



Oxygen and iron are the key components of Form Energy’s battery, which charges and discharges through a cycle of rusting and unrusting small iron pellets.

# Expansions of renewable energy

Rusting battery in Minnesota could unlock the electric grid of the future

**By Adam Willis**  
The Forum

**Bismarck**

While the incoming owner of North Dakota’s largest coal-fired power plant, Coal Creek Station, is investing in an emerging fossil fuel technology to slash greenhouse gas emissions, the facility’s current owner is betting on a different path to the same end: a breakthrough in battery technology that could allow for vast expansions of renewable energy on the power grid.

North of Minneapolis, Minnesota’s second largest electricity provider, Great River Energy, is looking to deploy a pilot scale battery with the capacity to cheaply store power for days at a time. It’s a prospect that could solve a fundamental problem in the country’s shift toward low carbon energy sources, providing



A rendering of what Form Energy’s one megawatt battery is expected to look once installed and operating in Cambridge, Minnesota.

renewably sourced power at times when the sun isn’t shining and the wind isn’t blowing.

And unlike today’s fleet of batteries, the key to the concept is an abundantly available element: iron. The resource could be supplied right there in Minnesota, the country’s leading producer of iron ore.

GRE’s project is a partnership with a buzzy — and, until recently, secretive — start-up called Form Energy, which claims to have achieved the coveted long duration storage prize at its lab in Cambridge, Massachusetts. The next step is to test their invention in the field, with plans to deploy its single megawatt

battery into the GRE portfolio as soon as the end of next year.

Ted Wiley, president and co-founder of Form, said the company is looking to provide a battery that can hold energy for 100 hours at a time, as much as 25 times the span of currently available batteries, all while driving down costs by a factor of ten or more.

It’s an achievement they say could be “a good, reliable replacement to coal and natural gas,” Wiley said. “All of the generation that’s currently provided by coal and natural gas could be provided by wind and solar augmented by batteries.”

The idea represents a different pathway towards cleaning up the electric grid from the technology that has gotten the most attention in North Dakota, carbon capture, which seeks to keep fossil fuels online. GRE unveiled its partnership with

Form at the same time it announced its plans to close the 1,100 megawatt Coal Creek Station, but since then has initiated a sale of the plant to the Bismarck-based Rainbow Energy Center. The incoming owner is pursuing a \$1.5 billion carbon capture retrofit, which would siphon greenhouse gas emissions off the plant to make it a cleaner producer of power for the long-term.

For Wiley, a successful long-duration battery of the kind they’re developing at Form has the potential for massive adoption — reaching into the “terawatt scale,” or more than a million times the size of the company’s pilot in Minnesota.

Jon Brekke, the vice president of GRE, said that in its partnership with Form the cooperative saw an opportunity to enact its climate goals and prioritize

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## Updates on Brewhalla, Hope & Coffee Shop, West Acres’ playland, and more

**By Angie Wieck, Thomas Evanella, Tammy Swift, and Helmut Schmidt**

**Fargo**

Drekker Brewing Co. is giving patrons a glimpse into what Brewhalla will look like once its \$20 million expansion is complete later this year.

The brewery announced in December of 2020 it was partnering with MBA Investments to add a 100,000-square-foot expansion to its brewery and taproom at 1666 1st Ave. N.

At the time, plans called for a 24-room hotel, 18 one- and two-bedroom apartments, an events venue and a market to house food vendors and shops.

In a March 10th Facebook post, Drekker shared renderings of what some of the hotel’s guest rooms will look like.

Cofounder and

Wieck

Evanella

Swift

Schmidt

President Mark Bjornstad explained to The Forum that all guest rooms were designed with Drekker beers in mind.

For instance, one room highlights the brewery’s PRRRT series



Drekker Brewery recently released renderings of what some of Brewhalla’s hotel guest rooms will look like. The rooms were designed with Drekker beer brands in mind. This room is dedicated to Drekker’s PRRRT series.

of beers.

