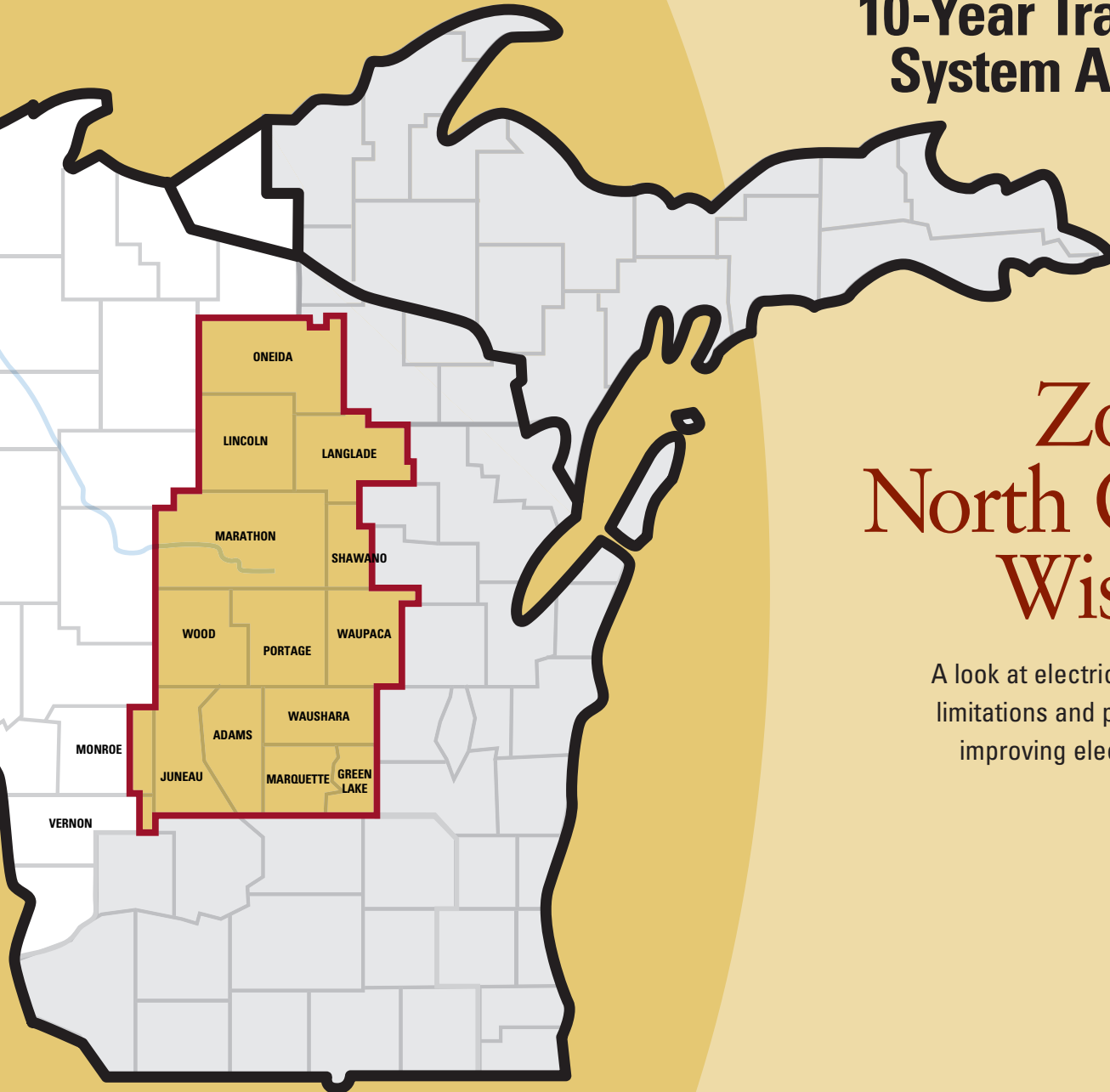




An excerpt from ATC's

2005

10-Year Transmission System Assessment



Zone 1 – North Central Wisconsin

A look at electric transmission system limitations and proposed solutions for improving electric system reliability

September 2005

www.atc10yearplan.com



About transmission planning

American Transmission Co. annually produces a 10-Year Transmission System Assessment that identifies and begins to prioritize future projects needed to improve the adequacy and reliability of the electric transmission system. Our planners continually conduct engineering studies on the electric transmission system looking for potential problems that may affect the future performance of the system.

