



**GREAT
RIVER
ENERGY™**

Grid modernization initiative

12300 Elm Creek Boulevard • Maple Grove, Minnesota 55369-4718 • 763-445-5000 • greatriverenergy.com

Background

Interest in new power generation sources, energy efficiency, distributed energy resources and a constant stream of new technologies that make life easier continue to reshape the electric utility industry. As costs for residential and utility-scale solar energy, wind energy, energy storage, LED lights and other technologies steadily decrease, the industry continues to move from the centralized power system of yesterday to a system where energy resources are more distributed and intermittent. Consumers accustomed to using smart devices to easily interact with people and service providers in every area of their lives now want options and the same ease of interaction from their electric cooperative. Electric cooperatives are working with stakeholders around the country to bring the electric grid to a place where it can meet members' needs, take advantage of advanced technologies and meet public policy goals such as those related to renewable energy and energy efficiency.

Our position

Great River Energy and its members are excited about the opportunities our changing industry provides. We continue to find innovative solutions and lead the pursuit of technologies and resources that will allow us to better use the grid and serve our members in new ways. While the rapid pace of change poses challenges, they are challenges Great River Energy and its members are well positioned to meet -- we have been laying the groundwork for years. In our future, we see a transformed energy system that we helped shape, and it is more resilient, reliable, affordable and cleaner than it ever has been before.

Shaping our future together

Our cooperative business model enables us to work in the best interest of our members. Together, Great River Energy and its members are transforming our electric system and developing a shared vision of the future through an effort we call our grid modernization initiative. This process is being facilitated by a Great River Energy-member committee created in 2014 to enable collaboration among us with respect to markets, consumers and technology. Our unique grid modernization initiative is being recognized around the country by thought leaders and other cooperatives as a powerful method for finding the best path forward. Through this initiative and information-sharing groups already in place, we are planning, evaluating new technologies, learning from industry peers and leading conversations with other innovators to ensure the best future for our members and our industry.

Technology advancements

Great River Energy and its members are well into updating critical systems and implementing new technologies for metering, telecommunications, demand response management and meter data management. The two-way flow of information and data enabled by these technologies can allow members to do things that are otherwise not possible, such as monitor their energy bill daily, or sell excess power into the electric system from solar panels on their home. Because much of the grid's infrastructure is dated or nearing obsolescence, now is the time to invest in systems that offer advanced capabilities that will make our electric grid more agile and responsive, and create countless options for serving our members in new ways.

Leadership and innovation

For years Great River Energy and its members have been driving major industry initiatives, demonstrating new technologies and educating stakeholders through pilot projects. A few examples:

Solar pilot projects: In 2014 and 2015, Great River Energy launched a significant pilot project, installing 20-kilowatt solar installations at its headquarters and at 19 member sites to evaluate solar energy's performance, maintenance requirements and impact on the grid. Several Great River Energy member cooperatives have installed community solar gardens for their members.

Electric vehicle program: Recognizing growing momentum for the electrification of Minnesota's economy, Great River Energy and its members developed Revolt™, a program that offers renewable energy credits for the expected life of an electric vehicle at no additional cost. Several of our member cooperatives offer special EV rates and rebates for the installation of special chargers.

Community Storage Initiative: Great River Energy was a founding member of the Community Storage Initiative, a group of utility sector businesses and nonprofit organizations focused on wide-scale implementation of energy storage technologies. Great River Energy and its member cooperatives have long offered community storage programs, such as our electric thermal storage water heating program.

Demand response management system: Great River Energy and its members can reduce demand for electricity during periods of heightened market prices by strategically suspending service to certain loads, helping minimize electricity purchases during the most expensive periods. Great River Energy is replacing its outdated demand response management system with a more advanced version, which will allow for fine-tuning of demand response and meet our members' needs.

Meter data management pilot projects: Great River Energy and two member cooperatives conducted a meter data management pilot project that uncovered a wide variety of business applications, including monitoring line losses, monitoring transformer losses, identifying power theft and analyzing energy data.

Data analytics pilot projects: Great River Energy and its members are in the midst of researching and testing new data analytics capabilities for three purposes: identifying distribution line losses, assessing cycled air conditioning programs and enabling timelier financial ratio comparisons.

CapX2020: Great River Energy was a founder and leader of CapX2020, the largest electric grid expansion in the Upper Midwest in decades. CapX2020 improved the reliability of the region's grid, opened new pathways for renewable energy and developed a collaborative business model others can emulate.

GridBallast research: Great River Energy and one of its members are participants in this grid reliability research project led by the National Rural Electric Cooperative Association and funded by the U.S. Department of Energy. The project involves creating a water heater controller and a smart circuit breaker capable of controlling plug-in appliances. The goal is to make load management an inherent part of grid operations versus a central control action, which is currently how demand response programs are managed.

Conservation voltage reduction pilot projects: Great River Energy and its members are researching uses for conservation voltage reduction to decrease energy use, lessen peak loads and reduce demand charges while continuing to serve their members within established voltage parameters.

Grid security and compliance: Great River Energy works with utilities, government agencies and others to address the rising risk of cyber attacks. We participate in industry organizations and work with the North American Electric Reliability Corporation and the U.S. Department of Energy to ensure compliance with reliability standards and preparedness against natural disasters, vandalism and other threats.