

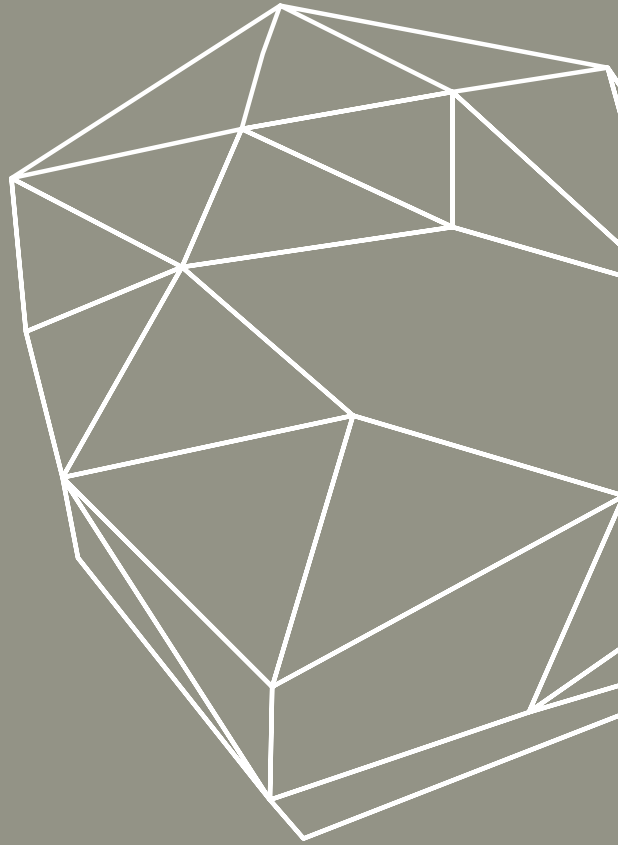
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PART 4: 2002-2024

**FOR GENERATIONS
TO COME**



THE BOLIDEN



BOLIDEN 1924-2024

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Boliden 100 years, Part 4

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Searching for tomorrow's building blocks

In the 2000s, Boliden became more successful than ever before. Kevitsa was acquired, and together with the investments in Harjavalta, nickel formed an important part of our metals portfolio. The mining and metal industry went from being regarded by others as a sometimes dangerous industrial relic to a modern enabler of both regional development and a fossil free society. Responsible metals supply became a societal issue, and even Europe woke up.

Boliden began to make a name for itself out in the world. We were still not the biggest player, but we had begun to win respect in many fields. Our safety work achieved results that were unique in global terms. Successful expansion projects, developments in technology and productivity, the management of economic cycles and not least Boliden's leadership in many sustainability areas, all left an impression. Our vision was

reformulated to read: To be the most climate-friendly and respected metal provider in the world. We also succeeded in recruiting more women than ever before.

But this does not mean we're satisfied. But naturally, we still face challenges. We need to continue building our values and making them and our sustainability profile visible in order to attract new people to our industry. We must improve our performance in a number of areas if we are to remain competitive, while also taking good care of our history and everything that makes our company unique.

Boliden is always at the beginning of a great many value chains. When we're exploring for ore we're actually searching for tomorrow's building blocks. We create possibilities, and what we do allows us to create an even better future for ourselves and for generations to come.



Photo: Jeannette Hägglund



Photo: Jeannette Hägglund

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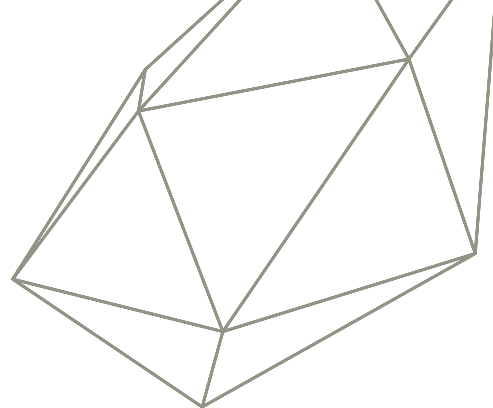
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We want to create an attractive place based on the area's new conditions. By attractive, we mean that it must be accessible and possible to use for a different kind of activity.

Joanna Lindahl, sustainability manager
(Read more on page 36).



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“

From waste that previously would have been disposed of in rock caverns, we have created a new lead product with traces of e.g. gold.

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MINING BOOM AND CONFLICTING GOALS

*Text: Dag Avango, history professor
at Luleå University of Technology*

In the beginning of the 2000s, the mining industry underwent rapid expansion driven by strong economic growth in the global south, especially China, which was undergoing a comprehensive industrialization and urbanization process with the expansion of infrastructure and a population with increasing purchasing power. Similarly, as with the industrial breakthrough, this growth generated an increased demand for metals, especially base metals such as iron and copper, but also other metals used in electronics. The rising demand expressed itself as increasing investments in exploration, which became noticeable from 2004 onwards. The demand also led to investments by mining companies in increased production in existing mines.

**Increased demand
has led mining
companies to gladly
reconsider reopen-
ing previously closed
mines.**





Photo: NamLong Nguyen

Green industrialization

The mining boom that has grown in strength from the 2020s, is also due to the increasing demand for green products and production processes. This demand was not only generated by a growing industrial customer base and a general public that wants products which cause as few greenhouse gas emissions as possible, but also by a policy intended to bring about a transition to an economy that minimizes greenhouse gas emissions. Electrification is a key component in the green transition, and this requires great quantities of metals, in particular copper and other metals critical to innovation. This provides additional impetus to the expansion of the mining industry and especially affects companies such as Boliden, which has specialized in mining and processing the types of metals in demand. This ever-increasing demand has also led mining companies to consider reopening previously closed mines.

Exploration and the establishment of mines and other production facilities is taking place in several parts of Sweden, Norway and Finland. Once again, the northern region is in focus, in part because of mineral deposits, but also because the historical legacy from previous investments have endowed the area with infrastructure and access to relatively cheap energy.

Stresses

The history of mining shows it to be an industry that not only generates value, but also tensions. These arise for several reasons. Environmental pollution is one example. Other common causes are conflicts arising from the use of land such as those between mining projects and traditional industries like reindeer husbandry or tourism. There are also the conflicting goals that can occur when people have a different opinion than the mining industry on what a desirable future

Electrification is a key component in the green transition, e.g. electric vehicles. The transition will require great quantities of metals.

might consist of. We have much to learn from history here, about how and why conflicts arise and how to solve them by creating solutions that are acceptable for the majority.

Today's mining industry appears to have a bright future, despite the challenges the industry often exposes, such as long-drawn-out permitting processes. Compared to the crisis years of the 1970s and 80s, faith in the future is strong. At the same time, it's important to learn from the experience the industry's history provides. This is not the first time grandiose visions of the future have been created around the industry, and no boom lasts forever. We live in a global market economy with ups and downs that affect the demand for metals.

2002–2024

NEW BOLIDEN

A year after the rescue operation, the financial situation for Boliden turned and the company reported a profit. Despite this, the first three years were difficult due to lower metal prices, unfavorable exchange rates and poor treatment charges. But things would improve.

Text: Karin Jansson Myhr

At the end of 2003, Boliden concluded a major, important structural deal with the Finnish company Outokumpu. The deal was considered necessary to secure the company's long-term, positive development. And it proved to be a correct assessment. The deal meant that Boliden acquired Outokumpu's zinc and copper mining and smelting operations. At the same time, Boliden's copper pipe and brass rod businesses and technology sales (Boliden Contech) were transferred to Outokumpu.

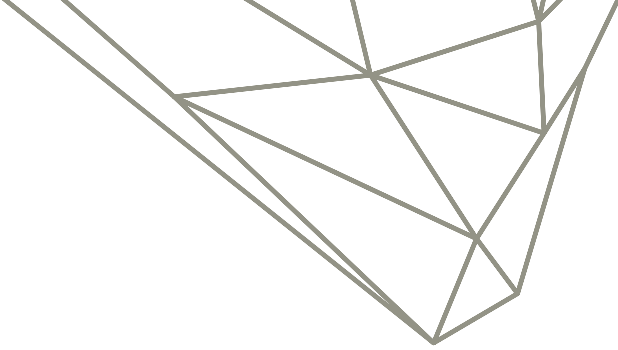
And thanks to the deal, New Boliden became a world leader in its field. In terms of zinc, Boliden became Europe's biggest mining company, and number four globally. New Boliden would focus primarily on the copper and zinc mining and smelting operations. But it would also produce and sell lead, precious metals, sulfur products and lead and tin alloys. The new company would also focus on the Nordics, which led to the sale of the Myra Falls mine in Canada in February 2004.

With the Outokumpu deal, Boliden has invested more in copper and zinc.





Boliden produces sulfuric acid at the smelters in Harjavalta, Kokkola and Odda.



A deal between Boliden and Outokumpu had been under discussion for decades, but always came to naught.

A deal between Boliden and Outokumpu had been under discussion for decades, but always came to naught. Discussions were resumed at the end of 2002, and this time both companies were very motivated. And for several reasons. One was the consolidation underway in the global mining and smelter industries that was putting pressure on small companies in particular. Another was that both companies had resolved to pursue a different, more-focused, future direction.

Boliden paid for its part of the deal partly in cash, and partly in stock. This means Outokumpu was the single biggest shareholder in Boliden with 49 percent of the shares and votes. However, Outokumpu would reduce its ownership in Boliden the following year. This,

together with the new issue in 2004 from which Boliden received more capital, meant that ownership was spread.

During the fall of 2005, Outokumpu disposed of its remaining holding in Boliden and the majority of the shares were acquired by foreign owners. Since then, just over half of the Boliden share are foreign owned. The owners, both foreign and Swedish, are primarily institutions and funds. The deal was made under favorable circumstances for Boliden.

There was a sharp increase in production on the mining side, and the company also benefited from a price rise in metals. An important factor behind the price rise was growth, especially in China.

Through the deal, Boliden acquired a number of new assets in several coun-



With the Outokumpu deal, Boliden became the owner of the zinc smelter in Kokkola.

tries. Boliden now had mines in Aitik, the Boliden Area and Garpenberg in Sweden and Tara in Ireland. Also, the company had two zinc smelters, one in Kokkola in Finland and another in Odda in Norway. Furthermore, the company had two copper smelters, of which one in Harjavalta in Finland, and Rönnskär in Sweden as well as the Bergsöe copper smelter in Sweden. The head office was located in Stockholm.

The zinc smelter in Odda has a special history. Back in 1964, Boliden became 50 percent owner of Det Norske Zinkkompani AS, or Norzink (known today as Boliden Odda). But the shares were sold to Outokumpu in the year 2000. Following the structural deal, Odda belonged once again to Boliden.

