ENVIRONMENTAL REPORT 2019
ENVIRONMENT AND HEALTH & SAFETY

aalborgportland
CEMENTIR HOLDING

ENVIRONMENTAL REPORT 2019 ENVIRONMENT AND HEALTH & SAFETY

AALBORG PORTLAND A/S

Aalborg Portland has been manufacturing cement at the Aalborg factory for 130 years and is the sole producer of cement in Denmark. The development towards sustainable production originated in the 1970s when the energy crisis resulted in closure of three competing Danish cement plants. Energy efficiency came into focus, and in 1988 an efficient new cement kiln for manufacturing grey cement entered service. Since then, work has taken place on a large number of initiatives involving alternative fuels, using surplus production heat to provide district heating, further energy efficiency measures and so on.

Sustainable production continues to be of great importance for employment, technological development and export. Accordingly, Aalborg Portland has focused on socio-economic sustainability for a number of years.

The present Environmental Report describes Aalborg Portland's approach and contribution to the UN 2030 Agenda for Sustainable Development and the associated 17 Global Goals, as well as the global climate agreement from COP 21 in Paris.

Formal particulars concerning Aalborg Portland A/S appear in the "General information" section of this report - cf. also www.aalborgportland.dk.

ENVIRONMENTAL REPORT 2019 – TARGET GROUP

Aalborg Portland's Environmental Report 2019 is intended to provide stakeholders with easy access to an overview of our principal environmental impacts, initiatives relating to occupational health and safety, and ongoing improvements.

These stakeholders include:
Customers, employees, suppliers, present and future investors, financial institutions, insurance companies, authorities, neighbours, political groups and interest organisations.

PART OF THE AALBORG PORTLAND HOLDING GROUP

Aalborg Portland A/S is a part of the Aalborg Portland Holding Group, which is owned by the Cementir Group, an international supplier of cement and concrete, headquartered in Amsterdam and with secondary offices in Rome. Cementir Group is listed on the Italian stock exchange in Milan. For more information on Cementir, see www.cementirholding.com, and for Aalborg Portland Holding, see www.aalborgportlandholding.com.

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Environmental Report 2019 covers the Aalborg Portland cement factory situated at Rørdalsvej 44, 9220 Aalborg Øst, Denmark.

One of Denmark's largest industrial companies, Aalborg Portland owns 1,200 hectares in the Rørdal area. In addition to the cement factory, the site contains a variety of uncultivated areas and farmland and also a chalk pit.

The factory and the active chalk quarry cover a total area of approx. 190 hectares. In addition to production facilities for cement and district heating, there is a recycling depot and two on-site landfills, one now closed.

Aalborg Portland has 340 employees, in addition to which there are external employees from contractors, each equivalent to approx.1½ FTEs. A total of around 850 people are therefore employed at Aalborg Portland.

The Environmental Report 2019 covers the period 1 January – 31 December 2019.

Verification of this report in accordance with the EMAS scheme has been performed by Bureau Veritas Certification (Accreditation No. 6002), cf. the section "Environmental verifier's report and EMAS registration".

CERTIFICATIONS

Aalborg Portland's management system for quality, environment, health & safety and energy has been certified by Bureau Veritas Certification.

Furthermore, Aalborg Portland's environmental management system has been EMAS-registered since 2000.

Reg. no. DK-000132

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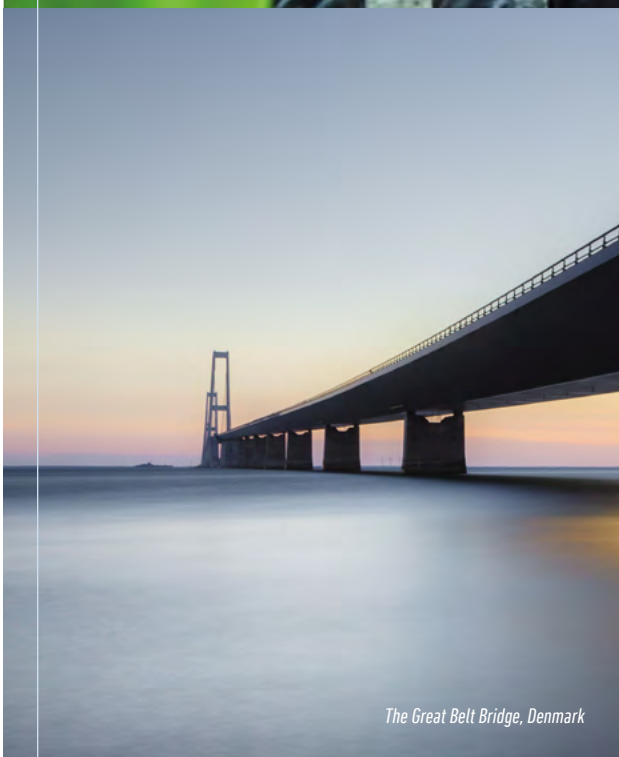
Chalk pit with deep-excavator

Billedtekst



The Great Belt Bridge, Denmark

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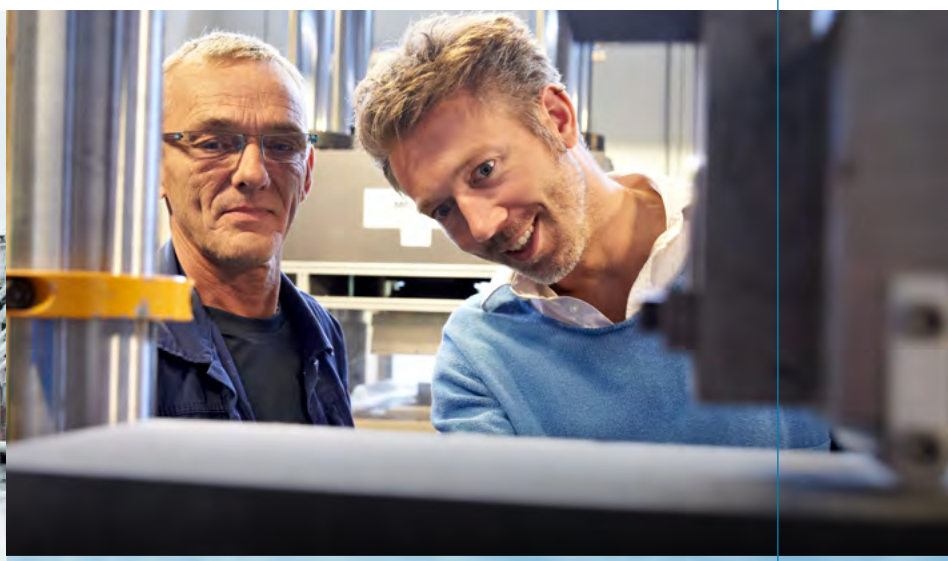
ENVIRONMENT, ENERGY AND HEALTH & SAFETY IN 2019

Environmental Report 2019 is the management's review of the year's most significant activities and work in the area of environment, energy and health & safety activities for Aalborg Portland's Danish cement production.



ENVIRONMENTAL REPORT AND HEALTH & SAFETY

Michael Lundgaard Thomsen, Managing Director, Aalborg Portland A/S

At Aalborg Portland we have focused on sustainability since the 1970s. Among other things, this has resulted in supply of surplus heat, currently to 25,000 and soon to 30,000 households, as well as high energy efficiency, use of alternative fuels, and recycling of waste rather than use of new raw materials.

The work documented in this Environmental Report is rooted in our fundamental DNA - we are committed to being a responsible business as regards climate, environment, community and people. That's the way it has been since 1889 when Aalborg Portland was founded, and that's the way it still is after 130 years.

2030 GOALS FOR CO_2 EMISSION

In order to support the Danish Government's ambition of a 70% reduction in Denmark's CO_2 emission by 2030 we have accelerated our sustainable transition. With the current conditions and known technologies we can cut our emissions by that date by 30%. This is a goal we must achieve. But we are also looking at reducing by even more. A 70% reduction is actually not impossible, but it will require new fuels at competitive prices and a public-private partnership for CO_2 capture.

Inspired by the UN global goals, our sustainability work is focused on 10 of the 17 goals where we can make a real difference. This work - like our other sustainability activities - is audited and verified by a third party so we get ongoing feedback for creating further progress.

MASSIVE INVESTMENT BEHIND CLIMATE TARGETS

In the period 2014-2019 we have spent around a quarter of a billion on investments in sustainable transition, and looking three years ahead we will spend a similar amount on lowering our emissions. These huge investments testify to our commitment to making sustainability a business.

ADVISING THE GOVERNMENT

The undersigned is one of 13 Danish chief executives advising the Danish Government on achieving the world's most ambitious climate target. I do this as a member of Denmark's Green Business Forum and as chairman of the Climate Partnership for Energy-Intensive Industry. I am grateful for the trust placed in me.

The task of the climate partnerships was to identify what Denmark's energy-intensive industry can contribute, and how the industry can work with Government to realise the ambitious target of a 70% CO_2 reduction by 2030.

The report of the Climate Partnership for Energy-Intensive Industry establishes that the companies themselves can deliver 30% reductions. The next 20% against 70% must come from sustainable and competitive fuels such as biogas, while the final 20% must be obtained by CO_2 capture.

GLOBAL MARKET FIRST IN 2020

Documentation of our sustainability work is crucial. We have therefore a comprehensive measurement programme of environmental impacts and compile life-cycle analyses and environmental product declarations, so we can measure the emission impact of new types of cement and changes in production. The facts and impacts must be properly substantiated.

IN THE PERIOD 2014-2019 WE HAVE SPENT AROUND A QUARTER OF A BILLION ON INVESTMENTS IN SUSTAINABLE TRANSITION

- Measurement of impact is particularly important because in 2019 we focused on the final development of a new type of cement capable of saving up to 30% CO_2. It's name is FUTURECEM™ - the cement of the future. FUTURECEM™ is actually a global first based on break through technology for which we have high hopes. The market launch is scheduled for the end of 2020, and in the period to 2030 the product will be fully implemented in our grey cement portfolio.

AALBORG PORTLAND RESEARCH WITH WORLDWIDE IMPACT

Aalborg Portland is part of a global group, but all development activities take place in Aalborg where our research and quality department is located.

We have worked on development for decades and continuously participate in R&D activities together with Danish universities and the rest of the Danish construction industry. One result of this collaboration is the new type of cement – FUTURECEM™. But many other products have also resulted, not least in the area of white cement.

In 2019, we were particularly proud that the prestigious Danish Concrete Prize was awarded to our longstanding Research Director, Jesper Sand Damtoft. Presented by the Danish Concrete Society, the prize was granted in recognition of Jesper's research and development work over many years. His work has made a significant contribution to the Danish and international cement and concrete industry.

LIVING NEAR THE CHALK PIT – DUST

Chalk excavation can occasionally lead to dust nuisance for local residents – primarily our closest neighbours in Øster Uttrup. Weather conditions such as strong winds and dry periods with no rain create challenges for our efforts to minimise dust from the chalk pit.

We have introduced a large number of initiatives to prevent airborne dust, including measures to reduce dust on our bucket wheel excavator, planting of windbreaks on the noise embankment, and watering of surfaces and roadways. For more information on our initiatives, see the section "Dust".

MEASUREMENT OF IMPACT IS PARTICULARLY IMPORTANT BECAUSE IN 2019 WE FOCUSED ON THE FINAL DEVELOPMENT OF A NEW TYPE OF CEMENT CAPABLE OF SAVING UP TO 30% CO_2

WE CARE FOR OUR EMPLOYEES

Any accident at work is one too many. We therefore strive hard to prevent them occurring. In 2019, the number of accidents was the lowest since 2014 and 50% compared to 2018.

This is something both we and our employees can be proud of. But at the same time we can do even better. Our employees are our most important resource.

Focus on health & safety is paralleled by priority for education and training. For example, in 2019 we had 18 apprentices and interns, and we recruited five newly-qualified graduates who will undergo two years' rotational training in all parts of our internal value chain, developing both professionally and personally. Also in 2019, more than 1,800 man-days were spent on courses and in-service training.

This is the contribution we make to our employees and our way of supporting ongoing development of skills and competence across the company. In this way we are building solid foundations for another 130 years' cement production in Aalborg.

Michael Lundgaard Thomsen

Managing Director, Aalborg Portland A/S, September 2020

Cement factory and chalk pit at Limfjorden

ENVIRONMENTAL AND ENERGY POLICY

This policy is applicable to the cement factory in Aalborg and shipping terminals in Denmark.

Excavator in the chalk pit with conveyor belt to the cement factory

OUR POLICY IS TO:

- Respect statutory legislation and relevant official requirements. If a limit is exceeded we will inform the authorities and prepare remedial action plans.
- Promote sustainable development and cleaner technology within the scope of economic feasibility.
- Set pro-active targets for our future work and review our targets once a year at the Management's seminar established for that purpose.
- Support our customers in achieving their environmental targets by developing and helping to develop sustainable cement and concrete products which improve the life cycle of concrete.
- Protect the environment by reducing emissions and consumption of energy and raw materials per tonne of cement product through energy efficiency, energy management and other means.
- Inform our suppliers and subcontractors of relevant procedures and requirements.
- Adopt an active and open approach towards communication, knowledge and dialogue with customers, employees, authorities, neighbours, organisations and other collaboration partners.
- Educate and motivate our employees to ensure that we live up to the requirements contained in our policies, targets and action plans.
- Oppose introduction of further anti-competitive environmental levies and work for a reduction of the existing tax burden.

TO REALISE THESE OBJECTIVES WE UNDERTAKE TO:

- Maintain and develop a management system that embraces environment, energy and CO_2. The system is certified according to ISO 14001, ISO 50001 and the Danish Energy Agency's supplementary requirements hereto and is registered under the EMAS scheme.
- Publicise our policy, targets, action plans and results in the form of an annual Environmental Report.
- Formulate and use indicators as guidance mechanisms to achieve defined targets.
- Assess our products, facilities and significant renovation projects in relation to the scope of this policy, and support energy-efficient procurement and eco-friendly project planning.
- Be an active collaboration partner in Danish environmental and energy policy by utilising alternative raw materials and fuels.

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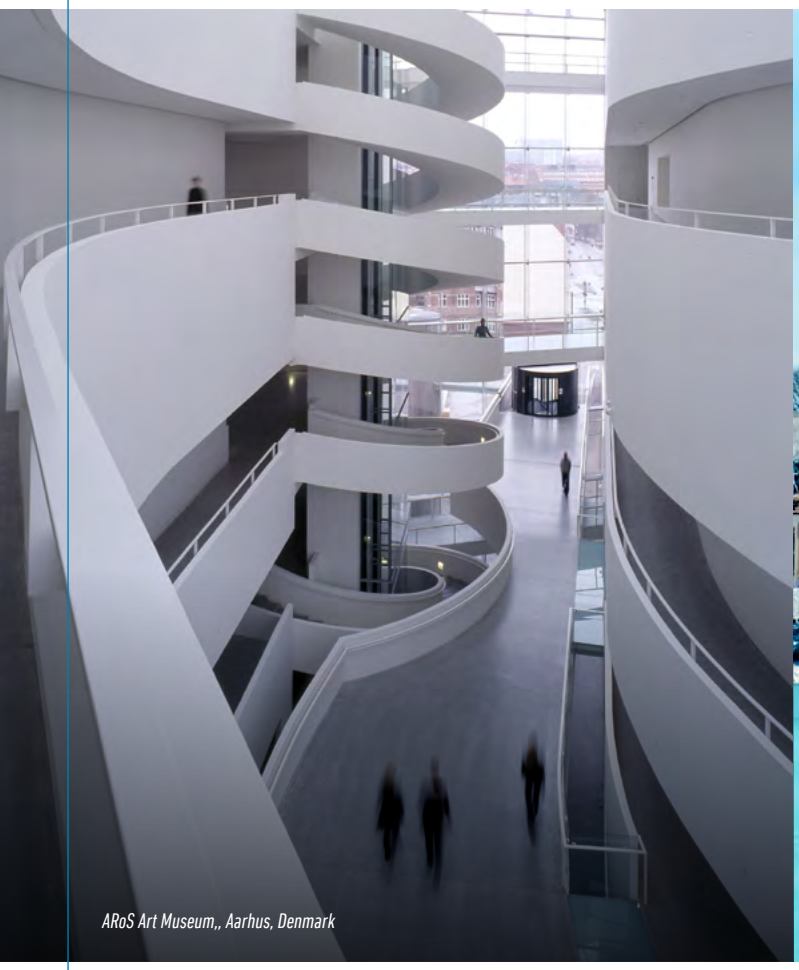
THE GLOBAL GOALS
For Sustainable Development

THE UN GLOBAL GOALS AND AALBORG PORTLAND

Development and manufacture of Aalborg Portland's cement products take place with focus on socio-economic sustainability. Aalborg Portland contributes to the global achievement of the UN Global Goals in several dimensions and both economically, socially and environmentally.



ARoS Art Museum,, Aarhus, Denmark

Chalk pit with deep-excavator

In 2019, Aalborg Portland achieved certification for its work in respect of the 17 Global Goals. Performed by Bureau Veritas Certification, the certification involved screening and verification of Aalborg Portland's value chain and business results.

As part of the certification process, Aalborg Portland's activities were assessed in relation to all 17 Global Goals and a selection is described below.


BUREAU VERITAS Certification

Aalborg Portland A/S
Rørdalsvej 44, 9220 Aalborg, Denmark

Bureau Veritas Certification Denmark A/S certifies that the above organization has been audited and found to be in accordance with

Reference

Bureau Veritas' requirements for the contribution of the organization in order to reach the 17 sustainable development goals defined by UN

Scope of certification

Development, manufacturing and distribution of cement.

Original cycle start date: **13-09-2019**
Certification review date: **14-10-2019**

Subject to the continued satisfactory of the organization's contribution to the reaching of the 17 sustainable development goals, this certificate expires on: **13-09-2020**

Certificate No.: DK011914 Version: 1 Revision date: **19-11-2019**

Certification Office: Bureau Veritas Certification Denmark A/S Oldenburggade 24-31 7000 Fredericia, Denmark

Further clarifications regarding the scope of this certificate and the applicability of the Management System requirements may be obtained by consulting the organization. To check this certificate validity, please call (+45) 77 311 000.

At Aalborg Portland we operate from a holistic approach with sustainability as an integral part of our overall business strategy. Our support for the UN Global Goals includes activities in the areas below.

4 QUALITY EDUCATION

UN GLOBAL GOAL NO. 4

We provide ongoing education and training for Denmark's work force. We do so by educating apprentices and interns, by recruiting graduates and by providing in-service training for our experienced personnel. In 2019, we had 18 apprentices and interns, five graduates, and we provided in-service training equivalent to approx. 1,800 man-days for our experienced personnel.

6 CLEAN WATER AND SANITATION

UN GLOBAL GOAL NO. 6

We reuse water in our production by recycling process water and capturing rainwater from selected areas. In 2019, we recycled 1,500,000 m^3 of technical and process water and 28,000 m^3 of rainwater.

7 AFFORDABLE AND CLEAN ENERGY

UN GLOBAL GOAL NO. 7

In connection with the production of cement we exploit the potentials for supplying sustainable energy. We thus supply energy by utilising the heat from our kilns as district heating, and cold water from our chalk lake will in future be used to supply district cooling to Aalborg's coming University Hospital. In 2019, we supplied enough heat to meet the needs of around 25,000 households, and this number will soon be increased to more than 30,000. The district cooling project has begun.

8 DECENT WORK AND ECONOMIC GROWTH

UN GLOBAL GOAL NO. 8

We create economic growth and jobs. We cooperate across functions and are open to the possibilities for employment on special conditions. In 2019, we generated added value of EUR 116.2m, which included social benefit amounting to EUR 38.4m in the form of VAT, levies, taxes, etc. and EUR 21.7m in employee wages and pension contributions.

UN GLOBAL GOAL NO. 9

We combine the unique structural properties of cement, characterised by high strength and long life, with development of sustainable production. With external partners, we are developing cements and concretes that can be produced with less energy and less CO_2 emission. As an example, Aalborg Portland is working with the construction industry on "Sustainable Concrete Initiative", a project enabling the CO_2 footprint from building with concrete to be significantly reduced by 2030.

UN GLOBAL GOAL NO. 11

We are committed to close contact with neighbours and other stakeholders to contribute to good sustainable solutions in the local community.We want to being part of the sporting and cultural life of Aalborg and North Jutland. Therefore, we sponsor, among other things, the zoo, theatre, art, handball and football, and we participate in a number of events and workshops. In 2019, we hosted around 2,000 visitors and took part in the Aalborg Sustainability Festival.

UN GLOBAL GOAL NO. 12

In our cement production we utilise by-products from other companies as substitutes for the natural raw materials. In 2019, we recycled around 440,000 tonnes of external by-products.

In addition, more than 200,000 tonnes of alternative fuels are being used instead of fossil fuels.

UN GLOBAL GOAL NO. 13

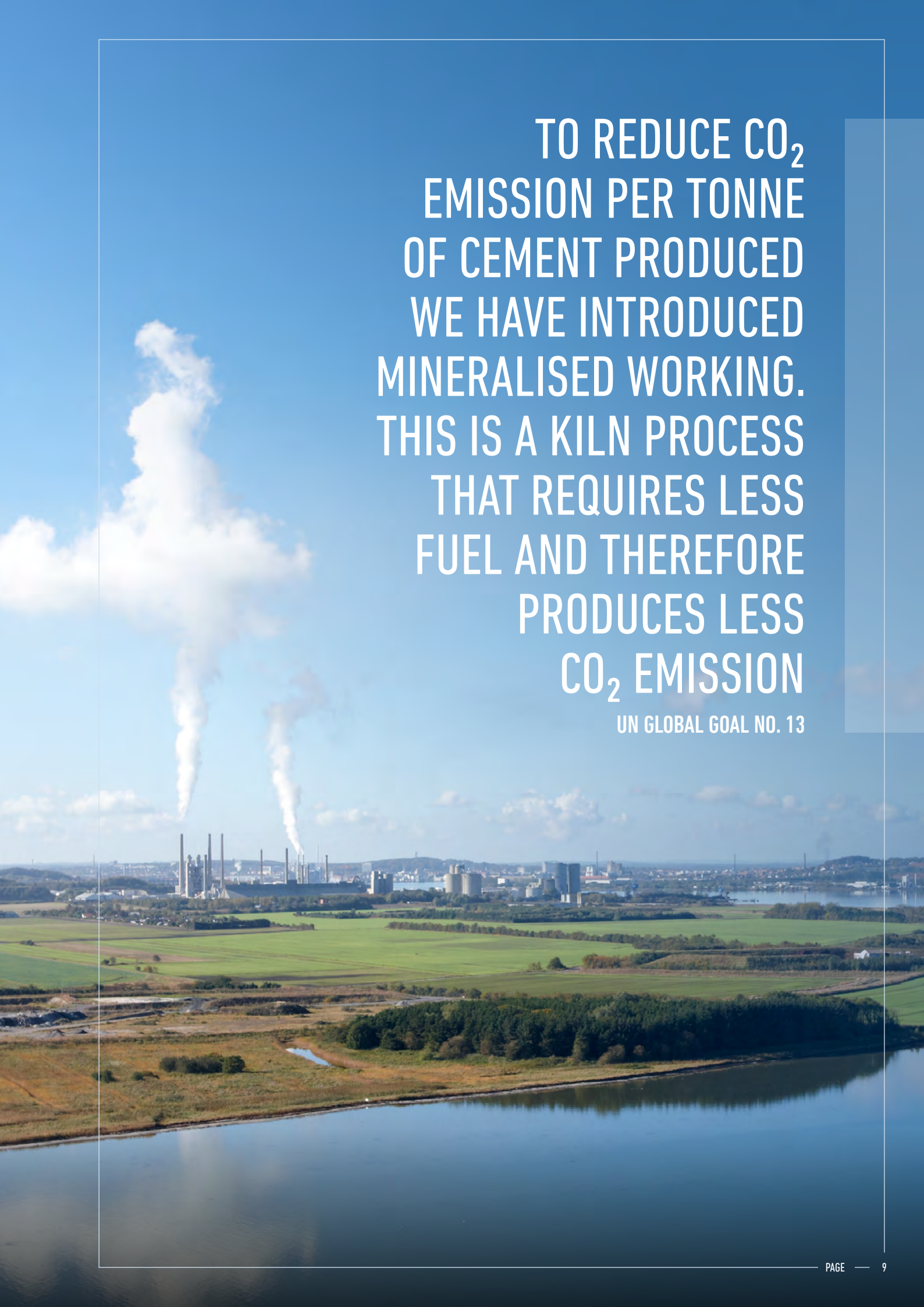
We invest in measures that reduce energy consumption, and we try to meet our remaining energy need from alternative energy sources. To reduce CO_2 emission per tonne of cement produced we have introduced mineralised working. This is a kiln process that requires less fuel and therefore produces less CO_2 emission. In 2019, we invested in measures that reduce actual energy consumption by 37,925 MWh. Furthermore, we replaced 28% of fuel consumption with alternative fuels.

UN GLOBAL GOAL NO. 15

Our chalky soil is conducive to rare plant species. It is planned to rehabilitate the Rørdal chalk pit to provide areas for both recreation and nature. Rehabilitation is taking place in step with the end of chalk extraction and will be completed on an ongoing basis.

UN GLOBAL GOAL NO. 17

Partnership is important for realising the UN Global Goals. This applies in relation to research and innovation, sustainable development of production and utilisation of energy potentials, education and training of our employees, and collaboration within our value chain. In all these contexts we need both close partnerships and strategic cooperation. Among other things, Aalborg Portland therefore holds the chairmanship of the Danish Government's Climate Partnership for Energy-Intensive Industry. Within this forum we pursue a frank dialogue with the rest of Denmark's senior business community to formulate concrete climate recommendations for the Government.



