RENEWABLE ENERGY

Xcel Energy operates in some of the country's best regions for producing wind and solar power, and we are putting these resources to work for customers.

Increasingly, the customers and communities we serve want their energy from clean, renewable sources, and we are delivering. Renewable energy plays a vital and growing role in our energy supply and future plans for meeting customer needs. We anticipate that as we reach our goal to reduce carbon emissions 80% by 2030, renewable sources will generate up to 60% of the electricity we provide.

Wind and solar technologies continue to improve, and prices have declined, making it possible to operate a reliable, affordable power grid with significant levels of renewable generation. When it comes to managing cost and reliability, scale matters. We focus on increasing the use of large-scale, universal wind and solar energy because these resources are significantly more economical and can provide energy for all customers at half the cost compared to smaller, distributed resources.

We also understand that some customers want more renewable energy, beyond what is currently in our energy supply. This includes some of our business customers and communities that have set goals for up to 100% renewable energy. To meet this need, we are enabling customers to achieve their goals by improving and expanding our voluntary renewable choices.

HIGHLIGHTS

- Under our Steel for Fuel growth strategy, we completed three new, company-owned wind farms in 2019 and expect to complete seven additional projects by the end of 2020. Altogether, we will increase our wind ownership fivefold by the end of 2021 when our current wind expansion is complete.

- By the end of 2019, we had 762 megawatts of large-scale, universal solar capacity and approximately 8,000 megawatts of wind capacity on our system — enough to power approximately 4.6 million homes annually.

- Xcel Energy is a national leader in wind energy. Based on the American Wind Energy Association's annual industry report, we have been ranked the No. 1 utility wind provider 12 of the past 15 years.

- Our Colorado system set a record in May 2020 by delivering more than 80% wind and solar generation to meet customer energy needs during a peak load hour. In all our regions, there are hours where wind and solar provide approximately 70% of our customers' electricity and entire days where they generate at least 60% of customers' power — levels that at one time were considered impossible.

- More than 200,000 customers participate in our renewable choice programs, including 145,000 customers enrolled in programs backed by Xcel Energy renewable resources, demonstrating high engagement and satisfaction with these options, which include Renewable*Connect®, Windsource® and Solar*Connect Community® in Wisconsin.

- Early in 2019, we successfully transitioned 100% of Windsource subscribers in Wisconsin to Renewable*Connect. As customer demand for the Renewable*Connect program grows, we have approval to expand our Minnesota program and expect to propose an expansion to the program in Colorado sometime in 2020.

- Through renewable choice programs, we have installed 60,000 distributed energy systems, totaling more than 1,300 megawatts of capacity. While most systems are customer-sited, more than half of the capacity is from community solar gardens, which have been coming online since late 2016.

Renewable energy is a vital and growing part of our energy supply.

| **9%** 2005 | **13%** 2010 | **28%** 2019 | **60%** 2030* |
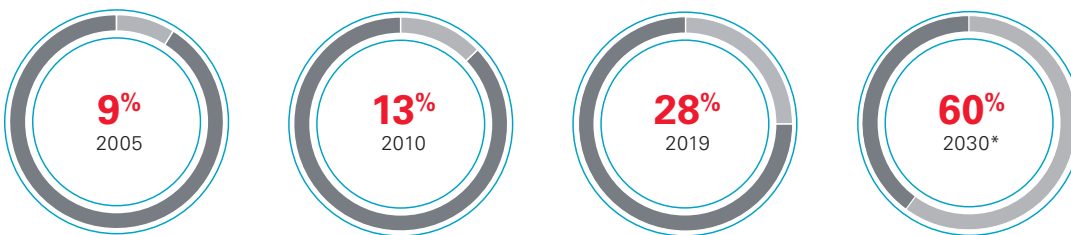
*Results are estimated based on potential scenarios that reduce carbon emissions 80% by 2030; actual system depends on regulatory approval of our plans.

STEEL FOR FUEL: RENEWABLE ENERGY EXPANSION

Xcel Energy's Steel for Fuel strategy resonates with all types of stakeholders because it expands the company's wind and solar portfolio and delivers carbon-free energy while helping to keep customer bills low. We are adding renewable resources — the steel — at a net savings, where the capital costs of the projects are more than offset by future avoided fuel costs. In addition, the projects support local economies through jobs, tax base and landowner lease payments.

Delivering on the nation's largest multi-state wind investment

Xcel Energy announced the nation's largest multi-state wind investment several years ago with plans to add 12 new wind farms across seven states. A year later, regulators approved the Colorado Energy Plan that includes three new wind farms. We also acquired several projects under purchased power agreements that were set to expire and are rebuilding the projects with the latest wind technology as part of our portfolio.

