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Finland's Natural Resources and the Environment 1996





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Statistics Finland

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Inquiries:

*Jukka Hoffrén
Leo Kolttola
tel. +358 9 17341*

*SVT Suomen virallinen tilasto
Finlands officiella statistik
Official statistics of Finland*

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Foreword

One of the main objectives set by the Government in its programme is to strengthen the principles of sustainable development in different sectors of society, especially in regard to the management of Finland's natural resources and the environment. The Government programme particularly emphasises the development of ecological accounting of both the economy and the Government sector. The review *Finland's Natural Resources and the Environment 1996* continues the practice first adopted by the Government in the budget for 1995 of assessing the state of the country's natural resources and the environment in drawing up its budget proposal.

One of the items approved by the United Nations Conference on Environment and Development held in Rio de Janeiro in 1992 was an extensive action plan for sustainable development (Agenda 21). Finland has committed itself to complying with the decisions approved in Rio. The UN Habitat 2 meeting held in Istanbul in spring 1996 confirmed the process initiated in Rio, and both the private sector and the local level agreed at the meeting to observe the principles approved in Rio. A working and reciprocal connection between environmental and socioeconomic policy is the key to attaining sustainable development. By taking the environment into account in the formulation and implementation of sectoral policies for different fields at all levels of society it is possible to influence the underlying causes of environmental problems and thus effectively preempt the generation of these problems.

This review was compiled by a working group appointed by the Ministry of the Environment chaired by Mr. Markku Nurmi, Director General, from the Ministry of the Environment, assisted by Mr. Heikki Sourama, Special Advisor, and Pekka Pelkonen, Special Advisor, from the Ministry of Finance, Mr. Risto Timonen, Senior Inspector, from the Ministry of Finance, Ms. Erja Fagerlund, Senior Advisor, from the Ministry of Trade and Industry, Ms. Johanna Haavisto, Researcher, from the Ministry of Transport and Communications, and Mr. Jarmo Muurman, Senior Inspector, and Ms. Pirkko Isoviita, Senior Inspector, from the Ministry of the Environment. Acting as secretaries to the team responsible for compiling the review were Mr. Jukka Hoffrén, Senior Statistician, and Mr. Leo Koltola, Senior Statistician, from Statistics Finland. The project was financed by the Ministry of the Environment.

Helsinki, September 1996

Ministry of the Environment

Pekka Haavisto
Minister of the Environment

Statistics Finland

Timo Relander
Director General

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1 *The economy and the environment*

Sustainable development

One of the basic objectives stated by the Government in its programme is the observance of mutually enhancing policies that will ensure the strengthening of the principles of sustainable development in all fields of society, especially the management of Finland's natural resources and the environment, by the end of the millennium. According to the programme, economic growth must throughout the legislative period be both rapid and environmentally sustainable.

The programme specifies a number of policies and actions on natural resources, energy, agriculture, transport, etc., that affect the environment and sustainable development. In the case of some of them, the decisions have already been made, and in others preparations are under way. The main measures already implemented include the amendments to the environmental protection and forest legislation placed before Parliament in May 1996. Agreement was also recently reached on the financing of the environmental protection programmes to be carried out. Preparations are also under way for the total revision of the legislation on land use planning and construction.

The first global agreements on biodiversity and climate change were signed at the United Nations Conference on Environment and Development in Rio in 1992. The Conference also approved a broad action plan for the achievement of sustainable development in the next millennium. Work on these, both preparation and implementation, has continued since the Conference at both national and international level, and Finland is likewise drawing up a national programme or strategy on both in accordance with the Gov-

ernment programme. These issues will for the most part be decided by the Government in the course of 1997.

According to the EU programme for sustainable development, ecologically sustainable development is one of the basic objectives of the European Union. The EU operates on the principle that environmental policy should be decided as close to the people as possible according to the principle of subsidiarity. Member States must monitor the implementation of sustainable development, chiefly at national level and especially in the following focal areas:

- industry
- energy
- transport
- agriculture
- tourism

The aim in the case of industry is to promote the adoption of environmental auditing systems, to improve and standardise the legislation on pollution, and to enhance the environmental awareness of enterprise. The focal area in energy supply is the development and use of techniques for the conservation of energy, the development of renewable energy sources, and the internalisation of external costs. The aim in the case of transport is to internalise the costs of external hazards, to seek to rectify the imbalance between various forms of transport, and to promote the use of more environment friendly means of transport. In agriculture the aim is to promote versatile production methods and nature conserving cultivation techniques.

According to the EU programme, the availability of information on the environment should also be rapidly improved in Member

States in sectors in which economic and environmental decision making could in the near future be integrated. This calls for the establishment of an ecological accounting system and monitoring of the state of the environment by, among others, environmental indicators. Since it is in practise much cheaper to prevent environmental problems beforehand than to repair the ensuing damage, major cost savings may be achieved through integration. Since not all environmental damage is transferred to market prices, the markets are not alone sufficient to steer measures towards the optimal result for the environment and the economy.

The EU environmental programme will be revised in the course of 1996 by joint decision of Parliament and the Government. The primary sectors will then include the integration of environmental matters with other action policies, diversification of the use of instruments, development of the enforcement of the legislation, the increasing of awareness, and the role of the EU in international cooperation. The EU has, it is estimated, made progress in reducing certain environmental impacts. This has not, however, been sufficient to improve the quality of the environment in Member States, and even less to further sustainable development. Environmental policy will therefore have to be intensified in the next few years if the objectives are to be achieved.

Instruments

Restrictions based on legislation have traditionally been one way of adopting environmental costs in economic decision making. In addition to such conventional administrative instruments efforts have, however, been made to find more flexible instruments in the form of taxes, marketable emissions licences, eco-labelling and voluntary agreements.

Government can influence the markets and the state of the environment:

- through legislation,
- through planning and other administrative actions, like requiring assessments of the environmental impacts of projects and plans,
- through taxation, fees and aid,
- by assigning public purchases,
- by targeting subsidies so that the detrimental impact of measures on the environment is minimised,
- through voluntary agreements and arrangements,
- by increasing environmental awareness, and
- through international cooperation.

The Act on environmental impact assessment that came into force in September 1994 requires that environmental consequences must be assessed and allowance made for them in planning and decision making. This assessment has so far been applied to 45 projects, 20 of them road projects and the remainder projects connected with power stations, waste management, railways, ports, forests, wetlands and marshes.

Collaboration with nearby Estonia, Latvia, Lithuania, Poland and the northwestern parts of Russia has been an important element of Finland's environmental protection. Through these joint ventures it has been possible to use Finnish expertise to considerably reduce air pollutant depositions, to improve the state of the waterbodies and to safeguard the biodiversity not only of the target countries but also of Finland. Between 1991 and 1995 assistance totalling over FIM 200 million was granted to 128 projects in all, and there are plans for investing about FIM 106 million in major projects during the period 1996–1998. Finland is the first country in the West to carry out a debt-for-nature swap, meaning that Finland will write off some of the debts owing to

it by Poland if Poland decides to invest the corresponding sum in environmental protection and energy conservation. FIM 80 million of government funds has been earmarked for this purpose in the 1990s, some FIM 60 million of which has so far been spent.

Finland also has a variety of instruments for the economic regulation of environmental protection, such as taxes on commodities harmful to the environment, graded taxes affecting the state of the environment, economic incentives, certain administrative and municipal fees, financial subsidies and deposit schemes to encourage recycling.

The most important of the economic instruments involve tax subsidies. Central to the introduction of environmental taxes is the

regulatory effect of the tax relative to its fiscal effect. The revenue from environmental taxes allows the State to lower other taxes without changing the overall tax returns. When the regulatory effect is not particularly strong, the environmental tax yields a steady revenue. The yield on environmental tax with a strong regulatory effect decreases in the long term. Excessive environmental taxes may reduce the international competitiveness of the branches affected most. A rapid shift in the direction of environmental taxation is not therefore possible.

One of the aims of the Government's programme is to compensate for lowering the labour taxation by means of environmental taxes. The objective is to establish a tax model that encourages people to conserve energy

1. Environmentally-related State taxes and fees (FIM million)

	1993	1994	1995	1996	1997
	R	R	R	B	BP
Disposable drink-carton tax	16	48	88	90	90
Soft drink surtax	19	16	15	16	16
Fertiliser tax	516	267	—	—	—
Pesticide fee	6	6	6	6	6
Electricity tax	656	56	—	—	—
Energy taxes, of which	8 404	9 815	11 628	13 550	14 100
<i>Carbon dioxide component</i>	1 005	1 140	1 488	1 707	..
<i>Energy component</i>	—	760	791	949	..
<i>Basic tax</i>	7 399	7 915	9 349	10 894	..
Oil waste tax	21	19	21	20	20
Car and motorcycle tax	1 609	2 054	2 685	3 600	3 800
Charter flight tax	111	80	—	—	—
Water protection tax	2	2	3	2	2
Oil pollution control fee	34	31	34	34	34
Vehicle tax ("sticker" tax)	—	618	1 046	1 040	1 070
Motor vehicle tax ("diesel" tax)	885	844	668	860	870
Waste tax	—	—	—	80	300
Total	12 279	13 856	16 194	19 298	20 308

R = revenue B = budget BP = budget proposal

— = not in use
.. = data missing

and to reduce the emission of substances harmful to the environment. On the Government's proposal, Parliament passed the bill for a new Act on waste tax in June 1996. This waste tax will be levied on landfill waste apart from extractable land resources and biodegradable waste. The waste tax came into force at the beginning of September 1996 and will be levied at the rate of FIM 90 per tonne of waste. This tax is expected to yield FIM 350 million a year in revenue, with households

accounting for about 20 per cent. A tax on disposable retail products is also being investigated.

The Government has in principle prohibited the landfill deposit of used car tyres as of June 1996. The recycling of used tyres will be financed by a recycling fee included in the price of the tyre amounting to FIM 12.5 for private car tyres and FIM 50 for lorries. Finland annually accumulates some 30 million kilos of

2. State expenditure on environmental protection (FIM million)

	1992	1993	1994	1995	1996	1997**
Environmental administration	391.6	355.1	378.2	429.7	454.6	469.1
<i>Central government</i>	108.3	95.2	128.4	126.6	135.8	139.1
<i>Local government</i>	283.3	249.9	249.8	303.1	318.8	330.0
Cooperation with nearby areas	85.6	55.0	57.0	57.0	56.6	59.6
Nordic environmental financing company	7.6	9.0	8.7	7.7	6.5	6.5
Research and development*)	432.6	442.0	479.3	422.4	505.9	497.4
<i>Environmental protection and management¹⁾</i>	209.3	201.6	229.3	190.3	202.7	196.1
<i>Use and management of natural resources²⁾</i>	86.4	77.5	72.3	108.0	113.7	111.3
<i>Development of environmental technology³⁾</i>	110.0	136.0	149.0	193.0	160.0	160.0
<i>Other environmental research⁴⁾</i>	26.9	29.9	28.7	31.1	29.5	30.0
Grants to non-gov. environmental organisations	6.2	6.3	6.3	5.6	6.3	6.2
Environmental protection	91.8	119.0	152.2	84.9	118.5	189.1
<i>Air protection and waste management</i>	24.6	38.4	47.3	45.0	41.0	26.8
<i>Water protection</i>	24.3	25.2	22.2	7.5	32.6	56.5
<i>Environmental management and decontamination</i>	42.9	55.4	82.7	32.4	44.9	105.8
Environmental subsidies for silviculture	–	–	–	–	10.0	15.0
Nature conservation	234.6	263.7	346.7	288.3	327.2	371.0
Energy conservation promotion	7.7	6.0	9.8	6.0	7.5	7.5
Environmental protection of transport*)	..	..	135.6	139.1	187.8	236.7
Railway transport*)	..	..	..	..	78.9	92.9
Environmental subsidy for agriculture	–	–	–	1 419.9	1 543.0	1 570.0
<i>Basic subsidy</i>	–	–	–	1 329.7	1 380.0	..
<i>Special subsidy</i>	–	–	–	90.2	139.0	..
Agricultural development fund	–	–	–	2.5	2.5	..
Subsidies for manure pit investments	47.0	54.8	83.6	–	80.0	80.0
Total	1 304.7	1 310.9	1 657.4	2 963.1	3 385.2	3 601.0

– = not in use .. = data missing *) = estimate **) = forecast

1) Environmental administration and Academy of Finland

2) Agriculture and forestry administration

3) Technical research 4) Other administrative sectors

used tyres, 20 million kilos of which previously ended up as landfill. The latest deposit scheme introduced in March 1996 concerns soft drink cans and amounts to FIM 1 per can.

Table 1 lists the taxes and fees with a clear regulatory impact. They are not all itemised in the national budget. The oil waste tax is paid into a separate fund. Many of these taxes and fees were imposed for reasons other than environmental protection. The regulatory effect of the environmentally related taxes and fees is most marked in the surtax on alcoholic beverages and soft drinks, the environmental energy surtax, the oil waste tax, the water protection fee, the oil pollution control fee and the waste tax.

Environmental protection in the state administration

The Government may, in addition to the economic and administrative instruments quoted above, seek to improve the state of the environment by means of its own environmental protection measures and by observing an environmentally conscious purchasing policy. The State administration plays an extremely important role in conducting and financing environmental R&D. Research into the environment is financed by, among others, the Academy of Finland, the Technology Development Centre, and the ministries operating in the environmental, energy and natural resources sectors. The extensive environmental research carried out by the universities is not included in the figures shown in Table 2.

Expenditure on environmental protection is mainly directed at improving and restoring the state of the environment. This expenditure consists for the most part of investment sub-

sidies to industry and income transfers to municipalities. Environmental protection funds are set aside for the purchase and management of nature conservation areas. These funds will be examined more closely in the chapter on natural resources. The most significant State environmental protection expenditure item has since 1995 been the environmental support for agriculture. The distribution and use of this support will be examined more closely in the chapter on rural industries.

Environmental protection by the municipalities

The municipalities and municipal federations also spend considerable sums on environmental protection: FIM 3.5 billion in 1993 and FIM 3.4 billion in 1994. Half the expenditure went on sewerage, 29 per cent on waste water treatment and 15 per cent on waste management. Table 3 shows the expenditure by municipalities, municipal federations and municipal agencies on environmental protection. The figures do not include municipal energy supply, which will be examined in the chapter on energy.

The bulk of the municipalities' environmental protection expenditure springs from sewerage and waste water treatment. The cost of waste management, sewerage and waste water treatment is for the most part covered by user fees. Investments in these projects have, however, been financed to some extent out of the national budget. This expenditure has grown as the water consumption of communities has risen as a result of urbanisation. The expenditure on environmental management is financed out of the municipalities' tax revenue and State income transfers.

