

# NORDKALK AND THE ENVIRONMENT

REPORT 2012





In this environmental report we describe the effects of our operations on the environment, and our actions, either planned or accomplished, to reduce environmental impact in all our countries of operation. Nordkalk has been publishing environmental reports since 1996.

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# RESPONSIBLE UTILIZATION OF NATURAL RESOURCES

In modern society, it is necessary to ensure the supply of important raw materials, such as limestone. Limestone is a pure natural product, which has many applications in various fields, ranging from civil engineering to environmental care and industry.

## RECONCILING ENVIRONMENTAL AND GEOLOGICAL ASPECTS

The environmental impacts of production operations must be minimized. However, it is an inevitable fact that the utilization of mineral-based natural resources affects the area where they are extracted. Seen from a wider perspective, it can be stated, however, that the benefits derived from the natural resources are relatively greater than the environmental effects caused by their extraction. A quarry area offers considerable environmental benefits in other sectors of society that are difficult or even impossible to replace by other means. This does not mean, however, that requirements should not be set for mineral extraction or production. The place of extraction is primarily selected on the basis of geological conditions, i.e. the location, quality and size of the deposit. There are also other factors relating to land use that must be considered. Sustainable production requires us to be aware of the environmental effects of our operations and to continuously seek to minimize them.

Long-term community planning enables the use of old quarries after the industrial operations have ended. They can be used for the needs of society, for example, as water basins or storage facilities, and for other industrial activities or various activities related to culture and tourism. If no use can be found, the mining company is responsible for after-care of the quarry.

## PROFITABLE AND ECONOMICALLY SUSTAINABLE OPERATIONS

Energy and material efficiency play a key role in sustainable operations and cost-effectiveness pursued by profitable production. We have to be profitable in order to meet the expectations that society places on us. Society can promote the efficient utilization of natural resources, for example, by ensuring that all surplus stone and fines produced can be fully exploited. Thus the alternative, having to dispose by-products from quarries while extracting materials in untouched areas, can be avoided.

PHOTO: TERHI ANTILA



## SOCIAL RESPONSIBILITY FOR THE BENEFIT OF PEOPLE

People are the focal point of our operations. Without skilled and motivated employees we could not provide society with the benefits mentioned above. As a company, we must bear our responsibility for our employees in an optimal way. In occupational safety, our only possible goal is zero accidents. Reaching this goal requires the commitment and support of the entire personnel in order for us to be able to create a sufficiently safe working environment. In the same way as we take care of our working environment, we must also seek to further improve the living environment at our locations. Inconveniences caused by our operations must be reduced effectively. The requirements defined by the permit-granting and supervisory authorities only set the minimum standards that we must comply with.

*Håkan Pihl*  
Vice President, Geology and Environment

# NORDKALK GROUP

PHOTO: GRZEGORZ OTFINOWSKI

Miedzianka, Poland



## GUIDELINES FOR OPERATIONS

- The working environment shall be good and safe for everybody.
- Compliance with legislation and codes of practice is a minimum requirement.
- We strive to minimise the environmental impact of our operations.
- Our values - Trust, Competence and Quality - guide our operations.
- We deliver the right product, quality and service at the agreed time.

Operating Guidelines of Nordkalk Group, read more: [www.nordkalk.com](http://www.nordkalk.com)

## BUSINESS DESCRIPTION

Fulfilling customer needs with limestone-based products and knowledge-based service concepts.

## MISSION

More clean water, food, energy and products with less resources and emissions.

## VISION 2020

- Northern European leader
- Good profitability ensured by operational excellence.
- Growth in high-value businesses and new markets.

# YEAR 2012 IN BRIEF

**Nordkalk is the leading producer of high quality limestone-based products in Northern Europe. The products are used mainly in the paper, steel and building materials industries as well as in environmental care and agriculture. The company's turnover for 2012 totalled EUR 351.0 million. Nordkalk employs some 1,100 people and has operations at more than 30 locations e.g. in Finland, Sweden, Norway, Poland, Estonia and Russia. Nordkalk is a member of the Rettig Group.**

## DEMAND FOR LIMESTONE-BASED PRODUCTS DECREASED

The year 2012 was characterized by euro crises, which were also felt by Nordkalk in the form of a drop in consolidated turnover to EUR 351.0 million from EUR 369.2 million in 2011. Demand for limestone-based products decreased in the steel industry, especially in the second half of the year, and in Poland road construction slowed down noticeably. On the other hand, deliveries to many other construction segments increased in 2012, and sales to the mining industry remained brisk. Sales to the pulp and paper industry decreased slightly.

## BUSINESS ACTIVITIES IN FINLAND MERGED INTO ONE DIVISION

A major organizational change took place in Finland on 1 June 2012, when two divisions were merged into a new division PulpPaper & Finland. It combines production units and sales in Finland as well as sales to the pulp and paper industries. This internal change has allowed Nordkalk to unify, simplify and improve operations.

## NUMBER OF PERSONNEL DECREASED

As the activities at Nordkalk were streamlined and the organization lightened, it also affected the number of personnel. At the end of

2012, Nordkalk Group's personnel numbered 1,083 (2011: 1,186). The number of personnel decreased significantly at Nordkalk Alekseevka in Russia because of the discontinuance of production. In Sipoo, eight employment relationships were terminated in 2012 because Finland's only fiberglass factory, an important customer of the Sipoo plant, was closed down in 2011. In addition, other codetermination negotiations took place, for instance because of the bankruptcy notice of the steel manufacturer FNsteel. The negotiations led to a few temporary and permanent lay-offs. However other work was found within the corporation for almost all of the temporarily laid-off workers.

