



Zone 5 overview

Zone 5 includes the Wisconsin counties of:

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

The physical boundaries of Zone 5 and transmission facilities located in Zone 5 are shown in [Figure ZS-26](#). Zone 5 encompasses southeast Wisconsin. Land use in Zone 5 is largely urban, though some agricultural uses exist.

The major population center in Zone 5 is the metropolitan Milwaukee area.

Zone 5 typically experiences peak demands 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.

Demographics

The population of the counties in Zone 5 grew at an annual rate of 0.5 percent from 1998 to 2008. The highest growth rate occurred in Washington County, while the largest increase in population occurred in Waukesha County, which increased about 32,000 people over the period.

Population in Zone 5 is projected to grow at 0.5 percent annually for the 2008 through 2019 period. Waukesha County is projected to realize the largest increase in population, while Washington County is projected to have the highest growth rate.

During the same period, the annual employment growth rate was 0.6 percent. The highest growth rate was in Kenosha County and the highest increase in employment occurred in Waukesha County.

Employment in Zone 5 is projected to grow at 0.9 percent annually between 2008 and 2019. Waukesha County is projected to realize the largest increase in employment, while Ozaukee County the highest growth rate.

Employment			
Annual Growth Rate			
	1998-2008		2008-2019
Zone 5	0.6	Zone 5	0.9
Kenosha, WI	2.1	Ozaukee, WI	1.6

Population			
Annual Growth Rate			
	1998-2008		2008-2019
Zone 5	0.5	Zone 5	0.5
Washington, WI	1.3	Washington, WI	1.6

Total Increase			
	1998-2008		2008-2019
Zone 5	72,400	Zone 5	127,610
Waukesha, WI	39,165	Waukesha, WI	44,211

Total Increase			
	1998-2008		2008-2019
Zone 5	86,959	Zone 5	115,739
Waukesha, WI	31,634	Waukesha, WI	60,878



Zone 5 environmental considerations

Zone 5 encompasses the southeastern portion of the state and is the most densely populated of the zones. The area lies in the Southern Lake Michigan Coastal and Southeast Glacial Plains ecological landscape regions. Most of the zone lies in the drainage basins of the Milwaukee, Root or Fox rivers. The Kettle Moraine State Forest lies in the western portions of the zone, and Lake Michigan forms its eastern boundary. Pre-settlement vegetation varied from prairie and oak savanna in the south, to southern mesic forest in the northern portions of the zone. Agricultural land uses are common throughout this zone.

Zone 5 electricity demand and generation

The coincident peak load forecasts for Zone 5 for 2010, 2014, 2019 and 2024 are shown in Table ZS-12. Existing generation, along with proposed generation based on projected in-service year, are also shown. The resultant capacity margins, with or without the proposed generation, are shown as well.

The table shows that load is projected to grow at roughly 1.7 percent annually from 2010 through 2019. Comparing load with generation (at maximum output) within the zone indicates that Zone 5 has less generation than load during peak load periods.

Zone 5 transmission system issues

Key transmission facilities in Zone 5 include:

- ❑ the southern portion of 345-kV lines from Point Beach and Edgewater,
- ❑ the Saukville, Arcadian, Granville, Oak Creek, and Racine 345/138-kV substations,
- ❑ the transmission lines emanating from the Pleasant Prairie and Oak Creek power plants,
- ❑ 230 kV facilities near Milwaukee, and
- ❑ a significant 138-kV network in the Milwaukee area, a portion of which is underground.

Key system performance issues in Zone 5 include:

- ❑ heavy flows on aging facilities,
- ❑ new generation projects expected to be placed in service in 2009 and 2010 that may influence the solutions to load-serving needs in the zone,
- ❑ heavy flows from the west (Zone 3) resulting in heavily loaded 138-kV facilities in the western portion of Zone 5,
- ❑ heavy market flows from the south, resulting in high 345- and 138-kV line loadings and the need to monitor potential multiple contingency conditions, and
- ❑ sagging voltage profile in portions of Washington, Waukesha and Jefferson counties.

The proposed rebuild of the Zoo interchange will necessitate some review of the existing 138-kV lines originating from the Bluemound Substation. This review could result in new projects within the next few years.

Oak Creek generation: We Energies has placed in service one 615-megawatt (net) coal powered generator in 2009 and another 615-megawatt (net) plant is under construction at Oak Creek with an



10-Year Assessment

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

2009

October 2009 10-Year Assessment
www.atc10yearplan.com

in-service date of 2010. The following projects have been or will be constructed as a result of this new generation.

2009 - Oak Creek generation Phase 1

The following projects were completed prior to the first Oak Creek generator being placed in service in 2009.

- Construct a new Oak Creek 345-kV switchyard to interconnect one new 615-megawatt (net) generator,
- Reconductor a segment of the Oak Creek-Ramsey 138-kV line,
- Terminate the Ramsey-Harbor line into the Kansas/Norwich substations creating a Kansas-Harbor 138-kV line and a Norwich-Ramsey 138-kV line,
- Reconductor the Oak Creek-Allerton 138-kV line,
- Replace current transformers at the Racine 345-kV Substation,
- Replace two 345-kV circuit breakers at Pleasant Prairie Substation on the Racine and Zion lines with IPO breakers and upgrade relaying, and
- Expand Oak Creek 138-kV switchyard to connect the 345/138-kV, 500 MVA transformer.

2010 - Oak Creek generation Phase 2

The second phase of new generation at Oak Creek is scheduled to be placed in service in 2010. The following projects will need to be completed prior to the second unit being placed in service.

- Expand 345-kV switchyard at Oak Creek Power Plant to interconnect a second new 615-megawatt (net) generator,
- Reconductor the Oak Creek-Root River 138-kV line,
- Upgrade terminal equipment and increase line clearances on the Oak Creek-Nicholson 138-kV line to permit operation at 230 degrees, and
- Increase line rating of the Kansas – Ramsey 138-kV line.

In response to customer requests for new distribution interconnections, new 138-kV bus sections were recently constructed at the Pleasant Valley, Shorewood and Brookdale Substations.