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2023 ENERGY FACTSHEET

Tracking MN's clean energy trends

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2023 MINNESOTA ENERGY FACTSHEET

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The Business Council for Sustainable Energy®

The year 2022 was both an exciting and challenging time for Minnesota's energy industry. It started off with some hurdles: supply chain constraints, solar tariff cases, and workforce shortages led to small growth in new renewable energy installations. Global instability from the war in Ukraine led to energy price increases for gasoline, natural gas, and other commodities. Grid congestion also made interconnecting projects to the electricity grid a challenge.

Mid-year, it took a positive turn with record breaking announcements that will propel the industry's growth even further. In July, the Midcontinent Independent System Operator (MISO) announced approval of its Long Range Transmission Planning (LRTP) Tranche 1 Portfolio, their largest investment in transmission infrastructure to date. Tranche 1, an estimated $10.3 billion investment, will support an additional 53 gigawatts (GW) of renewables across its footprint. This investment is the first of four planned expansions of the MISO transmission grid.

In August, the federal government enacted two major pieces of legislation impacting the energy industry: the CHIPS and Science Act and the Inflation Reduction Act (IRA). These laws provide a variety of incentives and new programs to spur innovation and development within the clean energy industry, with an estimated investment of more than $500 billion by the federal government.

The business community is already responding to the opportunities presented by these bills. As a result of the incentives around hydrogen production, Cummins announced a new electrolyzer manufacturing facility in Fridley, MN, with an initial annual production capacity of 500 megawatts (MW) and the creation of 100 new jobs starting in 2024.

In September, the Walz-Flanagan Administration announced Minnesota's Climate Action Framework.[1] This plan details goals for the state to adapt to climate change and continue to decrease greenhouse gas emissions from Minnesota's economy. The framework sets goals in six areas: clean transportation, climate-smart natural and working lands, resilient communities, clean energy and efficient buildings, healthy lives and communities, and clean economy. The overarching goals are for the state to have a carbon-neutral economy by 2050; to ensure Minnesota's businesses, communities, and natural environment are resilient in the face of climate change; and to create an equitable transition to a carbon-neutral economy for all Minnesotans.

This report provides a fact-based overview of Minnesota's energy sector. It presents key metrics and highlights recent trends.

[1] https://climate.state.mn.us/minnesotas-climate-action-framework

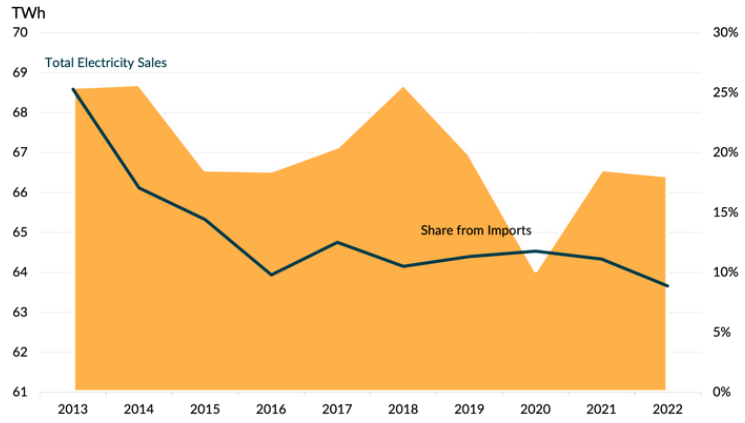
- Zero-carbon power generated 55% of Minnesota's power last year - remaining the **MAJORITY OF MINNESOTA'S ELECTRICITY.**
- **RENEWABLE TECHNOLOGIES** provided nearly **ONE-THIRD** of Minnesota's generation in 2022.
- Minnesota continues to **OUTPACE THE NATION** in power sector emission reductions - now nearly 50% below 2005 levels vs. the 40% reduction nationwide.
- Power sector emissions in Minnesota DECLINED 7% in 2022 with an overall decline of nearly 35% in the last decade.
- Minnesota has slashed energy imports **BY MORE THAN HALF** – with just 9% of energy imported in 2022, compared to 25% a decade ago.
- Renewables account for 81% of **ALL NEW POWER-GENERATING CAPACITY** built in Minnesota in the last decade.
- In 2022, wind and solar accounted for **NEARLY ALL** (96%) new generation capacity added in Minnesota.
- The American Council for an Energy-Efficient Economy ranked **MINNESOTA** 10th for its overall energy efficiency programs (the **HIGHEST RANKING** in the Midwest).
- Despite average energy productivity declining in the U.S. last year, Minnesota's **ENERGY PRODUCTIVITY** increased to 31% from 29% in 2021.
- Minnesotans are increasingly choosing electric vehicles. There are currently **FOUR TIMES** as many EVs on Minnesota roads as there were in 2018.

Overview of Minnesota's Electric Sector

Zero-carbon power provided the majority of Minnesota's electricity generation for the third year in a row, up to 55% in 2022, significantly ahead of the national share of 41%. Minnesota's clean energy industry employs nearly 58,000 workers, and the industry grew in line with the state's overall workforce in 2021. While job growth remains steady, the total clean energy workforce is still below the pre-pandemic peak of nearly 62,000 workers.

