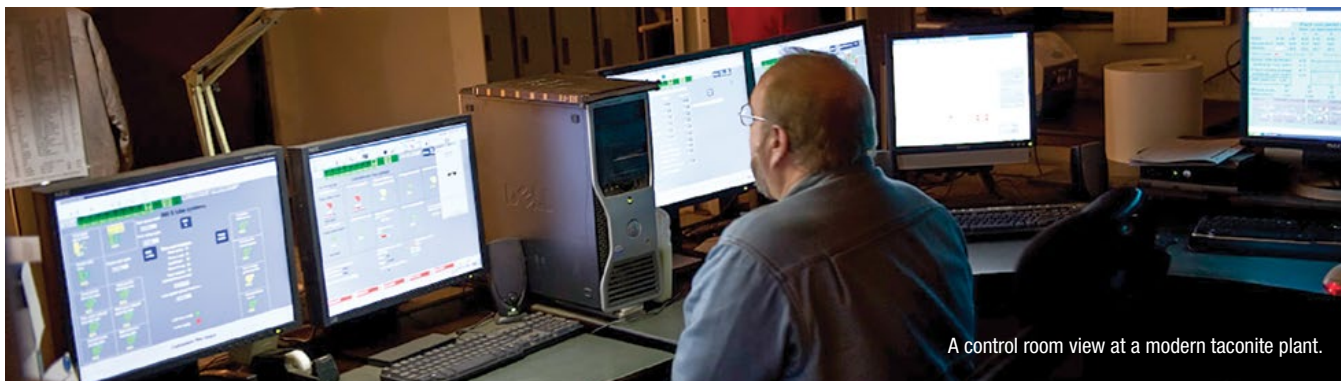


THE IRON RANGE

**THE TIMES
THEY ARE A-CHANGIN'...**



Jaime Johnson, LaTisha
Gietzen, Tasha Niemi and
Christine Kennedy



A control room view at a modern taconite plant.

Welcome to Minnesota's Most Innovative Industrial Region

When you hear the term “Iron Range,” you might think of an old industry that’s fading into history.

But in northeastern Minnesota, the opposite is occurring, thanks to an impressive use of the world’s leading technologies and engineering, along with an unstoppable work ethic, dedicated support industries and heart. This is mining country. But unlike some other places in the United States, the folks here have not only found a way to survive, but to lead—and to begin growing the proud industry once again.

Take iron mining itself. You might picture blackened men wielding shovels and pickaxes with lantern-crowned helmets. But those days are long gone; modern mining is a highly efficient high-tech industry, requiring the services of hundreds of engineers, environmental specialists, geologists and high-skilled, tech-savvy equipment operators. In fact, mining professionals are some of the best-paid workers in the state.

What’s more, northeastern Minnesota’s workforce has been getting younger in recent years, as engineers and other specialists see new opportunities here—not only in mining, but in manufacturing, education and other fields. The number of 25- to 34-year-olds working in northeastern Minnesota other than Duluth has increased 12 percent in the past two decades. Today, more than 50 percent of people working in the mining industry are under 45. Many are regional natives who want to live in one of the most beautiful regions of the state, known for its clear lakes, thick forests and outdoor recreational opportunities that offer a highly sought-after quality of life.

While the mining industry has become much more technical over the years, the Iron Range still treasures a blue-collar sensibility that focuses on practical solutions and working with one’s hands. A maker culture, if you will, that attracts manufac-

turers and companies seeking excellent problem solvers.

The foundation of the Iron Range is, of course, iron. The Iron Range serves an inland steel market that can’t be easily penetrated by seaborne ore. It also boasts a well-developed, mature supply chain infrastructure incorporating rail, ships, vendors and power plants that’s 150-plus years in the making.

Though the Range mining industry has always bounced back from downturns in the steel market—many triggered by underpriced steel imports—economic diversification remains a focus.

Economic development partners throughout northeastern Minnesota are working to create new growth from new, innovative products rooted in the region’s natural resources, in manufacturing, fabrication, and in customer service.

But the economic value of natural resources is not limited to how they can be converted into products. The Iron Range’s lakes, woods and recreational trails remain hugely popular weekend and summer vacation spots for outdoors enthusiasts from across the state and nation.

Natural resources will undoubtedly remain a key within northeastern Minnesota’s economy for decades to come. The resilient iron mining industry along with the addition of copper-nickel mining will remain an important economic driver for the region. Indeed, taconite, timber and tourism have traditionally formed “the three Ts” of northeastern Minnesota’s economy. And now a fourth, technology, has taken root.

Technology in mining, at regional manufacturers, in education, health care, and at customer service centers connected to the world, are driving the Iron Range economy into the future.

Here’s an invitation to reacquaint yourself with one of the most beautiful, diverse parts of the state—that might well surprise you.

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The Modern Mine

Minnesota mining is much more brain than brawn these days. And top minds are working on the industry's next iterations.

The mining industry has been part of Minnesota's economy almost as long as the state has been in existence. Minnesota became a state in 1858, and mining began on the Vermilion Range in 1885.

One hundred and thirty-two years later, the industry that has contributed billions to Minnesota's economy and helped the United States win two world wars is still going strong.

While annual iron ore pellet production on Minnesota's Mesabi Iron Range accounts for only 2 percent of the world's total iron production, "we are a key component in the economic viability of the state," says Kelsey Johnson, president of the Duluth-based Iron Mining Association of Minnesota, a trade group comprising six iron mines and 175 vendor members. "And Minnesota is the top iron producer in North America."

What's more, mining industry employees are some of the highest-paid in the state. The industry's high-paying jobs paired with the Iron Range's beautiful landscape and quality of life continue to attract exceptional talent to the area. Mine workers are often described as resilient, with a deep-rooted

work ethic that's been handed down through generations who have lived and thrived through the boom-and-bust cycles of the industry.

Today, all six Iron Range iron mines are operating. It's another sign of this industry's remarkable durability. Meanwhile, the region is advancing new mining projects to boost the Iron Range and state economy and produce higher-value products. Here's a look at some of the notable contributions coming from the Range mining industry.