As part of our planning studies, we take a comprehensive look at various factors affecting electricity utilization in the region, such as business development, employment trends, proposed new generation and projected growth in electricity usage.

Our studies consistently show that the transmission system is operating at the limits of its capabilities primarily because the system 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. Our plans include \$3.4 billion in projects throughout our service area over the next 10 years.

About ATC

We own and operate the electric transmission system in portions of Wisconsin, Upper Michigan and north central Illinois. As a public utility, 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,
- **maintain** the transmission equipment and surroundings to minimize opportunity for failures.

Understanding electric transmission

The electric transmission system serves as the vital link in bringing power to people, businesses and communities. 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 electric transmission system also 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.



Zone 1 – North Central Wisconsin

Electric system overview

Population, employment increasing in Zone 1

- Population is projected to grow 0.6 percent annually through 2010. Marathon County is projected to realize the largest increase in population, while Juneau County is projected to have the highest growth rate.
- Employment is projected to grow 1.2 percent through 2010. Marathon County is projected to realize the largest increase in employment, while Adams County is projected to have the highest growth rate.

Electricity usage growing in Zone 1

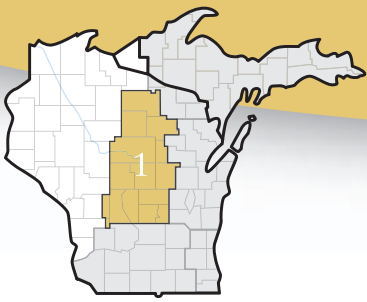
- Peak electric demands typically occur during the summer months, with some winter peaks appearing in the northern portion. Primary electricity users in Zone 1 include a number of large paper mills and food processing plants.
- Electric load is projected to grow approximately 2 percent annually from 2006 through 2014.

Transmission projects completed or under way address electric needs

- **Skanawan-Hwy. 8 (Rhineland Loop) project** – This project, which was completed in June 2005, involved replacing 16 miles of aging poles between Tomahawk and Rhineland and adding a second 115-kilovolt circuit to existing poles to better serve electricity needs in the area.
- **Arrowhead-Weston project** – This 345-kilovolt transmission line is under construction between Wausau, Wis. and Duluth, Minn. The 220-mile line is expected to be in service in 2008 and will improve reliability, help increase electric import capability and reduce system disturbances.
- **Gardner Park-Central Wisconsin project** – The Public Service Commission of Wisconsin is reviewing our application to build a 50-mile, 345-kilovolt transmission line between a new Gardner Park Substation near Weston Power Plant and a new substation in Shawano County. The line is needed to support the increased output from upgrades to Weston Power Plant by the end of 2009.

Our 2005 10-Year Assessment outlines 45 additional projects to ensure electric system reliability in North Central Wisconsin. The following pages describe the system limitations in North Central Wisconsin and our planned, proposed and provisional projects to address those limitations.

For more information about current projects, please visit the Projects section of our Web site, www.atcillc.com



zone 1

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.

