Nordkalk

# Environmental Report 2007


# Nordkalk Is Number One in Northern Europe

Nordkalk is the leading manufacturer of high quality limestone-based products in Northern Europe. Nordkalk operates at over 30 different locations in 8 countries. The deposits and production plants are concentrated around the Baltic Sea and a great deal of both limestone and finished products are transported to the customers by sea. The company's roots lie in Pargas, Finland where limestone has been extracted continuously for more than a hundred years.

Nordkalk extracts limestone at 20 locations from its own deposits and processes it into crushed and ground limestone, concentrated calcite, and quick and slaked lime. Nordkalk's range of products also includes dolomite and wollastonite. Nordkalk extracts and processes all limestone qualities based on the customers' needs and the products are tailored to the customers' processes.

Lime is a familiar concept to most people. The word lime, however, refers to very different lime products with diverse qualities and purposes of use. Few people know, however, that limestone plays an important and often irreplaceable role in the manufacture of so many different products. Each one of us uses daily such necessities – everything from sugar to paper.

## A Wide Customer Base Gives Shield against Changes in Trade Cycles

Nordkalk products are used in the paper, steel and building materials industries and also in environmental care and agriculture. Nordkalk's largest group of customers is industry, which accounts for 86 per cent of Nordkalk's sales. The paper making industry uses crushed limestone and quicklime for filling and coating purposes. The manufacture of steel calls for lime to remove impurities at different stages of the production process. In the sugar industry lime also has a purifying function.

Building materials form one of the oldest uses for limestone products, and the building materials industry is today Nordkalk's next largest customer segment after the paper industry. Lime is also used in the manufacture of glass and paints. Dolomite is an important raw material for making fertilisers and wollastonite is used to manufacture plastics and ceramics.

In road and ground engineering lime is used to for stabilising the soil. The asphalt used for surfacing roads also contains limestone powder.

Lime appears in all facets of our everyday lives; perhaps most obviously in the countryside, where agricultural liming reduces the acidity of the fields. Lime is also used to neutralise the acidity of watercourses and forests. Limestone-based products clean the flue gases from coal-fired power stations and they are also used to regulate the acidity of our drinking water and clean our waste water.

## Year 2007 Was a Good Year for Nordkalk

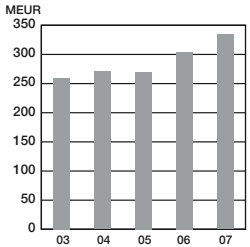
The positive development continued during 2007. The consolidated net sales increased by 10 per cent to EUR 334.4 million and the profit before extraordinary items increased from EUR 24.5 million to EUR 32.7 million. The result for the fourth quarter was slightly poorer compared to the previous year because it was burdened by high energy and freight costs that could not be transferred to prices. Also the restructuring of the company's operations in Sweden affected the result.

The industry continued to experience an economic boom which reflects on the demand for limestone-based products in the company's main three customer segments, namely the paper, steel and construction materials industries. The improved profitability can also be attributed to cost-efficiency and high utilisation of capacity.

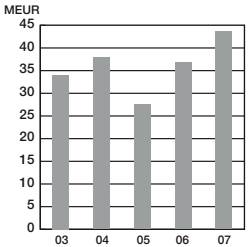
The positive development in Poland and in the Baltic countries continued as well as the modernizing of the lime plant in Russia. The start up of the new kiln in Verdal, Norway took place at the end of the year, which will strengthen Nordkalk's capacity of quicklime production. The lime kiln built by the Norwegian company NorFraKalk AS and owned in equal shares by Nordkalk Corporation and Franzefoss Minerals AS was commissioned in December of 2007. The new kiln has an annual capacity of 200 000 tons of quicklime.

The total number of employees at the end of the year was 1339. In Finland the two-year training programme for foremen continued during 2007. A training programme called Nordkalk Future was also started. The program is aimed at young key employees in all countries where Nordkalk operates.

# Our Aim Is Sustainable Development

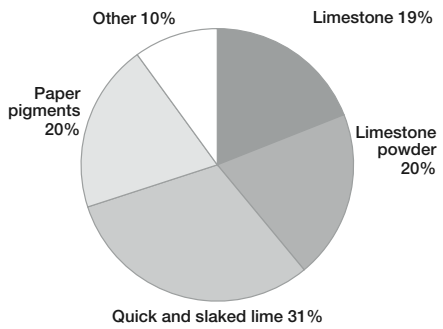


Net sales

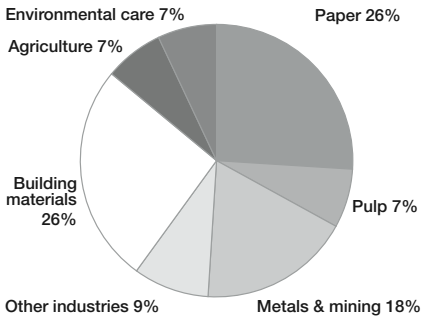


Operating profit

**Products**
(as a percentage of total sales)




**Sales by customer segment**
(as a percentage of total sales)




In 1995 Nordkalk set up an environmental and quality department. The department's task is to maintain an environmental management system for Nordkalk in collaboration with Nordkalk's line organisations. The environmental management system supports Nordkalk's endeavours to achieve sustainable development, which means taking the environmental impact of its operations into account when drawing up the goals for its activities. Environmental plans form an important part of the annual strategic planning process, and Nordkalk's operations are subject to regular monitoring. Responsibility for matters concerning production lies with the divisional managers. The environmental effects of Nordkalk's operations are monitored and evaluated on a continuous basis in accordance with the Nordkalk Group's operating policy.

