HVDC
MODERNIZATION PROJECT

minnesota power
AN ALLETE COMPANY

PROJECT OVERVIEW

Minnesota Power plans to modernize and upgrade its existing High-Voltage Direct-Current (HVDC) Terminal in Northeastern Minnesota, the eastern endpoint of a 465-mile direct-current transmission line from North Dakota.

The terminal has served Minnesota Power well, but it is now 45 years old and has exceeded its 30-year design life. This project includes modernizing and upgrading the terminal, along with the western terminal in North Dakota, with new technology to meet the need for safe and reliable energy today and into the future.

As we and other energy companies across the nation add more renewable energy sources to our energy mix, the value of this transmission line and its terminals will only grow. This project is critical to ensure a reliable grid that can expand to deliver renewable energy to where it's needed by our customers. It also continues the safe delivery of electricity across an existing corridor to meet the growing demand for energy in an increasingly electrified economy.

The project will increase the size of the terminal's footprint in Solway Township and require three one-half mile transmission lines next to the terminal.

PROJECT BENEFITS

Modern energy control and conversion equipment will improve the reliability of the transmission line and prepare for the renewable energy future.

Technology upgrades present a cost-effective opportunity to substantially increase the operating capacity of the terminal to allow the future transfer of additional renewable energy.

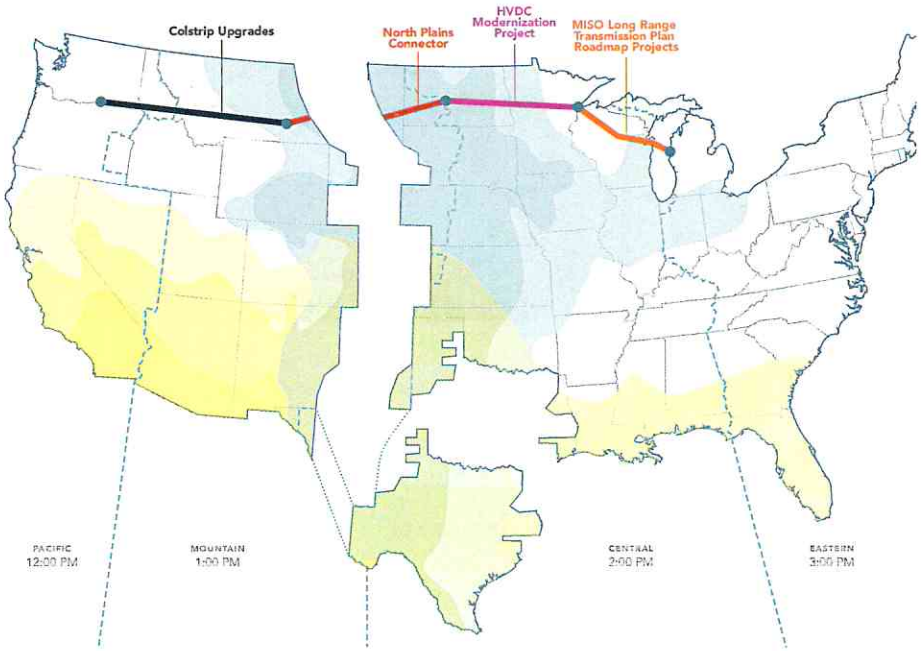
The upgrade will create a bi-directional line allowing energy to flow in either direction to where it is needed.

GREAT LAKES – PACIFIC POWER INITIATIVE

THE GREAT LAKES – PACIFIC POWER INITIATIVE IS AN AMBITIOUS, MULTI-PARTY TRANSMISSION PROJECT THAT WILL CONNECT THE UPPER MIDWEST/GREAT LAKES REGION WITH THE PACIFIC NORTHWEST.

The Great Lakes – Pacific Power Initiative

1. Span all four time zones in the US, from Michigan to Oregon
2. Bridge the Eastern and Western Interconnections with key energy drop off locations to optimize system flexibility
3. Connect the robust wind regimes and other energy resources of the Upper Midwest to the hydro, solar and wind of the Pacific Northwest
4. Combine high voltage alternating current (HVAC) lines and fully controllable voltage source converter high voltage direct current (HVDC) segments



Strategic Transmission for Efficiency and Reliability

The best way to take full advantage of diverse generation types and distinct regional generation profiles is a robust grid. Sharing baseload and intermittent generation resources across thousands of miles via HVAC and HVDC transmission lines will allow full optimization of these diverse resources.

