StoraEnso

EMAS Environmental Statement 2002

Stora Enso
Packaging
Boards
Enocell
Pulp Mill

Responsibility and performance

Stora Enso is an integrated paper, packaging and forest products company producing publication and fine papers, packaging boards and wood products, areas in which the Group is a global market leader.

Stora Enso's sales totalled EUR 12.8 billion in 2002. The Group has some 42,500 employees in more than 40 countries in five continents and about 15 million tonnes of paper and board annual production capacity. Stora Enso's shares are listed in Helsinki, Stockholm and New York.

Stora Enso serves its mainly business-to-business customers through its own global sales and marketing network. A global presence provides local customer service. Customers are large and small publishers, printing houses and merchants, as well as the packaging, joinery and construction industries worldwide. The main markets are Europe, North America and Asia.

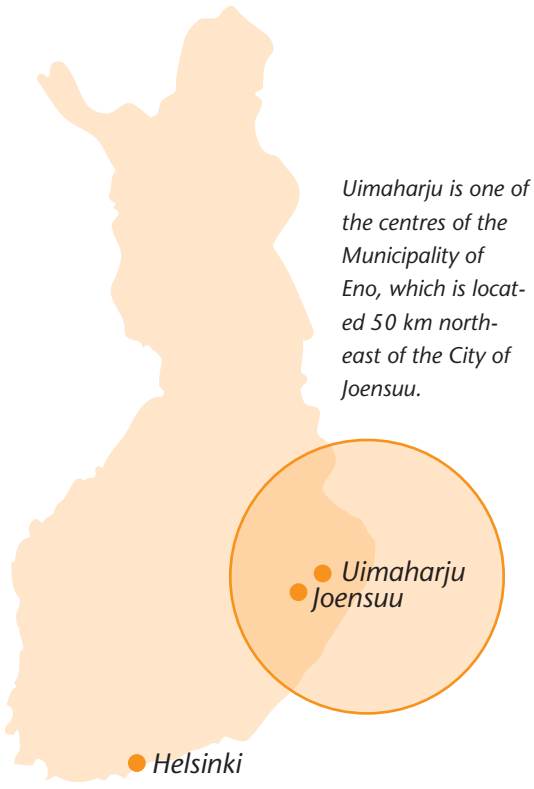
The Group has production facilities in Europe, North America and Asia. Its modern production capacity and the good integration between raw material, energy and efficient processes ensures production continuity.

Stora Enso is committed to developing its business towards ecological, social and economic sustainability. This commitment is demonstrated through its values and environmental and social responsibility policy, and has been recognised by selection for the Dow Jones DJSI World and DJSI STOXX sustainability indexes since they were launched in 1999. Stora Enso had the highest score in this sustainability ranking among forest products companies in 2002. Stora Enso is also included in the FTSE4Good index.

EMAS
VALIDATED INFORMATION
FIN-000004

Stora Enso Packaging Boards Enocell Pulp Mill

EMAS Environmental Satement 2002



Uimaharju is one of the centres of the Municipality of Eno, which is located 50 km north-east of the City of Joensuu.

Enocell Oy's Managing Director Jukka Heiko.

Enocell Oy's fourth environmental statement

This is the fourth environmental statement issued by Enocell Oy in compliance with the EC Eco-Management and Audit Scheme (EMAS) Regulation. The first statement was published in 1996, and thousands of copies of the publication have been distributed to customers, visitors, researchers and other co-operation partners. According to the feedback we have received, the statement has provided most of these interested parties with sufficient information on the mill's operations and environmental management.

Enocell Oy is a subsidiary of Stora Enso Oyj. In 2002, the mill produced 608,000 tonnes of bleached chemical pulp, two thirds of which was delivered to Stora Enso's own mills. The remainder was sold to external customers, mainly in Europe. Enocell's customers use the pulp for the manufacture of fine papers, magazine papers and packaging boards.

Our operations are guided by Stora Enso's corporate values and environmental and social responsibility policy. Enocell has used them to build its own environmental principles and operations models in order to maintain continued improvement in the state of environmental protection.

Despite the significant increase in production volumes, we have succeeded in maintaining a low level of emissions. The reduction of discharges into waters is evident in the improved state of the waters downstream from the mill. We have also been successful in cutting emissions to the air. In 2002, particulate emissions were 35% lower than the previous year, thanks to the repair of the electrostatic precipitators. A significant reduction in the amount of waste going to landfill has been achieved by efficient sorting and recycling. Enocell's strong focus on research activities, active co-operation with other pulp mills and development of personnel competence are guarantees of continuous improvement in environmental protection.

The entire mill personnel take responsibility for the environment and are committed to considering environmental matters in all of their activities.

Uimaharju, 16 April 2003

Jukka Heiko
Managing Director

Enocell Pulp Mill. The activated sludge plant of the effluent treatment plant in the front.

History and general information

Enocell Oy owns the pulp mill located in Uimaharju in the municipality of Eno in eastern Finland. The company was founded in 1989. Other businesses operating on the site are Stora Enso Timber's Uimaharju Sawmill, Enotuhka Oy's ash pelletising plant owned by Enocell Oy, Fortum Oy's power plant, Oy AGA Ab's oxygen plant and Eka Chemicals' chlorine dioxide plant. The sawmill has its own EMAS-verified environmental statement.

The first pulp mill started operations in Uimaharju in 1967. At its height, the mill's production was 140,000 tonnes a year, most of which was used by the company's mills. The pulp mill was modernised and expanded in 1990–1992 and, despite increased production, emissions to the environment were reduced. The phosphorous discharges into waters, for example, dropped to one tenth of the previous level. Before the new mill started up, the entire personnel were trained to use the new technology, with special attention given to the requirements of environmental protection. Enocell Oy currently employs some 320 people.

The present capacity is 620,000 tonnes of chemical pulp a year. The mill produces fully bleached sulphate pulp, which is bleached using oxygen, chlorine dioxide and hydrogen peroxide. Both softwood and hardwood are used as raw materials. The mill is also equipped to produce pulp without the use of chlorine compounds.

Products

Enocell's main products are bleached hardwood (birch) and softwood pulp. The pulp is used as raw material in paper and board mills.

Markets

Typical products manufactured from Enocell's pulp include juice cartons and label paper. Most of Enocell's customers are located in Finland, Sweden, Germany and North America. Pulp is delivered to Finnish customers either by train or by truck, while ships are mainly used for overseas deliveries. During the shipping season, pulp is loaded on board in the Port of Joensuu, the nearest city; in the winter, pulp is first transported to Finland's sea ports by train.

Product quality

Enocell produces fully bleached sulphate pulp, which is particularly suitable for the manufacture of food packaging and high-quality fine papers. The pulp is bleached in order to guarantee whiteness, purity and hygiene. Food packaging must be hygienic and must not cause off-flavours or off-odours to appear in the food.

The emissions per tonne of pulp produced are shown in the table below. Comparisons between pulp mills have shown that the phosphorous emission to the waters per tonne of pulp produced is less at Enocell than at other pulp mills.

