

Smart Grid Technology Special Report:
***"America's Smart Grid - Powering the
next generation of millionaires."***

Xcel Energy (XEL) is a holding company, with subsidiaries engaged chiefly in the utility business, and is quite the pioneer, especially with the subject at hand; the smart grid.

As of 2008, The company's umbrella covered the activity of four wholly owned utility subsidiaries that serve electric and natural gas customers in eight states.

These utility subsidiaries are as follows:

- **NSP-Minnesota:** NSP-Minnesota was incorporated in 2000 under the laws of Minnesota. NSP-Minnesota is an operating utility engaged in the generation, purchase, transmission, distribution and sale of electricity in Minnesota, North Dakota and South Dakota.
- **NSP-Wisconsin:** NSP-Wisconsin was incorporated in 1901 under the laws of Wisconsin. NSP-Wisconsin is an operating utility engaged in the generation, transmission, distribution and sale of electricity in portions of northwestern Wisconsin and in the western portion of the Upper Peninsula of Michigan.
- **PSCo:** PSCo was incorporated in 1924 under the laws of Colorado. PSCo is an operating utility engaged primarily in the generation, purchase, transmission, distribution and sale of electricity in Colorado.

- SPS: SPS was incorporated in 1921 under the laws of New Mexico. SPS is an operating utility engaged primarily in the generation, purchase, transmission, distribution and sale of electricity in portions of Texas and New Mexico.
- Other Subsidiaries: WGI was incorporated in 1990 under the laws of Colorado. WGI is a small interstate natural gas pipeline company engaged in transporting natural gas from the PSCo system near Chalk Bluffs, Colo., to the Cheyenne system near Cheyenne, Wyo.

Environmental Excellence and Leadership

What brought us to Xcel is was because of their Environmental leadership and the fact that they are developing and implementing their smart grid technology, which in fact is a direct result of the Obama Administration and their stimulus package that congress passed.

The SmartGrid Technology (*Courtesy of Xcel Website*)

"Xcel Energy's business strategy has multiple components, including a focus on our customers, people and communities. Our strategy of delivering reliable energy is complimented by our commitment to find the most environmentally feasible methods of meeting the energy demands of our customers.

One area of opportunity revolves around the concept of a smart grid. While the industry has various definitions of a smart grid and there are multiple efforts underway that are called "smart grid," Xcel believes the opportunity to develop a fully inter-connected system allowing customers to automatically manage their energy consumption and

enabling Xcel Energy to reliably produce and deliver that energy through real-time, automated controls is now available.

Xcel Energy's vision of a smart grid includes a fully network-connected system that identifies all aspects of the power grid and communicates its status and the impact of consumption decisions (including economic, environmental and reliability impacts) to automated decision-making systems on that network.

This vision leverages the multitude of vertical system solutions currently available and deploys a horizontal integration of these systems into a real-time, automated "neural network" that will manage all of the variables involved in delivering energy to the consumer.

The company believes this vision of an advanced decision-making system will allow Xcel Energy to more efficiently deliver energy while providing consumers with valuable information for better decisions on when, where and how to consume energy. The impact will be a greatly improved delivery system that optimizes the impact on the environment, ensures the most efficient delivery, and maximizes reliability.

Xcel Energy has been recognized in the past for its ability to drive transformation, in addition to its ability to bring partners to the table for leveraged development. The company's past successes combined with a continued commitment of transformation presents them with a unique position to be one of the leaders in Smart Grid development and deployment within the industry. The company is excited to establish this industry leadership with Xcel Energy's vision of the smart grid.

What is a Smart Grid?

The fundamental method of operating the nation's power grid has not changed much in the past 100 years. It has remained essentially the same, although the number of customers and their needs have grown exponentially.

Utilities across the nation—and indeed, around the world—are trying to figure out how to bring their networks into the 21st century and the digital age. This effort to make the power grid more intelligent is generally referred to as creating a "smart grid."

The industry sees this transformation to a smart grid improving the methods of delivery as well as consumption. Xcel Energy not only sees it as improving our energy security issue, but is the first utility to view smart grid as an environmental solution, helping solve the more pressing global issue of climate change.

While details vary greatly, the general definition of a smart grid is an intelligent, auto-balancing, self-monitoring power grid that accepts any source of fuel (coal, sun, wind) and transforms it into a consumer's end use (heat, light, warm water) with minimal human intervention.

It is a system that will allow society to optimize the use of renewable energy sources and minimize our collective environmental footprint.

It is a grid that has the ability to sense when a part of its system is overloaded and reroute power to reduce that overload and prevent a potential outage situation; a grid that enables real-time communication between the consumer and utility

allowing us to optimize a consumer's energy usage based on environmental and/or price preferences.

What Does Smart Grid Mean to Xcel Energy?

Xcel Energy's vision of smart grid covers the entire value chain - "wind to light," or "coal to cool air"- and sees smart grid as a continuing organic evolution that includes multiple layers of functional intelligence leading to real-time analytics, decision-making, and action.

