



Environmental Report 1998

## Environmental Report 1998

*This Environmental Report is the first produced by Stora Enso only a few months after the formation of the Group.*

*Stora Enso's Environmental and social responsibility policy was published in April 1999. The individual units and departments are currently establishing their own environmental principles and setting their environmental objectives and targets based on this Group policy. As soon as the environmental principles relating to the Group's main activities have been finalized, we will be reporting on them in our environmental news bulletin, Stora Enso EcoPerspectives, and on our Internet site, [www.storaenso.com](http://www.storaenso.com). The first issue of Stora Enso EcoPerspectives is scheduled for publication in summer 1999. All the production units that are registered according to the EMAS regulation regularly publish reports with the local environment in focus.*

*This Environmental Report provides a picture of how the recently established Stora Enso will put its policy of responsible growth into practice. We also report on our environmental performance (pro forma) in 1998. The environmental performance data as well as the financial information relating to environmental management (page 13 and pages 28–33), have been verified.*

### 1998 in brief

*By year-end 1998, 34 Stora Enso sites had EMAS-registered and/or ISO 14001-certified environmental management systems. The forest holdings in Finland and Canada have been certified according to ISO 14001. All forest holdings in Sweden were certified in accordance with FSC criteria.*

*Production of sawn timber products, pulp, paper and board was higher during 1998 than in the preceding year. The processing of recovered fiber into new products increased.*

*Total emissions to air of sulphur compounds and nitrogen oxides were down by 9.9% and 2.3%, respectively, compared with 1997. Discharge to water of COD and AOX decreased by 10.9% and 5.9%, respectively.*

*Use of biofuels within the Group increased during the year, while use of fossil fuels was reduced.*

*A new copier paper quality was introduced, allowing reduced consumption of ink in the printing process, thereby improving the environmental performance of the paper supply chain.*

*A new transport system, Baseport, for transport of products from Sweden to continental Europe, was launched during 1998.*

*Environment-related investments during 1998 amounted to EUR 68 M (EUR 89 M in 1997). Environmental costs totaled EUR 96 M (EUR 99 M in 1997).*

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# This is Stora Enso

*Stora Enso Oyj is one of the world's leading forest industry companies, with shares listed on the Helsinki and Stockholm stock exchanges. The Group was formed through the merger of Finnish Enso and Swedish STORA at the end of 1998. Stora Enso is domiciled in Finland.*

*Stora Enso is an integrated forest products group that manufactures magazine paper, newsprint, fine paper and packaging boards. The Group holds leading global positions in these product areas. Stora Enso owns 2.1 million hectares of productive forest land and conducts extensive sawmilling operations.*

*Annual sales amount to approximately EUR 10 billion. The number of employees in 1998 was approximately 40,000 in more than 40 countries. Europe is Stora Enso's primary market. The Group's global structure enables Stora Enso to serve customers and develop operations worldwide.*

## Key figures

	1997	1998	1998 adjusted	Target
Return on capital employed (ROCE), % .....	8.0	6.2	10.2	13.0
Debt/Equity ratio, multiple .....	1.05	1.04		less than 1
Sales, EUR M .....	9 998	10 490		
Operating profit, EUR M .....	916	719	1 190	
% of sales .....	9.2	6.9	11.3	
Profit before tax and minority interests, EUR M .....	636	339	822	
Net profit, EUR M .....	409	191		
Capital expenditure, EUR M .....	1 134	896		
% of sales .....	11.3	8.5		
Interest-bearing net liabilities, EUR M .....	6 090	5 783		
Capital employed, EUR M .....	11 875	11 355		
Earnings per share, EUR .....	0.54	0.25	0.79	
Equity per share, EUR .....	7.26	6.97		
Dividend per share, EUR .....	0.33	0.35		
Dividend per share, FIM .....	1.99	2.10		
Market capitalization, EUR M .....		5 801		
Deliveries of paper and board, million tonnes .....	11.3	11.8		
Deliveries of timber products, million m <sup>3</sup> .....	2.5	2.8		
Average number of employees .....	40 301	40 679		

# Local and global challenges



The year 1998 marked a turning point for two long-established forest industry companies. The merger that led to Stora Enso meant combining the resources of both companies, setting new targets and objectives, and forming a joint organization and corporate culture. Although many operations still need refinement, our goal is clear: we want to respond to the challenges of the next millennium in the best possible way.

Stora Enso's objective is to strengthen its role as a global force in the forest industry. This requires first-class customer service, a truly comprehensive range of products and state-of-the-art production capacity. It also requires new perspectives in the way we integrate business and environmental management.

Commitment to environmentally responsible business management is an essential part of Stora Enso's corporate culture. As a global player, we face a wide range of different cultures, national standards and local legislation. Accordingly, when formulating

the new company's environmental policy, we decided to expand it to include social responsibility as well – responsibility for the social structures, environment and people that surround us. We believe that one of the prerequisites of success is the ability to respect different kinds of cultures and individual needs.

We are confident that our company is able to cooperate openly and interactively with all our stakeholders. Of utmost importance is that we continue the dialogue with non-governmental organizations. It is clearly in the common interest of all parties to create operational models that are adapted to the local context and environment.

Stora Enso has set its environmental and social targets for the next millennium at a high level as a key element in the Group's agenda. Our task is to improve the integration between our business and the external environment.

*Jukka Härmälä, CEO*

# Environmental and social responsibility policy

## **Responsible business**

*Stora Enso is committed to developing its business towards ecological, social and economic sustainability. These tasks are recognized 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 possible 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.*





Article 1

## Global responsibility

*The forest industries have a positive message. Our products are based on renewable raw materials, which are also recyclable. The level of emissions from modern industries is just a fraction of what it was a couple of decades ago. Moreover, there are many examples of how we are meeting the challenge posed by such threats as global climate change and deteriorating biodiversity. On the other hand, there is still work to be done.*

Stora Enso has set its sights on being the world's leading forest-products company. We promote communication and people's well-being by turning renewable fiber into paper, packaging and processed wood products. The company wants to apply responsible principles in supplying its customers and ultimate consumers with useful and reliable products that satisfy their needs.

Service plays a crucial role in our operations. The company's products serve consumer and community needs in product protection, communications and construction. The service concept encompasses the product price, technical quality, and delivery reliability and schedules, as well as environmental factors. From an environmental standpoint, we want to offer products and services which customers, end consumers and other interested parties can use with a clear conscience.

In Western Europe, which is our main market area, environmental conservation has become a social norm. Citizens demonstrate their environmental awareness by expressing their concern about the degradation of the physical environment, through water pollution or deforestation for example. However, environmental issues extend beyond the local physical environment; they also involve complex factors relating to cultural and humanistic values. Examples of such items on the environmental agenda are the debates on tropical forests and the rights of indigenous peoples.

The forest-products industry has often been considered slow to respond to the challenges posed by a changing society, and this may well be true. On the other hand, the enormous improvements that have taken place in environmental protection in the sector have been widely, but not fully, recognized. One reason for these somewhat contrasting evaluations relates to the way business is performed. Commerce in the forest-products industry is conducted primarily on the basis of business-to-business trading, which means that the customer of a forest-products company usually represents an intermediate stage in the value chain between the raw material and the consumer of the end product. Messages from the general public to the companies at the beginning of the production chain often have to pass through a considerable number of intermediaries before reaching their intended recipient. The more service-oriented view now adopted by Stora Enso involves speeding up communication along the supply chain, also in regard to environmental issues.

Achieving the targets of our environmental policy will not be easy, but we are confident that we are both familiar with and capable of handling the environment-related aspects of our operations. One of the most important tasks will be to identify future environmental issues. This will call for an active and open dialogue with various interested parties. This report, together with the different certification schemes and other measures we apply, reflects the



growing demand for transparency and external assessment in environmental issues.

### ***Global but local***

Since Stora Enso operates in an international context, production is carried out in a variety of conditions and cultures. Our operations are based on the laws and regulations in force in each country. At



Stora Enso, however, we often want to go further. Depending on the circumstances, we aim to proactively anticipate future challenges.

Stora Enso can also point to excellent examples of how progressive decision-making in environmental conservation is also economically justified. We wish to demonstrate that, irrespective of geographical location, Stora Enso's operations are compatible with, and a clear expression of, the Group's environmental policy and values.

We are fully aware that we face a demanding task in seeking to address global environmental problems within the scope of an ongoing business. Stora Enso aims at business leadership, including environmental performance, based on our belief that our way of producing useful products from renewable raw materials is among the best examples anywhere of sustainable development.