3. Municipal expenditures on environmental protection and its financing (FIM million)

	1993	1994		1993	1994
Waste management			Environmental management		
<i>Expenditure</i>			<i>Expenditure</i>		
Operating expenditure	414.5	408.8	Operating expenditure	187.6	187.9
Investments	51.1	98.1	Investments	16.3	29
<i>Income</i>			<i>Income</i>		
State subsidies	4.7	2.6	State subsidies	4.4	9.7
Fees from municipalities and the State	3.4	3.4	Fees from municipalities and the State	12.4	12.5
Other fees	408.6	426.5	Other fees	28.1	25.6
Water supply			Total		
<i>Expenditure</i>			<i>Expenditure</i>		
Waste water treatment			Operating expenditure	2 489.2	2 314.8
Operating expenditure	849.2	767.9	Investments	1 007.4	1 083.1
Investments	385	223	<i>Income</i>		
Sewerage			State subsidies	55.8	64.9
Operating expenditure	1037.9	950.2	Fees from municipalities and the State	113.4	109.5
Investments	555	733	Other fees	4 396.6	3 835.9
<i>Income</i>					
State subsidies	46.7	52.6			
Fees from municipalities and the State	97.6	93.6			
Other fees	3 959.9	3 383.8			

2 Natural resources

Timber resources and use of the forests

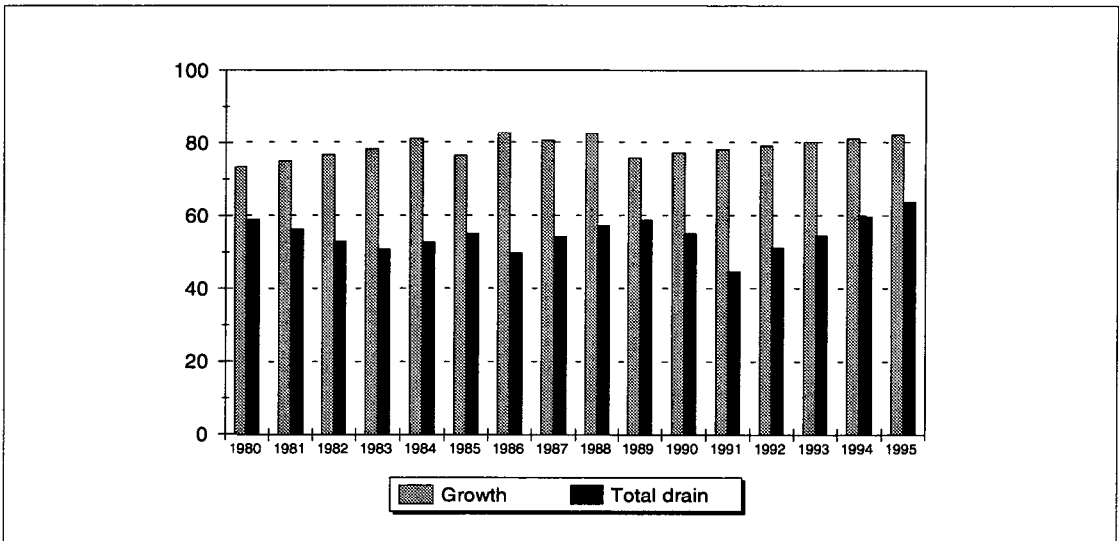
The forests are, economically, Finland's most important natural resource. The country has over 26 million hectares of forest land, i.e. 86 per cent of the land area is covered by forest. Forest soil proper amounts to 20 million hectares, the remainder being lowproductivity or waste land. The forest growth in Finland clearly exceeds the drain; even the total drain, which comprises waste wood and natural drain as well as cutting, is clearly lower than the annual growth for pine, spruce and broadleaves.

Since the forests renew moderately quickly, Finland has great potential for using them in a sustainable manner. At the European forestry ministers' conference held in Helsinki in 1993 Finland undertook to engage in ecologically sustainable forestry and to protect the biodiversity of its forests. Allowance has been made for this in the revision of the forest legislation. The aim of the Forest Act is to

promote the economically, ecologically and socioeconomically sustainable management and use of the forests, achieving a sustainably good yield while preserving their biodiversity. The Forest Act and the Act on the Financing of Sustainable Forestry are scheduled to come into force at the beginning of 1997. Work on establishing the principles of a certification system suitable for Finnish conditions began in spring 1996.

Finland seeks to promote the implementation of sustainable forestry in international forest policy. PanEuropean criteria and indicators for sustainable forestry have been developed in conjunction with the Helsinki process. An international seminar connected with the work of the intergovernmental forest panel subordinate to the UN commission on sustainable development was held in Helsinki in August 1996. The aim of the seminar was to promote the adoption and further development of international commensurable criteria and indicators.

Diagram 1. Forest growth and total drain (million cubic metres)



In Finland, unlike in most other countries, private individuals constitute the biggest group of forest owners. The responsibility for and authority over the state of the forests are thus in a great extent in the hands of private persons. Private citizens own 54 per cent of commercial forest land, companies eight per cent and the State 33 per cent. The private forests are in the best timber growing areas of Southern Finland.

Less than 0.4 per cent of Finland's forest land is clearcut every year and then replanted as required by law. Other silvicultural measures such as thinning and seedling management are conducted over 1.8 per cent of the total commercial forest area each year. In 1995 a record 57 million cubic metres of wood were cut for industry and other human uses. Allowing for wastewood and natural drain, the total drain from the Finnish forests was a good 63 million cubic metres. The average annual wood growth was, according to the forest inventory conducted between 1989 and 1994, a good 75 million cubic metres. The Finnish Forest Research Institute estimates that the growth is at present even more than 80 million cubic metres. The forest growth thus clearly exceeds the drain. Use of the forest resources

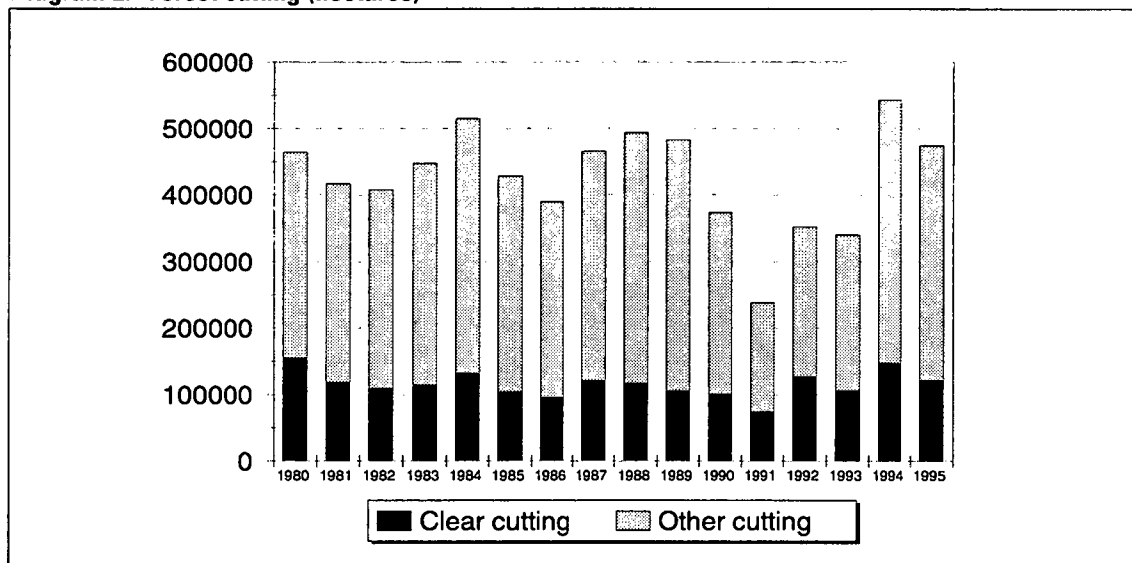
is not, therefore, a threat to the timber stock and is in accordance with the principle of sustainable development.

Forests as carbon dioxide sinks

Finland's forests are substantial carbon dioxide sinks and contribute to combating the intensification of the global greenhouse effect. Forests bind carbon dioxide as long as they are in the process of growth. This is true of Finland's forests, where the age structure is young and silvicultural measures are effective.

The Finnish forests have over the past few decades acted as a carbon dioxide sink from the atmosphere to the biosphere. In the early 1990s the annual net accumulation of carbon in Finnish forests corresponded to some 37–55 million tonnes of carbon dioxide; at the same time 51–58 million tonnes of carbon dioxide were released in emissions from fossil fuels. The volume of carbon bound in the Finnish forest ecosystems will, it is estimated, continue to grow for at least the next 15–20 years.

Diagram 2. Forest cutting (hectares)



Biodiversity

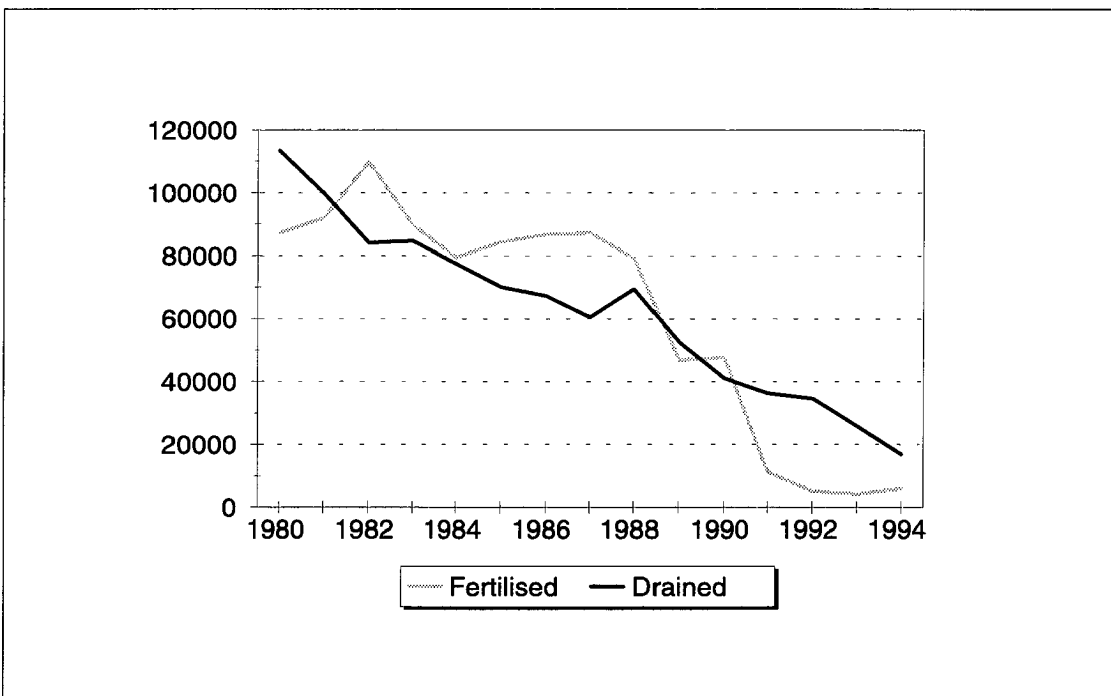
Preservation of the biodiversity is part of the sustainable use of the forests, marshes, waters and farmlands. A significant proportion of Finland consists of natural forests in commercial use; the way they are treated thus occupies a key role in the protection of their biodiversity. The systematic increase of wood resources has led to a reduction in the diversity of the forest nature and of oldgrowth forests, tree species of little commercial value and rotten wood.

Every effort is nowadays made to reconcile the various demands on Finland's commercial forests in order to guarantee their biodiversity and a forest economy that is economically sustainable. The environmental policy ratified by the Ministry of Agriculture and Forestry and the Ministry of the Environment in 1994 and the silviculture recommendations issued

by the different forest organisations have improved the forestry methods to make greater allowance for the care and protection of the forest's diversity. It appears from investigations that the recommendations have been widely put into practice in practical forestry, and the methods are being constantly updated according to the latest research findings.

The amendments to the legislation on both forestry and nature conservation are to go into force as of the beginning of 1997. Preparing the amendments to all the legislation simultaneously has permitted a high degree of coordination in ensuring the diversity of the Finnish ecosystems, biotypes, organisms and their populations, especially endangered ones. The need to protect endangered forest species has been widely recognised in the past few years, and in June 1996 the Government decided to greatly increase the protection of oldgrowth forests.

Diagram 3. Forests annually fertilised and drained (hectares)



Nature conservation areas

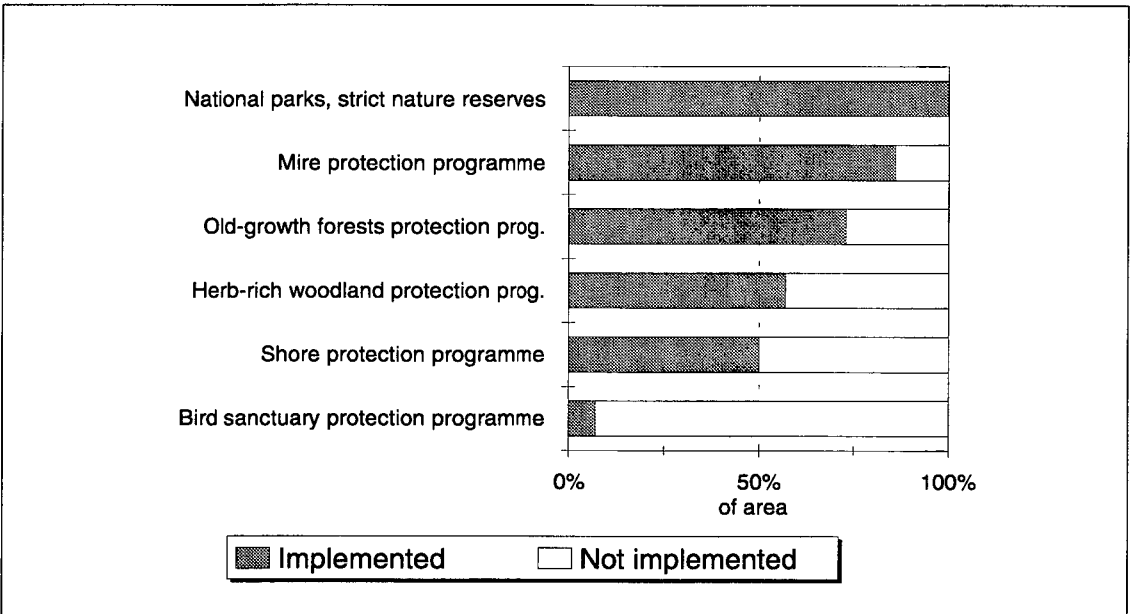
Finland's nature conservation objectives are closely tied to the sustainable use of the commercial forests; this is the primary way to guarantee biodiversity. This is further enhanced by leaving sufficient nature conservation areas, either untouched or managed in a certain way, for various habitats in different parts of the country. Under the Nature Conservation Act it is possible to safeguard the biodiversity of the Finnish forests, i.e. a sufficient network of nature conservation areas. The bindingness of the network and the protection regulations is vitally affected by the extent to which protection of biodiversity is allowed for in utilisation of the natural resources. Nature conservation areas covering 1.25 million hectares have been established on State lands since 1916, and wilderness areas covering 1.5 million hectares. Some 10.4 per cent of forest land area is protected.

The sum of FIM 1,050 million was spent on the purchase of and compensation for conser-

vation areas between 1971 and 1995. Also state lands with total value of FIM 280 million were exchanged. Of the protection programmes, 140,000 hectares were on private land. The Government still has plans for on 250,000 hectares more conservation area and certain other protected areas. The speed with which areas under the conservation programmes are purchased is to be greatly increased in the next few years. According to the overall financing plan for nature conservation programmes approved in June 1996, areas to the total value of FIM 3.2 billion will be purchased by the year 2007. Some of the funds will be provided by extending the land exchange obligation and the use of income from sales of land for the execution of nature conservation programmes by the Finnish Forest and Park Service up to the year 2004.