## INVESTMENTS

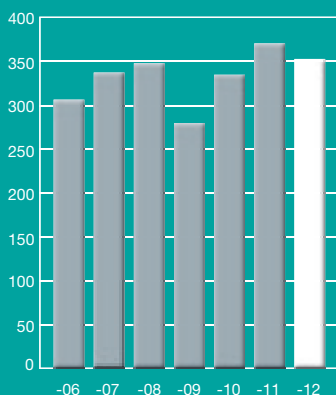
On Gotland in Sweden Nordkalk's biggest investment ever, the opening of a new limestone quarry in Bunge, has been delayed because of a prolonged legal process. The work is now expected to start in 2013. In all, Nordkalk will invest more than EUR 60 million, and quarrying will be able to continue for 25 to 40 years.

The extensive modernisation at Nordkalk's lime plant in Rakke in Estonia was finalized in February 2012 when the second renovated kiln was brought on stream according to plan. Recent months have proved that in addition to product quality improvements, energy efficiency has been considerably improved, and environmental impacts of the plant have been reduced.

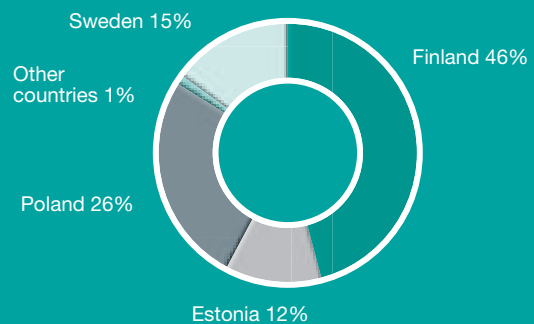
In Raahe in Finland a new briquette plant is ready, enabling the use of fine rest material of quicklime production. The fine material is pressed into briquettes which the steel plant is using. This supports the goal of 100 per cent usage of raw materials.

A divestment also took place in 2012 when Nordkalk sold its minority share in Finnish Viljavuuspalvelu Oy, a laboratory analyses service company for agriculture.

TURNOVER, NORDKALK GROUP (meur)



PERSONNEL BY COUNTRY (excluding subsidiaries)



# LIMESTONE IS PURE AND NATURAL

**Thanks to its mines in 21 locations and an external limestone source network, Nordkalk is able to offer its customers various products and qualities with the required physical and chemical characteristics.**

## LIME IS NEEDED EVERYWHERE

Limestone is a versatile and often irreplaceable raw material with numerous application areas. It plays a role in the production of many familiar daily products that are necessary for maintaining our current standard of living. Every day we use products that could not have been made without limestone-based products. In environmental applications, they are needed to provide society with the basic prerequisites for life – clean air, pure water and fertile soil.

Limestone is a pure and natural substance. It consists almost solely of calcium carbonate and can be used crushed or ground, or it can be refined into calcium oxide (quicklime) or calcium hydroxide (slaked lime), which increases its reactivity and enables it to bind impurities better. Limestone-based products are used to remove impurities in various processes and as a neutralizer and filler. Typical applications are municipal and industrial water purification, and neutralization of flue gases at power plants. In metal mines, lime is used to regulate the concentration processes and in steel industry, lime is needed above all in slag forming. In paper industry, limestone-based products serve as a raw material for the paper pigments used as coating or filler material. Limestone powder is the most frequently used construction material filler.

## IMPORTANCE OF ECO-FRIENDLY CLEANTECH SOLUTIONS GROWING

Limestone-based products can be used to prevent and treat environmental problems. In agriculture, liming reduces the acidity of soil, which improves the living conditions of vegetation and, in turn, the productivity of crops. Environmental liming can help save acidic watercourses and organisms that live in them. In addition

to the traditional environmental applications, Nordkalk is developing new products to help customers minimize the environmental impacts of their processes.

Nordkalk's Fostop® concept consists of limestone-based solutions that help reduce the leakage of phosphorus into watercourses and which contribute to the recycling of phosphorus. This is extremely important, as the world's phosphorus reserves are estimated to dry up already in 50 years' time. The Fostop concept consists of lime filter drains, lime filters, and the stabilization of sludge with lime and structure lime to improve the soil structure and drainage of arable land, thereby reducing nutrient runoffs into watercourses.

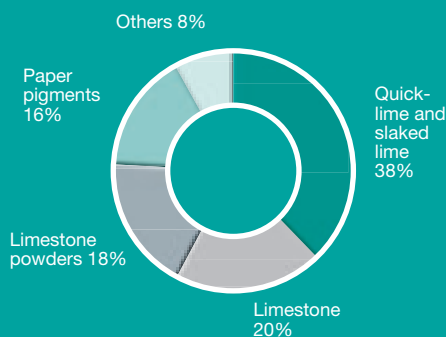
Structure lime is sold in Sweden under the name Fostop® Struktur. Its sales have increased in the country, where government support for phosphorus reduction in lakes and waterways is provided – something that other Baltic Sea countries should also have as their objective.

There are several ongoing phosphorus-related research projects at Nordkalk, the most significant of which is the extensive structure lime project in the fields surrounding the Bornsjö lake in Sweden. The project was started in autumn of 2012 by Nordkalk and Stockholm Vatten.

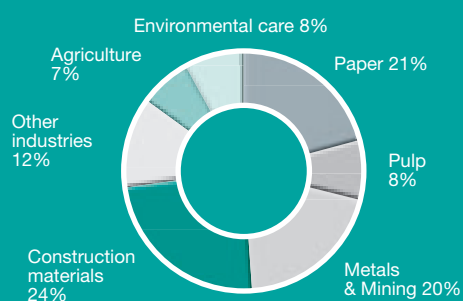
According to the EU's sulfur directive, vessels operating in the Baltic Sea, the North Sea and the English Channel must, as of 2015, use fuel that has a sulfur content limit of 0.1 per cent, in contrast to today's allowance of 1 per cent. One solution is to use a sulfur scrubber to clean the sulfur emissions from exhaust gases. Nordkalk and Rettig Group's shipping company Bore are together looking into possibilities to use limestone-based solutions for desulfurization.