The company plans on partnering with key industry leaders to jointly fund the design and deployment of a complete smart grid model to a city within Xcel Energy's service territory.

The deployment of a working model will allow Xcel to test and prove the value assumptions directly with customers and regulators. By collaborating with industry leaders, the company will spread the cost and associated risk across multiple players, thereby allowing a fully deployed smart grid system that can demonstrate the capabilities of technology to reform the industry.

Xcel Energy's vision of smart grid includes the optimization of all investment, operational expenditures, and environmental impact in coordination with consumer choices and by better managing supply (both central and distributed generation) and consumption.

It allows consumers to become dynamically engaged in making intelligent and automated energy choices based on their own individual priorities, effectively balancing cost, reliability, and environmental impact on an individual customer basis; ensuring full application integration leading to the transformation of data and knowledge

into real-time decisions and actions; and resulting in measurable value for all stakeholders across the entire value chain.

Concerns about climate change, environmental impact and sustainable energy solutions, along with a renewed personal sense of responsibility for limiting carbon footprints, are key reasons consumers are pushing for cleaner, more efficient energy solutions.

An integrated smart grid allows customers to better plan and manage their energy consumption while optimizing the grid through real-time generation and distribution control management. The smart grid will create the ability to optimize traditional fuel sources and integration of renewable sources and distributed generation to reduce the impact we have on the environment, while still meeting our consumers' growing energy demands. It is believed that the smart grid will result in:

- Positive environmental impact
- Customer choice from products to services
- Enhanced system reliability
- Increased efficiency of power delivery
- Extended asset life

Xcel expects the smart grid to provide tangible and intangible benefits to all stakeholders, including consumers, shareholders, and regulators. It will bring environmental benefits that impact all of us today, as well as our future generations.

Customers will have options and choices when it comes to the amount and type of power they use, and when to use those energy resources.

Their systems will be more reliable, creating a reduced need for building additional capacity, and

allowing us to better manage energy demand with the resources available and create higher returns. Utility operating costs will be lower as a result of automation and better visibility into operational aspects of the grid, leading to more efficient and effective use of resources.

Smart Grid Capabilities

The company believes a Smart Grid will provide new capabilities to customers, utilities and the overall energy market.

Consumers will have the opportunity for choices not just with the type of energy they receive but also with the ability to manage their own consumption habits through in home automation.

They will have visibility into how energy is used within their home, how much that usage costs them, and what kind of impact that usage has on the environment. They will have the option of self-managing that usage interactively, or setting preferences allowing the utility to automatically make adjustments based on those choices.

Xcel believes the smart grid will also open up opportunities for new consumer services, energy management offerings and products not currently possible with today's infrastructure.

Also, the company believes smart grid will allow utilities to intelligently respond to supply availability and demand.

Utilities can expect to enhance and refine their distribution and generation management with the help of real-time system information. As a result, they will be able to respond to peak demand loads more efficiently; identify outages and their

related causes more precisely (enabling faster restoration); dispatch a more cost-effective mix of fuel sources (while minimizing environment impacts); and automatically re-route energy as needed to meet consumer demands and avoid unnecessary strain on the power grid.

Smart grid capabilities will enable marketers to have a real-time view of the demand on various aspects of the grid and manage the market accordingly. With smart grid concepts continuing to evolve and emerge, Xcel Energy believes additional capabilities will be realized related to the integration of real-time data analytics and decision-making throughout all the components of a smart grid. These will become more apparent as the smart grid is implemented and matures.

Xcel's environmental stance is considered by the company as a "core strategic priority." And their environmental leadership strategic plans are designed to meet customer and policy maker expectations while in the end, and most importantly, creating shareholder value.

The company has established a highly effective environmental compliance program and has produced an excellent compliance record. Additionally, the company pursues environmental policy initiatives that promote environmental leadership and provide growth opportunities.

Specifically, Xcel Energy is a national leader in voluntary emission reduction programs, the nation's largest retail utility wind energy provider and a leader in innovative technology, energy efficiency and conservation and customer-driven renewable energy programs.

In 2007, Xcel Energy filed resource plans in Colorado and Minnesota, which are intended to result in a significant reduction in GHG (Green House Gas) emissions, while meeting growing customer demand at a reasonable price.

Through their environmental leadership strategy, the company and their shareholders, as well as their customers are well-positioned to meet the challenges of potential future climate change regulation, comply with renewable energy mandates and take advantage of clean energy incentives created by policy makers in the states in which they operate.

Utility Segments

Xcel Energy operates its utility business in the following segments: regulated electric utility, regulated natural gas utility and all other.

Xcel Energy focuses on growing through investments in electric and natural gas rate base to meet growing customer demands, environmental and renewable energy initiatives and to maintain or increase reliability and quality of service to customers.