The emphasis in establishing nature conservation areas is at present on the protection of oldgrowth forests. Under the decision taken by the Government in June 1996, some 316,000 hectares of new conservation area

Diagram 4. State of conservation programmes on 1.1.1996



will be established, mainly in Northern Finland, after which the conservation of the Finnish forests will, by international comparison, be relatively good. The costs to the State of purchasing private lands are included in the overall plan for the financing of nature conservation.

Membership of the EU has faced Finland with new nature conservation obligations; these were allowed for in formulating the new Nature Conservation Act. The Act also satisfies the demands of the EU nature and bird directives. The directive is to be enforced by creating a homogeneous network of protected areas, Natura 2000. Finland and Sweden have together submitted a proposal to the Commission on the biotypes to be added to the nature directive and the species of flora and fauna characteristic to the northern EU regions.

Finland's tentative proposal for Natura 2000 areas was completed in January 1996. The proposal covers only conservation areas owned by the State and is to be supplemented by areas mainly covered by the nature conser-

vation programmes by the end of 1996. The EU Commission will make its final decision on the network in 1998 and the network should be complete by the year 2004.

The EU LIFE fund is contributing to the implementation of the Natura 2000 network. The fund has an annual budget of some ECU 450 million, 40 per cent of which is allocated for nature conservation purposes and about 50 per cent for new innovative environmental technology projects. The allocation of grants from the LIFE fund is decided annually. In 1995 Finland received FIM 15.7 million from the fund for nature conservation projects and FIM 12.7 million for other purposes.

Water resources

Finland's water resources far exceed its own need. The inland waters cover 10 per cent of the total area, i.e. 33,500 square kilometres, and the territorial waters 36,000 square kilometres. The lakes are shallow, so that their combined volume is only 235 cubic ki-

4. Financing of nature conservation programmes (FIM million)

	1992	1993	1994	1995	1996	1997
	R	R	R	R	B	BP
Purchase of conservation areas	117.3	146.4	141.6	159.1	159.0	235.0
<i>Purchases of private land</i>	..	78.4	71.6	64.8	89.0	115.0
<i>Land exchanges</i>	..	68.0	61.0	87.0	60.0	110.0
<i>Income from land sales</i>	—	—	9.0	7.3	10.0	10.0
Conservation area management	56.5	62.8	65.9	64.7	64.7	68.0
Conservation area compensations	26.2	16.2	16.2	19.0	19.0	43.0
Rapids protection compensations	0.0	17.0	100.0	35.0	45.0	25.0
Other expenditure	34.6	21.3	23.0	10.5	39.5	..
Total	234.6	263.7	346.7	288.3	327.2	371.0

R = revenue
B = budget
BP = budget proposal

— = not in use
.. = data missing

lometres of water. About four per cent of the lakes as a whole is, due to the waste water load, classified as a poor or fair, while 80 per cent are of good or excellent quality. The volume of heavily polluted waterbodies has decreased in recent years, but the area of totally unpolluted waters has grown with the increase in stray loads. The situation as a whole in the areas affected by industry and urban settlement has improved, but it has deteriorated in the areas affected by agriculture and forestry. The pulp and paper industry in particular has in the past few years carried out numerous environmental protection measures improving the quality of the waters.

Hydro power was used to generate 12.9 TWh of electricity in 1995, corresponding to 10 per cent of the total demand. All in all 1,500 rapids have been harnessed for energy production, and one third of the total lake area, some 12,000 square kilometres, is regulated, mainly for energy production, water supply and flood control. The aim of the flood control projects has generally been to protect farming land from flooding, providing 60,000 hectares of farming land for efficient use. The dams and power stations do, on the other hand, obstruct the movement and reproduction of migratory fish, and the changes in water level due to regulation have transformed the habitats of water fowl. Most of the economically exploitable hydro power has already been constructed, and now as the last of the extensive flood control projects are nearing completion, the emphasis is shifting towards the maintenance and development of those already carried out.

Finland has plenty of groundwater, though the exploitable reserves in Southern Finland are almost all in use. The groundwater basins are not every extensive and the soil layers protecting them are very thin. The groundwater reserves in the Finnish sand and gravel areas amount to about five million cubic metres per

day and the main groundwater areas cover a total of 4,239 square kilometres. The biggest threats to the quality of the water reserves are impurities in the air and acid rain. The Finnish groundwaters are extremely sensitive to acidification, since the buffer capacity of the soil is clearly inferior to that of Central Europe with its thick layer of limestone.

About 13 per cent of the rain water is absorbed as groundwater, which is most abundant in the sand and gravel areas. The community waterworks use about 0.6 million cubic metres of groundwater and artificial groundwater a day. These public waterworks serve 85 per cent of the population and the sewage networks 77 per cent. Of the water used by the water works, 45 per cent is surface water and 55 per cent ground or artificial groundwater. Most of the drinking water will in future be ground or artificial groundwater, with groundwater accounting for an estimated 70 per cent in the year 2010.

The per capita water consumption has steeply declined in the past few years. Reaching its peak with 335 litres per day in 1972, it was only 261 litres in 1993. In 1994 the water works supplied 419 million cubic metres of water and handled 519 million cubic metres of sewage. The fall in consumption is a consequence of the highclass sanitary fittings, enlightenment, the reduction in the water consumption by domestic appliances and industry, the renewal of water pipes and the rise in water and waste water rates.

Ore resources

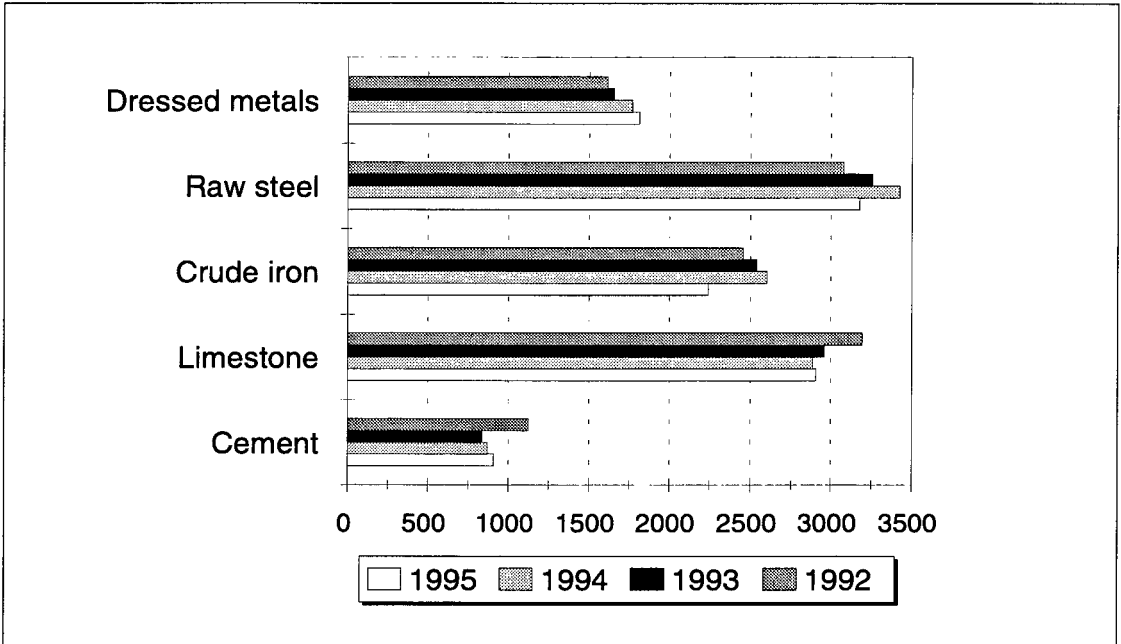
Finland has relatively little ore resources of its own in proportion to its industrial output. Production by the metal industry relies on nonrenewable and unrefined natural resources. In 1994 the metal industry purchased 3.6 million

tonnes of ores from abroad and 1.1 million tonnes of rolled products and scrap. Meanwhile the domestic output of metal ores totalled 3.2 million tonnes and the gross value of the products of the ore mines was FIM 600 million.

Finland's known ore deposits are becoming rapidly depleted and only one of the present ore mines is still expected to be in operation at

the beginning of the next millennium. Major reservations have, however, been made, especially in Lapland, for ore prospecting. Since the metal industry itself is very modern in Finland, metal refining will probably continue for many years to come, even though it has to rely on imported raw materials. Metal refining in the next millennium will to a great extent probably rely for the most part on foreign raw materials and recycling.

Diagram 5. Output of dressed metals, iron, limestone and cement (1,000 tonnes)



3 Industry

The trend in environmental protection

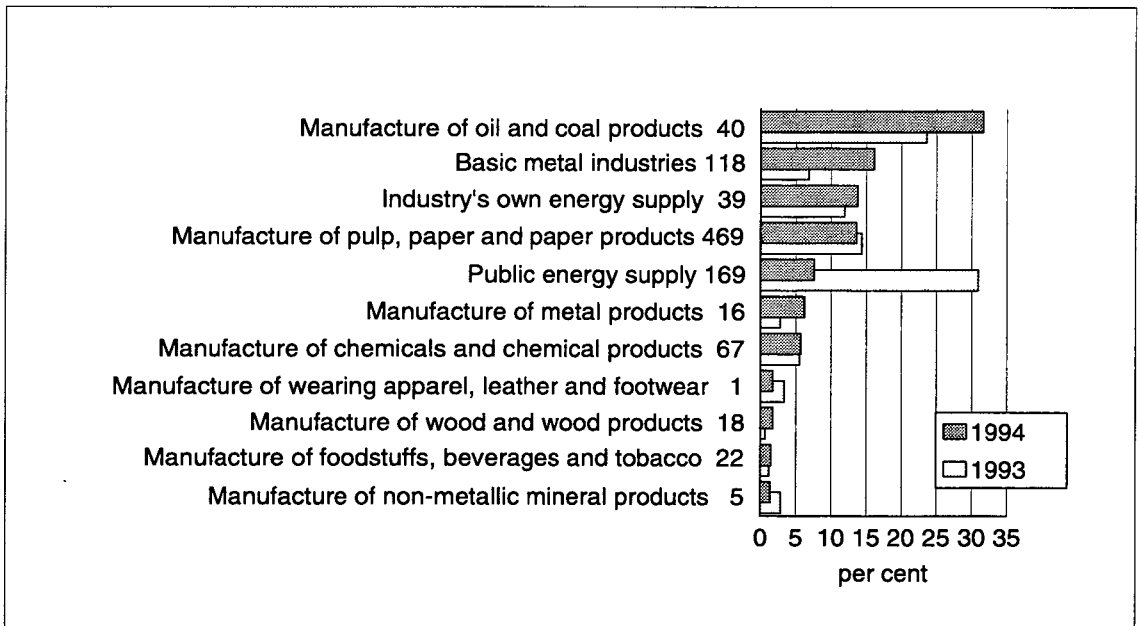
According to the principle of sustainable development, industry should produce more from less. This means using natural resources and energy more efficiently and minimising the emissions and waste. The focus of environmental protection by industry has in the 1990s shifted away from emission reduction based on administrative regulations towards the propagation of environmental awareness and the use of environmental management systems.

The aim of the environmental auditing procedure of the EU is to promote the voluntary development of environmental protection management in enterprises. In Finland the Act on Voluntary Participation by Companies in the Industrial Sector in an Environmental

Management and Audit Scheme came into force at the beginning of 1995. The Finnish Environment Institute (former Agency) maintains a register of the establishments which have adopted the scheme and reports the establishments to the European Commission. The Centre for Metrology and Accreditation establishes the validity of the environmental verifiers of the system, i.e. accredits them. The first Finnish companies joined the EMAS system in spring 1996.

The EMAS supplements the permits and reporting obligations applying to environmental protection. In the system the enterprise draws up an environmental policy and management system which includes regular environmental checks or ecoaudits. The enterprise itself also keeps an active check on the trend in emissions, the volume of waste and the consumption of raw materials, energy and water.

Diagram 6. Investments in environmental protection in 1994, in FIM million, and as a percentage



Environmental management systems based on voluntary standards have been developed, in particular, by enterprises that have already adopted quality management systems. The environmental management systems used in Finland are based mainly on the BS7750, ISO 9000 and ISO 14001 standards. More and more industrial enterprises are, furthermore, issuing separate environmental reports in addition to the traditional Annual Reports.

The value added by industry accounted for 27 per cent of Finland's GDP in 1995. Environmental investments by the manufacturing industry have in Finland concentrated on a few branches: the forest industry, the chemical industry and basic metal industries.

Forest industry

Environmental protection investments account for a very high proportion of the total fixed investments by the forest industry and grew in 1993–1994: by over 15 per cent in the pulp and paper industry in 1994. By contrast, the number of environmental protection investments fell in 1993–1994 with the overall decline in investments. According to an estimate made by the Finnish Forest Industries Federation, environmental protection investments clearly increased in 1995, even though they fell in proportion to total investments.

The forest industry spends most on water protection. The running and maintenance expenditure on water protection is also high and has risen steadily. The forest industry in fact contributes most to the water protection expenditure by industry.

Environmental protection investments by the forest industry have in recent years focused on the closing of the water circulations of production processes, the development of bleach-

5. Environmental protection expenditure by the forest industry

Investments (FIM million)	1992	1993	1994
Air protection	227	117	119
Water protection	419	445	338
Waste management and soil protection	26	17	26
Others	2	0	7
Total	673	579	490
Running and maintenance expenditure (FIM million)	1992	1993	1994
Air protection	11	17	29
Water protection	175	207	243
Waste management and soil protection	78	77	91
Others	2	3	5
Total	267	303	368
Other operating expenditure (FIM million)	54	66	74

ing methods and the improved purification of effluent. The emphasis in air protection investments has been on making the treatment of odorous gases more effective and on reducing the emissions of nitrogen oxides. Waste treatment has been intensified by, among other things, improving the broke recovery and landfill maintenance.

Emissions by the forest industry decreased in 1995 even though there was no drop in production. The biological oxygen demand (BOD₇) of the pulp and paper industry fell 18 per cent and the chemical oxygen demand (COD_{Cr}) about four per cent. The improved bleaching processes reduced the chlorine emissions so that the organic chlorine compound emissions were 15 per cent down on the previous year.

Under the target programme for water protection issued by the Government in 1988, the pulp and paper industry was, in particular, to

reduce its oxygen demand and the load caused by chlorinated organic compounds and nutrients. These objectives have been achieved extremely well:

6. Water protection goals

	Objective 1995	Achieved 1995
Pulp and paper industry		
BOD ₇	160 tpd	80 tpd
Phosphorus	1.5 tpd	0.9 tpd
Chemical pulp industry		
AOX	1.5 kg/tp	0.34 kg/tp
COD _{Cr}	65 kg/tp	30 kg/tp
Phosphorus	60 g/tp	35 g/tp

tp = tonne of pulp

The Government is at present working on a new target programme up to the year 2005.