In the recent years, Nordkalk has been developing new products for, e.g., the concrete, paper and polymer industries. The products are based on patented technology and they represent cost-effective and environmentally friendly product options. The products for the concrete industry were launched in autumn 2012.

SALES BY PRODUCT GROUPS 2012  
(% turnover, Nordkalk Group)



SALES BY CUSTOMER SEGMENTS 2012  
(% turnover, Nordkalk Group)





## WATER — THE FOUNTAIN OF LIFE

Pure water is one of life's essentials. Nordkalk's products play an important role in both water resources engineering and in water protection. Lime-based products are also needed to process drinking water, to clean wastewaters, and to neutralize the process waters used in metal mines and various industries.

Liming can potentially save an acidic lake or wetland. At the moment, Nordkalk has an even bigger goal: to improve the condition of the Baltic Sea with limestone-based products. In 2012, Nordkalk joined the Baltic Sea Action Group (BSAG), making a 5-year-long commitment with the goal of reducing the phosphorus burden on the Baltic Sea. Nordkalk has committed to making

tailor-made applications of the FOSTOP® concept for Poland and the Baltic countries.

Water is linked to Nordkalk's own production, too. Water collects on the bottom of the quarries as groundwater seeps in through cracks in the bedrock. Rain and melt water from nature also end up in the quarry. Thanks to the composition of limestone, the water that collects in the quarries is clean and, e.g., in Pargas, Finland, it is pumped into the town's raw water reserve. Tytyri in Lohja, Finland and Miedzianda in Poland also deliver water to the municipal water utilities.

# HEALTH AND SAFETY ARE HIGHLIGHTED IN ALL ACTIVITIES

PHOTO: ELINA HEINONEN

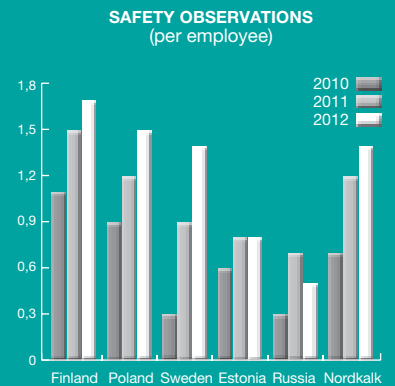
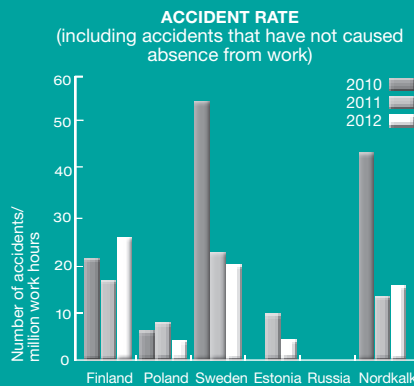
Nordkalk is a member of the Rudus Safety Park in Espoo, Finland, since 2012. A day-long safety training program was arranged there for the Finnish summer workers. The aim of the trip to the safety park was to give the summer workers the opportunity to learn about the safety risks of an industrial work environment in safe and visualized surroundings.



## THE NUMBER OF REPORTED SAFETY OBSERVATIONS INCREASED IN NORDKALK GROUP

In Nordkalk an incident is called an accident if medical help by a nurse or a doctor is needed, regardless possible absence from work.

Accident rate includes Nordkalk employees only.





**The work environment must support wellbeing at work, but the attitudes of staff are also significant when it comes to safety. At Nordkalk, efforts have been made to change people's attitudes towards safety, and the results have been good.**

### ZERO ACCIDENTS IS THE ONLY POSSIBLE GOAL

Nordkalk's goal in occupational safety is zero accidents, and the OHSAS 18001 standard is applied in all production countries.

In 2012 there were 38 occupational accidents, including those involving the personnel of subcontractors (49 in 2011). There were no serious accidents. Staff are encouraged to report safety observations. Last year the number of observations increased by about 200 to more than 1,550, which shows that our staff have the right attitude when it comes to improving safety at the workplace. An example of this positive development and the right attitude is the milestone of 10 years without accidents reached at the Vimpeli plant in June 2012. A new campaign against eye injuries produced encouraging results already in its first year: In 2012, there were 5 eye injuries, whereas in the year before the number was 16.

Nordkalk's international H&S Network works continuously to develop safe work methods. Every accident is a learning process, which leads to re-evaluation of all safety routines. For example, after a tragic accident in Luleå, Sweden in 2011, the company has invested in improving the protective gear used. In 2012 special protective clothing for maintenance work on the kilns was taken into use and a motorized breathing mask was tested. Zero tolerance to intoxicants continued in all countries.

Early intervention was introduced in Finland in 2012. The aim of early intervention is to support wellbeing at the workplace and

avoid possible problems in advance by recognizing an individual's ability to cope at work at the earliest possible time. Persistent efforts in wellbeing at work and investing in age management show at Nordkalk in the high average retirement ages and low disability benefit payments.

### TRAINING TO SUPPORT COMPETENCE

Limestone industry often requires skills that are not taught at any school. Therefore, various training programs have been developed at Nordkalk. In Finland, three-year process operator training started for 12 Nordkalk employees in 2010. In Estonia, a qualifying examination for lime kiln operators was implemented, as well as a training program for middle management and specialists. Occupational safety training was organized for supervisors in Sweden. The third corporate-level mentoring program started in autumn 2012. Twenty-five employees were chosen for the year-long mentoring program from different countries. The purpose of the program is to encourage them to share their expertise and tacit knowledge.

