Elkem
A Bluestar Company

Sustainability report 2015

Contents

Key figures

FINANCIALS	UNIT	2015	2014*	2013*	2012*
Revenues	NOK million	14 541	12 674	11 473	11 526
EBITDA	NOK million	2 207	1 252	819	1 048
EBIT	NOK million	1 465	578	345	(216)
Profit for the year	NOK million	953	(22)	(268)	(82)
Total assets	NOK million	14 477	15 453	13 086	12 548
Net interest-bearing assets /(liabilities)	NOK million	(1 928)	(3 529)	(3 538)	(7 399)
Equity	NOK million	6 319	5 675	4 022	(112)
Equity ratio	Per cent	43.6	36.7	30.7	(0,9)
No. of employees	Numbers	3 628	3 459	3 420	3 409
Health and safety					
Sick leave rate	Per cent	3.7	3.4	3.7	3.9
No. of lost time injuries per million work hours	H1	1.3	2.1	0.8	1.8
Energy and emissions					
Energy recovered	GWh	483	420	450	340
CO_2 emissions	1000 tonnes	1 498	1 478	1 352	1 389
NO_X emissions	Tonnes	7 049	8 086	7 119	7 341
SO_2 emissions	Tonnes	7 392	7 536	7 525	7 328

* Elkem Solar is presented as discontinued operation for the two months ended February 2014 and for the year ended 2013 and 2012. As a consequence Elkem Solar is not included in revenues, EBITDA, EBIT and net interest-bearing asset/(liabilities). Please refer to accounting principles under consolidated financial statement for Elkem AS group in the annual report 2015 for more details: www.elkem.com/about-elkem/key-figures/

Global Reporting Initiative

For the year 2015, Elkem is reporting according to the Global Reporting Initiative-guidelines (G4/Core). When addressing sustainability issues, Elkem puts great emphasis on input from stakeholders (see page 12). Based on this input, and a broad knowledge of Elkem's sustainability challenges and possibilities, Elkem's CSR committee (see page 10) considers the following aspects the most material for Elkem:

- Environment
  - Energy
  - Emissions
  - Effluents and waste
  - Supplier environment assessment
- Labour practices, human rights and decent work
  - Occupational health and safety
  - Non-discrimination
  - Training and education (own indicator: EBS)
  - Supplier assessment for labour practices
- Business ethics
  - Anti-corruption
  - Anti-competitive behaviour
- Local communities
- Product responsibility
  - Customer health and safety
  - Product and service labelling

Interview with CEO Helge Aasen and Chairman of the board Robert Lu

Business as part of sustainable growth

Q: The Vision 2050 report, developed by World Business Council for Sustainable Development, calls for a new agenda for business. The message is that business must change, if the world is going to be habitable in 2050. How do you find this relevant for Elkem?

Lu: The key message is that business can contribute, and must contribute. Elkem's strategy aligns well with this scenario: We want to improve our production processes, and produce more efficiently, with less energy consumption and with utilisations of all by-products. We want to bring to market solutions that bring value to society.

Aasen: An example of this is microsilica. Today microsilica is a product with many applications, and an important business area for Elkem. However, it used to be a big problem, both in terms of cost and waste of resources, and as an environmental problem, as dust was covering the neighbourhoods of the silicon plants.

Q: How do you see Elkem in a carbon neutral future?

Aasen: CO_2 is a by-product in the silicon production process. Silicon is made from quartz, which consists of silicon and oxygen. Quartz without oxygen is silicon. To release the oxygen from quartz, carbon (C) is added to the process. Carbon connects eagerly with oxygen, forming CO_2 that is emitted, leaving silicon (Si). One possible way of reducing the total CO_2 emissions is to substitute fossil carbon (coal) with charcoal in this process. In a long-term cycle, this will come close to being carbon neutral, as the trees grow back. This is not easily done, but we are working on finding solutions.

Q: Why is it so difficult to replace coal with charcoal?

Aasen: First, we must be sure that the production process is not adversely affected by substituting one major

We do not accept that injuries or illnesses are unavoidable facts of life in our industry.

raw material with another, and that our product quality is maintained. Secondly, we must be certain that the trees that end up as charcoal in our processes are sustainably sourced, and that the charcoal itself is produced in a safe and environmentally responsible manner. If this does not happen, we risk adding to existing problems with deforestation and natural habitat destruction. Thirdly, we must consider the impact a major charcoal project can have on people who live in or near the areas affected.

Lu: We are conducting a major research project into a new, innovative way of producing metal. The project is called CNMP – Carbon Neutral Metal Production. It aims at integrating the production of charcoal in our metal production and ensuring that all materials and energy are use as efficiently as possible. If we succeed, it will be a revolution: carbon neutral metal production with zero net electricity input.

Aasen: There are also other important ways to reduce emissions of CO_2. We strive to maximise the yield, which is the ratio between the amount of raw materials you put into the process and the amount of silicon you get out. Elkem's plants have high yields and we constantly work to improve this to the benefit of the environment and, of course, to improve our financial results.

Q: The number of medically treated injuries fell to an all time low in 2015. Only ten Elkem employees experienced injuries that needed medical treatment. Have you now reached the safety level that you have been striving for?

Lu: Elkem's health and safety work is based on a zero-harm-philosophy. We do not accept that injuries or illnesses are unavoidable facts of life in our industry. There is also a need to focus on individual choices and behaviour, not only on the systems. Our statistics show us another fact: that the vast majority of injuries can be traced back to unsafe behaviour.

Aasen: The results for 2015 are good. However, these positive results were overshadowed by a fatal accident that happened to a contractor at our site in Brazil. Contractors are overrepresented when it comes to injuries. Our statistics show that it is possible to run operations with zero injuries; this must be the case for contractors in our plants as well.

Q: What about energy?

Aasen: Elkem's plant at Bjølvefossen in Norway was the first plant in the world to use the hot off-gases from the production process to produce electricity in 1977. Now the facility has been upgraded with an additional 30 GWh to a capacity of 80 GWh a year. Many Elkem plants have energy recovery systems today, but there is still a large potential at all plants. The challenge is to make it financially viable. Energy recovery investments require very high capital expenditure and the pay-back time is much longer than most other investments in our industry. This makes it difficult to finance large energy recovery investments. We do however, hope to realise further major energy recovery projects in the years to come.

Lu: We see sustainability-related megatrends driving the underlying demand for Elkem's products. The need for renewable energy, population growth and improved living conditions in emerging economies are three important examples. Our quartz to ready-made solar panels value chain gives the word renewable energy. Our quartz-to-silicones value chain lays the foundation for a myriad of different silicone products. Silicones have a smaller environmental footprint than plastics. The superior properties of silicones make them sought after in all walks of life, from health care to fire prevention. A rule of thumb: Consumption of silicones grows at twice the pace of the economy.

Q: What are the main challenges?

Lu: There is no lack of good projects in the pipeline. However, implementation of Elkem's ambitious plans cannot move faster than our resources allow. We have to stay competitive.

Aasen: Major innovative solutions have inherent financial risk and are expensive to launch, even if they probably will be profitable in the long, or very long run. We are therefore dependent on close cooperation with governments and other funding sources, to be able to put some of our ideas into action.

Lu: Businesses have an important role to play in solving many of the challenges the world faces today. We must show how we can align high economic growth with a drastic reduction in greenhouse gases and other environmental challenges. Without growth, there is no way to lift large populations out of poverty.

Elkem - an overview

Elkem is one of the world's leading companies in the environmentally responsible manufacture of metals and materials. The main activities are related to production and sale of silicon materials, silicones, ferrosilicon, specialty alloys for the foundry industry, carbon products and microsilica. In 2015 the turnover was NOK 14.5 billion and the net profit NOK 953 million. Elkem had 3,628 employees in over 40 countries throughout the world. Elkem is owned by Bluestar Elkem International Luxembourg, which is controlled by China National Bluestar.

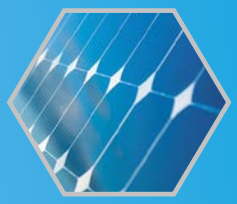
OUR BUSINESS AREAS

Silicon Materials is one of the world's leading suppliers of silicon and microsilica. Silicon has a wide range of applications and is used in the chemical, solar, electronics and aluminium industries worldwide. Microsilica is extremely finely grained silicon that is used as additive to concrete, refractory materials, plastics, fertiliser and sealants for oil wells.

3 plants in Norway.

OUR MARKETS

- Silicones
- Aluminium
- Chemicals
- Solar
- Electronics
- Microsilica
- Construction
- Refractories
- Oil & gas



Silicones (Bluestar Silicones) was merged with Elkem in June 2015. Silicones produces siloxanes and a comprehensive range of silicones, which are a family of specialty, high performance products and materials, produced by reacting silicon with methyl chloride. The Silicones division trades under the Bluestar Silicones brand name.

2 plants in France and one plant in Spain, Italy, Germany, US, Brazil and China.

- Paper & film release
- Automotive
- Chemical formulators
- Personal care/ Cosmetics
- Safety cable
- Textile
- Oil field

Foundry Products is the world's leading producer of ferrosilicon and ferrosilicon-based speciality alloys. The division provides metal treatment solutions to iron foundries and is a supplier of high quality specialty ferrosilicon to the steel industry. The automotive, engineering, pipe and steel industries are important markets for Foundry Products.

2 plants in Norway and one plant in Iceland, Canada, China, (plant in Paraguay under construction).

- Automotive
- Engineering
- Piping
- Specialty steel

Carbon is a world-leading supplier of electrically calcinated anthracite, which is used in electrode paste, cathode ramming paste and furnace lining products that are necessary in the manufacturing process for steel, aluminium, silicon and other metals.

Plants in Norway, South Africa, China and 2 plants in Brazil (plant in Malaysia under construction).

- Ferroalloys
- Silicon
- Aluminium
- Iron foundries

Elkem Technology works on research and development projects related to all parts of Elkem's value chain. The research strategy is based on a close connection between the operational organisation and the researchers.

People are the driving force

Elkem Business System (EBS) forms the foundation of Elkem's corporate culture and operations. EBS is a set of fundamental principles describing how employees at all levels and in all positions shall work together to achieve common goals and continuous improvement.

Individual responsibility

One of the main EBS principles is that people are the driving force. This means that each Elkem employee is encouraged and expected to actively look for and suggest improvements to the processes he or she is involved in. In order to ensure that everyone can take part in and contribute to the continuous improvement work, targeted training sessions are arranged at operator, team leader, administration and management levels. All Elkem's plants have established arenas for active daily improvement work.
A deep level of personal engagement from all employees is an important success factor for Elkem. Annual development discussions provide basis for the professional and personal development of Elkem's employees.

Leadership responsibility

Another key principle of EBS is that leaders are coaches and must have in-depth knowledge about critical processes. Elkem's leaders are expected to be regularly present at the production facilities to see for themselves what is happening, engage in discussions with employees about their tasks, the production flow and improvement ideas. In addition to good coaching and listening skills, the ability to give direct, specific feedback on how each employee is performing his or her duties is an important leadership skill in Elkem.

The four main principles of Elkem Business System are:

1. Make to use
The customer's needs are always in focus. This applies also internally in Elkem, where everyone in the organisation is interlinked as suppliers and customers in a value chain.

2. Empowered people
Elkem ascribes 70 per cent of its success to human input and 30 per cent to the underlying system and technical equipment. People who perform the tasks are the experts, and together they constitute Elkem's resource base.

3. Eliminating waste
Eliminating all forms of waste, including waste of time and human resources, lies at the heart of Elkem's goal of continuous improvement.

4. Processes in control
All processes shall be stable and predictable, and variations shall be avoided.

Corporate management

Helge Aasen
CEO

Morten Viga
CFO

Katja Lehland
CHRO

Inge Grubben-Strømnes
SVP Business development

Håvard I. Moe
SVP Technology

Trond Sæterstad
SVP Silicon Materials

Frédéric Jacquin
SVP Silicones

Asbjørn Søvik
SVP Carbon

Jean Villeneuve
SVP Foundry Products

Louis Vovelle
SVP Innovation and R&D

Mark Breidenthal
VP EHS & CSR

Kristin Karlstad
VP Public relations

Board of directors

Robert Lu
CEO Bluestar
Chairman

Olivier de Clermont-Tonnerre
Bluestar Silicones
Board member

Sverre T. Tysland
Selmer DA
Board member

Helge Aasen
Elkem AS
Board member

Yougen Ge
Bluestar
Board member

Einar Støfringshaug
Union representative
Board member

Espen Sortevik
Union representative
Board member

Corporate governance

Elkem considers good corporate governance to be a prerequisite for value creation and trustworthiness. Elkem has governance documents setting out principles for how business should be conducted. These apply to all Elkem entities. The board of directors approves the Elkem governance structure.

Elkem is governed by the board of directors, which consists of seven individuals, five of whom are elected by the owners and two by the employees. Mr. Robert Lu of Bluestar is chairman of the board. Elkem's CEO Helge Aasen is board member elected by the owners. Aasen also sits on Bluestar's board of directors.

Elkem has had employee representatives on its board since 1974 and promoted the introduction of corporate democracy in Norway. The relationship between the corporate management and the employees is characterised as good and constructive.

Elkem's board meets regularly and conducts its activities in accordance with approved rules of procedure, which are based on the provisions of the Norwegian Public Limited Liability Companies Act.

Corporate social responsibility

Elkem's work on corporate social responsibility (CSR) is coordinated through a steering committee lead by CHRO. The steering committee reports directly to Elkem's CEO.

Elkem has dedicated governing documents and a number of tools in the areas of sustainability and social responsibility in order to safeguard basic human rights, the employees' rights as workers, environmental concerns, a sustainable utilisation of natural resources and business integrity.

Elkem does not permit or tolerate engagement in any form of corruption and has implemented an anti-corruption policy that defines different forms of corruption and how it must be avoided. Elkem has also implemented supplier requirements regarding human rights and responsible environmental management.

In addition to these policies and tools, Elkem publishes an annual sustainability report, documenting its activities and results (see page 10 for more information).

Detailed authority structure and internal control

Control and corporate governance mechanisms shall contribute to achieving predictability and reducing the level of risks for owners and other stakeholders.