TO REDUCE CO_2 EMISSION PER TONNE OF CEMENT PRODUCED WE HAVE INTRODUCED MINERALISED WORKING. THIS IS A KILN PROCESS THAT REQUIRES LESS FUEL AND THEREFORE PRODUCES LESS CO_2 EMISSION

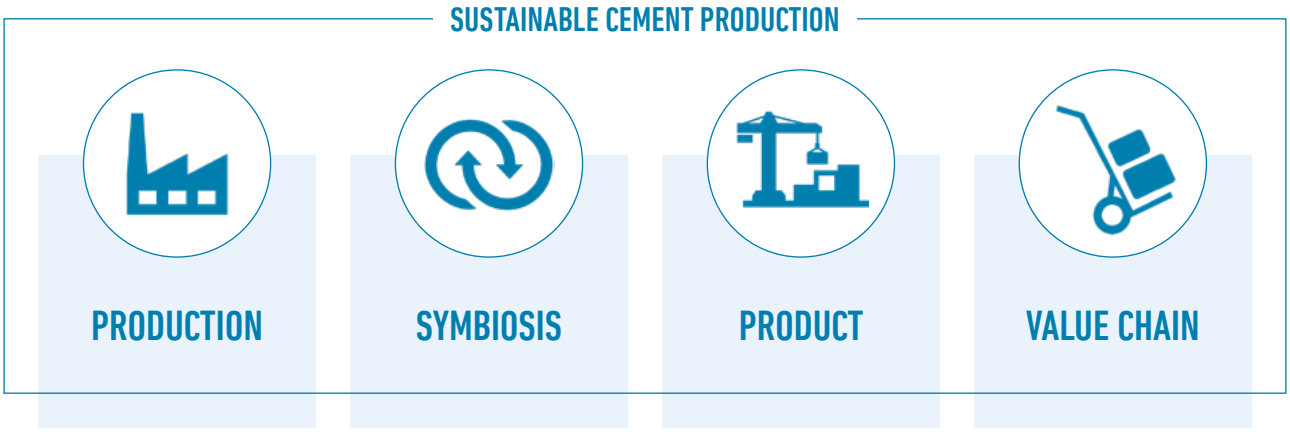
UN GLOBAL GOAL NO. 13

2030 ROADMAP FOR AALBORG PORTLAND

Reduction of at least 30% in CO_2 per tonne of cement by 2030.

We have at Aalborg Portland formulated a long-term strategy for sustainable transition of our manufacturing and products. The strategy has been operationalised in a roadmap which is intended to reduce our CO_2 emissions by 30% per tonne of cement by 2030. It is a dynamic roadmap which has identified the known and viable solutions. Hence there is also a chance that we can reduce CO_2 emissions even more. Potentially by up to 70% if CO_2-neutral fuels become available and competitive and are supplemented by CO_2 capture. However, the latter technology will require significant public support.

We are following a roadmap with focus on four areas:



PRODUCTION

In our production, transition to alternative or CO_2-neutral fuels is the most important lever for reducing our emissions. The cement production requires very high temperatures - up to 1,500° C - and this heating process cannot be electrified. 50% of our emissions derive from it. But alternative or CO_2-neutral fuels can reduce this emission.

Today, we already make extensive use of biofuels and wastes instead of fossil fuels. We are searching intensively for new waste fractions, such as textile and chemical wastes, which we can make use of but would otherwise be non-recyclable. We are also exploring the potential for using eg. natural gas and potentially biogas as a fuel supplement.

In parallel with this we are working to set up our own wind turbines so that we can in time produce our own green electricity. And we continue to look at improving efficiency and optimising operation so we can reduce our energy consumption, operate stable and avoid breakdowns that cost unnecessary additional energy.

SYMBIOSIS

Denmark's largest industrial symbiosis, and one of the largest in Europe can be found in Aalborg with Aalborg Portland at the hub. This symbiosis has even greater potential has been utilised to date.We are proud to supply surplus heat as dependable district heating to 25,000 households. Under a new supplementary agreement with Aalborg Forsyning it will soon be possible to increase this to more than 30,000. This represents a large and necessary contribution to Aalborg's climate ambition of becoming a fossil-free city by 2050. But we have the capacity to supply 50,000 households and potentially even more. This is our aim and we are committed to achieving it.

We are also working with the utility company Aalborg

Forsyning on using cold water from our chalk lake to provide district cooling to the new Aalborg University Hospital. This cooling project also has important perspectives for other buildings in Aalborg. Furthermore, together with the utility, we are also working with the utility on a new heat reservoir the size of three football pitches containing hot water for the supply of district heating.

Additionally, we wish to increase the circular economy with the community so we can take and use even more waste instead of new raw materials and fuels. We will intensify our efforts and focus regarding the circular economy.

Finally, we will explore the possibilities for CO_2 capture. This is still a new and development-intensive technology associated with high costs, and it will need prioritising politically and public support if it is to be realised.

PRODUCT

Heating chalk to 1,500° C causes release of CO_2 in a process known as calcination. This release is unavoidable when making cement, and 50% of our emissions come from calcination. But the emission can be minimised by substituting part of the chalk with other materials.

Aalborg Portland is the leader in this field and will later in 2020 launch FUTURECEM™ – a type of cement based on breakthrough technology. Partly based on clay, FUTURECEM™ can reduce CO_2 emission by up to 30%. In the period to 2030, FUTURECEM™ will be implemented throughout our grey cement portfolio, and we are also looking at the possibilities of using the same technology for white cement. We are an established participant in research projects and we are constantly developing new and optimised cements. This is a significant and integral part of our planning for 2030.

WE ARE PROUD TO BE SUPPLYING SURPLUS HEAT AS CO_2-NEUTRAL DISTRICT HEATING TO 25,000 HOUSEHOLDS. BUT WE HAVE THE CAPACITY TO SUPPLY 50,000 HOUSEHOLDS AND POTENTIALLY EVEN MORE

VALUE CHAIN

Production of cement is one thing. Its use in concrete is another. This is an area with significant scope for optimisation. Aalborg Portland has joined forces with the rest of Danish construction industry in "Sustainable Concrete", a project aimed at enabling CO_2 footprint from building with concrete to be reduced by 50% by 2030. This initiative will dominate the construction industry for the next 10 years with us as an active partner.

We also assist our customers with improved IT tools to optimise their production. Furthermore, we are focused on more sustainable distribution, among other things with view to shipping more product by rail, making higher demands to suppliers and obtaining more fuel-efficient ships. We are committed to constantly monitoring and minimising these indirect emissions.

City of Aalborg

THE RESOURCE-EFFICIENT PARTNERSHIP

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

Aalborg Portland converts raw materials, by-products and wastes into cement and district heating. We focus on promoting sustainable development by basing large parts of our cement manufacture on recycling material flows from society and industry in a resource-efficient partnership. UN Global Goal 12, Responsible Consumption and Production, is an integral part of our manufacturing concept.

For Aalborg Portland, wastes and homogeneous by-products constitute a resource. We recycle and utilise wastes and homogeneous by-products from other industries for use as fuel and raw materials in the production of cement.

By reusing and recycling fuels and alternative raw materials in cement manufacture, wastes and by-products are fully utilised. All the components are used and no new residues formed. High temperatures and special process conditions make cement kilns ideal for using alternative fuels and raw materials. At the same time the flue gases are effectively cleaned in the kiln system, in filters and scrubbers, so that the environmental load of the factory is not increased.

In 2019, Aalborg Portland used more than 200,000 tonnes of alternative fuels and more than 440,000 tonnes of alternative raw materials, thus replacing equivalent volumes of fossil fuels and natural raw materials that would otherwise have had to be sourced in Denmark or imported. Overall, Aalborg Portland used more than 640,000 tonnes of alternative fuels and raw materials.

BY REUSING AND RECYCLING FUELS AND ALTERNATIVE RAW MATERIALS IN CEMENT MANUFACTURE, WASTES AND BY-PRODUCTS ARE FULLY UTILISED

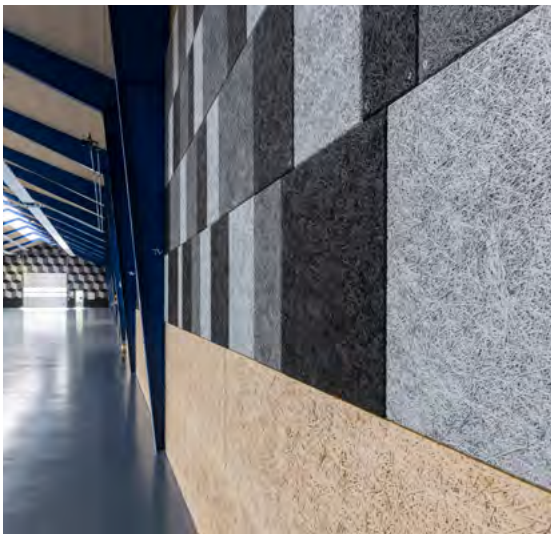
Storage site for alternative fuels

TROLDTEKT BOARDS – RECYCLED TO NEW CEMENT

In 2018, Aalborg Portland joined forces with Danish building materials supplier Troldtekt to receive offcut waste from Troldtekt boards, which consist of wood and cement.

The pulverised waste is used as a recycled by-product in Aalborg Portland's cement manufacture.

The partnership has developed positively, and in 2019 almost 3,000 tonnes of pulverised waste was received from Troldtekt.

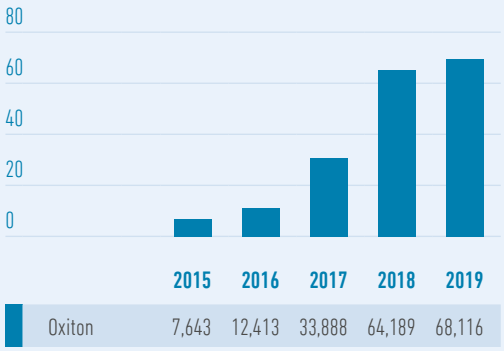


OXITON – AN ALUMINOUS BY-PRODUCT

Companies that reprocess aluminium scrap generate an aluminous by-product Oxiton, resulting from aluminium oxide filtration.

In the past two years, Aalborg Portland has expanded its partnership for the recycling of Oxiton for cement production. This has taken place in order to replace some of the constituents in fly ash, which is being phased out in step with the closure of coal-fired power stations or the transition to biofuel.

OXITON | tonnes



	2015	2016	2017	2018	2019
Oxiton	7,643	12,413	33,888	64,189	68,116

DRIED SEWAGE SLUDGE MUNICIPAL TREATMENT PLANTS

Aalborg Portland receives dried sewage sludge from Aalborg's municipal treatment plants for use as a CO_2-neutral biofuel substitute for fossil coal and raw materials.

This collaboration began back in 2000 with receipt of the first amounts.

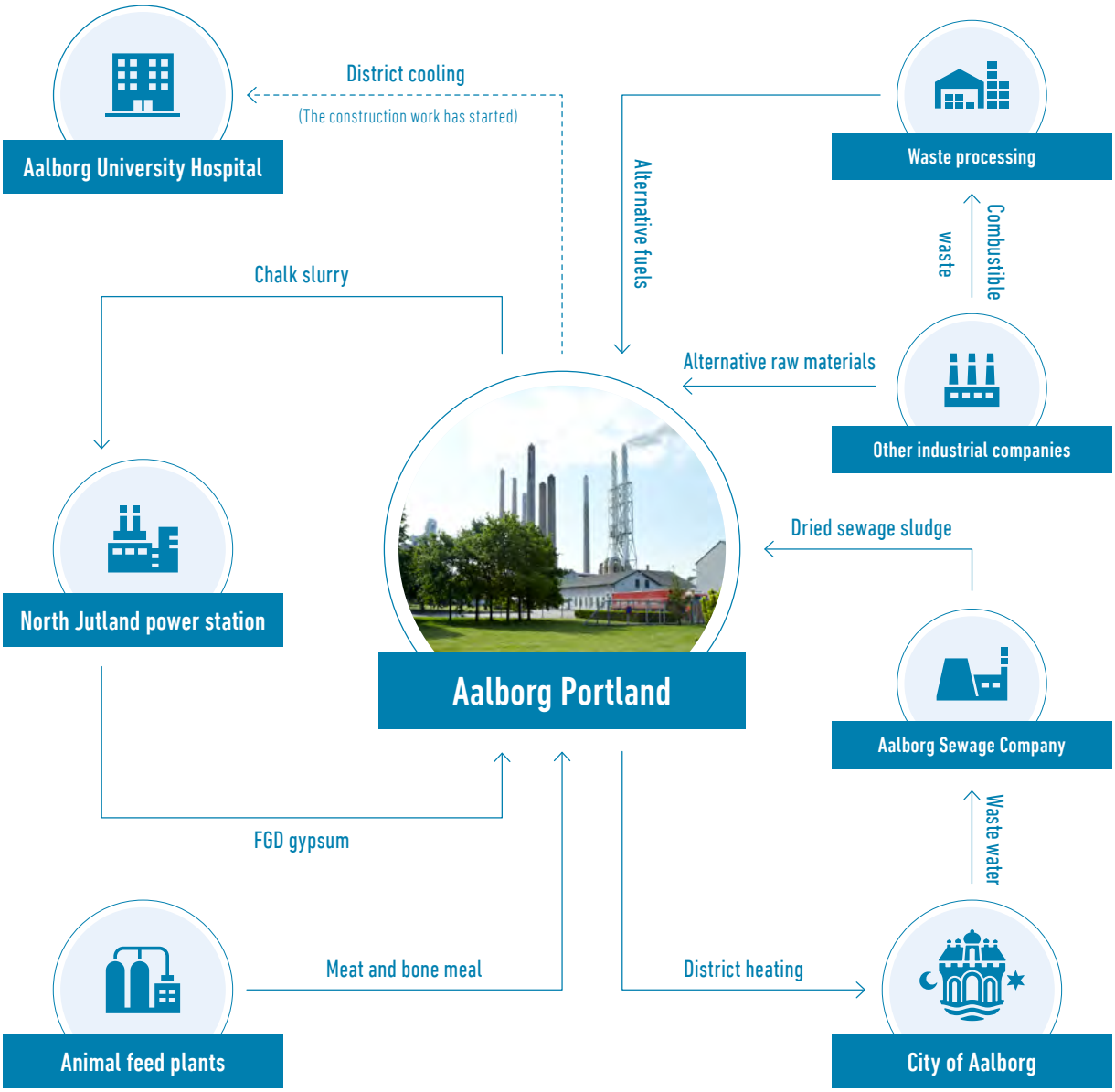
More than 3,000 tonnes of dried sewage sludge were recycled in 2019.

MUSSEL SHELLS RECYCLED IN CHALK PIT

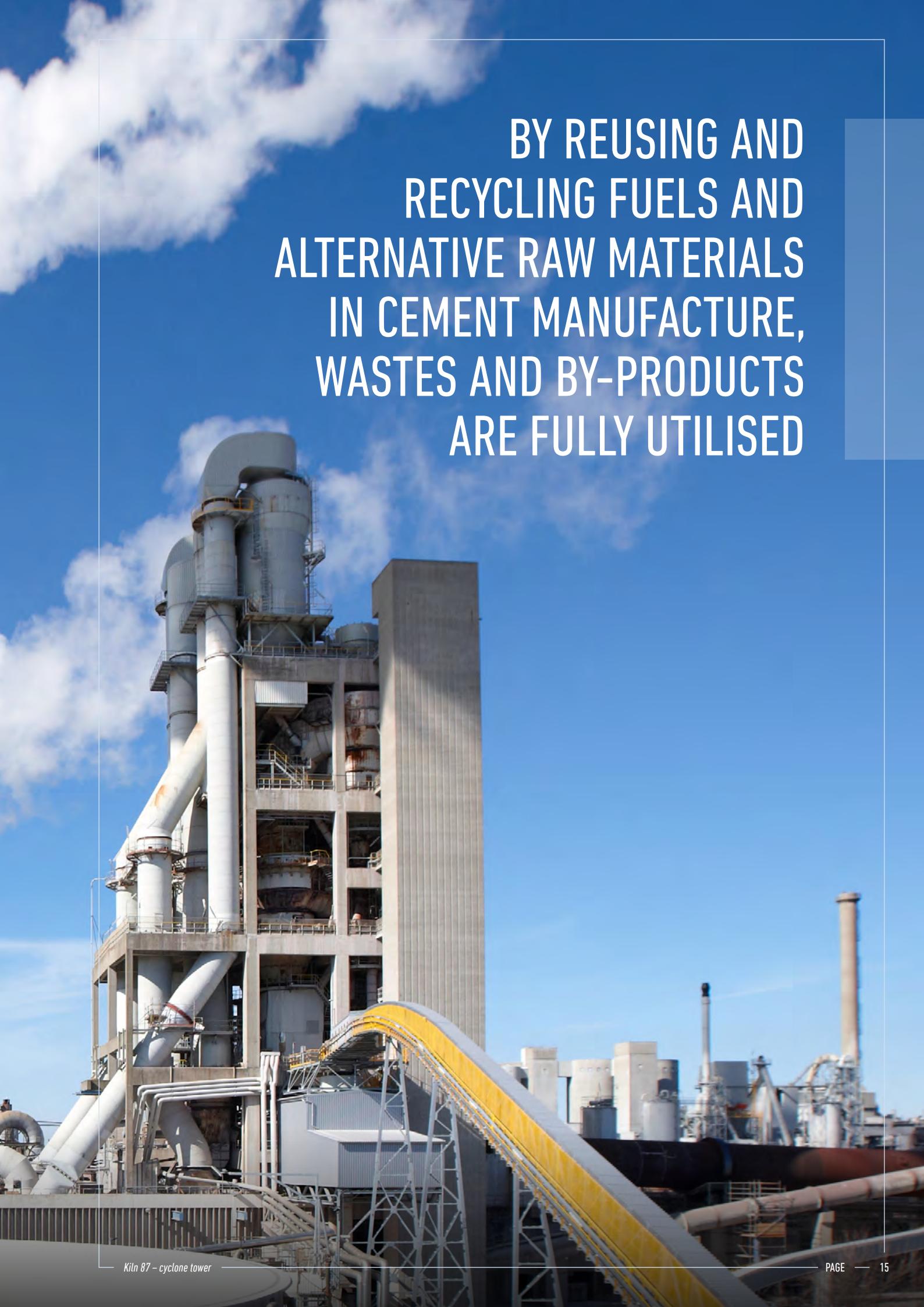
Mussel shells from a food processing plant by the Limfjord are use as a recycled waste product in Aalborg Portland's chalk pit. After unloading, the mussel shells are spread over the working area of the quarry to provide a support surface for the large deep-excavator and belt conveyor. The shells ensure stable operation particularly in wet and frosty weather. The shells are removed along with the excavated chalk and recycled in cement production. More than 3,000 tonnes of mussel shells were recycled in 2019.

SYMBIOSIS BETWEEN ENERGY AND RAW MATERIALS

To reduce the use of fossil fuels and conserve natural materials, Aalborg Portland participates with other companies in a circular business model. For example, FGD gypsum from North Jutland power station is incorporated in our cement, while chalk slurry from our cement production is used by the power station for scrubbing flue gases. And municipal sewage sludge from Aalborg is used in our cement kilns, in return for which surplus heat from our production is supplied to Aalborg residents.



BY REUSING AND RECYCLING FUELS AND ALTERNATIVE RAW MATERIALS IN CEMENT MANUFACTURE, WASTES AND BY-PRODUCTS ARE FULLY UTILISED



Kiln 87 – cyclone tower

MANUFACTURE OF CEMENT

The manufacturing process for grey cement and white cement is essentially identical except for differences in kiln configuration.

SOURCING OF RAW MATERIALS

Chalk and sand are the core components in all cements produced at Aalborg Portland. The chalk is sourced from Aalborg Portland's chalk pit, while the sand is obtained from Sandmosen and from dredging at Hals Barre. This dredging also serves to keep the Limfjord navigable.

INITIAL PROCESSING OF RAW MATERIALS

The chalk is first mixed with water in a slurry drum, while the sand is ground in a sand mill. The two ingredients are then mixed to form the finished kiln slurry.

KILN PROCESS (GREY CEMENT)

The slurry is injected together with fly ash and pyrite ash into a dryer-crusher where the material is converted with the help of hot flue gases into raw meal. The raw meal is conveyed via a separating cyclone to the cyclone preheaters where it is heated to 750° C.

The raw meal is further heated in the calciners to 900° C, at which temperature the carbon dioxide is released. The material then enters the 74-metre long rotary kiln where it is gradually heated to a temperature of 1,500° C to form cement clinker. The clinker is then cooled in the clinker cooler.

Process heat for the kiln is provided by coal, petcoke and alternative fuels, including waste products, dried sewage sludge and meat and bone meal.

HEAT RECOVERY

Heat recovered from the manufacture of white cement is used internally in the factory and supplied to the citizens of Aalborg. In 2019, the heat supplied was sufficient to meet the needs of 25,000 households.

Burner zone in a rotary kiln with cement clinker

GRINDING IN CEMENT MILL

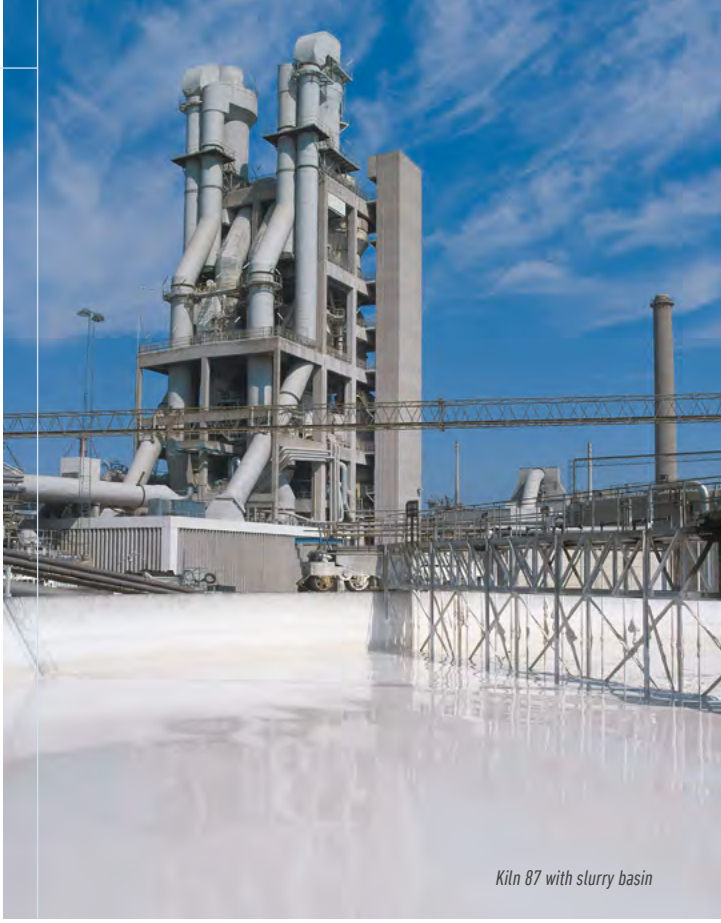
After stockpiling in the clinker store, the clinker is ground in the cement mill to a fine powder together with a small percentage of gypsum to produce the types of cement required.

PACKING AND DISTRIBUTION

The cement is distributed in bags or in bulk by road or ship.

A QUALITY PRODUCT

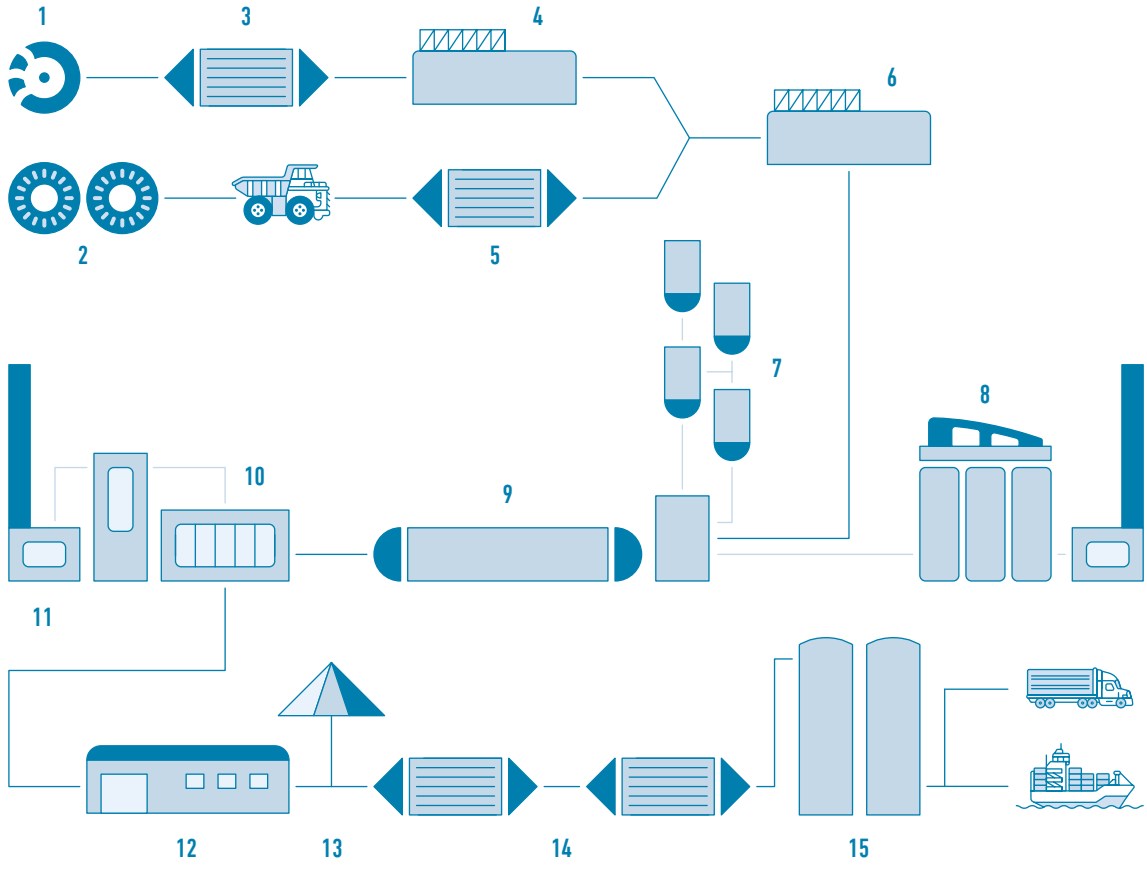
The finished cement is ready for use in building projects large and small worldwide. It is a quality product which is used in concrete, mortar etc. and which adds strength, stability and long life to buildings and constructions everywhere.