By-products

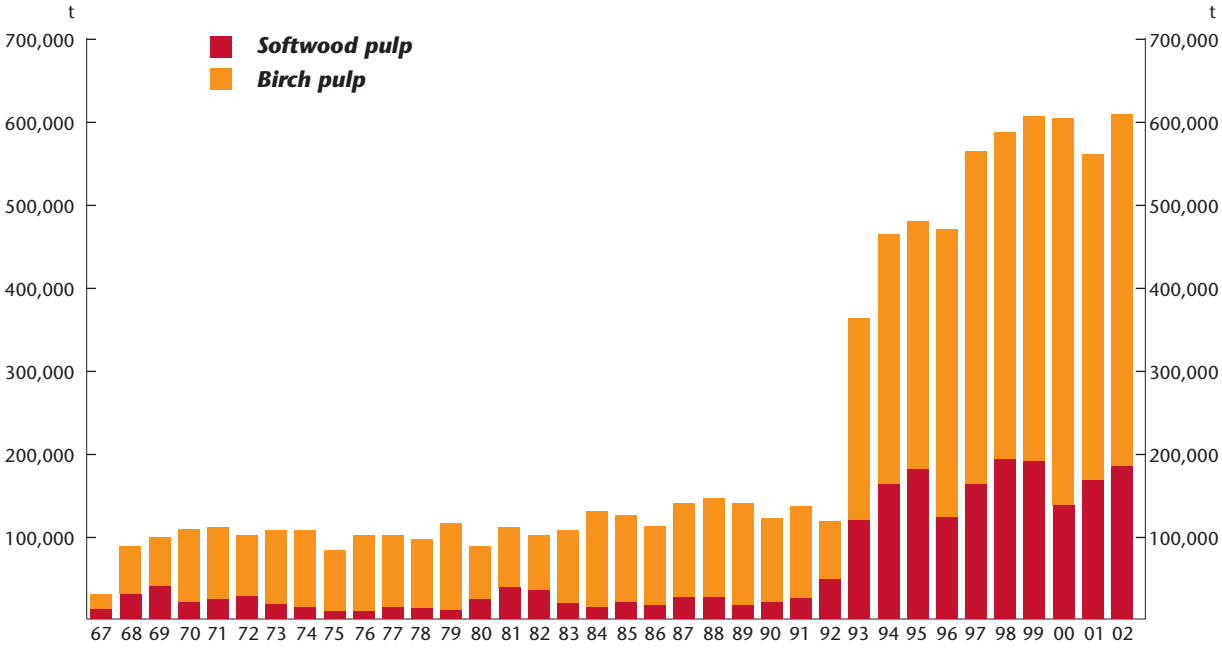
Enotuhka Oy pelletises the fly ash recovered from the bark boiler for use as a fertilizer in peatland forests and for landscaping purposes. A total of 2,037 tonnes of ash was pelletised in 2002. Other by-products are terpentine and tall oil that are sold to the chemical industry for use as raw material.

The chemical pulp manufactured by Enocell is suitable for the manufacture of food packaging boards.

Emissions per tonne of pulp produced in 2002

To water	**COD**	**11**	**kg/t**
	AOX	**0.13**	**kg/t**
	Nitrogen	**0.097**	**kg/t**
	Phosphorus	**0.004**	**kg/t**
To the air	**SO_2**	**0.42**	**kg/t**
	NO_x	**1.7**	**kg/t**
	CO_2 (fossil)	**162**	**kg/t**
Solid waste to landfill		**9**	**kg/t**

Pulp production in 1967 - 2002



Stora Enso Oyj's environmental and social responsibility policy

Responsible business
Stora Enso is committed to developing its business towards ecological, social and economic sustainability. These tasks are recognised as shared responsibilities within Stora Enso enabling a continuous improvement of our operations.

Eco-perspective
Stora Enso's objective is to supply customers with products and services that satisfy various needs related to printed communication, packaging and construction purposes. These products are mainly produced from renewable raw materials, are recyclable and safe to use.

The concept of product life cycle is considered guiding our environmental activities and provides the framework for our efforts. We expect the same commitment from our suppliers and partners so that at every stage, from raw material to the end product, the impact on the environment will be minimized.

Social respect
As an international company, Stora Enso acknowledges its role as a model company in the global, national and local society. Our attitude shall be characterized by respect for the cultures, customs and values of individuals and groups in countries where we operate. When developing our business to earn credibility, we will comply to and when necessary, go beyond the requirements of national standards and legislation.

Transparent interaction
In order to continuously strengthen our operations and develop environmental and social issues in a sustainable way, Stora Enso considers an open discussion and interaction with all stakeholders, both governmental and non-governmental, as fundamental.

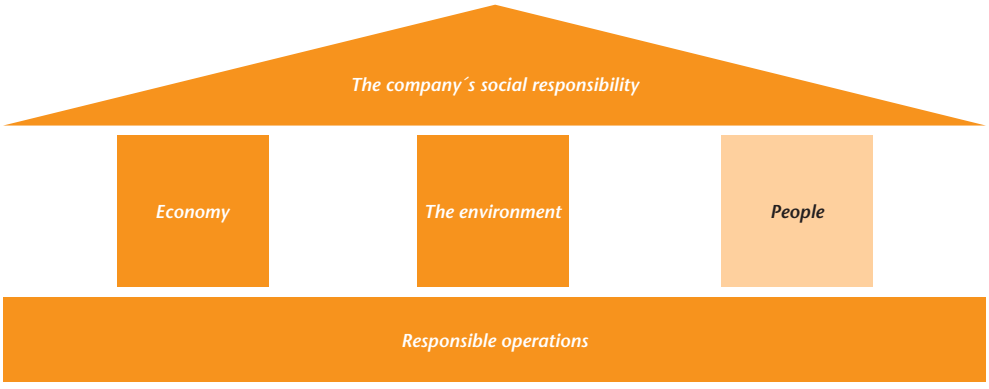
Summary of Enocell Oy's environmental principles

Enocell Oy has undertaken to comply with the environmental and social responsibility policy of Stora Enso Oyj.

Our operations are based on the use of renewable natural resources. Our mission is to make a product that is appropriate for the customer's needs and safe to use, while minimising the environmental load. We carry out life cycle inventories in order to monitor the environmental impacts of our products and, when developing processes, we use the best available technology in order to save raw materials and energy and minimise the environmental impacts.

Our environmental management is characterised by sensitivity, anticipation and preparedness to deal with any questions that may arise. Our communication is active and focuses on facts. We maintain the personnel's competence by training and by internal communication. Environmental protection objectives are set on an annual basis. Responsibility for the environment is an integral part of overall line responsibility.

We regularly survey the environmental impacts and risks involved in our operations.



The company's social responsibility encompasses responsibility for the economy, for the environment and for people, both the company's own personnel and other people who may be affected by the company's operations.

Environmental management system

Enocell's environmental and quality management systems form an integrated whole. The environmental management system is based on the ISO 14001 standard and was certified in 1997. It received EMAS approval in 1996. The quality and environmental management systems were first certified in 1995, and the quality system was amended to comply with the ISO 9001:2000 standard in 2003.

The entire personnel are committed to promoting environmental protection. The mill's quality manager deals with the authorities, environmental protection surveys and development tasks and is in charge of the functioning and further development of the environmental management system. Environmental matters are co-ordinated by an environmental team, which consists of the representatives of production, property management and development functions.

