and
- a 69-kV network in the eastern portion of the zone.

There are a number of transmission system performance issues in Zone 2 including limited ability to import or export power, generator instability, voltage instability, overloaded lines and equipment, low system voltages and chronic limitations to transmission service. Primary drivers of these issues include a mismatch of low-cost generation to load in the Upper Peninsula and aging facilities in poor or obsolete condition.

Transmission system limitations in Zone 2

In the 2006 analysis of Zone 2, we identified low voltages, transmission facility overloads and transmission service limitations. In addition, heavily loaded facilities during off-peak periods especially when the Ludington Pumped Storage Facility in Lower Michigan is in pumping mode continue to keep the system working with very small operating margins.



Areas in the western and far eastern Upper Peninsula are most vulnerable to low voltages. The most notable areas experiencing transmission service limitations include the Plains-Stiles 138-kV line and the Hiawatha-Indian Lake 69-kV line. Both of these lines are being addressed for the near term with projects planned for completion in 2006.

The potential for generation at Presque Isle Power Plant becoming unstable after certain disturbances on the transmission system has been a long-standing limitation and the reason for an automated tripping scheme in place at Presque Isle. We are evaluating alternatives to this complex scheme.

ZONE 2 INCLUDES THE COUNTIES OF:

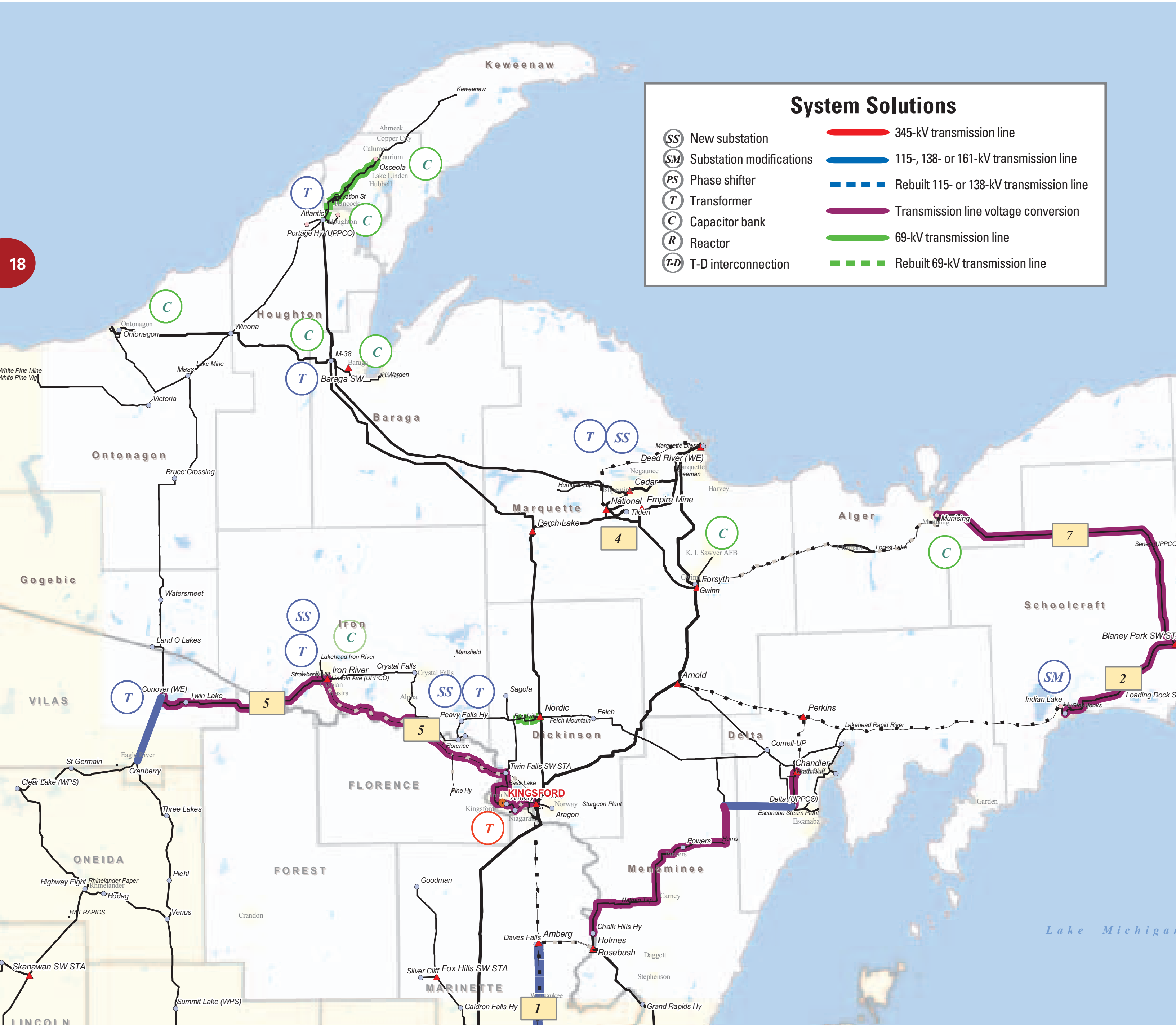
- Alger, Mich.
- Baraga, Mich.
- Chippewa, Mich.
- Delta, Mich.
- Dickinson, Mich.
- Florence, Wis.
- Forest, Wis. (northern portion)
- Gogebic, Mich. (eastern portion)
- Houghton, Mich.
- Iron, Mich.
- Keweenaw, Mich.
- Luce, Mich.
- Mackinac, Mich.
- Marinette, Wis. (northern portion)
- Marquette, Mich.
- Menominee, Mich. (northern portion)
- Ontonagon, Mich. (eastern portion)
- Schoolcraft, Mich.
- Vilas, Wis. (northern portion)

Michigan's Upper Peninsula and Northern Wisconsin

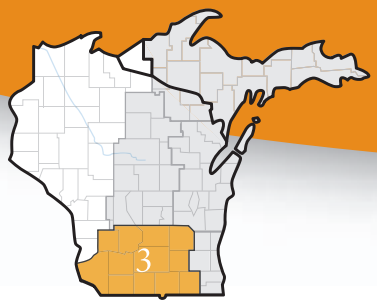
Transmission projects in Zone 2

ATC completed one project in Zone 2 since the 2004 Assessment Update. This involved rebuilding the Plains-Amberg portion of the Plains-Amberg-Stiles 138-kV line. The Stiles-Amberg portion will be rebuilt in early 2006.

Our current plans in Zone 2 include more than 35 projects between 2005 and 2015 to address issues and limitations. These projects are in various stages of development. The most notable planned, proposed and provisional projects in Zone 2, along with their projected year of completion and the factors driving the need for the projects, are listed at right.



	Project description	In-service year	Need driver
	Planned projects		
1	Stiles-Amberg 138-kV line rebuild	2006	Partially addresses chronic transmission service limitation, addresses line facilities in poor condition, lowers system losses
2	String second Hiawatha-Indian Lake circuit and convert both to 138 kV	2006/2009	Addresses chronic transmission service limitation, improves voltage profiles in the area, enhances value of another provisional project
	Proposed Projects		
3	Replace the existing Straits Substation (Mackinac)	2007	Improves reliability in eastern UP, addresses substation facilities in poor condition, provides for future expansion
4	Relocate Cedar Substation (North Lake)	2007	Improves reliability in the area, addresses aging facilities in poor condition
5	Cranberry-Conover 115-kV line and Conover-Iron River-Plains rebuild and conversion to 138 kV	2008	Part of Cranberry-Conover project (Zone 1) for Rhinelander Loop, improves voltage profile in the area, addresses aging facilities with condition issues
	Provisional Projects		
6	Hiawatha-Pine River-Mackinac 69-kV line rebuild and conversion to 138 kV	2009	Addresses potential overloads of existing lines in the area, addresses aging facilities in poor condition, improves voltage in the profile area, accommodates future expansion in the area
7	Blaney Park-Munising 69-kV line rebuild and conversion to 138 kV	2012	Addresses low voltages in the area, improves stability of Presque Isle generation, addresses aging facilities in poor condition



South Central/Southwest Wisconsin and North Central Illinois

ZONE 3 INCLUDES THE COUNTIES OF:

- Columbia
- Crawford (southern portion)
- Dane
- Dodge
- Grant
- Green
- Iowa
- Jefferson
- Lafayette
- Richland
- Rock
- Sauk
- Walworth
- Winnebago, Ill. (northern portion)

