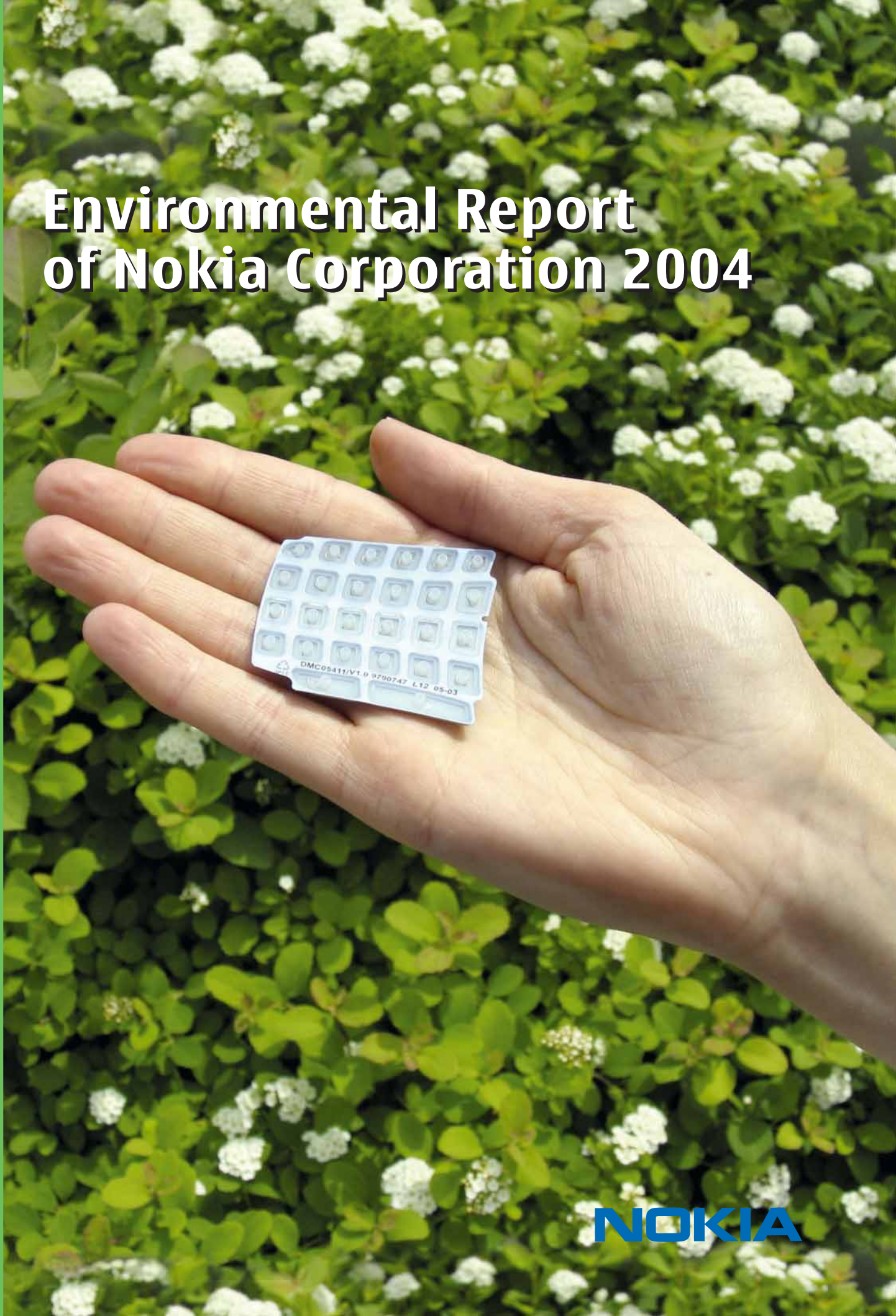
Environmental Report of Nokia Corporation 2004



NOKIA

The aims and scope of this report

This environmental report is addressed to Nokia's employees, customers, shareholders, and other stakeholders affected by or interested in Nokia's environmental activities. The report states Nokia's understanding of the environmental aspects and impacts of its activities, outlines a set of programs for reducing the adverse impacts, reports implementation of established goals and principles, and states objectives and targets for continuous improvement.

Nokia provides its Corporate Social Responsibility report at http://www.nokia.com/crr/index.html, and reports also separately on economic, environmental, and social issues. The scope of this report is limited to environmental issues. The spirit of this report is that of the Global Reporting Initiative's (GRI) Sustainability Reporting Guidelines. The information on economic and social activities, including the safety of mobile telephones and Nokia activities in electromagnetic fields research, is available on the Internet at www.nokia.com/aboutnokia.

Nokia previously reported on its environmental activities in 2002. Nokia has moved all its corporate reporting online and since issuing the previous report, has updated the information about environmental issues available on the corporate web site.

The environmental data presented in this report includes energy consumption, direct and indirect carbon dioxide emissions, water consumption, discharges to water, waste, ozone depleting substances, and VOC emissions to air. This group-level report includes no systematic site-specific information. The case studies offer close-ups of stakeholder cooperation and other practical environmental work that is being carried out in different parts of Nokia.

For more information on environmental matters at Nokia, please contact:

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Statement from CEO

Everyone's Business

With leadership comes great responsibility. As the leading company in our industry, Nokia also strives to be a leader in environmental performance. Future generations are relying on us to protect and preserve the natural environment. We believe that everyone must do their part.

Nokia promotes sustainable development by managing its operations in a responsible way. We take environmental aspects into account throughout the life cycles of all our products. Energy efficiency continues to be one of the key focus areas in continuously improving environmental performance. We have consistently reduced the energy-intensity of our products while the total use of materials in mobile devices has been reduced to a fraction of what it was a few years ago.

Our customers can use their mobile phones with confidence and good conscience. Because we know that health and environmental issues are important to our stakeholders – they are important to us. We make every effort to ensure that our products are both safe for personal use and do not overly tax the environment. Nokia is a trusted name and we take that trust very seriously.

In the end, a solid commitment to the environment makes good business sense. By supporting sustainable development, we minimize risk, ensure legal compliance and promote long-term economic growth. Of course it is our mission to run a profitable and growing business, but that doesn't mean business at any cost.

After all, protecting the environment is everyone's business.

Jorma Ollila
Chairman and CEO
Nokia


Kirsi Sormunen


Veli Sundbäck

Executive summary

Four issues have been running through much of Nokia's environmental work in the past few years and will continue to do so over the coming years. They are the restrictions on the use of certain substances, the arrangements for the take-back and recycling of end-of-life products, and energy and material efficiency. As a leading company in its industry, Nokia wants to play its full part in the management of these issues in a responsible manner in cooperation with all relevant stakeholders. Nokia has also continued to make environmental issues as part of every Nokia employee's daily work by increasing their environmental awareness.

Nokia's constant long-term aim is to improve the environmental performance of its products in a life cycle perspective. In product creation, as well as in its own activities, the key areas for continuous improvement are energy and materials efficiency.

Working consistently and proactively with its suppliers, Nokia is well on its way to full compliance with the materials restrictions of the European Union's directive on the Restriction of the use of certain Hazardous Substances (RoHS), which will apply to electric and electronic equipment put on the market from 1 July 2006. Nokia is actively following the preparation of similar restrictions in other markets.

Nokia has been developing systematic substance management as a means of responding to materials restriction proactively. The tools include a comprehensive database of all materials used in Nokia products and actively managed lists of banned and monitored substances. Nokia is actively involved in developing and spreading the use of the open RosettaNet standard for standardized online exchange of materials data between component suppliers and electronics producers, thereby helping to ensure the availability of systematic information about the material content of components used in the electronics industry.

Nokia has had in place take-back and recycling arrangements of its own for mobile devices and accessories, as well as for mobile network and IP network security equipment for years. Mobile devices and some Internet security equipment are covered by the European Union's directive on Waste Electrical and Electronic Equipment (WEEE). Nokia will assume the producer responsibility defined in the directive as it is implemented in the EU member countries. Meanwhile, take-back of Nokia mobile devices will continue at Nokia Service Points and Care Centers in Europe and elsewhere, as will contractual infrastructure recycling service to corporate customers.

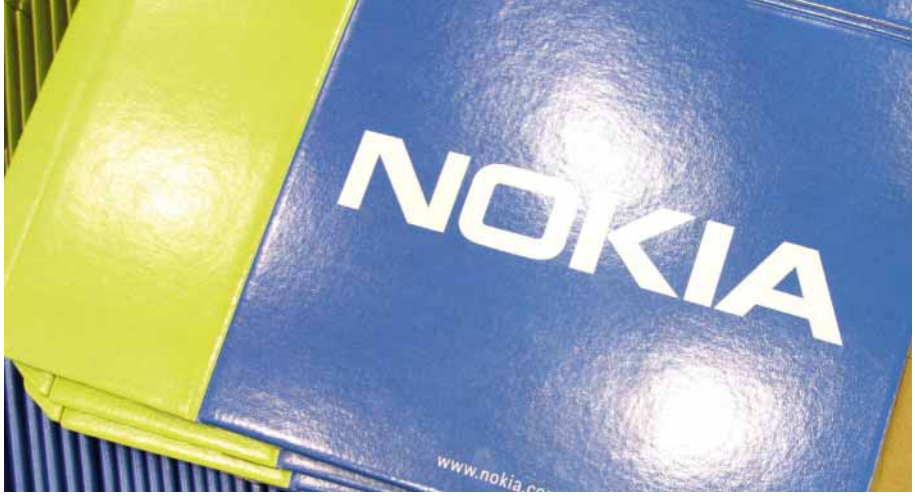
In June 2004, Nokia's mobile phones were chosen as one of the two product pilots aimed at exploring methods and instruments for implementation of the European Commission's new Integrated Product Policy (IPP) initiative. Based on life cycle thinking, the IPP puts the emphasis on voluntary and market-based action. The pilot project focuses on the implementation of life cycle thinking in Nokia's business management and involves the full spectrum of different stakeholders.