Trainees were hired in Miedzianka, Poland, and in Rakke, Estonia, mainly to work in the mines and in maintenance. In Finland, Nordkalk employed summer workers in Pargas, Lappeenranta and Tytyri. In Lappeenranta, Nordkalk is taking part in forest cluster activities, which give students an opportunity to learn about companies, for example through practical work training, and their possible orientation into the field is being supported.

## LENGTHY PERMIT PROCESS BURDENS PERSONNEL

In 2006, Nordkalk filed an application to open a new limestone quarry in Bunge, Northern Gotland, Sweden. This has entailed both favorable and unfavorable decisions from various courts of justice. Now, after seven years and two rounds in different court instances, the lack of a decision is beginning to take its toll on the personnel. In particular, uncertainty about workplaces is causing them concern.

"It is hard on the personnel. It is obvious that the employees are not happy with the situation," says the work safety official Jörgen Pettersson from Storugns, where Nordkalk's present production plant is located.

The favorable permit decision Nordkalk received in July 2012 was followed by a dispute that pitted jobs and nature values against one another. This has been hard on the personnel. "The employer, however, has offered external help to the personnel: in addition to the occupational health service, the services of a psychologist have been available for anyone who has wanted it. The company's internal communication has also increased," says Pettersson.

"The personnel must feel safe. A constant need for information has been emphasized during this uncertain situation. We have regularly gathered the staff together and told them all we know. Despite the difficult situation, they are very committed and participating," says Josefin Bähr, H&R Manager at Nordkalk AB.



Jörgen Pettersson (3. from left) and colleagues Anders Sjögren (left), Roger Möllerström, Pär Åkesson, Anders Jonsson, Ingela Pettersson and Kajsa Hägbom.

# ACTIVITIES IN BUNGE CAREFULLY MONITORED



## PERMIT PROCESS

- 2006** Nordkalk applies for a permit for mining activities in Bunge Ducker. The permit application includes an environmental impact assessment. It has been later completed by several environmental studies.
- 2007** The municipality seconds the plans by Gotland's municipal councilmen (kommunfullmäktige) voting for the Bunge deposit.
- 2008** The Land and Environment Court hears the case and rules against the permit. Nordkalk appeals the ruling. Work on an extensive control program begins.
- 2009** The Land and Environment Court of Appeal hears the case and grants a permit for the quarry activities and assigns the Land and Environment Court to set the conditions. The opponent appeals to the Supreme Court.
- 2010** The Supreme Court informs that it will not hear the case and that the permit is legal and permissible.
- 2011** The Land and Environment Court announces that it has not been able to establish conditions for the activities. Nordkalk appeals the decision.
- 2012** The Land and Environment Court of Appeal hears the case and conducts a comprehensive re-assessment of the Bunge application. On 5 July the conditions are given with immediate execution. The ruling is appealed.
- 17.9.2012** The Supreme Court suspended the execution right as it announces partial re-deliberation on the matter. The work is interrupted until the final decision on the matter of opening a new quarry is made. The re-deliberation applies to the question of "how the Land and Environment Court of Appeal's legal ruling in the permit case affects the deliberation of the permit issue" i.e. what has the meaning of the 2009 permit been in processing the matter further. Nordkalk has, in its statement of 31 January 2013, given its viewpoint, according to which the ruling from 2009 is legally valid and the hearing from 2012 fully extensive.

**The mining industry is important to the Swedish economy and the community on Gotland. Gotland supplies limestone to Nordic mining and steel industry clusters. Approximately half of the production is delivered to steel industry companies in northern Finland and Sweden. The Bunge area on Gotland has the best geological, qualitative and quantitative conditions for the extraction of limestone.**



[www.nordkalk.se/Bunge](http://www.nordkalk.se/Bunge)

At the beginning of July 2012, after almost seven-year-long court proceedings, Nordkalk was granted a permit and conditions for opening a new quarry in Bunge on Northern Gotland in Sweden. The ruling on the permit itself became final as early as in 2010. The ruling of July 2012 has been appealed to the Supreme Court of Sweden, and a decision is expected in spring 2013. Meanwhile, preparatory work for the opening of the quarry is at a standstill.

#### **PERMIT PROCESS BASED ON A THOROUGH ENVIRONMENTAL ASSESSMENT**

A comprehensive environmental assessment was a prerequisite for the permit. Compliance with the conditions will be ensured with the help of a control program. Marshland areas adjacent to Natura 2000 areas have a separate control program. Several alternative water purification solutions for the treatment of discharge water from the quarry will be tested in our present quarry in Klinthagen during 2013. Environmental monitoring will be carried out in cooperation with the provincial government of Gotland, which is the supervisory authority.

#### **TWO REQUESTS FOR CLARIFICATION AND REPORTS OF OFFENCE**

In 2012, Nordkalk received two requests for clarification relating to measures in Bunge. The first one concerned tracks made by forest harvesters in the marshy soil. Demands were made for a separate control program for the marshland areas for the work stages preceding the active quarrying. The case has now been closed, and an environmental control program has been introduced.

The other case concerns the suspension of preparatory work for the opening of the quarry. The reason announced for the suspension is the need to establish whether nitrogen emissions from forest harvesting are in compliance with the limit values set in the permit decision. Nordkalk has appealed the case to the Land and Environment Court of Sweden.

In addition, two reports of offence relating to the forest harvesting work were made against Nordkalk. One concerned damage caused by forest harvesters to the terrain, and the other the allegation that the forest area cleared was more extensive than permitted. Both reports of offence were rejected on the basis of preliminary examinations.