*Björn Hägglund, Deputy CEO*



Article 2

## *Environmental* management

*Environmental issues are an integral part of business management within Stora Enso. To ensure continuous improvement of its operations and to create openness to its stakeholders, Stora Enso is working forcefully to implement environmental management systems.*



## Environmental management systems

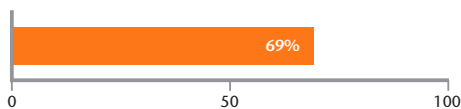
A majority of Stora Enso's business units are registered according to EMAS (EU's Eco Management and Audit Scheme) and/or certified according to ISO 14001.

All Stora Enso employees are encouraged to contribute to achieving improvements. In order to be able to apply the most up-to-date environmental

expertise at all levels, Stora Enso arranges regular training for its employees.

In order to optimize the allocation of financial resources to environmental protection and material flows, and to improve the environmental profile of its products, Stora Enso applies a lifecycle approach in its efforts to continuously improve its environmental performance.

### Environmental management systems



*By year-end 1998, 34 Stora Enso sites had EMAS-registered (Eco Management and Audit Scheme) and/or ISO 14001-certified environmental management systems.*

*These sites represented 69% of total pulp, paper and board production within the Group. All sawmills within Stora Enso Timber in Finland and Sweden will have certified environmental management systems in early 1999.*

## Responsibilities in environmental management

In Stora Enso operative management is responsible for environmental matters. On Group management level, in each division, business and production unit, the management ensures that environmental work is organized and performed efficiently. Environmental management systems will be applied in all production units. This secures full employee participation, continuous improvements and transparent interaction with stakeholders.

In addition, according to the principle of Cor-

porate Governance, a group-wide Environmental Committee, chaired by the deputy CEO, has been established to make decisions on environmental issues of strategic significance.

A Group support function, Stora Enso Environment, provides environmental expertise to Group management, the divisions and the business and production units. Regional as well as divisional environmental networks are tools for coordination and transfer of knowledge.

Registered and/or certified units, April 1999

Unit	Country	EMAS	ISO 14001
1. Kabel .....	EMAS - First in Europe and Germany	●	●
2. Fors .....	EMAS - First in Sweden	●	●
3. Enocell .....	EMAS - First in Finland	●	●
4. Uetersen .....	Germany	●	
5. Veitsiluoto incl. sawmill, Fortek Oy, Tornion Pakkauslava .....	Finland	●	●
6. Mölndal .....	Sweden	●	●
7. Grycksbo .....	Sweden	●	●
8. Berghuizer .....	EMAS - First in the Netherlands	●	●
9. Varkaus incl. sawmill, Corenso, Pakenso .....	Finland	●	●
10. Imatra (see also 37) .....	Finland	●	●
11. Kotka .....	Finland	●	●
12. Sachsen .....	Germany	●	●
13. Karhula .....	Finland	●	●
14. Nymölla .....	Sweden	●	●
15. Corbehem .....	EMAS - First in France	●	
16. Kvarnsveden .....	Sweden	●	●
17. Hylte .....	Sweden	●	●
18. Oulu incl. Fortek Oy .....	Finland		●
19. Kitee .....	Finland		●
20. Forest Operations .....	Finland		●
21. Pappersgruppen .....	Sweden		●
22. Honkalahti .....	Finland		●
23. Koski Timber Oy, Hämeenkoski Sawmill .....	Finland		●
24. Tolkkinen .....	Finland		●
25. Lahti (Pakenso) .....	Finland		●
26. Heinola (Pakenso) .....	Finland		●
27. Reisholz .....	Germany	●	●
28. Baienfurt .....	Germany		●
29. Ala .....	Sweden	●	●
30. Gruvön (sawmill) .....	Sweden	●	●
31. Norrsundet .....	Sweden	●	●
32. Port Hawkesbury, Woodlands Division .....	ISO 14001 - First in Canada	*	●
33. Anjalankoski .....	Finland	●	●
34. Uni-Pak .....	Finland		●
35. Pori (Corenso) .....	Finland		●
36. Loviisa (Corenso) .....	Finland		●
37. Imatra (Corenso) .....	Finland		●
38. Uimaharju (sawmill) .....	Finland		●
39. Kemijärvi incl. Fortek Oy .....	Finland		●
40. Pankakoski .....	Finland		●
41. Woodpax .....	UK		●
42. Summa .....	Finland		●
43. Barcelona .....	Spain		●

\* EMAS is applied for European mills only.

## Environmental investments and costs

In 1998, Stora Enso spent EUR 164 M (1997:188) on environmental protection. The figure includes capital expenditure as well as operating and maintenance costs, but excludes interests and depreciation. Total environmental investments amounted to EUR 68 M, while environmental expenses totaled EUR 96 M.

Major environmental investments included EUR 10.3 M for upgrading the chemical recovery system and internal improvements at the Skutskär pulp mill in Sweden to reduce discharge to water. At the Anjalankoski mill in Finland, the investment program for improving wastewater treatment was finalized, with the 1998 costs amounting to EUR 3.6 M. In addition to the modernization of the treatment plant, measures for closing up process water loops and for improving the sludge treatment were included. At the Norrsundet pulp mill (Sweden), EUR 3.5 M was invested in a second oxygen delignification stage. EUR 3.0 M was used to finalize the clean-up work on soil and buildings at the old forest chemicals plant at Imatrankoski (Finland).

The following units in Finland are due to renew their discharge permits in 1999–2000: Enocell, Imatra, Oulu and Varkaus. The Hylte, Kvarnsveden, Grycksbo and Skoghall mills in Sweden are involved in permitting processes for increased production of current paper and board qualities.

Financial savings can be achieved by integrating environmental issues with business management. One example is residual products management. Since waste can in many cases be defined as a raw material in the wrong place, Stora Enso continuously investigates new solutions for reusing residues which were earlier regarded as waste. As a result, the business units have been able to reduce waste vol-

### Environmental investments and costs

(EUR M)	1998	1997
Environment-related investments		
<i>Aquatic environment</i> .....	36	45
<i>Air environment</i> .....	12	18
<i>Other</i> .....	20	26
<b>Total</b> .....	<b>68</b>	<b>89</b>
Environmental costs .....	96	99

umes by utilizing them on an increasingly large scale. Often, these solutions can be justified purely based on financial reasons.

A total of EUR 42 M has been estimated to cover future environmental expenditure. The timing for implementing these measures is not detailed in all parts but the programs will be carried out over the next few years.

Major remediation projects include the final disposal of mercury at the Skutskär harbor. At Uetersen in Germany, plans are being made for the decommissioning of a closed landfill area. At Pateniemi in Northern Finland, cleaning of the old sawmill has been started. At Skoghall (Sweden), clean-up of mercury contamination at the closed chloralkali plant continues.

Decommissioning activities at the closed Falun mine area are in progress, partly financed by the Swedish Government.

Stora Enso is free from legal claims concerning environmental issues which could have a major impact on Stora Enso's financial position.



Article 3 **Resource management**

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*Stora Enso's operations are based on wood fibers that are produced in well-managed forest operations. Recovery of used fibers is another important source of raw materials. Wood and recovered paper and board involve significant energy values. Accordingly, Group energy management focuses heavily on the use of these raw materials. Management of residual products and waste is another important resource-management aspect related to raw materials and their processing.*

## Wood procurement

Wood is the most important raw material for Stora Enso. The Group's total consumption in 1998 was 38 million m<sup>3</sup>, of which 85% was produced in Western Europe.

Stora Enso's objective is to practice environmentally and socially responsible wood procurement and forest management in all Group operations. Through active dialogue with stakeholders and continuous improvement of its practices, Stora Enso also aims at achieving wide acceptability for forestry in general.

Stora Enso procures wood from various domestic sources, including Group-owned forests, small-scale family forest holdings and state-owned forests, and through imports. Stora Enso's wood procurement policy, regardless of the origin of wood supplies, always aims at maintaining biodiversity.

Stora Enso owns 2.7 million hectares of forest, of which 1.9 million hectares are located in Sweden (see table on page 17). In addition, Stora Enso leases 0.8 million hectares of forest.

The most important wood source is small-scale family forest holdings, which are the predominant forest ownership in Western Europe. In Finland, for example, Stora Enso signs 40,000 contracts with private family forest owners every year. Both Finland and Sweden, which are the major forestry countries for Stora Enso, have recently updated their national forestry legislation and environmental programs for forestry, as well as promoting forest certification schemes, which contribute to improving environmental standards in forestry.