In June 2003, Nokia signed a three-year cooperation agreement with WWF International. Activities launched during the first year of what is regarded as a mutual learning cooperation include a web-based learning platform aimed at increasing environmental awareness of Nokia employees, regional management training workshops, stakeholder seminars, and participation of Nokia employees in Nokia-WWF voluntary Helping Hands activities. Top managements of Nokia and WWF review the cooperation annually.

Nokia has been listed on the Dow Jones Group Sustainability Index (DJSI) since 2000 and was relisted in 2004. It was also selected as the technology sector leader in the European DJSI STOXX index in 2003 and 2004. Other listings include for instance the FTSE4Good.

Kirsi Sormunen
Vice President
Head of Environmental Affairs

Veli Sundbäck
Senior Vice President
Corporate Relations and Responsibility



Company profile

Business profile

Nokia is a world leader in mobile communications, driving the growth and sustainability of the broader mobile industry. Nokia connects people to each other and the information that matters to them with easy-to-use solutions for imaging, games, media, and businesses. Nokia provides equipment, solutions, and services for network operators and corporations. Nokia is a broadly held company with listings on four major exchanges.

Nokia comprises four business groups and two horizontal groups that support the mobile device business groups. The business groups are Mobile Phones, Multimedia, Enterprise Solutions and Networks. The horizontal groups are Customer and Marketing Operations and Technology Platforms.

At the end of 2004, Nokia had

- 15 production facilities in 9 countries around the world
- Research and development activities in 12 countries
- Sales to over 130 countries
- Around 55 500 employees (at the end of December)

More business information on Nokia can be found at
http://www.nokia.com/nokia/0,8764,624,00.html.

Business groups

Mobile Phones aims to make user-friendly mobile devices with many features for different segments of the global market. It currently offers mobile phones and devices based on the three global cellular technologies: GSM/EDGE, CDMA and TDMA.

Multimedia brings connected mobile multimedia to consumers in the form of advanced mobile devices and solutions. The business group is also responsible for exploring and developing business models and systems, applications and new sales channels for the growing mobile multimedia market.

Enterprise Solutions is dedicated to helping businesses and institutions improve their performance by extending their use of mobility from mobile devices for voice and basic data to secure mobile access and use of their content and applications. Its solutions range from business-optimized mobile devices for end users to a broad portfolio of IP network perimeter security gateways and mobile connectivity offerings.

Networks is a leading provider of network infrastructure, communications and networks service platforms and services to operators and service providers. It focuses on the GSM family of radio technologies, including GSM, EDGE and WCDMA networks, core networks with increasing IP and multi-access capabilities, and services. The business group enables mobility for mobile voice, consumer multimedia and enterprise solutions.

Horizontal groups and corporate functions

Customer and Market Operations includes Nokia's sales and marketing organization as well as manufacturing, logistics and sourcing for Mobile Phones, Multimedia and Enterprise Solutions mobile devices. The Networks business group continues to have its own dedicated sales and marketing, logistics and sourcing activities. The group is responsible for three of Nokia's environmental focus areas: Supplier Network Management, Environmental Management Systems, and End-of-Life Practices.

Technology Platforms is responsible for Nokia-wide technology management and research and development process development. It delivers leading technologies and platforms to Nokia's mobile device business groups and external customers.

Corporate Functions include e.g. the Corporate Relations and Responsibility Unit, part of which is corporate level environmental support function, and Nokia Workplace Resources that is responsible among other issues for environmental management related to real estate and facilities and the collection of global facilities' related environmental data.

Markets

The market penetration of mobile communication is growing much faster than was predicted only a couple of years ago. The number of mobile phone subscribers has passed 1.7 billion. By 2006, one third of the world population will own a mobile phone, and the ratio is predicted to go up to one half by 2015.

This development means that mobile communication is fast becoming the standard in voice communication instead of being supplementary to fixed-line communication. At the same time, the advancing convergence of mobile and fixed networks can be environmentally beneficial, resulting in networks that communicate and share elements instead of separate networks consisting of separate elements.

In the developed countries, the mobile handset is starting to become a multimedia device offering a multitude of over-the-air services from imaging and e-mail to mobile television. In the emerging markets, mobile penetration starts with voice service and SMS, and then gradually expands to include other types of services. In the developed markets, phone replacement accounts for growth, while in the emerging markets new subscribers drive growth.

Mobile communication and information technology in general can play a part in enabling fast economic growth, as currently witnessed for instance in Asia and other emerging markets. Economic growth puts pressure on the environment. Information technology can help reduce those pressures by reducing consumption of resources through replacement of physical services and transaction with digital over-the-air services and transactions (Please, read more on **dematerialization** and **immaterialization** later in this report.).

Mobile communication has also been called a great equalizer, enabling competition and quickening development by doing away with monopolies based on restricted communication systems. Quicker technological, economic, and social development also creates new opportunities for reducing the environmental impact of human activities.

Environmental profile

Nokia strives to reduce the possible harmful environmental impact of its products, services, and operations over the entire product life cycle. The key instrument for this is Design for Environment, which takes into account the environmental aspects at the very beginning of the product life cycle. It aims to reduce the use of natural resources and energy while at the same time enabling maximum recycling and reuse of the materials used in the products.

Nokia relies on an extensive network of suppliers for components, manufacturing services, facilities management, logistics, and end-of-life services. Supplier network management plays an essential role in the validation and improvement of the products' environmental performance.

Nokia requires that all its suppliers have a documented Environmental Management System. This is also the means of verifying and developing the environmental performance of Nokia's own production sites. Environmental Management Systems are also implemented on Nokia's large office and R&D sites.

Nokia takes back mobile devices for recycling at its service outlets in every country where it has a presence and offers a take-back and recycling service to its network customers. Nokia is establishing a network of audited and Nokia-approved recyclers in all its business regions to handle end-of-life products collected from consumers and network and business customers.

The horizontal Technology Platforms group is responsible for verifying that the technologies and product platforms developed for and delivered to the business groups are environmentally advanced and meet the requirements of current and pending environmental legislation.

Nokia participates in industry-wide efforts and research cooperation with universities and research institutes to find economically and environmentally sustainable solutions to life cycle issues facing the whole information technology and communications industry.

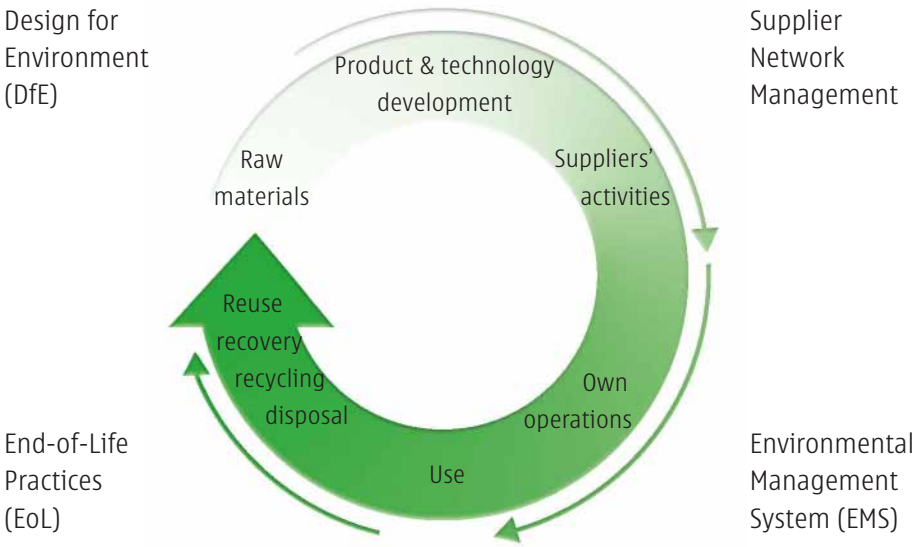
Life cycle thinking

The life cycle of products begins with the extraction of raw materials and ends with the recycling and waste treatment and the reintroduction of recovered materials into the economic system. The environmental aspects of Nokia products are linked to the use of materials and energy at the different stages of their life cycle. The related environmental impacts are mainly associated with waste and pollutants released into the air, water, and ground.

Nokia supports and manages its environmental activities based on life cycle thinking. Life cycle impact evaluations can help to improve environmental performance of products at the stages of their life cycle where improvements are most effective and can be achieved cost-effectively. This is particularly the case in the product design phase.

Methodology is being developed by various bodies for life-cycle assessment (LCA). At the moment, however, Nokia does not consider LCA to be a fully reliable and mature method for the definition of the environmental impact of complicated electronic devices like mobile phones. Nokia will continue to contribute to the development of processes and tools suitable for the assessment and evaluation of environmental impacts of electronics production by cooperating with researchers and specialists in recognized initiatives.

Life-cycle thinking



Nokia strives to reduce the possible harmful environmental impact of its products, services, and operations over the entire product life cycle.

“ We continuously apply life cycle thinking to improve our performance in environmental aspects. Life-cycle thinking covers all the environmentally significant impacts of a product from cradle to crave, and provides the basis for all Nokia’s environmental activities as well as the framework for actions. Based on this approach we have set a number of targets to further improve our environmental performance.