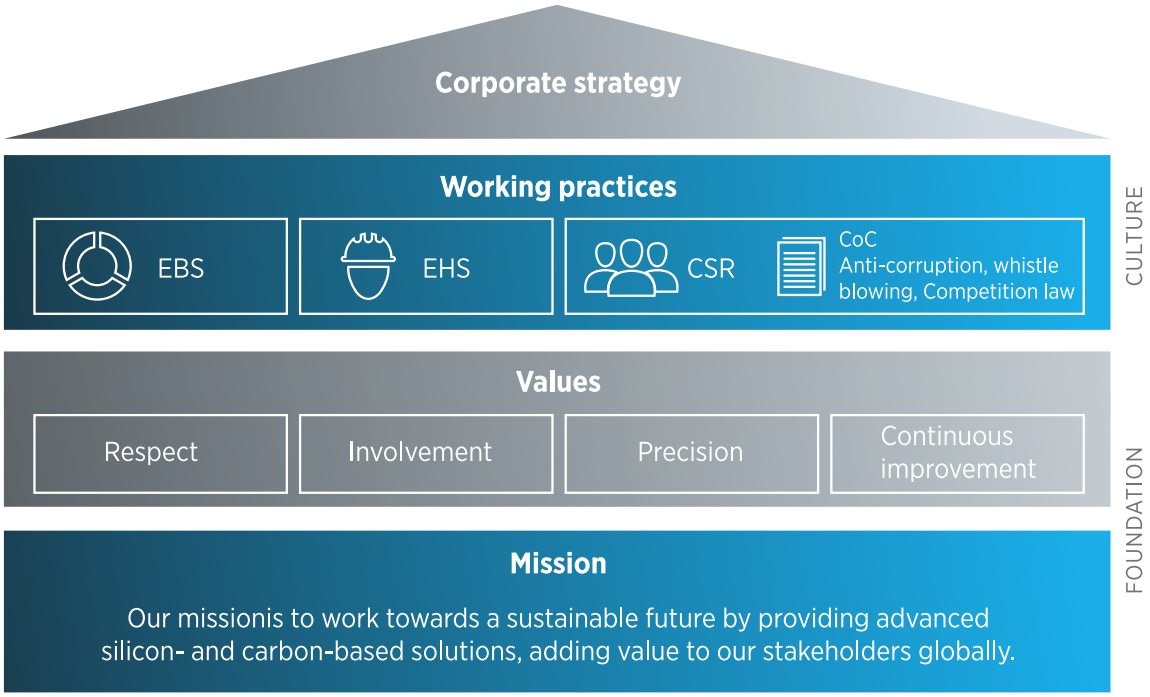
Assessment of risks includes all aspects of the operation and is delegated as a line responsibility. This includes health and environmental risk, financial risk, market risk (price and volumes) and operational risk. There are policies and procedures in place for all areas, and the risk assessment is updated regularly. The board and management monitor Elkem's performance on a regular basis and implement necessary actions when needed.

Elkem's internal control function is exercised through monthly reviews of the business activities at the group management level. The monthly reviews are conducted according to a standard agenda.

A detailed authority structure has been developed to determine who can make decisions at various levels in the organisation.

Corporate social responsibility in Elkem

Elkem is a signatory to UN Global Compact, and Elkem's definition of corporate social responsibility (CSR) is based on the ten UN Global Compact principles. CSR forms an important part of Elkem's business culture.



Organisation and responsibilities

Elkem's CEO is the formal owner of Elkem's policy and program for corporate social responsibility, and governing documents are subject to board approval. All employees have responsibilities to follow Elkem's policies and principles, to report discrepancies to his or her immediate supervisor, or Elkem's function for whistle blowing, and help investigate and correct discrepancies.

Each location and function is responsible for establishing an understanding of how Elkem's CSR policy affects their specific working environment and develop necessary procedures and routines to ensure full compliance.

The formal CSR framework in Elkem includes the following policies and documents:

- General policy of Elkem AS
- Elkem policy for corporate social responsibility
- Mandate for the CSR steering committee
- Code of conduct
- Whistle blowing
- Anti-corruption policy
- Competition law compliance policy
- Annual sustainability report

CSR steering committee

The CSR steering committee has the overall responsibility for defining and following up governing documents for corporate social responsibility. The committee has responsibility for Elkem's annual sustainability reporting.

On a day to day basis, support for Elkem's CSR activities is given by corporate and divisional functions. This includes:

Corporate help chain functions (HR, EHS, EBS, Legal department)

- Support for competence building and change management within the areas of ethics and social responsibility
- Auditing of own business, suppliers, customers and partners

Corporate and divisional procurement functions

- Mapping and basic monitoring of suppliers in relation to Elkem's requirements
- Collaboration with suppliers to improve identified discrepancies
- Termination of relationships with suppliers when the improvement rate is not satisfactory

Corporate and divisional sales functions

- Mapping and basic monitoring of the business functions (sales office, distributor, agent and customer)
- Collaboration with agents, distributors and customers to improve identified discrepancies
- Termination of relationships with agents and customers when the improvement rate is not satisfactory

Training and education

All employees are given documented training in Elkem's Code of conduct. Training includes details about all Elkem policies related to social responsibility and focus on understanding how local culture and customs can influence the perception of what is acceptable in different situations. Selected target group employees are also required to have documented training in Elkem's Anti-corruption and Competition law compliance policy. Each location is responsible for its own implementation and documentation of training, with support from the corporate HR and Legal department. Agents doing business with Elkem's products also have anti-corruption training.

Employees who conduct supplier audits receive additional training in recognised international standards and the use of audit tools. The corporate EHS/CSR function is closely involved in this type of training.

UN Global Compact 10 principles

UN GLOBAL COMPACT

WE SUPPORT

1 Human Rights

Principle 1: Businesses should support and respect the protection of internationally proclaimed human rights; and

Principle 2: make sure that they are not complicit in human rights abuses.

2 Labour

Principle 3: Businesses should uphold the freedom of association and the effective recognition of the right to collective bargaining;

Principle 4: the elimination of all forms of forced and compulsory labour;

Principle 5: the effective abolition of child labour; and

Principle 6: the elimination of discrimination in respect of employment and occupation.

3 Environment

Principle 7: Businesses should support a precautionary approach to environmental challenges;

Principle 8: undertake initiatives to promote greater environmental responsibility; and

Principle 9: encourage the development and diffusion of environmentally friendly technologies.

4 Anti-corruption

Principle 10: Businesses should work against corruption in all its forms, including extortion and bribery.

Collaboration to achieve improvements

Cooperation and dialogue with employees, politicians, local communities, regulatory authorities, organisations, researchers and other interested parties forms an important part of Elkem's continuous improvement philosophy.

Employees

Elkem strives to create a working environment employees find fulfilling, both on a personal and professional level. We want our employees to be able to be proud of working for Elkem. Employee involvement at all levels of the organisation is an important part of this and fully integrated in the Elkem Business System. This means that employees are involved in systematic continuous improvement activities throughout Elkem and included in dialogue about working conditions, occupational health and safety, and Elkem's economic results and strategic choices.

Elkem needs to attract highly qualified and dedicated employees, and wants to influence young people to choose educations that are relevant to Elkem, typically science subjects. School visits, trade fairs and other forums are used to meet students near our production, at universities and sales locations around the world.

Research institutions

Elkem is dedicated to improving its existing business and developing innovative solutions. To achieve this world-class research is needed and Elkem works extensively with many research institutions around the world. International research partners include institutions such as the Wuhan University of Science and Technology (China), L'Ecole des Mines d'Alès (France), Fraunhofer Institute and Technische Universität Bergakademie Freiburg (Germany), Texas A&M University System (USA), Okayama University (Japan), KTH Royal Institure of Technology (Sweden), the University of Central Lancashire (UK) and NTNU (Norway).

Regulatory and supervisory authorities

Dialogue with regulatory authorities takes place both as direct contact between Elkem and the authorities, and indirectly, through business associations. Elkem's largest presence is in Norway and France, where many of our largest plants, as well as our corporate headquarters and major research facilities are located. Elkem

wants to contribute to, and influence, the framework conditions for our industry. An important aspect of Elkem's dialogue with public authorities involves informing about the impact policies will have on our plants and facilities. Elkem is an active member of national and European industry organisations such as Euroalliages, Eurometaux, the European chemical industry council (CEFIC) and industry associations in Norway and France. Important topics for the industry's dialogue with public authorities are emissions and other environmental issues, energy policies and EHS.

R&D funding

Support to implement major, capital intensive research and development (R&D) projects is important to promote industrial innovation and growth.

Elkem is actively involved in several major research projects together with research institutes and industry partners in Norway, France and on EU level. The EU is an important partner. For example, Elkem Technology R&D Center in Kristiansand, Norway, will be an industry partner in a EU project called REE4EU. The project will develop, test and industrialise novel methods for recycling of Rare Earth Elements (REE) from wastes and end-of-life magnets and batteries.

In Norway, Enova, the Research Council of Norway, Innovation Norway, Siva, the Norwegian business sector's NO_x Fund, the Environmental Fund, and private actors such as the Competence Development Fund of Southern Norway, are important partners to promote R&D break-through technologies and their implementation in industry.

Non-governmental organisations (NGOs)

Elkem maintains informal dialogue with numerous environmental organisations and other NGOs in order to share knowledge about various environmental and social issues associated with the operation of Elkem's plants. Elkem also cooperates formally with certain NGOs, drawing on their competence in matters such as sustainable sourcing of raw materials.

Corporate sustainability initiatives

Elkem is signatory to the UN Global Compact, the world's largest corporate sustainability initiative. Global Compact challenges us to align our strategies and operations with universal principles on human rights, labour, environment and anti-corruption. Elkem's silicones division is a member of Responsible Care, the chemical industry's global initiative to drive continuous improvement in environment, health, safety and security performance.

Local communities

Elkem is focused on being a good neighbour everywhere our operations are located. As a long-term partner, we maintain a good dialogue with neighbours and local politicians. Many of Elkem's plants are cornerstone employers and of great importance to local communities, in terms of tax incomes, jobs and community development.

Dialogue with local communities is the responsibility of each plant manager and is carried out both formally and on an informal day-to-day basis. Input from local communities is considered valuable information that helps us improve. Important topics for dialogue with local communities are community development projects, job security, safe operations, emissions and other environmental issues, and traffic generated by the plant. Complaints raised by local communities, and traffic incidents related to our operations are registered and managed in accordance with good practices for incident and deviation management.

Traffic

Elkem manages most if its' own logistics activities stretching from raw material transportation to production sites and to finished product transportation to customers. This general principle allows us to better manage and influence environmental and safety factors throughout the supply chain.

Elkem has introduced a 'safe truck initiative' in parts of Norway, which means that if there is reason to doubt whether a truck and/or driver satisfy national safety requirements, loading will be refused. If the identified deviation is not remedied, it is regarded as a breach of contract and the service provider may lose its contract.

Transportation of raw materials, intermediates and some finished products in the silicones division includes a higher level of risk than in the other Elkem divisions as many of these products are defined as hazardous goods. The division has strict policies for their logistics activities and follows mandated procedures for hazardous goods transportation.

Iceland: Dialogue on environmental performance

Each year, companies located at Grundartangi industrial area in Iceland are required by their operating permit to perform research in order to evaluate environmental impacts caused by their operations. The companies participating in the environmental monitoring programme are Elkem Iceland, Century Aluminium, GMR recycling and Kratus ehf.

The purpose of the programme is to research, ascertain and document any change in environmental effect that the industrial area could have on the external environment (receptor). The monitoring program is issued for 10 years at a time and is under supervision of the Environment Agency of Iceland. The environmental monitoring program covers the concentration of pollutants in the atmosphere, river water, vegetation, ovine animals, the marine ecosystem and ocean near seashore landfills in the vicinity of the industrial plants.

The environmental performance of the industrial area is important to the Icelandic government, but also to the local communities and farmers. The results from the receptor monitoring, internal monitoring (source) and inspection results from each of the plants are presented in a public meeting, including an introduction on counter measures from Elkem Iceland and the other companies. The Environmental agency is in charge of the meetings and researchers and company representatives are present and available to answer questions from stakeholders. In addition, Elkem Iceland informs stakeholders (employees, students, local community, customers and public authorities etc.) about how Elkem Iceland addresses important environmental issues in an annual sustainability report.

Plant manager Gestur Pétursson participates in meeting with stakeholders.

Brazil: Colorir

The Colorir project was started as a neighbourhood project initiated by employees at Elkem Carbon's plants Carboindustrial and Carboderivados in Brazil.

Colorir uses principles from the Elkem Business System (EBS) and focuses on continuous improvement. Measuring progress and results is an important part of the project. Activities and lectures focus on safety and maintenance, and clear goals are set. Today the project also includes schools where Elkem provides teaching materials and training for school employees.

The project has won the 'Socio-economic development' category in a competition organised by Brazilian authorities. Colorir also won second place in the 'Education and development' category.

Colorir is registered as an independent organisation in Brazil and several companies participate as sponsors when the project is rolled out in other areas.

Broad Based Black Economic Empowerment

The Broad-Based Black Economic Empowerment Act (BBBEE) is implemented by the South African government in order to redress inequalities of the past and improve the livelihood for disadvantaged ethnic groups.

In order to deliver excellent results on BBBEE, Elkem Carbon Ferroveld, South Africa, in conjunction with co-owner Samancor Chrome, has implemented policies in the following areas:

1. Employment equity through appointing people in line with a strategy of preferential employment of disadvantaged racial groups
2. Skills development through continuous training of employees and offering scholarships and learnerships for community members.
3. Preferential procurement through awarding contracts to black owned companies as well as developing black owned businesses.
4. Socio economic development through working with the community to improve the lives of community members within the communities that the company operates. The following projects have been undertaken:
   - A school kitchen has been built for the Jeremiah Ndaka Primary School. The school is situated within 5 kilometres of the plant and offers schooling to 1450 pupils.
   - Contribution to the furnishing and medical equipment of a primary health clinic that will allow all members of the community access to primary health care.

Goal: Reduced environmental impact

Based on highly developed production technology, Elkem converts natural resources into products that society cannot do without. This process involves resource and energy consumption and emissions. Elkem is committed to continuously improve the company's environmental performance.

