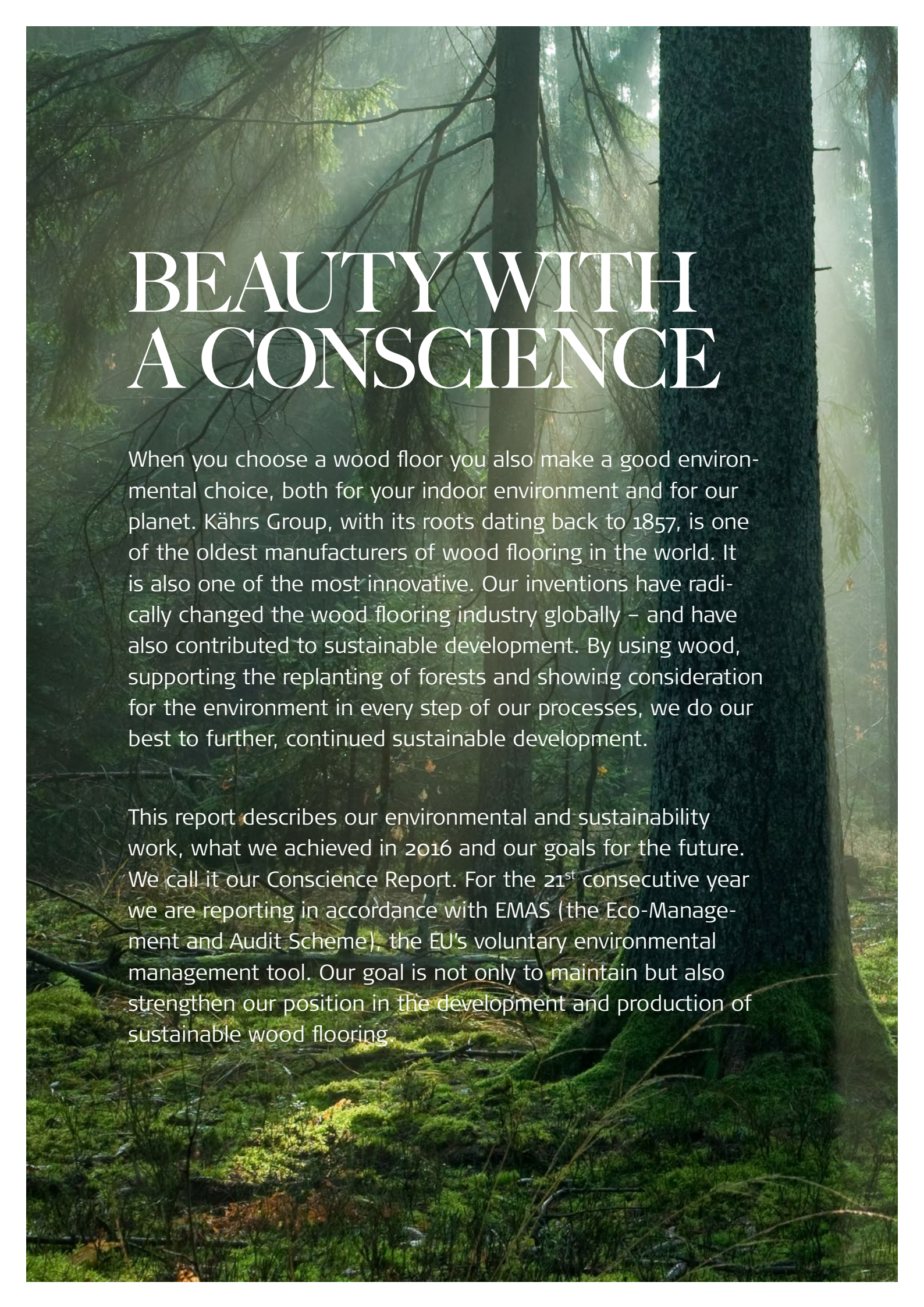


ENVIRONMENT & SUSTAINABILITY EMAS 2016

The Conscience Report

This report is a translation of the controlled Swedish EMAS-report which covers Kährs Group Sweden and the operations in Nybro, Blomstermåla and Malmö.

A misty forest scene with tall trees and sunlight filtering through the canopy. The image is used as a background for the text.

BEAUTY WITH A CONSCIENCE

When you choose a wood floor you also make a good environmental choice, both for your indoor environment and for our planet. Kährs Group, with its roots dating back to 1857, is one of the oldest manufacturers of wood flooring in the world. It is also one of the most innovative. Our inventions have radically changed the wood flooring industry globally – and have also contributed to sustainable development. By using wood, supporting the replanting of forests and showing consideration for the environment in every step of our processes, we do our best to further, continued sustainable development.

This report describes our environmental and sustainability work, what we achieved in 2016 and our goals for the future. We call it our Conscience Report. For the 21st consecutive year we are reporting in accordance with EMAS (the Eco-Management and Audit Scheme), the EU's voluntary environmental management tool. Our goal is not only to maintain but also strengthen our position in the development and production of sustainable wood flooring.

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About Kährs Group

Kährs Group is a world-leading flooring manufacturer of hardwood and resilient flooring with a number of leading brands in its product portfolio, Kährs, Karelia and Upofloor. Kährs Group, which delivers products to more than 70 countries, is the market leader in Sweden, Finland, Norway and Russia and holds a strong position in other key markets, such as the UK and Germany. The Group has approximately 1,700 employees and annual sales of EUR 300 million. The President and CEO is Christer Persson. The owners are Triton & Hartwall Capital.

Read more at www.kahrsgroup.com

This report covers Kährs Group's Swedish units, organised within the subsidiary AB Gustaf Kähr and its operations in Nybro, Blomstermåla and Malmö, which produce about 6 million m² of wood flooring and employ 790 people.

About EMAS

EMAS is the EU's voluntary environmental management and environmental auditing regulation, Number 1221/2009. It aims to improve environmental work at companies and organisations and make it more efficient. EMAS conveys a credible message about the result of the environmental work through an assessed/audited and approved environmental report.



BRINGING OUR SUSTAINABILITY WORK TO THE NEXT LEVEL

Never being satisfied. This is one of the most important driving forces of Kährs Group and one of the main reasons behind our world leading position in developing, producing and marketing wood floors which are both beautiful and sustainable. This is also why we are continuously evaluating new ways of reducing our environmental footprint. Now we are taking new steps in order to keep our leadership in sustainability. These include obtaining environmental certifications for all wood floor production plants in 2017.

Kährs Group is one of the oldest producers of wood floors in the world. Meanwhile, we have taken a leading position in the industry when it comes to developing sustainable production methods. During the decades, we have introduced a number of new cutting edge technologies that later have turned into industry standards.

Sustainability is, in other words, one of the most important pillars of the company and a central part of our brand. In order to maintain this, we must continuously evaluate new ways of improving. One of the most effective ways is to create a joint sustainability focus in the organisation for all the decisions we make in our everyday life, whether big or small. In order to ensure this, in January 2017 we appointed a new function in our management group - Communication and Compliance - with responsibility for matters regarding ESG (Environmental, Social responsibility and Governance).

But the production of wood floors includes so many dimensions - from process flows to production and recycling - and new opportunities for thinking in a new and more sustainable way continuously present themselves. This means that we must all contribute.

During the last 4-5 years we have been working intensely with developing joint corporate methods and standards for sustainability issues. Now we will take the next step. Our central production plant in Nybro was awarded an environmental certification a long time ago. Our target now is to achieve environmental certification for our other wood floor production plants, i.e. in Romania and Poland, in 2017. In parallel, we will focus on education and communication in order to reach all members of staff, regardless of position and location of the plant where they work.

During the year, we have also taken other important steps within the sustainability area. These include the Safety First project, aimed at increasing safety in our workplaces. As part of the project, we have adopted new and clear safety routines for all plants, among other things. Meanwhile, we have increased our transparency with focus on fast information if an incident should occur, what the reason was - and how we can prevent it from happening again in the future. Our aim is that all our members of staff at our different plants shall learn from, and benchmark themselves against, each other.

During the last, few years, Kährs Group has taken part in a pioneering, Pan-European research project between the industry and academia on how wood affects the indoor environment. The Wood2New project, which was finalised during the year, proved, among others things, that wood releases heat when it is cold and has a cooling effect when it is hot. This means that wood contributes to saving energy. But wood also has a psychological effect on our well-being, according to the study, which shows that it is perceived as both calming and relaxing. In Germany, not least, there is currently an intense debate going on about how we are affected by building materials,

Working with sustainability has become a hygienic factor for leading companies, such as Kährs Group. But we do not content ourselves with this. We also wish to continue to break new grounds when it comes to producing both beautiful and sustainable floors. And continue never being satisfied

Christer Persson
President and CEO



The environment year 2016 in brief

In 2016, we continued our efforts to ensure that our operations are conducted in a both sustainable and responsible way. This work included establishing a group forum for issues regarding sustainability – the Compliance Committee. We also installed a new chemical system, as well as a new cleaning plant for process water.

Kährs Groups' extensive approach to running our operations in a responsible and sustainable way while taking the expectations of our interested parties into account is based on respecting principles on social, economic and environmental consideration in how we plan and operate our business.

Our production plants are situated in densely populated areas, close to housing and other public functions, which means that issues regarding noise, dust and stormwater are extremely important. Our own controls prove that we live up to existing standards and regulations.

Our work with product certifications continuously raise new demands on Kährs Group's operations – from product development and purchases through to production, environment and working environment functions, to the marketing and communication departments. We have started to collaborate with Linköping University regarding a life cycle analysis on some of our flooring products.

Climate change and the need to reduce our carbon dioxide emissions affects our activities, particularly when it comes to transports and use of energy. One of the advantages of wood flooring operations is that it is based on a very high proportion of renewable raw material, both when it comes to producing floors and biofuel. Delivering floors to more than 70 countries, however, leads to a great amount of

transports, mainly by ship and lorry. This means that dependence on fossil fuels for transports is part of climate impact and demands future improvements and research.

One of the climate compensating effects of our operations, however, is that there is a surplus

of biofuel from the production in Nybro and Blomstermåla and that our wooden products store carbon dioxide throughout the decades the floors are being used. The wood floors we sold stored more carbon dioxide than what we emitted in 2016.

POSITIVE RESULTS/ MEASURES

- Establishment a joint, corporate forum for sustainability issues – The Compliance Committee
- Approval from the authorities for a final cover of the internal landfill in Nybro
- Implementation of new chemicals system, iChemistry from Intersolia
- Installation of new ozone plant in Nybro for cleaning process water and waste water
- 5.6 million square meters of wood floors store more than 83,000 tons of carbon dioxide
- Continued support for projects supporting the protected stag beetle
- An LCA study regarding our floors will be carried out together with Linköping University

FUTURE CHALLENGES

- Transports between Kährs Group's plants and external suppliers result in carbon dioxide emissions. Our challenge lies in optimising logistics in order to reduce emissions of carbon dioxide
- Action plans to reduce energy use and waste quantities have not been sufficient to reach our goals. Long-term efforts to map out how we use energy initiated in order to promote reducing our energy consumption
- Taking full advantage of the installed ozone plant to reduce hazardous waste
- Make risk analyses of chemicals in the operations using the new chemicals system
- Increased interest in certifications from customers in many countries increase demands on our organisation and operations



STUDY PROVES WOOD'S
POSITIVE IMPACT
ON HUMAN BEINGS

Now, it's been scientifically proven that wood has a positive impact on us. The European research project Wood2New, which ran for three years and was finalised in February 2017, shows that using wood as a construction material benefits both the environment and our health. Industry, including Kährs Group, has collaborated with scientists from six countries in the project. The aim was to map out the effects of using wood in indoor environments, as well as to stimulate increased use of wood in interiors.



We spend, on average, 90 per cent of our lives indoors. This means that the air quality and indoor temperature not only affects our health, but also our quality of life. But exactly in what way and how much has previously not been mapped out. In order to fill this gap in existing research, an international research project was initiated in 2014 in which a number of wood industry companies and universities participate. The final report was presented at a seminar at Linköping University at the beginning of March 2017.

Scientists engaged in the project state in the report that wood has

"Apart from the purely technical properties, we have also measured the emotional aspects of using wood in health care institutions, for example, through using focus groups in different countries. It's interesting to note that wood is perceived in the same way – regardless of culture – i.e. natural, warm and cosy. It has a calming effect, as well as good acoustic and air properties" Yrsa Cronhjort, Aalto-University

superior strength in proportion to its weight, is easy to work with, renewable and widely accessible. It is quick to work with, promotes good conditions at the building site, is flexible and provides designers with a great scope of freedom. Furthermore, wood binds and stores carbon dioxide, evens out indoor humidity and can be recycled. When we, for example, have a shower or cook food on our stoves, it contributes to increased indoor humidity. Wood absorbs this - and later, when it becomes drier, emits humidity – a process that has been studied with a thermo camera.

"Apart from the purely technical properties, we have also measured the emotional aspects of using wood in health care institutions,

for example, through using focus groups in different countries. It's interesting to note that wood is perceived in the same way – regardless of culture – i.e. natural, warm and cosy. It has a calming effect, as well as good acoustic and air properties," says Yrsa Cronhjort, Project coordinator at the Aalto University in Finland of Wood2New.

The overall goal of the project was to contribute to creating competitive and sustainable wood based interior products and systems for modern wood constructions through:

- Identifying opportunities and limitations for using wood interior elements.
- Examining if, and how wood may affect human health.
- Developing, designing and evaluating concepts for sustainability, value-adding, multifunctional wood based interior products and systems.
- Developing business models based on the acquired facts of how wood affects health.

The research project has been conducted, apart from the Aalto University, also at the Linköping University, Holzforschung Austria, Norsk TreTeknisk Institutt (Norway) Building Research Establishment Ltd (UK) and Technisches Büro für Chemie - Dr. Karl Dobianer.

"We were lucky to be able to engage such committed partners in Europe, including Kährs Group," says Yrsa Cronhjort.

The project is part of the international program WoodWisdom-Net Research, aimed at strengthening the competitiveness and sustainability of Europe's forest and wood industry by developing long-term cooperation between different players. Read more about the project on www.wood2new.org

Compliance:

FORUM AIMED AT ENSURING SUSTAINABLE WORKING METHODS

The systematic work on compliance and development within all aspects of sustainability is extensive. This is why we have established a special forum for issues regarding sustainability – the Compliance Committee. The Committee is monitoring our compliance with laws and regulations and set goals for the work related to ESG (Environment, Social responsibility and Governance). Members of group management and the Environmental Ambassador participates and Board members and owners can monitor the progress through key performance indicators and reports.

Kährs Compliance Committee provides advice and contribute to the implementation of the company's compliance program and analyzes the industry, legal requirements and the specific areas of risk. It also works to evaluate existing policies and processes, and contribute to the development of new tools to promote compliance.

AREAS OF RESPONSIBILITY

The Committee is responsible for questions regarding non-financial compliance, including the company's overall programs, policies and processes that ensure that the operations are conducted according to existing rules, exposure when it comes to important legal or regulatory issues, Enterprise Risk Management - ERM, Business Continuity Planning – BCP, as well as Environmental and Social Governance – ESG. It is also responsible for ensuring that the company fulfils the owners' demands on reporting KPI's on annual basis, which the

owners will use in the transparency report and to demonstrate that the operations fulfil UN demands on responsible investments

The Committee supervises the company's compliance work and that the operations are conducted according to applicable policies, the company's Code of Conduct, its Code of Conduct for suppliers, guidelines for anti-corruption and money laundry. It is also engaged in ensuring that the operations are conducted in accordance with more than 30 applicable regulations, laws and product certifications. Local risks are reported on page 32.

DEALS WITH COMPLAINTS

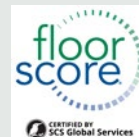
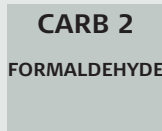
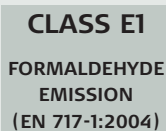
The Committee's tasks include dealing with complaints made by both internal and external sources, including through the employees' whistle-blower system.

Product certifications and requirements that apply to many of our flooring products



BYGGVARUBEDÖMNINGEN

BREEAM



Environmental management system



Foto: Örjan Karlsson

Our operations affect the environment – This is why we work on continuous improvement and follow-up

Our management system helps us control the environmental work in a structured and efficient manner. Our goal is to manage the Group environmental work based on the same conditions and under a joint ISO 14001 certificate in 2017. From 2017, energy mapping and energy streamlining is covered by the environmental management system.