Connecting geographies also enhances grid resiliency. Severe weather will be a key driver of energy supply volatility in the future. Extreme weather events impact areas that span hundreds – but not thousands – of miles. Connecting large electric systems will dramatically enhance the ability of each system to reliably serve load in the face of these weather events and will help grid operators to manage day-to-day wind and solar variability. New carbon capture and storage (CCS) resources will have the ability to reach markets east and west.

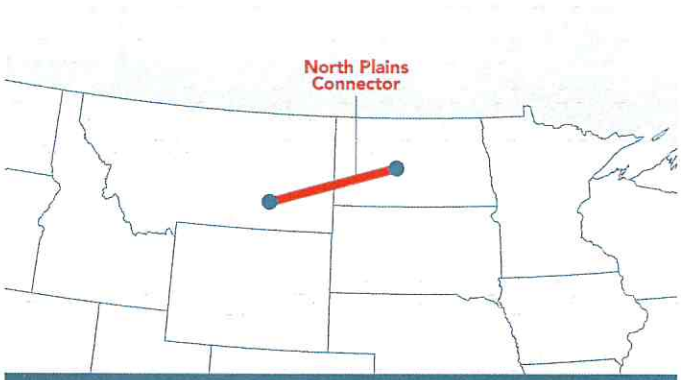
Transmission Planning Underway

While ambitious, the Great Lakes-Pacific Power Initiative is within reach and can be completed in the next decade. Significant portions of the rights-of-way are either in place or currently being acquired. All of the segments make sense on a stand-alone basis such that sequencing the segments is not critical to realizing benefits but the combined benefit of the link is even more valuable from energy diversity, reliability, and value optimization perspectives. Additionally, the Great Lakes - Pacific Power Initiative provides optionality in terms of generation sources likely to grow over the next 50 years, including CCS, solar and wind generation.

Project Descriptions

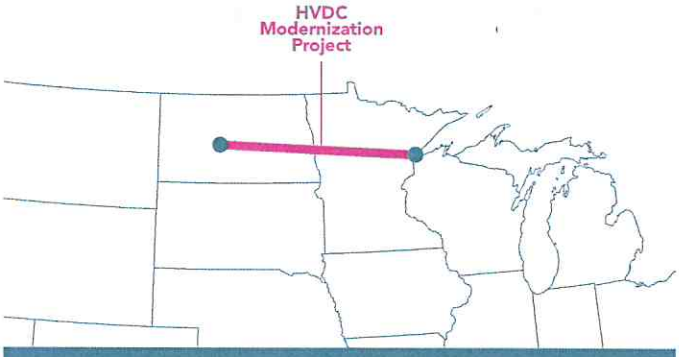
Colstrip Upgrades

Colstrip transmission assets in Montana and Washington will be utilized along with upgrades currently under study to improve capacity from Montana to points west.



North Plains Connector

A 3000 MW HVDC project, under development by Grid United and ALLETE, will bridge the gap between the eastern and western interconnections, linking Colstrip in Montana to central North Dakota.

