Renewable Energy

We operate in regions rich in wind and solar resources and are putting those resources to work for our customers.

As a national leader in wind energy, Xcel Energy has steadily expanded its wind portfolio since 2005. We are among the first U.S. energy providers to surpass 10,000 megawatts of wind power on our system, with approximately 11,000 megawatts of capacity installed by early 2022. We continue to increase solar capacity as well. By the end of 2021, we had more than 2,700 megawatts of solar capacity through large-scale purchases and distributed solar energy systems. Under landmark clean energy plans in Colorado and Minnesota, we expect to add nearly 10,000 megawatts of renewables over the next decade in those regions.

Wind and solar power are integral to our goal of reducing carbon emissions 80% by 2030 from 2005 levels. We anticipate renewable resources will produce more than 60% of our electricity by that same year. Not only is wind and solar energy emissions free, but through cost-effective renewable projects, we can also save our customers money. We estimate that over the past five years our company-owned wind farms saved customers approximately $1.8 billion through avoided fuel costs and renewable tax credits.

We know that some customers want more renewable energy than what is currently provided in our energy supply. This includes our business customers and communities that have set goals for up to 100% clean energy. To meet this need, we offer one of the most extensive portfolios of voluntary renewable energy programs in the industry, providing customers flexibility and multiple options that appeal to different interests.

Highlights

- We completed the nation's largest multi-state wind investment from 2017 to early 2022, adding more than 3,600 megawatts at new company-owned wind farms across seven states, enough clean wind energy to power nearly 1.8 million homes.

- Xcel Energy announced plans to own its first large-scale solar projects. Regulators approved the 74-megawatt Western Mustang solar array in Wisconsin, and we proposed a 460-megawatt project near the Sherco coal-fueled power plant in Becker, Minnesota, which will help replace power from Sherco when the plant is retired ahead of schedule in 2030.

- Our Upper Midwest, Southwestern and Colorado systems set multiple records for delivering wind and solar power in fall 2021 and spring 2022. In all regions, we've recorded hours where wind and solar energy produced about 90% or more of electricity serving customers and entire days when they delivered about 78% of our customers' power.

- Xcel Energy joined EVRAZ North America and Lightsource BP to dedicate the 300-megawatt Big Horn Solar project in fall 2021. We purchase energy from the Lightsource BP project to serve EVRAZ North America's campus in Pueblo, Colorado, which is now the world's only steel mill powered largely by solar energy.

- Our renewable choice programs delivered nearly 3.4 billion kilowatt hours of wind and solar energy in 2021, with more than 275,000 customers participating in the programs. This includes almost 166,000 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®.

- Through renewable choice programs, we have installed nearly 84,000 distributed energy systems, totaling more than 1,700 megawatts of capacity. Over half of the capacity is from community solar gardens, which continue to come online since late 2016.

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

9%	13%	36%	67%
2005	**2010**	**2021**	**2030***
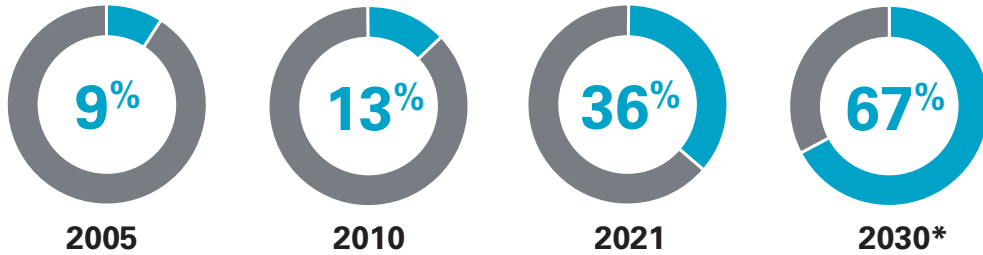
*Results are estimated based on implementation of regional clean energy plans.

Steel for Fuel: Renewable Energy Expansion

Xcel Energy's Steel for Fuel growth strategy delivers both economic and environmental benefits for customers and other stakeholders. We are installing wind and solar energy projects—the steel—at a savings, where the capital costs of the projects are more than offset by the savings from renewable tax credits and avoided fuel costs. We operate in some of the best regions of the country for wind and solar resources, which means our projects have higher capacity factors and can produce more electricity.

Delivering on the Nation's Largest Multi-State Wind Investment

Xcel Energy announced the nation's largest multi-state wind investment in 2017. From 2017 to early 2022, we added 14 new company-owned wind farms to our system, including nine that Xcel Energy built. Combined, the projects provide more than 3,600 megawatts of new wind capacity to our system, enough to power nearly 1.8 million average homes annually. In addition to affordable clean energy, the new wind farms created approximately 3,000 construction jobs and nearly 160 permanent jobs and will result in landowner and property tax payments of nearly $1.2 billion over the project lives. We estimate that the wind projects saved our customers $1.8 billion though avoided fuel costs and renewable tax credits during the past five years.

