

# MEET #1-2021 SANDVIK

## DIVERSITY FOR BUSINESS EXCELLENCE

"Diversity has a direct impact on company performance," says Nidhi Gokhale, Sandvik.

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**A SUPERCRITICAL MOMENT** • Strategy review  
AI-driven packaging • **FOCUS: AUTOMATION IN MINES**  
• Carbon-emission-free heating system

#### SUSTAINABILITY

**NORWAY.** Glasopor eliminated its carbon footprint by switching to a Kanthal® electric heating system.  
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#### ARTIFICIAL INTELLIGENCE

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## CONTINUOUS DEVELOPMENT

**TO CONTINUE BEING** a relevant and successful company, we constantly strive to be at the forefront of technological development, to find new solutions and navigate the right path in a changing world. External trends such as digitization, automation, electrification and an increased focus on sustainability affect how we act today and in the future.

**IN MARCH**, we presented an updated strategy and a new common purpose (page 17). The outside world and a number of important shifts that we are facing are playing a greater role than before. We have also defined clear goals for 2025. In recent years, Sandvik has become a more customer-oriented, decentralized and financially stable company, and we are now ready to focus on growth. Although the Covid-19 pandemic caused a sharp decline in demand in 2020, we have nevertheless managed to maintain profitability at a good level, and 2021 has all the prerequisites for a better year ahead.

We have a tradition of world-class technical know-how that we will build on, and we are doing this through our own expertise and acquisitions. The acquisition of the software company CGTech and the agreement to acquire DSI Underground, a leading provider of underground security solutions (page 8), are good examples of this, and the ambition is for a continued active acquisition agenda.

**INNOVATIONS ARE** crucial to our success. Examples of this in the magazine include the electric loader (page 5), AI-inspired packaging (page 10) and our automated concept vehicle for the mining industry (page 14). These technical solutions make our customers more productive, efficient and sustainable and are central to us continuing to be our customer's first choice.

**Stefan Widing,  
President and CEO**





## BATTERY INCLUDED

**MINING JUST GOT** more muscles, as Sandvik unveiled the world's first 18-ton battery loader LH518B. Using an electric battery solution reduces heat and emissions underground, thereby helping mines reach sustainability targets and create a better working environment.

Thanks to AutoSwap™, a patented self-swapping system, changing batteries is fast and easy, with minimum manual handling, and it only takes about six minutes.

The new loader comes with an exceptional capacity for its size – its design allows the loader to fit inside a 4.5 x 4.5-meter tunnel and carry 18-ton loads. ■



# NEWS

**FOR THE TWELFTH** consecutive year, Sandvik qualified for the renowned Sustainability Yearbook by S&P Global, indicating a sustainability performance within the top 15 percent of its industry.



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**Kilotons of CO<sub>2</sub> reduced in 2020**, corresponding to a 17 percent reduction. The 2030 target is to reduce CO<sub>2</sub> emissions by 50 percent, or to 166 ktons with the current structure.



## SUCCESSFUL WEBINAR ON MATERIALS



**LEADING EXPERTS** from Sandvik and external partners teamed up for a live interactive webinar to present the very latest in additive manufacturing titanium powder production as well as life-changing applications in medical technology.

“Reaching out to customers,

prospects and partners in times of travel restrictions and social distancing requires new thinking,” says Paulina Kjellin at Sandvik Additive Manufacturing, who hosted the event and was pleased with the turnout.

Some 1,500 viewers signed up in advance, but more than

4,000 tuned in live, and by early February the webinar had been downloaded about 15,000 times. The most recent event in the series covered superduplex materials. If you don't know what those are, scan the QR code. ■

## POLYTECH STUDENTS GO DIGITAL WITH SANDVIK

**A GROUP OF** engineering students at Rensselaer Polytechnic University in Troy, in the U.S. state of New York, got a feel for Industry 4.0 in an assignment created by Sales Engineer Dayne Mosconi and Digital Machining Specialist Bijal Patel at Sandvik. They were supported by the machine monitoring software CoroPlus® Machining Insights, developed by Sandvik.

“The purpose was to teach students how data can be

autonomously gathered from machines and analyzed, supporting the understanding of the manufacturing process – and thus optimize it to levels of efficiency not possible without the use of the technology,” explains Patel.

Students interpreted the raw data coming from the machines to determine such things as cycle time and axis load measures. They were then able to compare the engineering goals that went into

the design of the machining process with real-world results via the actual metrics and detailed information from Machining Insights.

“We help prepare students to work with technology they can be expected to utilize and further promote once they enter the workforce as engineers supporting manufacturing processes,” says Mosconi. ■



## THE KNIFE THAT LIGHTS FIRES

**OFFERING TWO FUNCTIONS** in one tool, the Swedish FireKnife comes with a handle made from bioplastics that hides a weatherproof fire starter that's good for 3,000 strikes. The blade is made of Sandvik 12C27® stainless steel, which consists of 90 percent recycled material. ■

## INVESTMENT IN AI-POWERED SOFTWARE

**SANDVIK HAS** acquired a minority stake in the American software company Oqton, a leading provider of AI-powered manufacturing solutions that allow manufacturers to manage, optimize and automate their manufacturing workflows.

“This investment is in line with our strategic agenda to broaden our offering in digital manufacturing,” says Stefan Widing, CEO of Sandvik.

Oqton provides a cloud-based manufacturing platform that links data across the complete manufacturing ecosystem, enabling manufacturers to operate agile factories and manage complex product mixes with lower inventory and a simplified supply chain.

**Learn more at [oqton.com](https://www.oqton.com)** ■







DSI is a market-leading underground safety solutions company.

## HISTORIC ACQUISITION

**IN LATE 2020**, Sandvik signed an agreement to acquire DSI Underground, a market-leading underground safety solutions company. It's one of the biggest acquisitions in the history of Sandvik.