- Organization and distribution of responsibilities
- Identified environmental aspects and legal requirements
- Kährs' environmental policy, environmental targets & plans of action
- Routines for controlling the environmental effect of the activity/product and preparation for emergencies
- Internal and external environmental communication

- Training, education and participation
- Monitoring through internal audits and handling of deviations
- Auditing of the environmental management system
- Management reviews - Kährs Group's management meets four times a year to evaluate and improve the efficiency of the management system

THE DIFFERENCE BETWEEN ISO 14001 AND EMAS

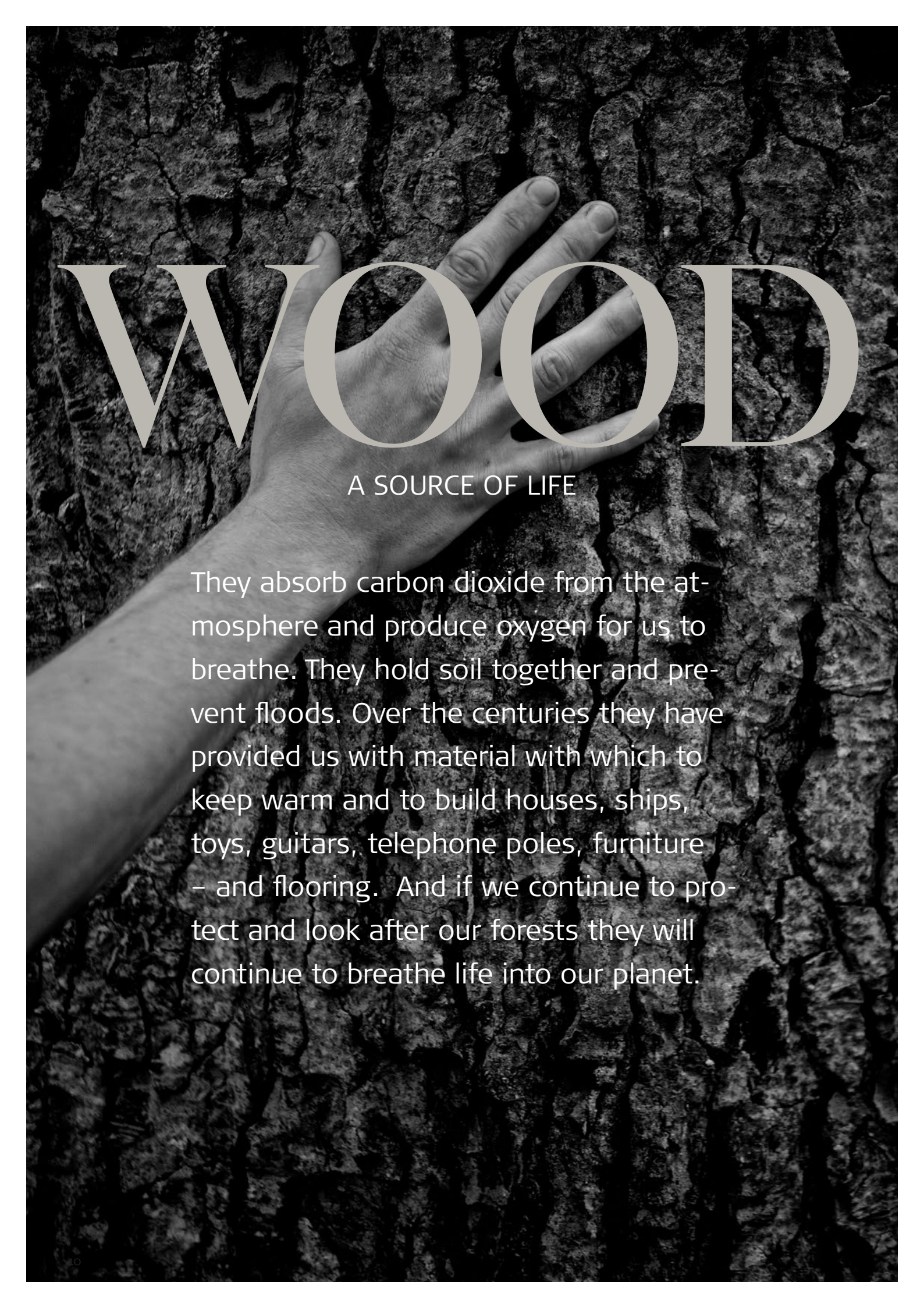
EMAS is a complete environmental management system based on ISO 14001. EMS includes requirements not normally included in an environmental management system. According to EMAS, our annual environmental report must be made public and published on the Swedish Environmental Protection Agency's website. Another difference is the requirement on employees' involvement, that we manage through our intranet, MBL – the Employment (Co-determination in the Workplace) Act – and departmental meetings.

Kährs Group Environmental Policy

- Our commitment to the environment must be genuine and all issues handled with the utmost thought and respect.
- We will strengthen our environmental commitment further and create a business that is sustainable in the long term, for the benefit of current and future generations.
- We must contribute to and support responsible forestry.
- We must lessen our environmental impact through continuous improved management of chemicals, water, raw materials, transportation and energy efficiency while reducing our use of non-renewable energy.
- Our development and flooring manufacturing processes must reflect the natural lifecycle, following the principles of sustainable development.
- We must fully understand and comply with legislation and environmental requirements, and apply this method throughout the whole supply chain

Christer Persson, President and CEO, 30 January 2015

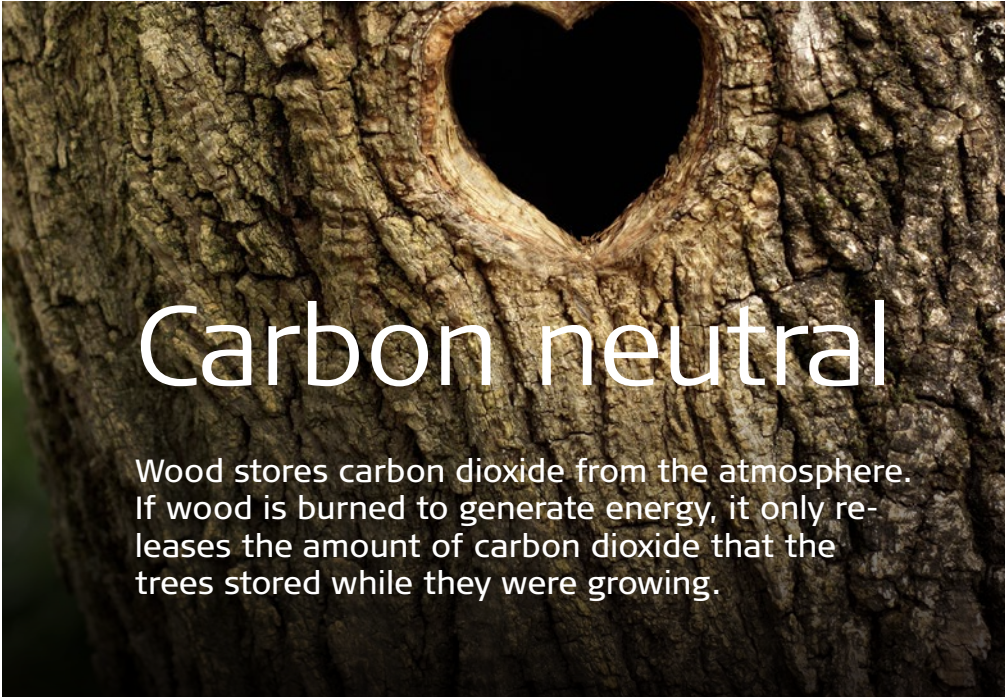


A black and white photograph of a hand touching a tree trunk. The hand is positioned in the center, with fingers spread, touching the rough, cracked bark of a tree. The word "WOOD" is overlaid in large, white, serif capital letters across the middle of the image. The background is the textured bark of the tree, showing deep grooves and cracks.

WOOD

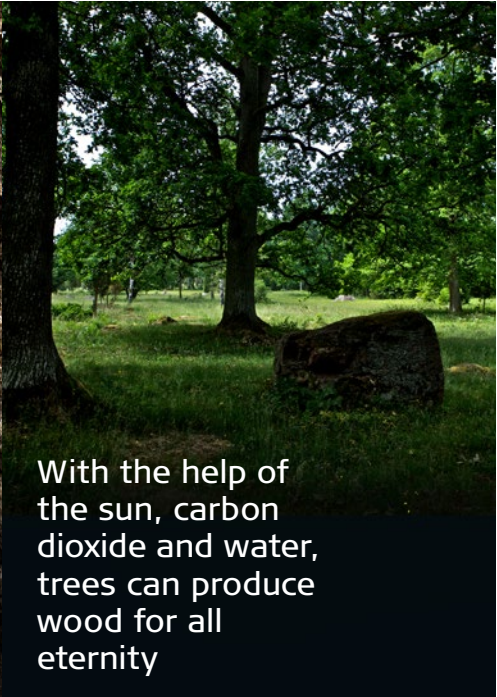
A SOURCE OF LIFE

They absorb carbon dioxide from the atmosphere and produce oxygen for us to breathe. They hold soil together and prevent floods. Over the centuries they have provided us with material with which to keep warm and to build houses, ships, toys, guitars, telephone poles, furniture – and flooring. And if we continue to protect and look after our forests they will continue to breathe life into our planet.



Carbon neutral

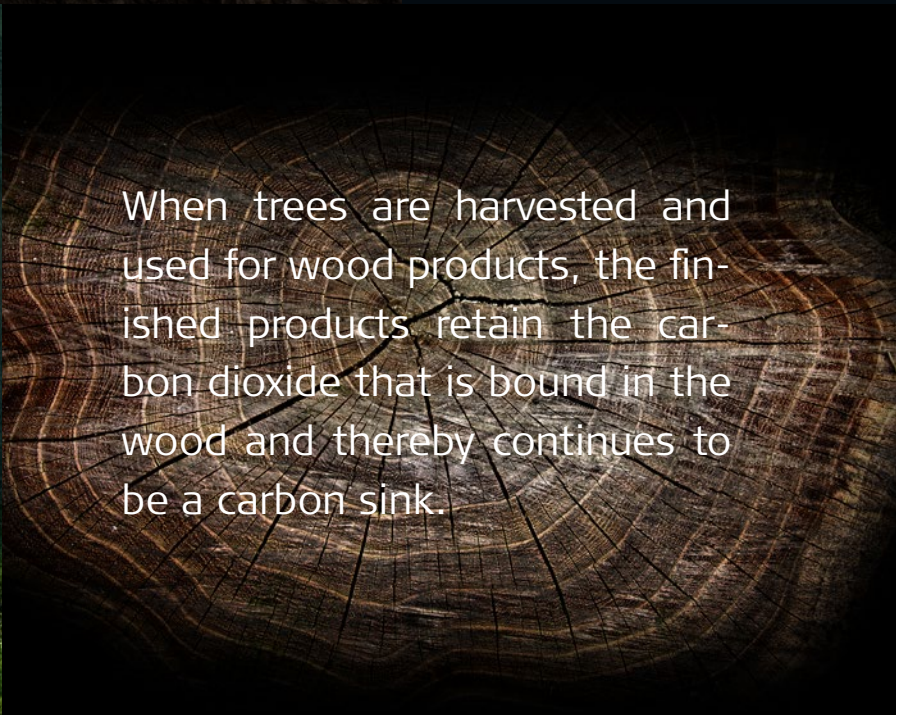
Wood stores carbon dioxide from the atmosphere. If wood is burned to generate energy, it only releases the amount of carbon dioxide that the trees stored while they were growing.



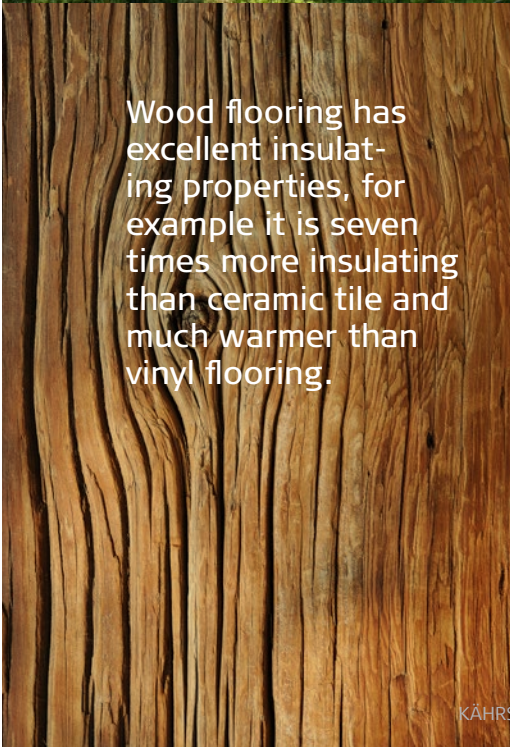
With the help of the sun, carbon dioxide and water, trees can produce wood for all eternity



Europe's forests are growing about 6,000 km² per year



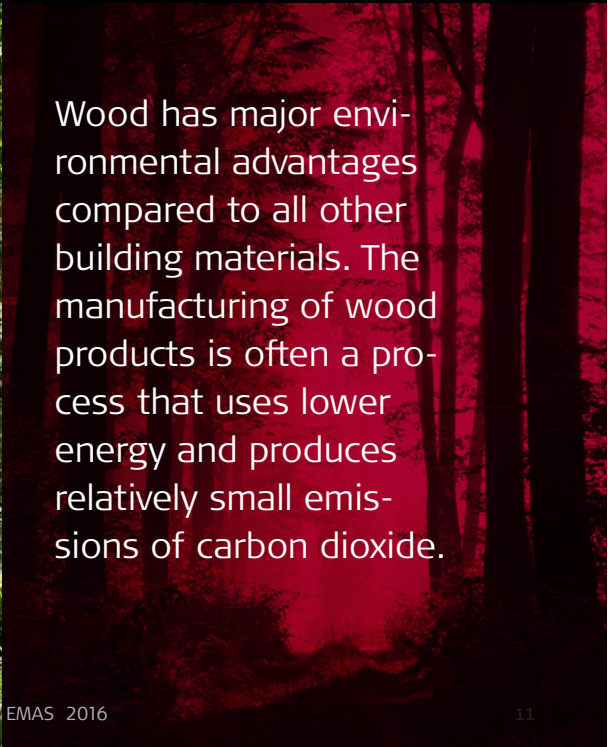
When trees are harvested and used for wood products, the finished products retain the carbon dioxide that is bound in the wood and thereby continues to be a carbon sink.



Wood flooring has excellent insulating properties, for example it is seven times more insulating than ceramic tile and much warmer than vinyl flooring.



Swedish broad-leaved deciduous forests (hardwood) are protected by legislation that aims to preserve their acreage.



Wood has major environmental advantages compared to all other building materials. The manufacturing of wood products is often a process that uses lower energy and produces relatively small emissions of carbon dioxide.