At the end of 2004, Boliden had 4,479 employees: 2,243 in Sweden, 1,180 in Finland, 366 in Norway, 661 in Ireland and 29 in the rest of the world.

A new company culture

In 2004, Boliden began developing a vision, mission, core values and identity that came to be known as The New Boliden Way. Initially it was a brand platform intended to guide Boliden's employees toward future goals. Following the merger with Outokumpu's operations, they faced the challenge of creating a strong company culture, i.e. getting thousands of employees in five countries to work toward the same goals. And also understand how to get there.

Later, The New Boliden Way would evolve into a new, more efficient way of working and developing the operation. A change program was begun under the same name to create a culture of constant improvements according

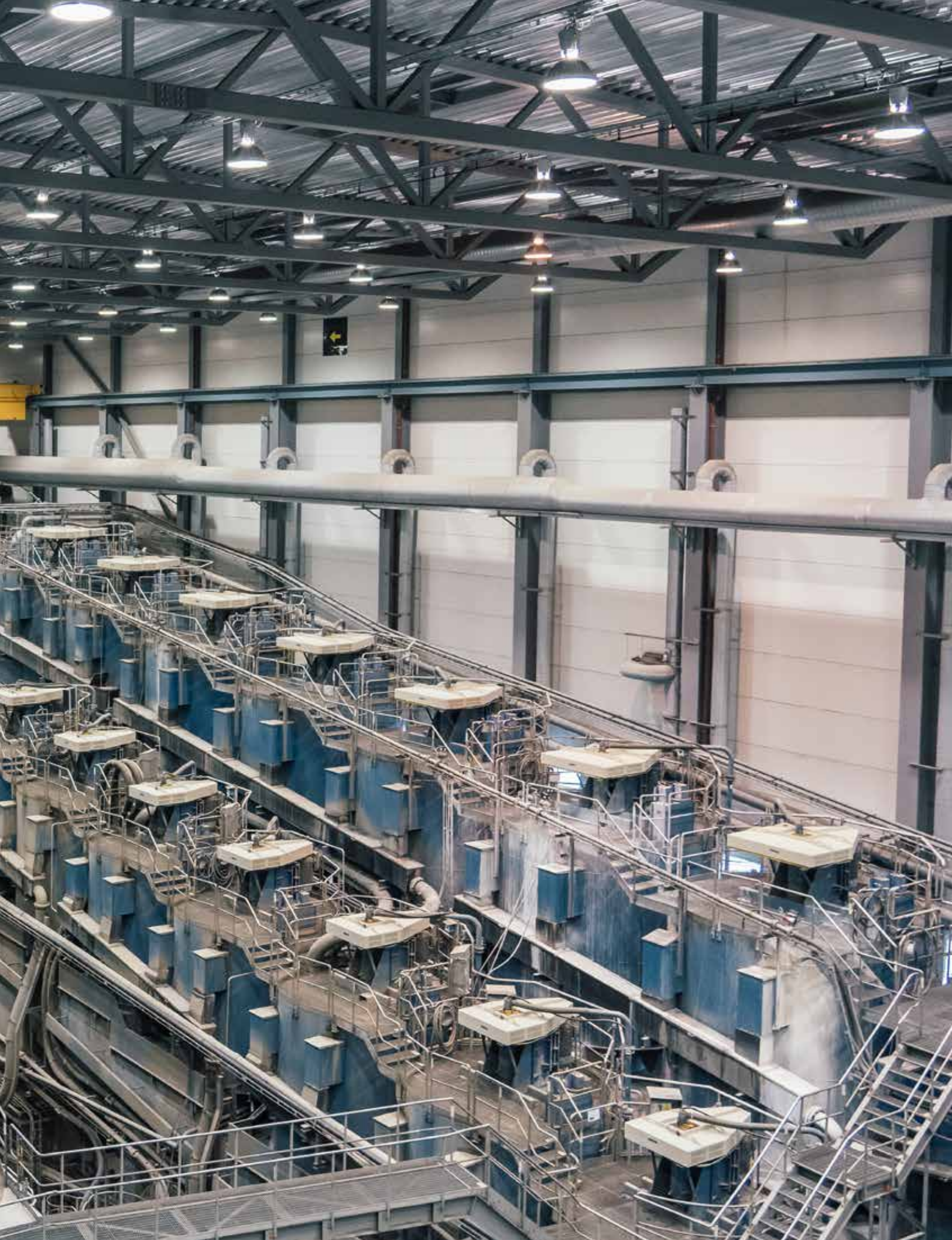


▲▲ The zinc smelter in Odda was founded back in 1924. In the 1960s, Boliden became 50 percent owner.

▲ The Tara mine in Ireland became part of Boliden through the deal with Outokumpu in 2003.

The concentrator in Garpenberg.





to the lean method. The ambition of this organizational and improvement philosophy was to improve productivity and process stability in the operation. Ultimately, it was about Boliden's future competitive advantages. The New Boliden Way also functioned as a model for leadership and operational performance based on a very high level of delegated decision-making. All employees would be properly informed and involved in reducing costs, stabilizing processes and reducing everything that did not help increase competitiveness.

Soon, health and safety also became an important company culture area. The accident frequency would be reduced by creating a sense of involvement and responsibility among all employees. A company culture where responsibility forms a natural part of day-to-day work would create good conditions for implementing improvements.

Investments, streamlining and environmental improvements

The year after Boliden began implementing The New Boliden Way, it also adopted a new overarching company strategy with a roadmap that was intended to lead Boliden toward its goal of becoming Europe's premier supplier of zinc and copper. The strategy comprised the following: expanded exploration, better material flow balance between mines and smelters, organic growth projects, participation in consolidation and the development and expansion of electronics recycling. Part of this was a new exploration strategy whose goal was

to allocate money to projects that would more quickly, and at lower cost, lead to profitable mining operations. It involved a sharper focus on exploration close to mines. Among other things, the work led to new deposits in Garpenberg.

In the fall of 2006, Boliden resolved to invest almost SEK 6 billion in an extension of the copper mine in Aitik, which would lead to greatly improved productivity and efficiency levels. The major financial crisis in the fall of 2008 came in the middle of this investment phase. But the price of zinc had already fallen by 50 percent the previous year, and after that the prices of zinc, copper and many other metals halved. Up until

2007, base metal prices had enjoyed very strong trends thanks to great demand, especially from China. This meant the entire mining industry increased capacity, and it was this that had an impact on zinc prices in 2007. The copper price was stable until the fourth quarter 2008, but fell sharply when the vehicle and construction industries were hit by the financial crisis. But the turnaround came quicker than many had dared hope.

In 2010, the new mine in Aitik was opened – the company's biggest investment ever. During the first year, it produced 28 million metric tons of ore containing 67,000 tons of copper and 2,200 kilos of gold. The goal was for the



The investments in Aitik and Garpenberg (pictured) made the mines the world's most productive in their respective fields.

mine to produce 36 million tons of ore by 2014. The goal was exceeded by 3 million tons. Accordingly, Boliden resolved to invest in a further expansion, which would entail an annual rate of 45 million tons by 2017. However, this goal would take time, but in 2022 Aitik produced a little over 43 million tons of ore.

There were also major investments in Garpenberg. The year after Aitik began operations, Boliden resolved on a major extension costing SEK 3.9 billion. According to the Wood Mackenzie research and consultancy group, the investments in Aitik and Garpenberg made these mines the world's most productive in their respective fields. Not only did the

investments lead to production increases, but also to better environmental performance.

Boliden began to increase the level of automation to streamline mining operations. The company introduced e.g. an underground positioning system that enabled vehicles to be remotely controlled. Boliden also became one of the first mining companies in the world to introduce 5G systems for wireless data transfer in the mines. In the 2010s, Boliden carried out more extensive investments than ever before. Major investments were made in all areas, including the mine in Tara and the smelters in Odde, Rönnskär and Harjavalta.

“

In the 2010s, Boliden carried out more extensive investments than ever before.

▲ A load of copper cathodes in Harjavalta.

▼ By acquiring the smelters in Kokkola and Harjavalta, Boliden became a major player in Finnish base industry

▼▼ Major investments were also made in Harjavalta at this time.



Stronger position in Finland

In the 2010s, Boliden made a number of acquisitions in Finland. Boliden was already the owner of the two smelters in Kokkola and Harjavalta, following its deal with Outokumpu in 2003. The first in this new round of acquisitions took place in 2010, namely Kemira's acid plant in Kokkola. Boliden and Kemira had a common history during the 1980s, when Boliden Kemi was sold to Kemira in Finland. The acid plant was located right next to Boliden's zinc smelter in Kokkola, and it produced around 300,000 tons of sulfuric acid per year. Boliden took over production on May 1, 2010, and with that sulfuric acid production in Kokkola was managed in the same way as in Boliden's other smelters.

The next deal took place in 2014 when Boliden acquired Kuhmo Nickel Ltd and its subsidiary with a copper mine in Kylylahti. The acquisition also included extensive exploration rights in the Outokumpu field in eastern Finland. Through the acquisition, Boliden gained synergies in mining, metallurgy and exploration largely thanks to Boliden's know-how and experience from similar geology in the Skellefte field. Since acquiring the smelters in Kokkola and Harjavalta in 2003, Boliden had been a major player in Finnish base industry, and the acquisition of Kylylahti strengthened this position. It was mined for the last time in 2020.

In 2016, Boliden acquired Finland's biggest mine, the Kevitsa nickel and copper mine in the north of the country. The acquisition included a new investment in nickel. The mine was making a loss when it was acquired, but through increased production and better metal prices, it began to make a profit in 2017. Harjavalta and Kevitsa not only became a strong

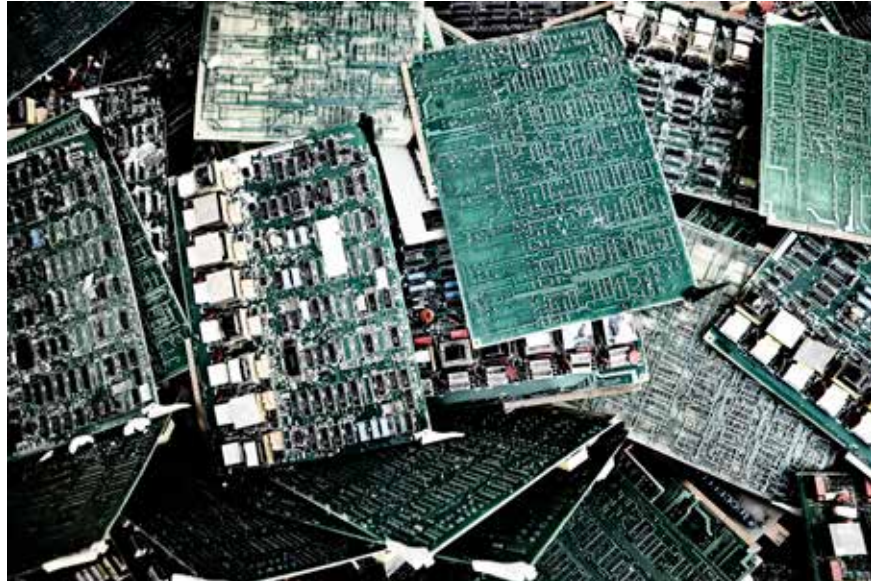


Photo: Stefan Berg



▲▲ Electronic scrap is recycled in the e-kaldo plant on Rönnskär.