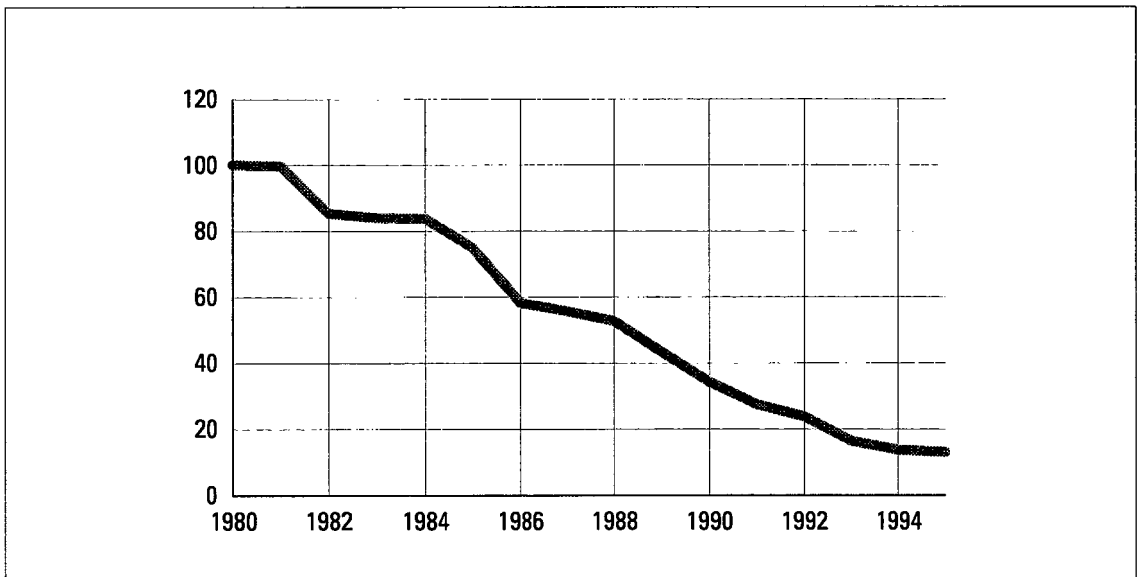
One feature characteristic of the forest industry is its ability to use residual materials from one stage of production as raw materials for some other stage. For example, the waste chips from sawmills can be used as raw ma-

terial for chemical pulp and particle board. Bark and the black liquor from pulping are important sources of energy for the industry. The forest industry uses over 95 per cent of the raw wood; about 60 per cent of the sludge from the waste water treatment plants is used for energy production, and 35 per cent of the ash from energy production is used as, for example, fertiliser and in soil improvement.

In 1995 Finland collected a record 492,000 tonnes of waste paper. This represents about 58 per cent of the total consumption of paper and board. 70,000 tonnes of paper were recycled as raw material for the paper industry and 22,000 tonnes were exported. The paper industry used 525,000 tonnes of recycled paper as raw material in 1995.

Environmental management systems have rapidly spread in the forest industry. At the end of 1995 there were management systems in use at 16 mills and under construction at 15 more. The Finnish Forest Industries Federation annually publishes an environmental protection yearbook reporting on the trend in

Diagram 7. The oxygen demand of industrial effluent (1980=100)



environmental protection by forest industry companies.

Chemical industry

Environmental protection investments in the chemical industry proper accounted for six per cent of all fixed investments in 1994. The rate of investment was particularly high in the manufacture of oil and coal products, at 32 per cent. The Chemical Industry Federation of Finland estimates that there was a marked increase, of about 40 per cent, in investments made by the chemical industry for environmental, health and safety reasons in 1995.

The running and maintenance expenditure on environmental protection by the chemical and mineral industry in 1994 came to a good FIM 270 million.

The guideline for the voluntary environmental protection carried out by the chemical industry has since 1992 been the international Respon-

7. Environmental protection expenditure by the chemical and mineral industry

Investments (FIM million)	1992	1993	1994
Air protection	80	163	80
Water protection	46	36	23
Waste management and soil protection	38	18	10
Others	2	0	0
Total	165	217	113
Running and maintenance expenditure (FIM million)	1992	1993	1994
Air protection	73	145	90
Water protection	122	139	111
Waste management and soil protection	86	91	70
Others	1	0	2
Total	283	376	273
Other operating expenditure (FIM million)	49	49	42

sible Care programme covering not only environmental issues but also health and safety. By the end of 1995, 52 companies had committed themselves to the programme, five of them during that year. In terms of output tonnage these committed companies represented over 80 per cent of industry in 1995.

The training in environmental, health and safety matters provided for the staff during the programme has grown considerably: in 1995 close on 12,000 persons took part in such training.

The implementation of the Responsible Care programme and improvements in operations are being monitored by various indicators and benchmarks. The Finnish chemical industry was the first in Europe to begin the systematic collection and publication of indicator data in 1992.

Since 1988 emissions of sulphate into water by the chemical industry have fallen 40 per cent, and there has been a steady decrease in heavy metal emissions. The emissions into the air of sulphur compounds have been reduced by about 70 per cent and emissions of hydrocarbon by about 30 per cent.

Metal industry

Investments in environmental protection by the metal industry varied considerably between 1992 and 1994. There was by contrast a steady increase in expenditure on the running and maintenance of environmental protection. Expenditure on waste management and soil protection account for close on half the total environmental protection running and maintenance expenditure by the metal industry. The environmental protection problems facing the metal industry are greatest in the basic metal industries. Other branches of

the metal industry, such as the manufacture of electrotechnical products and instruments, which have invested heavily in the past few years, have accounted for only a small proportion of the environmental protection investments.

Air pollution control has been improved in the metal industry by, among other things, the recovery of particle and dust emissions. Waste management has been improved by reducing the formation of problem waste and by intensifying the processing of used chemicals.

In 1992 the Finnish metal industry produced some 500,000 tonnes of metal waste, 58 per cent of which was recovered. A large proportion of the metal waste was temporarily stored for further use. The size of the stocks varies from year to year. As much as 96 per cent of the total metal waste from industry, 87 per cent of which is scrap iron and steel, is recovered.

Only 20 per cent of the metal waste from communities is on estimate recovered. Recy-

cling of this form of waste is an economic function regulated by the going price for scrap. The recovery of metals is mostly in the hands of scrap merchants, though the municipalities have set aside collection points for community metal waste or arranged collection campaigns. Most of the scrap collected in Finland is used in the Finnish metal industry.

The focal areas in the development of environmental technology by the metal industry will, it is believed, be surface dressing, painting, the organisation of recycling, materials economy and the branding of the technical environmental features of products. Environmental management and the accompanying life cycle analyses are regarded as promising tools for this.

Waste management and environmental damage

The new Act on waste that came into force in Finland at the beginning of 1994 aims to minimise the volume of waste in accordance with the principle of sustainable development. The Act obliges companies to keep a closer record than before of their waste. A national waste tax was introduced at the beginning of 1996.

Finland annually produces an estimated 89 million tonnes of waste: mining 36 million, industry 15 million, and rural industries 22 million, of which some 20 million tonnes are, however, manure, 90 per cent of which is used as fertiliser. Municipal solid and liquid wastes amount to a good four million tonnes. Of these, 47 per cent is recycled and 33 million tonnes is annually consigned to landfill. Sixty per cent of the industrial waste and municipal sewage is recycled. The recycling rate is lowest only 2030 per cent for municipal waste, building waste and problem waste.

8. Environmental protection expenditure by the metal industry (FIM million)

Investments, FIM million	1992	1993	1994
Air pollution control	215	40	100
Water protection	55	11	30
Waste management and soil protection	23	8	20
Other	0	0	4
Total	294	59	154
Running and maintenance expenditure, FIM million	1992	1993	1994
Air pollution control	52	44	55
Water protection	70	94	82
Waste management and soil protection	88	103	124
Other	5	1	0
Total	215	243	263
Other operating expenditure, FIM million	1992	1993	1994
	22	30	32

Intensification of waste recycling will in the near future be required according to the EU packaging directive making the recovery of packing materials compulsory by the year 2001. Finland has tried to intensify recycling by means of voluntary agreements between the authorities and industry. A working group appointed by the Ministry of the Environment in June 1996 proposed as a target the recovery of 81 per cent of packing materials or packaging waste by the year 2001. At least 61 per cent of packaging waste could be recovered as such and at least 42 per cent recycled.

In 1994 the companies engaged in the recycling of paper, metal, wood, glass and plastics had a combined turnover of FIM 1,172 mil-

lion and the waste management companies of FIM 1,090 million.

In June 1995 a law came into force in Finland on liability for environmental damage. This placed companies under stricter obligation than before to pay for any damage caused. The Act also covers the damage caused by "normal" emissions, even if these comply with the terms of the permits. The likelihood that an activity may cause damage is now sufficient grounds for liability for damages. Research has shown that the costs of environmental disasters totalled over FIM 22 million in 1989–1994, of which companies accounted for FIM 17.5 million.

4 Energy

Use of energy

Due to the country's northern location, one of Finland's special characteristics is the great need for heating. In addition to this, economic activity is hampered by long transport distances owing to the fact that the country is sparsely populated. The market areas of the export industry are also situated far away.

Finland's total energy consumption in 1995 was 31.5 Mtoe. This was distributed by sector as follows:

9. Total energy consumption in 1995

	Mtoe	%
Industry	14.6	46
Heating	6.8	22
Transport	4.1	13
Other	6.0	19
Total	31.5	100

High energy intensity is typical of Finnish industrial production. This applies to export production in particular, although exports of converted and high technology products are increasing steadily. The key export sector, the forest industry, does, however, rely to a significant extent on the use of biomass for its energy. The efficiency of energy use has shown a marked improvement in the past couple of decades: the energy consumption of industry in relation to the value added has been reduced by one third.

Over 30 per cent of Finland's electricity is generated in combination with heat, in either district heating or back pressure power plants. The proportion ranks as one of the highest in the world. In these plants 80–90 per cent of the fuel's energy is recovered, as against some 40 per cent in condensing power plants.

The structure of energy consumption in Finland has changed little over the past ten years. In 1995 fossil fuels, i.e. oil, coal and natural

Diagram 8. Total energy consumption per GDP unit in certain countries, 1993

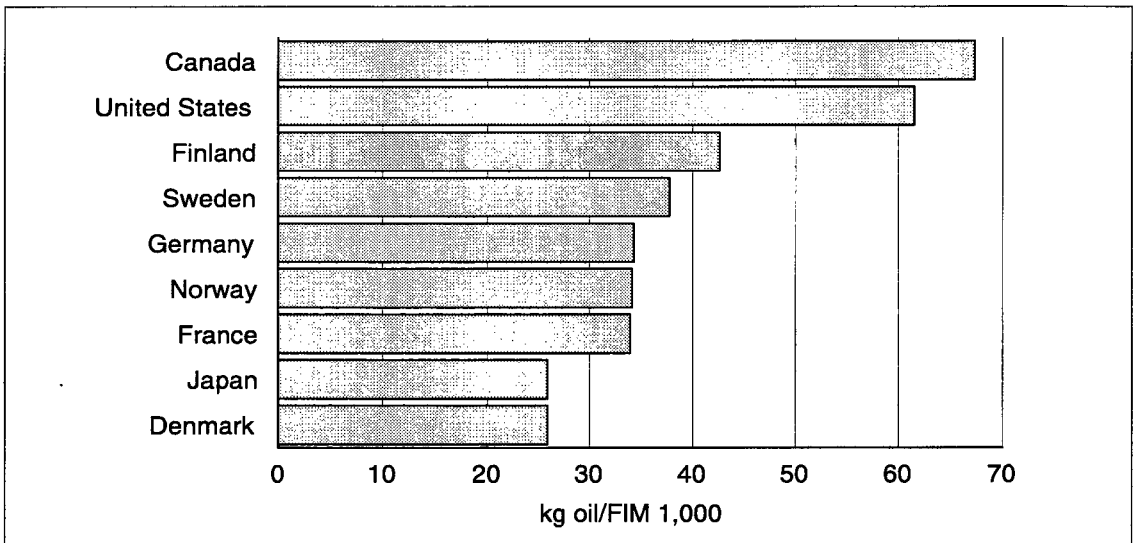
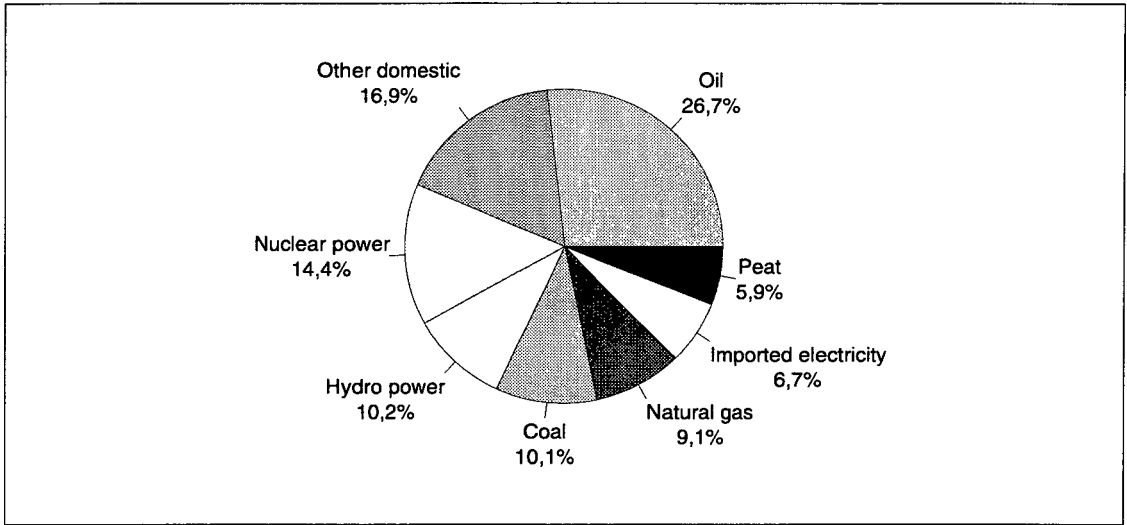


Diagram 9. Consumption of primary energy, 1995



gas, together accounted for 46 per cent, nuclear power and imported electricity jointly for 21 per cent and domestic energy sources for a joint 33 per cent of the total use of energy.