During 1998, ISO 14001 certificates were awarded to Stora Enso's wood supply network for its Finnish mills (including wood imports) and to the

Woodlands Division's supply to the Port Hawkesbury mill in Nova Scotia, Canada. Stora Enso Forest Sweden is currently implementing ISO 14001 and EMAS while Stora Enso Forest Finland runs a pilot certification project for EMAS, which will be ready in spring 1999.

Forest Stewardship Council (FSC) certification of Stora Enso's forest holdings in Sweden was completed in 1998.

In Finland, the preparations for a forest certification were completed and the certification will come into effect in 1999. The aim is to integrate the Finnish national certification standard with existing international forest certification schemes.

### **Environmental performance 1998**

Annual monitoring of environmental performance including day-to-day nature conservation and ecological landscape planning in the Swedish forest operations began in 1994 in conjunction with the introduction of revised nature conservation and silviculture strategies. Overall performance has improved considerably during the period since 1994. However, the results of monitoring have shown that, in some cases, increased educational activities are needed.

More detailed information is published annually in the "Green balance sheet" by Stora Enso Forest Sweden. Issues from 1994 to 1998 are available.

Stora Enso's Finnish wood procurement operations have achieved a clear improvement in environmental performance during the past few years. Independent surveys, mostly carried out by the Forestry Development Center Tapio, show that the preservation of biotopes important for biodiversity or for water protection is satisfactory or good, and that the number of trees left standing in felled areas to preserve biodiversity fulfills the target. However, special attention needs to be focused on preserving key





*calyptus globulus*. Other forest species, such as pine and oaks (mainly cork oak) cover 4,000 hectares. The remaining area (8,000 hectares) is designated for conservation and other uses.

As a result of the implementation of the strategic forest plan, the total area has decreased, while the growing stock has increased by 7% and average growth by 5%.

Ongoing projects aimed at improving silvicultural techniques to create a forest with a better environmental balance have produced results which are already being applied in day-to-day operations.

A project is in progress to prepare for the implementation of an environmental management system based on ISO 14001. Implementation is planned to take place during the period 1999–2000.

### **Forest operations in Southern Hemisphere**

Stora Enso is involved in three forestry projects in the Southern Hemisphere. In Brazil, Stora Enso is engaged in Veracel, a joint venture with the Brazilian Odebrecht Group. The aim is to establish eucalyptus plantations large enough to supply a pulp mill. By the end of 1998, the ownership covered 138,000 hectares, of which 43,000 hectares are already planted with eucalyptus, 24,000 hectares are designated for planting and 50,000 hectares are al-

located to nature conservation. The existing rain forest will be preserved and strengthened through an extensive restoration program and will eventually cover the whole area set aside for nature conservation. 21,000 hectares are considered to be non-productive. The land was formerly used mainly for low-intensive agriculture, such as cattle grazing.

In West Kalimantan in Indonesia, Stora Enso plans to reforest some 100,000 hectares of grassland or bushland considered to have minor ecological or social importance. So far, 20,000 hectares have been planted. No cutting or prescribed burning will be carried out to make way for reforestation. Reforestation will be performed in close cooperation with the local inhabitants, and the reforestation project is integrated with a wide-ranging development project. PT Finnantara Intiga, of which Stora Enso owns a 30% share, will be responsible for running the project. If the project succeeds well, which will depend on such factors as the economic and political situation in Indonesia, it can also supply a pulp mill with sufficient raw material.

In Thailand, Stora Enso owns 1,200 hectares of eucalyptus plantations. Stora Enso is also a minority owner, with a 19.9% share, in the pulp and paper company Advance Agro. Advance Agro procures its wood exclusively from commercial plantations.

### **Stora Enso forest ownership**

	Company owned, 000s ha	Leased, 000s ha
Sweden .....	1 936	
Finland .....	610	
Canada .....	23	600
Russia .....		195
Brazil .....	138	
Portugal .....	35	22
Thailand .....	1.2	
Estonia .....	2.4	
<b>Total .....</b>	<b>2 745.6</b>	<b>817</b>



## *Recovered fiber*

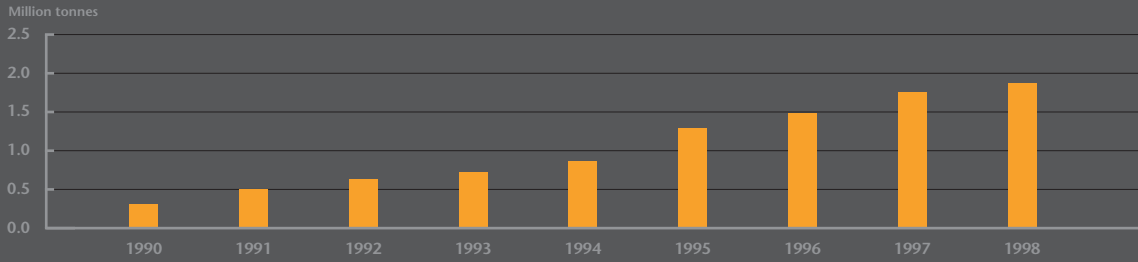
Recovered paper will continue to constitute an important fiber raw material for Stora Enso. As growth and internationalization have added production in regions with abundant secondary fiber supplies, the use of this fiber source has grown steadily. In 1998, Stora Enso utilized 1.9 million tonnes of this fiber raw material for paper and board production in its European mills.

The principle of producer responsibility will provide further impetus to the use of recovered paper in the paper and board industry, and Stora Enso will continue to be an active, responsible producer in this respect. Both Sweden and Finland have introduced producer responsibility legislation for paper recovery aimed at increasing the recovery rates to more than 70%. However, even after this high recovery rate is achieved, the paper and board produced in these countries will continue to contain a dominant proportion of primary fiber.

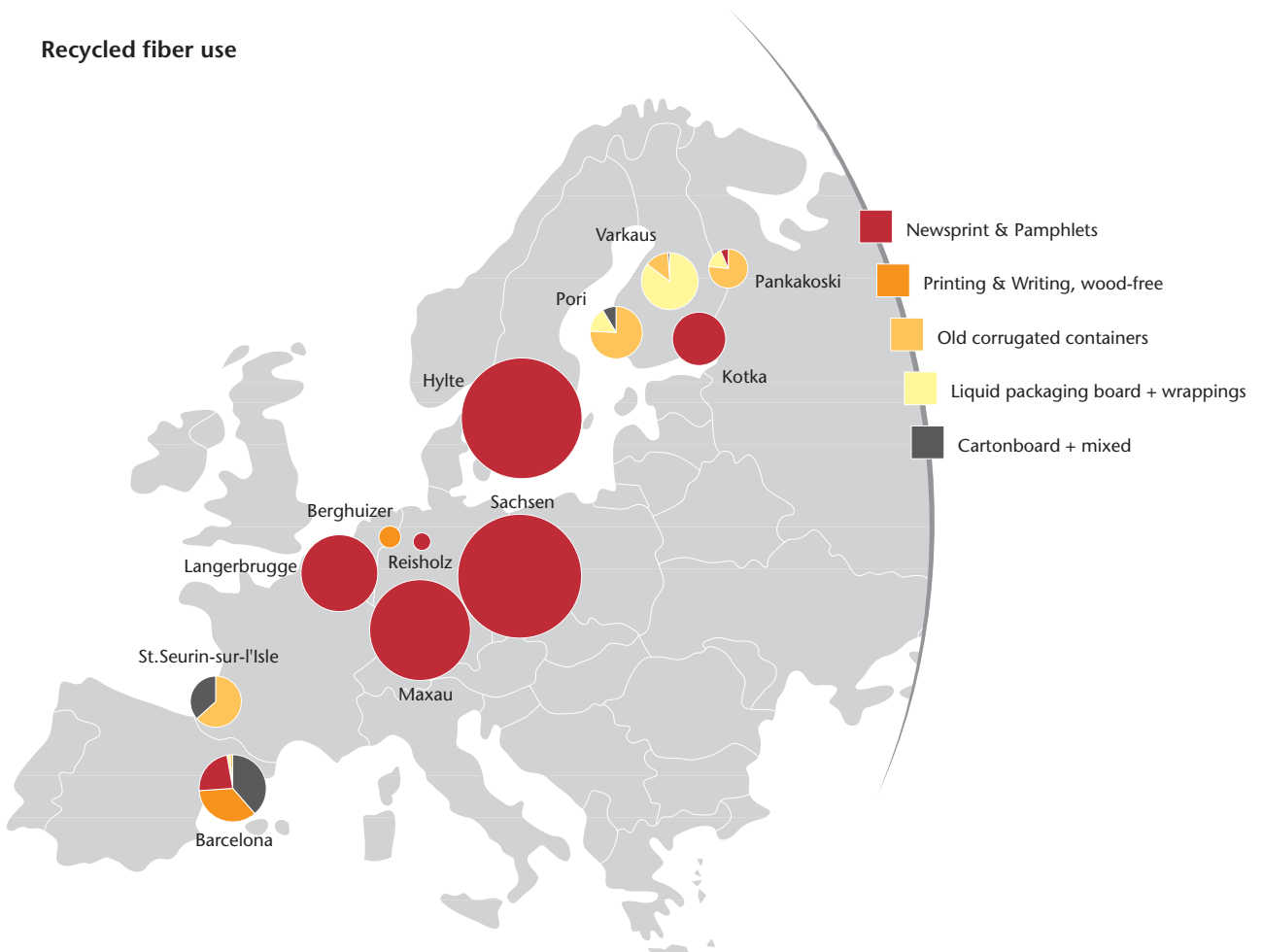
Stora Enso's use of recovered fiber is primarily a function of its availability, as well as its suitability for products in the Group's product range. Consequently, future recycling initiatives are likely to occur in areas of relatively high population densities and paper consumption, where recovered fiber is locally available. Stora Enso recognizes incineration for purposes of energy recovery as a realistic, necessary and environmentally friendly recovery alternative, provided that the availability of fiber for material recycling is assured.