"This acquisition is an important step in our growth ambition," says Stefan Widing, President and CEO of Sandvik. "DSI Underground's track record of driving progress and safety in underground operations and its

global reach will further strengthen our world-leading market position within mining and rock solutions."

DSI Underground is present in 70 countries, with 22 production units situated close to the end customers.

"With the world's most extensive choice of ground support products and systems, the DSI Underground offering is highly complementary and enables us to deliver greater value

and safety to our customers," says Henrik Ager, President of Sandvik Mining and Rock Solutions.

DSI Underground has approximately 2,000 employees, and its 2020 revenue is expected to be about EUR 518 million. The purchase price is approximately EUR 943 million on a cash and debt-free basis. The impact on earnings per share will be slightly positive. The transaction is expected to close by mid-2021. ■



## DIAMOND WINS GOLD

**JOHAN SUNDSTRÖM** and Malin Mårtensson were awarded the Sandvik Innovation Prize 2020 for their work in developing the world's first 3D-printed diamond composite. Possible commercial applications include products that demand extremely high wear resistance, thermal stability and low weight.

"This is a unique product with many opportunities for top-line growth, since it solves the

long-standing challenge of producing complex shapes of the world's hardest material," CEO Stefan Widing told those gathered digitally for the award ceremony.

The Sandvik Innovation Prize is awarded to employees who have developed the most innovative product or process during the year. ■



## ALLOY SANICRO® 35 AWARDED

**THE SANDVIK ALLOY** Sanicro® 35 won the Materials Performance Corrosion Innovation of the Year Awards 2021, published by *NACE International*, the world's largest-circulation magazine dedicated exclusively to corrosion prevention and control.

"We are pleased with this unique

material, and it is gratifying to see our peers in the industry recognizing its benefits too," says Ulf Kivisäkk, Senior Expert Corrosion Resistant Alloys, Sandvik Materials Technology. "Sanicro 35 is the result of us identifying a market opportunity for customers, then innovating an effective solution." ■

## EVA LINDH-ULMGREN JOINS ROYAL ACADEMY

**EVA LINDH-ULMGREN**, Director Materials Design at Sandvik Materials Technology, has been elected a Fellow at the Royal Swedish Academy of Engineering Sciences (IVA).

"I am very happy and honored," says Lindh-Ulmgren. "Enterprise and academia need to team up and develop new interdisciplinary approaches. IVA is a very exciting platform and enabler in this respect." ■



## INNOVATORS AWARDED

**THE 2021** Wilhelm Haglund Medal for the product developer of the year was awarded to the innovators of Exera® medical wire and wire-based components for medical devices with demanding requirements, such as pacemakers, devices for glucose monitoring and units for deep-brain stimulation. The winning team was Gary Davies, Business Unit Manager Medical, Tim Tacionis, Lead Engineer, and Gene Kleinschmit, Senior Product Manager, at the Sandvik Palm Coast, Florida, site.

The Sandvik Sustainability Award in Memory of Sigrid Göransson went to the team behind the production program for premium crushing chambers in Svedala, Sweden:

Jörgen Petersson, Foundry Specialist and Anders Åkesson, EHS Manager. More than 90 percent recycled steel is used as raw material in a premium crushing chamber recycling program, reducing both indirect and direct carbon emissions in the supply chain. Sandvik has also introduced the first certified Environmental Product Declaration in the industry for manganese crusher wear parts. ■



# HOW DARWIN INSPIRED AI-DRIVEN PACKAGING

It all began with a revelation involving Charles Darwin's evolution theory and ended with an AI-driven solution set to change machine tool packaging as we know it. When Sandvik Coromant launches its application next fall, every new tool created will be allocated the most suitable packaging available, leading to major cost-savings and vastly lower CO<sub>2</sub> emissions.

**IN THE SUMMER** of 2019, Maria Rajabzadeh Namaghi, a 33-year-old R&D engineer and system developer from Iran, was sitting in her office in Sandviken working on Sandvik Coromant's next generation of product packaging selection solutions. She had a tall order: to ensure the packages selected would be as small and lean as possible, not only to cut material costs but also to help the Sandvik Group reduce its overall carbon footprint.

Although Rajabzadeh Namaghi had already found a solution based on traditional computer programming, she couldn't kick the nagging feeling that something was missing. "The solution wasn't flexible enough," she recalls. "It was customized for a certain type of packages, and it wouldn't work for new types of packages."

**THEN, AS SHE** let her thoughts wander through the deserted office landscape, it suddenly hit her: "What if I applied genetic algorithms using artificial intelligence?" A genetic algorithm is an AI-based problem search process based on Charles Darwin's evolution theory. Just as in nature, the



Prototypes of AI-driven packaging.

algorithm evolves through the generations, allowing for smarter and better solutions to develop with every cycle. After spending a few days putting her theory to the test, Rajabzadeh Namaghi knew she was on to something big.

"I was really excited," Rajabzadeh Namaghi recalls. "I couldn't wait to tell my colleagues here at the department about it when they were back from vacation." She notes that although genetic algorithm isn't something new in itself, it hasn't to her knowledge been applied to packaging solutions in this manner before.

"The way it works here is that whatever



Maria Rajabzadeh Namaghi came up with the packaging solution.

you might need to put in a package – whether something small like a tool or something big like a bicycle – the application will find you the smallest possible package to fit into,” she says. “The size or geometrical shape of what’s being packed doesn’t matter.”

She explains how the Package Selector Application (PSA) identifies the most critical points of an object by analyzing a CAD-based model of it in 3D. The AI algorithm then takes over to work out the object’s rotation, and from there the application is able to recommend not only the smallest possible packaging for it, but also how to fit the object into the selected packaging.

**ASIDE FROM** contributing to lower costs when it comes to packaging materials, transportation and storage, the ability to always select the smallest possible package will also help reduce CO<sub>2</sub> emissions.