Olli-Pekka Kallasvuo
Executive Vice President and General Manager
Mobile Phones, Nokia

Global warming

In its third assessment report published in 2001, the Inter-governmental Panel on Climate Change (IPCC) stated that the earth's climate system has demonstrably changed on both global and regional scales since the pre-industrial era and that some of these changes are attributable to human activities. The combustion of fossil fuels is seen as the main cause for the observed strong increase in the atmospheric concentration of carbon dioxide (CO_2). According to the report, the increase in the concentrations of other so-called greenhouse gases is also primarily due to human activities.

Concurrently with the build up of greenhouse gases, the global mean temperature increased by about 0.6° C over the 20th century. The IPCC states that there is new and strong evidence that most of the warming observed over the last 50 years is ascribed to human activity. With carbon dioxide concentrations set to continue to rise during this century, the IPCC projects globally averaged surface temperatures to increase by 1.4–5.8° C by 2100. This rate of warming will very likely be without precedent during at least the last 100 000 years.

Changes connected with global warming include increased heavy rain and floods in some parts of the world and increased droughts in other areas, retreat of non-polar glaciers, rising sea levels, and decreases in snow cover and sea-ice.

The IPCC notes that while small climate changes can benefit some regions, the larger the changes and the rate of change, the more the adverse environmental and socio-economic effects predominate. These include increased threats to human health, risk of extinction of some vulnerable species, decrease in crop yields, exacerbated water shortages, and severe social and economic damage to small islands and low-lying coastal areas.

According to the IPCC, emissions of CO_2 due to fossil fuel burning are virtually certain to be the dominant influence on the trend of atmospheric CO_2 concentration during the 21st century. Stabilization of CO_2 emissions at near-current level will not lead to stabilization of CO_2 atmospheric concentration. To achieve that, global CO_2 net emissions need to be radically reduced from the current level. The primary target for reduction is the use of fossil fuels.

The Intergovernmental Panel on Climate Change was established by the World Meteorological Organization and the United Nations Environmental Program in 1988 and has the role of assessing "on a comprehensive, objective, open, and transparent basis the scientific, technical, and socio-economic information relevant to the understanding of the scientific basis of risk of human-induced climate change, its potential impacts, and options for adaptation and mitigation". For more information, consult www.ipcc.ch

Depletion of resources

Heavy consumption is eroding both the renewable and non-renewable resources of the globe. Renewable resources under pressure include forests, fresh water, and fisheries. Of non-renewable resources, the growing cost of extraction from remaining sources has significantly increased the recycling of metals. Although renewable over a very long time, fossil fuels are in practice non-renewable. Fossil fuels currently account for about 90 per cent of the world's energy consumption. Their burning releases carbon dioxide into the atmosphere; observed increases in atmospheric carbon dioxide concentration are linked with the noted warming of the global climate.

Deterioration of environment

Human activities are causing a deterioration of both the physical and biological environment. Toxic releases from industry, traffic, and improperly produced or disposed of products constitute a risk to human health and safety, as well as endangering the lives of other species. Both seawater and fresh water bodies are under pressure from waste discharges. Depletion of resources and climate change will bring about a marked deterioration of the physical, biological, and socio-economic environment.

Nokia products in life cycle perspective

Energy consumption and material efficiency are the most important environmental aspects for all Nokia products.

Global concern about climate change connected with carbon dioxide emissions from the burning of fossil fuels underlines the importance of energy consumption at the various product life cycle stages, including the use phase. Nokia recognizes the impact of its own operations on the carbon dioxide question and is studying and implementing ways of reducing energy consumption at its facilities.

The concern about climate change is increasing the environmental significance of transportation and logistics, which are largely based on use of fossil fuels. Nokia is working on these issues together with its logistical service providers with the aim of establishing reliable and comparable data to improve the environmental performance of the logistics chain.

The life cycle profiles of Nokia's main products, mobile phones and network equipment, are somewhat different. For mobile phones, the upstream stages of raw material extraction and component manufacture account for the biggest part of the overall environmental impact. For network equipment, energy consumption during use accounts for the biggest part.

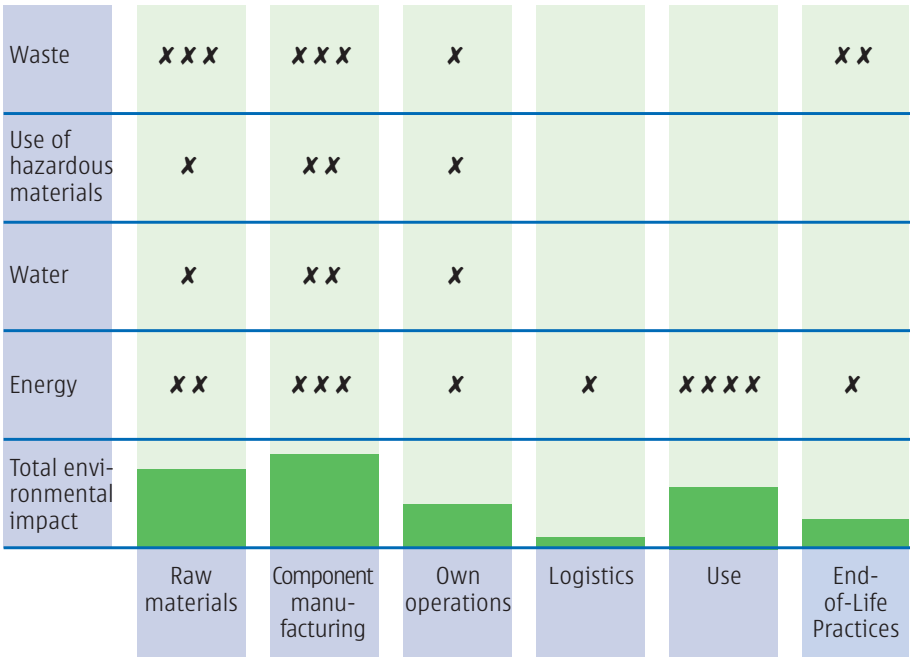
Network products contain a large proportion of metals whose processing consumes more energy than that of plastics, the dominant material in mobile phones. On the other hand, metals can be more readily recovered for reuse and recycling than plastics.

Energy consumption is the principal cause of environmental impacts during the use of all Nokia products. The introduction of new multimedia and Internet features in mobile devices calls for improved power management to improve energy efficiency and extend battery life. While the capacity of mobile networks has increased their relative energy consumption has decreased. Energy efficiency design evolution has been significant in mobile network elements.

In the disposal stage, recycling of metals and plastics is the main issue. Elimination of the use of potentially harmful substances through substance management and product design aims at obviating the need to extract such substances from waste streams.

Recycling plays an important role in the implementation of eco-efficiency through extraction and processing of metals and other materials, which can be reused. If energy use is counted as recycling, most of the plastics used in Nokia products can be recycled. Studies suggest that Nokia products are already highly optimized with regard to recyclability.

Outline of environmental aspects of Nokia's products



Minor impact	
Moderate impact	✗
Considerable impact	✗✗
Substancial impact	✗✗✗
Crucial impact	✗✗✗✗

The amount of crosses signifies the relative importance of the life cycle phase in question. The crosses can be compared horizontally, but not vertically.

The total environmental impact bars aim at taking into account also the importance of the impacts and therefore the amount of crosses isn't necessarily equal to the size of the bar. The total impacts can be compared horizontally.

Implementation of life-cycle thinking

Nokia implements life cycle thinking by defining targets for improvement in the various stages of the product's life cycle. The current focus areas include:

- Compliance with applicable environmental legislation and other relevant stakeholder requirements
- Continuous improvement of the environmental performance of Nokia suppliers network
- Professionally managed take-back of recycling services
- Consumer information on the products' environmental performance through Eco Declarations, which present energy consumption, material use, packaging, and recycling in an understandable form

case

First movers reap the benefits

The European Commission's Integrated Product Policy (IPP) is aimed at improving the environmental performance of products over their life cycle. In June 2004, the Commission selected Nokia's mobile phones as one of two products to which the new approach is to be applied in a one-year pilot project. The other pilot product is the Carrefour retail group's wooden garden furniture.

"We wanted to work with industry leaders that can make a difference to the whole market. It was very important that they were companies with a track record of paying attention to environmental sustainability in their operations," says Mr **Timo Mäkelä**, Director of the Directorate on Sustainable Development and Integration at the European Commission's Environment Directorate-General.

According to Mr Mäkelä, IPP complements the more traditional legislative approach as a tool for assessing where and what type of action may be most effective to improve the whole life cycle of environmental performance of products. This requires careful analysis of the life cycles of different products and the close involvement of the different stakeholder groups.

The emphasis is on voluntary and market-based action to encourage producers to develop and consumers to demand greener products. Possible policy instruments range from taxation and eco-labelling, aimed at helping the consumer to make informed choices, to voluntary schemes and commitments by producers. Mr Mäkelä says there is already evidence from elsewhere that voluntary environmental benchmarks for products can be an effective 'name, fame, and shame' instrument operating through consumer choices.

"This project gives Nokia the opportunity to lead in the environmental field in the same way as it is the leading producer of mobile phones," he adds.

He stresses the importance of engaging the various stakeholders involved at the different stages of the product life cycle. The stakeholders participating in the pilot projects include competitors.

"We don't want to compromise Nokia's commercial confidentialities, but at the same time we want to have an open and transparent process involving the other producers in the sector, as well as the consumer organizations and other NGOs."