Transmission system characteristics in Zone 3

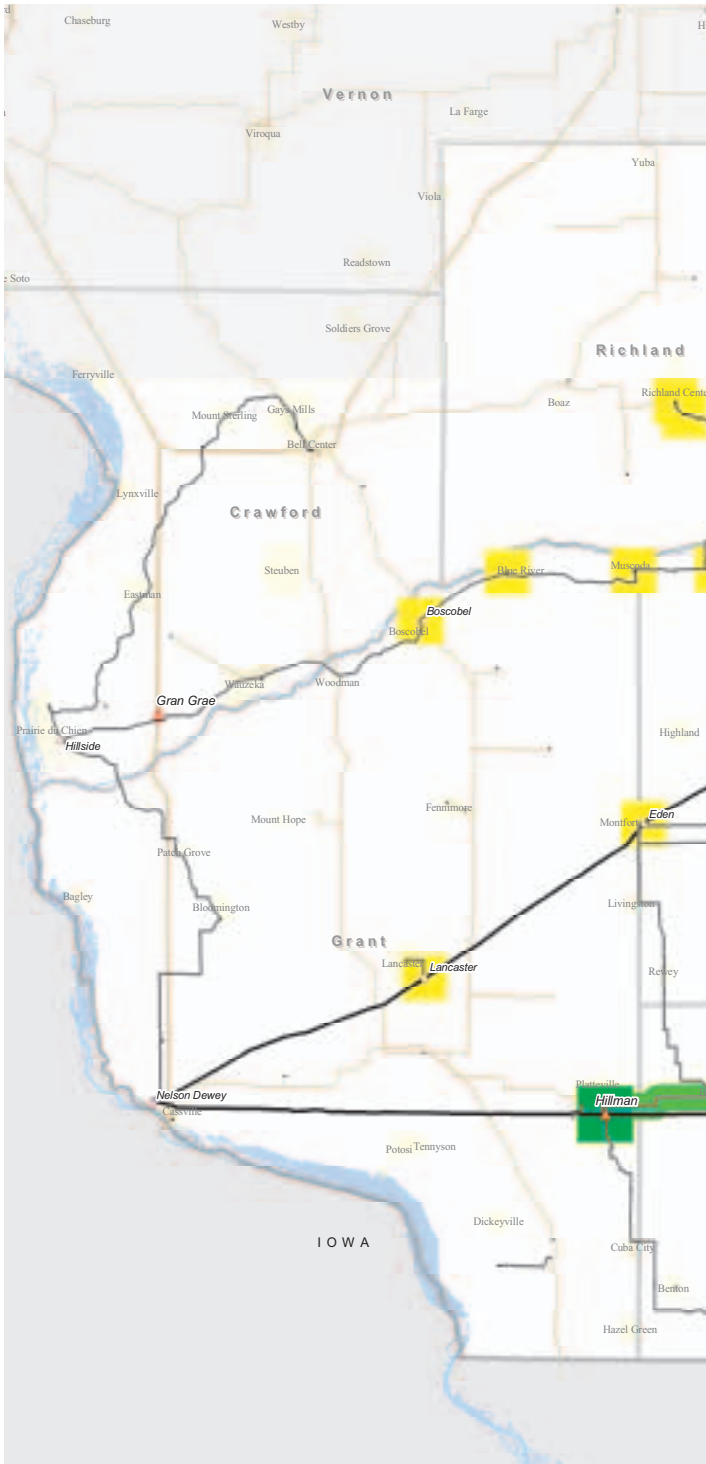
ATC delivers power in Zone 3 with various transmission facilities including:

- two north-south 345-kV lines extending from Illinois to Columbia Power Plant and to Paddock Substation,
- an east-west 345-kV line from Fond du Lac and
- 138-kV and 69-kV facilities throughout the remainder of the zone.

There are a number of transmission system performance issues in Zone 3 including voltage instability, generator instability, limited import capability, chronic transmission service limitations, overloaded lines and equipment, and low system voltages throughout the zone. The causes of these emerging problems include steady or rapid growth in certain areas, two new power plants and parallel path flows from new generation in northern Illinois.

Transmission system limitations in Zone 3

In the 2006 analysis of Zone 3, we identified low voltages and transmission facility overloads. Low voltages are particularly serious in the Madison area. The potential for voltage collapse in the Madison area is emerging and will require significant transmission reinforcements within the next 10 years. Facility overloads on 138-kV and 69-kV facilities throughout Zone 3 are current or emerging concerns. Electric load growth in Rock and Walworth counties is precipitating the need for reinforcements in those areas in the 2006-2010 timeframe. Load growth in southwestern Wisconsin will necessitate reinforcements to the transmission system in the 2009-2015 timeframe.

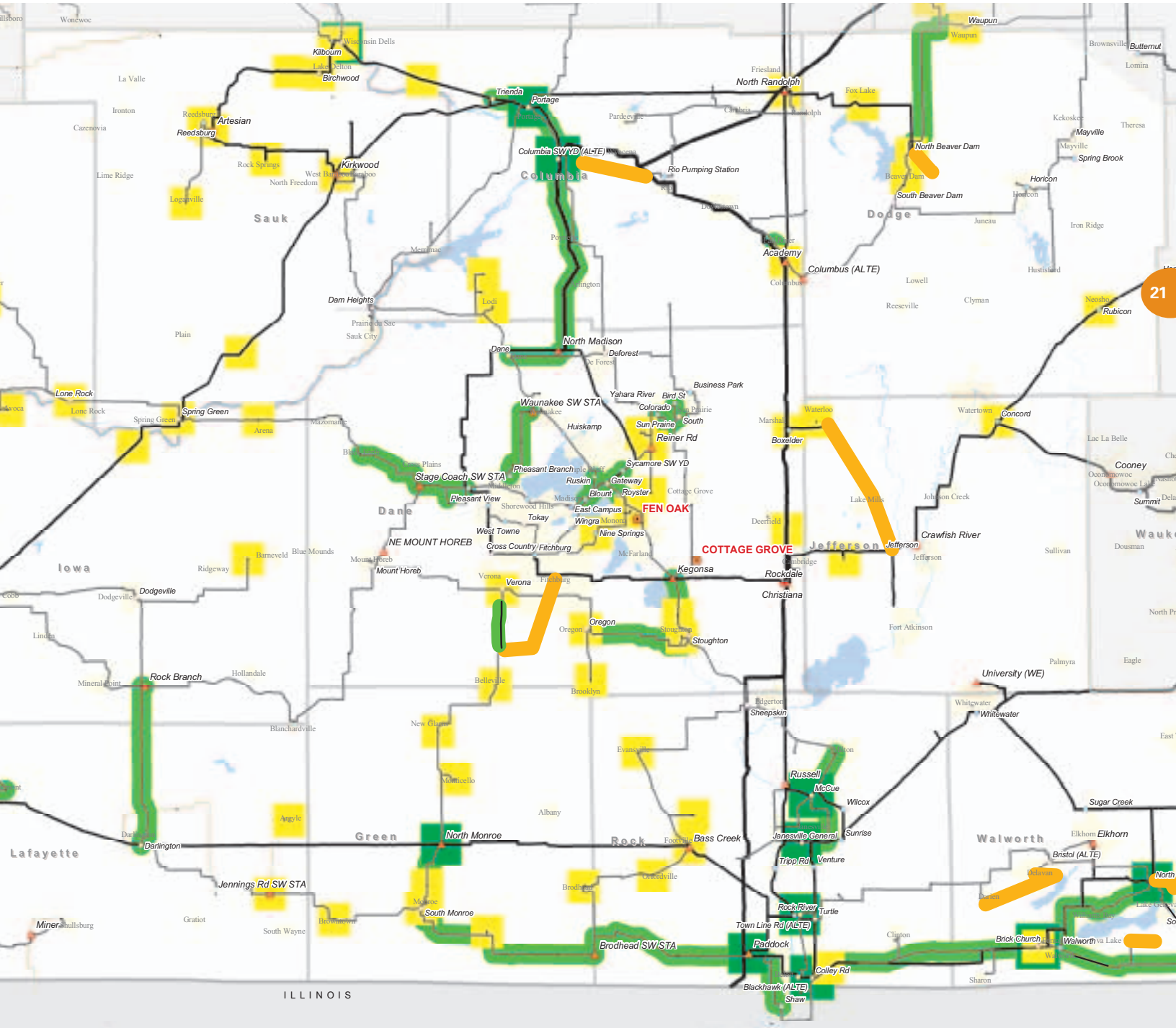


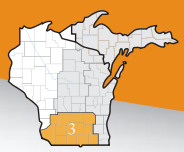
Changes in prevailing power flows in the region are congesting the transmission system in northeastern Iowa and the southwestern, southeastern and south-central portions of Wisconsin. This has resulted in chronic interruptions of approved transmission service and denial of numerous transmission service requests. We are pursuing a new 345-kV circuit to address this congestion.

In the 2004 Assessment, we identified generator instability at Columbia Power Plant. This has been addressed, in part, with changes at Columbia Substation. Further additions at Columbia Substation to accommodate the planned Columbia-North Madison 138-kV line conversion to 345 kV will fully address this limitation.

