



## **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 2000 to 2010. The highest growth rate occurred in Washington County (1.3 percent), while the largest increase in population occurred in Waukesha County, which increased about 29,000 people over the period.

Population in Zone 5 is projected to grow at 0.5 percent annually for the 2010 through 2020 period. Waukesha County is projected to realize the largest increase in population of 55,500, while Washington County is projected to have the highest growth rate (1.7 percent).

During the same period, the annual employment growth rate was flat. The highest growth rate was in Washington County at 1.0 percent and the highest increase in employment occurred in Waukesha County (12,900).

Employment in Zone 5 is projected to grow at 0.8 percent annually between 2010 and 2020. Waukesha County is projected to realize the largest increase in employment of 36,700, while Washington County the highest growth rate (1.4 percent).



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Employment				Population			
Annual Growth Rate				Annual Growth Rate			
2000-2010		2010-2020		2000-2010		2010-2020	
Zone 5	0.0	Zone 5	0.8	Zone 5	0.5	Zone 5	0.5
Washington, WI	1.0	Washington, WI	1.4	Washington, WI	1.3	Washington, WI	1.7
Total Increase				Total Increase			
2000-2010		2010-2020		2000-2010		2010-2020	
Zone 5	1,697	Zone 5	103,406	Zone 5	91,927	Zone 5	108,000
Waukesha, WI	12,906	Waukesha, WI	36,723	Waukesha, WI	29,373	Waukesha, WI	55,540

### Zone 5 environmental considerations

Zone 5 encompasses the southeastern portion of the state and is the most densely populated planning zone. 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 2011, 2015, 2020 and 2025 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 1.0 percent annually from 2011 through 2020. 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.



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Key system performance issues in Zone 5 include:

- ❑ Heavy flows on aging facilities,
- ❑ New generation project expected to be placed in service in 2010
- ❑ 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 and to the south, resulting in high 345-kV and 138-kV line loadings and the need to monitor potential multiple contingency conditions, and
- ❑ Sagging voltage profile in portions of Washington and Waukesha counties.

Apart from the analysis performed in this Assessment, there are two major area events that can impact transmission plans in Zone 5. The proposed road rebuild of the Zoo interchange has been placed on hold. When the project is reactivated, it will be necessary to review some of the existing 138-kV lines originating from the Bluemound Substation. This analysis could result in new projects depending on the plan the Department of Transportation develops to rebuild the interchange.

The second impact concerns additional Oak Creek generation. We Energies currently has a 615-MW (net) coal powered generator in the final stages of construction at Oak Creek. This is the second unit of two units and is scheduled to go in to service in 2010. The following projects will be constructed as a result of this new generation:

- ❑ Expand 345-kV switchyard at Oak Creek Power Plant to interconnect a second new 615-MW (net) generator,
- ❑ Reconductor the Oak Creek-Root River 138-kV line (complete),
- ❑ Uprate 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 (complete).