Over the years, the paper and board industry has developed into a major recycler of its own products. This development did not happen overnight but progressed steadily at a pace governed by market needs and considerations. For this process to continue, a sustainable balance between collection and utilization is required. Stora Enso will actively support measures that facilitate increased use of recovered fiber and which are based on sound market and economic considerations.

## Stora Enso's recovered paper consumption



## Recycled fiber use





## Energy management

The energy requirements of the processes demand a secure and long-term supply of power and heat. Stora Enso has prioritized efforts to reduce costs through improved energy efficiency and better use of fuels.

There is a clear connection between energy and the environment. Stora Enso has committed itself to develop its business toward sustainability. This will be achieved through solutions which reduce resource utilization and emissions while at the same time both improving and developing quality.

Optimal economical and technological utilization of domestic renewable fuels and industrial cogeneration is to be encouraged. Energy efficiency audits of energy production and consumption were started in 1998 and will be continued in 1999. The implementation of the environmental management system within Stora Enso Energy was started in 1998 and the EMAS registration will take place in 1999.

Stora Enso is seeking to cut emissions from energy generation, become an active player in the more open energy market and maintain a high level of energy self-sufficiency.

Numerous activities are in progress at the mills aimed at improving the utilization of energy – both heat and power.

### Electricity procurement and consumption

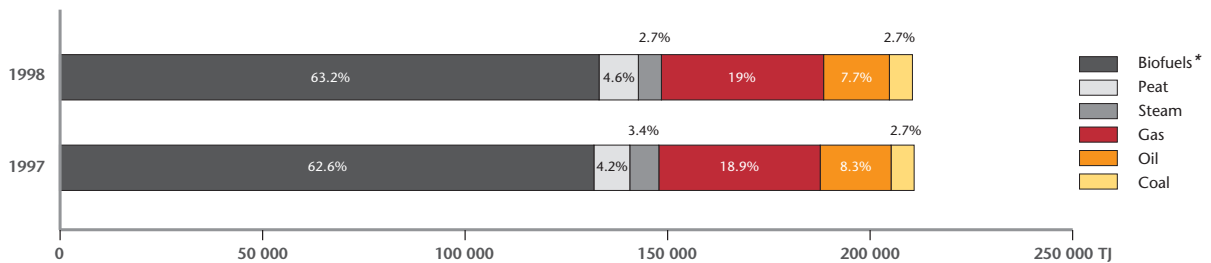
(TWh)	Finland	Sweden	Other	Total
CHP (Combined Heat and Power) .....	3.8	1.5	1.8	7.1
Hydropower .....	1.2	3.9		5.1
Nuclear .....	1.1	2.2		3.3
Other resources .....	1.7	(1.5)		1.7
<b>Total production</b> .....	<b>7.8</b>	<b>7.6</b>	<b>1.8</b>	<b>17.2</b>
Purchases .....	1.8	4.4	3.3	9.5
<b>Total procurement</b> .....	<b>9.6</b>	<b>12.0</b>	<b>5.1</b>	<b>26.7</b>
<b>Stora Enso mill consumption</b> .....	<b>7.8</b>	<b>6.5</b>	<b>4.9</b>	<b>19.2</b>
External sales .....	1.8	5.5	0.2	7.5

**Examples of activities aimed at improving the utilization of energy:**

- ★ A new energy management system was introduced at Stora Enso in Finland with the aim of achieving energy synergies between the Swedish energy producers and the deregulated energy markets in Finland and Sweden.
- ★ Energy efficiency audits and audits of the realization and implementation of environmental management systems for energy resources were started.
- ★ A biofuel project was initiated to determine how much biofuel could be obtained from logging waste for use in power plants at the mills.
- ★ Decisions were made to start construction of a new biofuel boiler at the Pankakoski mill, a natural-gas fired CHP plant at the Anjalankoski mill and a new recovery boiler at the Gruvön mill.
- ★ At the Skoghall mill, two postgraduate students started a four-year degree project to find ways of improving energy utilization. Their supervised research work is part of the Energy Systems Program, in which six faculties from four different universities are participating.
- ★ A district heating system serving Hammarö municipality, based on a supply of secondary heat from the Skoghall mill, was put into operation, and an agreement was signed to construct a similar system, based on secondary heat from the Nymölla mill, to serve Bromölla municipality.

*Stora Enso's use of biofuels increased during the period from 1997 to 1998. Most of the biofuel is consumed at Group mills in Finland and Sweden.*

**Total consumption of fuel within Stora Enso**



\*Biofuels include spent liquors, bark, sludge etc.

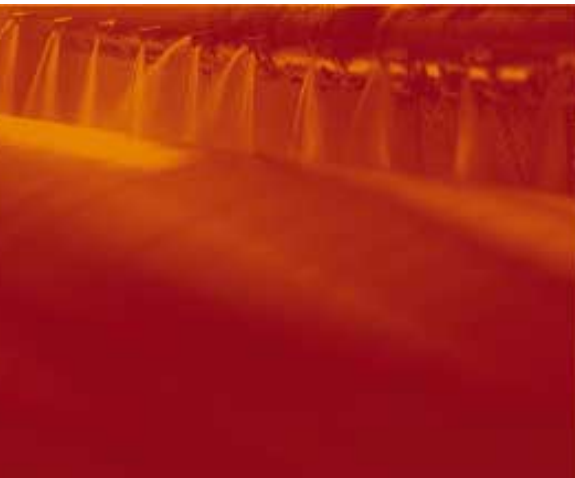


## *Waste and residuals management*

An important aspect of Stora Enso's environmental work is to reduce the amount of waste being disposed of in landfill sites and to recycle residual products as raw materials whenever possible. Disposal of waste in landfills has decreased 21% during the past four years. Much of the material that was previously transported to landfills as waste can now be categorized as residues that are reusable as raw materials.

The reduction in the amount of waste disposed of in landfills is chiefly attributable to improved process control combined with the day-to-day environmental work performed within the framework of environmental management systems.

Prevention of waste generation is a main target for the mills. Fiber and various types of chemical sludge have historically formed a major portion



of the solid waste deposited in landfills. During 1998, the Veitsiluoto mill in Finland started to reuse the fiber sludge by pumping it back into the process. The result is a reduction of 10,400 tonnes in the amount of solid waste deposited in the landfill. Special equipment installed at the Uetersen mill in Germany for the recovery of fillers and fibers has resulted in very low reject losses. Fiber sludge fractions from the mills in Belgium, France and Germany are also utilized as building materials or soil-improvement agents.

The calorific value of sludge can be increased significantly by dewatering operations and thereby utilized for heat production. Wood bark is normally utilized for energy production, and bark is an important contributor to the biofuel mix used by the mills for heat generation. At the Uimaharju sawmill in Finland, the log handling area has been covered with a hard layer, which keeps the wood bark free of contaminants such as stones and soil particles, so that it can be collected and used as a fuel for drying sawn timber products. The amount of solid waste consigned to landfills by the sawmill and pulp mill

at Uimaharju has decreased by a total of 7,700 tonnes compared with 1997.

