



Zone 1 overview

Zone 1 includes the Wisconsin counties of:

- ❑ Adams
- ❑ Forest (southwestern portion)
- ❑ Fond du Lac (northwest portion)
- ❑ Green Lake
- ❑ Juneau
- ❑ Langlade
- ❑ Lincoln
- ❑ Marathon
- ❑ Marquette
- ❑ Monroe (eastern portion)
- ❑ Oneida
- ❑ Portage
- ❑ Shawano (western portion)
- ❑ Vernon (eastern portion)
- ❑ Vilas (southern portion)
- ❑ Waupaca
- ❑ Waushara
- ❑ Winnebago (western portion)
- ❑ Wood

The physical boundaries of Zone 1 and transmission facilities located in Zone 1 are shown in [Figure ZS-22](#).

Land use in Zone 1 is largely rural, including agricultural and forested areas.

Zone 1 typically experiences peak electric demands during the summer months, with some winter peaks appearing in the northern portion. Primary electricity users in Zone 1 include a number of large paper mills and food processing plants.

Demographics

The population of the counties in Zone 1 grew at an annual rate of 0.3 percent from 1998 to 2008. The highest growth rate occurred in Adams County, which grew at 1.5 percent, while the highest increase in population occurred in Marathon County, which increased 6,000 people over the period.

Population in Zone 1 is projected to grow at 0.7 percent annually for the 2008 to 2019 period. Marathon County will realize the largest increase in population, while Adams County will have the highest growth rate.

During the historical period of 1998 to 2008, the annual employment growth rate was 1.0 percent. The highest growth rate occurred in Adams County, while the largest increase in employment occurred in Marathon County.



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Employment in Zone 1 is projected to grow at 1.0 percent annually between 2008 and 2019. From 2008 to 2019, Marathon County is projected to realize the largest increase in employment, while Adams County is projected to have the highest growth rate.

| Employment | | | | Population | | | |
|--------------------|-----|-----------|-----|--------------------|-----|-----------|-----|
| Annual Growth Rate | | | | Annual Growth Rate | | | |
| 1998-2008 | | 2008-2019 | | 1998-2008 | | 2008-2019 | |
| Zone 1 | 1.0 | Zone 1 | 1.0 | Zone 1 | 0.3 | Zone 1 | 0.7 |
| Adams, WI | 3.4 | Adams, WI | 2.1 | Adams, WI | 1.5 | Adams, WI | 2.1 |

| Total Increase | | | | Total Increase | | | |
|----------------|--------|--------------|--------|----------------|--------|--------------|--------|
| 1998-2008 | | 2008-2019 | | 1998-2008 | | 2008-2019 | |
| Zone 1 | 32,106 | Zone 1 | 36,234 | Zone 1 | 16,241 | Zone 1 | 38,458 |
| Marathon, WI | 14,357 | Marathon, WI | 9,625 | Marathon, WI | 6,065 | Marathon, WI | 8,489 |

Zone 1 environmental considerations

Zone 1 covers the central and north-central portions of Wisconsin and spans a wide range of ecological landscapes varying from the Northern Highland and North Central Forest regions in the northern part of the zone through the Forest Transition, Central Sand Plains and Central Sand Hills regions to the Western Coulee and Ridges region in the southern portions of the zone. Descriptions of the characteristics of each of these ecological landscapes may be found on the Wisconsin Department of Natural Resources Web site: <http://dnr.wi.gov/landscapes/>

The northern portion of the zone contains numerous lakes and woodlands, while the southern portion is more agricultural in nature. Lands in this zone primarily are located in the Upper and Central Wisconsin River drainage basins with smaller portions of the zone located in the Fox and Wolf River drainage basins. The Necedah and Fox River National Wildlife Refuges, a small portion of the Nicolet National Forest and several Indian reservations are located in this planning zone.

Zone 1 electricity demand and generation

The coincident peak load forecasts for Zone 1 for 2010, 2014, 2019 and 2024 are shown in Table ZS-8. Existing generation, along with proposed generation based on projected in-service year, also is shown. The resultant difference between load and generation, with or without the proposed generation, is shown as well.

The table shows that load is projected to grow at roughly 1.8 percent annually from 2010 through 2019. Comparing load with generation (at maximum output) within the zone indicates that Zone 1 is a net importer of power during peak load periods.

Zone 1 transmission system issues

Key system performance issues in Zone 1 include:

- ❑ the load serving capability and voltage stability of the 115-kV loop in northern Zone 1 (Rhineland Loop)
- ❑ the load serving capability of the 138-kV and 69-kV network in southern Zone 1
- ❑ the temporary overloading of 69-kV and 138-kV network lines along the interface with Xcel Energy and Dairyland Power Cooperative for the loss of either the King-Eau Claire, Eau Claire-



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Arpin or Arpin-Rocky Run 345-kV lines during high west-to-east transfer conditions. In particular, the Monroe County-Council Creek 69-kV line, the Hillsboro-Hilltop 69-kV line and the Lublin-Lakehead 69-kV line are susceptible to overload for loss of the King-Eau Claire or Eau Claire-Arpin 345-kV lines or loss of the Arpin-Rocky Run 345-kV line during high transfers. Additionally, for the loss of the Arpin-Rocky Run 345-kV line, the 138-kV system from Arpin to Port Edwards is susceptible to overloads. These overloads are mitigated through the use of a Special Protection System on the 138-kV network at Port Edwards Substation and overload tripping schemes on the 69-kV network at Council Creek and Hilltop Substation. With the Arrowhead-Stone Lake-Gardner Park 345-kV line in service and the commercial operation of Weston 4 generation during 2008, the Wien Special Protection System has been retired. However, the tripping of above mentioned lower voltage facilities strains the load serving capability of the network in Zone 1.

- A large generator was added in 2008 at the existing Weston generation station in the Wausau area. Generator interconnection studies indicated that additional 345-kV lines are required along with upgrades to existing lower voltage facilities. These reinforcements were recently implemented.