Nordkalk develops its products and production methods so as to minimise the effects of extraction and processing on the environment. Careful and diverse monitoring leads to increased awareness of environmental issues. It also makes it possible to continuously improve Nordkalk's operations as dictated by Nordkalk's operating policy. This constitutes an inseparable part of managing its environmental efforts. This policy covers both the earlier policy for quality and the environment and the basic principles of occupational safety. All Nordkalk's production plants in Finland (2000) and its entire operations in Sweden (2001) and Poland (2006) have been awarded ISO 14001 environmental certificates.

An ongoing project in Nordkalk includes creating a new management system which covers the whole corporation. The aim is to unite the whole spectrum of the current subsystems in Nordkalk into one management system, which includes systems of quality management and environmental management, grounds for occupational health and industrial safety systems and all the other guidelines and routines concerning the whole consolidated corporation. Nordkalk's purpose is to acquire a so called multi-site certificate for the management system by the end of the year 2008.

This environmental report covers the effects of our operations on the environment and our actions, either planned or accomplished, to reduce environmental load in all of our operating countries. The Nordkalk intranet has separate environment-related pages with information concerning the environment. The purpose of these pages is to enhance environmental awareness and responsibility of the staff and to act as an inspiration to as many as possible in order to get them involved in environmental work. In addition, the company has an internal network of environmental coordinators in which all of the operating countries of Nordkalk have representation. The network aims at heightening communication and the exchange of information in relation to environmental work in the organization.

The level of environmental protection in Nordkalk is good, and our goal is to continuously improve it. Our operations comply with the current regulations and provisions of law and guidelines from the authorities. Furthermore, we are prepared to meet the new, tightened requirements of the future.

The new European Union Regulation on chemicals, REACH, has entered into force on 1 June 2007. It aims to enhance the protection of human health and the environment and to maintain the competitiveness of the EU chemicals industry. It is not yet completely clear how REACH affects the limestone industry. The requirements of REACH do not concern limestone unless it is chemically altered. Quicklime, on the contrary, is chemically altered stone and, according to our current knowledge, it must be registered.

Measures are taken to protect the environment during production and Nordkalk also offers advice on environmental liming matters to its customers. When drawing up contracts with entrepreneurs and sub-contractors Nordkalk requires an assurance that the requirements of its operating policy will also be met. The sub-contractors are checked regularly in this connection by means of environmental audits.

Nordkalk operates all over the Baltic Sea; thus it aspires actively to reduce its emissions both into air and water. In addition, Nordkalk takes part in several research and development projects which aim to enhance the condition of the environment. Together with several research institutes, Nordkalk investigates the utilization and disposal of carbon dioxide.

Nordkalk has an active role in a research project aspiring to reduce the use of fossil fuels, which began in the spring 2007. The focus of the study lies in advanced combustion techniques, such as in oxy-fuel combustion and in finding optimal lime burning techniques in connection with different raw materials. The study raises awareness on increasing energy and material efficiencies which, on their part, diminish environmental impacts. In addition, the study covers techniques of separating carbon dioxide which are applicable to lime burning. The research is conducted in cooperation with the other

Nordic Countries and it is administered by the Swedish Mineral Processing Research Association (Föreningen Mineralteknisk Forskning). The study has been financed by the Swedish Energy Agency (Energimyndigheten i Sverige).

The quality of the Alinen watercourse in Nokia, Finland, is improved by liming. Nordkalk also participates in the Pro Saaristomeri (Pro Archipelago Sea) project. This was started in 1999 by the Southwest Finland Environmental Centre, the Regional Council for Southwest Finland and the SW Finland Employment and Economic centre; its aim is to improve the quality of the archipelago seawater. The company is supporting Operation Mermaid – WWF's campaign to save the Baltic Sea. Nordkalk also participates in different waste-water projects to improve the purification of waste water in sparsely inhabited areas. To this end Nordkalk has evolved new products that bind phosphorus and nitrogen. At Louhi, for example, Nordkalk cooperates with the South Savo Environmental Centre, the town of Savonlinna and nearby local authorities in a project designed to maintain the right oxygen balance in the upper course of Enovesi, which forms part of the Saimaa Lake system.

*The old lime kiln in Bunge was put in use in 1849.*

## Nordkalk Applying for Environmental Permit for New Quarry on Gotland

In order to secure access to raw material, Nordkalk has applied for an environmental permit to extract limestone during the period 2010-2035 at Bunge in the north of the island of Gotland, Sweden. Bunge is admirably located in relation to the current infrastructure; it is situated about nine kilometers from Storugns, where the stone is sorted and processed before the sea transport to the customer. One of the principal advantages of the Bunge quarry is that it lies farther from residential areas than the present quarry in Klinthagen.

In order to be able to begin extraction at Bunge and to know what impact it will have on the environment Nordkalk has worked with two parallel environmental studies. One addresses the question of the environmental consequences of test mining and the other extraction on a large scale.

Experimental quarrying began in the autumn of 2006 and was concluded in February 2007. Limestone from Bunge has been burned and tested in the processes of the customers and the results have been promising. Licence application for the actual quarrying and a report on its environmental impacts were submitted to the environmental authorities in May 2006. The application will be dealt with in the second quarter of the year 2008 at the earliest.

Opening a new quarry is a complicated process pursuant to the current legislation. It is important to keep the environmental aspects and industrial interests in balance. Nordkalk has plenty of experience in limestone industry in different countries. On grounds of this experience the company has conducted and completed, together with consultants and authorities, extensive studies on the environmental impacts of quarrying. The ongoing hydrogeological and ecological studies create the basis for a follow-up programme for the forthcoming activities at Bunge. In conclusion, actions will be taken to prevent the effects of quarrying on the hydrology. The quality of the leachates will be checked before releasing them into the environment and the surface water will be conveyed away from the quarrying area.