ARCELORMITTAL SUPPLIES LARGEST BLAST FURNACE

Iron ore pellets produced at the taconite plants have distinct "formulas." Take the Virginia mine and production facility owned and operated by Luxembourg-based steel producer ArcelorMittal. The plant, which employs 357, produces 2.8 million tons of pellets annually. All go to one customer: ArcelorMittal's No. 7 blast furnace at its East Chicago, Ind., steel mill. It's the largest blast furnace in the Western Hemisphere.

"Our pellet is custom-designed for that furnace," says Jonathan Holmes, ArcelorMittal's regional manager and

an Iron Range native. The steel the East Chicago mill produces is used primarily by U.S. auto and appliance manufacturers.

CLIFFS NATURAL RESOURCES ADVANCES NEW TECHNOLOGIES

Among the largest mining companies on the Range and one of the most durable is Cleveland-based Cliffs Natural Resources. Cliffs has been mining on the Iron Range since 1902 and in the iron ore business for 170 years. It's coming off a strong year, posting a \$199 million profit. That reflects in large part the improvement of the domestic steel industry and Cliffs' cost-efficiency measures. Lourenco Goncalves, Cliffs' chairman, president and CEO, says that in 2015, his company eliminated nonproductive, unprofitable assets, "cutting costs to the bone, thus creating the basis for a much better year in 2016."

Cliffs is also celebrating its \$65 million investment to produce a new customized pellet at its United Taconite plant in Forbes, Minn. Construction began in August and is slated for completion this spring. Once complete, UTAC will pro-

Continued on page 4





THE RANGE INDUSTRY BY THE NUMBERS

Minnesota's iron mining industry
directly employs more than

3,700 people

as of early 2017.

The state's mining professionals have some
of the best-paying jobs in the state, with
some miners capable of earning annual
salaries (benefits included) of

\$100,000

Has a more than

\$3 billion

annual impact on the Minnesota economy.

Supports approximately

11,200

indirect jobs throughout Minnesota.

Sources: Iron Mining Association of Minnesota, Minnesota Department of Natural Resources, Minnesota Department of Employment and Economic Development

duce a "superflux" pellet for Cliffs' largest customer, ArcelorMittal. This project is part of Cliffs' strategy to shift production from its idled Empire Mine in Michigan's Upper Peninsula, which has depleted its iron ore reserves.

"I'm very optimistic about the future of Cliffs," Goncalves says. "It's a very good business. On the other hand, it's a business that is very self-contained. We are not in Minnesota to export our ore to the world. We are in Minnesota to supply the domestic steel industry. And the domestic steel industry is not really growing. So you have to be the best-in-class in order to be successful."

So how has the company sustained success for 170 years? "We have always been ahead of the curve in terms of technology and how to utilize the resources that are on the ground," Goncalves says. To help maintain that legacy, Cliffs is pursuing a new product to serve a new market. "And that is what needs to be done in order to support a future in this business for another 100 years."

That product is called hot briquetted iron (HBI). It's a compacted form of direct reduced iron (DRI), which is produced by a process that allows the iron to be used in electric arc furnaces.

Goncalves is hopeful that HBI can be produced on the Iron Range, and Cliffs is currently evaluating potential locations for the plant. The company is also the first to produce commercial-scale quantities of direct-reduced-grade iron ore pellets at its Northshore Mining pellet plant in Silver Bay. These pellets have been successfully tested by a customer, opening new opportunities for Cliffs and its iron ore plants in Minnesota.

NRRI RESEARCHING HIGHER-VALUE PRODUCTS

The Duluth-based Natural Resources Research Institute (NRRI) is another entity exploring the production of a higher-value taconite-based product, namely taconite-based DRI.

According to Kevin Kangas, site manager for the NRRI's Coleraine labs, the DRI process removes the oxygen that is in standard taconite pellets. The result is a much higher-purity iron. Taconite pellets are 60 to 65 percent iron; DRI

processing further concentrates the iron to 90 to 95 percent.

NRRI is also "developing our ability to make what's called a DR-grade iron oxide pellet," says Kangas. A DR-grade pellet needs to have less silica and additives, such as limestone, than blast-furnace-grade iron ore pellets.

Fueled by \$2.6 million from the Minnesota Legislature in 2016, the NRRI is developing the "next generation" of mining technology, including an iron-reduction simulator to help develop higher-value iron ore products that utilize Minnesota ore. NRRI plans to have a simulator in operation next year.

But bringing new investments such as a DRI plant to the Mesabi Iron Range won't be cheap. "We're probably talking on the order of \$100 million or more in capital investment for existing taconite plants to make DRI-grade pellets, and another \$750 million or so to build a new DRI plant," Kangas says.

MINNESOTA POWER: A 'POWER PLAYER' TO INDUSTRY

Another advantage that the mining industry has on the Range is a 24/7, reliable source of electric power from a longtime local partner. That energy source is Minnesota Power, the largest unit of Duluth-based ALLETE Inc., an energy company with regulated utilities and energy infrastructure and related services businesses. With a \$3 billion-plus market capitalization, ALLETE is one of the larger public companies in the state.

As ALLETE chairman, president and CEO Alan Hodnik knows, iron mining and pellet processing are heavy-duty energy users. For these customers, Minnesota Power provides what Hodnik, himself a native Ranger, describes as customized contracting designed to provide competitive pricing and encourage usage during lower-peak periods. "The idea is that northeastern Minnesota remains healthy if [the mining businesses] remain healthy," Hodnik says.

ALLETE has been actively pursuing development of renewables. "We're a big believer in a cleaner, more sustainable energy future here in northeast Minnesota." *Continued on page 6*

Cliffs Natural Resources' Northshore mine in Babbitt extracts taconite that's shipped by rail to its pellet plant in Silver Bay.



THE MINES OF THE MESABI

The six Iron Range taconite plants have an annual production capacity of approximately 44.2 million tons of iron ore pellets. Iron ore pellets produced on Minnesota's Iron Range are the primary ingredient used to make steel. The steel made from Iron Range iron ore pellets is used to build cars, trucks, appliances, bridges, pipe, wind turbines and other steel products. Each year, more steel is recycled in North America than plastic, paper, glass and aluminum combined.