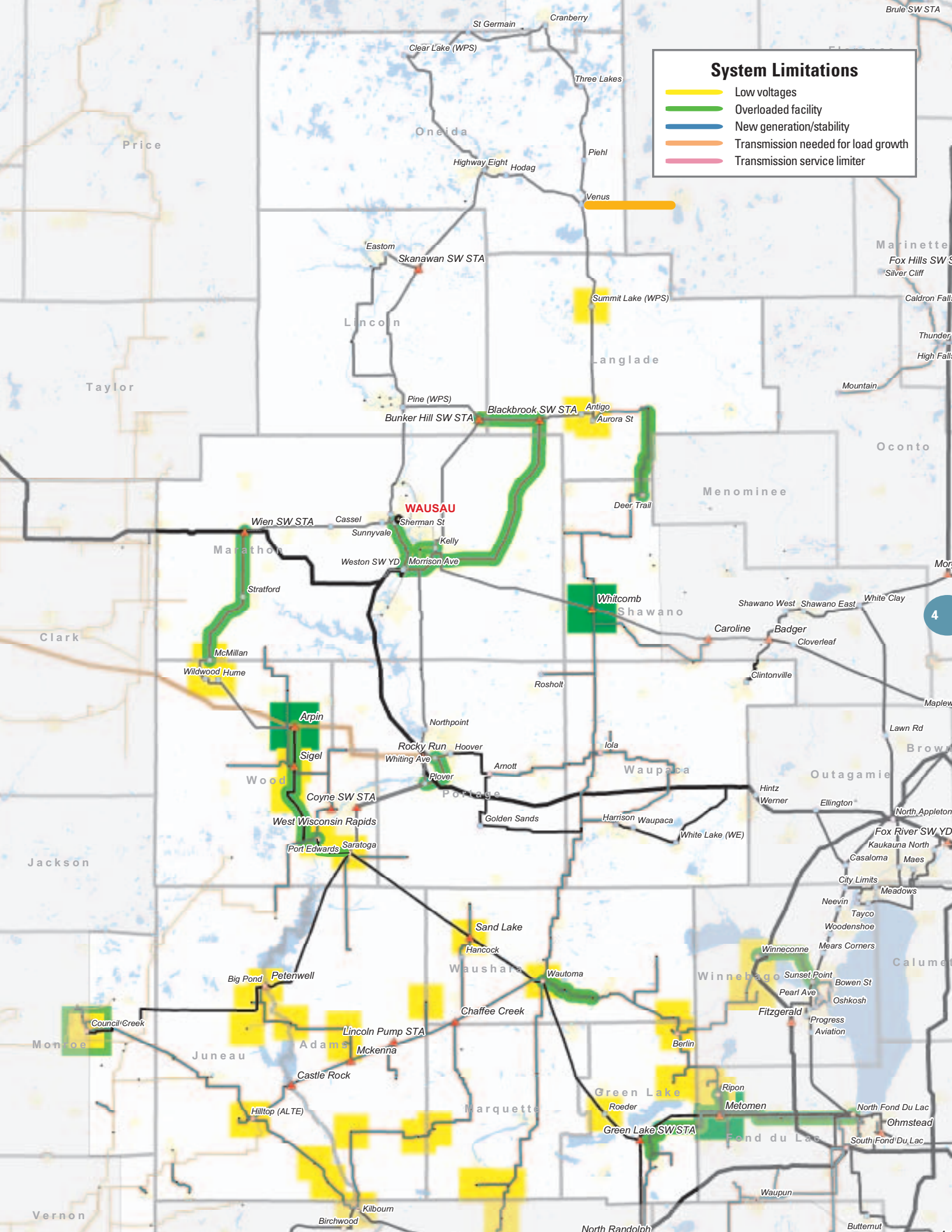
Transmission system limitations in Zone 1