Kiln 87 with slurry basin

FROM RAW MATERIALS TO CEMENT

1. Chalk excavator
2. Sand dredger
3. Slurry drum
4. Chalk slurry
5. Sand mill
6. Finished slurry
7. Cyclone tower
8. Electrostatic precipitator
9. Rotary kiln
10. Clinker cooler
11. Electrostatic precipitator
12. Clinker store
13. Gypsum store
14. Cement mills
15. Cement silos



3

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

CEMENT CONTRIBUTES WITH CONCRETE RESULTS IN A DYNAMIC WORLD

Cement is used to manufacture concrete and is one of the most widely used building materials in the world. Its combination of functional, economic and aesthetic properties has made concrete the preferred material for construction. Foundations, subways, ports, bridges, tunnels, sewers, pavings, dams and buildings are examples of where cement is used. Architects, engineers and manufacturers are constantly seeking new areas of application.

Opera House, Oslo, Norway

The Oresund Bridge

AALBORG PORTLAND PRODUCTS

Aalborg Portland manufactures both white and grey cement. These are quality products which are distributed in bags and in bulk to the domestic and export markets.

Bagged cement for distribution

All Aalborg Portland cements are CE-approved and conform to defined criteria in Cement Standard EN 197-1 and the EU Construction Products Regulation. Monitoring of cement performance is carried out by Bureau Veritas, which has certified Aalborg Portland's products. The CE mark indicates that the product conforms to requirements for strength, physical, chemical and durability properties as defined in the cement standard.

Product properties are continuously tested by external independent laboratories in Denmark and internationally.

SUPPLEMENTARY CLASSIFICATION

Aalborg Portland cements are also classified and certified according to the standard DS/INF 135. This classification relates to alkali content and sulphate resistance.

NATIONAL PRODUCT CERTIFICATIONS AND MARKS

Aalborg Portland abides by the wishes of the market and customers as regards certifications. Within Europe, there are several national product certification schemes, such as NF002 and BENOR TRA 600. These are voluntary certifications relating to national cement standards.

Certifications impose additional product quality requirements and are monitored by national certification bodies, such as AFNOR in France and BE-CERT in Belgium.

AALBORG WHITE® cement has been NF-certified according to the requirements of NF002 since 2014 and BENOR TRA since 2019.

PRODUCT MONITORING

Aalborg Portland has a comprehensive internal testing programme that ensures continuous monitoring of product quality. The testing programme includes raw materials, process materials and finished products. All external cement storage facilities are also covered by the programme.

PRODUCT INFORMATION

It is important to us as manufacturer that information about our products is readily available. The intended use for each product must be stated in the product information and in the technical documentation produced for compliance with relevant legislation.

More information about our products can be found on our website www.aalborgportland.dk and relevant documents can be downloaded.

DECLARATION OF PERFORMANCE (DOP)

Declarations have been produced for the individual products. These are compiled in accordance with the Cement Standard and requirements in the EU Construction Products Regulation.

SAFETY DATA SHEETS (SDS)

The products are accompanied by Safety Data Sheets, which therefore form the basis for customers' assessment

- of the chemical risk associated with use of the products in their own company. The Safety Data Sheets were revised in 2019. The sheets give details of which risks may be associated with working with the products, together with information about relevant protective equipment etc. The sheets are prepared in accordance with the Classification, Labelling and Packaging regulation (CLP).

EUROPEAN CHEMICALS AGENCY, ECHA (REACH)

All our products are registered with the European Chemicals Agency (ECHA), and relevant documents are compiled in accordance with the REACH regulation.

ENVIRONMENTAL PRODUCT DECLARATIONS (EPD)

The environmental profile of a product is based on declared values for climate and environmental impact, consumption of resources, waste, etc.

To ensure compliance with these new product information requirements we have joined forces with Aalborg University to develop Life Cycle Assessment (LCA) models and thereby identify the environmental hotspots in our value chain – from chalk extraction to product packaging.

Cement distributed to the domestic and export markets

CEMENT PRODUCTS MANUFACTURED FOR THE DANISH MARKET INCLUDE THE FOLLOWING:

BASIS® CEMENT

Suitable for pre-cast concrete units and concrete products.

RAPID® CEMENT

Suitable for ready-mixed concrete, pre-cast concrete units, concrete products, floors and screeds. Also suitable for masonry mortars, including lime cement mortars used in building, rendering etc.

BASIS® AALBORG CEMENT

Suitable for general concreting and construction work on building sites, such as foundations, floors, masonry, rendering etc.

MESTER® AALBORG CEMENT

Suitable for lime cement mortars used in construction, pointing, rendering, roofing etc.

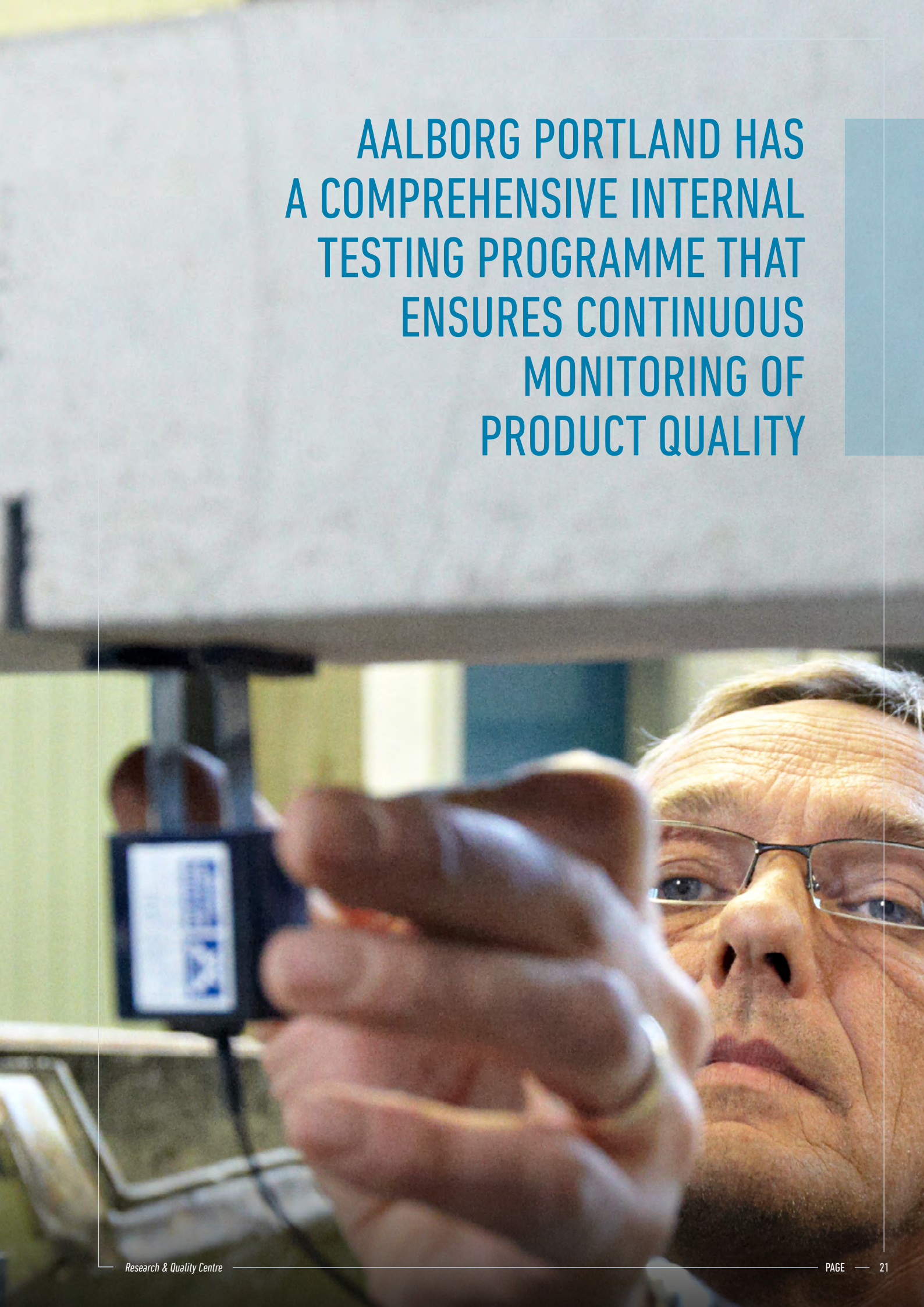
AALBORG WHITE® CEMENT

General-purpose cement, but the preferred choice when the specification calls for white or pigmented concrete.

LOW ALKALI SULPHATE RESISTANT CEMENT

Specially developed for concrete used for civil engineering structures such as bridges or constructions in contact with sulphate-containing groundwater.

AALBORG PORTLAND HAS A COMPREHENSIVE INTERNAL TESTING PROGRAMME THAT ENSURES CONTINUOUS MONITORING OF PRODUCT QUALITY



CEMENT AND CONCRETE OF THE FUTURE

Aalborg Portland is involved in developing a variety of cements and concretes for the future. In this way we contribute to UN Global Goal 9, which encourages building of robust infrastructure, promotes inclusive and sustainable industrialisation, and supports innovation.

FUTURECEM™

Aalborg Portland has developed a revolutionary new type of green cement – FUTURECEM™ – which is based on breakthrough technology. FUTURECEM™ is capable of reducing CO_2 emission from cement production by up to 30%.

The new type of cement is the result of the Green Concrete II project run by the Danish Innovation Consortium. This project included Aalborg Portland and a number of partners and was aimed at developing eco-friendlier concretes to promote sustainable future building. The project ended in March 2019 but intensive work is under way with a view to launching FUTURECEM™ on the market.

COMPOSITION OF A GREEN CONCRETE

Green concrete incorporating FUTURECEM™ differs from conventional concrete by containing limestone and calcined clay that are burned at significantly lower temperatures than ordinary cement. This requires significantly less energy consumption, thereby reducing CO_2 emission by up to 30%.

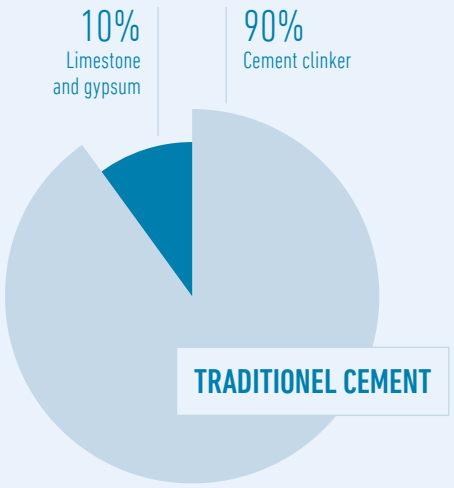
Addition of limestone and calcined clay as a binding agent in green cement also means that fly ash can be wholly or partly eliminated in the concrete mix.

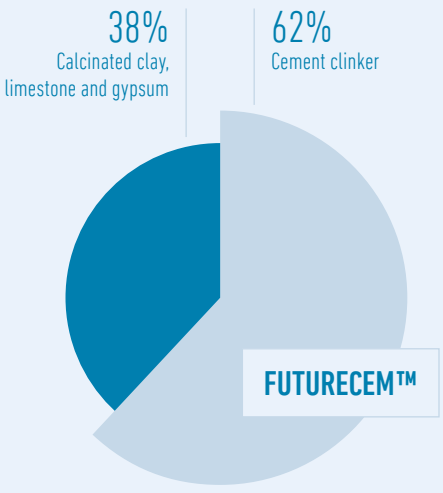
SUSTAINABLE INNOVATION

The worldwide replacement of existing cements and concretes by the new green equivalents developed in Denmark can reduce global CO_2 emission from building by 400 million tonnes annually.

FACTS ABOUT THE NEW GREEN CEMENT – FUTURECEM™

Conventional cement consists primarily of approx. 90% cement clinker, the remainder being equal parts limestone and gypsum. FUTURECEM™ consists of approx. 62% cement clinker, around 17% calcined clay, around 17% limestone and the rest gypsum. The result is a significantly smaller CO_2 footprint.





Road bridge with "geen cement" on the Herning-Holstebro motorway

BRIDGES AND LABORATORY PAVE THE WAY

The first large demo project for green concrete – construction of parts for a new motorway road bridge – was completed in 2016. A year later, in 2017, a further important step was taken when green concrete was used to cast sections for two new demo bridges in Lolland. This was an important contribution to full-scale view of the new technology.

In 2018, the Technological University of Denmark (DTU), one of the project participants, built a new concrete and materials testing laboratory with one wall in the central auditorium cast in situ using green concrete. The floor of an adjoining technical room was also cast with green concrete.

Based on the positive experience provided by the Green Concrete II project, Aalborg Portland is continuing to prepare FUTURECEM™ for market launch. Preliminary manufacturing trials were carried out at Aalborg Portland in 2019 to determine the best way to implement large-scale production.

DANISH CONCRETE PRIZE

The biennially awarded Danish Concrete Prize was presented on 26 September 2019 in Svendborg. This prestigious prize is bestowed by the Danish Concrete Society and its membership to one or more persons who have by their work significantly contributed to the development and understanding of concrete's technical properties, its aesthetic applications, and so on.

In 2019 the prize went to Aalborg Portland's long-standing Research Director Jesper Sand Damtoft whose R&D work has made a major contribution to the Danish and international cement and concrete industry.

The sensational Green Project II has been particularly notable in this respect. Headed by Jesper as steering committee chairman, the project resulted in the development of the new cement type FUTURECEM™, which is expected to enable CO_2 emission from cement and concrete production to be cut by as much as 30%.

Research Director, Jesper Sand Damtoft

4

ENVIRONMENT AND ENERGY IN FOCUS

Aalborg Portland is an industrial company with a large land area that includes a cement factory and a chalk pit, and environmental and energy factors are fully monitored. To govern these environmental and energy factors, Aalborg Portland has introduced a system of environmental and energy management. We focus on ongoing improvements and specific targets aimed at enhanced environmental and energy performance.

Conveyor belt for waste fuels to Kiln 87

ENVIRONMENTAL MANAGEMENT

Aalborg Portland has an integrated management system that embraces quality, environment, CO_2, energy, and health & safety. The management system is an integral part of everyday life at Aalborg Portland, and helps to maintain focus on the principal environmental and energy factors and to successfully implement our policies.

The management system establishes requirements and defines targets and action plans so that our performances can be continuously improved, cf. the section "Environmental and energy targets – actions and results".

Aalborg Portland's management system conforms to international standards and is certified by Bureau Veritas. This certification is an independent guarantee that Aalborg Portland meets criteria defined in these standards.

In 2019, the management system was re-certified in accordance with the latest standards for occupational health & safety (ISO 45001-2018) and energy (ISO 50001: 2018). Furthermore, product certification of Aalborg White® according to the Belgian standard (TRA 600) was widened in 2019 to include the requirements of NBN B 12-109:2015, which imposes specifications for low-alkali cement.

In 2019, Aalborg Portland also focused on integrating the UN Global Goals within its own strategies. The results of these efforts have now been documented by verification and scoring performed by Bureau Veritas Certification. Aalborg Portland is one of the first three Danish companies to have been certified according to a rating model for work carried out on the UN Global Goals.

The Aalborg Portland management system is subject to an external audit intended to assess its effectiveness and recommend improvements to control, risk management and business processes. The audit is based on objective testimony by review of business processes and analysis of data. In 2019, 16 external audits were performed, independently of one another, by Bureau Veritas, DANAK, LEMVP and BE-CERT.

Central control room – operation and monitoring of production

AALBORG PORTLAND CERTIFICATION OVERVIEW

QUALITY AND PRODUCT

- ISO 9001:2015
- EN 197-1:2011
- EN 197-2:2014
- EN 12620:2002+A1:2008
- EN 13043:2002
- NF002:2019
- TRA 600 C:2019
- TRA 600 P+E:2019
- DS/INF 135:2015
- Danish Ministry of Industry, Business and Financial Affairs' Executive Order No. 9639:2002 on Technical Regulation concerning Loading and Unloading of Bulk Carriers.

ENVIRONMENT AND ENERGY

- ISO 14001:2015
- ISO 50001:2018
- Commission Regulation (EU) No. 1505:2017 amending Annexes I, II and III to Regulation (EC) 1221/2009 of the European Parliament and of the Council on the Voluntary Participation by Organisations in a Community Eco-management and Audit Scheme (EMAS).
- CO_2
- The UN's 17 Global Goals

OCCUPATIONAL HEALTH & SAFETY

- DS/ISO 45001:2018
- Danish Working Environment Authority Executive Order No. 1510:2018 on Recognised Occupational Health & Safety Certification gained through DS/ISO 45001 etc.
- Regulation (EC) No 725:2004 of the European Parliament and of the Council on Enhancing Ship and Port Facility Security.

ACCREDITATION OF LABORATORY

- ISO 17025:2017

ELECTRICAL AUTHORISATION

- Danish Ministry of Industry, Business and Financial Affairs' Executive Order No. 1608:2017 on Operational Safety of Electrical Equipment.
- Danish Ministry of Industry, Business and Financial Affairs' Executive Order No.1363:2018 on Quality Management Systems for Authorised Companies Installing Electricity, Heating, Plumbing and Sewers and for Companies with Gas Approval.

PRINCIPAL ENVIRONMENTAL IMPACTS

Cement manufacture is associated with consumption of energy and raw materials. The extraction of raw materials and production therefore give rise to a number of environmental impacts in the form of flue gas emissions, waste, noise, wastewater, etc. In addition, there are environmental impacts arising from, for example, transportation and reprocessing of fuels.

MATERIALITY CRITERIA

The point of departure is the list of pollutants and emission limits reportable to the European Pollutant Release and Transfer Register.

In our environmental and energy activities the principal direct and indirect environmental impacts are surveyed and selected according to the following criteria:

- Spreading of substances, as well as climate and environmental impact.
- Volumes.
- Conditions in environmental approvals and consideration for neighbours.
- Optimisation of raw material resources.
- Receipt of waste products from other industries.
- Energy savings potential.
- Minimising of energy consumption during product distribution.
- Product development, and research into sustainable manufacture of cement and concrete.
- Biodiversity.

ENVIRONMENTAL APPROVAL

Environmental impacts are regulated in Aalborg Portland's environmental approvals and permits, which are listed in the section "General information". Compliance with the conditions is discussed in connection with the status of the specific environmental impacts.

Aalborg Portland's general environmental approval for extraction of raw materials and production consists of an extraction permit dated 10 October 2012, and an environmental approval of 10 March 2017 which covers environmental approval and reassessment of the cement factory. These approvals are supplemented by a number of additional approvals. The environmental approvals stipulate conditions for operation, including:

- Conditions for atmospheric emissions from kilns, cement mills, etc.
- Conditions for factory noise arising from production and excavation.
- Conditions for release of process waste water, cooling water, rainwater, etc.
- Requirements for handling and reporting of serious breakdowns and accidents.
- Requirements for operation of storage sites holding raw materials and fuels.
- Requirements for operation of on-site landfills and recycling facilities.

ENVIRONMENTAL PERFORMANCE

As follow-up to our environmental and energy activities, key performance indicators have been selected for grey and white cement production, cf. the table on next page. Key performance indicators are values for consumption and emission relative to production. The section "Material flows" shows KPI development in the past five years for overall production.

Some key performance indicators can increase from year to year, as was the case with white cement production from 2017-2018, due to short periods of unstable kiln operation or changed technical conditions in production. Most importantly, however, Aalborg Portland has reduced both CO_2 and NO_X emissions significantly since year 2000 and continuously implements new eco-improvement initiatives, including environmental investments.

KEY PERFORMANCE INDICATORS

GREY CEMENT PRODUCTION	Unit	Base year 2000	2015	2016	2017	2018	2019
Energy	GJ per tTCE	4.78	4.45	4.31	4.41	4.43	4.54
CO_2	Kg per tTCE	897	761	756	764	734	731[a]
NO_X	Kg per tTCE	3.72	0.70	0.63	0.76	0.65	0.65[b]
WHITE CEMENT PRODUCTION							
Energy*	GJ per tTCE	6.80	6.82	6.89	6.98	7.49	7.13[c]
CO_2*	Kg per tTCE	1,276	1,155	1,173	1,180	1,235	1,182[c]
NO_X*	Kg per tTCE	3.82	1.51	1.69	1.71	1.95	1.93[b]

* Adjusted for recovery of heat produced for Aalborg's municipal district heating network that would otherwise have had to be produced and supplied by North Jutland power station. The adjustment for saved CO_2 and NO_X has been calculated using the power station's emission and energy figures for coal firing based on the 125% thermal efficiency method.

[a] In grey cement production, low CO_2 level was maintained due to continued consumption of alternative fuels containing CO_2-neutral biomass.

[b] In grey and white cement production, NO_X was similar to 2018. In white cement production, NO_X has been rising since 2016 due to adjustment of mixing air equipment for NO_X. Furthermore, an increase in the number of kiln scavengings in order to limit dust in the kiln process has resulted in more thermal NO_X formation and contributed to higher NO_X level in the last couple of years.

[c] In white cement production, energy consumption and CO_2 decreased from 2018 to 2019 and have returned to the 2017 level due to recuperation of more surplus heat on the recovery plant for district heating purposes. However, energy consumption and CO_2.are not back at the same lower level as in 2015 when the specific heat recovery for the district heating network was higher and adjustment for saved energy and CO_2 was therefore greater. Focus continues on exploring the technical feasibility for increasing the supply of surplus heat.

AALBORG PORTLAND HAS REDUCED BOTH CO_2 AND NO_X EMISSIONS SIGNIFICANTLY SINCE YEAR 2000 AND CONTINUOUSLY IMPLEMENTS NEW ECO-IMPROVEMENT INITIATIVES, INCLUDING ENVIRONMENTAL INVESTMENTS

ARoS Art Museum,, Aarhus, Denmark

ENVIRONMENTAL DIALOGUE

Aalborg Portland is a part of the community locally, regionally, nationally and internationally. It is important for us to have contact with our neighbours and other stakeholders and to be a part of the local area. We do this for example by issuing invitations to events and supporting local sport and culture. The aspirations of UN Global Goal 13, Sustainable Cities and Communities, are reflected in our longstanding presence in the city of Aalborg.

Aalborg Portland pursues a number of important activities with a view to strengthening ongoing contact with stakeholders:

- In 2019, we hosted around 100 visits and some 2,000 guests. Visitors were briefed on Aalborg Portland's sustainability activities and had opportunity to ask questions.
- We held information meetings with neighbours and other stakeholders at which we presented our plans for excavation and rehabilitation of the Rørdal chalk pit along with our initiatives and results relating to environment and energy.
- Our personnel address external courses and meetings.
- We incorporate environmental data from suppliers in relevant supply contracts.
- We maintain ongoing contact with Danish and EU environmental authorities on development of proposed legislation and on regulations that will impact the company.

Aalborg Portland's Environmental Report is distributed to many stakeholders nationally and internationally, including neighbours, owners, authorities, politicians, the Danish Society for Nature Conservation, customers and suppliers.

The report is also freely available on Aalborg Portland's website.

In order to ensure the best possible motivation and dialogue with our internal and external stakeholders concerning our work in the environmental area, we urge all parties to express their views and to suggest improvements to our reporting.

EXTERNAL COMPLAINTS

Aalborg Portland received 40 external complaints in 2019, mainly about noise and dust.

There have been many complaints about dust problems relating to excavation in Rørdal chalk pit. We are therefore following these up with a meeting with neighbours to discuss local needs. The airborne dust from excavation is primarily due to windy and dry periods with no rain,


Shipping terminal

NUMBER OF EMISSIONS RESULTING IN COMPLAINTS

	2015	2016	2017	2018	2019
Dust	33	39	30	34	36
Noise	1	1	4	3	3
Smell	0	0	1	0	1
The Limfjord	1	1	5	0	0

DIALOGUE AND COLLABORATION ON FUTURE CLIMATE AND ENERGY SOLUTIONS

The heads of the Danish Government's 13 climate partnerships together with Denmark's Prime Minister, Minister for Climate and Energy, and Minister for Industry, Business and Financial Affairs

Aalborg Portland contributes to dialogue and collaboration on several fronts to ensure good solutions for climate and energy.

- Aalborg Portland holds the chairmanship of the Danish Government's Climate Partnership for Energy–Intensive Industry. Within this forum we pursue a frank dialogue with the rest of Denmark's senior business community to formulate concrete climate recommendations for the Government.
- Based on the City of Aalborg's climate and energy strategy we are involved in a partnership for establishment of pond heat sinks so that hot water can be stored and pumped to consumers as and when needed.
- In partnership with North Jutland power station we are formulating a strategy for developing renewable energy in the area around the power station and Aalborg Portland from sources that include wind turbines.
- Together with the City of Aalborg and other stakeholders we are seeking to determine the technical feasibility for increasing the supply of surplus heat.
- In partnership with the utility Aalborg Forsyning and North Denmark Region a project has been begun to utilise cold water from Aalborg Portland's large chalk lake as a source of district cooling for the coming Aalborg University Hospital.

allied to the close proximity between excavation work and our neighbours. We have implemented a large number of measures to restrict windborne dust, including reducing dust from the bucket wheel excavator working the top face of the chalk pit, planting windbreaks on the noise embankment and watering roads and surfaces. For more information on these measures, see the section "Dust".

Complaints were also received about dust problems from production. This led to installation of new technology for recording specific parameters during kiln operation. More stable operating conditions have resulted, thereby reducing the starting and stopping of critical plant that can otherwise cause a small puff of dust that can be a nuisance for nearby neighbours. In 2019, there was a single complaint about smell. This prompted an investigation of potential sources, and as a result a number of flue gas dampers will be replaced in 2020/2021.

With regard to noise complaints, a project was begun in 2017 to design a noise guard for the deep-excavator. This work has now been completed and the guard was fitted in spring 2019, significantly reducing excavator noise emission. For more project information, see section "Noise".