#### **WATER**

Good water quality and sufficient water flows are important factors for the wells and animal water supplies in the area and the nearby Bästetråsk lake, which will be used as a municipal water source. For several years, extensive research has been carried out to study water issues in the area, including geological surveys, geophysical measurements, drilling, test pumping and groundwater level and chemistry monitoring, both within and outside the planned quarry area.

It has been estimated that the potential impact area with respect to the groundwater resources closest to the surface, i.e. groundwater utilized by wildlife, extends to a distance of 300 meters from the edge of the quarry. There are no private wells within this area.

According to long-term water monitoring, considerable annual and seasonal variation occurs in surface water flows. Based on the monitoring results, calculations have been made of how much water can be returned from the quarry to the environment in such a way that the amount corresponds to the natural water flows and levels. Using protective ditches with filter dams, water will be directed around the quarry to ensure that the natural flow of surface waters is maintained. All water accumulated in the quarry will be treated, and its quality will be checked before it is returned to the environment through natural channels.

The permit for Nordkalk's new quarry covers the extraction of limestone from the ground surface to a level that is + 1 meter above the present level of the Baltic Sea.

#### **NATURAL VALUES**

Bunge, where the new quarry will be opened, is located between two nature conservation areas included in the Natura 2000 network. Impacts on nature will be monitored in an area extending 300 meters outside the full-scale quarry. This is the same area as the impact area estimated for groundwater. Annual measurements will be carried out at several points to monitor any changes in the vegetation of the marshland areas over the years. The vegetation of the area was surveyed in 2006, and its natural values were assessed. It is inevitable that the plants living in the area of the future quarry will disappear. However, all of these plant species are also found in the area surrounding the quarry. This means that all the species will survive in the area during and after the quarrying phase.

#### **RESIDENTIAL ENVIRONMENT**

The area around the future quarry is sparsely populated. The nearest permanent dwellings are located some 500 meters south-east of the quarry, and there are a few houses along the future conveyor belt. At the initial stage of operations, the distance between the focus of quarrying and the nearest house will be more than a kilometer. Potential causes of inconvenience are noise, vibration, blast waves and dust. In addition, there will be light vehicle traffic on the service road daily and heavy vehicle traffic monthly. The conditions set in the permit define limit values for noise and vibration levels at the nearest houses. All buildings in the vicinity will be inspected before the operations are started, and a risk assessment relating to vibration will be carried out.

#### **OPERATIONS MUST BE SUSTAINABLE**

Nordkalk is continuously working to minimize the environmental impact of its operations and to increase sustainability. Development work is also carried out in cooperation with contractors. For example, materials will be used even more efficiently in Bunge. New crushing and sorting plants will be constructed for stone processing. These will enable higher utilization of the fines produced in connection with the extraction. This will considerably improve the utilization rate of materials and resources.

When extraction is started in the Bunge quarry, Nordkalk will set up a fund to support regional development in Northern Gotland. The fund will accrue from each limestone tonne quarried, and the funds will primarily be used to promote employment in Northern Gotland, but possibly also to support training and environmental protection.

# EFFICIENCY REQUIRES CONTINUOUS IMPROVEMENT

The Ihalainen deposit in Lappeenranta, Finland is able to produce limestone for at least the next hundred years.



## GOAL OF 100 PER CENT MATERIAL EFFICIENCY

Nordkalk seeks to use its raw material as efficiently as possible, including by-products. These include surplus stone extracted in addition to the proper useful stone, sand produced in the flotation process, and filter dust, which builds up in all lime kilns and at grinding plants.

Surplus stone is created in the Finnish quarries, in particular, where stone with a carbonate content that is too low for customers' processes must be extracted in addition to useful limestone. Surplus stone is mainly used for infrastructure construction. For example, in Lappeenranta approximately one third of all of the quarried stone is surplus stone, and the current disposal area for surplus stone must be expanded. Disposal areas are needed as there are not enough practical applications for surplus stone at

the moment. New applications are being developed actively to minimize the need for disposal. The use of surplus stone should be promoted by ensuring that existing stone material is used before extracting in untouched areas is started.

The environmental impact assessment (EIA) required by the expansion of the disposal area in Lappeenranta was started in summer 2012 before the applications for an environmental permit and a permit for mining activities required for the project were made. In November, a public event included in the EIA procedure was organized, and the company received many good suggestions for the utilization of surplus materials. The EIA will be completed in fall 2013.

**Nordkalk has production plants at 27 locations in Finland, Sweden, Norway, Poland, Estonia and Russia. Some of our production plants are located in the middle of population settlements, which means that our operations affect the local people's residential environment. Nordkalk's production processes cause dust, noise and vibration, and most of our environmental work focuses on minimizing these inconveniences.**

**PART OF THE COMMUNITY**

At locations where the mine or quarry is an integral part of the community, mining activities are usually generally accepted. Formerly, companies in old industrial areas were responsible for many of the functions that today belong to the public sector. Limestone must be extracted in areas where it can be found, and in many cases communities have been established around mines or quarries. Limestone is usually extracted in open quarries, and thus the operations are also a visible part of the landscape.

As a residential environment, quarry districts today are very different from what they were decades ago. Nordkalk seeks to make its operations as unobtrusive as possible. Industrial operations and the preservation of environmental and natural values must be reconciled. One example of this is the protection of rare plant species in the vicinity of quarries.

**LESS EMISSIONS THROUGH ENVIRONMENTAL OBJECTIVES**

Nordkalk's operations are regulated not only by legislation and the limit values defined by authorities in the permits but also by the environmental objectives set by the company itself, which are part of Nordkalk's continuous improvement process. Environmental aspects are taken into consideration in all new investments and in the planning of the methods and routines used at the plants.