According to Mr Mäkelä, the transformation towards greener products is already underway in the consumer electronics sector. The material restrictions and the take-back and recycling obligations enacted through the EU's RoHS and WEEE directives, respectively, drive this development as legal instruments fashioned through dialogue between the Commission and the producers. The IPP approach puts the emphasis on the carrot of market benefits through greener consumption.

"We want to demonstrate to the consumers that they can make educated choices assisted by eco-labelling, information campaigns, and also marketing by the companies. This is the direction the markets are moving. The first movers will get the benefits and the laggards then have to follow."

Mobile phones are trend-setting products, and according to Timo Mäkelä, they can also be environmental trendsetters.

"Their very trendiness makes mobile phones such an attractive pilot scheme. Mobile phones have an image of being hi-tech, and we need to send the message that hi-tech is environmentally sustainable. Consumer electronics has a lot of potential to move towards more sustainable production and consumption. At the same time, the companies that are the first movers are set to reap the market benefits of it."

Vision and strategy

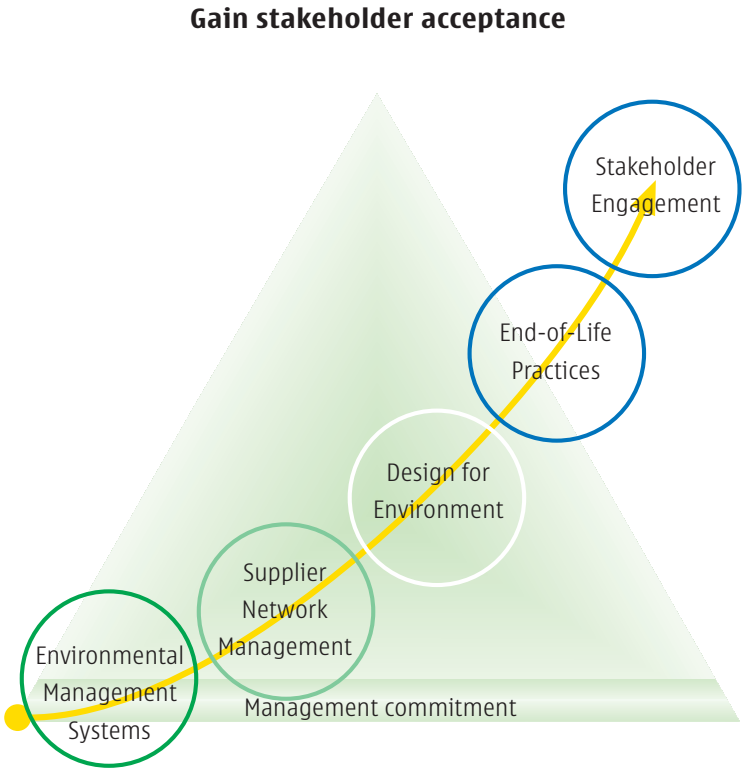
Nokia's vision of sustainable environmental development

Nokia sees mobile technology as an enabler that can help create a more sustainable future world. Combined with better product design, tighter control of production processes, greater reuse of materials, and proper recycling, mobile communications can help to reduce the use of scarce natural resources and energy.

This vision of a sustainable future is linked with our value Respect, which also extends to showing respect for the environment. Nokia encourages people to show their appreciation for the environment and to take into account the enabling opportunities of mobile communications in a way that reflects our collective responsibility for environmental impact.

Our vision is anchored in the totality of our activities. We take care of environmental affairs to ensure and enhance the long-term profitability of our company and to reduce adverse environmental impacts from our activities at the same time.

> "With leadership comes great responsibility. As the leading company in our industry, Nokia also strives to be a leader in environmental performance. Future generations are relying on us to protect and preserve the natural environment. We believe that everyone must do their part."
>
> **Jorma Ollila**
> Chairman and CEO
> Nokia



Nokia's environmental goals are risk management, strengthened financial performance and stakeholder acceptance.

Nokia's strategy for sustainable environmental development

Nokia's strategy for sustainable environmental development covers the whole product life cycle and is implemented through four key focus areas: Design for Environment, Supplier Network Management, Environmental Management Systems, and End-of-Life Practices. With the help of these focus areas Nokia strives to eliminate risks, gain the acceptance of its stakeholders, and increase its profits.

Nokia's goal is to develop advanced technology, products, and services for people, which have no undue environmental impact, consume energy efficiently, and can be appropriately reused, recycled, or disposed of.

Nokia's environmental strategy is integrated with the business strategy. The business groups have set environmental targets for their own activities to implement the corporate environmental strategy.

- Nokia takes into account that environmental issues are increasingly important drivers of development globally. Nokia recognizes the importance of cooperation in addressing such global issues as the usage of resources and carbon dioxide emissions from human activity, and participates in a wide range of cooperative initiatives through industry association and various global organizations. At the same time, Nokia strives to reduce energy consumption in its own activities, including cooling, heating and lighting of facilities. Telephone and video meetings are consistently used to replace routine travel. Cost considerations drive the development of travel and transportation in an environmentally desirable direction.
- Solutions based on mobile technology can replace traditional business methods; for example, the production and transportation of goods. Replacement of physical services with digital services can help significantly to reduce the use of fossil fuels that is the chief cause of the climate change known as the greenhouse effect.
- The consumers' need for better services is driving the development of mobile technology towards increasingly short life cycles of mobile devices. Nokia believes that the related increase in consumption known as rebound effect is compatible with sustainable growth, thanks to the dematerializing and immaterializing potential of mobile technology. Nokia recognizes that its duty is to utilize these opportunities in a responsible manner. The four environmental key focus areas aimed at decreasing the environmental impacts of Nokia's products at all stages of their life cycle are Nokia's tools for achieving sustainable growth.
- The volume of and contamination spread by waste is a significant cause of globally observed deterioration of the environment. Reduction of waste is an environmental goal closely linked with quality – quality of design, quality of component sourcing, quality of assembly and quality of End-of-Life Practices.

> "New functionalities and services that become available with the help of Multimedia devices – such as communication, imaging, gaming, accessing media and content, entertainment, shopping, etc. – reduce the need for traveling and transportation, which in turn reduces environmental impact.
>
> New imaging technologies also enable capturing, storing, viewing, and sharing, as well as the distribution of images wirelessly and electronically without the need for traditional photograph exposure using paper and chemicals."
>
> **Anssi Vanjoki**
> Executive Vice President and General Manager
> Multimedia, Nokia

Mobile technology as enabler of sustainable growth

Nokia regards mobile technology as an enabler of sustainable growth through innovative utilization of its dematerializing and immaterializing potential.

Dematerialization means the reduction in the use of physical materials needed to provide services to consumers and companies. For example, a past portable phone that may have weighed over 10 kilograms delivered talk-only service. Today, mobile devices often weighing less than 100 grams can provide a variety of digital services, including voice, imaging, e-mail, fax, and access to the Internet.

Immaterialization means the replacement of physical products with digital counterparts. For example, downloading digital games over the Internet can replace the need for manufacturing, packing, and selling games in stores with the related transportation and travel.

Wireless communication reduces the pressure on physical communications; for example, goods no longer need to be transported vainly in search of buyers. Mobile communication has not by itself reduced the traveling and moving of people, rather people on the move have progressively better services available to them. This enables reduction of unnecessary travel and the time required for various transactions.

In the end it is the individual who decides how she or he will use the time made available through digital transactions. Mobile communication increases the freedom of choice by definition. It is on the basis of the choices people make that the ultimate impact of this technology on the environment can be evaluated.

> “Today’s mobile technology already allows us access to an ever-widening range of services. This will provide consumers with an opportunity to communicate in new ways and reduce the burden on the environment.“

Olli-Pekka Kallasvuo
Executive Vice President and General Manager
Mobile Phones, Nokia

Policies and management systems

Nokia has a long-standing commitment to the pursuit of environmentally sustainable development and signed the ICC Business Charter in 1991. For Nokia, environmental sustainability is an integral part of corporate responsibility, which embraces economic and social as well as environmental issues.

It is Nokia's policy to achieve the goals of sustainable development by leveraging its resources, including technological know-how, market position, and the continuous building of competencies.

In environmental matters, implementation of the principles of sustainable development involves:

- Integration of environmental activities into business activities
- Active and open external and internal communication
- Proactive cooperation with customers, suppliers, industry, authorities, and other stakeholders

Eco-efficiency

The seven principles of eco-efficiency defined by the World Business Council for Sustainable Development, combined with life cycle thinking, guide the development, production, and delivery of Nokia products and solutions. These seven principles are as follows:

- Minimizing energy intensity
- Minimizing the material intensity of goods and services
- Extension of product durability
- Increasing the efficiency of processes
- Minimizing toxic dispersion
- Promoting recycling
- Maximizing the use of renewable resources

Environmental policy

Nokia's commitment to continuous improvement in environmental issues is stated in our environmental policy, revised in 2002. Environmental specialists and business management are jointly responsible for implementing the policy.