▲ In 2016, Boliden acquired the Kevitsa nickel and copper mine in northern Finland.



Harjavalta and Kevitsa not only became a strong combination in nickel, but also in copper and precious metals.

combination in nickel, but also in copper and precious metals. Also, the investment further strengthened Boliden's position in Finland.

Metals for modern society

In recent decades, it has become all the more clear that the world has to achieve a climate transition, and that this transition will entail an enormous need for investments. It will require e.g. great quantities of copper and zinc for new energy sources such as wind and solar power, especially for power transmission. Batteries of every description are of increasing interest, and so too nickel and lead, which are important components. Also, the circular economy for metals is expected to increase significantly, i.e. demand for recycled metals will increase.

Several of the metals that Boliden produces have been designated as being of special strategic interest for the Euro-

pean continent. This became especially clear when the EU commission took the initiative in 2020 to create the European Raw Material Alliance, which Boliden supports. The purpose of the alliance is to strengthen conditions for meeting increasing demand, especially for base metals in conjunction with the spread of renewable energy systems, energy storage and electrified transportation.

Boliden adopted ambitious climate goals that same year. The company aims to reduce the CO₂ intensity of its products by 40 percent by the year 2030 compared to base year 2012. In conjunction with this, Boliden also adopted a new vision of being the most climate-friendly and respected metal supplier in the world. The climate goals were tightened further in 2022. Emissions must now fall by 40 percent up until 2030, with 2021 as the base year.

The production of copper and zinc is important for new energy sources such as wind and solar power.

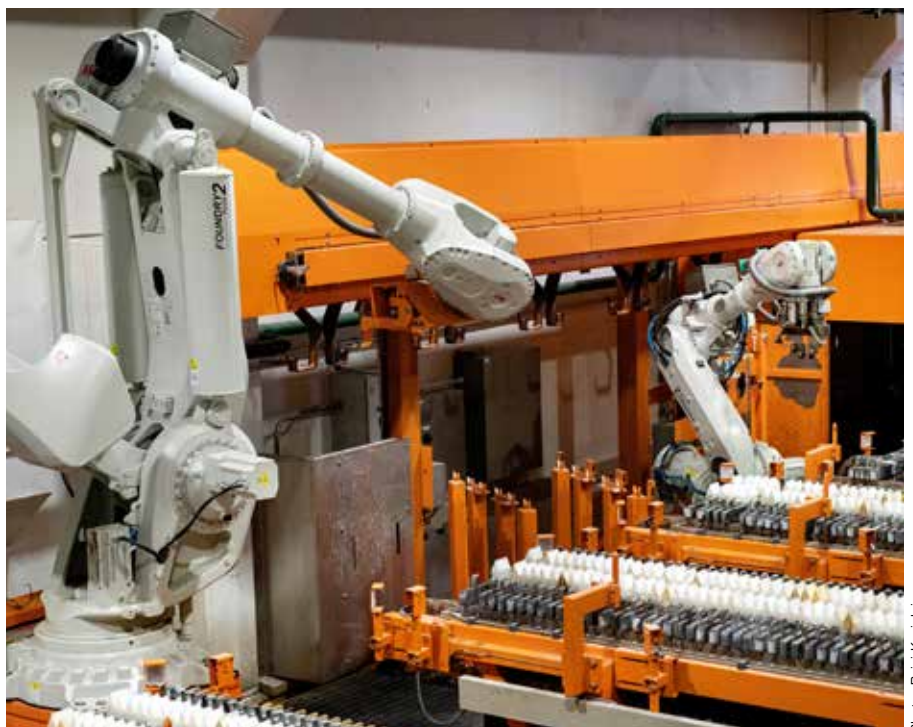


Photo: Paivi Kenjäläinen



BERGSÖE IN BRIEF

Commissioned: 1942

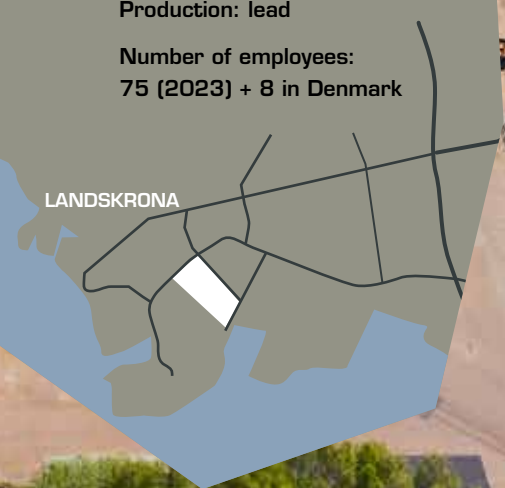
Acquired by Boliden: 1979

Operation: smelter for recovery

Production: lead

Number of employees:
75 (2023) + 8 in Denmark

LANDSKRONA



In focus: Bergsøe

Landskrona is home to the odd man out in Boliden, namely Boliden Bergsøe. It's one of Europe's biggest recycling plants, and the only one in the Nordics for spent vehicle batteries.

Text: Anna Wachtmeister

Bergsøe has always been about recycling metals, which is precisely what makes it a somewhat different kind of operation in Boliden. Nobody here works with raw material from mines, instead they recycle more than 4 million spent lead-acid batteries every year. A little over 90 percent of the lead from the spent batteries is

then returned to the vehicle battery industry in Europe for use in new batteries. This makes Bergsøe an important link in the lead cycle. In addition to lead, it now recycles the plastic battery cases. The investment in the plastic separation plant has its origin in the creation of a better, safe work environment, and as a bonus

“

Nobody here works with raw material from mines, instead they recycle more than 4 million spent lead-acid batteries every year.



◀ Svend Bergsøe on the right, together with his cousin Jens Krag Juel Vind Frijs, who was the Landskrona plant's first director. The picture is from 1942.

the plant can now also sell the plastic back to the vehicle battery industry.

Expanding in Sweden

Founded in Copenhagen in 1902, Bergsøe was from the very beginning a recycling company. Its founder Paul Bergsøe was a Danish engineer who began by cycling around Copenhagen collecting and purchasing metal waste, everything from tin to lead. He had the metal melted down and created alloys, which he then resold. He recognized opportunities when they arose, and manufactured e.g. bullets to the Danish military during World War I. As his business grew, Paul was able to build a bigger plant in Glostrup, and the company also changed its name to Paul Bergsøe & Son

as his son Svend had joined the company.

The idea of expanding the company into Sweden first arose back in the 1920s when they were thinking of exporting to the Swedish market. This resulted in a decision to invest in their own facility. Having first looked around Sweden's west coast, they chose Skåne and Landskrona, which offered them a building lot in an excellent location at a good price.

They engaged Danish architects to help build the new facility, and also benefited from the more than 40 years' experience accumulated since their founding in Copenhagen. In 1942, Bergsøe in Landskrona was completed and business could begin. Since Svend Bergsøe was assigned the responsibility for both the construction and the business, he chose

“

World War II was a difficult time, and the move to Sweden made business easier during the time Denmark was occupied.



Casting of ingots in the 1940s.

At least 90 per cent of the lead produced is sold to the battery industry.



to move to Landskrona. He became very enamored of Skåne and Landskrona, and regarded the entire project as a means to weld Sweden and Denmark together through shared interests. He even wrote a book in which he describes his love for Sweden. The title of the book is *Jag älskar dig, Sverige* [I love you Sweden].

World War II was a difficult time, and the move to Sweden made business easier during the time Denmark was occupied. Read more about *Bergsöe in the shadow of the war* in part 2

Preventive measures

Paul Bergsøe understood early on that inhaling when processing metals was not healthy, and he made sure his personnel had face masks long before people talked about work environment initiatives.

Boliden took over the operation in 1979, and the tradition of taking care of the work environment lives on, and these days it's considered a perfectly natural part of business. Today, it's about taking preventive measures such as the mandatory blood tests every quarter for everyone who works in production. This

makes sure everybody is well in terms of lead in the blood, and that protective equipment and other measures are working. Another measure was to build the part of the plant known as the Breaker, a plastics separation plant built to improve the work environment and which also increased the amount of recycled plastic from battery casings, another gain for the environment.

Reduced emissions

The desulfurization plant is another recent investment. It forms part of the sustainability work that is constantly in progress at Bergsøe. It reduces the sulfur from the lead paste produced in the Breaker before the paste enters the furnace. This reduces SO₂ emissions, as well as CO₂ emissions and waste deposition. Among other things, this results in lower emissions of CO₂. In the fall of 2023, they also installed a large solar cell array on one of the warehouse building roofs. This complements ongoing energy optimization projects such as Smart Powerbank and the previously installed solar cell array on the Bergsøe site.

Processing 85,000 metric tons of lead-acid batteries every year naturally involves unavoidable emissions. Bergsøe only releases around 1 kg of lead per year in its process water discharge, which is an extremely good result considering the amount of lead processed and recovered. Every year, the plant delivers surplus heat from production to Landskrona's district heating system equivalent to the heating needs of around 2,000 single-family homes.

With more than 120 years of expertise and experience, Bergsøe continues to improve and develop the business with the aim of becoming Europe's most sustainable and profitable lead recycling plant.

In focus: Kevitsa

Kevitsa is a multi-metal mine in Sodankylä in northern Finland. With just a little more than 10 years under its belt, the open pit is the youngest operation in the Boliden Group.

Text: Sara Johansson



Photo: Hannu Vallas, Lentokuva Vallas Oy

Finland's second-biggest municipality, Sodankylä, is one of Finland's biggest mineral deposit areas – Kevitsa. The open pit began there in 2012 and is today a major employer in the region. Almost every family in Sodankylä has someone who works there. The primary products are nickel and copper concentrates, but the concentrates also contain cobalt, platinum, palladium and gold. The ore concentrates are delivered to the smelters in Harjavalta and Rönnskär.

