ERAMET NORWAY

SUSTAINABILITY REPORT **2016**

ERAMET NORWAY

Eramet Norway supplies manganese alloys to steel manufacturers all over the world – founded on Norwegian industrial traditions and the use of self-developed high technology.

ERAMET NORWAY

CONTENTS

We are in a good position, but we still have to become more sustainable!

Bjørn Kolbjørnsen, CEO of Eramet Norway

Eramet Norway is one of the world's most efficient manufacturers of manganese alloys, whether that efficiency is measured in costs per produced tonne or in terms of climate and the environment.

We have a century-long history of producing alloys. If we had not been able to make continuous, year-on-year improvements, we would not be as well-placed as we are now.
Our actual products, manganese alloys, have not undergone frequent product development. Our product range has remained more or less unchanged for the last 30 years, which might seem unusual. A similar lack of development within the telecommunications or auto industry would certainly have resulted in bankruptcy a long time ago. However, manganese alloys are not an end product. Instead we are at a very early stage of the commercial chain.
Our role is to convert manganese ore from mines in Africa into useful alloy components used in the production of a range of different qualities of steel. Steel is one of the most widely-used construction materials in the world, and as an example, twenty times more steel is produced than aluminium. It is the steel manufacturers who ensure the correct quality of the products used in bridges, rails, industrial facilities, car bodies, white goods and much more besides.

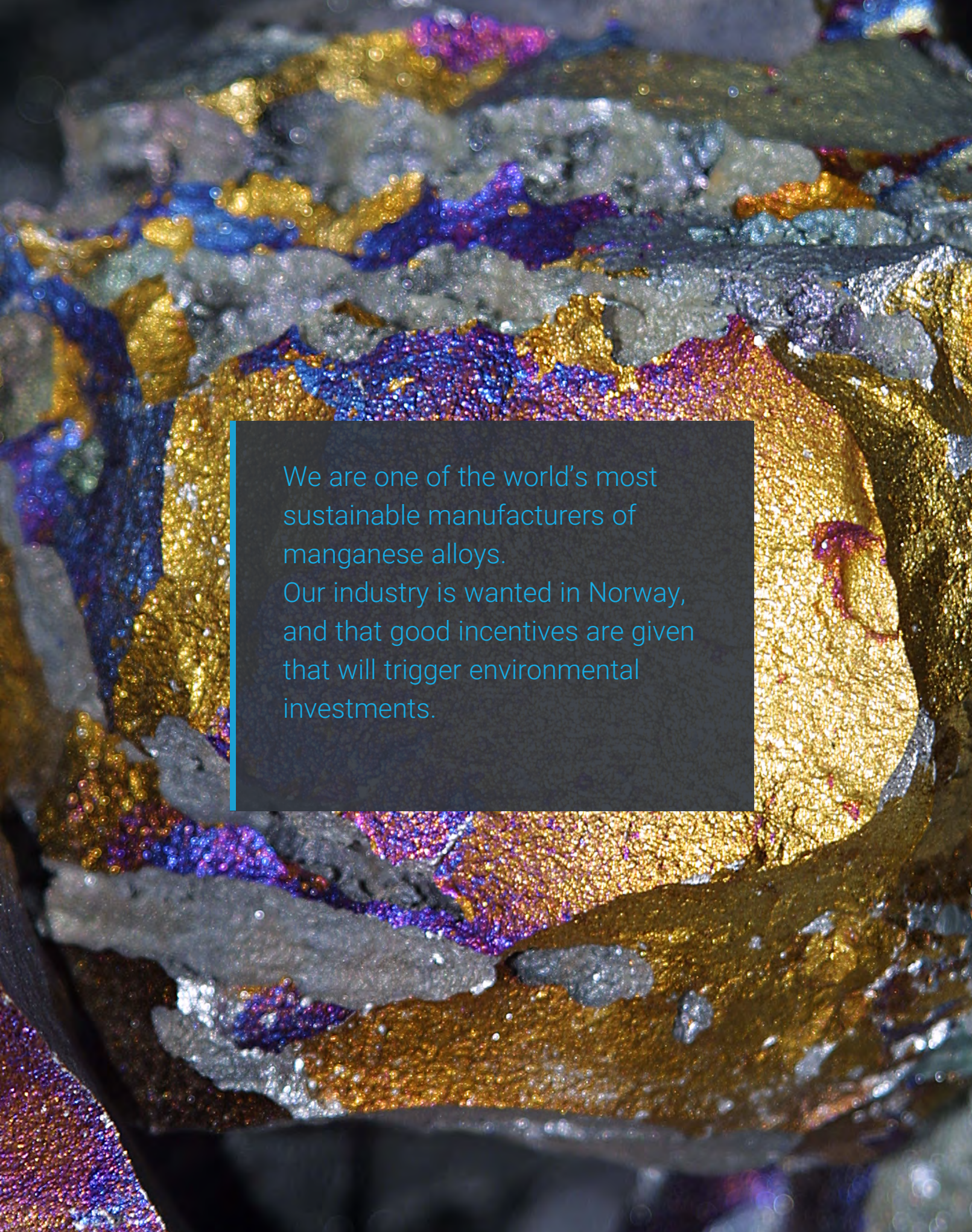
Good general conditions and advanced expertise

There is no longer any steel production of any significance in Norway, so our main markets are Europe and North America. The reasons why we are still operating up here in the north are the good general conditions, the high level of expertise and the fact that we are constantly improving the efficiency of our operations. For our customers and owners, costs and profitability are the most important factors, while the environment and safe and developing jobs are most important for the communities in which we are located.
We have to assume that these expectations of us will persist and become more pressing in the years ahead, and as a result we will have to continue to focus on improvements. The work on our new emissions licences also confirms this.

Good environmental practice will generate good "business"

I am nevertheless convinced that environmental issues will provide the greatest impetus for improvements in the time ahead – but not because we have a poor record in this respect. Quite the opposite, we are currently one of the manganese alloy manufacturers with the lowest greenhouse gas emissions per produced tonne. The reason is quite simply that the climate and sustainability will, in future, be the most pressing issues in the society of which we are a part, for all of the world's current and future citizen's and consumers – and consequently also for national and international agencies. We also have a fundamental belief that acting in a way that is environmentally responsible now will, over time, prove to be good "business" – both for Eramet Norway as a responsible social partner, and for our customers and suppliers.
We are currently working on developing our own concrete roadmap for achieving lower greenhouse gas emissions, inspired by the work we have previously done together with other operators from the Norwegian processing industry

We have 100 years of various kinds of improvements behind us, and we are keen to take new steps – and we'll succeed!



We are one of the world's most sustainable manufacturers of manganese alloys.
Our industry is wanted in Norway, and that good incentives are given that will trigger environmental investments.

ERAMET IS A WORLD LEADER IN THE PRODUCTION OF **MANGANESE ALLOYS**

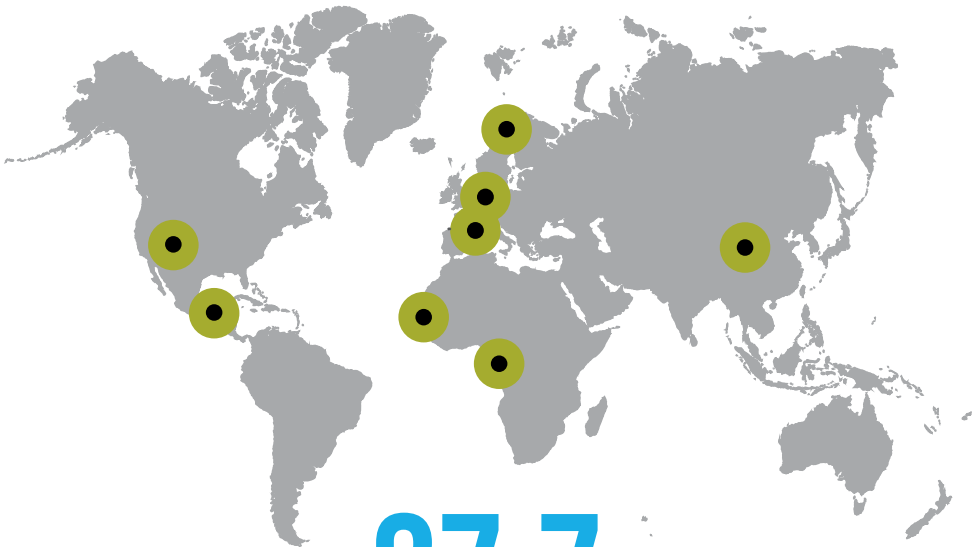
The French industrial group ERAMET is the second-largest producer of manganese ore and the world's largest producer of refined manganese alloys. The company is in the business areas of manganese, nickel and special alloys.

13 000

EMPLOYEES IN 20 COUNTRIES THROUGHOUT THE WORLD

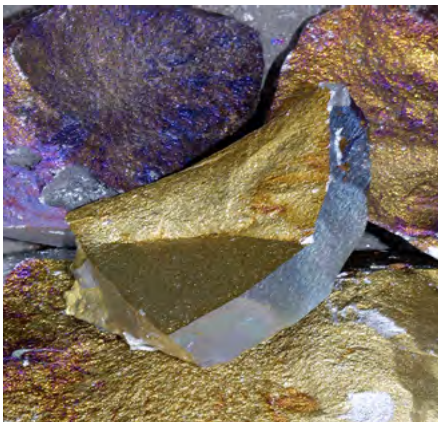
6 000

EMPLOYEES WORLDWIDE IN THE MANGANESE DIVSION



27,7 MRD NOK

REVENUE IN 2016



ABOUT MANGANESE

MANGANESE IS A METALLIC ELEMENT BELONGING TO GROUP 7 IN THE PERIODIC TABLE OF ELEMENTS.

Pure manganese is a steel-grey metal. It is hard, but at the same time so brittle that it can be pulverized.
On a worldwide basis, there are large deposits of manganese. In the earth's crust, there are some 900 ppm, making it the second most common metal after iron. It is primarily extracted from the mineral pyrolusite (MnO_2), also known as brownstone. More than 80 per cent of occurrences are found in South Africa and Ukraine. Other important deposits are in China, Australia, Brazil, Gabon, India and Mexico. Manganese is also found in the form of nodules on the ocean floor.

AREA OF UTILIZATION

MANGANESE IS NECESSARY TO MAKE STEEL DUCTILE AND DURABLE.

For one tonne of steel, about 10 kilograms of manganese alloy is needed.
Nearly 90 per cent of the world's total manganese alloy production goes into the production of carbon steel: steel for the construction, energy and transport sectors, and the tool industry, and special steel produced for the aeronautics and aerospace industries.

ERAMET NORWAY – A PART OF ERAMET GROUP'S MANGANESE DIVISION

Eramet Norway is part of ERAMET with processing plants at Sauda, Kvinesdal and Porsgrunn, and an R&D group in Trondheim. The company employs 510 people, and its operations make the ERAMET Group the world's second largest producer of manganese ore and manganese alloys.

From smelter to modern processing plant

The Norwegian processing plants maintain the traditions and expertise that the ferroalloy industry has built up since industrialization accelerated in Norway in the early 20th century. Today, Eramet Norway supplies manganese alloys to the international steel industry market.

The worlds cleanest manganese alloy production

Eramet Norway realized early on that environmentally sustainable onshore industry is the way of the future for Norway. Since 2001, when ERAMET acquired the processing plants previously owned by Elkem, about half a billion Norwegian kroner has been spent on developing and adopting green technology. Today, Eramet Norway can proudly boast that we operate the world's cleanest manganese alloy production facilities. ERAMET Norway has a workforce of about 510 employees. It is a part of the ERAMET group, which is the world's second-largest producer of manganese ore.

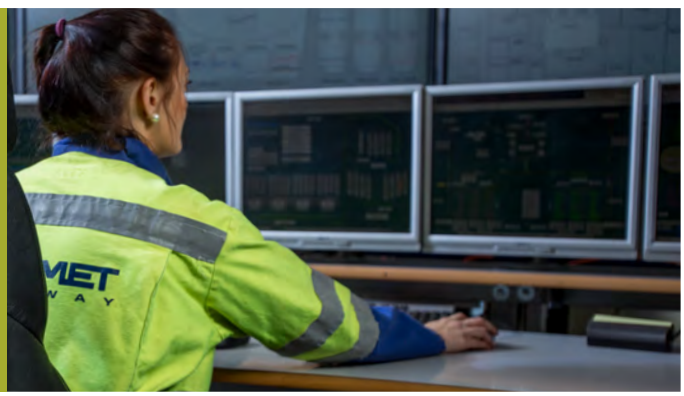
All production are exported

Eramet Norway exports all its production of manganese alloys, primarily to Europe and North America. The processing plants transport 98 per cent of their production by ship and the remaining percentage by road and rail.

Organizational philosophy

The company has a very flat organizational structure built on a strong contribution-based philosophy and the Nordic model of collaboration.

Eramet Norway supplies the world's steel manufacturers with a full range of extremely high quality manganese alloys, and it has advanced high-technological expertise that few other companies in the world are able to match.



World-class Norwegian metallurgical expertise

Metallurgy is a broad field with a long tradition in the ferroalloy industry, in which Norway enjoys high international standing.

Metallurgy is metal technology. The employees working in this specialized field range from apprentices and process operators to doctoral level researchers.
Modern metal technology has become increasingly more sustainable over recent years.

International competitiveness

One challenge in operating and developing business in Norway is that, in cooperation with Norwegian authorities, we need to adapt our framework conditions so as to create the basis for strengthening our international competitiveness.

BUILDING MATERIALS

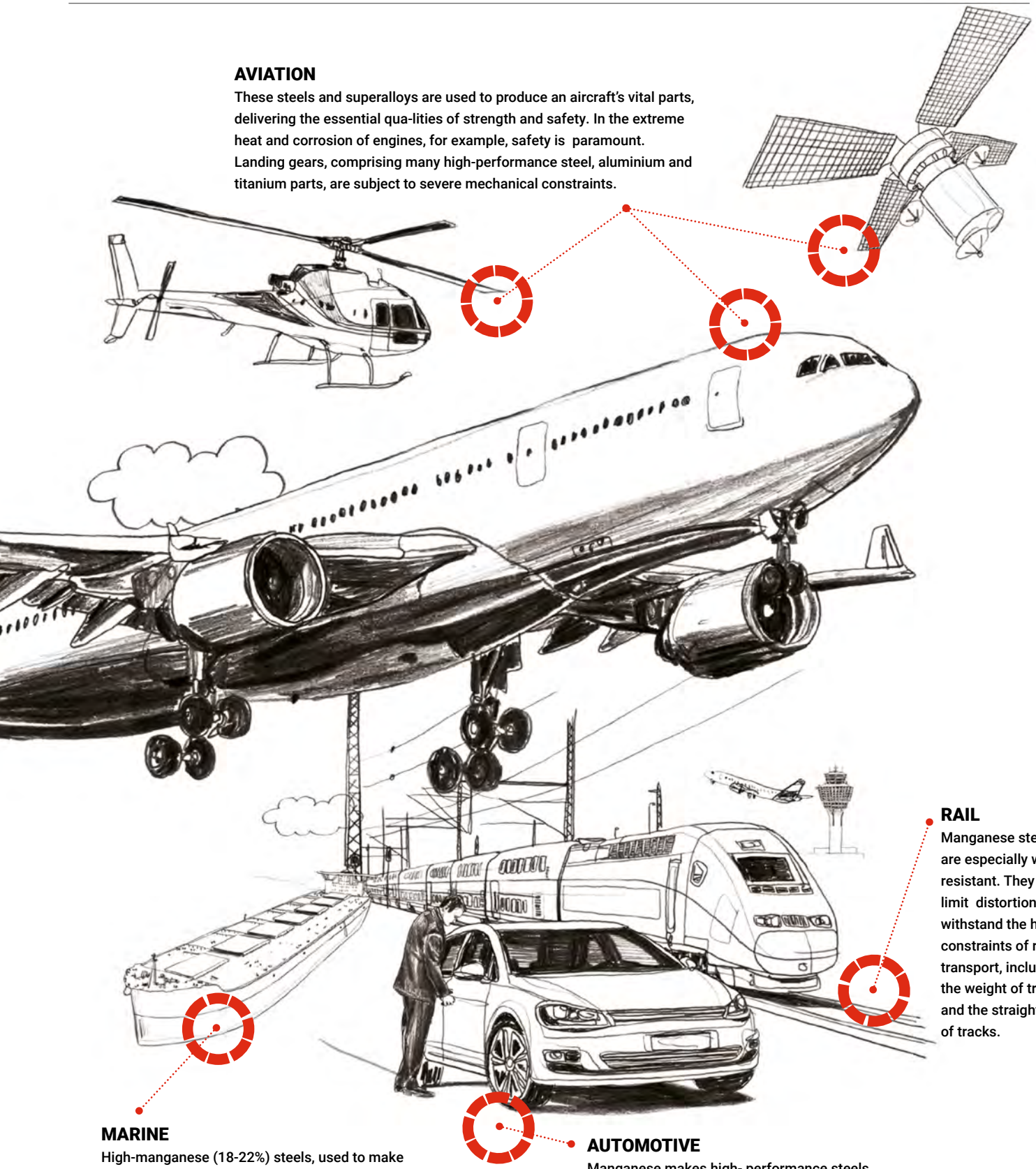
The biggest outlet for manganese is carbon steel, which is used to make the essential parts of all modern buildings. Concrete reinforcing rods contain manganese which makes them stronger and stiffer. High speed steel saws are used extensively to cut structure parts on construction sites. On average around the world, it takes 7 kilos of pure manganese or 10 kilos of manganese alloys to make 1 ton of steel.