Surpassing the 10,000-Megawatt Wind Capacity Milestone

Xcel Energy is one the first energy providers in the country to reach 10,000 megawatts of wind power in our portfolio. We currently have approximately 11,000 megawatts of wind capacity, including approximately 4,400 megawatts from company-owned projects and 6,500 megawatts of purchased wind power in early 2022.

Wind Repowering Projects

As our power purchase agreements expire over the next decade, we are seeking opportunities to buy and repower older wind farms. In 2022, we expect to acquire the repowered 100-megawatt Northern Wind project in Minnesota from Allete Clean Energy.

We are also upgrading turbine components including blades at four company-owned wind farms under our plan to help fuel Minnesota's economic recovery from the COVID-19 pandemic. Upon completion of the upgrades, we expect the average annual energy output of the farms to increase approximately 20%, compared to today. The projects include:

- 200-megawatt Nobles Wind Farm (estimated completion 2022)

- 100-megawatt Grand Meadow–Ben Fowke Wind Energy Center (estimated completion 2023)

- 150-megawatt Border Winds Wind Farm (estimated completion 2025)

- 200-megawatt Pleasant Valley Wind Farm (estimated completion 2025)

The repowering projects are expected to save customers about $160 million in energy costs over the next 25 years and create up to 700 local, union construction jobs in addition to indirect jobs provided by suppliers. They will also provide landowners and local governments more than $9 million in annual lease and property tax payments.

Decommissioning Wind Farms

Wind farms currently have an operating life of 20 years or more, including Xcel Energy's wind farms which are expected to operate 25 years. 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, we are committed to the responsible disposal, reuse and recycling of wind turbine components associated with our projects.

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

- Nacelles, tower sections and internal gearing contain metal that can be recycled

- Concrete from foundations can be removed, ground and reused

- Oil from wind turbines can be removed and reused or recycled

- Turbine blades are made of mixed materials, including fiberglass that currently has limited recycling options—the blades are typically cut into sections and 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 currently non-recyclable materials. As new opportunities develop, we will evaluate and incorporate them into our recycling programs.

Expanding our Portfolio of Large-scale Solar Projects and Storage

Currently, all large-scale solar power on Xcel Energy's system is contracted through power purchase agreements, but that is changing as we plan to own the following projects:

- The Wisconsin Public Service Commission approved our proposal to own the 74-megawatt Mustang Solar project, which will be the largest solar array in western Wisconsin. It's expected provide enough energy to power more than 15,000 homes annually and generate nearly $300,000 in annual shared revenue for Pierce County and the town of Gilman, as well as about $7 million in customer bill savings over the project life.

- We have proposed a 460-megawatt solar project at the site of the coal-fueled Sherco Generating Plant in Becker Minnesota, which will help replace energy from Sherco when the plant is retired ahead of schedule in 2030. The project will be Minnesota's largest solar array, providing enough energy to power about 100,000 homes each year, and is expected to generate an estimated $115 million in wages from nearly 900 new union construction jobs and $240 million in local benefits over the project life. We expect regulators to make a preliminary decision on the project in third quarter 2022.

We also plan to purchase more than 750 megawatts of solar power and 275 megawatts of storage under our 2018 Colorado Energy Plan. The following projects are underway:

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

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

- Front Range-Midway Solar Project in El Paso County (100 megawatts, plus 50-megawatts of storage)

- Sun Mountain Solar Project in Pueblo County (200 megawatts)

Find Xcel Energy's renewable capacity by resource type and region in the **Data Summary** and information on our practices to responsibly develop wind and solar project in the **Wildlife and Habitat Protection brief** in Xcel Energy's Sustainability Report.

Renewable Choice Programs

Just as customers want more control over their energy use, they also want more choice in how their energy is produced. Our goal is to offer innovative solutions that enable our customers to meet their priorities around clean energy and the environment while balancing these options 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.

Programs Backed by Xcel Energy Renewable Resources

Through Renewable*Connect, Xcel Energy customers can choose to source their energy with up to 100% wind and solar energy. Different contract options, such as month-to-month, five-year and 10-year terms, further meet customer needs. 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 customer input with our program and regulatory experience to design the program so customers can fully retain the rights to renewable energy claims. Renewable*Connect also keeps bills low for participating customers by being self-supporting through subscription fees, so nonparticipants do not pay more.