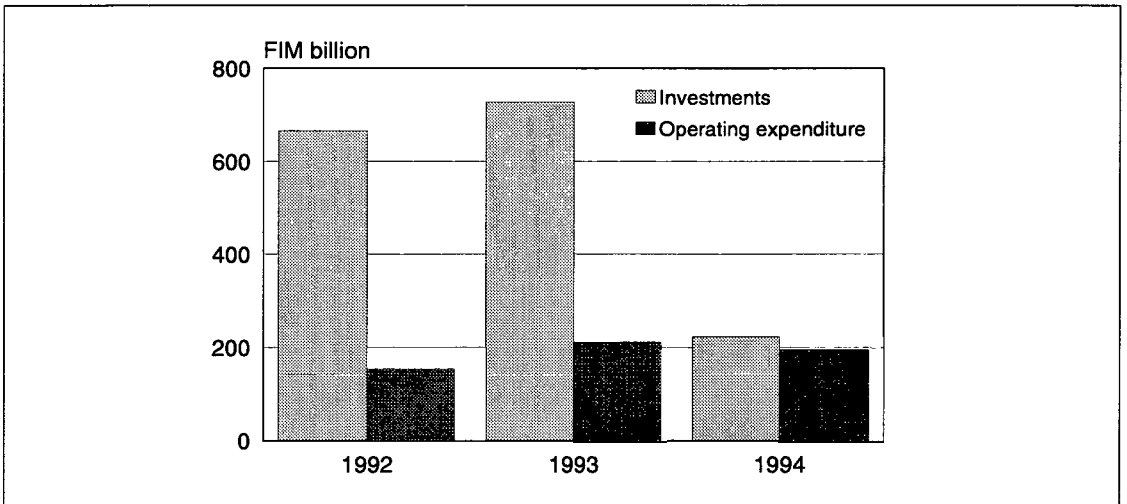
accounted for only 22 per cent of the total environmental protection investments by industry, as against 45 per cent in 1994. The environmental protection operating expenditure by energy supply also fell somewhat in 1994.

Air protection expenditure

Environmental protection investments by energy production showed a sharp decrease in 1994. This was due to the completion of major earlier investments. By 1994 energy supply

Of the air protection investments made by industry in 1994, less than half, FIM 205 million, were in energy supply, where they were targeted mainly at the modification of combustion processes in order to reduce the emissions of nitrogen oxide and, to a lesser

Diagram 10. Environmental protection expenditure by energy supply (FIM million)



extent, at the recovery of particulates. In 1993 energy supply was still investing FIM 698 million in air protection, the bulk of which was targeted at desulphurisation.

Greenhouse gases

According to estimates by an international panel of experts, the mean temperature of the earth is expected to rise some four degrees by the year 2100, unless the trend in greenhouse gas emissions changes. Even if it were possible to reduce emissions drastically, it would not, according to current opinion, be possible to prevent global warming entirely.

Finland signed the UN Framework Convention on Climate Change at the Conference on Environment and Development in Rio de Janeiro in 1992. The convention aims at *"the stabilisation of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a timeframe sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner"*. At the initial stage, the aim is to halt further growth in greenhouse gas emissions by the year 2000, and later to regain the 1990 level.

10. Finland's greenhouse gas emissions

Million equivalent tonnes of carbon dioxide

	1990	2000	2010
Carbon dioxide	58–69	62–67	72–74
Methane	6.2	5.0	4.9
Nitrous oxide	7.4	9.0	9.3
Nitrogen oxides	11.8	9.1	8.0
Carbon monoxide	1.5	1.0	0.9
Hydrocarbons	2.4	1.5	1.5
Total	87–98	88–93	97–99

For Finland, the most notable greenhouse gases are carbon dioxide emissions from fossil fuels and peat, which together account for some 55 per cent of the total. Other greenhouse gases are nitrogen oxides, methane and nitrous oxide.

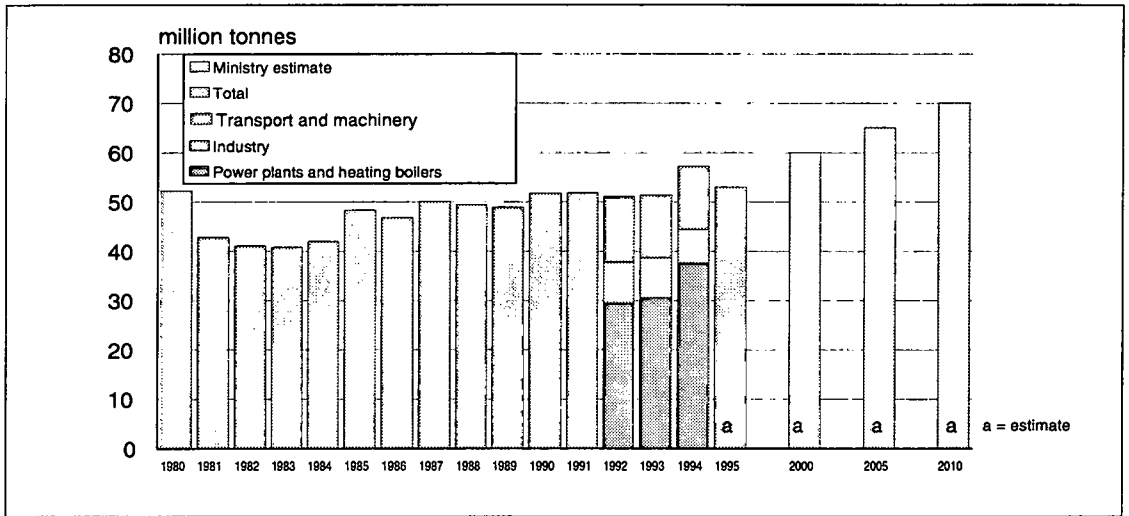
The carbon dioxide emissions from fossil fuels showed a significant increase in 1994 due to the reduction in electricity imports and hydro power, but reverted almost to the previous level in 1995.

According to an estimate made to the Finnish climate committee by the Ministry of Trade and Industry, the emissions of carbon dioxide will grow to about 70 million tonnes by the year 2010. This estimate is based on the following assumptions:

- the GDP will grow 2.5 per cent a year,
- the prices of energy will show some increase,
- technological development will be supported by the existing national programmes with no new measures,
- energy conservation will be supported by a special programme,
- imported electricity will cover 15 per cent of the total capacity,
- there will be no major change in the proportion of nuclear and hydro power.

The replacement of energy production capacity is a very slow process, so the carbon dioxide emissions being produced in the year 2000 will primarily be caused by production capacity that already exists or is now under construction. The new capacity now under construction (including the rise in output by the nuclear power plants, new hydro power projects and further natural gas construction) will reduce the carbon dioxide emissions if they replace coal and oil. The import of electricity will also affect the capacity requirement, use and emissions in the year 2000.

Diagram 11. Carbon dioxide emissions from fossil fuels and peat



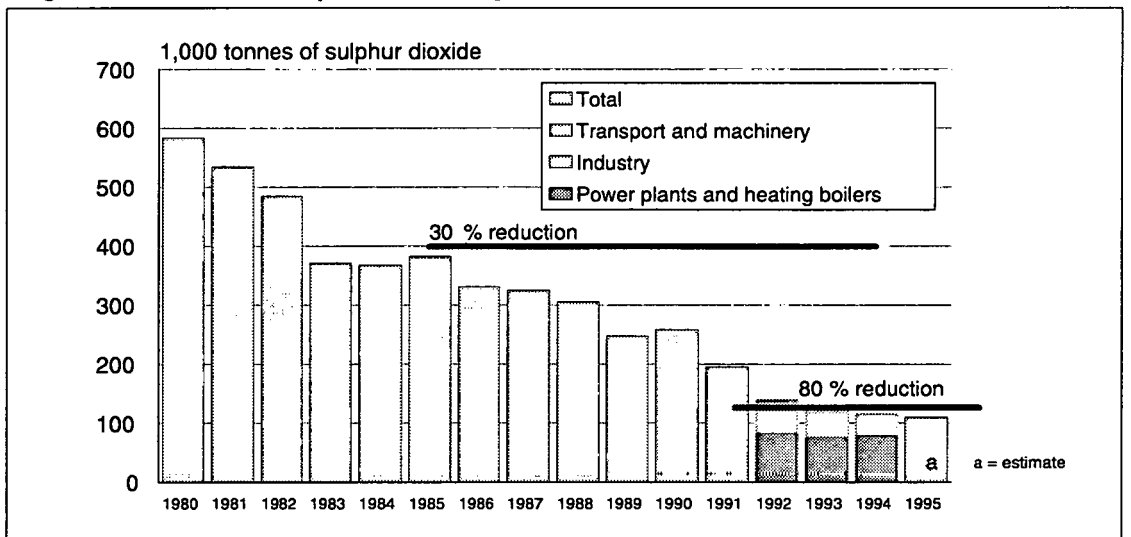
Sulphur emissions

The international conventions signed by Finland call for considerable decreases in various emissions into air by the energy industry during the 1990s. In the international sulphur protocol signed in 1985, Finland committed itself to reducing its sulphur emissions by 30 per cent on the 1980 level (584,000 tonnes) by 1993 and announced that it would halve its emissions on the 1980 level by 1995. By 1992

emissions had already been reduced by over 70 per cent. This was achieved by changes in the structure of energy production, the reduced use of heavy fuel oil, the fall in the sulphur content of fuels together with improvements in process technology.

In 1991 the Government further decided to draw up a tenyear programme aimed at reducing sulphur emissions by 80 per cent on the 1980 level. Finland further committed itself to

Diagram 12. Emissions of sulphur and the targets for their reduction



the same goal by signing the second international sulphur protocol in Oslo in 1994. The target was achieved in 1994 and a further reduction was recorded in 1995. The emissions may, however, rise unless further measures are taken.

Nitrogen oxide emissions

As regards nitrogen oxides, Finland committed itself under the Sofia Protocol signed in 1988 to stabilise emissions at the 1987 level (288,000 tonnes) by 1994. Finland also stated that it would cut emissions of nitrogen oxides by 30 per cent on the 1980 level by 1998. The growth in traffic volumes and energy use in particular increased emissions of nitrogen oxides in the 1980s, whereas in the 1990s emissions have fallen somewhat due to the economic recession, improvements in power plant process technology and catalytic converters in cars.

Emissions have therefore been frozen at the 1987 level, but achieving the 30 per cent target will call for the restructuring of energy use and traffic. The committee set up to consider

means of cutting emissions of nitrogen oxides estimated in spring 1990 that a reduction of only some 15 per cent can be achieved by technical means.

By 1995 the nitrogen oxide emissions from energy production had fallen by 26 per cent on 1980, even though energy consumption had at the same time increased 46 per cent. Achieving the targeted 30 per cent on the 1980 level by the year 2000 would, according to the investigations made, cost more than FIM 1 billion.

Acidification

Finland's own emissions into the air and long-range transboundary air pollution pose a threat to the Finnish nature and will, in the long run, jeopardise the sustainable use of the natural resources. Only during the past few years has the impact of sulphur and nitrogen compounds and of ozone and heavy metals released into the lower atmosphere been reduced by introducing restrictions on emissions. Deposition that exceeds the critical load and thus causes damage is still to be found over vast areas. The organisms of small

Diagram 13. Emissions of nitrogen oxides and targets in Finland

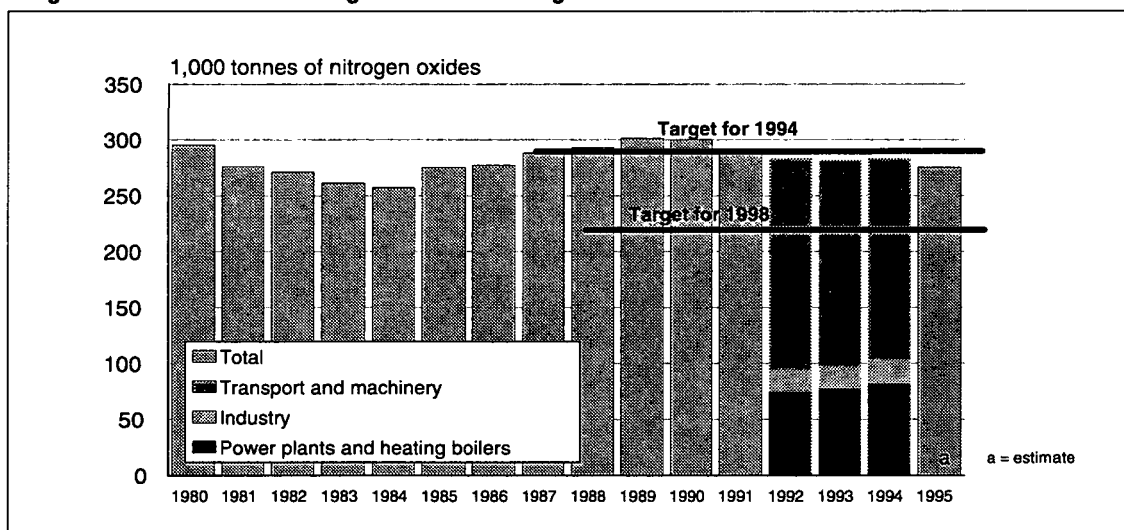
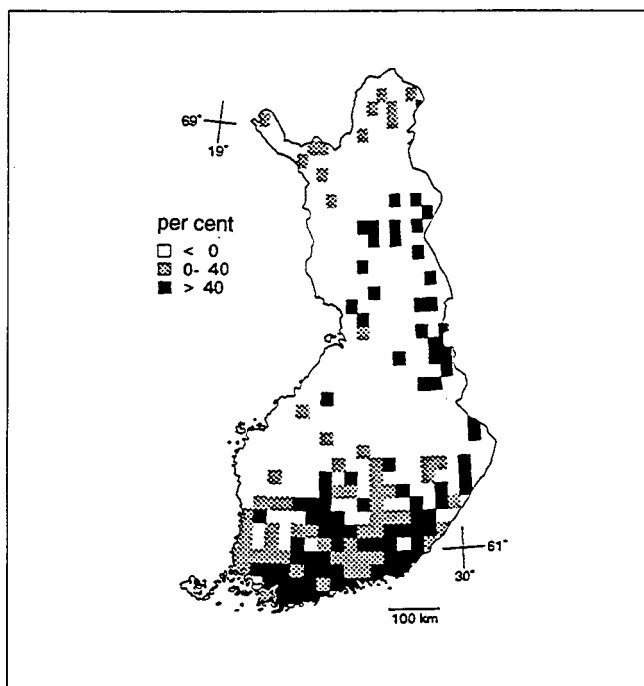


Diagram 14. The need to reduce the acid deposition



waterbodies, forest lakes and infertile forest land are those most endangered by the acidification from this deposition. Diagram 14 shows the need to reduce acid deposition based on the critical load on lakes and forest land in 1994.

According to the calculations of EMEP, the Programme for Monitoring and Evaluation of the Longrange Emissions of Air Pollutants in Europe, the biggest sources of Finland's sulphur deposition in 1994 were countries outside Europe or not defined (27 per cent), and Russia, Belarus and Ukraine (24 per cent). 12 per cent

of the sulphur deposition was of Finnish origin.

The biggest source of nitrogen deposition were the EU and EFTA countries (42 per cent), while Finland itself accounted for 15 per cent. Efforts are being made to reduce the deposition from neighbouring Russia and the Baltic states by means of mutual cooperation.

The biggest receiver of Finland's nitrogen and sulphur emissions is Russia, though almost as much of the sulphur remains in Finland.

11. Origin of the acid deposition in Finland, 1994

Origin	Sulphur %	Nitrogen %
Finland	12	15
EU and EFTA countries	16	42
Eastern Europe	12	10
Baltic states	9	4
Russia, etc.	24	9
Other countries	27	20
Total	100	100

12. Emissions of Finnish origin to other countries, 1994

Receiver	Sulphur %	Nitrogen %
Finland	31	18
EU and EFTA countries	7	9
Eastern Europe	0	1
Baltic states	4	3
Russia, etc.	32	44
Other countries	26	24
Total	100	100

Sustainable energy supply

Sustainable development means ensuring that energy production and consumption remain within the limits imposed by the bearing capacity of the environment and the longterm sufficiency of natural resources. It also calls for the use of safe, efficient and economical energy systems which pollute less. In particular, the use of renewable energy sources should be promoted and the efficiency of energy use improved.