System Limitations

- Low voltages
- Overloaded facility
- New generation/stability
- Transmission needed for load growth
- Transmission service limiter





South Central/Southwest Wisconsin and North Central Illinois

Transmission projects in Zone 3

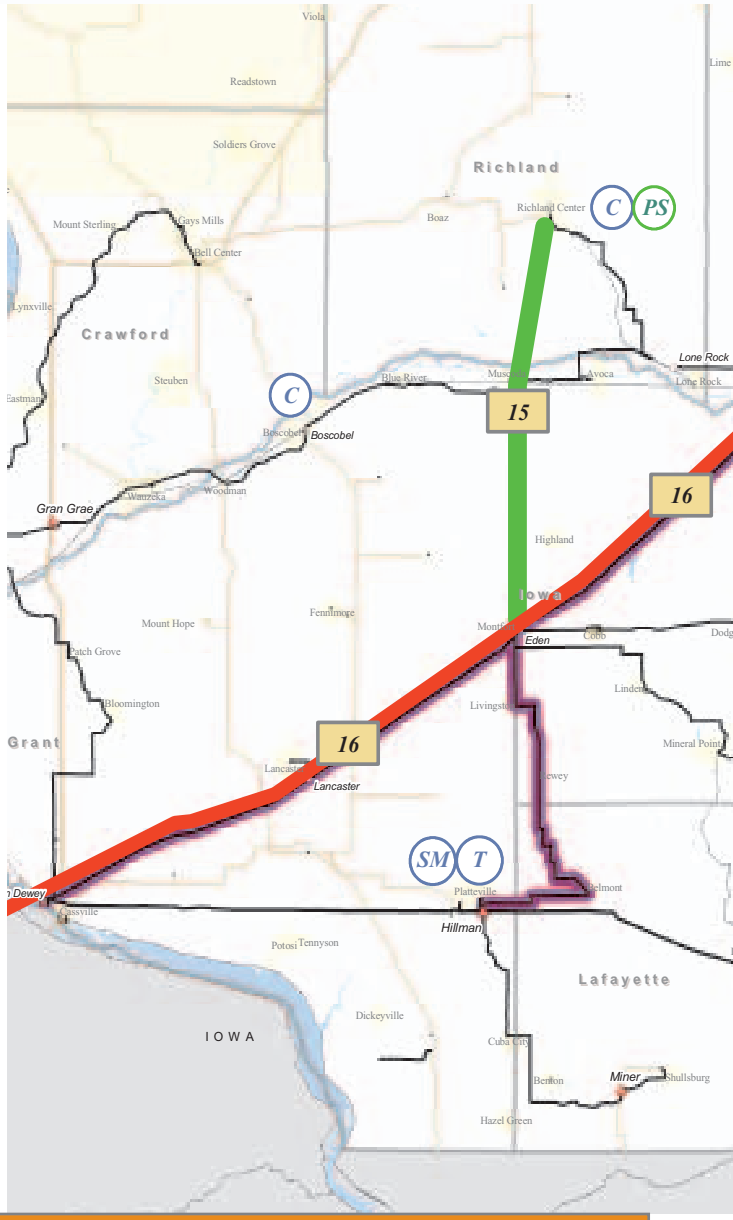
ATC has completed six network projects in Zone 3 since the 2004 Assessment Update, most notably adding a second 345-kV circuit to the Wempletown-Paddock 345-kV line along with the reconfiguration of existing Wempletown-Paddock and Paddock-Rockdale 345-kV circuits into a Wempletown-Rockdale 345-kV circuit.

ATC's current plans in Zone 3 include more than 90 projects between 2005 and 2015. These projects are in various stages of development. The most notable planned, proposed and provisional projects in Zone 3, along with their projected year of completion and the factors driving the need for the projects, are listed below.

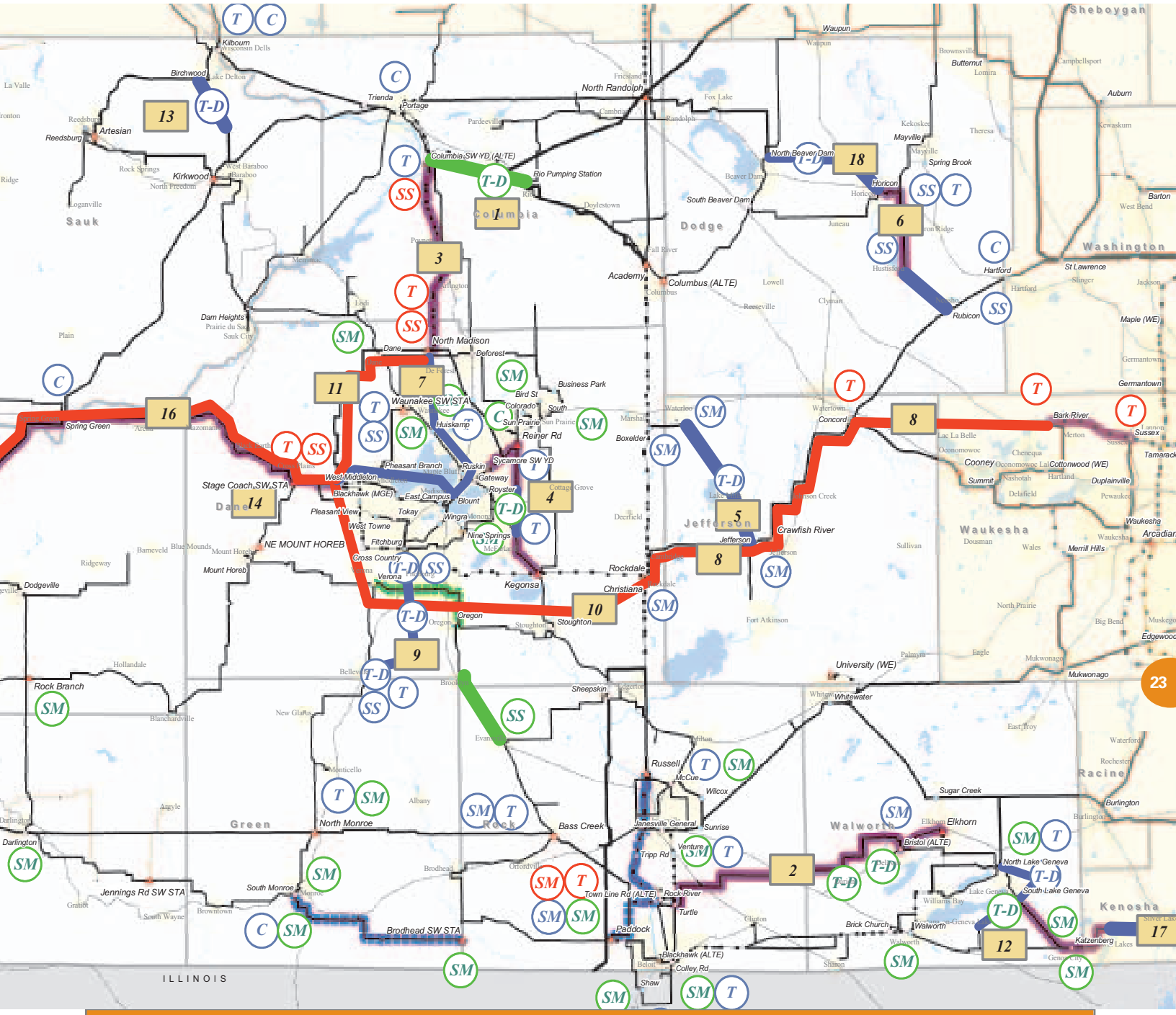
System Solutions

- SS New substation
- SM Substation modifications
- PS Phase shifter
- T Transformer
- C Capacitor bank
- R Reactor
- T-D T-D interconnection

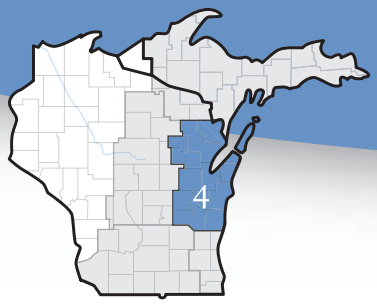
- 345-kV transmission line
- 115-, 138- or 161-kV transmission line
- Rebuilt 115- or 138-kV transmission line
- Transmission line voltage conversion
- 69-kV transmission line
- Rebuilt 69-kV transmission line



	Project description	In-service year	Need driver
	Planned projects		
1	Columbia-Wyocena-Rio 69-kV line	2006	Addresses low voltages, accommodates T-D interconnection
2	Turtle-West Darien-Southwest Delavan-Delavan/Bristol 138 kV	2006/2007	Addresses low voltages, accommodates T-D interconnection
3	Convert Columbia-North Madison 138-kV line to 345 kV	2006	Addresses low voltages, accommodates transmission service request
4	Sprecher-Femrite 138-kV line	2007	Addresses low voltages, accommodates transmission service request
	Proposed Projects		
5	Jefferson-Lake Mills-Stony Brook 138-kV line	2007	Addresses low voltages and overloaded facilities, accommodates T-D interconnection
6	Rubicon-Hustisford-Horicon 138-kV line	2008	Addresses low voltages
7	North Madison-Waunakee 138-kV line	2008	Addresses low voltages, averts voltage collapse
8	Rockdale-Concord-Bark River 345-kV line	2011	Addresses low voltages, averts voltage collapse, improves west-east transfer capability, lowers system losses
9	Montrose-Sun Valley-Oak Ridge 138-kV line	2009	Improves area voltages, addresses overloads and accommodates T-D interconnection