We expanded Renewable*Connect in 2020 now offering it to customers in Michigan, and we plan to increase the size of the existing program in Minnesota in 2022. We currently purchase energy from the 50-megawatt Titan Solar facility in Colorado and from the Odell Wind Farm and North Star Solar project in Minnesota to supply the program. The popularity of Renewable*Connect continues to thrive, with program waitlists. We are working with stakeholders and regulators to further expand program availability and options in coming years. In Colorado, we have proposed to expand the Renewable*Connect concept to include natural gas and community-level participation options, and to transition Windsource into a Renewable*Connect model that includes solar resources. We expect a decision on these models in the last half of 2022.

Our Solar*Connect Community program in Wisconsin is fully subscribed. The program delivers energy to participants through three solar garden projects each located to serve customers in different parts of our service area, including Ashland, Eau Claire and La Crosse. 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. We also began offering this program to customers in New Mexico in 2021 with solar energy from a new resource near Clovis.

Xcel Energy now offers income-qualified customers in Colorado the opportunity to benefit from renewable energy under a unique partnership involving municipalities, community organizations and solar developers. We interconnected three solar gardens designed and built by Pivot Energy for a total capacity of 4.5 megawatts. Xcel Energy owns and operates these solar gardens that are located on the sites of two former coal-fueled power plants in Boulder and Denver. Energy Outreach Colorado, a nonprofit agency that supports consumers who struggle to afford their energy bills, serves as the subscribing agency. More than 900 income-qualified customers now participate in the program and benefit from reduced energy bills through the program subscriptions. We are currently considering program expansions to serve even more income-qualified customers.

Third-party Solar Garden Programs

Solar*Rewards Community® in Colorado was one of the first community solar gardens programs in the nation. At the end of 2021, the program had 112 megawatts of capacity from 97 solar gardens. In Minnesota, Solar*Rewards Community is among the largest community solar program in the country, with over 825 megawatts of capacity from more than 425 participating solar gardens at the end of 2021. However, the purchase rate for the Minnesota solar energy is two to four times higher than what we would pay from more cost-effective energy sources, and the program currently increases an average residential customer's bills by $40 to $50 a year. While we operate and support solar development in this legislated program, we also continue to engage on policies to lower the bill impacts for nonparticipating customers due to the program's cost.

Customers also continue to install more on-site solar and our popular Solar*Rewards® incentive program helps make solar more affordable. Across all states, more than 12,000 on-site solar systems were installed during 2021, adding more than 125 megawatts of additional on-site distributed solar. To reduce the impact of energy bills for customers struggling to make ends meet, we continue to offer options to install solar for income-qualified households in Colorado and Minnesota. Additionally, we launched our latest Solar*Rewards offering in Minnesota in May 2022, providing incentives to eligible schools, as well as state colleges and universities, that install solar in our service area.

We administer the country's largest third-party distributed community solar garden program in Minnesota, as well as a robust on-site solar program, and we've had great successes and some challenges connecting a large volume of projects and solar capacity to the power grid. In 2021, we began a significant investment in efforts to improve the process and outcomes. We have completed significant improvements to our application processing and technical analysis, and continue to work with all parties to make the interconnection process smooth and successful for our customers and the solar industry while maintaining grid reliability and safety.

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 a third-party solar garden and receive electric bill credit payments for the solar energy produced	All Customers	✓				✓	✓*		
Solar*Rewards	Install a private on-site solar system and earn an incentive for transferring the RECs to Xcel Energy	All Customers	✓				✓	✓**		
Net Metering	When customers produce wind or solar energy through on-site equipment, they can retain RECs, and sell any excess energy back to the grid	Participant	✓	✓	✓		✓	✓	✓	✓

*New Mexico community solar gardens launch fourth quarter 2022.
**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 and reflect our clean-energy mix in their sustainability accounting or reporting. 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.

Find the Certified Renewable Percentage by state on xcelenergy.com (under energy portfolio, power generation and select the state Colorado, Minnesota or Wisconsin).

Integrating Wind and Solar Power

The significant wind and solar resources on our system fundamentally changed the way we operate. With each increase in renewable capacity, we've improved system operations and created the ability to reliably add even more wind and solar power.

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

- **Improved forecasting**. We worked on a multi-year research and development project over a decade ago to improve wind forecasting with the National Center for Atmospheric Research and its affiliate company the Global Weather Corporation. From that effort, the WindWX system was developed, which uses real-time, turbine-level operating data and sophisticated algorithms to more accurately forecast wind energy. Xcel Energy and energy providers around the globe currently use the system to make better commitment and dispatch decisions.

- **Using control equipment**. We use set-point controls for wind farms in combination with automatic controls on thermal units. This enables wind farms to operate at peak levels and reduces fossil fuel generation.

- **Increasing the flexibility of our dispatchable power plant fleet**. As we have retired coal-fueled plants, we replaced some of the energy with lower carbon natural gas generation, which operates more efficiently with renewable energy. We've also negotiated more flexible agreements with natural gas suppliers that enable us to operate the system more reliably and help lower customer costs. We continue to seek out and implement projects that increase the flexibility of our remaining fleet.