## The Nordkalk Corporation's Operating Policy

Nordkalk extracts, processes and delivers limestone and offers services related to these operations.

### Guidelines for Operations

We comply with environmental legislation and regulations.
Our values - Trust, Competence and Quality - guide our operations.
We deliver the right product, quality and service at the agreed time.
We strive to minimise the environmental impact of our operations.
The working environment shall be good.

### Continuous Improvement

Our aim is to continuously improve our products and services while taking into consideration economic aspects and the environmental impact of our operations.

We maintain active communication with our customers and we improve our performance by following up any shortcomings.

As part of our strategic and annual planning we make plans for improvement that cover quality, the working environment and environmental aspects together with goals and measures and the investments related to these. When an investment is evaluated in Nordkalk, an assessment of its impact on the working environment and the environment must be carried out.

We regularly monitor our targets for quality, working environment and environmental impact.

### Responsibility

All persons in supervisory position are required to ensure that the personnel understand their role and have the authority and competence needed for their work. We all bear a duty to point out defects and errors. Nordkalk's president has overall responsibility for ensuring that the operating policy is followed.

### Communication

This policy is reviewed regularly and updated when necessary. It is distributed to the personnel and is also available to Nordkalk's stakeholders.

# Environmental Impacts

Nordkalk extracts and refines limestone in Finland, Sweden, Estonia, Poland and Russia. Some of Nordkalk's production plants are situated in towns and built-up areas, which means that the surroundings place great demands on operations. The most disturbing aspects of Nordkalk's operations are noise, vibration and dust. In addition, there is the question of how to dispose of surplus stone and other by-products from the production processes.

Nordkalk uses hydroelectric power at all of its plants, except in Lappeenranta. However, also the electricity used at the Lappeenranta plant has been produced without any emissions of carbon dioxide.

## Production Processes

Limestone is extracted from the bedrock in either quarries or underground mines. The stone is then transported for rough handling and sorting, after which it goes on to be processed further elsewhere. These operations cause vibration, noise and dust. Quarrying results in very obvious changes in the landscape. Nordkalk's extraction processes result not only in the limestone that is actually used by Nordkalk, but also considerable amounts of surplus stone. To some extent this can be crushed and used for macadam. Ground water seeps by way of fissures in the bedrock into the mines, and surface water collects in the quarries. This may affect the level of the ground water in the area.

Carbonate or limestone products, i.e. calcium carbonate ($CaCO_3$), consist of crushed, ground or sieved limestone. The grinding of the limestone is a dry process so that dust formation poses a major environmental problem in plants where this is done. The dust emissions can be effectively controlled, however, by passing them through filters.

Carbonate products are used for soil improvement, to clean flue gases in coal-fired generating plants and to reduce acidity in water courses, for example. They are also used in different building materials, in animal feed and as a filler in paper and asphalt.

Nordkalk produces calcite and wollastonite from the limestone extracted from the quarry in Lappeenranta. Nordkalk's subsidiary, Suomen Karbonaatti Oy, then further processes the calcite to make paper pigments. The flotation process is a largely closed system. If necessary, water can be siphoned from the basins under controlled conditions into a nearby small river, into which flows water from the local water treatment plant, too.

Quicklime is produced by heating crushed and sorted limestone to a temperature of some 1100°C in either a rotary or shaft kiln. Coal, oil or gas may be used to fuel the process. Quicklime (CaO) is grainy or floury in appearance. It is sifted into different fractions or ground to a fine flour. Flue gases from the process contain oxides of nitrogen ($NO_x$), carbon dioxide ($CO_2$) and varying amounts of sulphur dioxide ($SO_2$). The manufacturing process also releases dust into the air and, in order to reduce this, the emissions are passed through a highly effective electric or textile filter.

The products are used in the manufacture of iron and steel, for processing sulphite ores, for making pulp and paper pigments, for stabilising the soil and for cleaning water. Coal-fired power plants and refuse incinerators use slaked lime that they process themselves from quicklime to clean flue gases.

Slaked lime is made by adding water to quicklime. The calcium dioxide reacts with the water to produce calcium hydroxide ($Ca(OH)_2$), slaked lime, which is a dry, powder-like flour, light in colour. The process of slaking lime releases heat and steam. Efficient dust removal, however, means that the quantity of particles discharged into the atmosphere is minor. Slaked lime is used by local authorities and industry in water purification plants, for cleaning flue gases and by the building materials industry.

## Energy Consumption

The process of crushing, grinding and sifting carbonate products consumes electricity. Moreover, liquid gas or fuel oil is used for drying carbonate products. The specific consumption of energy in 2007 was 0.24 GJ (0.24 in year 2006) per tonne of produced carbonate product. Energy analyses have identified potential ways of saving energy in the manufacture of carbonate products.

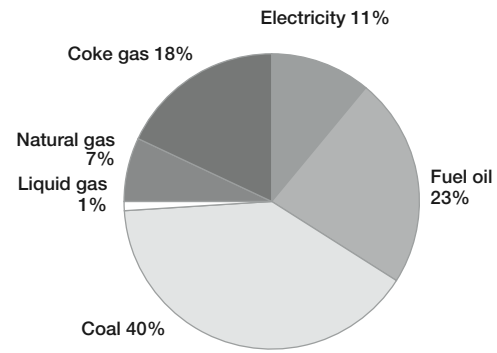
The process of burning lime requires high temperatures. Calcination of the limestone takes place in lime kilns at a temperature of about 1100°C. The heat is derived from coal, fuel oil, coke or natural gas. Coke gas is a by-product in the steel-making industry and can be used as a fuel in the lime kilns if they are situated in the immediate vicinity of a steel mill. Using other fuels to replace coal and oil in the lime industry poses a problem. The impurities in the fuels permeate the lime products, the purity demands for which are extremely strict. Moreover, the thermal values for most renewable fuels are in general low so that the quantities of fuel required increase and necessitate major changes in the processes. In 2007 the specific energy used in the production of quicklime was 5.3 GJ (5.3 in 2006) per tonne of lime.