“The smaller packages you use, the less package material you waste,” Rajabzadeh Namaghi says. “And in terms of transport, smaller packages take up less space, meaning you can fit more into a shipment and therefore waste less fuel.” Her department is responsible for specifying, developing, implementing and supporting a system platform for CAD/CAM/CMM/CAE automation.

**SAMIR BALIC**, Product Manager Packaging and Labeling, says the application, which is scheduled to go live in the second half of 2021, will automate the packaging selection process “from start to finish.”

“The product designers will get a tool added to their CAD programs,” he says, “and with the simple push of a button they will be able to film the tool they have just created and it will be matched with the most suitable packaging – even before the tool has been physically created.” ■





# SELF-DRIVING BACK TO THE FUTURE

Many people, from engineers to filmmakers, have long predicted the arrival of the driverless car revolution, and now of course it's very much on the horizon. But while driverless cars are getting the attention, other sorts of self-driving vehicles have been quietly changing industry, particularly the mining industry.

**"WHERE WE'RE GOING,** we don't need roads," exclaimed Doc Brown in the 1985 sci-fi blockbuster *Back to the Future*. Doc was talking to Marty McFly as their time machine, made from a sports car, flew off into the future of 2015. There are few signs of flying cars today – the filmmakers seem to have grossly misjudged the technological developments of transportation in the early 21st century – but what if Doc had told Marty

that where they were going, they wouldn't need drivers?

In 2015, the year of the future that Doc and Marty flew to, there was much hype about the dawn of the age of the self-driving passenger car. In December 2015, for example, Tesla CEO Elon Musk predicted that a completely automated car would be introduced by the end of 2018.

The completely automated car has yet to hit



Local Motors' shuttle Olli, made with additive manufacturing technology and finished with Sandvik tools.

the market, but it is clearly in advanced stages of development.

The pioneering companies in the field, including Waymo, the Google self-driving car project, and Tesla, have built the cars and run numerous well-publicized trials over the past few years, and the technology clearly works. The main hurdle to mass market rollout is making the cars 100 percent safe. There are too many hazards in the real world, including changing weather conditions and the unpredictable actions of pedestrians and other drivers, to be able to ensure that self-driving cars will do exactly the right thing all of the time.

**BUT WHILE WE** will have to wait a bit longer to use driverless cars ourselves, other types of self-driving vehicles have been in use for years, and that use is becoming ever more widespread.

A Sandvik concept vehicle with an automation solution, for example, is the current technological pinnacle of autonomous and remotely operated equipment that the company has been developing for two decades. And automated loaders and trucks from Sandvik have been working in mines around the world for more than 20 years, with zero accidents involving people. Of course hazards

are much easier to manage in a self-contained mine compared with a city street, hence the much earlier adoption of the self-driving technology in mines.

The mining industry is today probably the most advanced when it comes to the actual use of self-driving vehicles, but there are many other industries where the use of self-driving vehicles is ready to take off.

Driverless tractors for the farming industry are, for example, already in existence and will soon surely revolutionize the agricultural industry, which already spends billions on robotics. The freight industry is also developing driverless trucks to go from A to B.

Governments are working with industry to develop driverless public transportation. A driverless bus was in fact unveiled back in 2015 in China. It drove 20 miles through the crowded city of Zhengzhou without crashing into other motorists. And in the U.S., in Phoenix, Arizona, Waymo has been operating a driverless minivan taxi service since 2017, albeit in a limited geographic space.

**IN FACT THE** technology for these vehicles is so advanced that they can now be produced on 3D printers. One example of this, a shuttle bus named Olli, was unveiled at the 2018 International Manufacturing Technology Show in Chicago. It was employed to shuttle visitors from building to building.

But as in the case of driverless passenger cars, the main hurdle to rollout for all these applications is safety – specifically safety in the context of putting the vehicles into the unpredictable real world of people.

Solutions will undoubtedly be found, and found soon. Some experts believe that self-driving cars could be a feature of our highways within the coming five years. We'll still need roads in that future, though, even if we won't need drivers. ■

# ROCKING THE MINING INDUSTRY

This is what the future of mining looks like. A mining automation concept vehicle from Sandvik gives a unique and real hands-on preview of how the latest technologies can make the mining industry more safe, efficient and sustainable.

**CABINLESS, ELECTRIFIED** and automated. Without human interaction, a concept vehicle from Sandvik with an Automine® mining automation solution can navigate through the rough and changing conditions of underground mining tunnels. It can read the environment in 3D, create a model of the environment and plan its own missions – while the miners monitor the machine operations from the comfort and safety of a control room that can be located hundreds of miles away.

“Automation, digitalization and electrification will form the future of mining,” predicts Jarkko Ruokojärvi, Director of Automation Global Business Development and Marketing at Sandvik Mining and Rock Solutions. “New technologies provide new opportunities to increase safety and productivity and make the operations more sustainable.”

The ongoing development toward more technically advanced mining is both necessary and inevitable, Ruokojärvi says. The mining industry has recovered from a tough period of market volatility and downturn in commodity prices. This has increased the focus on cost-cutting through operational efficiency.

“Add to that the fact that many easier deposit locations have already been mined,” says

Ruokojärvi. “The companies need to search for valuable minerals in locations that are more and more challenging and remote.”

**GENERALLY SPEAKING**, the deeper into the ground the more challenging the rock mechanical conditions and the more challenging and costly it becomes to establish a mining area. Safety hazards increase and building infrastructure can become problematic.

“Removing people from hazardous environments is really one of the main drivers for automation,” says Ruokojärvi. “Reducing the in-pit and underground mining workforce by moving people to control centers will increase health and safety and create new types of job opportunities, which should benefit local communities and make the operations more sustainable.”

Sandvik has been developing autonomous and remotely operated equipment for 20 years and its Automine automation system has been delivered in hundreds of mining machines to customers around the world. Many of the groundbreaking mining innovations have come to life in its test mine and test lab in Tampere, Finland. To continue this journey, it is here also that the concept vehicle is being developed under great secrecy.