	Project description	In-service year	Need driver
10	Rockdale-West Middleton 345-kV line	2011	Averts voltage collapse, addresses low voltages, improves transfer capability to Madison area, lowers system losses
11	North Madison-West Middleton 345-kV line	2014	Averts voltage collapse, addresses low voltages, in the Madison area, lowers system losses, improves stability at Columbia Power Plant, improves transfer capability to Madison area
	Provisional Projects		
12	South Lake Geneva-White River 138-kV line	2009	Addresses low voltages, accommodates T-D interconnection
13	Lake Delton-Birchwood 138-kV line	2011	Improves area voltages, improves reliability for Lake Delton load
14	West Middleton-Stagecoach double-circuit 138/69-kV line	2012	Addresses low voltages and overloads
15	Eden-Muscoda-Richland Center 69-kV line	2012	Addresses low voltages
16	Salem-Spring Green-West Middleton 345-kV line	2013	Representative Access project, improves transfer capability, improves line system voltages in southwest Wisconsin, lowest system losses
17	Twin Lakes-Spring Valley 138-kV line	2013	Addresses low voltages, improves reliability for area loads
18	Horicon-East Beaver Dam 138-kV line	2013	Addresses low voltages



Northeast Wisconsin

ZONE 4 INCLUDES THE COUNTIES OF:

- Brown
- Calumet
- Door
- Fond du Lac
- Manitowoc
- Marinette (southern portion)
- Menominee
- Oconto
- Outagamie
- Kewaunee
- Shawano (eastern portion)
- Sheboygan
- Winnebago

Transmission system characteristics of Zone 4

ATC delivers power in Zone 4 with various transmission facilities including:

- four 345-kV lines extending from Kewaunee and Point Beach nuclear plants,
- two 345-kV lines extending from Edgewater Power Plant,
- an west-east 345-kV line extending from Stevens Point to the Appleton area,
- a 345-kV line connecting Fond du Lac to Columbia, Edgewater and North Appleton via Fitzgerald Substation and
- a 345-kV line connecting Morgan to Plains.

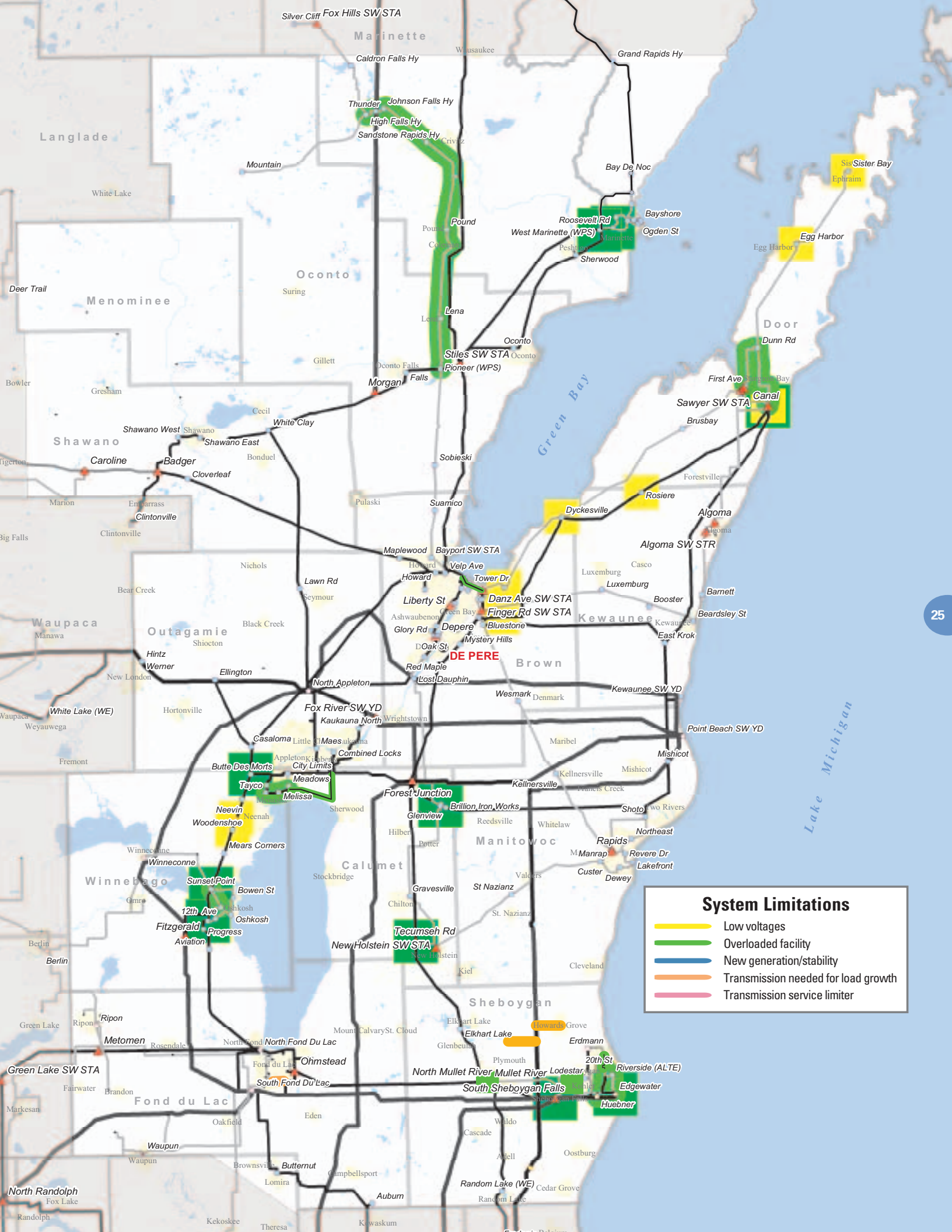
There are a number of transmission system performance issues in Zone 4, most notably insufficient transformer capability, limited transfer capability to and from Michigan's Upper Peninsula, the stability response of the Kewaunee and Point Beach nuclear plants, aging facilities in poor condition and heavily loaded facilities in Fox Valley and Green Bay. Primary drivers of these issues include steady load growth in certain areas, new power plants and increased desire to transfer power through the system.

Transmission system limitations in Zone 4

In the 2006 analysis of Zone 4, we identified low voltages, transmission facility overloads and transmission service limitations. In addition, transmission service limitations during off-peak periods when the Ludington Pumped Storage Facility is in pump mode contribute to heavy loading on facilities south of Green Bay to Michigan and continue to keep the system working with very small operating margins.

The areas identified as vulnerable to low voltages are Peshtigo, Door County and west of Appleton. Most notable of the transmission service limitations are the Plains-Stiles 138-kV line (Zone 4) and the Hiawatha-Indian Lake 69-kV line (Zone 2). Both lines are being addressed for the near term with projects planned to be completed in 2006.