Environmental protection is integrated into the mill's planning processes. Environmental objectives are set annually in line with the corporate environmental policy and the company's environmental principles. Medium-term objectives are defined once a year for the following three years.

Environmental matters are studied separately for each department, and the quality manager analyses the results of these studies. The most important environmental aspects include the consumption and transportation of wood and the cooking and bleaching of chemical pulp.

Achievement of environmental objectives in 2000–2002

Odour nuisance was successfully reduced by lessening the number of interruptions in the combustion of undiluted malodorous gases. The total duration of interruptions, during which undiluted malodorous gases were emitted untreated, was 26 minutes a month in 2002, while the corresponding figure was 52 minutes a month the previous year.

The planned reduction in the use of process effluent to a level of 30 m^3 per tonne of pulp has not been realised. We will work to achieve this target in the future by means of investments in production.

The reduction of AOX (organic chlorine compounds) emissions by 10% from the 1999 level has almost been achieved by improving the process technology. AOX emissions amounted to 239 kg/d in 1999, but decreased by 7% to 222 kg/d in 2002. In 2002, AOX emissions amounted to 133 g per tonne of chemical pulp.

Environmental objectives for 2003–2006

- ❑ process effluent volumes to 35 m^3/t
- ❑ interruptions in the combustion of undiluted malodorous gases to less than 25 min/month
- ❑ AOX emissions to 120 g/t

Environmental permits

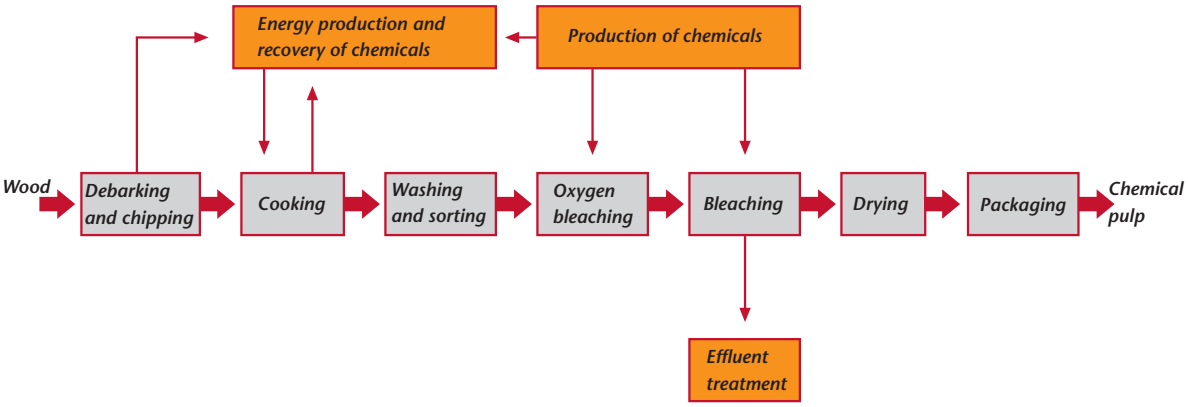
The mill is covered by a valid air protection notification from the year 1990 and a valid environmental permit related to waste management and the landfill, granted in 1998. The environmental permit related to waste water emissions was issued in 2001. The next application for the environmental permit must be made by 2004. The permit conditions have not been exceeded.

Students of the Eno Senior Secondary School studying the pulp mill's energy generation during their physics class.

Chemical pulp production

The logs enter the mill via a defrosting conveyor. They are debarked in a dry debarking drum and then reduced to chips. The chips are taken to intermediate storage, sorted by grade. They are then cooked in Super Batch digesters by the sulphate method. In the sulphate method, the wood fibres are separated by dissolving the lignin in the hot cooking liquor, which is a mixture of sodium hydroxide and sodium sulphide. After cooking, the pulp and cooking liquor are separated in the washing section. The cooking liquor is piped to the power plant for concentration and incineration in the soda recovery boiler, where the lignin is burned to generate electricity and steam for the mill. The sorted pulp is conveyed to oxygen bleaching and then to final bleaching by oxygen, chlorine dioxide and hydrogen peroxide. The bleached pulp is dried and delivered to the customers in bales.

Stages of pulp production



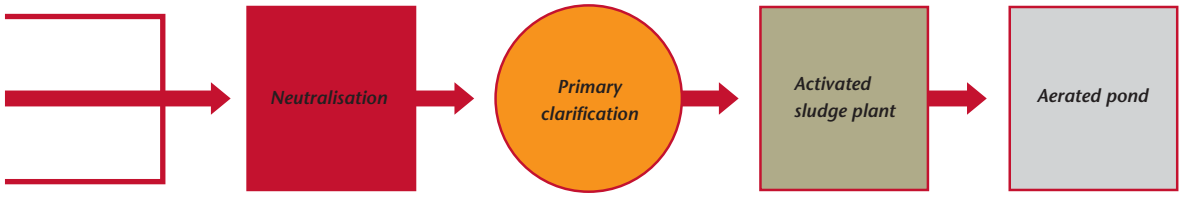
Effluent treatment

The majority of effluents are generated in the bleaching process. The effluent coming to the purification plant contains fibres, organic matter dissolved from the wood and chemicals used in the cooking and bleaching processes.

The effluents are treated mechanically, biologically and ecologically. At the mechanical purification stage, the solids present in the effluent settle at the bottom of the clarifier and are recovered for sludge treatment. At the biological stage in the activated sludge plant, the organic matter dissolved in the effluent decomposes and is bound in the form of biosludge. The organisms in the sludge feed on the effluent from the pulp mill. The biosludge is dried together with the sludge from the mechanical purification process and incinerated, together with the bark, in the bark boiler.

After the activated sludge plant, the effluent goes on to a special Niska pond for the ecological treatment phase. The pond is slightly aerated, and crucian carp and whitefish have been introduced into it. In addition, natural stocks of perch and roach thrive there. The fish grow fast and breed in the pond. Their taste is monitored and no toxic effects have been found; however, although the fish are edible, they have a slightly woody taste.

Stages of effluent treatment



The smelt outlets of the recovery boiler are cleaned in order to guarantee even cooking.

