



Energy Innovation

Rapidly evolving technology is transforming our industry, driving the transition to clean energy and delivering more sophisticated solutions for serving customers.

New and emerging technologies are foundational to fulfilling our strategic priorities. We need economical, resilient and reliable zero-carbon 24/7 power technologies, as well as advanced storage and new low-carbon fuels, to deliver on our vision of providing net-zero energy by 2050. Technology and innovation are also key to enhancing the customer experience and providing more customer-focused products and services built around evolving energy needs and preferences.

Through collaborations with researchers, technology developers, venture investors and others in our industry, we actively monitor and participate in emerging and advanced energy technologies. We have underway initiatives, pilots and demonstration projects that are advancing and testing the real-world applications of cutting-edge technologies to serve customers today. These partnerships are essential for developing technology because we can't do it alone. It takes the right resources and experience to make projects possible, especially since as a regulated energy provider, our ability to invest in research and development is limited.

We are also fostering a workplace culture of innovation that, combined with new technology, is making our operations more efficient, safer and cost effective. As powerful tools emerge to transform our work, they can improve productivity and enhance the service we provide, benefitting our customers through better service and helping keep energy bills low.

Governance

Xcel Energy's Board of Directors oversees the company's pursuit of advanced energy technologies, with the board's Finance Committee overseeing major investments, including those associated with clean energy and technology. Within the company, the chief financial officer oversees Corporate Development and the company's Innovation and Transformation Office. The chief operations officer is responsible for executing clean energy and fuels projects. Both officers report to the CEO.

Highlights

- Xcel Energy participates in the Low-Carbon Resources Initiative led by the Electric Power Research Institute (EPRI) and GTI. It's a five-year focused research and development commitment to create the pathways to advance low-carbon technologies for large-scale deployment. The goal is to create risk-informed understanding of options and technologies for enabling a clean energy future from 2030 and beyond through global partnerships and demonstrations, applied engineering developments, and technology acceleration of the most promising options.
- We belong to EPRI's Incubatenergy Labs that offers early-stage companies the opportunity to pitch their concepts to a group of leading energy providers, and if selected, prove their innovations over a 16-week period. This accelerated proof-of-concept process provides growth potential for start-up companies that are leading the advancement of electrification, decarbonization and grid modernization. Member companies benefit from exposure to vanguard technologies, with the opportunity to potentially demonstrate and scale the innovations in their operations. For 2022, as a lead sponsor, we've committed to demonstrate some of the finalist company selections alongside our peers.
- Since 2015, Xcel Energy has been a founding participant in Energy Impact Partners, a strategic clean-tech investment fund. We've committed \$120 million to multiple EIP funds that are advancing technologies and driving innovation in our industry.
- In 2021, we committed \$15 million to Energize Ventures, a leading global investment manager that is accelerating digital innovation in energy and sustainability. Energize actively partners with entrepreneurs to drive impact across four key software themes: accelerating renewable deployment, advancing electrification, enabling infrastructure resilience and powering sustainable business. Our investment is for Fund II—technologies from this portfolio of companies are estimated to have already avoided 340,000 metric tons of carbon dioxide equivalent for the year, comparable to taking almost 75,000 cars off the road.
- Xcel Energy joined MSP Equity Fund in early 2022, committing to invest \$2.5 million. This first-of-its-kind fund aims to attract venture capital expertise and investment to support Minnesota-based startups led by Black, Brown and Women founders.
- To examine future partnerships, we signed a memorandum of understanding with NuScale Power to explore the feasibility of becoming a plant operator at NuScale plants. NuScale is a leader in developing advanced small modular reactors that are considered the next generation of carbon-free nuclear energy, and Xcel Energy is a leader in nuclear operations. The agreement doesn't include a formal operating agreement, but it creates a framework for negotiating definitive agreements for our company to work with NuScale.
- The Infrastructure Investment and Jobs Act that Congress passed in 2021 significantly increases Department of Energy funding for deployment of zero-carbon 24/7 power technologies, driving much needed research and development for these priority technologies. Xcel Energy plans to submit applications for the opportunity to demonstrate technologies in our operations at a lower cost to customers through the federal funding. We've developed an internal process for evaluating and tracking technologies and moving them from evaluation to consideration and potential demonstration.
- To foster creativity and innovation, the company launched the XCELab, an incubation and innovation space for Xcel Energy project teams and employees to come together to explore new concepts, test ideas and find ways to build the future of energy.

Clean Fuels

Hydrogen and other clean fuels have quickly become promising options for meeting future energy needs as the technologies advance. We're exploring using clean fuels to produce electricity to support grid reliability as we add large amounts of wind and solar power to our systems, as well as to provide a clean alternative to natural gas for heating homes and other uses.

Not only can the fuels help achieve our environmental goals, but they also present a potential growth opportunity for the company. In early 2022, we established a new business unit to focus on the development of hydrogen and other clean fuels. We're already starting to build the business through the following projects:

- **Carbon-free Hydrogen Production Demonstration:** Engineering and sourcing are underway on a new, innovative pilot that will use electricity generated at the Prairie Island Nuclear Plant in Minnesota to produce hydrogen, beginning in early 2024. The Department of Energy awarded Xcel Energy approximately \$10 million for the \$12 million project, which will use a semi-trailer sized high-temperature steam electrolysis system and electricity and steam from the plant to produce hydrogen from water.