ERAMET PART OF YOUR DAILY LIFE

Everywhere you go you will encounter products that contain manganese alloys. Eramet Norway supplies the world's steel producers with a complete range of high-quality manganese alloys. In our processing plants in Norway, raw manganese is refined and processed into ferromanganese and silicomanganese. These additive ingredients comprise 1–10 per cent of the composition of steel, graded by quality. Nearly 90 per cent of the world's total manganese alloy production is used to make carbon steel and specialty steels for the construction industry, the aeronautics and aerospace industry, the energy and transport sectors, and the machine tool industry. The construction market alone accounts for more than half the steel used worldwide.

AVIATION

These steels and superalloys are used to produce an aircraft's vital parts, delivering the essential qua-lities of strength and safety. In the extreme heat and corrosion of engines, for example, safety is paramount. Landing gears, comprising many high-performance steel, aluminium and titanium parts, are subject to severe mechanical constraints.



RAIL

Manganese steels are especially wear-resistant. They can limit distortion and withstand the harsh constraints of rail transport, including the weight of trains and the straightness of tracks.

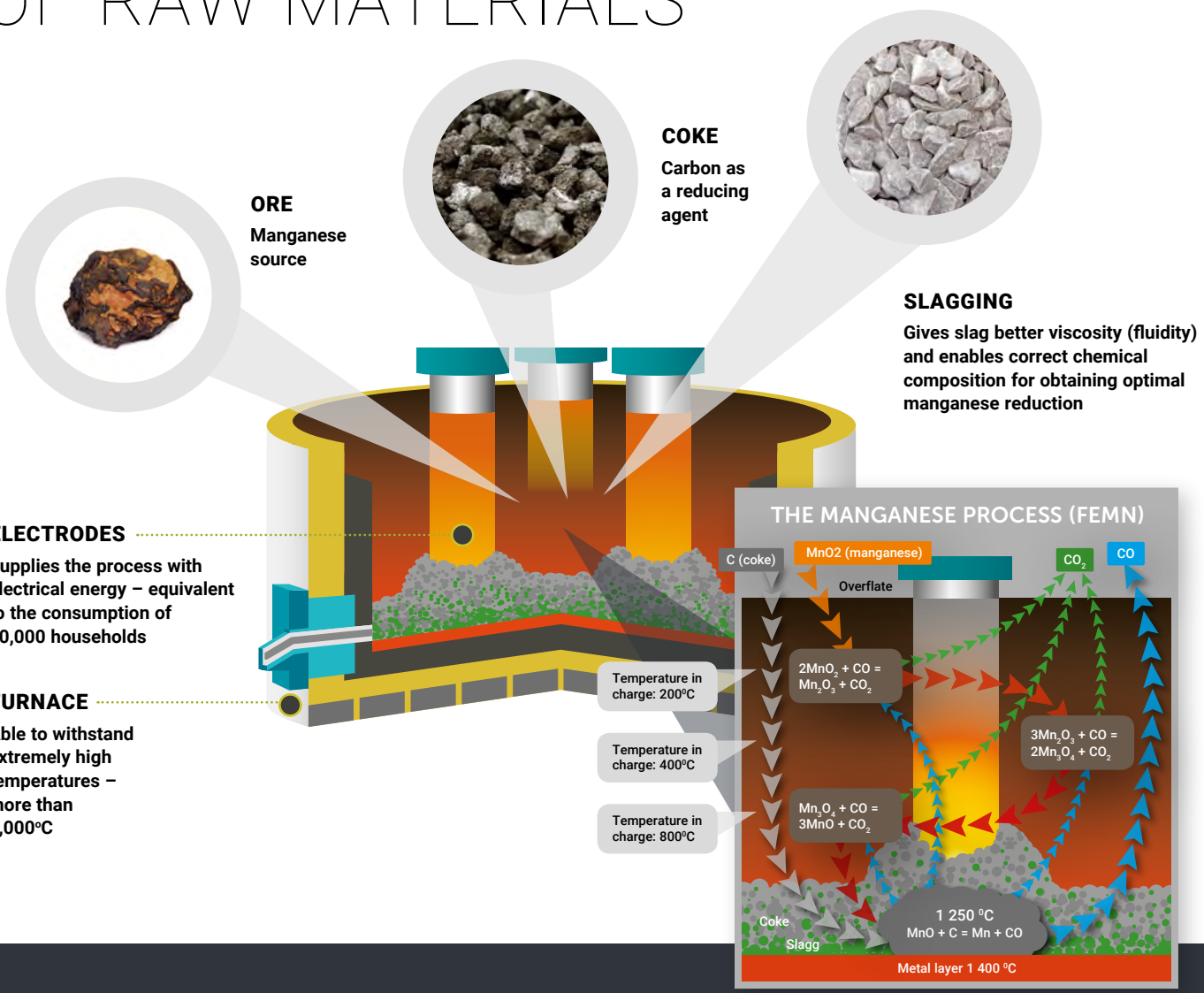
MARINE

High-manganese (18-22%) steels, used to make liquefied natural gas tanks for example, deliver toughness that stops cracks spreading at low temperatures.

AUTOMOTIVE

Manganese makes high- performance steels stronger for use in vehicle structure parts. These steels also improve wear resistance in critical engine parts.

PRODUCTION OF MANGANESE ALLOYS AND CONSUMPTION OF RAW MATERIALS



885 000
TONNES OF MAGANESE ORE

231 700
TONNES OF METALLURGICAL COKE

101 500
TONNES OF QUARTZ

OUR MOST IMPORTANT RAW MATERIALS

Eramet uses significant quantities of raw materials in its production every year. These raw materials come from both foreign and domestic suppliers, and they are mainly:

- Manganese ore, with Eramet having access to its own mine in Gabon via its part-owned company, Comilog
- Metallurgical coke
- Quartz and limestone

OTHER FACTOR INPUTS

Other important factor inputs are electrode paste and metallic silicon sources. During the smelting process, a number of internal products are produced and consumed. They are transferred as required to other parts of the same plant and between the three processing facilities.

ENERGY CONSUMPTION

The combined electrical energy consumed in the smelting processes, including auxiliary power, was about 1.92 TWh in 2016. The required amount of natural gas and propane used as thermal energy sources amounted to almost 592 tonnes. Eramet Norway is also one of the country's largest consumers of industrial gases, particularly liquid oxygen, in production processes.

WORLD-CLASS TECHNOLOGY

Eramet Norway has a century of experience in manufacturing manganese alloys. This knowledge base, developed over generations, is Eramet Norway's most important resource and asset. This expertise has also made the company a leader in smelting and refining manganese alloys.

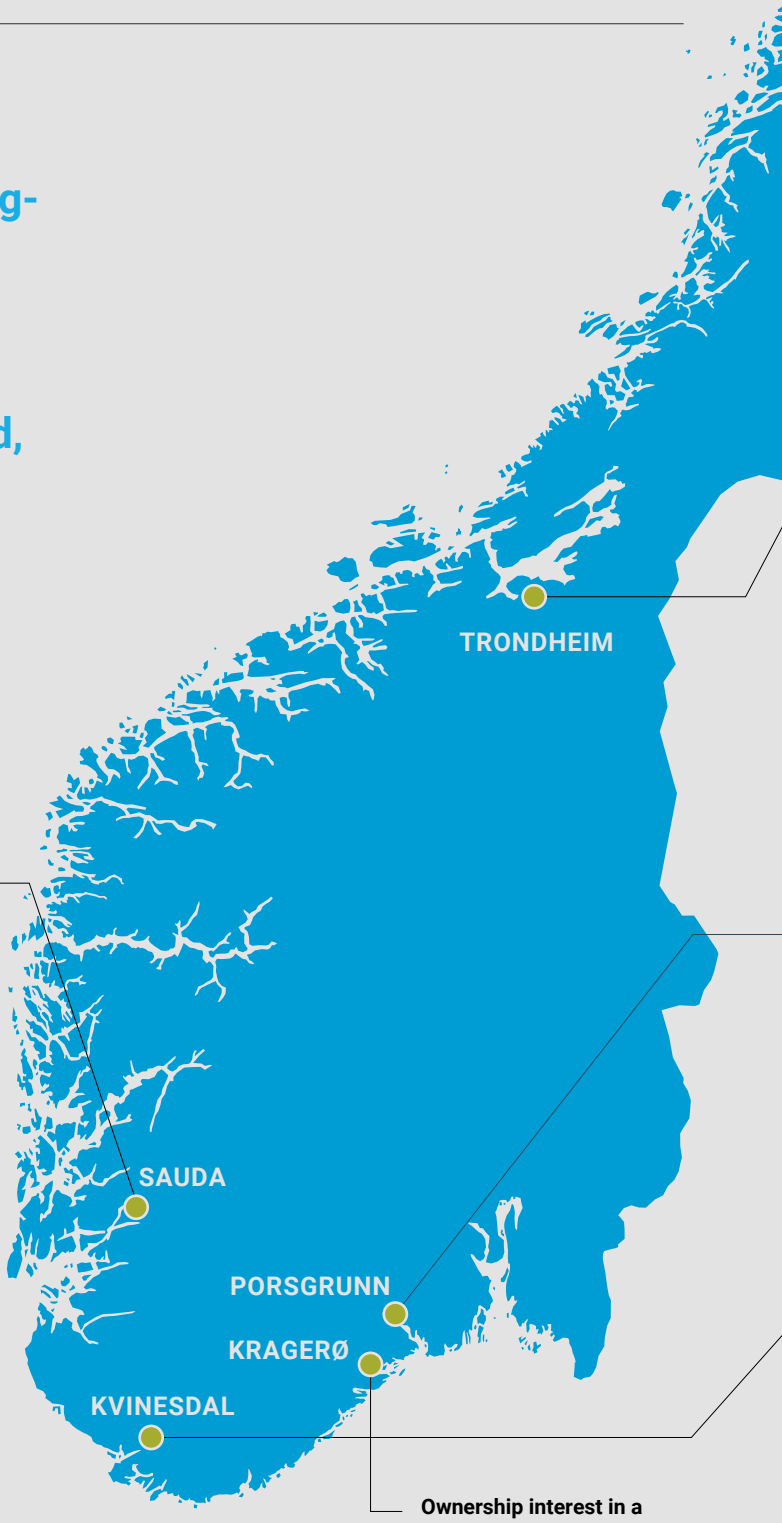
Today, the refining process is an advanced, highly technological process that few other countries in the world are able to emulate. From the time an optimal mix of ore and coke is blended and sent to the furnace, and until the crucial refining process has been completed, precision and experience are essential. With the aid of an advanced control system, every stage of production is monitored in detail, and the laboratories take samples at regular intervals to test quality.

14 000
TONNES OF ADDED ELECTRODE MATERIAL

1,92 TWH
TOTAL CONSUMPTION OF ELECTRICAL ENERGY / AUXILIARY POWER

592
TONNES OF NATURAL GAS AND PROPANE

Eramet Norway is founded on long-standing industrial traditions. The three Norwegian processing plants are located between the fjords and mountains of Rogaland, Vest-Agder and Telemark.



ERAMET NORWAY
SAUDA

Sauda, in the northeast part of Rogaland county, is a community of 5,000 inhabitants. The local rivers were harnessed for hydroelectric power generation in the early 20th century, paving the way for industrialization in Sauda.
Eramet Norway's processing plant in Sauda employs about 163 people and, with its two 40 MW furnaces, is the largest ferromanganese producer in northern Europe.
Production has more than doubled since the 1960s, and some 70 per cent of the plant's revenue is from refined products.
Annual power consumption totals 730 GWh when the plant is operating at full capacity. Measured in tonnes produced, Sauda is the largest plant in the Eramet Norway family.
Sauda has the highest output of refined ferromanganese alloys, processing about 70 percent of the manganese ore imported by Eramet Norway. Eramet Norway Sauda is a cornerstone of the local economy and takes its corporate social responsibility seriously, benefiting both the company and our stakeholders.
The Sauda plant celebrated its centenary in 2015, and its vision is reflected in the motto "All set for another hundred years in Sauda!"

Ownership interest in a quartz quarry operator, Georg Tveit AS.

R&D GROUP IN **TRONDHEIM**

Eramet Norway's development group in Trondheim consists of three researchers with access to the facilities and expertise of NTNU and SINTEF. Working as a team, they are all acknowledged experts in applied research who continuously pursue enhanced understanding and greater insight. The development group supports the processing plants at Kvinesdal, Sauda and Porsgrunn, and contributes to innovation and knowledge dissemination within Eramet Norway.

ERAMET NORWAY **PORSGRUNN**

Porsgrunn is a city of 35,000 residents in Telemark county. As the successor to a plant first established in 1913, Eramet Norway Porsgrunn is a modern, high-technology business with long and proud traditions. Average seniority among the workforce is 23 years, and it is not uncommon to encounter second- and third-generation employees manning the smelting
furnaces. The plant is considered an attractive workplace locally and currently employs 152 people. Equipped with two smelting furnaces and a refinery facility, the plant produces 65,000 tonnes of silicomanganese and 115,000 tonnes of refined ferromanganese annually. The plant consumes 570 GWh of electricity annually, from which it recovers almost 200 GWh of thermal energy by supplying carbon monoxide gas to Yara's ammonia factory at Herøya.

ERAMET NORWAY **KVINESDAL**

Established in 1974, Eramet Norway Kvinesdal is centrally located in the Lister region. Kvinesdal is a community of 5,800 residents, 195 of whom work at Eramet Norway in 2016.
The modern, highly versatile processing plant is a key player in the local community and an undisputed leader in energy recycling, flexibility, adherence to emissions requirements and, not least, customer satisfaction.

The plant consumes 750 GWh of electrical energy annually and is strongly committed to energy recycling. As long ago as 1981, a thermal power plant was built, which now supplies nearly 90 GWh annually to the grid. Wastewater is reused by the plant itself and by external customers, including a turbot farm producing 250 tonnes of fish annually. A district heating plant, built in 2007, supplies hot water to five external customers for heating off-site workshops.

When it comes to advanced technology, few metal producers can match Eramet Norway.

ENERGY-MARKING

GUARANTEES OF ORIGIN ARE A MARKING SCHEME FOR ELECTRICITY

Guarantees of origin are a labelling scheme for electricity that shows the electricity customer that a certain quantity of energy has been generated from a specified energy source. The scheme was introduced with the EU's first renewables directive (Directive 2001/77/EC) in 2001 in order to give consumers a choice between renewable and non-renewable energy. At the same time, energy producers who sell guarantees of origin receive an additional income from their renewable energy production.

It is the energy suppliers who buy the guarantees of origin from energy producers. The energy suppliers can then give a guarantee to the customer that the energy the customer is paying for is renewable, and that an amount of renewable energy is being generated that is equivalent to the amount used by the customer.

Source: The Norwegian Water Resources and Energy Directorate (NVE)

Neither the climate nor Norwegian value creation are served by a system that contributes to green-washing coal power generation

Ole Børge Ytredal, Director of the Federation of Norwegian industries

GREEN ENERGY SHOULD PAY FOR ITSELF

One of the most important advantages for industrial production in Norway is emissions-free and green hydroelectric power.

Green hydroelectric power, combined with Norway's position as one of the world's most technologically-advanced countries, provides an extremely good basis for continuing industrial production in Norway. The government also stresses this in its Industrial Report, which was presented on 31 March.

Going on the offensive on environmentally-friendly initiative

Industry is now high on the political agenda because we have emissions-free hydroelectric power and because industrial companies in Norway, in their road-map for increased value-creation and reduced emissions up to the year 2050, have adopted an extremely aggressive attitude to continued environmentally-friendly initiatives in Norway.

The underlying principle for further industrial initiatives is energy security for competitive conditions. It is important that there should be no doubt that energy bought in Norway really is green! Physics says so, but a financial instrument known as guarantees of origin has been created which is contributing the confusion on this point.

Industry in Norway runs on emissions-free energy

The Federation of Norwegian Industry is actively working to change the guarantees of origin system in order to eliminate any doubt that Norwegian industrial production uses emissions-free energy. Following consideration of the Energy Report last summer, the Storting has instructed the government to look more closely at the system.

The system has its origins in Brussels. The draft for a new renewables directive envisages a continuation of the system, but at the same time there is also scope for adaptations that ensure that the green nature of Norwegian hydroelectric power and industrial production is not undermined.

Neither the climate nor Norwegian value-creation is served by a system of guarantees of origin that contributes to the green-washing of energy production based on burning coal. The system has to be changed, and the Federation of Norwegian Industry aims to play a constructive part in ensuring that this happens.

The Norwegian processing industry is extremely energy-efficient and based on clean, renewable hydroelectric power, making it the world-leader in terms of climate and the environment.


Wenaas

WORLD-LEADERS IN ENVIRONMENTAL PRODUCTION

In 2006, Hatch Beddows compiled a study for the Federation of Norwegian Industry, based on 2005 data, of emissions of CO_2 from worldwide production of silicon and manganese ferroalloys. The Federation has asked AlloyConsult to update this study based on data from 2015.

This presentation summarises the results of that update, using the best available data as of May 2016.
The remit of the study is unchanged from 2006, namely to estimate CO_2 emissions by country from the production of ferrosilicon, silicon metal, silicomanganese, high-carbon ferromanganese and medium/low-carbon ferromanganese.