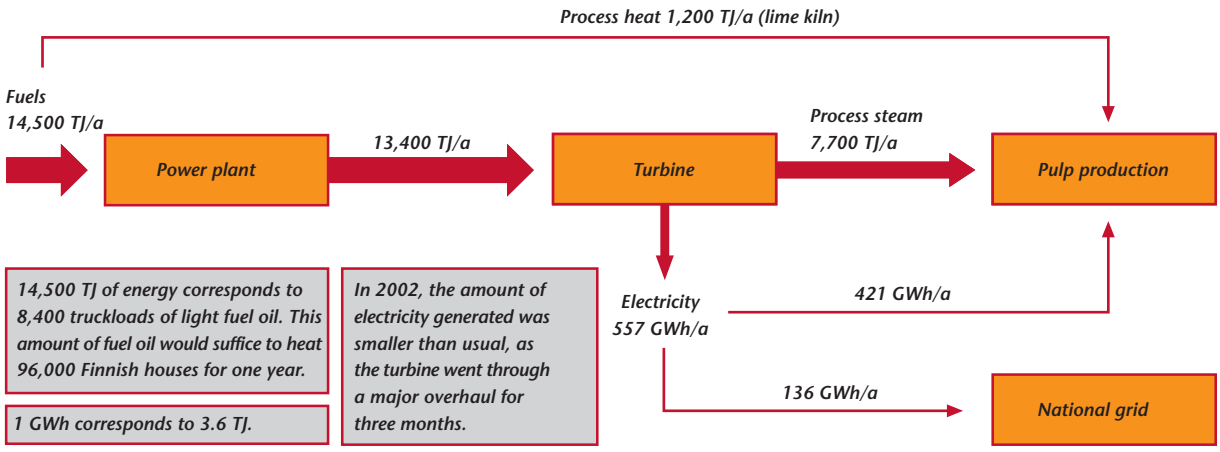
Energy generation and consumption

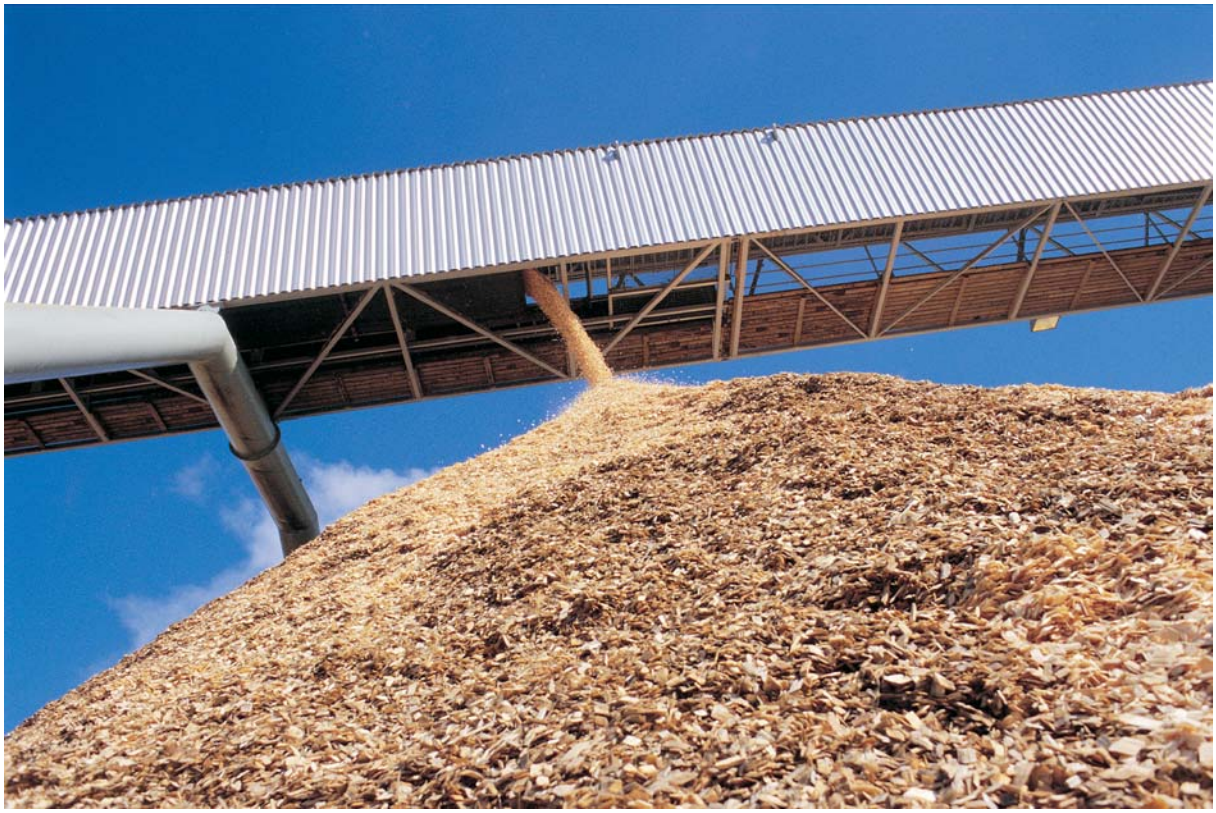
In addition to chemical pulp, Enocell produces large amounts of energy. Energy is generated by burning wood in different forms: black liquor, bark, pine soap and methanol. Black liquor contains the organic matter dissolved from the wood. Pine soap consists of the resin from the wood, which is separated from the cooking liquor.

These fuels provide all the thermal and electrical energy required by the mill and, in fact, more electricity is produced than is consumed. In 2002, the electricity production was over 557 GWh, of which 136 GWh was sold to the national grid.

The bark boiler and turbine in the mill area are owned by Fortum Oyj. In addition to bark, sludge from the effluent treatment plant is burned in the bark boiler. Enocell Oy supervises the operations of the plant.

Pulp mill energy generation in 2002





Chipped wood material is stocked in open piles.

Wood procurement and utilisation

Stora Enso Forest supplies the mill with wood raw material. In 2002, the mill's total wood consumption was 2.9 million cubic metres. Hardwood accounted for 1.8 million cubic metres and pine and spruce pulpwood for 0.3 million cubic metres each. The mill also utilises softwood chips produced by the neighbouring sawmills, which accounted for 0.5 million cubic metres of the total wood raw material consumption in 2002. Of the wood delivered to the mill in 2002, 45% was transported by rail and the remainder by road.

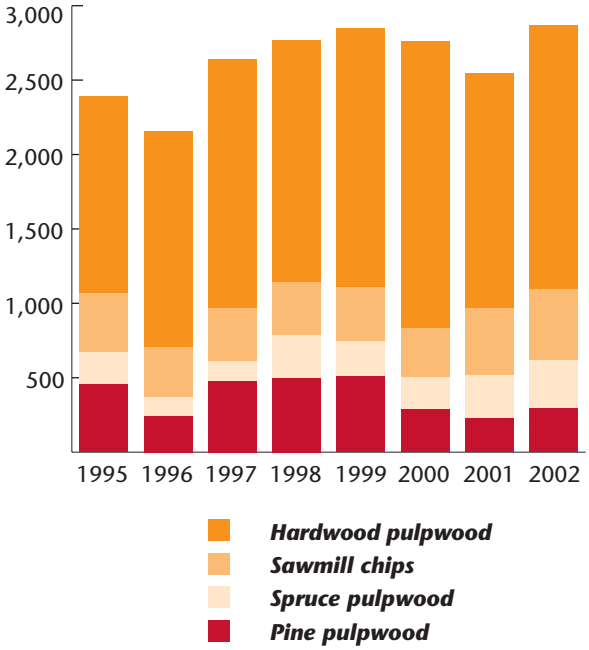
Stora Enso Forest's environmental management system, complying with the ISO 14001 standard, and its quality system based on the ISO 9002 standard were certified in 1998. These cover all wood procurement operations from planning to delivery to the mill gate. The environmental and quality systems also cover the procurement of imported wood, which is the responsibility of Stora Enso Oyj's International Wood Procurement unit.