Construction

It had been known that there were mineral deposits in Kevitsa since the 1950s, when a private individual submitted bedrock samples to a lab for testing. But it did not lead to any mining then. The Finnish industrial giant Outokumpu had long owned the mining rights in the area, but did not think it was possible to mine the orebody profitably. Instead, it was a private company, Scandinavian Minerals

The Kevitsa open-pit mine began operating in 2012.



KEVITSA IN BRIEF

Commissioned: 2012

Acquired by Boliden: 2016

Operation: open pit

Minerals mined: nickel, copper, cobalt, platinum, palladium and gold

Number of employees: 568 (2023)

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In addition to the obvious need to build up the site, a great deal of fundamental work had to be done before the mine could begin operations.

led by the Britt Peter Walker, that finally succeeded in finding an efficient way to process and concentrate the ore. *You can read more about him and how Kevitsa began in another article.*

The mine was registered in 2004, and in May 2012 the operation could finally begin, then with Canada’s First Quantum Minerals as owner. In addition to the obvious need to build up the site, a great deal of fundamental work had to be done before the mine could begin operations. It was above all infrastructure in an otherwise pretty desolate landscape that had to be built. For example, they built an entirely new road and the bridge between Kevitsa and the nearby little town of Petkula.

Four years after operations began, Boliden came in as the new mine owner.

This entailed something of a cultural change for the employees, as the Swedish way of running a company was different from the Canadian. For example, they strive to get as steady a flow as possible to the concentrator by buffering ore on the ground before taking the next step.

A mine for modern times

Today, the mine is the biggest local employer in an area that is geographically large but which only has 8,000 residents. To find the right new personnel, Kevitsa collaborates with a training provider in Sodankylä, the regional center. Over the years, many employees were trained there before becoming trainees in the mine. This has proved to be very successful as a traineeship often leads to employment right after graduation. It has also led

The open pit is the youngest operation in the Group.



many women to begin working in the mine or the mining area.

While it's true that mining is an old and in many ways traditional industry, when a mine is as new as Kevitsa, it's not weighed down by any 'but this is how we've always done it' attitude. Everything is modern. It's a mine for modern times where much is already automated, remotely controlled and electrified. And development is constantly in progress, to increase efficiency and make work safer for the employees. For example, Finland's first electric trolley line opened in Kevitsa at the end of September, 2022.

As in all other Boliden operations, Kevitsa works systematically to minimize environmental impact, increase energy efficiency and conserve biodiversity. Today's permit expires in 2033, but

work is in hand to enable an additional pushback, thus hopefully extending the mine's life span by a number of years. How this will succeed naturally depends on a number of different factors, but the companies that are all actively exploring and planning projects bear witness to the presence of metals and minerals in the region. And when Kevitsa is mined for the last time, the area will be reclaimed to become as natural a part of the landscape as possible.

▼ During construction, 2011.

▼▼ Many employees began by taking part in the mine's trainee program.



TOPIC: FOR GENERATIONS TO COME

CONSTANTLY WORKING FOR A BETTER ENVIRONMENT

There have always been adverse winds. They sometimes abate, but never stop blowing. Ever since mines and smelters were branded as eco-villains, the image has been difficult to erase. No one denies there were real reasons for criticism, but enormous improvements have been made since the winds blew at their bitterest.

Text: Olle Lundqvist



Rönnskär is a perfect example of both of these truths. 'Sweden's dirtiest industry'. The epithet was minted in the 1970s and not without reason. Traces of discharges from Rönnskär were registered in the Southern Baltic, as 2,000 tons of arsenic were discharged every year into the sea.

From having been low priority during the first half of the 20th century, environmental issues were suddenly in focus by the authorities and in the media. It was better knowledge, and also because many industries had been built using 1930s and 40s technology. This was especially the case with Rönnskär, which was definitely unable to meet the environ-

Much has changed over the years, especially regarding the environment and emissions. Seen here, recovery plant at Bergsöe in the 1960s.



mental demands of the 1970s. Capitalism and industry were not highly valued in public awareness and this accentuated Rönnskär's position as the mass media's punch bag, and possibly contributed to the attitude of the authorities.

in 1975, Rönnskär was presented with around 50 environmental demands by the National Franchise Board for Environmental Protection, compliance with which continued operation depended. Gas and water treatment, the roasting furnaces, the lead plant, precious metals plant, electrolysis plant, indeed almost everything had to be rebuilt. This was challenge enough. But they also had to do it all while maintaining profitable production.

They succeeded with both, but barely 10 years later, Rönnskär had a knife at its throat again. In conjunction with the 1986 franchise application, Skellefteå municipality gave the thumbs down. It's environmental manager asserted that the smelter should be closed, no less.

Ultimately, the application was handled by the government, who gave the okay. But 10 years later, there was a further demand for emission reductions, even though the smelter's environmental impact was significantly lower. For example, arsenic emissions had been reduced by 99 percent. It was the same in 2003, when the operation had to run with a time-limited permit pending the solution of a technical problem with arsenic treatment.

The efforts have yielded results

Since the 1970s, all process water that circulates on Rönnskär is treated. The same applies to rainwater and flush water. To facilitate the rapid detection of concealed leaks, process water drains have been raised above ground on bridges. The



Photo: Stefan Berg



▲▲ Taking water samples, Aitik 2012.

▲ Restoration of an industrial area, Näsliden 2013.

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But it also involves impressing the importance of environmental consideration on every employee, and constantly implementing small improvements.

work has also involved the enclosure of processes and filters for exhaust air, the constant measurement of emissions from smokestacks and round-the-clock automatic water sampling. But it also involves impressing the importance of environmental consideration on every employee, and constantly implementing small improvements. And with good results. In the Byske region, 40 kilometers north, the impact of sulfur precipitation from industries on the Kola Peninsula is today greater than Rönnskär's emissions.

Even though there are places where metal emissions from the past have left lasting wounds, nature has recovered in many places.

Because Rönnskär is Sweden's only copper smelter, its surrounding areas have been an Eldorado for researchers. The environmental department's employees constantly measure most things, and

checks for lead in the blood of children and expectant mothers began back in the 1990s. Every comparison points in the right direction. Not even 25 years ago could any difference be detected in the lead levels of the test group in Skelleftehamn and the reference group in the area around Umeå. The impact area outside Rönnskär has shrunk markedly.

When Michael Borell was appointed environmental manager at the smelter in 1997, he became its sole environmental worker, but 20 years later, Rönnskär's environmental department comprised 12 people and dioxin emissions were just one tenth as large. This illustrates the increase in awareness of how emissions from the operation have an impact outside the industrial site, as do our efforts to reduce environmental impacts. The Swedish Environmental Protection Agency has also recognized the smelter.



At Boliden Bergsöe, all storm water is treated before it returns to the system again.

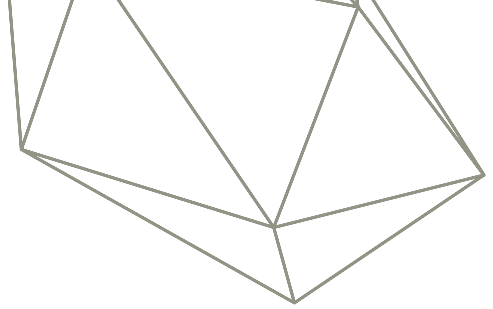
Photo: Mikael Florens, Riley&



Sarkanenå sustainability park near the Aitik mine in Gällivare comprises around 330 hectares of forest and 140 hectares of wetlands. Here people get to learn about Boliden's work with ecological compensation and biodiversity. The park was made possible through a collaboration between Boliden, SLU and Sveaskog.

Photo: Thomas Westermark





In fact, it has used Rönnskär as a reference plant when it comes to cleaning up mercury from the smelter.

The 1970s were also a decade of awakenings and efforts in environmental issues in Odda in Norway. In 1975, the smelter opened an environment and health center with a medical reception and a department of health and safety. The following year, a wastewater treatment plant was built that radically reduced heavy metal discharges into Sørfjorden, which was then one of the world's most polluted marine environments. Water in the Eitrhemsvågen inlet was previously a brown sludge. But since a membrane was laid out and covered with sand, an entirely new seabed has been created in the inlet outside the smelter. The risk of new heavy metal discharges has been minimized by e.g. steel barriers. Now even the salmon have found their way back.

Rock caverns

There are waste problems everywhere, not least in smelters and mines. In Odda, the solution is rock caverns. The smelter uses around 20 caverns to store its iron waste, jarosite. It concerns rock cavities that are 235 meters long, 24 meters wide and 60 meters deep.

The first of these gigantic storage rooms was built in 1986. Since then they have built one after the other, and they pump iron waste from the smelter through a two-kilometer long pipeline to the vertical cliff north of the smelter. It involves iron sludge and sulfur that was previously filtered to form a cake, to which water was then added to make

the slurry that is pumped to the caverns. The water is then returned in a parallel pipeline, mixed with the new filter cake and the cycle is repeated, time after time. Surplus water is pumped into the fjord, after it has passed through a treatment plant. Blasting to create new chambers in the rock goes on constantly. Every year, Boliden invests SEK 30 million in this environmental measure, which has proved to work very well.

A similar pattern can be seen in Harjavalta, Finland. After decades of an almost total focus on production, they have finally arrived at their own insights, criticisms and environmental requirements. During its first decades, the

smelter may well have been welcome as a major employer that paid generously, but no one denies that it was a major polluter whose environmental impact was very visible in the surrounding spruce and pine forests. And so Outokumpu, the then owner, had to pay substantial compensation to the region's forest owners. But when the enormous Harjavalta project was carried out in 1993-1996, it was mainly an environmental investment, even though it resulted in a production increase.

Suspicion lives on

Lead in gasoline, lead in fishing sinkers, lead in rifle bullets. Bergsöe in the 1980s

The rock caverns in Odda have been crucial for the environment.



Photo: Rune Sævig

had an unconcerned approach to environmental issues in keeping with the times, so the sudden spotlight directed at lead as an environmental and health hazard rang alarm bells with the authorities, company management and the employees at the smelter in Landskrona. Bergsöe happens to recycle spent vehicle batteries.

A treatment plant, filters, a renovated shaft furnace and a new lead processing plant have not only reduced health risks for employees, but also improved the external environment. Lead values in Landskrona are today no higher than in Trelleborg, 80 km to the south, where there are no industries that handle lead.