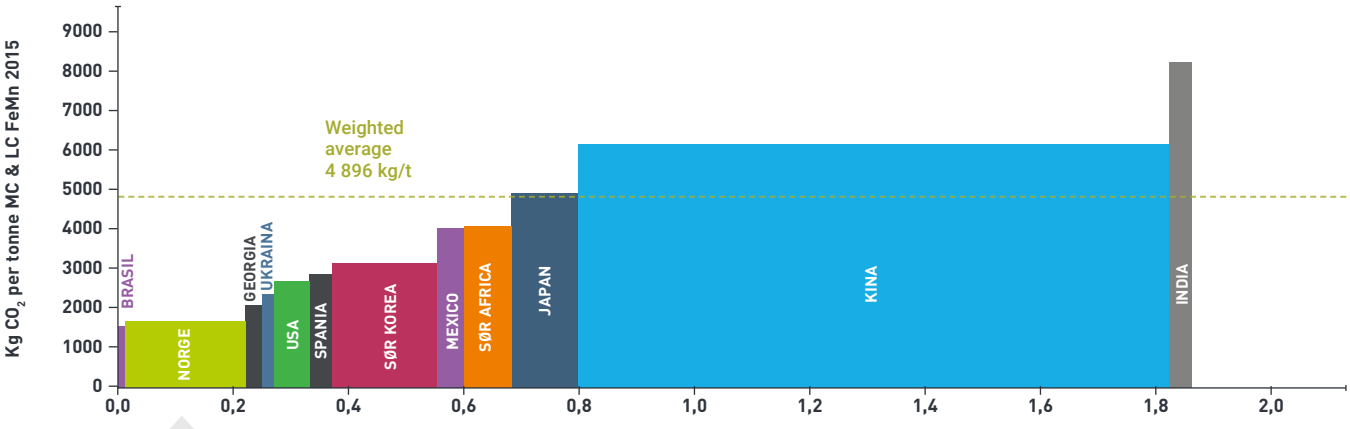
The source of electrical power makes the biggest difference

The type of electricity used continues to be the biggest difference between countries with regard to CO_2 emissions, with electricity generated from renewable and nuclear sources assigned a zero CO_2 emission for the purposes of this analysis. In contrast, electricity generated from thermal sources results in a substantial CO_2 emission. In many countries, more renewable electricity is now used in ferroalloy output than in 2005, though as discussed the opposite is true in China. Most silicon and manganese alloy production takes place in electric arc furnaces, though there is still some ferromanganese output from blast furnaces. Blast furnaces use minimal electricity but very large amounts of coke.

Eramet Norway world leader in low CO_2 emissions

Norway's CO_2 emissions per tonne are slightly lower for most alloys than in 2005, reflecting a different mix of reductants and a different distribution of output between producers. China's higher market share means Norway's relative position on the emissions graph is even lower than previously. Overall, Norwegian production is in the lowest 6% of world output of silicon and manganese ferroalloys in terms of CO_2 emissions, based on 2015 data.

Global MC & LC ferromanganese production ranked by CO_2 emissions 2015



The diagram illustrates Eramet Norway's main product, refined FeMn, which accounts for 40 per cent of our total sales. The position for Eramet Norway's other products represents a smaller market share, while occupying the same leading position for CO_2 emissions per produced tonne.

GREENER PRODUCTION BASED ON RESEARCH

The development group within Eramet Norway works together with a number of prominent research environments. Internally, the R&D group collaborates with Eramet Research, and externally with actors such as SINTEF and NTNU in Trondheim as well as with Teknova, Tel-Tek, Elkem Technology and PFI.

The Norwegian ferroalloy producers reserach association (FFF)

This organisation was founded by the Norwegian ferroalloy industry in order to collaborate on research in ferroalloy processes and products.

The aim of the FFF is to maintain the position of the Norwegian ferroalloy industry at the forefront of development in ferroalloy production and of electro-metallurgical technology. Its biggest member companies are Eramet Norway and Elkem, and together they contribute something like 80 per cent of the organ-isation's subscription funding, with each accounting for almost equal parts.

At the same time, the Norwegian Fer-roalloy Producers Research Association (FFF) is the most important arena for joint research within the industry. In particular, Eramet Norway is a member of the Eyde cluster, where R&D occupies a central position.

Collaboration projects with support from the Research Council of Norway in 2017:

DeMaskus
– aimed at understanding the mechanisms underlying dust-generation in Mn alloy production in order to improve the working environment for employees

GassFerroSil
– aimed at using natural gas in Mn alloy production as a CO_2-reducing measure

SCORE
– aimed at the innovative use of flue gas to reduce emissions and increase energy utilisation

Waste to Value
– aimed at reducing landfill and increasing the use of by-products

Biocarb+, Pyrogass
– aimed at developing a process for bio carbon that is suitable for Mn alloy production

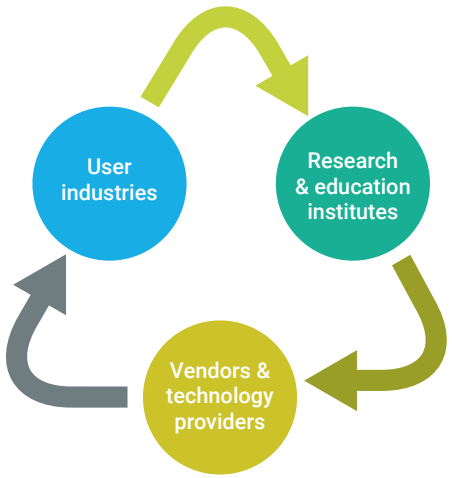
NewERA
The R&D group has also contributed to the extremely important NewERA project, which is part-financed by ENOVA. The aim of NewERA is to develop and implement technologies for significantly reducing CO_2 emissions and to achieve more efficient energy utilisation.

Focus on sustainability and environmental problems in the R&D group

Eramet Norway is taking part in two eight-year research programmes:

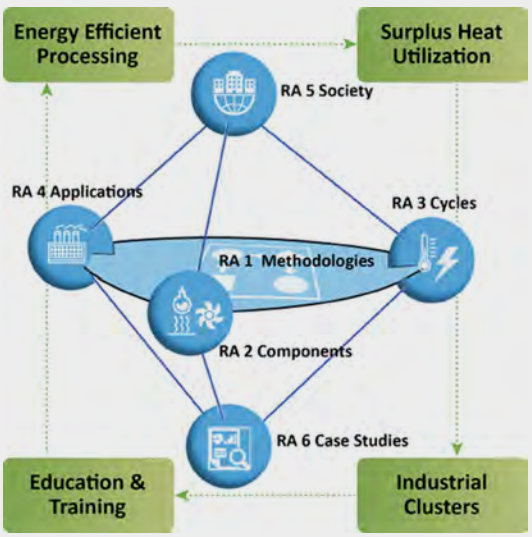
RESEARCH PROGRAMME 1
FME-centred HighEFF

Eramet Norway also participates in FME HighEFF, which was launched in 2016 and which collects together a lot of the industrial companies in Norway. FME is the Norwegian abbreviation for "Centres for Environment-friendly Energy Research". The programme, which is run under the auspices of the Research Council of Norway, provides time-limited support for Norwegian research centres operating at a high international level in the field of environmentally-friendly energy.



RESEARCH PROGRAMME 2
SFI Metal Production

SFI Metal Production, which is a programme that focusses on metallurgy and sustainability. In its efforts to achieve more sustainable operations, Eramet is focussing in particular on controlling PAH (Polycyclic Aromatic Hydrocarbons) and recycling materials.



The goal of HighEFF is, by improving energy-efficiency, to contribute to Norway having the greenest industry in the world. The work areas are divided into centres, as shown in the figure.

Eramet Norway has high expectations that HighEFF will contribute to a better understanding and utilisation of energy flows in the furnaces, based among other things on a dedicated PhD paper. Activities can also help other important areas, such as the utilisation of furnace gas, for example.

PROJECT

«Waste to Value» – recycling sludge and dust

Eramet Norway, Elkem Technology, Alcoa Norway, Glencore Nikkelverk, Hydro Aluminium, SINTEF, NTNU, ReSiTec and the Eyde cluster are collaborating on the "Waste to Value" project.

The project is part of an ambitious plan which aims to develop technologies for processing waste in the process industry. "Waste to Value" has been granted an innovation grant of nine NOK MN by the Research Council of Norway via the BIA programme (BIA stands for "Brukerstyrt innovasjonsarena" [User-driven Research based Innovation]). The project is to last for three years starting in 2016.

Waste will be processed into various products or refined into raw materials in the companies' own processes. The "Waste to Value" project also reduces the metallurgy industry's carbon footprint by reducing the need to send waste to land-fill. The project is also making a contribution to Eramet Norway's strategic goal of having the smallest carbon footprint in our industry.

The main concept in the processing of the various side-flows from the companies is illustrated in the following flowchart.

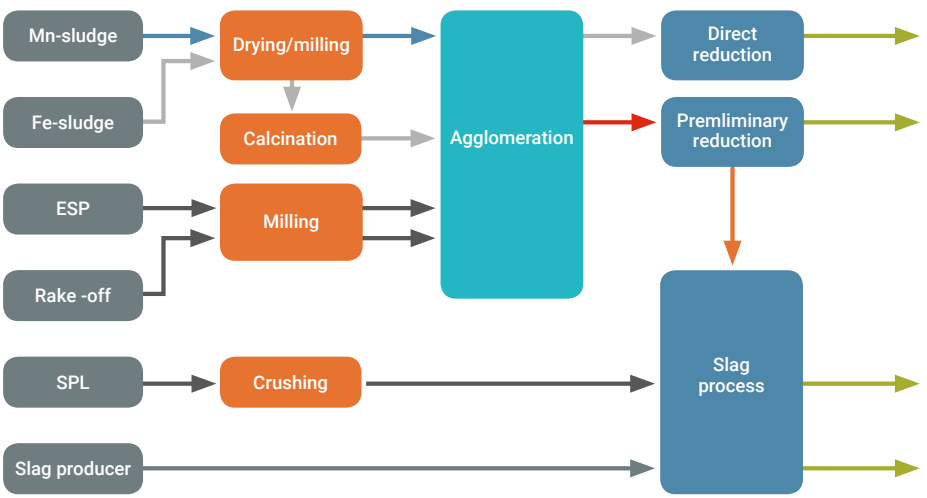
Eramet Norway has assessed techniques for feeding sludge and dust back into its furnaces. In recent years we have produced pellets on a lab scale by mixing together sludge and dust. In 2016, several tens of tonnes of pellets were produced using an industrial mixer that is installed in Kvinesdal. Pellets were then fed through the usual transport system to existing production furnaces. During the trial period, which lasted over a few days, the pellets did not produce any significant consequences in terms of furnace operation. In 2017, we will be continuing to work with pellet strength and we will produce a technical-economic assessment for a longer trial period in 2018.

In parallel with this, work is also being done on an alternative processing of sludge and dust as input materials for briquetting as part of the NewERA project.

High-intensity mixer

Pellets made from dust and sludge

Processing by-products from the companies



PROJECT

Improved smoke collection from the furnace 11 tapping area in Sauda

Tapping off metal and slag from furnaces is an important part of the production process in the ferroalloy industry.

In the furnace-tapping process, liquid metal and slag at a very high temperature (around 1,500 °C) flows out from the furnaces. This high temperature results in the evaporation of liquid metal and slag, and large quantities of smoke and emissions are created in the furnace halls. The effective collection of the emissions from the furnaces' tapping area is therefore extremely important. Eramet Norway Sauda (ENS) has an effective extraction system throughout its processing plant, also including the furnaces' tapping areas. Even though the smoke extractor that is directly over the furnace tapping hole collects a large proportion of the total emissions during the tapping process, some smoke still escapes from the tapping hall. The metal and slag scoops are in this tapping hall during furnace tapping.

Optimal design as a result of modelling

The development group, in collaboration with ENS, has designed a new extraction hood for collecting the smoke released from the tapping hall. The work of designing the hood involved use of a modelling tool able to simulate the flow of smoke and emissions into the above area. This tool can be used to simulate the design under different operational conditions. Based on the results produced by the model for each case-study, the design can be adjusted until an optimal design is finally obtained. This is an example of a scientific approach being used to solve an industrial problem. The optimal design, which was proposed as a result of modelling work, has been installed in ENS11's tapping hall. The following images show the results of the model and the industrial implementation of the results in the processing plant. The new design has resulted in a greatly improved working environment and more sustainable production.

See also page 44 for discussion of the project.

The geometry of the optimal design for the tapping hall's extractor hood (furnace 11 in Sauda) and the results from the modelling work and the improved collection of smoke and emissions during installation of the new hood.

SINTEF

SINTEF is a broad and multidisciplinary research organisation with international core expertise in technology, science, medicine and social science. SINTEF conducts contract research as an R&D partner for industry and administration and is amongst the four biggest contract research organisations in Europe.

The Norwegian university of science and technology (NTNU)

The NTNU is the country's biggest and leading supplier of engineers, covering areas of technology that range from nanotechnology and IT, to petroleum technology and ship design.
The NTNU, which has its own research environments, works together with some of the country's most important technological and industrial companies.

Teknova

Teknova AS is a technology and science research institute. Its operations are aimed at contract research, technological development and innovation.
The institute aims to develop knowledge and technology, and to create value for its users, for society and for its owners.
Teknova aims to create proximity and co-operation between the University of Agder, Agder Research and trade and industry in the Sørland region.
Due to the international nature of its research activities, Teknova will develop a broad, international field of activity and international collaboration relationships.

PROJECT «PyroGas» – towards using biocarbon in the Mn industry

While considering options for significantly cutting CO_2 emissions from the smelting process by 2030, the replacement of fossil carbon with biocarbon was identified as the most promising measure.

Although there are a number of challenges relating to the properties of biocarbon that must be resolved before it can be used as a reductant, it will probably be possible to use bio carbon to replace current reductants without requiring any major changes to current processes. Eramet Norway is therefore working to promote research in this field.

In 2017, Norske Skog was given a grant of 15.7 million kroner over four year from the Research Council of Norway for a project called "PyroGass", in which Eramet Norway is a partner company. The project is intended to develop a new technology for combined production of biogas fuel and bio-based agglomerate, which can be used to replace fossil carbon in the manganese industry. The agglomerate will make use of bio-residue from paper production. The project is being conducted in the form of a collaboration with the Paper and Fibre Research Institute in Trondheim (PFI), the University College of Southeast Norway in Porsgrunn (HSN) and Cambi. The aim of the project is to produce an acceptable agglomerate that can be used for industrial trials in the manganese industry.

Norske Skog

Press release

Norske Skog Saugbrugs developing new technology in order to produce biocarbon for the manganese alloy industry

Norske Skog has been granted a total of NOK 15.7 million over four years by the Research Council of Norway to develop the production of biogas fuel at Norske Skog Saugbrugs in Halden. The project, which is known as "PyroGass", has a total cost framework of NOK 31.5 million. The aim of the project is to develop new technology for the combined production of biogas fuel together with bio-based reductants for the manganese alloy industry from the bio-residues from paper production. The project is being conducted in the form of a collaboration with the Paper and Fibre Research Institute in Trondheim (PFI), the University College of Southeast Norway in Porsgrunn (HSN), Cambi and Eramet Norway AS.

"Norske Skog will be a driving force in the development of the biofuel of the future. The Norwegian timber processing industry has drawn up a roadmap for zero emissions and a doubling of value creation by 2050, and this project will be making a valuable contribution to that," says Kjell Arve Kure, who is the managing director of Norske Skog Saugbrugs.
PFI is an internationally recognised research institute that is active in processes and products based on forest-based biomass, and it has advanced expertise in pyrolysis technology. The University College of Southeast has advanced expertise in anaerobic processes for biogas production. Cambi is a leading supplier of technology for converting sludge into renewable energy and high-quality biomass. Eramet Norway AS is part of the Eramet Group, with smelting works in Kvinesdal, Porsgrunn and Sauda. The Eramet Group is a world-leader in the production of alloy components.
"Norske Skog Saugbrugs' strategy is to utilise the raw materials in our entire value chain in order to further develop existing products and to develop new products. The PyroGass project is taking us into an entirely new dimension, i.e. being able to supply biocarbon to a smelting works. The project is unique in that we are utilising Norwegian technology across what have traditionally been entirely distinct industries. The PyroGass project will also play an important role in reducing the carbon footprints of both the manganese alloy industry and the transport sector", says Kjell Arveand Kure. "And as a result, it is in line with the Norwegian government's stated goals."

In the current round, the Research Council's ENERGIX programme received 67 applications in the category of innovation projects for trade and industry, with grants given out for 29 projects.
Norske Skog Saugbrugs is also involved in the national centre for sustainable production of biofuels and bioenergy, Bio4Fuels, which is now starting up. Norske Skog, Cambi, PFI and the University College of Southeast Norway are all playing central roles in the centre.

Oslo/Halden, 5 February 2017

Norske Skogindustrier ASA
Karenslyst allé 49
P.O. Box 294 Skøyen, 0213 Oslo
Norway

www.norskeskog.com

twitter: @Norske_Skog

Example of a potential project aimed at achieving more environmentally friendly raw material production

WORK ON NEW **EMISSIONS PERMITS**

In May 2014, the Norwegian Environment Agency issued requirements for the renewal of emissions licences for all manganese works in Norway. The requirements were based on the fact that all the emissions licences were over 10 years old, and they required updating.