Stora Enso Forest obtained the EMAS trial registration certificate in 1999. By the end of 2002, more than 95% of Finnish forests had been certified according to the criteria of sustainable forestry laid down by the Finnish Forest Certification System, FFCS, which is part of the Pan-European Forest Certification (PEFC) system. The majority of the domestic wood supplied to the mill is from these certified forests.

The imported wood mainly originates in Russia and is purchased from long-term co-operation partners. Our procurement contracts require that wood sellers and suppliers are committed to the environmental principles of Stora Enso Forest and specify the origin of the wood right down to the individual stand. We do not procure wood from officially confirmed or planned conservation areas or from other agreed areas where restrictions are in force due to assessment of their ecological values.

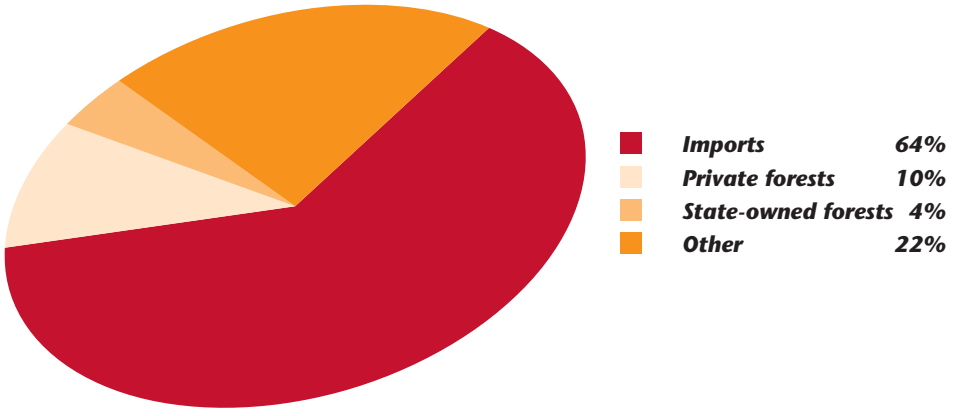
We ensure the origin of wood and compliance with local legislation and the terms of cutting contracts by auditing the stands concerned. The number of audits depends on the amount of wood delivered and the source of procurement. We monitor the radiation levels of imported wood and, if necessary, batches exceeding the accepted levels are returned.

Use of wood material in 1995–2002 (1000 m³)



In Russia, forests have been divided into quarters. Quarter codes make it possible to trace the origin of the wood.

Wood procurement sources in 2002



Consumption of chemicals

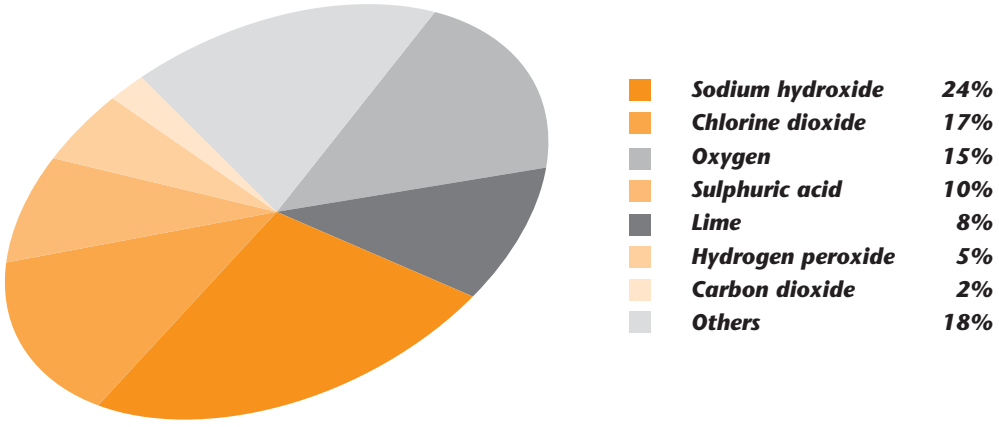
Various chemicals are needed in the production of chemical pulp, most of which are recycled for reuse. In 2002, a total of 67,400 tonnes of chemicals was consumed at the mill. The most commonly used chemicals are lye, or sodium hydroxide, and the chlorine dioxide used in the bleaching process. Chlorine dioxide is manufactured on the mill site in co-operation with Eka Chemicals Oy. In addition to the internally recycled lime sludge, fresh lime is required for the production of cooking lye. Further materials needed in the chemical pulp process include talc, magnesium sulphate, cooking additives and anti-foaming agents.

The pulp is bleached using chlorine dioxide, oxygen and hydrogen peroxide, and its acidity is regulated by the addition of sodium hydroxide and sulphur dioxide dissolved in water. The oxygen is prepared by Oy AGA Ab in an oxygen plant located on the mill site.

In the treatment of effluent, urea is needed as a nutrient for the micro-organisms used to purify the waste water. Polymers are used to speed up dehydration in the sludge drying process.

Most of the chemicals are brought to the mill by road.

Chemicals consumption in 2002



Effluent treatment has increased fishing downstream of the mill.

Discharges into water systems

The quality and volume of effluent is monitored in the different departments of the mill and at the various purification stages. An automatic measuring system monitors the effluent at several points. In addition, Enocell Oy's laboratory takes random samples if necessary. The samples are analysed for pH, conductivity, solids content, biological oxygen demand (BOD), chemical oxygen demand (COD), phosphorus, nitrogen and sodium. The results provide data for controlling the dosage of nutrients in the purification plant. Some of the samples are sent to Stora Enso Oyj's research centre in Imatra, which analyses the content of organic chlorine compounds (AOX), sulphur and chloride.