The extraction and processing of limestone causes dust that can be controlled effectively. The emissions to air by the grinding plants and lime kilns are purified using filters, and production and storage areas are asphalted. Roads and stored stone material are watered during dry periods. Washing facilities for truck tires and chassis are used, and enclosed conveyor belts are introduced to prevent dust dispersion.

Sound insulation is improved by constructing noise barriers, planting trees and using various noise damping materials at crushing plants, conveyor belts and loading places. At some locations, there are restrictions on night-time operations to avoid disturbance to neighbors.

The environmental impact of Nordkalk's operations is monitored on a regular basis, but the monitoring activities vary considerably between plants, depending on their operations, size and location. The measurements are carried out by Nordkalk or a specialist service provider, and the results are reported to the authorities.

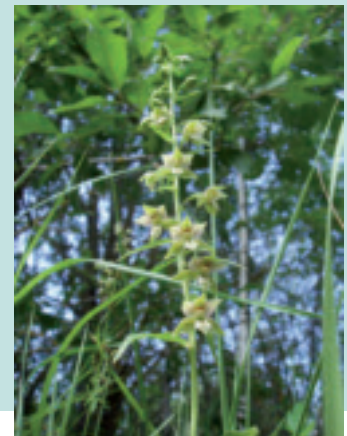
**A NEW HOME FOR RARE FLOWERS**

Several rare plants and other rare organisms thrive in lime-rich soil, and biodiversity is typically high in such areas. In Nordkalk's Vimpeli quarry, new locations have been sought for rare flowers. In 2013, large soil masses will be moved from areas where flowers such as field gentian (*Gentianella campestris*) and broad-leaved helleborine (*Epipactis helleborine*; in the photo) are found. Both species are calcicoles, i.e. they thrive in lime-rich soils.

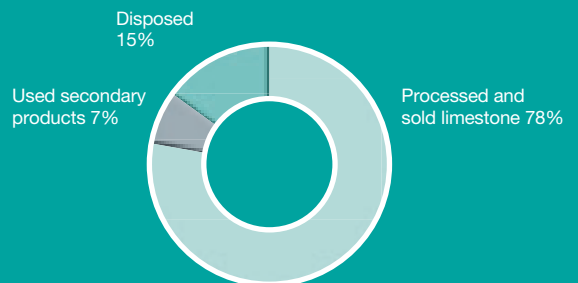
In June 2012, some field gentians were moved in cooperation with the environmental authorities, and in the fall some broad-leaved helleborines were transplanted. The new locations needed to have conditions similar to those of the quarry, and much preparatory work was required before the plants could be moved.

First, limestone gravel was transferred to the future location of the plants. Then a pit of 1 x 1 x 0.8 meters was dug in the gravel using an excavator. The plants were dug up, taking as much soil as possible with the plants, and placed in the pit.

Some of the field gentians moved in June have started to prosper in their new location. How have the plants transplanted in the fall fared? That remains to be seen in summer 2013.



**MATERIAL EFFICIENCY IN NORDKALK GROUP**  
(Utilization of stone-based material in 2012)



The material efficiency, calculated of the total extracted stone tonnage, was almost on the same level as a year ago when the share of sold and processed limestone was 79% and 14% was deposited.

# INCREASING USE OF RENEWABLE ENERGY

**Traditionally, coal, oil and natural gas have been used as energy sources for lime burning. Electricity is used for crushing and grinding, fuel oil and liquid petroleum gas for the drying process. However, Nordkalk is intensively seeking alternative fuels and is investing in new, environmentally friendly technologies and the development of energy efficient processes on a continuous basis. Nordkalk already uses various types of energy in the manufacturing of its products, and energy efficiency is also an important aspect when planning new investments.**

## IMPROVED EFFICIENCY THROUGH COOPERATION

In Finland, Nordkalk has signed the energy efficiency agreement for industries, which aims to introduce new energy efficient technology and increase the use of renewable energy sources. In 2012, Nordkalk also joined a two-year project concerning the utilization of industrial waste heat. The results of the project coordinated by Motiva Ltd will be published in 2014. The aim is to collect information on the possibilities available for industrial waste heat utilization and to find ways to utilize waste heat from processes in industry and energy production. Nordkalk's processes also generate waste heat, which is already being utilized in many locations, for example in communities' district heating networks. Nordkalk decided to join the Motiva project to find ways to increase the utilization rate of waste heat.

In Sweden, Nordkalk signed an agreement with the town of Köping on the delivery of waste heat from the lime burning process to the district heating network. At the initial stage, the amount of heat delivered by Nordkalk will be 12 MW, but the equipment is

dimensioned for 15 MW, which enables additional deliveries in the future. The project was launched in June 2012. The plant will be connected to the district heating network, and deliveries will start in December 2013.

In addition, Nordkalk's unit in Köping has sought to increase the use of alternative fuels since 2005. The plant has invested in new technology and set new targets for fuel consumption. The proportion of alternative fuels of the total energy consumption is increasing, accounting for 18% at present. Utilizing recycled fuels reduces the use of non-renewable resources, and the use of biofuels helps to reduce carbon dioxide emissions from fossil fuels used in production processes.

In Finland, a development project for implementing biofuels in lime burning is underway. The project was launched in 2010 and will continue until the end of 2013. For the grinding plant in Vampula, 2012 was the first full year it used biogas. The biogas is produced by Vambio Oy, a nearby biogas producer. Thanks to the use of biogas, fuel oil consumption in Vampula has decreased by 80%.

In Sweden, Nordkalk is participating in a joint research project carried out by universities and industry focusing on biomass gasification. Another participant in the project is Cortus Energy AB, a Swedish company planning to build a gasification plant in Köping.