Two of Elkem's most important environmental initiatives involve efficient use of energy and energy recovery. In addition, the environmental focus for 2015 has been on activities to ensure compliance with the EU water directive and to further reduce the level of dust emissions. For the EU water directive, information collection through recipient surveillance and analysis is still the main focus. You can read more about this on page 29. For dust emissions, a number of successful initiatives have been implemented at different plants and measurements show improvement in many areas. Read about Elkem's management of discharge to water on page 25.

Energy

By the end of 2015, all production plants in Norway had implemented systems for energy management according to ISO 50001, and also reduced their energy consumption. Current energy recovery systems connected to furnace operations have a capacity of recovering a total of 200 GWh/year electricity and 400 GWh/year steam and hot water. A major upgrade of the existing energy recovery system at the Bjølvefossen plant in Norway was completed in March 2016, and existing energy recovery systems in both Thamshavn and Chicoutimi have shown good results. New investments for energy saving and energy recovery are in the pipeline. More information about Elkem's energy management is found on page 18.

Emissions

Main emissions to the air include CO_2, NO_X, SO_2 (sulphur) and dust. As these are inherent to our production process, emission levels vary with production from year to year. There are however a number of projects focusing on process and technology development to reduce and/or clean these emissions.

Furnace 3 at Elkem Salten was rebuilt according to plan in 2015. One of the main goals was to reduce the furnace's NO_X emissions by 50 per cent, i.e more than 400 tonnes per year. Because of the NOx reduction potential, financial support was available from the Norwegian NO_X fund. Elkem is also planning to convert several other furnaces based on achieved results and operating experiences related to the new NO_X-reduction technology. Converting furnace 1 at Salten and furnace 5 in Bremanger will give an additional reduction of more than 400 tonnes per year in the coming years. Together, all of these projects will represent nearly 1000 tonnes of reduced NO_X emissions annually.

As far as net CO_2 emissions are concerned, improvement is dependent on

improving production yield and increasing the amount of reduction materials from non-fossil sources that can be used in the process. The yield has been successfully increased over the years, while the future use of biocarbon will depend on the price and availability of sustainable charcoal.

Elkem allocates significant resources to combat dust. However, extremely high temperatures and ultrafine particles that disperse very quickly make it especially difficult to capture dust generated in some of the production processes. Due to high production volumes and start up challenges after rebuilding the dust emissions have gone slightly up in 2015. Read more about Elkem's work to reduce dust emissions on page 28.

For SO_2 the main focus has traditionally been on sourcing raw materials with a lower sulphur content. As this potential is limited, scrubbing systems are also being considered where this is feasible. Elkem is currently evaluating two major projects with support from the Norwegian SO_2 fund. Decisions are expected during 2016 with possible effect from 2018.

Local responsibility

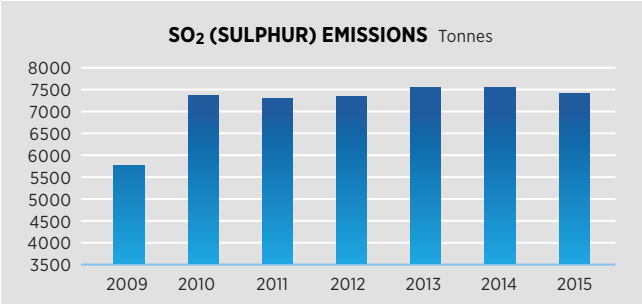
All plants have actions plans aiming at reducing their environmental footprint. Great importance is attached to the recovery and use of bi-products from the different production processes. Emissions and discharges are recorded and dealt with in compliance with public permits at each site. All identified challenges are being managed in a timely manner in cooperation with the authorities. All environmental incidents are recorded, investigated and followed up.

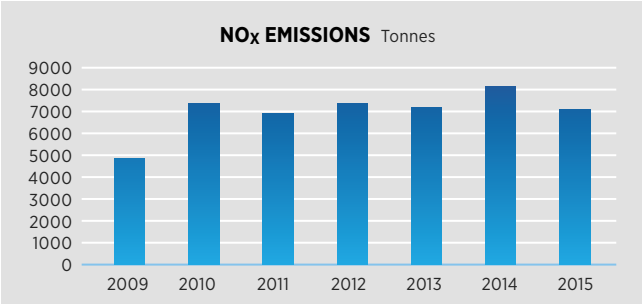
CO_2 quotas

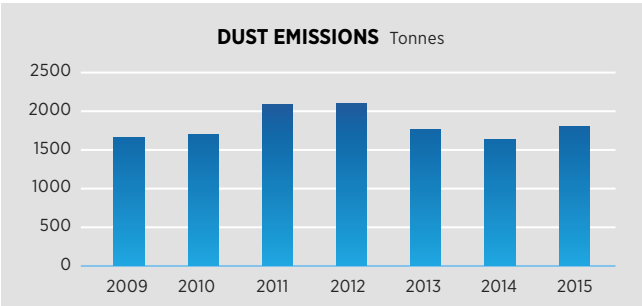
Since 2013, Elkem plants in Europe have been subject to the EU system for trading CO_2 quotas. Energy recovery measures and high consumption of charcoal over many years have given lower net emissions of fossil CO_2 and thus reduced Elkem's need to purchase quotas. Companies like Elkem get the free allocation of 75 per cent of their emissions based on historical product data, but are also credited with quotas for heat sales, energy recovery and/or using bio-based means of reduction. In 2015, Elkem purchased 333,151 CO_2 quotas to cover the gap between its total CO_2 emissions of 1,310,521 tonnes in Europe and the free allocation.

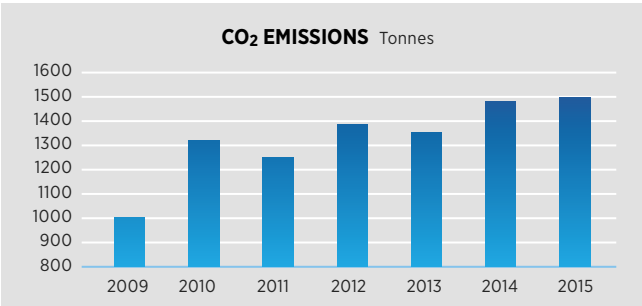
Elkem's silicon and ferrosilicon smelting plants are based on hydroelectric power. 97 per cent of CO_2 emissions stem from process emission. You can see how silicon production results in CO_2 emissions on page 19.

Even though the EU emission trading system (ETS) price is currently relatively low, it does lead to a mark-up in energy prices as power producers pass on their CO_2 costs to consumers of power. This has a significant effect on companies that consume large amounts of power like Elkem does. To counter 'carbon leakage', i.e. that companies in the European Economic Area (EEA) relocate outside the EEA and thus move their emissions to another region without a CO_2 price, the EU and Norway has introduced schemes to compensate for the unintended effects quota trading has on energy prices in Norway. Elkem received a compensation of NOK 67 million in 2015 (for 2014: NOK 31 mill) for the impact CO_2 quota prices had on energy prices. Both the free allocation of free quotas and the compensation for the impact of the prices for CO_2 on energy prices are temporary schemes that will be gradually phased out , meaning that Elkem's allocations via these schemes will shrink each year, while costs will vary according to CO_2 prices as before.





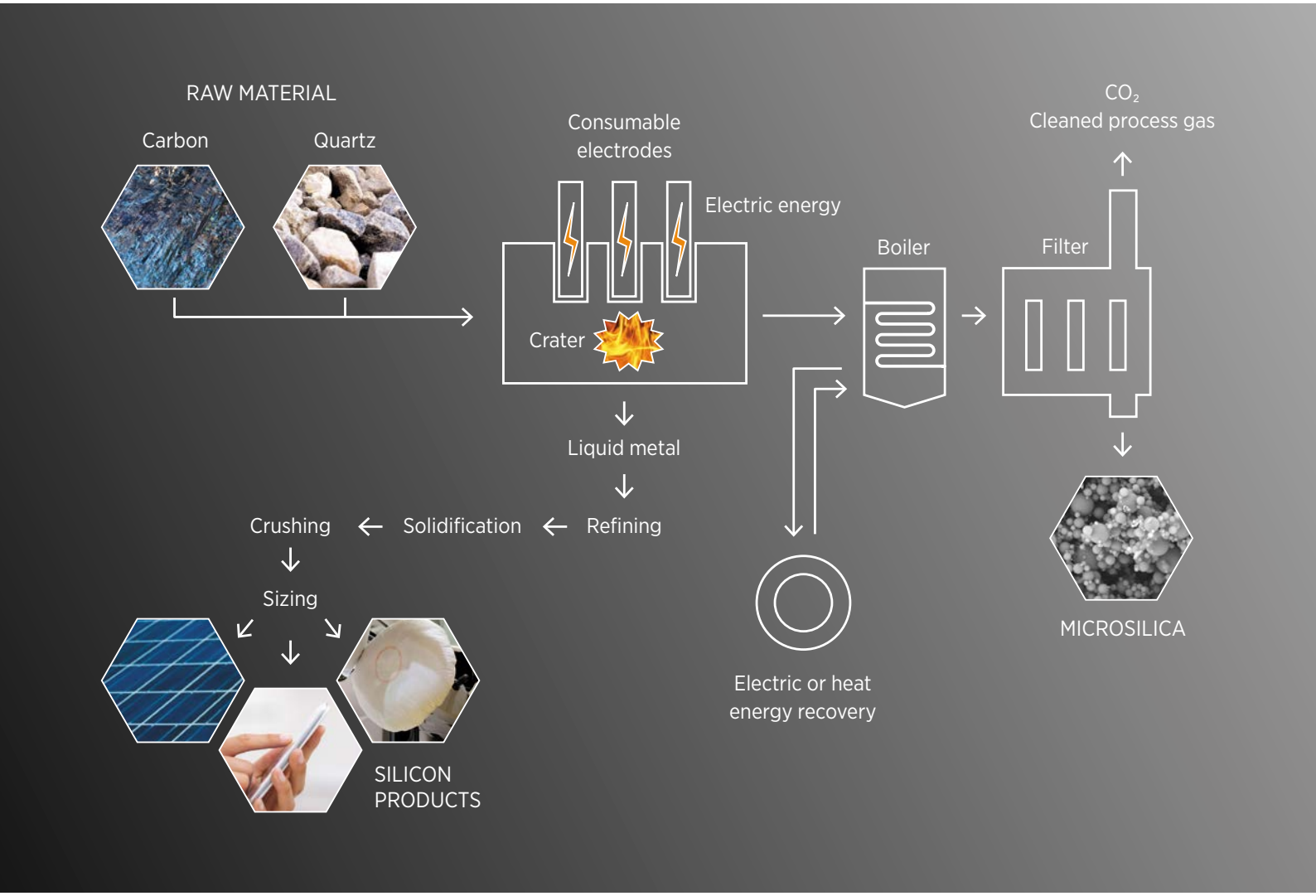




Energy efficiency and scrubbing measures in Elkem

Problem	Measures	Where	Solution provides
Unused thermal energy from production Poor resource utilisation Unnecessary indirect CO_2 emissions	Energy recovery plant	Most plants	Hot water and steam for reuse or sale Electricity for sale Better resource utilisation Lower CO_2 emissions
Unnecessary electricity consumption for furnace operation Poor resource and raw material utilisation	Ensuring stable furnace operation and continuous development of optimum furnace operation	All plants	Lower electricity consumption Better resource and raw material utilisation
Unnecessary electricity consumption for plant operations, other than furnaces Poor resource utilisation and higher costs	Energy efficiency measures	All plants	Lower electricity consumption Better resource utilisation and lower costs
Inadequate control of silicon dust from production Local pollution and loss of sellable by-product	Collection of dust in scrubbing system connected to silicon and ferrosilicon furnaces Processes under control	All silicon and ferrosilicon plants	Valuable by-product (Microsilica) Less pollution and better quality of life in local environment Better relationship with local community
Inadequate control of dust in the workplace Deterioration of the working environment Wasting sellable by-products Time and resources spent on cleaning and maintenance	Development of production methods for avoiding dust generation New equipment Better extraction and cleaning	All plants	Improved working environment and health and safety results Reduced time used and costs for cleaning and maintenance Sellable by-product
NO_x emissions Poorer air quality in the local environment	Introduction of new feed method, new furnace design in line with research results	Elkem Salten, Norway	Up to 40 per cent lower NO_x emissions
SO_2 emissions Poorer air quality in the local environment, odour	Use of raw materials with less sulphur where appropriate SO_2 capture and scrubbing	Raw material use in all plants Plans for SO_2 capture at Fiskaa Carbon and Bjølvefossen	Eliminates SO_2 emissions Better relationship with local community
Runoff of pollutants to waterways, sea and ground	Reduced water use Projects reducing pollution of waste water Better control of diffuse emissions Bio-purification of polluted rain water at plants in tropical climates	Silicones plants in France Elkem Carbon, Norway and Brazil. Bremanger Silgrain	Reduced chemical oxygen demand (COD) emissions Reduced supply of polluted dust into the surroundings that can be dispersed further by water Clean water

The silicon and ferrosilicon process



FACTS ABOUT NO_X

Silicon is the most common element in the Earth's crust. In the Elkem process it is extracted from the mineral quartz. In its natural state, silicon is 'married' to oxygen. This is a marriage that only a very high temperature can dissolve. Temperatures must reach 1,500-2,000 degrees Celsius before silicon is released from the oxygen bond; only then does the substance become a useful product.

Much of the released oxygen remarries with the carbon in coal, coke or wood in the furnaces and turns into CO_2. But some lonely oxygen atoms seeking a partner will always manage to bind themselves to nitrogen in the air instead and thus become nitrogen oxides (NO_X).

Nitrogen oxides (NO_X) are gases that lead to higher concentrations of tropospheric ozone, acid precipitation and global warming. These emissions can be harmful to ecosystems and vegetation, as well as health.

- In Norway, the transport sector accounts for 58 per cent of Norway's collective emissions, while industry accounts for 11 per cent.
- Elkem accounts for about 3 per cent of Norway's total NO_X emissions.
- The Norwegian business sector's NO_X Fund is a team effort where affiliated companies can apply for support for emissions reducing measures. The processing industry is not obliged to pay into the fund, but can still receive support for cost-effective measures.

If you and your company have ideas that may be of interest to Elkem, please contact us. We are always interested in discussing new technology, products or business opportunities or even sharing best practices to enhance our innovation performances.

Innovation in Elkem

Future oriented and ambitious innovation strategies have been the foundation for Elkem's development and success since Sam Eyde established the company in 1904. The integration of Bluestar Silicones in 2015 reinforced this strategy, mainly in the field of new products and new markets.