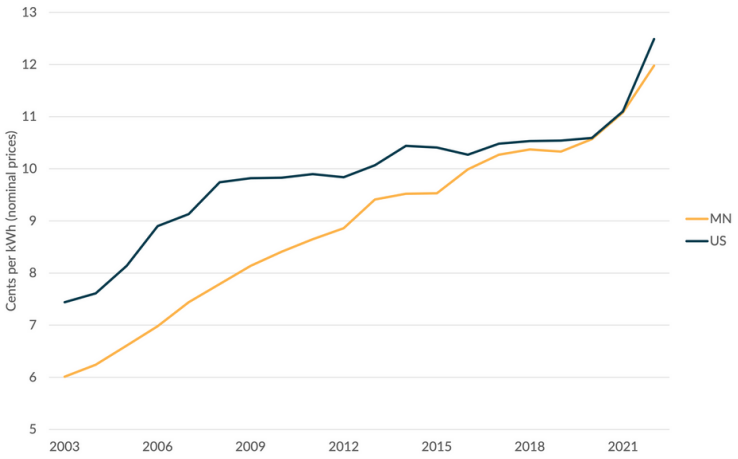
Minnesota consumed 66 terawatt-hours (TWh) of electricity in 2022 and imported 5.9TWh (Figure 1). That marks the lowest level of imports for two decades. Imported electricity accounted for 9% of consumption in 2022, down from 25% in 2013. Total electricity consumption in Minnesota declined 0.3% last year.

Figure 1: MN electricity sales and generation



Source: BloombergNEF, EIA.

Figure 2: MN average retail electricity prices relative to US average



Source: Minnesota Department of Commerce, EIA.

Consumer electricity prices in Minnesota as measured on a cents-per-kilowatt-hour (cts/kWh) basis have been rising for residential, commercial and industrial clients over the last decade (Figure 2). These increases are due to a number of factors, including higher natural gas prices in 2022 and utility infrastructure investments. In 2022, Minnesota consumer electric rates averaged 11.98cts/kWh, up 8% from 11.08cts/kWh in 2021 and up 27% since 2013 (in nominal terms). Minnesota's total average electricity prices today are below the U.S. total average of 12.49cts/kWh.

Minnesota's electricity generation mix continues to trend away from coal-fired generation and toward renewables and natural gas (Figure 3). In the last 10 years, no new coal-fired power plants were built in the state, and renewables accounted for 81% of all new capacity. All other additions were natural gas and oil plants. In 2022, Minnesota built primarily renewable power plants, totaling 228MW of new wind and solar generation (Figure 4). Over the last decade, Minnesota retired 953MW of coal-fired power plants, and all coal plants located in Minnesota plan to retire by 2035. The implementation of Minnesota's Climate Action Framework will continue this trend, as a primary goal is the expansion of carbon-free electricity.

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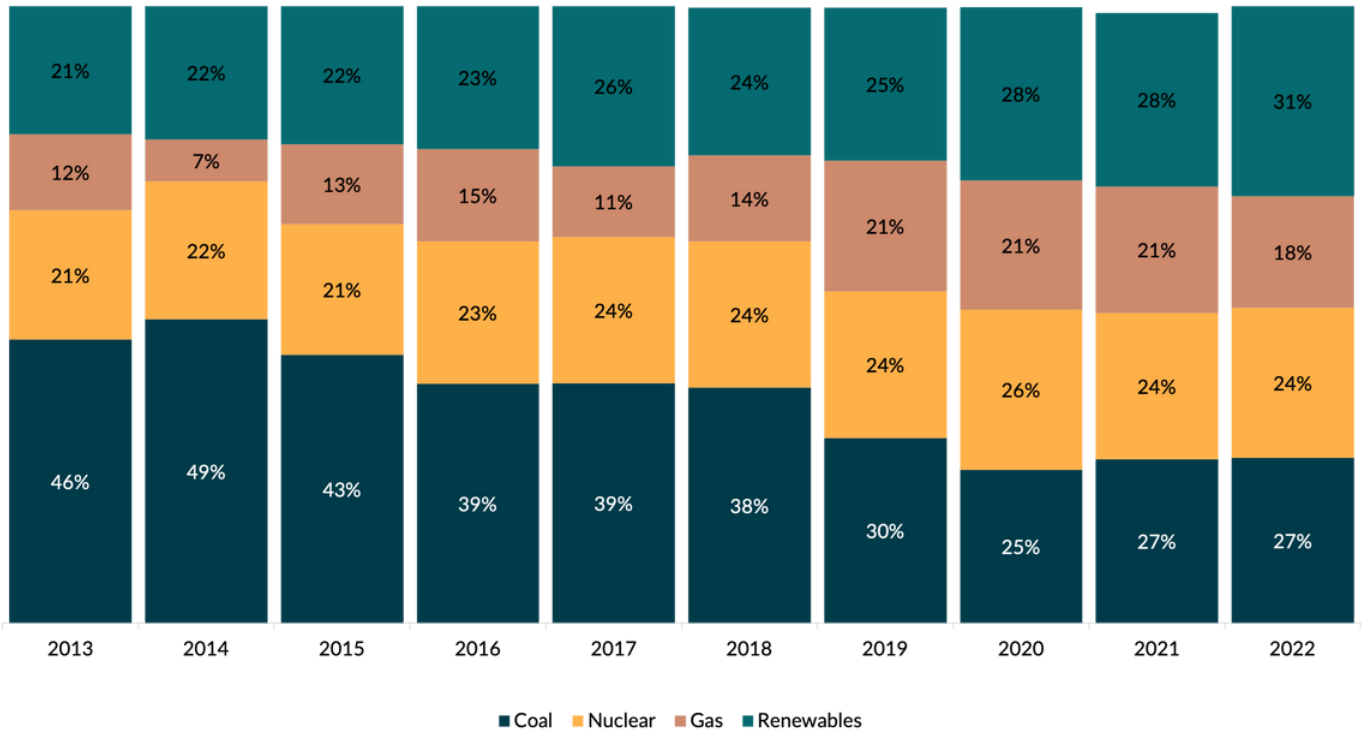
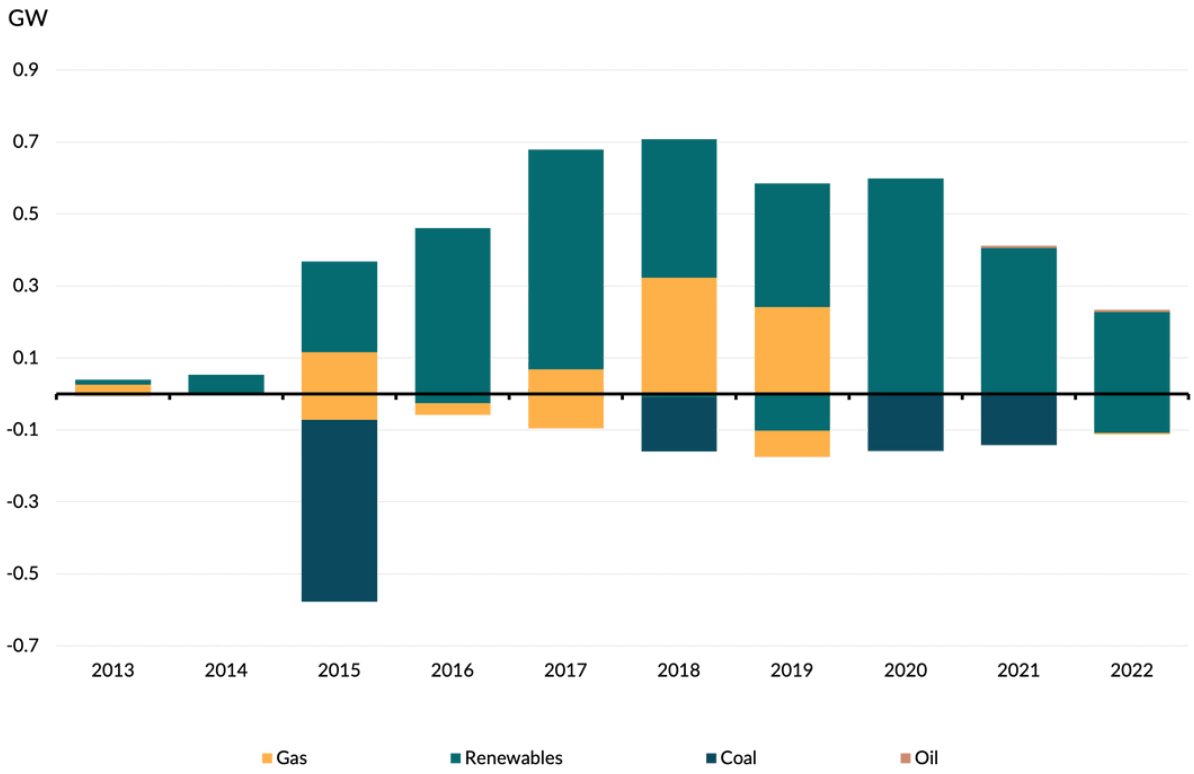
Figure 3: MN electricity generation mix by technology



