

An excerpt from ATC's

2008

10-Year Transmission System Assessment

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

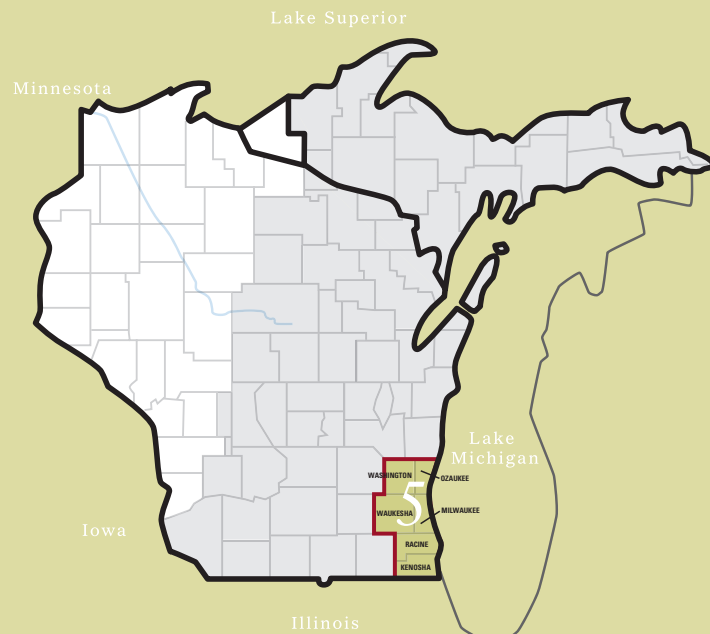
www.atc10yearplan.com

September 2008



KENOSHA
MILWAUKEE
OZAUKEE
RACINE
WASHINGTON
WAUKESHA

Southeast Wisconsin



zone 5



Looking at tomorrow's electric needs today

Advances in technology powered by electricity are improving our quality of life. At the same time, they've created a dependence on and expectation for an uninterrupted supply of electricity. However, the age of the transmission system and changes in the regional wholesale electricity market are impacting the reliability of the electric system upon which people and businesses have become so dependent.

American Transmission Co. was formed in 2001 to plan, permit, build, own, operate and maintain a transmission system that meets the reliability, economic and adequacy needs of our customers. Our planners continually conduct engineering studies on the electric transmission system looking for potential problems that may affect the future performance of the system.

Since 2001, ATC has produced annual assessments of the transmission system, identifying areas of need on the system and proposing solutions to those needs. This assessment covers the years 2008 through 2018. Our studies identify and prioritize future projects needed to improve system adequacy and reliability and meet evolving priorities for increased availability of renewable generation. As part of our technical studies, we take a comprehensive look at various factors affecting electricity utilization in the region, such as business development, employment trends, population and projected growth in electricity usage. We look 10 years into the future because it can take 5 to 10 years to plan, study route options, get approvals and build new transmission lines.

In this year's assessment, our studies identify and prioritize \$2.7 billion in future projects needed over the next 10 years 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 we also identify new challenges facing the electric industry.

Clean energy objectives impact transmission planning

Concerns for climate change have caused many states, consumers and utilities to turn toward greater use of renewable generation of electricity, such as wind, solar, biomass or hydro power. With renewable resources often being located in remote locations, new interstate high voltage transmission lines will be needed to deliver large volumes of renewable

energy from where it's produced to population centers where it's used. As today's transmission system has neither the capacity nor the configuration to accommodate high volumes of renewable energy, we're reaching out to regulators and utilities across state lines to begin planning a regional transmission grid that can meet these challenges.

Annual energy efficiency and conservation efforts also are currently mandated by state law, and the energy savings from these efforts are factored in to each utility's load growth forecast and our needs analysis. Programs that are designed to reduce electricity usage during peak-use periods have greater potential to impact planning for new transmission lines than overall efficiency programs. However, increasing energy use is only one of many drivers of new transmission projects. Changing power flows, generation utilization and location, and shifts in population centers also contribute to the need for new transmission facilities.