Elkem's development has always been based on world-class in-house expertise within our core competencies: metallurgical high temperature processes, furnace operations, material characterisation and chemical analysis. Research & development (R&D) is at the core of our businesses, and Elkem's R&D centres with near 400 researchers, are strategically located across Asia, Europe, Latin America and the USA. Our commitment to R&D upholds our reputation as a leader in our field and we continuously lead the way in pioneering technologies that ask more from metallurgy and chemistry. During the last few years, innovation in Elkem has been focused on finding sustainable solutions. Elkem University is the main internal arena for technology transfer and dissemination of new knowledge.

Elkem's innovation strategy covers:

- **Incremental innovation:** The core of Elkem Business System (EBS) is the organisation's continuous work on improvements. Elkem employees are always looking for improvement potentials, and use EBS tools to describe the potential, find solutions and measure results. This means that Elkem achieves progress that keeps the company equipped to stay competitive.
- **Step-change innovation:** As we continue to evolve, we look for future growth opportunities by monitoring market trends. Working groups consisting of marketing, technology and R&D resources support front-end innovation and product development.
- **Radical improvements:** To keep our position as a world-leading materials producer Elkem also seeks radical improvements through research.

Innovation as part of the corporate strategy

In Elkem we set innovation targets to achieve our strategic goals and environmental performance. Examples are Carbon Neutral Metal Production, research on reuse of process water and projects on energy recovery and energy efficiency.

The four most important areas for step change innovation or radical improvements are:

- New or improved products and services
- Fundamentally new production methods, equipment and processes that achieve improved quality, improved safety and a smaller environmental footprint of our products – energy efficiency, resource efficiency, or reduced emissions
- Development of new sources of raw materials
- Innovative ways of working, both in sales, marketing and production

Open innovation

Collaboration is increasingly important for successful innovation. Open innovation means that we share ideas and create value, and open the mind to new possibilities.

Identifying potential partners and developing relationships with customers, suppliers, research institutions, government authorities and financial markets is therefore an integral part of Elkem's innovation strategy. By working alongside partners with complementary skills to our own, we have enhanced the development of new products, processes and services.

Elkem continues to move production towards ever more specialised solutions and products. Ideas for new products often emerge in meetings where our technical specialists, researchers and production managers cooperate with the customer to find solutions. By continuously looking for ways to improve our products, focusing on quality rather than just cost, we create lasting value for our customers.

The open innovation approach to R&D is also made possible by multiple collaborative projects supported by European, Norwegian, Chinese and French governments and through industry clusters such as Eyde in Norway and Axelera and Techtera in France.

Many of our most successful research-based innovations come from research programmes in cooperation with universities, research institutes and industry partners, with support from the Norwegian Research Council and French Ministry of Research.

Carbon Neutral Metal Production

Carbon Neutral Metal Production (CNMP) is the combination of ferrosilicon or silicon production, charcoal production, and utilisation of the combined high energy off-gas flows from both production lines for steam or electrical power generation.

At optimal levels, the power generated in this process will be greater than the power consumed. Alternatively, the by products from the charcoal production, including both biogas and bio oil, can be refined into more high value chemical products.

Elkem is among the world's cleanest metal manufacturers but still releases around 1.4 million tonnes of CO_2 each year. It has long been acknowledged that it is possible to replace fossil coal with charcoal, thus substantially reducing net CO_2 emissions depending on the amount of charcoal used. Quartz consists of silicon and oxygen. In a chemical reaction at high temperatures carbon releases the oxygen from the quartz. Subject to strict quality requirements, charcoal could do this job better than fossil coal, meaning that the use of charcoal may also increase the efficiency of the silicon furnaces.

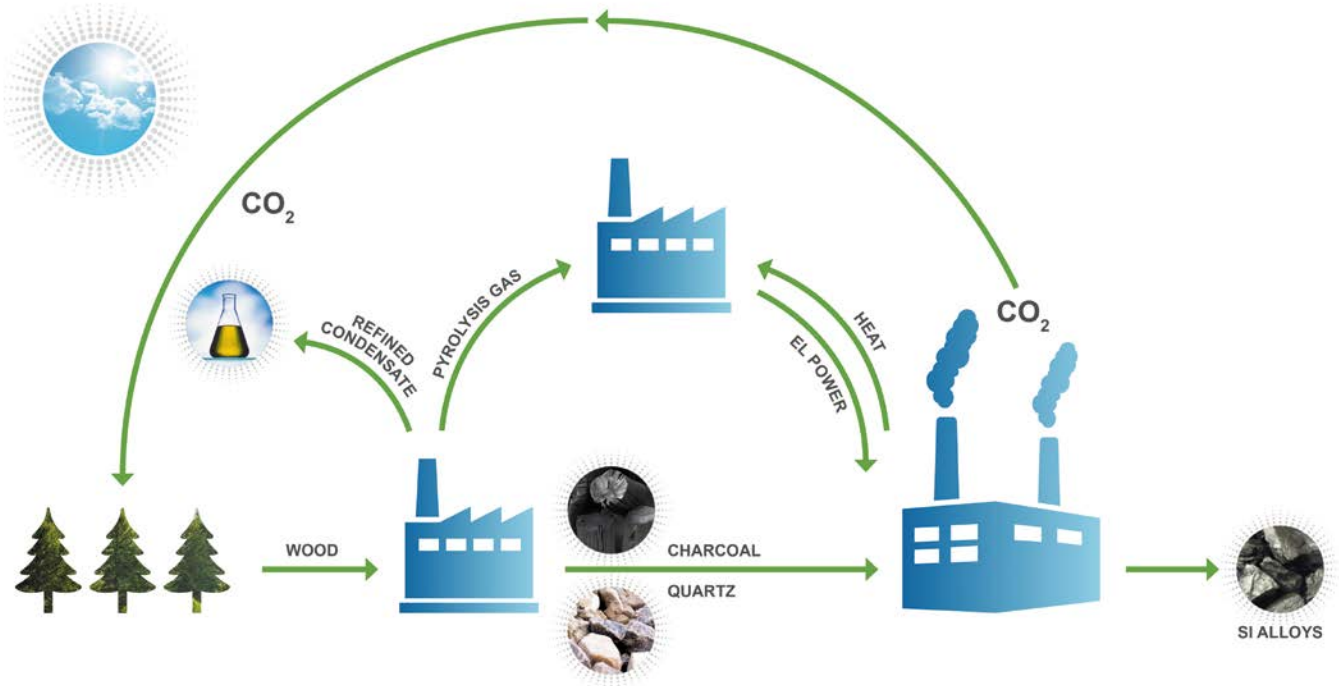
Research on the CNMP process started in 2013. In December 2014, the Norwegian Research Council of Norway awarded NOK 7 million in funding to the research project over a two-year period starting in January 2015. Elkem's own investment will be just over NOK 8 million in the same period. Elkem's technological partners in the project are SINTEF Energy Research and Teknova, both located in Norway. Elkem is considering teaming up with partners from relevant industries.

During 2015, the CNMP project has been looking into different ways to optimise the concept. Technically, it is possible to adjust the process to increase the amount of oil produced at the cost of lower volumes of electricity and charcoal. The optimal mix of charcoal, electricity and oil will depend of the market prices and government taxes or subsidies.

Liquid or gas bio fuel for the transport sector, whether for cars and trucks or airplanes, can be an interesting alternative to producing electricity. To make use of low temperature heat, district heating can be an interesting option if the charcoal plant is located close to densely populated areas.

The common denominator for all concepts is to extract all energy and materials from the timber that will be used as feedstock. The goal is zero waste and zero net greenhouse emissions. No waste means better economy.

The research project is scheduled to conclude by the end of 2016. Elkem will then decide whether the project will be continued with large-scale tests in laboratories and industrial pilot plants.



Research to develop next generation high capacity Li-ion batteries

Two new projects will help develop the promising Li-ion batteries further. The test cells that have been tested contain twice the amount of energy compared to Li-ion batteries available today.

Next generation electric vehicles, the development of smart grid solutions and the need for more efficient utilisation of renewable power, demands Li-ion batteries with higher storage capacity. Current Li-ion batteries are limited by the material properties of graphite and cannot fulfill the future capacity need. Replacing graphite with silicon would solve this problem.

Until now, the problem with silicon based Li-ion batteries has been restrictions in how many times the batteries can be charged. In 2015, Elkem made good progress in increasing the numbers of charging cycles. The ground-breaking research is supported by the Research Council of Norway.

Elkem has carried out research on developing the optimal silicon material for batteries since 2010. In theory it is possible to increase battery capacity tenfold by using silicon as the anode material. The problem with silicon, however, is that it expands 3-400 per cent when it reacts with lithium during discharge. This can lead to the pulverisation of the anode, meaning that the battery looses capacity.

Silicon and graphite

Elkem has its own divisions of specialists in both carbon and silicon who, together with the Institute for Energy Technology (IFE) and SINTEF in Norway have tried to find mix proportions with silicon that can withstand enough charging cycles to be used in, for example, a car. Binding together microscopic particles of silicon and graphite leaves enough room in the structure for the silicon elements to expand and contract without the substance being pulverised.

In 2015, Elkem Technology concluded a three-year research project and decided to transfer the battery development project to Elkem Silicon Materials. This indicates a possible commercialisation in foreseeable future. During 2015 tests have been done with Si-batteries that have double storage capacity compared with ordinary batteries. Results show that a battery with a silicon/graphite anode could do more than 1000 charge cycles. This is, however, still low for most electrical vehicles.

To improve these results, the two new research projects *'Silicon anodes for Li-ion batteries – optimised binder, electrolyte and cathode'* and *'Industrial scale silicon - carbon composites adapted to battery grade anode material'* have been launched. The goal is full industrial use of silicon as anode material.

Elkem currently produces speciality silicon, Silgrain® e-Si, at the plant in Bremanger, Norway. Elkem's unique production process gives Silgrain® e-Si a considerably lower environmental footprint than comparable silicon materials, a pH that limits hydrogen gas development during processing of slurries and high consistency in size and chemical composition. Institutes and Li-ion battery producers use Silgrain® e-Si in battery Li-ion batteries. Silgrain® e-Si was developed in collaboration with AIST Kansai, a Japanese research centre.

Energy leadership

Elkem is constantly seeking ways to reduce energy consumption per produced unit. There are three ways to reach this goal: Increasing the production yield, recovering heat from the furnace off gases and managing other energy consumption.

Silicon alloy production is energy intensive. In 2015, the electrical smelting furnaces in Elkem consumed 4,314 GWh electricity, compared to 4,257 GWh in 2014. In addition to electricity, the production process requires adding carbon based reduction materials in vast quantities to the process. Historically most of these have been fossil based sources (approximately 500 thousand tonnes coal in 2015) while a substantial amount have also been renewable based sources (approximately 250 thousand tonnes charcoal/woodchips in 2015). Taking into account the different carbon content, reduction materials from renewable sources comprises about 15 per cent of the total. The carbon sources also represent a vast amount of energy.

Elkem recovered 483 GWh of energy in 2015, compared with 421 GWh in 2014. As per cent of total electricity consumption, the amount of recovered energy was 11.1 per cent in 2015 (9.9 per cent in 2014).

While 180 GWh of new electricity was generated from hot off gasses at two of the plants, most of the recovered energy was utilised as district heating, or in the case of Elkem Chicoutimi, as 224 GWh of steam sold to the nearby aluminium plant of Rio Tinto.

Energy efficiency

The most effective method to reduce the energy used per produced tonne of ferrosilicon or silicon is to make the production process more energy efficient. Elkem has some of the most energy efficient smelting furnaces in the world, but we still see there is potential for improvements and have a dedicated research and development project called Si2020 that focuses on furnace design, process control, refining, and optimal use of raw materials.

Energy recovery

There are two main pathways to recovering energy from the smelting process. Both have their advantages and challenges. The first method recovers energy by utilising surplus heat directly in the form of steam or hot water. This is very efficient, but not very feasible as most of Elkem's plants are located in sparsely populated areas where there is little demand for heat from local communities or other industry.

In the second method for energy recovery, surplus heat is used to produce electricity. The advantage is that electricity can be fed into the power grid. The problem is that two thirds of the energy is lost in the transformation.