“With this vehicle we wanted to take automation





Automation, digitalization and electrification form the future of mining.

a step further, disrupt the mindset of how things are conventionally done and show what we think the future will hold,” says Ruokojärvi.

**THE CURRENT CONCEPT LOADER** operating its way through the test mine in Tampere is not for sale. It is even doubtful that there ever will be a loader that looks exactly like it available on the market. This is a teaser, to show what to expect. The concept loader showcases the Sandvik vision for future robotic mining technologies, and the plan is to gradually commercialize and deploy the

technologies across different types of equipment.

Developments in the automotive industry have been valuable in this endeavor. The advances in sensor technology development for self-driving cars have led to new components becoming available for sensing the environment, for route planning and for avoiding obstacles. The electrification is greatly beneficial in mining too, as battery-driven equipment reduces CO<sub>2</sub> emissions both above and underground. If powered with renewable energy the value chain increases further.

The new concept vehicle has been designed →

from the ground up for autonomous use. All factors necessary to accommodate people onboard have been eliminated, such as the operator cabin. Optimizing the design for autonomous use allows higher payloads in existing tunnels. It also enables the design of smaller machines that can work in narrow passages, a valuable aspect as smaller tunnels mean less mining waste.

“Focusing on machine design for only autonomous use allows for improved motion control and higher reliability,” says Ruokojärvi. “The higher intelligence provided by the new technologies allows for increased operational flexibility, higher adaptivity and higher productivity, due to the machine’s self-awareness and self-planning, as well as simpler preparations required by people.”

Mining operations are widely varied in terms of mine design, minerals and geology. Different levels of automation are already in use in mining operations.

“Our goal is to make the automation more generic so that more types of mining methods can get the same benefits of safety, production efficiency and sustainability, regardless of how complicated the mining process is,” Ruokojärvi says.

**HE PREDICTS THAT** in five to ten years mining operations in most parts of the world will be far more technically advanced than they are today. The concept vehicle has already shown what it can look like.

“It’s very exciting that we can show that these technologies work in the toughest conditions and what is possible to achieve,” says Ruokojärvi. “In our next steps it is necessary to evaluate how to incrementally commercialize these technologies to make sure they meet the needs of our customers.” ■



Removing people from hazardous environments is one of the main drivers for automation.



# STRONGER FOCUS ON GROWTH

Sandvik has updated its strategy for an increased focus on growth. Six strategic objectives, well-defined measurables and a new purpose are the building blocks of the future.

**SANDVIK HAS** reviewed its vision, core values and strategy to ensure further progress, value creation and engagement among stakeholders.

Stefan Widing, President and

CEO, explains, "Our previous strategy has served Sandvik well. We have built a strong foundation, and today we are a more stable, profitable and decentralized company. For example, decision-

making close to our customers, agility and quick adjustments to changing market conditions are now ingrained in our culture."

The rationale behind the review was to simplify and bring clarity





“The new purpose expresses how our innovative solutions create value, not only for our customers and employees but also for society and the planet, ultimately creating shareholder value.”

and focus to future Group ambitions. “We wanted to clearly express why we exist, how we do things and what we should focus on to ensure further development and long-term success,” Widing explains.

In the updated strategy much attention has been given to development areas, measurable goals and concrete actions, such as systematic follow-ups to determine customer and employee satisfaction.

Sandvik’s core values – innovation, customer focus, fair play and passion to win – are well embedded in the organization and will stay the same. They define the required behaviors to contribute to the strategy and purpose.

**THE PREVIOUS** vision is now being replaced with a long-term common purpose and narrative statement:

We make the shift – advancing the world through engineering.

“The new purpose expresses how our innovative solutions create value, not only for our customers and employees but also for society and the planet, ultimately creating shareholder value,” Widing says. “It will further

align and support the Group’s future direction, culture and strategy.”

He explains that a central idea behind the strategy is enabling important shifts in the world, such as digitalization and sustainability. To that end, six strategic objectives are being introduced: “shift to growth, sustainability shift, the digital shift, customer’s first choice, the employer of choice and agile through the business cycle.”

## SIX STRATEGIC OBJECTIVES

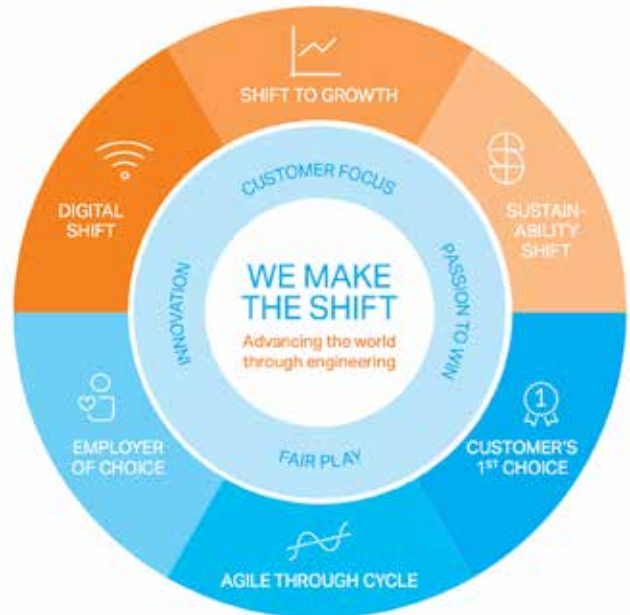
- **Shift to growth**
- **Digital shift**
- **Sustainability shift**
- **Customer’s first choice**
- **Agile through cycle**
- **Employer of choice**

The strategic objectives will be followed up by systematic measurement for maximum transparency, accountability and actionability.