But this did not mean a welcome with

open arms in Landskrona. Some suspicion toward lead and the smelter lives on, and this is reflected both in opinions and media attention. When the new plastics separation plant caught fire, many asserted that the city 'smelled of batteries' despite there being two weeks before the plant was scheduled for operation, and there was not a single battery in it. Even so, there was an official 'important announcement to the public' warning of a battery fire. There were big headlines when the smelter was struck by lightning in 2001, and the local atmosphere was mean.

For their part, Bergsöe employees can easily find themselves on the defensive

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These days, we are proactive rather than reactive.

▲ Taking water samples near Strömfors, 1983.

▼ Noise can also be an environmental problem.



against criticism they perceive as unjustified. It's the same story in Harjavalta and most of Boliden's units, especially Rönnskär, which despite its recognition for exemplary environmental efforts is still often the target for criticism whose roots date back to the 1970s.

Repercussions throughout the industry

Who can picture an existence without metals such as those in our TVs, computers, smart phones, bikes and cars? Hardly anyone. Yet the resistance against new mines is often great, comes from several different directions and spreads to mass media and the authorities.

When a mining company is unsuccessful with a project and ends up in the spotlight because of this, it often has repercussions throughout the industry.

For a great deal has actually happened. Environmental consideration has a dominant place in the company's planning. These days, we're proactive rather than reactive. Today, we start at the other end. Knowledge has increased dramatically, as have the company's efforts. External requirements have changed, but so too have our own values. As a company, Boliden must behave, and be seen to behave, utterly professionally and be an operation that is accepted by the surrounding world. No more than anything else can mines be operated without changing the landscape in some way, but our ambition is to cause no additional environmental impact.

Extracting more from waste

Green issues can be difficult, for both bureaucratic and technical reasons. One

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Some suspicion toward lead and the smelter lives on, and this is reflected both in opinions and media attention.



Photo: Shutterstock

Even though modern technology requires metals, new mines are often met with great resistance.

The underground repository on Rönnskär entered operation in 2022.

recent example of this is the jarosite repository at the smelter in Kokkola where they are not just seeking to dispose of the waste, but also to extract more valuable metals from it. How this should take place, and how to change the process so that it creates less waste remains an issue they are struggling with.

Waste also occurs at Rönnskär, but here the solution is underground repositories and additional extraction. Since 2022, the waste that previously remained on site at the smelter is now stored in eight nearby rock cavities 330 meters below ground, which together will hold 400,000 tons of jarosite. But this is not all of the original waste, as they have been able to extract more copper-bearing products from the slag heaps since 2021.

Reclamation

The environmental challenges will always be there, and not just while the installations are still in operation. Mines can be long-lived, but in most cases the ore runs out sometime and then another undertaking awaits. In the past we said 'Restoration', but since nothing can be precisely the way it was before we use a different term, reclamation. (Find out more about this on the next page) When a mine is closed, the ambition is for it to become a natural part of the surrounding landscape. The methods are many and not only involve the five people in the group for closed mines who work full-time with the matter, but also a great many more. Demands and knowledge have increased, and these days the way reclamation should proceed is described when a new mine is being planned.

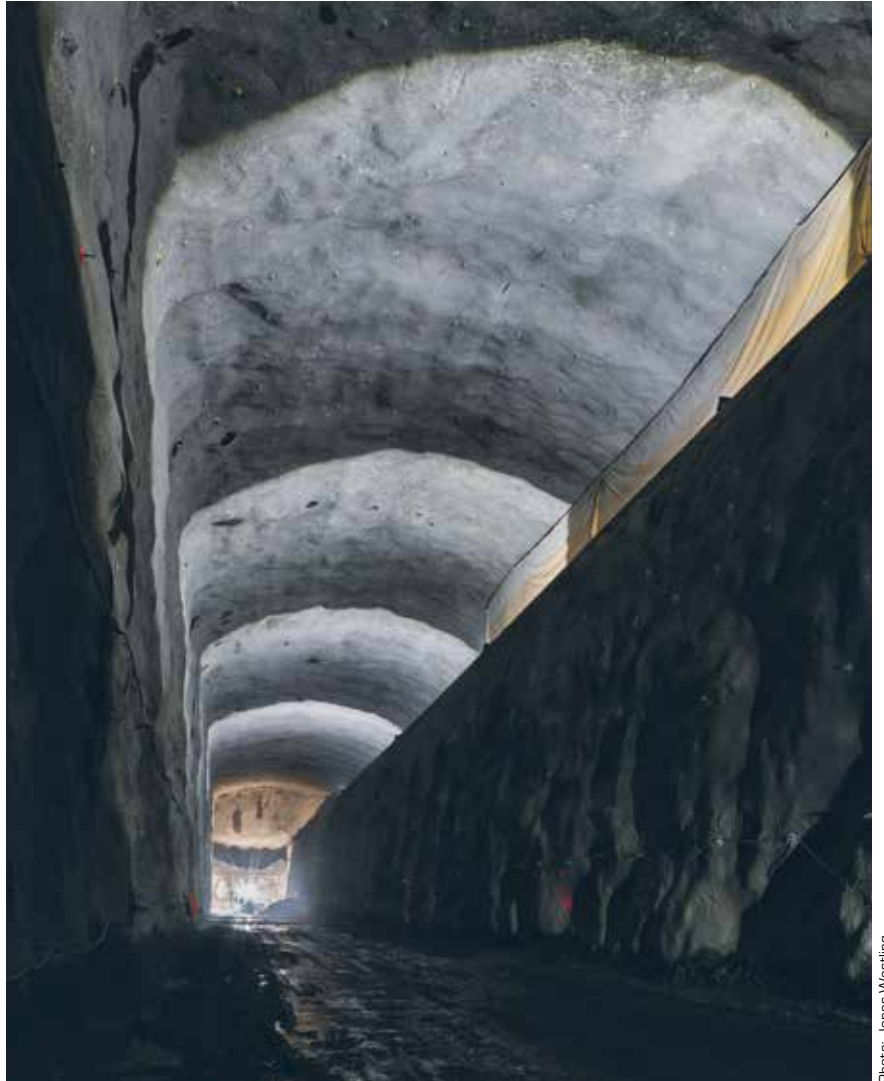


Photo: Jonas Westling



Demands and knowledge have increased, and these days the way reclamation should proceed is described when a new mine is being planned.

After the mine

A mine often involves intrusions that change the landscape permanently. But all areas can be reclaimed such that they can be used for other purposes once mining operations have ended.

Text: Sara Johansson

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We prefer to create an attractive place based on the area's new circumstances.

If an area where mining took place is to become, as far as possible, part of the surrounding landscape again, reclamation will require effort. The goal is to create a long-term solution that does not damage the environment or involve safety risks for nature and people. The method used is determined by the conditions in a specific area. Restoring an area exactly the way it appeared before mining is not always the goal or even possible.

“We prefer to create an attractive place based on the area's new circumstances. By attractive, we mean that it must be accessible and possible to use for a dif-

ferent kind of activity. This could mean recreation, new industrial operations or making the place suitable for reindeer husbandry,” says Joanna Lindahl, who is the sustainability director for Boliden Mines.

One possibility that has recently attracted great interest is the use of closed mines for energy storage or the mining area for solar cell parks.

Requires extensive analyses

Environmental legislation demands that mining areas be reclaimed, and Boliden sets aside money for this. But extensive analyses are required before reclamation work can begin. We seek the help of local companies, stakeholder organizations, municipalities and authorities. The results are compiled in a waste management plan with an associated closure and reclamation plan that must be approved by the court before it is valid.

“Because conditions vary for all mining areas, we tailor a reclamation program based on the most suitable matters for the site concerned. Boliden is a member of the International Council on Mining and Metals (ICMM), an international organization dedicated to a safe, fair and sustainable mining and metals



Post-closure work is based on the conditions in the area concerned.



Where there was previously a mine in Långdal, the dam was opened and the open pit filled with water.

Joanna Lindahl is sustainability director for Boliden Gruvor.



Photo: Jeanette Heggjund

industry. Through our membership, we undertake to abide by ICMM’s principles concerning reclamation regardless of the country our operation is in.”

Demands for reclamation and their results have increased over time. It might concern the location and design of waste rock dumps, knowledge of dam designs, how water flows are managed or the type of emissions that are acceptable from a mining area.

“To respond to such questions, we must be sure to possess good knowledge of our mining area in everything from the foundations of tailings ponds to the type of ecological rehabilitation that is suitable. Thus our work must be interdisciplinary where several Boliden departments such as exploration, mining planning and sustainability contribute know-how and expertise,” says Joanna Lindahl.

Monitoring

A period of monitoring follows the conclusion of reclamation work. All of the mines that Boliden has already reclaimed are monitored in an inspection program for closed mines. Small areas can be reclaimed in two or three years. But when it concerns larger areas such as the future reclamation in Aitik, such work may continue for many years. And it can take up to 100 years before reclamation work reaches its full effect.

So how long will Boliden administer areas that have been reclaimed? Is it responsible for ever?

“That’s not an easy question to answer. But in general, the answer is yes; our responsibility for closed areas has no exit unless we sell the mineral rights and land to another operator.”

WHAT OUR METALS ARE USED FOR

For centuries, society has developed with the aid of the mining industry. The availability of minerals and metals is essential for our modern lives. But what are they actually used for?

Base metals such as copper, zinc, nickel and lead are fundamental building blocks in our modern society. These metals are of great importance for e.g. infrastructure and the construction and automotive industries.

Copper is best known for its ability to generate, distribute and store energy. Thus it's often used in cables and generators of various types. Boliden is able to produce extremely pure copper that makes it suitable for superconductors. But copper has a range of other qualities that make it useful. Because it's antimicrobial, it's often used for e.g. door handles in public spaces, and in the Swedish one krona coin.

Zinc is a versatile metal with very many important areas of application, each different from the next. Much of global production is used to protect steel from corrosion in a process known as galvanization, which can extend the life of steel by many years. Zinc is also an essential mineral used in everything from pharmaceuticals and sun cream to food supplements. It can also be used to improve harvests in low-nutrient soils, giving more people secure access to food.



Photo: Bruno Ehrns



Nickel is used mainly in the production of stainless steel. This is due to its excellent ability to protect against corrosion, something that has also led the metal to be used in e.g. aircraft turbine engines. Also, nickel's great conductivity makes it an important metal for tomorrow's increasing production of rechargeable batteries and electrical vehicles.

▲ Copper is often used in cables and generators.

◀ Zinc is used in e.g. sun cream.

▼ Rechargeable batteries are a major field of application for nickel.