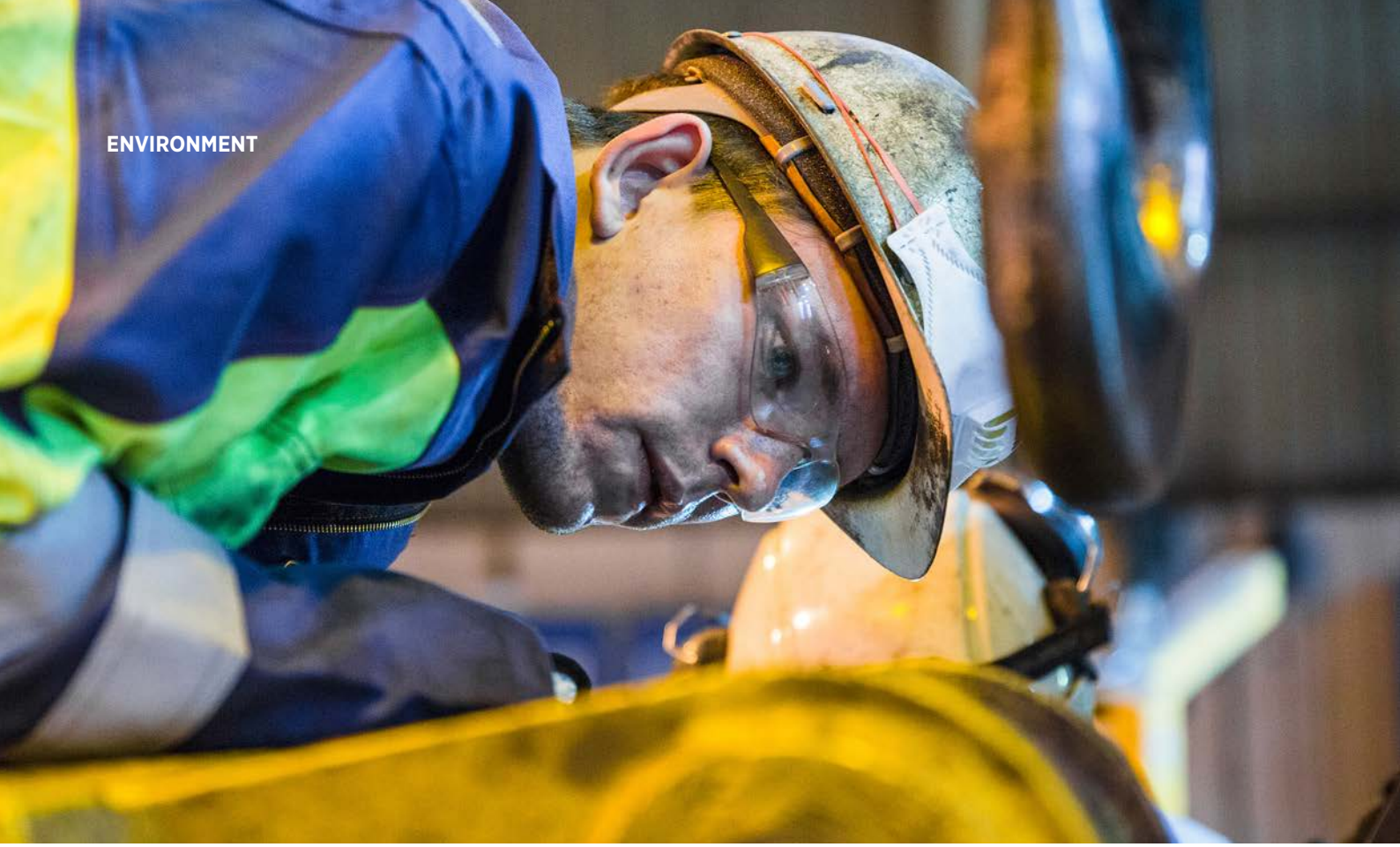
Both methods are currently used by Elkem. In Norway, Elkem Thamshavn currently generates around 160 GWh of electricity every year, and Elkem Bjølvefossen will increase it generating capacity from 40 to 80 GWh per year, after the recovery facility upgrade was finished in March 2016.

Maintaining an intense focus on energy efficiency has made Elkem Thamshavn, Norway and Elkem Chicoutimi, Canada the world's most energy efficient smelting plants for silicon and ferrosilicon production respectively. 70 per cent of the electrical energy used at Elkem Chicoutimi in 2015 was recovered as steam and sold for use at a neighbouring plant. The main study for a new energy recovery facility at Elkem Salten, Norway, with a potential of recovering 300 GWh/year has been performed, but low electricity prices in Norway have made it difficult to finance the project, which still is under consideration.

Energy management

All Elkem plants in the Silicon Materials, Foundry and Carbon divisions now have energy management systems that comply with ISO 50001. The process has showed us that even small measures, such as better insulation, motor inspections, lighting management, sealing leaks in compressed air systems, and heating and cooling control, can produce substantial savings, even though each individual measure is relatively small compared with the energy consumption of a smelting furnace. Potential energy savings of 10 per cent of auxiliary energy have been identified.

The upgraded energy recovery plant at Bjølvefossen.



Cooperation across European industries

Project RECOBA is a project across sectors developing tools and methods for real-time sensing, advanced control and optimisation of batch processes to save energy and raw materials.

All companies in the European process industry are facing the same challenges: product quality must be excellent, production costs must be lowered and the ecological footprint must be reduced, through resource and energy efficiency in products and processes.

A consortium of major companies in different sectors, universities, research institutions and small enterprises participate in the RECOBA project. Elkem is one of three world-leading companies from the polymer, steel and silicon metal industry that are participating. These three sectors represent important branches of the European process industry. The goal of the project is the maximisation of efficiency regarding quality, energy, raw materials, and costs of batch processes.

In general, efficiency varies for different batch runs in any given process. This is due to different products, feed qualities and time-consuming corrective actions. Fixed schedule-driven operations do not consider such disturbances. However, by using an integrated sensing and control system, one can always achieve the maximum efficiency.

Elkem aims to apply new and innovative sensor technologies to measure key process parameters. The measured values will be input to sophisticated process models, both off-line and on-line that help us run the process more efficiently and stably.

If successful, this will give energy savings in the order of 26 GWh and emission reductions of 15,000 tonnes CO_2 for Elkem alone.

Polymer industry: With an annual production in Europe of 2-2.5 million t/a and an expected reductions of 5 per cent in energy and raw materials thanks to integrated process control, this sector could reduce its CO_2 emissions with 525 kt/ annually.

Steel-making: Improved process control would result in estimated energy savings of 10 per cent for the steelmaking sector. This represents around 600 GWh/a, and 360 kt/a in CO_2 emissions respectively.

Silicon production: Current silicon production in Europe is 335 kt/a. The implementation of real-time process control would give an estimated energy savings of around 79.2 GWh/a reducing CO_2 emissions by about 47.5 kt/a.

Local water monitoring in Norway

During 2015 the six Norwegian Elkem plants have monitored their surrounding water bodies.


Photo: Sigurd Øxnevad, NIVA.

The monitoring programmes done by Elkem Salten, Elkem Thamshavn and Elkem Bjølvefossen, were mainly designed and performed to monitor possible run-off from existing or previous landfill sites, whereas the Elkem Carbon and Elkem Solar monitoring programs in Kristiansand were designed to take into account regulated discharge to water. The plant-specific water monitoring programs are in compliance with the Norwegian and European water regulations and were approved by the Norwegian Environment Agency early in 2015. Elkem Bremanger had the most extensive program, monitoring both potential run-off from landfills and regulated water discharge. With the exception of Elkem Salten and Elkem Thamshavn, water monitoring has been an ongoing activity for almost a decade or more at the other Norwegian Elkem plants.

The water monitoring results were mostly as expected. Key parameters like levels of heavy metals and organic compounds in blue mussels and sediment levels from landfill run-off at Elkem Salten, Elkem Bjølvefossen and Elkem Thamshavn seem to be very low. The environmental status of the Nordgulen (Elkem Bremanger) and Kristiansand fjords (Elkem Solar and Elkem Carbon) are more complex, due to various past and present activities from both industrial parties and the local community.

Feedback will be given to each plant regarding the continuation and frequency of water monitoring by the Norwegian Environment Agency in medio 2016. For water bodies in Norway that are at risk of not achieving 'Good Chemical' or 'Good Ecological' status within 2021, the agency plans to address risk reducing measures during the autumn of 2016.

Plant	Monitored water bodies	Blue mussels stations and parameters		Sediments stations and parameters	
Elkem Salten	Andkilen stream, the Tørrfjord river and Tørrfjorden	3 stations (February 2016)	Metals and PAHs	5 stations (February 2016)	Metals and PAHs
Elkem Thamshavn	Skjenald river (upper part) Orkdalsfjorden	 5 stations (September/October)	 Metals and PAHs	6 stations (June)	Metals
Elkem Bremanger	Nordgulen fjord	7 stations (August)	Metals and PAHs	8 stations 4 stations (July)	Metals and PAHs Metals
Elkem Bjølvefossen	Samlafjorden	5 stations; (September)	Metals and PAHs	1 station	Metals and PAHs
Elkem Solar	Kristiansands-fjorden (inner port)	5 stations; (May and September)	Metals		
Elkem Carbon	Kristiansands-fjorden (inner port)		Metals and PAHs		

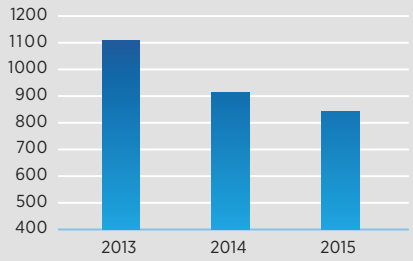
Water management in silicones production

The Elkem's Silicones division does not have a standalone water policy. Water management issues are included in the Responsible Care Global Charter that Bluestar Silicones is a signatory to. All silicones plants have permits, which limit effluent discharge and define daily limits for discharge volume, flow rate and concentration of pollutants. The parameter used is chemical oxygen demand (COD), expressed as metric tonnes of oxygen. COD emissions are measured at all plants and analysed and managed daily. An monthly environmental review is organised at plant and board level for the French plants as they represent around 99 per cent of Bluestar Silicones' effluents.

In addition to compliance with local environmental permits, continuous improvement in both water use and COD reduction is the goal. Several improvement projects have been initiated during the last 3 – 4 years. Some examples are:

- Several contaminated water discharges stopped and are now incinerated
- Installation of dry vacuum pumps instead of water vacuum pumps
- Optimisation of pH treatment to remove soluble copper before discharge
- New distillation column to reduce volatiles.

COD EMISSIONS FROM BLUESTAR SILICONES



* Numbers from plants in France, representing around 99 per cent of Bluestar Silicones' water reject.

Lower PAH emissions

A majority of Elkem Carbon's products contain PAHs (polycyclic aromatic hydrocarbons). Elkem is systematically working to reduce its PAH emissions.

PAH free products

By developing products that do not contain PAHs, Elkem Carbon aims to minimise PAH emissions both from its own production and from its customers' production. Elkem Carbon has developed ELSEAL® Type G as an alternative to coal tar pitch based ramming paste. ELSEAL® Type G contains neither PAHs nor other hazardous substances. There are no emissions of PAHs during use, and workers will not be exposed to these potentially harmful compounds. Read more about ELSEAL® Type G in the article Product stewardship in Elkem (page 36).

Reduced waste

To avoid unnecessary disposal of waste containing PAHs, scrap production is recycled in the production of new products. The rejected products are crushed, sieved and fed in controlled quantities into the production process through a separate silo.

Reduction of PAH emissions to air

Elkem Carbon Fiskaa, Norway, aims to keep its emissions of PAH under 50 per cent of what is permitted in their environmental permit, even with increased production. A stable production process in a well-maintained facility is important to reach this goal. PAH emissions to air from the plant and in the working environment have been greatly reduced, and the positive trend has continued in 2015.

Systematic work to reduce dust has had a strong impact on Elkem Carbon's PAH emissions to air. As part of the program Elkem Carbon has done a comprehensive mapping of exposure to dust and PAH for all employees. The vast improvements have given room for less use of personal respiratory protection as the air in the working environment is safe to breath.

Elkem Carbon, Fiskaa, Norway is also participating in a national survey on moss quality in the areas around Norwegian production facilities. This includes determination of PAHs and metals in moss and PAHs in air.

Reduction of PAH emissions to water

Efforts are ongoing at all Elkem Carbon plants worldwide to reduce the amount of water used in production. PAH emissions to water from Elkem Carbon Fiskaa, Norway have been heavily reduced from around 650 kg to around 10 kg per year. Extensive maintenance has been carried out on the water pipes to avoid leaks, and new piping has been installed, in order to separate water streams into clean cooling water and contaminated water. This makes it possible to treat the contaminated surface water and measure emissions. Since 2010 Elkem Carbon Fiskaa, Norway has been monitoring the water and sediment quality for PAHs in the neighbouring fjord (Kristiansandsfjorden).

Elkem Carbon Ferroveld in South Africa has an integrated process water treatment system on site. Contaminated water from the extruder facility is transferred to process water used for cooling chrome slag at another production facility in the industrial park. In this process contamination is destroyed and water evaporated instead of being discharged.

In tropical regions, biological methods for water purification can be used to remove PAHs and other contamination from rainwater and other storm water. At Elkem Carbon's plant in Brazil, water that may be contaminated is fed through three basins: one containing old wood materials, one containing plants, and one containing bacteria. This purification method will also be adopted at Elkem's new plant in Malaysia.

PAH

Elkem Carbon uses coal tar pitch as a binder. Coal tar pitch contains *polycyclic aromatic hydrocarbons* (PAHs). These are a group of over 100 different chemicals that are formed during the incomplete burning of coal, oil and gas, garbage, or other organic substances like tobacco or charbroiled meat. Some of these chemicals have been defined as carcinogenic, meaning exposure to them may cause cancer. Industry, road run-off and sewage are typical sources of PAH emissions.

Capturing ultrafine dust

In the production of (ferro-)silicon, dust is both a health hazard and a pollutant. Dust also means waste because dust particles are products that have gone astray. Process dust from the furnace, tapping and casting processes is a valuable product for Elkem, captured in large bag house filters and sold to the market as Elkem Microsilica®.

Elkem allocates significant resources to combat dust, for many reasons. The overall goal is to reduce process dust in the working environment to levels where exposure is acceptable without the use of respiratory protection. All Elkem's Norwegian (ferro-)silicon plants have developed detailed plans regarding reduction of dust generation and improved dust collection.

Extremely high temperatures and ultrafine particles that disperse very quickly make it especially difficult to capture dust generated during the tapping and casting processes for molten metal. These two areas were identified by the FUME research project as primary sources of dust in the production of (ferro-) silicon. Elkem, together with partners in the FUME project successfully gained greater understanding of the challenges and developed better solutions for dust collection near sources with gas temperatures of up to 1,400 °C.

Continued research

Elkem is also partner in DeMaskUs, which is a four-year research program started in 2015 as a follow-up to FUME. DeMaskUs is an interdisciplinary research project financed by the Norwegian Research Council. Participants are the Norwegian ferroalloy, silicon and silicon carbide industry, with Norwegian research partners. The studies include basic physics, chemistry and thermodynamics.

As the project name suggests, the main focus for the program is respiratory protection with dust masks. Do traditional dust masks give real protection, or a false sense of protection? The project is researching the effectiveness of various dust masks against ultrafine particles, the importance of personal customisation of masks, the psychological aspects related to using a dust mask and psychological aspects that influence the use of dust masks in the industry. Elkem's production plants will participate in this important work.

'Doghouse' technology

In parallel with this research, Elkem has been developing new types of highly effective local dust collection and extraction systems for the tapping area, commonly called 'Doghouse technology' after the first prototype. The tapping area is one of the most difficult emission points for combatting dust. As each furnace is unique with respect to processing and structural conditions, the technology must also be tailored to each furnace.

The 'Doghouse' technology has been installed at several Norwegian plants:

- An industrial pilot was installed on Thamshavn furnace 1 in 2013.
- The second installation was done on Bremanger Foundry furnace 4 in January 2016, and the third is now initiated for Bremanger Foundry furnace 2.
- For Elkem Salten furnace 1 and Elkem Thamshavn furnace 2 conceptual design solutions are developed.