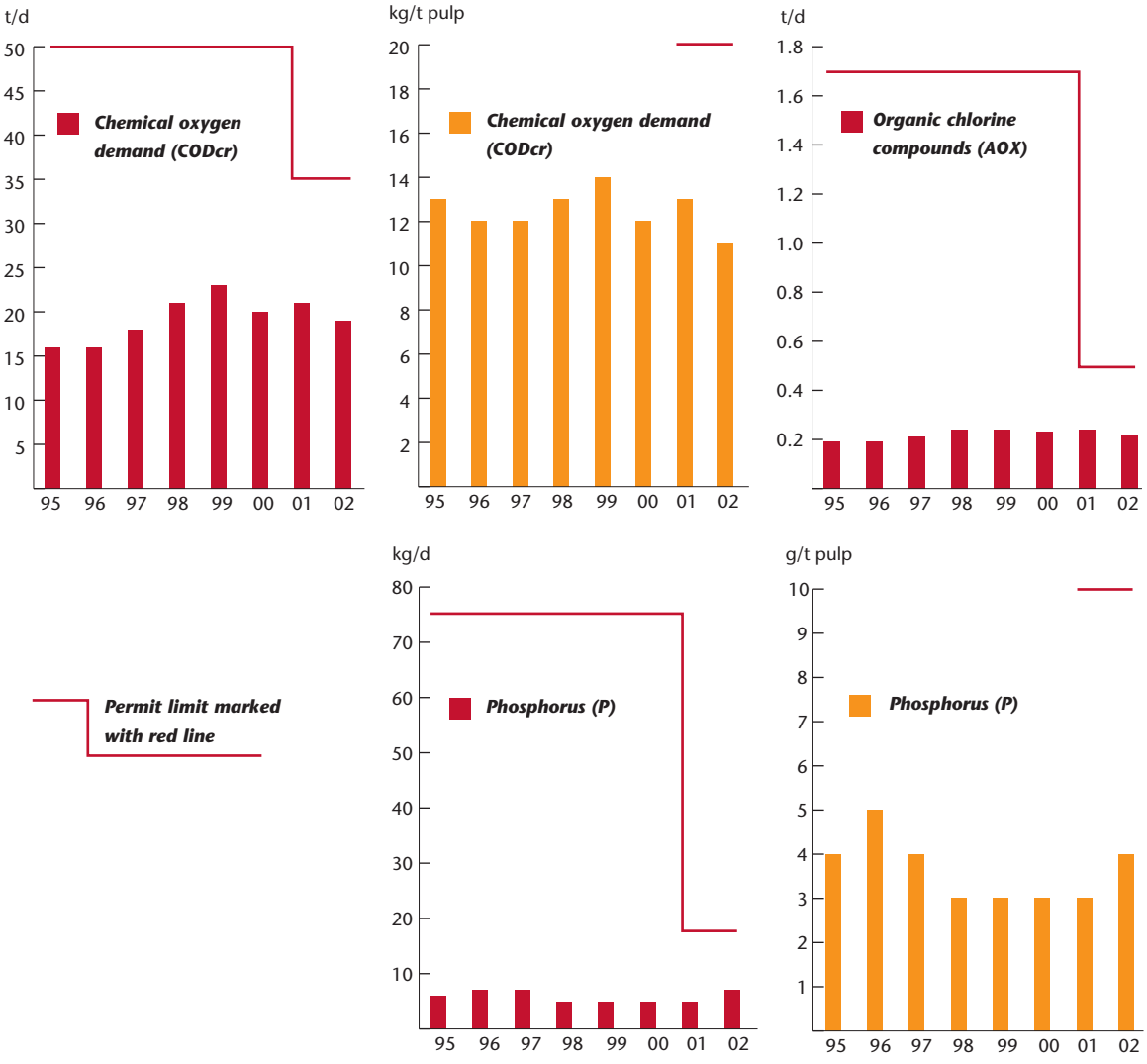
The mill also uses fresh water for cooling the equipment. The clean cooling water and rainwater from the mill is channelled directly into the lake through a separate sewage system. The quality of water in this system is regularly monitored in order to detect any malfunctions.

Improved water quality

There has been a marked reduction in effluent releases throughout the 1990s after the mill was modernised. This has had a clearly discernible impact on the improvement of water quality downstream from the mill, which has helped to restore the River Pielisjoki as a significant recreational fishing and leisure area.

The water quality is regularly monitored by the Karelian Institute of the University of Joensuu, which measures the concentrations of nutrients and oxygen-consuming matter and the number and activity of flora and fauna living in the water. The fish stocks in the River Pielisjoki and Lake Pyhäselkä are also monitored continuously on the basis of data retrieved from catch records, fishing inquiries, contamination of fishing nets and fish quality analyses. No toxins have been detected. The obligatory monitoring programme was revised in 2001, and the new programme is valid for 2002–2006.

Discharges into waters in 1995–2002 and permit limits



Emissions to the air

Energy is generated mainly by burning wood-based fuels. The flue gases arising from combustion contain various impurities: particulates (TSP), sulphur dioxide (SO_2), nitrogen oxides (NO_x), malodorous sulphur compounds (TRS) and carbon monoxide and carbon dioxide. Small particles are separated from the flue gases by means of electrostatic precipitators, and gaseous impurities are cleaned in washing towers.

The undiluted malodorous gases are collected and combusted in a boiler or, during shut-downs, in the lime kiln. In the combustion process, the malodorous sulphur compounds are converted into sulphur dioxide, which is washed out of the flue gases in a lye solution. The sulphur is recycled into the pulp process.

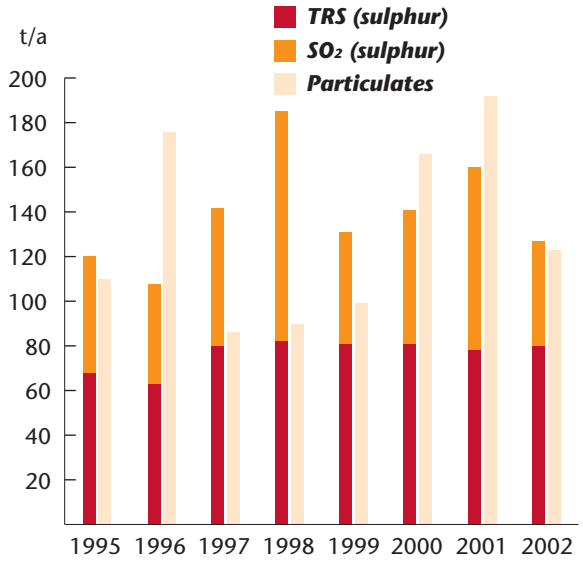
Emissions to the air are calculated on the basis of data on fuels, uptime, malfunctions and emissions coefficients, which in turn are determined on the basis of regular measurements of emission levels. With increasing energy production, the nitrogen oxide emissions have risen slightly. On the other hand, emissions of particulates have been reduced, thanks to more efficient cleaning of flue gases, while sulphur compound emissions have diminished with the introduction of more advanced combustion technology and improved flue gas scrubbers. Emissions have remained below the limits set by the authorities. The gas-vapour mixtures, or draught gases, are the most visible emissions to the air.

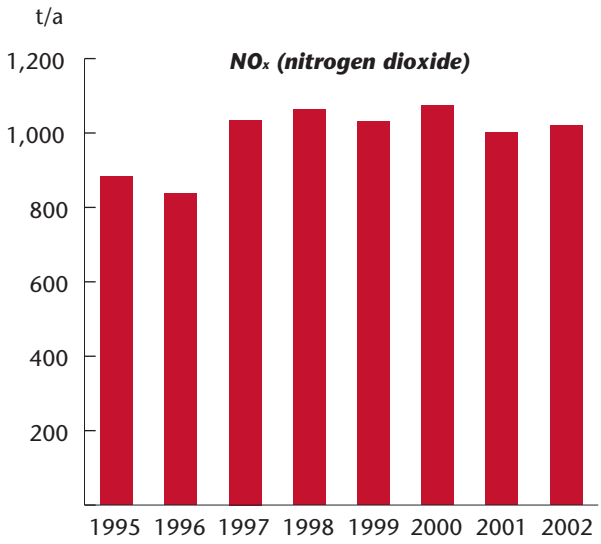
Reduced emissions to the air

Interruptions in the combustion of undiluted malodorous gases cause noticeable odour nuisance. However, these interruptions are infrequent and of short duration. The total duration of interruptions, during which undiluted malodorous gases were emitted untreated, was 5.2 hours in 2002, which was less than in the previous years. Nitrogen oxides and sulphur dioxide cause acidification. Their distribution has been studied by spread models and their impacts have been measured by wet deposition measurements. In 2002, emissions of sulphur dioxide were 40% lower than in the previous year, due to reduced malfunctions. The emissions of particulates decreased by 35% from the previous years after the electrostatic precipitators were repaired.

