



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

Historical and Projected Population

The population of the counties in Zone 2 experienced slightly negative growth from 2001 to 2010. The highest growth rate of 0.2% per year and the largest increase in population of 1,100 occurred in Marquette County.

Population in Zone 2 is projected to grow on an annual basis of 0.2% between 2011 and 2020. For the same period, Vilas County is projected to realize the largest increase in population of about 1,300, as well as the highest growth rate (0.6%).



Historical and Projected Employment

During the same period, the annual employment also had a slightly negative growth rate was -0.4%. The highest growth rate and the highest increase in employment were in Marquette County (Michigan).

Employment in Zone 2 is projected to grow at 0.8% annually between 2011 and 2020. During this time period, Marquette County (Michigan) is projected to realize the largest increase in employment of over 3,800, while Luce County (Michigan) is projected to have the highest growth rate of 1.8%.

Employment			
Annual Growth Rate			
2001-2010		2011-2020	
Zone 2	-0.4	Zone 2	0.8
Marquette, MI	0.6	Luce, MI	1.8
Total Increase			
2001-2010		2011-2020	
Zone 2	-5,511	Zone 2	12,724
Marquette, MI	1,899	Marquette, MI	3,812

Population			
Annual Growth Rate			
2001-2010		2011-2020	
Zone 2	-0.3	Zone 2	0.2
Marquette, MI	0.2	Vilas, WI	0.6
Total Increase			
2001-2010		2011-2020	
Zone 2	-7,722	Zone 2	5,903
Marquette, MI	1,152	Vilas, WI	1,305

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 2012, 2016, 2021 and 2026 are shown in [Table ZS-9](#). 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 2 is projected to grow at roughly 0.59 percent annually from 2012 through 2021. 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:

- Morgan-Plains and Plains-Dead River 345-kV lines,
- Plains-Stiles 138-kV double-circuit line
- Conover-Plains 138-kV line, and
- 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, the inability to immediately serve nominal growth or generation changes could emerge. This indicates the need for extensive Strategic Flexibility analysis which requires the inclusion of varied internal and external factors.



Please note that more information on the need drivers and preliminary solution development is presented fully in the [ATC Energy Collaborative - Michigan](#) section. This section presents a strategic flexibility approach to the multiple factors emerging across the U.P. and the status of current studies. The solution development process utilized in the [ATC Energy Collaborative – Michigan](#), in addition to our ongoing studies, identified the area solutions to address various limitations based upon ATC’s [Planning criteria](#).

Key system performance issues in Zone 2 include:

- Connecting possible renewable generation sources,
- Serving possible point load increases,
- Anticipating possible generation retirements,
- Limited import and export capability,
- Aging 69-kV and 138-kV infrastructure throughout the Upper Peninsula,
- Generator stability in the central portion of Upper Peninsula,
- 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 previous years result in reduced available hydro generation output in the eastern U.P., magnifying reliability concerns in this area,
- High voltage concerns at lighter load periods for central and eastern Upper Peninsula,
- 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 and generation reductions.
- Several provisional projects in past 10-Year Assessments found low voltage and thermal overload issues which did not appear in the 2011 TYA. 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.

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