IRON RANGE TACONITE PLANTS

	ArcelorMittal Minorca	Hibbing Taconite	Northshore Mining	United Taconite	U.S. Steel– Keetac	U.S. Steel– Minntac
LOCATION	Virginia	Hibbing	Babbitt (mine); Silver Bay (pellet plant)	Eveleth (mine); Forbes (pellet plant)	Keewatin	Mountain Iron
OWNER	ArcelorMittal	ArcelorMittal, Cliffs Natural Resources, U.S. Steel	Cliffs Natural Resources	Cliffs Natural Resources	U.S. Steel	U.S. Steel
NUMBER OF EMPLOYEES	357	731	549	490	326	1,323
ANNUAL IRON ORE PELLET CAPACITY	2.8 million tons	8.0 million tons	6.0 million tons	5.4 million tons	6.0 million tons	16.0 million tons



sota,” Hodnik says. Currently, 30 percent of the energy it supplies customers comes from renewables, including wind power, hydro energy and solar.

But clean energy, Hodnik notes, requires “clean minerals.” ALLETE’s North Dakota wind farm contains more than 1,000 tons of copper, says Hodnik. Rooftop solar “is even more copper-intensive per megawatt hour than wind,” he says. “I believe the needed minerals could come from northeastern Minnesota.”

Despite the ebbs and flows of iron demand, the Iron Range remains an important economic player in the state. And that importance could very well grow in the future. “I think a lot of people in the state think the mining industry is yesterday’s news,” Hodnik says. “But mineral mining is very much alive and well. It has a chance to take it to the next level. It has a chance to make Minnesota a clean mining state and a clean energy state.”

PRODUCING METALS IN AN ENVIRONMENTALLY RESPONSIBLE MANNER

Several new minerals and metals projects that would bring good-paying jobs and economic growth to the region are poised to take shape within northeastern Minnesota. The Duluth Complex, the bedrock formation that makes up most of the Arrowhead region of northeastern Minnesota, holds what geologists believe is 4 billion tons of precious metals. “We have an opportunity in Minnesota to bring modern, environmentally responsible copper, nickel and precious-metal mining to the state,” says Frank Ongaro, executive director of Duluth-based Mining Minnesota, a trade group representing state companies interested in pursuing nonferrous (non-iron) mining.

Ongaro believes the timing is right for

nonferrous mining in the state. The U.S. is import dependent on these important metals, he notes. “These are materials that are important to our economy.” There’s worldwide interest in the region as a source of such metals. Companies that Ongaro says are looking at the Duluth Complex and other parts of Northern Minnesota include St. Paul-based Twin Metals Minnesota LLC, as well as global mining firms Rio Tinto Group, based in London, AngloGold Ashanti (South Africa) and Antofagasta PLC (Chile).

Furthest along in developing a nonferrous mining project is St. Paul-based PolyMet Mining Inc., which has been working to open a copper and nickel mining project centered in Hoyt Lakes, rehabilitating and placing back into service a former taconite operation.

“We’ve made a lot of progress recently,” PolyMet president and CEO Jon Cherry says. The state has completed and validated the comprehensive final Environmental Impact Statement. Early this year, the U.S. Forest Service issued its final Record of Decision on the land exchange, authorizing the land exchange to go forward. “That was a big step for us,” he says. The company has submitted all of its major air, water and permit applications to the state and is currently responding to requests for clarifications and questions the agencies have as they review and prepare draft permits for public review.


It’s been a long process, and there’s still more work to be done. But the company is getting closer to getting the project permitted, financed and built. PolyMet’s NorthMet project is estimated to annually produce 72 million pounds of copper, 15.4 million pounds of nickel, 720,000 pounds of cobalt and 106,000 troy ounces of precious metals.

Project development has been slow and arduous for a number of reasons. The Duluth Complex is a lower-grade

ore body, Ongaro acknowledges. “With iron ore, you move three tons of rock for every ton of product. With base and precious metals, you’re going to move 90 percent of the material. Some might be only 1 percent metals.” That means more concentrating, flotation and hydrometallurgical processing—all in ways that meet state and federal guidelines.

Still, Ongaro says, with all the expenses, “companies are willing to invest, even with cyclical metal prices. They believe they can make a profit.” PolyMet thinks it can do so. “Since the discovery of these metals in this ore body many decades ago, the technology has advanced to the point where we can do select separation of these metals in the processing of the ore,” Cherry says. That makes this more economically feasible to extract the metals. Environmental water management and monitoring on the treatment side “has also advanced to the point where we can now ensure that the mining is done in an environmentally responsible manner,” Cherry adds.

From an environmental standpoint, the chief concern about nonferrous mining is the potential for water-quality issues. The lengthy environmental review performed by state and federal agencies affirms that the company’s water management and treatment plans will maintain water quality within the strict state and federal guidelines. To prove the company’s water treatment capability, PolyMet developed a pilot reverse-osmosis plant to show it would work.

With PolyMet hoping to establish the first copper-nickel mine in Minnesota, “we understand the responsibility that has been put on us to do it right—to develop it in a very responsible manner,” Cherry says. The project has the potential for 360 direct and over 600 indirect jobs, and the infrastructure and the skills it needs to tap are already here. “You really couldn’t pick a better place to build a new mine,” Cherry says. 

THE PROJECT HAS THE POTENTIAL FOR 360 DIRECT AND OVER 600 INDIRECT JOBS.

PolyMet Mining hopes to open a copper-nickel mining operation at this former taconite facility in Hoyt Lakes—a potential new direction for the region’s industry.





Joy Global's Virginia facility keeps mining equipment running on the Mesabi Range—and at other mines in the U.S. and overseas.

Mining's Support Industry

Vendors have the products and the expertise to keep the mines moving.

Iron Range mining companies rely on a wide variety of local vendors, including suppliers of heavy equipment and outside engineering specialists. And the expertise that these support companies have developed through their work on the Mesabi Range has translated to expansion into geographical markets both nationally and globally.