Beard lichen is sensitive to the effects of air pollution.

Emissions to the air in 1995–2002





Solid waste

The aim of waste sorting has been to reduce the amount of waste transported to landfill. Waste is efficiently sorted in the various mill departments. All reusable waste is recycled. An outside contractor looks after the collection and transport of disposable waste; according to the contractor's reports on the correctness of waste sorting, waste has been carefully sorted.

Combustible waste is crushed and incinerated along with bark in the bark boiler. This waste includes wood residue, cardboard and various paper-based packages. Office paper is collected separately and recycled. Waste metal and glass are also collected separately and recycled. The ash from the bark boiler is pelletised and used as improvement fertilizer in forests. The ash that cannot be pelletised is used for rehabilitation and landscaping of the landfill site. In 2002, a total of 600 tonnes of lime sludge, which could not be used in the process, was sold for use as field fertilizer, as it can replace lime and phosphorus fertilizers.

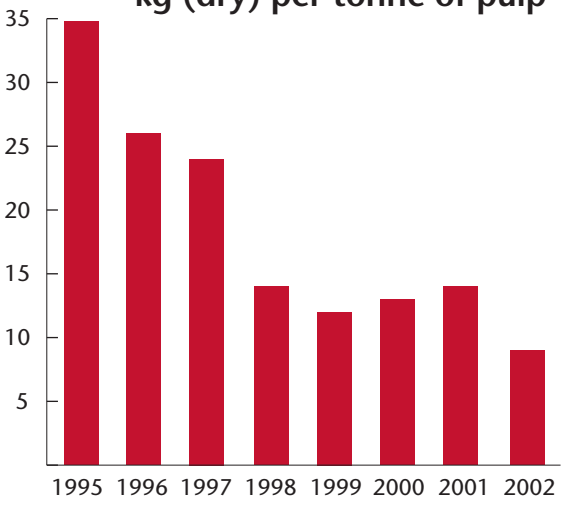
Hazardous waste is collected and sorted, and the waste management contractor Lassila & Tikanoja delivers them to the hazardous waste treatment plant. In 2002, the amount of hazardous waste was 57 tonnes. Domestic waste from the kitchens and personnel facilities is taken to the Kontiosuo landfill site near Joensuu.

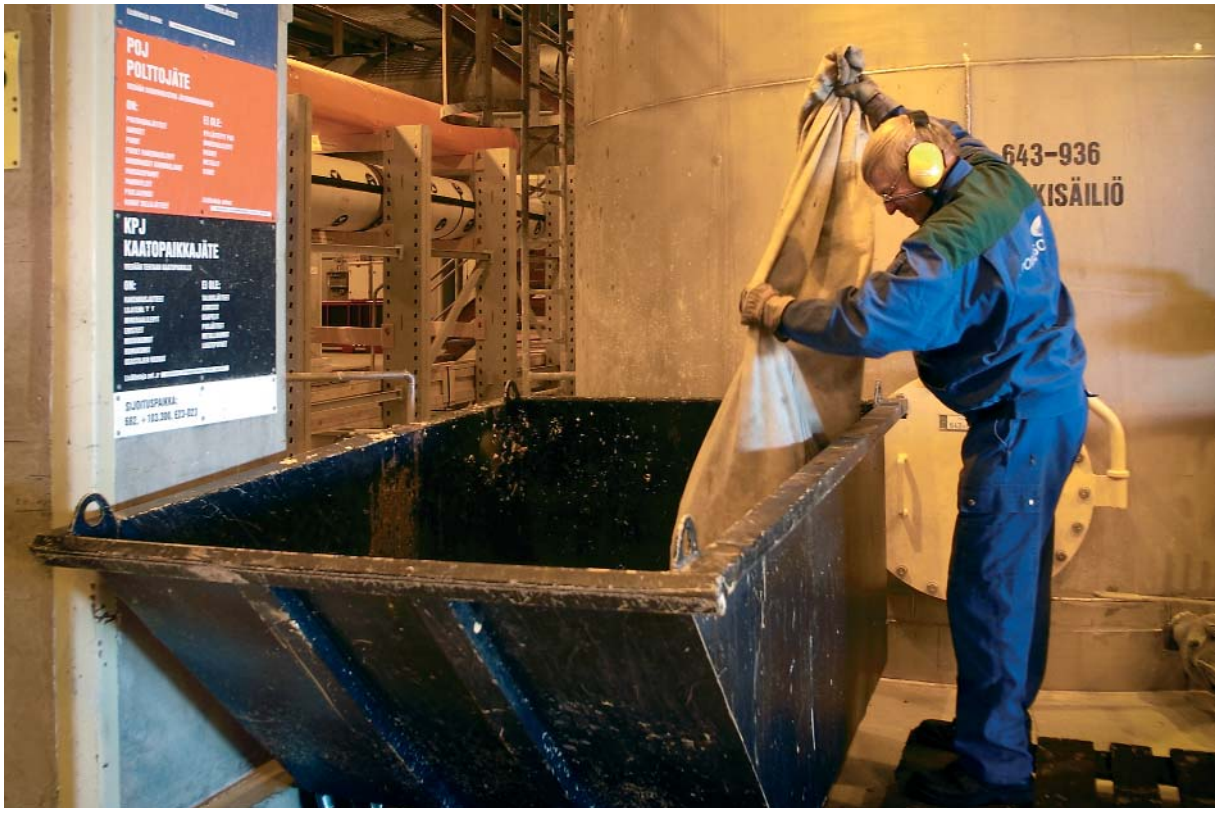
Landfill

The mill has its own landfill for waste generated in the chemical pulp process. The volume of landfill waste has been reduced each year. In 2002, the amount of waste disposed of at the landfill was less than 5,500 tonnes (calculated as dry solids).

The greatest single source of process waste is green liquor sludge, which consists mainly of calcium carbonate. It contains small volumes of iron and manganese as well as nutrients including phosphorus, originating from the wood raw material. Waste water accumulating at the landfill site is pumped to the effluent treatment plant, and the leachates are monitored regularly.

Landfill waste in 1995–2002
kg (dry) per tonne of pulp





Waste is sorted in the mill departments to landfill waste, waste metal and combustible waste.

Other environmental impacts

Environmental risks
The safety and environmental risks related to all production departments of the mill have been assessed, and systematic action has been taken to improve the operations in question. The latest assessment was carried out in 2001. Possible leakage of heavy fuel oil into the waters in an accident is the most serious environmental risk. The mill's safety organisations, including the fire department, are prepared for risk situations.

Emissions due to malfunctions
Eighteen notifications of emissions due to malfunctions were given in 2002. The most significant of these was the escape of effluent past the activated sludge plant directly to the aerated pond for seven hours. The permit limits were not exceeded because of the malfunction.

Traffic and noise
The most significant sources of noise in the mill area are wood handling and incoming and outgoing traffic. The noise carried over to the residential area has been reduced by building a noise wall. The noise level in the neighbourhood has been measured in co-operation with the local authorities. The latest noise measurement was carried out in the summer of 2002.