Our progress continues

Since we were formed in 2001, we've invested \$1.9 billion to upgrade more than 1,350 miles of transmission line, improve 110 electric substations and build 32 new transmission lines totaling 344 miles. These investments have helped to raise the system's performance in meeting peak demand, supporting a new fleet of generation, increasing import capability, interconnecting wind projects, alleviating overloads and voltage instabilities, reducing energy losses and improving system reliability ratings. As we plan for new challenges of meeting renewable energy mandates and accommodating changing market power flows, we will do so with your input.

We seek your input

As part of the planning that occurs throughout the year, we proactively seek input from customers, regulators, community officials, residents and others in an effort to strike the right balance between the need for a safe and reliable system, and the potential impacts on costs, landowners and the environment. Public examination and discussion can improve projects by incorporating 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 will meet future electricity demand.

The details of our studies can be found at www.atc10yearplan.com.



www.atc10yearplan.com

Southeast Wisconsin – Zone 5

Electric System Overview

Population, employment increasing

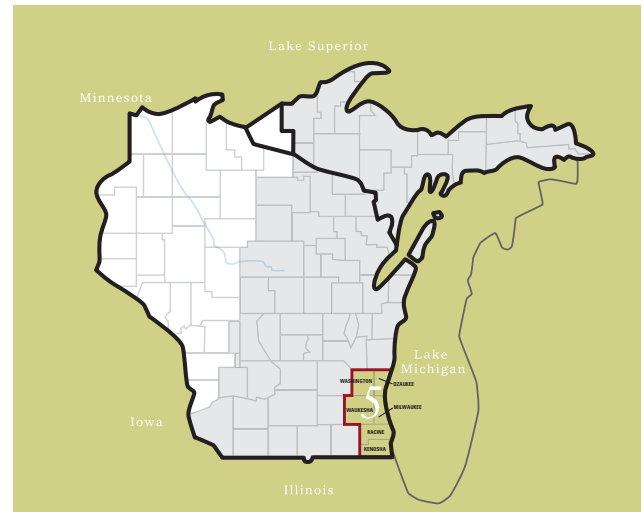
- Population in Zone 5 is projected to grow at 0.6 percent annually for both the 2008-2013 and 2013-2018 periods. From 2008 to 2013, Waukesha County is projected to realize the largest increase in population, while Washington County is projected to have the highest growth rate.
- Employment in Zone 5 is projected to grow at 1.3 percent annually between 2008 and 2013 and at 1.2 percent from 2013 through 2018. From 2008 to 2013, Waukesha County is projected to realize the largest increase in employment and to have the highest growth rate.

Electricity usage growing

- 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 approximately 1.8 percent annually through 2018.

Transmission projects completed or under way address electric needs

- **Saukville – St. Lawrence project** – We recently completed replacement of 60-year old poles and wires along a 19-mile, 138-kilovolt electric transmission line between the Saukville Substation and the St. Lawrence Substation, located northeast of Slinger in the town of Hartford. This newly built line can now support the additional output from the Port Washington Generating Station.



- **Oak Creek project** – Wisconsin Energy is constructing two 650-megawatt generation units on Elm Road adjacent to its Oak Creek Power Plant in Milwaukee County, and several upgrades to the existing transmission system have been completed or are under way in conjunction with the power plant expansion.

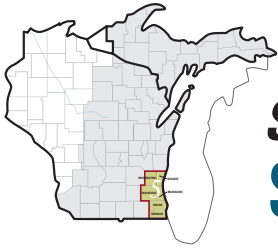
Phase 1 – We completed the relocation of certain transmission lines to make room for the new generating units. Other on-site transmission lines were moved to facilitate the construction of a new 345-kilovolt substation and modifications to an existing 230-kilovolt substation.

Phase 2 – Upgrades at several substations in southeast Wisconsin along with some modifications to some transmission lines are under construction.

Our 2008 10-Year Transmission System Assessment outlines more than 25 projects to ensure electric system reliability in Southeast Wisconsin. These projects are in various stages of development. The following pages describe the system limitations in Southeast Wisconsin and our planned, proposed and provisional projects to address those limitations.

