



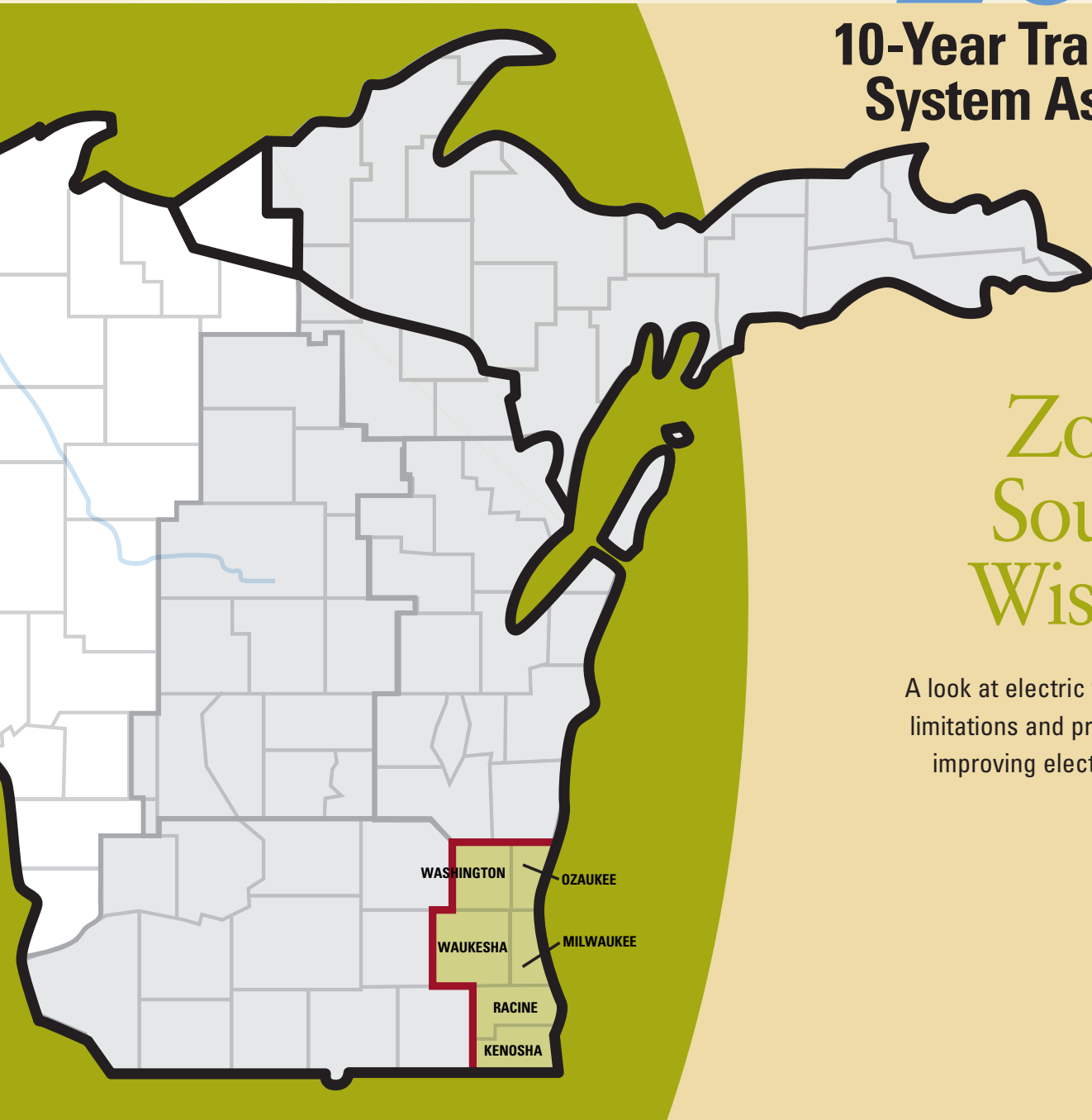
An excerpt from ATC's

2005

10-Year Transmission System Assessment

Zone 5 – Southeast 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 5 – Southeast Wisconsin

Electric system overview

Population, employment increasing in Zone 5

- Population is projected to grow 0.5 percent annually through 2010. Milwaukee County is projected to realize the largest increase in population, while Kenosha County is projected to have the highest growth rate.
- Employment is projected to grow 1 percent annually through 2010. Waukesha County is projected to realize the largest increase in employment and to have the highest growth rate.