Photo: Shutterstock



▲ Lead is used in battery manufacturing.



Precious metals are not only used in ingots and jewelry, but also in e.g. electronics.



Photo: Shutterstock

Lead is one of the best metals in terms of efficient recyclability. It can be recycled time and time again without losing any of its qualities. This makes lead ideal for batteries, and almost 90 percent of all lead produced is used in one kind of battery or another. Thus the metal is important for e.g. tomorrow's industrial batteries, but also in electric vehicles where lead acid batteries will be needed to power a vehicle's electronic equipment.

Boliden also produces precious metals such as gold and silver. In addition to the jewelry industry and the financial sector, these metals are primarily used in the manufacture of electronics.

Historically, **gold** is one of the most sought-after metals, which has led to its use as an inflation proof asset in the form of e.g. a means of payment and jewelry. Today, gold is also used in the electronics, aerospace and pharmaceutical industries. Mobile phones and computers are two good examples of where gold is an important metal.

While more than half of all silver produced globally goes to the electrical and electronics industries, it is used to a large extent in the production of jewelry. Silver is namely the metal that conducts heat and electricity best, and is used for such things as electrical contacts, high-capacity batteries and circuit boards in mobile phones and computers.

Important buildings

Many of the buildings in areas where mines and smelters are located have a long history, and some of them are also used for operations that are also important outside the company itself. Here are a few of them!

Bergrum, Boliden

The old works office was the first building erected in the new mining community of Boliden in 1926. When the mining company grew out of the office it was used for a long while as a geology and mining industry museum, with a focus on the Skellefteå orefield's development. It formed part of the Skellefteå museum, and was closed for good in 2012. Today, the beautiful building is known as Bergrum Boliden and again houses offices and conference rooms for Boliden, the company.



Company hotel, Boliden

When the town of Boliden was built, it also included a hotel at the highest point in the upper part of the fan-shaped town layout very close to the mine manager's residence. The company hotel was completed in 1927 and was used to accommodate the mining company's traveling guests and officials, and for conferences, fine business dinners and other meals. The historic building is still in use today in much the same way, but the general public is also welcome to book a room, space permitting.





Knockumber House, Tara

Originally, this was a perfectly ordinary residence that had been lived in by various families since the early 20th century. In conjunction with the arrival of the mine, the building was sold to Tara Mines Limited, who began using it as an office. It was the location of e.g. the telex used to order explosives and maintain contact with the head office, then located in Vancouver. Showers for the miners were installed in a little building in the yard. Later, the first floor was converted into a gym that was well used by employees over the years.



The Mine Chapel, Garpenberg

Garpenberg's mining chapel is located in the old mining area on Odalfälten in Hedemora municipality and is Sweden's only preserved mining chapel. It's a square wooden building with vertical wood exterior paneling, and its style is reminiscent of a shaft tower. This unique chapel is from the early 17th century and has been preserved in its original condition but was moved 150 meters from its original site due to the risk of pitfalls. Of old, miners would congregate here for morning prayers before work. Today, the second floor is furnished as a mining museum where visitors can get guided tours by Garpenberg's cultural society.

BOLIDEN 100 YEARS PART 4

Harjapirtti, Harjavalta

This historic event setting is located in Boliden Harjavalta Clubhouse. When the smelter in Imatra was dismantled and moved to Harjavalta during World War II, some of the interior furnishings from the previous event locale in Honkapirtti were preserved. Furniture and valuable copper lamps were packed away and sent by railroad to the smelter's new location. A new facility was built there, which has since functioned as a meeting and representation venue, where Christmas lunches and other festivities are also arranged for the benefit of employees.



The Wooden Office, Rönnskär

When construction of the Rönnskär plants began in 1928, Boliden's office was in Skelleftehamn, but it quickly became clear that an office was also needed in the new industrial area. The office building was designed by architect Johan Åkerlund and is a little special as only the external walls are load-bearing, allowing all internal walls to be moved. Initially, the office was for management, but over the years the building has held several different operations. The historic wooden building has been home to Forum Museum Rönnskär since 2001.





Photo: Päivi Karjalainen



Photo: Päivi Karjalainen

Merimaja, Kokkola

Outokumpu erected overnight accommodation and entertainment facilities called Merimaja (Seaside Lodge in English) in the 1960s, when Kokkola was industrializing quickly and there was insufficient hotel capacity for business visitors to the town. The building, which houses a popular sauna, is located on a beautiful rocky island next to the industrial area. There are views across the sea from the sauna's benches. In the 1990s, ownership of Merimaja was transferred to the zinc smelter, which uses the building mainly for representation.

UNKNOWN
BOLIDEN



Battery pioneer 75 years ago

Swedish battery manufacture is a topical subject, but not for the first time. The Rönnskär plant was already making batteries at the end of the 1940s.

Text: Olle Lundquist

Boliden Batteri AB was yet another example of management's ambition to create a business using all the raw materials available at the smelter, and the by-products that arose there.

In this case it concerned lead, oxides of lead, red lead and sulfuric acid. In a time when car driving was rising sharply, battery manufacture was a brilliant business opportunity. Boliden's initiative was also wholehearted and began in 1948 with the purchase of Svenska Batteri AB whose premises were in Stockholm, which was not ideal. So they decided to move some of the manufacturing to Rönnskär, more precisely to the old sulfur works whose production had ceased when deliveries of coal and coke from Germany came to an end in 1939. However, assembly continued in Stockholm.

Research into accumulators was conducted in the smelter's laboratory. Hans Åkerström was a member of the team involved.

"I'd graduated from junior high, was very interested in physics and chemistry and had been admitted to technical high school. But I also wanted to earn money, so I enquired at Rönnskär and got to join the team researching accumulators," he says.

Knowledge cluster

At that time, battery manufacturing on Rönnskär had been moved to a factory in Hultsfred, but the operation was still Boliden's and until 1956 R&D continued at Rönnskär's laboratory, where young Åkerström ended up in an environment bursting with knowledge. There were highly educated chemists and internally trained local talents with practical experience.

"This mixture was fertile soil indeed, both for my own development and bouncing around ideas that energized the entire team," says Hans Åkerström.

Rönnskär manufactured stationary

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In a time when car driving was rising sharply, battery manufacture was a brilliant business opportunity.

Advertising the Boliden battery in Istanbul.

UNKNOWN BOLIDEN

batteries from 1948–1951, among others for the switchgear in Rakkejaur and the Finnforsfallet Hydro station. But the major volumes were in car batteries. But the real full coverage concerned General Motors. The American giant included Boliden batteries in every GM vehicle sold in Sweden. While it was proof that the batteries were good, it did not mean they were perfect from the start. As they grew older, the batteries were sensitive to vehicle vibrations. All too often, the outcome was a short circuit. This did not just apply to the first Boliden batteries, but car batteries of every brand.

“We were two engineers tasked with testing and taking apart both Boliden batteries and comparison batteries from other brands that we purchased to study their function and wear.”

Flying barrel and exports

The car batteries were gradually developed into the Boliden Ultra model, which not only reduced the risk for short-circuits, but was also spill proof. The same solution was used for tractors and other terrain vehicles. Boliden Arctic was the name of the more cold-resistant battery version used in military vehicles, and as they could cope with every kind of tilting, they were also used in airplanes. In 1951, Boliden batteries were installed in the Saab 29, a single-engine fighter developed for the Swedish Air Force and popularly called the Flying Barrel.

In 1956, development of the Boliden battery was also moved to Hultsfred. The head office and the sales department ended up in Bromma, and stores and

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40 percent of production was exported.



The major part of production concerned car batteries.

General Motors included Boliden batteries in every vehicle sold in Sweden.

additional sales offices were created in Gothenburg and Malmö. By this time, the Boliden battery was no longer used only in Sweden, and 40 percent of production was exported. All this took place while the company was still owned by Boliden.

Every other Swede relies on Boliden

By 1961, circumstances had changed. Battery manufacture had become ever less important for Rönnskär's lead sales, and Boliden Batteri AB was sold to AFA, the German battery group Accumulatoren-Fabrik Aktiengesellschaft. The terms of the business deal required the name to remain until 1969, when it was changed to Noack (Nordisk Ackumulatorfabrik AB). But even so, Boliden retained an interest in the industry as the raw materials used in Noack's production were chiefly Boliden products: refined lead from Rönnskär, lead alloys from Boliden Bergsöe and sulfuric acid from the erstwhile Boliden Kemi. These raw materials deliveries were behind the proud assertion that Every other Swede relies on Boliden. Not only were Boliden products used in Noack's car batteries, but also in batteries from Tudor, another Boliden customer.

Thus Boliden's time as a battery manufacturer was concluded only 13 years after developments on Rönnskär were initiated. But car batteries that bear the name Boliden are still produced today, but by companies in Thailand and Ghana as the trademark was not protected.



Engineer Fogelberg and supervisor Eriksson busy with Boliden batteries.

Four generations at the Zinc works

Being inspired by one's parents when choosing a profession is nothing unusual. But working at the same workplace probably is. Four generations of the same family have worked at the Odda smelter since Det Norske Zinkkompani began in 1924.

Text: Olle Lundqvist

When Birte Moland was little, she got to go with dad to his job. The Odda smelter organized visiting days for children, and gave them an appetite for more.

“We got to drive trucks and grill hot dogs. It was great fun!”

How much the truck and the hot dogs influenced her future choice of occupation is unknown, but today she also works at the Zinc works, thus continuing a 100-year tradition. Her father, Gunnar, is now 70, and until his retirement he was a purchaser at the zinc smelter where her grandmother, and both grandfathers also worked. Her grandmother worked in the lab, and granddad was an electrician. Her paternal great granddad worked as a pipe fitter and was there at the very start.

“My maternal granddad often talked about the war, when the smelter was under German authority.

It was then management at the smelter did everything to help the employees keep their jobs instead of being unem-

ployed and risking German servitude. This succeeded thanks to an imposed work-to-rule. Meanwhile, my maternal granddad went to evening classes, and because of the blackout at Odda, he had to study with drawn blinds.

And just to complete the family history at Boliden Odda, Birte Moland's father's maternal grandfather was a crane operator there.

Strong links

Birte was born in 1983 and belongs to a generation where many moved away from Odda after high school.

“I did, too. I studied administration for four years in Bergen and I had no plans to move back, at least in the beginning.

But the connection to both my hometown and the smelter was always there. After her years in Bergen, she made up her mind. She was homesick for Odda, and returned there in 2006 to



join the smelter's chemistry and process training course.

"I grew up outside the gate to the smelter. My connection to the workplace and the town was very strong," says Birte.