Transmission is the vital link in bringing power to communities

Transmission lines move electricity at high voltages over long distances – from power plants to communities where local utilities deliver power to homes and businesses via local electric distribution lines. 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 they will experience service interruptions. 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.



System Limitations **Southeast Wisconsin – Zone 5**



Transmission system characteristics in Zone 5

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

- north-south 345-kV lines extending from the Edgewater, Point Beach and Sheboygan Energy Center power plants,
- 345-kV lines from the Pleasant Prairie Power Plant,
- 345-kV, 230-kV and 138-kV lines from the 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 the Oak Creek Power Plant comprise much of the expansion in Zone 5. Significant load growth in Waukesha and Washington counties is projected to exceed the capabilities of the existing 138-kV system in those areas, signaling the need for transmission system reinforcements.

Transmission system limitations in Zone 5

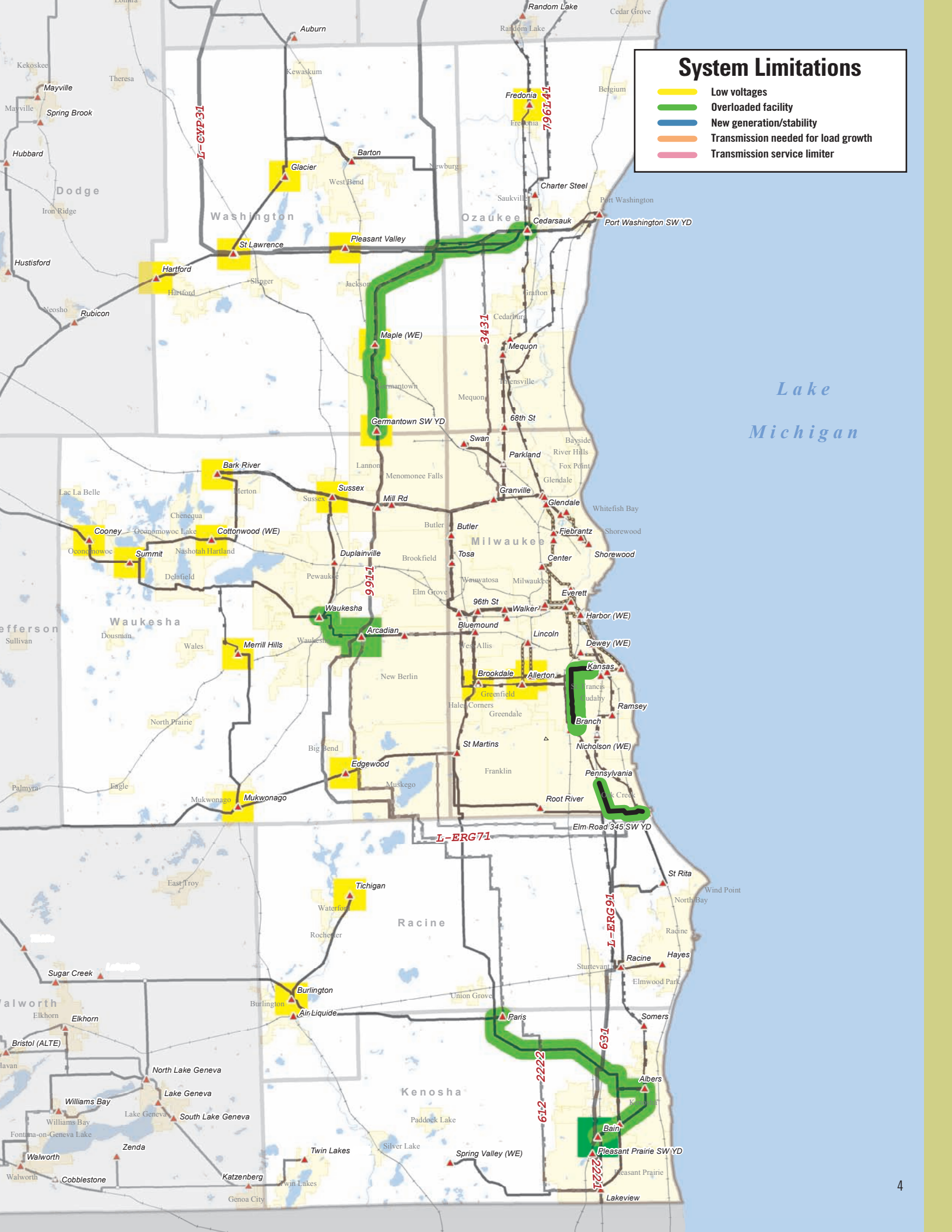
In the analysis of Zone 5 performed in the 2008 Assessment, we identified low voltages, transmission facility overloads and transmission service limitations. In addition, chronic transmission service limitations within Zone 5 need to be addressed.