We completed three company-owned wind projects in 2019: Hale in Texas (478 megawatts), Foxtail in North Dakota (150 megawatts) and Lake Benton in Minnesota (100 megawatts). In early 2020, Blazing Star 1 (200 megawatts) also began operating. We have approximately 2,000 megawatts of company-owned wind under development or construction and 900 megawatts under purchased power agreements slated for completion by the end of 2021 or earlier. The majority will be finished by the end of 2020 to take advantage of the full production tax credit before it phases down.

Altogether from 2017 to 2021, we will add more than 4,700 megawatts of new wind resources, enough to power about 2.3 million homes annually. This includes adding 3,500 megawatts to our company wind portfolio, increasing it to more than 4,300 megawatts — five times the wind capacity we previously owned.

We also anticipate more repowering opportunities in the future as additional purchased power agreements expire in the next decade.

Managing Environmental Impacts of Wind Energy

Wind farms currently have an operating life of 20 years or more, and ideally, all wind turbine components are designed to last that full lifespan. As many first-generation wind farms reach the end of their useful lives and we consider repowering opportunities, there are questions about wind turbine waste and disposal.

Most wind turbine components are made of recyclable materials. The following is a breakdown of components:

• Nacelles, tower sections and internal gearing are made from metal that can be recycled

• Concrete from foundations can be removed, ground and reused

• Oil from wind turbines can be removed and reused

- Turbine blades are made of mixed materials, including fiberglass that is not recyclable — the blades are typically cut into sections to remove recyclable materials and the remaining fiberglass material is disposed in an approved landfill for regular construction waste

Technology and recycling opportunities are always changing, and we work with industry groups to explore ways to sustainably reuse non-recyclable materials. As new opportunities develop, we will evaluate and incorporate them into our recycling programs.

We report on managing wind development and potential impacts to wildlife in the Wildlife and Habitat Protection section of the Corporate Responsibility Report.

Large-scale, Universal Solar and Storage
Under the Colorado Energy Plan, we expect to purchase more than 700 megawatts of solar power and 250 megawatts of storage through projects planned for completion by 2022. The projects include:

- Neptune Solar Project in Pueblo County (250 megawatts, plus 125 megawatts four-hour storage)

- Thunder Wolf Solar Project in Pueblo County (200 megawatts, plus 100 megawatts four-hour storage)

- Hartsel Solar Project in Park County (72 megawatts)

- A solar and storage project in El Paso County (100 megawatts, plus 50 megawatts four-hour storage)

- A solar project in Pueblo County (113 megawatts)

In addition, we have contracted with Lightsource BP to build one of Colorado's largest solar facilities. The 240-megawatt Bighorn Solar Project will be installed on the EVRAZ Rocky Mountain Steel property in Pueblo. We plan to purchase the power to supply EVRAZ, making it the largest on-site solar facility dedicated to a single customer in the country.

Find Xcel Energy's renewable capacity by resource type and region in our Performance Summary of the Corporate Responsibility Report.

RENEWABLE CHOICE PROGRAMS
Just as customers want more control over their energy use, they also want more choice in how they engage with energy options. Our goal is to offer innovative solutions that enable our customers to meet their priorities around clean energy and the environment, while balancing these choices with the cost that all customers pay to support them.

We were an early adopter of voluntary green power back in 1998 with the introduction of our flagship program, Windsource. Since then, our program offerings have expanded to include options for community solar gardens, on-site solar and Renewable*Connect.

Through Renewable*Connect, customers can choose to make their energy up to 100% renewable through different contract options, such as month-to-month, five-year and 10-year terms. There is no equipment to install and customers can remain on the program if they move to a different home or business location within our service area.

Renewable*Connect exemplifies innovation. We have combined our program and regulatory experience and customer input to design the program so customers retain the renewable energy credits (RECs) and rights to renewable energy claims. Renewable*Connect also keeps bills low for participating customers, while not increasing costs for nonparticipants. It is self-supporting through subscription fees, so nonparticipants do not pay more.

In Colorado, the program's energy is delivered from the 50-megawatt Titan Solar facility, near Deer Trail, Colorado. The energy sources for the Minnesota and Wisconsin programs include the Odell Wind Farm and North Star Solar.

Participation in other renewable choice programs continues to grow as well. Solar*Rewards Community® in Colorado was one of the first community solar gardens programs in the nation. Between 2017 and 2019, it quadruped in size, with over 90 megawatts of capacity from 71 participating solar gardens. In Minnesota, Solar*Rewards Community is easily the largest community solar program in the country, with nearly 660 megawatts of capacity from 268 participating solar gardens at the end of 2019. However, the purchase rate for this Minnesota solar energy is two to four times higher than what we would pay from more cost-effective energy sources.