One example is the Virginia branch of Milwaukee-based Joy Global Inc., a mining equipment and services company. Joy Global has had a presence on the Iron Range for more than 20 years. Its 82,000-square-foot Virginia facility built in 2013, which employs 65, provides sales and service for Joy Global brands, notably the P&H surface mining equipment line.

The Virginia facility also supplies and services equipment to an Iowa underground gypsum mine, and to Michigan for both surface and underground mining. Joy Global also offers equipment rebuild services for its customers, giving them the option to quickly switch out worn components with rebuilt ones.

"That minimizes the downtime and maintains the uptime for the mine," says John Ward, Joy's Virginia general manager. Components rebuilt in Virginia are then shipped to other customers, some as far away as Brazil and Australia.

Road Machinery & Supplies Co. (RMS) in Virginia is a 91-year-old supplier of construction, mining and forestry equipment. It's one of the largest Komatsu truck and hydraulic shovel distributors and support facilities in North America. It also sells and services Atlas Copco rotary drills.

"Besides mining, we've really become involved in road construction, crushing and quarrying," says Jon Anderson, RMS vice president. "We're in the Upper Peninsula of Michigan, Iowa, northern Wisconsin and Minnesota, and

do a lot with construction in the metro area where there is no mining."

Success at RMS has come from "the people we have here and the product lines," says Anderson. "Our technicians can do it all, but it's not like the old days when all you needed was a trouble light and a monkey wrench. Now, you need to have mechanical and computer skills."

With a highly skilled, well-trained workforce and the potential for new forms of mining to begin, Anderson says, "We're very high on the future of northern Minnesota. Mining is going to be here for a long time, and RMS is excited to be a part of the future."

Another well-diversified business is the Hibbing office of Minneapolis-based Barr Engineering Co. Founded 50 years ago, Barr's Iron Range office employs about 70. In addition to working for Iron Range mines, it provides mechanical, electrical, structural, civil, environmental and process engineering, and engineering support services to a number of industries in the United States, Canada and South America.


"Mining is a big part of what we do," says Joe Vespa, the office's branch coordinator and a company vice president and senior electrical engineer. "But we also work for the fuels industry, power companies and manufacturers." A few years ago, Barr's Hibbing staff helped engineer a new oil refinery in North Dakota—the first new refinery in the U.S. since the 1970s. "It was a pretty big project for us," Vespa says.

Barr's experience is in demand in South America. "Right now, they're at a point where the Iron Range was at 50-plus years ago," Vespa says. "They had been processing rich ore primarily. Now, as they need to process other sources of iron, we're helping provide conceptual engineering."

Barr's Hibbing office has been able to extend its knowledge of processing, raw-materials handling, conveyors, piping and pumping across the world. "We've done work for the potash industry, and gold and silver mining," Vespa says. "The skills we have here are easily transferable to other industries."

Jeff Jamar is another Hibbing native, and while he now works in the Twin Cities area, the company he co-owns, Jasper Engineering & Equipment Co., still calls Hibbing home. Founded in 1958, Jasper is a manufacturer's rep, distributor and service company for processing equipment, control valves and instrumentation for a wide variety of industries. Its chief products include mining pumps from Weir Minerals, a Scottish company, and industrial instrumentation from Germany-based Siemens.

Founded to serve the iron mining industry, Jasper has extended its heavy industry expertise to other businesses, including cereal makers and manufacturing plants, food and dairy processors, oil and gas operations, and even medical device manufacturing. It expanded to the Twin Cities in 1988, and it now operates in Iowa and Nebraska, the Dakotas, Montana, Wisconsin and Michigan's Upper Peninsula. Now employing 43, Jasper still derives about half of its business from iron mining work.

And while the company's work often takes it elsewhere, its Iron Range roots are still deeply embedded in its DNA. "Growing up on the Range, a lot of us ended up going to engineering school," Jamar says. "Unlike other parts of the state, engineering is a focus of people on the Range. That's because the mines require technical abilities. Many of the best jobs in northern Minnesota come from engineering and the technical side of things." 



Women on the Iron Range

These female engineers and scientists have changed the face of the iron mining industry.

Mining engineer LaTisha Gietzen remembers going down to the State Capitol in St. Paul in her first days as a mining industry lobbyist. One of the older male legislators asked her, “You really don’t work in the mines, do you?”

Well, yes. Gietzen has been a miner since 1997. And as a woman miner, she’s far from unique.

Women have been working in Minnesota’s mines, in various capacities, for decades. When the men went off to fight the two world wars, women picked up shovels and worked in the mines until the men came home. Today, women hold key technical and management roles in mining. They operate mine equipment, perform plant maintenance and engineer technological advancements that protect the environment.

While there’s been a national focus on engaging women in science, technology, engineering and math (STEM) fields, the Iron Range has already made great strides in that direction.

One of the organizations helping northeastern Minnesota women enter STEM fields is Iron Range Engineering (IRE), a program that provides opportunities for college students to work on STEM projects at local businesses, giving them real-world experience while they pursue a degree. IRE director Christine Kennedy, who worked as a mining engineer herself before taking her current position, notes that nationwide, about 15 percent of those working in STEM fields are women. Currently, the participants in her program are about 25 percent female. “In the next few years, we’re going to be graduating our first 50-50 group,” Kennedy says. “And that’s fantastic.”

It’s also a fantastic thing for the region’s talent pool for engineers. “We have an impending talent shortage,” says Julie Marinucci, senior project engineer at Duluth engineering firm Short Elliot Hendrickson and president of the Range Engineering Council, a volunteer group that supports and promotes STEM programs for elementary and high school students across the Iron Range. “We think the best success from a retention standpoint is to develop our own talent.”

Here are four women who are working as engineers and scientists in the mining field and are encouraging other young women to become engineers and scientists themselves.



LaTisha Gietzen

**Director of Public and
Community Affairs,
PolyMet Mining**

Hibbing native LaTisha Gietzen is a fourth-generation Iron Range miner. Given her family heritage, it’s no surprise that after earning her civil engineering degree from the University of North Dakota in 1997, she joined National Steel, a pellet producer in Keewatin later acquired by U.S. Steel Corp.