## EMISSIONS TRADING PRESENTS CHALLENGES TO THE INDUSTRY

In 2010, the EU approved new legislation on emissions trading for 2013–2020. The lime industry is granted free emission allowances in accordance with the agreed calculations and a benchmark value of 0.954 emission allowances per produced tonne of quicklime. It is important for the lime industry that interest groups and decision-makers are aware of the impact of the emission allowances on the lime business.



## MODERNIZATION OF THE LIME PLANT IN RAKKE REDUCED ENERGY CONSUMPTION

In August 2012, Nordkalk's lime plant in Rakke in Estonia celebrated the completion of its modernization project. This modernization became necessary as the demand for lime increased in the Baltic states. As increasing the plant's production required new technology, the project was launched in 2010. The sizeable investment included the modernization of two lime kilns constructed in the 1980s, a crushing line and a new filler line. Considerable modifications were made to the lime kilns: almost all of their technical solutions were replaced, and not much more than the frames and buildings housing them were preserved.

Thanks to the modernization, the annual lime production capacity in Rakke increased from 40,000 tonnes to 100,000 tonnes, and its current filler production capacity is 150,000 tonnes (previously 100,000 tonnes). Although the production capacity has grown, the plant has also become considerably more energy-efficient. Its energy consumption per lime tonne produced has decreased by more than 20%, and it is now an efficient production plant with reduced environmental impact. In addition, new dust filters reduced dusting significantly, which has also increased attractiveness of the surrounding residential area.

# INDUSTRIAL EMISSIONS DIRECTIVE AIMS AT REDUCED EMISSIONS

The EU's Industrial Emissions Directive (IED) entered into force on 6 January 2011, overriding 7 existing pieces of legislation regulating industrial activities. The essential change caused by this directive is the definition of the regulation about Best Available Techniques (BAT). The aim is the reduction of harmful industrial emissions, and improved energy and raw material efficiency.

The IED covers industrial activities with major polluting potential. The permit conditions, including emission limit values, are based on the Best Available Techniques, which have been accepted by, e.g., cement and lime industries. In addition to tighter emission values, the demands for supervision, monitoring and reporting will be unified. In some of Nordkalk's locations, the emission limits will require the modernization of filters and filter plants.

Implementation of the IED into national legislation has been completed e.g. in Estonia, where it was accepted almost as is. In Finland, the directive was included in the reform of the environmental protection law and it will enter into force in January 2014.

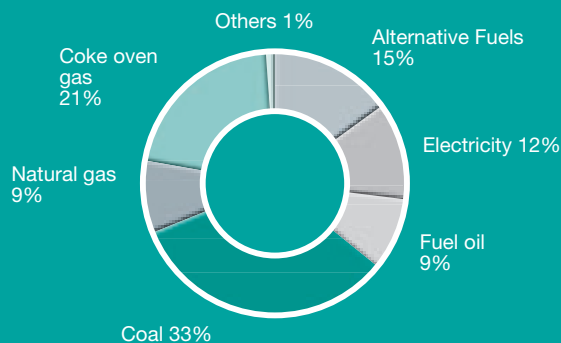
## REACH REGISTRATIONS

The European chemicals legislation (REACH and CLP) requires that companies submit to the European Chemicals Agency various key information on the substances that they manufacture, import or use. This includes information on the hazard properties of the substance, on the classification and labelling and the assessment of the potential risk presented by substances.

Nordkalk has submitted information to the European Chemicals Agency and registered quick and slaked lime and precipitated calcium carbonate. Some of Nordkalk's new substances are pre-registered and will be registered before 2018.

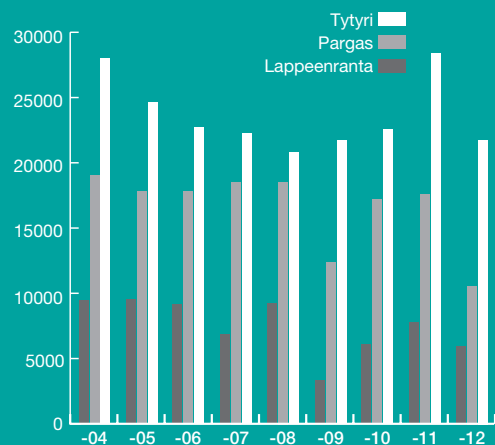
Updated Safety Data Sheets are available at [www.nordkalk.com](http://www.nordkalk.com)

SOURCES OF ENERGY  
IN NORDKALK GROUP 2012



Recycled oil, plastics and bio fuels are alternative fuels. In 2012 the share of these fuels was 1% less than the previous year due to the fact that several of the lime kilns running on recycled oil had production stops during the year.

WASTE HEAT OF LIME KILNS  
USED IN DISTRICT HEATING NETWORKS (MWh)



Waste heat from lime kilns is used for district heating in Lappeenranta, Lohja and Pargas. In 2012 the production of lime kilns decreased and thereby also the amount of delivered district heat was smaller.

# GOALS OF ENVIRONMENTAL WORK

In environmental work, new goals for improvement are continuously being set, and their fulfillment is followed up on. This is done within the framework of the management system maintained in co-operation with the line organizations. The practical work to decrease the environmental impacts is implemented at the production plants.

**FOR RAW MATERIAL** the goal is to increase the utilization level of quarried stone to 90% in 2013 and to 95% by 2016, and develop new fields of application for by-products.

In 2012, 15% of stone-based material was deposited. However, for example in Sweden at the locations in Ignaberga, Orsa and Uddagården, and at Kurevere in Estonia, material efficiency was 100%. In Miedzianka, Poland, the utilization rate of quarried stone was 94.1%. In Vimpeli the rate was 96.2%. The utilization of by-products increased for example in Pargas, where the sale of surplus stone increased by over 50%.

**REGARDING ENERGY** the goal is to reduce consumption by 5% by 2016 compared to 2008, and to reduce the use of fossil fuels in lime production: 2-5% during the years 2009-2013.