There were several reasons for this update. A lot has changed with regard to emissions in general, and there are now new separation technologies and new rules and regulations. in addition, the old licences were very different, both in terms of structure and limits.

New emissions limits with the same general structure

The aim of the new emissions licences was not to standardise the limits for all the processing plants, but that they should all be based on the same general structure.
Work on the new licences has been proceeding more or less continuously since spring 2014, and we are now starting to see the results for the processing plants in Porsgrunn and Kvinesdal. The emissions licences for Porsgrunn and Kvinesdal have been circulated for comment, and the Norwegian Environment Agency is now setting the final conditions.

Due to capacity problems at the Norwegian Environment Agency, completion of the licences for Sauda has been put back to the second half of 2017.
The new licences incorporate more recent EU regulations. This includes implementation of the new BAT requirements. BAT stands for Best Available Technique and it describes what the best available technique is for our area, and what the permitted concentrations are in emissions.

Increased focus on air quality near to processing plants

In general, it can be said that the new limits are significantly lower than before and just above what we have achieved in recent years, both in air and in water. The new licences reflect an increased focus in air quality in the areas around the processing plants, but regulations concerning emissions into water are also stricter than they have been previously. The new emissions licences impose even stricter requirements on the operation of both furnaces and purification systems.

The Norwegian Environment Agency believes that the processing plants will manage to satisfy the new licences without having to make major investments in new purification systems. The only exception is the central chimneys in Kvinesdal, where investment in new filters is required. Work here is already under way in the form of a study / preliminary project. Requirements for central chimney filters in Kvinesdal are a direct consequence of the new BAT requirements.

New emissions limits and investigation requirements

The licences contain a lot of new points. The most important of these are:

- Limits have been set for emissions of PAH into the air.
- All emissions to the air will be regulated with respect to dust quantity.
- Restrictions are set for total emissions of dust into the air from the processing plants.
- More limits are set for the emission of several heavy metals into water.
- There is regulation of cyanide releases into water.
- There is regulation of oil releases from oil separators into water.

**In addition to lower emissions limits, a number of assessment requirements have also been issued.
The most important of these are:**

- Charting diffuse dust emissions
- Charting emissions via storm water
- Charting dust
- Charting soil conditions at smelting works
- Charting and reducing a number of elements/substances released into water

SUSTAINABILITY REPORTING – **CARBON FOOTPRINT**

The failure of climate change mitigation and adaptation is ranked as one of the highest risks in the 2017 World Economic Global risk matrix.

The GHG protocol

GHG stands for "The Greenhouse Gas Protocol", and it is a CO_2 calculator that divides up a company's emissions of CO_2 and other greenhouse gases into three areas.
These are divided based on where the emission is from (from your own or another company) the company's ability to change these emissions.

What are areas 1, 2 and 3?

Area 1 represents the direct sources of the company's greenhouse gas emissions. Areas 2 and 3 are the indirect emissions sources.

Following the COP21 Paris agreement we are now seeing climate initiatives developing faster than before.

The carbon footprint on the agenda

The ability to establish and disclose carbon footprint is increasingly on the agenda for companies in order to benchmark and compare performance. In Eramet we started the work of ascertaining our carbon footprint in 2016, and we have now finalized our carbon footprint baseline for the year 2015. Going forward we will now be able to monitor and follow up the effect of energy-efficiency and carbon-reduction projects and initiatives.

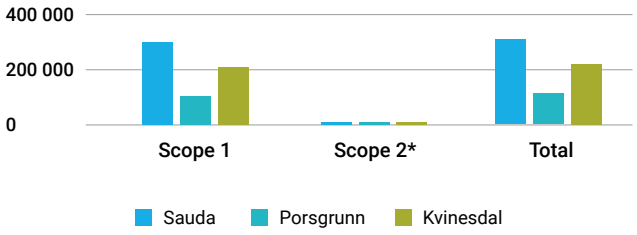
Calculating Eramet Norway's carbon footprint

We commissioned DNV GL to facilitate the process of gathering the information and data required to calculate CO_2 emissions per tonne of manufactured product from our sites in Porsgrunn, Kvinesdal and Sauda. The carbon footprint is calculated from the GHG inventory and based on the internationally recognized GHG Protocol and ISO 14064-1.

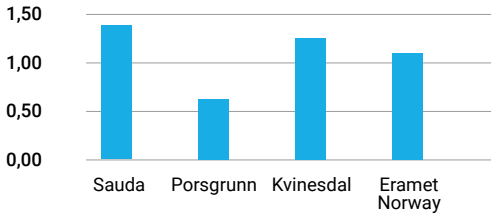
The GHG inventory baseline for our production plants includes direct emissions from sources controlled by Eramet ***(Scope 1)*** and indirect emissions from electricity consumption ***(Scope 2)***.

The GHG inventory does not include emissions related to the production of raw materials (coke), transport of raw materials and products and emissions related to travel by employee ***(scope 3)***.

GHG inventory tonnes CO_2



Tonnes CO_2/tonnes metal

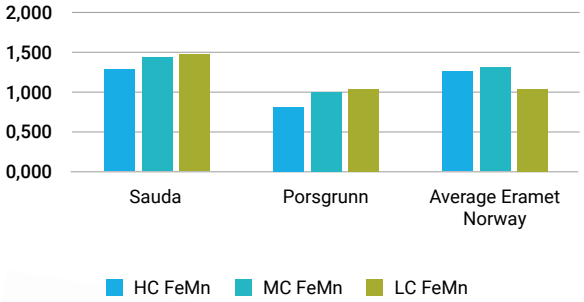


***) Scope 2 is a location-based electricity factor for Norway**
(source IEA Statistics CO_2 Emissions 2013 edition from fuel combustion)

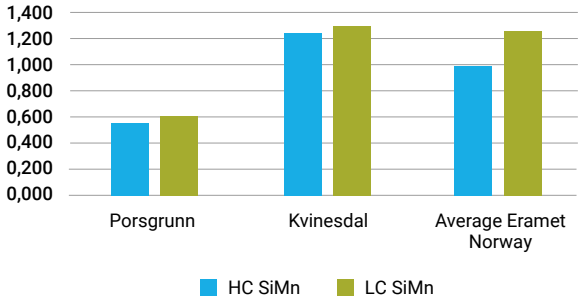
The carbon footprint varies for the different sites, and for Porsgrunn we see the effect of selling CO gas (including CO_2) to Yara, resulting in a lower carbon footprint. The average carbon footprint for Eramet Norway (all products) is 1.1 tonnes CO_2/ tonne metal.

The carbon footprint model allocates emissions to the different products (FeMn and SiMn) based on consumption of raw materials.

Tonnes CO_2/tonnes FeMn metal



Tonnes CO_2/tonnes SiMn metal



The average carbon footprint for Eramet Norway (all products) is 1.1 tonnes CO_2/tonne metal.

ABOUT INNOVATION NORWAY

Innovation Norway is the Norwegian Government's most important instrument for innovation and industrial development. With offices throughout the country, Innovation Norway offera advisory services, as well as grants and loans to companies within all sectors. Working from its international offices in more than 30 countries, it also stimulates trade and exports.

Kari Holmefjord Vervik, director of Innovation Norway

Ole Jørgen Marvik, Special Adviser Life Sciences

Innovasjon Norge

INNOVATION NORWAY **INNOVATING IN NORWAY**

Innovation Norway actively promotes opportunities related to CCU (carbon capture utilisation). A large proportion of the Norwegian process industry emits large amounts of concentrated CO/CO_2 gases, which represent a potential feedstock for conversion into valuable products.

Microbial fermentation of such off-gases allows a wide spectrum of products to be envisaged, including biofuel, precursors for plastics and perhaps most intriguingly, fish feed ingredients. The use of CO and CO_2 in fermentation processes is well aligned with the objectives and ambitions of the national bioeconomy strategy, which was launched by the government in November 2016.

New uses for waste gas

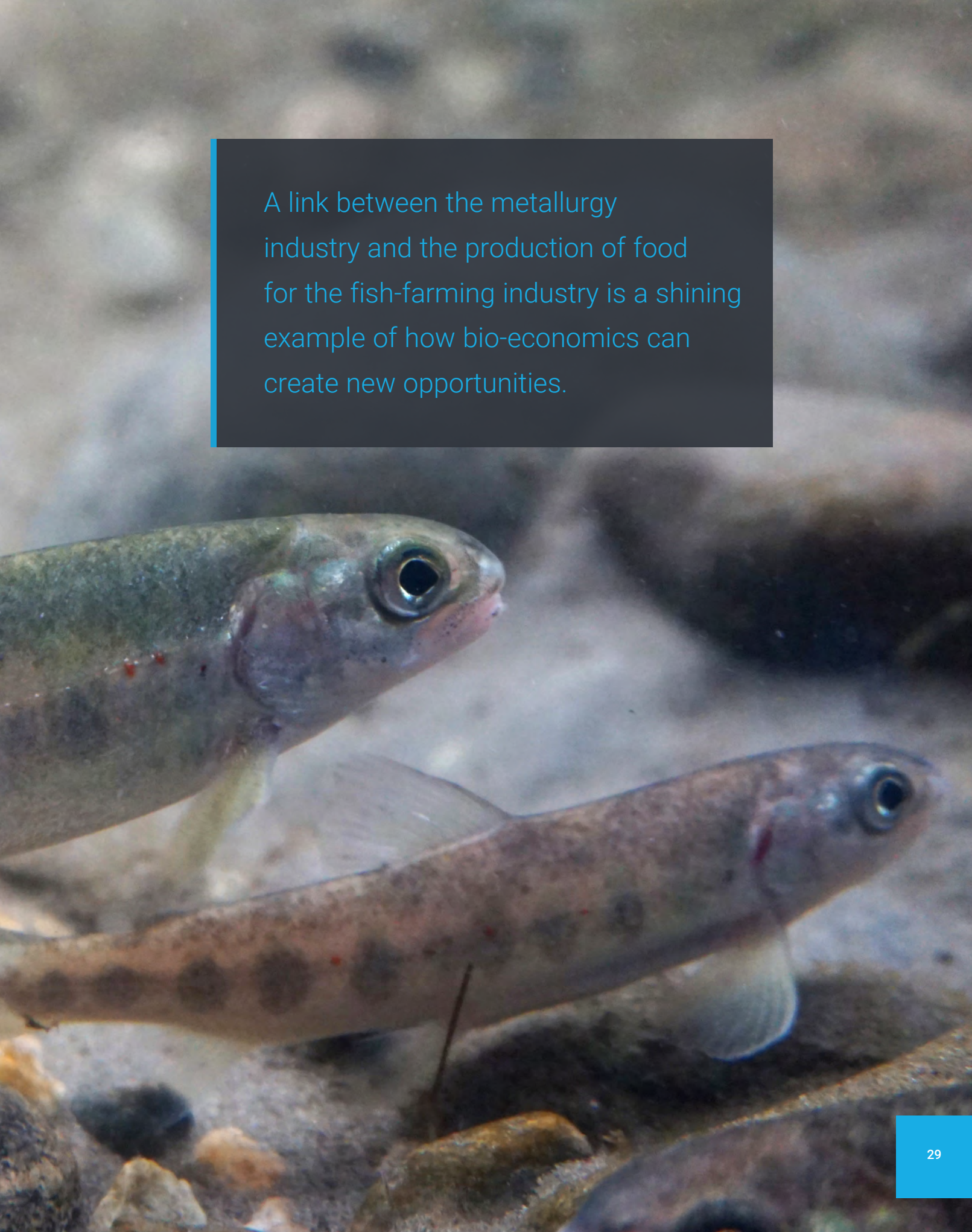
In addition to the ample supply of carbon gases, Norway can also offer a number of other advantages linked to CCU. Norwegian industry has developed leading technologies and an international state-of-the-art test centre for CO_2 concentration and clean-up. Moreover, efficient utilisation of both CO and CO_2 requires hydrogen as a reducing agent, and Norway is one of the few countries that can offer sustainably produced hydrogen based on electrolysis and clean energy from hydroelectric power.

In June 2016, Innovation Norway launched a joint effort aimed at exploring business opportunities within CCU. Involved in this initiative are several Norwegian process industry and technology companies, together with leading national research institutes. Furthermore, this initiative was based on a technology platform developed by the US company LanzaTech, which in March 2017 for the second time was voted no.1 among the “50 Hottest Companies in the Advanced Bioeconomy”.

From furnace to dinner plate

As a further aspect of this initiative, Eramet Norway was given a 50% grant to conduct a conceptual study together with LanzaTech. The initial goal has been to evaluate the possibility of using furnace gas as feedstock for producing ethanol as a carbon-neutral fuel additive. However, using essentially the same process and equipment, microbes can instead be engineered to produce higher-value products such as chemical intermediates and materials.

With support provided by the International Research Institute of Stavanger (IRIS), LanzaTech and Eramet Norway are exploring the possibilities for extending this sustainable manufacturing platform to ingredients for salmon feed. Norway is the world’s largest producer of salmon, and the national growth targets for salmon farming are crucially dependent on new sources of feed ingredients. Linking the metallurgical industry to food production is an excellent example of how the advanced bioeconomy creates new and intriguing cross-sectorial opportunities.



A link between the metallurgy industry and the production of food for the fish-farming industry is a shining example of how bio-economics can create new opportunities.

ENERGY BALANCE STATUS FOR ERAMET NORWAY 2016

Eramet Norway's three manganese processing plants are all ISO-50001-certified. Eramet Norway Sauda and Eramet Norway Porsgrunn obtained their certificates in 2014.

In common with Eramet Norway Kvinesdal, the processing plants, and so the company, maintain a formal focus on systematic energy conservation in order to strengthen the sustainable basis for our energy-intensive manganese alloy operations.
Energy consumption can be divided into three main groups (see illustration), with "electrons" and "hydrocarbons" each representing 46 and 43 per cent respectively of the total 4.4 TWh for 2016 (compared with 4.2 TWh for 2015). The remainder is accounted for by the energy used in the consumption of metallic materials (silicon and manganese) in the furnace and refining processes.

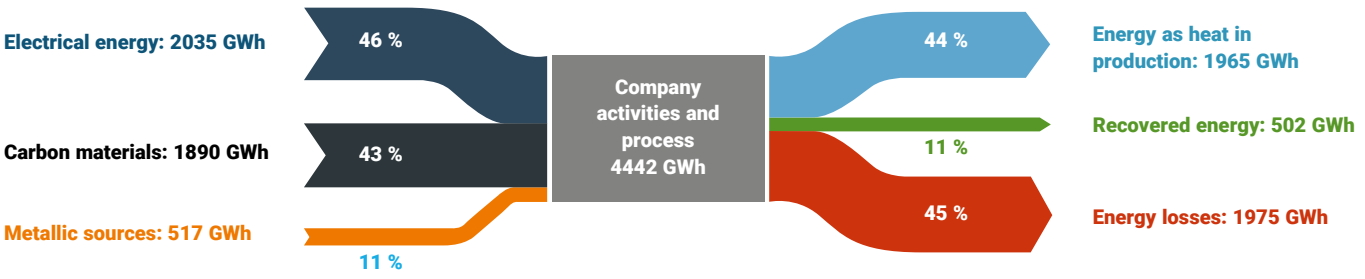
Energy consumption

The consumption of 2.04 TWh of electrical energy represents 0.56 TWh, 0.71 TWh and 0.76 TWh at Porsgrunn, Sauda and Kvinesdal respectively. Coke and anthracite are primarily used as reductants in the smelting furnaces, but the energy content of 1.89 TWh is included in the balance sheet.

With a sellable production in the order of 523,000 tonnes of manganese alloys in 2016, we estimate that 1.96 TWh of energy is used in the production of these products – or roughly 44 per cent of the total energy used in the processes for standard and refined FeMn and SiMn.
The major challenge is how much energy we succeed in recovering as fuel and in heat flows, such as air and water. For 2016, this was roughly 0.5 TWh, which is about 11 per cent of the added energy. The corresponding figures for 2015 were 0.34 TWh and 8 per cent. The energy recovery plant at Kvinesdal produced about 58 GWh net, which is something less than the total capacity due to an implemented scheduled shut-down. Suppliers of furnace gas to Yara's ammonia plant in Porsgrunn usually also produce a significant effect, but here as well there was a lengthy production shut-down, which reduced the volume compared with 2015. The hot water suppliers to the fish farm in Kvinesdal, the compressor heat recovery plant in Porsgrunn and the internal use of furnace gas for refractory activities and building heating in Sauda are all activities that make a solid contribution to energy recycling. In Porsgrunn, a system for recycling hot water from slag beds was commissioned in 2016.

A further increase in energy recovery is demanding

As a residual item, we also ended up with almost 2.0 TWh on the tap side in 2016, as we did in 2015. The energy teams at each of the processing plants are all involved in this work, ranking their plans for improvement measures according to investment needs, implementation time and potential gain. Location factors have some significance for the potential use and attractiveness of recycled energy. Use is made of public support schemes arranged via Enova. Internally, each of the three processing plants receives a dedicated annual sum that is earmarked for energy conservation measures.



Charlotte's working day

07.00–08.00: Morning meeting to evaluate the previous day's work, register any non-conformances and review tasks for the day ahead
08.00–11.00: The working day is in full swing, involving everything from installing sockets to fixing engines
11.00–11.30: Lunch
11.30–14.45: The working day continues, with time in the last 15 minutes to take a shower before heading home

Charlotte's favourites

TV series:	Bones
Film:	The Harry Potter films
Book:	Anything by Lars Kepler, Jørn Lier Horst and Jo Nesbø
Music:	Lots on NRK MP3!