The basic principles of Nokia's environmental policy are:

- Successful business requires a solid product life cycle based environmental performance
- The Nokia Way means an active, open, and ethically sound approach to environmental protection
- The objective of Nokia's environmental policy is sustainable development in accordance with the ICC Business Charter

Principles of implementation

The following principles guide the implementation of the environmental policy:

- The environmental policy is a part of the general management process
- Line organizations plan and implement the action programs by using environmental specialists and the best available technology
- The action programs are based on the understanding of the environmental impacts of a product throughout its life cycle
- Minimizing the environmental impacts requires continuous efforts and follow-up of the results; it is, therefore, a part of the total improvement activities

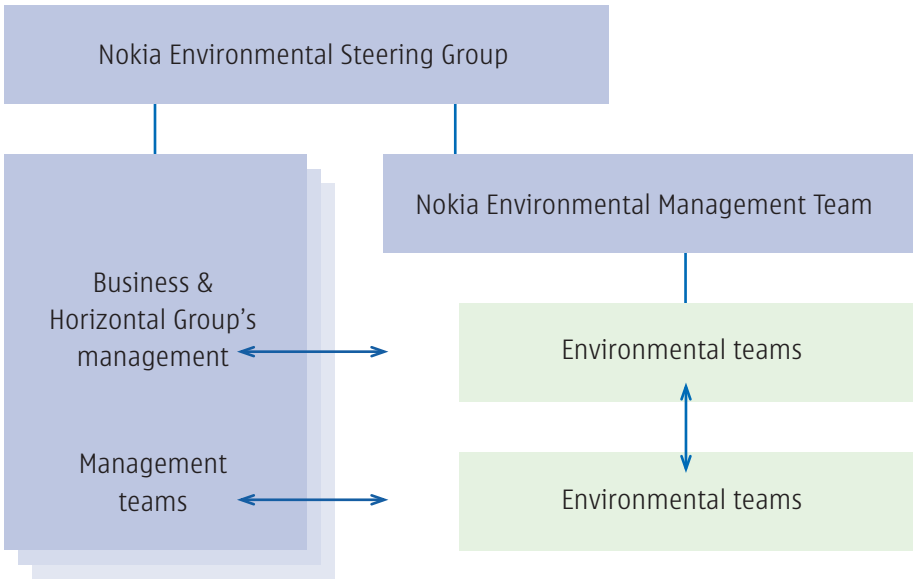
Environmental organization

Kirsi Sormunen, Vice President, Head of Environmental Affairs, is in charge of environmental issues in Nokia. She reports to Veli Sundbäck, Senior Vice President, Corporate Relations and Responsibility, who is responsible for this area at the Nokia Executive Board.

The environmental organization includes two Nokia-wide bodies, the Nokia Environmental Steering Group and the Nokia Environmental Management Team, which comprises representatives of the business, horizontal groups, and corporate functions.

The Nokia-wide management bodies strive to ensure that the implementation of environmental activities is consistent with the environmental policy and strategy across Nokia.

Environmental organization



In Nokia, environmental work is carried out in line organizations.

Management systems

Nokia applies global operating standards for business practices, transfers of technology, and management systems throughout its business units. These standards are applied when establishing a new site in any country. Nokia has a large number of contract manufacturers who share the company's technology and expertise. The company encourages its contractors to adopt Nokia guidelines insofar as they are applicable, taking into account local requirements.

The environmental performance of Nokia products and environmental impact of Nokia's own operations are systematically managed through four environmental key focus areas: Design for Environment (DfE), Supplier Network Management, Environmental Management Systems (EMS), and End-of-Life Practices (EoL). The expertise of the four areas is integrated into normal daily business and line organizations.

A large part of environmental work related to products and product development is carried out in the horizontal Technology Platforms group. The horizontal Customer and Market Operations group is responsible for Supplier Network Management, Environmental Management Systems, and End-of-Life Practices. Nokia Workplace Resources is responsible for environmental management related to Nokia's real estate and facilities.

> "Our continuous goal is to set the industry benchmark in environmental performance and seamlessly integrate environmental aspects into our strategic and operative activities. Caring for the environment is everybody's business."

Olli-Pekka Kallasvuo
Executive Vice President and General Manager
Mobile Phones, Nokia

Stakeholder engagement

Nokia's external stakeholders comprise the customers, shareholders, suppliers and other contractors, non-governmental organizations, governments, authorities, and citizens of societies in which Nokia operates. Nokia employees are the company's internal stakeholders.

Internal stakeholders

At Nokia, the environment is everybody's business and an integral part of daily business. Nokia believes that a company that is recognized to be environmentally responsible is also in a better position to attract and retain employees.

All Nokia personnel have access to internal training and communication on environmental matters.

Communication

Nokia has an internal intranet site that covers environmental issues and activities within Nokia. The site gives information on the implementation of the environmental activities in the business and horizontal groups giving the network of environmental specialists and other Nokia employees access to the overview of Nokia's environmental objectives, targets, and activities. It is also a channel for dissemination of news and information on environmental matters.

Established in 2003 and intended as an internal magazine of the environmental experts' network, the e-magazine Impact has attracted a large number of readers from all parts of Nokia. Each issue focuses on a theme and the editorial team covers different business units and geographical locations.

In addition, a monthly newsletter is circulated to the environmental experts' network by e-mail, and environmental issues are regularly discussed in Nokia's global in-house magazine, Nokia People.

Nokia arranges several Environmental Forums both globally and regionally throughout the year. These one-day information-sharing events bring together both environmental specialists as well as other employees engaged with or interested in environmental work in different parts of Nokia.

Training and competence development

All Nokia employees have access to Nokia's and WWF's common Connect to Protect web based learning application where they can learn and test their knowledge about environmental issues that they encounter both as Nokia employees and in private life (Please, read more on this later in this report: Case WWF).

Environmental awareness and understanding has been integrated into Nokia's competence development with cognitive progression paths and job profiles created for different types of environmental specialists.

A modular e-learning application on environmental matters is easily available to all Nokia employees. The application is used as learning material in some management and leadership development programs.

The principle that the environment is everybody's business is implemented in management development, with environmental issues included in most of Nokia's regular management training programs.

Induction of new employees also includes information on environmental matters by means of a multimedia self-study and face-to-face learning.

Growing environmental awareness

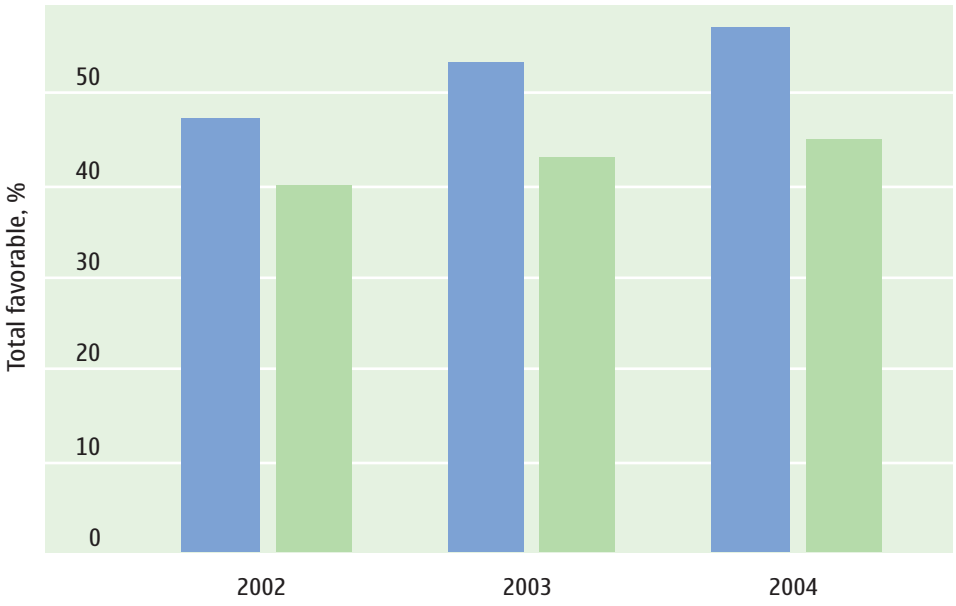
Nokia's global employee opinion survey Nokia – Listening to You has included two questions on environmental matters since 2002. The employees are asked to take stand, on a scale from 'fully agree' to 'fully disagree', to two assertions:

1. I am well aware of Nokia's key environmental programs.
2. In my team, we have taken specific actions to support the company's environmental goals.

The results of the 2004 survey show an improvement over the previous surveys in 2002 and 2003.

Listening to You 2002–2004

Nokia Corporation



Environmental awareness and environmental work have increased among Nokia employees.

External stakeholders

Nokia is engaged in a continuous dialogue with its external stakeholders to stay abreast with what issues they see as important now and in the future, what is expected of Nokia, and how these expectations can be met.

Consumers

Nokia promotes two-way communication with consumers through comprehensive, regional and worldwide brand surveys and related focus groups.

Nokia's external web site www.nokia.com/environment contains extensive information on Nokia's environmental goals, principles, and activities, including advice on the take-back of mobile devices.

Corporate customers

Account teams of the business groups conduct customer-specific discussions with trade customers and carry out customer satisfaction surveys. An extranet information service has been implemented for increased interaction with telecom operators.

Suppliers

The requirements of environmental legislation due to come into effect in Europe and elsewhere have been extensively discussed with suppliers, and tools for keeping the suppliers continuously informed about Nokia's requirements have been developed. Supplier issues are reported in more detail in the Performance Review.

Investors

In investor relations, the focus is sustainable shareholder value. Nokia has successfully sought inclusion of its share in indexes that are based on evaluating Nokia's performance against various criterion of sustainable operations. Nokia shares have been listed on the Dow Jones Sustainability Indexes (DJSI and DJSI STOXX) since 2000. In 2003 and 2004, DJSI STOXX nominated Nokia as leader among its listed technology sector companies. Other listings include for instance FTSE4Good.

