

Report on Electric Reliability in Dane County

The Energy Initiative includes representatives from the following organizations:

1000 Friends of Wisconsin protects and enhances Wisconsin's urban and rural landscapes by providing citizens with the inspiration, information and tools they need to effectively participate in the decisions that have the greatest impact on community health: where we live, work, learn, play and how we get from one place to another.

American Transmission Company, formed in 2001, is a utility which owns and operates the high voltage electric transmission lines previously owned by other Wisconsin electric utilities.

Citizens Utility Board is a member-supported nonprofit organization that advocates for reliable and affordable utility service and that represents the interests of residential, farm, and small business customers of electric, natural gas, and telecommunication utilities before regulatory agencies, the legislature, and the courts.

Madison Gas and Electric Company provides electricity and natural gas to Madison and other nearby communities.

Midwest Renewable Energy Association is a nonprofit network for sharing ideas, resources, and information with individuals, businesses, and communities to promote a sustainable future through renewable energy and energy efficiency.

MSB Energy Associates offers comprehensive energy consulting services for businesses, federal and state government agencies, consumer and environmental organizations and utilities.

RENEW Wisconsin advances a sustainable energy future through public policy and private sector initiatives.

Wisconsin Energy Conservation Corporation is a nonprofit organization that creates and implements energy savings programs for a wide variety of clients—utilities, municipalities, regulatory commissions, weatherization providers, and consumer and environmental groups in the United States and Canada.

Wisconsin Power & Light provides electricity and natural gas in Dane County and central and southern Wisconsin. WP&L is a subsidiary of Alliant Energy Corporation

Wisconsin Public Power Inc. is a statewide power company owned by 37 municipalities that operate electric utilities. These community-owned utilities purchase all of their electric requirements from WPPI and supply power to more than 141,000 homes and businesses throughout Wisconsin.

Executive Summary

The reliability of electric service in Dane County is heavily dependent on the condition of the high voltage electric transmission network in and around the area. The Energy Initiative (EI) was formed in 2003 to evaluate energy needs and plans for new electric transmission lines in Dane County. To our knowledge, this is the first time that Wisconsin utilities, public advocacy organizations, and environmental groups have worked together, in a cooperative environment, to analyze the need for electricity in Dane County and to make recommendations regarding the best options for meeting this need.

Because new transmission lines have landowner, community, environmental and aesthetic impacts, the need for new lines must be clearly established before the routing and siting process begins. Members of the EI looked at forecasts of the demand for electricity in Dane County through 2020. Next, the EI analyzed whether new transmission lines and non-transmission alternatives, such as energy efficiency, demand management, distributed generation (small power plants), large power plants, renewable energy, or a combination of measures could best meet the future need for electricity in Dane County.

The Energy Initiative concludes that, barring a change in electricity consumption or other unforeseen circumstances, a major new transmission line will be needed in Dane County by 2011 and every few years thereafter to keep pace with growing electricity usage. Energy efficiency, demand management, and distributed generation represent positive options that should be pursued on their own merits, even though they are probably unable to offset the need to build some of the new transmission facilities. The EI concludes that state and regional electricity needs are also likely to influence whether new transmission lines are built in Dane County.