“We do tons of different PRRRTs, always rotating. ... We have one big PRRRT mural in the room, and there will be kind of a gallery wall of all the pictures of the different labels we’ve done with PRRRT. We tell a little bit of the story behind them,” Bjornstad said.

Room types include a

standard with two queen beds, to a king room with a seating area, to one- and two-bedroom king suites.

“All the rooms have a beer fridge, but anything in the suite category has a kitchenette up to almost a full kitchen,” he said.

The hotel guestrooms are located on the third and fourth floors and

overlook the planned vendor market.

Bjornstad said all vendor spots have already been spoken for.

“We’ve put together what we think is a great mix of food, crafters and makers, and retail businesses. The balance between it all is really things that are meant to be enjoyed on site,” he said.

But there will be plenty of items to enjoy at home.

“It’s like a farmer’s market. You go there to get your week’s produce, but you also go there to get something to eat and to participate in the activities going on. It becomes a community space,” he said.

It will all take place indoors under a giant skylight.

“We get to enjoy those really sunny winter days, but you get to be inside. And you get 12 months of what

feels like an outdoor neighborhood market activity,” he said.

Bjornstad said the expansion is expected to be complete in September of 2020.

**Caring for Kids Playland opens at West Acres**

Parents and others in charge of crumb crushers, ankle biters, rug rats, curtain climbers and various other small fry can take heart; the West Acres Shopping Center has reopened its playland.

Worn-out shoppers in need of a place for their munchkins to wear themselves out can once again bring them to the Caring for Kids Playland in the food court area of the mall.

Playland is sponsored by Blue Cross Blue Shield North Dakota’s Caring Foundation,

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BUSINESS ANNOUNCEMENTS



New Hire

Aasved joins Aaland Law Firm

Bryse L. Aasved has joined the Aaland Law Firm as an Associate Attorney. Bryse's practice is focused on civil litigation, personal injury, and family law. Bryse, a native of Moorhead, graduated from the University of Colorado with a bachelor's degree in Political Science. He earned a law degree from the University of North Dakota Law School in May 2019. Prior to joining the Aaland Law Firm, Bryse served as a judicial law clerk for the Honorable Amber B. Gustafson in Moorhead, MN.

Larry Zahradka Joins Hospice of the Red River Valley as Community Relations Specialist

Hospice of the Red River Valley welcomes Larry Zahradka as a community relations specialist. In this role, Larry educates and collaborates with local health care professionals, facilities and community organizations to help serve patients and families in need of hospice care. Larry is based out of Fargo and serves a multicounty region in the southeast portion of North Dakota. Larry has spent his career in health care and worked as a certified athletic trainer before transitioning into an educator and advocate for patients. He joined Hospice of the Red River Valley in late 2021 with a passion for education, patient support and compassionate end-of-life care. Larry received his bachelor's degree in athletic training from North Dakota State University in Fargo and a master's degree in sports management from the University of Wisconsin in La Crosse, Wis.



Gjesdahl Law adds Associate Attorney

Gjesdahl Law, P.C. has hired Kirsty Liedman as an associate attorney. A graduate of Mitchell Hamline School of Law, Kirsty is passionate about helping families and finding solutions to their legal difficulties. While in law school, she obtained a Child Welfare Certificate focused on courtroom advocacy and trauma-informed practices. Kirsty served as the Student Bar Association Vice President, the Student Representative for the Diversity, Equity Inclusion Steering Committee, and as the Student Representative for the First-Generation Law Student Sub-Committee. She is licensed to practice in Minnesota and a member of the Minnesota Bar Association and also serves on the Board of Directors of Friends of The Children Fargo-Moorhead. Gjesdahl Law, P.C. is the region's preeminent family law firm with eight attorneys, handling cases in North Dakota and Minnesota.



Moxness recognized as a business unit sales leader in 2021

Matt Moxness, a Career Agent for Nodak Insurance Company in West Fargo, has been recognized as a business unit sales leader. Matt earned this recognition for his outstanding sales performance during 2021. His office is located in West Fargo where he offers insurance products such as auto, home, farm, business, life insurance and annuities. Nodak Insurance Company, rated A (Excellent) by A.M. Best, is the largest domestic property/casualty insurer in the state of North Dakota. It has a statewide sales force of 70 agents and serves more than 26,000 North Dakota policyholders.



