



## Zone 4 overview

Zone 4 includes the Wisconsin counties of:

- ❑ Brown
- ❑ Calumet
- ❑ Dodge (northeast corner)
- ❑ Door
- ❑ Fond du Lac (eastern portion)
- ❑ Manitowoc
- ❑ Marinette (southern portion)
- ❑ Menominee, Mich. (southern portion)
- ❑ Menominee, Wis.
- ❑ Oconto
- ❑ Outagamie
- ❑ Kewaunee
- ❑ Shawano (eastern portion)
- ❑ Sheboygan
- ❑ Winnebago (eastern portion)

The physical boundaries of Zone 4 and transmission facilities located in Zone 4 are shown in [Figure ZS-25](#). Zone 4 land use is a mix of agricultural, forest and urban.

Major population centers in Zone 4 include Appleton, Green Bay, Fond du Lac, Sheboygan, Marinette/Menominee and Manitowoc.

Zone 4 typically experiences peak electric demands during the summer months, though the northern portion of Zone 4 typically experiences nearly equal summer and winter peaks. Paper mills and foundries in the metropolitan areas are some of the largest electricity users in the zone.

### *Demographics*

The population of the counties in Zone 4 grew at an annual rate of 0.6 percent from 1998 to 2008. The highest growth rate occurred in Calumet County, while the largest increase in population over the period occurred in Brown County, which increased 23,000 people.

Population in Zone 4 is projected to grow annually at 0.7 percent for the 2008 through 2019 period. Brown County is projected to realize the largest increase in population, while Calumet County the highest growth rate.

During the same period, the annual employment growth rate was 1.2 percent. The highest growth rate occurred in Calumet County. In addition, the largest increase in employment also occurred in Calumet County, which increased 26,400 employees.

Employment in Zone 4 is projected to grow at 1.0 percent annually for the 2008 to 2019 period. Calumet County is projected to realize the largest increase in employment, while Door County is projected to have the highest growth rate.



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2009

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Employment				Population			
Annual Growth Rate				Annual Growth Rate			
1998-2008		2008-2019		1998-2008		2008-2019	
Zone 4	1.2	Zone 4	1.0	Zone 4	0.6	Zone 4	0.7
Calumet, WI	3.6	Door, WI	1.3	Calumet, WI	1.3	Calumet, WI	1.3
Total Increase				Total Increase			
1998-2008		2008-2019		1998-2008		2008-2019	
Zone 4	85,066	Zone 4	84,882	Zone 4	64,531	Zone 4	82,870
Calumet, WI	26,384	Calumet, WI	21,838	Brown, WI	22,787	Brown, WI	23,634

### Zone 4 environmental considerations

Zone 4 includes lands in the Southeast Glacial Plains, Central and Northern Lake Michigan Coastal, and Northeast Sands ecological landscape regions.

The area drains towards Lake Michigan via the Milwaukee, Sheboygan, Manitowoc, Twin-Door-Kewaunee, Wolf and Lower Fox drainage basins. Lake Winnebago and the Fox Valley are located in the central part of this zone. The eastern boundary of the zone is formed by the shorelines of Lake Michigan and Green Bay. The Niagara Escarpment runs through the center of the zone and out the Door County Peninsula.

Portions of the Kettle Moraine State Forest and the Horicon National Wildlife Refuge are found in the southern end of the zone. Navarino State Wildlife Area and a segment of the Wolf River, classified as a Federal Wild and Scenic River, are located in the northwest part of the zone. Several Indian reservations are also located in this zone.

### Zone 4 electricity demand and generation

The coincident peak load forecasts for Zone 4 for 2010, 2014, 2019 and 2024 are shown in [Table ZS-11](#). 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.

This table shows that load is projected to grow at roughly 1.5 percent annually from 2010 through 2019. Comparing load with generation (at maximum output) within the zone indicates that Zone 4 has more generation than load during peak load periods. Actual operating experience indicates that during lighter load periods, Zone 4 is a net exporter of power.

### Zone 4 transmission system issues

Key transmission facilities in Zone 4 include:

- ❑ four 345-kV lines extending from the Kewaunee and Point Beach nuclear units, 138-kV network in the Fox River Valley/Green Bay area,
- ❑ two 345-kV lines extending from the Edgewater Power Plant,
- ❑ the eastern portion of the Gardner Park – Highway 22 345-kV circuit along with the Highway 22 – Werner West 345-kV circuit and the Werner West - North Appleton 345-kV circuit,
- ❑ 345-kV lines from South Fond du Lac to Columbia, Edgewater and Fitzgerald and



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- a 345-kV line from Fitzgerald to North Appleton.

Key system performance issues in Zone 4 include:

- heavily loaded and aging 138 and 69-kV facilities in the Green Bay area, north of Green Bay and the Fox River Valley,
- low voltages and heavily loaded 138/69-kV transformers in the northern Door County area,
- heavily loaded 138-kV lines west of Green Bay and Appleton,
- heavily loaded 69-kV facilities in the Oshkosh area and,
- the limited import capability of northeast Wisconsin and Michigan's Upper Peninsula, resulting in uneconomic dispatch of generating units.