Electricity usage growing in Zone 5

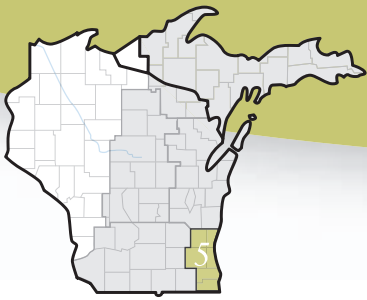
- Peak electric demands typically occur during the summer months. Large industrial loads in the Milwaukee metropolitan area (such as Charter Steel, Miller Brewing) are among the largest electricity users in the zone.
- Electric load is projected to grow at approximately 1.6 percent annually through 2014.

Transmission projects completed or under way address electric system needs

- **Duplainville project** – We built and put into service in 2005 a new nine-mile transmission line between Waukesha and Sussex to meet demand for increased usage in electricity in the region and accommodate a new distribution substation.
- **Paris-St. Martins project** – In 2005, we replaced 50-year old wires and structures on a 17-mile line between Kenosha and Milwaukee counties.
- **Port Washington-Saukville project** – We completed upgrades on two five-mile lines that connect We Energies' Port Washington Power Plant with our Saukville Substation. A related project was completed in 2004 to upgrade 22 miles of line between Port Washington and the Range Line Substation in Glendale. Additional work is planned for 2007 to support the output of Port Washington Power Plant's second new unit.

Our 10-Year Assessment outlines more than 30 additional projects to ensure electric system reliability in Southeast Wisconsin. The following pages describe the transmission system limitations in Southeast 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.atcllc.com



zone 5

Southeast Wisconsin

ZONE 5 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.

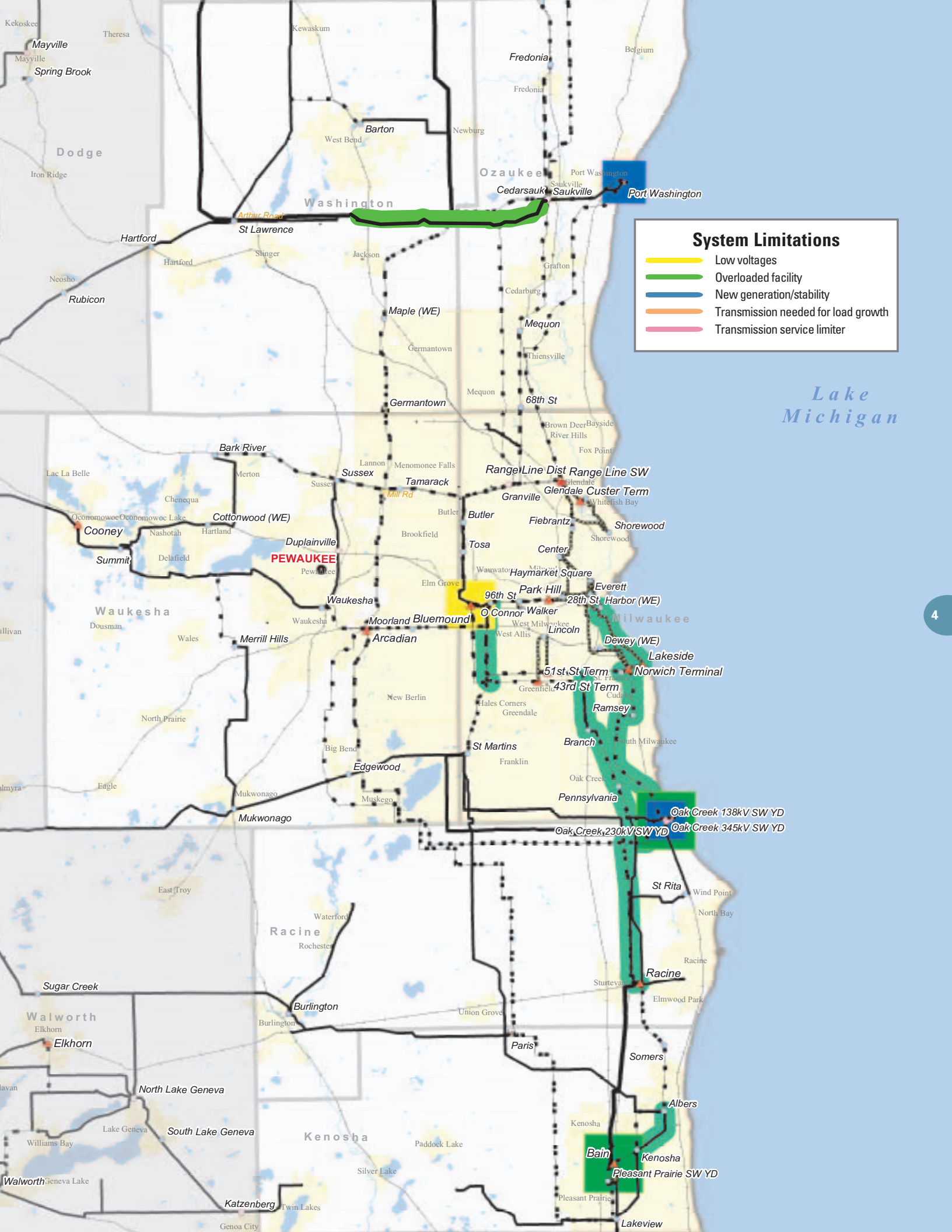
Transmission system limitations in Zone 5