New Hire

Simonson joins Aaland Law Firm

Steven J. Simonson has joined the Aaland Law Firm as the managing attorney of the firm's domestic law division. Steve's practice is focused primarily on assisting clients in family law matters. Steve, a native of Enderlin, North Dakota, did his undergraduate work at the United States Military Academy, West Point NY, and North Dakota State University in Fargo. After serving in the United States Army, Steve earned a law degree from the University of North Dakota School of Law in 1991. Prior to joining the Aaland Law Firm, Steve was the managing attorney of Legal Services of North Dakota.

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ENERGY

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low costs for customers, all while supporting a new market for a core Minnesota resource. “We used iron from Minnesota mines to help build the country,” he said. “Now we can use iron from Minnesota mines to help maintain reliability and cost effectiveness of a very quickly transforming power grid.” **Iron and air** Today, the batteries powering electric cars and parts of the national electric grid are made from lithium and other relatively scarce metals like nickel, cobalt and manganese. These lithium-ion units cap out after just a few hours of storage, and their inputs can be costly, even posing human rights concerns at mining sites in some parts of the world. Iron, on the other hand, is low cost and naturally abundant. The Form innovation, Wiley explained, is relatively basic: its batteries take in oxygen

from the air, causing small iron pellets inside to rust, releasing electrons in the process. The “magic” is in the next step, Wiley explained, when the battery breathes out air again and reverses the rust back to fully metallic iron, a cycle that charges and discharges the battery. “It’s dead simple. It’s extremely low cost. It’s safe. And it’s really effective for storing multiple days of energy,” Wiley said. And though iron is too heavy for use in electric vehicles, its batteries have a longer lifespan than the current lithium-ion technology. A lithium-ion battery may last for around seven to 10 years, while iron-based batteries can easily last for more than 20, said Massoud Amin, a professor of electrical engineering at the University of Minnesota who specializes in power grid systems. And unlike batteries in our iPhones, micro versions of the lithium-ion batteries found on the power grid, iron-flow batteries don’t see their capacity degrade over time. All of these qualities add up to much lower

storage costs, so that with iron, “the equation changes,” Amin said. Form, which began research into power grid solutions in 2017 and entered its partnership with GRE the next year, kept the specifics of its project under lock until last year. Since announcing its one megawatt pilot in Minnesota, the small start-up has prompted big expectations in energy circles. Last August it closed out a \$240 million fundraising round, and it counts Breakthrough Energy Ventures, a climate investment fund backed by Microsoft founder Bill Gates and Amazon founder Jeff Bezos, among its investors. Still, Form is charting a course that others have pursued before. Scientists with NASA and GTE first began exploring the potential of iron-air batteries in the 1960s, and the company Westinghouse Electric Corporation pushed the research further in the 1970s. But those early trailblazers eventually abandoned the technology. There just wasn’t a need for a battery with days of storage capacity at the

time, especially one with iron’s weight, Wiley said. It’s a different world today, as regulators and energy providers are under mounting pressure to take bold steps to mitigate climate change, pressures that have spurred a race for technologies that eliminate greenhouse gas emissions without sacrificing the stability of the grid. On that score, Minnesota presented Form with a “perfect problem statement” to test its battery, Wiley said: extreme, subzero temperatures that can affect the reliability of the grid for days on end. **Replacing coal?** If Form’s battery is successful, Wiley said, it could help to unleash the wind resource in neighboring North Dakota, where turbines are prevalent but have yet to capture the extent of the state’s renewable resource. GRE is on pace to supply half of its electricity from wind power by 2025 and more by 2030, and Brekke said finding a way to store energy from those renewables sources is central to its long-term