AALBORG PORTLAND'S ENVIRONMENTAL REPORT IS DISTRIBUTED TO MANY STAKEHOLDERS NATIONALLY AND INTERNATIONALLY, INCLUDING NEIGHBOURS, OWNERS, AUTHORITIES, POLITICIANS, THE DANISH SOCIETY FOR NATURE CONSERVATION, CUSTOMERS AND SUPPLIERS

In 2019, three activities gave rise to noise complaints:

- In maintenance work on Kiln 87, the cyclone tower was air-blasted to clear the inside of the calciners.
- A section of the new guard for the deep-excavator was temporarily removed for adjustment offsite.
- The deep-excavator was wet-blasted to prepare the surfaces for repainting.

RAW MATERIALS

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

Cement is produced using raw materials from natural resources, including chalk, sand and gypsum. UN Global Goal 12, Responsible Consumption and Production, is an integral part of our production philosophy.

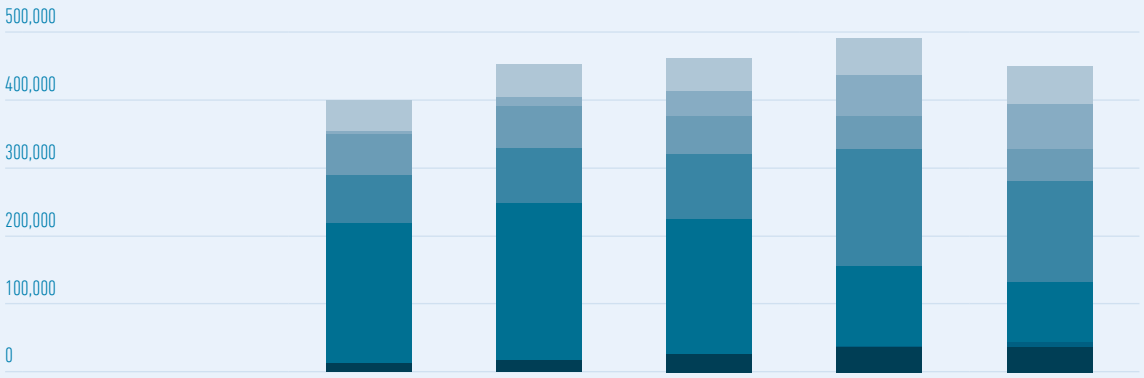
Aalborg Portland began using fly ash – a power station by-product – almost 40 years ago. Subsequently, a number of other alternative raw materials have been included in our production.

In order to limit the impact on natural reserves, Aalborg Portland in 2019 replaced almost 10% with alternative raw materials in the form of by-products and wastes from other industries and from society. These materials are therefore utilised as a resource.

SAND FROM DREDGING

Sand dredgers keep navigation channels at Hals Barre and in the Limfjord open for the passage of ships.

ALTERNATIVE RAW MATERIALS | Tonnes



	2015	2016	2017	2018	2019
Iron oxide	42,763	45,154	55,617	50,936	51,772
Oxiton	7,643	12,413	33,888	64,189	68,116
FGD gypsum	56,961	57,203	58,172	51,077	53,007
Sand	75,410	79,239	92,913	161,106	148,456
Fly ash	201,406	235,031	202,801	124,225	89,561
Troldtekt	0	0	0	603	2,821
Other	16,107	21,313	23,882	36,581	33,544
Total	**400,290**	**450,353**	**467,273**	**488,717**	**447,277**[a]

[a] In 2019, alternative raw materials utilised in cement production amounted to more than 440,000 tonnes, a fall compared to 2018 predominantly due to a decrease of around 35,000 tonnes in consumption of fly ash. This decrease was caused by reduced availability of fly ash as a result of increasing phasing out of coal-fired power stations in the European market. The fly ash is therefore increasingly being replaced by Oxiton and sand.

Chalk pit with deep-excavator

The dredged sand, which would otherwise be dumped in the Kattegat, thereby impacting the marine environment, is instead used in cement manufacture. It takes the place of quarried sand, thereby reducing impact on the countryside. Aalborg Portland's position on the Limfjord also offers an effective logistical solution as the dredged sand can be pumped directly into drainage basins ashore.

FGD GYPSUM

Gypsum from desulphurisation of flue gases is used as an additive in cement manufacture. Obtained both internally and from the local North Jutland power station, this gypsum product replaces natural gypsum and anhydrite sourced in Morocco and Germany, and at the same time thereby reduces the amount of long-distance transport by sea.

The local partnership between Aalborg Portland and North Jutland power station is a good example of industrial symbiosis. We supply chalk slurry to the power station for use in desulphurisation and take the desulphurised gypsum product in return.

FLY ASH

Fly ash, a mineral product resulting from power and heat generation at coal-fired power stations, has been recycled at Aalborg Portland since the 1970s. In cement production the fly ash replaces natural clay that would otherwise have to be quarried in Denmark.

IRON OXIDE

Iron oxide (pyrite ash) is a by-product of the manufacture of sulphuric acid and is a necessary source of iron for production of grey cement.

OXITON

Oxiton or SEROX is an aluminous by-product resulting from aluminium oxide filtration.

TROLDTEKT

Pulverised material supplied by Danish building products manufacturer Troldtekt. The material originates from offcuts of Troldtekt boards which are made of wood and cement.

CLIMATE ACTION

Aalborg Portland has been investing in energy savings in electricity and fuel consumption since the early 1990s. In the case of fuel consumption, massive equipment changes have also taken place, enabling fossil fuels to be substituted with alternative fuels. Climate Action, UN Global Goal 13, is therefore a longstanding area of focus for Aalborg Portland. In 2019, alternative energy sources accounted for more than 53% of energy consumption in grey cement production.

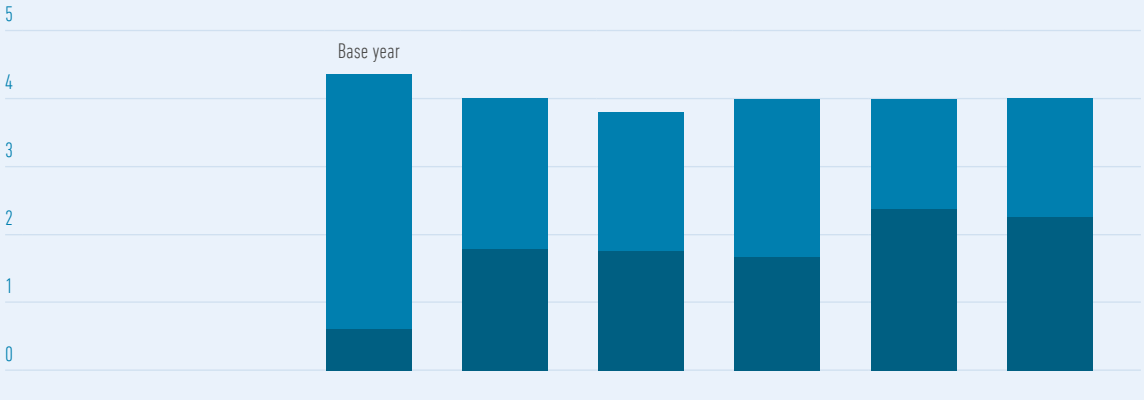
ENERGY SAVINGS

Aalborg Portland has worked hard for many years to identify energy savings in electricity and fuel consumption at the factory. The heightened focus in recent years on improving energy efficiency in existing production units has led to new ideas and the launch of new projects for saving energy.

SURPLUS HEAT FROM CLINKER COOLER OF KILN 87

Kiln 87 produces daily around 4,500 tonnes of grey cement clinker. The hot cement minerals, which have a temperature of 1,400° C, are cooled in the process by blowing atmospheric air through a clinker cooler.

FOSSIL AND ALTERNATIVE FUEL CONSUMPTION FOR GREY CEMENT | GJ per tTCE – grey production



	2000	2015	2016	2017	2018	2019
Fossil fuel – grey	3.80	2.27	2.11	2.30	1.77	1.92
Alternative fuel – grey	0.57	1.74	1.78	1.70	2.24	2.17
Total fuel – grey	4.37	4.01	3.89	4.00	4.01	4.09
Alternative fuel in %	13%	43%	46%	42%	56%	53%[a]

[a] In 2019, substitution by alternative fuels decreased. This was due to increased consumption of Oxiton as replacement for fly ash, which means that chloride input from alternative fuels must be correspondingly reduced to avoid operating disruptions caused by clogging in the kiln system.

In foreground: The pipe that conveys excess heat from clinker cooler of Kiln 87 for use as primary air in five white cement kilns and a coal mill.

Most of the heated air is returned and utilised energy-efficiently in the calciners of Kiln 87, but a small fraction from the kiln back end is not utilised fully.

In 2018, an energy-saving project was therefore launched aimed at using the heated air in the five other kilns, which produce white cement clinker, and for drying coal in one of the coal mills.

In partnership with consultants and equipment designers, Aalborg Portland has built a supply line and branches for reusing the hot air.

Kiln 76 was the first kiln to be connected to the supply line. In 2019, all five white cement kilns and one coal mill were connected and are contributing to an annual fuel saving of around 30,000 MWh or more than 4,000 tonnes of coal.

ALTERNATIVE FUELS – WASTE IS ENERGY

Recycling waste contributes to a resource-efficient society. In cement production, waste can be recycled as a resource by replacing coal and petcoke. Waste fuels help to reduce emissions of fossil CO_2, NO_X, SO_2 etc. in the flue gases, and biomass content can be recycled, thereby benefiting the cause of the global climate. As an example, meat and bone meal are considered 100% CO_2-neutral, and in industrial waste the amount of biomass carbon is typically 30-40% when substituted for fossil fuels

Fuel – grey cement production

Since 2000 the relative consumption of alternative fuel replacing fossil fuel such as coal and petcoke has risen from 0.57 to 2.17 GJ per tTCE, which in 2019 corresponded to a substitution of 53% of the total fuel consumption in grey cement production.

IN 2019, ALTERNATIVE ENERGY SOURCES ACCOUNTED FOR MORE THAN 53% OF ENERGY CONSUMPTION IN GREY CEMENT PRODUCTION

In 2019, relative fuel consumption was more than 6% lower than in year 2000. This has been achieved despite a slight rise in fuel consumption in 2019, caused by replacement of dry fly ash by wet sand and Oxiton due to the phasing out of coal at power stations.

Fuel – white cement production

We still seek alternatives to fossil fuel in production of white cement. Since 2000, meat and bone meal has been a good alternative fuel that has not impacted quality and the characteristic high whiteness of Aalborg Portland white cement. In 2019, 5% of the fuel energy was substituted.

The high whiteness is a quality criterion that limits the possibilities for finding alternative fuels, for which the requirement for low iron content is a particular challenge. We remain focused on finding alternative fuels and on increasing the production of surplus heat from the white cement kilns so as to utilise the fuel energy optimally.

ELECTRICITY

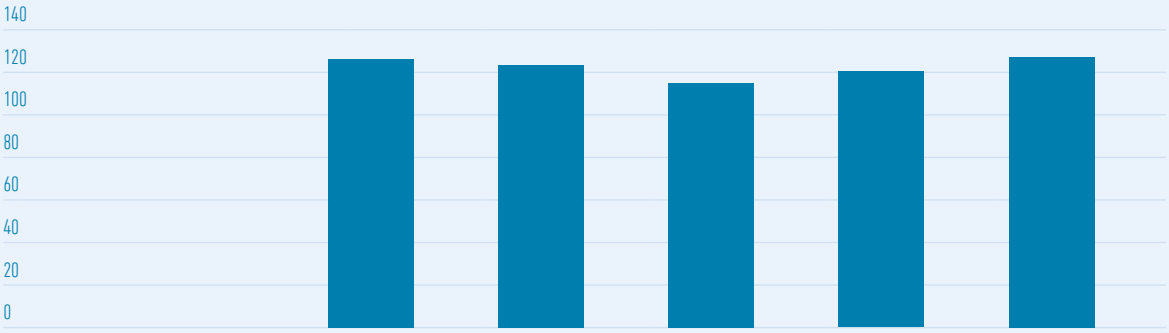
Electricity is essential for operating cement plant equipment. Consumption in 2019 was around 320,000 MWh. The biggest power consumers are the kilns and cement grinding plant. Consumption of electricity consists of an equipment base load and a variable component that depends on the scale of production on primary units.

Shown below is the relative electricity consumption for production of grey and white cement in the period 2015-2019 and the associated equivalised volumes in tTCE.

For grey cement production, the relative electricity consumption in 2019 increased to 128.7 kWh per tTCE, a rise of 7%. This was due to a three-week period of single-string operation on Kiln 87 in September 2019 following a breakdown on one of the kiln's two cyclone strings that prevented energy-efficient production from being maintained. The reduced production also meant that the base electricity load for auxiliary units accounted for a larger part of the relative total electricity consumption.

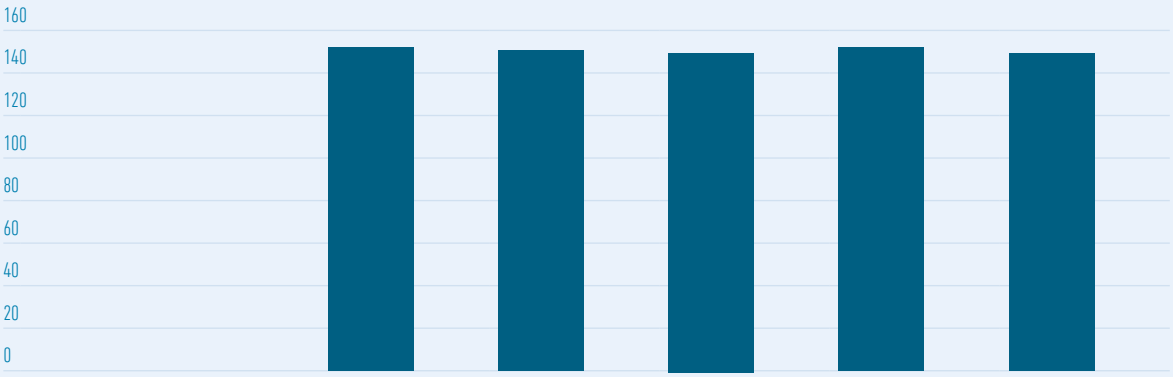
For white cement production, the relative electricity consumption fell by 2% to 152.9 kWh pr. tTCE as more energy-efficient production was achieved at a higher level of production. The base electricity load for auxiliary units therefore accounted for a smaller part of the relative total electricity consumption.

ELECTRICITY CONSUMPTION | kWh per tTCE – grey cement production



	2015	2016	2017	2018	2019
Electricity consumption – grey, kWh per tTCE	124.9	122.2	117.2	120.1	128.7
Cement equivalent – grey tTCE	1,291,797	1,486,879	1,643,912	1,624,054	1,538,154

ELECTRICITY CONSUMPTION | kWh per tTCE – white cement production



	2015	2016	2017	2018	2019
Electricity consumption – white, kWh per tTCE	157.7	154.4	151.7	156.3	152.9
Cement equivalent – white tTCE	610,275	715,593	771,630	735,957	803,873

SUSTAINABLE ENERGY

7 AFFORDABLE AND CLEAN ENERGY

Aalborg Portland is also an energy supplier. Heat from our kilns is utilised for district heating, and cold water from our chalk lake will be used to provide district cooling for the new Aalborg University Hospital. UN Global Goal 7 is for us about challenging and exploiting our potentials for producing sustainable energies.

RECOVERY OF HEAT FROM KILN FUEL

Aalborg Portland recovers surplus heat from production for supply as district heating to the citizens of Aalborg. In 2019, the heat we supplied corresponded to the annual needs of approx. 25,000 households. However, our plant has sufficient capacity to meet the annual heat requirements of 36,000 households, and we are working hard to realise this.

IN 2019, THE HEAT WE SUPPLIED CORRESPONDED TO THE ANNUAL NEEDS OF APPROX. 25,000 HOUSEHOLDS

COLLABORATION WITH AALBORG FORSYNING

In partnership with the utility Aalborg Forsyning, a project has begun to utilise cold water from the large chalk lake at Aalborg Portland to provide district cooling. In the first instance the plan is to use the lake water to meet the comfort and process cooling needs of the coming Aalborg University Hospital as an energy-efficient alternative to conventional electrical cooling systems.

District cooling is the cooling equivalent of district heating, cold water being pumped through a closed pipe system to the buildings to be cooled. The water absorbs the space heat from the buildings and is pumped back to be cooled, which in this case will be done by the cold lake water.

Prompted by the City of Aalborg's climate and energy strategy, collaboration has also begun on establishing pond heat sinks. Pond heat sinks are reservoirs that can be used to store hot water for piping to consumers as and when necessary. This makes for example utilisation of surplus heat independent of when users need hot water and will enable surplus heat to be utilised all year round.

WIND TURBINES – GREEN ENERGY

Aalborg Portland has plans to install wind turbines on its own land close to the factory, thereby using even more green energy for cement production. In 2019, Aalborg Portland and North Jutland power station worked on a combined strategy for developing renewable energy in the area around both parties. This work will continue in 2020.

The first shovelfuls for the district cooling project were dug in August 2019 by Michael Lundgaard, Managing Director, Aalborg Portland; Thomas Kastrup-Larsen, Mayor of Aalborg, Ulla Astman, Chairman of Regional Council, and Lasse P.N. Olsen, Environment and Energy Administration

Emission from heat recovery plant

EMISSION TO THE ATMOSPHERE

Aalborg Portland has a range of atmospheric vents, such as chimney stacks and workshop extractors.

Overall, the company has around 400 vents where the air is passed through various types of filters before emission. The largest chimneys are equipped with sensors that continuously measure the relevant content. In addition, some vents are regularly sampled and analysed to further document the content. Sampling and analysis are performed by an independently accredited laboratory.

FLUE GASES

CO_2

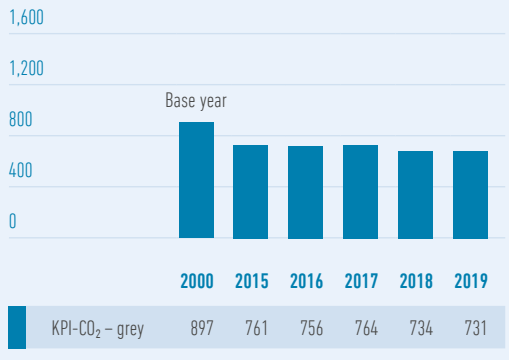
Grey cement production

For grey cement production, the key performance indicator for CO_2 reached its lowest level ever in 2019 and has therefore decreased by more than 19% compared to 2000. This has been achieved by more energy-efficient kiln operation and transition from fossil fuel to use of alternative fuel with CO_2-neutral biomass content.

White cement production

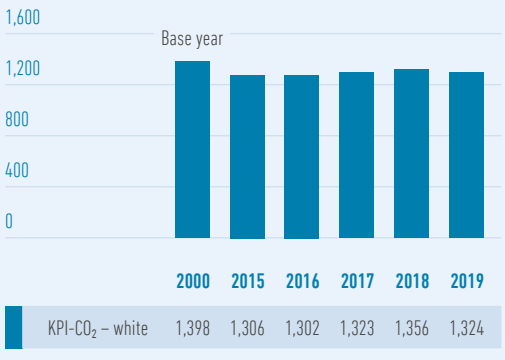
CO_2 for white cement production has fallen by 5% compared to 2000. This has been achieved by use of meat and bone meal as a fossil-free fuel.

CO_2 | kg per tTCE – grey



	2000	2015	2016	2017	2018	2019
KPI-CO_2 – grey	897	761	756	764	734	731

CO_2 | kg per tTCE – white



	2000	2015	2016	2017	2018	2019
KPI-CO_2 – white	1,398	1,306	1,302	1,323	1,356	1,324

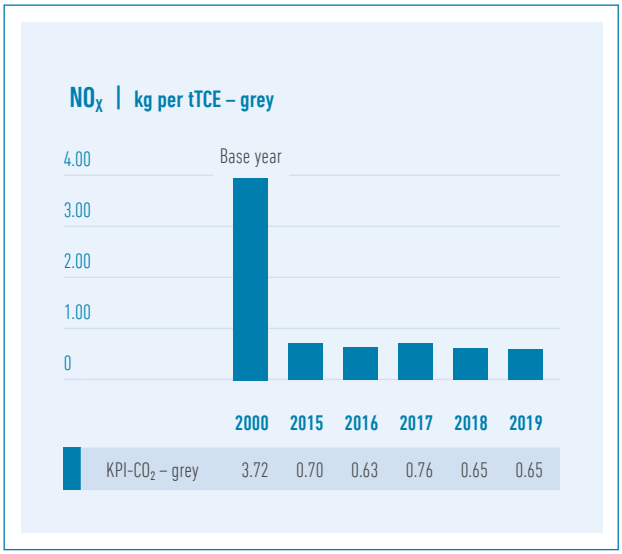
NO_X

Grey cement production

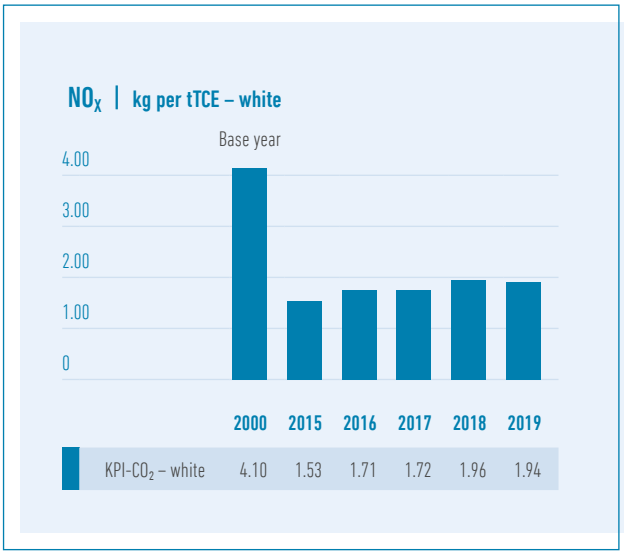
NO_X scrubbers were developed and fitted on all kilns in the period 2004-2007. In 2019, relative NO_X emission had therefore decreased by a massive 83% from 2000 when it was 3.72 kg per tTCE.

White cement production

Emission of NO_X has also fallen significantly on the white cement kilns, by 53% compared to 2000. The reason there is a difference in NO_X reduction between white and grey cement production, and therefore in the relative NO_X emission in the tables below, is due to the need to ensure a high degree of whiteness in the white clinker. This has been achieved using Mixing Air technology – see description in the terminology.



	2000	2015	2016	2017	2018	2019
KPI-CO_2 – grey	3.72	0.70	0.63	0.76	0.65	0.65



	2000	2015	2016	2017	2018	2019
KPI-CO_2 – white	4.10	1.53	1.71	1.72	1.96	1.94

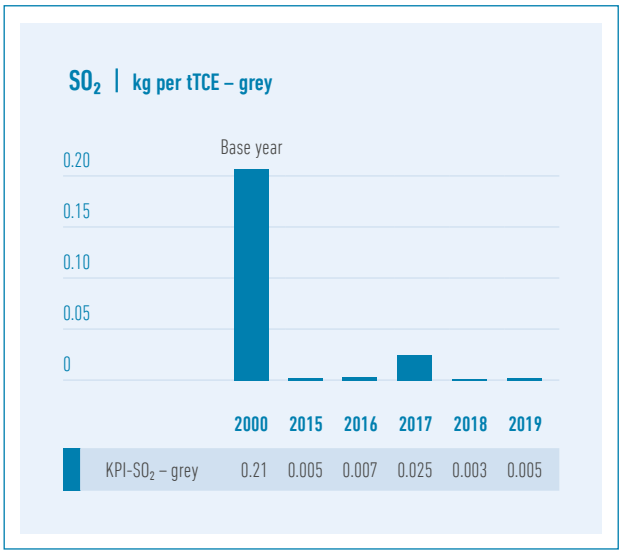
SO_2

Grey cement production

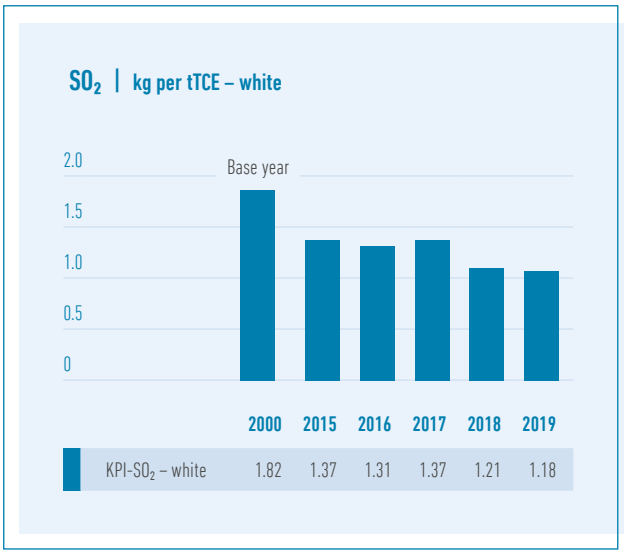
SO_2 is removed from the flue gases in a semi-dry kiln process in which kiln slurry containing chalk is introduced into the drier-crusher on Kiln 87 and acts as a highly effective scrubber during flow contact with the hot flue gases. After conversion of a grey cement kiln to white cement production in 2003, SO_2 emission from grey cement production fell significantly compared to base year 2000.

White cement production

On the white cement kilns, SO_2 is removed from the flue gases by combined scrubbing and heat recovery equipment. SO_2 for the white cement kilns has fallen by 35% since 2000, from 1.82 to 1.18 kg SO_2 per tTCE. This has been achieved by installing a new scrubber when converting a grey cement kiln to white cement production in 2003 and by optimised sulphur removal on the existing scrubbers.



	2000	2015	2016	2017	2018	2019
KPI-SO_2 – grey	0.21	0.005	0.007	0.025	0.003	0.005



	2000	2015	2016	2017	2018	2019
KPI-SO_2 – white	1.82	1.37	1.31	1.37	1.21	1.18

DUST

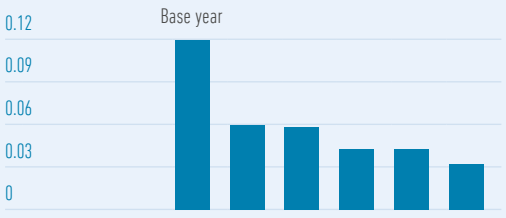
Grey cement production

In cement manufacture, dust is removed from the flue gases by, among other things, electrostatic precipitators. The relative dust emission from grey cement production has fallen around 50% since 2015, from 0.06 to 0.03 kg per tTCE. This was facilitated in 2017 by a more stable kiln process and efficient precipitator operation after investment in two new calciners on Kiln 87. After conversion of a grey cement kiln to white cement production in 2003, dust emission has been reduced significantly compared to base year 2000.