Source: BloombergNEF, EIA.

Figure 4: MN capacity build and retirements



Source: BloombergNEF, Minnesota Department of Commerce. Note: 2022 values include estimates for year-end build and retirements.

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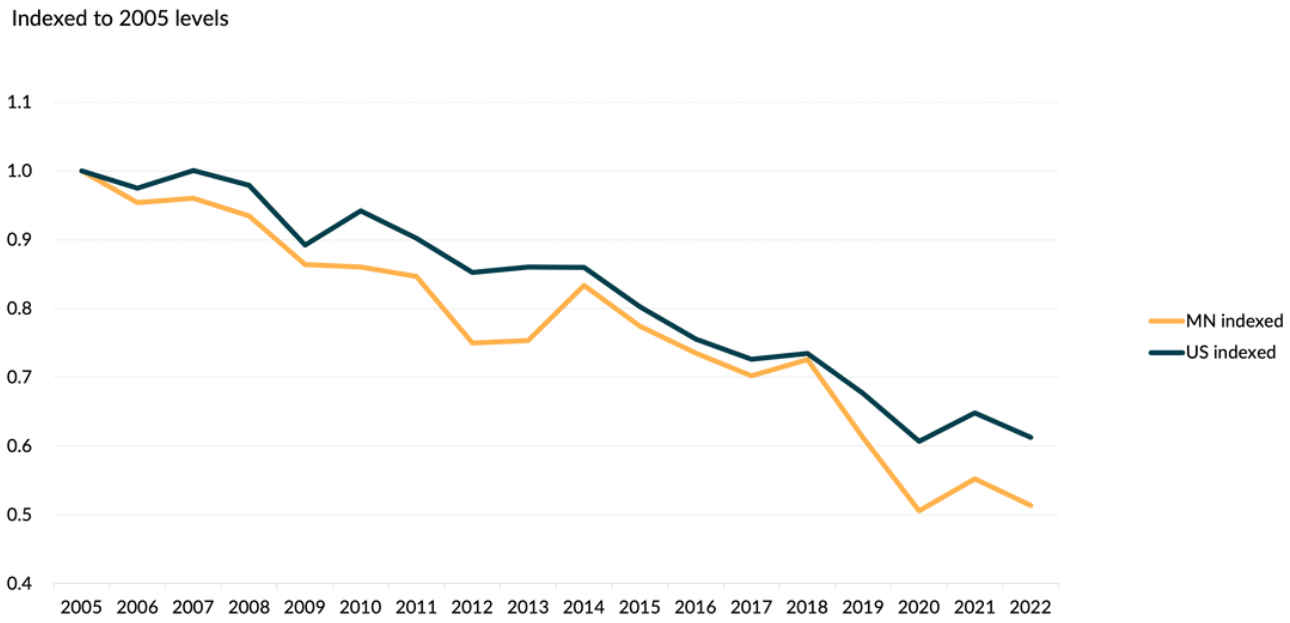
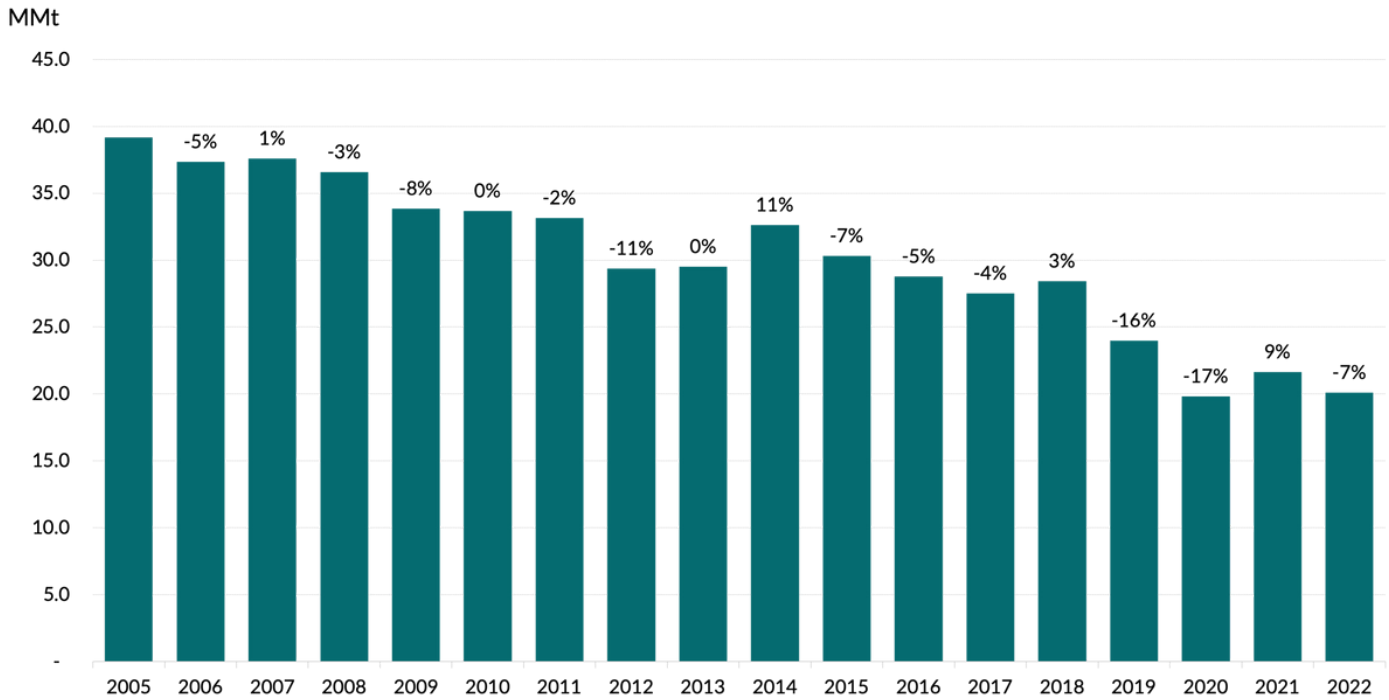
Due to these shifts, power sector carbon dioxide (CO2) emissions have fallen 50% in Minnesota since 2005 (Figure 5). In this timeframe, Minnesota has reduced power sector CO2 emissions faster than the U.S. average. In 2022, power sector CO2 emissions decreased 7% from 2021 levels, bringing emissions near to 2020 levels (Figure 6). National power sector emissions dipped 1.5% in 2022.

Figure 5: MN power sector carbon (CO2) emissions vs U.S. emissions



Source: BloombergNEF, EIA.

Figure 6: MN power sector carbon emissions, with year-over-year percent changes



Source: BloombergNEF, EIA. MMt = million metric tons

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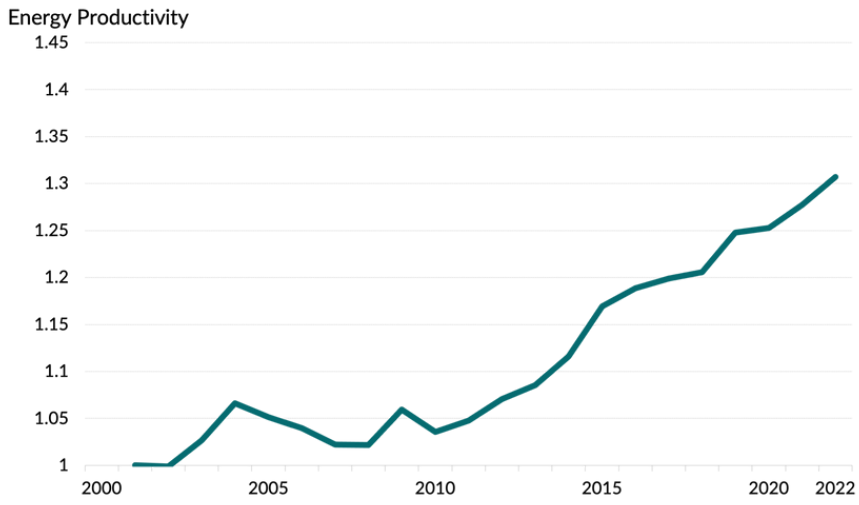
Sustainable Energy Deployment

Energy Efficiency

Minnesota continues to demonstrate its leadership in energy efficiency policy and realized energy savings. The state has seen a 31% boost in energy productivity over the last decade, a measure of the economic benefit gained from each unit of energy used (Figure 7). Minnesota is also a regional leader in energy efficiency, again ranking in the top 10 nationally and the highest in the Midwest for its overall energy efficiency programs and policies, according to the American Council for an Energy-Efficient Economy (ACEEE).

Figure 7: MN energy productivity



Source: BloombergNEF.

Minnesota has made energy efficiency a goal for electric and gas utilities since the 1980s, and the state continues to innovate on those policy incentives and goals. The Conservation Improvement Program (CIP) is a utility-administered program with regulatory oversight provided by the Minnesota Department of Commerce. Utility CIP portfolios promote energy-efficient technologies and practices by providing rebates, marketing, and technical assistance to utility customers. Energy conservation programs help Minnesota households and businesses lower their energy costs by using electricity and natural gas more efficiently.