Casting

Elkem is also working with the development of extraction hoods for capturing process gas during casting. This is challenging because it involves several moving systems and multiple points of dust generation. A preliminary study has been done at the Salten plant in Norway and will now be followed up with a pilot proposal.

Combatting dust at Elkem Carbon's plants

In 2010, Elkem Carbon initiated a project targeted at eliminating dust and other emissions in the working environment. Given that finely crushed and dried coal (anthracite) is one of Elkem Carbon's most important input factors, this was an ambitious goal. Systematic work on combating dust has produced very good results.

'The Zero Dust' initiative was launched at all Elkem Carbon sites, and measurements were taken in targeted areas. These results have been used as the reference point for future improvements.

Important

Dust reduction means a great deal for all parts of production:

- Greater well being for employees, thanks to a better physical working environment. Wearing a dust mask correctly can be physically trying for many employees. Elkem Fiskaa, Kristiansand, Norway, achieved an important goal in 2014 when the general requirement to wear respiratory protection in the production hall was removed based on improvements verified by working environment exposure measurements.
- Anthracite dust is abrasive and wears out equipment. Dust control gives greater operational stability for machinery and equipment, and reduced repair and maintenance costs.
- Enabling the introduction of more cost saving automated processes and the use of equipment that cannot tolerate high dust loads.
- Reduced pollution because dust may contain PAH components.

New equipment

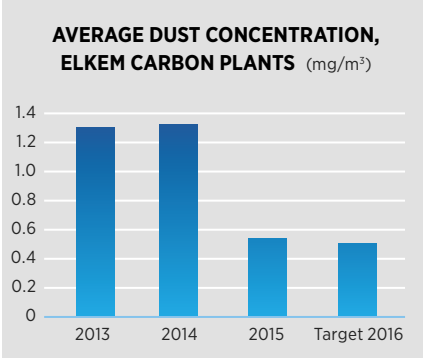
Changing equipment has had great effect: New equipment has better seals and is smaller, meaning the dust containment and extraction is more effective. New sieves and new mixers have resulted in substantial dust reduction, and have made it possible to introduce automated solutions that would otherwise be unfeasible because of the wear from dust. In turn, automated solutions also result in less dust. One example of this is a considerable reduction in the use of forklifts by using conveyer belts for internal transportation, and thereby avoiding stirring up dust with vehicle movement.

When Elkem Carboindustrial, Brazil, installed a new sieve, they took the opportunity to redesign the whole area and remove idle equipment around the sieve. In addition to a substantial reduction of dust from the new sieve, this has also resulted in a sharp drop in other emission points for dust and given brighter and better working conditions in the area around the sieve. Elkem Carbon aims to implement this type of improvements in connection with the installation of new technology and new equipment at all of their plants.

At Elkem Carbon Ferroveld in South Africa, a new extruder line was installed in 2011, which significantly reduced the amount of coal tar pitch volatiles (CTPVs) released into the work environment. The Elkem design allowed the extruded paste to be submerged in water, milliseconds after exiting the extruder, capturing the vapours in the process water. The remaining CTPV was captured through an extraction hood and fan. This was significant as the extruder area (crane bay) is where 90 per cent of the people work and are exposed to CTPV for the greatest part of their shift.

In 2015, Elkem Carbon Ferroveld completed the installation of a self-positioning dust extraction hood that is connected to an extraction fan and bag filter, on their skip hoist. Historically the skip hoist has been one of the main dust generators at the plant causing serious dust problems throughout the facility. An enormous improvement has been made reducing static emissions from an average of 2.89 mg/m^3 in 2013 to only 0.47 mg/m^3 in 2015.

Combatting dust at the Ferroveld plant in South Africa.



Mutual respect

Elkem has operations and sales offices on all continents. Understanding how to systematically improve work processes is a core skill in Elkem, along with technology and processing know-how.

The strategic role of Human Resources (HR) in Elkem is to support the business strategy implementation by continuously developing the organisation in line with the Elkem Business System (EBS) that is actively practised at all levels of the organisation, world wide. Furthermore, continuous talent management and systematic competence development are key to successful growth of the company.

Elkem's employees

In June 2015 Elkem acquired Bluestar Silicones International. At the same time, Elkem Solar was restructured as a sister company to Elkem AS, within the same ownership structure. While Elkem had 2,127 employees at year-end 2014, it employed 3,628 people at the end of 2015.

Around half of Elkem's employees work as operators at Elkem's production plants in Brazil, Canada, China, France, Germany, Iceland, Italy, Norway, Malaysia, South Africa, UK, Spain and USA. In addition to production plants, Elkem also operates mining operations in Spain and Norway. Elkem has sales offices in 22 countries, with approximately 250 employees working with sales-related activities. About 10 per cent of Elkem's staff (370 employees) are engaged in research and development at group and divisional level. Elkem's head office is in Oslo, Norway, which is also the base for central administrative functions.

Skills development

Elkem is active in a large number of demanding markets, and the need for continuous development and improvement is constant. The organisation's improvement work needs to be targeted, fast paced and always of high quality. This requires continuous development of employee competence. Elkem actively uses employees' day-to-day work situation as the primary learning arena. We believe that the best way of developing new skills is to participate in actual improvement processes and problem solving. We also consider taking on new

responsibilities as a very important way of learning and developing. To strengthen the 'learning-by-doing' approach Elkem also offers a range of in-house training activities and courses.

Management development

Capable leaders are a necessity for any organisation that wants success. Elkem's global leadership development programs provide Elkem talents from all continents specific leadership competence development, practical training in a variety of leadership skills and an opportunity to build a professional network with other Elkem leaders. The networks enable leaders to share experiences and learn from each other. It also contributes to transfer of skills and best practises across divisions and plants in Elkem globally. We believe that one of the most important tasks for a leader is to develop future leaders for the company. Systematic talent management is thus in focus globally.

Elkem Business System (EBS)

Elkem's EBS centre is a group level resource centre providing support to Elkem's divisions and plants when it comes to implementing EBS. Each business area also has personnel with in-depth knowledge about both EBS and the division's operations, with a responsibility for implementing EBS in the division. The human resources function at operations level is, together with local management, responsible for continuously developing the organisation, in line with EBS principles.

Equal opportunities

The processing industry is generally male dominated. Women are, however, increasingly expressing an interest in working in the processing industry, much because of increased automation, less heavy manual work and commitment to sustainability in all operations. The percentage of female employees in Elkem has increased slightly in recent years, but remains low at 22 per cent. Some parts of the company have a female share of around 30-40 per cent, but among operators the female share remained at 11 per cent in 2015. Elkem aims to achieve a better gender balance and is continuously looking for ways to improve. In the Elkem trainee- and leadership- programs for example, the female share has been around and above 50 per cent for many years.

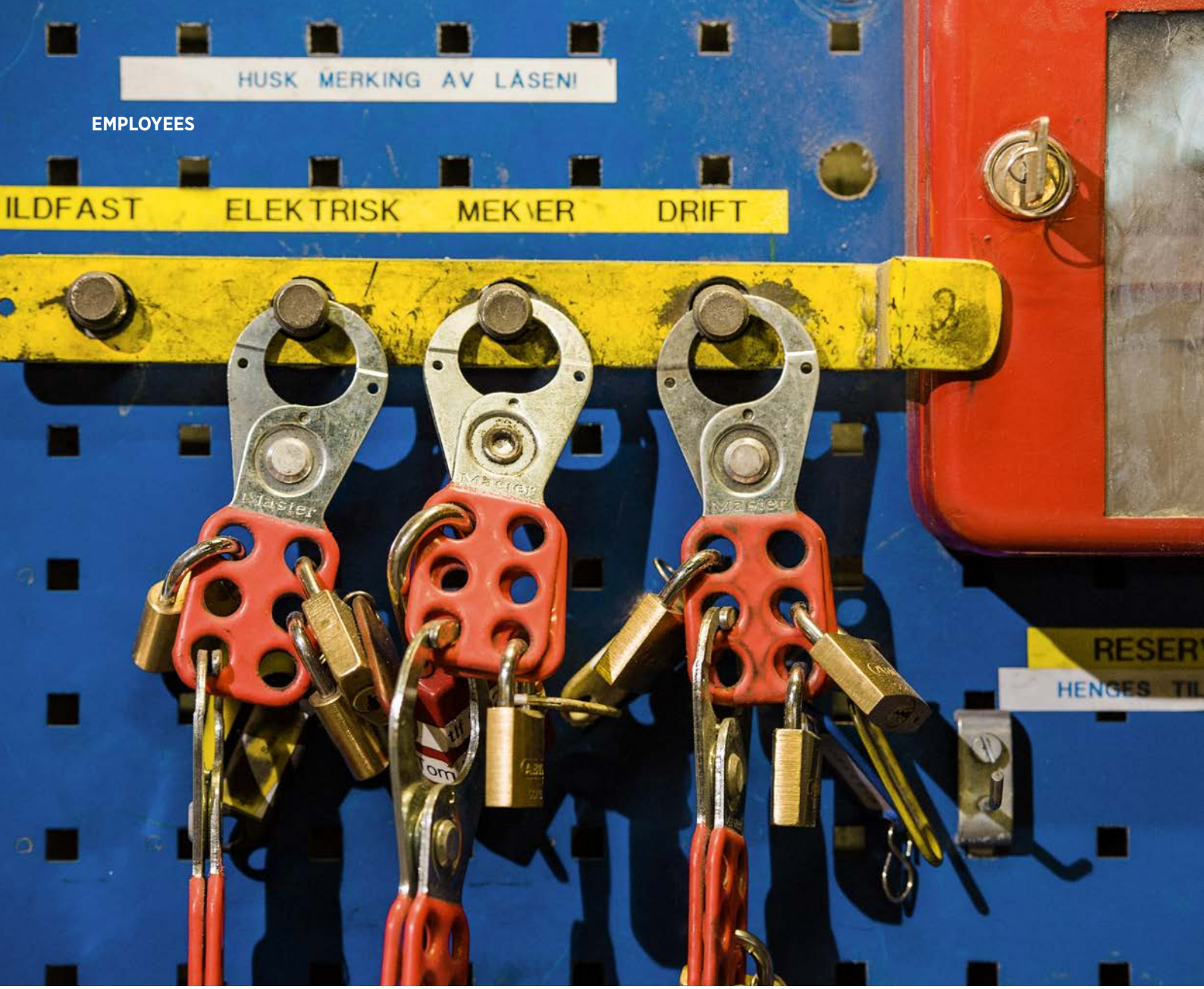
Elkem is an international company with roots in Norway, with Chinese owners, and production and sales offices on all continents. Having employees who match this global presence, with diverse cultural and individual backgrounds, are necessary for the company to succeed. Elkem Business System (EBS) is based on every employee being deeply involved and playing an important role in the development of Elkem. In EBS, employees are considered specialists in their fields and thus listened to and treated with respect. This ensures both good operations and the best solutions when challenges arise. Discrimination in any form is strictly forbidden in Elkem, and our code of conduct and group policies clearly state this. Discrimination is not only unethical, it is also totally incompatible with EBS, our basic workplace philosophy.

Cooperation

Elkem has been through many major reorganisations since the foundation in 1904. The international markets Elkem operates in are highly competitive, and the need for restructuring is a constant in a changing world. Good cooperation and teamwork between employees and leaders is a prerequisite if Elkem is to cope with what are at times demanding market conditions. Elkem has a long tradition of constructive and mutually beneficial cooperation between employees, their unions and leaders.

Deep involvement of all employees at all levels is a cornerstone in EBS. Without involved and respectful cooperation within all groups of employees and the management, EBS cannot be implemented, and the company cannot adjust to changes in the business environment.

Elkem complies with local statutory requirements regarding freedom of association in all countries where we are present. Pursuant to the provisions of the Norwegian Companies Act, employees have two representatives and two observers on the board of Elkem AS.



From preventing injuries to improving health

Elkem's health and safety work is based on a zero harm philosophy. We do not accept that injuries or illnesses are unavoidable facts of life in our industry. Our statistics show clearly that it is possible to run operations with zero injuries.

The downward trend in the number of injuries among Elkem employees continued in 2015. The number of injuries requiring medical treatment ended at 10 which is an all-time low. This gives us a recordable rate of 1.8 injuries per million work hours, down from 5.3 in 2014, when we had 22 injuries.

However, these positive results were overshadowed by a fatal accident with a contractor at the carbon plant in Brazil. During a simple operation (changing a light bulb), the person came in contact with live electrical parts sending 230-volt electricity through his body. Even though first aid was done immediately by his colleagues, and professional medical help was given at the local hospital, they were not able to save his life.

The fact that a simple every day task like changing a light bulb can result in a fatality shows how important it is to focus on the details and fully understand hazards with jobs before they are done. The incident was thoroughly investigated and analysed, and learning points were used to improve operation safety at all plants.

In addition to own employees, a substantial number of contractors work at Elkem sites in connection with cleaning, maintenance, transportation and project activities. Any contractor employee working on Elkem property is subject to the same EHS requirements as Elkem employees and receive training and follow-up to ensure that they have a safe and healthy working environment. In spite of this, statistics show that contractors have a higher recordable injury rate than

our own employees. While injuries per million work hours are in the range of 1.3 to 4.5 for employees, the corresponding numbers for contractors are between 6 and 39. Elkem has therefore intensified contractor health and safety training and follow-up activities to ensure that they fully understand our values and requirements and know how to work safely.

Personal responsibility

Our statistics clearly show that it is possible to run difficult and potentially dangerous operations with a large work force without injuries. Several of our plants have achieved this for a number of years in succession. However, experience has taught us that zero injuries one year is no guarantee for injuries not occurring the following year. To ensure the success of our health and safety work, high awareness throughout the whole organisation at all times is crucial.

Elkem's injury prevention principles are based on knowing and understanding the potential hazards, including their likelihood of happening and their potential consequences. Based on this knowledge we strive to work effectively to eliminate or reduce the risk to an acceptable level.

Our statistics also show that the vast majority of all injuries are caused by individual behaviour with employees not taking the time and effort to understand and prevent possible hazards, not following prescribed safe working procedures and/or not using correct protective equipment. In addition to our standard tools like job observations and audits, a number of plants have also arranged awareness programs in 2015 helping people see the potential consequences of serious injury for each individual and their families. We have also seen that focus on behaviour is not just about individuals doing the wrong thing, but also about what causes certain behaviours and how we have to work with behaviour at all levels of the organisation.