**THE INCREASED** focus on growth (through acquisitions and organically) is partly a result of Sandvik’s success in reaching and retaining the kind of stability and profitability that permit higher growth ambitions. The plans include a more proactive acquisition agenda and an increased focus on new products and solutions. “We have to grow in areas that are necessary to manage the shift to digitalization

## SHIFTING TO GROWTH

Sandvik has updated its strategy for an increased focus on growth. The past years we have divested underperforming businesses, decentralized the organization and become a much more resilient company. From this stable platform we will further increase the focus on growth, digitalization, sustainability and agility. We have introduced five-year targets in each of the six strategic objectives (see chart at right) to ensure transparency and follow through. We are continuing with the financial targets set in 2019.



and the shift to sustainability," says Widing, "and at the same time ensure that we maintain a technology leadership in our core areas."

The digital objective is to be a leader in digital solutions in the industry and to grow the digital customer offering. "Internally we need to ensure efficiency through a seamless flow, supported by standardized business systems at our sites," he says.

Sustainability, continues Widing, has grown in importance to investors of all sizes, from institutions to private households. "Our institutional owners expect us

to lead the way and remain at the forefront in developing technologies and solutions that enable the transition to more sustainable businesses," he says. "Sustainability excellence opens up many business opportunities."

**SANDVIK SHOULD** have a cost structure flexible enough to manage economic downturns and allow for quick responses to changing market conditions, Widing says. This flexibility was tested to the extreme when the Covid-19 pandemic dealt the order intake a severe blow in the first half of 2020. But Sandvik

managed to weather the storm.

"I believe we handled the difficulties very well, holding on to our margins and managing our cost base in an agile way," he says.

"Attracting the right competences and a diverse workforce are key requisites for future success," he says. Customers form another crucial stakeholder group. "We want to advance the way we measure and improve customer value and customer satisfaction," Widing says. "We need to continuously improve to continue to be our customer's first choice." ■

Svein G. Lund at the Glassit facility in Skjåk, Norway.



## BREAKING GLASS

Norwegian company Glasopor is one of the few manufacturers in the world that produce foam materials from recycled glass. The company has boosted its profitability and eliminated its carbon footprint by switching from gas to electricity based on a Kanthal® electric heating system.

**NESTLED IN THE** rolling hills of the Skjåk countryside just west of Oslo is the Glassit factory, one of Europe's most innovative glass recycling works. This plant, owned by Glasopor, recycles some 18 million wine bottles and other glass products per year and turns the waste into a granulated high-tech foam material.

This lightweight foam glass is used mainly as filler in the construction of roads and railways, where it is especially effective in poor ground. It is also widely used as an insulation material in buildings. Glaso-

por's premium foam glass is 100 percent recyclable and consists of 80 percent air, which results in a bulk weight of 180 kg/m<sup>3</sup>.

To improve its environmental performance and reduce costs, the company engaged Kanthal, a Sandvik division, for a complete process conversion from gas to electric heating.

**SINCE THE COMPANY** was founded in 2002, Glasopor's sales have gone from strength to strength, but as a modern recycler it was not entirely at ease with

its own internal performance. Its gas consumption, and therefore its energy cost, was high and so too were its CO<sub>2</sub> emissions – around 4,000 metric tons per year.

After a thorough review of its operations, the company decided to take the radical step of switching its energy source from gas to electricity, based on Kanthal® electric heating technology, and it has never looked back.

Although the switch itself from gas to electricity entailed a substantial cost saving, Glassit wanted a powerful heating system that it could rely on for its glass foaming process. In addition, the plan called for the upgrade of furnace zones as well as service and maintenance to keep the system working effectively and efficiently far into the future. The choice was Tubothal® heating elements from Kanthal, recognized worldwide for its superior efficiency.

**THE COMPLETE CONVERSION** from gas to electric was managed on-site in Norway. The team designed and simulated the conversion, calculating the required power and element temperatures. In the planning process, technicians from Kanthal also provided a payback calculation to facilitate the upgrade of three zones in the furnace.

**THE DECISION TO** switch from gas to electricity turned out to be more successful than anyone had imagined. Glasopor Development Manager Svein G. Lund explains: “In calculating this conversion we saw it as something of a high-risk project for us. Naturally we wanted to improve the environmental side – because of course that’s very important for us – but we also



The electric furnace at the Glassit facility requires 37 percent less energy and emits no CO<sub>2</sub>.

wanted it to be beneficial in terms of our future earnings.

“Our aim was to reduce our energy consumption by 28 percent. Today our research shows that the real reduction in energy is more like 37 percent – even higher than we expected, which is fantastic! And on top of that, we have reduced our CO<sub>2</sub> emissions to zero.”

Lund adds that the new system is in the spirit of innovation that has permeated the company’s development since its inception. It also fits in with Glasopor’s policy to use local water power resources rather than pump gas from the North Sea.

“Innovation is the driving force in this company and the key to our success,” he says. “We think this project and the Kanthal system will help us to maintain our position as the leading manufacturer of glass foam products, and that’s something we are looking forward to telling the market about.” ■





# BUILDING A GREENER FUTURE

Sustainable business development is key to the way employees at the Langfang plant in China work. Lemon Jin, Site Manager, talks about the efforts the facility has made to reduce emissions and protect the environment.

The Sandvik Coromant plant in Langfang, China, is part of the global “Green Factory and Sustainable Facilities” initiative the company has driven for several years. Located in China’s Bohai economic rim region, the plant has developed a medium and long-term road map, as well as a five-year plan, based on the Sandvik Coromant Sustainable Development Strategy 2030. Using professional assessment tools, the plant will undergo yearly assessments, and annual key performance indicator (KPI) goals and Top 10 actions will be scheduled to reflect the results of these evaluations.

“Our ‘Top 10 actions’ focus on energy savings, emission reductions and environmental protection,” says Lemon Jin, Site Manager at the Langfang plant. “They cover almost every aspect of the daily operations of the plant and the way people work here, including clean production, resource recycling, water and electricity savings, waste reduction and garbage classification and treatment.”

**AS ONE EXAMPLE** of how to integrate sustainability into the daily work Jin mentions the implementation of an “empty plate”

campaign in the plant canteen, encouraging people not to order more than they can eat to reduce food waste.