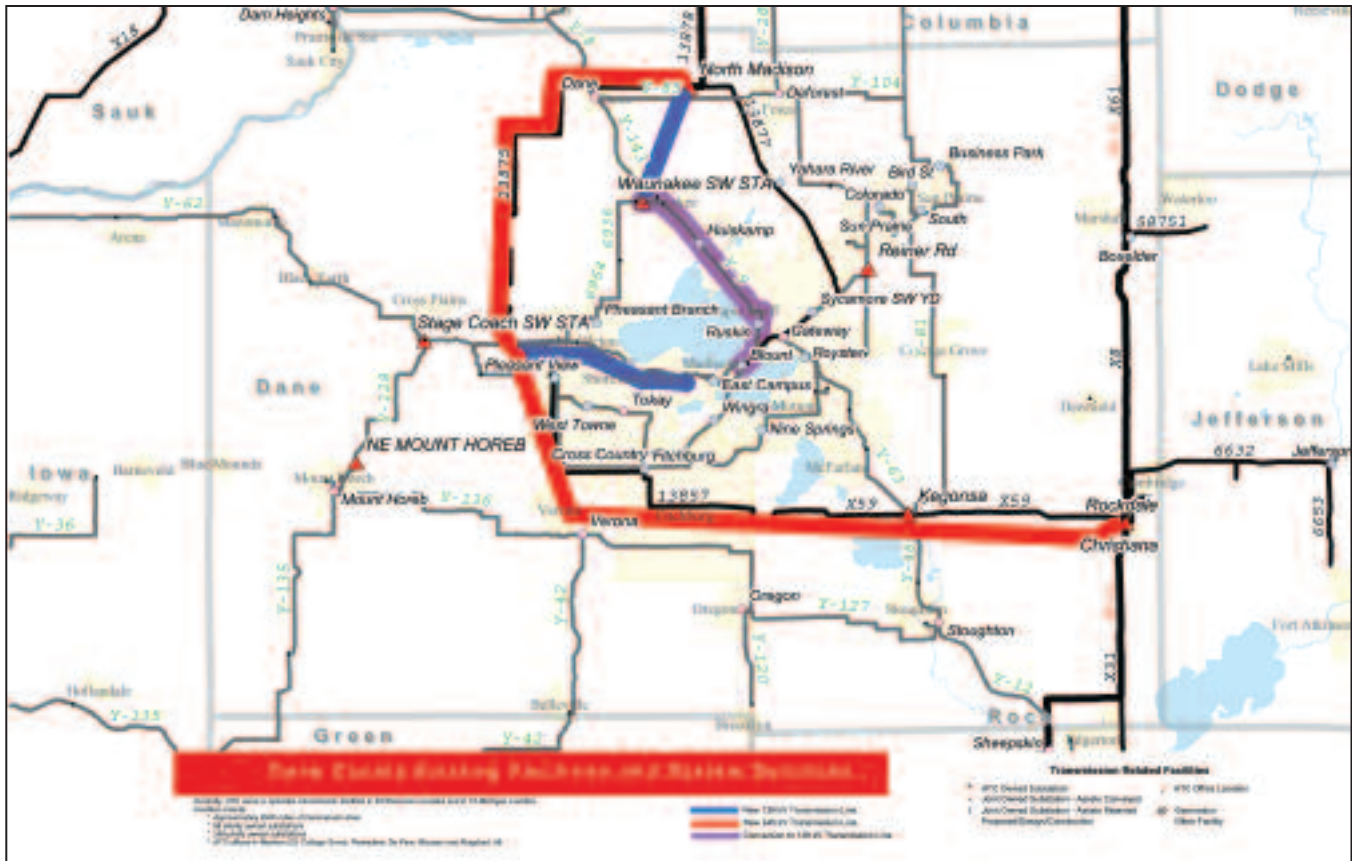
The EI's analysis of the transmission system in Dane County through 2020 reveals a weak system that is becoming increasingly vulnerable to widespread outages for a variety of conditions. Increasing demand for electricity, especially in the rapidly developing areas south and west of Madison, is the primary reason for stressing the transmission system. The rapid increase in electricity usage, caused by new residential and commercial development as well as increased electricity use by each customer, will soon exceed the transmission system's capacity, despite the recent addition of numerous upgrades.

While the initial analysis of non-transmission alternatives suggests a limited ability to mitigate or defer several near-term transmission projects, the EI recommends aggressive efforts toward energy efficiency, demand management, and distributed generation because they can provide substantial financial, environmental and societal benefits regardless of whether they can defer or avoid new transmission lines in Dane County.

Indeed, unless new efforts toward energy efficiency, demand management, and distributed generation are aggressively pursued now, continued growth in electricity usage will likely require additional transmission lines and improvements beyond those considered by the EI. Such action now could help defer or possibly avoid future transmission line projects, which take between 7 and 10 years to plan, route, permit, and construct.