Ash is a special residual product, since it contains important micro- and macro-elements deriving from combusted wood. Within Stora Enso, 88,300 tonnes of the total 218,600 tonnes of ash were used in various applications. A total of 6,700 tonnes of ash was self-hardened or granulated for spreading on forest land. At the Enocell pulp mill in Finland, bioash is granulated to be used for the revitalization of forest lands. Self-hardened bioash from the Nymölla mill in Sweden is also used in a similar way. The Imatra mill (Kaukopää) in Finland used ash in ground building and as covering material for landfill areas. The Veitsiluoto mill made road and ground construction trials with ash. Bioash from the Kvarnsveden mill (Sweden) blended with sludge was used as cover material for landfill areas (e.g. surroundings of the Falun mine). This type of ash/sludge mix has good water-resistance properties – for example, when used as a sealant beneath or on top of landfills.

Ash from the Corbehem mill in France is supplied to the cement industry and also used for road construction.

At the Sachsen mill in Germany, 100% of the filter ash and surplus fiber sludge was utilized in construction materials or in the mining industry.

The mills also generate miscellaneous residual products, such as packaging, worn-out equipment and construction waste. A small amount of the waste, so-called hazardous waste, is handled separately by accredited companies responsible for the destruction. An advanced source-sorting system enables unnecessary waste disposal on landfill to be avoided.



Article 4

## Supply chain cooperation

*The development of a broad environmental perspective is a natural consequence of Stora Enso's position in the supply chain. To be able to improve the environmental profiles of the end products of the chain, it is important to fully understand the performance requirements that the products are ultimately intended to meet. It is equally important to develop a corresponding understanding with our suppliers. In both cases, close cooperation is the key.*



Normally, Stora Enso's position in the supply chain involves delivering products not to the end consumer but to a business customer who is producing for the final consumer. When working towards environmental improvements of a process or a product, it is necessary to look at the entire supply chain.

## *Cooperation with customers*

As an example of this approach, Stora Enso cooperated with a supplier, Canfor, and a customer, Axel Springer Verlag AG, to develop an LCA-based study (Paper Chain Study) of the production of a daily newspaper and a magazine. The report, published in 1998, provides an insight into the relative contributions of the environmental loading from forestry (insignificant), pulp and paper production and printing. Such information is of great value for the continuation of improvement work. Copies of the report may be ordered from Stora Enso Environment (see address on page 37). Stora Enso's product development work is to a large extent based on the eco-perspective approach exemplified by this study.

The most recent example of product development with customer focus is the rebuild of Veitsiluoto's paper machine no 2. When the project, known as Cut Size 2000, is completed, PM 2 will be able to run off copier paper with a smoother surface, thereby reducing the amount of printing ink required. The customer will also benefit by reduced maintenance costs for copiers and printing machines using this grade of paper. The investment will

For Stora Enso, this means it is vital that we work closely both with our customers and with our suppliers. This also encourages us, as well as our partners, to look for and use transparent and relevant environmental information.

also reduce the paper machine's water consumption and emissions.

Cooperation on environmental issues between Stora Enso Paperboards and its customers has been particularly close and it has resulted in lighter board grades. This is a major benefit for customers when transporting large volumes and positive from a waste and residual point of view. The Imatra and Skoghall mills have made the most significant progress in developing lighter boards.

An investment project is currently underway at the Baienfurt mill to improve Aurocard board products in a similar manner.

We also serve our customers by being a responsible producer. We recognize our obligations by developing recycling methods for our products. A most interesting example of this policy is provided by the milk and juice cartons manufactured by various converters from Stora Enso liquid packaging board. We have developed a process for fully recycling the used cartons and use the fibers to manufacture coreboard, which in turn can be recycled.

## Cooperation with suppliers

In addition to wood raw material and recovered fibers, Stora Enso uses considerable amounts of pigments and synthetic binders for its paper and board production. Process chemicals are also used as additives. Stora Enso's purchasing of strategic raw materials and transports is coordinated at Group level, which also facilitates environmental management.

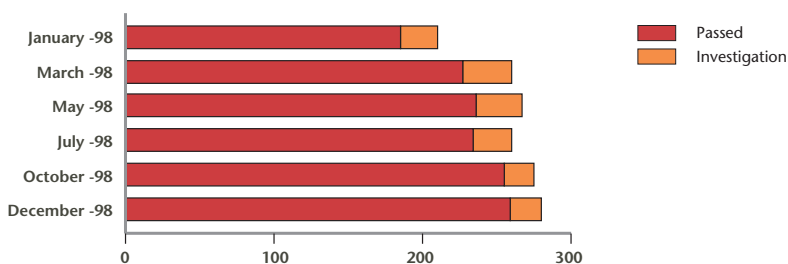
When the entire supply chain leading to Stora Enso's end products is traced, it is clear that suppliers of materials and services play a vital role in contributing to the environmental profile of the Group's processes and products. Accordingly, it is important that the Group involves its suppliers in its environmental improvement work.

In some cases, Stora Enso is not in a position to judge the environmental performance of suppliers, since most of them are active in fields outside the Group's own core competence area. Suppliers are, however, expected to demonstrate their commitment to continuous improvements. The implementation of an externally audited environmental management system, such as ISO 14001 or EMAS,

provides the most convincing demonstration of this commitment, but we realize that in the case of smaller operations this is not always feasible. Other practical solutions are therefore acceptable.

One approach adopted by Stora Enso is to use a specially developed commercial tool known as COMPASS (Company Management Performance Assessment), which assists purchasers in evaluating suppliers. COMPASS is based on a questionnaire, which is circulated to suppliers, including each of their production sites. Also transport suppliers are being evaluated by the same system. By the end of 1998, 276 production sites, operated by 180 of the Group's suppliers of fillers, binders, fuels and other materials, had been evaluated. Developments during 1998 are shown in the diagram below. Of the suppliers evaluated so far, only a small fraction have yet to receive approval and are therefore required to undergo a more thorough examination. The aim of the evaluation program is not to phase out suppliers but, where necessary, to encourage them to improve their environmental performance.

Suppliers of goods assessed by COMPASS



Trend during 1998 for suppliers of goods and their production units assessed by COMPASS. 93% (88%) of all registered production units were approved by year-end 1998.

## Transports

Stora Enso is one of Europe's largest transport purchasers by volume. While the Group retains management responsibility for the transport and distribution of finished goods, the transport warehousing and handling are purchased from external suppliers. Stora Enso acknowledges that the environmental impact of transports also has to be included when assessing the Group's overall environmental performance. External suppliers are expected to take measures to reduce their environmental impact and to promote environmental awareness on a continuous basis.

During the past few years, Stora Enso in Sweden has developed a special environmental management system for transports, known as *Transport Chain Assessment (TCA)*. The system has been specifically developed and adapted to handle transport-related environmental issues from a market-driven perspective. It takes into consideration such aspects as how the procurement of transports is handled, the division of responsibility for transports and the environmental impact they cause, and the transport market's structure and manner of functioning. The basic premise of the TCA system is that goods generate an environmental impact through the manner