In 2012 the most significant improvement was the energy saving caused by the Rakke plant's modernization in Estonia. In Tytyri,

for example, energy efficiency was improved in the drainage of water by replacing equipment. In Lappeenranta idle running of quarry machinery decreased by 30%.

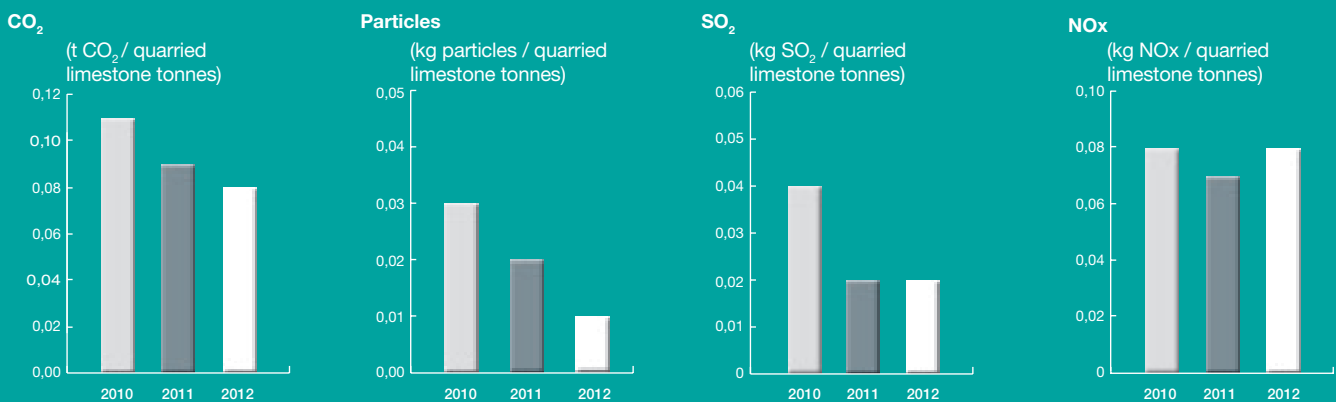
**REGARDING VIBRATIONS, NOISE AND DUST** caused by production, the general goal is to reduce them.

In 2012, filters and parts of them were replaced and improved at several locations. The loading place for lorries was renewed in Ignaberga, Sweden, and it fulfils now requirements of dust-free loading.

**REGARDING AFTER-CARE** all of Nordkalk's quarries have an after-care plan. Operations are integrated in the society.

In 2012, parts of the quarry were landscaped in Ignaberga, Sweden. In Estonia, several universities are involved in quarry reclaiming and landscaping projects.

## EMISSIONS IN AIR, NORDKALK GROUP



Nordkalk's production processes form particles or dust, and flue gases from the process contain oxides of nitrogen (NO<sub>x</sub>), carbon dioxide (CO<sub>2</sub>) and varying amounts of sulphur dioxide (SO<sub>2</sub>). The figures are based on measurements and calculations for Nordkalk's plants in the whole Group. The particle emissions

decreased in 2012 due mainly to made improvements in Vimpeli, Siikainen and Rakke in Estonia, where the emissions have decreased to about a third.



# ENVIRONMENTAL ACHIEVEMENT OF THE YEAR

**Nordkalk's internal award for an important environmental achievement was granted in 2012 to its subsidiary company Suomen Karbonaatti Oy (SKOY). Thanks to its goal-oriented and long-term work, SKOY has managed to reduce considerably the use of water and raw material waste.**

SKOY produces calcium carbonate-based coating pigments and fillers for the Finnish paper industry. The production process needs a lot of water, some of which was used earlier as seal water in pumps. Thus the amount of water used by the plant was clearly bigger than the amount needed in the production process.

A couple of years ago SKOY's production team decided to try a technical alternative, which allowed the seals' water circulation in the pumps to be closed. Now this thermosiphon solution has been built into almost every pump. In the solution, the seal water circulates in its closed circuit through a small water tank. There are over 100 pumps in the factory, so the consumption of seal water has decreased considerably. In 2005, 280.000 m<sup>3</sup> water was used – now the number is 130.000 m<sup>3</sup>.

Earlier the seal water from the pumps was used in the process as best one could. Most of it was excess and was pumped out from the factory into a settling pool and further into a ditch underneath.

Another main goal was to reduce the loss of the raw material calcite. This has happened mainly by separation of clear and solids bearing waters already where they originate. The solids bearing waters is recycled back into the process and only the clean excess water is pumped into the ditch when not needed in the production process.

The waste calcite i.e. the amount of calcite in the excess water from the factory was 0.02% in 2012. In 2010, the percentage was 0.41. The improvement is significant also economically.



The SKOY team involved in the project: Vesa Pekki (left), Petri Hahl, Tommi Penttilä, Juha Hiiva, Pekka Särmölä and Ilari Hallaluoto. Tero Kosunen, who is missing from the photo, also had an important role.

Nordkalk complies with the international standards for quality, environment and occupational health and safety.



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Nordkalk is the leading producer of high quality limestone-based products in Northern Europe. The products are used mainly in the paper, steel and building materials industries as well as in environmental care and agriculture. Nordkalk employs some 1,100 people at more than 30 locations e.g. in Finland, Sweden, Norway, Poland, Estonia and Russia. Nordkalk is a member of the Rettig Group.

-  Grinding
-  Sales/office
-  Quarry
-  Kiln
-  Own harbour/depot



**NOT JUST LIME, BUT  
RESPONSIBILITY FOR  
A SUSTAINABLE  
TOMORROW**

**Nordkalk and the Environment  
Report 2012**



*- member of the Rettig Group -*