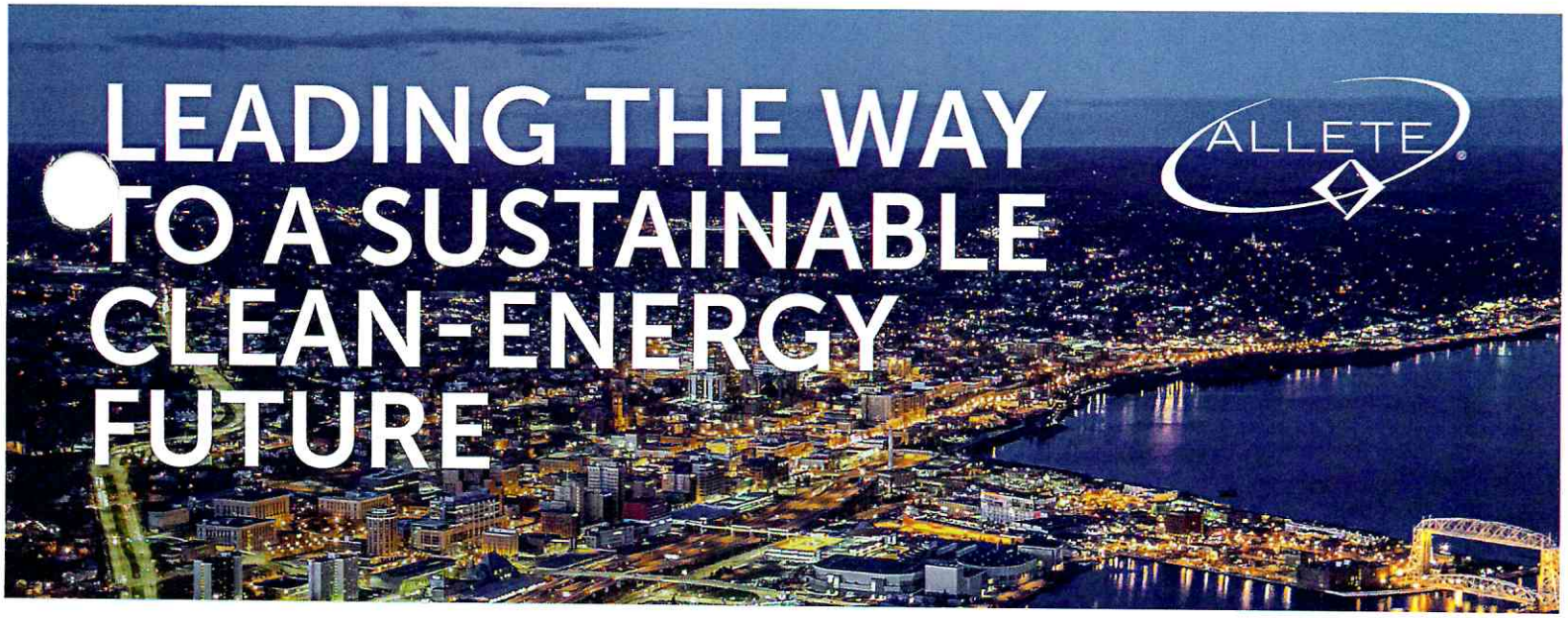


HVDC Modernization Project

Minnesota Power is upgrading its existing 465 mile HVDC system from ND to MN to expand capability from 550 MW to 900 MW. Future opportunity to expand further is being investigated.

MISO Long Range Transmission Plan Roadmap Projects

MISO has identified a combination of transmission upgrades and new projects that may provide value.



Headquarters in Duluth, Minnesota

Our five businesses include regulated utilities and complementary energy-centric companies. ALLETE also has an 8% interest in the American Transmission Co., which owns and operates transmission lines in parts of Wisconsin, Michigan, Minnesota and Illinois

Sustainability statement

ALLETE is putting sustainability into action while honoring our commitments to the climate, our customers and the communities we serve.

ALLETE Subsidiaries

MINNESOTA POWER, based in Duluth, Minnesota, is an investor-owned electric utility serving 145,000 residential customers, 14 municipal customers and some of the nation's largest industrial customers. It provides electric service in a 26,000-square-mile region of northern Minnesota rich with mineral deposits and timber.

SUPERIOR WATER, LIGHT & POWER delivers electricity, natural gas and water to customers in Superior, Wisconsin, and adjacent areas. SWL&P serves 15,000 electric customers, 13,000 natural gas customers and 10,000 water customers. Its offices are in Superior.

ALLETE CLEAN ENERGY acquires, develops and operates clean and renewable energy projects and is well-positioned to drive additional clean-energy sector growth. ALLETE Clean Energy owns, operates, has in advanced construction and has delivered build-transfer projects totaling more than 1,600 megawatts of nameplate wind capacity across eight states.

BNI ENERGY is the parent company of BNI Coal, which operates a lignite mine near Center, North Dakota, and supplies lignite to the nearby Milton R. Young Generation Station. Based in Bismarck, North Dakota, BNI Energy has a rich history of environmentally responsible energy production in North Dakota and is partnering with others to develop less-intense or zero-carbon uses of lignite.

NEW ENERGY EQUITY, based in Annapolis, Maryland, with an office in Roseville, Minnesota, is one of the nation's top distributed solar developers and financiers. New Energy Equity has successfully developed over 330 megawatts of solar projects and closed more than $600 million in clean energy investments across the United States. The company has a development pipeline of about 2 gigawatts across 26 states over the next three years.