Nordkalk's emissions of carbon dioxide emanate from its consumption of energy but carbon dioxide is also released into the atmosphere during the actual process of making quicklime. Carbon dioxide is released from calcium carbonate under the influence of heat and the final product is calcium oxide, quicklime. Theoretical calculations indicate that about a third of the carbon dioxide produced by Nordkalk comes from the fuel used and the rest from the raw material. Quicklime is an irreplaceable raw material for both environmental and industrial purposes. In some of the processes employed by Nordkalk's customers, such as the manufacture of PCC used for paper pigments, for example, the carbon dioxide released when the lime is burnt is reintroduced into the product when recarbonisation occurs.

## Energy Saving Agreement

Nordkalk has continued the Energy Saving Agreement, concluded in Finland in 2000, until the year 2008; in addition, it will continue the new Energy Efficiency Agreement during the years 2008-2016. The aim is to reduce energy consump-

**Sources of energy used within the Nordkalk Group**



tion in all localities of Nordkalk. For example heating techniques, the usage of waste heat and the possibilities of replacing coal with alternative fuels are under discussion in the current agreement period.

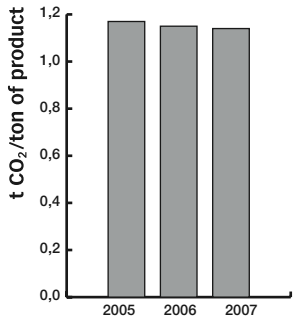
## Emissions Trading in 2007

The emissions trading from 2005-2007 has been concluded and the new, ongoing period continues from 2008 until 2012. The planned production of Louhi and Tytyri kilns in Finland was lower than anticipated because of a decrease in deliveries to customers in the forest industry and in deliveries to the paper industry for the production of PCC products. In Sweden, especially the Luleå lime kiln suffered from technical difficulties which caused the production of quicklime to decrease. The deviations in production resulted in a surplus of emissions rights and Nordkalk was able to sell emission rights for one million euros.

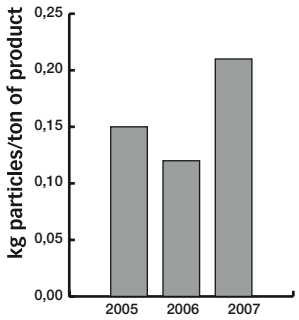
Nordkalk has applied for emissions rights for its lime kilns in Finland, Sweden and Estonia for 2008-2012. In Norway the statutory amendments on emission rights have a negative effect on the profitability of the new lime kiln, which was commissioned in December 2007. Nordkalk has appealed the decision to the EFTA Surveillance Authority and a ruling is expected during the first half of the year 2008. The production in Norway will be reduced into a minimum during 2008 if all emissions rights have to be purchased.

## Specific emissions in air

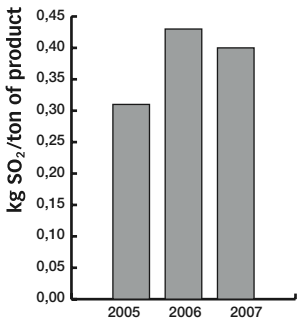
### Quicklime



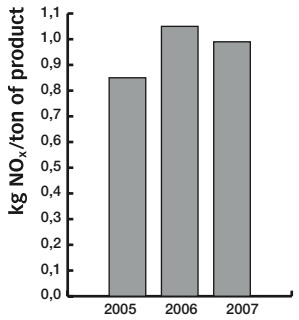

$CO_2$ specific emissions




emission of particles

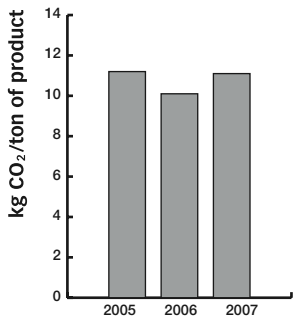



$SO_2$ specific emissions

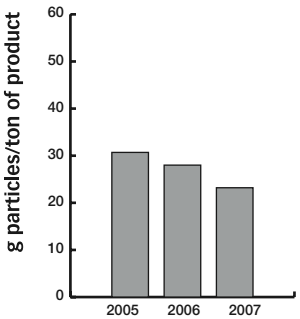



$NO_x$ specific emissions

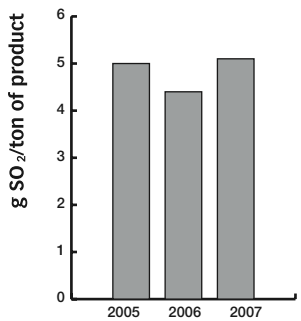
### Carbonate products



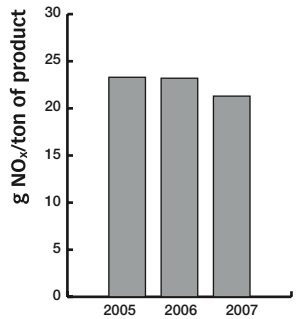

$CO_2$ specific emissions




emission of particles




$SO_2$ specific emissions




$NO_x$ specific emissions

*The figures are based on measurements and calculations for Nordkalk´s plants in Finland and Sweden. The increase of particle emissions from lime kilns is a consequence of filter problems which have been acted on and the work continues in 2008. The increase of emissions concerning carbonate products results from changes of the product mix, the manufacture of which requires more energy than before.*

# Environmental Products

Nordkalk products are also used in environmental care. Different kinds of limestone-based materials can be used to prevent and remedy environmental problems. Sales of products for the environmental care accounted for seven per cent of Nordkalk's total sales in 2007. The delivery volumes were almost at the same level as a year ago but their share has decreased in proportion to Nordkalk´s growing total sales. Lime products play an important role in water treatment and cleaning flue gases. The percentage of total sales of environmental products accounted for by water treatment amounted to approximately 60 and by flue-gas cleaning to about 40. New products and applications for environmental care are being developed all the time.