NGOs

In June 2003, Nokia signed a three-year agreement on a learning cooperation with WWF International. This cooperation is reported in more detail elsewhere in this report (Case: WWF). Nokia is also in regular discussions with other NGOs.

case

Bar-raising relationship

In June 2003, Nokia and WWF International signed a three-year agreement on global cooperation aimed at increasing environmental awareness among Nokia employees and promoting sustainable business practices in Nokia.

Activities launched during the first year include the web-based learning platform Connect to Protect, management training workshops, stakeholder seminars, and involvement of Nokia employees in WWF activities through Helping Hands activities. The top management of the two organizations meet twice a year to review the cooperation.

Paul Steele, Chief Operating Officer of WWF International, says WWF seeks relationships with companies where a win-win agenda can be developed.

"This is achieved in a relationship where we are working with the company to help it achieve its own objectives in terms of moving towards more sustainable practices. For our part, the resulting reduction of environmental impact and the increased conservation awareness helps us achieve our mission."

According to Steele, WWF expects its corporate partners to challenge its conservation agenda by putting it to the test of the marketplace. WWF likes to work with companies that are in a leadership position in their business segments as this offers the opportunity of raising the bar and setting a standard for the rest of an industry.

"In terms of Nokia management's vision of how they want to see Nokia operate, it is in a leadership position. Bar-raising and standard-setting is a real possibility in this relationship."

Steele believes the learning cooperation is helping Nokia gain broader stakeholder acceptance for its sustainability practices and that this will have a favourable business impact, too.

"At the end of the day, we believe that putting in sustainable business practices over time will increase business and profits for Nokia."

According to Steele, WWF's side of the bargain is that the relationship helps reduce the environmental footprint of a major global company at the same time as building awareness of WWF. He stresses the importance of reaching out to the employees and commends the Connect to Protect intranet solution as an innovative way to engage employees.

"Most major companies want to be more sustainable in their business practices. They can make all sorts of business decisions, but where they struggle is making sure that all their employees are on board with what they're trying to do. We think Nokia has taken a very innovative approach to doing this and we're very pleased and very proud to be part of that process." ■

Governments and authorities

Nokia engages in extensive dialogue and involvement with governments and intergovernmental organizations (IGO). These include the United Nations, the European Community, and the International Chamber of Commerce (ICC).

Nokia has committed itself to the United Nations' Global Compact principles. The Compact has the aim of bringing companies together with UN agencies, organized labor, non-governmental organizations, and other civil-society actors to foster action and committed cooperation in the pursuit of good corporate citizenship.

Nokia's active participation in the World Council for Sustainable Development projects still continues.

Industry cooperation

Nokia plays an active role in environmental committees of many national and international industry organizations and initiatives, such as the European Information, Communications and Consumer Electronics Technology Industry Association (EICTA), Cellular Telecommunications Industry Association (CTIA), Electronics Industry Alliance (EIA), American Engineering Association (AEA), Mobile Manufacturers Forum (MMF), Global Business Dialogue on Electronic Commerce (GBDe), and The National Electronics Product Stewardship Initiative (NEPS).

Legislators

In June 2004, the European Commission selected Nokia's proposal on mobile phones as one of two product pilot projects aimed at building practical foundations for implementation of the Commission's Integrated Product Policy (IPP).

The IPP anticipates that companies should consider the environmental performance of their products at each stage of their life cycle. This has been at the heart of Nokia's product development for a long time, and Nokia wants to share its experience. The pilot project gives Nokia a chance to get views from different stakeholders to be taken into account in improving the processes further. For a more detailed report of this cooperation, see p. 16–17 (Case: IPP).

Nokia is also playing an active stakeholder role in relevant legislative processes in other markets, where legislation is being prepared on materials restriction and the recycling of electronic waste. In Europe such legislation will come into effect in the near future.

Society at large

Nokia participates in many ways in the community life of the societies in which it operates. Promotion of environmental awareness has been one target area of these local activities.

case

Environmental art

In 2003, Nokia honored ten young aspiring artists and filmmakers at an official awards ceremony in Malaysia. The awards were divided into Fine Arts Category and 1st Shot Young AV Makers – The Film/Multimedia category. The entire category had an environment related theme for 2003.

Under the Fine Arts category, the theme was "Sea Earth Sky – Our Environment". A total of 305 entries were received and thirty-three were selected to the finals.

Three winners were selected by a professional panel to receive MYR 5 000 each, a Nokia Arts Awards plaque, and a Nokia product for their outstanding artistic work. Additionally, the three winners stand a chance of holding their first solo exhibition, sponsored by Nokia.

Under the 1st Shot Young AV Makers category, the theme was simply "Our Environment", where students were urged to place themselves within the environment and express their views concerning issues like the depletion of natural resources, global warming, pollution, and fauna and habitat destruction. They were encouraged to call into question, contemplate, and essentially delve into human-environmental relationships through an expressive and interactive medium, which was television.

Five awards were selected for the best short film clips. The "Best Shot" winner, Ms. Lim Ay Nee, won MYR 10 000, a Nokia plaque, and a Nokia product, for her visually stunning piece "Contact Lens".

Four other works received Silver Awards, each winning MYR 5 000, a Nokia plaque, and a product.

"Nokia is proud to be working with the arts because it goes to the very heart of Nokia's philosophy of Connecting People," said Mr **Goh Doh Hau**, Senior Account Manager for Nokia Mobile Phones. "This is Nokia's fifth year of holding the Nokia Arts Awards (for Fine Art) and the second year for the AVMaker Awards (for Film), which speaks to our commitment of encouraging professionalism and the development of young creative minds in Malaysia", added Goh.

Performance review

Materials issues

Nokia's Design for Environment priorities are:

- Energy efficiency of the products
- Knowledge of product material content
- Considerations concerning the quantity and type of materials used in the product
- Promoting efficient use, reuse, and recycling of materials through product design

The priorities concerning the selection and use of materials have been implemented through systematic substance management and enhanced materials efficiency of products.

Substance management

Compliance with current and pending environmental legislation is among the focus areas of Nokia's life cycle thinking (see p. 10). Nokia has developed substance management tools that help it prepare for and comply with legislative and other relevant requirements concerning the materials used in the products.

Substance management implementation is also a Nokia supplier network management issue, managing materials issues throughout the supplier network that provides Nokia with the materials and components used in the assembly of the products. Full disclosure of the raw material content of the products supplied to Nokia is one of Nokia's Global Supplier Requirements on Environmental Management (see page 43). Compliance with the requirements is regularly assessed.

The data received from the suppliers form the Nokia materials database that is an invaluable tool when, for example, a substance needs to be systematically phased out from products. Systematic and progressively automated collection and storage of materials data enables Nokia to proactively meet pending legal and other stakeholder requirements.

The Nokia Substance List

Legislation in force, as well as pending laws in Europe and those under preparation elsewhere, underline the importance of systematic substance management. The Nokia Substance List defines those substances that Nokia has banned, restricted, or targeted for reduction.

The list divides into two sections, restricted substances and monitored substances. The use of **restricted substances** is banned or limited in Nokia products or packaging. The list of restricted substances states allowable threshold concentrations (typically fractions of a percent by weight) and possible exemptions. If relevant, a phase-out date is stated.

Recent changes in the restricted substances list include phase-out dates on the use of certain brominated flame retardants on main circuit boards of mobile device equipment.

Nokia expects the use of **monitored substances** to be reduced or phased out at some stage in the future. Suppliers are encouraged to investigate alternative solutions enabling Nokia to eliminate these substances from its products.

Nokia Substance List can be found at
http://www.nokia.com/nokia/0,8764,27566,00.html.

> “Main focus areas during the product planning and design phases are the products’ material substance contents and material and energy efficiency. We continuously analyze the materials used in our products with the aim of reducing the amount of hazardous and harmful substances by utilizing other types of materials, technologies, and solutions.”
>
> **Anssi Vanjoki**
> Executive Vice President and General Manager
> Multimedia, Nokia

Materials restrictions

The materials whose use is set to be restricted in Europe and elsewhere in the near future comprise lead, three other heavy metals, and two flame retardants. Of those, lead has traditionally been used in the interconnection of electronic components and in the soldering process during assembly. As the legislation makes various exemptions on the use of lead and includes restrictions also on other substances besides lead.

Preparations for the restrictions have been going on over a number of years. Schedules for the introduction of RoHS compliant components have been regularly discussed with suppliers, while at the same time RoHS compliant soldering has been developed. All new devices will meet the requirements of the directive in advance.

The short replacement cycle of mobile devices facilitates the transition to RoHS compliant devices. The restricted substances are being eliminated from new network and Internet security equipment as well, and all Nokia equipment will meet the requirements as they take effect.

> “In both of our product lines, Enterprise Solutions has aggressively pursued compliance to all applicable environmental legislation globally. We plan to meet and exceed all applicable legislative requirements. This begins with our commitment to full compliance with EU Directives, RoHS (Restriction on the use of certain Hazardous Substances) and WEEE (Waste of Electrical and Electronic Equipment).”
>
> **Mary McDowell**
> Senior Vice President and General Manager
> Enterprise Solutions, Nokia

Ongoing work

Nokia is systematically monitoring emerging externally-imposed environmental requirements and strives to influence them already at their drafting, with an aim to achieve requirements that can be practically implemented by the industry ensuring a result that is ecologically preferable as well as technologically and economically pragmatic.

In 2002, Nokia initiated the elimination of PVC and certain halogenated flame retardants from all new Nokia mobile devices. PVC is due to be phased out by the end of 2005 and halogenated flame retardants by the end of 2006. In addition to the elimination of the mentioned substances, the project is producing a generic process that can be applied for the implementation of possible future materials restrictions.