White cement production

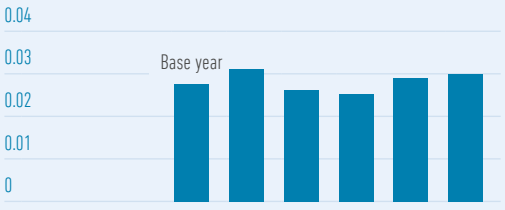
Dust emission from white cement production has remained at a stable, low level over the years. The dust contained in the kiln flue gases is trapped in electrostatic precipitators and is also detained by wet scrubbing in desulphurisation equipment.

DUST | kg per tTCE – grey



	2000	2015	2016	2017	2018	2019
KPI-Dust – grey	0.119	0.060	0.059	0.042	0.042	0.031

DUST | kg per tTCE – white



	2000	2015	2016	2017	2018	2019
KPI-Dust – white	0.028	0.031	0.027	0.026	0.029	0.030

EMISSION LIMITS

Aalborg Portland's environmental approval of 10 March 2017, which is the result of the Danish Environmental Protection Agency's review based on BAT requirements, includes amended specifications for operating emissions and limit emissions.

The table below shows the principal sources of air pollution, the associated emission limits and Aalborg Portland's current average emission levels. NO_X, SO_2 and dust emissions are determined by averaging continuously recorded data. Limits stated are average emissions per 24-hour period.

EMISSION LIMITS AND LEVELS DURING OPERATION – THE MAIN SOURCES

	NO_X		SO_2		DUST	
	Limit *	Average level 2019 **	Limit *	Average level 2019 **	Limit *	Average level 2019 **
Heat recovery Kiln 73/79	500	347	400	134	20	3,6
Heat recovery Kiln 74/78	500	260	400	209	20	0.04
Heat recovery Kiln 76	500	366	400	152	20	1.1
Kiln 87	500	158	50	0.15	20	3.0

All values are stated in mg/Nm^3 dry flue gas at 10% oxygen content.

* Daily average according to enviromental approval valid at 31.12.2019. ** Daily average over the year.

Differences in emission levels between kiln systems are due to differences between kiln types and different cleaning measures. For example, Kiln 87 produces grey cement by means of a semi-dry process where SO_2 in the flue gases is bound in the clinker production process itself, whereas the white cement kilns with heat recovery have scrubbers to reduce SO_2 emission. Furthermore, the kiln process cycle and the performance of cleaning equipment also impact the various emissions.

COMPLIANCE WITH CONDITIONS FOR ATMOSPHERIC EMISSIONS

In 2019, emission limits were exceeded 22 times, cf. the table below. These cases were notified to the Danish Environmental Protection Agency in Aarhus, and preventive measures to avoid repetition were disclosed in monthly reporting.

EMISSION LIMIT OVERRUNS 2019

Unit / Parameter	Limit * mg / Nm^3	24 h average mg / Nm^3	No. of overruns	Cause
KILN 87				
TOC	10	14	1	In accordance with replacement of TOC gauge.
NH_3	30	53	2	Too much ammonia injected for NO_X reduction.
	30	32-34	7	Too much ammonia in Oxiton consignment.
CO	1,500	1,503	1	Lack of oxygen for combustion due to obstruction/blockage of material in kiln system.
	800	806	1	
Dust – main stack	20	78	1	The electrostatic precipitator removing dust in the kiln gases achieves optimum efficiency at a flue gas temperature 115-125° C. Insufficient flow of air/oxygen through the kiln over the day meant this temperature could not be maintained and climbed to approx. 200° C. Precipitator efficiency was impacted, causing high dust emission.
Dust – cooler stack	20	22-29	5	Electrostatic precipitator efficiency was reduced due to excessively high temperature of surplus air to the cooler stack precipitator.
	20	39	1	The precipitator has two fields, one of which sustained an electrical fault (rectifier). The other field had insufficient capacity to adequately clean the excess air.
HEAT RECOVERY, KILN 76				
SO_2	400	471	1	SO_2 is removed from kiln gases by scrubbing with chalk slurry. One of five pumps developed a fault, and a simultaneous reduction in gypsum crust in the kiln, and thus an increased SO_2 level, SO_2 scrubbing was inadequate.
	400	548	1	Lack of chalk slurry to SO_2 scrubber due to feed problems.
HEAT RECOVERY, KILN 73/79				
NO_X	500	597	1	Fault in measuring equipment.
TOTAL LIMIT OVERRUNS			22	

* Limit values apply as daily averages. All values are stated in mg/Nm^3 dry flue gas at 10% oxygen content.

DUST

Aalborg Portland's primary raw materials are chalk and sand. Handling of chalk and sand can give rise to dust development, and to dust migration which can be a nuisance locally. Aalborg Portland is addressing this issue with view to limiting the nuisance caused. The principal causes of dust formation are quarrying, transport, airborne dust from outdoor stores, and dust emission in production. Weather factors such as temperature, wind and humidity have an effect on how much dust is carried by the wind and may possibly be deposited locally.

DUST FROM THE CHALK PIT

A raw material like chalk is a finite resource that we have to obtain where nature has placed it. Quarrying of raw materials is highly visible in the landscape, and can cause nuisance and worry – especially for those who live nearest.

In recent years, Aalborg Portland has experienced cases of dust from the operations in Rørdal chalk pit impacting local residents. This has to do with the relatively short distance which now separates the chalk pit and its neighbours, combined with periodic dry and windy weather. The dust can therefore be carried by the wind from Rørdal chalk pit to these neighbours. In order to prevent airborne dust, Aalborg Portland has initiated a number of anti-dust measures on its machinery, installed watering equipment and planted windbreaks, which generally have resulted in reduced dust migration.

QUARRY MEASURES

We have focused both on preventive measures to inhibit development of dust at source, and measures that help to reduce dust migration. On our bucket wheel excavator, which operates on land on the upper quarry faces, a series of design modifications have been introduced to limit dust formation – for more information see fact box.

In order to avoid dust swirling up during transport movements we have asphalted the most frequently used routes and water them routinely. We have also minimised the amount of land clearance, and as far as possible retained the vegetation. At the southern end of the chalk pit, coconut netting has been placed on terraces in order to prevent erosion and dust migration from the remediation operations.

In order to limit dust migration towards Øster Uttrup we have planted windbreaks of fast-growing willow and poplar on the noise embankment between the chalk pit and village. We have also installed watering equipment on the embankment and set up a water cannon to spray the excavations on the upper faces of the quarry in order to wet the chalk in periods of dry weather.

Furthermore, work is under way on other measures, including erection of a building site fence near the bucket wheel excavator.

The neighbouring area of Øster Uttrup and Stenbjergvej is marked with a white circle.


Coconut netting has been laid out on the quarry terraces to prevent erosion and dust migration.

EXTRACTION OF CHALK

For quarrying we use a deep-excavator and a bucket wheel excavator. The former extracts chalk from under water, and this causes no dust emission. The bucket wheel excavator operates on land, stripping chalk from the upper quarry faces. In dry periods, dust can cause nuisance and we have therefore made a number of design modifications to the bucket wheel excavator and the trucks on the belt conveyer to minimise the development of dust.

a. Fitting of 1-metre high extensions to the trucks on the belt conveyor in order to provide improved wind protection. Installed July 2019.

b. A 1-metre extension of the existing rubber guard at the discharge on to the outgoing belt conveyor at the midpoint of the bucket wheel excavator. Installed July 2019.

c. Fitting of canopy on the central section of the bucket wheel excavator in order to reduce dust when the chalk "drops" down through the equipment. Installed July 2019.

d. Fitting of dust screen at the bucket wheel (the part which digs). Designed and constructed by the equipment supplier, the screens were installed in 2020.

e. Fitting of alternative-type buckets to reduce dust during digging. Here too, the equipment supplier assisted with design and construction. The bucket type was modified, but this solution proved not to be durable. Focus was given instead to an overall solution with the dust screen on the bucket wheel. Installation took place in 2020.

DUST IN PROCESS AIR

Flue gases from the kiln systems are effectively dedusted by electrostatic precipitators prior to discharge via the stacks. Process air from coal and cement mills and other plant is dedusted by effective bag filters – sometimes in combination with electrostatic precipitators (so-called hybrid precipitators).

Temporary outages on the large electrostatic precipitators from the kilns can cause increased dust emission, resulting in dust falls in the nearby area.

DUST FROM STORES AND ROADS

During dry periods with strong winds, airborne dust can take place from outdoor stores and the associated transport roadways where swirling dust can develop. We have therefore established routine cleaning and watering of roadways and factory areas. Water sprinkler equipment has been installed at coal store in the dock and at the pyrite ash store to inhibit dust development. In addition, in order to limit dust from transport roadways, two units have been installed to wash the wheels of vehicles travelling to and from the chalk pit.

DUST FROM SHIPS UNLOADING

Ships unloading dry materials, such as natural gypsum for cement production, can be a source of dust formation. A mobile hopper equipped with a water spray has been installed by the dock crane to inhibit dust escape during discharge to trucks and dumpers. In the event of windy weather during unloading, ship hatches must be shut and unloading halted.

DUST FROM CEMENT DISTRIBUTION

Distribution of bulk cement by road tankers and ships takes place in closed and dust-free systems to storage terminals. Dust emission can occur by accident on customer premises, e.g. if terminals are overfilled or dedusting filters leak.

DIALOGUE WITH NEIGHBOURS

Complaints about dust nuisance have been received from local residents. We continue to address this issue and our website will be regularly updated.

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We have created a page on our website which will be continuously updated on chalk pit initiatives. This page is available here: **www.aalborgportland.dk/nabo**

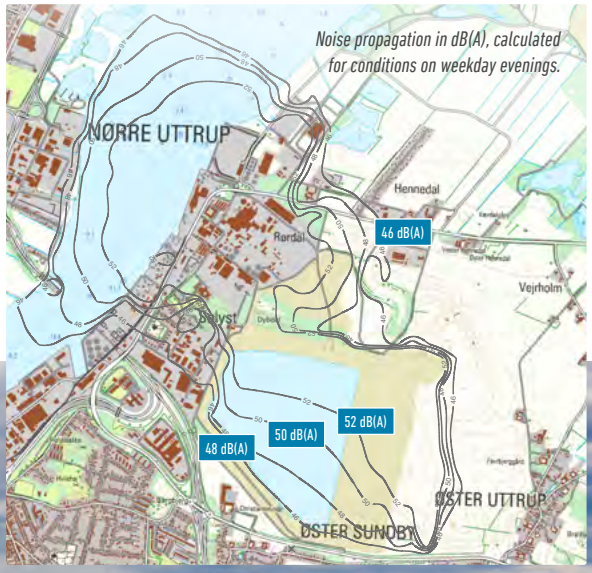
NOISE

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

Responsible production is also about limiting noise. Noise emission at Aalborg Portland comes from a large number of stationary sources located both indoors and outdoors as well as from internal traffic.

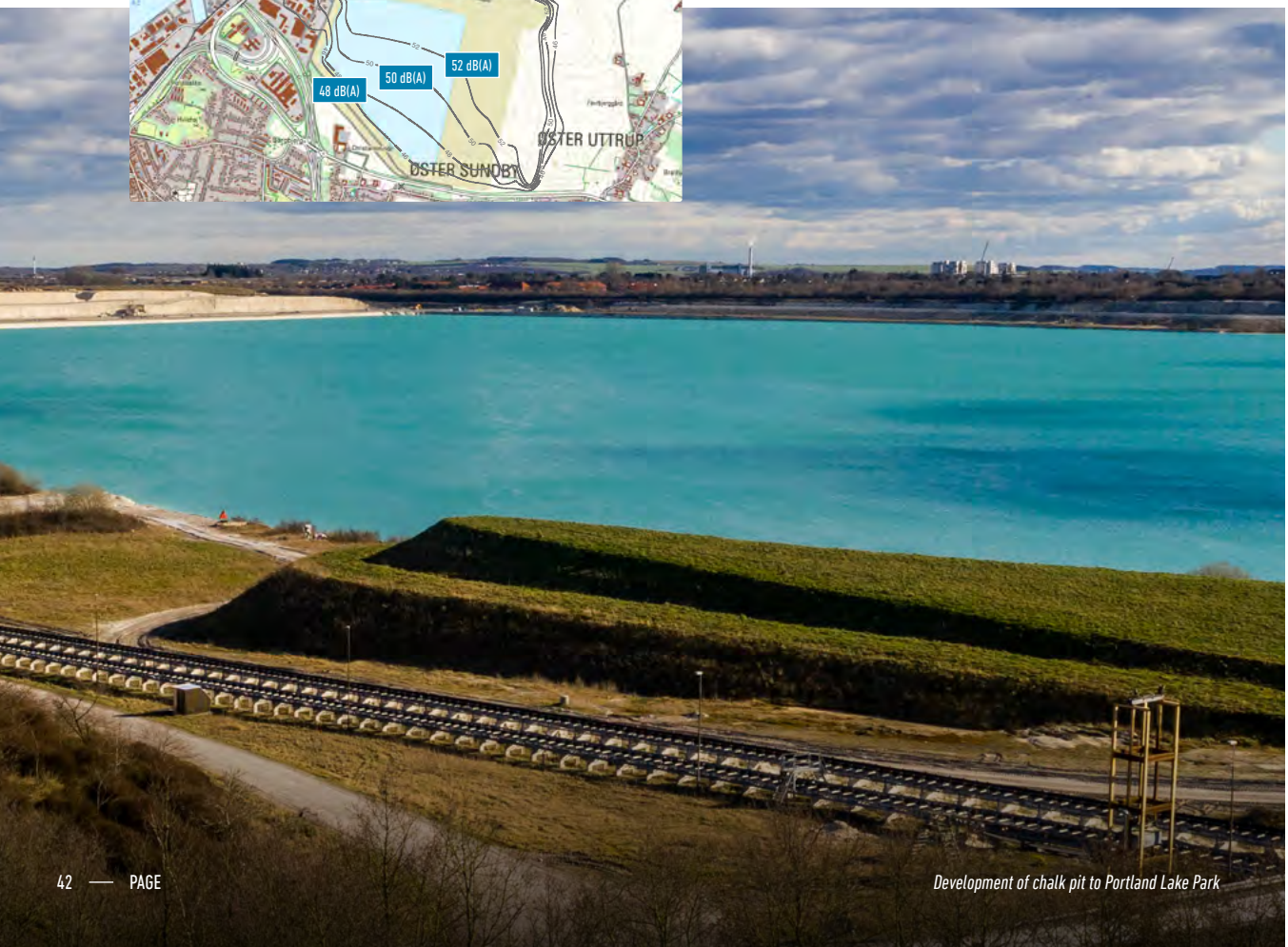
The noise sources include chimney stacks, kilns, cement and coal mills, belt conveyors, fans, ships loading and unloading, trucks, and excavation and rehabilitation operations in the chalk pit.

Aalborg Portland has compiled a noise map which is regularly updated, most recently in January 2016 in conjunction with the review by the Danish Environmental Protection Agency of the company's overall environmental status.



In order to comply with tighter noise regulations entering into force on 1 March 2022, Aalborg Portland has initiated a five-year action plan for noise reduction culminating in 2022.

In 2020, noise suppression measures at the factory will continue. In the chalk pit, the noise embankment will be extended northwards from the south-eastern corner to screen the village of Øster Uttrup from quarry operations.



Development of chalk pit to Portland Lake Park

NOISE SUPPRESSION PROJECT FOR THE DEEP-EXCAVATOR

The deep-excavator weighs more than 1,300 tonnes and has a bucket chain for excavating chalk from the chalk lake at a depth of 40 metres. The machine is electrically powered and runs backwards and forwards on rails in the chalk pit over a distance of around 1 km. Excavation is associated with noise from sources such as the engine compartment, the bucket chain and from its drive wheel and idlers which have now been equipped with noise suppression. Enclosure with baffle plates has therefore substantially reduced noise from chalk excavation. The project to design, fabricate and install the noise guard was completed in April 2019 at a cost of around EUR 0.9m.

Chalk pit with deep-excavator

WATER

Water is used in the cement manufacturing processes and also for cooling production plant. We strive wherever possible both to recycle our process water and also to capture and reuse rainwater from selected areas. For Aalborg Portland, UN Global Goal 6, Clean Water and Sanitation, includes exploiting the possibilities for limiting the use of new water resources and instead recycling process water.

Aalborg Portland obtains technical water for production purposes from on-site wells in a limestone aquifer.

Aalborg Portland is licensed to extract a total of 5.2 million m^3 annually. In 2019, 4.8 million m^3 was extracted. This included approx. 1.1 million m^3 of water from chalk excavated below the water table in the chalk pit by the deep-excavator. Of the remaining 3.7 million m^3, almost 2.7 million m^3 was sourced from 15 on-site wells near the cement factory. 1.0 million m^3 was sourced from lowering of groundwater around Kilns 76 and 85.

In 2019, 2% more water was used than in 2018, mainly due to the increasing phasing out of fly ash and its replacement by Oxiton. Aalborg Portland is looking for a fly ash substitute and Oxiton has proved to be a possibility. In this connection there is a need for grinding of sand and Oxiton, and this grinding process requires water.

Water meter

MORE THAN 840,000 M³ OF WATER IS RECYCLED FOR COOLING FACTORY COMPRESSOR PLANT. THIS WOULD OTHERWISE HAVE TO BE DONE USING COOLING WATER FROM AALBORG PORTLAND'S OWN WATER RESOURCES

To limit water consumption the following projects have been implemented:

LOWERING OF GROUNDWATER TO PROVIDE COOLING

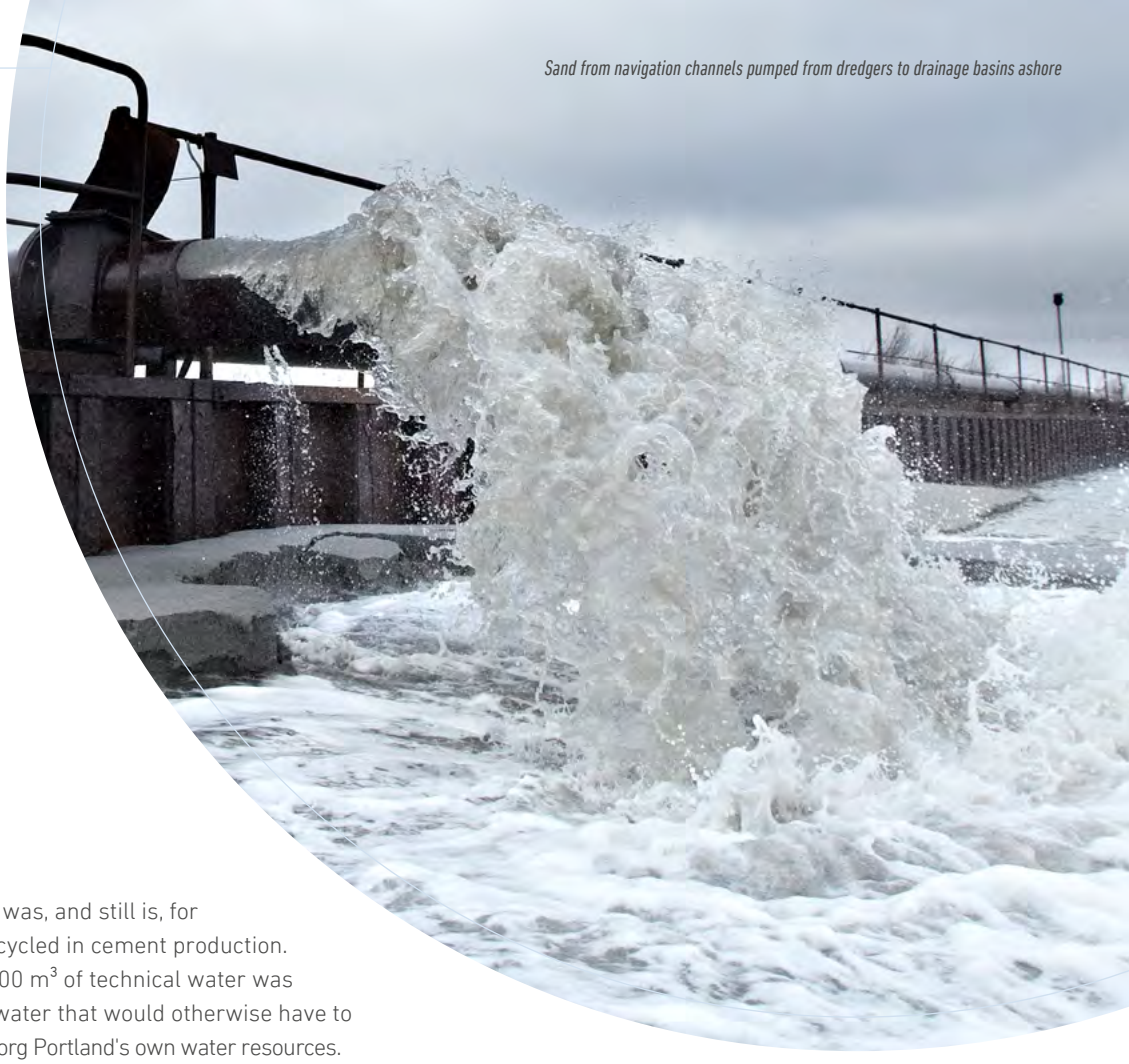
Over the years, local lowering of the groundwater table has proven to be an effective solution for maintaining dry underground basements, passages and on-site conveyor systems. At the same time, more than 840,000 m^3 of water is recycled for cooling factory compressor plant. This would otherwise have to be done using cooling water from Aalborg Portland's own water resources.

SPLIT WATER SYSTEM

Following bacterial contamination of drinking water in 1998 the water supply system was split into two parts – one for drinking water and one for technical production water. In 2019, Aalborg Portland still received drinking water from Aalborg's municipal supply as some years ago pesticide residues were found in Aalborg Portland's own drinking water wells.

RECYCLING OF FILTRATE WATER

Filtrate water arises in the heat recovery and desulphurisation system during production of gypsum for removing SO_2 in the fuel gases. Until 2004, filtrate water was released into the Limfjord.



Sand from navigation channels pumped from dredgers to drainage basins ashore

The effective solution was, and still is, for filtrate water to be recycled in cement production. In 2019, almost 700,000 m^3 of technical water was replaced in this way, water that would otherwise have to be extracted from Aalborg Portland's own water resources. Release of filtrate water to the Limfjord has ceased simultaneously. A win-win situation.

USE OF SURFACE LAKE WATER

Aalborg Portland is licensed to extract surface water for use in cement production from a clay pit lake. The water is used as process water, slurried with pyrite ash.

The lake, which is a product of former clay quarrying, is on Aalborg Portland's land at Bredhage. The adjacent fields need to be drained, and the resulting water is led to the lake and by way of canals to the Limfjord. Before entering the Limfjord, part of the water is utilised by Aalborg Portland as replacement for groundwater. Annually, around 24,000 m^3 of groundwater is replaced in this way.

CAPTURE OF SURFACE WATER

In 2019, almost 28,000 m^3 of surface water was captured from the storage facility next to the slurry preparation department and from the pyrite ash store. This water was used in slurry production, thereby replacing the need to recover an equivalent volume of technical water.

MONITORING PROGRAMME

Every year since 1991, an external company has performed a series of hydro-geological surveys and analyses of water quality at Aalborg Portland. Ongoing reporting provides an overview of developments, thereby ensuring effective protection and utilisation of the water resource.

WASTE WATER AND SURFACE WATER

Waste water is piped by Aalborg Portland into the public sewer. Surface water and cooling water are released directly into the Limfjord. Waste water diverted to the public sewer passes through the municipal treatment plant before release into the Limfjord. Waste water and surface water that can contain mineral oils and sand pass through oil-water separators and sand filters on the factory's premises.

In 2019, a TV inspection project was begun to map the condition of the pipelines in Aalborg Portland's on-site sewer system. The first three of 10 zones will be surveyed in 2020.

Flushing prior to TV inspection of sewer pipes

WASTES AND BY-PRODUCTS

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

Wastes are reused and recycled at Aalborg Portland whenever possible. Other wastes are sorted close to source and deposited in containers and oil and chemical receivers located around the factory. For Aalborg Portland, UN Global Goal 12, Responsible Consumption and Production, is about recycling, recovering and handling wastes in the most environmentally correct manner.

Aalborg Portland's wastes are utilised for recycling, incinerated in accordance with municipal regulations, or landfilled on site.

In 2019, more than 99% of company waste was non-hazardous, and the remainder was characterised as hazardous in the form of oil and chemical waste to be recycled and as mixed waste for external landfill.