The potential for generation at Kewaunee and Point Beach nuclear plants becoming unstable after certain disturbances on the transmission system has been a long-standing limitation and the reason for an operating guide at Point Beach. This situation is somewhat aggravated by new generation being constructed near Kaukauna. Projects to improve stability response are scheduled to be in service by 2006.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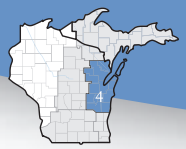
Fox Hills SW STA
Marinette
Wausaukee
Caldron Falls Hy
Grand Rapids Hy
Thunder
Johnson Falls Hy
High Falls Hy
Sandstone Rapids Hy
Crivitz
Langlade
Mountain
White Lake
Bay De Noc
Sister Bay
Ephraim
Bayshore
Roosevelt Rd
West Marinette (WPS)
Ogden St
Pound
Marinette
Peshtigo
Sherwood
Egg Harbor
Oconto
Deer Trail
Menominee
Suring
Lena
Door
Dunn Rd
Oconto
Stiles SW STA
Oconto Falls
Pioneer (WPS)
Gillett
Bowler
Gresham
Morgan
Falls
First Ave
Sawyer SW STA
Canal
Brusbay
Cecil
White Clay
Shawano West
Shawano
Shawano East
Shawano
Green Bay
Caroline
Badger
Bonduel
Sobieski
Cloverleaf
Forestville
Marion
Pulaski
Suamico
Rosiere
Dyckesville
Algoma
Clintonville
Algoma SW STR
Maplewood
Bayport SW STA
Howard
Velp Ave
Tower Dr
Nichols
Lawn Rd
Luxemburg
Casco
Bear Creek
Seymour
Liberty St
Danz Ave SW STA
Finger Rd SW STA
Barnett
Booster
Waupaca
Outagamie
Black Creek
Ashwaubenon
Green Bay
Kewaunee
Beardsley St
Manawa
Shiocton
Glory Rd
Depere
Bluestone
Mystery Hills
East Krok
Oak St
DE PERE
Hintz
Werner
Brown
Red Maple
Lost Dauphin
Ellington
New London
North Appleton
Wesmark
Denmark
Kewaunee SW YD
White Lake (WE)
Hortonville
Fox River SW YD
Kaukauna North
Wrightstown
Point Beach SW YD
Weyauwega
Maribel
Casaloma
Little Chute
Maes
Combined Locks
Mishicot
Fremont
Appleton
Kaukauna
Butte Des Morts
City Limits
Meadows
Kellnersville
Tayco
Melissa
Forest Junction
Francis Creek
Shoto
Two Rivers
Neevin
Neenah
Brillion Iron Works
Glenview
Reedsville
Whitelaw
Woodenshoe
Sherwood
Hilbert
Potter
Manitowoc
Northeast
Rapids
Mears Corners
Manrap
Revere Dr
Winneconne
Lakefront
Calumet
Custer
Dewey
Winnebago
Stockbridge
Valders
Sunset Point
Bowen St
Gravesville
St Nazianz
Omro
Chilton
12th Ave
Oshkosh
Oshkosh
Fitzgerald
Progress
Tecumseh Rd
Aviation
New Holstein SW STA
Berlin
Berlin
New Holstein
Kiel
Cleveland
Sheboygan
Green Lake
Ripon
Ripon
Elkhart Lake
Howards Grove
Mount Calvary
St. Cloud
Elkhart Lake
Metomen
Rosendale
North Fond
North Fond Du Lac
Glenbeulah
Erdmann
Ohmstead
Plymouth
20th St
Green Lake SW STA
Fond du Lac
Riverside (ALTE)
North Mullet River
Mullet River
Lodestar
Fairwater
Brandon
South Fond Du Lac
South Sheboygan Falls
Edgewater
Fond du Lac
Huebner
Markesan
Eden
Oakfield
Waldo
Cascade
Waupun
Adell
Oostburg
Waupun
Brownsville
Butternut
Campbellsport
Lomira
Random Lake (WE)
Cedar Grove
North Randolph
Auburn
Fox Lake
Random Lake
Randolph
Kekoskee
Theresa
Kewaskum
Lake Michigan
System Limitations
Low voltages
Overloaded facility
New generation/stability
Transmission needed for load growth
Transmission service limiter



Northeast Wisconsin

Transmission projects in Zone 4

We have completed 11 network projects in Zone 4 since the 2004 Assessment Update, most notably the West Marinette-Amberg 138-kV line rebuild and conversion project.

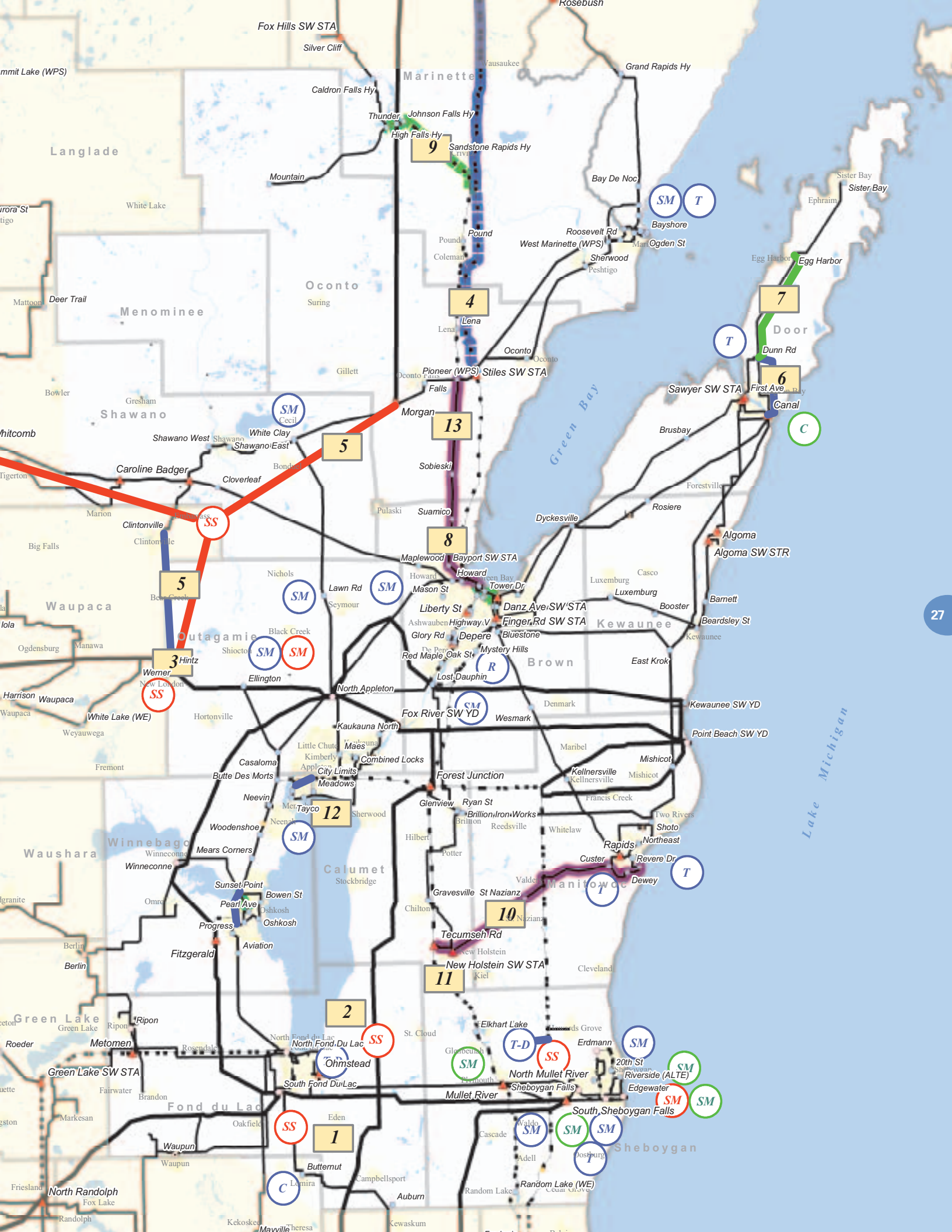
Our current plans in Zone 4 include more than 40 projects between 2005 and 2015. These projects are in various stages of development. The most notable planned, proposed and provisional projects in Zone 4, along with their projected year of completion and the factors driving the need for the projects, are listed below.

	Project description	In-service year	Need driver
	Planned projects		
1	Loop Butternut-South Fond du Lac 138 kV into Forward Energy Center	2005	Interconnection of new Forward Energy Center Power Plant
2	Loop Forest Junction-Arcadian 345 kV into Cypress	2006	Interconnection of new Cypress Power Plant
3	Werner West (New London) 345/138-kV Substation	2006	Addresses chronic transmission service limitation and facility overloads, improve system voltages in the area
4	Stiles-Amberg double-circuit 138-kV line rebuild	2006	Addresses chronic transmission service limitation, improves voltage stability limit in the UP, addresses aging facilities in poor condition
5	Werner West-Morgan 345-kV line and Clintonville-Werner West 138-kV line	2009	Addresses chronic transmission service limitations in Green Bay, improves Wisconsin-UP transfer capability, lowers system losses
	Proposed Projects		
6	Canal (Sturgeon Bay)-Dunn Road 138-kV line	2008	Addresses low voltages and facility overloads
7	Dunn Road-Egg Harbor 69-kV line	2010	Addresses low voltages and provides network service
	Provisional Projects		
8	Pulliam-New Suamico line rebuild & conversion from 69 kV to 138 kV	2008	Addresses facility overloads, addresses aging facilities in poor condition and accommodates T-D interconnection
9	Crivitz-High Falls 69-kV double-circuit line rebuild	2008	Addresses low voltages and facility overloads
10	New Holstein-Lakefront (Manitowoc) 69-kV line rebuild & conversion to 138 kV	2010	Addresses facility overload and improves transfer capability to Manitowoc area
11	Tecumseh Road-New Holstein 69-kV line rebuild conversion to 138 kV	2010	Addresses facility overload and improves transfer capability to & Manitowoc area
12	Northside-City Limits (Menasha) 138-kV line	2015	Addresses facility overloads
13	New Suamico-Pioneer line rebuild & conversion from 69 kV to 138 kV	2015	Addresses facility overloads, addresses aging facilities in poor condition and provides network service

System Solutions

- SS New substation
- SM Substation modifications
- PS Phase shifter
- T Transformer
- C Capacitor bank
- R Reactor
- T-D T-D interconnection