In addition to renewable natural resources, Finland's domestic sources of energy comprise the utilisation of various wastes and residues. On the other hand, it should be borne in mind here that peat renewal takes thousands of years.

In December 1995 the Government made a decision on energy policy and energy conservation. The target for energy conservation is for consumption in the year 2010 to be 10–15 per cent less than it would be without such conservation measures.

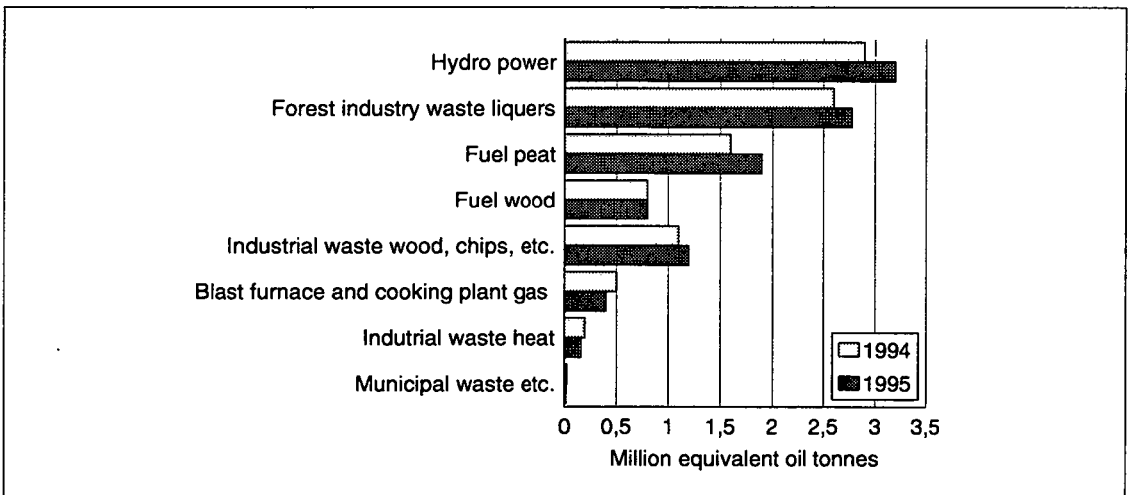
The aim is to increase the use of bioenergy by at least 25 per cent by the year 2005. This

means an amount of bioenergy equivalent to 1.5 million tonnes of oil. The proportion of biofuels of total energy consumption is higher in Finland than in other industrialised countries. Wood and peat satisfy over 18 per cent of the energy demand. A much higher yield of energy raw materials for utilisation could, however, be gained from our forests, peatlands and fields.

The Government's policy emphasises the significance of bioenergy and other renewable energy sources in research and commercialisation financed out of public funds. The competitiveness of domestic energy sources is to be enhanced by supporting research and development creating new industry and increasing exports.

Finland is participating in the ALTENER and SAVE programmes of the EU seeking to promote the use of alternative forms of energy and energy conservation as a means of preventing climate change. Within the programmes Finland is taking part in network projects concerned with the utilisation of waste and energy conservation. Finland has so far been entrusted with eight ALTENER development projects and five SAVE projects.

Diagram 15. Domestic energy sources



Taxes on energy

Since 1994 the fuel tax has been determined by imposing a tax on all primary sources of energy depending on their energy content. In addition to this, fossil fuels are liable to a tax based on their carbon content. This tax is not, however, collected on wood, wind power, or waste used for energy generation. An additional basic tax is also levied on nuclear power and imported electricity. Liquid fuels are also liable to a basic tax of older origin. As regards petrol and diesel oil, it constitutes a major part of the total tax. The basic tax on petrol was raised at the beginning of 1996 by FIM 0.40 a litre.

The tax based on energy content is FIM 3.50 per megawatt hour and the tax based on carbon content FIM 38.30 per tonne of carbon dioxide. Some 65 per cent of the total environment based surtaxes consists of the carbon dioxide part and 35 per cent of the energy tax part.

The energy taxes in force since 1995 affect the separate generation of electricity as follows:

	pennies/kWh
heavy fuel oil	4.3
coal	4.3
natural gas	1.5
peat	0.9
fuel wood	0.0
nuclear power	2.4
imported electricity	2.2
hydro power	0.4
average	1.8

Environment based energy taxation affects the head of the production chain. This makes the regulatory impact of the system as effective as possible in the entire energy chain from producer to consumer. The problem is that few other countries have introduced corresponding taxes, and even those which have, have tried to safeguard the competitiveness of their industry either through low tax levels or

by granting special tax concessions for industry.

The following are some of the problems arising, according to the electricity tax group at the Ministry of Finance, from the Finnish system:

- domestic electricity production is no longer competitive with foreign production and the conditions for investments in raising electricity production have been impaired
- the tax on imported electricity may go against the Treaty of Rome
- the taxation on imported electricity and the rebate on exports are hindering the operation of the Nordic electricity exchange
- the tax rebate on electricity exports does not treat all forms of electricity generation equally
- the high energy taxation is reducing the competitiveness of Finland's energy-intensive industry.

According to the energy policy approved by the Ministry of Finance on in December 1995, the problems are to be solved by shifting the focus of electricity taxation from the production fuels to the end product, i.e. electricity. A further condition was that the solution must make allowance both for environmental considerations and the status of bioenergy as an employer, and that the tax rates do not significantly change as a whole or between different energy user groups. The amendment to the electricity tax will be carried out first and the question of lower rates for industry will be postponed to a later date.

In its report dated June 1996 the electricity tax group of the Ministry of Finance stated that the objectives are to some extent conflicting. A solution in which all the objectives can be achieved simultaneously probably does not exist. The decisions on energy taxation are thus compromises between the various objectives.

The taxation on electricity should, in the group's opinion, be shifted as far as possible from imported fuels to the end product only electricity. The carbon dioxide tax, and the basic tax on nuclear power and imported electricity would therefore be lifted entirely from electricity generation, to be replaced by an electricity tax at a present rate of 1.8 p/kWh; the government revenue on electricity would not then change.

The group expressed the opinion that a future rise in the environmentbased taxes might compensate for most of the disadvantage which lifting the carbon dioxide tax on fuels for electricity production would have on bioenergy. Should it be decided to retain the

carbon dioxide tax on fuels for electricity production in order to safeguard the position of peat, the tax should be much smaller than at present and levied for a fixed period only.

During the budget preparations in August 1996 the Government decided to raise the revenue on energy taxation by FIM 1.1 billion to compensate in part for the reduction in income taxation. A committee led by Mr. Niinistö, Minister of Finance, will be set up to look into the restructuring of Finland's energy taxation in accordance with the decision made by the Government in December 1995. The committee will also be discussing any questions of taxation that may arise from the demerging of the national grid.

5 Transport

Trends in traffic volumes

Finland's per capita mileage is one of the highest in the European Union. The demand and cost of transport are results of the sparse population, decentralised community structure and remote location. The railways in Finland carry a far larger proportion of the goods traffic than in Central Europe.

The traffic volumes took a downward turn in the early 1990s due to the economic recession, after several years of growth. The relative share of public transport fell and now accounts for about one fifth of total passenger traffic. According to the forecasts, passenger traffic will grow 30 per cent between 1995 and 2010, goods traffic 42 per cent.

The costs of goods transport are in Finland two to three times larger than in European competitor countries. The higher costs are ex-

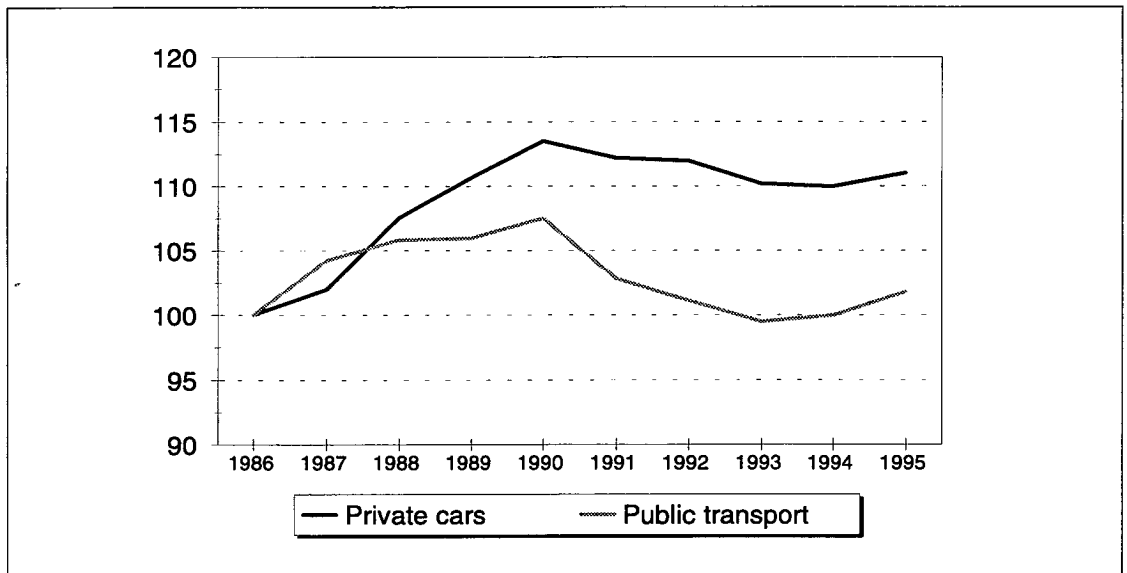
plained by the long distances, natural conditions and the structure of manufacturing. The bulk of foreign transports are by sea. The proportion of road transport (65 per cent of domestic goods transport) has changed little throughout the 1990s. Railway transports have increased their share slightly to 25 per cent. Because of the rather sparse railway network, only longdistance goods transports can to some extent be transferred to the railways. Water transport accounts for just on nine per cent of domestic goods transports.

Environmental impact

Traffic has the following environmental impact:

- greenhouse gas emissions, such as emissions of carbon dioxide, methane and nitrous oxide,

Diagram 16. The trend in public transport and private car use (1986=100)



- other exhaust gas emissions, such as nitrogen oxides, sulphur dioxide, carbon monoxide and particulates
- emissions of volatile organic compounds
- ground water pollution
- noise
- fragmentation of ecosystems and landscape
- waste.

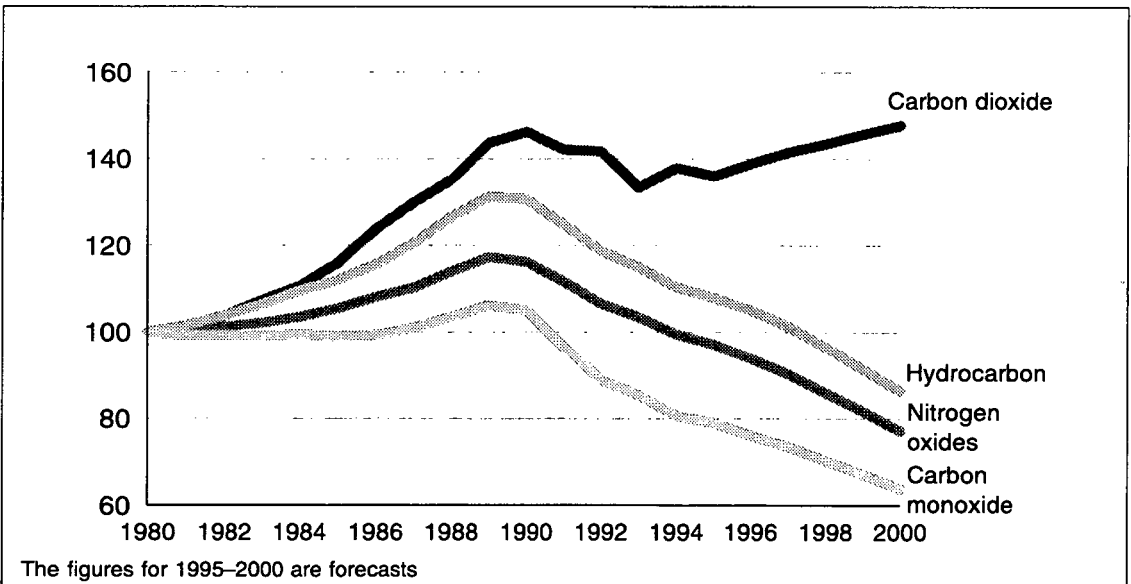
Of the total emissions in Finland, traffic accounts for 25 per cent of the carbon dioxide, 60 per cent of the nitrogen oxides, 50 per cent of the hydrocarbon, 75 per cent of the carbon monoxide and five per cent of the sulphur dioxide. Traffic emissions of carbon monoxide have fallen 20 per cent since 1980, those of nitrogen oxides by some three per cent, while those of lead have ceased entirely. By contrast, emissions of carbon dioxides have risen 36 per cent and those of hydrocarbon eight per cent.

The environmental damage caused by traffic can be reduced by favouring public transport and cycling, by encouraging goods transport by rail, and by improving the purification of exhaust gases. Transport assignments should be

carried out efficiently and economically with as little traffic as possible and effective logistics. Greater allowance is now being made for the environmental impact of projects in the planning and maintenance of traffic routes by environmental impact evaluation, for example. The use of natural resources and the strain on the environment are also being minimised in building the communications infrastructure. The first broad evaluation of the environmental impact of a complete traffic route to be made in Finland was completed in February 1996. The aim of the Nordic Triangle project supported by the EU is to develop a traffic system connecting up the Nordic capitals.

The upper limits on the emissions from vehicles have been made considerably stricter in the 1990s in order to reduce the pollution caused by road traffic. Thanks to changes in fuel quality, relatively low levels of lead emissions from petrol cars and sulphur emissions from diesel vehicles were attained in the early 1990s. The new, cleaner fuels are

Diagram 17. The trend in road traffic emissions (1980=100)



reducing the emissions of nitrogen, hydrocarbon and carbon monoxide by 10–15 per cent.

The effective reduction of nitrogen oxide emissions calls for the use of catalytic converters in cars (CAT-cars) and new engine technology in heavy vehicles. The vehicle stock is, however, slow to renew, and not until the turn of the millennium will almost all petrol cars have catalytic converters. Of the fuel consumption of private cars, CAT-cars account for a good fifth. The fuel used in Finland is almost totally unleaded. Within the EU, almost all the petrol consumed is likewise unleaded in Sweden, Austria and Denmark. Diesel vehicles account over 44 per cent of the total consumption of fuel. Sulphurless grades represent 70–80 per cent of diesel sales.

Car emissions are controlled more extensively in Finland than in other EU countries during the statutory annual car tests. The air quality values are nowadays less frequently violated by traffic thanks to the improvements in fuels, and the carbon monoxide emissions seldom exceed the limits. The norms for particulate and nitrogen oxide emissions are, however, still exceeded.

The limits on particulate emissions from heavy vehicles imposed in 1995 and improved street cleaning will reduce the particulate emissions in the next few years. Within the EU the emission limits will become even stricter in the near future in view of the technical advances being made.