Christine Kennedy

Director, Iron Range Engineering

As a kid growing up near Bemidji, Christine Kennedy loved mixing up household chemicals to see what would happen. Her love of science led her to earn an associate degree in engineering at Itasca Community College in Grand Rapids. In 2009, she became one of the first students in the Iron Range Engineering program (IRE), which gives undergrads the opportunity to take on STEM-related projects and earn credits toward a bachelor's degree.

As an IRE student, Kennedy worked on a project for United Taconite in Forbes, Minn. Her work involved engineering, designing, and prototyping a filter wash system for disc filters, which are used to remove water from the slurry that the mining process generates. Unlike filter bags, which would get plugged, resulting in downtime while the bags were changed, the wash system was designed to work while the system was running.

Like some people, Kennedy's image of mining was "pickaxes and shovels." As she learned that mining requires innovative engineering skills, she got hooked. In iron mining production "you are producing something specific and useful," she says.

United Taconite hired her in 2011; her job duties included project management, mechanical and structural engineering, and crew supervision. When Ron Ulseth stepped down as IRE director, Kennedy left United Taconite and took the IRE position this past

November. (She's also working on a master's degree in engineering management at the University of Minnesota Duluth.)

Kennedy says that she sometimes misses the intensity and "firefighting" of engineering work. But she loves providing Iron Range students opportunities in mining that she herself has experienced.



She was hired as an environmental engineer, helping make sure the plant's operation met all air and water regulations. Gietzen soon became the department's manager. When she was hired, not only was she the only woman department manager, but she was much younger than most of her colleagues.

Still, Gietzen says, being a woman at that time "wasn't really a big issue." It's even less so now. "If you look at the workforce today, there are a lot more women and a lot more young people," Gietzen says. "That's been an amazing transition over the last 10 years or so."

In 2007, Gietzen joined PolyMet to direct the nonferrous mining

company's public, government and media relations efforts. Though that means she's no longer working as an engineer per se, she notes, "it's been incredibly helpful to have a technical background when you're conveying technical information."

Gietzen's husband is also an engineer (though he's not a native Iron Ranger). Engineering "has given us the ability to go anywhere in the world. But what's most important to me and my family is the ability to stay here on the Range. And the mining industry has given us the opportunity to raise—we hope!—a fifth generation of miners."

"THE MINING INDUSTRY HAS GIVEN US THE OPPORTUNITY TO RAISE—WE HOPE!—A FIFTH GENERATION OF MINERS."

— LaTisha Gietzen, PolyMet Mining



Jaime Johnson

Environmental Manager, ArcelorMittal Minorca

As environmental manager for Luxembourg-based steelmaker ArcelorMittal's Minorca mine, a job she's held for 10 years, Jaime Johnson oversees the environmental performance of the facility. She also implements and monitors strategies to minimize the plant's environmental impact, ensuring the facility's compliance with environmental regulations. It makes for busy days, but it allows Johnson to live in the area where she grew up. "It's seeing the work come together that is rewarding," says Johnson.

After graduating with a bachelor's degree in environmental studies from the University of Minnesota Duluth, she worked as an assistant start-up coordinator in Augusta, Ga., for a company that designed and built drinking water systems. While she learned a lot, she was

excited about the opportunity to come back to her hometown and enjoy the region's outdoor activities.

"The number of women in the mining industry continues to grow, and I'm fortunate to work with a number of talented women (and men) at Minorca," says Johnson. "Having diversity within any industry is an advantage, as unique points of view and experiences contribute to growth and innovation."

Johnson recently earned a master's degree in environmental planning and management, building upon the knowledge and expertise required for her role. "There are so many aspects of my job I enjoy," she says of her work at Minorca. "Each day is different, offering new challenges and successes. I continue to learn something new every day."

Tasha Niemi


Environmental Representative, Hibbing Taconite

For Tasha Niemi, managing Hibbing Taconite's air quality and environmental outputs offers a way to help people. "I really do want to make sure that our environment is good for future generations," she says. "I don't want to worry about the air my kids are breathing or the water they're drinking."

A Wisconsin native, Niemi didn't plan to enter the mining industry after earning a bachelor's degree in mineral conservation from Northern Michigan University in Marquette. Her first impulse was to manage fisheries, but due to a lack of available positions in the field, Niemi instead moved to Nevada to work in environmental education for AmeriCorps, and later was employed as an environmental engineer for a Nevada gold mine.

When her family wanted to return to the Midwest, she decided she wanted to stay in the mining industry. That meant moving to northeastern Minnesota. Four years ago, she was hired at Hibbing

Taconite, an iron ore pellet production facility owned jointly by Luxembourg-based steelmaker ArcelorMittal, Cleveland-based iron merchant Cliffs Natural Resources Inc. and Pittsburgh-based U.S. Steel.

Niemi's background as an educator with a passion for protecting the environment is serving her well at Hibbing Taconite, where training is a key component of the operation's environmental program. In addition to managing permitting and projects for Hibbing Taconite, Niemi's job is to educate employees about the proper environmental protocols that apply to their roles at the facility. "Each employee has a responsibility to preserve this beautiful region, so this is my way of having a positive influence on our environment by providing the tools that ultimately help the industry that I'm working for," says Niemi. "I love that about my job." 



Manufacturing on the Range

A dependable workforce anchors numerous manufacturers that sell nationally and globally.

It's not surprising that a region known for people with an outstanding work ethic is also home to successful manufacturing businesses.

Virginia-based steel fabrication shop TRITEC of Minnesota Inc. is one example. Company president Mitch Robertson founded TRITEC 21 years ago and describes his client base as "any company that mines any kind of aggregate out of the earth." Primary clients are iron mining companies on the Iron Range and in the Upper Peninsula of Michigan, for which TRITEC fabricates a variety of specialty process and production-based products, such as 240-ton truck boxes, pelletizing and crushing machinery and large-scale air emission stacks.

Ten years ago, 75 percent of TRITEC's business was in the mining sector. Now, it's 35 percent.

In 2005, TRITEC added a second location in Bismarck, N.D., where it builds equipment for the power industry. TRITEC also manufactures and ships products to international markets, notably Canada.