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.

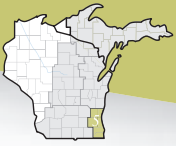
The most chronic transmission service limitations in Zone 5 are caused by the loss of the Wempletown-Paddock 345-kV line. We added a second 345-kV circuit to the Wempletown-Paddock line and reconfigured the existing Wempletown-Paddock and Paddock-Rockdale 345-kV circuits into a Wempletown-Rockdale 345-kV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



zone 5

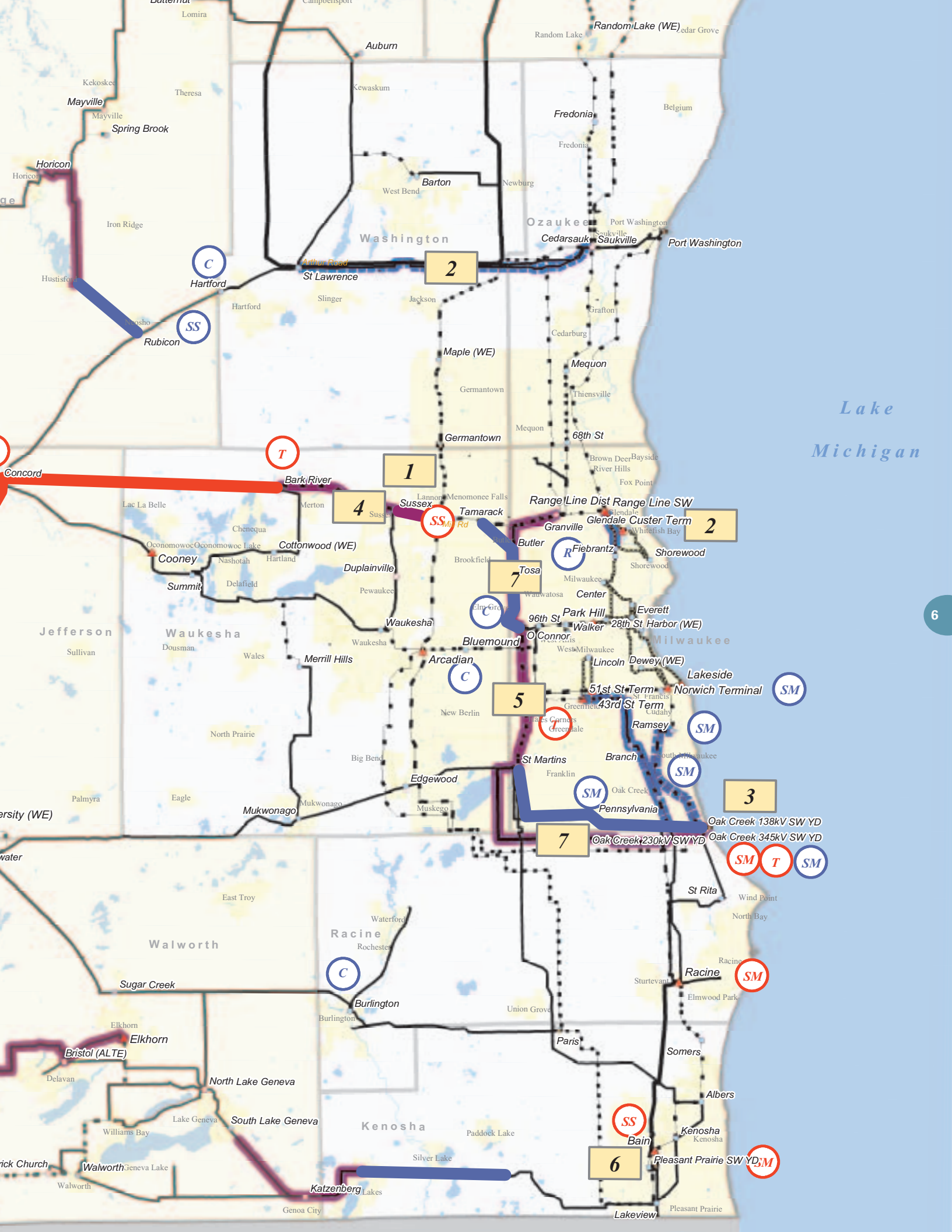