Lemon Jin joined the Langfang plant in 2002, working his way up from a machine operator to a plant manager. The Langfang factory means a lot to him.

“Sandvik is a global group, and environmental protection has always been a top priority for us,” Jin says. “As part of Sandvik Coromant, we always endeavor to live up to our commitment to being a responsible corporate citizen. In addition, Langfang is the city where I grew up and continue to live, so we have to do our best to protect the environment of our hometown and be responsible to the city.”

**ONE OF THE** initiatives that that has been performed at the plant is a new heat-recycling system to recycle heat generated from air



Lemon Jin is Site Manager at the Langfang facility.

compressors. The recycled heat was used to heat the water for showers for employees, reducing gas consumption by 4,000 cubic meters and CO<sub>2</sub> emissions by 9.6 tons.

“Because of the steadily increasing costs of dealing with waste, liquid-waste treatment equipment has

been installed. By using low-temperature vacuum distillation technology, 97 percent of the wastewater can be purified for reuse in production. The remaining 3 percent is disposed of by a qualified third party,” Jin says. In 2020, 69 tons of wastewater were recycled at the plant.

**ANOTHER INITIATIVE** is the installation of a tank to collect rainwater from the building roof for irrigation of gardens, resulting in water-consumption savings of more than 200 tons annually.

The plant has installed a cooling tower that reduces the need for the chiller being opera-



Sustainability is an integrated part of everyday work.

ted. Whenever the outdoor temperature drops, the chillers can be shut down to save energy. In 2020, this made it possible for the plant to save 325 megawatt hours and reduced CO<sub>2</sub> emissions by 239 tons.

The Langfang plant has also upgraded to a boiler with higher efficiency that reduces emissions of nitrogen oxide from 90 milligrams per cubic meter to 30 milligrams per cubic meter, and cuts natural gas consumption by about 30,000 cubic meters.

To increase the machine efficiency, the plant replaced the old return oil pump, which consumed 2.2 kilowatts of power, with a new one that consumes only 0.7 kilowatts.

Together, all these measures will contribute to reducing the Langfang plant’s environmental footprint as much as possible. ■

## THIS IS LANGFANG

The city of Langfang is in China’s Bohai economic rim region, an important geographical position close to Beijing and Tianjin that boasts a well-developed transportation network. The Sandvik Coromant Langfang plant, which in 2021 is celebrating its 28th year of business, is situated here. The plant covers some 33,700 square meters and has about 300 employees.



SCW Systems uses supercritical water gasification to produce renewable gas.

## A SUPERCRITICAL MOMENT

Sandvik delivers advanced, seamless stainless steel tubes to the world's first industrial supercritical water gasifier that will help the Netherlands gearing up for a renewable future.

**AS COUNTRIES ACROSS** the globe seek cleaner energy, for those that currently rely on natural gas – such as the Netherlands where it accounts for 40 percent of the country's energy consumption – simply switching to renewable gas has many benefits. Like natural gas, it can be

efficiently stored on a large scale, it can be transported over long distances and can be used in existing gas infrastructure. The only problem is not enough renewable gas can be produced to meet the Netherlands' – let alone the world's – needs.

This is something that SCW Systems

“The technology uses the fourth natural phase of water – the supercritical water phase.”

aims to change. “We develop novel technologies to convert organic waste streams into carbon-neutral, or even carbon-negative, energy carriers,” explains Gerard Essing, CEO of SCW Systems. “The technology uses the fourth natural phase of water – the supercritical water phase – to split molecules to almost an atomic level. This largely untapped phase occurs when temperatures reach 375°C and pressure is higher than 221 bar.”

**WHEN WATER IS** in the supercritical phase, organic substances such as sewage, become extremely soluble. The water becomes a solvent for organic components and a catalyst for a rapid and almost complete conversion of the energy stored in organic components into gas. From this, gas components such as green gas and hydrogen can be stored and used in the same infrastructure as existing gas supplies. As the process uses waste to create hydrogen, it is completely renewable.

Together with Gasunie New Energy, SCW Systems has successfully developed, completed and tested the first industrial reactor. Currently, the world's first full demonstration facility is under construction and the production of the indu-

strial supercritical water gasifiers has begun.

To make its gasifiers, SCW Systems needed advanced materials that could withstand high temperatures and pressures, and most steels wouldn't make the cut, according to Dyon Hermesen, Sales Manager at Sandvik.

**AFTER SEVERAL** years of collaborative development and testing, the solution was Sanicro®, Sandvik grades of nickel alloys and high-alloy austenitic stainless steels. The material used in this specific solution is characterized by its high structural stability, creep strength and oxidation resistance and has been specifically developed for use at material temperatures up to 700°C.

**AS SANDVIK CONTINUES** to work with SCW Systems to support the industrial production of its gasifiers, the future for supercritical water gasification looks promising. Recently, the Dutch government set itself the goal of producing 2 billion cubic meters of renewable gas by 2030, 60 percent of which is to be produced by supercritical water technology. If successful, many other countries that also have an extensive gas infrastructure could well follow suit. too. ■





Nidhi Gokhale strongly believes in a diverse and inclusive workforce.

# DIVERSITY FOR BUSINESS EXCELLENCE

A diverse, inclusive workforce is good for business, says Nidhi Gokhale, Head of HR at Sandvik Manufacturing Solutions. But you need to walk the talk to make real change happen.

**DIVERSITY AND INCLUSION** (D&I) has never been more important to businesses than right now. Around the world, companies are pledging to create workplaces that include everyone, regardless of gender, race, age or orientation.

**You've been in HR and with Sandvik for ten years. Why did you choose a career in HR and why at Sandvik?**

I graduated with honors in physics, but in the first year of my master's I realized this was not the career I wanted. My father once told me to make a career "out of your own strength and what you love." I decided to complete a master's in HR. I moved to Pune, India, for my studies and it was here that I eventually started working for Sandvik.