While on the electrical engineering programme at upper-secondary school Charlotte Lindrum knew she didn't want to become a domestic electrician. But it wasn't until the class was visited by an industrial apprentice from Eramet Norway in Porsgrunn that all the pieces fell into place …

AN INSPIRATIONAL APPRENTICESHIP THAT OPENS DOORS

"I knew that no one else in the class was going to apply and so I had a good chance of getting the training place," explains Charlotte, who was born in 1998 and has just begun her apprenticeship at Herøya. "Everything worked out, and I've never regretted applying here."
She describes a workplace where everyone says hello, where employee well-being and safety are taken seriously, and where the working day is filled with a range of tasks involving electronics and automation, and so varied that she is never bored.
"The fact that everyone is so friendly means that I feel at home and as if I belong here. It also lowers the threshold for making contact and asking others for advice when I need it."

Part of something big

Accuracy and creativity are useful qualities for working as an electrician at Eramet Norway's process plants. Often there is no set answer to the challenges to be solved, and this is one of the things Charlotte likes best about her job.
"I've been involved in some big projects that I'm proud to have contributed to," she says. "You aren't sure what the solution will look like or what is required. You quite simply have to work it out, trust in yourself and ask for help if you need it. There is always scope for learning here."
Charlotte mentions a major energy-efficiency project where she was responsible for drawing up and implementing a solution to control heating elements, pumps and valves. The project involves using surplus heat from slag beds to produce hot water. The water is used for cleaning ESP on MRU, and is supported by ENOVA, a Norwegian government enterprise responsible for promoting environmentally-friendly production and consumption of energy.

Everything will be ok!

If Charlotte has a saying she lives by, it's probably "Everything will be ok!" For her, this is about knowing you have to work to achieve your goals and not give up when there is a challenge to be faced – qualities that come in useful for an apprentice at Eramet Norway.
"I think good communication skills are an advantage here too," Charlotte adds. "It's important to be able to provide good feedback to whoever has assigned you to a job and to provide status reports along the way."

Apprenticeship opens doors

Charlotte's key goal now is to pass her apprenticeship examination in February 2019. Once that milestone is achieved, she wants to take a master's degree in renewable energy at the Norwegian University of Life Sciences (NMBU) and perhaps move to Denmark to immerse herself further in the subject. The course is set: there are many exciting opportunities open to apprentices at Eramet Norway.
"Right now, my main focus is on learning as much as possible to achieve my goals," concludes Charlotte, who in her free time enjoys playing Minecraft with friends, completing jigsaws with many thousands of pieces and going fishing with her dogs. She also works as a volunteer for a local animal charity, helping to rehome homeless cats.

BUSINESS ETHICS HAS ALWAYS BEEN A PRIORITY FOR OUR OPERATIONS

Pierre Lassalle,
VP Purchasing
ERAMET Manganese & Nickel

In 2015 ERAMET revised its Ethics Charter, soon followed by an updated Responsible Purchasing Charter in 2016.

ERAMET has close to 3,500 active suppliers throughout the world and it recently set up a dedicated platform which will support is in our evaluation of our suppliers' social responsibility practice.

We decided to systematically share its content with our suppliers by including it in the terms and conditions of all business units and making it a specific clause in our contracts.

Taking responsibility

Corporate Social Responsibility (CSR) has become part of the normal assessment process of our suppliers and partners, in addition to safety, quality, capacity and financial aspects. Of course this is also true for our clients, who in turn require us to be transparent in our business practices, including how we deal with our own supply chain, and to check our CSR regularly through audits.

ERAMET now has about 3,500 active suppliers throughout the world and recently it joined a dedicated platform to support our suppliers' CSR assessments. Through this platform, ERAMET can request key CSR information from its suppliers and access third-party evaluation based on their answers and supporting documents. We are convinced that such an approach to improved transparency will foster even better partnerships and long term cooperation with our suppliers.

Ethical business practices are a global trend

This trend towards more ethical business practices is definitely a global trend, and one that is increasingly supported by strict legislation. France, where our Group is headquartered and listed, is currently strengthening the legal framework for business ethics and has recently passed specific laws targeting corruption, conflicts of interest, and calling for the implementation of due diligence procedures by parent firms with regard to their subcontractors. Finally, business ethics is also a matter of personal behaviour. Each of us must be aware of the Group's commitments and contribute to this modern and responsible way of running our operations.

Eramet Norway exercise our social responsibility by:

- Owners receiving an expected return on their invested capital
- Employees feeling a sense of security for themselves and for their families
- Our suppliers having a demanding customer
- Our customers getting their products on time and with the agreed quality
- Keeping our environmental impact to a minimum
- Taking the initiative to make changes in response to circumstances
- Producing useful products needed by the world in a way that is environmentally effective

Eramet Norway is also interested in helping to build robust industrial regions. Developing arenas that help to promote social structures in places where we are established improves our competitiveness.

A robust industrial region is characterised by:

- A welfare provision that is characterised by equality and stability
- A competitive, profitable and adaptable commercial sector
- Good access to skills
- Access to a varied jobs market, accommodation and services

Shaping the provision of training and skills development for the future

In spring 2016, Sauda technical college, together with Eramet Norway, as well as the municipalities and industrial companies in Suldal and Sauda, launched a strategy-development process.

The technical college in Indre Ryfylke has an extended responsibility as an agent for regional development – a role requiring systematic and targeted work on developing attractive courses for adults and young people. The initial part of the project will be ready in the first quarter of 2017, and this will form the basis for prioritising focus areas and project activities in the next phase of the initiative. Eramet Norway is also a member of the partnership that constitutes Utdanning i Ryfylke (UIR) [training in Ryfylke]. This sees Sauda and Strand technical colleges, in collaboration with Western Norway University of Applied Sciences, developing and offering tailor-made further education and qualifications for working life in the region.

«If you want to get an insight into the Sauda community and an understanding of how the local community will be developing over the years ahead, the current picture at Sauda technical college is the best indicator. Relevant educational and training provisions, skilled and motivated teachers and keen students are the best guarantee for the future.»

Rune Dolmen, works director Eramet Norway Sauda

READY TO MEET **THE DEMANDS OF THE FUTURE**

Eramet Norway has an overall objective of being the greenest manganese alloy industry in the world. This is an objective that obliges and requires significant drive in all the processing plants in Norway.

The processing plant at Herøya in Porsgrunn demonstrates both commitment and drive, and in 2016 it implemented a lot of exciting projects that have meant that the processing plant is now more prepared for the future.

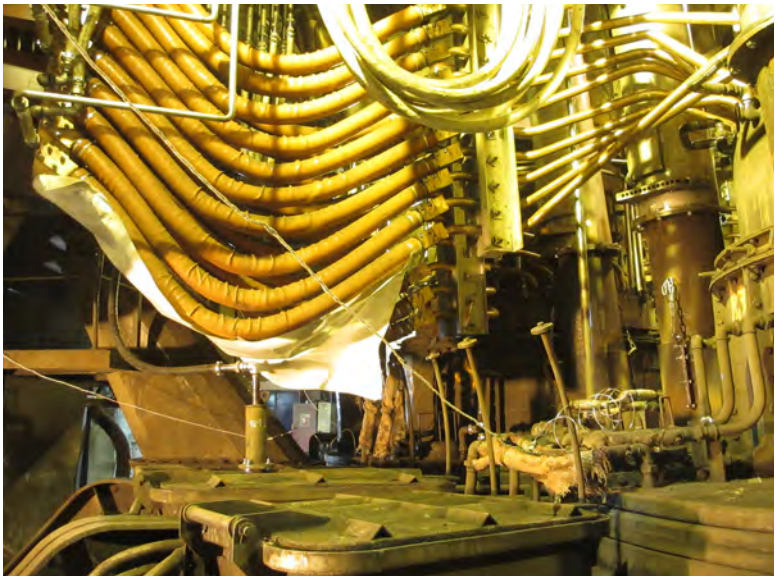
Upgrading and maintenance of furnace 11 and MOR

The most extensive project has been essential maintenance, but there has also been expansion of capacity in furnace 11 and the MOR plant. Following a long and thorough planning phase, the furnace was shut down for a labour-intensive period of 25 days in November and December. More powerful transformers were installed, as well as new copper power transfer rails, new water-cooled power cables and flow tubes for the electrode equipment. All of this allowed an increase in the current between the electrodes and thereby a greater smelting capacity.

A changed design and a change-over from aluminium to copper also resulted in lower power transmission losses. As well as increasing the inward flow of raw materials, investments were made in the road and transport facilities, and further investments were made in the gas purification plant in order to be able to handle and purify larger quantities of furnace gas. The housing around the MOR reactor was replaced by a re-designed housing that more efficiently directs the smoke from the MOR process into the large extractor duct. An advanced computerised tool was used here to simulate how the smoke behaved in order to minimise diffuse emissions into the furnace hall.

The housing around the MOR reactor has been redesigned

New power transfer rails that require less cooling



New water-cooled power cables

Reduced diffuse emissions from furnace 11

A positive effect of replacing the power transfer rails with copper has been that the copper rails do not need the extensive air-cooling required by the aluminium rails. We had previously fed 45,000 m3 of fresh air per hour around the aluminium rails, and this air then had to be removed via extraction to the central chimney filter.

This filter has the same capacity as before, but since fresh air was no longer being fed through it, we have noticed that it is extracting the flue gas and dust generated by the furnace much more effectively. The result has been a reduction in diffuse emissions generated by furnace 11.

Smarter processing of tar

The furnace gas contains some mercury, and this is removed in the MRU. The furnace gas also contains tar, which condenses in the unit, including in the electrostatic filter in the MRU. Removal of this tar coating requires regular flushing of the electrostatic filter using an ammonia solution. Unfortunately this has not proved particularly effective, and we had to stop the unit at regular intervals in order to clean it with hot high-pressure water from a bowser truck.
The accumulated tar we remove is categorised as special waste that requires expensive disposal. In 2015 we tried regular flushing of the filter using hot water from our own supply, and this produced a workable effect on the tar coating. To further improve this, a multidisciplinary group was put together in 2016 that worked on how we could best use other heat sources to help us keep the electrostatic filter free from tar. The result was that we took heat from the slag bed at furnace 10, which is close to the MRU. Here, the hot slag is flushed with water, and the heated waste water is stored in a hot water tank. The water, which is at a temperature of > 80 °C, is frequently tapped and used to flush the electrostatic filter. This prevents tar accumulating in the filter.

In this way, we are both utilising waste water and reducing the need for disposing of special waste, while at the same time improving the efficiency and operational availability of the electrostatic filter. And in particular, we are also avoiding inconvenience and saving money (NOK 350,000/year) by eliminating the use of ammonia.

0 EMISSIONS BY 2050

The collective target for the Norwegian processing industry is to improve value creation while reducing greenhouse gas emissions to zero before 2050.

COP21 in Paris in December 2015 set ambitious climate targets. As a company operating in the processing industry, Eramet Norway should be part of the solution, and not the problem.

Based on that principle the processing industry itself drew up a roadmap for the road ahead – and Eramet Norway was involved in this work.

A tradition of green solutions

Eramet Norway Kvinesdal has worked on energy-efficient and green solutions for the past 35 years. The combined heat and power plant that generates 90 GWh of electricity every year is our biggest source of pride. But we have a number of merits: We also provide waste heat to a fish-farming industry that produces 250 tonnes of turbot annually. And we also supply remote heating to other companies in the vicinity.

Continuous reduction in auxiliary power consumption

In 2010, Eramet Norway Kvinesdal became the third company in Norway to obtain energy management certification to EN 16001 (since replaced by ISO 50001). By systematically focussing on harvesting the low-hanging fruit without any associated costs, and by choosing energy-efficient solutions in projects and assignments, we have steadily reduced our consumption of auxiliary power over the last 6 years.
Now that we have to work to achieve zero emissions by 2050, along with the rest of Norway's processing industry, it is important to continue with this steady and good work in energy management, while at the same time we will have to investigate all available opportunities for large and small quantum leaps in technology and solutions.

- How can we either reduce or re-use side- and waste streams as input factors in our own or others' processes?
- How can we produce larger quantities of manganese alloys more energy-efficiently?
- How can we avoid using electricity for heating-up?
- What industries can be set up based on our side- and waste streams

A bright future ahead

We know that the world has an ever-growing appetite for products with a low carbon footprint, both in production and in use. Based on the use of Norwegian hydroelectric power, years of production expertise, good cooperation with the trade union and a shared understanding of the need for continuous improvement, we have every reason to anticipate a bright future ahead.

Better use of MC slag

Eramet Norway Kvinesdal (ENK) has been using MC slag from Eramet Norway Porsgrunn (ENP) as a source of manganese in its processes since spring 2014. This slag had not previously been fully exploited as a source of manganese.

A valuable raw material

MC slag contains only low levels of both boron and titanium, which makes it very valuable as a raw material at Eramet Norway Kvinesdal, where there are particularly low requirements for these two elements. Slag from the processing plant in Marietta (USA) is now being replaced by slag from the processing plant in Porsgrunn.

MC slag contains calcium oxide which is already fully burnt and which helps to reduce the role of slag-generating components in the process. At the same time it produces an energy-saving as it is no longer necessary to remove CO_2 from limestone.

Known negative effects

Known negative effects from using MC slag are variation in analysis results and a large proportion of fine materials.

Improvements in environmental performance

PROJECT:

Environmental Monitoring ERAMET NORWAY KVINESDAL

4

INSTALLING CAMERAS
Cameras will be installed at three different locations on the company's premises. These cameras will detect dust emissions from buildings and outdoor areas, and they mean that the company will be better able to deal with events that generate dust emissions.

3

CONTINUOUS DUST MONITORING
will be introduced in the company's neighbourhood. The very latest mobile dust-measuring equipment will be bought in. The equipment, which will be connected up to a weather station, will be used to detect emissions originating from the company. It will continuously measure dust quantities and the particle size of the dust. The latter measurement is important in terms of the health impact from the dust. The equipment can easily be moved around to different locations outside the company's premises.

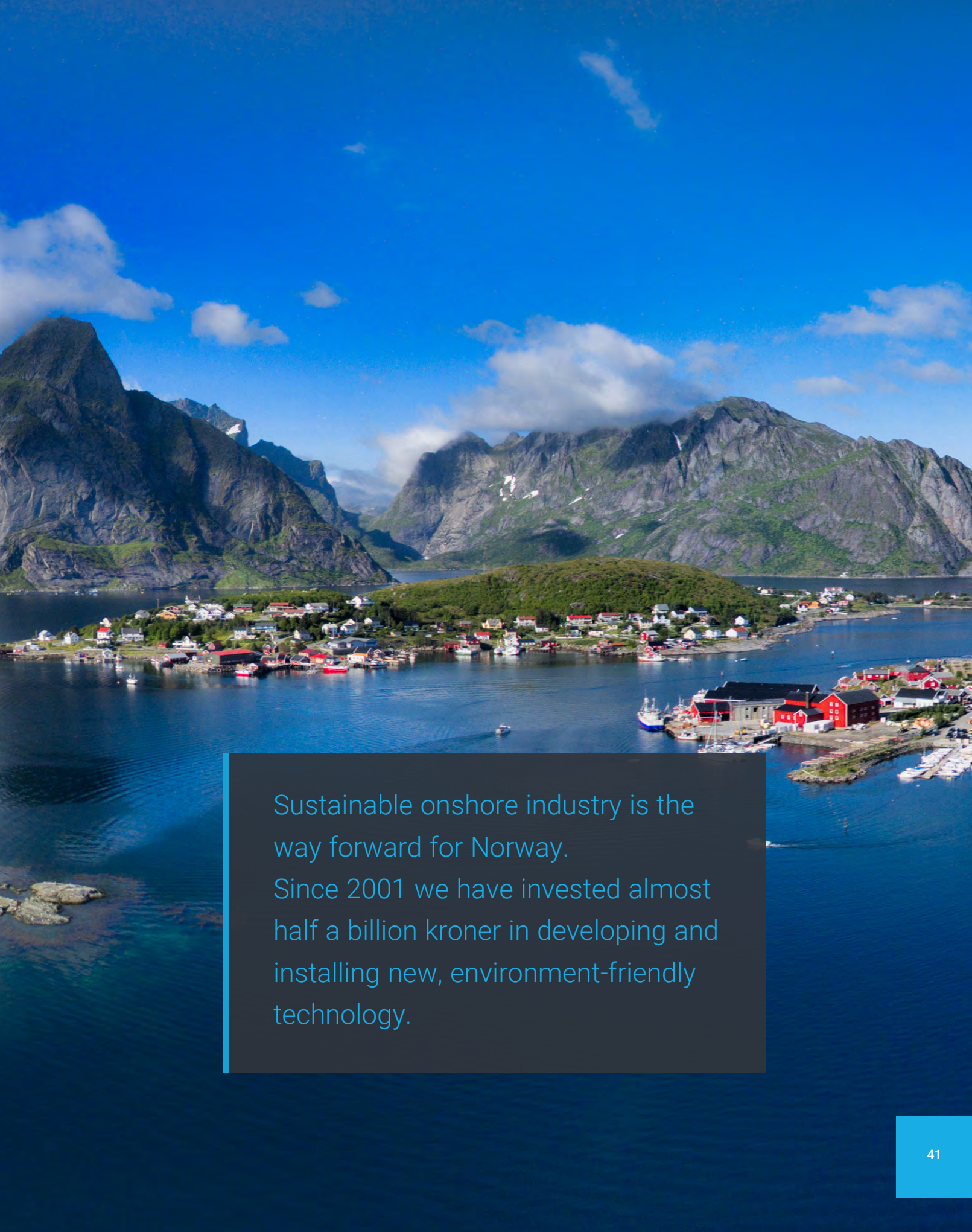
2

AIR QUALITY MEASUREMENTS
Measurements will be taken in the surrounding area in order to confirm whether there is compliance with the air quality criterion for manganese. This is a direct consequence of the new emissions licences.