In Wisconsin, the third solar garden project in our fully subscribed Solar*Connect Community program is now in-service. Located in Ashland, it joins solar gardens in Eau Claire and La Crosse to provide the program to customers throughout our Wisconsin service territory. Like Renewable*Connect, the incremental program costs are covered through subscription fees so that nonparticipating customers do not pay extra to make the program available. In early 2020, we received approval to offer Solar*Connect Community to customers in New Mexico beginning January 1, 2021.

Customers also continue to install more on-site solar, with our Colorado customers increasingly choosing to install solar panels without incentives through Solar*Rewards®. Across all states, more than 8,300 solar systems were installed during 2019, adding 88 megawatts of additional on-site distributed solar. To reduce the impact of energy bills for customers struggling to make ends meet, we recently launched incentive options to test solar installations for income-qualified households in Colorado and Minnesota.

We offer the following renewable choice programs that reflect our company's commitment to meeting the clean energy interests of customers.

Program	Description	REC Attribution	MN	WI	ND	SD	CO	NM	TX	MI
Renewable*Connect	A flexible and affordable way to subscribe for up to 100% renewable energy	Participant	▮	▮			▮			
Windsource	An easy, low-risk way to subscribe to clean wind energy	Participant	▮				▮	▮		▮
Solar*Connect Community	Subscribe to a solar garden and get full rights to the solar claims, plus a bill credit for choosing solar energy	Participant		▮				▮*		
Solar*Rewards Community	Subscribe to third-party solar gardens and receive electric bill credit payments for the solar energy produced	All Customers	▮				▮			
Solar*Rewards	Install your private on-site solar system and earn an incentive for transferring the RECs to Xcel Energy	All Customers	▮				▮	▮**		
Net Metering	When you produce wind or solar energy through on-site equipment, you are able to retain RECs, and sell any excess energy back to the power grid	Participant	▮	▮	▮		▮	▮	▮	▮

*We have approval to offer customers in New Mexico Solar*Connect Community beginning January 2021.

**New Mexico Solar*Rewards availability varies from year to year and is not currently available.

CERTIFIED RENEWABLE PERCENTAGE

In addition to renewable choices, we now offer customers in Colorado, Minnesota and Wisconsin a Certified Renewable Percentage to let them claim the full benefit of our increasingly clean energy mix. We retire Renewable Energy Credits (RECs) to cover the entire renewable energy portion of the electricity we deliver to customers, beyond what we already retire to meet state renewable portfolio standards. Certified Renewable Percentage is not something customers enroll in or subscribe to but is a benefit they automatically receive. This enables customers to make renewable energy claims. For example, our commercial customers can claim the portion of renewable energy included in the Certified Renewable Percentage just by being an Xcel Energy customer.

INTEGRATING WIND AND SOLAR POWER

The significant wind and solar resources on our systems have fundamentally changed the way we operate. With each increase in renewable capacity, we have improved system operations, enabling our ability to incrementally grow the use of wind and solar power and achieve new system records.

Some of our operational improvements for accommodating more wind and solar energy include:

- **Adding more flexible backup generation.** As we retire aging coal plants, we are replacing some of the energy with lower carbon natural gas generation, which can more efficiently and cost effectively ramp up or down to accommodate variable, renewable generation.

- **Cycling baseload plants offline and reducing minimum generation levels.** After years of study and experience, we turn off coal units to accommodate more wind generation and have reduced the time that units need to be offline before they can be restarted. It is a practice that reduces fuel use and emissions. Building on this experience, we now operate our nuclear plants with similar flexibility.

- **Negotiating greater flexibility from our natural gas suppliers.** These agreements allow us to efficiently use our gas generation resources to integrate variable renewable generation, helping to increase system reliability and lowering customer costs.

- **Investing in transmission.** We are improving and building new transmission facilities that can deliver more wind and solar energy to customers.

- **Using control equipment.** We use set-point controls for wind farms in combination with automatic generation control of thermal units that lets wind farms operate at peak levels while fossil-fuel production is reduced.

- **Establishing a 30-minute flexibility reserve.** We previously carried one megawatt of reserve capacity for every megawatt of wind generation as backup in case winds suddenly dropped off. As our wind portfolio grew, we studied the maximum amount of wind energy typically lost within 30 minutes and were able to reduce this reserve, dramatically decreasing costs associated with carrying large wind reserves while maintaining system reliability.

- **Adjusting planned maintenance.** We now plan transmission and plant maintenance outages around times of the year when wind and solar production is lowest.