- 345-kV transmission line
- 115-, 138- or 161-kV transmission line
- Rebuilt 115- or 138-kV transmission line
- Transmission line voltage conversion
- 69-kV transmission line
- Rebuilt 69-kV transmission line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Grand Rapids Hy
Marinette
Caldron Falls Hy
Thunder
Johnson Falls Hy
High Falls Hy
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Sandstone Rapids Hy
Langlade
Mountain
Bay De Noc
SM
T
Bayshore
Sister Bay
Ephraim
Roosevelt Rd
West Marinette (WPS)
Ogden St
Sherwood
Peshtigo
Egg Harbor
Pound
Coleman
Oconto
Menominee
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Mattoon
Deer Trail
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Lena
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Door
Dunn Rd
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Sawyer SW STA
First Ave
Canal
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Oconto
Pioneer (WPS)
Stiles SW STA
Falls
Gillett
Bowler
Gresham
Shawano
Morgan
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Brusbay
Green Bay
Whitcomb
Shawano West
Shawano East
White Clay
Cecil
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Caroline Badger
Cloverleaf
Sobieski
Forestville
Tigerton
Marion
Clintonville
Pulaski
Suamico
Rosiere
Dyckesville
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Bayport SW STA
Howard
Tower Dr
Big Falls
Nichols
Lawn Rd
Mason St
Luxemburg
Casco
Waupaca
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Danz Ave SW STA
Finger Rd SW STA
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Glory Rd
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Bluestone
Kewaunee
Outagamie
Black Creek
Shiocton
Ogdensburg
Manawa
Mystery Hills
Red Maple
Oak St
Brown
East Krok
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Hintz
Werner
New London
Ellington
Lost Dauphin
Harrison
Waupaca
North Appleton
Denmark
Kewaunee SW YD
White Lake (WE)
Hortonville
Fox River SW YD
Wesmark
Weyauwega
Kaukauna North
Point Beach SW YD
Maes
Little Chute
Kimberly
Appleton
Combined Locks
Maribel
Mishicot
Fremont
Casaloma
Butte Des Morts
City Limits
Meadows
Forest Junction
Kellnersville
Mishicot
Neevin
Tayco
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Glenview
Ryan St
Francis Creek
Sherwood
Brillion
Iron Works
Two Rivers
Woodenshoe
Reedsville
Shoto
Whitelaw
Northeast
Rapids
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Hilbert
Mears Corners
Potter
Custer
Revere Dr
Waushara
Winneconne
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Omro
Pearl Ave
Oshkosh
Chilton
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Progress
Oshkosh
Tecumseh Rd
Berlin
Fitzgerald
Aviation
New Holstein
New Holstein SW STA
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Kiel
Cleveland
Green Lake
Green Lake
Ripon
2
Elkhart Lake
Roeder
Metomen
North Fond du Lac
St. Cloud
T-D
Erdmann
20th St
Riverside (ALTE)
Ohmstead
Glenbeulah
North Mullet River
Edgewater
Green Lake SW STA
South Fond du Lac
Sheboygan Falls
Mullet River
Fairwater
Brandon
Fond du Lac
South Sheboygan Falls
Markesan
Oakfield
Eden
Waldo
Cascade
Sheboygan
Waupun
Adell
Butternut
Campbellsport
Friesland
Lomira
Random Lake
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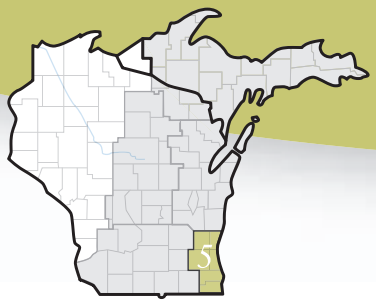
North Randolph
Fox Lake
Auburn
Randolph
Kekoskee
Theresa
Kewaskum
Lake Michigan



zone 5

Southeast Wisconsin

ZONE 1 INCLUDES THE COUNTIES OF:

- Kenosha
- Milwaukee
- Ozaukee
- Racine
- Washington
- Waukesha

Transmission system characteristics of Zone 5

ATC delivers power in Zone 5 with various transmission facilities including:

- north-south 345-kV lines extending from Edgewater and Point Beach power plants,
- 345-kV lines from Pleasant Prairie Power Plant,
- 345-kV lines from Illinois to Pleasant Prairie and Arcadian,
- 345-kV, 230-kV and 138-kV lines from Oak Creek Power Plant and
- numerous 138-kV lines in and around the metro Milwaukee area.

Transmission system reinforcements needed to interconnect and deliver new generation at Port Washington and Oak Creek power plants comprise much of the expansion in Zone 5. Significant load growth in Waukesha, Walworth and Washington counties is projected to outpace the capabilities of the existing 138-kV system in those areas, signaling the need for transmission system reinforcements.

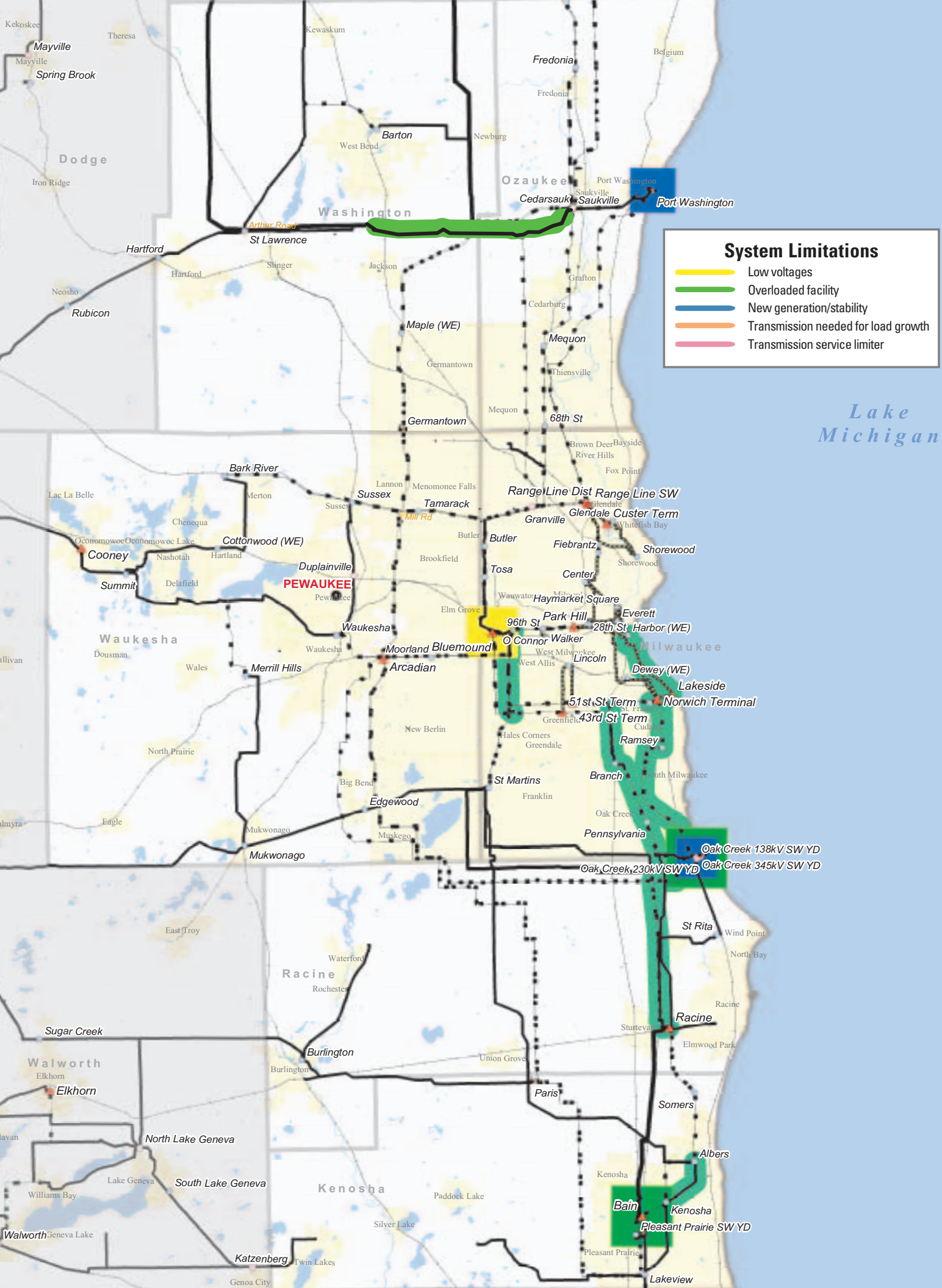
Transmission system limitations in Zone 5

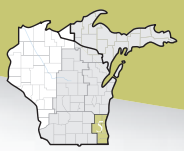
In the 2006 analysis of Zone 5, we identified low voltages, transmission facility overloads and transmission service limitations. In addition, chronic transmission service limitations within Zone 5 need to be addressed.