Carbonate products, together with both quicklime and slaked lime, are used to purify drinking water and clean waste water. Lime products are used to regulate the pH value, alkalinity and hardness of drinking water to prevent and reduce corrosion in the distribution network or consumers' taps and other household equipment. In waste-water treatment Nordkalk's products are used to regulate the pH value and alkalinity of the effluent so that it can be treated at the sewage plant. They also make it possible to efficiently remove nitrogen so that the eutrophying burden of waste water in watercourses is reduced. The sludge resulting from the treatment of waste water can be made more hygienic with the aid of quicklime, in other words, lime-stabilised. Nordkalk Velox is a product for more efficient composting of sludge and other wastes and for combating unpleasant odours. Nordkalk Velox can also be used to neutralise unpleasant smells from waste water.

Nordkalk Filtra P is granular filter material that removes phosphorus and so improves the cleaning of waste water in sparsely populated areas. In this way it effectively combats eutrophication in watercourses. It is best used in the final stage of purification after ground filters or small water-treatment plants. Nordkalk's latest product in this range, Sauna-Seppo, launched in 2005, contains Nordkalk Filtra P filter material to remove phosphorus from the washing water at summer cottages.

The liming of arable land can prevent the release of nutrients causing eutrophication into watercourses. Different kinds of ground limestone products are used for reducing acidity in the soil. This enables plants to make better use of the nutrients, which reduces the amount of nutrients washed out of the soil into watercourses.

When heat and electricity is being produced by burning either fossil fuels or household and industrial wastes, acid substances, e.g. sulphur and chlorine compounds, emerge in connection with burning and they must be separated from the flue gases before they can be conveyed into a chimney. When sulphur dioxide reacts with humidity in the atmosphere, sulphuric acids are formed. The rain falling onto the earth's surface is thus acid and consequently harmful to the nature. Plants growing in acid soil are not able to utilize all the nutrient substances and fish cannot survive in lakes that are too acid. Liming individual watercourses is a method for returning the quality of the water of acidic watercourses to what it was before acidification took place. Usually liming is carried out with the help of nature's own remedy, namely finely ground limestone.

The flue gases of power plants can be efficiently purified with the help of quicklime or slaked lime, limestone powder or dolomite. By using a so called wet method with limestone sludge, the emissions of carbon dioxide can be reduced by even over 90 per cent. Waste incineration produces more emissions of chloride and fluorine than that of carbon dioxide. Also their amounts can be reduced with the help of limestone-based products. The wastewaters resulting from the wet method can be neutralized with limestone powder and/or slaked lime.

# Environmental Improvement 2007

In 2007 Nordkalk invested altogether EUR 3.0 million (1.2 in 2006) in the environment. Different development projects according to the company's operating policy are in progress at the production plants. The most important of these are aimed at reducing dust emissions and noise and to make more efficient use of stone and fuel. Nordkalk also regularly improves its monitoring and supervising routines.

The environmental management system has led to many improvements, in handling hazardous waste and sorting refuse, for example. Finding more efficient uses for surplus stone and minimising the amount that needs to be dumped constitute one of the most important aims of the environmental programme for Nordkalk's mines and quarries.

Lappeenranta in Finland publishes every year an updated version of its environmental report for the Ihalainen industrial area. It includes environmental perspectives for the whole of the industrial site, where other companies as well as Nordkalk operate.

## Dust and Other Emissions

Reducing dust emissions is one of the most important environmental measures in Nordkalk's operations, and efforts to cut the amounts of dust released are being continuously improved. By scattered dust emissions is meant that fine particles are spread by the wind, principally from loading bays and storage sites and from the wheels of vehicles. Better traffic arrangements at Nordkalk's different industrial sites can reduce the amount of dust released and improve safety. To facilitate the cleaning many of Nordkalk's plants have asphalted their roads and their yards, increased wetting, built noise barriers and planted trees. As far as possible water from the company's own mines or quarries is used for wetting dusty areas and roads. The effects of the measures taken are monitored, and the majority of the plants measure the dust fall-out at their location regularly. The measurements taken at Sipoo, for example, show that the amount of dust in the air around the plant has been reduced to a quarter of what it was in the early 1980's.

The renewal of a filter at the Parfill plant in Pargas has decreased dust emissions by 10 per cent. New dust removal equipment was built for the screening plant of crushed limestone at the Pargas quarry. At the Lappeenranta lime plant a dust filter has been renewed in the inlet area of raw material. Because of lack of space and the strong demand from the market, stone for the cement production is being crushed above the ground at the Lappeenranta plant by a special permit given by the authorities. This crushing may occasionally be the cause of dust formation. The effects of crushing on the immediate surroundings are under constant surveillance in order to keep the impacts as small as possible. At the Raahe lime plant dust formation was discovered in the kiln filters and was fixed by changing certain parts. Filters will be upgraded in compliance with the next annual maintenance, which will take place in the spring and in the autumn of 2008.