13. Road traffic energy consumption and emissions, 1995

	Fuel consumption %	Particulate emissions %	Nitrogen oxides %	Carbon monoxide emissions %
CAT-cars	13.7	0.9	3.0	9.4
Other private cars	40.5	10.9	52.4	77.3
Diesel private cars	6.0	18.7	3.1	1.1
CAT-vans	0.0	0.0	0.0	0.0
Other vans	1.6	0.3	2.2	4.0
Diesel vans	8.6	8.5	4.1	1.1
Buses	7.0	15.0	9.4	2.0
Lorries	22.5	45.7	25.8	5.0
Total	100.0	100.0	100.0	100.0

Diagram 18. Sales of petrol (million litres)

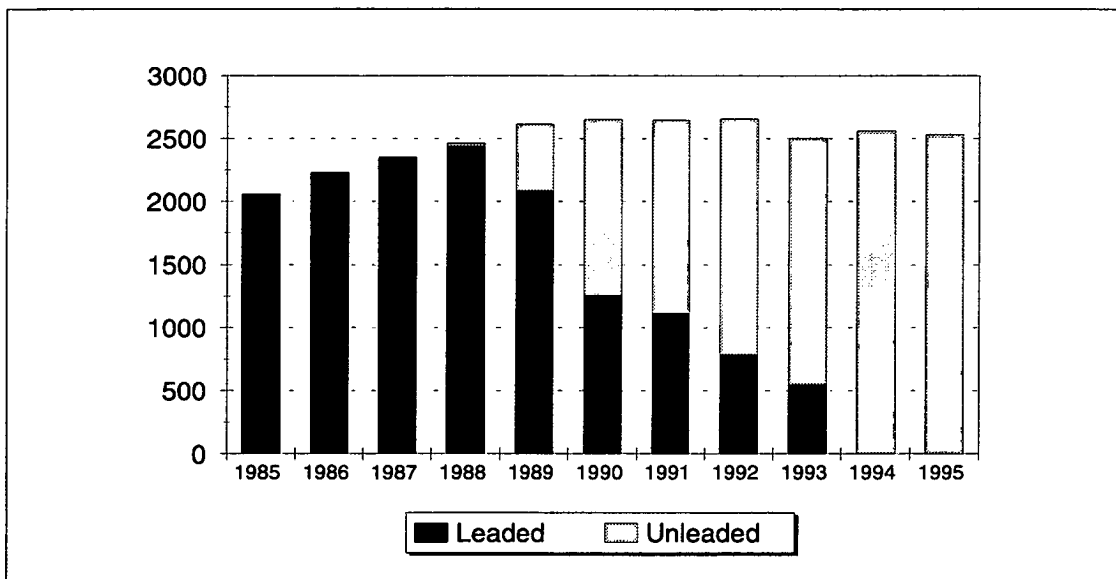
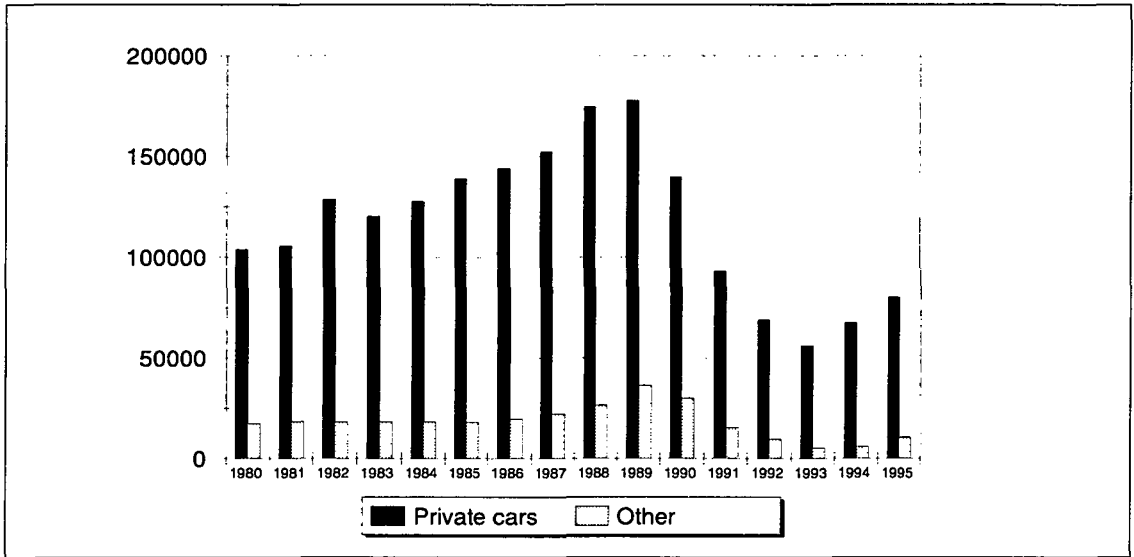


Diagram 19. Newly registered cars



The environmental load caused by trains has been and will be further reduced by continuing the electrification of the railway network.

Traffic pollution and taxation

According to the Green Paper published by the EU Commission, the aim is to collect fees from traffic based on the external costs so as to reduce pollution, traffic jams, accidents and noise without causing the overall costs of transport to rise. The costs arising from the adverse effects of traffic are to be collected as fees from those causing them.

Finland is in principle favourably disposed to the Commission's objectives, so long as the pricing allows for the special problems of the sparsely populated regions. The principle of charging at source should be observed. In Central Europe the costs of traffic jams represent about two per cent of GDP, whereas the corresponding figure for Finland is estimated as being in the range of only 0.1 per cent. Some of the measures proposed have already

been carried out in Finland; the grading of fuel prices has, for example, been implemented in accordance with the Green Paper.

In addition to using economic instruments, the environmental damage imposed by traffic can be reduced through community structure and land use planning. Various estimates in Finland have calculated that road traffic meets its external costs relatively well. According to a survey made by the Government Institute for Economic Research, the taxes and fees imposed on road traffic cover the direct costs incurred, and following the tax increases imposed in recent years, it will also cover the external costs. As recently as the beginning of this decade, road traffic still did not cover its costs. The survey revealed that rail traffic is not costsupporting. This is justifiable on environmental grounds. In evaluating the external costs the survey used the same assumptions and unit prices as the evaluations of traffic route projects.

Not even high taxation has succeeded in changing the relative shares and structures of different modes of transport. Nor is internalising the external costs of transport alone suffi-

cient to solve the environmental problems caused by traffic.

Most of the tax and fee revenue connected with the environment comes from the tax on traffic and especially transport fuels, which are, however, collected mainly on fiscal grounds. Transport fuels are in 1996 expected to yield about FIM 12.7 billion in taxes, FIM 0.6 billion of which are environmental and based on either carbon content or energy content. Fuel taxes are graded on environmental grounds so that reformulated petrol with a higher oxygen content has in practice taken the place of the "ordinary" petrol grades.

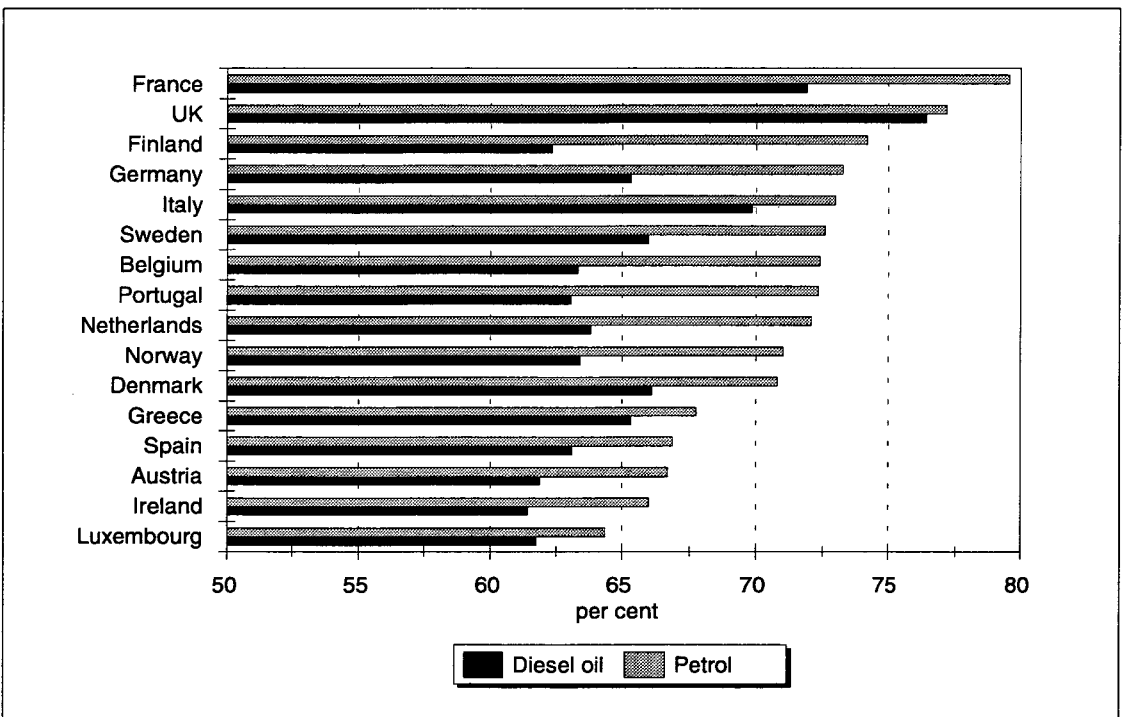
The proportion of taxes in the consumer price of petrol in Finland is the third highest in Western Europe, after France and the UK. The tax on diesel oil is approximately the average for Western Europe.

14. Surtaxes paid by road traffic (FIM million)

	1994 R	1995 R	1996 B	1997 BP
Vehicle tax	618	1 046	1 040	1 070
Motor vehicle tax	844	668	860	870
Excise duty and VAT on vehicles	450	590	790	836
Total vehicle taxes	2 054	2 685	3 600	3 800
Excise duty and VAT on transport fuels	2 150	2 550	2 981	3 102
Fuel tax	9 815	11 628	13 550	14 100
Total	15 931	19 167	22 721	23 778

R = revenue
B = budget
BP = budget proposal

Diagram 20. Taxes as a percentage of the consumer price of transport fuels on 22.7.1996



6 Rural industries

Agriculture

Of Finland's total land area, 2.6 million hectares or 8.3 per cent is farmland. There were 114,510 holdings with over one hectare of arable land under cultivation in 1994. The average acreage of arable land including fallow land was 19.2 hectares. The number of holdings is expected to decrease considerably in the next few years. Meanwhile, the average size of holdings will grow, chiefly due to field rental. Agricultural production is based primarily on animal husbandry. Dairy farming and beef production account for nearly half the total agricultural output. Forty per cent of active holdings specialise exclusively in root crop and vegetable growing.

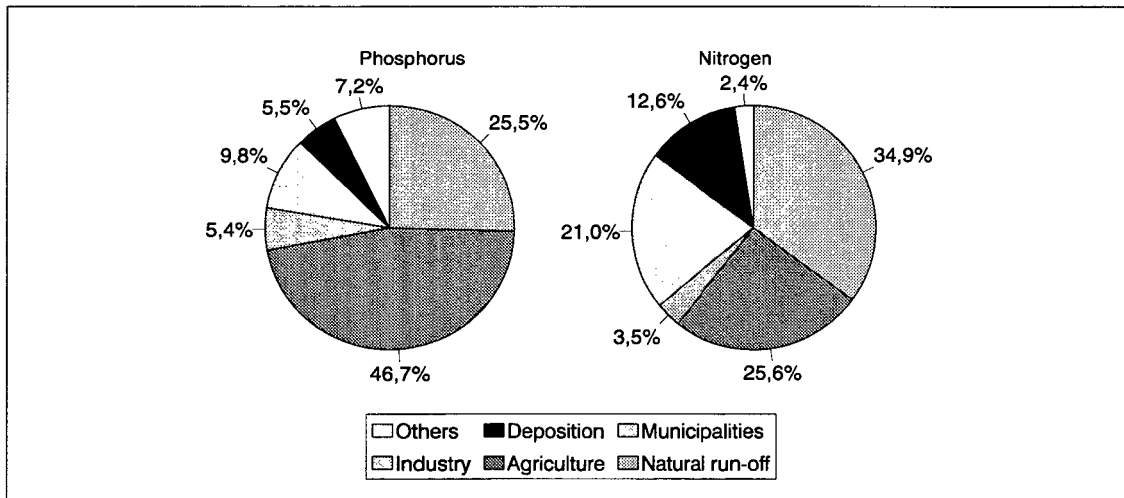
As a result of Finland's EU membership, the cultivated area devoted to growing cereal crops has grown while the area of land lying fallow has decreased; the producer prices of agricultural products fell 40 per cent on average and the consumer prices of foodstuffs nine per cent in 1995. The agricultural output

in 1994 amounted to FIM 23 billion as against only FIM 14–16 billion in 1995. Due to the considerable subsidies during the transitional period, animal husbandry and root crop growing continued on the same scale as before. The adaptation of agriculture to the keen internal market competition and to the fluctuation in prices, and the uncertainty felt by farmers will in the near future add impetus to the structural change in agriculture.

Agriculture has certain harmful effects on the environment:

- nutrients and soil from waterside fields are draining into the waterbodies, thus impairing the quality of the water,
- animal husbandry is making the surface water unhygienic
- acidifying ammonia is passing from fertilisers and manure into the soil and waterbodies
- the growing bias and intensity of production methods is reducing the traditional biodiversity of the rural environment.

Diagram 21. Loads on waterbodies by source, 1994



Agriculture does, however, have numerous environmental advantages in maintaining an open, locally differentiated farming landscape and the habitats important for numerous species.

The most important direct impacts of agriculture on the environment is the runoff into the waterbodies of nutrients and fertilisers used in crop growing. While the environmental hazards caused by industry and municipalities have been reduced considerably in the past few decades, there has been no change in the load on waterbodies generated by agriculture. The phosphorus derived from agriculture is of special significance to the eutrophication of inland waterbodies, while the nitrogen runoff is eutrophying the sea.