The sheer variety of products that TRITEC produces is a testament to the skills of its Iron Range workforce. "The level of talent on the blue-collar side is very remarkable," Robertson says. "The work ethic is stellar." Robertson believes that the economic future of the Range "is going to be relative to the amount of mining and manufacturing that goes on in America."

A made-in-the-USA ethos is key to the success of Minnesota Twist Drill, a Chisholm-based manufacturer of drill bits—one of only four such manufacturers left in the country. The company's products are sold through distributors. Most of its bits are used in manufacturing, repair, tooling companies and larger industrial firms involved in fields such as aerospace. And Minnesota Twist Drill employees are busy. The company makes 85,000 drill bits a day, and 2017 started off quite well, says Scott Allison, president and CEO.

The company now has 125 employees, compared to 46 when Allison and his partners bought it in 2003. Minnesota Twist Drill also purchased an Illinois company, Triumph Twist Drill, and moved its operations to the Iron Range.

The key to Minnesota Twist Drill's steady growth, Allison says, is its skilled, experienced craftsmen. "Probably 30 to 40 percent of our employees have been with the company 20 to 30-plus years," he says. And, "our turnover rate is very low."

Low turnover is something Iron Range companies tend to see among highly skilled workers, Allison says. "People are loyal if the company treats them well," he adds. "And that's huge for our business, because we have an incredibly long learning curve on our equipment. High turnover would make it very tough for us to meet targets and capacities. I think it's a tribute to the Iron Range work ethic."

Another Iron Range manufacturer that has experienced significant expansion is Hibbing-based DMR Electronics Inc. Founded in the late 1980s, DMR started as a remanufacturer of engine components for buses and mining trucks. In time, it began remanufacturing electronic engine components for a variety of vehicles. "It was a privately held mom-and-pop organization," DMR operations manager David Rhode says.

In 2007, DMR was acquired by Detroit-based Detroit Diesel Remanufacturing LLC, now a unit of Germany-based automaker Daimler AG. Today, DMR specializes in electronics manufacturing for the Detroit Diesel series of engines. About 95 percent of its business is vertically integrated within the Daimler family, which includes Mercedes-Benz, the Smart line of two-seat vehicles and truck brands Freightliner and Western Star.

When DMR was acquired, it had fewer than 50 employees. It now has 115, and its revenues have grown more than 14-fold over the past decade. Most of its employee base is local. "We



Minnesota Twist Drill is one of just four drill-bit makers in the U.S.—and its made-in-America products are increasingly in demand.


"THE LEVEL OF TALENT ON THE BLUE-COLLAR SIDE IS VERY REMARKABLE."

— Mitch Robertson, TRITEC

have been extremely successful at our location at proving our competence with high-quality results, with a favorable cost structure," says Rhode.

DMR also produces custom components for New Flyer buses, for instance, and has worked on electronic controls for trains. Rhode says that other potential customers outside of the Daimler family of companies have expressed interest in tapping DMR's electronics expertise.

The company has the room to add new business. In 2014, DMR moved into a new 60,000-square-foot custom-designed facility with help from the Chisholm-Hibbing Airport Authority and State of Minnesota economic development entities. The support allowed DMR to stay on the Range, says Rhode.

Rhode says Daimler is shifting more work to DMR because of the local support. 



Answering the Call

The Iron Range's customer engagement center industry continues to grow—and to serve.

If you've called the customer service line for Delta Air Lines, Blue Cross Blue Shield of Minnesota, or Delta Dental, chances are you've talked to an Iron Ranger exuding an aura of Minnesota Nice.

Two decades ago, Iron Range economic development entities developed a strategy to diversify the Range's industrial base by attracting customer service centers and high-end back office facilities to northeastern Minnesota. The strategy brought three Twin Cities companies attracted not only by strong financial support, but also a hard-working, loyal and dependable employee base. The three chief customer service operations on the Iron Range have grown steadily over the years, and now provide more than 1,200 jobs with good pay and benefits.

The first such center was established in 1996 in Chisholm by Northwest Airlines, which Delta Air Lines acquired in 2010. With employment now at about 500, Delta's Iron Range Customer Engagement Center along Highway 169 handles more than 14 million calls annually, and was awarded the prestigious J.D. Power certification for top-quality service for three consecutive years from 2014 to 2016.

The center recently underwent a major renovation, transforming the 40,000-square-foot space into a modern, state-of-the-art customer engagement facility. "The new design supports Delta's collaborative style of leadership and training, while promoting its family-culture atmosphere," says Christa Khalileh, the center's director. The renovation signaled that Delta is on the Iron Range to stay.

In 2000, Eagan-based dental benefit management company DeCare Dental LLC opened a customer service center in Gilbert for members of Minnesota's largest dental plans. DeCare now is a wholly owned subsidiary of Indianapolis-based health benefits company Anthem Inc.

Starting with 25 employees, Anthem's Gilbert call center now employs about 300. Its staff handles customer service, broker and sales support services, business renewal, claims support and appeals services. Employees handle calls from dental groups ranging from two to more than 100,000 members. This team has had a first-call resolution rate of more than 97 percent for the past four years.

Gilbert also is home to Anthem's Broker and Small Group Sales Support Services team, which works with insurance brokers and small dental groups throughout the country. When the team's director, Renae Krmpotich, moved from Eagan to Gilbert 12 years ago, she managed a staff of 12. She now oversees 52.

Until last year, Krmpotich's team focused its sales and support work solely on Anthem's dental plans. "Our customer retention rate is outstanding," she says. "Last year, it was over 89 percent." That caught the attention of Anthem's management. In 2016, Anthem asked the Gilbert team to assist with calls and broker support for the company's life, vision and disability insurance in addition to its dental business.

It's a highly experienced crew, as well as a successful one. Many of Krmpotich's staff have been working for her for at least seven years. "We're finding a lot of talent among people who grew up here—who moved away, started a family, graduated from college, and now are gravitating back to where they grew up," she says. "When we have an opening, we're getting resumes from all over the place. It's fabulous for us."