Through this effort, the EI sought to ensure proper consideration of needs and alternatives early in the planning process while time was available to adjust course. Based on our experience working together, the EI is providing the following recommendations for improving energy planning at the state level.

- **Energy Planning.** There is a compelling need to create a comprehensive energy planning process where potential measures, including transmission, energy efficiency, demand management, and large and small power plants are considered together (the goal is not to recreate the process known as the "advance plan"). The EI supports the ongoing efforts by the Public Service Commission of Wisconsin to strengthen its planning process.
- **Involvement.** Energy stakeholders have different abilities, resources, and responsibilities; cooperation and coordination are the best ways to ensure that the best mix of energy measures are pursued in a timely manner.
- **Resources.** Stakeholders proposing non-transmission alternatives need time and resources to effectively participate in any planning process.
- **Outreach.** The EI recommends that energy planners work closely with communities as Smart Growth plans are developed, so that local governments and citizens are better able to provide input to the design of appropriate energy infrastructure.



Substantial new right-of-way will be needed for some of these projects. Above is a map that shows the general areas within Dane County in which the proposed projects would likely occur.

Scope and Timing of Transmission Improvements

The scope of the transmission improvements that would be necessary to reinforce the reliability of the existing Dane County transmission system given expected demand growth would include a series of four major projects:

- A new 138 kV transmission line from the North Madison substation to the Waukelee substation is needed immediately, with a planned in-service date of 2008.
- A new 345 kV transmission line from the Rockdale substation to the West Middleton substation will be needed to back up critical facilities and reduce vulnerability of the network to widespread outages, with a planned in-service date of 2011.
- A new 345 kV transmission line from the West Middleton substation to the North Madison substation will be needed to reduce vulnerability of the network to widespread outages, with a planned in-service date of 2015.
- A new 138 kV transmission line from the West Middleton substation to the Blount Street substation will be needed to maintain adequate reliability of the system, with a planned in-service date of 2015.

Future Reliability of the Dane County Electric System

The EI concludes that there is a clear need to take significant action soon to ensure the reliability of the energy delivery system in Dane County. This conclusion is based on a technical analysis of electric demand forecasts and modeling of different system scenarios and solutions. The highlights of this analysis are listed below.

- Load in Dane county is estimated to grow by approximately 3.75 percent per year
- Even if estimated load growth turns out to be one percent lower than is currently forecast, the need to reinforce the system will only be delayed by about two years.
- The existing Dane County transmission system will become increasingly vulnerable to widespread outages, especially after 2011.

Other Considerations Affecting Future Transmission Projects

The EI's analysis of the potential need for future transmission improvements focused on the reliability needs in Dane County. However, there are broader system and policy aspects that further augment the basis for new high voltage transmission lines in Dane County. The four most prominent aspects are:

- Increased ability to import more power into Wisconsin
- Increased ability to transfer power within Wisconsin
- Access to lower cost power
- Emergence of a Midwest electricity market

Alternatives to Proposed Transmission Lines

In its analysis, the EI sought to consider a range of options and alternatives to the transmission package identified above.

Transmission Alternatives

- Low-voltage transmission improvements only
- 345 kV line directly to Blount Street Power Plant

Supply-side Alternatives

- Large generation
- Distributed generation including renewable energy

Demand-side Alternatives

- Load management
- Energy efficiency

Integrated Set of Alternatives

The Energy Initiative concludes that, barring a change in electricity consumption or other unforeseen circumstances, a major new transmission line will be needed in Dane county by 2011 and every few years thereafter to keep pace with growing electricity usage. Energy efficiency, demand management, and distributed generation represent positive options that should be pursued on their own merits, even though they are probably unable to offset the need to build some of the new transmission facilities. The EI also concludes that state and regional electricity needs are also likely to influence whether new transmission lines are built in Dane County.

While the initial analysis of non-transmission alternatives suggests a limited ability to mitigate or defer several near-term transmission projects, the EI recommends aggressive efforts toward energy efficiency, demand management, and distributed generation because they can provide substantial financial, environmental and societal benefits regardless of whether they can defer or avoid new transmission lines in Dane County.