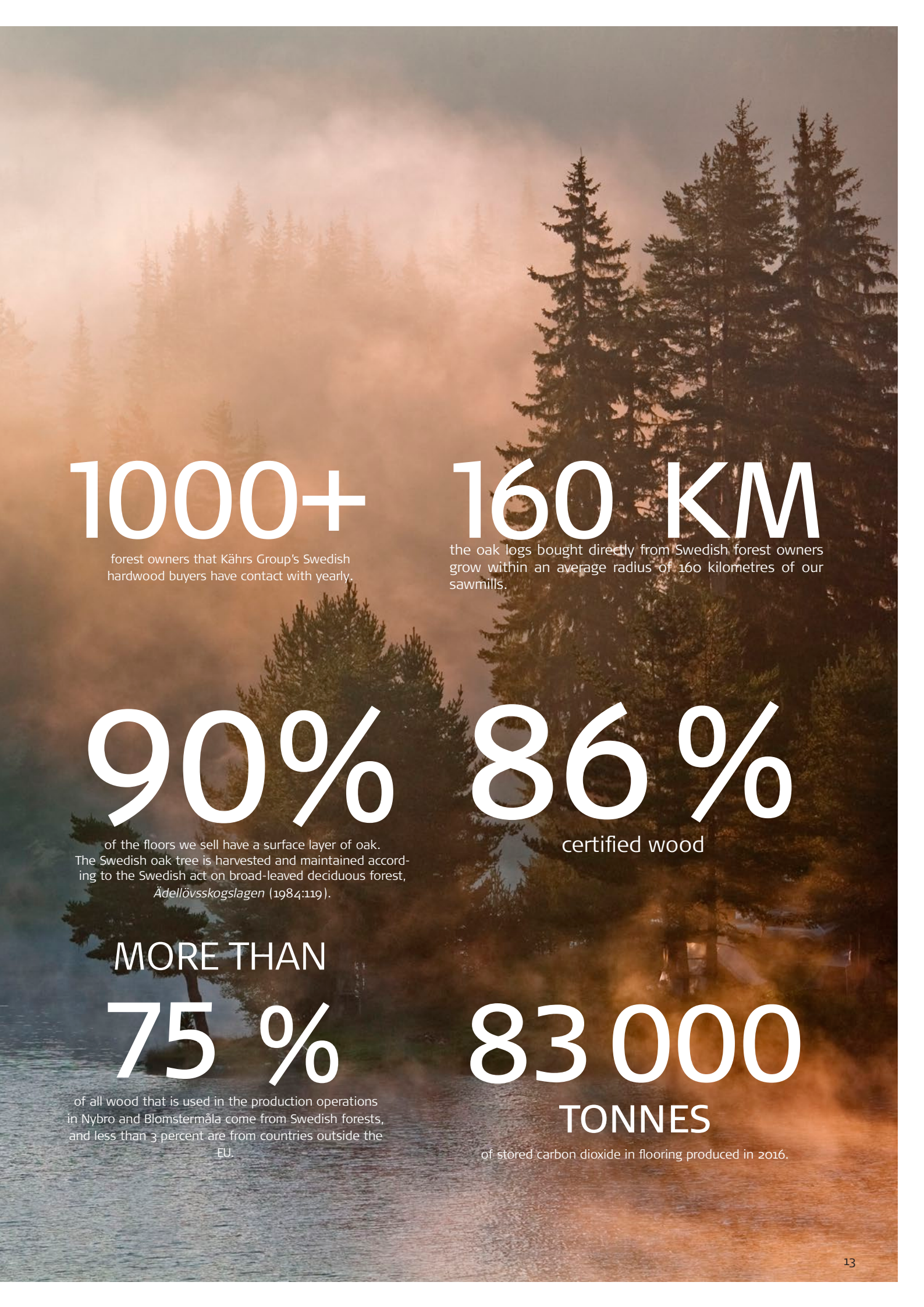


SUSTAINABLE FORESTRY

THE FOUNDATION OF OUR WOOD FLOORING

Kährs has many activities to support a growing, biodiverse forest and to further strengthen oak forestry in the south of Sweden, including:

- Special forest days with training for local forest owners on many sustainability topics including EU funding for replanting.
- Production and distribution of the Kährs educational magazine, EK (Oak), to 7,000 forest owners.
- Bonuses offered for certified timber in Sweden.



1000+

forest owners that Kährs Group's Swedish hardwood buyers have contact with yearly.

160 KM

the oak logs bought directly from Swedish forest owners grow within an average radius of 160 kilometres of our sawmills.

90%

of the floors we sell have a surface layer of oak. The Swedish oak tree is harvested and maintained according to the Swedish act on broad-leaved deciduous forest, *Ädellövsskogslagen* (1984:119).

86%

certified wood

MORE THAN

75%

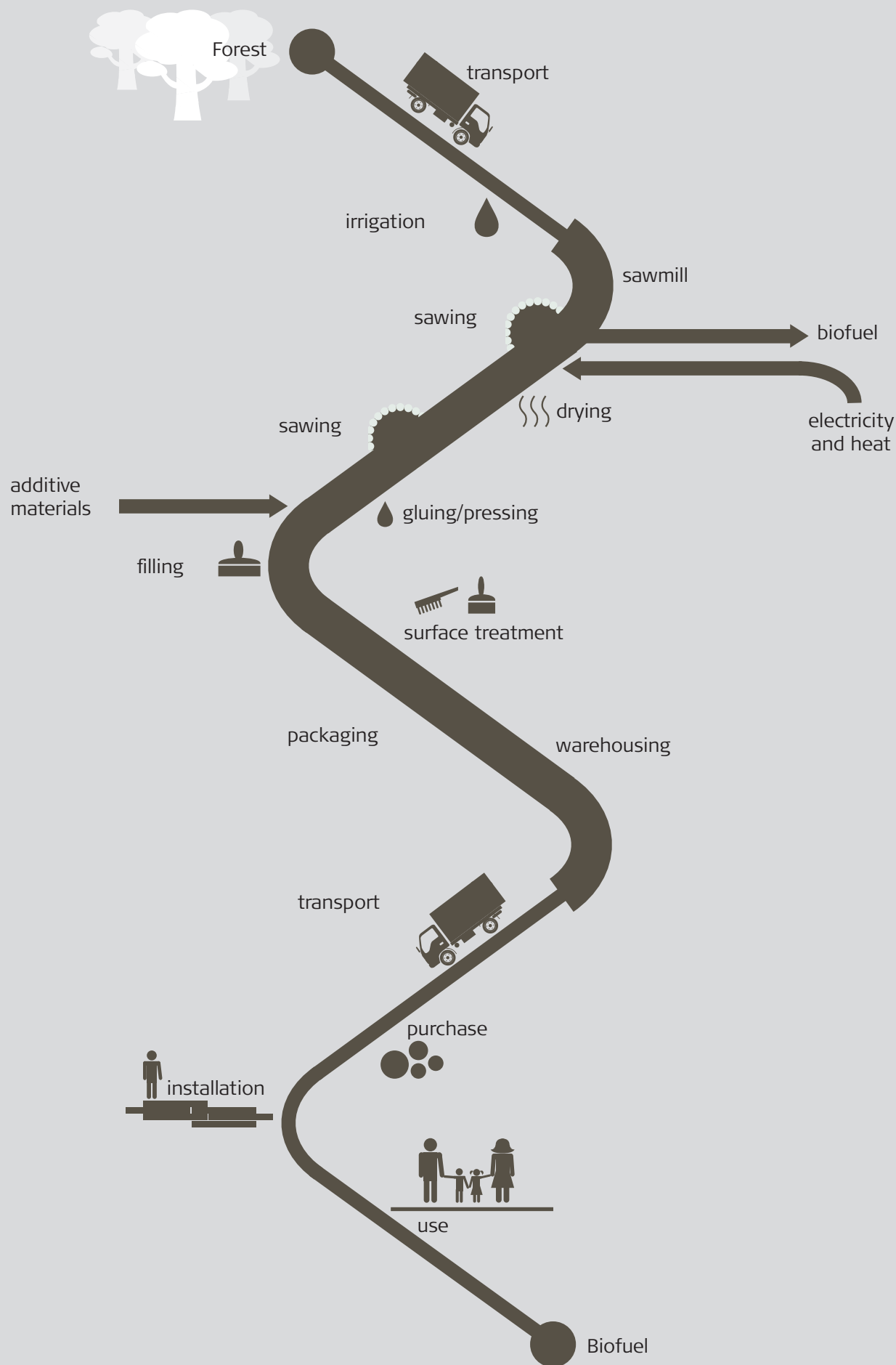
of all wood that is used in the production operations in Nybro and Blomstermåla come from Swedish forests, and less than 3 percent are from countries outside the EU.

83 000

TONNES

of stored carbon dioxide in flooring produced in 2016.

Our operations – wood flooring lifecycle





IMPACT ON THE ENVIRONMENT – ECOLOGICAL BALANCE

An organisation's activities, products and services affect or could affect the environment. This impact is described through environmental aspects. Some aspects will have no impact on the environment during normal operation and a few only in connection with operational disruptions or accidents.

SIGNIFICANT ENVIRONMENTAL ASPECTS

An activity that causes or may cause significant environmental impact is called a significant environmental aspect. To determine which of our environmental aspects are the most significant from an environmental perspective, we perform an annual evaluation, in which we take into account factors such as extent, environmental policy, legislative requirements, local/global environmental impact and risks of operational disruption or accidents.

The significant environmental aspects form the basis for the goals that we have set for reducing our impact on the environment.

ECOLOGICAL BALANCE

We report on the development of significant environmental aspects within Kährs Group's Swedish operations in what we call an Ecological Balance. This includes trends for outcomes of key environmental indicators and a description of negative and positive environmental impact for various environmental aspects. Results of work on our goals are also reported.

The trend for each significant environmental aspect is summarised with a colour code, where the colour indicates the development compared to the previous year.

-  = Positive development during the year
-  = The situation is stable
-  = Environmental impact is increasing, measures required

Biological diversity – Responsible forestry

Our largest impact on biological diversity is linked to the extraction of wood raw materials and purchases of wood raw materials, we have chosen to focus on this through sustainable forestry. One of Kährs' main environmental objectives is to increase the proportion of certified wood material in our floors.

It is our belief that a future, sustainable supply of controlled wood is of utmost importance not only for Kährs Group, but also as a global concern.

The wood floors we manufacture are 98 percent made of wood material, and as a considerable user of wood as a raw material, we have a responsibility to support and encourage the development of sustainable forestry. Through continuously increasing demand for certified wood, we contribute to placing a value on lasting, long-term forestry.

ENVIRONMENTAL TARGET: CERTIFICATION

ONE OF KÄHRS' ENVIRONMENTAL GOALS IS TO INCREASE THE PERCENTAGE OF CERTIFIED WOOD RAW MATERIAL

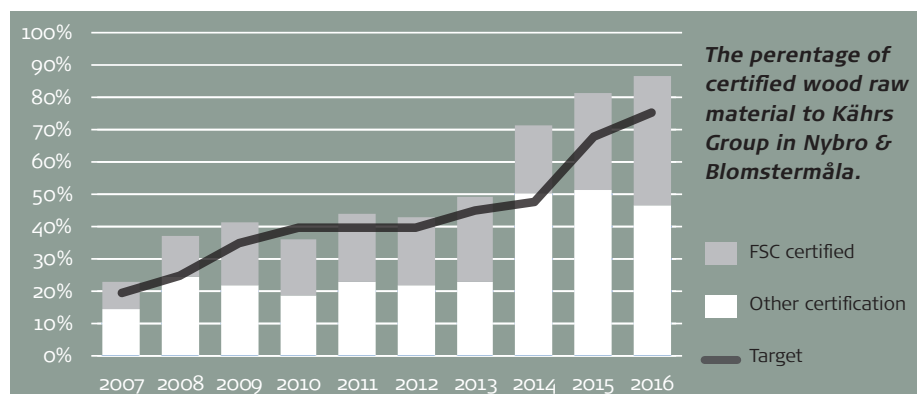
In 2016 our goal for certified wood raw material was 75 percent, calculated as a percentage of the total volume purchased for the Kährs Group's Swedish operations; the outcome was 86 percent.

The forest certifications Kährs Group uses are FSC®, FSC-Fairtrade, FSC Controlled Wood, PEFC and trusted certifications that we have deemed acceptable in conjunction with leading environmental organisations.

All wood purchases, according to our specifications, must comply with the requirements of the Lacey Act and the European Timber Regulation.

Our ambition is to purchase according to Kährs Group's standard for controlled wood, as our minimum acceptable level, which is a good way to provide support to responsible forestry. The amount of sold FSC certified flooring is driven by customer demand.

The percentage of FSC-certified oak logs available in Sweden is dependent on the percentage of woodland that is certified. Today the percentage is over 50 percent, but despite this the actual hardwood supply available is limited. All the local Swedish raw material is classified as "from low-risk area" by the FSC but due to costs considerations many of the small landowners choose not to become FSC certified.



Targets for 2017

The target for Kährs Group Sweden is being increased to 78 percent (75).

For all wood purchases within Kährs Group the target is to reach 70 percent certified wood raw material.

One key measure in our action plan is to obtain FSC certification for our operation in Romania. This will give us traceability for further wood product purchases and a higher proportion of certified items.

SIGNIFICANT ENVIRONMENTAL ASPECT:	USE OF RAW MATERIAL – PURCHASES OF WOOD RAW MATERIAL	
ENVIRONMENTAL IMPACT	RISK	TREND
Purchasing of wood raw material. Can cause a deterioration in biological diversity and a disrupts a carbon sink.	Wood from felling operations that do not meet requirements regarding sustainable forestry is delivered to Kährs.	Positive development

FAIR WOOD PROVIDES FOREST FARMERS WITH A LIVING – AND THE WORLD WITH GOOD RAW MATERIAL

In 2011, Kährs became a pioneer in the industry by supporting a pilot project in Chile, aimed at producing wood raw material certified according to both FSC® and Fairtrade. The lessons and knowledge learnt are now being transferred to three similar projects; in Chile, Tanzania and Mozambique. The goals are still the same – to offer the native population opportunities to sell timber on the global market and get fairly paid for it, while the FSC certification ensures that the forests are managed in a sustainable way.



Many of the forests around the globe are in danger of deforestation caused by corruption and poverty. According to FAO, the Food and Agriculture Organization of the UN, some 13 million hectares are subjected to deforestation every year, corresponding to half of Sweden's total forest area. Deforestation is the main reason behind loss of biological diversity, while it contributes as much as the entire transport sector to climate change.

Fair Wood is a WWF concept supported by SIDA, among others. It aims at providing small forest farmers, mainly in the Southern Hemisphere with access to the global market, while at the same time contributing to sustainable forestry farming in areas threatened by deforestation.

"The main difference between Fair Wood and other wood that originates from the Southern Hemisphere, is that it comes from forests controlled by small owners and that the value of it increases from both an ecological and financial point of view through being FSC-certified", says Martin Persson of environmental consultancy company Sense Group.

Kährs Group supported a pilot project within the framework of the Fair Wood concept in the financially deprived Curacautin valley in Chile. The aim was to provide the population with long-term sustainable means of supporting themselves and protecting the forest,

while producing commercially marketable raw material for floors. The project was subjected to setbacks and the company was finally forced to put a stop to the venture.

"Despite of that, Kährs played an important part and showed the world something completely new – i.e. that it's possible to create commercial products that benefit both local societies and the whole world in a long-term way", Martin Persson says.

"Based on the experience and knowledge we gained in Chile, we are now continuing with several Fair Wood projects, of which the one in Mozambique is most advanced. At the moment, we're evaluating interest in purchasing raw material from the plant, where an upgrade of the sawmill has been planned", he continues.

According to Martin Persson, the plant produces raw material from a number of local, hardwood species with exotic appearance that could attract both the local and the global market, where Kährs Group could be a potential client, if the raw material proves to meet the company's demands on quality and quantity.

"One of the lessons learnt from Chile is that we must become better at developing local demand. The project there is now being restructured with assistance from the Chilean equivalent of Vinova in order to make it more professional and commercial", Martin Persson says.

PROJECT SAVE THE STAG BEETLE

Three years ago, Kährs built nine "hotels" – or habitats – for stag beetle larvae on the site of its Nybro plant. The hope was that the stag beetle would check in, multiply – and that the protected, giant insect thus would be saved for posterity. But it will take a number of years before we will know whether the hotels appeal to the discriminating guests.

If you have ever seen the magnificent stag beetle, it is likely that you will never forget it. The long, well-developed jaws, the impressive length and the shiny, darkish brown body of Europe's biggest beetle leave an unforgettable impression. A couple of years ago, Kährs got engaged in a number of different projects to save the protected insect. The overall aim is to help reintroduce stag beetles into Denmark, where the beetle has been extinct until very recently when a re-establishment drive was launched. It



is also designed to increase knowledge about stag beetles in Sweden.

A number of old, rotting oak logs with holes of various sizes stacked around Kährs site bear witness to the efforts. Their task is to attract stag beetles, which need dead wood for their lifecycle. The beetles lay their eggs in the ground and inside old logs or stumps of dead trees so that their larvae can gnaw on the wood.

It will, however, take a few years at least before we will know whether the project will be successful or not – since it takes a minimum of five years for the stag beetle to develop in the wood from larvae to pupae and then to fully fledged beetle. After hatching at the end of June, it will dig itself out and can then be seen flying around on calm, warm summer nights when it will reproduce. The stag beetle male only lives for a around two weeks and the female for two months, during which she will produce an egg and then find a place to lay it.

Water - Sources and usage

Water is part of a closed loop environmental system, so it is very important that the water we return to the environment is clean. The largest part of our water use goes to the irrigation of timber and to regulate the moisture content in the drying process.

Photo: Örjan Karlsson

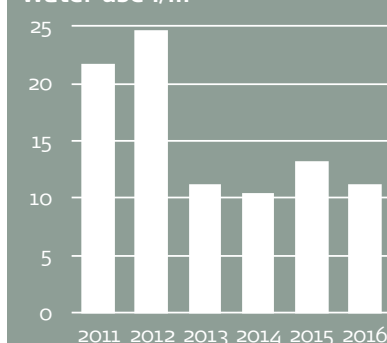
USE

The irrigation of timber prevents the timber from drying too quickly and cracking before it is sawn. In Blomstermåla water is taken from the River Alsterån, while the process in Nybro is based on recirculation to reduce water use.

To prevent the drying of sawn wood from proceeding too quickly, the moisture level in the drying facility is regulated, which also requires water. Water is also used to clean processing equipment.

