



Zone 2 Overview

Zone 2 includes the counties of:

- ❑ Alger, Mich.
- ❑ Baraga, Mich.
- ❑ Chippewa, Mich.
- ❑ Delta, Mich.
- ❑ Dickinson, Mich.
- ❑ Florence, Wis.
- ❑ Forest, Wis. (northern portion)
- ❑ Gogebic, Mich. (eastern portion)
- ❑ Houghton, Mich.
- ❑ Iron, Mich.
- ❑ Keweenaw, Mich.
- ❑ Luce, Mich.
- ❑ Mackinac, Mich.
- ❑ Marinette, Wis. (northern portion)
- ❑ Marquette, Mich.
- ❑ Menominee, Mich. (northern portion)
- ❑ Ontonagon, Mich. (eastern portion)
- ❑ Schoolcraft, Mich.
- ❑ Vilas, Wis. (northern portion)

The physical boundaries of Zone 2 and transmission facilities located in Zone 2 are shown in [Figure ZS-23](#).

Land use in Zone 2 is largely rural and heavily forested.

Zone 2 typically experiences peak electric demands during the winter months. Ore mining and paper mills are the largest electricity users in the zone.

Demographics

The population of the counties in Zone 2 experienced slightly negative growth from 1998 to 2008. The highest growth rate of 0.8 percent per year and the largest increase in population of 1,700 occurred in Vilas County.

Population in Zone 2 is projected to grow on an annual basis of 0.2 percent between 2008 and 2019. For the same period, Vilas County is projected to realize the largest increase in population, as well as the highest growth rate.

During the same period, the annual employment growth rate was 0.6 percent. The highest growth rate and the highest increase in employment occurred in Marquette County (Michigan).

Employment in Zone 2 is projected to grow at 0.8 percent annually between 2008 and 2019. During this time period, Marquette County (Michigan) is projected to realize the largest increase in employment, while Luce County (Michigan) is projected to have the highest growth rate.



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

Employment				Population			
Annual Growth Rate				Annual Growth Rate			
1998-2008		2008-2019		1998-2008		2008-2019	
Zone 2	0.6	Zone 2	0.8	Zone 2	-0.1	Zone 2	0.2
Marquette, MI	1.7	Luce, MI	1.6	Vilas, WI	0.8	Vilas, WI	0.7
Total Increase				Total Increase			
1998-2008		2008-2019		1998-2008		2008-2019	
Zone 2	10,525	Zone 2	17,030	Zone 2	-4,619	Zone 2	7,595
Marquette, MI	5,676	Marquette, MI	5,201	Vilas, WI	1,732	Vilas, WI	1,834

Zone 2 environmental considerations

Zone 2 includes a small part of the far northeast portion of Wisconsin and approximately the eastern two-thirds of the Upper Peninsula of Michigan. The Wisconsin portions of the zone fall into the Northeast Sands and North Central Forest ecological landscape regions. The portions of the zone located in Michigan are part of the Eastern Upper Peninsula eco-region. A description of the characteristics of the Eastern Upper Peninsula eco-region may be found on the Michigan Department of Environmental Quality Web page at http://www.michigan.gov/dnr/0,1607,7-153-10366_11865-31471--,00.html.

Large expanses of this zone are forested and there are large numbers of streams, lakes and wetlands throughout the zone. The Niagara Escarpment is situated in the Eastern Upper Peninsula. Lakes Superior, Huron and Michigan form the northern and eastern boundaries of the zone. Two Michigan State Natural Rivers (Fox and Two-Hearted) and nine National Wild and Scenic Rivers (Tahquamenon, Indian, Sturgeon, Whitefish, Yellow Dog, Ontonagon, Paint, Carp and North Sturgeon) are found in this zone. Portions of the Nicolet, Ottawa, and Hiawatha national forests, and numerous state forests and parks are found in this zone. Several Indian reservations are found in this zone. The Seney National Wildlife Area, Pictured Rocks National Lakeshore and numerous federal wilderness areas also are found in this zone.

Zone 2 electricity demand and generation

The coincident peak load forecasts for Zone 2 for 2010, 2014, 2019 and 2024 are shown in [Table ZS-9](#). Existing generation along with proposed generation based on projected in-service year also are shown. The resultant capacity margins, with or without the proposed generation, are shown as well.

This table shows that load is projected to decrease at roughly 0.6 percent annually from 2010 through 2019. Comparing load with generation (at maximum output) within the zone indicates that Zone 2 has more generation than peak load, though actual operating experience indicates that during most periods, Zone 2 is a net importer of power.

Zone 2 transmission system issues

Key transmission facilities in Zone 2 include:

- ❑ the Morgan-Plains and Plains-Dead River 345-kV lines,
- ❑ the Plains-Stiles 138-kV double-circuit line and



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

- the 138-kV facilities tying the Upper Peninsula of Michigan to the Lower Peninsula.

Transmission study drivers

An overriding general characteristic of the Zone 2 transmission system is the fact that it consists of load islands dispersed over a broad area and numerous components are near limits. Both the local and interconnecting components of this network have been generally adequate by historic standards, however, modern performance requirements, coupled with load increases or generation reductions of "modest" magnitudes could result in reinforcement needs. Furthermore, inability to immediately serve nominal growth or generation changes could emerge. This indicates the need for extensive Strategic Flexibility analysis including the varied internal and external factors. This is the basis for conducting the ATC Energy Collaborative – Michigan study process which constitutes the bulk of the Zone 2 analysis in this 10-Year Assessment.

Key system performance issues in Zone 2 include:

- proposed renewable generation source increases,
- proposed point load increases,
- proposed generation retirements,
- limited import and export capability,
- aging 69-kV and 138-kV infrastructure throughout the Upper Peninsula,
- generator stability at the Presque Isle Power Plant,
- parallel path flow around Lake Michigan that contributes to heavy loading on the 138-kV and 69-kV systems, and results in the need for transmission loading relief incidents and reconfiguration of the system,
- record low Lake Superior water levels in the last few years have resulted in potentially reduced hydro generation, output in the eastern U.P., magnifying reliability concerns in this area,
- low voltages, most pronounced in the western and eastern Upper Peninsula,
- potential low voltages and overloads in the northwestern U.P. due to recent load increases, and
- potential marginal voltages and overloads in the central U.P. due to *potential* load increases.

Please refer to the ATC Energy Collaborative – Michigan for more information on the application of strategic flexibility planning to Zone 2.