One day, during my master's, a guest lecturer came to speak to us from the nearby Sandvik

plant. He'd been with the company for 35 years, and I remember wondering how a company had gotten someone to stay for so long. After my master's, I applied for a one-year internship at Sandvik and here I am, ten years later!

### Why do companies need to take D&I seriously?

Research shows that more diversity in executive teams and leadership roles has a direct impact on a company performing better – when it comes to creating a more inclusive culture but also for productivity and profitability. We can see that younger generations actively seek out teams of people from different backgrounds. Their approach to innovation and problem-solving is to bring diversity into the team because they know it will lead to a better end result.

### Why is D&I important to Sandvik?

At Sandvik, we believe a diverse workforce is better suited to serving our customer base around the world. In today's globalized, digitized world, a diverse, inclusive workplace is central to a company's ability to attract, develop and retain the talent it needs to compete in the future.

It's important to understand that true diversity means respecting all the differences that define us as individuals – from gender to age, cultural and national backgrounds, orientation and ethnicity, as well as differences in education, experience and skills. A truly diverse company is one that encourages open thinking and creates a culture of inclusion in which all individuals feel respected, are treated fairly and have the opportunity to excel.

### Having worked in both India and Sweden, how do the two compare in terms of D&I?

Both countries share a similar challenge: how to attract more women to traditionally male jobs. But there is more of an uphill battle in India due

to cultural constraints. In India, we opened a day-care center at Sandvik in Pune to attract female employees. When I first returned from maternity leave, my son Hridaan used to spend his days at the spacious, cheerful center. Meanwhile, in Sweden, the Female Leader Engineer initiative encourages newly graduated women to meet and learn from their peers. Research shows that young women are more likely to consider working for an organization when they have gender role models.

### What is your greatest challenge?

The greatest challenge in D&I is making it a central part of the business strategy, not just an afterthought. It isn't enough to talk about diversity, it needs to be embedded in everything we do, from how we attract people to how we develop, manage and retain them. At Sandvik, I can confidently say that D&I is an integral part of who we are as a company.

### One of the sustainability goals of Sandvik is to have 33 percent female managers. Why have you set this goal and how will you achieve it?

When it comes to gender diversity, studies show that you need about one-third representation in a group before you stop feeling like a minority, so our current levels are not enough. The proportion of women in our global workforce is 19.6 percent currently, while the women in managerial positions increased in the past five years from 16.5 percent to 18.5 percent in 2020. We are also seeking to broaden the ethnic and cultural diversity on the executive teams. We currently have 19 percent non-Europeans on the division management teams. So even though the numbers have been gradually improving every year, we need to speed up the process. We're working with greater intensity and more targeted interventions globally, and driving this as part of our business strategy. →



The greatest challenge in diversity and inclusion is to make it a central part of the business strategy.

**What makes you feel the greatest sense of pride in your work?**

Although we have a long way to go, I'm proud of the growing numbers of women in our organization. We have reworked our recruitment processes to make sure the wording in job vacancies is modern and inclusive. For instance, we avoid gender-specific pronouns as much as possible. I'm proud of our 18-month Global Graduate Program, which helps attract young talent, as selected graduates develop an in-depth understanding of our businesses through various rotations in their home country and abroad. I'm proud of our other D&I initiatives such as the nano-learning we recently rolled out and our Global Leadership program "Bridge," which focuses on leading across boundaries and increasing cultural diversity awareness. On a personal level, I'm proud to work with so many amazing people from all over the world. It's so much more challenging, stimulating and fun to be a part of a diverse and inclusive environment.

**You started at Sandvik ten years ago. Where do you see Sandvik in 2031?**

At Sandvik, we offer a world of opportunities. Our diverse business and global network enables us all to take control of our career development and thrive to the best of our potential.

I strongly believe that we will continue to grow and deliver value to our customers, suppliers and shareholders while having a globally diverse workforce from a wide range of cultural, geographical and professional backgrounds and with modern, agile and sustainable ways of working driving the shift in the industry in which we operate. ■

**NIDHI'S TIPS FOR YOUNG WOMEN**

**Feed your passions:** This enables you to be more focused and enjoy every aspect of your life.

**Ask for help:** Regardless of whether you are starting a new position or are a working mom with kids at home or are simply looking for inspiration on what to do next, asking for help is a strength, not a weakness.

# SOLID RESULTS AND POSITIVE MOMENTUM

## 3 QUESTIONS for Tomas Eliasson, Chief Financial Officer (CFO) at Sandvik.

### How would you summarize the first quarter report for 2021?

We saw very strong demand on the mining side and a continued recovery in our short-cycle business, such as the automotive segment and the engineering segment. It was also satisfying to see that we are once again delivering strong profitability. The adjusted operating margin of 19.2 percent for the quarter was one of our highest ever – another sign that we have emerged from a turbulent year as a stronger, more stable and more flexible company.

But while we are recovering in many of our operations, the pandemic is still ongoing, and demand continues to be low in areas such as the aerospace industry and oil/gas. This is a reminder that we must not lose focus and constantly be agile and ready to act quickly in the



event of sudden changes in the market.

### What are your expectations for 2021?

During the current recovery we're in there is strong focus on identifying and delivering on the growth opportunities that exist – both through acquisitions and organically.

But while we shift towards growth, it is important that we do it in a smart and carefully thought-out way. We must be ready to deal with challenges on the cost side and in the supply chain in a stronger economy, and at the same time ensure that we constantly update our contingency plans so that we are even better equipped for

the next downturn, whenever it comes.

Our cost structure must be flexible enough to handle both ups and downs, as much as possible without incurring one-off costs.

### Acquisitions are an important component in the growth strategy – what is important to consider?

We have a favorable starting position thanks to strong cash flows, a solid balance sheet and leading market positions. Now we need to implement what we have set out to do, and we got off to a good start already in 2020 when we announced the big acquisitions of CGTech and DSI Underground, despite all the uncertainty in the world.