Municipal drinking water	22 500 m ³	4,0 l/m ²
Of which is cooling water	8 000 m ³	
Groundwater for irrigation of logs	0 m ³	0,0 l/m ²
River water for irrigation of logs	40 610 m ³	7,2 l/m ²

Water use l/m²



EMISSIONS TO WATER

Surface runoff water/leachate från from irrigation of timber and from biofuel stores has elevated levels of oxygen-demanding substances and tannins (a substance that arises from the decomposition of wood or other organic substances).

A vegetation-based sediment filter (VSF) in Nybro reduces the amounts of organic matter (total organic carbon – TOC) to the recipient. In Blomstermåla no recirculation of irrigation water takes place; instead it is filtered, mainly

by ground soil, before it reaches the River Alsterån. Outgoing water is regularly tested to check for emissions of potential pollutants.

Process wastewater is generated in manufacturing operations, mainly for the cleaning of machinery and equipment. Process wastewater is treated in a sedimentation/adsorption process to reduce the amount of persistent organic substances that are not easily degraded. Processed wastewater from the treatment plant is then released into the wastewater

network and the municipal treatment plant, amounting to about 150 m³ /year.

In 2016, the sedimentation process has been improved to reduce the amount of organic matter (TOC) to the municipal treatment plant. The levels after treatment has decreased in 2016 compared with the previous year. At the end of the year, an ozone system to further improve the treatment outcome, was installed.

Type of water	Treatment stage, Kähns	Diverted to	TOC content before treatm.	TOC content after treatm.
Leachate from timber yard	VSF (vegetation-based sediment filter)	Municipal storm water network (for surface runoff water)	150-200 mg/l	50 mg/l
Process wastewater from cleaning of glueing and hardening equipment	Sedimentation/adsorption process	Municipal sewage network	ca 21 000 mg/l	4 300 mg/l

SIGNIFICANT ENVIRONMENTAL ASPECT:	WATER USE AND DISCHARGE OF PROCESS WASTEWATER	
ENVIRONMENTAL IMPACT	RISK	TREND
Water pollution and the dispersal of organic material which is not broken down in a municipal waste treatment plant (WWTP).	Damage to treatment processes in a waste treatment plant or recipient.	Positive development



Nature's own assets used in ambitious water cleaning project

From water plants to ozone. Kährs has dedicated many years and substantial resources to trying out the most environmental friendly way of managing the small amount of process water originating from producing wood floor. The goal is for the plant to manage all process water; to clean it and then either recycle it or discharge it directly into the storm water. The project has resulted, among other things, in five new PhD's – who you will meet on the next spread.

The project was initiated in 2007 when the Linnaeus University set up containers at the Kährs Nybro site to find out how vegetation and sunlight can be used to treat the water from the irrigation of the timber and the leachate from the large piles of wood shavings. The project is what is known as a triple helix collaboration (university, state and industry) and ran in 2007–2014.

The hypothesis was that it would be possible to remove up to 90 per cent of the natural pollutants from the water – which could then be reused, for example to irrigate timber – by using special plants and aeration. The groundbreaking research started with a conversation between William Hogland, Professor in Environmental Engineering and Åke Erlandsson, environmental manager at Kährs. The result is a full-scale facility for water treatment that is shown nationally and internationally – and which has yielded valuable knowledge about how plants can be used to clean water from the industry in a both simple and cheap way.

THE VEGETATION “EATS” ENVIRONMENTALLY HARMFUL SUBSTANCES

When they have been felled, oak can emit substances that can cause problems if they get into the environment. Surface runoff water from the piles of oak contains 4–5 times more organic substances than other surface runoff water.

The trials showed that these environmentally harmful substances are effectively removed by allowing leachate and other water that is used to store timber pass through the ponds of vegetation/plants. The plants work together with microorganisms to break down the substances, which are absorbed into the tree root systems or leaves and then are bound in the sediment in the ponds. The trials were conducted in 36 containers of plants, which were subsequently placed into the sediment ponds.

During the trial projects, which took place between 2007 and 2014, and involved not only Kährs and Linnaeus University but also Swedish government agencies and suppliers of both chemicals and energy, Kährs built full-scale facilities for treatment of both surface runoff water and process wastewater

- This is by far one of the most successful projects that I've taken part in during my 30 years as a researcher, William Hogland says.

LOCAL TREATMENT WITH NATURAL, INEXPENSIVE, SIMPLE SYSTEMS

The intention is to use this method in many more global industrial environments, besides the wood industry, in the future. The overall objective is to tackle environmentally harmful chemicals at the source and not wait until they appear in municipal treatment plants or drinking water. The basic idea is that you should treat water locally

and have inexpensive, simple systems that are easy to maintain.

- If each industry can perform such treatment work locally before they release the water, for instance to the municipal treatment plant, we would be able to make major savings,” says William Hogland.

TESTS BASED ON USING OZONE TO TREAT WATER

In 2016, Kährs initiated yet another project for treating the process water at the Nybro plant, this time using ozone. Ozone breaks down virtually all types of organic and non-organic substances in an environmental friendly, fast and effective way. The only thing left in the water is carbon dioxide and salt particles – which can be filtered or separated from the water using different methods.

Ozone has a powerful oxidation potential. It easily solved in water with excellent ability to eliminate the microorganisms that form pollutants. The method currently tested by Kährs forces the ozone to react with the pollutants and break them down. Afterwards, what is left of the ozone becomes oxygen.

- The overall goal with our water treatment projects is for us to be able to treat all process water ourselves, i.e. not passing on any water to the municipal sewage treatment plant and either recycle it or discharge it straight into the storm water, says Åke Erlandsson.

We help students to become doctors – they help us to clean our water

The water project at the Nybro plant has resulted in five new PhD's. Supervising them all was William Hogland, professor of Environmental and Ecological technology at the Linnaeus University in Kalmar. "We saw an opportunity to solve an interesting water problem in a way that would benefit both the company and research in general. This has been one of the most interesting projects that I've participated in so far – it has resulted in an operating plant, while five doctoral students have made their theses on one single company, something which is completely unique", he says.



**SAWANYA LAOHAPRAPANON,
THAILAND**

WHAT PERIOD OF TIME DID YOU SPEND AT KÄHRS?

From 2009 to 2013 in a project on treating wastewater and storm water from the wood industry.

WHY DID YOU CHOOSE KÄHRS?

Because Kährs has shown a strong interest to cooperate with our research team in finding innovative treatment technologies for wastewater management. In addition, in the scientific point of

view, not much research has been discussed on the environmental effects of the wastewater generated from the wood-floor industries and what technology could be economically implemented for treating this small stream of wastewater.

WHAT DID YOU DO IN THE PROJECT?

My research with Kährs was mainly focused on the treatment of process wastewater generated from the cleaning of raw materials and machineries in the production lines. This included identifying the source, sampling wastewater from the site and mapping out its effects the aquatic environment. I also conducted treatability study

for the wastewater using fly ash adsorption, biological treatment and combined adsorption and electrocoagulation process.

HOW WOULD YOU DESCRIBE YOUR TIME AT KÄHRS?

I enjoyed working with Kährs because I can feel that Kährs really want to find a solution for treating the process wastewater. This research work is not only limited in the laboratory scale but it is a work to solve a real problem in the real world. I am thankful for Kährs and my supervisor Professor William Hogland to brought me in this project and giving me the opportunity to work in the team in the international environment.

WHAT KIND OF SUPPORT DID YOU GET FROM THE COMPANY?

I received material support for my research and also support from Kährs employees - especially from Åke Erlandsson, who was very active and supportive.

DID THIS EXPERIENCE BENEFIT YOUR CAREER?

Yes, in many different ways, such as increasing my knowledge and skills for industrial wastewater treatment and management. It also improved my communication skills, as well as my critical thinking and problem solving skills.

WHAT KIND OF WORK DO YOU DO NOW?

After receiving my PhD, I spent 2 years as a post-doctoral researcher at a university in Taiwan. My research was mainly focused on the nanoparticles and surface modification of membrane for water treatment process. The work was fun and I learnt a lot. Now, I've applied for a faculty position at a university in Thailand.

JOACIM ROSENLUND, SWEDEN

WHAT PERIOD OF TIME DID YOU SPEND AT KÄHRS?

I was based in Kalmar 2011 and 2014, doing research on how collaborations between universities and industry works in real life as part of a EU project, that Kährs took part in, aimed at increased cooperation between more partners in the region.

WHY DID YOU CHOOSE KÄHRS?

The collaboration between the research team in Kalmar and Kährs had already been established.

WHAT DID YOU DO IN THE PROJECT?

My aim was to find out more about the co-operation regarding triple helix in the Kalmar region. Since I was a member of environ-

mental science and environmental technology team, the collaboration with Kährs was part of this. I used interactive research, among other things, to create workshops during which the collaboration could be discussed.

HOW WOULD YOU DESCRIBE YOUR TIME AT KÄHRS?

The personal contacts and the collaboration between the Linnaeus university and Kährs was an important part of the work

WHAT KIND OF SUPPORT DID YOU GET FROM THE COMPANY?

I felt than I could contact Kährs whenever I needed to. A representative of the company also took part in one of my workshops.

DID THIS EXPERIENCE BENEFIT YOUR CAREER?

It was part of my PhD thesis – so in that way it was an important tool in pushing my research forward.



WHAT KIND OF WORK DO YOU DO NOW?
I am soon to defend my PhD thesis.



HENRIC DJERF, SWEDEN

WHAT PERIOD OF TIME DID YOU SPEND AT KÄHRS?

Between 2010 and 2014.

WHY DID YOU CHOOSE KÄHRS?

I got the opportunity to write my PhD thesis with William Hogland as supervisor.

WHAT DID YOU DO IN THE PROJECT?

I studied storm water from Kährs industrial plant in Nybro, where I examined the optimal way of treating the water before it leaves the site.

HOW WOULD YOU DESCRIBE YOUR TIME AT KÄHRS?

It was a fantastic opportunity not only to work in a laboratory with sedimentary solution – but

with real process water. It was also stimulating to construct and evaluate pilot plants for treating process water.

WHAT KIND OF SUPPORT DID YOU GET FROM THE COMPANY?

The company and the university together built different pilot plants, where we could test and evaluate theoretical thinking in practice. It was valuable to be able to work with an industrial company and get experiences from real life.

DID THIS EXPERIENCE BENEFIT YOUR CAREER?

I am certain of it.

WHAT KIND OF WORK DO YOU DO NOW?

I'm working as a teacher at Kristianstad University, where I teach environmental science.

HENRIK NILSSON, SWEDEN

WHAT PERIOD OF TIME DID YOU SPEND AT KÄHRS?

From 2010 until 2014.

WHY DID YOU CHOOSE KÄHRS?

I/the project chose Kährs both because of previous collaborations and because the company was interested in and willing to let researchers into the company, something which is quite unusual.

WHAT DID YOU DO IN THE PROJECT?

I was engaged in mapping out the various difficulties in managing the process water that Kährs generates – with the goal to find a successful method of cleaning it.

HOW WOULD YOU DESCRIBE YOUR TIME AT KÄHRS?

I learnt an enormous amount about how environmental work is put into practice at a big industry, something that I really appreciate. The greatest challenge was to balance academia versus industry with their different goals and conception of time.

WHAT KIND OF SUPPORT DID YOU GET FROM THE COMPANY?

I worked a lot together with Åke Erlandsson, who was very generous both his time and opportunities to try our ideas. Apart from this, Kährs also contributed financially to the project.

DID THIS EXPERIENCE BENEFIT YOUR CAREER?

Very much so – since I'm working a lot with the industry right now.

WHAT KIND OF WORK DO YOU DO NOW?

I'm working as an environmental consultant.



FABIO KACZALA, BRAZIL

WHAT PERIOD OF TIME DID YOU SPEND AT KÄHRS?

I conducted my PhD studies focused at process water and storm water at Kährs between 2006 and 2011.

WHY DID YOU CHOOSE KÄHRS?

I was part of a research team at the Linnaeus University, which was collaborating with Kährs.

WHAT DID YOU DO IN THE PROJECT?

I have done research for characterization and treatability of different process waters in both laboratory and pilot scale. My characterization was done through physical-chemical analysis and also eco-toxicological studies. I have also worked with stormwater runoff from the log-yard and I have monitored the quality of this water for one year and also characterized it via eco-toxicological studies.

HOW WOULD YOU DESCRIBE YOUR TIME AT KÄHRS?

It was a time that was very important to learn and develop since I was working with real waters. In cooperation with a company trying to develop treatment systems which in this case are much more difficult in comparison to work with spiked waters. Therefore lots of challenges and constraints were faced and overcome which gave me lots of knowledge both theoretically and in practice. In this way, it was a very positive experience.

WHAT KIND OF SUPPORT DID YOU GET FROM THE COMPANY?

I got very good support from the Environmental Coordinator Åke Erlandsson and also internally with other workers to show me the processes and also during my period running the pilot plant.

DID THIS EXPERIENCE BENEFIT YOUR CAREER?

Yes, for sure.

WHAT KIND OF WORK DO YOU DO NOW?

Nowadays I divide my time at the Linnaeus University working at the same research group, the Environmental Science and Engineering Group, and giving lectures.

Waste – Recycling

By reducing waste, material efficiency increases while resource needs decrease. We strive to reduce the amount of waste that arise from our operations.

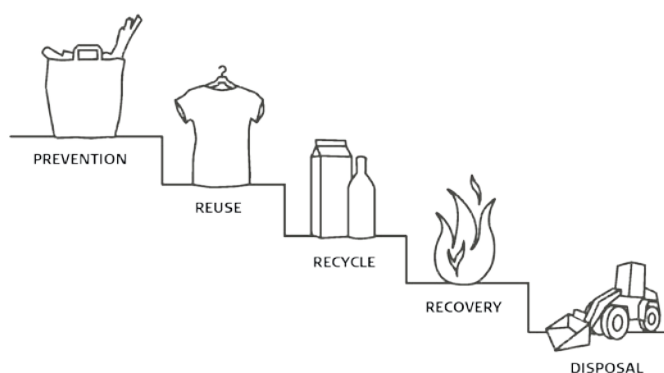
WASTE

Our operations mainly give rise to waste that is recycled for its materials (such as plastics, corrugated cardboard, metals and office paper) and energy extraction (such as sand paper, adhesive residue, plastic straps and filter bags from our filtering systems). Everything that is unsuitable for recycling or energy extraction goes to a landfill, this can be waste such as concrete.

All waste is sorted according to Kährs' waste standard. The waste standard is based on the principles of the waste hierarchy, which is a priority list for how we should treat our waste when we dispose of it.

We are striving to move our waste management as far up the waste hierarchy as possible.

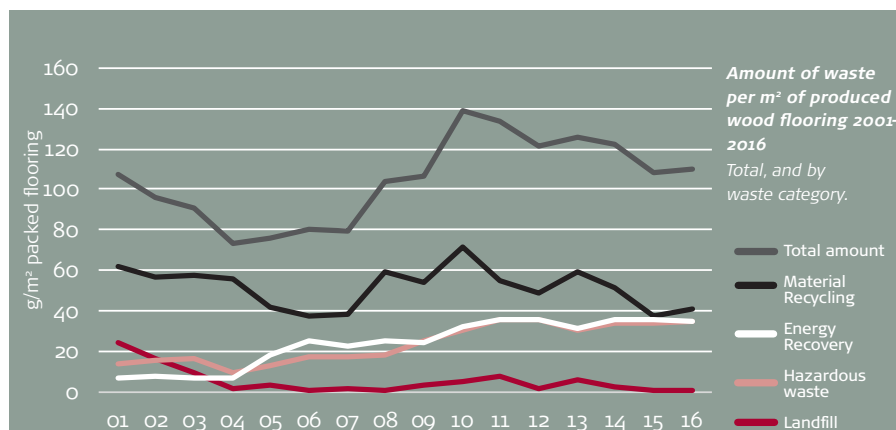
This section does not cover by-products such as wood chips and sawdust (see, instead, Energy Efficiency and Biofuel Production on pages 32-33).



HAZARDOUS WASTE

Hazardous waste constitutes one of our significant environmental aspects and largely arises from cleaning, in conjunction with changeovers in our production run processes. Further development of new products require many process changeovers for test runs creating waste that includes lacquer, glue and oils.

Even though waste is managed in an environmentally acceptable manner, it still interrupts the natural eco-cycle. The handling of hazardous waste also always involves a risk that these substances will harm the environment if they are not handled properly. Our waste is collected in approved containers by their particular use and are stored and managed in designated locations. Specialized contractors are used to handle the hazardous waste legally and in an environmentally correct way.