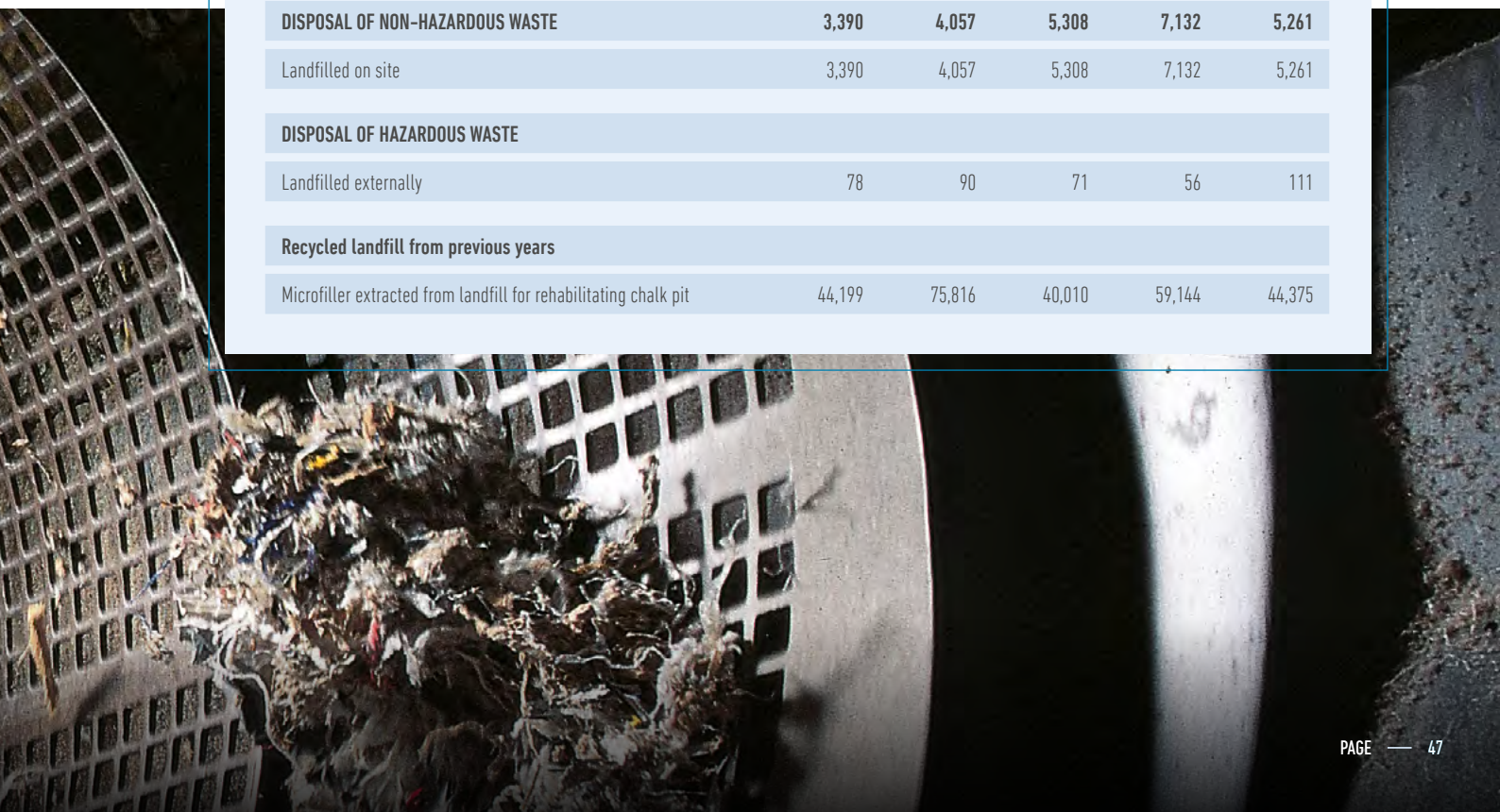
MICROFILLER - RECYCLING OF BY-PRODUCT

Aalborg Portland's waste statistics have been significantly changed by the project to use microfiller - a by-product from the factory's kilns – in rehabilitating the company's chalk pit. For more information on this project, see section "Land use and biodiversity". Recycling of waste is in harmony with the Danish Government's resources policy, which encourages the use of wastes to replace natural raw materials.

Container site for waste sorting

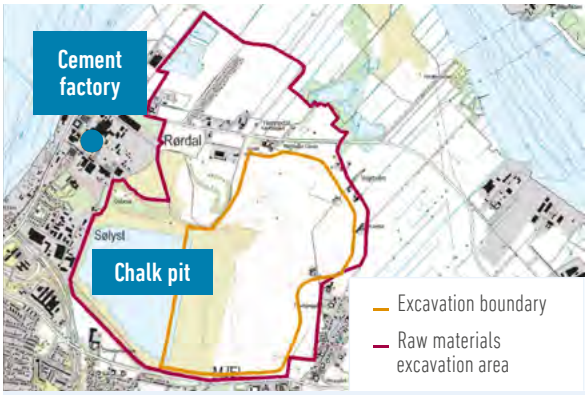
WASTE | Amount in tonnes

	2015	2016	2017	2018	2019
TOTAL WASTE	**46,904**	**62,773**	**83,874**	**74,915**	**69,521**
UTILISED NON-HAZARDOUS WASTE	**43,406**	**58,549**	**78,410**	**67,659**	**64,089**
Recycling	**42,249**	**58,117**	**77,622**	**67,063**	**63,797**
Microfiller from kilns for rehabilitating chalk pit	34,172	43,326	63,072	53,555	49,730
Sweepings	824	2,776	3,142	2,777	3,632
Sand and grate material	48	3	21	12	-
Building waste	1,060	1,850	1,818	1,798	1,034
Iron and metal	736	741	1,200	1,025	808
Paper and cardboard	9	16	14	14	0,4
Glass	0.5	0.3	0.5	0.3	0
Plastics	746	620	669	1,150	598
Electronic scrap	0	4.4	2.4	3.2	5.9
Other recyclables	4,653	8,780	7,683	6,728	7,990
Incineration	**1,157**	**431**	**788**	**596**	**292**
Mixed combustible	1,139	415	771	582	279
Municipal collection	18	17	17	14	13
UTILISED HAZARDOUS WASTE	**30**	**77**	**85**	**68**	**61**
Oil	27	74	78	62	54
Chemicals	3	3	7	6	7
DISPOSAL OF NON-HAZARDOUS WASTE	**3,390**	**4,057**	**5,308**	**7,132**	**5,261**
Landfilled on site	3,390	4,057	5,308	7,132	5,261
DISPOSAL OF HAZARDOUS WASTE					
Landfilled externally	78	90	71	56	111
Recycled landfill from previous years					
Microfiller extracted from landfill for rehabilitating chalk pit	44,199	75,816	40,010	59,144	44,375



LAND USE AND BIODIVERSITY

Aalborg Portland covers an area of 1,200 hectares, 188 of which are used in connection with cement production. The remaining 1,012 hectares consist of lakes, woods, meadows, salt marshes, fallow and farmland. For Aalborg Portland, UN Global Goal 15, Life on Land, is encompassed in the company's actions to create natural areas of high biodiversity.



Aalborg Portland owned land in Rørdal area (hectares)	1,200
Factory	120
Chalk pit – working quarry	52
Landfill	12
Pyrite ash plant	4
Total land use	**188**

84%
Nature and agriculture
(1,012 hectares)

16%
Industry
(188 hectares)

DISTRIBUTION OF LAND

CHALK PIT

The chalk pit is situated close by the factory and will have an area of approx. 340 hectares when fully excavated. An important part of the chalk pit is the lake with its characteristic azure-blue water.

Aalborg Portland is licensed to quarry chalk in the Rørdal area within the designated excavation zone in the Raw Materials Plan for the North Jutland Region. Quarrying is permitted until 2052.

REHABILITATION AS PORTLAND LAKE PARK

The purpose of the rehabilitation plan is to transform the chalk pit into "Portland Lake Park", a recreational area close to Aalborg with a variety of leisure and sporting amenities for the local population.

The rehabilitation is essentially intended to create a scenic space with steep, exposed slopes, soft green hilly areas and opportunities for walking and leisure.

Establishment of banks and terraces has begun in defined areas of the chalk pit. These earthworks are constructed using microfiller which is subsequently capped.

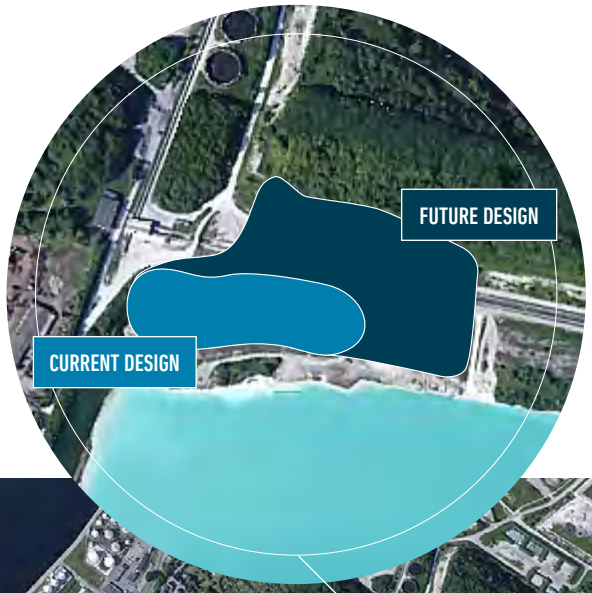
Area for extension of Stage 1 in the north-western part of the chalk pit

STAGE 1

The embankment is intended to create a natural transition between the drop-off station area and the lakeside. It will also screen the factory from view and act as a partial noise barrier between the factory and the public access area planned for the northern and western parts of the chalk pit.

Extension of Stage 1

In 2020, the ambition is to improve the recreational and scenic value of the area by creating greater landscape variation. Aalborg Portland wishes to recreate the original terrain that pre-dated the start of quarrying in the area. By integrating Stage 1 with the former excavation front to the north a hill crowned with a plateau will be created. From the hill, visitors will have a view over the city of Aalborg, the chalk lake and Aalborg Portland.



STAGE 2

Establishment of terraces in the south-western part of the chalk pit. The terraces are envisaged used for various sporting activities. A system of paths and public areas are also planned. The establishment of Stage 2 has been completed but currently serves as road access to Stage 3. When establishment of Stage 3 has been completed, Stage 2 will be finalised.

STAGE 3

Under construction in the southern part of the chalk pit.

SUSTAINABLE DISTRIBUTION

In 2019, the distribution of cement from Aalborg Portland included the handling and transport of more than 2.4 million tonnes of product to the domestic and export markets. For Aalborg Portland, UN Global Goal No. 9 on infrastructure includes choice of distribution mode and placement of distribution terminals inside and outside Denmark.

Our influence on cement distribution to export markets is chiefly limited to the choice of transport by ship, and this part of the distribution may therefore be described an indirect environmental impact.

In 2019, 71% of our cement was distributed by ship and 29% by road.

All our cement manufacture takes place in Aalborg, from where most of our production is sent by sea to our six shipping terminals strategically positioned around Denmark and to shipping terminals abroad. From the shipping terminals the cement is transported by road to the customers in the various areas.

Distribution by ship avoids long-distance carriage of cement by heavy road tankers. Ships also have the advantage of being a more sustainable form of transport.

In Denmark, some cement distribution is contracted out by Aalborg Portland to external road hauliers. Customers in North and Central Jutland are supplied direct by road from Aalborg. All bagged cement is also carried by road from Aalborg.

SEA TRANSPORT BY CLIMATE-FRIENDLY FREIGHTERS

In 2019, three new freighters were launched which provide climate-friendlier distribution of cement by halving fuel consumption per tonne carried.

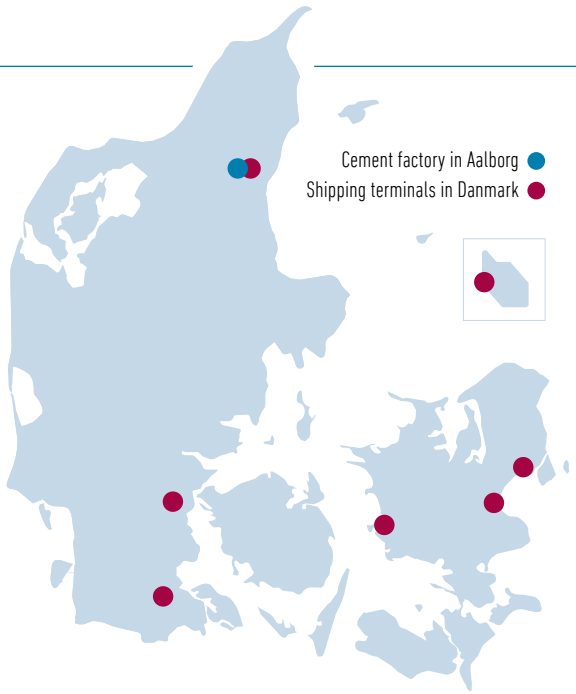
Aalborg Portland's dock facilty – "Kongsdal" is one of three newly built cement freighters

CO_2 emission has therefore been reduced by around 50% compared with the older vessels which previously carried our cement to shipping terminals in Danish and other North European ports. The significant improvement in fuel consumption for the three new vessels compared to their predecessors from the 1980s is due to a combination of factors.

The new ships are designed from the start with focus on fuel efficiency, reduction of atmospheric emissions, and simplicity of operation.

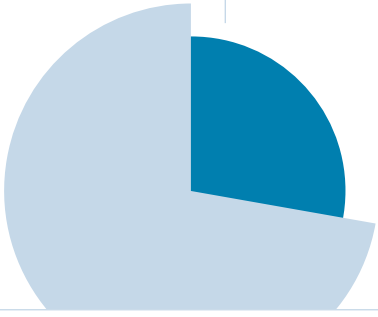
THE MOST IMPORTANT FACTORS ARE:

- Ship design and configuration have been optimised for a speed of around 10 knots.
- The propeller is the fixed pitch type, which is more efficient than a controllable pitch propeller.
- The main engine is a modern and energy-efficient diesel whose 1,326 kW power is commensurate with ship design and size. The older ships were designed for a slightly higher speed and had larger main engines than required. Their engines – 2,100-2,404 kW – were therefore not particularly energy-efficient when used at reduced power.
- Electricity consumption for lighting and other equipment is more economic than for the older ships.
- Aalborg Portland has acquired the new, specially built ships on long-term leases. All the ships are self-unloading and dust-free in connection with both loading and unloading.



71%
Cement carried by ship

29%
Cement carried by road



DISTRIBUTION OF CEMENT

MATERIAL FLOWS

Key performance indicators and status 2019 - Aalborg Portland cement plant

The material flows for the Aalborg Portland cement plant are stated using both absolute and relative figures as key performance indicators. The absolute amounts are calculated as tonnes in the wet state. The relative values are based on the quantity (kg) of materials in the wet state used to make one tonne of Total Cement Equivalent (tTCE), a standard unit for production. This is obtained by calculating the equivalent cement tonnage if all the clinker were processed into cement. The relative values thus enable year-on-year comparison of the material flows, independently of any variations in volume of cement production, changes in clinker stocks and sales and imports of clinker.

INPUT

	Absolute figures | tonnes *					Relative figures | kg per tTCE *				
	2015	2016	2017	2018	2019	2015	2016	2017	2018	2019
COMBUSTION AIR										
O_2, N etc.	592,568	676,406	751,904	709,416	699,795	311.5	307.1	311.2	300.6	298.8
RAW MATERIALS										
Chalk	3,173,982	3,649,362	4,003,719	3,905,097	3,898,979	1,668.7	1,656.9	1,657.2	1,654.7	1,664.8
Water	3,170,668	3,499,229	3,584,351	3,842,658	3,879,463	1,667.0	1,588.8	1,483.6	1,628.2	1,656.5
Sand	129,595	152,484	192,502	158,617	172,718	68.1	69.2	79.7	67.2	73.7
Gypsum	42,373	56,557	60,302	65,850	69,128	22.3	25.7	25.0	27.9	29.5
Other	33,290	35,394	35,763	31,522	32,095	17.5	16.1	14.8	13.4	13.7
Packaging	1,305	1,018	887	886	751	0.7	0.5	0.4	0.4	0.3
RECYCLABLES										
Fly ash	201,406	235,031	202,801	124,225	89,561	105.9	106.7	83.9	52.6	38.2
Sand	75,410	79,239	92,913	161,106	148,456	39.6	36.0	38.5	68.3	63.4
FGD gypsum	56,961	57,203	58,172	51,077	53,007	29.9	26.0	24.1	21.6	22.6
Oxiton	7,643	12,413	33,888	64,189	68,116	4.0	5.6	14.0	27.2	29.1
Iron oxide	42,763	45,154	55,617	50,936	51,772	22.5	20.5	23.0	21.6	22.1
Other	16,107	21,313	23,882	37,184	36,365	8.5	9.7	9.9	15.8	15.5
Total	**400,290**	**450,353**	**467,273**	**488,717**	**447,277**	**210.4**	**204.5**	**193.4**	**207.1**	**190.9**
FUELS										
Coal	49,456	60,189	74,670	75,106	77,072	26.0	27.3	30.9	31.8	32.9
Petcoke	201,429	223,584	243,938	211,217	236,984	105.9	101.5	101.0	89.5	101.2
Fuel oil	4,637	4,831	5,031	4,779	4,644	2.4	2.2	2.1	2.0	2.0
Alternative	126,618	149,491	164,746	214,237	199,168	66.6	67.9	68.2	90.8	85.0
Total	**382,140**	**438,095**	**488,385**	**505,339**	**517,868**	**200.9**	**198.9**	**202.2**	**214.1**	**221.1**
ELECTRICITY	MWh	MWh	MWh	MWh	MWh	kWh per tTCE	kWh per tTCE	kWh per tTCE	kWh per tTCE	kWh per tTCE
Electricity	**257,703**	**291,953**	**309,580**	**309,977**	**320,849**	**135.5**	**132.6**	**128.1**	**131.3**	**137.0**
INTERNAL RECIRCULATION										
Microfiller	100,549	116,082	114,316	113,728	108,509	52.9	52.7	47.3	48.2	46.3
Water	1,195,258	1,192,066	1,218,148	1,227,285	1,539,603	628.4	541.2	504.2	520.0	657.4
Own FGD gypsum	27,591	33,012	33,231	32,251	34,997	14.5	15.0	13.8	13.7	14.9
Recycling of clinker/raw meal	19,418	30,810	27,260	33,320	18,116	10.2	14.0	11.3	14.1	7.7
Recycling of cement from silo cleaning	4,054	216	393	159	377	2.1	0.1	0.2	0.1	0.2
	GJ	GJ	GJ	GJ	GJ	MJ per tTCE	MJ per tTCE	MJ per tTCE	MJ per tTCE	MJ per tTCE
District heat from heat recovery	19,672	24,486	23,863	19,059	13,552	10.3	11.1	9.9	8.1	5.8

* Determined with water content of materials

OUTPUT

	Absolute figures | tonnes *					Relative figures | kg per tTCE *				
	2015	2016	2017	2018	2019	2015	2016	2017	2018	2019
FLUE GASES										
CO_2	**1,780,564**	**2,054,900**	**2,277,214**	**2,190,706**	**2,189,152**	**–**	**–**	**–**	**–**	**–**
CO_2-grey	983,684	1,123,546	1,256,114	1,192,542	1,124,623	761.5	755.6	763.9	734.3	731.2
CO_2-white	796,880	931,354	1,021,100	998,164	1,064,529	1,305.8	1,301.5	1,323.3	1,356.3	1,324.3
NO_X	**1,832**	**2,164**	**2,586**	**2,494**	**2,556**	**–**	**–**	**–**	**–**	**–**
NO_X-grey	900	942	1,257	1,050	993	0.70	0.63	0.76	0.65	0.65
NO_X-white	932	1,222	1,329	1,444	1,563	1.53	1.71	1.72	1.96	1.94
SO_2	**844**	**948**	**1,099**	**895**	**958**	**–**	**–**	**–**	**–**	**–**
SO_2-grey	6	11	41	5	8	0.005	0.007	0.025	0.003	0.005
SO_2-white	838	937	1,058	890	950	1.37	1.31	1.37	1.21	1.18
CO	**1,601**	**1,969**	**3,186**	**3,624**	**4,600**	**–**	**–**	**–**	**–**	**–**
CO-grey	780	1,055	1,769	1,955	2,867	0.60	0.71	1.08	1.20	1.86
CO-white	821	914	1,417	1,669	1,733	1.35	1.28	1.84	2.27	2.16
Dust	**96**	**107**	**90**	**89**	**71**	**–**	**–**	**–**	**–**	**–**
Dust-grey	77	88	70	67	47	0.060	0.059	0.042	0.042	0.031
Dust-white	19	19	20	22	24	0.031	0.027	0.026	0.029	0.030
NH_3	40	46	51	86	104	0.02	0.02	0.02	0.04	0.04
HCl	7	7	9	7	12	0.004	0.003	0.004	0.003	0.005
Hg	0,026	0,039	0,027	0,030	0,029	0.000014	0.000018	0.000011	0.000013	0.000013
PRODUCTS										
Cement	**1,971,721**	**2,256,013**	**2,346,692**	**2,313,489**	**2,408,720**	**1,036.6**	**1,024.3**	**971.4**	**980.3**	**1,028.5**
Cement-grey	1,368,754	1,542,342	1,595,288	1,554,757	1,647,945	–	–	–	–	–
Cement-white	602,967	713,671	751,404	758,732	760,775	–	–	–	–	–
Clinker **	-60,456	-56,954	44,545	37,994	-57,078	-31.8	-25.9	18.4	16.1	-24.4
Filler **	1,373	-2,022	2,539	-200	1,523	0.7	-0.9	1.1	-0.1	0.7
Chalk slurry to power station	8,846	10,893	5,820	8,785	8,853	4.7	4.9	2.4	3.7	3.8
Total	**1,921,484**	**2,207,930**	**2,399,596**	**2,360,068**	**2,362,018**	**1,010.2**	**1,002.6**	**993.2**	**1,000.0**	**1,008.6**
Adjustment	–	–	–	–	-	-10.2	-2.6	6.8	0.0	-8.6
Total Cement Equivalent	**1,902,072**	**2,202,472**	**2,415,907**	**2,360,011**	**2,342,027**	**1,000.0**	**1,000.0**	**1,000.0**	**1,000.0**	**1,000.0**
Total Cement Equivalent-grey	1,291,797	1,486,879	1,644,277	1,624,054	1,538,154	-	-	-	-	-
Total Cement Equivalent-white	610,275	715,593	771,630	735,957	803,873	-	-	-	-	-
PACKAGING										
Packaging	**1,305**	**1,018**	**887**	**886**	**751**	**0.7**	**0.5**	**0.4**	**0.4**	**0.3**
WATER										
Water vapour	1,407,063	1,880,371	1,998,008	2,021,656	1,939,744	739.8	853.8	827.0	856.6	828.2
Cooling water, incl. Kiln 85 groundwater	2,409,532	2,514,030	2,568,453	2,866,764	2,941,072	1,266.8	1,141.5	1,063.1	1,214.7	1,255.8
Groundwater lowering (Kiln 76)	313,543	201,436	213,265	147,490	168,864	164.8	91.5	88.3	62.5	72.1
Waste water	41,396	31,200	36,769	38,423	38,651	21.8	14.2	15.2	16.3	16.5
HEAT RECOVERY	GJ	GJ	GJ	GJ	GJ	MJ per tTCE	MJ per tTCE	MJ per tTCE	MJ per tTCE	MJ per tTCE
Heat recovery for district heating	**1,214,257**	**1,199,988**	**1,449,809**	**1,185,306**	**1,521,827**	**638.4**	**544.8**	**600.1**	**502.2**	**649.8**
WASTE * **										
Recycling	42,249	58,117	77,622	67,063	63,797	22.2	26.4	32.1	28.4	27.2
Incineration	1,157	431	788	596	292	0.6	0.2	0.3	0.3	0.1
Landfill	3,468	4,147	5,379	7,188	5,372	1.8	1.9	2.2	3.0	2.3
Oil and chemical waste	30	77	85	68	61	0.02	0.03	0.04	0.03	0.03
Total	**46,904**	**62,773**	**83,874**	**74,915**	**69,521**	**24.6**	**28.5**	**34.6**	**31.7**	**29.6**

** Incl. sales and changes in stocks and adjustment for import of clinker. *** Waste volumes are classified as hazardous and non-hazardous wastes on *page 46* stating whether the materials are utilised or disposed of.

UN GLOBAL GOALS AND AALBORG PORTLAND

Status 2019 and targets 2020.

UN GLOBAL GOAL NO. 4

We provide ongoing education and training for Denmark's work force. We do so by educating apprentices and interns, recruiting graduates and providing in-service training for our experienced personnel.

TARGET 2019	STATUS 2019	TARGET 2020
Aalborg Portland has decided to continue its graduate programme launched in September 2017. This means that in 2019 six newly qualified graduates will be recruited for three eight-month periods of rotational training over two years with different departments, nationally and internationally, and also our sister company Unicon.	☺ The graduates recruited in 2017 have finished their programme and are now performing jobs and tasks using the broad knowledge acquired from rotational training across departments. ☺ Within the graduate programme, five newly qualified graduates are well under way with developing their talents in our departments.	The five graduates recruited in 2019 will continue their graduate programme in Aalborg Portland's business processes, and rotation between departments is planned for mid-2020.
In order to provide in-service training and to ensure knowledge of the new technology it is planned in 2019 to stage technical special courses in partnership with VDZ (Verein Deutscher Zementwerke e.V).	☺ The technical special courses were held and new cement-technical knowledge was acquired via e-learning, seminars, and visits to other cement factories in Germany. The various specially designed courses for the cement industry therefore gave new insight in subjects such as the latest process and environmental technology, preventive maintenance, automation, controlling, and energy balances with view to developing both employee competences and the company.	The ongoing in-service training of staff is continuing.

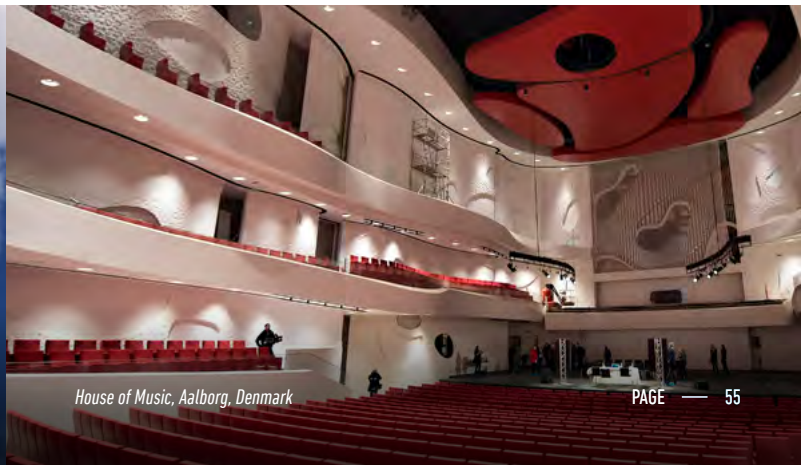
Research & Quality Centre

7 AFFORDABLE AND CLEAN ENERGY

UN GLOBAL GOAL NO. 7

Aalborg Portland is committed to contributing to sustainable development in partnership with the community. Sustainable energy covers a broad range of possibilities. For Aalborg Portland it includes utilising potential for supplying surplus heat and distant cooling and for producing energy from the company's own wind turbines.

