



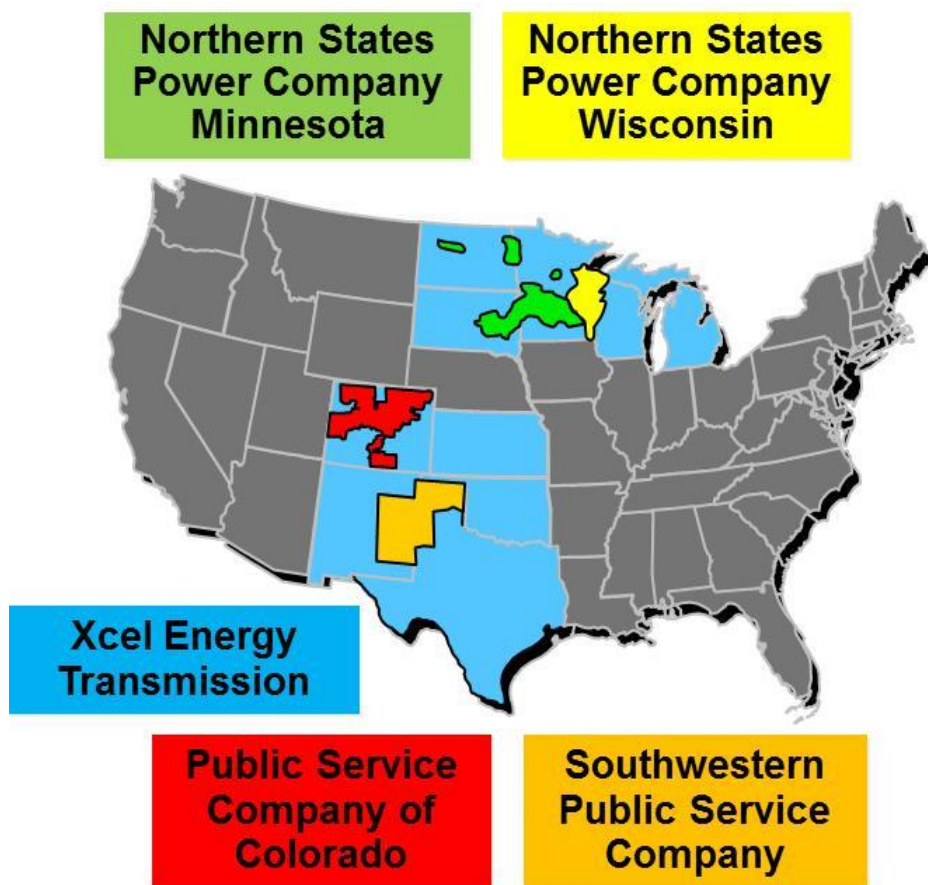
Advanced Grid

Intelligence and Security

Midwest Governors' Association
October 30, 2017



Xcel Energy Service Area



- 4 operating companies spanning 8 states
- 3 time zones
- 8 Public Utility Commissions
- Diverse population densities
- Dramatically different geography and weather conditions
- 3.5M Electric customers
- 2,900 Feeders

Utility Industry Perspective

- Competitive landscape
- Increasing customer expectations
- Advanced Grid
- Aging infrastructure
- Changing rules & regulations



Energy Industry Perspective

- 80% Decrease in solar price from 2008 to 2015
- 85% Increase in energy-related competition by 2030
- Decreasing electricity demand (per customer)
- Distributed Energy Resources (DER), emerging technologies
 - **Solar**
 - **Wind**
 - **Utility-scale renewables**
 - **Energy storage**
 - **Microgrids**
 - **Energy efficiency**
 - **Business technology mgmt**
 - **Electric Vehicles (EV)**

Advanced Grid Intelligence and Security

Strengthen the grid as our competitive advantage such that our customers view Xcel Energy as their long-term energy solutions provider



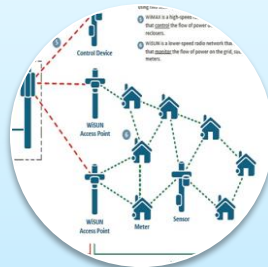
Advanced Distribution Management System (ADMS)



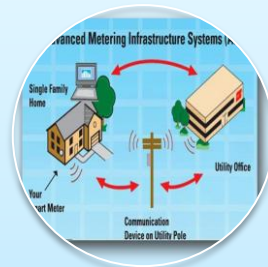
Fault Location, Isolation, and Service Restoration



Integrated Volt-VAR Optimization (IVVO)



Field Area Network (FAN)



Advanced Meter Infrastructure



Emerging Technologies

Technology Suite – Enabling Customer Experience, Choice, Control & Enhancing Grid Operability

Security and Data Solutions

Process Integrations, Change Management, Talent Strategies, Communications, Governance

Xcel Energy's Advanced Grid provides value...

Cleaner, More Reliable Energy

A Better Customer Experience

More Ways to Save Money

Customer Value

Integrates more renewable, carbon-free energy sources

Improves reliability with fewer, shorter outages due to better system monitoring and more automation that will prevent outages and enable us to restore power quickly

Provides timely, relevant information such as high bill alerts

Makes it easy to integrate new technology such as electric vehicles

Saves you time with more self-serve options

Helps customers track energy use in near real-time and make adjustments to keep energy costs low

Enables new pricing plans that provide opportunities to save money

Operations Value

Provides interactive controls to enable system operators to respond more quickly to outages

Provides the ability to remotely configure system to isolate outages

Improves situational awareness and improve efficiency with monitor and control capability

Provides instantaneous alarming of outages for proactive communications to customer

Improves access to customer usage data for better customer service

Enables remote connect and disconnect service for faster customer intervention

Provides additional interval attribute data to support complex billing

Improves outage duration by identifying outage location through technology

Increases operational efficiencies through remote sensing, voltage control of system