An important part of this work is to make acquisitions an even more integrated part of how we run our businesses and proactively maintain a large pipeline of interesting candidates. Sandvik should be seen as a company you want to be acquired by and be a part of. ■

## ACQUISITIONS COMPLETED

**SANDVIK HAS** completed the acquisition of U.S.-based CGTech, a global market leader in software for numerical control (NC/CNC) simulation, verification and

optimization. In 2019, CGTech had revenues of about SEK 470 million and around 180 employees.

Sandvik has also completed the acquisition of the Indian company

Miranda Tools, a manufacturer of high-speed steel and solid carbide round tools. In 2019, Miranda Tools had revenues of about 200 million SEK and around 580 employees. ■



# SANDVIK AT A GLANCE

Sandvik is a high-tech, global engineering group offering products and services that enhance customer productivity, profitability and safety. In 2020, the Group had approximately 37,000 employees and sales of SEK 86 billion in more than 160 countries.

## BUSINESS AREAS



### SANDVIK MINING AND ROCK SOLUTIONS

A leading supplier of equipment and tools, service and technical solutions for the mining industry and rock excavation within the construction industry.

**SHARE OF REVENUES 39%**

**SHARE OF ADJUSTED OPERATING PROFIT 46%**



### SANDVIK MANUFACTURING AND MACHINING SOLUTIONS

A market-leading manufacturer of tools and tooling systems for advanced metal cutting, expanding into digital and additive manufacturing.

**SHARE OF REVENUES 38%**

**SHARE OF ADJUSTED OPERATING PROFIT 41%**



### SANDVIK MATERIALS TECHNOLOGY

A leading developer and manufacturer of advanced stainless steels, powder-based alloys and special alloys for the most demanding industries.

**SHARE OF REVENUES 16%**

**SHARE OF ADJUSTED OPERATING PROFIT 7%**



### SANDVIK ROCK PROCESSING SOLUTIONS

A leading supplier of equipment, service and technical solutions for processing rock and minerals in the mining and construction industries.

**SHARE OF REVENUES 7%**

**SHARE OF ADJUSTED OPERATING PROFIT 7%**

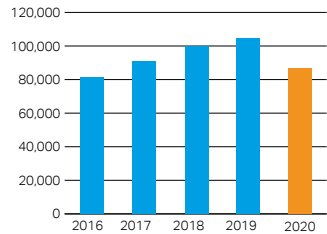
## INDICES AND MEMBERSHIPS

MEMBER OF  
**Dow Jones Sustainability Indices**  
In Collaboration with RobecoSAM

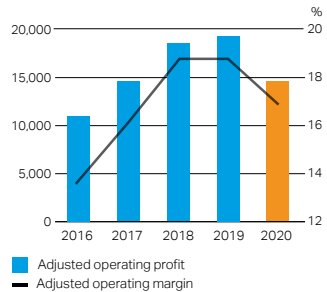


## THE GROUP

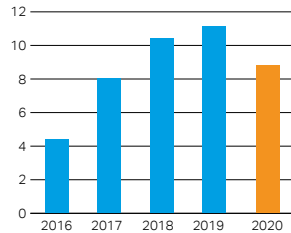
### Revenues, MSEK



### Adjusted operating profit, MSEK and adjusted operating margin, %<sup>1</sup>



### Adjusted earnings per share, SEK<sup>1</sup>



<sup>1</sup>) Adjusted for items affecting comparability

**MAIN CUSTOMER SEGMENTS****MINING**

We deliver drill rigs, rock-drilling tools and systems, mobile and stationary crushers, load and haul machines, tunneling equipment, continuous mining and mechanical cutting equipment, as well as service and various solutions for increasing automation, safety and customer productivity.

**SHARE OF REVENUES 40%**

**ENGINEERING**

Our tools and tooling systems for metal cutting as well as advanced materials and components are used in engineering industries worldwide, improving productivity, profitability, quality and safety as well as reducing environmental impact. We are also a global leader in high-alloy metal powder.

**SHARE OF REVENUES 23%**

**AUTOMOTIVE**

Our tools and tooling systems for turning, milling and drilling in metals increase productivity when manufacturing, for example, engines and transmissions. Our stainless and high-alloy products are found in air conditioning and air bags, among other things.

**SHARE OF REVENUES 11%**

**ENERGY**

We offer solutions for all forms of energy production, including clean and renewable energy. We supply high-alloy products, such as stainless steel tubes for selected niches in the most demanding industries as well as tools and tooling systems to satisfy the industry's metal-cutting needs.

**SHARE OF REVENUES 10%**

**CONSTRUCTION**

We offer products and services that increase safety and customer productivity in breaking, drilling, crushing and screening within the construction industry. Application areas include tunneling, quarrying, civil engineering, demolition and recycling.

**SHARE OF REVENUES 8%**

**AEROSPACE**

We work closely with the world's aerospace companies. As they apply new materials to manufacture airplanes that are lighter, safer and more fuel efficient advanced tooling solutions and lightweight materials are critical.

**SHARE OF REVENUES 5%**



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## **THE OBJECT** | Canine in the ore mine

An agile canine-like robot called "Spot" is making a name for itself in underground mining. This robotic K9 navigates terrain with unprecedented mobility, allowing for automated routine inspection tasks and data capture. And it fits perfectly into the Sustainable Underground Mining (SUM) collaboration between LKAB, ABB, Combitech, Epiroc and Sandvik. The goal of SUM is to create a sustainable and digital ecosystem underground.

LKAB has brought in two Spots, manufactured by Boston Dynamics, for testing in northern Sweden. "They are now being tested in the mines here to see how they can help us with, for instance, exploring areas of difficult rock conditions where it's not possible to send humans," says Mike Lowther, Head of Konsuln test mine. "We see it as another aspect of technology that can help us with mining in the future. The testing with these two Spots is going really well."