It's not an unusual feeling. Many people her age have done the same. Wandered off to the big city before returning. Birte feels she made the right decision.

"I really enjoy work at the smelter. The atmosphere is great, there are opportunities to develop and advance at work, and the pay is comparatively high."

This does not mean the smelter is a natural magnet for Odda's youth and returnees.

"Many are drawn to the oil rigs. The pay there is even higher, and there's a really attractive schedule with two weeks' intensive work followed by four weeks' leave.

Birte Moland is among those who have advanced at work and is now involved in

the smelter's gigantic expansion project scheduled for completion during 2024, and where her task includes testing and commissioning new systems.

A perfect family town

Talking of family traditions, her partner Nils Petter works in the vicinity of the smelter. He was an apprentice at Boliden; he works with electronics and is currently employed by one of the many contractors engaged by the zinc smelter.

Even though the population of Odda has fallen over the past 10 years to remain relatively constant, it isn't easy to find or build homes in a town whose clustered center is hemmed in by steep cliffs. Some are approaching 1,000 meters high, and they are also adorned with several waterfalls, which is one of the reasons the smelter was established just here. But Birte and Nils Petter have taken over an old house on one of the mountain slopes, and they feel that Odda

Father and daughter – Gunnar and Birte Moland – have carried on the family tradition through their respective jobs at Zinken.

is a perfect family town. There are fabulous natural surroundings, great cultural facilities, a bathing area and soccer field (finding a sufficiently flat surface was not easy and the locker room was blasted out of the rock). It's a great place for the couple's two children, eleven and two years old, to grow up in.

It's too early to tell whether the children will one day constitute the fifth generation at Boliden Odda. While four is impressive, it's by no means unique.

"There's actually another family like ours with four generations that have worked at the smelter," says Birte Moland.

“We have to create knowledge, understanding and respect”

Text: Olle Lundqvist

He doesn't look for ore or mine it. Even so, Anders Forsgren is a central figure in Boliden's operations. For 30 years he's negotiated with Sami communities and local residents, and as social sustainability manager he now has an even greater area of responsibility.

Land is Anders Forsgren's thing. As a professional forester, he began working for LRF Konsult after graduation; he stayed there for five years before he was hired by Boliden as the company's head of forests, land and mining rights issues. Expressed in square meters, his workplace was huge. Boliden owns 22,000 hectares of land, 13,000 of which are

productive forest. His work has entailed, and still does to a great extent, environmental permits and forest and land issues in the broadest sense, especially consultations and negotiations with Sami communities and local residents.

“The issues often take a long time to process. I have to build mutual trust and respect the counterparty's situation to understand their point of view, and accept the fact that discussions will take time. And I never expect to reach agreement at the first meeting.”

Things almost always work out in the end, and it's often more a question of perseverance than drama. When he ended up in negotiations with Hells Angels, whose property in Garpenberg Boliden needed, he admits it didn't feel like just another day at work. But even then, the parties reached agreement and were satisfied.

The importance of listening to each other

You get to see and understand a lot in 30 years. Anders Forsgren's experience has influenced him personally and the company as a whole. Contacts with 'claimants', i.e. landowners and local residents, no longer solely take place when Boliden is planning a new project.

“I meet most Sami communities at least four times a year. We talk and we listen, and this creates knowledge, respect and mutual understanding.”

A recent example of what this can lead to came after an event in Aitik.

“We'd put up a fence with a gate that did not close as it should. A reindeer calf





I meet most Sami communities at least four times a year.

ran through the opening and there they were, the cow and the calf, on either side of the fence. When mine management found out, they immediately installed an automatic gate that closes by itself when anyone passes through.”

But social sustainability, his assignment, is about so much more.

“Could we imagine child labor anywhere in our value chain? No, not in our own operations, but maybe in one of the many things we purchase. We must always bear such things in mind. And how are things at work? We’ve always considered ourselves to be good at women’s rights, but then a woman truck driver calls wanting to bring this up in a workshop, ‘because you’d never believe the language some people use.’”

But he says things are headed in the right direction. And should anyone mutter something about Anders Forsgren being some kind of dead weight, he’ll take it in his stride.

The call of the forest

When he visits Sami communities, he often takes an associate along. It’s important to spread knowledge and understanding in the company. As no matter how great a passion he feels for his job, he doesn’t intend to keep it forever. Anders Forsgren, former Swedish draft dog champion, finished 142nd in the Vasaloppet ski race and ran a half marathon in 1.12, may well have left his sporting ambitions behind, but he’s looking forward to other challenges in life:

“I’ve bought some forest and in a few years I aim to devote my time fully to it.



Anders Forsgren often visits Sami communities and enjoys good relations with them.

Managing change at the smelter

Text: Olle Lundqvist



Usually, Helene Seim is in charge of 300 people. But nothing has been as usual in Odda since 2021, as the biggest investment in Boliden's history is happening here.

The world's most modern zinc smelter is taking shape over a period of three years at a cost of EUR 805 million, and it's not just the sticker price that's huge. In addition to Odda's own personnel, a further 1,000 people are working in the smelter area, and at the center of developments is Helene Seim. That's how things can go, even for a girl who actually started out on the shop floor.

Helene Seim began her career at Norzink in a summer job as a cleaner, but did not actually climb her way to the top. After high school, she left to see the big

wide world, and 20 years later returned to the smelter, which at that time became Boliden Odda, of which today she's general manager. Measured in tons processed per hour worked, the zinc smelter is one of the world's most productive. But it operates in an ever tougher market. Survival of the fittest is the order of the day, and there is a constant struggle to be better in every area.

Feeling and understanding

Helene grew up in Odda and her father, Magne Seim, worked in the zinc smelter's electrolysis hall. She acquired a certain feel and understanding for the industry, and kindled an interest in industry and technology. So when she took her doctorate at Oslo University, it was no coincidence that the subject was materials science.

She and her husband also lived for a few years in Helsinki, but her longing for Odda was always there, and in 2003 the former cleaner was back at the zinc smelter as laboratory manager. In 2011, she was appointed production manager in a critical situation. Boliden Odda had undergone a number of difficult years and the threat of closure or sale was manifest, but the situation was resolved as every employee was informed about how serious circumstances were, and they each took responsibility for the implementation of a cost-cutting program.

The project, led by the then general manager, Dag Berg, was called P 100.

"We reviewed everything. Where and how can we be more efficient? Where are the bottlenecks and how should we remove them? And so forth," Helene Seim tells us.

Gigantic increase in production

She succeeded Dag Berg as general manager in 2017. The smelter she manages is in good shape in terms of production and finances, but Helene Seim makes it clear that this is no time to lean back and relax. On the contrary, Odda is taking a giant stride forward. With the aid of the latest IT technology, they're building the world's most modern zinc smelter. Its 300 employees will be 360, but the higher number does not truly reflect the planned production increase. Today's 200,000 tons per year will become 350,000, which measured in productivity per employee will put Odda in a league of its own.

"A new roasting plant, a new electrolyzer, an extended harbor with new cranes and greater capacity in the lye and leaching plants," illustrates Helene Seim.

Almost 50 of the smelter's own employees work full-time on the project, and around another 1,000 people with contractors, most of them Norwegians, but also people from Portugal and Finland. Most of them live aboard a floating 800-room motel in the fjord. They were able to build some accommodation ashore, even though Odda with its clustered downtown surrounded by steep cliffs has geographical limits to new construction.

For three years, more than four times as many people as usual will work in the smelter area, so things will naturally be a tad chaotic.

Flexibility and a new product

But production must be maintained in the middle of all these obstacles, people and fuss. This requires the company's own employees, contractors and Helene herself to be flexible.

"In this situation, it's especially important to take care of ourselves and try to disengage from work and recover during our free time."

She does this herself in a traditional Odda manner. Together with her husband and three children, she drives to the family's cabin to enjoy skiing and hiking.

In 2024, when the construction mess is over, an additional 60 people will begin work at the smelter. Many new employees are recruited from the smelter's own apprentice program, others from towns in the area and a few from other parts of Norway. When everything is completed, Boliden Odda will not only be one of the world's most productive smelters, it will also have an additional focus, according to Helene Seim:

"From waste that previously would have been disposed of in rock caverns, we have created a new lead product with traces of e.g. gold to sell on for further processing."

“

We reviewed everything. Where and how can we be more efficient? Where are the bottlenecks and how should we remove them?

For three years, more than four times as many people as usual will work in the area.



Photo: Stefan Berg

Driven by challenges

Text: Anna Wachtmeister

Stefan Olsson supervises deliveries of lead acid batteries for recycling from his weighbridge booth. He's worked at Bergsöe for 35 years and lived through plenty of changes in that time.

Stefan Olsson spends his time in Bergsöe's weighbridge booth, where he oversees deliveries.

"I direct traffic and make sure raw materials go to the right place and that the right guy takes care of them. And I also weigh everything that arrives. The biggest challenges at work are languages and language confusion. We get truck drivers from a great many different countries and most of them don't speak English. We get everything from Russians, Ukrainians, Belorussians, Polish, Bulgarians and Romanians. I speak English, but I learned German through my work here on the weighbridge, so I understand a little," says Stefan.

He began work at Bergsöe in 1988, and back then he worked in the copper hall pouring bronze, or red brass as it was known. It was a tough, smoky environment back then, but he enjoyed his work.

"Stuff happened all the time, and things popped and bubbled. We didn't think safety the way we do today. We stood there bending over molten metal. It's good that so much has happened when it comes to safety and the work environment since then."

The way to the weighbridge

Eventually, the copper hall was closed and at first Stefan got to work in the yard. Next, he stepped up and began working shifts in the shaft furnace,

before moving on to the stores and again to the yard. Then came a day with truly bad weather and Stefan went up and had a chat with his boss in the weighbridge booth, but just to see what they did there. Back then, two white-collar workers worked there, one who dealt with all the paperwork and another who did the weighing. Stefan was curious how the weighbridge worked and asked if he could learn how to use it. And he never left. So on one really bad-weather day he stumbled into a whole new world.

"Getting to meet all the different people every day is really cool. The linguistic challenges add spice, and it's exciting to

Stefan Olsson's work involves a lot of contact with people from different countries.



Battery recycling is Bergsöe's thing. Batteries that used to power submarines.



“

Getting to meet all the different people every day is really cool.

work things out and understand each other by drawing, pointing and using Google translate. The most unpleasant thing is sometimes having to act as punchbag for suppliers and take negative criticism from them without actually being able to change anything. But perhaps it's not surprising as I'm the person their truck drivers meet.”