To material recycling	229 t	41 g/m²
To energy recovery	193 t	34 g/m²
Disposed as hazardous waste	194 t	34 g/m²
To landfill	5 t	1 g/m²

SIGNIFICANT ENVIRONMENTAL ASPECT:	HAZARDOUS WASTE	
ENVIRONMENTAL IMPACT	RISK	TREND
An efficient use of materials will not produce waste. Hazardous waste presents a risk of violating System Condition 2.	The handling and storage of hazardous waste involves a risk of seepage into nearby soil and watercourses.	Stable development

ENVIRONMENTAL TARGET WASTE

ONE OF THE ENVIRONMENTAL TARGETS FOR 2016 WAS TO REDUCE THE AMOUNT OF HAZARDOUS WASTE

In 2016, the focus has been on reducing hazardous waste. The target was to reduce the amount with 5 per cent, per square meter wooden floor, compared to 2015. The target was not achieved but the implemented measures are not yet fully reflected in the follow up.

The action plan for Kährs Sweden Group includes to separate fractions upstream that we can handle internally, and also education and information to the improvement groups.

Target for 2017

The target is to reduce the amount of hazardous waste by 5 per cent, per square meter of wood flooring, compared with the previous year.

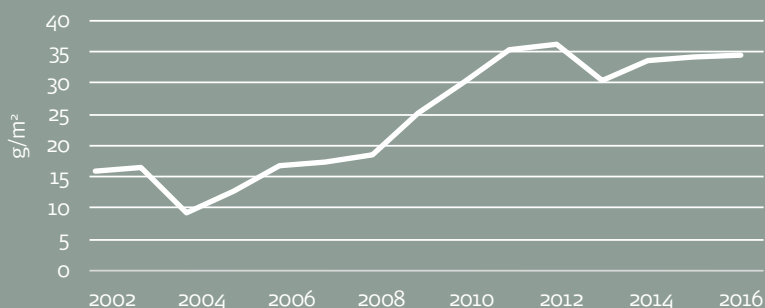
The goal is common to all production units within the Kährs Group.

The action plan for Kährs Group Sweden includes inventory and treatment of cleaning water that today is mixed in hazardous waste.

KÄHRS WASTE STANDARD

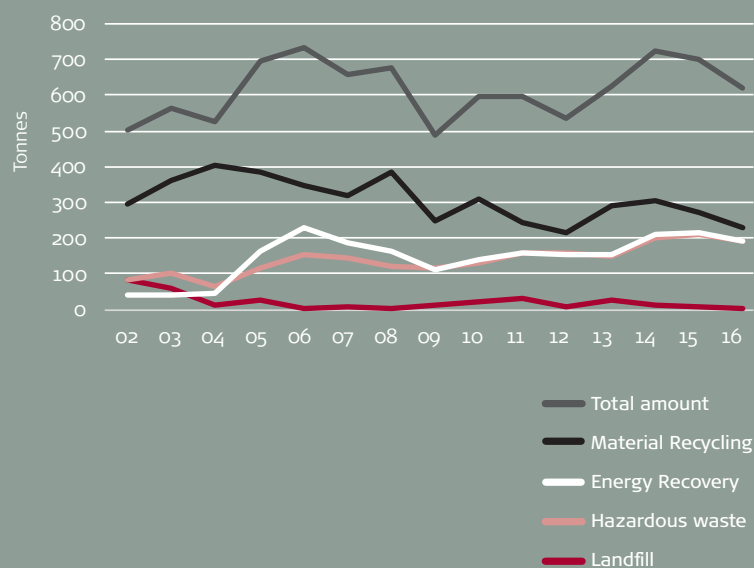
Kährs Avfallsstandard				
Allt avfall som uppkommer inom verksamheten ska sorteras enligt denna standard. Farligt avfall har markerats med *.				
Fraktion	Färg	Symbol	Exempel	Tar vägen
Blandskrot	Svart		Plåtbitar, skruv & mutter, stålband, plåtskyfflar, tomfat, tömda motorer och maskindelar	
Brännbart	Röd		Handskar, munskydd, plåster, skor, gummi, kläder, flaskor, hinkar, dunkar m.m....	
Plastemballage	Transparent säck		Transparent emballageplast som krympfilm och bubbel-plast	
Återvinningsbart papper	Vit eller blå		Tidningar, kataloger, kontors-papper	
Wellpapp	Brun eller nätkorg		Wellpapp	
Bobiner, Kantskydd	Blå containrar		Bobiner, Hylsor, Kantskydd, Fritt från annat material	

Amount of hazardous waste per square metre of flooring



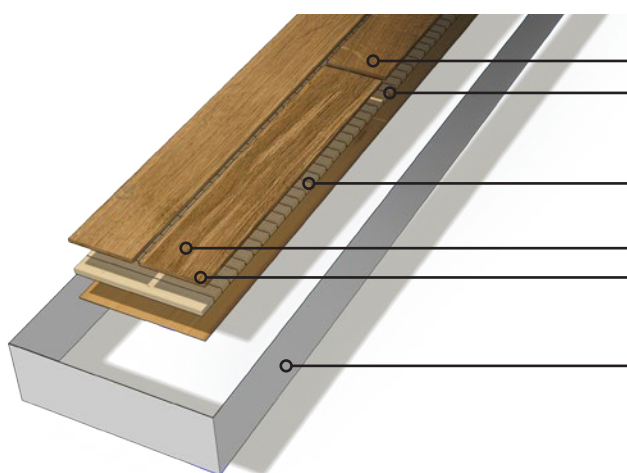
Total amount of waste in 2002-2016

Expressed in tonnes, per category



Material efficiency

Our material flow consists primarily of wood materials and additive materials for the product, as well as production maintenance materials and fuels. An improved efficiency of materials reduces the demand for resources and the need for transport.



WOOD MATERIALS

Hardwood – oak, ash and beech – are sawn in Nybro & Blomstermåla
Softwood for cores and back veneers, purchased sawn materials

AUXILIARY MATERIALS

Water-based adhesive for joining wear surfaces and pressing the various layers of the floorboard together

Filler used to even out the surface and fill in any knot holes

Surface treatment for performance and appearance

- Water-based UV curing lacquer

- Stains & oils – contain small quantities of VOCs, emitted during curing

Packaging materials

- Corrugated cardboard, wooden pallet – renewable, recyclable

- Plastic shrink wrap and metal banding – non-renewable, recyclable

MAINTENANCE FLUIDS

Machinery fluids as lubricating oils and hydraulic oils are used in production processes.

FUELS

At Kährs we use almost exclusively diesel and some alkylate petrol. Alkylate petrol is a

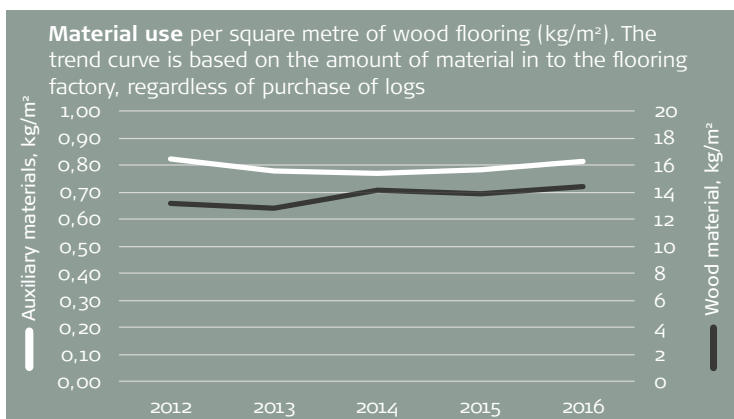
cleaner fuel and mainly used in chain saws at our production facilities.

CHEMICALS MANAGEMENT

Before any new chemicals are introduced for use in any of our production processes they are assessed for environmental and

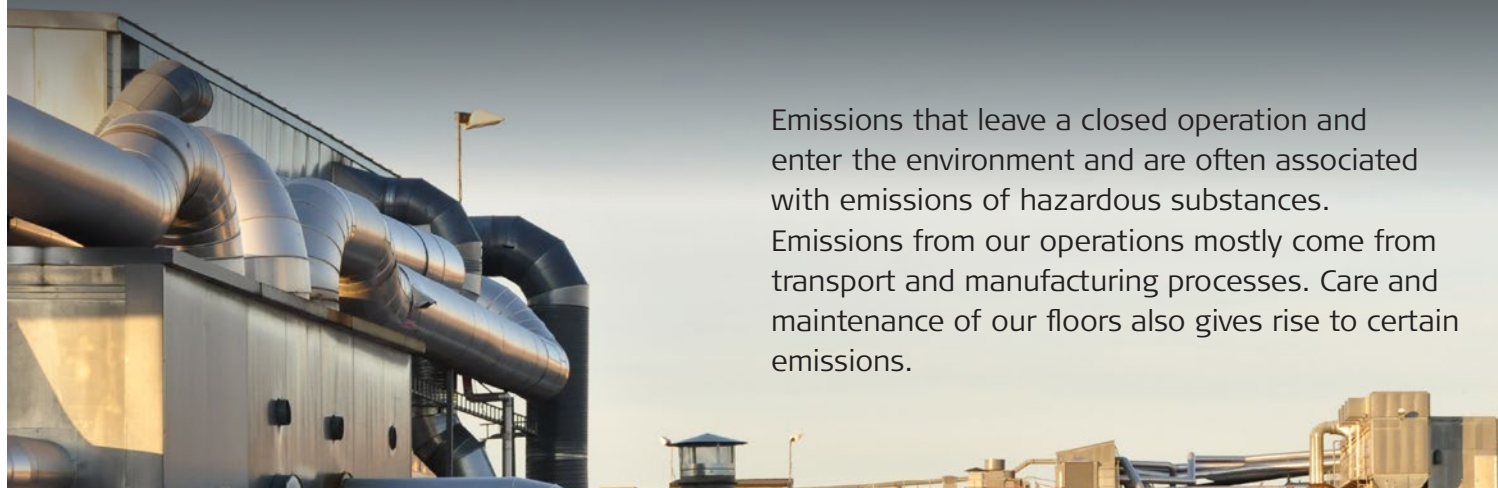
safety criteria. Approved chemicals are listed in our chemical register, where information about each chemical can be found as material safety data sheets. Currently, about 500 approved chemicals are listed in the register.

Wood material	138 000 t	25 kg/m ²
Logs	88 000 t	
Sawn wood & semi manufactures	50 000 t	
Additive materials for products	4 100 t	720 g/m ²
Renewable	1 000 t	180 g/m ²
Nonrenewable	3 100 t	540 g/m ²
Maintenance chemicals	56 t	10 g/m ²
Renewable	31 t	6 g/m ²
Nonrenewable	25 t	4 g/m ²
Fuel	192 t	34 g/m ²



SIGNIFICANT ENVIRONMENTAL ASPECT:	CONSUMPTION OF ADDITIVE MATERIALS	
ENVIRONMENTAL IMPACT	RISK	TREND
Use of a nonrenewable resources and the risk that these substances may seep into the natural environment.	Hazardous chemical substances risk getting into the environment & being absorbed by plants, animals & humans.	Stable development

Emissions – Emissions from manufacturing



Emissions that leave a closed operation and enter the environment and are often associated with emissions of hazardous substances. Emissions from our operations mostly come from transport and manufacturing processes. Care and maintenance of our floors also gives rise to certain emissions.

Emissions to the atmosphere from production processes are primarily dispersed emissions of VOC and dust from our various filtration systems.

VOC

VOCs are volatile organic compounds in lacquer, oil, stain, filler and from various chemicals used in machine and building cleaning and maintenance.

Emissions of VOC mainly occur in the surface treatment process. Certain VOC-classified substances in the curing of adhesives are consumed as they react and thus are not emitted during production.

Of the total amount of additive used (not renewable), only 0.15% VOC is released during

the production process. Other VOC emissions come from maintenance chemicals, such as spray cans.

We are actively working to reduce the proportion of VOC in additives. In our development work for new products, we have significantly reduced the VOC content in oils. However, changes in the product range have led to a shift in mix in recent years, which in turn has led to an increase in VOC emissions

DUST

Industrial air filtration systems transport large quantities of wood shavings and wood dust/flour through our large facility at Kährs Group's factory in Nybro. Preventive maintenance ensures that the filtration equipment operates well. By measuring, examining and listening to the equipment we can find prob-

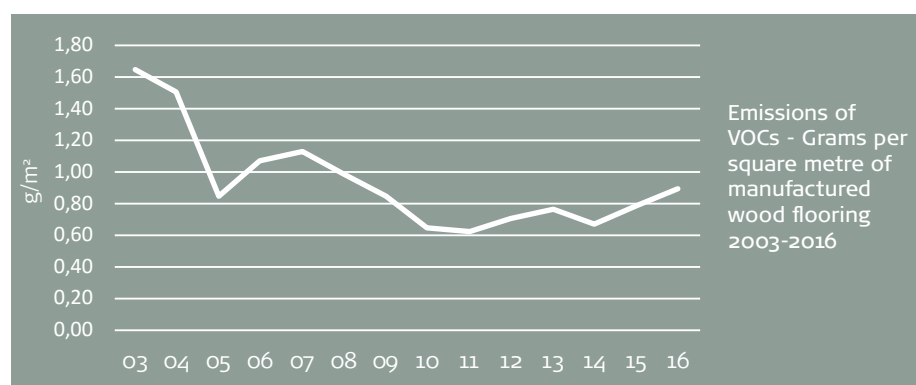
lems early on to stop any emissions and avoid costly repairs to the filtration system.

OTHER EMISSIONS TO THE ATMOSPHERE

Heat energy is contracted from a local energy company using our own biofuel (wood waste) from Kährs. The burning process releases carbon dioxide, nitric oxide and dust. The carbon dioxide emissions contribute to the greenhouse effect, but biofuel does not cause a net increase of carbon dioxide in the atmosphere. However, nitrogen oxide and sulphur dioxide contribute to atmospheric acidification.

The energy conversion does not occur on Kährs' premises, and no emission is therefore stated for this in the report.

The location of Kährs' main factory in central Nybro is a challenge in terms of noise. Noise is caused primarily by our fans and filters in the manufacturing plants, but also in connection with transports (loading/unloading or road/motor noise). Noise may be harmful or least be perceived as a nuisance by people both inside and outside the company premises (employees, neighbours and local residents). Periodic noise samples are taken to ensure compliance to requirements.



VOC (Volatile Organic Compounds)	4,5 t	0,9 g/m²
Dust (estimated quantity)	1,9 t	0,3 g/m²

SIGNIFICANT ENVIRONMENTAL ASPECT: EMISSIONS TO AIR		
ENVIRONMENTAL IMPACT	RISK	TREND
Emissions of substances that adversely affect air quality.	A disruption to equipment or a process can entail increased emissions.	Stable development for dust but a small increase of VOC due to changes in product range.

Why do we use chemicals?

Wood accounts for 98% of the content of the floors Kährs manufactures. To make a finished product that performs well in everyday life and that can handle the demands of use in modern environments, it is necessary to add materials and substances that enhance the wood's beauty, protect the surface and hold the construction. Auxiliary materials in the products and maintenance chemicals in production are simply necessary in the manufacture of wood flooring.

Our focus is to minimise the amount of chemicals in our processes. There are many good reasons for doing that; to reduce the impact on the environment and the risks for people who work with us or use the products are obvious reasons. Financially, it is also an advantage to keep down the amount of auxiliary material.

PROVIDES IMPROVED PERFORMANCE, LONGEVITY AND BEAUTY TO THE WOOD FLOORS

For us who produce wood flooring, the natural beauty of the wood is another important reason not to overdo the amount of lacquer applied to the surface. We work with our suppliers to develop effective and durable surface treatments that will do the job and protect the floor already at small amounts to preserve and enhance the feel and the beauty of wood.

HOLDS TOGETHER A GENIUS CONSTRUCTION

Other chemicals in our products are used to hold up the construction. The multi-layer/engineered construction of doors and wood flooring was invented by Gustaf Kähr already in the 1930 's and was a genius solution to problems such as. dimensional stability and resource utilization of wood material.

Engineered wood flooring simply means that the floor is built up in several layers of layers of wood that are placed in opposite directions to make the wood's inherent powers pull in different directions. This in turn reduces the swelling and shrinkage of the flooring boards when humidity changes in a room and will minimize the gaps between the boards.

The other big advantage of engineered wood flooring is to use the slow-growing hardwood only to the floor's visible, upper layer. A thrifty problem solving that saved both the deciduous forest and the wallet, and which has become a standard today. The design requires that the various layers are joined and we do this with water-based adhesive.

KEEP OUR FACTORIES RUNNING

Other groups of chemicals that are needed in order to produce flooring is motor fuels and maintenance material that lubricates the machines in our manufacturing facilities.