Southeast Wisconsin

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

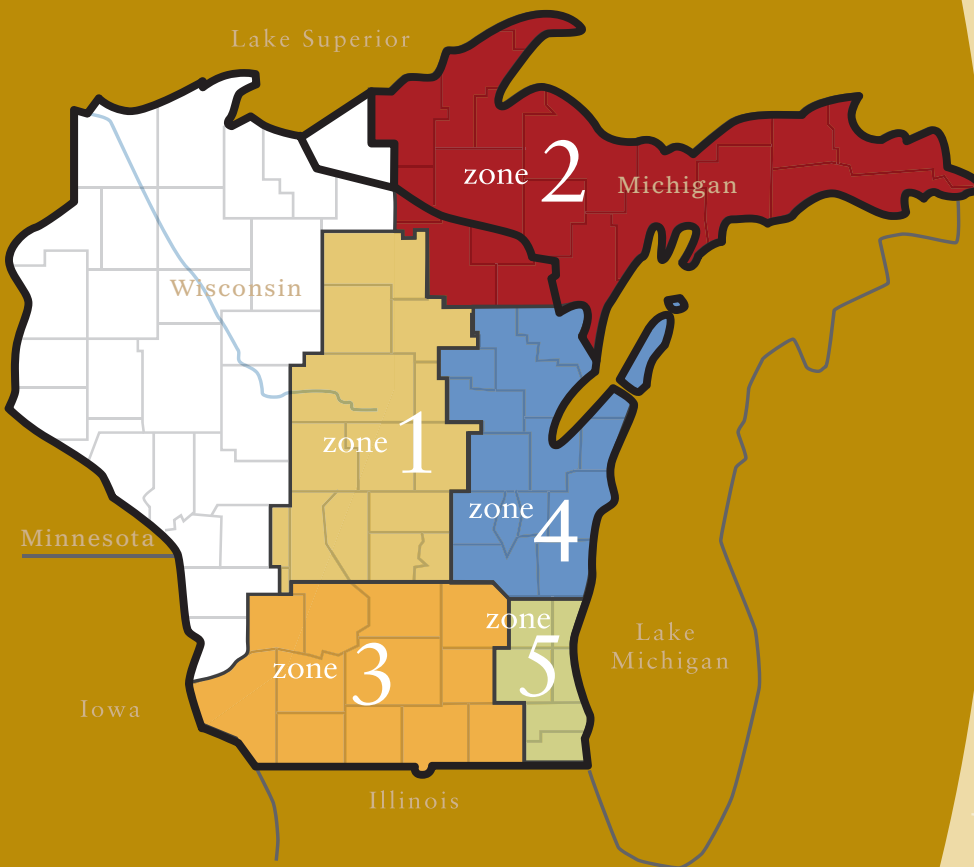
System Solutions	
New substation	345-kV transmission line
Substation modifications	115-, 138- or 161-kV transmission line
Phase shifter	Rebuilt 115- or 138-kV transmission line
Transformer	Transmission line voltage conversion
Capacitor bank	69-kV transmission line
Reactor	Rebuilt 69-kV transmission line
T-D interconnection	





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