EnergyForward: Investing in the future

Minnesota Power began as a renewable energy company more than a century ago by harnessing the hydropower of the St. Louis River. Today, we deliver safe, reliable, affordable and increasingly clean energy to about 145,000 residential customers, 14 municipal customers and some of the largest energy users in the United States.

Our electric load is unusual among U.S. utilities because a small number of large industrial customers, including iron mining operations, paper and pulp mills, and pipeline companies, consumes more than half of the energy we sell. At most other utilities, residential customers consume most of the electricity sold.

We are rapidly transforming the way we generate electricity through our EnergyForward strategy, with a vision to reach a 100% carbon0-free energy supply by 2050. Today, we are meeting or exceeding state standards for renewable power, energy conservation and carbon emissions reductions.

About 50% of the electricity we provide comes from renewable sources. By 2030 we expect to be more than 70% renewable with the addition of up to 400 megawatts of wind energy and 300 megawatts of solar energy, along with a significant investment in energy storage. We plan to cease coal operations at Boswell Energy Center Unit 3 in 2030 and at Boswell Unit 4 in 2035, when we expect to reduce carbon emissions on our system by 80 percent compared with 2005 levels. Recent actions include:

- Retired Taconite Harbor Energy Center in Schroeder.
- Retired two coal units at Boswell Energy Center.
- Converted Laskin Energy Center in Hoyt Lakes to a natural gas peaking station.
- Planning to build a 525- to 550-megawatt combined-cycle, state-of-the-art power plant in Superior, Wisconsin. The Nemadji Trail Energy Center, a natural gas power plant being built in partnership with Dairyland Cooperative and Basin Electric Power Cooperative, will be one of the single largest private investments in the area's history. It will ensure reliable service for customers during our clean-energy transition and enable the addition of renewable energy to our system through our share of the plant's production.

Renewable energy

Wind

- Bison Wind Energy Center in North Dakota, 500 megawatts. Enough electricity to power nearly 170,000 homes each year.
- Taconite Ridge Wind Energy Center, first commercial wind generating station in northern Minnesota (2008).
- Purchase output of Oliver 1 and Oliver 2 wind farms built in North Dakota by NextEra Energy.
- Purchase 250 megawatts from Tenaska's Nobles 2 wind farm in southwestern Minnesota.
- Our wind portfolio is now about 870 megawatts of owned and contracted wind capacity.

Hydro

Minnesota Power operates the largest hydroelectric system in Minnesota with a capacity of more than 120 megawatts. Our generating stations are:

- Blanchard, Little Falls and Grand Rapids on the Mississippi River.
- Winton on the Kawishiwi River.
- Pillager and Sylvan on the Crow Wing River.
- Prairie River Station on the Prairie River.
- Fond du Lac, Knife Falls, Scanlon and Thomson on the St. Louis River.
- We also purchase about 250 megawatts of hydropower from Manitoba Hydro, delivered over the Great Northern Transmission Line that traverses Roseau, Lake of the Woods, Koochiching and Itasca counties

Solar

- 10-megawatt installation at Camp Ripley.
- 20 megawatts at three sites in Duluth, Laskin Energy Center and Sylvan Hydro.
- Community solar garden made up of a 1-megawatt array near Wrenshall and a 40-kilowatt array in Duluth.

Biomass

- 70-megawatt Hibbard Renewable Energy Center in Duluth.

Conservation

Minnesota Power and its conservation team has exceeded the state of Minnesota's 1.5 percent energy-savings goal every year since the target went into effect in 2010.

In 2021, the company's efforts saved 2.8% of retail energy sales, or more than 74,539,000 kilowatt-hours, enough energy to power about 8,200 homes for a year. The savings also translates to reducing emissions of carbon dioxide by about 44,000 tons, which is comparable to taking more than 8,700 cars off the road for a year.

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Company Statistics

Power generation capability: **More than 1,660 megawatts**

Transmission/distribution: **More than 8,000 miles**

Large Power customer contracts (each requiring 10 megawatts or more of load): **8**

Residential customers: **145,000**

Municipal customers: **14**

Minnesota Power/ALLETE employees: **1,400**

Yellow Ribbon Compa designation earned in 2016 for supporting an environment where military-connected employees can thrive.

Moody's Investors Service has identified ALLETE as having the most gender diverse board among 45 utility companies it examined for a report on board gender diversity.

Legislative Affairs

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