TARGET 2019	STATUS 2019	TARGET 2020
Continue recovery of surplus heat for Aalborg Forsyning's supply network.	☺ Surplus heat recovered for Aalborg's district heating network increased by 28% to around 1,500,000 GJ, equal to the heat consumption of around 25,000 households.	Use of surplus heat from Aalborg Portland forms part of the City of Aalborg's climate and energy strategy. The 2020 target is to maintain the current level of heat recovery, and in partnership with other stakeholders to explore the feasibility for increasing the supply.
2019 will see the start of the project to recover cold water from Aalborg Portland's chalk lake for use in district cooling for the coming Aalborg University Hospital. The district cooling will replace comfort and process cooling provided by conventional electrical equipment.	☺ The first shovel for the district cooling project entered the ground in August 2019. Establishment of equipment to supply cold water from Aalborg Portland's chalk lake for use as cooling for the coming Aalborg University Hospital is well under way.	Establishment of district cooling equipment, which is expected to become operational in mid-2021. Cold water from Aalborg Portland's chalk lake will subsequently be used to provide cooling for hospital wards, staff facilities, clinics and medical equipment, and will replace conventional cooling equipment.
Production of 18% of electricity consumption, compared to 2014, from five wind turbines installed at Aalborg Portland. Aalborg City Council's approval of municipal plan addendum for installation of five turbines is awaited in 2019.	☹ Wind turbines not installed at Aalborg Portland as local plan addendum not approved. In partnership with North Jutland power station, work began in 2019 on a strategy for renewable energy development in the area around the power station and Aalborg Portland.	In 2020, continue work on strategy for renewable energy development around North Jutland power station and Aalborg Portland. The strategy will also include installation of Aalborg Portland wind turbines. Authority work on strategy implementation is expected to start in 2020.



House of Music, Aalborg, Denmark

UN GLOBAL GOAL NO. 9

Used in multiple contexts, cement is characterised by high strength and long life. During cement development, research is taking place into the possibilities for minimising CO_2 footprint, both by efficient utilisation of resources and by developing new types of cement.
For efficient utilisation of resources, see the section "Raw Materials".

TARGET 2019	STATUS 2019	TARGET 2020
Implement pilot production of FUTURECEM™.	☺ A 165 tonne trial batch of FUTURECEM™ was produced in September 2019 and followed up by full-scale production in December.	▪ Get certification for FUTURECEM™ and produce further quantities. ▪ Test FUTURECEM™ in full-scale concrete castings in partnership with Unicon Denmark. ▪ Further testing of FUTURECEM™ in specially selected customer projects. ▪ Get approval from Danish Standards Committee S328 for production of concrete in Denmark with FUTURECEM™ cement in accordance with DS/EN 206 DK NA.


Research & Quality Centre

UN GLOBAL GOAL NO. 11

We see ourselves as part of the city of Aalborg and are committed to close contact with neighbours, authorities, research bodies and educational institutes with view to developing tomorrow's sustainable cities and building in dialogue and partnerships concerning future climate and energy solutions. We are also committed to being part of the sporting and cultural life of Aalborg and North Jutland. We hold guided tours, information gatherings and meetings with neighbours, we sponsor the city's zoo, theatre, art museum, handball and football, and we participate in a variety of events and workshops.

TARGET 2019	STATUS 2019	TARGET 2020
In 2109, we plan to hold information meetings for neighbours concerning operations in Rørdal chalk pit, and to initiate cooperation surrounding development of Portland Lake Park.	☺ An information meeting was held on 12 September in conjunction with the City of Aalborg's Sustainability Festival. At the meeting, neighbours were invited to a guided tour of the factory area and Rørdal chalk pit and an associated question and answer session.	In 2020, Aalborg Portland will continue dialogue and collaboration with authorities and other stakeholders on future climate and energy solutions, cf. also fact box in the section "Environmental dialogue". In 2020, we also plan to hold information meetings with neighbours on operations in Rørdal chalk pit etc.

UN GLOBAL GOAL NO. 12

In our cement production we use by-products from other industries as substitutes for natural raw materials, and wherever possible we use alternative rather than fossil fuels.

Aalborg Portland is furthermore recycling a cement production by-product in connection with rehabilitation of Rørdal chalkpit. For efficient utilisation of resources, see the section "Raw materials".

TARGET 2019	STATUS 2019	TARGET 2020
SUBSTITUTION OF FOSSIL FUELS WITH ALTERNATIVE FUELS Our objective is to substitute alternative fuels for 58% of the fuel energy in grey cement production and 5% of the fuel energy in white cement production.	☺ Alternative fuels were substituted for 53% of the fossil fuel energy used in grey cement production and 5% of fossil fuel energy used in white cement production.	Our objective is to substitute alternative fuels for 56% of the fuel energy used in grey cement production.The reduced substitution target compared to 2019 is a result of experience from kiln operation when a trial period with higher substitution caused problems with kiln clogging. For white cement production the target is to substitute alternative fuels for 6% of the fuel energy.
RECYCLING The target is to recycle 40,000 tonnes of the cement production by-product, microfiller, in rehabilitation of the chalk pit.	☺ 49,730 tonnes of microfiller from cement production were used in rehabilitation of the chalk pit as Portland Lake Park.	The target is to recycle 8,000 tonnes of the cement production by-product, microfiller. The reduction in target from 2019 is because current and available stages of the rehabilitation project are nearing completion, and authority approval for a new rehabilitation stage is not expected to be forthcoming until second-half 2020.

The chalk pit with the cement factory on the horizon

13 CLIMATE ACTION

UN GLOBAL GOAL NO. 13

At Aalborg Portland we are engaged on reducing CO_2 by initiatives on several fronts: We are conducting research in product development aimed at producing a cement with a smaller CO_2 footprint. And we are making energy-saving investments in our existing production. Furthermore, we are focused on optimisation with view to increasing the substitution of fossil fuels with alternative fuels.
In addition, we continuously carry out studies and pilot initiatives to determine scope for energy-saving projects.

TARGET 2019	STATUS 2019	TARGET 2020
For 2019, we have established the following concrete targets and activities in relation to UN Global Goal no. 13 regarding Climate Action:		For 2020, we have established the following concrete targets and activities in relation to UN Global Goal no. 13 regarding Climate Action:
		**CO_2 REDUCTION – GREY AND WHITE PRODUCTION** The target is a 30% reduction in CO_2 per tonne of cement by 2030 by implementing the roadmap – see section " 2030 Roadmap for Aalborg Portland"
CO_2 REDUCTION – GREY PRODUCTION The target is to stay within the 2018 CO_2 emission level of 734 kg CO_2 per tTCE.	☺ Target achieved. CO_2 emission decreased from 734 to 731 kg CO_2 per tTCE – a fall of 0.4%.	The 2020 target is to reduce CO_2 emission from grey production, to less than 731 kg CO_2 per tTCE, which was achieved in 2019.
CO_2 REDUCTION – WHITE PRODUCTION The target is to continue reducing CO_2 emission* from white production by 2% in relation to 1,139 kg CO_2 per tTCE in 2012.	☹ Target not achieved as CO_2 emission* was 1,182 kg CO_2 per. tTCE against 1,139 kg CO_2 per tTCE in 2012. However, CO_2 emission* fell by 4% in relation to 1,235 kg CO_2 per tTCE in 2018.	The 2020 target is to reduce CO_2 emission* from white production by 2% in relation to 1,139 kg CO_2 per tTCE in 2012.
ELECTRICITY SAVINGS Besides the targets above, the following studies/pilot projects are planned in 2019 aimed at exploring the potential for energy-saving initiatives: ▪ Feasibility study for modifying the existing system for conveying slurry (expected reduction: 75,000 kWh). ▪ Feasibility study for removal of bottlenecks in the system for conveying fly ash (compressed air system) (expected reduction: 300,000 kWh). ▪ Study of selected compressed air consumers and potential for improvements (expected reduction: 300,000 kWh). ▪ Replacement of selected lighting by LED in the store, grey cement mills and outdoor lighting along office building (expected reduction: 300,000 kWh).	☺ The following preliminary studies and measures have been performed resulting in an energy saving of 659,000 kWh. ▪ Slurry conveyor system at Sand Mill 6 modified so that one pump replaces two existing pumps (59,000 kWh). ▪ Study of bottlenecks in fly ash conveyor system (compressed air system) was not concluded and will continue in 2020 together with study of selected compressed air consumers and potential for improvements. ▪ Transition to LED lighting in grey cement mill department, and outdoor lighting along administration buildings (186,000 kWh). In addition, selected auxiliary equipment for conveying material has also been upgraded (414,000 kWh).	Besides the targets above, the following studies/pilot projects are planned in 2020 aimed at exploring the potential for energy-saving initiatives: ▪ Feasibility study for removal of bottlenecks in the system for conveying fly ash (compressed air system) (expected reduction: 300,000 kWh). ▪ Study of selected compressed air consumers and potential for improvements (expected reduction: 300,000 kWh).  *Hydraulic station – electrically powered pumps*

* Adjusted by the CO_2 fraction relating to heat recovered for supply to Aalborg municipal district heating network, which should otherwise have been produced and supplied by North Jutland power station. Adjustment for saved CO_2 has been calculated using North Jutland power station's emission and energy figures for coal firing based on the 125% thermal efficiency method for district heating.

TARGET 2019	STATUS 2019	TARGET 2020
FUEL SAVING The 2019 target is to achieve an annual fuel saving of 22,000 MWh by the following concrete projects: ▪ Installation of energy-efficient lining bricks in the burning zone on Kilns 74 and 78. ▪ Use of surplus heat from the clinker cooler of Kiln 87 as hot primary air for Kilns 74 and 78 and Coal Mill 7.	☺ Projects were carried out with an annual fuel saving of 37,266 MWh, which is 69% more than planned. The added saving was due to installation of energy-efficient lining bricks being extended to include Kilns 73 and 79, plus similar extension of the surplus heat project to include Kilns 73 and 79. These installations were planned for implementation in 2020. The following were carried out: ▪ Installation of energy-efficient lining bricks in the burning zone on Kilns 73, 74, 78 and 79 (12,011 MWh) ▪ Use of surplus heat from the clinker cooler of Kiln 87 as hot primary air for Kilns 73, 74, 78 and 79 and Coal Mill 7 (24,965 MWh) ▪ Replacement of front-end loader by more energy-efficient equivalent (290 MWh)	The 2020 target is to achieve an annual fuel saving of approx. 10,000 MWh by the following concrete project: ▪ Installation of energy-efficient lining bricks in the burning zone on Kilns 74, 76, 78 and 79. (10,434 MWh)
Preliminary study Testing of a dispersant that enables slurry water content to be reduced without impacting fluidity. Less energy must therefore be used for subsequent evaporation of the water volume (expected reduction: up to 170,000 MWh).	☺ Testing of a dispersant for reducing slurry water content, thereby reducing energy requirement for kiln evaporation. This study will continue in 2020.	Testing of a dispersant for reducing water content without impacting fluidity, thereby reducing energy content for kiln evaporation (expected reduction: up to 170,000 MWh).


Surplus heat from the clinker cooler of Kiln 87

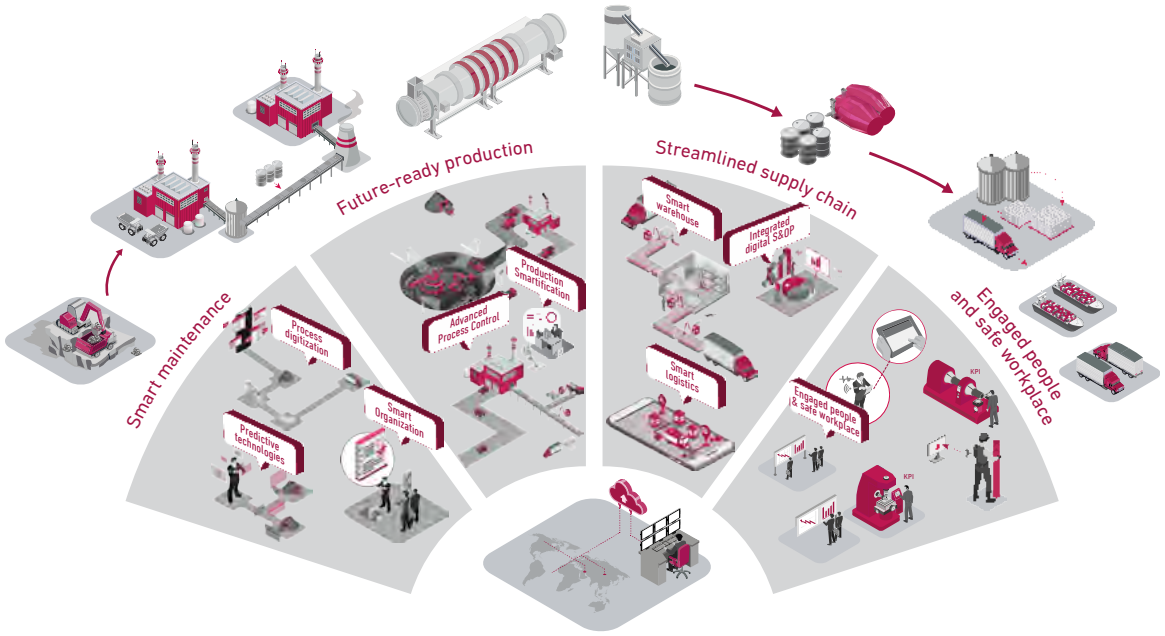

New energy-efficient front-end loader

5

OUR WORK ENVIRONMENT

Decent Employment and Economic Growth, UN Global Goal 8, is central to Aalborg Portland. One of our most important tasks is to ensure that all employees get safely through the working day. Work must be planned so that it can be performed without risk. We will comply with external legislation and internal safety rules.

CEMENTIR 4.0 – PROGRAMME FOR DIGITISATION



The digitisation programme includes four focus areas and nine activity clusters

"YOUR VOICE"

In 2019, we implemented "Your Voice", Aalborg Portland's internal job satisfaction survey. The focus of the survey was the work environment, and based on the results our departments have established action plans with initiatives in those areas where changes are desired. Work has thus taken place to improve occupational health & safety at both general and departmental level and in respect of both physical and psychological work environment.

AALBORG PORTLAND'S SAFETY RULES

We have 10 basic rules that apply to all work performed at the cement plant. In addition, there are a further 10 rules defining the specific requirements which exist for external companies operating Aalborg Portland. These rules ensure alignment of expectations in tendering and performance.

Our Health & Safety Driver's Licence, which consists of an e-learning tool relating to our safety rules for external contractors working at Aalborg Portland, was introduced in 2019 and more than 650 people completed the training during the year.

STRENGTHENED HEALTH & SAFETY ORGANISATION

In the wake of new elections, we have reorganised our health & safety organisation and allocated further resources. The structure of the organisation is therefore sound, and the health & safety representatives have received additional resources for planning and performing their tasks. In 2019, the organisation carried out a new health & safety risk assessment.

INVOLVING THE EMPLOYEES – CEMENTIR 4.0

2019 saw the launch of the Cementir 4.0 digitisation programme which is intended to bring the digital transformation of the Cementir Group a few steps closer.

Aalborg Portland and its Belgian sister company, CCB, have been chosen as the programme frontrunners, and they will therefore be the first to implement new digital solutions defined in the Cementir 4.0 projects. In the first instance a total of six projects will be implemented relating to the supply chain, production and maintenance.

The projects in the Cementir 4.0 programme are concerned with far more than simply the introduction of digital tools and methods. For example, an important part of the digitisation work consists of working with change processes. New technology impacts the work processes our employees are involved in and thereby the way we work.

ONE OF OUR MOST IMPORTANT TASKS IS TO ENSURE THAT ALL EMPLOYEES GET SAFELY THROUGH THE WORKING DAY. WORK MUST BE PLANNED SO THAT IT CAN BE PERFORMED WITHOUT RISK

HEALTH & SAFETY POLICY

Aalborg Portland is focused on production of quality products which live up to customer requirements and expectations. Health and safety is an integral part of daily working, and there is a constant commitment to improvement.

GUIDELINES

All activities must at all times be performed in accordance with relevant legislation, and in accordance with the company's internal guidelines which ensure a continuing safe and healthy work environment. The point of departure is at all times Aalborg Portland's core values: the value of people, quality, dynamism, sustainability, diversity and inclusion.

OUR EMPLOYEES

Within the scope of technical and economic feasibility, Aalborg Portland will create the best possible framework for a safe and healthy work environment by using the best possible tools and solutions. Aalborg Portland will ensure that all employees are trained and motivated to actively support improvement of the work environment. It is the responsibility of each employee to help to improve health & safety in and around performance of their own work.

EXTERNAL CONTRACTORS

Aalborg Portland recognises its responsibilities and obligations towards the various players who work at the production site.

THE COMMUNITY

Aalborg Portland adopts an open and active role in interaction with employees, authorities, customers, suppliers, organisations and other collaboration partners.

POLICY, TARGETS AND OBJECTIVES

Targets for the year ahead are proposed at the annual conference of the health & safety organisation. Health & safety targets are discussed at management's QHS Review where the final goals for the period are established. The health & safety policy is updated on an ongoing basis and at least every two years.

8 DECENT WORK AND ECONOMIC GROWTH

aalborgportland

Dynamic workplace

Aalborg Portland is a goal-driven company dedicated to pursuit of best practice.
We generate economic growth and jobs – both for ourselves and suppliers.
We collaborate across functions and are open to the possibilities of employment on special conditions.

UN Global Goal No. 8
Decent jobs and economic growth are ensured by sustainable productivity.

Solid Sustainability

ANY ACCIDENT IS AN ACCIDENT TOO MANY

Accident prevention is a large part of our daily work, and our systems are continuously being optimised to support this purpose. In practice, this means that we operate in accordance with safety instructions and risk assessments. We work continuously to strengthen our safety culture so that each does their best to prevent accidents from occurring.

In 2019, we recorded 8 accidents resulting in more than one day's absence and 22 accidents with no absence. The most frequent types of injury were superficial injuries, twists or sprains. 78 near-accidents were also reported.

We analyse all accidents thoroughly to determine the fundamental cause so that we can prevent and initiate corrective actions to avoid repetition.

We continue to work hard to reduce risks, and we share experiences and information on solutions across the organisation.

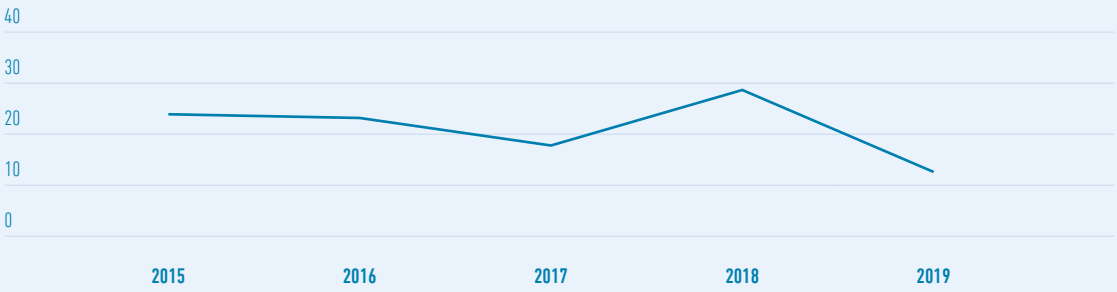
ACCIDENTS

ACCIDENTS REPORTED TO THE WORKING ENVIRONMENT AUTHORITY	2015	2016	2017	2018	2019
Number of accidents reported	13	13	10	16	8
Number of days lost	134	48	36	92	321

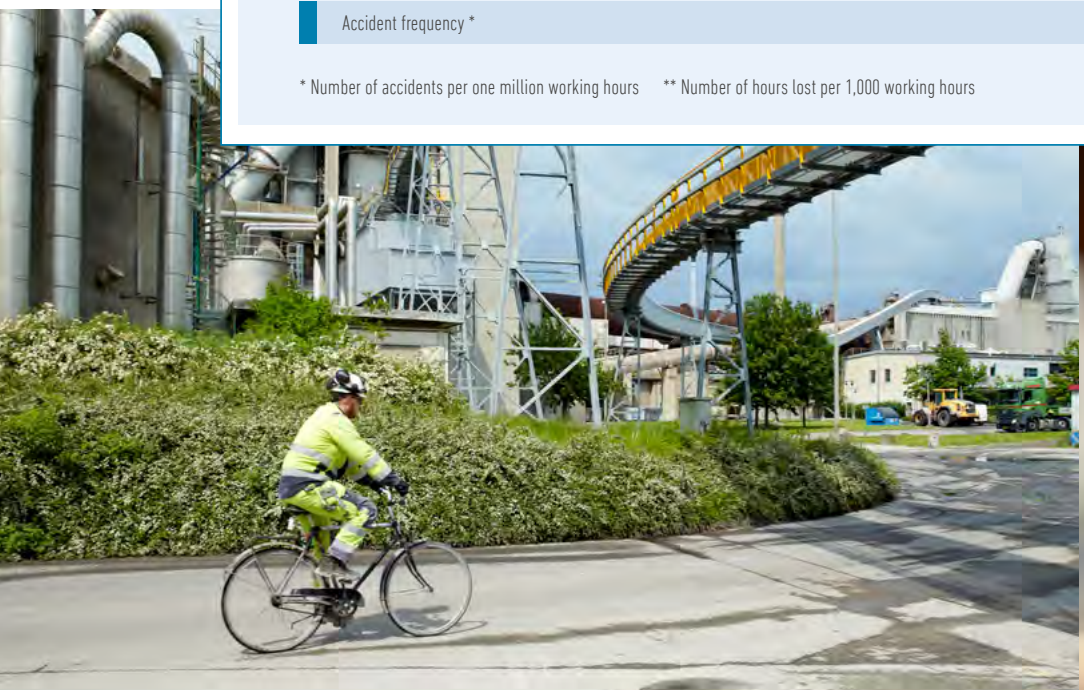
ACCIDENT FREQUENCY / TIME LOST – HOURLY PAID AND SALARIED EMPLOYEES					
Accident frequency *	24.9	23.3	17.9	28.7	12.5
Time lost **	1.9	0.6	0.5	0.2	3.7

Accident frequency was halved in 2019 as events resulting in more than one day's absence fell from 16 to 8, the target being max. 5.

ACCIDENT FREQUENCY / TIME LOST – HOURLY PAID AND SALARIED EMPLOYEES



* Number of accidents per one million working hours ** Number of hours lost per 1,000 working hours




Five new graduates in Aalborg Portland's careers programme

EXPECTATIONS TO THE FUTURE

Aalborg Portland's managers have a special responsibility for motivating and developing the employees so that we deliver solid results today and also develop the skills to meet the challenges of tomorrow.

UN Global Goal 4, Quality Education, is therefore a focus area for Aalborg Portland. To ensure high standards of competence we provide ongoing training to our employees, and to continuously maintain a specialised work force we train apprentices and interns and recruit graduates.

In 2019, Aalborg Portland therefore had 18 apprentices and interns as well as five graduates. We also devoted more 1,800 man-days to courses and in-service training.

PREPAREDNESS

In order to train our employees in a variety of situations requiring preparedness, regular drills and courses are arranged.

In 2019, we held first aid courses, a course in fall protection for around 60 employees, and a high-level rescue course for around 20.

Firefighting courses were also held.

The drills and courses provide opportunity for developing both physical and mental preparedness for rapid intervention in a critical situation.

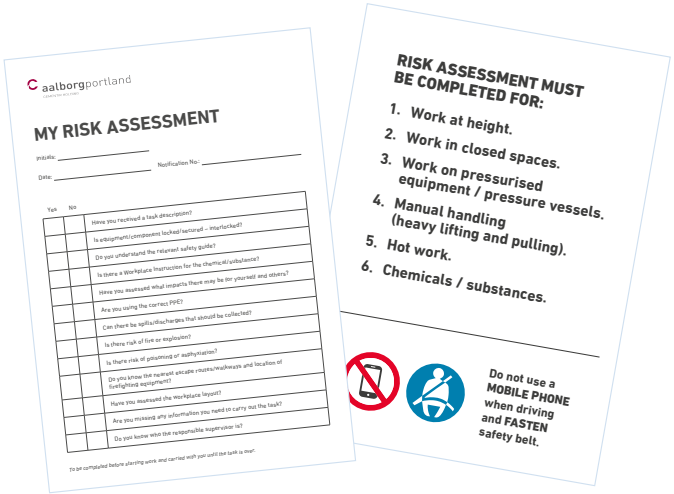
HEALTH & SAFETY TARGETS

TARGET 2019	STATUS 2019	TARGET 2020
ACCIDENTS WITH MORE THAN ONE DAY'S ABSENCE Max. 5 accidents.	☹ We failed to reach the target as we recorded eight accidents in 2019. However, this was a reduction from 16 accidents in 2018.	**ACCIDENTS WITH MORE THAN ONE DAY'S ABSENCE** Max. 3 accidents.
MEASURES PREVENTING AND MINIMISING RISKS 500 "Safety Walks".	☺ Target achieved. 596 "Safety Walks completed in 2019.	**MEASURES PREVENTING AND MINIMISING RISKS** 600 "Safety Walks".
4,000 "My Risk Assessments".	☺ Target achieved. 7,556 "My Risk Assessments". These can now be done electronically via an app.	8,000 "My Risk Assessments".

My "Risk Assessment"
Is a form that should be completed before an employee starts on a task classified as especially risky and where an accident can be fatal for the employee or others. ▶

"Safety Walk"
A walk round the factory with focus on employee health and safety.

