



## Zone 4 overview

Zone 4 includes the counties of:

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

### *Historical and Projected Population*

The population of the counties in Zone 4 grew at an annual rate of 0.5% from 2001 to 2010. The highest growth rate occurred in Calumet County (1.0%), while the largest increase in population over the period occurred in Brown County, which increased about 19,500 people.



Population in Zone 4 is projected to grow annually at 0.7% for the 2011 through 2020 period. Outagamie County is projected to realize the largest increase in population (17,800), while Calumet County the highest growth rate of 1.3%.

*Historical and Projected Employment*

During the same period, the annual employment growth rate was 0.2%. The highest growth rate occurred in Calumet County (0.7%). In addition, the largest increase in employment also occurred in Brown County, which increased about 5,500 employees.

Employment in Zone 4 is projected to grow at 0.9% annually for the 2011 to 2020 period. Brown County is projected to realize the largest increase in employment of over 16,500, while Calumet County is projected to have the highest growth rate (1.4%).

<b>Employment</b>			
Annual Growth Rate			
2001-2010		2011-2020	
Zone 4	0.2	Zone 4	0.9
Calumet, WI	0.7	Calumet, WI	1.4
Total Increase			
2001-2010		2011-2020	
Zone 4	10,677	Zone 4	62,653
Brown, WI	5,537	Brown, WI	16,495

<b>Population</b>			
Annual Growth Rate			
2001-2010		2011-2020	
Zone 4	0.5	Zone 4	0.7
Calumet, WI	1.0	Calumet, WI	1.3
Total Increase			
2001-2010		2011-2020	
Zone 4	48,794	Zone 4	67,765
Brown, WI	19,520	Outagamie, WI	17,832

**Zone 4 Environment 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 2012, 2016, 2021 and 2026 are shown in Table ZS-11. The table also shows existing generation, proposed generation based on projected in-service year, and resultant capacity margins (with and without the proposed generation). This table shows that load in Zone 4 is projected to grow at roughly 0.67 percent annually from 2012 through 2021. 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,
- Four 345-kV lines connecting the Gardner Park, Werner West, Morgan, and Plains Substations,
- Two 345-kV lines from North Appleton to Werner West and Fitzgerald, and
- Three 345-kV lines connecting South Fond du Lac Substation to the Columbia, Edgewater and Fitzgerald Substations.

Key system performance issues in Zone 4 include:

- Asset renewal concerns for the 138 and 69-kV facilities in the Green Bay area, north of Green Bay, southern Door County, areas north and west of Manitowoc and the Fox River Valley area,
- Heavily loaded 138-kV lines west of Green Bay and Appleton, and
- Heavily loaded 69-kV facilities in the Oshkosh area
- Several provisional projects in past 10-Year Assessments found low voltage and thermal overload issues which did not appear in the 2011 Assessment. The provisional project in-service dates were retained for now until it can be determined in future assessments that these voltage and thermal issues no longer exist.