Because nuclear energy is carbon free, the hydrogen produced through the project will be created without carbon emissions, significantly advancing how hydrogen is produced today. Hydrogen and oxygen molecules in water will be separated using a high-temperature electrolysis process, which is a more environmentally sustainable way to produce hydrogen, compared to traditional low-temperature electrolysis methods. At full capacity, the pilot system will be able to produce about 90 kilograms of hydrogen per day. If scaled up in the future, this carbon-free hydrogen could potentially be used in numerous industries, including oil and gas, ammonia production for agriculture, and potentially transportation and power generation, many of which could benefit from efficient, local hydrogen production sources.

- **Hydrogen Blending Pilot for the Natural Gas System:** Starting in late 2023, we plan to inject up to 10% hydrogen into a subsystem of our natural gas distribution piping network. This demonstration will support the viability of introducing hydrogen as a low-carbon fuel into our gas system to help reach our net-zero vision for natural gas by 2050.
- **Renewable Natural Gas:** In Colorado, we've worked with South Platte Water Renewal Partners and the City of Boulder Water Resource Recovery Facility to interconnect renewable natural gas from wastewater treatment plants. We purchase the gas from South Platte as part of our supply, and transport the gas for City of Boulder. The projects are a first step in greening our natural gas supply and support the carbon reduction goals at these two customer facilities.

Looking ahead to new opportunities, we're working with our states and plan to apply for Department of Energy funding for hydrogen hub projects in our regions. Hydrogen hubs connect clean resources that can produce hydrogen to multiple end uses, such as power generation, industrial processes, transportation and residential gas use. We also continue working with customers interested in renewable natural gas.

Find more information about our clean energy goals and participation in research projects in the [Leading the Clean Energy Transition brief](#) in Xcel Energy's Sustainability Report.

Energy Impact Partners (EIP)

EIP is a collaborative, strategic investment platform that provides capital primarily to clean-tech companies that seek to optimize energy consumption and improve sustainable energy generation. Investments have included multiple advancements from distributed energy resources to storage, electric vehicles, advanced data analytics, cybersecurity, microgrid applications, and other clean energy technologies.

Xcel Energy first joined EIP's Fund I in 2015 as a founding participant. The collaboration originally began with about 15 utility and industrial participants and has since expanded to more than 25 participants, including European investors. EIP offers the opportunity to better understand technology's impact on our business and drive greater efficiency and innovation to meet evolving customer needs.

Several years ago, we recommitted and joined EIP's Fund II. Since then, we've expanded our participation to include other funds, including:

- **Frontier Fund:** We are co-chairs of this fund that targets investment into companies focused on eliminating carbon emissions from the power sector, including zero-carbon energy generation, clean hydrogen, energy storage, transportation electrification and carbon capture.
- **Elevate Fund:** The fund, which we also co-chair, invests in clean-tech companies founded or run by diverse leaders in targeted sectors, such as digital infrastructure, smart buildings or cities, customer engagement, mobility and electrification, supply chain, distributed energy, and cybersecurity.
- **Energy Impact Credit Fund:** The purpose of this fund is to support investment in small U.S. businesses in the emerging energy sector.

Altogether, we have invested \$120 million in EIP funds. By joining with peer companies, we gain greater visibility into the business models and technologies of promising companies and can influence emerging business models so that energy companies and third parties can collaborate and grow together.

This collaboration also allows us to share diverse, global perspectives and insights into policy and regulations, positioning our company to successfully manage new trends, rules and other requirements in the states we serve. We are gaining insights that inform our strategic decisions and how we conduct business across our organization from energy supply to distribution, customer solutions and cybersecurity.

Electric Power Research Institute (EPRI)

Through our long-time membership with EPRI, we gain insights into the challenges and opportunities associated with using advanced clean energy technologies and reducing carbon emissions. This includes EPRI's work on electric system resiliency, climate scenario analysis and greenhouse gas reduction goals, as well as renewable integration, electric vehicles, combined heat and power, customer demand response and energy efficiency.

EPRI also informs our regulators and customers on the technical and economic issues, opportunities and challenges related to new grid technologies, such as energy storage and distributed generation. In this collaborative research environment, we engage with other organizations that are testing and evaluating new technologies or products and that are developing tools and methodologies to optimize the use and analyze the effects of distributed energy resources on the power grid.

SolarTAC

The Solar Technology Acceleration Center (SolarTAC) in Aurora, Colorado, is a world-class facility for demonstrating and validating advanced solar and distribution grid technologies in a real-world, grid-connected environment. Even before the project's grand opening in 2011, Xcel Energy recognized the potential benefit of the facility and signed on as an original founding member.

Our investment has paid off for customers. Not only have we tested important battery projects at the site, but solar technologies fine-tuned at SolarTAC serve our customers in Colorado and New Mexico with more cost-effective, efficient solar energy. Through testing, solar developers were able to adjust their technology for adverse weather conditions before installing it in our service area. For 2022, we are exploring the possibility of demonstrating new long-duration battery energy storage technologies at SolarTAC. These new capabilities could provide customers with greater resiliency and reliability as more renewable energy, electric vehicles and other loads are added to the power grid.

To continue evolving with technology and developer needs, the 74-acre site has transitioned to become a testbed for solar, storage and other distributed energy enabling products and components. GridNXT at SolarTAC now supports the demonstration of advanced technologies for integrating distributed generation and storage, including microgrid capabilities at the edge or end of the electric distribution system.