The areas identified as vulnerable to low voltages are Washington County and areas west of Milwaukee. Numerous line overloads were identified throughout the zone. Most of the overloads and low voltages in Zone 5 are caused by outages at substations. We are evaluating alternatives to address these issues. The low-voltage situation to the west of Milwaukee is an indication that load growth is outpacing the load-serving capabilities of the 138-kV network serving that area, and the existing network will be insufficient without significant reinforcements.

Accommodating new generation at Port Washington and Oak Creek power plants is driving the need for most of the system reinforcements in the Milwaukee area.

The most chronic transmission service limitations in Zone 5 are caused by the loss of the Wempletown-Paddock 345-kV line. We added a second 345-kV circuit to the Wempletown-Paddock line and reconfigured the existing Wempletown-Paddock and Paddock-Rockdale 345-kV circuits into a Wempletown-Rockdale 345-kV circuit (see Zone 3 section) in 2005 to address these limitations.


System Limitations
Low voltages
Overloaded facility
New generation/stability
Transmission needed for load growth
Transmission service limiter
Lake Michigan
Mayville
Spring Brook
Fredonia
Barton
West Bend
Dodge
Iron Ridge
Ozaukee
Port Washington
Cedarsauk
Saukville
Washington
Arthur Road
St Lawrence
Hartford
Rubicon
Neosho
Maple (WE)
Mequon
Germantown
Thiensville
Grafton
Cedarburg
68th St
Bark River
Sussex
Tamarack
Mill Rd
Range Line Dist
Range Line SW
Glendale Custer Term
Granville
Fiebrantz
Shorewood
Cottonwood (WE)
Cooney
Duplainville
PEWAUKEE
Summit
Butler
Brookfield
Tosa
Center
Haymarket Square
Everett
Park Hill
96th St
28th St Harbor (WE)
O Connor
Walker
Lincoln
Waukesha
Moorland
Bluemound
Arcadian
Merrill Hills
Dewey (WE)
Lakeside
Norwich Terminal
51st St Term
43rd St Term
Ramsey
Branch
St Martins
Edgewood
Pennsylvania
Oak Creek 138kV SW YD
Oak Creek 345kV SW YD
Oak Creek 230kV SW YD
St Rita
Racine
Sugar Creek
Burlington
Elkhorn
Walworth
Paris
Somers
North Lake Geneva
South Lake Geneva
Albers
Kenosha
Bain
Pleasant Prairie SW YD
Lakeview
Katzenberg
Waukesha
Racine
Kenosha
Milwaukee
Walworth
Mayville
Theresa
Kewaskum
Belgium
Fredonia
Newburg
West Bend
Port Washington
Saukville
Hartford
Slinger
Jackson
Grafton
Cedarburg
Germantown
Mequon
Thiensville
Brown Deer
Bayside
River Hills
Fox Point
Lannon
Menomonee Falls
Sussex
Merton
Lac La Belle
Glendale
Whitefish Bay
Chenequa
Oconomowoc
Oconomowoc Lake
Nashotah
Hartland
Delafield
Pewaukee
Brookfield
Butler
Wauwatosa
Milwaukee
Elm Grove
West Allis
West Milwaukee
Waukesha
Dousman
Wales
Eagle
Mukwonago
Muskego
New Berlin
Greenfield
Hales Corners
Greendale
Cudahy
South Milwaukee
Oak Creek
Franklin
North Prairie
Big Bend
East Troy
Waterford
Rochester
Racine
Sturtevant
Elmwood Park
Wind Point
North Bay
Union Grove
Burlington
Elkhorn
Williams Bay
Lake Geneva
Paddock Lake
Silver Lake
Twin Lakes
Genoa City
Pleasant Prairie
Kenosha
Lakeview
29



zone 5

Southeast Wisconsin

Transmission projects in Zone 5

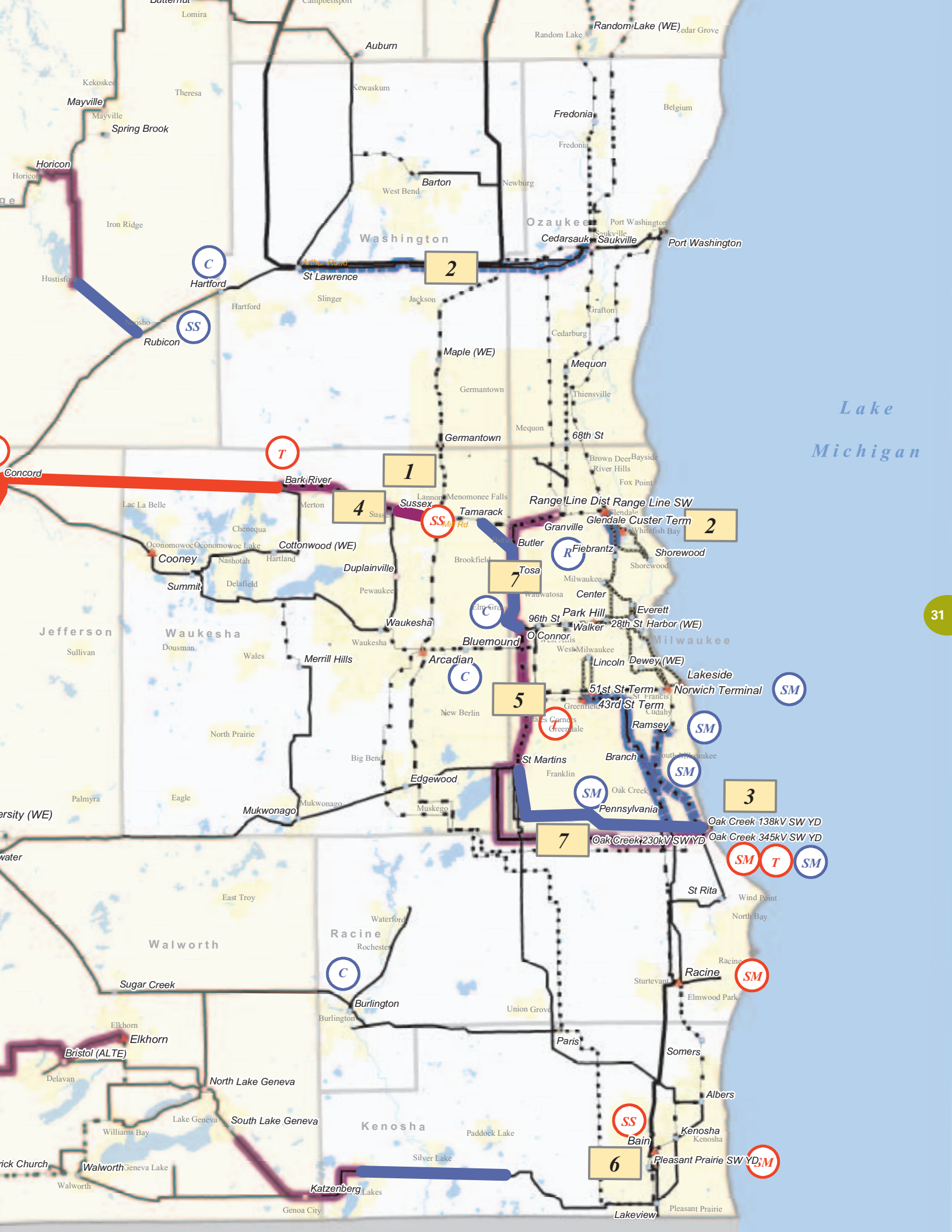
Our current plans in Zone 5 include more than 30 projects between 2005 and 2015, 20 of which are needed for the new generation planned at Oak Creek Power Plant. These projects are in various stages of development. The most notable planned, proposed and provisional projects in Zone 5, along with their projected year of completion and the factors driving the need for the projects are listed below.