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



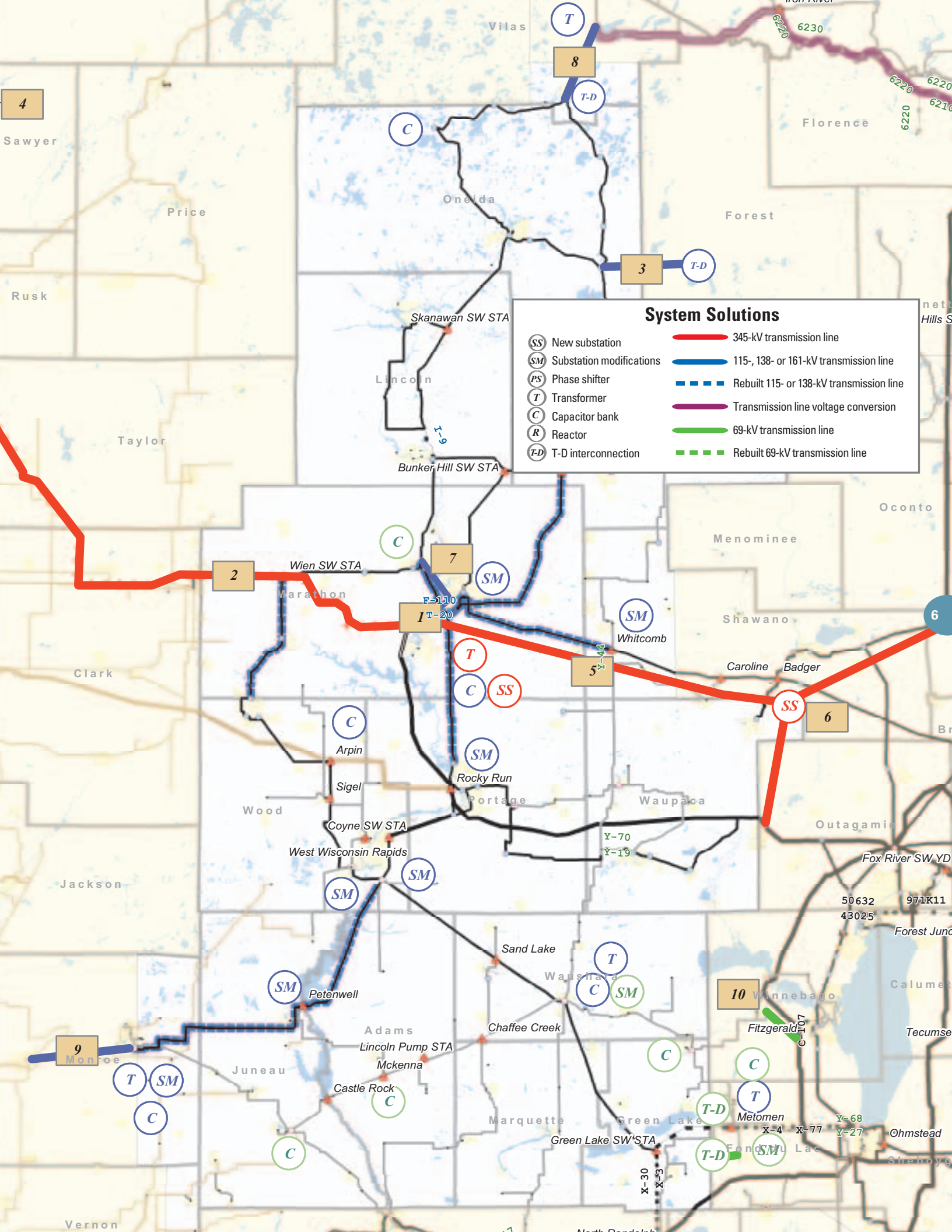
zone 1

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

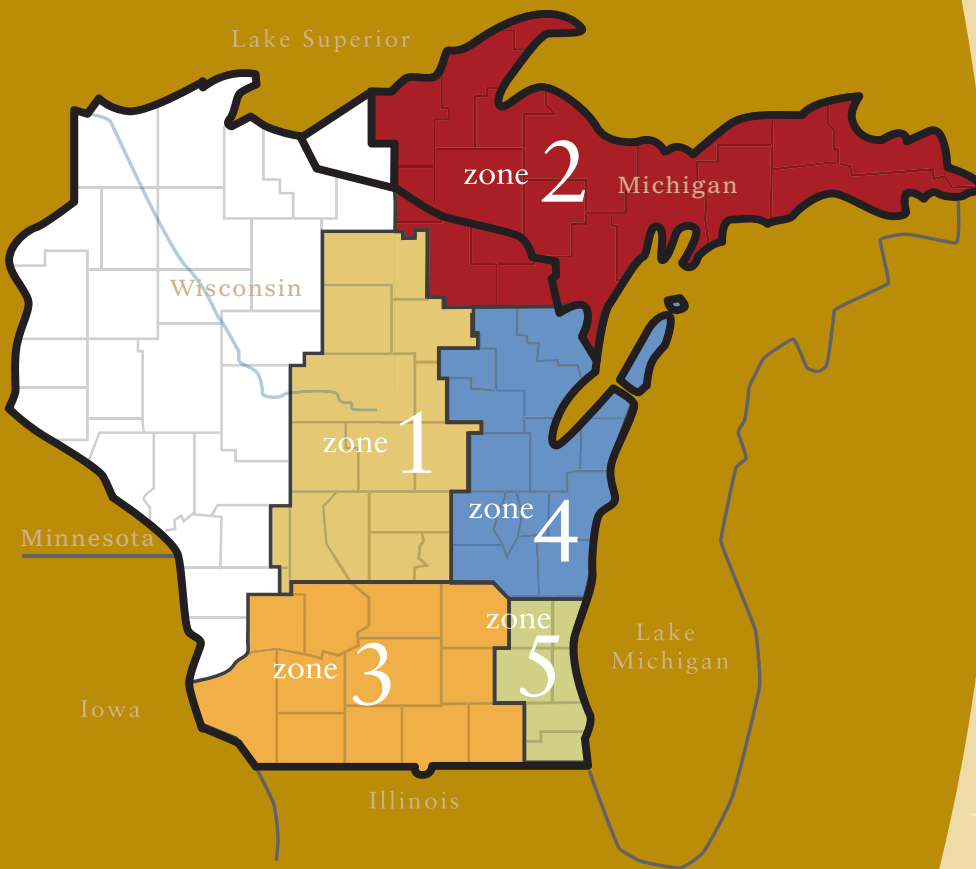
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Contact

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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.

www.atcllc.com