



Load sensitivity analysis

The analysis that we perform for each 10-Year Assessment is based on power flow analysis using specific load forecast assumptions. The load forecast assumes there is some probability of exceeding the load forecast on the peak day. A traditional practice for generation and transmission planning in Wisconsin has been to use a load forecast probability of 50 percent (also known as a 50/50 forecast). This means that there is a 50 percent chance that the actual system peak load will exceed the forecasted value in any given year or, to state it another way, it is expected that on the average the forecast will be exceeded once every two years. The problem with analysis based on the traditional method is that it does not indicate the reliability risk of the actual system peak exceeding the forecasted value. The question then is, what is the risk to reliable system operation in the ATC footprint if the forecast is exceeded and what, if anything, should be done to mitigate some or all of the risk?

One way to assess this risk is to increase the load forecast and determine whether or not ATC's proposed projects can reliably serve this increased electricity usage. To accomplish this purpose, some utilities use a 90/10 forecast¹, as opposed to the 50/50 forecast. ATC has relied on its customers to provide the load forecasts for our analysis, so we currently do not have a 90/10 forecast available for the risk assessment in the 2009 Assessment. However, general discussions have found that a 5 percent increase in certain peak loads may be a reasonable assumption for a 90/10 versus a 50/50 forecast. Therefore, for the 2009 Assessment, ATC used a 5 percent increase in certain peak loads as a proxy for the higher 90/10 forecast.

ATC applied a 5 percent increase to scalable² peak hour loads in the power flow models representing the year 2014. In Zones 1, 3, 4 and 5, ATC found that the increased load did not have a significant impact on the need for projects. While we did not see that the increased load had a major impact on voltages, we did see areas where voltage is expected to be marginal for the 5 percent increased forecast. These voltages will need to be considered more carefully to determine if any mitigation should be considered for higher than expected load.

In Zone 2, ATC found that the increased load did have a significant impact on the need for proposed projects. To address this and other area needs, ATC has completed an Energy Collaborative discussion in Zone 2 to identify reasonable futures and drivers that should be considered in developing appropriate plans for Zone 2. Table ZS-2 compares the results of the 50/50 and proxy 90/10 analyses for 2014 for Zones 1-5.

We saw some additional areas where previously marginal voltage worsened and/or thermal overloads were aggravated as loads increased. In Zone 3, the in-service dates of at least three projects become more critical if loads are higher than expected:

- ❑ Bass Creek 138/69-kV transformer and Bass Creek-Town Line Road 138-kV rebuild (2013),

¹ A 90/10 forecast generally means that there is a 90 percent chance that the load will be less than the forecasted value. Thus, a load based on a 90/10 forecast load would be higher than a load based on a 50/50 forecast where there is only a 50 percent chance that the load will be less than the forecasted value

² Scalable means that these loads follow some predictable load cycle pattern throughout the year that may or may be sensitive to extreme weather conditions.



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
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- ❑ Uprate Fitchburg-Nine Springs and Royster-Pflaum 69-kV lines, move AGA to Femrite-Royster 69-kV line and install Nine Springs capacitor bank (2013), and
- ❑ Horicon (Hubbard)-East Beaver Dam 138-kV line (2019).

Futures (2019)

ATC planning decided to explore the impact of using a security constrained economic dispatch (SCED), in addition to a merit order dispatch, in its reliability analyses. To do this, output from the PROMOD model for the peak load hour from ATC's 2018 Slow Growth and DOE 20% Wind Futures was provided. Please refer to the Methodology & Assumptions section for descriptions of these Futures. This output included ATC's total load, flows on all of ATC's tie lines, and dispatch of all of the generators within our footprint for the peak hour in each of the two futures. The PROMOD Analysis Tool (PAT) was used to extract the data. This extracted PROMOD data was then incorporated into 2018 summer peak load flow models for study purposes. A summary of the data provided from PROMOD/PAT is listed below.

PROMOD simulates random forced outages of generators and these are also listed for each future. PROMOD models for ATC's futures are developed from MISO models. MISO added some wind plants within the ATC footprint to its 20% DOE PROMOD model to achieve the mandate. The total amount of wind power added by MISO to its 20% DOE PROMOD model and dispatched on peak within ATC is listed below. Table ZS-3a lists the impact of the 20% Wind and Slow Growth futures vs. our typical 50/50 Summer Peak models for Zones 1-5.

At this time, ATC is not proposing to advance any project timings to anticipate higher loads, potential futures or load growth. However, we will continue to evaluate these conditions in future Assessments.