Another insurer, Eagan-based Blue Cross Blue Shield (BCBS) of Minnesota, has had a presence on the Range for 15 years. It operates two call centers in the region (Virginia and Aurora) to process claims and handle BCBS' Medicare and Medicaid member calls. Together they employ about 470 people.

**"WE
EXPERIENCE
LOWER LEVELS
OF ATTRITION,
AND A LOT
OF TENURE."**

— Penny Erchul,
BCBS of
Minnesota

According to Penny Erchul, BCBS' director of service delivery at the Virginia and Aurora call centers, there are several advantages to operating those centers on the Iron Range. "We experience lower levels of attrition, and a lot of tenure," she says. "That reduces the costs associated with hiring." In addition, she praises her employees' high-performance work.

BCBS is partnering with Mesabi Range College in Virginia to look at ways to recruit from some of the college's programs. Last year, the health insurer added more than 100 new employees at its northeastern Minnesota facilities. 

Blue Cross Blue Shield of Minnesota has two call centers in the region that handle member calls and process claims. The centers provide non-mining job opportunities to 470—100 of whom were added last year.





Talent Pipeline

Range schools and colleges have combined forces to develop the next generation of talent—in mining and in other fields.

Minnesota's Iron Range has long had a reputation for outstanding schools. The region's historic commitment to education dates to the early 1900s, when tens of thousands of immigrants, many of whom couldn't speak English, came to work in iron ore mines, seeking a better life.

Today, Iron Range K-12 schools and colleges are national leaders in implementing innovative, collaborative programs designed to meet the needs of industry and train a new generation of high-tech workers.

Applied Learning Institute (ALI) is a prime example. ALI offers technical education programming to more than 1,300 11th- and 12th-grade students in 20 northeastern Minnesota school districts, for which the students earn college credit. ALI also ensures that high schools have state-of-the-art technical equipment. Its programs "ladder" into technical programs at Northeast Higher Education District (NHED) community and technical colleges in Ely, Grand Rapids, Hibbing, International Falls, and Virginia-Eveleth. Over its 10 years, ALI has created a pipeline of technically driven students to NHED colleges "because they were able to get a taste of it while in high school," says Bill Maki, NHED president.

EXPANDING OPTIONS

Because many of today's college students work full-time jobs or are returning in midcareer for retraining, NHED has become more flexible in its delivery of education and training. NHED has responded by expanding its online learning offerings. Each of the colleges has what Maki describes as a robust telepresence. This allows the best programs and faculty to be shared across several colleges.

Engineering has taken off in a big way at NHED. Launched in 2011 as an offshoot of a highly successful two-year engineering program at Itasca Community College in Grand Rapids, Iron Range Engineering (IRE) is a four-year degree program accredited through Minnesota State University, Mankato, and located at Mesabi Range College's Virginia campus.

According to IRE executive director Christine Kennedy, the program arose because "what engineering educators are producing isn't exactly what industry is looking for anymore." IRE students, she says, learn their technical skills "by doing a real-world project." Students earn college credit while helping the businesses they work for. The program has more than 100 students enrolled.

Most of IRE's graduates find jobs on the Range, says Kennedy, though some have gotten jobs out of state (one graduate has been hired at Amazon.com). A few others are attending graduate school. IRE also encourages its students' entrepreneurial impulses. "We have had multiple patents come from that," Kennedy says. IRE recently launched its first spinoff, the Iron Range Makerspace in Hibbing. She hopes that it's just the first of many IRE-born startups that can inspire entrepreneurs to launch businesses of their own in the region.

A master's degree engineering program in collaboration with the University of Minnesota Duluth is also available. "We're able to serve our region, and students are able to stay on the Iron Range and get a bachelor's of science in engineering and a master's degree in Virginia, if they wish," Maki says.

In the growing health care field, NHED has established a partner-

ship with Minnesota State University, Mankato and Minneapolis-based Fairview Health Services to provide Iron Range students opportunities to earn bachelor's, master's and Ph.D. degrees in nursing through primarily online programs.

Last year, Hibbing Community College unveiled a new Healthcare Simulation Center, which simulates hospital, clinic and home-care units with the use of "high-fidelity" mannequins. The simulator includes two fully equipped clinic rooms and a homecare room.

DEVELOPING YOUNG TALENT

Aiding the colleges in their efforts to encourage youth considering employment and education options is the Range Engineering Council. Organized in 2014, this nonprofit connects regional engineers with regional schools to promote awareness and encourage participation in STEM careers. The engineers volunteer their time both inside and outside the classroom "to develop the talent pipeline for technical careers," council president Julie Marinucci says. The organization works with schools across the Iron Range as well as in Duluth, reaching thousands of students.


According to Marinucci, the members of the Range Engineering Council encourage students "to learn about the diverse technical career paths that exist in their own backyards. We have an impending talent shortage," Marinucci says. "We thought the best success from a retention standpoint is to develop our own talent." One of the council's chief goals is "a continuous development of regional talent to serve the technical industries in our area."

The organization's focus is students in the fifth through 12th grades, though it also works with post-high school individuals who

are considering which classes to take in college. Her organization also helps connect young people with regional internships. "We're continuously making the connections between the students, the professions and the companies in the region," says Marinucci, who is particularly interested in getting young women interested in STEM.

One of the Range Engineering Council's biggest programs is the annual Iron Range STEM Showcase. This one-day program brings together about 2,000 fifth- and sixth-grade students. The International Wolf Center, the Minnesota Department of Natural Resources and other partners make presentations and talk about various STEM-related career possibilities. The showcase offers a hands-on approach intended to "spark excitement in STEM and STEM careers," Marinucci says.

Another council-driven program is Engineering, Cool!, an after-school program for sixth-graders. The regionwide program brings in engineers who teach principles of engineering and science that are related to the industries they work in. Regional companies provide funding and encourage employees to volunteer. Minnesota Power engineers, for instance, offer "courses" on electric circuits; Cliffs Natural Resources engineers and scientists present segments on mining and geology.