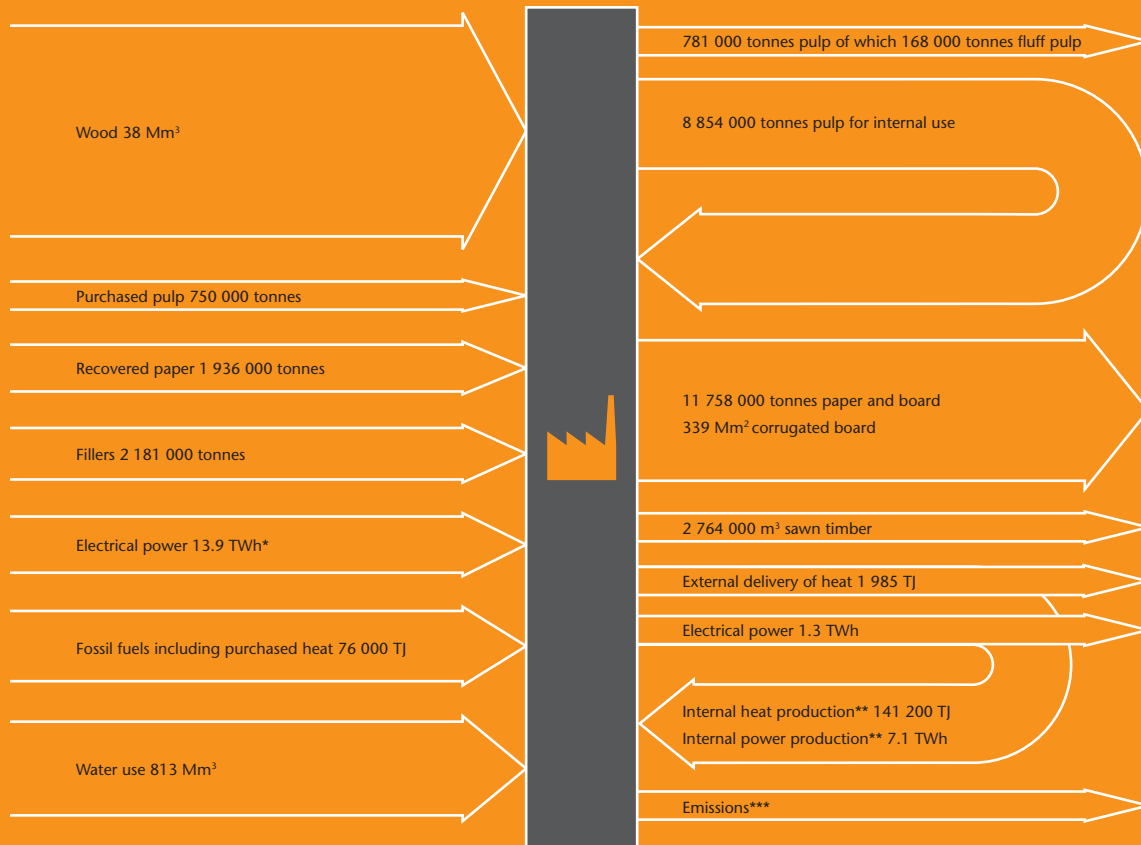
in which they are transported. Stora Enso's transports of finished products mostly involve several different transport systems.

In Finland, Stora Enso has been working closely with the Finnish forest-products industry and with major carriers to improve the environmental performance of transports and, in particular, to investigate emissions from sea transports. Stora Enso has also stepped up its efforts to develop *ecoroute* models which enable energy consumption and emissions to be calculated for individual routes. Transport solutions that are both economically feasible and environmentally sustainable are being sought for the goods flows in the market areas analyzed. Transport by ships plays a major role in these *ecoroute* models.

A decision was made during 1998 to launch a new transport system, *Baseport*, for transport of products from Sweden to continental Europe. Compared with today's solutions, comprehensive transport environmental assessments indicate substantial environmental benefits in terms of emissions to air, energy consumption and cost savings. The system is also expected to produce significant improvements regarding noise and vehicle-queuing problems.

Within the Baseport project, Stora Enso will have created the most resource-efficient, i.e. lean, transport product currently available from the Swedish mills to Zeebrugge.

# Resource utilization and environmental performance 1998



## Comments on resource balance

Total consumption of electrical power within Stora Enso's industrial operations is nearly 20 TWh.

Internal production via backpressure and condensed power is 7.1 TWh. Total external procurement is 13.9 TWh. External deliveries of electrical power amounted to 1.3 TWh. Nearly 70% of the total fuel consumption for heat production is based on biofuels such as spent liquors, bark and dewatered sludge.

The major proportion of the paper pulp manufactured within Stora Enso is used in the Group's own paper and board production.

\* Electrical power excluding back-pressure and condensed generated power

\*\* Fuels; spent liquor, bark, sludge, recovered heat

### \*\*\* Discharge to water

COD	186 000 tonnes
AOX	720 tonnes
Phosphorus	300 tonnes
Nitrogen	2 000 tonnes

### Emissions to air

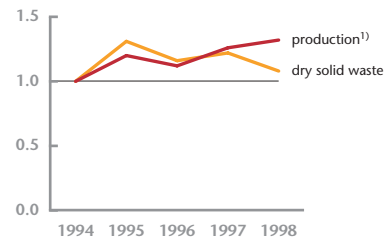
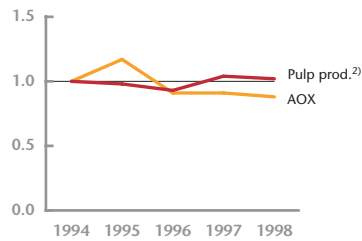
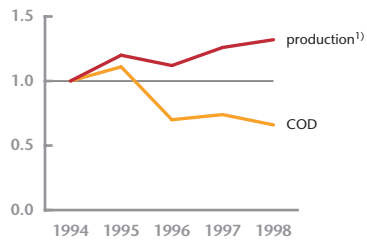
CO <sub>2</sub> from non renewable fuels	4 747 000 tonnes
CO <sub>2</sub> from renewable fuels	14 979 000 tonnes
CO <sub>2</sub> total	19 726 000 tonnes
SO <sub>2</sub>	17 000 tonnes
NO <sub>x</sub> (NO <sub>2</sub> )	16 000 tonnes

### Waste for landfill Hazardous waste

450 000 tonnes
7 200 tonnes



## Improving environmental performance

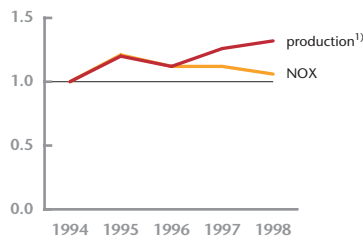
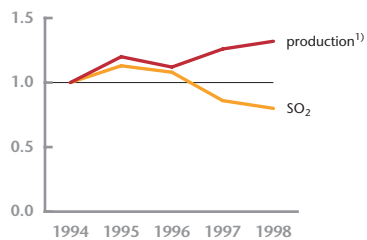


Total emissions from Stora Enso's operations have decreased, despite the fact that production is now some 30% higher than five years ago. This trend is a result of growing awareness of environmental issues, environmental training and investment in modern, cleaner, resource-saving technology and the introduction of environmental management systems.

Stora Enso devotes considerable effort to finding new solutions for the reuse of residuals which were earlier considered as waste. A typical example is ash, which is being used in an increasing amount as a raw material for road and other land-based construction projects, as well as for the revitalization of forest lands.

<sup>1)</sup> Sales production of market pulp, paper and board.

<sup>2)</sup> Bleached chemical pulp.



# Production, waste disposal and emissions (tonnes)

Site	Product <sup>1)</sup>	Production <sup>2)</sup>		Landfill <sup>3)</sup>	
		1998	1997	1998	1997
<b>Belgium</b>					
Langerbrugge	▼	232 000	217 000	1 300 <sup>a)</sup>	6 600
<b>Canada</b>					
Port Hawkesbury	▲ ▼	338 000	333 000	10 900 <sup>a)</sup>	39 000
<b>China</b>					
Suzhou	+	68 000	25 000	11 100	9 300
<b>Denmark</b>					
Dalum	+	104 000	103 000	20	40
Dalum (Maglemölle)	▲	67 000	69 000	0	0
<b>Finland</b>					
Anjalankoski	■ ▼	646 000	625 000	24 500	22 600
Enocell	▲	586 000	563 000	8 300 <sup>a)</sup>	16 000
Heinola (Fluting)	■	239 000	249 000	15 000 <sup>13)</sup>	16 500 <sup>13)</sup>
Imatra	■ +	1 013 000	1 012 000	19 000	28 500 <sup>13)</sup>
Kemijärvi	▲	175 000	175 000	7 800	6 000
Kotka	▼ X ◻	291 000	275 000	9 100 <sup>13)</sup>	10 600 <sup>13)</sup>
Kotka (Keräyskuitu)	▲	68 000	66 000	11 900	12 500
Lahti, Heinola, Ruovesi (Pakenso)	◻	105 000	106 000	900	900
Oulu	+	664 000	478 000	47 900	51 600
Pankakoski	■	70 000	80 000	2 100	3 500
Summa	▼	441 000	409 000	6 000	8 000
Tervakoski	*	83 000	78 000	100	200
Varkaus	+ ▼ ■ ◻	614 000	618 000	18 400	16 000
Veitsiluoto	+ ▼	725 000	729 000	7 600 <sup>a)</sup>	18 000
<b>France</b>					
Corbehem	▼	494 000	492 000	22 800	27 400
<b>Germany</b>					
Baienfurt	■	166 000	171 000	1 300	70
Flensburg	*	31 000	30 000	6	2
Hillegossen	*	131 000	152 000	0	0
Kabel	▼	556 000	540 000	1 400	2 400
Maxau (Holtzmann)	▼	524 000	514 000	400	5 000
Reisholz	▼	204 000	201 000	200	70
Sachsen	▲ ▼	358 000	331 000	3 400	5 600
Uetersen	+	184 000	213 000	0	600
Wolfsheck (Holtzmann)	▼	148 000	141 000	300	300

## Explanations

- <sup>1)</sup> ■ = board and packaging paper, ◻ = converted products, + = fine paper, ▲ = pulp, ▼ = newsprint and magazine paper, ● = red paint pigment, \* = technical office paper, X = laminating paper, ◆ = sawn timber  
<sup>2)</sup> Reported production refers exclusively to end products. Internal pulp production is not reported for the integrated mills. Production of sawn timber is reported in m<sup>3</sup>, other products in tonnes.