The risks caused by traffic in the mill area have been included in the safety and environmental hazard assessment. Heavy traffic is directed to specific routes within the site and compliance is monitored. Transport is the most serious polluter among the indirect environmental impacts of the mill. The most significant emissions from traffic are nitrogen oxides and carbon monoxide.

According to the noise measurements that were carried out in 2002, the Enocell Pulp Mill does not exceed the guideline values in the residential areas. However, the guideline noise values are exceeded by the railway traffic and heavy road traffic in the vicinity of the road area.

Fog
The waste water ponds at the mill give rise to water vapours which condense in cold weather, possibly restricting visibility at the mill site and at the Uimasalmi bridge.

Soil
The groundwater quality around the landfill site is monitored regularly. A soil protection plan has been drawn up for the mill site for the years 1995–2010. The cleanliness of the soil in the mill site was examined in 2001, and no special needs to clean the soil were detected.

Chemical pulp being loaded on a truck.

Glossary

AOX (Adsorbable Organic Halogens)
The AOX content of waste water indicates the concentration of organic chlorine present. The AOX in waste water from the chemical pulp process derives from bleaching.

Batch cooking
A system of cooking the chemical pulp in batches in several containers.

Biosludge
Sludge produced in aerated treatment ponds or other biological treatment plants.

Black liquor
Used cooking liquor from pulp washing. Contains matter dissolved from wood and cooking chemicals. Reused in the chemical cycle both as a compound and for energy generation.

BOD_7 (Biochemical Oxygen Demand)
The amount of oxygen consumed by micro-organisms in seven days when consuming easily degradable organic matter in water. Bacterial activity causes the organic compounds to break down, mainly into carbon dioxide and water.

Carbon dioxide (CO_2)
A gas produced as a reaction product of carbon and oxygen in the combustion of organic matter. Carbon dioxide is the single most significant gas contributing to global warming.

Chemical cycle
Recovery of chemicals in the chemical pulp process, their treatment and reconversion to active form.

COD (Chemical Oxygen Demand)
The amount of oxygen required for the chemical decomposition of all organic matter present in the water.

EMAS (Eco-Management and Audit Scheme)
A voluntary environmental management and auditing scheme for all organisations, based on EC legislation.

GWh (gigawatt-hour)
Unit of energy, one million KWh.

Hazardous waste
Waste which may, due to its chemical or other properties, cause particular risk or damage to health or to the environment.

ISO 14001
Standard defining the issues to be addressed by an environmental management system.

ISO 9001
International quality standard.

Lignin
An organic substance which acts as a binder for the cellulose fibres in wood.

Lime sludge
Calcium carbonate ($CaCO_3$). Generated in the production process of pulp chemicals in the lime kiln, as a by-product of white liquor.

Nitrogen oxides (NO_x)
Gases generated in combustion, when a small part of the nitrogen present in air fuses with oxygen at high temperatures. Nitrogen oxides cause acidification of soil and waters. In this statement, nitrogen oxides are presented in terms of nitrogen dioxide (NO_2).

Particulates (TSP, Total Suspended Particles)
Dust, soot and fly ash released into the air, for example, with the flue gases arising from combustion.

Soda recovery boiler
Boiler for the combustion of black liquor sludge. The main process in the chemical cycle of pulp production. The boiler separates the dissolved ligneous matter from the black liquor. The resulting thermal energy is used for energy generation at the power plant, and the chemicals are used for white liquor production at the chemical pulp mill.

Sulphur dioxide (SO_2)
Gas produced by the combustion of the sulphur present in fuels; causes acidification of soil and waters.

Suspended solids
Particles of fibres floating in the water, causing turbidity and disturbing the organic processes when settling to the bottom.

TRS (Total Reduced Sulphur)
Arises in the production process of sulphate pulp when wood reacts with the sulphur in the cooking liquor. These compounds typically have a pungent smell, even in very small concentrations. In this statement, TRS is presented in terms of pure sulphur.

Waste
Matter or object discarded by the owner or which the owner intends to or is obligated to discard.

Social responsibility

A company's social responsibility encompasses three sectors: responsibility for the economy, for the environment and for people. The environmental statement covers the realisation of the environmental responsibility. This section of the statement includes information on the company's impacts on the economy and people. Enocell employs 350 people, of which 310 are permanent employees and 40 are employed for a fixed term. Female employees account for 19% of the entire personnel, and the average age of the employees is 47 years. The employees who will retire in the next few years are being replaced by training newcomers mainly through an apprenticeship system. Eleven percent of the employees have a degree from a university or a polytechnic, while 12% have vocational qualifications. Occupational health care services and special activities have been provided in order to maintain the occupational health and work ability of employees. In 2002, 57 accidents were reported that took place either in the workplace or when travelling to or from work. Various training and development projects are in progress in order to reduce the number of accidents.

Enocell works in co-operation with the other players in the region. Co-operation with the schools of the Municipality of Eno is one of the most prominent forms of such work. The plan for the co-operation with schools was last updated in March 2003, and the objective is that schoolchildren and students could obtain a realistic image of the forest industry and its environmental impacts. The plan has been drawn up so that it supports young people when they choose subjects and their career.

Summary of the environmental statement

This is the fourth environmental statement issued by Enocell Oy. Enocell received its first environmental certificate in 1995, and was EMAS-approved the following year. Environmental management is part of our everyday operations, and has been decentralised to different parts of the organisation. An environmental team co-ordinates all matters related to the environment. The Quality Manager reports on environmental matters to the Managing Director.

In 2002, Enocell produced 608,000 tonnes of chemical pulp, most of which was delivered to the Group's own paper and board mills in Europe and the USA. A total of 2.9 million cubic metres of wood was consumed for the manufacture of chemical pulp. Most of the hardwood is imported from Russia.

Most of the current production equipment is ten years old. The modernisation of the pulp washing lines in 2001 and 2002 decreased the discharges of effluent.

The repair of the electrostatic precipitators has reduced the amount of particulate emissions to the air. The odour nuisance caused by malodorous gases in the neighbouring area is the most significant environmental impact. The emissions of undiluted malodorous gases due to interruptions of their treatment were less in 2002 than in the previous year.

The amount of solid waste placed in landfills has reduced, thanks to improved sorting and the identification of new opportunities for reusing waste. Most of the solid waste is green liquor sludge, which contains minerals originating from the wood raw material. Green liquor sludge will be used as construction material in the bottom and surface structures of the landfill.

The Enocell's environmental team consists of the representatives of production, property maintenance and research and development departments.

Verification of the environmental statement

SFS Certification, which is an accredited verifier (FIN-V-001), has certified the environmental management system of Enocell Oy's pulp mill and the information contained in this EMAS statement. SFS Certification has verified, on the basis of the audit that was carried out on 24 April 2003, that the company's environmental management system and the Finnish-language environmental statement fulfil the requirements of EMAS Regulation (EC) No 761/2001.


EMAS-sertifikaatti

Enocell Oy

EMAS


SERTIFIKAATTI

Enocell Oy
Uimaharju

SFS-EN ISO 14001:1996


SERTIFIKAATTI

Enocell Oy
Uimaharju

SFS-EN ISO 9001:2000

The next verified environmental statement will be published by 31 May 2006.

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