Each dollar spent on CIP generates nearly $4 of societal benefits.[2] According to the Minnesota Department of Commerce, through 2020 (the most recent statewide CIP data available), Minnesota's electric utilities have met or exceeded 1.5% annual energy savings each year since 2011 (Figure 8). Additionally, the state's natural gas utilities have generally met or exceeded 1% energy savings each year (Figure 9). In total during 2019 and 2020, Minnesota businesses and residents saved more than $253 million in energy costs from CIP.

In 2021, Governor Tim Walz signed the Energy Conservation and Optimization Act (ECO Act) into law, which modernizes CIP with a more holistic approach to energy efficiency programming. The ECO Act increased the state's overall economy-wide energy savings goal from 1.5% to 2.5%, which includes savings from utility energy efficiency programs and also savings from rate design, efficient improvements to utility infrastructure, advancements in the state's energy codes and more. The ECO Act also increased the investor-owned utilities' minimum spending requirements for electric and gas utilities for energy efficiency programs that serve low-income customers. On March 15, 2022, the Minnesota Department of Commerce issued technical guidance for investor-owned and consumer-owned utilities to implement key provisions of the ECO Act, including how to determine if a fuel switching improvement meets required statutory criteria and to calculate energy savings associated with such improvements.

[2]Cadmus. 2020. Economic Impacts of the 2013-2018 Conservation Improvement Program. *https://www.cards.commerce.state.mn.us/CARDS/security/search.do?documentId=%7bB6869C0A-433B-4976-B57D-E0EA57CC84B6%7d*

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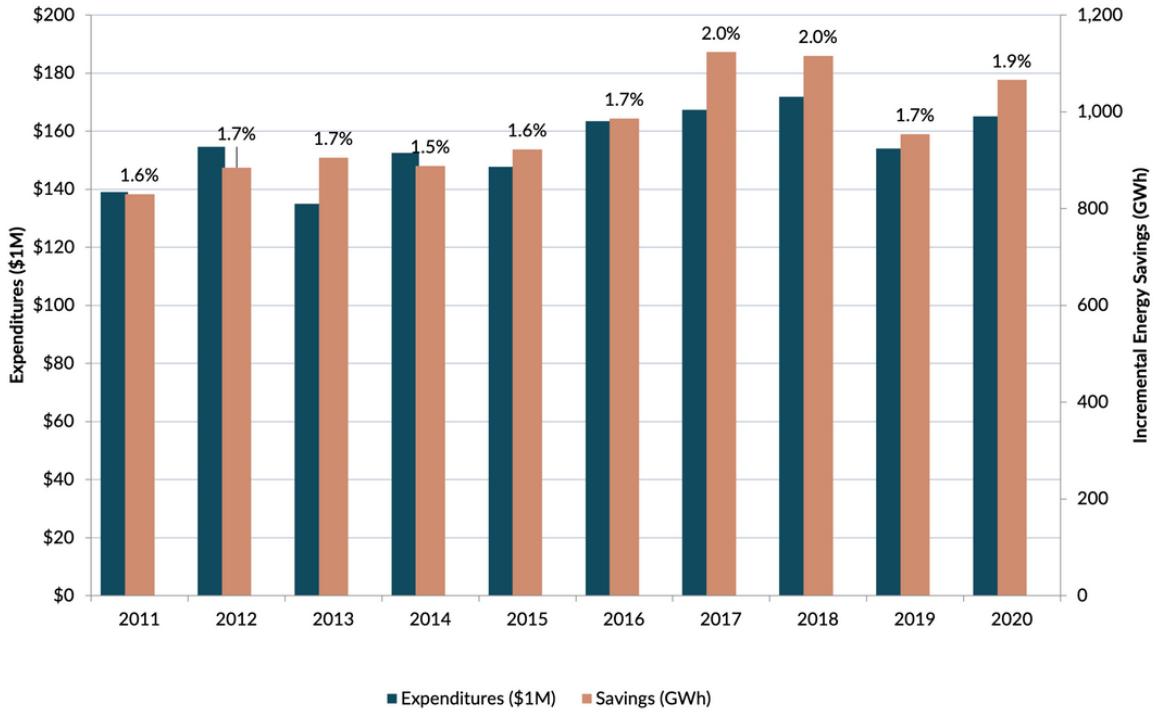
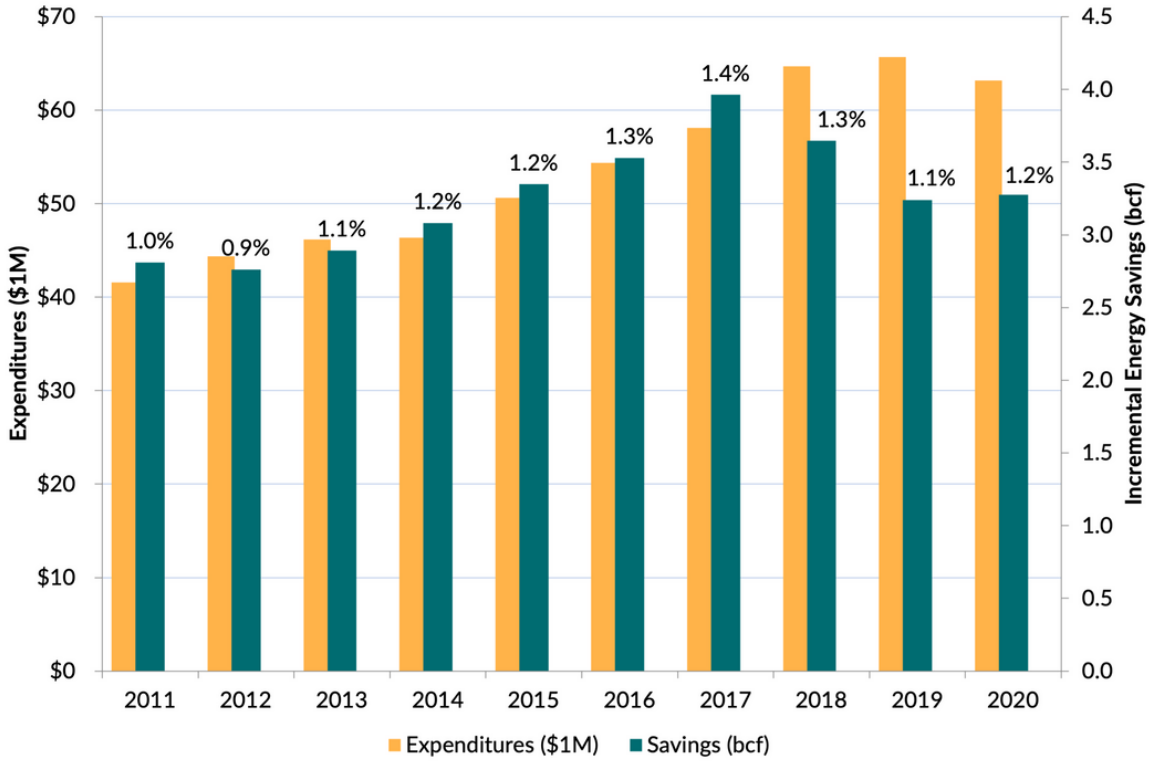
Figure 8: Conservation Improvement Program (CIP) Electric Utilities Results