The Duluth-based Iron Mining Association of Minnesota, which also teaches youngsters about the mining industry, is working with Education Minnesota to produce an education piece called Taconite Rocks!, designed to teach young people about the importance of the industry and to consider careers in mining and related fields. 



The Mesabi Trail: An Open-Air Museum for Cyclists

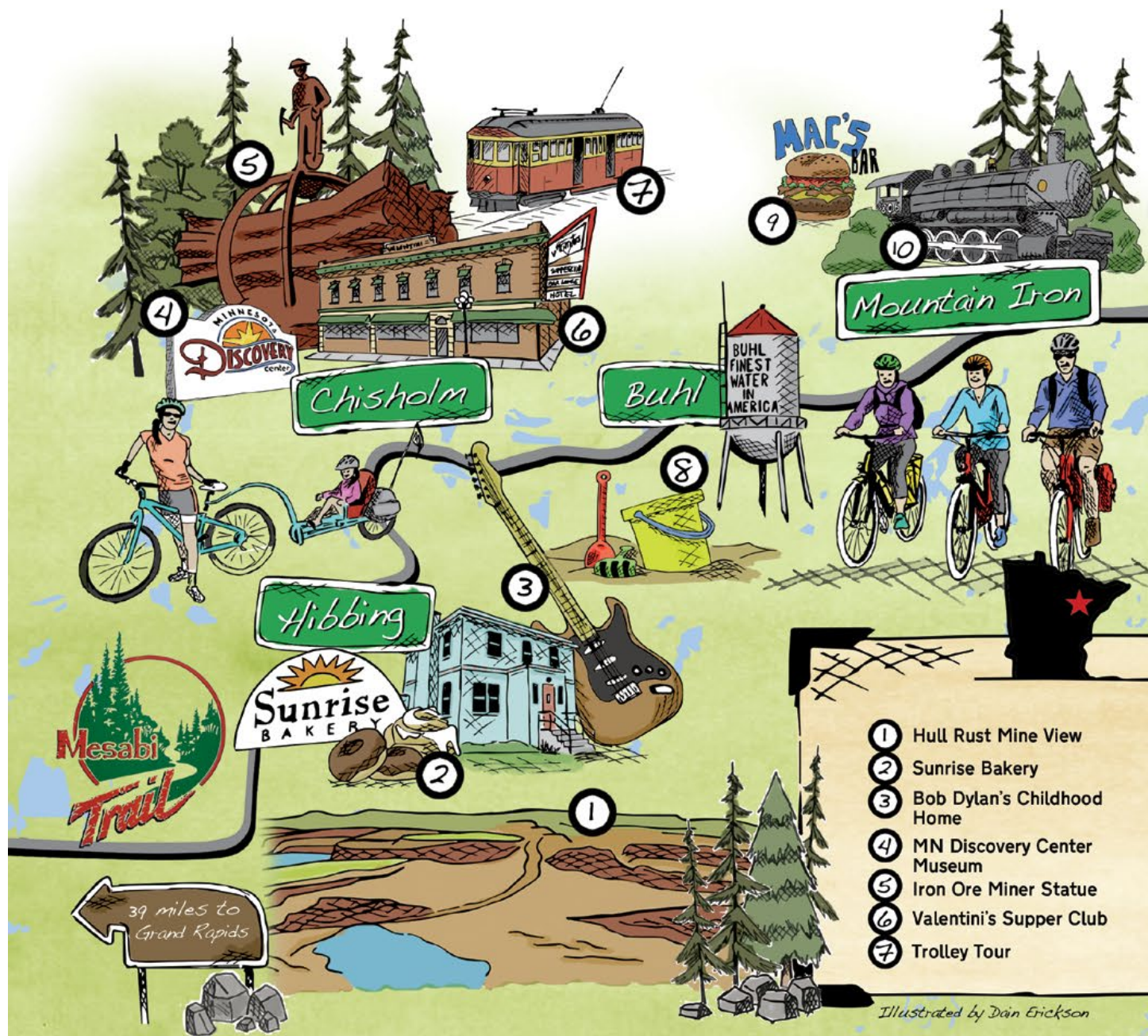
According to legend, a sleeping giant rests beneath the ridges of the Mesabi Iron Range. In fact, the Iron Range holds the secret of the Continental Divide within its mountainous terrain. The Laurentian Divide is a three-way watershed at the Hill of Three Waters near Hibbing.

Whether you prefer the facts or you would rather imagine a sleeping giant, both lend further intrigue to the lore that Mesabi is Magic.

One of the best ways to discover the magic is bicycling the Mesabi Trail. The trail opened in 2005 and connects the towns across the Iron Range, from Grand Rapids to north of Biwabik.

When completed, it will stretch more than 155 miles to Ely and connect 28 communities—making it one of the longest trails in the United States.

Traveling at a slower pace by bicycle allows time to enjoy and discover the towns that built America with the ore hewn from the rich, red earth. It's like touring an outdoor, open-air




museum of mining, blended with Euro-inspired foods and cultures that are still vibrant today: One part spice and two parts soul.

Discover the jaw-dropping view at the Hull Rust Mine View, called the “Grand Canyon of the North.” Take a selfie outside the childhood home of music legend Bob Dylan, and then visit the library that displays Bob Dylan memorabilia. Take a break from bicycling to explore mining history at the 660-acre Minne-

sota Discovery Center museum, ride an iconic trolley, or tour a working mine. Cycle past history, such as Hockey Town Eveleth—home of the U.S. Hockey Hall of Fame Museum and America’s largest hockey stick and puck.

Along the Mesabi trail, the richness of the local culture is further evident in its cuisine—the 100-year-old Italian Sunrise Bakery or authentic pasta at Valentini’s. A hearty “pasty” can be found nearly everywhere. (Pronounced

past-ee, this mouth-watering meat pie is stuffed with potatoes and root vegetables in a pastry crust.) Be surprised by Jamaican food in Gilbert or enjoy organic fare at Virginia’s Natural Harvest Food Coop between Silver and Bailey lakes.

History, culture, food and a fun, year-round destination: When you hit the Mesabi Trail, you never know what you’ll find around the next corner. Mesabi is Magic. 



A Cyclist's Guide to Mesabi

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