1

UPDATING OF NOISE CHART
An updated noise chart will be drawn up for the company. This will make it easier for Eramet Kvinesdal to implement targeted noise-prevention measures. There are already noise charts, but they require updating in line with changes in the processes and in the equipment being used.

As part of the efforts to improve the environmental performance of the processing plant in Kvinesdal, a project is being launched in spring 2017 that we have decided to call "Miljøovervåkning ENK" [ENK Environmental Monitoring].
This new project will focus on monitoring emissions from the processing plant that affect people living nearby.



Sustainable onshore industry is the way forward for Norway.
Since 2001 we have invested almost half a billion kroner in developing and installing new, environment-friendly technology.

STABLE OPERATING PROCESSES RESULT IN **GOOD ENVIRONMENTAL PERFORMANCE**

The emissions results for Eramet Norway Sauda in 2016 illustrate the link between short term negative process variation and diffuse dust emissions. In 2016, there was an increase in measured Mn emissions into the air at the processing plant in Sauda, as well as a number of complaints from people living nearby.

The increase occurred despite a year of production records at furnaces and refineries. Long periods of good and stable primary processes also resulted in a significant reduction in levels of suspended materials in the processing water fed into the water purification plant.

Fact-based approach to sources of diffuse dust emissions

In 2016, operations in Sauda were essentially characterised by process control and record-high production in both furnaces and refineries. Despite this, the processing plant was the cause of an increase in complaints from people living nearby and of greater fall-out measurements, which measure the number of milligrams of Mn dust per square metre. The complaints from our neighbours related essentially to undesired incidents involving diffuse dust emissions. The stricter requirements from our environment have contributed to the processing plant's strong focus on developing barriers in connection with this source of emissions.

The charting process that revealed the root causes of the various emissions sources resulted in increased knowledge

New district heating system

In the fall of 2016, we commissioned a new district heating system which will increase water temperature in the town center streets and the Sauda Stadium sports facility. It is a process that involves harvesting surplus heating water from the furnaces, which is at about 40 deg. C. This water is then passed through a heat exchanger, which increases the temperature by 6-10 degrees at a rate of 80 cubic meters per hour.

Maintenance engineer, Rolf Egil Steen, with the new district heating system.

In 2012, the new filter system for the refining process (OGC2) was commissioned. The new filter was intended to improve working conditions at the plant, reduce the need for maintenance and ensure good environmental standards in connection with the refining process. The system has since proved it worth in all areas, including in terms of increased refining volume at the plant.

Magne Årthun, who works at the department of the environment and operational support, standing in front of the OGC2 filter system.

about the relevant potential for consequences for diffuse dust emission when the performances of the existing barriers are weakened. Measurements carried out in 2016 show that short-term instability in the primary processes, combined with weak design of extraction installations and simultaneity factors in connection with the use of extraction installations, can result in increased diffuse dust emissions.

Close collaboration with the researchers in the development group

The processing plant at Sauda is sited in such a way that many of the town's residents are able to see the company's emissions situation at all times. Operators and specialists in Sauda have worked closely with Eramet Norway's development group in Trondheim (ENT) in order to improve the likelihood of achieving targets, especially in the reduction of diffuse dust emissions.
ENT is made up of three permanent researchers and as many as three researchers working on a project basis.

Eramet's researchers have specialised knowledge in the reduction of dust emission, process control, characterisation of raw materials and refining manganese alloys.

Before installation of the tapping extractor above the tapping hall at furnace 11

After installation of the tapping extractor above the tapping hall at furnace 11

Advanced models are used in, among other things, mass and heat balance calculations, flow (Computational Fluid Dynamics) and statistics. The focus in this collaboration has been on optimising the design and performance of extractor hoods and systems in the hot processes.

Scientific and methodical approaches such as CFD modelling and the use of flow techniques have resulted in changes to operational procedures that regulate the use of extraction systems. The aim of this regulation is to optimise the efficiency of each extraction point. Trials using new designs of extraction systems were conducted towards the end of 2016, and these showed a significant improvement in performance compared with the current extraction system.

Reduced diffuse dust emission from pouring

There has also been considerable focus in the past year on activities in connection with pouring liquid metal and slag, as well as logistical activities. We are pleased at having come up with a lasting solution for the reduction of diffuse dust emissions from the pouring process for refined manganese.
This solution is the result of a major commitment on the part of operators, specialists and managers in the operation of the processing plant, and maintenance and processing departments. We are continuing to work on further developing this technology so that the method can also be used to reduce diffuse dust emission from other activities this year.

SAUDA

AN ALL-OUT EFFORT TO ACHIEVE A REDUCED FOOTPRINT

Eramet Norway Sauda had no breaches of the permitted emissions limits in 2016, but it did have a challenging year in terms of diffuse dust emissions. At the same time, the processing plant has reduced its specific energy consumption per tonne.

The diffuse dust emissions in this period were the reason why the processing plant in Sauda has systematically charted and measured the effects of current extraction installations.
The purpose of this was to increase the efficiency of the extractors and also to install new extractors where technically feasible. In addition, secondary barriers to prevent diffuse emissions into the exterior environment were improved by using water misting systems where appropriate.

Energy costs and use of auxiliary power reduced

In 2016, we managed to reduce our consumption of auxiliary power by close to five per cent.

In the period from August to September, Eramet Norway achieved certification in all three standards of Quality Management (9001:2015), Environmental Management (14001:2015) and Energy Management (50001:2015).

The main purpose of this review was to obtain confirmation that the control system complied with the requirements contained in the standards. There was also evaluation of the control system's efficiency in order to ensure the organisation's ability to achieve set targets and to satisfy relevant requirements contained in laws and regulations and contractual requirements.

Central activities in our daily HSE and energy-efficiency work

- We hold daily morning meetings at which we review any recorded HSE and energy-efficiency incidents.
- HSE and energy-efficiency matters are at the top of the agenda at our regular weekly management meetings.
- We have a monthly follow-up meeting at which we review HSE and energy-efficiency results from the past month, as well as progress in our work on implementing measures in the HSE and energy-efficiency plan. The meeting is held on the first Wednesday of the month and it is open to everyone.
- All departments conduct HSE and energy-efficiency rounds (safety rounds) according to a fixed plan.
- All employees conduct open safety discussions with all employees.
- Work on the HSE and energy-efficiency plan is evaluated quarterly, focussing on attainment of objectives and level of implementation. Everyone has access to the minutes and status report.
- Safety officer meetings are held four times a year. All employees have access to the minutes.
- Shift department meetings are held regularly. Minutes are available.
- Risk mapping and risk analyses are standard forms of work in all projects and other development activities.
- Every year we have an HSE and energy-efficiency day for our own employees and companies with which we work.
- We have several meeting venues (arenas) for collaboration with the other Norwegian Eramet processing plants.
- We regularly follow-up and report on the status of the group's and the manganese division's action plans.
- We have a close collaboration with International SOS, our occupational health service.
- In 2016 we started an annual safety meeting for and together with our trainees.

NewERA
MAKING PROGRESS

Our objectives for 2017

1

To conduct a feasibility study for the energy recovery sub-project, aiming at drawing up a project plan and a capital expenditure application for a gas engine pilot project by the end of 2017.

2

To conduct a pre-feasibility study in order for the ore quality and agglomeration sub-project to be in a position to launch the feasibility study phase in 2018.

In 2014, Eramet Norway (ENO) conducted the "Vision 2020-process", aiming at identifying mid- and long-term challenges and potential improvements.

Vision 2020 resulted in the definition of the company's strategic goals that will guide our development efforts in the years to come:

ENO – STRATEGIC GOALS

- **Health and Safety first!**
- **Be the Manganese producer with the smallest environmental footprint in our industry**
- **Continue to be the world's leading producer of refined alloys**
- **Continue to be one of the most cost-competitive producers of Mn alloys.**

In order to achieve our strategic goals, we need to ensure that ENO is a learning organisation that capitalises on the knowledge, skills and experience of our employees in order to xxxxxxxxxx

As a consequence, the NewERA project for the development and implementation of new and environmentally-friendly technology with a significant potential for improving energy utilisation, process efficiency and environmental footprint was launched.

The main objectives of this project can be grouped into 3 categories:

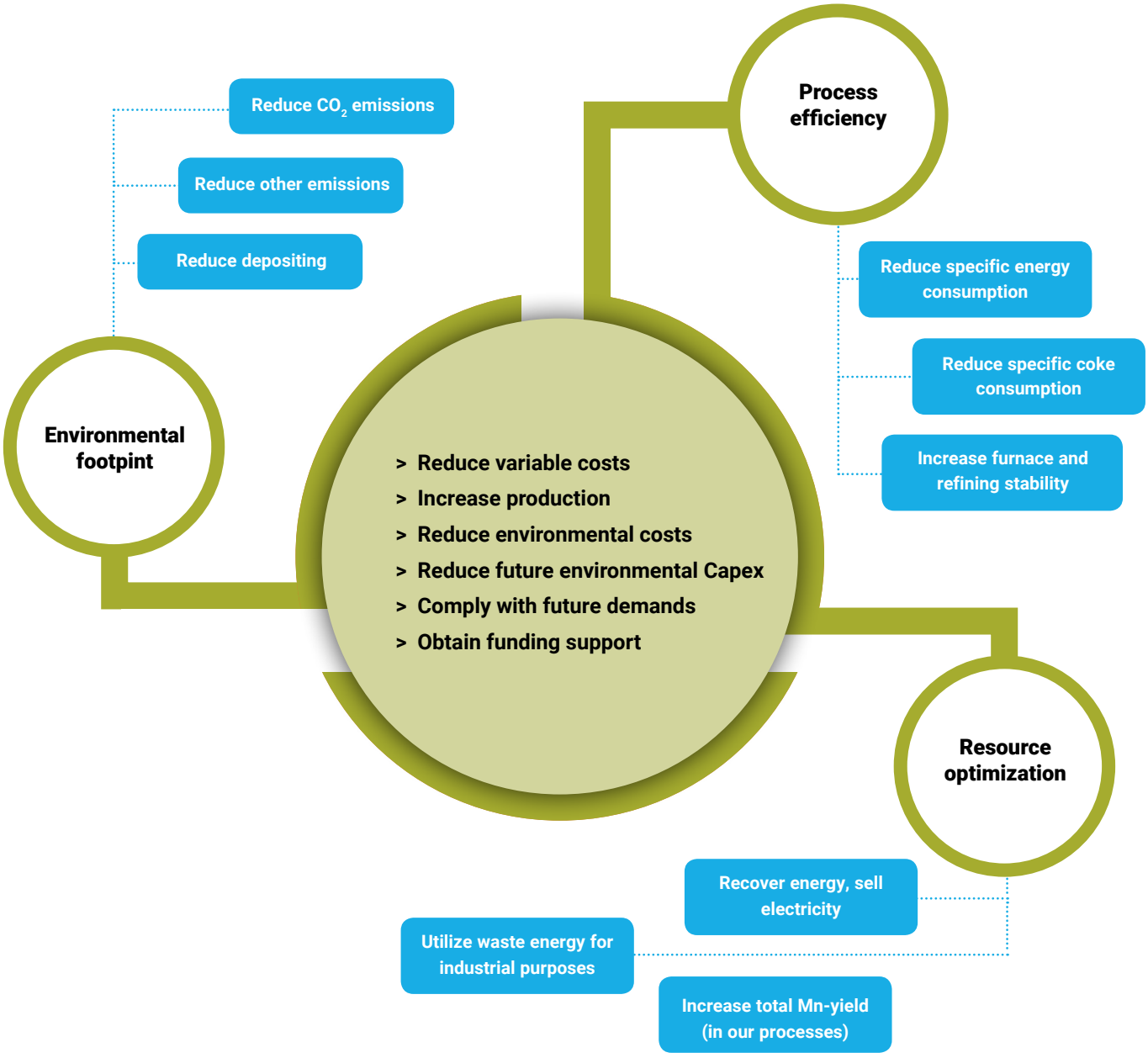
- **Process efficiency**
- **Resource optimisation**
- **Environmental footprint**

The NewERA project therefore forms a vital part of the efforts to further develop ENO's overall business position in compliance with our strategic goals.

The project identification phase was completed in 2015, and it was decided by the manganese division industrial management to enter the pre-project phase.

The scoping study was conducted in 2016. Based on the scoping study report launched at the end of October 2016, the project steering committee decided to prepare for the next step of the project.

Focus areas in the NewERA project



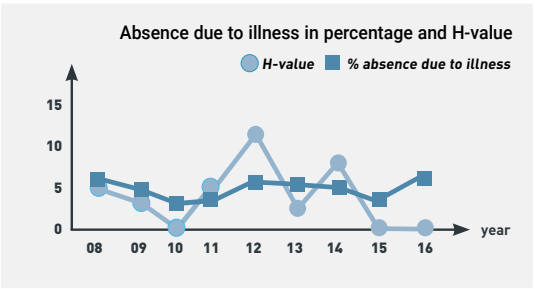
NewERA aims to develop and implement new and environmentally friendly technology with the potential for significantly reducing CO_2 emissions and improving the efficiency of energy use in our processing plants.


04F1037B
SYSTEM OK

As an environmentally conscientious company, we are committed to maintaining a safe working environment that protects our employees, facilities and assets.

SAUDA

Injury figures H1 and absence due to illness

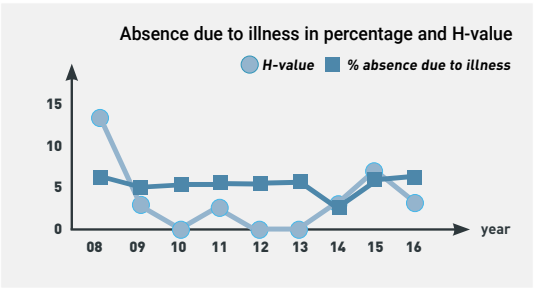


HES figures

CATEGORY	2015	2016
Absence due to illness	3,8 %	6,1 %
Injuries w/ absence	0	0
Injury figures H1 (H-figures)	0	0
Undesirable incidents - environmental	160	226
Complaints from neighbours	28	51
Violation of discharge permit	0	0

PORSGRUNN

Injury figures H1 and absence due to illness

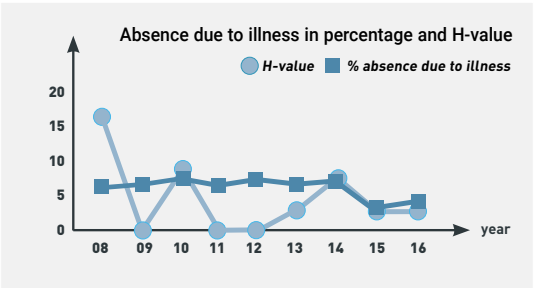


HES figures

CATEGORY	2015	2016
Absence due to illness	5,6 %	5,5 %
Injuries w/ absence	2	1
Injury figures H1 (H-figures)	6,6	3,3
Undesirable incidents - environmental	71	121
Complaints from neighbours	20	24
Violation of discharge permit	0	0

KVINESDAL

Injury figures H1 and absence due to illness



HES figures

CATEGORY	2015	2016
Absence due to illness	3,9 %	4,5 %
Injuries w/ absence	1	1*
Injury figures H1 (H-figures)	2,2	2,2
Undesirable incidents - environmental	18	24
Complaints from neighbours	3	0
Violation of discharge permit	1	0

** Ekstern arbeider*

ERAMET NORWAY **HES-POLICY**

OBJECTIVE

At Eramet Norway, we seek to conduct our business in such a way as to minimize potential harm to health, the environment and safety throughout the value chain.
Metals, materials and other products are to be manufactured using resource-efficient processes with due regard for health, the environment and safety. As an environmentally conscientious company, we are committed to maintaining a safe working environment that protects our employees, facilities and assets.
The twin goals of preventing environmental damage and continuously improving our performance on health, the environment and safety underpin all our activities.

PRIORITIZATION

Health-, environment- and safety-related activities are to be integrated into all aspects of our operations. Our chief concern is to protect our employees and other stakeholders from workplace injuries and adverse health effects.
We are committed to complying with all applicable statutory and regulatory requirements, and with all codes of practice endorsed by the company.
Environmental and safety aspects will be a key consideration when we make decisions on capital expenditure, operating methods and changes.

RESPONSIBILITY

Managers at all levels have overall responsibility for health, the environment and safety in their respective areas. They are responsible for planning, organizing and training, for implementing health, environmental and safety procedures, and for ensuring that practices comply with statutory and regulatory requirements. Managers are to set specific targets for improvement and seek the cooperation of employees in achieving those targets. All managers and employees have a shared responsibility to create a safe workplace, to protect the environment, and to protect the company's resources and equipment. All employees are personally responsible for protecting themselves and for safely performing their duties according to established instructions and guidelines.

IMPROVEMENT

Health, the environment and safety are integral parts of Eramet Norway's management system. A continuous improvement program is to be put in place, based on careful evaluation of the potential for undesirable incidents and suggested improvements. Reporting of undesirable incidents is to be a priority, as the starting point for implementing corrective and preventive measures.