At Ingaberga in Sweden the dusting problems have been solved by changing the filter of the mill. Some parts of the kiln filter have been renewed at the Luleå lime plant. A continuous measuring system for monitoring emissions has been put into action in Köping and at the Gotland plant of KBAP. In addition, at KPAB a dosing apparatus for activated carbon has been installed to reduce flue gas emissions.

At Miedzianka, Poland, Nordkalk has carried out several environmental investments, the newest being a cleansing station for washing tyres and bases of vehicles. To reduce dust from the finest stone material which is unloaded to the stone deposit, a loading chute that automatically adjust to the hight of the stone pile has been installed. An agreement concerning the cleaning of the roads in the plant area has been signed. Together these measures have significantly reduced the dust formation in Miedzianka.

## Noise and Vibration

Nordkalk's plants make continuous improvements in efforts to cut the noise from machines and other equipment. Another important consideration is to update the work routines so that exposure of both workers and the environment to noise can be reduced. Measurements of noise levels in recent years have shown that the situation has improved markedly. The latest measurement was performed at Köping in Sweden and it did not lead to any measures.

The quarries are located near residential areas, which is taken into consideration when planning and carrying out quarrying. Residents who live by the quarries occasionally send inquiries about the vibration. In such cases the situation will be looked into and, if necessary, adjustments to blasting methods will be made in order to reduce vibration. For exam-

ple, vibration was measured in two properties in the Tytyri area in Lohja, Finland last year but based on the measurements no further actions were deemed necessary.

At Pargas and Lappeenranta in Finland and at Storugns in Sweden blasting has been developed so that the stone loosens as easily as possible, which means less vibration. Efforts are also being made by taking greater account of the geological conditions, by using several different kinds of explosives at the same time and by limiting and directing the explosion area.

## Water

The state of both ground and surface water is subject to continuous monitoring. Analyses carried out at Lappeenranta, for example, indicate that the water released into watercourses from the industrial site consists mainly of rainwater and is of good quality. Nordkalk also monitors the state of ground water; there are some twenty measuring points within the Lappeenranta industrial site. The measurements show that the water is of good quality. The level of the ground water has not dropped even though mining continues at increasingly lower levels.

The Miedzianka plant in Poland supplies ground water to nearby households and the Tytyri plant in Finland supplies ground water to the local waterworks.

At the flotation plant for wollastonite in Lappeenranta a new filter for process waters has been installed, which enables a more efficient water cycle. This has decreased the amount of water pumped into the process to a tenth of what it used to be.

## District Heating and Energy

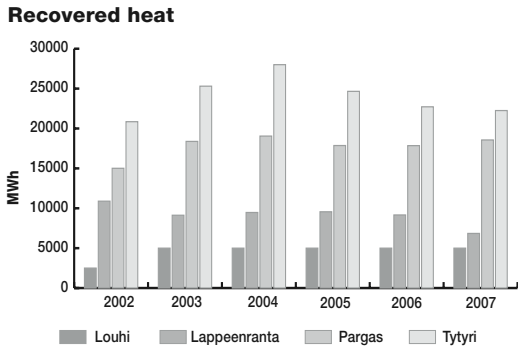
The waste heat of the lime kilns is utilized in the network of district heating in the Finnish towns of Lappeenranta, Lohja and Pargas. If the corresponding amount of heat were to be produced by fuel oil, carbon dioxide would be released into the atmosphere. In 2007, the amount of heat delivered by Nordkalk was equivalent to the amount needed for heating approx. 2400 detached houses and providing them with warm water. Sales of waste heat decreased slightly compared to the previous year because of a warm summer and a mild autumn. Furthermore, waste heat is utilized besides in Lappeenranta, Lohja and Pargas at Nordkalk's own production at Louhi and KPAB.

At Tytyri the efficiency of the operations is improved and energy consumption in lime burning reduced. A new control system for the rotary kiln has been installed, which has helped to save energy and to reduce $CO_2$ emissions. That resulted in energy consumption which was nine per cent lower than in the previous year. The surplus corresponds to the amount of energy which is needed to heat approx. 88 detached houses.

The Parfill plant in Pargas has invested in new low- and high-pressure compressors, in rebuilding of air intakes and in automatic regulation of dew point and the amount of air. As a result of these improvements, the amount of saved energy coincides with the amount needed for the heating of approx. 18 detached houses.

At the KPAB lime plant in Gotland the waste heat from the compressors is used in heating fuel oil for the kiln. At the Landskrona grinding plant old fans have been replaced with compressed air which transfers the products from the mill into silos. Consequently, the energy saved by these actions suffices for the heating of approx. 20 detached houses.

Several projects are under way to make operations more effective. In Sweden the Köping plant for instance aims at reducing the use of electricity in the production of compressed air. An energy control system is currently under development at Luleå to reduce the energy used for the kiln. In addition, a project for optimizing product range in relation to the energy used in production is in progress. An automation project was introduced at Vampula, Finland which aims to enhance the energy usage of the grinding plant.




*Waste heat produced at the lime plants in Finland is used as district heat. In 2007 sales of waste heat were somewhat lower than in the previous years due to the warm summer and autumn.*

The possibility of relinquishing the use of fossil fuels is being investigated at Köping. The plant has investigated and tested plastic-based fuels to reduce the use of coal.

## Efficient Exploitation of Resources

The annual quantity of surplus stone produced at Nordkalk's different extraction sites depends on geological factors and the way blasting is carried out. Nordkalk aims to an increased use of surplus stone and to environmentally friendly quarring. In Finland about 67 per cent of the surplus stone produced is reused and at Lappeenranta, for example, last year the whole amount of surplus stone could be used.