The overall goal of our health and safety work is to reduce the likelihood of injuries. As our total recordable injury rate has been brought down 90 per cent in the last 10-15 years we have seen a vast improvement in equipment and facility safety. The way we work has also been changed. More operators find themselves in front of a computer and new challenges to the health and safety of our employees replace the old ones that we have solved. As safety has improved we can turn more of our attention to health issues caused by less physical activity and a changing working environment. One of the questions facing us today as an employer is how we can improve employees' health, and not just protect them from injuries.

Focus

Focus is Elkem's programme for health, safety and the environment in the workplace. Focus is closely linked to Elkem Business System (EBS). The emphasis is on continuous improvement and each employee's involvement and responsibility to contribute to good results. Focus has five fundamental principles:

1 Improvement has no limits.

2 Zero harm philosophy: All incidents and injuries can be prevented.

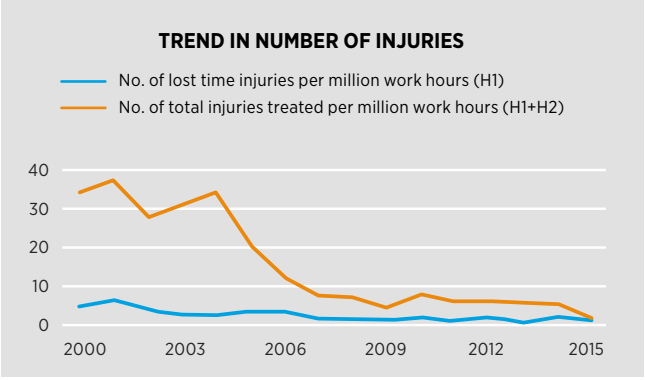
3 Incidents and/or injuries will always have one or more causes. Causes will always be associated with unsafe conditions, unsafe actions, or a combination of both. Reporting and investigating all incidents and injuries allows us to identify root causes and eliminate them before they cause more serious harm.

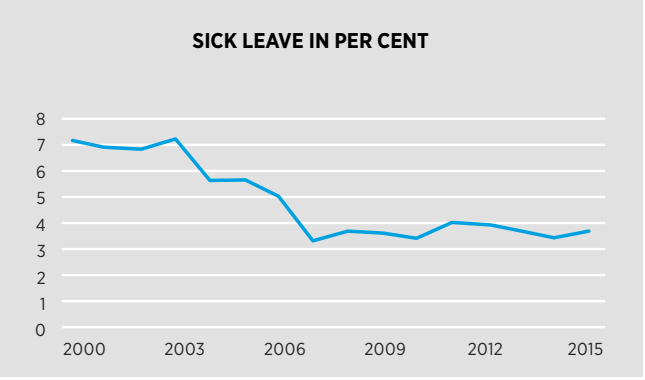
4 Effective prevention of harm requires hazard identification, risk analysis and the implementation of actions to reduce unacceptable risk to an acceptable level.

5 Success depends on all employees being actively involved in the health and safety work and sharing the responsibility for a safe working environment.

Assessed by the management

The status of Elkem's health and safety work is discussed every week at division and group management level. Reporting and investigating all injuries, incidents and deviations are an important part of Elkem's improvement work. All divisions provide reports on health and safety every month. Detailed presentations of the course of events that led up to an incident, including causes and lessons learned, are produced for all serious incidents. This enables the lessons learned to be shared between plants and divisions, and contributes to similar incidents being avoided in the future.





Entering the ‘Green Zone’

Elkem Silicon Materials started a programme for culture, communication and behaviour in 2015. The program has important bearings on the health and safety work and is mandatory for all employees on all sites all over the world.

The initiative started at Elkem Bremanger, Norway inspired by work done at Norsk Hydro, which experienced very good results from a similar programme. From a health and safety perspective, it is important to make all employees reflect on their own behaviour and on how the culture in their team and on the plant affects workplace safety. In order to establish a ‘Green Zone’ of safety around each employee, everyone must be able to evaluate themselves and her or his colleagues. No one shall accept that anybody conducts himself or herself in an unsafe way.

In order to enter and stay in the green zone, everyone must know the correct way to carry out operations. This applies for everyone in the division, management included.

Technical and process safety

To reduce the likelihood of serious incidents, processes and equipment need to be designed in a way that makes them safe to operate. In addition to the health and safety benefits, this will also have a positive effect on availability and operating time of the production facilities.

To target this, Elkem has initiated a competence program for personnel that work with design and modification of machinery and processes. The program covers technical challenges like understanding inherent process hazards, performing suitable risk assessments, implementing safety barriers and other measures required by harmonized standards. Individual training courses give introduction to specific disciplines like machine safety, process safety and instrumented safety. The purpose of the program is to enable small and large projects to build production facilities that are in accordance with all relevant regulations. The aim is to achieve operations with an acceptable level of residual risk.

Projects have been initiated to increase the level of automation in order to move people away from hazardous processes. Other projects assess hazards on existing machinery and implement measures to ensure compliance with the EU Machinery Directive. Projects like these are found in Elkem’s divisional health and safety strategies, and are prioritised based on risk assessments.

Product stewardship in Elkem

Elkem wants to ensure safe handling, use and disposal of our products. Our continuous improvement philosophy means that we constantly look for ways to improve our products' properties.

Updated product information to customers

Elkem is committed to comply with international regulatory requirements and provides Safety Data Sheets (SDS) for all its products in accordance with the UN Globally Harmonized System of Classification and Labelling of Chemicals (GHS) or its National implementations.

In whatever market Elkem's products are promoted, the products must meet specific requirements and need to comply with certain technical, health or environmental standards. Elkem's product stewardship team monitors the development of the applicable standards and regulations at the targeted international level in order to make sure that all Elkem products are compliant at any time.

The majority of Elkem's SDS and product compliance certificates are available for download from Elkem's website (www.elkem.com). However, the SDS for some selected products are only available on request, in order to protect confidential business information.

With a portfolio of approximately 4000 different products that are used in a multitude of applications, regulatory and product compliance is key also for Elkem's Silicones division. Elkem Silicones has therefore developed the document management system OSCAR which ensures that compliance certificates and regulatory statements are easily available for distribution to customers.

The Silicones division is a signatory of the Responsible Care Global Charter of the International Council of Chemical Associations (ICCA). This entails a commitment to managing chemicals safely throughout their life cycle.

Innovation to improve product properties

Elkem's philosophy of continuous improvement also applies to research and development work regarding new products.

Breakthrough: Elkem Carbon's new product makes aluminium production greener

ELSEAL® Type G is a new product developed by Elkem Carbon that will make aluminium production greener and safer by removing harmful exposure to carcinogenic PAH (polycyclic aromatic hydrocarbon) compounds.

Aluminium is produced at temperatures of 950 °C in specially designed production units. In order to prevent liquid metal and corrosive electrolyte from damaging the inner parts of the cathode lining which holds the molten materials in place, a ramming paste is required that seals the gaps between and around the cathode blocks.

Traditional ramming paste products use coal tar pitch as a binder. Coal tar pitch contains PAHs (polycyclic aromatic hydrocarbons). Several of the PAH compounds are carcinogenic, and thus classified as a health hazard. They can also be emitted into the workplace atmosphere, and they complicate the handling of waste material.

The product developed by Elkem Carbon is an alternative to coal tar pitch-based ramming paste. It contains no PAH nor other hazardous substances, there are no emissions of PAH during use, and workers will not be exposed to these potentially harmful compounds. ELSEAL® Type G has the same or improved technical performance compared to existing products. It has a proven performance under challenging electrolysis conditions where the combination of high temperature and corrosive bath is a tough environment. It is classified as non-hazardous according to present regulations like GHS (globally harmonized system) and the EU/EEA regulations REACH and CLP (Classification, labelling and packaging). The product is essentially odourless, easy to handle and does not form any harmful waste. Furthermore, it has improved storage stability.

R&D focusing on customers' needs: Silicone provides pain relief

Silicones have a wide range of applications, and new ways of utilising silicone's properties are developed every year. Elkem's Silicones division serves markets from energy to cosmetics, via electronics, aerospace, automotive manufacturing, construction, paper and textile coating, healthcare, and more. Silicones are replacing plastics and other petroleum-based products, and improving thousands of products in terms of performance, comfort and safety.

An example from health care: Elkem's Silicones division has developed silicone gels for scar care and wound management that reduce pain for the patient, but also reduce health care institutions' consumption of wound dressing material. Because silicone dressings foster a humid environment perfect for wound healing, silicone dressings accelerate the healing of certain types of wounds. Silicone dressings also considerably reduce pain, because silicone adhesives are soft and do not strip hairs and upper skin layers, as do conventional adhesive dressings. Silicones also prevent the development of adherence between the wound and the absorbent pad during healing. The risks of trauma upon removal are minimised, even during critical phases when the wound is drying. The silicone dressing also saves health care institution resources, as they can be easily removed and repositioned. When a conventional wound dressing is removed, skin cells are ripped off and remain as a film on the adhesive. Silicone adhesives lift off cleanly, maintaining their adhesion.

The issue of D4 and D5

When producing all of the silicone based end-products modern society is so dependent on, a number of chemical processes are used to create intermediate products which are then further processed to consumer products. D4 and D5 are two of these intermediate products.

Concerns have been raised in some countries as to possible residues from the intermediate products in some of the final products used for rinse-off personal care (like shampoo), and if these could have any negative environmental effects.

What are D4 and D5?

D4 and D5 are cyclosiloxanes, basic members of the silicone family. As intermediate products they are most frequently used as raw materials in the manufacturing process and only present at low levels in some end products.

Are D4 and D5 safe for the environment and human health?

The main concerns about D4 and D5 have been in connection with rinse-off personal care products. Critics are concerned that residue will end up in waterways and accumulate over time. Even though public organisations like Health Canada have declared both D4 and D5 safe for human health after substantial independent scientific review and evaluation of ways consumers may be exposed to D4 and D5, the possibility of bioaccumulation in the environment has triggered other public organisations in other countries to propose stricter regulations around the use of these intermediate products.

In Europe, the ECHA Member States Committee have concluded that D4 and D5 could be regarded as persistent and bioaccumulative under the European Union's chemicals management program (REACH). Following a proposal by the United Kingdom to restrict the use of D4 and D5 in rinse-off personal care products under REACH, the ECHA's Risk Assessment and Socio-Economic Analysis Committees will evaluate the appropriateness of the proposed Risk Management Measures.

Elkem works closely with the European silicone association (CES) and supports scientific research to fully understand any potentially harmful effects of our processes, intermediates and/or final products. Research is also ongoing to ensure sustainable production should any harm be identified or any restrictions implemented on today's processes and products. Elkem is fully committed to comply to existing regulations at all times and to prevent potential harm to the environment.

Responsible business conduct

Successful business depends on confidence and a good reputation. Elkem requires its employees and representatives to promote our values towards colleagues, business associates and society at large.

In accordance with established Elkem principles and business values Elkem has a strong commitment to operate in accordance with responsible, ethical and sound business principles and to comply with applicable laws and regulations.

Code of conduct

Elkem's code of conduct is based on the principles of honesty and respect, and must be complied with regardless of where our operations are carried out. Elkem's code of conduct has been approved by the board of directors and applies for all employees and representatives.

We encourage an open discussion about responsible conduct and expect all employees to raise any concerns they might have about unethical and/or illegal behaviour. Reporting concerns and complaints can be done confidentially and if necessary anonymously.

Violation of Elkem's code of conduct will not be tolerated and may lead to internal disciplinary action, dismissal or ultimately to civil legal action or criminal prosecution.

Should an improper practice or irregularity occur within Elkem we will make the necessary corrections and take remedial action, also with the object of preventing recurrence.

- Goal CoC commitment /signatory: 100 per cent
- Result 2015*: 100 per cent

Anti-corruption

Elkem does not permit or tolerate any form of corruption. Corruption prevents economic development, distorts competition and undermines the rule of law, well-functioning national and international markets and democratic processes.

Elkem is present in several countries where corruption is generally acknowledged as an issue of great concern. Elkem's policy on anti-corruption applies group wide, world wide. Several countries' anti-corruption regimes imply extraterritorial application and observing local law only is therefore not sufficient. Elkem's anti-corruption manual explains and elaborates the content and implications of the anti-corruption policy for Elkem's employees, representatives and partners. Each Elkem business unit is responsible for understanding the specific challenges regarding anti-corruption, the anti-corruption regulations applicable to its operations and for adopting adequate anti-corruption guidance and measures.

Elkem personnel considered exposed to corruption risk must complete training in Elkem's anti-corruption policy and manual, which includes real life dilemmas. Absolute compliance with Elkem's anti-corruption policy is required by all Elkem employees at all times. Any failure to comply with applicable anti-corruption regulations will be considered a serious breach of the employee's obligations towards Elkem and will most likely result in termination of the employment or other applicable sanctions.

- Goal on anti-corruption training and signatories: 100 per cent
- Results completed anti-corruption training - 2015 / 2014*: 100 per cent

Compliance with competition law

It is Elkem's general policy to compete vigorously and fairly in full compliance with relevant laws and regulations applicable to our business. Compliance is of special importance in the field of competition law, and Elkem has adopted a Competition Law Policy as well as a compliance programme to ensure group wide compliance on this matter.

Absolute compliance with competition law is expected of all Elkem employees. No employee should ever assume that it is not in Elkem's interest to comply with competition law. Any failure to take proper care to comply with competition law will be considered a serious breach of the employee's obligations towards Elkem.

Elkem has developed a manual that describes conduct that will or might infringe competition law. Elkem personnel considered exposed to competition law issues are required to participate in competition law training facilitated by Elkem. Business unit leaders have the responsibility to take steps to implement Elkem's policy in their respective organisations.

- Goal implementation of competition law training: 100 per cent
- Results implementation on competition law training 2014 / 2015*: 100 per cent
- Result signatories competition law 2015 / 2014*: 100 per cent

* Numbers excluding business area Silicones, which was formally included in Elkem June 2015.

Elkem's supplier requirements

All Elkem activities related to the purchasing of goods and services are based on Elkem's governing documents for occupational health and safety, human rights and worker's rights, responsible environmental management and anti-corruption.