PREVENTION

Health, environmental and safety procedures and practices, and any changes to these, are to be based on a thorough risk assessment. Operational plans and capital projects will likewise be subject to an assessment of the health, environmental and safety risks. Potential hazards are to be identified and assessed. Undesirable incidents such as near mishaps, accidents, injuries to health and environmental damage are to be recorded and investigated to determine the root cause and prevent recurrence.

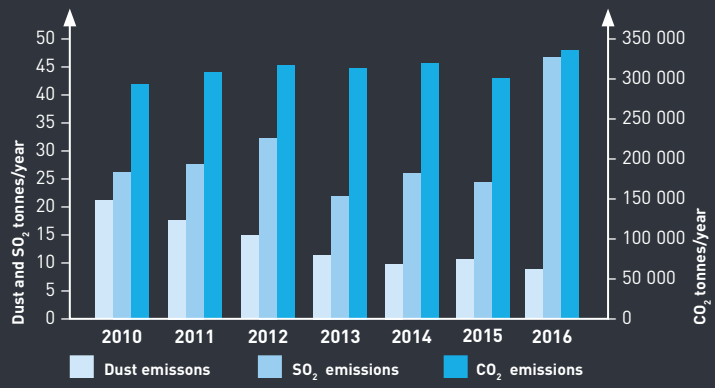
FOLLOW-UP

To ensure compliance with statutory and regulatory requirements, and respect for Eramet's own environmental goals, policies and guidelines, a system must be in place for ongoing reporting, record keeping and review.

Eramet Norway is to publish an annual health, environment and safety report.

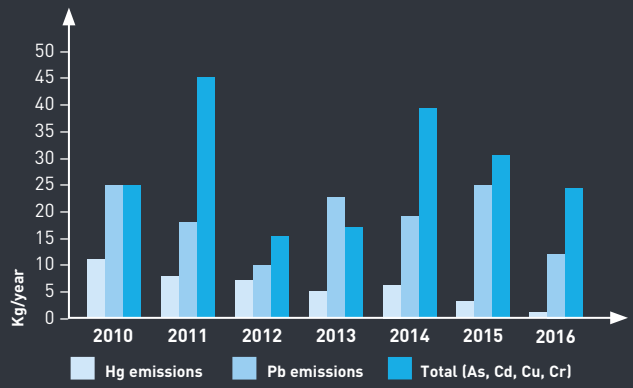
Eramet Norway exports its entire production of manganese alloys, primarily to Europe and North America, transporting 98% by water and 2% by road.

DUST, SO_2, CO_2 emissions to the air 2010-2016



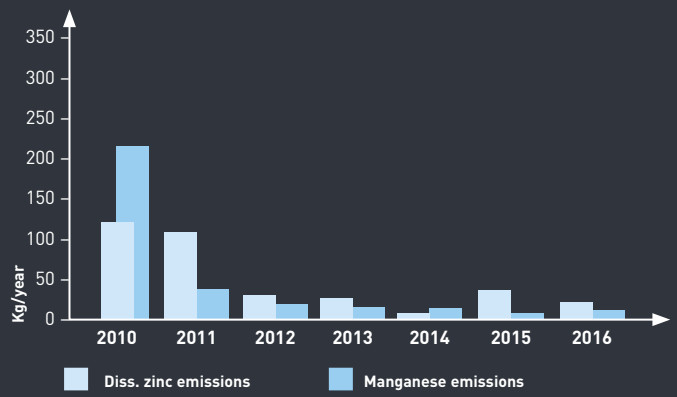
Emission limits:
Dust = 35 tonnes/year SO_2 = 50 tonnes/year

Hg/Pb/Total (As, Cd, Cu, Cr) emissions to the air 2010-2016



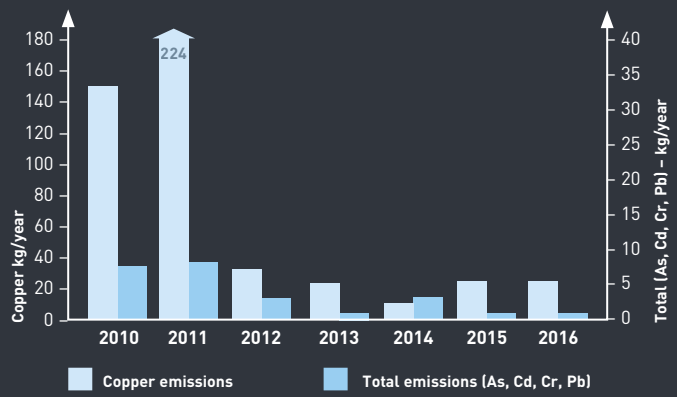
Emission limits:
Hg = 36 kg/year Pb = 100 kg/year sum (As, Cd, Cu, Cr) = 50 kg/year

ZINC/MANGANESE emissions to Saudafjorden 2010-2016*



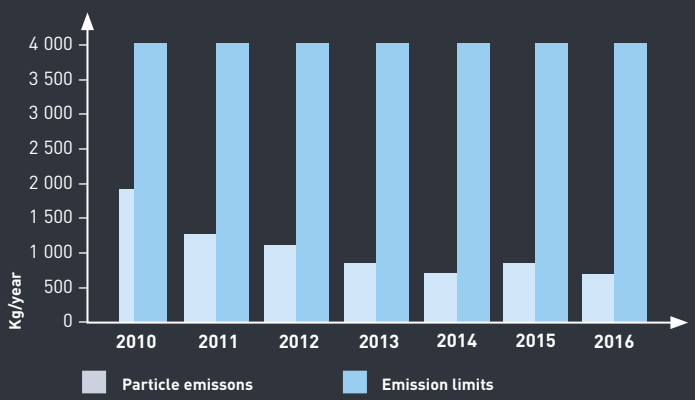
Emission limits: Dissolved zinc = 400 kg/year Manganese = 400 kg/year

COPPER/TOTAL (As, Cd, Cr, Pb) emissions to Saudafjorden 2010-2016*

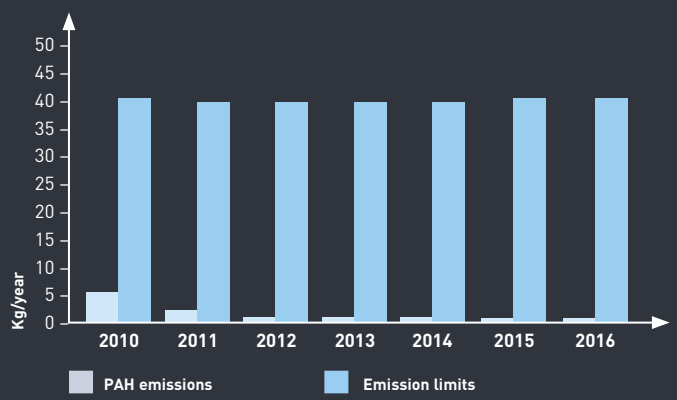


Emission limits: Copper = 150 kg/year Total (As, Cd, Cr, Pb) = 20 kg/year

PARTICLES emissions to Saudafjorden 2010-2016*



PAH emissions to Saudafjorden 2010-2016*



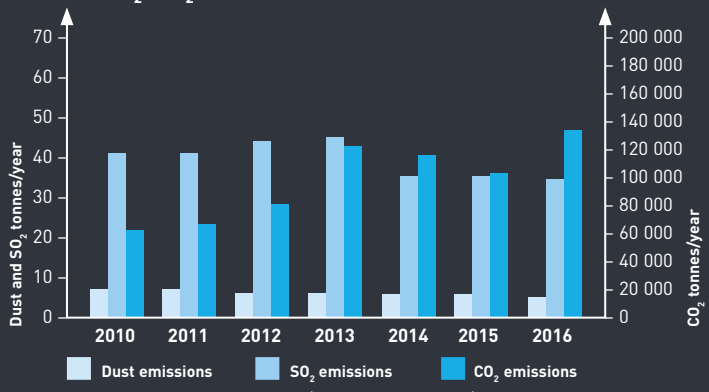
**Emissions from purifying plants.*

WASTE

CATEGORY	2016	2015
Slag	0 tonn	0 tonn
Sludge and dust (landfill)	2 030 tonn	3 716 tonn
Residual waste	107 tonn	120 tonn
Metal waste	396 tonn	207 tonn
Special waste	77 tonn	102 tonn

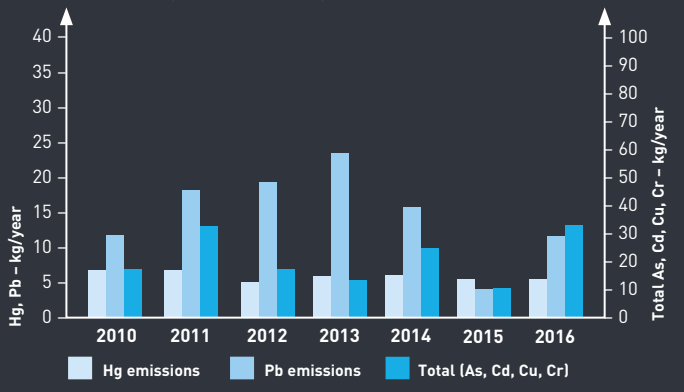
CATEGORY	2016	2015
Paper and cardboard	7,5 tonn	5 tonn
Wood waste	141 tonn	248 tonn
Plastic	3,9 tonn	8 tonn
Asphalt	0 tonn	14,3 tonn

DUST, SO_2, CO_2 emissions to the air 2010-2016



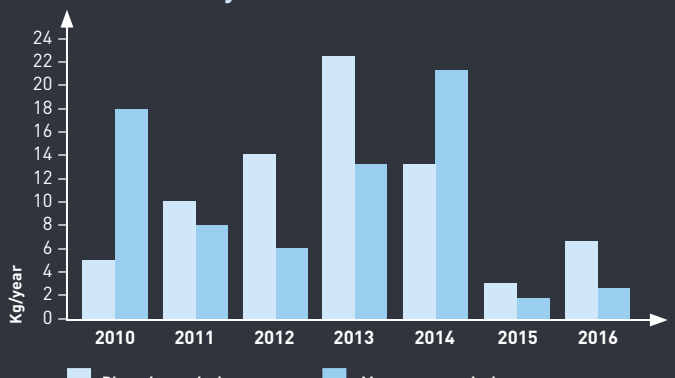
Emission limits: Dust = 35 tonnes/year SO_2 = 50 tonnes/year

Hg/Pb/Total (As, Cd, Cu, Cr) emissions to the air 2010-2016



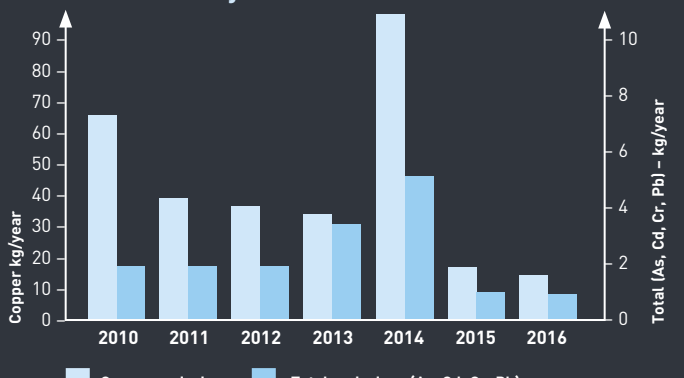
Emission limits:
Hg = 15 kg/yearr Pb = 150 kg/year Total (As, Cd, Cu, Cr) = 50 kg/year

ZINC/MANGANESE emissions to Frierfjorden 2010-2016*



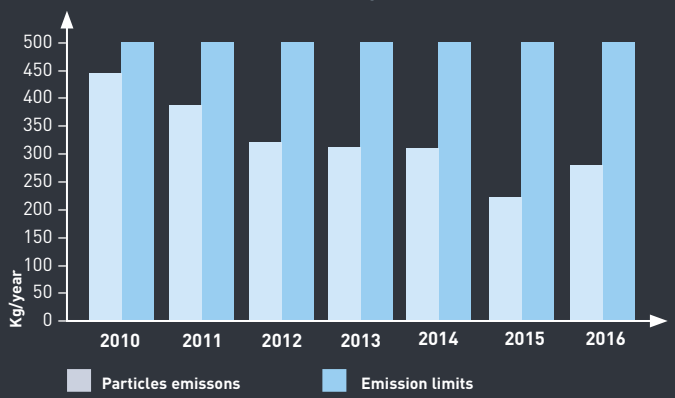
Emission limits: Dissolved zinc = 50 kg/year Manganese = 50 kg/year

COPPER/TOTAL (As, Cd, Cr, Pb) emissions to Frierfjorden 2010-2016*

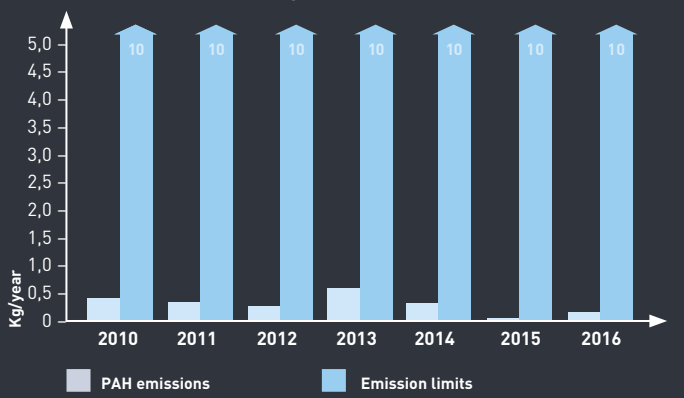


Emission limits: Copper = 100 kg/year Total (As, Cd, Cr, Pb) = 10 kg/year

PARTICLES emissions to Fedafjorden 2010-2016*



PAH emissions to Frierfjorden 2010-2016*



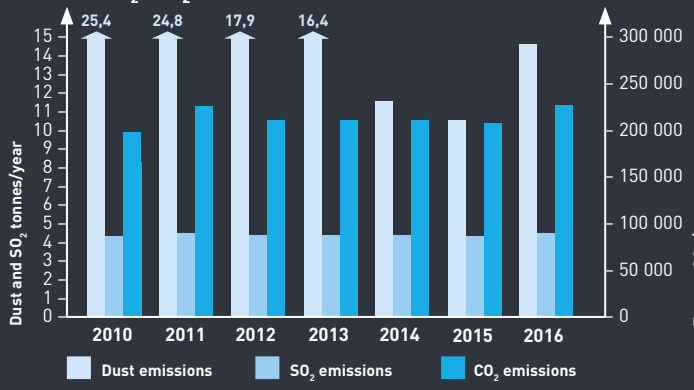
**Emissions from purifying plants.*

WASTE

CATEGORY	2016	2015
Slag	89 913 tonn	85 668 tonn
Sludge and dust (landfill)	5 203 tonn	8 077 tonn
Residual waste	115 tonn	108,2 tonn
Metal waste	158 tonn	180,1 tonn

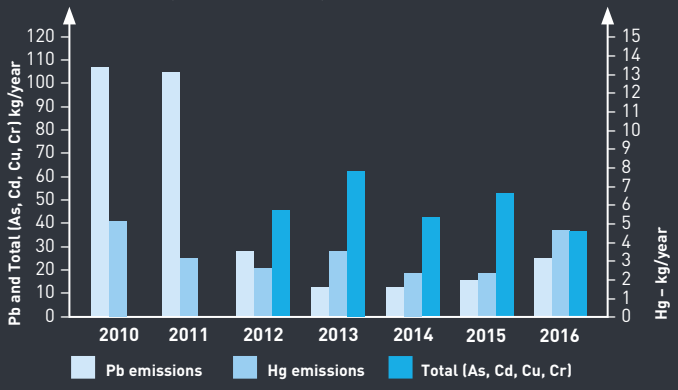
CATEGORY	2016	2015
Special waste	44,6 tonn	38,1 tonn
Paper and cardboard	4 tonn	4,7 tonn
Wood waste	152 tonn	138,7 tonn
Blandet gummiavfall	23,5 tonn	25,7 tonn

DUST, SO_2, CO_2 emissions to the air 2010-2016



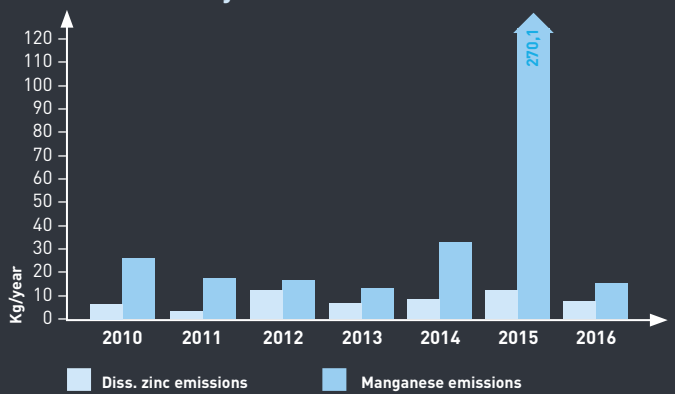
Emission limits: No emission limits

Hg/Pb/Total (As, Cd, Cu, Cr) emissions to the air 2010-2016



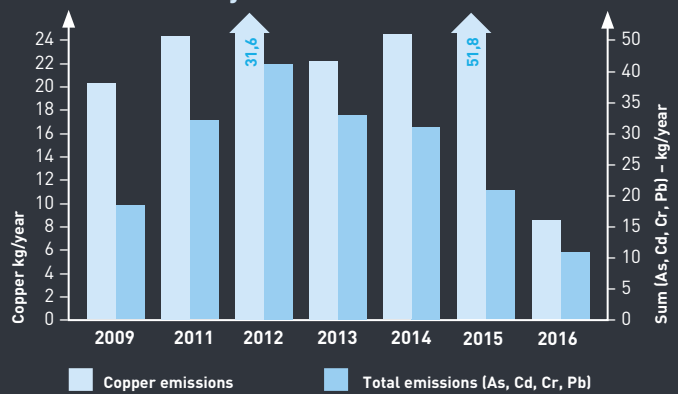
Emission limits:
Hg = 15 kg/year Pb = 150 kg/year Sum (As, Cd, Cu, Cr) = No emission limits