EXAMPLES OF ENVIRONMENTAL MILESTONES LINKED TO CHEMICALS:

1937 we were awarded the first patent for the multi-layer wood door that 1941 leads to the first patent for multi-layer engineered wood flooring

1958 we introduced the first factory finished floor

1984 we introduced the first solvent-free lacquer system

1999 first glueless joint, Woodloc® was introduced to the world

2011 we are certified according to DIBt, French VOC A+

2013 Kährs' first Swan, Nordic Ecolabelled products were launched. The Swan labelling means continuous tightening of set requirements on the products and the purpose is to help consumers choose the best products from the environmental point of view

2016 Investments are made in new technology, for cleaning of process waste water, based on ozone. The project continues also in 2017



Sara Hagman, Development engineer and surface finishing specialist

Chemical mapping - The Foundation for safe chemistry

As demand is becoming more influenced by lifestyle trends, product development has led to greater variation and more advanced designs in our wood flooring ranges. Inventory, development and management of chemicals in order to reduce risks and impact on the environment has always been part of the development work but have gradually become more and more complex. In 2016, great efforts were made to develop our chemical management.

Management and administration of chemicals is a must in our business where information on various substances always need to be available to employees and users of the products. To meet requirements on information availability can be time consuming and cumbersome and therefore Kährs Group decided make a thorough change of the chemical registers.

In order to streamline administration, management decided to switch to a new system which, in addition to facilitate procedures, also would support the development and

improvement work. After thorough mapping, all data about the chemicals in our operations were moved into a new database, where they were made fully searchable on key terms and substances.

"Kährs Group now has a really good tool that support the continuous development and improvement, while it meets the requirement of accessibility for those who come in contact with the chemical products," says Sara Hagman, development engineer and surface finishing specialist at Kährs Group.

The work put in to the new system will help us in our efforts to continuously reduce the number of products and to identify the chemicals that are in turn to be replaced with better products, as product development is progressing.

2016, the Swedish operations of Kährs Group had 462 products registered in the chemical register, based on iChemistry from the company Intersolia.

Emissions – climate impact from transportation

Kährs Group sells and delivers wood flooring all over the world, which involves many long-distance transport routes. The resulting fossil fuel carbon dioxide emissions contribute to an increased greenhouse effect and thus an increase in the risk of climate change.

Kährs Group's emissions of fossil carbon dioxide come from transport and amount to about 15 600 tonnes. This represents 1,6 kg CO₂ per m² of manufactured wood flooring in the Kährs Group.

SHIPS & TRUCKS ARE THE DOMINATING MEANS OF TRANSPORTATION

All calculations of transportation emissions are based on material from our suppliers of transport services.

Cargo ships are used primarily to transport incoming wood material from North America and other sources, and for transport of finished flooring to distant customers.

Truck transportation is used for short distance deliveries between suppliers and the production sites and for transport needs that cannot be served by ship or train. Most transportation work is via cargo ships, but the largest carbon dioxide emissions come from over the road transports.

Transportation by rail comprises the incoming delivery of logs to the Blomstermåla sawmill. The environmental benefits of rail transport are difficult to be taken advantage of as trains do not always meet customers' requirements for flexibility.

Transportation to our warehouses, from all Kährs Group production facilities and externally produced flooring, is included in the report.

In 2016, the basis for transport has been expanded, comparisons with previous years are therefore uncertain.

Our climate impact

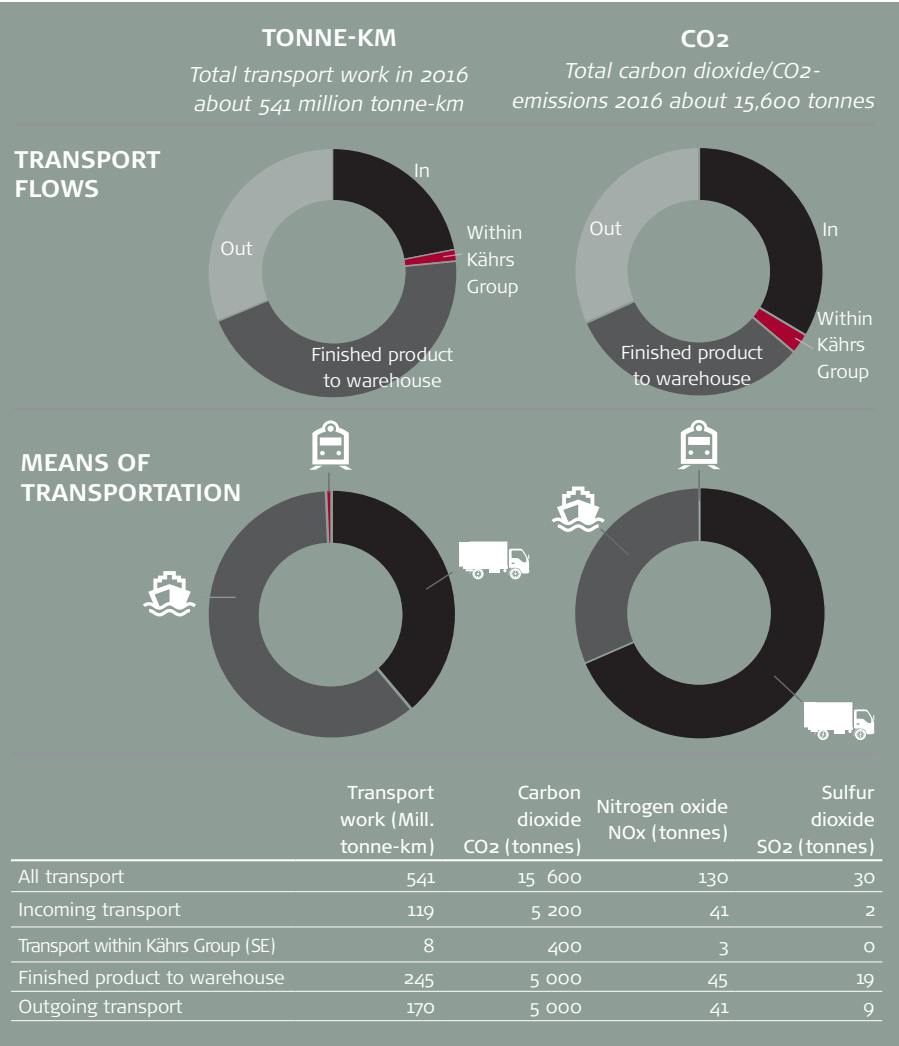
CARBON DIOXIDE IS STORED IN WOOD FLOORING

The wood flooring produced in Nybro in 2016 stores more than 80 000 tonnes CO₂ up to 50 years in the flooring installations made on the market. A wood floor can have a lifecycle of 50 years, and it is then usable as biofuel as 98 percent is wood. Burning wood does not give a net increase of atmospheric carbon dioxide, provided that the forests are replanted. Alternatively flooring could be reused for another wood-based product and continue to store carbon dioxide.

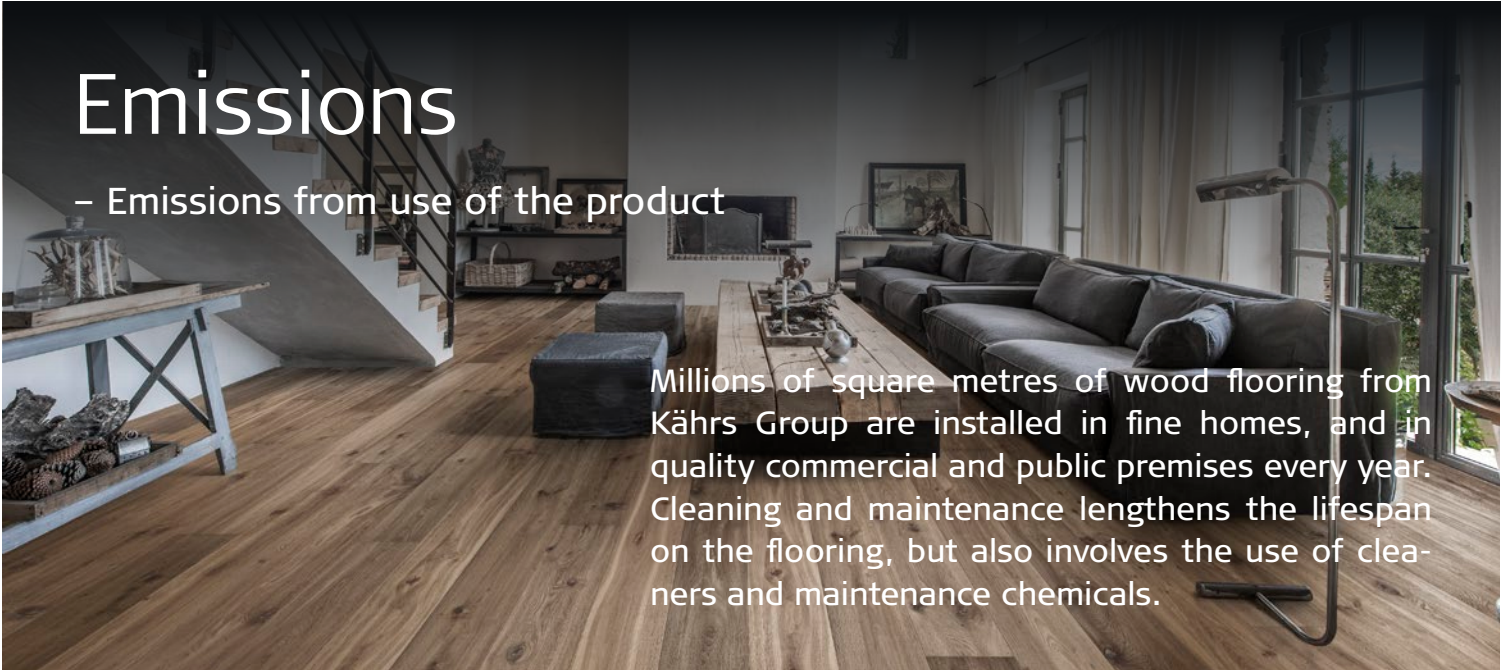
Our main activities to reduce our carbon dioxide footprint are to increase efficiency when planning logistics and use transport methods that have lower carbon dioxide emissions.

INCREASE OF TRAIN TRANSPORTS IN 2017

During 2017, we will test a new transportation concept with rail transport between Satulung in Romania and Nybro.



SIGNIFICANT ENVIRONMENTAL ASPECT:	CLIMATE IMPACT THROUGH TRANSPORTATION	
ENVIRONMENTAL IMPACT	RISK	TREND
Emissions of carbon dioxide from fossil fuels into the atmosphere give rise to an increased carbon dioxide content and an enhanced greenhouse effect.	Procurement of less efficient transports.	Stable development



Emissions

– Emissions from use of the product

Millions of square metres of wood flooring from Kährs Group are installed in fine homes, and in quality commercial and public premises every year. Cleaning and maintenance lengthens the lifespan on the flooring, but also involves the use of cleaners and maintenance chemicals.

As a manufacturer we have a responsibility to make floors that are easy to clean and care for and to suggest suitable cleaning and maintenance methods for various application areas.

Care and maintenance instructions accompany every delivery of wood flooring and detailed information is available in many different languages on our website and on our products.

Care and maintenance are important components of our "flooring schools", where floor contractors, floor installers and store staff are trained.

Our own maintenance products have been formulated and tested to combine effectiveness with minimised environmental impact. Generally we advocate dry methods of cleaning for daily care and our (no VOC) Cleaner product when necessary.

Oiled floors require treatment immediately after installation, then periodically as necessary. This maintenance is carried out using Kährs Satin Oil.

EMISSIONS FROM WOOD FLOORS

All wood floors can generate emissions, e.g. formaldehyde and VOCs, both naturally through the wood and from additive materials. There are a number of guidelines and eco labels to help users select good products with low emissions.

Most wood floors from Kährs Group meet the requirements for some of the toughest ecolabels, such as Swan (the Nordic Ecolabel), E1, M1 and CARB 2, to give some examples.



KÄHRS FLOORING SCHOOL

We train flooring professionals, building contractors and store staff on site at our premises in Nybro. This is an opportunity for us to provide information on suitable methods of care and maintenance. Moreover, care and maintenance advice is included in our presentations given during customer visits and at events all over the world.

PRODUCT MAINTENANCE

Excessive use of aggressive cleaning agents and chemicals benefits neither the indoor environment, the environment or the wood floor.

Choose a mild cleaner and use it sparingly. The best way to protect the floor is to prevent dirt/grit and debris from spreading into the room using effective dirt barrier systems (e.g. for wiping your shoes on) at the entrance and to be sure to wipe up spills quickly.

SIGNIFICANT ENVIRONMENTAL ASPECT:		EMISSIONS FROM USING THE PRODUCT	
ENVIRONMENTAL IMPACT	RISK	TREND	
Recommended methods can reduce environmental pollution, e.g. less emission of chemicals and extend the life of the product. Emissions from the wood floor are monitored according to the requirements for different product certifications.	Poor care of wood flooring may result in unnecessary emission or use of chemicals.	Stable development – increased share of environmentally certified products and clear recommendations for care.	

Energy efficiency

– Use and biofuel production

Energy efficiency reduces environmental impact and we provide renewable energy to consumers who might use fossil fuels.

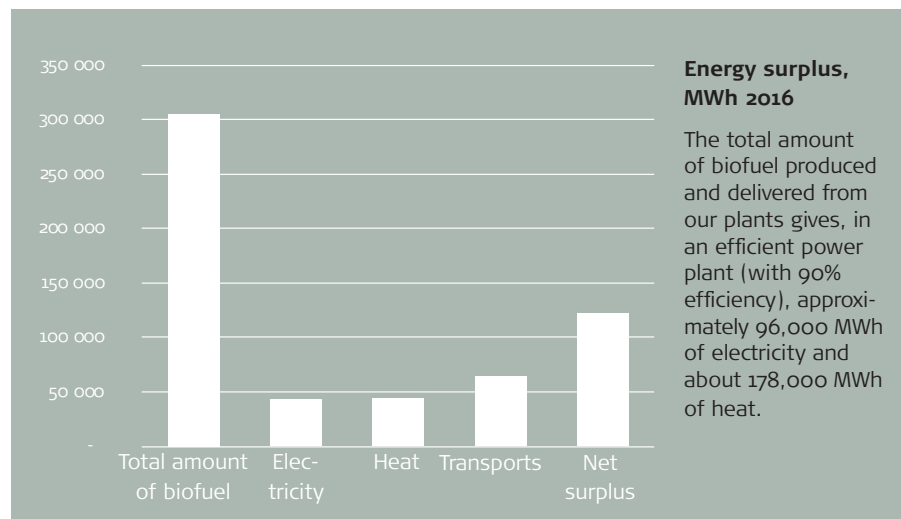
All conversion of energy has a certain effect on the environment and climate due to the use of fossil fuels and the emission of acidic gases.

All energy used at Kährs' Swedish plants is renewable. The electricity used is registered as 100 per cent renewable and all heat used comes from Nybro Energi and the municipal district heating network. In 2016 we supplied more energy, in the form of biofuel, than we used as district heating.

The largest part of energy use in Kährs Group's Swedish operations is for drying wood, heat for pressing and transportation. (described on page 24).

- Our dry residue (wood flour) is purchased by a local energy company to use the wood flour or make wood pellets for production of heat energy.
- Wood waste from our sawmill consists of sawdust, bark and chips.

- The ash from the combustion in the bio-mass boilers is collected and spread back in local forests as a nutrient.
- The total amount of fossil-based fuels which were used for transportation to the Kährs Group production units in 2016 is equivalent to approximately 64,000 MWh. Since this includes energy for all transports within the Group, the specific energy use is 6.3 kWh/m². Other energy data represents only the Swedish units.



POSITIVE ENERGY BALANCE

Kährs' activity in 2016 resulted in a surplus of carbon neutral fossil-free bio-energy.

Kährs produces more biofuel energy than we consume as electricity, heat and transportation.

When all internal consumption of energy is subtracted from the total amount of biofuel produced, we have a surplus of 123,000 MWh. This corresponds to the heating energy needs of 6,150 normal-sized Swedish houses yearly.

Biofuel is carbon dioxide neutral and over time has no climate impact as CO₂ is absorbed through the regrowth of new trees.