▼

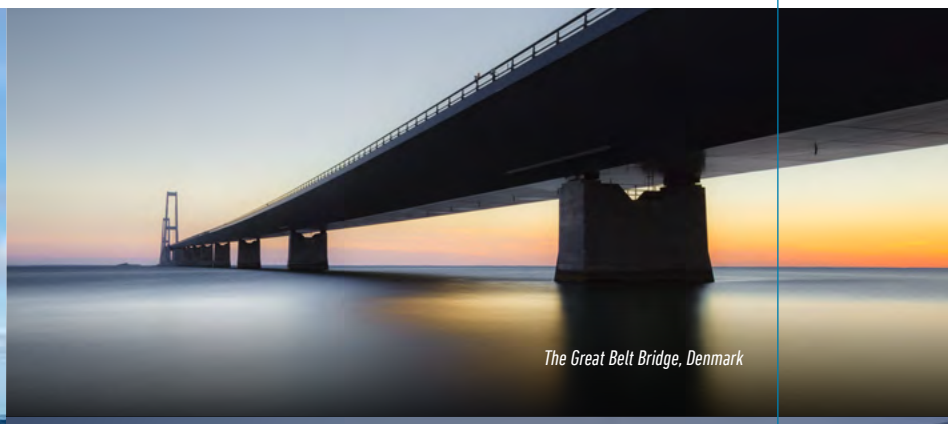


6

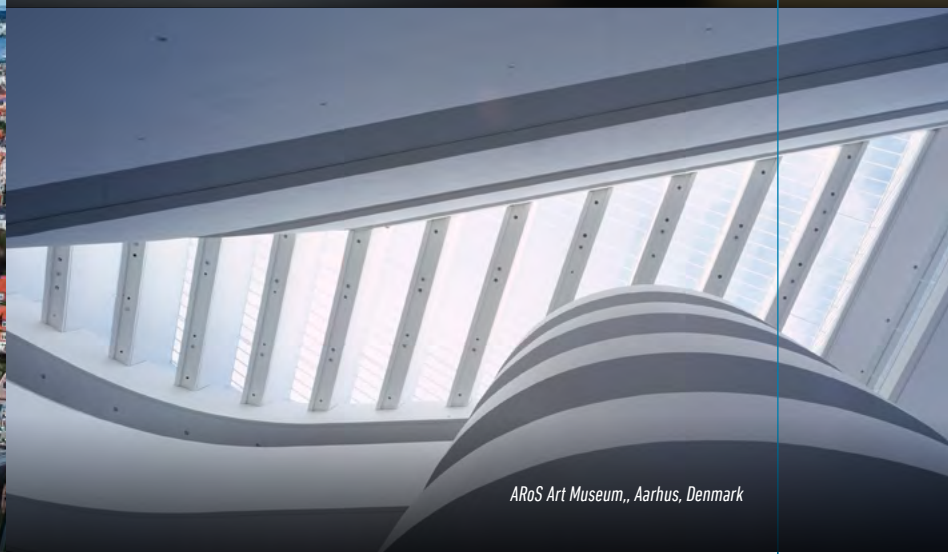
BENEFIT TO SOCIETY

Aalborg Portland is one of the largest employers in northern Denmark. As well as those employed directly, many more are employed in the companies that supply us with raw materials, goods and services and use our cement products. Our investments in the factory will generate still further employment.

City of Aalborg



The Great Belt Bridge, Denmark



ARoS Art Museum,, Aarhus, Denmark

INVESTMENTS WITH CLIMATE AND ENVIRONMENTAL IMPROVEMENTS

Aalborg Portland has continuously made large investments in climate and environmental improvement projects and in health & safety. In the period 2015-2019 a total of EUR 35.1m has been invested in a variety of technology improvement projects benefiting nature, the environment and the community.

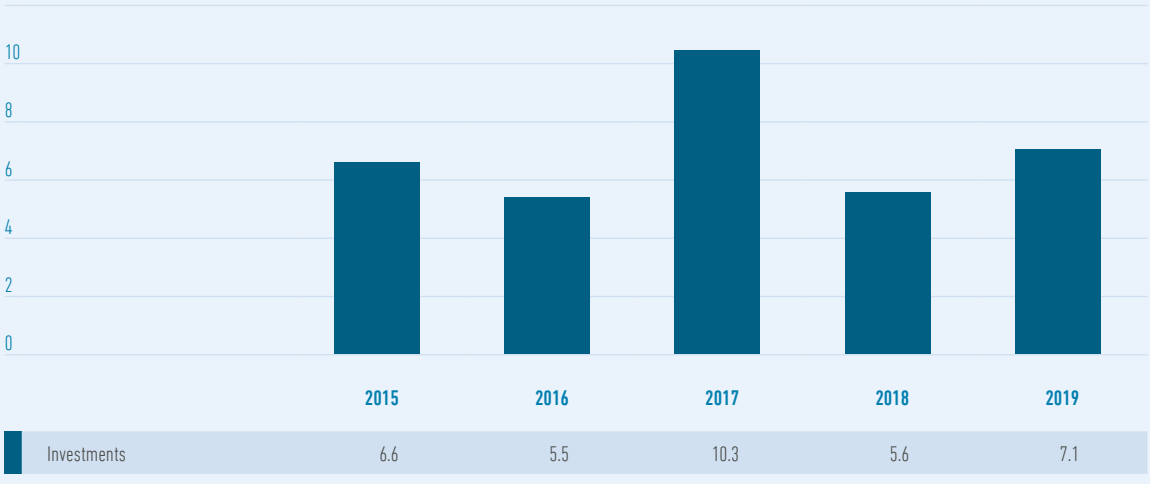
In 2019, Aalborg Portland invested a total of more than EUR 7.1m in climate and environmental improvement projects, including energy-saving projects, and in preventive safety and the work environment. To this must be added investment in maintenance of production equipment, which in 2019 amounted to around EUR 4.9m.

After significant investment in 2017, including an upgrade of Kiln 87's calciners, which has led to more stable operation and thus potential for more alternative fuel and reduction in CO_2, investment in climate and environmental improvements in 2019 increased against 2018.

INVESTMENT PROJECTS IN 2019 INCLUDED:

- Surplus heat from Kiln 87's clinker cooler for use as hot primary heat air for five white cement kilns and a coal mill.
- Noise suppression of deep-excavator in chalk pit.
- Expansion of reclamation equipment for rehabilitation of chalk pit.
- Transition to LED lighting in grey cement grinding department and at office buildings.
- Establishment of pre-insulated pipeline to send filtrate water to buffer tanks with view to increased heat recovery from kilns.
- Upgrade of selected dedusting filters combined with improved noise suppression.
- Preventive safety in the form of replacement of handrails and gratings, traffic separation, and procurement of auxiliary equipment for heavy lifting.

INVESTMENTS WITH CLIMATE AND ENVIRONMENTAL IMPROVEMENTS | EURm



	2015	2016	2017	2018	2019
Investments	6.6	5.5	10.3	5.6	7.1

Conveyor belt for waste fuels to Kiln 87

INVESTMENT IN ECO-TECH IMPROVEMENTS ALSO INCLUDED:

- New input materials in the form of alternative raw materials and fuels, cf. also section " The resource-efficient partnership".
- Environment-friendlier products for inclusion in research products with universities and other partners to develop the cements of the future.

Aalborg Portland continues to plan measures that will reduce consumption and emission levels, thereby impacting positively on environment. These measures are governed by the environmental action plan whose targets, actions and results are shown in section "UN Global Goals and Aalborg Portland – status 2019 and targets 2020".

PREVENTIVE MAINTENANCE

Maintenance expenditure on production plant amounted to more than EUR 4.9m in 2019.

Preventive maintenance in the form of filter replacement impacts on e.g. dust emission, while repairing leaks in the kiln system prevents ingress of false air, thereby saving on energy consumption.

Strong focus is also given to production reliability in order to reach the targets set. For example, timely replacement of kiln lining bricks minimises unscheduled kiln stops.

Preventive maintenance leads to stable, optimal operation of production and cleaning equipment, thereby also minimising environmental impacts.

IN 2019, AALBORG PORTLAND INVESTED A TOTAL OF MORE THAN EUR 7.1M IN CLIMATE AND ENVIRONMENTAL IMPROVEMENT PROJECTS, INCLUDING ENERGY-SAVING PROJECTS, AND IN PREVENTIVE SAFETY AND THE WORK ENVIRONMENT

FINANCIAL HIGHLIGHTS AND SOCIAL CONTRIBUTION

SOCIAL CONTRIBUTION

Aalborg Portland's cement production in Denmark is of significant economic importance to the nation.

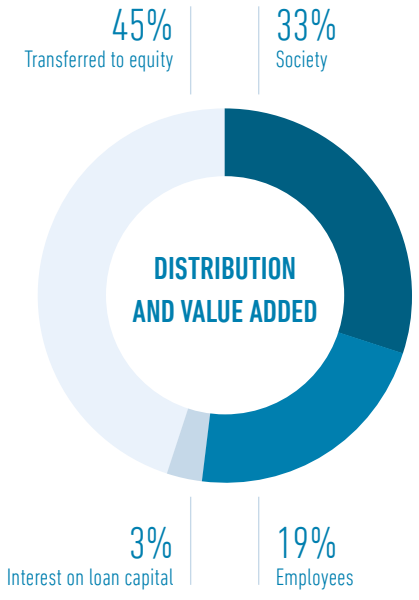
In 2019, Aalborg Portland's value added was calculated as EUR 116.2m. Of this, EUR 38.4m (33%) went to society in the form of VAT, company tax, other taxes and employee income tax. EUR 21.7m (19%) went to the employees in the form of pay and pension contributions (after tax). EUR 52.8m was transferred to the company's equity.

A social contribution is also created through our subcontractors involved in transport, maintenance, facility management, and other activities at Aalborg Portland.

ENVIRONMENTAL LEVIES

The Danish Government decided to reduce the NO_X tax in July 2016 and to phase out the PSO charge over a five-year period from 2017 to 2021. This has resulted in fewer environmental levies, but notably the Danish special tax on NO_X has great importance for the competitiveness of Danish production companies and poses a significant disadvantage for Aalborg Portland in competition with European companies not subject to this levy.

A removal of the NO_X levy will enable long-term investments in new production equipment and employment in Denmark.



EUR 38.4m
of the value added went to the public sector.

DISTRIBUTION AND VALUE ADDED | EURm

	2015	2016	2017	2018	2019
Revenue	210	232	245	245	259
Spent on materials, services, depreciation etc.	109	117	134	141	143
Value added	**101**	**115**	**111**	**104**	**116**
Society	38	36	33	33	38
Employees	18	22	24	22	22
Interest on loan capital	4	4	4	3	3
Transferred to equity	41	53	50	46	53
Dividend to the owner	0	0	0	0	0
Total	**101**	**115**	**111**	**104**	**116**

ENVIRONMENTAL LEVIES | EURm

	2015	2016	2017	2018	2019
PSO levy	4.8	5.2	2.3	1.8	0.1
NO_X levy	2.4	2.1	1.8	1.7	1.8
Waste levy	0.2	0.3	0.3	0.5	0.4
Electricity levy	0.1	0.2	0.2	0.2	0.1
Energy levy	0.7	0.7	0.7	0.5	0.7
Raw materials levy	0.6	0.7	0.8	0.7	0.7
Sulphur levy	0.7	0.8	0.9	0.7	0.8
Total	**9.5**	**10.0**	**7.0**	**6.1**	**4.6**

MEASUREMENT AND CALCULATION OF MATERIAL FLOWS

The information used in compiling this Environmental Report was derived from Aalborg Portland's environmental database (SAP EnvDB) which receives raw data from a variety of recording systems.

The methods of measurement used in conjunction with data capture are described below:

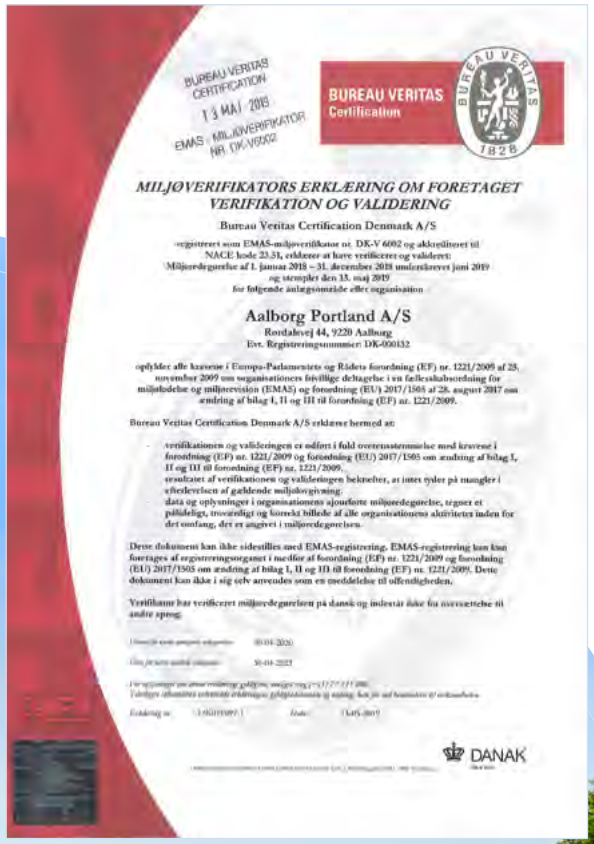
- Raw materials, recyclables and fuels are determined by flow meters and weighing devices installed in the production process.
- Water consumption is measured by water meters.
- Electricity consumption is measured by kWh meters.
- Packaging is calculated from inventory statements.
- CO_2 emission is determined according to the approved CO_2 plan for Aalborg Portland and verified externally.
- NO_X, SO_2, CO, HCl, NH_3 and dust emissions from kilns are determined by continuous metering in exhaust stacks. The same applies to dust concentrations in discharges from cement and coal mills, while air volumes from these sources are based on sampling.
- Hg quantity is calculated by continuous measurement of kiln air volumes and Hg concentration samples from yearly performance measurements. This does not apply to Kiln 87 where continuous measurement of Hg concentration was established in 2014.
- Products are determined by weighing and calculation.
- District heating production is measured by calorimeter.
- Wastes are determined by weighbridge and annual statements from external waste receivers.
- Cooling water is calculated on the "water balance principle" in which flow-metered outputs (water vapour, groundwater lowering at Kiln 76 and waste water, i.e. sanitation water and washing water) are deducted from measured inputs (water consumption, groundwater lowering and water content in materials and fuels).
- Combustion air is calculated indirectly by deducting the input side of the materials flow from the output side.
- Work accidents and time lost are determined from data reported to the Working Environment Authority.
- Noise calculation is performed by an accredited external firm based on measurement at source and subsequent computation.

Continuous emission and flow gauges and also weighbridges are subject to regular inspection and calibration by DANAK-accredited companies.

ENVIRONMENTAL VERIFIER'S REPORT AND EMAS REGISTRATION

The environmental verifier of Bureau Veritas Certification (accreditation no. 6002) has reviewed the part of the Environmental Report dealing with external environment and issued the statement shown below. Based on this statement the Danish Environmental Protection Agency has issued a Certificate of EMAS Registration and endorsed the Environmental Report.

Occupational health & safety, financial accounting data and social contribution are not covered by the verification.



BUREAU VERITAS CERTIFICATION
13 MAJ 2019
EMAS - MILJØVERIFIKATOR
NR. DK-V0002

BUREAU VERITAS Certification

MILJØVERIFIKATORS ERKLÆRING OM FORETAGET VERIFIKATION OG VALIDERING

Bureau Veritas Certification Denmark A/S

registreret som EMAS-miljøverifikator nr. DK-V 6002 og akkrediteret til NACE kode 23.51, erklærer at have verificeret og valideret Miljøredegørelse af 1. januar 2018 – 31. december 2018 underskrevet juni 2019 og stemplet den 13. maj 2019 for følgende anlægsområde eller organisation

Aalborg Portland A/S

Rørdalsvej 44, 9220 Aalborg
Evt. Registreringsnummer: DK-000132

opfylder alle kravene i Europa-Parlamentets og Rådets forordning (EF) nr. 1221/2009 af 25. november 2009 om organisationers frivillige deltagelse i en fællesskabsordning for miljøledelse og miljørevision (EMAS) og forordning (EU) 2017/1505 af 28. august 2017 om ændring af bilag I, II og III til forordning (EF) nr. 1221/2009.

Bureau Veritas Certification Denmark A/S erklærer hermed at:

- verifikationen og valideringen er udført i fuld overensstemmelse med kravene i forordning (EF) nr. 1221/2009 og forordning (EU) 2017/1505 om ændring af bilag I, II og III til forordning (EF) nr. 1221/2009,
- resultatet af verifikationen og valideringen bekræfter, at intet tyder på mangler i efterlevelsen af gældende miljølovgivning,
- data og oplysninger i organisationens sjouforlte miljøredegørelse, tegner et pålideligt, troværdigt og korrekt billede af alle organisationens aktiviteter inden for det omfang, der er angivet i miljøredegørelsen.

Dette dokument kan ikke sidestilles med EMAS-registrering. EMAS-registrering kan kun foretages af registreringsorganet i medfør af forordning (EF) nr. 1221/2009 og forordning (EU) 2017/1505 om ændring af bilag I, II og III til forordning (EF) nr. 1221/2009. Dette dokument kan ikke i sig selv anvendes som en meddelelse til offentligheden.

Verifikanten har verificeret miljøredegørelsen på dansk og indestår ikke for oversættelse til andre sprog.

DANAK

Certifikat for EMAS-registrering
Certificate of EMAS-Registration

EMAS
VERIFICERET MILJØLEDELSE

Aalborg Portland A/S

Rørdalsvej 44, DK-9220-Aalborg Øst

Registreringsnummer
Registration Number
DK-000132

Registreret første gang
Date of first registration
02-03-2000

Certifikatet er gyldigt indtil
This certificate is valid until
01-06-2021

Udstedelsesdato
Date of issue
03-07-2020

Denne organisation har indført et miljøledelsessystem, og udarbejdet en miljøredegørelse i henhold til forordning (EF) nr. 1221/2009 med det formål at fremme en løbende forbedring af organisationens miljøindsats og resultater, og informere offentligheden herom. Miljøledelsessystemet og miljøredegørelsen er verificeret af en uafhængig tredjepart.

This organisation has established an environmental management system and prepared an environmental statement according to Regulation (EC) No. 1221/2009 to promote the continual improvement of environmental performance and to inform the public hereof. The environmental management system and the environmental statement are verified by an independent third party.

Søren Mørch Andersen
EMAS Koordinator
EMAS Coordinator

Aalborg Portland – cement factory

GENERAL INFORMATION

NAME AND ADDRESS
Aalborg Portland A/S
Rørdalsvej 44
9220 Aalborg Øst
Tel. +45 98 16 77 77
E-mail: cement@aalborgportland.com
Internet: www.aalborgportland.dk

ENVIRONMENTAL SUPERVISORY AUTHORITY
Danish Ministry of Environment and Food,
Environmental Protection Agency Aarhus.

INDUSTRIAL SECTOR
Raw materials processing.

MAIN ACTIVITY
Production of cement for the domestic and export market.

LIST ITEM
3.1. a) Production of cement clinker in rotary kilns with an output capacity of more than 500 tonnes/day (s).

COMPANY REG. NO.
36 42 81 12

PRODUCTION UNIT NO.
1.019.874.563

NACE CODE
23.51 – Production of cement.

LAND REGISTER TITLE NOS.
1a, 1k, 1l, 1m, 1n, 1p,1o Rørdal, 9a, Ø. Sundby, and 9a, 10g, 11a, 16i, 17l, 21h, Uttrup under Aalborg Jorde.

SIGNIFICANT SECONDARY ACTIVITIES
K212. Facilities for temporary storage of non-hazardous waste prior to recycling or disposal with a waste feed capacity of 30 tonnes per day.

OWNERSHIP
Aalborg Portland A/S is 100% owned by Aalborg Portland Holding A/S, which is 75% owned by Cementir España S.L., Spain and 25% owned by Globo Cem S.L., Spain. The companies are part of Cementir Holding N.V., The Netherlands and the ultimate owner is Caltagirone S.p.A., Italy.

MANAGEMENT
Environment, energy, quality and health & safety:

Michael Lundgaard Thomsen, Managing Director

Søren Konstmann Lausen, Plant Director

Henriette Charlotte Nikolajsen, Environment, Energy and QMS Manager

PRINCIPAL ENVIRONMENTAL APPROVALS

7 JUNE 2019
Excavation and removal from the "Støvsøen" landfill of up to 60,000 tonnes of microfiller waste.

21 MARCH 2017
Licence for recovery of surface water from the clay pit lake for use in the pyrite ash facility at Aalborg Portland.

10 MARCH 2017
Environmental approval and review of Aalborg Portland cement plant.

The environmental approval covers:

- Increased emission limits for Kiln 87, Kiln 76, Kiln 74/78 and Kiln 73/79.
- Change of conditions for receipt of alternative fuels.

The review and enforcement notice cover:

- Changed conditions for the pyrite ash site.
- The company's overall environmental status.

10 MARCH 2017
Review of environmental approval for the "Støvsøen" landfill.

10 MARCH 2017
Review of environmental approval for the "Tippen" landfill.

10 OCTOBER 2012
Recycling of microfiller for rehabilitation of chalk pit.

10 OCTOBER 2012
Licence for extraction of chalk.

29 NOVEMBER 1991
Final licence for water extraction.

29 JUNE 1990
Licence under the Danish Environmental Protection Act to send waste water to the municipal treatment plant.

Aalborg Portland is not covered by the Danish Ministry of Environment and Food's regulations for the safe storage, handling and transport of materials that may give rise to serious environmental hazard in the event of accident.

TERMINOLOGY

ALKALI
Alkalis used at Aalborg Portland are sodium and potassium compounds.

ALTERNATIVE FUELS
Combustible waste products which replace fossil fuels and consist of a reprocessed fuel product, meat and bone meal and dried sewage sludge.

BAT
Best Available Techniques. EU documents that describe the best available technique within various fields. Used as basis for environmental approvals.

CEMENT CLINKER
Intermediate product that results from the burning of slurry in kilns and is ground to produce cement.

CEMENT MILL
Facility which grinds cement clinker to cement.

CO
Carbon monoxide. A result of incomplete burning of fuel. Converted in the atmosphere to CO_2.

CO_2
Carbon dioxide. Formed by burning of fuel and calcining of chalk. CO_2 emission is calculated according to EU guidelines.

dB(A)
Noise is measured in decibels, dB(A), which is a logarithmic scale. For example, the noise from leaves rustling in the wind is around 20 dB(A). The noise level in an ordinary living room is around 40 dB(A), in offices 60-65 dB(A), on a street with normal traffic 80-85 dB(A) and from a pneumatic drill approximately 100 dB(A).

EMAS
Eco-Management and Audit Scheme. EU scheme for the registration of environmental management systems.

EMISSION
Release of noise or gas. In flue gas emission the volumes released are metered continuously, except for CO_2 – see under CO_2.

ENVIRONMENTAL IMPACT ASSESSMENT (EIA)
EU directive which prescribes that installations having material potential environmental impact cannot be established until the procedure stated in the directive has been implemented, including preparation of an EIA Report, holding of a public inquiry, etc.

FILTRATE WATER
Waste water formed in heat recovery boilers by condensation of flue gases.

FLUE GAS DESULPHURISATION GYPSUM (FGD)
Gypsum formed by the desulphurisation of flue gases.

FLY ASH
Material produced by cleaning of flue gases in an electrostatic precipitator.

FOSSIL FUEL
Coal, petcoke, oil and natural gas.

GJ
Gigajoule, a unit of energy equal to 1,000 MJ.

HCL
Hydrogen chloride.

HG
Mercury.

HOUSEHOLD ENERGY CONSUMPTION
Estimated average annual consumption per household.
Electricity: 4,000 kWh per year. Heat (space heat and hot water): 60 GJ per year

IMMISSION
Level of emissions in outdoor air at 1.5 m above ground.

IRON OXIDES
Ferrous by-product of sulphuric acid manufacture.

ISO 14001
Standard issued by the International Standards Organisation with guidelines for establishment and maintenance of environmental management systems.

ISO 45001
International guideline for establishment and maintenance of health & safety management systems.

ISO 50001
Standard with guidelines for establishment of energy management systems.

LIFE CYCLE ANALYSIS (LCA)
Method for assessing the environmental and other impacts which a product has on its surroundings from raw material extraction until final product disposal.

MANAGEMENT SYSTEM
Aalborg Portland's internal management system for environment, energy, quality and health & safety. Ensures that all related matters are handled uniformly and in accordance with policies, targets, guidelines and rules.

MATERIAL FLOWS
Description of what resources Aalborg Portland uses in manufacturing cement, how much is produced, and what emissions and discharges the production entails, *cf. pages 52-53*.

MICROFILLER
Filler material with particle size < 50 µm.

MINERALISED OPERATION
Addition of small amounts of fluoride and alkali, which together with sulphur from fuels form especially reactive cement clinker.

MIXING AIR
With this technology, the kilns are operated with an oxygen deficit in the burning zone itself, thereby considerably reducing NOX formation and enhancing clinker whiteness. However, the oxygen deficit results in incomplete combustion and high CO formation. This is countered by injecting air after the burning zone, burning off the CO.

NH_3
Ammonia.

NOX
Nitrogen oxides. Formed by burning of fuel. Contributory cause of acid rain.

PETCOKE
A low-ash coke by-product from the refining of crude oil into petrol.

PRTR
European Pollutant Release and Transfer Register.

PSO LEVY
Levy charged on electricity purchase and supporting producers of green energy.

PYRITE ASH
See iron oxides.

RAW MEAL
Cement clinker and incompletely burned raw materials.Raw meal may result from e.g. kiln stoppage.

RDF
Refuse Derived Fuel is a waste fuel from which recyclable residues such as glass and metals have been removed.

SAFETY WALK
A safety round of the factory with focus on the employees' health and safety.

SO_2
Sulphur dioxide. Formed by burning of fuel. Contributory cause of acid rain.

SUBSTITUTION
Replacement of a raw material by a waste product. For example, substitution of clay by fly ash.

tTCE
tonne Total Cement Equivalent.
Standard unit for the production obtained by calculation of the equivalent cement tonnage if sales and changes in clinker stocks had been processed into cement. Each type of clinker is therefore multiplied by a factor that expresses addition of other materials for production of cement. Imports of clinker, which are consumed to produce cement, are deducted and are not considered as production.

WA
Workplace Assessment.

Environmental Report 2019
Environment and Health & Safety

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Environment, Energy & Management System

Responsible under Danish press law
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