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 low probability 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 will exceed the load-serving capabilities of the 138-kV network serving that area, and the existing network will be insufficient without significant reinforcements.

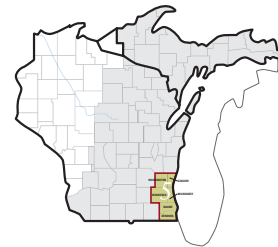
Accommodating new generation at the Oak Creek Power Plant is driving the need for most of the system reinforcements in the Milwaukee area.

System Limitations

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

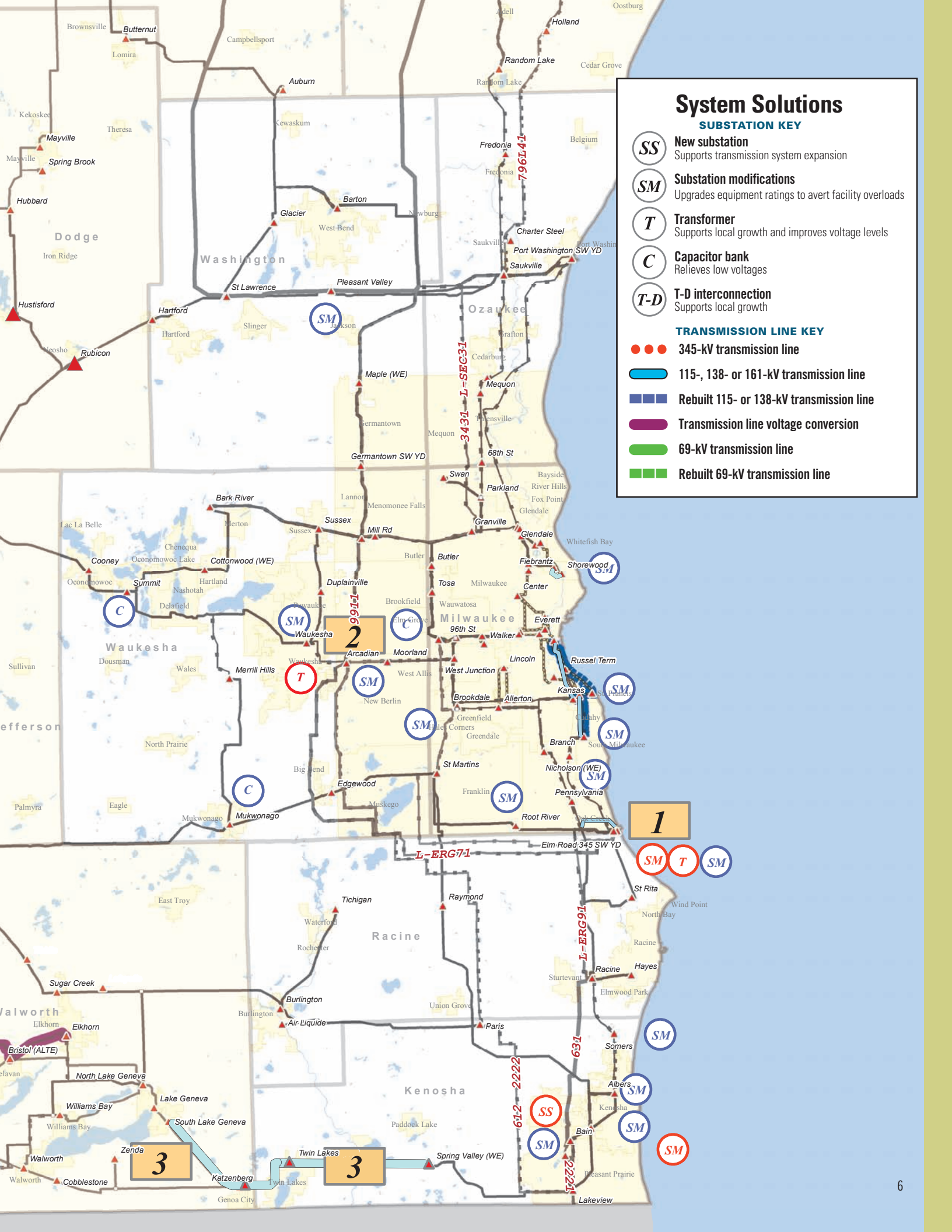


System Solutions Southeast Wisconsin – Zone 5



Our current plans in Zone 5 include 27 projects between 2008 and 2018, 11 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	Expand 345/230/138-kV substation at Oak Creek	2009	Accommodates new generation at Oak Creek Power Plant
	Provisional projects		
2	Replace two existing 345/138-kV transformers at Arcadian Substation with one 500 MVA transformer	2011	Relieves thermal overloads under contingency conditions
3	Spring Valley-Twin Lakes-South Lake Geneva 138-kV line	2018	Addresses overloads and low voltages



System Solutions

SUBSTATION KEY