<sup>3)</sup> Waste is reported in its dry state. Original dry content and volume-to-weight conversion are in some cases estimates.

<sup>4)</sup> SO<sub>x</sub> is calculated as SO<sub>2</sub> (sulphur dioxide) and includes all sulphur-containing compounds.

<sup>5)</sup> NO<sub>x</sub> is calculated as NO<sub>2</sub> (nitrogen dioxide).

<sup>6)</sup> Does not have own energy production.

<sup>7)</sup> Negative emissions after correction for amount in incoming water.

<sup>8)</sup> Estimation based on fuel mixture and performance characteristics of the boilers.

SO <sub>x</sub> <sup>4)</sup>		NO <sub>x</sub> <sup>5)</sup>		COD		AOX		Phosphorus		Nitrogen	
1998	1997	1998	1997	1998	1997	1998	1997	1998	1997	1998	1997
0 <sup>6)</sup>	0 <sup>6)</sup>	0 <sup>6)</sup>	0 <sup>6)</sup>	460	460			7)	7)	7)	7)
2 980 <sup>b)</sup>	4 630	660 <sup>8)</sup>	650 <sup>8)</sup>	16 200 <sup>c)</sup>	29 400	7	38	NA	NA	NA	NA
1 300	1 020	370	290	60	80			1		10	
0	0	80	110	0	0	0	0	0	0	0	0
0.1	<0.1	5	5	150	150	0.1	0	0.2	0.8	5	8
140	70	660	870	3 190	3 700			13	9	67	111
370	280	1 060	1 040	7 640	6 590	90	80	2	3	39	44
880	980	520	520	950	1 320			4	8	49	60
1 290	1 770	1 800	1 890	26 750	22 990	180	170	26	19	340	210
770	810	320	350	6 200	8 900	15	13	7	9	85	100
490	360	310	260	3 280	3 650			8	9	57	60
		5									
30	30	20	20								
920	710	1 090	830	11 620	10 690	110	100	14	12	160	98
210	250	100	120	960	1 090			0.3	0.3	4	4
70	90	250	250	660	720			2	3	27	29
0.4	1	90	70	440	360	0.4	0.5	1	1	8	6
430	430	860	750	6 950	7 480	25	29	13	15	115	112
1 430	1 390	950	950	14 400	19 260	44	49	10	13	125	153
1 720	1 850	1 100	1 160	1 190	1 030	0.2	0.8	16	13	0	0
40	40	160	160	620	640	0.5	0.3	2	3	31	25
0	0	7	8	60	50	0	<0.1	0	0	<0.1	0.3
0	0	80	90	80	70	0	0	0.1	0.1	6	5
6)	6)	6)	6)	1 280	880	0.2		1.7	1.4	1.7	2.5
30	8	320	320	2 040	1 740	1	1	8	6	11	11
6)	8	6)	15	140	120	0.5	0.4	9)	0.3	9)	10
0.5	2	350	360	730	880	1	1	1.2	2.4	13	11
0	0	40	70	9)	9)	9)	9)	9)	9)	9)	9)
0	25	0	30	170	150	0.1	0.1	3	2	7	6

<sup>9)</sup> Process water treated in external treatment facility.

<sup>10)</sup> COD measurements carried out on filtered samples.

<sup>11)</sup> These units are not listed separately due to low emissions.

<sup>12)</sup> Figures include the Schweighofer Group's production and emissions in December 1998.

<sup>13)</sup> Solid waste to landfill reported in the wet form.

NA=not analyzed

#### Comments

a) Decreased amount of landfill disposal due to new applications for various residual products.

b) Decreased emission of SO<sub>x</sub> due to closure of pulp mill.

c) Decreased discharge of COD due to closure of pulp mill.

d) Increased amount of landfill disposal due to temporary marketing problems of residual products.

## Production, waste disposal and emissions (tonnes)

Site	Product <sup>1)</sup>	Production <sup>2)</sup>		Landfill <sup>3)</sup>	
		1998	1997	1998	1997
<b>Latvia</b>					
Riga (Pakenso)	►	12 000	9 000		
<b>Netherlands</b>					
Berghuizer	✕	177 000	169 000	30	0
<b>Portugal</b>					
Celbi	▲	266 000	270 000	19 900	18 800
<b>Spain</b>					
Barcelona	■	144 000	145 000	9 700 <sup>a)</sup>	22 500
<b>Sweden</b>					
Falun (Red paint)	●	1 040	1 300		
Fors	■	271 000	273 000	9 600 <sup>a)</sup>	20 000
Fors, Hammarby	►	21 000	22 000	0	0
Gruvön	▲ ■	555 000	592 000	25 200	27 800
Grycksbo	✕	175 000	180 000	800 <sup>a)</sup>	1 500
Hylte	▼	723 000	734 000	44 300	39 400
Kvarnsveden	▼	664 000	629 000	3 700	5 500
Mölnadal	✕ ■	107 000	106 000	1 000	1 400
Norrundet	▲	278 000	283 000	5 400	3 400
Nymölla	▲ ✕	427 000	422 000	14 900 <sup>d)</sup>	11 500
Jönköping, Skene, Vikingstad (Pakenso)	►	81 000	80 000	300	
Skoghall	■	477 000	495 000	22 200	18 200
Skutskär	▲	445 000	406 000	40 400 <sup>d)</sup>	30 700
<b>United Kingdom</b>					
Newton Kyme	■	34 000	33 000	700	800
<b>Corenso</b>					
Corenso, core factories <sup>11)</sup>	►	52 000	32 000		
Pori	■	90 000	87 000	10 000	16 000
St. Seurin-sur-l'Isle	■	64 000	63 000	4 100 <sup>13)</sup>	4 400 <sup>13)</sup>
<b>Stora Enso Timber</b>					
Nonintegrated sawmills <sup>11),12)</sup>	◆	1 378 000	1 467 000	5 800	8 100
Integrated sawmills	◆	1 388 000	1 245 000		
<b>Total pulp, paper&amp;board, tonnes</b>		<b>14 388 000</b>	<b>14 025 000</b>	<b>443 956</b>	<b>529 182</b>
<b>Total timber, m<sup>3</sup></b>		<b>2 766 000</b>	<b>2 712 000</b>	<b>5 800</b>	<b>8 100</b>
<b>Grand total</b>				<b>449 756</b>	<b>537 282</b>

### Explanations

- <sup>1)</sup> ■ = board and packaging paper, ► = converted products, + = fine paper, ▲ = pulp, ▼ = newsprint and magazine paper, ● = red paint pigment, \* = technical office paper, ✕ = laminating paper, ◆ = sawn timber
- <sup>2)</sup> Reported production refers exclusively to end products. Internal pulp production is not reported for the integrated mills. Production of sawn timber is reported in m<sup>3</sup>, other products in tonnes.

<sup>3)</sup> Waste is reported in its dry state. Original dry content and volume-to-weight conversion are in some cases estimates.

<sup>4)</sup> SO<sub>x</sub> is calculated as SO<sub>2</sub> (sulphur dioxide) and includes all sulphur-containing compounds.

<sup>5)</sup> NO<sub>x</sub> is calculated as NO<sub>2</sub> (nitrogen dioxide).

<sup>6)</sup> Does not have own energy production.

<sup>7)</sup> Negative emissions after correction for amount in incoming water.

<sup>8)</sup> Estimation based on fuel mixture and performance characteristics of the boilers.