Current Initiatives (*from the company's Annual Report*)

Xcel pursues environmental leadership through management of environmental policy initiatives. The company actively evaluates public policy proposals and promotes environmental initiatives that are designed to assure compliance with state initiatives, appropriately manage long-term customer costs and, provides growth opportunities. These initiatives include the following:

- Xcel Energy is the nation's largest utility wind energy provider and the nation's fifth largest solar energy provider. Xcel Energy is pursuing new wind, solar and other renewable energy acquisitions and investments to meet some of the nation's most aggressive RESs in the states in which Xcel Energy operates. These standards provide for favorable cost recovery mechanisms and investment opportunities in order to allow Xcel Energy to meet the requirements.
- Xcel Energy has implemented voluntary emission reduction programs in Minnesota and Colorado. These programs have resulted or will result in substantial emission reductions from existing facilities. They also incorporate enhanced cost recovery mechanisms that allow for a construction work-in-process return and an incentive based ROE mechanism.
- Xcel Energy has announced plans for construction of the largest biomass generating plant in the Midwest. Xcel Energy has proposed installing technology at the Bay Front Generating Station in Ashland, Wis. to allow it to generate electricity from biomass in all three operating units. Xcel Energy currently has 67 MW of biomass generating capacity in Minnesota and Wisconsin.
- Xcel Energy has a number of environmental initiatives focused on their customers. Xcel Energy has the largest customer-driven wind program in the nation called WindSource®. In Colorado, Xcel Energy manages a growing customer-sited solar program, known as Solar*Rewards. Xcel Energy also has an increasing portfolio of customer energy efficiency and conservation programs. Xcel

Energy is allowed financial performance incentives associated with their programs in Minnesota and Colorado.

- Xcel Energy is also working to apply intelligence to its electric grid, creating a smart grid, to provide customers with more choice, reliability and control over their energy use. Xcel Energy is building the nation's first fully integrated SmartGridCity™ in Boulder, Colo.
- Xcel Energy is a leader in promoting new clean energy technologies for the future. Xcel Energy has recently proposed the creation of an innovative clean technology program in Colorado that creates a funding mechanism to explore innovative renewable and other environmentally sustainable technologies. Xcel Energy has also undertaken small-scale projects to study the technical and economic aspects of energy storage and the use of hydrogen. Xcel Energy is a leader in supporting the advancement of solar energy technology. Xcel Energy is also exploring the use of clean coal and is evaluating whether and how to best take advantage of state and federal incentives for clean coal development.

In 2007, the company filed resource plans in Minnesota and Colorado that propose significant new clean energy resources. During 2008, the Colorado plan was approved substantially as proposed, and the Minnesota plan is still under review. Under these plans, Xcel Energy would:

- Increase overall system wind capacity from approximately 2,800 MW at the end of 2008 to approximately 7,400 MW by 2020;

- Add between 200 MW and 600 MW of concentrating solar thermal technology;
- Increase the size of their customer energy efficiency and conservation programs, resulting in a reduction of retail demand;
- Retire and replace several existing coal-fired electric generation facilities;
- Improve the efficiency and reduction of CO₂, mercury, SO₂ and NO_x emissions at several existing fossil plants; and Upgrade the capacity of existing nuclear facilities.

Environmental Awards

The company's environmental leadership strategy has resulted in numerous environmental awards and recognition. For example, Xcel Energy was named to the Dow Jones Sustainability Index for North America for 2008-2009, which consequently was the second consecutive year that Xcel Energy has earned this distinction.

Xcel Energy is making, as part of their MERP program, nearly \$1 billion of improvements at three Twin Cities coal-fired generating plants, A. S. King, High Bridge and Riverside, to significantly reduce air emissions from those facilities while increasing the amount of electricity they can produce by approximately 300 MW.

New state-of-the-art emission control equipment was placed in service for the A.S. King plant in 2007 and the existing High Bridge facility was replaced with a 575 MW natural gas combined-cycle unit that went into service in May 2008. The final phase of the MERP, the new Riverside combined-cycle plant,

is currently scheduled to be placed in service by May 2009.

Invest approximately \$1.3 billion through 2010 for Comanche 3, a project to build a new 750 MW supercritical coal unit in Colorado, scheduled to be completed in late 2009. The CPUC has approved sharing one-third ownership of this plant with other parties. Consequently, PSCo's investment in Comanche 3 will be approximately \$1 billion.

Invest approximately \$192 million for the planned addition of two gas fired units totaling 300 MW at the Fort St. Vrain generating facility located in Colorado, scheduled to be completed in mid-2009.

Invest over a \$1 billion investment through 2015 to extend the lives and increase the output of the company's two nuclear facilities, Monticello and Prairie Island.

Spending approximately \$206 million for a new 100 MW wind farm located near Grand Meadows, Minn. The new plant was placed in service in December 2008.

Invest approximately \$900 million over three years for a 201 MW project in southwestern Minnesota called the Nobles Wind Project, and a 150 MW project in southeastern North Dakota, called the Merricourt Wind Project, expected to be operational by the end of 2010 and 2011, respectively.

Investment by the CapX 2020 coalition of utilities of approximately \$1.7 billion to expand the transmission system in the upper Midwest with major construction targeted to begin in 2010 and ending three to five years later, of which Xcel Energy's share of the investment is expected to be approximately \$900 million, depending on the route and configuration approved by the MPUC.