Source: Minnesota Department of Commerce.

Figure 9: Conservation Improvement Program (CIP) Natural Gas Utilities Results



Source: Minnesota Department of Commerce.

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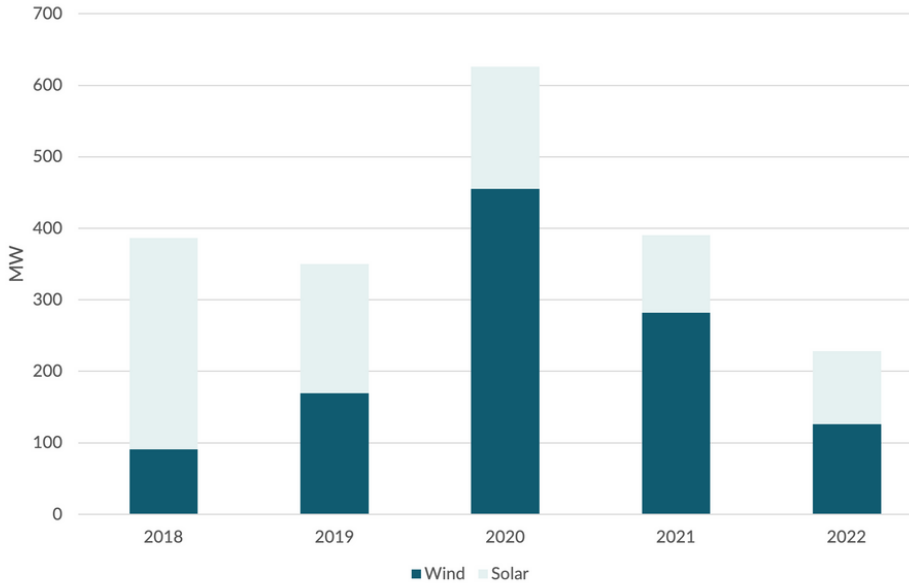
Renewables

Figure 10: MN wind and solar capacity additions



Source: Minnesota Department of Commerce.

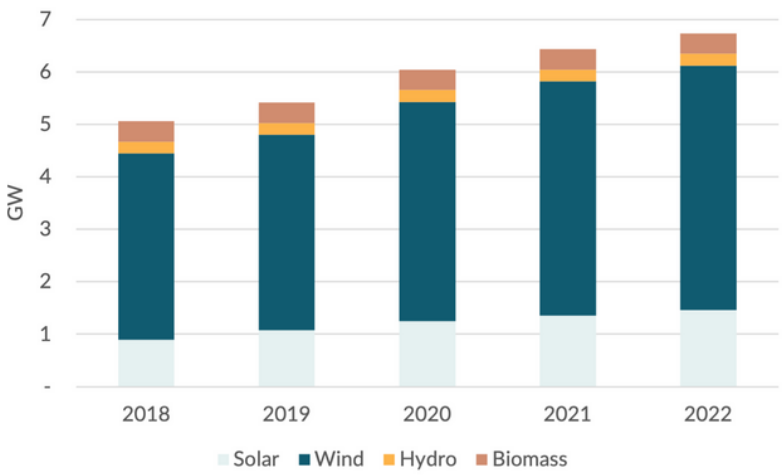
Minnesota continues to invest more in renewable electricity generation, driven both by policy and market factors. Minnesota first enacted a Renewable Energy Standard (RES) in 2007, setting initial targets for electricity generation from renewable sources. Minnesota utilities surpassed these goals eight years early, and in 2022, the Minnesota State Legislature introduced bills to set a target of 100% clean energy by 2040, as supported by Governor Walz.

In 2022, wind was the largest renewable energy source at 24% of all power generated, and it was also the second largest source overall, behind coal and in line with nuclear power. Solar provided another 3.4%, hydro 1.3%, and biomass/waste-to-energy 2% of electricity. Over the last decade, Minnesota added primarily renewable energy to its generation mix, adding 3.4GW, enough generation to supply more than 2.5 million households.[3] This included 1.4GW of solar and 1.8GW of wind, plus 48.5MW of biomass and small hydro.

Renewable energy capacity additions have fluctuated during the past five years, continuing to grow, but at varied rates. In the past five years, 2GW of new renewable capacity was added, including 860MW of solar and 1.1 GW of wind (Figure 10). The growth in 2022 was smaller than in previous years, due to supply chain constraints and uncertainty over solar tariffs.