Based on the materials database a product design tool is being developed that will guide the materials selections of product designers. The tool is being piloted in mobile phone design and is scheduled to be taken into use Nokia-wide from the beginning of 2006.

RoHS directive

The European Union's directive on the Restriction of the use of certain Hazardous Substances (RoHS) will ban the use of lead, cadmium, mercury, hexavalent chromium, and the brominated flame retardants PBDE and PBB in electrical and electronic equipment put on the market from 1 July 2006. Similar legislation is under preparation in other markets.

There remain to be some challenges related to enforcement of and compliance with the directive to agree on commonly applicable, workable solutions for enforcement and market surveillance. Harmonization of compliance and enforcement methods is essential for a proper functioning of the EU internal market.

> “Networks products will be RoHS compliant by the 1st of July, 2006. In order to reach this target, many of our suppliers will need to be able to deliver RoHS-compliant components well ahead of legal deadlines. This remains a challenging task for the whole industry.”

Simon Beresford-Wylie
Executive Vice President and General Manager
Networks, Nokia

Materials efficiency

Nokia subscribes to the principles of eco-efficiency defined by the World Business Council for Sustainable Development. Minimizing the material intensity of goods and services is one of those principles (see p. 22). As far as the amount of materials used in the products is concerned business and market considerations promote efficient use of materials. The size of mobile devices has decreased drastically while at the same time the range of services they provide has vastly increased.

Nokia products differ significantly with respect to materials efficiency. Modularity is an important design criterion for Nokia’s network equipment, providing for upgrading and repairs that can extend the service life, which is in any case much longer than that of mobile devices. Software dispatching rather than equipment replacement can further increase the materials efficiency of network equipment. Similar upgrading is in principle possible for mobile devices as well, but their nature as personal possessions expressive of the owner’s taste and preferences sets limits to this.

Preference of software solutions over hardware solutions in system design promotes eco-efficiency, as the environmental impact of updating software is smaller than that of updating hardware.

> “We continuously improve materials, energy efficiency, and the recyclability of our products. For example, we will deliver products exceeding the forthcoming EU-requirements already in 2005, well before the legislative requirements enter into force. Environmental performance of mobile devices has greatly improved thanks to materials and energy efficiency, a development that continues.”

Pertti Korhonen
Senior Vice President
Technology Platforms, Nokia

Recyclability

Recyclability is an important aspect of materials efficiency. Recyclability is essentially influenced by the ease of the disassembly of products, which is a design priority at Nokia. Complex issues, however, exist when defining precisely the measurement and optimization of recyclability. Nokia has developed methodology for evaluating recyclability based on calculating it as a percentage of the product’s mass. Unlike some manufacturers, Nokia excludes energy recovery from its calculations.

Studies indicate that the recyclability of Nokia mobile devices ranges from 65 to 80 per cent. For network equipment the corresponding figure is 80–85 per cent. There has been little change in those percentages recently, suggesting that Nokia products are already highly optimized with regard to their recyclability.

Of materials typically used in network equipment, aluminum is highly recyclable. Experiments aimed at increasing the recyclability of mobile devices include using only one plastic in the covers. Results indicate that improvements require closer cooperation with the recyclers.

The recyclability of products remains an area where greater agreement on definitions and methodology would be desirable. For example, thermoplastics combining metal and plastic are commonly classified as recyclable despite the fact that in the recycling process only the metal is recovered while the plastic is burned.

Energy issues

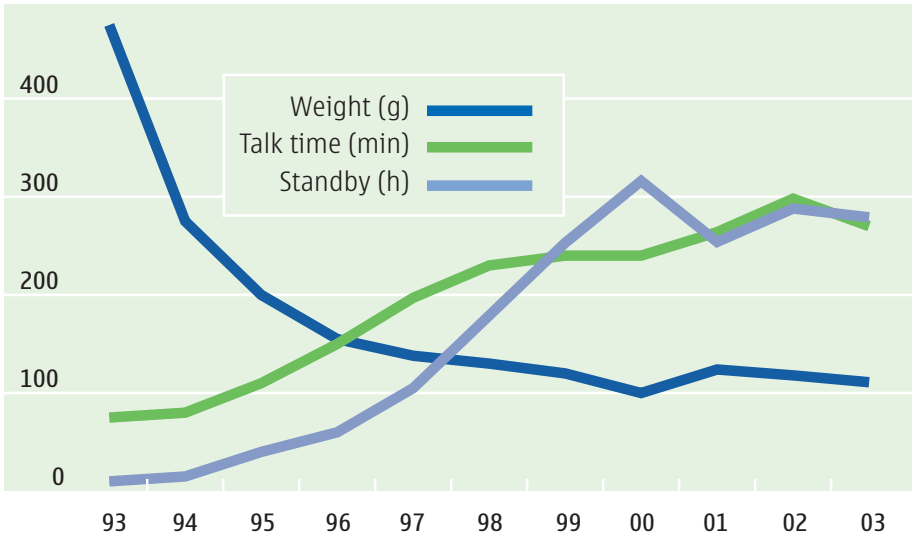
Energy efficiency is a long-standing product design priority at Nokia (see p. 34 Design for Environment priorities).

Nokia products differ with respect to the significance of energy consumption in a life cycle perspective. Use-phase energy consumption is the single largest environmental impact of mobile networks, while the upstream processes of raw material extraction, fabrication, and component manufacture account for the largest environmental impact of mobile devices. Charger energy use is the most significant use-phase energy issue for mobile devices.

Meaningful evaluation of energy efficiency is based on relating energy consumption to the service provided by the product. During recent years the capacity of mobile networks has been increased (number of base stations, amount of traffic) and thus the overall energy consumption has been increased, as well. However, as the volume and range of services provided by the networks have also greatly expanded, energy efficiency per service has in fact increased.

For mobile devices, improvements in battery technology have greatly expanded the talk time and thereby the overall energy efficiency of the devices. Nokia is a signatory to the EU's voluntary Code of Conduct on Efficiency of External Power Supplies aimed at reducing the no-load energy consumption of its chargers. The stand-by power consumption of Nokia chargers has been duly reduced and meets the strictest requirements of the EU code.

Product eco-efficiency

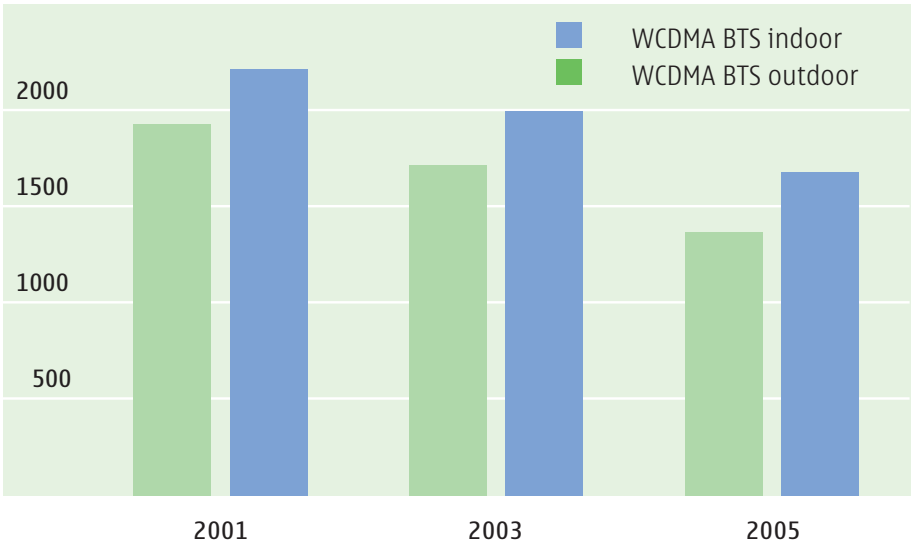


Material and energy efficiency of mobile phones have improved.

Technical improvements have reduced the power ratings of some network equipment. For example, in the case of a typical Nokia WCDMA base station the reduction from year 2000 to 2004 has been from 1930W down to 1370W, or, nearly 30 per cent.

Modular design also promotes energy efficiency of network equipment. For example, if the plug-in units of a base station can be changed without changing other hardware, the life cycle environment impact, including energy consumption, is reduced. Cost-efficiency promotes remote manageability and reduced need for maintenance in network equipment design and thereby also energy efficiency.

Product energy efficiency (PEE) in base stations



Eco-efficiency of base stations is improving. Energy consuption calculated for reference configuration inclusing three sector WCDMA base-station with each sector with 20W output power and with capacity of 64 speech channels.

Supplier issues

A large part of the life cycle environmental impact of Nokia's products arises from the activities of its suppliers. Supplier Network Management enables Nokia to gain a firmer control on the environmental performance of its products. Genuine and significant improvements are achieved by each tier of the supply chain taking responsibility for its own performance. Nokia will promote sound environmental performance throughout the supplier network. To support this, Nokia requires its suppliers to evaluate the environmental performance of their own suppliers and set targets for improvement as needed.