Approximately one million tons of surplus stone is being quarried in Pargas a year for the next three years. A new disposal area was opened to facilitate the sales of the surplus rock.

Nordkalk aims to expand its use of soil. Its goal is to sort the material that can be used for restoration purposes (e.g. humus and clay) and store these separately for future use. At Lappeenranta soil analyses have been carried out and the information gained used in planning how to store the different materials.

## Reduction in Use of Chemicals

Both the Pargas and Tytyri plants have invested in equipment which helps to replace chemicals with water in the grinding process. As a result, the need to use chemicals has decreased 8 000 kilograms per year at Tytyri.

## Environmental Achievement of the Year 2007

Nordkalk's internal award of merit for environmental achievement for 2007 was given to the Sipoo plant. The amount of airborne dust around the plant has been reduced to a quarter of what it was in the early 1980's, which is important also from the point of view of the community. In the course of the years, Sipoo´s achievement has been noticed by the press and by the environmental authorities who last year eased the requirements concerning dust monitoring.

# Emissions and Secondary Products

| FINLAND | | 2003 | 2004 | 2005 | 2006 | 2007 | |
|---|---|---|---|---|---|---|---|
| Emission in air | $CO_2$ (t) | 677 084 | 715 166 | 665 003 | 701 352 | 694 021 | |
| | particles (t) | 200 | 211 | 204 | 187 | 284 | 1) |
| | $SO_2$ (t) | 101 | 107 | 217 | 325 | 282 | 2) |
| | NOx (t) | 381 | 406 | 595 | 670 | 722 | |
| Emission in water | solid material (t) | 19 | 20 | 13 | 9 | 10 | 3) |
| | $BOD_7$ ATU (t) | 1 | 1 | 2 | 1 | 2 | |
| Secondary products | filter dust (t) | 53 409 | 54 352 | 51 791 | 52 282 | 48 725 | |
| | * utilized (t) | 29 551 | 26 194 | 26 921 | 29 459 | 40 389 | |
| | slaking residue (t) | 14 081 | 17 033 | 18 647 | 16 151 | 16 228 | |
| | * utilized (t) | 10 968 | 8 411 | 10 355 | 16 151 | 9 490 | |
| | surplus stone (t) | 2 253 181 | 1 448 785 | 1 602 610 | 1 286 688 | 1 305 954 | |
| | * utilized (t) | 1 533 212 | 1 128 657 | 1 374 426 | 731 054 | 879 667 | |
| | flotation sand (t) | 199 975 | 272 621 | 190 115 | 193 968 | 216 460 | |
| | * utilized (t) | 31 500 | 60 859 | 42 476 | 66 462 | 53 045 | |
| | kiln waste (t) | 11 496 | 14 067 | 17 270 | 15 886 | 14 443 | |
| | * utilized (t) | 987 | 5 587 | 111 | 686 | 611 | |
| | * backfilling (t) | 9 107 | 2 056 | 2 319 | 1 214 | 1 020 | |
| Environmentally hazardous waste | oil+greases (t) | 42 | 63 | 66 | 63 | 53 | |

| SWEDEN | | 2003 | 2004 | 2005 | 2006 | 2007 | |
|---|---|---|---|---|---|---|---|
| Emission in air | $CO_2$ (t) | 459 763 | 448 118 | 572 673 | 454 645 | 508 302 | |
| | particles (t) | 113 | 35 | 41 | 27 | 50 | 4) |
| | $SO_2$ (t) | 47 | 111 | 106 | 129 | 147 | 2) |
| | NOx (t) | 290 | 288 | 312 | 482 | 376 | |
| Secondary products | filter dust (t) | 27 727 | 16 421 | 25 928 | 31 025 | 30 364 | |
| | * utilized (t) | 25 917 | 15 026 | 21 924 | 19 004 | 78 930 | |
| | slaking residue (t) | 1 319 | 1 332 | 1 560 | 1 559 | 273 | |
| | * utilized (t) | 1 319 | 1 332 | 450 | 1 559 | 0 | |
| | surplus stone (t) | 1 036 638 | 980 801 | 836 306 | 821 404 | 892 214 | |
| | * utilized (t) | 377 453 | 470 700 | 462 917 | 257 808 | 287 867 | |
| | washing sludge (t) | 26 000 | 28 000 | 36 000 | 37 000 | 38 500 | |
| | kiln waste (t) | 1 526 | 1 591 | 1 633 | 1 393 | 2 084 | |
| Environmentally hazardous waste | oils+greases ($m^3$) | 506 | 378 | 209 | 437 | 423 | 5) |

| ESTONIA | | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|
| Emission in air | $CO_2$ (t) | 38 123 | 41 210 | 37 535 | 43 393 | 46 195 |
| | particles (t) | 321 | 299 | 305 | 405 | 434 |
| | $SO_2$ (t) | 2 | 2 | 1 | 2 | 2 |
| | NOx (t) | 29 | 30 | 30 | 35 | 15 |
| Secondary products | filter dust (t) | 2 100 | 1 600 | 1 856 | 2 180 | 0 |
| | * utilized (t) | 2 100 | 1 600 | 1 856 | 2 180 | 0 |
| | kiln waste (t) | 850 | 2 364 | 518 | 805 | 156 |
| | surplus stone (t) | 0 | 0 | 182 700 | 208 100 | 331 667 |
| | * utilized (t) | 0 | 0 | 14 300 | 19 100 | 10 900 |
| Environmentally hazardous waste | oils+greases ($m^3$) | 6 | 3 | 3 | 0 | 4 |

