



Zone 4 - 2010 study results

Refer to [Table ZS-1](#) and [Figure ZS-13](#)

Summary of key findings

- By 2010, the recently completed construction of the new 345-kV line from Morgan to Werner West will significantly increase transfer capability between Wisconsin and the Upper Peninsula, avert overloads in and around the Green Bay area, improve 138-kV voltage profiles in the Fox Valley and Green Bay areas and significantly lower system losses.

As noted in the Northern Umbrella Plan discussion in previous 10-Year Assessments, the most chronic problem plaguing day-to-day operation of ATC's transmission system is the limited transfer capability during non-peak periods between Wisconsin and Michigan's Upper Peninsula. The resulting effects include:

- uneconomic dispatch of generation,
- interruption or curtailment of transmission service,
- operating near thermal and voltage limits for extended periods of time and
- limited ability to schedule maintenance without invoking redispatch, system reconfiguration or other measures.

Most of the solutions discussed in earlier 10-Year Assessments are already in-service. Those are:

- rebuilding the Morgan-Falls-Pioneer-Stiles 138-kV line (2005),
- rebuilding the Plains-Amberg 138-kV line (2005),
- rebuilding/converting the West Marinette-Amberg 69-kV line to 138 kV (2005),
- rebuilding the Amberg-Crivitz-Stiles 138-kV line (2006), and
- constructing a 345/138-kV Substation at Werner West (2006).

As discussed in the 2008 10-Year Assessment, the following projects have been planned as longer-term solutions to the Zone 4 issues as discussed above:

- construct a new 345/138-kV substation at Werner West (in service 2006),
- construct a Cranberry-Conover 115-kV line (in service 2007),
- rebuild and convert the Conover-Plains 69-kV line to 138-kV (2008 to 2010), and
- and
- construct a new Morgan-Highway 22-Werner West 345-kV line (in service 2009).

The recently completed Morgan-Werner West 345-kV line will aid the transmission system by reducing the south to north loading on the 138-kV lines through the Green Bay area, thus deferring or eliminating the need for numerous 138-kV transmission line upgrades/rebuilds in and around Green Bay. The planned project will also provide the extra transmission capacity needed to fully utilize the upgrades to the Wisconsin-Upper Peninsula transmission corridor which are scheduled to be completed before this project (i.e., Plains-Stiles and Cranberry-Conover).

The recently completed Clintonville-Werner West 138-kV line was strung primarily on Morgan-Highway 22 345-kV line structures. This project will provide significant system benefits. These benefits include additional reduced loading on the Highway V-Preble-Tower Drive 138-kV line, the North Appleton-Lawn Road-White Clay 138-kV line, the Badger 138/115-kV transformer, the



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

Badger-Caroline 115-kV line and facilitating a future de-energized rebuild of the Pulliam-Stiles double-circuit 138-kV line, which would not be possible under current system conditions. In addition, the Clintonville-Werner West line will provide a second 138-kV source to the city of Clintonville.

Because the non-coincident nature of the load in northern Door County usually does not occur during ATC's typical system peak, two additional 1.2 MVAR distribution capacitor banks were placed in service at the Sister Bay 69/24.9-kV Substation in 2008. The addition of these capacitor banks bolsters the voltages in the area under normal and single-contingency conditions until longer term solutions are in place (See Zone 4 – 2014 study results for details regarding the long-term plan).

As discussed in earlier Assessments, the rebuild of the Sunset Point-Pearl Avenue 69-kV line would address the potential overload of the circuit under single-contingency conditions. The project is currently planned for 2011 in-service date.

Installing a second 138-kV reserve auxiliary transformer at Kewaunee and removing the existing tertiary auxiliary transformer (TAT) load from the Kewaunee 345/138-kV transformer is proposed for 2009. Implementing the project will increase the offsite power reliability and provide better operations and maintenance flexibility.

Projects whose "Need date" precedes the "In-service date"

None

Projects whose "In-service date" precedes the "Need date"

None