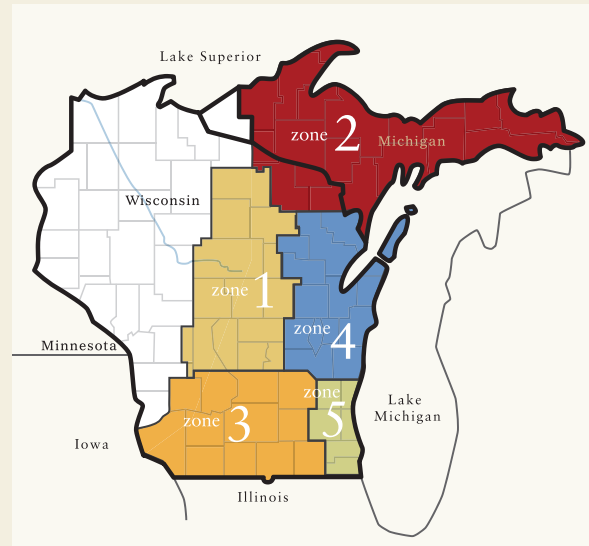
- SS** New substation
Supports transmission system expansion
- SM** Substation modifications
Upgrades equipment ratings to avert facility overloads
- T** Transformer
Supports local growth and improves voltage levels
- C** Capacitor bank
Relieves low voltages
- T-D** T-D interconnection
Supports local growth

TRANSMISSION LINE KEY

- 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

ATC AT A GLANCE

- Formed in 2001 as the first multi-state, **transmission-only utility.**
- Owner and operator of approximately **9,350 miles of transmission line and 500 substations.**
- Meeting electric needs of approximately **five million people.**
- Transmission facilities in **66 counties** in Wisconsin, Michigan and Illinois.
- **\$2.2 billion** in total assets.
- **Seven offices** in the communities of Cottage Grove, De Pere, Madison, Waukesha and Wausau, Wis.; Kingsford, Mich.; and Washington DC.



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.

www.atc10yearplan.com



Helping to **keep the lights on,**
businesses running and communities strong.

P.O. Box 47 ■ Waukesha, WI 53187-0047

Toll-free 866.899.3204 ■ 262.506.6700
www.atcllc.com