	Project description	In-service year	Need driver
	Planned projects		
1	Mill Road 345/138-kV Substation	2008	Improves system voltages in the area, reduces reliance on peaking generation
2	Cornell-Range Line and St. Lawrence-Pleasant Valley-Saukville 138-kV line reconductor	2008	Accommodates new generation at Port Washington Power Plant
3	Expand 345/230/138-kV Substation at Oak Creek	2009	Accommodates new generation at Oak Creek Power Plant
4	Convert Bark River-Mill Road 138-kV line to 345 kV	2011	Addresses low voltages, averts voltage collapse, reduces reliance on peaking generation, lowers system losses
	Proposed Projects		
5	Expand Brookdale Substation (Hale)	2013	Accommodates new generation at Oak Creek Power Plant
6	Loop Zion-Arcadian 345-kV line into Pleasant Prairie Substation	2013	Accommodates new generation at Oak Creek Power Plant
7	Oak Creek-Hale-Granville 345-kV line	2013	Accommodates new generation at Oak Creek Power Plant

System Solutions

- SS New substation
- SM Substation modifications
- PS Phase shifter
- T Transformer
- C Capacitor bank
- R Reactor
- T-D T-D interconnection

- 345-kV transmission line
- 115-, 138- or 161-kV transmission line
- Rebuilt 115- or 138-kV transmission line
- Transmission line voltage conversion
- 69-kV transmission line
- Rebuilt 69-kV transmission line


Lake Michigan
Random Lake (WE)
Auburn
Kewaskum
Fredonia
Barton
West Bend
Newburg
Ozaukee
Port Washington
Cedarsauk
Saukville
Washington
Arthur Road
St Lawrence
Hartford
Slinger
Jackson
Grafton
Cedarburg
Mequon
Maple (WE)
Germantown
Thiensville
68th St
Brown Deer
Bayside
River Hills
Fox Point
Range Line Dist
Range Line SW
Glendale Custer Term
Whitefish Bay
Shorewood
Fiebrantz
Granville
Butler
Tamarack
Sussex
Menomonee Falls
Lannon
Merton
Lac La Belle
Bark River
Concord
Chenequa
Oconomowoc
Oconomowoc Lake
Cooney
Nashotah
Hartland
Cottonwood (WE)
Duplainville
Pewaukee
Summit
Delafield
Brookfield
Tosa
Milwaukee
Wauwatosa
Center
Everett
Park Hill
96th St
Walker
28th St Harbor (WE)
O'Connor
Bluemound
West Milwaukee
Lincoln
Dewey (WE)
Lakeside
Norwich Terminal
51st St Term
43rd St Term
Greenfield
Cudahy
Ramsey
St Martins
Branch
Franklin
Oak Creek
Pennsylvania
Oak Creek 138kV SW YD
Oak Creek 345kV SW YD
Oak Creek 230kV SW YD
Jefferson
Waukesha
Sullivan
Dousman
Wales
Merrill Hills
Waukesha
Arcadian
New Berlin
Greendale
North Prairie
Big Bend
Edgewood
Muskego
Mukwonago
Palmyra
Eagle
East Troy
Waterford
Racine
Rochester
Walworth
Sugar Creek
Burlington
Union Grove
Paris
Somers
Sturtevant
Racine
Elmwood Park
St Rita
Wind Point
North Bay
Elkhorn
Bristol (ALTE)
Delavan
North Lake Geneva
Lake Geneva
Williams Bay
South Lake Geneva
Kenosha
Paddock Lake
Albers
Bain
Kenosha
Pleasant Prairie SW YD
Silver Lake
Walworth
Geneva Lake
Katzenberg
Lakes
Genoa City
Lakeview
Pleasant Prairie
Horicon
Mayville
Spring Brook
Iron Ridge
Hustisford
Rubicon
Theresa
Belgium
Lomira
Random Lake
Cedar Grove
Campbellsport
Butternut
1
2
3
4
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6
7
C
R
T
SS
SM

Glossary of terms

Access – The contracted right to use an electrical system to transfer electrical energy.

Adequacy – The ability of the electric system to supply the aggregate electrical demand and energy requirements of the customers at all times, taking into account scheduled and reasonably expected unscheduled outages of system elements.

Capacitor banks – System elements that support the voltages necessary to provide reliable service to customers.

Capacity – The electrical load-carrying ability, expressed in megawatts (MW) of generation, transmission or other electrical equipment.

Contingency – Outage of a transmission line, generator or other piece of equipment, which affects the flow of power on the transmission network and impacts other network elements.

Demand – The rate at which electric energy is delivered to or by a system or part of a system, generally expressed in kilowatts (kW) or megawatts (MW), at a given instant or averaged over any designated interval of time.

Distribution – An interconnected group of lines and associated equipment for the delivery of low-voltage electric energy between the transmission network and end users.

FERC – Federal Energy Regulatory Commission; an independent agency that regulates the interstate transmission of natural gas, oil and electricity.

Generation – The process of producing electrical energy from other forms of energy (fuel); also, the amount of electric energy produced, usually expressed in kilowatt hours (kWh) or megawatt hours (MWh).

Heavy loads – High volume of electricity flowing on a line, transformer or other equipment to meet a high demand for electricity.

Import/export – Ability of the transmission system to bring power into or out of an area in order to serve load.

Line rebuild – Removing an existing line and replacing it with a new, higher capacity line.

Line reconductor – Removing the conductors (wires) from an existing transmission line and replacing them with higher capacity conductors.

Load – All the devices that consume electricity and make up the total demand for power at any given moment, like factories, distribution substations, etc.

Loading relief – A system reinforcement of operating action that results in lower power flows on equipment that is heavily loaded or overloaded.

Low voltages – A situation that can occur in parts of the system that are heavily loaded or have high motor loads. Think of a clothesline pulled taut with nothing hanging on it, but which then tends to sag when more and more clothes (i.e. loads or motors) are attached. Low voltages negatively impact reliability.

kV – Kilovolt; equal to 1,000 volts.

MAIN – Mid America Interconnected Network; one of the nine NERC Regional Reliability Councils.

Margin – The difference between capacity resources and internal demand. Margin is usually expressed in megawatts (MW).

MISO – Midwest Independent Transmission System Operator; a not-for-profit Transmission System Operator that serves the electrical transmission needs of much of the Midwest.

MW – Megawatt; equal to 1 million watts.

NERC – North American Reliability Council; a not-for-profit company formed by the electric utility industry in 1968 to promote the reliability of the electricity supply in North America. NERC consists of nine Regional Reliability Councils and one Affiliate whose members account for virtually all the electricity supplied in the United States, Canada and a portion of Mexico.

Network – A system of interconnected lines and electrical equipment.

OASIS – Open Access Same Time Information System; an electronic posting system for transmission access data that allows all transmission customers to view the data simultaneously.

Off-peak – Those hours or other periods defined by contract or other agreements or guides as periods of lower electrical demand, generally nights and weekends.

On-peak – Those hours or other periods defined by contract or other agreements or guides as periods of higher electrical demand, generally weekdays.

Operating guides – Procedures carried out by transmission operators when certain events occur on the system that may compromise system reliability if no action is taken.

Outage – The unavailability of electrical equipment; could be planned or unplanned.

Overloads – Occur when power flowing through wires or equipment is more than they can carry without incurring damage.

Parallel path flows – When electricity flows from a power plant over the transmission system, it obeys the laws of physics and flows over the paths of least resistance. Though there may be direct connection between a power plant and a particular load area, some of the power will instead flow over other network lines "parallel" to the direction connection.

Planning – The process by which the performance of the electric system is evaluated and future changes and additions or enhancements to the bulk electric systems are determined.

Power flows – Electricity moving through lines or other equipment.

Reliable – Meets standard industry and specific ATC system performance criteria.

Reliability – The degree of performance of the elements of the bulk electric system that results in electricity being delivered to customers within accepted standards and in the amount desired.

Reserve – The difference between an electric system's capability and the expected peak demand for electricity.

Security – The ability of the electric system to withstand sudden disturbances such as unanticipated loss of system elements.

Serve load – Reliably deliver the amounts of electricity needed to match what consumers would like to use at any given time.

Shed load – Reduce the level of power flowing by disconnecting load from the network in order to prevent major equipment damage or widespread outages. This is usually a last resort emergency action.

Single contingency – The sudden, unexpected failure or outage of a system facility(s) or element(s) (generating unit, transmission line, transformer, etc.). Elements removed from service as part of the operation of a remedial action scheme are considered part of a single contingency.

Stability – The ability of an electric system to maintain a state of equilibrium during normal and abnormal system conditions or disturbances.

Substation – Place where transmission lines connect to each other and where protective equipment like circuit breakers are located. Also where transformers are located to step the voltage up or down in order to put power into or take power out of the transmission network.

T-D interconnection – Transmission to distribution interconnection; place where distribution substations connect to transmission system.

Thermal rating – The maximum amount of electrical current that a transmission line or electrical facility can conduct over a specified time period before it sustains permanent damage by overheating or before it violates public safety requirements.

Thermal overloads – Power flows on lines or equipment that exceed their capacity limits.

Transfer capability – The measure of the ability of interconnected electric systems to move or transfer power in a reliable manner from one area to another over all transmission lines between those areas under specified system conditions.

Transformers – Devices that change voltage levels.

Transmission – An interconnected group of lines and associated equipment for the movement or transfer of electric energy between points of supply and points at which it is transformed for delivery to customers or is delivered to other electric systems.

Transmission loading relief (TLR) – A procedure used to limit power flows on lines or equipment when they could overload if an outage on another system element occurred. The result is an interruption of specific power transactions that contribute to the power flow on the affected line or equipment.

Uprates – Make the transmission system element able to carry more electricity than it currently can. This can include increasing line clearances or replacing limiting pieces of equipment to enable the safe carrying of more power.

Voltage collapse – Can occur after a contingency where the voltage dips low enough and cannot recover quickly enough. In this situation protective equipment will automatically disconnect lines and/or transformers, causing load to be shed.

Voltage stability – System is able to maintain the proper voltages needed to serve load.

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