climate ambitions. If the Form pilot works, Great River Energy could move to much larger installations of the iron-air battery technology, ranging in the hundreds of megawatts, Brekke said. The co-op will also continue buying power from Coal Creek Station for the next 10 years, and Brekke said he’s supportive of efforts there to pursue carbon capture and storage. Coal Creek is one of two ventures to retrofit a coal plant for carbon capture in North Dakota, the other being Minnkota Power Cooperative’s Project Tundra. Carbon capture for coal is still in its infancy and remains mostly untested at scale, but North Dakota leaders have embraced it as the pathway to carbon neutrality by 2030, while preserving the state’s fossil fuel industries. Jason Laumb, director of Advanced Engineering Systems Initiatives at the University of North Dakota’s Energy and Environmental Research Center, said he sees technologies like carbon capture and batteries as equally important, and potential complements to one another on the

electric grid over the next 20 years. While batteries come with enormous benefits, among them the ability to dispatch electricity almost instantaneously, they need a lot of real estate, Laumb said. Even a single megawatt of battery storage takes up several acres of land. Wiley similarly said he sees efforts like carbon capture as an important piece in the larger project of tackling climate change, an ambition he said is going to need “several shots on goal.” And while Form has promoted its battery as a pathway for replacing coal, Wiley said there needs to be partnerships between government and industry to ensure that fossil fuel communities have a place in the clean energy economy. The iron-air battery can’t just work for the big cities, Wiley said, and its ramifications for North Dakota will be a litmus test of its success. “If we can’t figure out a way for this to work for North Dakota, this doesn’t work,” he said. **Readers can reach Forum reporter Adam Willis, a Report for America corps member, at [awillis@forumcomm.com](mailto:awillis@forumcomm.com).**

BUZZ

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West Acres Development COO Alissa Adams said Tuesday, March 15. Playland closed for much of the early part of the COVID-19 pandemic, then opened for a while when cases let up in the region last year, only to close again when another spike in area hospital caseloads spiked, Adams said. The mall announced the reopening of the play place for growing humans (42 inches tall or less, please) in a recent post on its Facebook page. “Let playtime begin! The Caring for Kids Playland is now open!,” the post said. “You can find the Caring for Kids Playland located in our Food Court. ... We hope you and your kiddos can come enjoy the Playland during your next visit!”



Contributed / West Acres

Caring for Kids Playland has opened in the West Acres Shopping Center in Fargo.

Playland opens at 7:30 a.m. daily with a couple of short closures during the day to allow staff to clean the area. **Soul Solutions rehab opens coffee shop to the public** Soul Solutions Recovery Center, the

outpatient addiction-treatment center that opened in December in Fargo, has now launched the next phase of its project: Hope & Coffee. The coffee shop is open to the general public as well as to members of the recovery community, in

efforts to break down misunderstandings about addiction and to create a “community living room” concept in which all feel welcome, says Brenda Podetz, executive director of Soul Solutions. Located in the southwest corner of

the Soul Solutions building at 1801 38th St. S., Hope & Coffee was named after a similar, recovery-themed coffee shop in Tamaqua, Penn. The first Hope & Coffee was formed in efforts to normalize and de-stigmatize recovery while providing a safe and welcoming place for those who struggle with addiction. Hope & Coffee also provides “safe, hassle-free ‘hyper-available meeting space,’” which is accessible to recovery groups as well as the general community, according to the Soul Solutions’ website. The volunteer- and employee-staffed coffee shop sells espresso, lattes, frappes, fruit smoothies, sodas, juice, flavored waters, chai, tea and regular coffee. Snacks include goodies like Family Farms’ chocolate-chip banana

bread and Cosmic Crisp apples. “It’s all at very affordable prices,” Podetz says. “We have no commercial kitchen so we will be trying out other kitchens’ baked goods until we know what customers want.” Podetz hopes to expand the menu and possibly add options like hummus, veggies and fruit and soup for lunch. The coffee shop offers puzzles, coffee table books and “good conversation,” she says, with plans to add Scrabble, open mic events, movie nights and trivia. Current operating hours for Soul Solutions’ Hope & Coffee will be 7 a.m. to 10 p.m. Wednesdays through Saturdays. To learn more: [info@soulsolutions.org](mailto:info@soulsolutions.org) or call (701) 356-7772.