Electricity consumption	43,000 MWh	7,6 kWh/m ²
Heat consumption	44,000 MWh	7,9 kWh/m ²
Transportation energy (fossil fuel) Kährs Group	64,000 MWh	6,3 kWh/m ²
Production of biofuel	304,000 MWh	51 kWh/m ²
Net-Energy Produced (Carbon Neutral)	123,000 MWh	22 kWh/m ²

SIGNIFICANT ENVIRONMENTAL ASPECT:	USE OF ENERGY	
ENVIRONMENTAL IMPACT	RISK	TREND, see the graph on page 27
Acidification, emission of carbon dioxide and the consumption of resources in the conversion of energy.	Increased use of energy.	Stable development

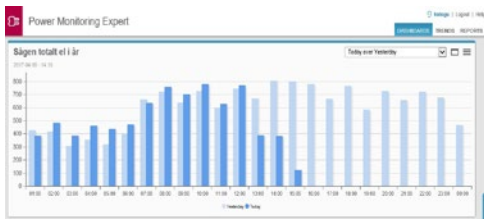
ENVIRONMENTAL TARGET ENERGY USE

TO DECREASE FUTURE ENERGY USE PER M²

The target for 2016 was to reduce energy use (kWh/m²) with 2 per cent per square meter compared to 2015. The target was not reached, mainly because parts of the action plan were not carried out and because the production volumes were slightly lower but the energy use was constant.

In 2016, a mapping of energy use throughout the company started, which will generate items in the action plan.

We perform continuous measurements of energy use in our buildings and production processes. Through these measurements we have identified savings potential with existing equipment that has subsequently been upgraded. This is ongoing work to identify future opportunities for reduced energy use.

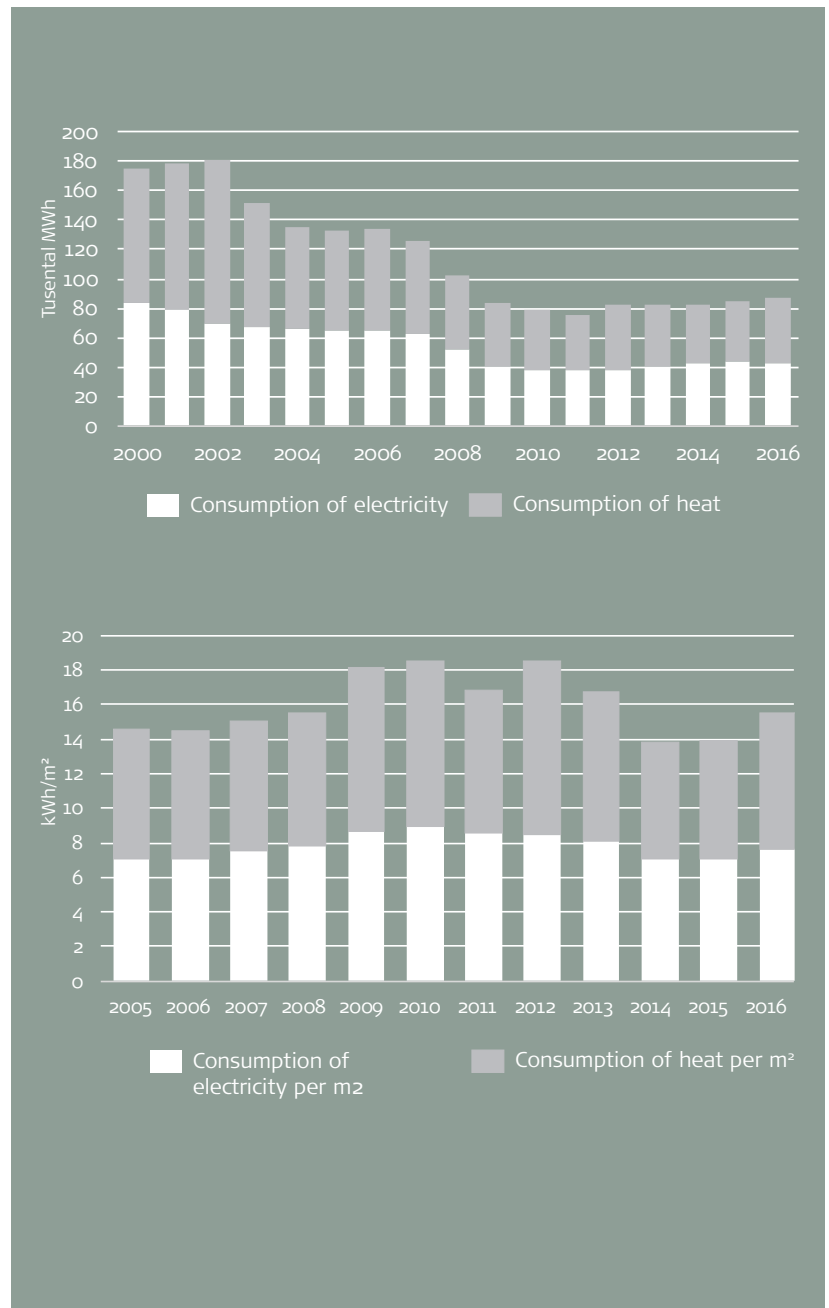


EXAMPLES OF COMPLETED AND ONGOING ACTIVITIES:

- Continued replacement of light fixtures with LED lighting, Timer-controlled lighting
- The feasibility of recovering energy (heat) from the exhaust air from our large filtration systems has been studied
- Hydraulic drive has been replaced with an electric drive for a saw carriage in Blomstermåla
- Gates of drying chambers have been sealed
- Motors have been replaced to better energy class

The effects of implemented measures have not had full impact on the outcome of 2016.

The potential to reduce energy use is influenced by many factors, including weather, mild or severe winters and increases or decreases in production volumes.



Target and action plan for 2017

More efficient use of energy remains an environmental target for Kährs Group. A new target is to decrease the use of energy (kWh/m²) by 2 percent in 2017 compared to 2016.

Heat recovery from compressors is a part of the action plan and mapping of the energy use will generate more items in the action plan in 2017.

Risks

Laws have evolved towards greater demands on risk assessment and measures to reduce the risks. Probabilities and consequences of an event affect that risk.

OUR WORK ON RISKS

For several years at Kährs Group in Nybro and Blomstermåla we have coordinated our risk assessment work in a group representing environment, fire protection, work environment, infrastructure and safety.

After a yearly analysis of risks related to the environment, an action plan is drawn up of what needs be corrected to reduce the risks.

OUR LARGEST RISKS

Implemented measures have been followed up and a new action plan has been developed, in which continued management of chemicals is one of the largest parts.

Risks to pollute water or soil are mainly connected to loading and unloading of chemicals. Routines are in place to prevent incidents and to minimize the environmental impact in the event of an accident.

MEASURES

Expanded surface runoff water collection helps to also reduce our risk in the event of a chemical spill on the site.

A review of chemical risks and training of personnel have been made in connection with placement of new emergency response kits for chemical spills. According to the analysis, the major environmental risks are associated with fires, filter breakdowns and the loading and unloading of chemicals.



Internal and external audits

Audits are tools to follow up our key processes progression. Audits check that our work methods guide us to meet the requirements and goals stipulated in Kährs' management system.

INTERNAL AUDITS

Management prioritizes the processes to be evaluated in the audits. The standards for each management system (SS-EN ISO 9001:2008 and SS-EN ISO 14001:2004 together with the EMAS regulations) define the requirements for internal audits.

We conduct internal audits at planned intervals to determine whether the management system has been properly followed and maintained in an appropriate manner but also to identify areas to improve.

Internal auditors with different roles in the company comprise our competent group of auditors. Planning, implementation and reporting are designed to evaluate and support continuous improvements

at Kährs according to the PDCA (which stands for: plan, do, check, act) wheel.

The audits are carried out according to Kährs' shared management systems for environment and quality. Effectiveness verification of the system at the different sites are included in the audits.

EXTERNAL AUDITS

Periodic audits of the management system for environment (ISO 14001) and quality (ISO 9001) were made during the year. For Kährs FSC/PEFC certifications, we have external third-part audits. Audits were also conducted to verify that we meet the demands of our many flooring products certifications.

Local conditions - Kährs Group Nybro



The Kährs plant in Nybro has a permit that enables the facility to produce up to 20 million m² of wood flooring per year. The permit also includes sawing up to 200,000 m³ of timber per year.

AUTHORITY-RELATED EVENTS DURING 2016:

- The final sealing of the old internal landfill facility has been approved by the supervisory authority (Myndighetsnämnden). No elevated levels indicating any environmental impact from the landfill has been detected.
- Consultations were held with the supervisory community authority and the water and sewage department regarding management of process wastewater.
- Measures to improve the quality of surface runoff water and process water have been implemented.
- Efforts to develop the internal inspection programme continue.
- Oil spill at the sawmill has been handled without polluting the municipal waste sewage/wastewater network.
- No complaints were reported during the year.

Permit conditions

Term (Date of issue)	Guideline	Status
3. Discharge of VOC (2005-02-04)	Max. 0.75 tonnes of VOCs per started million m ² . The applicable limit value is 15 tonnes of VOCs per year.	Met: 0.67 tonnes per started million m ² .
4. Noise (2005-02-04)	55 dB(A) weekdays, Monday–Friday 07:00–18:00 45 dB (A) at night 10:00 p.m. to 7:00 50 dB (A) at other times Maximum momentary noise level at night is 55 dB (A).	Extended operations at night at the sawmill can affect the noise. Update of mapping commenced.
5. Noise (2005-02-04)	At a new establishment, measures shall be taken to reduce noise emissions to the Swedish Environmental Protection Agency's guidelines for newly established industry.	No changes in 2016 that are affected by the condition. The location in Nybro town centre is a challenge.
8. Decontamination and after-treatment	Examine the need for decontamination and after-treatment measures	MIFO-FAS2 was conducted in 2013. No further measures necessary. Decision of approval from Myndighetsnämnden regarding the final sealing of the landfill.
9. Dust (2008-11-25)	2 mg/Nm ³ dry air, measured by random sampling.	Measurement performed in four filters during 2014. All results < 0.5 mg/ Nm ³ . No measurement carried out in 2016. Maintenance and monitoring of the filters is made according to the regular maintenance system.
10. Water (2010-09-09)	Process wastewater shall undergo sedimentation and adsorption processes before it is released to the municipal sewage/wastewater network.	This requirement is met through a treatment plant with a sedimentation stage and a provisional adsorption filter with wood chips. Installation of an ozone step in December 2016.
11–14. Water (2010-09-09)	The residue arising from the sedimentation and adsorption shall be disposed of as waste. Outgoing water must not damage the municipal sewage/wastewater network, water treatment plant or the recipient. In its environmental report, Kährs shall annually present its work to reduce the amount of process wastewater and pollutants into the municipal sewage treatment plant.	Residue as glue and sawdust from the water treatment processes are disposed as waste for energy use. Low pH in outgoing water after treatment, in the ozone step, the water will be adjusted for pH

* The environmental report (submitted to the government committee, Myndighetsnämnden, in Nybro Municipality) comments on all the conditions.

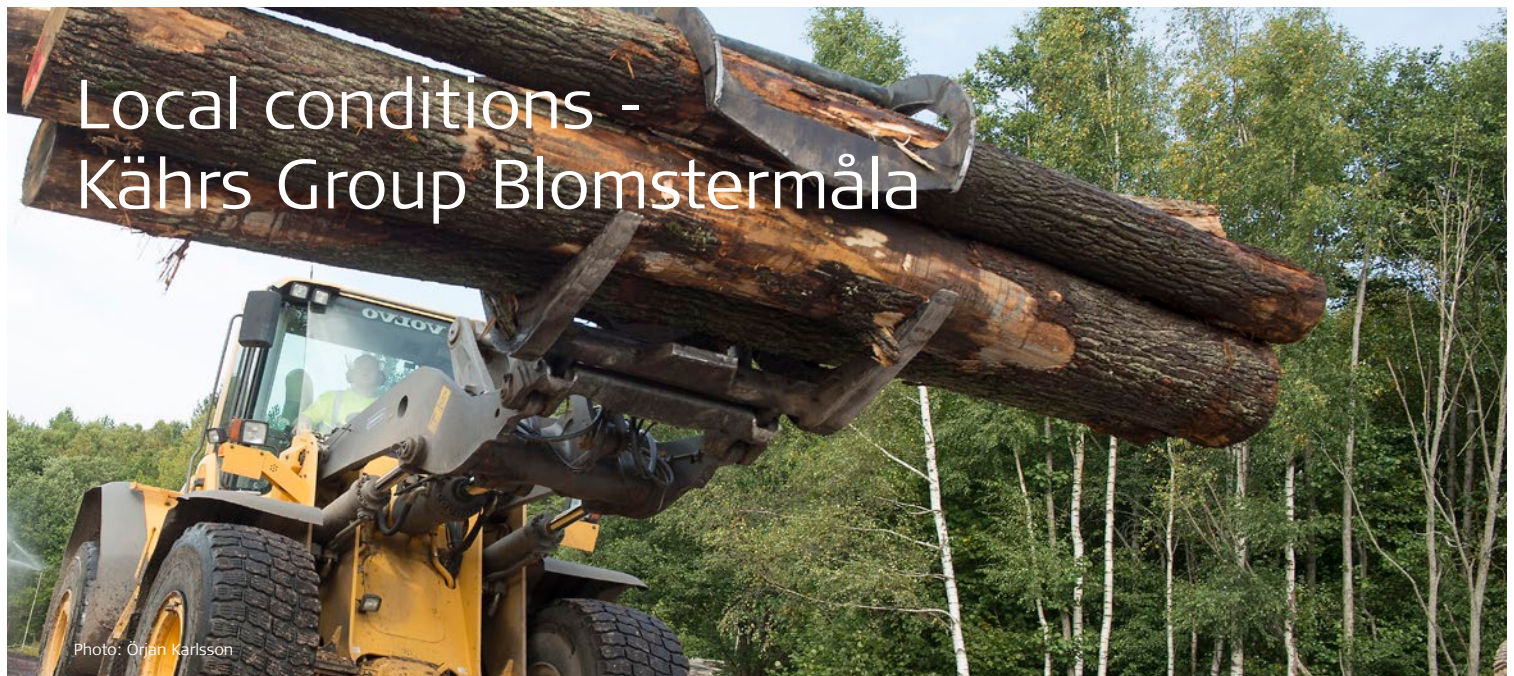


Photo: Örjan Karlsson

The operations in Blomstermåla do not require a separate permit, but are regulated by a number of precautionary and protective measures regarding issues such as irrigation, water and air emissions, management of chemicals, waste and noise. The sawmill in Blomstermåla sawed 20,767 m³ of timber in 2016. The sawmill has been rebuilt to produce rough-edged blocks and planks, immediately after the division of the log in the band saw. These are then further processed in the Nybro factory.

IRRIGATION

The watering system operated the entire season. Tests of the runoff from the irrigation was conducted and reported to the Environmental Office (Mönsterås). The diversion to the river Alsterån is mainly via ground infiltration, but runoff from the drainage area leads to the river bank area.

At the most, about 2,355 m³ of timber was stored in the water storage. Analyses of TOCs in water from the irrigation shows about 30 mg TOC/l. Analysis of the water upstream and downstream Alsterån show no elevated values. 6,000 m³ of logs were irrigated with 40,000 m³ river water.

RISKS IN CHEMICALS MANAGEMENT

The risk of accidental discharge into the near-by River Alsterån that flows alongside the saw-

mill is one of the most important environmental aspects connected with the Blomstermåla sawmill. Kährs is included in the Alsterån Water Council and follows the program for recipient monitoring. Emergency kit boxes in case of chemical spills have been placed around the sawmill. Protective equipment for storm drains (for surface runoff water) is positioned in selected locations to be available if any spillage occurs close to storm drains.

Oil storage and hazardous waste storing have improved in terms of availability and marking.

TRANSPORT

Transport is also a significant environmental aspect for the operations in Blomstermåla. Over 70 per cent of the imported logs delivered to Blomstermåla were transported by train or boat in 2016. The Swedish logs are primarily

transported by truck and constitutes of two-thirds of the totally delivered amount.

EMISSIONS TO AIR AND NOISE

The new sawdust storage facility has been in use in 2016 resulting in the dispersal of sawdust in the area around the River Alsterån has ceased. During the year, the sawmill has expanded its operations with a night shift, which does not affect fulfilling of the noise conditions.

SUPERVISION

Blomstermåla operations are classified as a Class C facility, the Environment Committee in the Mönsterås Municipality is the supervisory authority. The last supervised visit was conducted in May 2015. All points have been responded to and addressed. Improvement of self-monitoring has begun to secure measures and monitoring of environmental aspects.



Approval

Kährs' Group subsidiary company AB Gustaf Kähr and its Swedish units are included in our quality and environmental management system according to ISO 14001 and ISO 9001 as well as EMAS registration. Certificates are available for download at www.kahrs.com.