But always having to find new ways to improve work is also a rewarding challenge for Stefan. His idea of using restaurant pagers to simplify and improve the queuing system for incoming goods is a good example. But even before his job at the weighbridge, he came up with smart solutions elsewhere in Bergsöe. One he's especially pleased with is from the time they recycled tin. Tin oxide was collected in sacks that had to be taped to the outlet of a funnel into which they tipped the powder. One guy filled the funnel with powder while the other continually replaced the bags. It was a dirty, tough job and not particularly efficient according to Stefan. “Can't we use a container there instead?” No sooner said than done, and

then it only took one guy instead of two and no one had to do the toughest part. And as it also saved time and money for Bergsöe, no one was complaining.

Soccer coach

Outside work, soccer is Stefan's greatest passion in life, especially Landskrona BoIS. Stefan coaches children's and youth soccer teams. The teams play in nearby Borstahusen, so he spends a lot of time there, but otherwise it's only BoIS that matters. But it all began rather reluctantly. His dad had dragged him along to watch a game. Stefan would rather play with his buddies, but once he watched the game, he was helplessly hooked. So what's so special about Landskrona BoIS? Stefan's answer is emphatic:

“Because it's such a hopeless team to support. They never win any cups or Swedish championship gold. There's hope and despair in every game, but they never quit. And it's something I try to pass on to the children and youth I coach – that enormous fighting spirit.”

A career framed by crises

Text: Olle Lundqvist



Photo: Jeanette Hägglund

“Things weren’t going so well for Rönnskär. In 2003, numbers were in the red everywhere, the copper price kept on falling and I was on the lookout for other opportunities.”

‘Rushing off alone is pointless’

A year or two later things were going better for Rönnskär and Linn Andersson’s doubt had turned to enthusiasm; she really liked Rönnskär, and it really liked her. She attended her first managers course at the Boliden Academy in 2004 and a second in 2008. The course was called High Potential, which was precisely what then general manager Roger Sundqvist had seen in her early on. One of the insights the training gave was the recognition that a person’s strength can also be a weakness.

“I find it easy to make associations, to see contexts and then rush off to implement the changes that have to be made. But rushing off is pointless if no one else comes with me.

Instead, it’s important to get the team involved by explaining why the changes are necessary and what will happen if they’re not carried out. It sounds easy, but it can be really difficult.”

Left Boliden, but returned

In 2008, she was appointed departmental manager for the lab, and four years and two maternity leaves later, she became environment and development manager. A career can hardly be more meteoric, but in 2018 it took yet another step. That’s when Linn Andersson became production manager, virtually ‘No. 2’ in a Rönnskär where no fewer than four of seven management team members were women.

Her time at Rönnskär has been characterized by one crisis after another. But general manager Linn Andersson stands firm even in unsteady times.

She ended up at the smelter almost reluctantly. She studied chemistry and in 2000, the year before she graduated, she did her degree project at Rönnskär. They had a new x-ray machine for evaluation and analysis methods under development for scrap materials. Linn got to do her degree project and it was interesting, but not more. In 2001, when she graduated, the labor market was grim and the situation at a failing Boliden was shaky, but even so there was a job available for her at Rönnskär as a development engineer in the lab.

“

We’ve trained in crisis management and crisis support, but this was an entirely unreal feeling.

Even so, one year later she wanted to try something new and took the step over to another local company, Skellefteå Kraft. She became part of group management and felt her job was both educational and rewarding. But in December, 2019 she received an offer she could not refuse – the position of general manager at Rönnskär.

“I’d only worked at Skellefteå Kraft for just under a year and I really liked it. And what’s more, I knew how much effort working at Rönnskär would demand of me. But I also realized that this was a chance I would be unlikely ever to get again.”

She had just begun working when the Covid pandemic broke out.

“It was a real test. Most of our employees had assignments that require their presence. Our strategy involved isolating teams, working in small clusters and setting up our own Covid testing procedures. And in fact, it worked really well. We didn’t have very many Covid cases.

But when that crisis had passed, another awaited. On February 24, 2022, war broke out in Ukraine, which even had an impact on the Rönnskär plants.

“We were forced to find new delivery routes. Prices, especially for energy, skyrocketed and we had to analyze everything we did while avoiding anything that could breach the sanctions against Russia.

By early summer 2023, this also seemed to have resolved itself. But on

June 13, just when Linn Andersson and her colleagues seemed to have firm ground beneath their feet, fire broke out in the electrolysis plant.

Could only prevent it from spreading

It began in the middle of the night at 02:20. Linn’s husband woke her around 3 o’clock to tell her what had happened. The fire was so extensive and intense that the firefighters could only concentrate on preventing it from spreading.

Precisely what caused the fire is still unclear. But Linn Andersson’s plan was ready at once. She quickly started a project organization to bring about a new electrolysis plant. It will take a few years and cost a few billion kronor, but Linn is an optimist.

“The alternative, running a smelter without an electrolysis plant, is not particularly profitable.”

The Rönnskär plants are still produc-

ing copper, but only to the penultimate processing stage, anode casting. Thus the smelter is still taking in money, but revenues have fallen and three weeks after the fire Linn Andersson was forced to inform her personnel that notice had been given to 190 employees.

“We’ve trained in crisis management and crisis support, but this was an entirely unreal feeling,” she says.

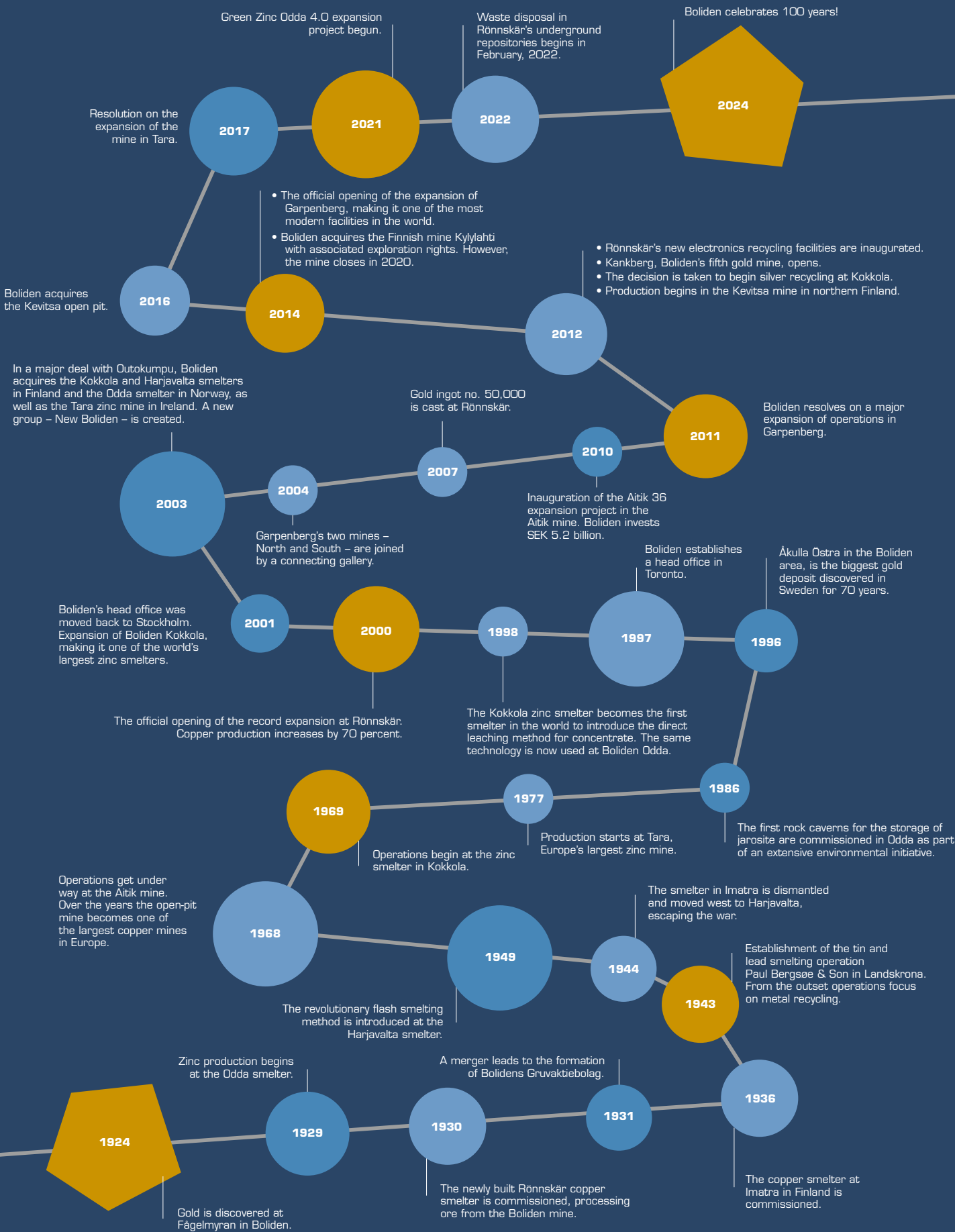
The summer did not turn out the way Linn had hoped and the fire has even affected her family.

“When it happened, the atmosphere in the area was extremely agitated. My youngest son became very scared; he knew that both mom and dad, who is a fire chief, were there, and he was afraid things could go wrong.”

Although 2023 was a heavy year, Linn is convinced that Rönnskär will also overcome this crisis.



The fire in the electrolysis plant in June, 2023, was Sweden’s biggest ever industrial fire. Right: the area before the fire.



DID YOU KNOW THAT ...

The construction and infrastructure industries are the largest users of zinc, but the automotive, haulage, electrical and electrical consumer goods industries are also important areas. Whether zinc is used in construction materials or as coatings for other materials, it's highly recyclable.



Foto: Shutterstock



Photo: Mikael Florens, Riley&

Around 99 percent of all lead in Europe is recycled, as it can be recycled time and time again without losing its qualities. Bergsöe mainly recycles spent batteries from the Nordics. The major part of the recycled lead is sold back to the battery industry, which uses it to make new batteries. The plastic cases are also recycled to become new battery casings.

Sulfuric acid is the world's most-used chemical. It's used chiefly in the production of artificial fertilizer, paper and titanium dioxide, as well as in the metals industry.





BOLIDEN 100 YEARS PART 4: 2002–2024

At the end of 2003, Boliden concluded a big, important deal with the Finnish company Outokumpu, and thanks to the deal, New Boliden became one of the world's leading mining companies. This, the fourth and last centenary year magazine, focuses on environmental issues. We describe how reclamation work in mining areas proceeds and what the metals Boliden produces are used for.