The overall trend of growth has led total installed renewable capacity in Minnesota to rise up to 6.7GW in 2022 (Figure 11), effectively doubling the capacity installed since 2012. Wind accounts for more than two-thirds of total capacity, while solar is responsible for one-quarter. The Minnesota Public Utilities Commission approved Xcel Energy's plan to build a 460MW solar or solar + storage installation to replace its coal-fired Sherco power plant site, which will be fully retired by 2030. This project will be Minnesota's largest single solar installation, and also the lowest cost solar project in Xcel Energy's upper Midwest region.

Figure 11: MN cumulative renewable capacity



Source: Minnesota Department of Commerce.

[3] Minnesota Department of Commerce data has been adjusted since the last report, reflecting corrections to the timing of installations and more complete information from small utilities.

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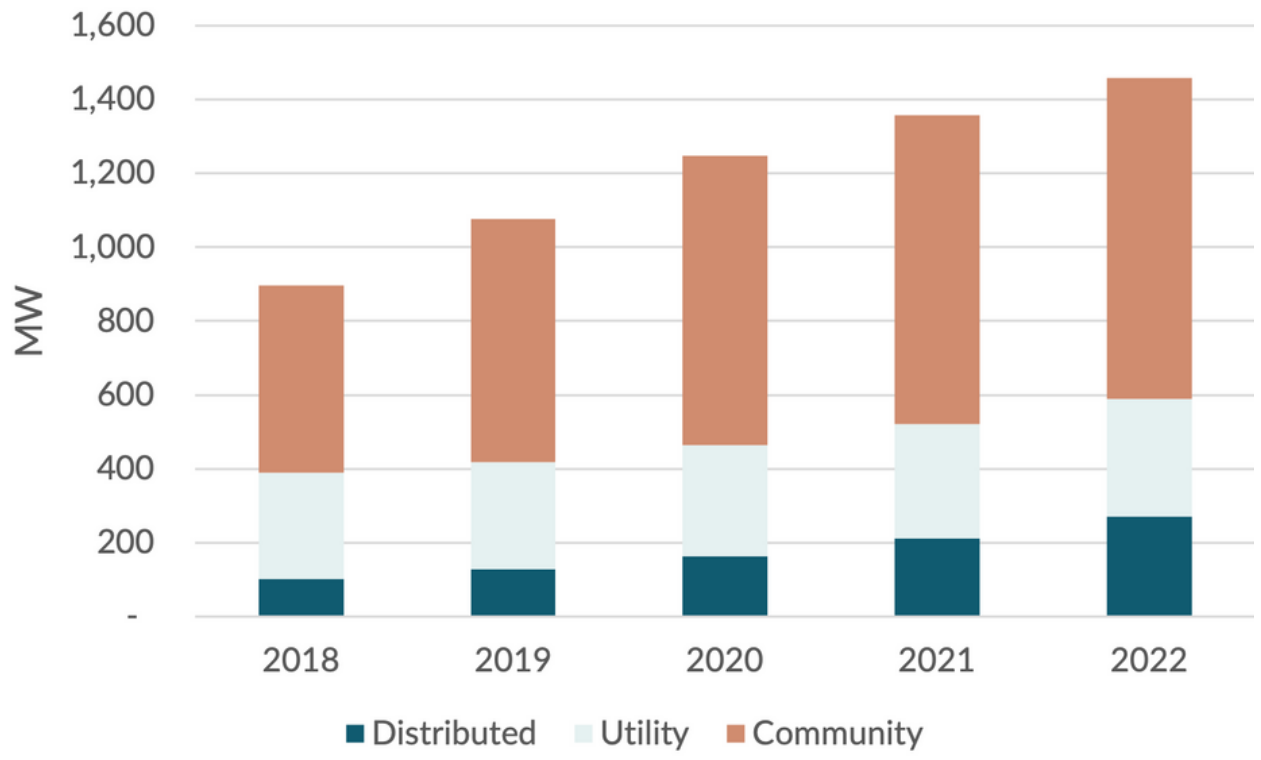
Distributed solar's contributions are growing in Minnesota. In 2022, installed residential, commercial, and industrial photovoltaic (PV) systems rose from 212MW to 270MW.[4] The largest industrial project announcement came from Minnesota fuel refinery, Flint Hills Resources, which is developing a 45MW solar array connected to its Rosemount facility. This project is expected to be the largest direct use of solar energy in the country. A 2013 law that created the solar carve-out under the state's RES also established a framework to promote community solar. This led to a boom in community solar activity, leading to a cumulative operational capacity of 868MW by the end of 2022. (Figure 12).

Renewables will also be a huge beneficiary of policy implemented at the federal level, particularly from the IRA. While rule-making and implementation are still ongoing, 10-year extensions of tax credits for renewable generation technology, as well as new and added flexibility for the types of technologies and projects that qualify as well as the entities which can take advantage of these credits, will accelerate the growth of renewables across Minnesota.

Figure 12: MN cumulative installed solar capacity



Source: Minnesota Department of Commerce.

[4]Minnesota Department of Commerce data has been adjusted since the last report, reflecting corrections to the timing of installations and more complete information from small utilities.