- **Cycling baseload plants offline and reducing minimum generation levels**. We operate our coal and nuclear units to accommodate more wind generation, ramping the units down and even turning off coal units, which reduces fuel use and emissions.

- **Investing in transmission**. We are improving and building new transmission facilities for delivering increased wind and solar energy to customers.

- **Adjusting planned maintenance**. We now plan transmission and plant maintenance outages to navigate reliability needs and take advantage of times when wind and solar production is lowest during the year.

- **Winterizing wind turbines**. All the wind turbines that Xcel Energy owns across its three regions are outfitted with cold weather turbine packages that support operations down to -22 F (-30 C).

Larger regional power grid operators and energy markets offer additional flexibility for integrating increased levels of wind and solar power. In the Upper Midwest, Xcel Energy belongs to the Midcontinent Independent System Operator (MISO), which is a non-profit, member-based organization that operates the power grid across 15 U.S. states. Xcel Energy's operations in Texas and New Mexico participate in the Southwest Power Pool (SPP), a regional transmission organization covering the central United States.

In Colorado, Xcel Energy continues to explore participation in a larger regional energy market. We joined with other energy providers in the state in early 2022 to propose joining the Western Energy Imbalance Service (WEIS) Market, operated by SPP. An energy imbalance market is a real-time market in which energy generation from multiple power providers is dispatched at the lowest possible cost to reliably serve customer demand in the region. It's a short-term move that will provide cost savings to customers and improve operational efficiencies while providing the flexibility to continue evaluating a longer-term and broader market structure for integrating wind and solar energy and maintaining system reliability. Larger regional markets can provide renewable resource diversity and help displace thermal generation with renewable energy on neighboring systems more economically. If approved by regulators, we expect to join WEIS in April 2023.

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, even as state requirements continue to evolve. We constantly evaluate our overall compliance strategy with increased target requirements based on individual state legislation.

Renewable Energy Requirements in Xcel Energy States

State	2021	Next Increase	Notes
Colorado Renewable Energy Standard	30%	30% indefinitely	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	15%	—	Goal of 35% by 2025
Minnesota Renewable Portfolio Standard	30% and 1.5% Solar	10% solar goal by 2030	30% of retail sales in 2020, with at least 25% from wind, plus 1.5% of retail sales from solar, with at least 10% of that from on-site solar 40kW or less
New Mexico Renewable Portfolio Standard	20%	40% by 2025	The New Mexico Energy Transition Act increases future 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 RPS Goal	10,000 MW of renewable capacity statewide by 2025 (goal achieved) and non-wind goal of 500MW	Xcel Energy's final RPS is approximately 3.2% of the statewide RPS goal
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. RECs are the unit of compliance for state renewable energy standards as well as some voluntary buyers' sustainability goals. They also provide a mechanism to commoditize renewable energy attributes and are tracked in national REC tracking registries, which are approved by our state public utilities commissions. RECs can be disaggregated or unbundled from the underlying renewable energy.

Xcel Energy uses RECs to comply with state renewable energy standards throughout our operating company service areas. We carefully track our REC ownership and 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. Renewable energy that is unbundled from its associated REC can retain its value to be used for compliance with environmental regulations. In reporting progress against our carbon reduction goals, our company does so based on actual carbon emissions from energy provided to our customers, independent of whether there was a REC associated with that energy.

Xcel Energy's policy is to manage its RECs to best serve its customers and to comply with renewable and carbon emissions requirements. It is also our policy to avoid regulatory penalties for customers. In some of the states we serve, regulatory penalties are applied to RECs not sold within their established shelf life. As of July 2021, we stopped initiating the sale of RECs generated from our portfolio unless it is necessary to avoid such penalties on a jurisdiction-by-jurisdiction basis or the RECs are transferred to or retained by customers as part of voluntary programs or contractual service arrangements.

RECs that accrue in excess of state renewable energy standard compliance may be transferred for a fee to Xcel Energy customers (through Xcel Energy program offerings or wholesale contracts) to help these customers achieve their voluntary and incremental sustainability goals. The company will retire RECs on behalf of these customers or require retirement of RECs post-transfer to avoid double-counting concerns. We continue to provide a residual mix carbon emission intensity by operating system that reflects RECs we have retired on behalf of or transferred to certain customers and RECs sold to avoid regulatory penalties. The residual mix carbon emission intensity also reflects energy purchased through any power purchase agreement where we do not purchase the associated REC.

We provide more detailed information on our 2021 REC sales in the **Data Summary** of Xcel Energy's Sustainability Report. We also provide residual mix carbon emission intensities for customers who participate in our renewable choice programs in the **2021 Carbon Dioxide Emission Intensities Information Sheet**.