SO <sub>x</sub> <sup>4)</sup>		NO <sub>x</sub> <sup>5)</sup>		COD		AOX		Phosphorus		Nitrogen	
1998	1997	1998	1997	1998	1997	1998	1997	1998	1997	1998	1997
		122	160	80	100	0	0.1	1.6	2	12	15
560	380	350	470	5 720	4 670	56	43	36	30	42	41
		81	50	1 790	1 660						
1	2										
50	80	80	110	2 430	2 200	0.4	0.3	1	1	24	22
0											
190	270	810	960	16 000	15 270	60	55	29	30	220	210
130	190	50	60	130	170	0.3	0.5	0.1	0.2	9	8
70	60	260	260	3 100	4 000	0	0,4	4	5	30	33
120	150	240	260	1 060 <sup>10)</sup>	1 450 <sup>10)</sup>	1	1	2	4	36	48
				200	200	0.1	0.2	0.1	<0.1	4	4
660	680	410	440	9 340	9 450	50	60	15	15	74	79
690	630	680	680	13 700	15 500	1	2	15	16	155	213
7	8										
530	700	520	610	8 000	10 790	8	10	18	16	118	170
570	620	810	740	16 790	19 340	70	110	22	25	76	105
5	5	20	20	360	210	<0.1	0.6	1.4	0.6	5	1
4	5	3	3	510	700	0	0	0.1	0.2	5	5
				80	110						
25	20	110	115	190	210			3	2	0	1
		20	15								
<b>16 688</b>	<b>18 534</b>	<b>15 643</b>	<b>16 011</b>	<b>185 510</b>	<b>208 220</b>	<b>722</b>	<b>766</b>	<b>279</b>	<b>275</b>	<b>1 971</b>	<b>2 020</b>
<b>25</b>	<b>20</b>	<b>130</b>	<b>130</b>	<b>190</b>	<b>210</b>			<b>3</b>	<b>2</b>	<b>0</b>	<b>1</b>
<b>16 713</b>	<b>18 554</b>	<b>15 773</b>	<b>16 141</b>	<b>185 700</b>	<b>208 430</b>	<b>722</b>	<b>766</b>	<b>282</b>	<b>277</b>	<b>1 971</b>	<b>2 021</b>

<sup>9)</sup> Process water treated in external treatment facility.

<sup>10)</sup> COD measurements carried out on filtered samples.

<sup>11)</sup> These units are not listed separately due to low emissions.

<sup>12)</sup> Figures include the Schweighofer Group's production and emissions in December 1998.

<sup>13)</sup> Solid waste to landfill reported in the wet form.

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#### Comments

a) Decreased amount of landfill disposal due to new applications for various residual products.

b) Decreased emission of SO<sub>x</sub> due to closure of pulp mill.

c) Decreased discharge of COD due to closure of pulp mill.

d) Increased amount of landfill disposal due to temporary marketing problems of residual products.

## *Preventive and corrective measures*

### **Risk analysis**

The assessment and prevention of environmental risks is an integral part of Stora Enso's environmental management system and environmental strategy, and involves regular examination and analysis of each operation.

Typical examples of areas for potential improvements in 1998 are the storage and handling of bulk chemicals, and noise and odor reduction.

### **Infractions and complaints**

With a few exceptions, the permits governing production at the various production units were fulfilled by a comfortable margin.

The county administrative board submitted a request to file charges against the Gruvön paper mill (Sweden) for exceeding the permitted size of a landfill area for solid waste. However, the request to file charges was rejected.

Samples taken at Newton Kyme (UK) by the Environment Agency exceeded the permitted consent levels by a small margin in August and September. An external consultancy has carried out a flow and load survey of the wastewater. A report will be produced detailing the action required to ensure future compliance with consent regulations.

Investigation of ground vibrations in the vicinity of the Reisholz mill (Germany) revealed that the debarking drum was the cause of the problem. New debarking facilities will be put into operation during 2000.

A long-pending claim for damages concerning eel fishing has been brought against the Nymölla

mill (Sweden). There has been no action on the matter for several years.

Monthly permitted averages for BOD and COD were exceeded at the Pankakoski mill (Finland) in April, May and September. These exceedings were reported to the authorities. Implementation of a new biological wastewater treatment started in September. New temporary higher permitted limits, pending the introduction of the new treatment facility came into force in December.

The Sachsen mill (Germany) received complaints about odors and noise. According to the measurements, the amount of noise and odor emissions is now below the permit level.

In the summer of 1998, sewage system repairs were performed at the Kotka mill (Finland). Due to the work, the BOD permit level was occasionally exceeded.

Fuel oil leakages from mill systems to lake and river water took place in June 1998 during the start-up of the Enocell pulp mill (Finland). Oil was cleaned from the water and shorelines during the next three weeks. Preventive actions were taken immediately, including training and technical measures.

The Imatra mill (Finland) received complaints about noise. A study of noise-related problems is scheduled for summer 1999.

In June 1998, the Oulu mill (Finland) submitted an application to construct a new deposit for sludge from the paper mill and ash from the power plant. The permit was obtained from the city of Oulu, but an appeal was made to a higher court. The case is still pending.

# Examination report

## **Statement**

We have examined the financial information presented on page 13 and the information regarding resource utilization and environmental performance presented on pages 28–33 of the Stora Enso Group's Environmental Report 1998. The information in the report is the responsibility of and has been approved by the management of the Group.

The management of the Group commissioned us to perform the procedures set out below:

- *Assess the procedures used to collect quantitative information on environmental issues selected by the management, from those production units included in the report.*
- *Assess whether this information obtained from the production units has been compiled correctly and presented appropriately.*
- *Assess whether the information in the report is in all materiality consistent with similar information in the 1998 Annual Report of the Group.*

Our work consisted of meetings with management responsible for environmental issues and examination of information compiled by Stora Enso Environment.

In our opinion the quantitative information of the Stora Enso Group presented on the above-mentioned pages of the Environmental Report 1998 is based on information collected with due care from the production units. Further, it is our opinion that this information is presented in an appropriate manner in the report.

Helsinki, April 22, 1999

SVH PricewaterhouseCoopers Oy, Authorized Public Accountants

*Pekka Nikula*  
*Authorized Public Accountant*

*Henrik Sjöblom*  
*Senior Manager*

# Glossary

**AOX** (Adsorbable organic halogen compounds) – Collective term for the amount of chlorine bound to organic pollutants, in wastewater for example.

**BIOFUELS** – Fuels derived from renewable raw materials, such as bark and logging residuals.

**BIOTOPE** – Habitat. An area that is naturally distinct as a result of its local climate, soil conditions, flora and fauna.

**CO<sub>2</sub>** (Carbon dioxide) – Carbon dioxide is formed as a result of human and animal respiration. It is also formed during combustion. Forest trees utilize carbon dioxide in the growing process (photosynthesis). Too much carbon dioxide in the atmosphere is considered to contribute to the greenhouse effect.

**COD** (Chemical Oxygen Demand) – Chemical oxygen-consuming substances. A measure of the amount of oxygen required for the total chemical breakdown of organic substances in water.

**CTMP** (Chemithermomechanical Pulp) – Pulp produced by refining chemical-impregnated, preheated woodchips.

**LCA** (Life Cycle Assessment) – Life Cycle Assessment is a method for assessing the environmental impact of a product “from the cradle to the grave”.

**LWC** (Lightweight Coated) – Coated magazine paper.

**NITROGEN** – An element. A high nitrogen content in water, together with phosphorus and organic substances, can lead to increased biological activity in water, known as eutrophication.

**NO<sub>x</sub>** – A collective term for the nitrogen oxides formed during combustion. When precipitation occurs, they can contribute to the acidification of soil and water. NO<sub>x</sub> can also, together with hydrocarbons, react with sunlight to form ground-level ozone.

**ODOR** – Volatile sulphur compounds formed during the kraft process cause a powerful odor even in very low concentrations. Biological treatment plants can cause odor problems resulting from the treatment process itself.

**PHOSPHORUS** – An element. High phosphorus contents, combined with nitrogen and organic substances, can cause increased biological activity in water, known as eutrophication.

**RECIPIENT** – A sea, lake, watercourse or the atmosphere which is the recipient of emissions.

**SO<sub>2</sub>** (Sulphur dioxide) – Sulphur dioxide is formed when sulphur-containing fuels such as oil and coal are burned. Sulphur dioxide contributes to the acidification of soil and water.

## Abbreviations:

**TJ:** Terajoule (1000 billion joule)

**GWh:** Gigawatt hours (1 billion watt-hours)

**TWh:** Terawatt hours (1,000 billion watt hours)

**ha:** Hectare (10,000 m<sup>2</sup> or 100x100 m)

**Mm<sup>3</sup>:** 1 million cubic meters

**M<sup>3</sup>fo:** Forest cubic meter – total tree volume, bark and top included

*Note: All references to tonnes refer to metric tons.*

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(Å/å and Ä/ä become A/a, and Ö/ö becomes O/o)

See also table "Production, waste disposal and emissions" on pages 30–33.

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