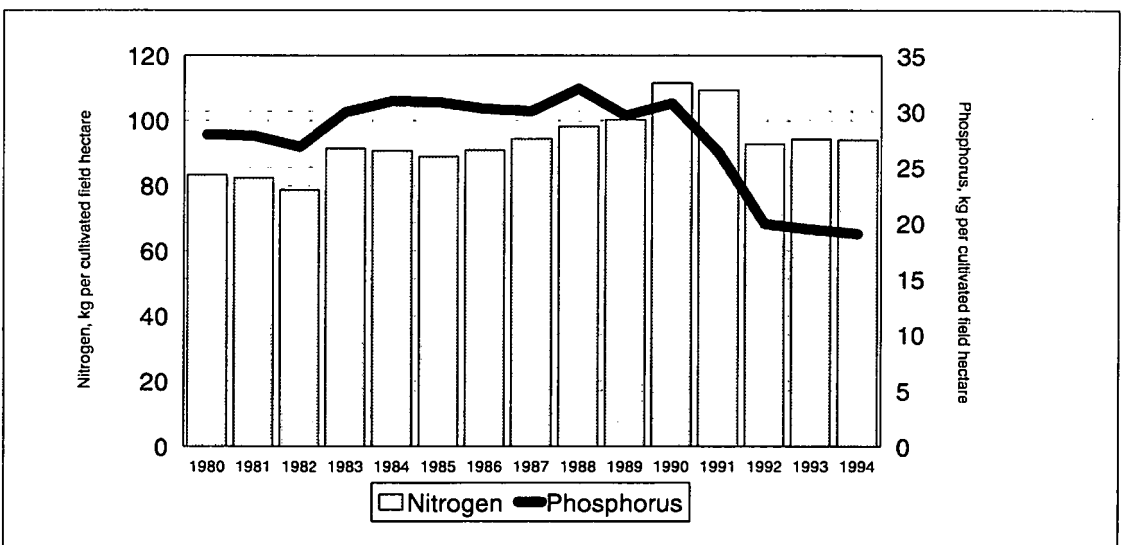
Unlike the impact on waterbodies of industry and municipalities, that of agriculture tends to take the form of stray loads. Centralised waste water purification methods are not suitable for treating these minor local quantities. The area of heavy polluted waterbodies has decreased, but the increase in stray loads has reduced the number of completely unpolluted areas. All in all, the eutrophication of waterbodies increased in the 1980s and early 1990s. In very

recent years the rise in load on the waterbodies caused by the use of fertilisers has been halted and the use of phosphate fertilisers has greatly decreased.

The acidifying effect of ammonia emissions is in Finland almost as big as that of nitrogen oxides and about half that of sulphur dioxide. More than half the Finnish ammonia deposition has its origins abroad. About 90 per cent of Finland's own ammonia emissions come from agriculture. Other sources are fur farms and industry.

The traditional species that thrive in a farm environment have enriched Finland's otherwise small range of species and provided habitats for species increasing the biodiversity. Increased efficiency, greater mechanisation, the growing use of chemicals, subsurface draining of arable land and specialised production have in turn resulted in continuous areas of cultivated land and a smaller variety of crops. With dwindling habitats, 300 animal and plant species that used to be an integral element of the rural scene have now become endangered.

Diagram 22. Use of nitrogenous and phosphate fertilisers in agriculture



Environmental subsidies for agriculture

As Finland joined the EU, the tax on fertilisers was lifted in accordance with EU practice and is now trying to reduce the environmental impact of agriculture by economic subsidies. The environmental support system for farms is partly subsidised by the European Union and is paid according to a national environmental programme approved by the Commission. The objective of the Finnish environmental programme for agriculture for the period 1995–1999 is to improve the protection of the waterbodies and to protect the traditional rural landscape and biodiversity. The programme also aims to eliminate the direct load on the waterbodies caused by animal husbandry and the production of silage. In order to qualify for basic environmental support,

- an environmental management plan must be drawn up for each farm,
- the nutrients from crop fertilisers and manure must not exceed the prescribed limits,
- a productivity study of the fields, an analysis of the nutrient content of the manure and detailed accounts of, among other things, the use of nutrients must be made in order to ensure the correct fertiliser dosages,
- manure must be stored in a way that will not damage the environment and it may not be spread on snowcovered or frozen ground,
- protective zones at least three metres wide and covered with vegetation must be established along waterbodies and streams, and banks one metre wide along ditches,
- herbicide and pesticide sprays must be tested and their users be specially trained in spraying, and
- at least 30 per cent of the arable land in the southernmost part of Finland must be covered in vegetation in winter, left as stubble or lightly tilled.

The special forms of environmental support for agriculture are intended for water protection and for the preservation and maintenance of biodiversity and the landscape. Water protection is enhanced by protective strips, treatment of the runoffs, and intensified use of manure. The use of fertilisers and chemicals is being reduced by transferring to organic farming and by diversifying production. To be organic, farming must stop using fertilisers and pesticides. The area under organic cultivation has quadrupled in the past two years and is expected to total some 100,000 hectares in 1996.

Farms were awarded environmental support to the value of FIM 1,543 million in 1996. Of this, FIM 1,380 million was granted to all farmers according to the amount of land they have under cultivation. To qualify for the special part of the environmental support a farm must initiate intensified environmental measures. A total of FIM 1,570 million has

15. Environmental support for agriculture (FIM million)

	1995 R	1996 B	1997 BP
1 Basic support	1 329.7	1 380.0	..
2 Special support	76.5	139.0	..
2.1 Organic production	36.5	..	..
2.2 Protective strips	1.1	..	..
2.3 Treatment of runoff	33.2	..	..
2.4 Intensification of fertiliser use	0.9	..	..
2.5 Landscape management and biodiversity	2.3	..	..
2.6 Diversification of production	0.1	..	..
2.7 Native breeds	2.4	..	..
3 Training and advisory work	8.7	10.0	..
4 Experimental projects	5.0	8.0	..
5 Others	..	6.0	..
Total	1 419.9	1 543.0	1 570.0

R = revenue B = budget BP = budget proposal
.. = data missing

been set aside for environmental support in 1997.

Farmers have shown interest in voluntary environmental programmes. About 80 per cent of active holdings have agreed to abide by the conditions for basic support. Farmers have also been encouraged to reduce the environmental load by other voluntary means. State subsidies to the value of FIM 3.9 million will be granted in 1996 for the development and marketing of organic agricultural production and FIM 1.5 million for research.

Quality of agricultural products

Membership of the EU has provided Finland with an opportunity to compete with the high quality of its foodstuffs. Finnish agricultural products are free from pollution, because Finnish farmers are able to use less pesticides than farmers in other countries due to the cold winter. The air pollution deposition is, furthermore, slight by European standards. The people of many industrial countries on average have a heavy metal intake 25 times that of

the Finns. The measures required as a precondition for environmental support aim to reduce the nitrogen and phosphorus load on the waterbodies by 30–40 per cent over the next 5–10 years. Meanwhile the aim is to reduce the risk of pesticide runoff by 30–40 per cent. High quality can thus be used to give products a competitive edge, and products especially organic ones subject to a quality control system will play a major role in developing exports of agricultural products.

Other agriculture-related industries

Finnish fur farms produce about 70 per cent of the world's fox furs and some 10 per cent of the mink. The total value of fur production in 1995 was FIM 1.3 billion. There is some 2,000 fur farms in operation. The environmental hazards of fur farming can be reduced by the right treatment and use of manure, by treating the runoffs and by developing the feed composition.

The biggest environmental hazard of fish farming are the eutrophying phosphorus emissions in the Gulf of Finland and nitrogen emissions in the Archipelago Sea. In a few inland waterbodies the impact of oxygenconsuming organic substances is also appreciable. The waterbody load per kilo of fish produced on fish farms has fallen in recent years, chiefly as a result of improved feed grades and feeding techniques, and partly due to the more intensive sludge removal of inland waterway farms. The annual domestic fish catch is around 150 million kilos, added to which the fish farms produce just on 18 million kilos of fish. The total value of fish production in 1995 was just on FIM 830 million. Expenditure over the year on management of the fishing waters and fish stock amounts to FIM 100–130 million, of which about one quarter is

16. Use of fertilisers and pesticides in certain European countries in 1991/92 (kg/ha)

	Nitrogen	Phosphorus	Pesticides
Belgium	22	17	10.8
Denmark	144	7	2.2
Finland	66	7	0.5
France	134	14	4.4
Germany	143	9	4.4
Greece	102	10	6.0
Ireland	373	32	2.2
Italy	76	12	7.7
Netherlands	406	17	17.0
Portugal	43	5	1.9
Spain	50	6	2.8
Sweden	63	4	0.7
UK	202	13	3.5

financed by the state. Fish are planted to the value of close on FIM 100 million.

Reindeer husbandry has a major impact on nature in Northern Finland. The reindeer breeding area covers almost one third of Finland's total land area. The total value of reindeer husbandry was FIM 85 million in 1995. The number of reindeer has grown considerably over the past decade and in many places now exceeds the sustainable ecological level. The reasons for this are the mild winters, the

widespread use of additional feeding and delicing of the reindeer. The state of the grazing grounds and their economic carrying capacity will be charted in the course of this decade.

Tourism could become a notable secondary occupation for farmers. The unpolluted countryside, its forests and lakes, give Finland a tourist advantage on the international market. By combining this with various recreational activities it is possible to develop attractive fishing, hunting and hiking services.

7 *Towards sustainable development*

The demand for production and products that comply with sustainable development is expected to increase rapidly in the future. Economic growth will in the future be more and more in the nature of qualitative growth based on the integration of environmental policy and other socioeconomic policy in a way that supports balanced economic development. Considerable achievements have already been made in water and air protection. Environmental issues are nowadays being incorporated in all business operations, for example through voluntary environmental audit systems. The emphasis in the environmental protection of industry and energy production has shifted from the cleaning of emissions to the technical improvements of production processes.

A shift from the taxation of labour income to taxation of the causers of environmental damage is being planned in accordance with the Government's programme. A rapid switch to environmental taxation is not possible, for reasons of competitiveness, except by resorting to international agreements. New economic instruments introduced in 1996 are the waste tax, the deposit system on soft drink cartons, and the recycling fee on used tyres introduced within the tyre branch. Instruments significant for the environment include the proposed Acts on forest and nature conservation already placed before Parliament and the Building Act still in preparation. Finland's environmental protection legislation will be collated in the near future and the procedure and administration for handling environmental permits standardised. One important basis for revising the legislation is the EU's directive proposal for the combined prevention and control of environmental pollution. The pro-

posal is based on the application of best available technology.

Of the government expenditure in 1996, FIM 3,385 million went on environmental protection direct. The budget for 1997 proposes that this sum be raised to FIM 3,601 million, which represents 1.9 per cent of the total national budget proposal.

Finland's aim is that the high standard of environmental protection and ecologically sustainable development written into the fifth EU environmental programme and the Treaty of Maastricht be implemented in all Member States. The most important natural resource for the Finnish economy are the forests, and it is on their sustainable use that our wellbeing rests. Questions connected with the sustainability of the international forest economy were also debated at a forest seminar arranged by the UN commission on sustainable development in Helsinki in August 1996. Environmental certification of the forest economy is also well under way. Under the budget for 1997, an extension programme for the protection of 316,000 of oldgrowth forests costing about FIM 1 billion will be initiated.

The OECD will be evaluating the costeffectiveness of Finland's environmental policy in spring 1997. By making these evaluations the OECD aims to improve the results of the environmental protection being carried out in Member States by helping governments to evaluate their own environmental policies. At the same time it passes on information and experience from one country to another and encourages governments to tell their people of their decisions on environmental policy.

The most important agreements on the conservation of natural resources and the environment binding on Finland

Agreement	Aim	Implementation
<p>Climate change UN Framework Convention on Climate Change, 1994</p>	<p>To stabilise concentrations of greenhouse gases in the atmosphere at a safe level. Initial aim to halve growth in greenhouse gases by 2000 and to regain the 1990 level.</p>	<p>In April 1995 the parties decided about a negotiation process with the intention of concretising the objectives of industrialised countries after the year 2000 by the end of 1997.</p> <p>In summer 1995 the Ministry of the Environment set up a committee to prepare Finland's climate policy for the period after 2000.</p>
<p>Substances that deplete the ozone layer in the upper atmosphere Montreal Protocol, 1987</p>	<p>To stop and restrict use of substances that deplete the ozone layer.</p>	<p>Use of halons prohibited in new equipment as of January 1, 1993. Use of tetrachloromethane prohibited as of August 1, 1993. Use of CFCs prohibited as of January 1, 1995, except for drugs inhaled into respiratory tract. Use of 1,1,1-trichloroethane prohibited as of January 1, 1995.</p>
<p>Sulphur emissions Oslo Protocol, 1994.</p>	<p>The long-term objective is to ensure that sulphur depositions do not exceed the critical loads in each area. The first step is to reduce the excess by 60 per cent by the year 2000. To this end, Finland engages to reduce sulphur emissions by 80 per cent on the 1980 level by 2000.</p>	<p>Finland signed the Protocol in 1994. It has not taken effect. In 1994 Finland's emissions were 80 per cent lower than in 1980. Keeping emissions at this level nevertheless requires extra measures.</p>
<p>Emissions of nitrogen oxides Protocol on the Control of Emissions of Nitrogen Oxides and their Transboundary Fluxes, 1988. Declaration on the reduction of nitrogen oxide emissions, 1991.</p>	<p>In the Protocol, Finland engages to freeze emissions of nitrogen oxide at the 1987 level by the end of 1994. In the Declaration Finland announced its intention to reduce emissions by 30 per cent on the 1980 level by 1998.</p>	<p>In 1994, emissions of nitrogen oxides fell 1.7 per cent on the 1987 level and by 4.5 per cent in 1995.</p>
<p>Volatile organic compounds International Protocol on the Control of Emissions on Volatile Organic Compounds and their Transboundary Fluxes, 1991.</p>	<p>To cut emissions of volatile hydrocarbons by 30 per cent on the 1988 level by 1999.</p>	<p>The agreement has not yet taken effect. Finland ratified the Protocol in January 1994.</p>

Agreement	Aim	Implementation
<p>Biological diversity General Convention on Biological Diversity, 1994.</p>	<p>The objective is the protection and sustainable use of the diversity of global ecosystems, animal and plant species and their genes, and the equitable division of the benefits gained from the use of biological natural resources.</p>	<p>The national report assessing the state of biodiversity in Finland will be completed by the end of 1996. The committee on biodiversity is preparing a national action programme for biological diversity scheduled for completed by the end of March 1997.</p>
<p>Protection of the Baltic Helsinki Convention, 1974, Helcom recommendations 1980- Ministerial declaration, 1988. Convention on the Protection of the Marine Environment of the Baltic Sea, 1992.</p>	<p>Aims include reducing the nutrient and heavy metal load on the Baltic and nondegradable or toxic organic substances by 50 per cent by 1995 and protection of the marine environment.</p>	<p>Targets will be integrated into national legislation and programmes, into Water Court decisions on individual cases and will be pursue through economic instruments.</p>

Finland's Natural Resources and the Environment 1996

Finland's Natural Resources and the Environment 1996 is a review of the state of Finland's natural resources and the environment. It presents the salient principles of economic and environmental interaction. It also reviews trends in the main sectors of the economy as they affect the environment. These sectors are natural resources, industry, energy, transport, agriculture and other rural industries. Finally, a list is given of the main conventions on the protection of natural resources and the environment to which Finland is a signatory.

Myynti:
Tilastokeskus
Myyntipalvelu
PL 3B
00022 TILASTOKESKUS
puh. (90) 1734 2011
faksi (90) 1734 2474
sähköposti: tilastomyynti@stat.fi

Försäljning:
Statistikcentralen
Försäljningstjänsten
PB 3B
00022 STATISTIKCENTRALEN
tfn (90) 1734 2011
fax (90) 1734 2474
e-post: tilastomyynti@stat.fi

Orders:
Statistics Finland
Sales services
P.O.Box 3B
FIN-00022 STATISTICS FINLAND
Tel. +358 0 1734 2011
Fax +358 0 1734 2474
E-mail: tilastomyynti@stat.fi

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