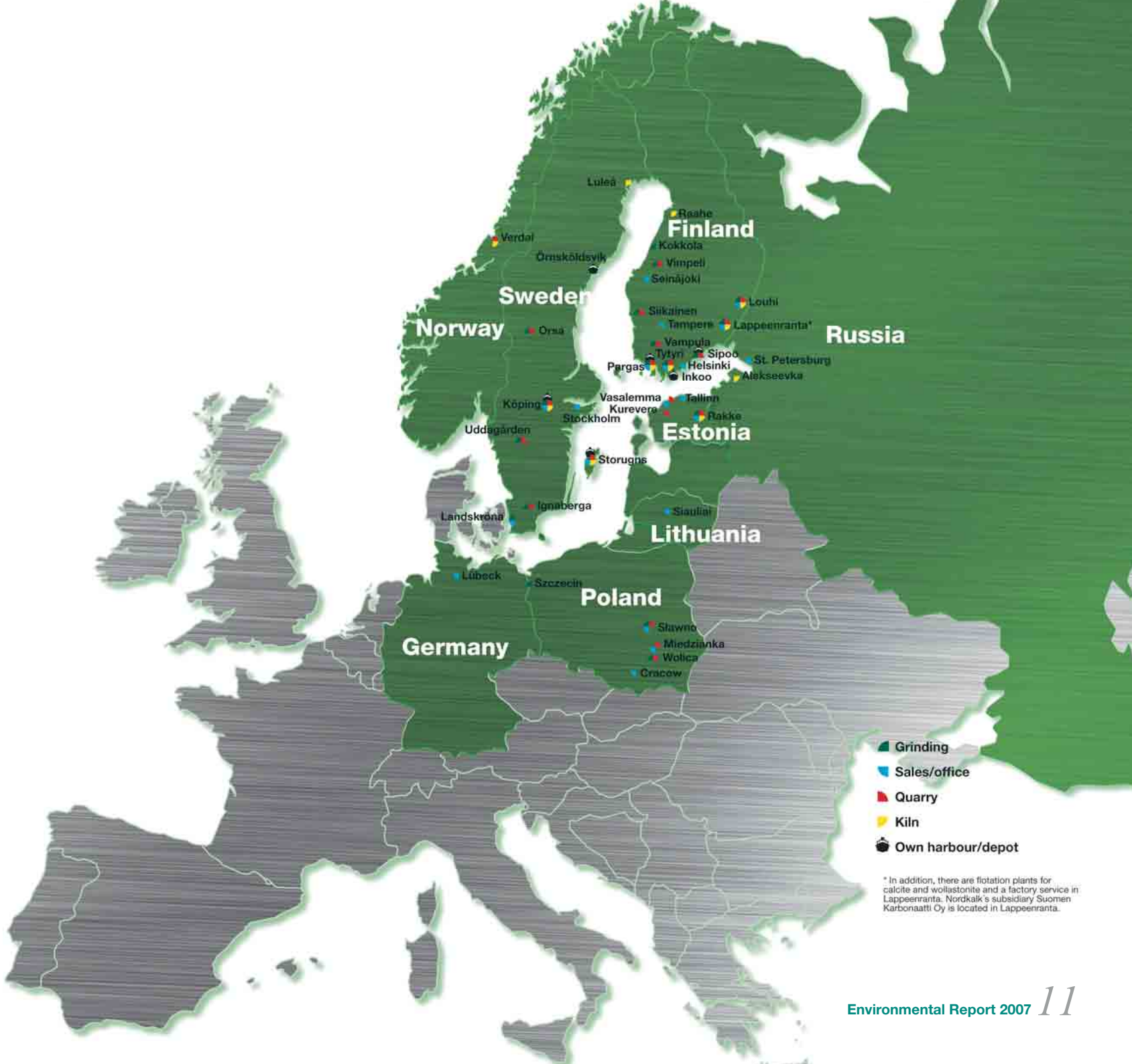
| POLAND | | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|
| Emission in air | $CO_2$ | 9082 | 10252 | 14951 | 12472 | 15684 |
| | particles (t) | 22 | 30 | 19 | 13 | 15 |
| | $SO_2$ (t) | 8 | 6 | 9 | 8 | 9 |
| | NOx (t) | 23 | 28 | 38 | 35 | 43 |
| Secondary products | surplus stone (t) | 0 | 98928 | 123361 | 129280 | 147170 |
| | * utilized (t) | 225147 | 200000 | 262237 | 225000 | 355351 |
| Environmentally hazardous waste | oils+greases (t) | 23 | 19 | 20 | 15 | 11 |

| RUSSIA | | 2006 | 2007 |
|---|---|---|---|
| Emission in air | $CO_2$ | 18866 | 28273 |
| | particles (t) | 0 | 31 |
| | $SO_2$ (t) | 0 | 0 |
| | NOx (t) | 13 | 16 |
| Secondary products | kiln waste (t) | 6062 | 6466 |
| | * utilized (t) | 0 | |
| | surplus stone (t) | 6609 | 11974 |
| | * utilized (t) | 1445 | 8600 |
| Environmentally hazardous waste | oils+greases (t) | 0 | 0 |

Nordkalk started production in Russia in October 2005. Therefore no statistics from earlier years are included in the tables.

The figures given in the tables represent both measured and calculated values.

1) Result of filter problems which have been acted on and will be followed up in 2008.
2) Result of changes in fuel mix and the increased burning temperature.
3) Ihalainen industrial area, Lappeenranta.
4) Result of filter problems which have been taken care of.
5) The figure includes waste oil from vessels docking at Storugns.




* In addition, there are flotation plants for calcite and wollastonite and a factory service in Lappeenranta. Nordkalk's subsidiary Suomen Karbonaatti Oy is located in Lappeenranta.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