This environmental report according to EMAS is checked by DNV GL, which is a SWEDAC-accredited environmental auditor (accreditation number 053). DNV-GL has reviewed Kährs Group's Swedish production plants and has found that they have environmental management systems that meet the requirements stated in the EMAS regulation (No. 1221/2009). From 2006 and forward, Kährs' Swedish units are registered collectively as Kährs Nybro. S-000055.



APPROVED

DNV-GL has reviewed the environmental report for 2016 and has found it to be accurate, and sufficiently detailed to meet the requirements in EMAS.

The report includes the production units in Nybro as well as Blomstermåla and AB Gustaf Kähr's collective functions in Nybro and Malmö. The next audited environmental report for Kährs will be drawn up during the first half of 2016.

Solna 2017-05-18

Ann-Louise Pått
Management Representative

DNV GL - Business Assurance

Certificates

	 EMAS	 FSC®	 ISO 9001	 ISO 14001	 PEFC
Year	1997	2005	1999 (ISO 9002: 1993) No. 2000-SKM-AQ-1481	1997 No. 2000-SKM-AE-228	2013

EMAS has the purpose of promoting environmental improvements. It is a voluntary EU programme that requires public reporting of environmental conditions.

FSC® is an international organization working for global responsible forest management that takes into account both the environment and the people living in and from the forest. The Kährs "chain of custody" certification means that we may buy FSC material and manufacture and sell flooring products that are "FSC Mix certified".

ISO 9001 is the international quality management system.

ISO 14001 is an international standard for environmental management, designed to protect the environment, prevent pollution and achieve constant environmental improvements.

PEFC (Programme for Endorsement of Forest Certification) is an international system for sustainable forest management. Kährs has a chain of custody certificate.

About Kährs Group globally

Kährs Group develops, manufactures and sells wood and resilient flooring all over the world. The company has strong brands in its product portfolio, Kährs, Karelia and Upofloor. The supply chain for manufacturing units are in strategic locations in Europe and are close to the wood raw materials and important markets. Resilient flooring represents a smaller proportion of the sales but is an important complement to wood flooring, making Kährs Group a comprehensive supplier of flooring with a focus on innovative solutions, environmental and health – in all its product segments.

The Group delivers products to more than 70 countries and is a market leader in Sweden, Finland, Norway and Russia, and also holds strong positions in other important markets, e.g. The UK and Germany. The Group employs about 1,700 people and has annual sales of approximately EUR 300 million..



Karelia
HARDWOOD FLOORS

UPOFLOOR®

Kährs Group's three global brands.

THE GROUP'S PRODUCTION UNITS



Units	ISO 9001	ISO 14001	FSC®	PEFC
Wood flooring manufacturing				
Tuupovaara, Finland (operations phased out in 2017)	Yes	Yes	-	Yes
Maklino, Russia	Yes	Yes	-	-
Satulung, Romania	Planned 2017	Planned 2017	Planned 2017	-
Białosłowie, Poland	Planned 2017	Planned 2017	Yes	-
Resilient flooring manufacturing				
Ikaalinen, Finland	Yes	Yes	Not relevant	Not relevant
Nokia, Finland	Yes	Yes	Not relevant	Not relevant



Ecological balance data 2016 – Wood Flooring Production at Kährs Groups units outside Sweden

Use of energy				
Electricity	49 578	MWh	13,7	kWh/kg
Heat	17 841	MWh	4,9	kWh/kg
Produced biofuel	54 511	MWh	18	kWh/kg
Material Use				
Wood material to products	82 813	tonnes	0,02	m ² /m ³
Chemicals for products, adhesives, hardeners, lacquers, stains, oil etc.	1 528	tonnes	423	g/m ²
Water	26 117	m ³	7,2	l/m ²
Emissions				
Dust	14 847	kg	4,1	g/m ²
VOC	4 983	kg	1,4	g/m ²
TOC or COD in process water	consolidated figure missing	kg	NA	g/m ²
Waste				
To material recovery	49 528	kg	14	g/m ²
To energy recovery	501 000	kg	139	g/m ²
Landfill	160 378	kg	44	g/kg
Hazardous Waste	66 905	kg	19	g/kg
Production				
Flooring Production	3 614 000	m ²		

In 2016 Kährs Group had four wholly-owned production units for wood flooring outside Sweden.

In Maklino, Russia the full-scale flooring factory mainly supplies the Russian market.

In Bialosliwie, Poland there is a factory for the manufacture of wood flooring, mainly veneer floors. In 2016, the factory was expanded to be able to produce other types of wood flooring in the Group flooring ranges.

The factory in Satulung plant is, since 2015, a full-scale wood flooring factory.

In Tuupovaara, Finland a limited range of engineered wood flooring has been manufactured in 2016. Production at the unit is stopped during the first half of 2017.

During the year, Kährs Group During the year, Kährs Group divested its ownership in a production facility for wood flooring in Croatia. This report does not present ecological balance data for this unit.



Ecological balance data 2016 – Resilient Flooring

Use of energy				
Electricity	8 091	MWh	1,7	kWh/m ²
Heat	8 252	MWh	1,3	kWh/m ²
Other	0	MWh	0	kWh/m ²
Material Use				
Polymers to Resilient Floors	4 513	tonnes	1,2	m ³ /m ²
Chemicals for products	85	pcs		
Water	9 580	m ³	2,0	l/m ²
Emissions				
VOC	0	kg	0	g/m ²
Waste				
To material recovery	951 585	kg	682	g/m ²
To energy recovery	454 827	kg	326	g/m ²
Production Waste	218 320	kg	156	g/m ²
Household Waste	19 793	kg	14	g/m ²
Production				
Flooring Production	1 396 000	m ²		

In Ikaalinen and Nokia in Finland, Kährs Group manufactures durable floors for commercial and public premises under the Upofloor brand.

The main products consist of PVC-free, plasticizer-free resilient flooring that have a growing market in the public project sector such as hospitals and schools having stringent requirements on environmental aspects, low VOC emissions, durability and low maintenance.



A history characterised by innovations & major progress in our environmental work

HISTORY

In 1857 Johan Kähr the elder moved from Mönsterås to the small, but thriving community of Nybro in Småland. He brought with him a lathe and a few other tools to set up a shop crafting wooden utility goods. These simple beginnings became the foundation of the modern Kährs Group of today.

In 1919, Gustaf Kähr, grandson of founder Johan Kähr, set up the company AB Gustaf Kähr. Under his leadership the company developed and became an important and innovative producer of wooden doors, toys, furniture and flooring. Gustaf was dedicated to finding efficient ways of using the wood raw material and improving the stability of wood when used as building materials. His perseverance paid off when in 1937 he received the patent for the invention of the modern multi-layer, laminated door.

Following upon this success he worked hard to find a solution for the problem of gapping, twisting and cupping of wood floors. After several years Kährs was awarded a patent, in 1941, for the invention of today's modern engineered hardwood floor, the multi-layer floor.

In 2012 AB Gustaf Kähr and Karelia-Upofloor Oy merged to form Kährs Group. The new company structure created even better conditions for continued sustainable development of products and operations.

KÄHR'S GROUP TODAY

Today, Kährs Group is a group operating worldwide, with production in several locations in Europe. Our product portfolio has been complemented with resilient flooring for use in environments with high traffic, needing low environmental impact, with the main focus for PVC-free, plasticizer-free, low-VOC products.

Our objective is to provide the market with flooring that is beautiful, durable, easy to install and more sustainable. We're proud that people all over the world appreciate our products. Today, our floors can be found in fine homes, offices, shops, hotels, concert halls, theatres and sports arenas from Europe and Asia to the Americas.

ENVIRONMENTAL MILESTONES

Kährs has always been at the forefront when it comes to innovative development. Developments in the early years of the company often comprised utilising resources more efficiently, striving for what we today is considered sustainability:

1921 we began using waste wood as biofuel for steam energy

1937 we were awarded the first patent for the multi-layer wood door

1941 we received the first patent for multi-layer engineered wood flooring

1958 we introduced the first factory finished floor

1984 we introduced the first solvent-free lacquer system

1997 ISO 14001 certification & EMAS registration achieved

1999 first glueless joint, Woodloc® was introduced to the world

2004 we launched the new generation Activity Floor, pre-finished, no job site shutdown, and today is FSC® and DIN certified.

2005 FSC certification

2010 we opened the first LEED certified (green) warehouse in Scandinavia

2011 we are certified according to DIBt, French VOC A+

2011 we made the first wood floor made from dual labelled FSC®-Fairtrade certified wood

2013 Kährs' first Swan, Nordic Ecolabelled products were launched. The company's Swedish production units became PEFC certified.

2014 Investment in a new, industry leading production line for production of advanced flooring designs and better utilisation of oak raw material

2015 Final sealing of the old landfill facility on Kährs' site in Nybro

2016 Investments are made in new technology, for cleaning of process waste water, based on ozone. The project continues also in 2017

Definitions

ADDITIVE MATERIAL

Material other than wood that is included in finished wood flooring. e.g. glue, lacquers.

BASTA

A database of construction and plant products that meet BASTA's stringent requirements for chemical content. BASTA is used by the construction industry for the selection of better products. bastaonline.se

CARB 2

California's environmental legislation, California Air Resources Board, phases 1 and 2, regulates requirements on formaldehyde in products.

CARBON DIOXIDE (CO₂)

Is included in the natural cycle and contributes to the greenhouse effect. Burning fossil fuels results in a net increase in carbon dioxide, which may affect the climate.

DNV GL

DNV GL Group. The certification body for Kährs' environment and quality management system, as well as EMAS and FSC.

DUST

Particles that can cause contamination if discharged.

E1

A requirement for formaldehyde emissions according to European Standard EN 14342:2005 (Wood Flooring), class E1 is < 0.124 mg/m³.

EMAS

Eco-Management and Audit Scheme. The EU's environmental management and environmental auditing regulation.

ENVIRONMENTAL ASPECT

Part of an organization's activities, products or services that affect or could affect the environment. Kährs' significant environmental aspects are identified, evaluated and prioritized. Expression of Kährs' significant environmental aspects, outcome and how we work with them are described in this environmental report.

EXAMINATION OF PERMIT APPLICATIONS

Process of decision making on permits for activity that can be dangerous to the environment. Committees, the ECD and the application are involved. The decision is taken by the Environment Inspection Committee of the County Administrative Board.

FORMALDEHYDE

A toxic compound that is found naturally in green plants (including trees) and fruit. Also found in many glues. The glues used by Kährs are within the E1-norm.

FOSSIL FUELS

Oil, coal and natural gas which are not classified as renewable.

FSC®

Forest Stewardship Council - an organization that works internationally for environmental certification of ecologically, economically and socially sustainable forestry.

GWH

Gigawatt hour - an energy unit corresponding to one million kWh (kilowatt hours).

GWP100

The GWP factor indicates how much effect a gas has on the climate compared with carbon dioxide. One kg of carbon dioxide corresponds to 1 GWP. This is calculated on a 100-year perspective, which means for instance that biofuel does not add any carbon dioxide. The hydrocarbons subject to restriction under the Kyoto protocol (various forms of HFC) have GWP values between 120 and 12 000, depending on their absorption of radiation and atmospheric lifetime.

HDF

High Density Fibreboard. Material used in the core of Linnea floors.

M1

A Finnish classification system aiming to promote the development of building materials with minimal environmental impact. The system shows which materials are recommended, for example in the construction of regular office and residential environments. M1 stands for a low degree of emissions and low odour.

MIFO

Methodology for the Inventory of Contaminated Areas. Phase 1 includes interviews and compilation of historical documents. Phase 2 includes sampling and analysis at critical locations.

MWH

Megawatt hours Megawatt hour - an energy unit = thousand kWh (kilowatt hours).

NITROGEN OXIDES (NOX)

A group of gaseous compounds of nitrogen and oxygen, which are formed in combustion. In humid air nitrogen oxides are converted to nitric acid, which falls in the form of acid rain. Emissions of nitrogen oxides also have a fertilizing effect.

LNU

Linnaeus University

NATIONAL ENVIRONMENTAL OBJECTIVES

Sweden has 16 national environmental objectives. Read more on the Swedish Environmental Protection Agency's website:

PDCA

Is short for Plan, Do, Check, Act and is a scheme in quality management for systematic improvement.

PEFC

The Programme for the Endorsement of Forest Certification. An international nonprofit, non-governmental organization promoting sustainable forest management around the world and tracking of timber from certified forests as well as the processing and trading chain.

RENEWABLE

When a resource is used up more slowly than it is regenerated. Examples are water, wood and various biomass products. Non-renewable means something that is depleted faster than it is regenerated, e.g. products based on fossil oil, such as diesel or plastics.

RESPONSIBLE FORESTRY

Wood material that comes from suppliers who can show verification that the forest of origin is managed in a sustainable manner. Examples of verification are FSC, PEFC, documented origin, underwater sawing.

SUNDA HUS

In SundaHus Miljödata (literally, Healthy buildings, Environmental data) you can search for thousands of assessed products. The assessments are based on various characteristics and are divided into five classes. A, B, C+, C- and D. sundahus.se

SULPHUR DIOXIDE (SO₂)

A gas that is formed when fossil fuel is burned, and the sulphur in the fuel is oxidized by atmospheric oxygen. In contact with humid air sulphur dioxide is gradually converted into sulphuric acid, which contributes to acidification.

SYSTEM CONDITIONS - NATURAL STEP

Four system conditions - sustainable society:

- Substances from the crust of the Earth must not increase in the natural environment.
- The concentrations of substances produced by society must not be increased in the natural surroundings.
- Conservation of space for the natural cycle and diversity.
- no structural obstacles to people's health, influence, competence, impartiality and meaning. Read more: detnaturligasteget.se

TANNINS

Also known as tannins and polyphenols which are found in oak wood, coffee, tea and red grapes.

TONNE-KM

Tonne-kilometres Unit of transport work performed. It is calculated as the number of tonnes transported multiplied by the number of kilometres.

TRIPLE HELIX COOPERATION

Interactions between the academic, industrial and institutional systems as a means to foster technological innovation and economic growth.

UV-LACQUER

Lacquer that is quickly cured by exposure to ultraviolet (UV) light.

VOC

Volatile Organic Compounds. A collective designation for organic compounds (solvents) primarily consisting of carbon, hydrogen and oxygen. VOCs contribute to the formation of ozone close to the soil.

Contact



Bruce Uhler
Compliance
+46 481 461 99
bruce.uhler@kahrs.com

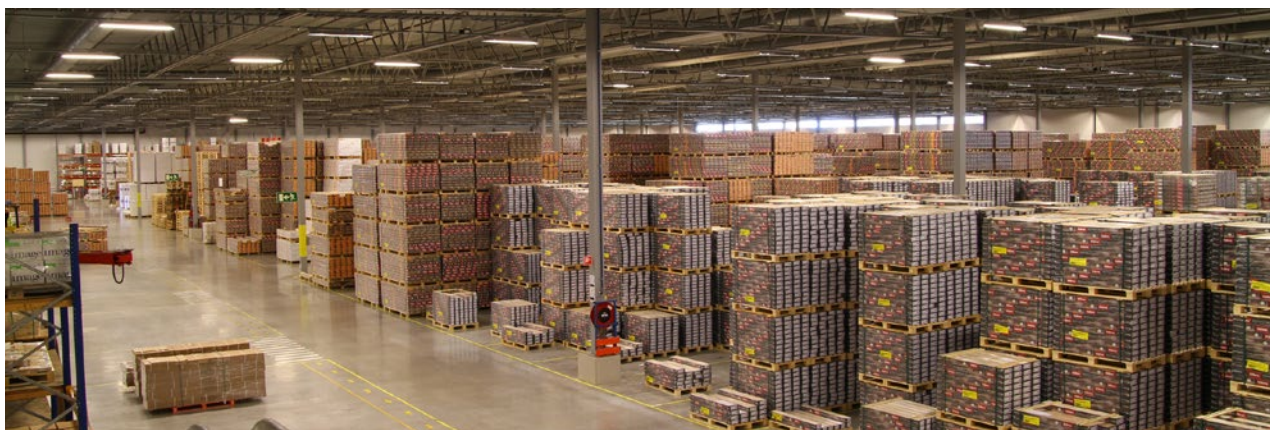


Åke Erlandsson
Environmental Manager
+46 481 462 99
ake.erlandsson@kahrs.com



Helén Johansson
Communication
+46 481 460 45
helen.johansson@kahrs.com





Kährs Group

AB Gustaf Kähr
Box 805, SE-382 28 Nybro

Tel: +46 481-460 00,

Fax: +46 481-178 31

info@kahrs.se, www.kahrsgroup.com