Generally, we find that wind and solar are very compatible resources for meeting customer needs. Our renewable generation works together consistently to operate on average across all hours of the day. While solar energy is relatively simple to forecast, wind generation has been notoriously difficult because of its variability. Most weather forecasting models are designed to generate information about winds near ground level rather than at 200 to 300 feet (61 to 91 meters), where turbine hubs are located. Also, landscape features such as hills and trees can reshape wind speeds and directions, causing turbulence in ways that can greatly influence the amount of energy produced.

To improve on this, we began working in 2009 on a multi-year research and development project with the National Center for Atmospheric Research (NCAR) and its affiliate company Global Weather Corp. (GWC). Today, the WindWX system helps energy providers around the globe, including Xcel Energy, to make better commitment and dispatch decisions. It uses real-time, turbine-level operating data and applies sophisticated algorithms to forecast the amount of wind power that will be produced. Forecasts for a 168-hour period are provided every 15 minutes across Xcel Energy's service territory.

COMPLIANCE WITH STATE RENEWABLE ENERGY AND PORTFOLIO STANDARDS

Xcel Energy is on pace to surpass established renewable energy requirements in the states it serves beyond 2030. The state requirements continue to evolve. For example, in 2019 New Mexico adopted Senate Bill 489, the Energy Transition Act, which set one of the most ambitious renewable portfolio standards in the nation. We constantly evaluate our overall compliance strategy with increased target requirements based on individual state legislation.

Renewable Energy Requirements in Xcel Energy States			
State	**2019**	**Next Increase**	**Notes**
Colorado Renewable Energy Standard	20%	30% by 2020	30% of retail sales by 2020, with 3% from distributed generation (DG), including at least 1.5% from retail net-metered DG resources and up to 1.5% from wholesale DG resources (defined as resources ≤30 megawatts located in Colorado that are not customer sited)
Michigan Renewable Portfolio Standard	12.5%	15% by 2021	Goal of 35% by 2025
Minnesota Renewable Portfolio Standard	25%	31.5% by 2020	30% of retail sales by 2020, with at least 24% from wind, plus 1.5% of retail sales from solar by 2020, with at least 10% from on-site solar 40kW or less
New Mexico Renewable Portfolio Standard	15%	20% by 2020	The New Mexico Energy Transition Act increases future goals of the RPS — in addition to the immediate goals, it sets a standard of 40% by 2025, 50% by 2030, 80% by 2040 and then 100% carbon-free electricity by 2045; under the rule, the Public Regulation Commission must consider the safe and reliable operation of the system and the prevention of unreasonable costs
North Dakota Renewable and Recycled Energy Objective		Voluntary	No RPS Requirement for North Dakota
South Dakota Renewable, Recycled and Conserved Energy Objective	10%	Voluntary	No RPS Requirement for South Dakota
Texas Renewable Generation Requirement	Statewide Goal	10,000 MW statewide by 2025 (goal achieved) and non-wind goal: 500MW	Xcel Energy's portion is approximately 3.3% of the statewide goal (the 3.3% is based on Xcel Energy Texas electric retail sales as a percentage of the total state electric retail sales)
Wisconsin Renewable Portfolio Standard	12.89%		

RENEWABLE ENERGY CREDITS

A renewable energy certificate or credit (REC) is created for every megawatt hour (MWh) of renewable electricity generated (1 REC = 1 MWh). RECs provide a mechanism to commoditize renewable energy attributes and are tracked in national commission-approved REC tracking registries. RECs can be disaggregated or unbundled from the underlying renewable energy in order to be sold separately. Typically, RECs are either traded to companies looking to claim green energy or transferred to other energy providers to reduce compliance costs.

Xcel Energy uses RECs to satisfy compliance with state renewable energy standards throughout our service territory. Our company carefully tracks its REC ownership and works to comply with the rules and best practices around renewable energy claims. Only parties that own and retire RECs can claim to use the renewable energy, according to the Federal Trade Commission's Green Guides. However, renewable energy unbundled from or without the associated REC can retain its value and be used for compliance with environmental regulations.

We continue to look for ways to increase the value of the renewable energy on our systems through the sale of RECs. In several states, Xcel Energy has more renewable energy on its system than is needed for compliance with renewable energy standards. Based on market opportunities and the projected shelf life of RECs, we sold more than 3.6 million RECs in 2019. The renewable energy that generated these RECs came from Colorado, Texas and the Upper Midwest. REC sales are a very minor portion of our REC holdings, and customers benefit by sharing a portion of profits associated with the sales.

We provide more detailed information on our 2019 REC sales in the Performance Summary of the Corporate Responsibility Report. We also provide residual mix carbon emission intensities for customers who participate in our renewable choice programs in the 2019 Carbon Dioxide Emission Intensities Information Sheet.