New suppliers of raw materials are subject to pre-qualification and risk assessment. Suppliers that fall into 'high risk' categories during the risk assessment are met with specific requirements included in their contracts. Risk-exposed suppliers are subject to detailed requirements from Elkem. Elkem also asks suppliers to influence their sub-contractors and suppliers to follow Elkem's principles.

Follow up

Elkem has developed detailed requirements for the health, safety and environmental standards of our suppliers of operations like mining, transportation, storage and loading, and is actively involved in the promotion and monitoring of safe and decent working conditions at its high-risk suppliers and contractors. This includes health and safety training and providing correct personal protection equipment for suppliers' employees when necessary. Age control to prevent child labour and ensure responsible working conditions for young employees is also carried out. Elkem requires that suppliers and contractors engage their employees on fair terms, and that they give them information about, and the ability to organise and collectively bargain with management where this is legally possible.

Elkem's requirements are regularly discussed in meetings with suppliers. High-risk suppliers must document their understanding of legal requirements and hazards in their operations and present plans showing how risk will be eliminated or controlled while working for Elkem. Elkem performs audits and inspections, both in connection with normal visits for sampling and as unannounced site visits. External auditors also conduct supplier audits on Elkem's behalf.

Violations of Elkem's requirements are registered, and addressed with verbal or written warnings and requests for improvements. Repeated violations lead to requirements for speedy implementation of improvement plans written by Elkem, financial penalties, or termination of contracts with immediate effect.

Biocarbon

Sourcing of biocarbon is subject to special sustainability requirements. Elkem cooperates with NGOs and academia to secure good understanding of environmental, social and human rights challenges related to biocarbon production in different markets. Elkem requires that suppliers of biocarbon are committed to sustainable and ethical raw material sourcing in accordance with internationally accepted principles and standards (i.e. FSC – Forest Stewardship Council or PEFC – Pan European Forest Certification).

Biodiversity status is reviewed against International Union for Conservation of Nature (IUCN)/Convention on International Trade in Endangered Species of Wild fauna and flora (CITES).

Elkem's business areas

Silicon Materials

Silicon Materials had a good year in 2015 with strong revenue growth and good results, mainly explained by strong operational performance, cost improvements and favourable market conditions. Elkem's merger with Bluestar Silicones (BSI), which now forms the Silicones division, has created an integrated industrial value chain from quartz to highly specialised silicones products.

Silicon Materials manufactures silicon and microsilica for a large number of applications. The division delivers products to customers in the chemical, solar, electronics, aluminium, construction, refractory, oil and gas industries worldwide.

Based on volumes, Elkem is the second largest merchant producer of silicon outside China with a production capacity of approximately 155,000 mt. With annual sales volumes of approximately 275,000 tonnes of Elkem Microsilica® and related products, Elkem is the world's leading supplier of microsilica. The annual expected growth rate for the silicon market is between 5 and 6 per cent.

Highlights 2015

Silicon is a key raw material for production of silicones and the acquisition of Bluestar Silicones in June 2015 has created a fully integrated value chain. Elkem and Bluestar Silicones launched a project called Bluelco already in 2012 to focus on optimising and streamlining the production processes. The merger will ensure that the Bluelco project continues to deliver synergies both upstream and downstream.

Silicon Materials reported increased revenue for 2015 based on good market conditions and higher sales volume of specialty products. The sale of Elkem Microsilica® and other products has, however, decreased following lower activity within construction and oilfield segments. All production facilities had stable and good operations throughout 2015.

Going forward

Elkem's Silicon Materials' strategy is a four-step model.

- The platform: Elkem business system (EBS) is the platform for the whole organisation and value chain.
- Secure sustainable cost position: The three plants have achieved the best cost position globally through systematic improvement work based on EBS. Cost reductions will continue in the same pace in 2016 as in 2015.
- Market positioning: Increased specialisation by developing new specialty products, while expanding the position as the leading supplier of silicon.
- Growth: Growing the business both within silicon and microsilica related products, as well as securing and developing access to high quality, sustainable raw materials including bio-carbon, which will further reduce Elkem's carbon footprint.

FACTS	
Plants:	Salten, Thamshavn and Bremanger, all in Norway.
Quartz mines:	Tana and Mårnes, both in Norway and Explotacion de Rocas Industriales y Minerals SA, Spain.
Capacity:	155,000 tonnes of silicon and 275,000 tonnes of Elkem Microsilica® per year.
Products:	Silicon produced in different purities and sizes according to customer needs. Elkem Microsilica®, which is used in construction, refractory, oilfield and polymer industries, because of its many unique properties.

For more information: www.elkem.com/silicon-materials

Silicon Materials – Sustainable quartz extraction

Elkem is one of the world's largest miners of quarts, extracting 1,250,000 metric tonnes every year to cover internal demand and sales to external customers. Respect for nature and stakeholders' interests are core principles of operations and exploration.

Elkem has quarries in Norway and Spain. The largest is Elkem Tana, located in northern Norway with an annual production of 850,000 metric tonnes. Elkem Mårnes, located in the middle of Norway, has a production capacity of 150,000 metric tonnes a year. In Spain Elkem owns 67 per cent of ERIMSA SA together with the FESIL group (33 per cent). In addition to quarry production, ERIMSA is also extracting gravel quartz from riverbeds formed after erosion of landmasses before and after the ice age. Today, these areas are agricultural fields. ERIMSA has a production capacity of 250,000 metric tonnes per year.

Zero waste

Elkem's philosophy of zero waste is a core value in the extraction business, which is a part of the Elkem Silicon Materials division. Over the years, Elkem has improved the net use of materials extracted from the quarries and riverbeds. When quartz is extracted from the quarries, blasted rock is transported to a processing plant where they are crushed and screened into different sizes. During the crushing process and following internal and external transportation and handling, friction creates fine particles that are too small for usage in smelting furnaces. In order to eliminate waste, improve the economy of the extraction business and extend the lifetime of extraction sites, Elkem has developed methods to utilise these fine particles.

The four processing plants in Spain separate the metallurgical quartz from the remaining sand and gravel. All size fractions are processed and sold to different users. The metallurgical quartz goes to the metal industry. Aggregates, the largest product in volume, are sold to the building industry. In addition to these two major product lines, specialty products have also been developed.

An example is silicon rich sand, which is sold to dairy farmers as Q-bed, a soft material cows can rest on. Silicon sand has low absorption capacity and allows for better hygiene, health and welfare for the animals, which in turn produce more milk. More than 40,000 cows rest on Q-beds in Spain.

Similar products are Q-Golf, Q-Seed, Q-Way, Q-Turf and Q-Play that all exploit the unique qualities of the silicon rich sand.

Land Restoration

Respect for nature is a key value for Elkem's extraction business. In 2015, ERIMSA received an environmental award from the Spanish Aggregates Federation (FdA), for its restoration of previously mined land into wetlands including lagoons and large meadows, presently used for livestock production. The FdA concluded that the condition of the land and its biodiversity where better after the restoration than before ERIMSA's extraction of the quartz.

The process of extracting gravel quartz from ancient riverbeds is different from extracting rock quartz from a quarry. For the riverbed, the top soil is first removed to expose the deposit, which is then dug out and screened to separate useful products from sand and soil. As the extraction goes forward, the topsoil is replaced and the area can be returned to agricultural use.

In a quarry, it is not possible to restore the area in the same way. Deep ravines can however be filled and rock faces covered to look compatible with their surroundings. The area can be made safe and fully accessible to the public when the quarry closes.

Quartz extraction has no toxic emissions or discharges, as often is the case with other forms of mining. Elkem's rules for health and safety apply for the mines as they do for all Elkem activities. Quartz dust does represent a health hazard when fine enough to enter a person's lungs. All dust-generating processes are closely followed up and personal respiratory protection is available and mandated when necessary.

Exploring new resources

Elkem's policy is to have accessible quartz resources for at least 20 years of full production. In order to secure new resources, a team of geologists travel to different locations around the world to find quartz with the right qualities. At Nasafjell in northern Norway, zoning for a new quartz quarry was accepted by the Norwegian authorities in February 2016. Nasafjell has a unique deposit of high quality quartz, but is also an area with indigenous community rights and reindeer herding interests. Preparations for operation will therefor take some time as Elkem is committed to ensuring sustainable utilisation of the resources and fair compensation for existing interests.

Silicones

Bluestar Silicones International (BSI) was merged with Elkem in June 2015 and now forms the Silicones division. The division had record sales in 2015 and improved its result considerably. Expected synergies from the merger will improve results further.

The Silicones division produces siloxanes and a comprehensive range of silicones, which are a family of specialty, high performance products and materials, produced by reacting silicon with methyl chloride. The division trades under the Bluestar Silicones brand name.

The merger in 2015 makes Elkem the world's fifth largest producer of silicones products.

Highlights 2015

The Silicones division became part of the Elkem AS group in June 2015 when Elkem purchased all the shares in BSI, from Bluestar Silicones Investment Co. Ltd in Hong Kong, which is controlled by China National Bluestar (Group) Co. Ltd.

Silicones reported strong revenue growth in 2015, largely due to increased sales volume of speciality products and favourable development of the euro versus the US Dollar.

Going forward

Silicones is part of an industrial value chain from quartz to highly specialised silicones products. Silicon produced by the Silicon Materials division is a key raw material for the silicones products and the cooperation between Elkem and BSI has been going on since 2012, under the name Bluelco.

The demand for the Silicones division's great variety of products stems from both increased use of silicones in industrial applications and consumer products, particularly in China and other emerging markets, but also in the rest of the world.

The strategic goal is to continue the growth within silicones specialty products. The strategy is supported by a strong R&D department in Lyon, France, and eight other locations around the world, with a total of 220 researchers. The share of specialty products was 60 per cent in 2015.

FACTS	
Plants:	Roussillon and Saint-Fons in France; Lübeck, Germany; Caronno, Italy; Santa Perpetua, Spain; York, USA; Shanghai, China; Santo Andre, Brazil.
Capacity:	Upstream capacity of more than 100,000 tonnes per year of siloxane and more than 250,000 tonnes capacity per year of intermediates and silicones.
Products:	Silicones have thousands of applications and improve the performance and reliability of millions of modern products. Silicones produced by BSI are found in products such as release coatings, rubber, textile coating, healthcare, personal care, mould making, speciality fluids, sealing and bonding and construction.

For more information: www.bluestarsilicones.com

Foundry Products

The Foundry Products division experienced strong revenue growth in 2015 and has an ambitious growth strategy going forward. A new plant is under construction in Paraguay, and is planned to start producing ferrosilicon in 2016.

Foundry Products provides metal treatment solutions to iron foundries and is a supplier of high quality speciality ferrosilicon to the steel industry. In the iron foundries and steelworks production errors are expensive and a waste of resources. Foundry Products produce alloys that improve production processes and reduce waste for our customers. The automotive, engineering, pipe and steel industries are important markets for the division.

Elkem is one of the world's five leading producers of ferrosilicon alloys.

Highlights 2015

A new ferrosilicon plant in Paraguay has been under construction during 2015. The project is a 50/50 joint venture with local partners and the plant will start producing in 2016. The sales organisation has already been established for South-America.

The Foundry Products division delivered significant revenue growth in 2015 due to higher sales volumes and favourable currency development. All production facilities had stable and good operations throughout 2015, and Chicoutimi and Bjølvefossen reached new production records.

Going forward

The division's long-term goal is to increase its market share of alloys in all geographic areas and to increase the share of specialty products within its ferrosilicon segment.

The existing foundry plant in China will be relocated to a new and larger site in Shizuishan. Construction of the new plant will take place in 2017. The goal is to strengthen the Foundry Products market position in China.

FACTS	
Plants:	Elkem Bremanger and Elkem Bjølvefossen in Norway; Elkem Iceland; Elkem Chicoutimi, Canada; Elkem Foundry China (EFC), Shizuishan, China, one under construction in Paraguay.
Capacity:	The division has a total production capacity of approximately 251,000 tonnes per year, based on its current product mix of ferrosilicon-magnesium (nodularisers), inoculants and ferrosilicon.
Products:	The division is a supplier of high quality speciality ferrosilicon and provides metal treatment solutions to iron foundries.

For more information: www.elkem.com/foundry

Carbon

Carbon is a world leader in production of carbon products and the only producer with a true global footprint. A new plant in Malaysia will secure this position. Greener materials and leaner production processes will make Carbon stand out in the competition.

The Carbon division produces carbon materials. The main products are Söderberg electrode paste, lining materials, pre-baked electrodes and specialty carbon products for various metallurgical smelting processes and primary aluminium industries. Carbon is a global leading supplier of electrically calcined anthracite.

Main events

A new plant in Sarawak, Malaysia will start production in the second quarter of 2016. This is the first step to meet the local demand from several new start-ups in the metal producing industries in Sarawak, which have been established based on good access to hydropower. Carbon has introduced the ELSEAL® Type G, a ramming paste for the aluminium industry. This is the first product based on a green binder that is free from the polycyclic aromatic hydrocarbons (PAH). ELSEAL® Type G is expected to gain an attractive market share.

The Carbon division increased its revenue in 2015, mainly as a result of higher sales prices due to favourable currency development. Sales volume of specialty products were similar to last year, while sales of Söderberg electrode paste decreased due to weaker demand in South America, South Africa and China.

Going forward

Carbon's mission is to serve the metal industry worldwide. To maintain Carbon's leading position, it is considered important to have production located close to all main markets.

Carbon is in the process of installing new equipment that will reduce cost and energy consumption and increase efficiency, while at the same time improve the Carbon division's environmental performance.

Developing more environmentally friendly products is an important part of the strategy, both as part of the group's social responsibility and to stay ahead of new regulations, such as REACH, which is the European Union's regulations on chemicals.

FACTS	
Plants:	Kristiansand, Norway; Shizuishan, China; Sarawak, Malaysia; Carboindustrial and Carboderivados, Vitoria, Brazil; Ferroveld JV, eMalahleni, South Africa.
Capacity:	Carbon has an annual production capacity of approximately 230,000 tonnes of Söderberg electrode paste and approximately 100,000 tonnes of other carbon products, depending on the product mix.
Products:	Söderberg electrode paste, lining materials, pre-baked electrodes and specialty carbon products for various metallurgical smelting processes and primary aluminium industries.

For more information: www.elkem.com/carbon

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Advanced materials shaping the future