ZINC/MANGANESE emissions to Fedafjorden 2010-2016*



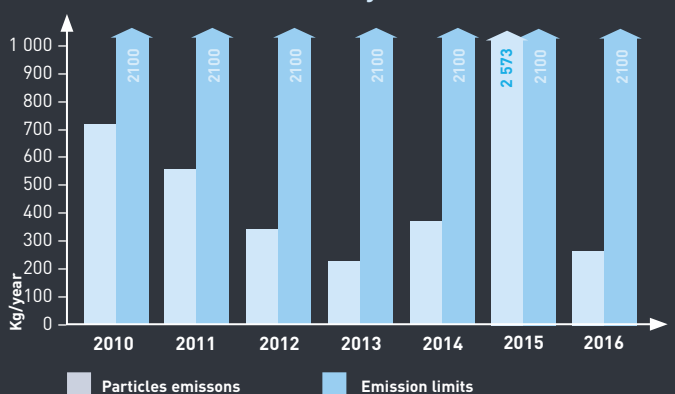
Emission limits: Dissolved zinc = 240 kg/year Manganese = 420 kg/year

COPPER/TOTAL (As, Cd, Cr, Pb) emissions to Fedafjorden 2010-2016*

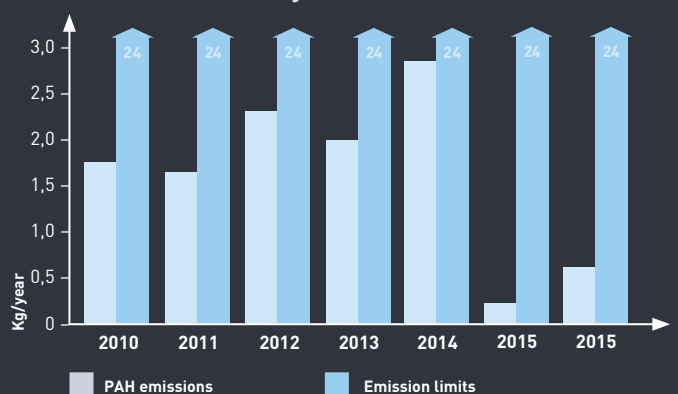


Emission limits: No emission limits

PARTICLES emissions to Fedafjorden 2010-2016*



PAH emissions to Fedafjorden 2010-2016*



**Emissions from purifying plants.*

WASTE

CATEGORY	2015	2016
Slag	199 729 tonn	214 856 tonn
Sludge and dust (landfill)	30 269,3 tonn	32 531 tonn
Residual waste	102,9 tonn	111,16 tonn
Metal waste	91,7 tonn	110 tonn

CATEGORY	2015	2016
Special waste	20 040 kg	37 160 kg
Paper and cardboard	7 200 kg	7 200 kg
Wood waste	43 200 kg	38 500 kg
Plastic	4 400 kg	4 500 kg

ENVIRONMENTAL INCOME 2016

Environmental income from sale of CO gas to Yara's ammonia factory at Herøya in Porsgrunn, and sale of manganese dust and sale of electrical energy in Kvinesdal.

15 NOK MN
SALES OF CO-GAS TO YARA

72 NOK MN
SALES OF MANGANESE DUST

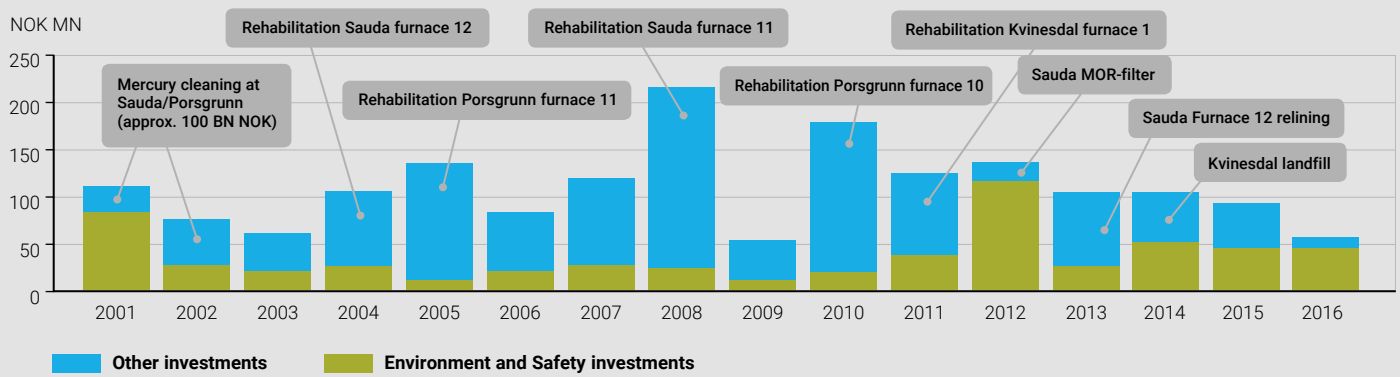
22 NOK MN
SALE OF ELECTRICAL ENERGY IN KVINESDAL

INVESTMENTS 2005-2016

Yearly investments in NOK MN for Porsgrunn and Sauda during the period 2005–2016, and Kvinesdal for the period 2010–2016.

2 PLANTS (PORSGRUNN, SAUDA)						3 PLANTS (PORSGRUNN, SAUDA, KVINESDAL)							
År:	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	SUM*
Environment and Safety investm.	11	24	27	25	11	18	43	113	37	55	45	67	**672**
Other investments	132	61	86	192	40	166	81	144	103	86	92	187	**1591**
TOTAL INVESTMENTS	**143**	**86**	**113**	**217**	**51**	**184**	**123**	**257**	**140**	**141**	**137**	**254**	**2263**

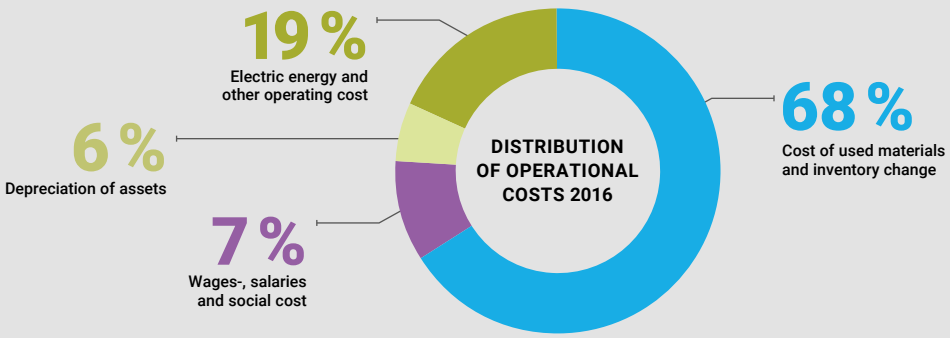
**) The total figure includes from year 2000.*



PROFIT & LOSS STATEMENT FOR 2015 AND 2016

Figures for the Sauda, Porsgrunn and Kvinesdal plants in NOK MN

	Last year 2016			Previous year 2015			Change	%
GROSS INCOME	**4 481**			**4 861**			**-400**	**-8 %**
Cost of used materials and inventory change	-2 541		68 %	-2 921		68 %	380	13 %
Wages-, salaries and social cost	-267		7 %	-424		10 %	157	37 %
Depreciation of assets	-214		6 %	-237		6 %	24	10 %
Electric energy and other operating cost	-717	-3 738	19 %	-718	-4 300	17 %	1	0 %
DRIFTSRESULTAT		**722**			**561**		**162**	**29 %**
Interest-/financial cost		-153			-203		50	25 %
Corporate taxes		-139			-91		-48	-53 %
NET RESULT	**431**			**267**			**164**	**61 %**



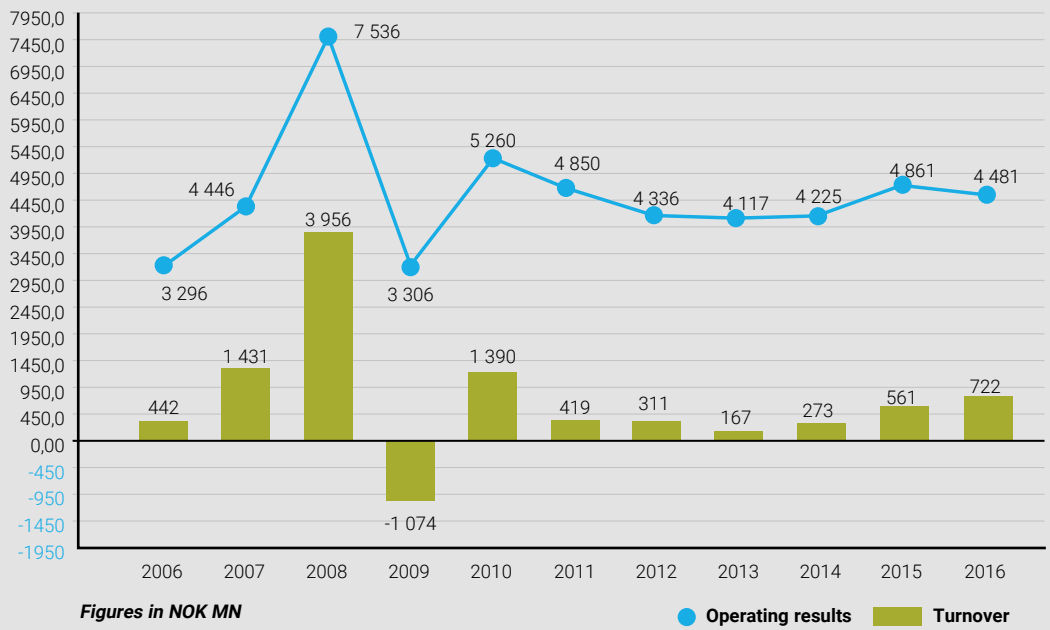
TURNOVER AND OPERATING RESULT

History of the Sauda, Porsgrunn and Kvinesdal plants. Figures are in NOK BN.

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Operational result	1,43	3,96	-1,07	1,39	0,42	0,31	0,17	0,27	0,56	0,72
Turnover	4,45	7,54	3,31	5,26	4,85	4,34	4,12	4,22	4,86	4,46
Operating margin	**32,2 %**	**52,5 %**	**-32,5 %**	**26,4 %**	**8,6 %**	**7,2 %**	**4,0 %**	**6,5 %**	**11,5 %**	**16,2 %**

4481 NOK MN
OPERATING RESULTS 2016

722 NOK MN
TURNOVER 2016



Figures in NOK MN

FOCUS ON SUSTAINABILITY THROUGHOUT THE GROUP

Eramet Norway is part of the French mining and metallurgy group, Eramet. The group's policy of sustainable development is of decisive importance for the company's industrial operations on a global basis.

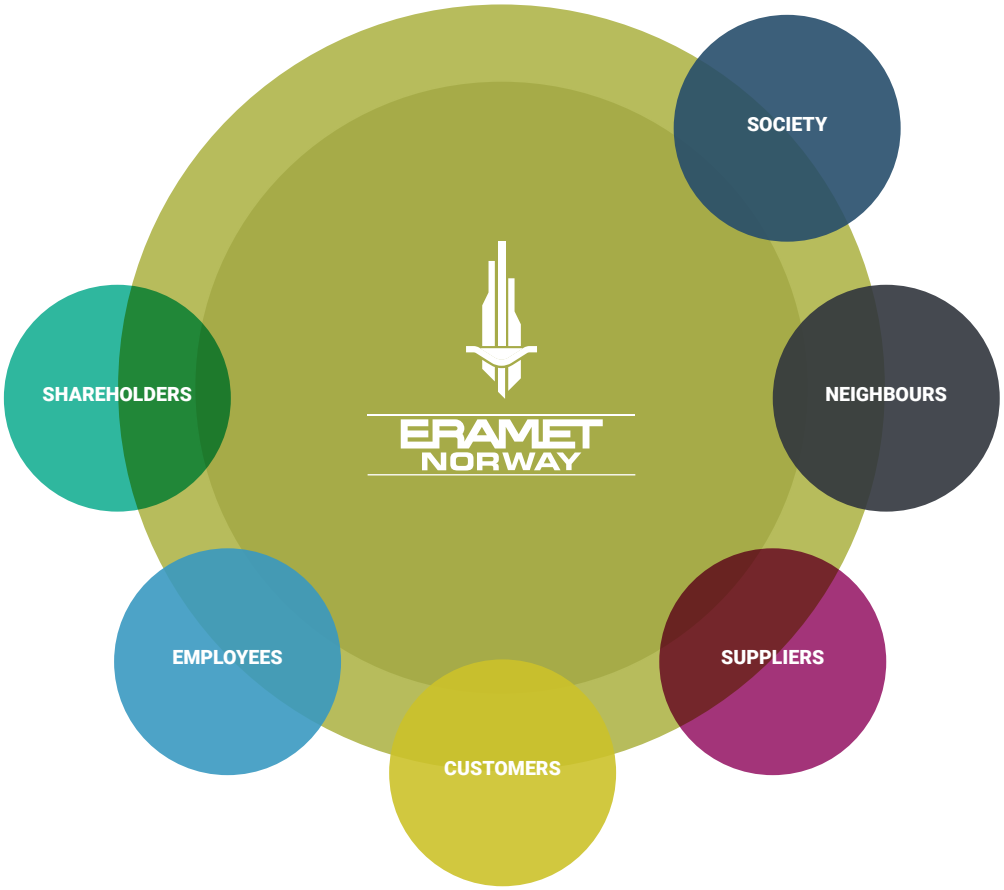
The group's sustainable development policy

The ERAMET group operates according to value-creating principles that undergo continuous development. This basis provides the premises for a sustainable development policy that allows the group to control its activities over the long term in the areas in which the company operates, and also to support the company's development in new territories.
The group always complies with regulations governing its activities, and it is continuously developing its performance standards in line with best practice within the industry. This policy covers the group's employees, customers and shareholders, as well as controls of industrial, health, social and environmental risks that are relevant to the group's activities.
Implementation of the policy is based on specific contracts and policies which have been introduced throughout the group, such as the Ethics Charter, the Environmental Charter and a number of HES policies.

A forward-looking sustainability strategy

In 2016, based on the group's policy and the Federation of Norwegian Industries' process for setting out a roadmap, Eramet Norway decided to start work on setting out the company's long-term ambitions and priorities in connection with climate, energy and the environment. This work will subsequently define out sustainability strategy in the lead-up to 2030.

SUCCESS FOUNDED ON TRUST



COLLABORATING FOR KNOWLEDGE

Through our membership of forums such as Grenland Industrial Cluster, the Eyde network and EnergiRike, we are committed to sharing knowledge among regulatory authorities, politicians, centres of expertise and our own industry on major issues of mutual concern.

COLLABORATION WITH BELLONA

Eramet Norway and the Bellona environmental foundation have instituted a formalised collaboration, the aim of which is to make use of each other's core skills in order to improve society's environmental results.

COLLABORATION WITH THE INDUSTRY

Through the Norwegian Ferroalloy Producers Research Association (FFF), Eramet Norway has played a role in a number of important collaboration projects between the industry, Sintef and the Norwegian University of Science and Technology (NTNU).

SUPPORTING THE LOCAL COMMUNITY

Eramet Norway supports clubs, organizations, cultural activities and individual events at each of its production locations. It is important that the local community around our company continues to provide opportunities for cultural and leisure activities.

CUSTOMERS MAKING EVER-GREATER DEMANDS IN TERMS OF SUSTAINABILITY

Sustainable products and processes are also increasingly being discussed in the context of our customer relations. As a leading supplier of manganese alloys, we work actively in order to satisfy our customers' requirements, as set out in their overall policies, specifications of requirements and guidelines.
Regular audits are also conducted together with our main customers.

ERAMET NORWAY

SAUDA
PO. Box 23 - NO-4201 Sauda,
tel: +47 52 78 50 00/fax: + 47 52 78 50 02

PORSGRUNN
PO. Box 82, NO-3901 Porsgrunn,
tel: +47 35 56 18 00/fax: +47 35 55 36 10

KVINESDAL
Øyesletta 61, NO-4484 Øyestranda
tel: +47 38 35 72 00/fax: +47 38 35 11 28

Organization number:: 980 518 647 I E-mail: eramet@erametgroup.com I www.eramet.no

The Manganese Source ®

DNV

NORSK AKKREDITERING
QUAL 002/EMS 001

ISO 9001/ISO 14001/ISO 50001
SERTIFISERT BEDRIFT

Tenk Kommunikasjon // tenkkom.no // Foto: Benjamin Nordhagen, Max Emanuelson og DSFOTO // Printed on 100% recycled paper.