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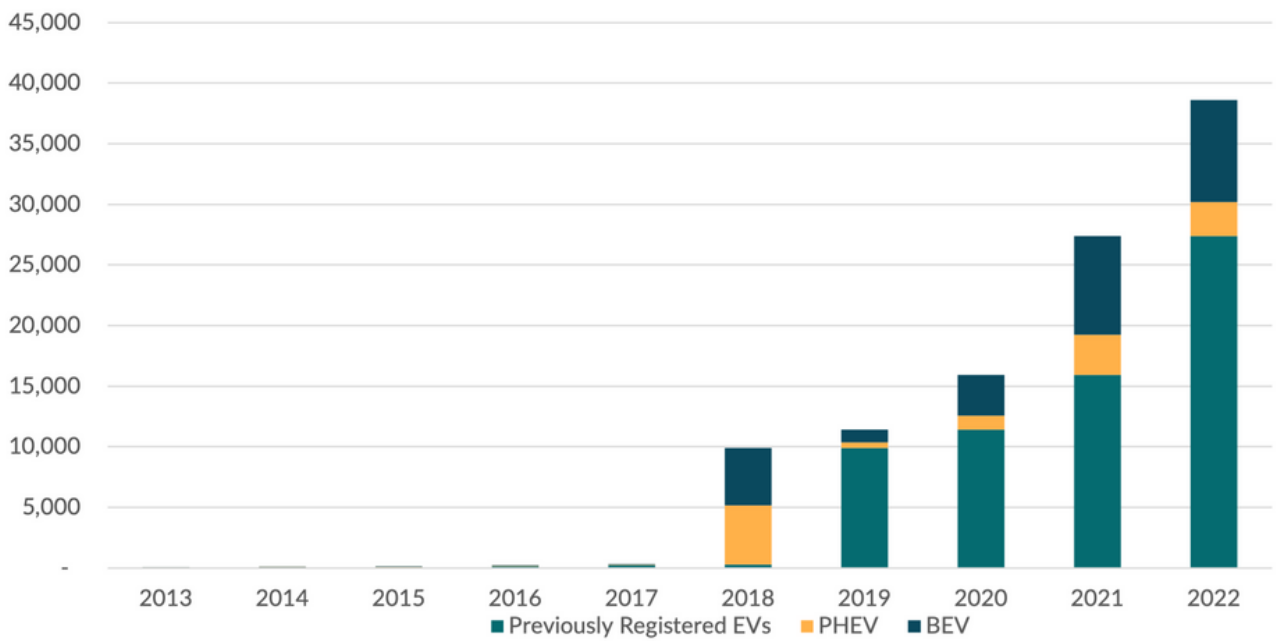
Electric Vehicles

The growth in sales of electric vehicles (EVs), including battery electric vehicles (BEVs) and plug-in hybrid electric vehicles (PHEVs), continue to be strong in the U.S. The IRA renewed a $7,500 tax credit for many models available in the U.S. in 2022, which boosted late year sales. In 2024, consumers will be able to use the EV tax credit to lower the cost of the vehicle directly instead of taking it later as a credit on taxes owed, which is expected to have a greater impact on EV car sales.

In 2022, U.S. consumers registered more than 750,000 EVs. Though overall car sales declined in 2022, due to supply chain and economic constraints, the sales of EVs increased 57%. EV registrations now represent 5.8% of light-duty registrations in the U.S., up from 3.1% in 2021. By the end of 2022, an estimated 2.4 million of these vehicles were on U.S. roads.

According to the Minnesota Department of Transportation (MnDOT), as of December 2022, the state had approximately 39,500 EVs on the road.[5] From 2018 through 2022, annual BEVs registrations doubled to 8,400 units. Annual PHEVs registrations dropped 40% to 2,800 units. Combined annual registrations totaled 11,250 in 2022 (Figure 13). This was slightly lower than in 2021, due to supply chain challenges from the Covid-19 pandemic and global instability.

Figure 13: MN cumulative annual electric vehicle registrations



Source: Minnesota Department of Transportation. Note: PHEV is plug-in hybrid electric vehicles, BEV is battery electric vehicles.

[5] The Minnesota Department of Transportation has changed the data collection, reflecting a change in numbers from past reports.

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Transportation is the sector which contributes the most greenhouse gas emissions in Minnesota's economy, making it a focus for meeting the Climate Action Framework goal of a carbon-neutral economy. Minnesota became the first Clean Cars state in the Midwest in 2021, though the administrative decision has been politically polarizing. In 2022, the Minnesota Automobile Dealers Association sued the state to stop the implementation of this rulemaking, and the issue played a role in political conversations during November elections. Enforcement of the rule will begin with vehicle model year 2025.

The Climate Action Framework will also create a statewide EV plan, and the state is leveraging all available funds to improve EV charging infrastructure. This funding includes part of the $47 million Minnesota received in the settlement with Volkswagen over emission standards, which can be spent on funding direct vehicle replacement or EV charging infrastructure. Minnesota is also investing the $68 million it was allocated from the bipartisan Federal Infrastructure Investment and Jobs Act (IIJA) for EV charging infrastructure. MnDOT has laid out the first planned charging installations and is in conversations with stakeholders across the state to plan the next phase. The state is also exploring creating a clean fuels standard to further decarbonize the sector.

Minnesota has increased activity in the electrification of other transportation sources as well. New Flyer manufactures electric buses at its St. Cloud location, and increased demand for their product has ensured the continuation of operations in Minnesota. New Flyer has been named as a Partner of Choice for over $380 million of grants from the Federal Transit Authority, and they signed contracts for more than 1,300 electric buses in 2022 alone.

The Metropolitan Council submitted its first zero-emission bus transition plan to the Minnesota Legislature in February 2022. Building off a pilot program with electric buses that began in 2019, this transition plan highlights short-, medium- and long-term goals for the transit agency as it decreases emissions from its fleet. Southwest Transit, which operates in the Twin Cities metro, received a grant to replace 10 gas/diesel vehicles with electric versions by 2026. The Duluth Transit Authority completed its evaluation of an electric bus pilot program in 2022, in partnership with the National Renewable Energy Laboratory and the Center for Transportation and the Environment. Other regional transit authorities, including Mankato, are considering adding more electric buses to their fleets. The Minnesota Pollution Control Agency has also granted some of the Volkswagen settlement funds to replace heavy-duty vehicles, such as school buses and trucks, with EV options.

The 2023 Minnesota Energy Factsheet is produced by Clean Energy Economy MN and the Business Council for Sustainable Energy, with data contributions from the American Council for an Energy-Efficient Economy, BloombergNEF, and the Minnesota Department of Commerce, and with the support of the McKnight Foundation.

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