



Technology is advancing in every area of our lives. Xcel Energy is modernizing our electric distribution grid and grid management operations through our Advanced Grid Initiative. The next generation of our energy grid—the advanced grid — will help us serve our customers better. Xcel Energy will install smart meters at customer homes over the next five years as part of building the advanced grid. A key result of this effort will be more of what customers expect from Xcel Energy — clean, reliable energy, and new ways to save money. Customers expect more from their energy partners. The Advanced Grid Initiative is essential to deliver the customer benefits and experiences by enhancing and enabling emerging experiences, providing more options for customers, and by dramatically improving Xcel Energy’s ability to deliver on the fundamentals customers already expect.

The Advanced Grid Initiative works in conjunction with many other Xcel Energy teams, such as the Customer Experience Transformation, Customer Solutions, and Customer Care teams, to improve our customers’ experiences. As we gather more detailed information about our customers’ energy usage and the electric distribution system, this information is then used to offer new products and services that help customers’ keep their bills low, improve outage restoration, provide more accurate notifications about energy usage, and offer customers more details about their bills. Without the Advanced Grid Initiative, many of these efforts would be less effective or impossible to offer our customers.

Safety, cyber and physical security are core values at Xcel Energy. We take safety and security seriously within the Advanced Grid Initiative and with our customers.

The Advanced Grid Initiative will provide us with more tools to ensure the energy we supply to our customers continues to be reliable and safe for everyone.

Protecting our customers data is extremely important to us. We use multiple layers of defense to ensure all data is secure and protected. Customer data can only be accessed by authorized third-parties where customers have provided consent to share their information.

These robust security protocols ensure that customers data is safe and secure.

KEY TERMS

Advanced Metering Infrastructure program

State-of-the-art hardware and software take interval meter data measurements to provide deeper insights about customers’ energy use. With more data, we’ll be able to predict which devices and systems are using the most energy for any given customer. Xcel Energy can make that data available to program managers, sales representatives, or customers through the new customer web portals and mobile applications. We will have wi-fi in the meter itself, a first for any major utility, and a secure, two-way, wireless communications network bringing information back to our systems. Distributed Intelligence is a little computer inside the meter that can use the detailed information using apps loaded onto the meter, similar to the apps on a smart phone.

Field Area Network program

The two-way communications network that allows the secure flow of data between Xcel Energy, smart meters, and devices on the electric distribution grid.

Grid Visibility and Control program

Grid Visibility and Control program (GV&C) includes three projects:

1. the **Advanced Distribution Management System (ADMS)**, a real-time operating system that enables enhanced visibility into the distribution power grid, which controls advanced field devices, and ensures that Xcel Energy is positioned to support increased power demands. For customers, ADMS is central to delivering the things that matter to them about the future of energy use: more stable, high-quality power; greater integration of distributed energy sources; and more efficient use of currently available energy which curbs the need for costly new large-scale generation.
2. **Integrated Volt-VAR Optimization**, the automated function of ADMS that supports higher-quality, more efficient power delivery.
3. **Fault Location, Isolation, and Service Restoration**, provides better outage response and, in some instances, outage avoidance.

ADVANCED GRID AND CUSTOMER EXPERIENCE

WEB AND MOBILE APPS

<p>Notifications and Alerts</p> 	<p>With granular usage information and more real-time communications capabilities, we will be able to provide customers with more relevant, proactive, personalized information through the channels they prefer, driving impacts through experiences from outages, bill pay, to demand response and demand management.</p>
<p>Green Button Connect</p> 	<p>This service allows customers to automatically share their energy usage data with third parties that offer a variety of energy management services that can help customers keep their bills low.</p>
<p>Home Area Network</p> 	<p>Smart meters send energy usage information through a customer’s wi-fi to their devices, so they can see their near-real time energy use.</p>
<p>Disaggregation</p> 	<p>The process of analyzing usage data to determine which customer appliances and other loads are using energy and their usage patterns. Smart meter interval data will greatly enhance this capability. Xcel Energy will provide these insights to our customers to help them make better decisions about their energy usage. Later, our Distributed Intelligence platform will extend the potential accuracy and uses.</p>
<p>Virtual Submetering</p> 	<p>Distributed energy resources (DER), such as roof top solar, battery storage, and electric vehicle (EV) charging stations are becoming more prolific on the electric distribution grid. Today, customers with any of these items require multiple meters. Submetering is measuring specific load(s) using a separate meter, usually to facilitate special rates, such as for water heating. It is also used for measuring distributed generation production, such as rooftop solar. Virtual submetering is the concept of measuring such loads by disaggregating the facilities total energy usage, which would enable submetering capabilities without the need to add an additional meter to the home.</p>
<p>Time of Use Pricing</p> 	<p>Charges customers for their energy use based on the time of day it is used. We can provide guidance to customers regarding when to use energy through price signals to help customers manage their bills while striving to achieve our carbon reduction goals. It is coming to Minnesota as a pilot and to Colorado as the new default residential rate.</p>

CUSTOMER EXPERIENCE ENHANCEMENTS ENABLED BY THE ADVANCED GRID INITIATIVE

<p>Smart Safety Disconnect</p> 	<p>Detects when a smart inverter malfunctions or was improperly installed and has not disconnected from the grid when incoming power has been lost. In this situation, the disconnect inside the meter is automatically tripped to protect the rest of the grid and the customer.</p>
<p>Smart Premise Restoration</p> 	<p>Restore power to various devices in a sequential order inside a home or business after an outage to reduce the likelihood of voltage or overloading issues, protecting customer system performance as power is restored.</p>
<p>Enhanced Control Options for Behind the Meter Systems</p> 	<p>AMI meters will be able to communicate more seamlessly with devices and systems within the customer premises. From smart homes to intelligent buildings, customers can use this capability to participate in demand response programs as well as to manage facility energy consumption in a more accurate and robust way.</p>

Keep bills low Enhance the customer experience Lead the clean energy transition