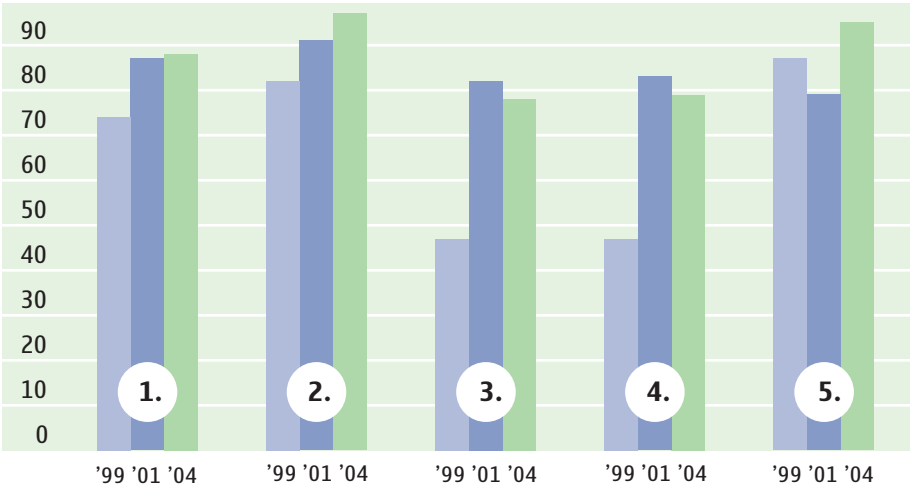
The global Nokia Supplier Requirements on Environmental Management are the basis for the approval and assessment of suppliers with respect to their environmental performance. Trained Nokia assessors conduct supplier assessments regularly.

The overall environmental competence of the sourcing and procurement of personnel is an important focus area in the promotion of environmentally sound practices in the supply chain. Regular training consists of classroom learning supported by an e-learning application accessible through Nokia intranet.

A number of different channels are used to raise and maintain awareness of environmental issues externally, including supplier meetings, annual Nokia Supplier Days, Nokia Global Supplier Web, and websites.

A recent supplier self-assessment provided the following results:

Nokia supplier environmental questionnaire, yes answers



1. Does your company have environmental management system (EMS) or plans to be certified < two years?
2. Does you company have an environmental policy?
3. Does you company set environmental criteria for you suppliers?
4. Does you company use a documented design system (DfE) that considers environmental aspects when selecting materials of new design solutions?
5. Is your company prepared to declare the material content for products delivered to Nokia?

The scope in 1999 self-assesment survey was suppliers for both terminal and network products, the survey 2001 included only the main suppliers for terminal products, and the last survey 2004 had again the wider scope of suppliers for both terminal and network business areas.

Nokia's Global Supplier Requirements on Environmental Management

EMS: The supplier shall have a documented Environmental Management System to ensure effective planning, operation, and control of environmental aspects. This Environmental Management System shall satisfy the requirements of ISO 14 001 or other internationally recognized standards. Continuous improvement efforts shall be addressed within the Environmental Management System.

Design for Environment: The supplier shall consider environmental aspects in all phases of product development, e.g. with specific Design for Environment tools or defined checklists. Choices made during this phase shall reduce or eliminate negative impacts on the environment. All reasonable attempts should be made to reduce or eliminate hazardous constituents from the product and pursue the use of recyclable materials.

Raw Material Content: The supplier shall record the raw material content of products supplied to Nokia, and provide end-of-life treatment recommendations for such products. These records shall be available to Nokia upon request.

Legal Compliance: The supplier shall be knowledgeable of environmental legislation and applicable regulations and provide evidence of compliance with such regulations.

Programs for Improving Environmental Performance: The supplier shall identify significant environmental impacts associated with its operations and implement continuous improvement programs to address them. These programs shall cover the efficient recycling and/or disposal of waste materials and improving treatment and control of waste emissions affecting air, water, and soil. The supplier shall be able to provide supporting evidence.

Suppliers' Environmental Performance: The supplier shall evaluate its subcontractors' and suppliers' performance and set necessary environmental improvement targets. If a subcontractor is used for waste disposal the supplier shall determine if that subcontractor is correctly authorized and licensed through on-site inspection or third party certification.

RosettaNet

As a part of supplier cooperation development, Nokia is taking into use the web-based RosettaNet information exchange solution in its product information exchange with suppliers, including information on materials content.

RosettaNet is a voluntary initiative by some 500 major Information Technology and electronics manufacturers to develop solutions for standardized exchange of information. The RosettaNet partner interface process is the first industrial standard of its kind. It enables the exchange of material content data as part of the technical product data. Standardized information exchange eliminated unnecessary work at both the producer and the supplier end. The development vision is for direct communication between databases.

RosettaNet will become a part of technical component data in Nokia's product data system, helping make substance management a standard part of component design and management. Some of the major suppliers are already members of RosettaNet.

> "We share the environmental responsibility with our component suppliers as their activities make up a large part of the environmental impact of the Nokia product life cycle. We are running a Supplier Network Management program to ensure that our suppliers are conforming to the high environmental standards and expect them to expect the same standards from their own suppliers."
>
> **Pekka Ala-Pietilä**
> President
> Nokia

case

Lead-free is a supply chain issue

National Semiconductor supplies Nokia with analog components used in handheld wireless devices and network equipment. Compliance with the European Union's forthcoming RoHS directive is a topical focus in cooperation between National and Nokia.

Martin Schnepf, EFS and packaging expert from the Quality Assurance Department of National's European headquarters, says National had already previously eliminated five of the six substances whose use is restricted by the directive, leaving only lead to work upon. The work started back in 2000 and by the end of 2004 lead-free versions were available for over 90 percent of products. Some high-power packages still use lead as a high melting temperature die attaches material. This use is exempted by the RoHS directive.

National has chosen the strategy of continuing to offer its customers leaded and lead-free versions of its products to enable the customers to transition smoothly from the standard production process to the lead-free environment.

"We don't want to put the customer under pressure and say, you have to accept lead-free components as of tomorrow as only those will then be available," Schnepf says.

The lead-free solders have an undesirable environmental side effect: they require a higher reflow temperature than lead-containing solders. Some products will have difficulty withstanding the thermal strain at the strictest moisture sensitivity level.

"More moisture sensitive products need dry-pack shipment with its greater environmental impact. Therefore, the aim is to achieve the same moisture sensitivity level as before", Schnepf says.

For National, RoHS compliance is essentially a supplier management issue. The company maintains lists of banned and reportable substances and requires its suppliers to disclose the material content of their products with concentrations of the banned and reportable substances declared. The suppliers need to provide evidence of compliance with the material restrictions.

"We work almost on a daily basis with these lists. In the same way as Nokia, we have moved antimony-based flame retardants to the list of substances to be phased out. National's products do not contain the RoHS-banned bromine-based flame retardants PBB and PBDE."

National shares Nokia's objective of phasing out all halogenated flame retardants. According to National's plans, all National components will be halogen-free by the end of 2005.

National started to compile a material content database in 2001. The material content of all the company's products is accessible over the Internet. Previously, material content information has been supplied to Nokia in spreadsheet form. In the future, this information will be supplied via RosettaNet.

Schnepf says RosettaNet brings a significant improvement in replacing the customers' different forms of declaration.

"Out of one hundred customers you might get ninety different forms. I'm really looking forward to the day when I no longer need to fill the same information separately in the different data sheets."

Own operations

Nokia uses certified Environmental Management Systems (EMS) as a management method for controlling and improving its own environmental performance. The end of 2000 completed certification of all Nokia production site EMS in accordance with the ISO 14001 standard. Certification is an ongoing process, with all new production sites due for certification.

Systematic environmental management is being extended to large offices and other non-production facilities by building Environmental Management Systems for them.

By the end of 2004 all office and product development facilities measuring over 10 000 sq. meters floor space had an internally verified EMS in place.

Environmental aspects and impact of own operations

The main environmental aspects of Nokia's own operations, including production and non-production activities, are energy consumption, water consumption, and waste. The associated environmental impacts are emissions from production of the energy used, and emissions and discharges from collection, transportation, and disposal of waste.

Carbon dioxide emissions from energy production based on fossil fuels are widely regarded as the greatest adverse impact of energy consumption. Space heating, cooling, and lighting account for most of the energy consumed at Nokia facilities. Significant energy savings and related reduction in carbon dioxide emissions can be achieved through good housekeeping and technical improvements.

> "We have integrated environmental thinking into our strategy and operations, and made the environment everybody's business. For example, same standards are applied at all our nine mobile phone production sites globally."
>
> **Pekka Ala-Pietilä**
> President
> Nokia

Energy saving pays off

In 2003, two energy saving campaigns were started. The "Good Housekeeping is Everyone's Business" campaign helps and guides employees to make environmentally sound and energy saving choices while at work. The EMEA Energy Saving Project focuses on the operation of technical systems outside the control of employees. Consequent energy saving measures include optimization of the use of cooling and ventilation systems, utilization of waste heat of PCs, lighting and people, and improved lighting control.

One half of all the energy consumed at Nokia facilities goes to maintain requisite indoor air conditions for production processes and work spaces. Nokia does not save energy at the expense of production and working conditions, which are linked with productivity.

In a pilot project at Nokia's Southwood, UK facility, energy consumption was studied with the help of a mathematical model based on an analysis of the facility's technical systems. Equipment with energy saving potential was identified and improvements requiring no investment were implemented by adjusting the settings. An investment proposal including a payback calculation was drawn up for other improvements. At Southwood, pay-back time was estimated at about one year.

The same process has been completed at Nokia's Bochum site in Germany, with the Copenhagen facilities in Denmark due to follow. The total savings in the European, Middle-Eastern, and African regions are estimated to amount to 14–16 GWh (700–800 000 euros). Translated into carbon dioxide emissions, it corresponds to 6 000 tons of CO_2.

The approach will be applied in other regions, as well. A pilot was started in North America in 2004 and China is due to follow.

In Finland, a technical energy saving project is starting during the first half of 2005. Expected savings are 3–5 per cent of existing consumption level in office areas. The target of the continuous process is to achieve an annual saving of 3 per cent in comparison to conventional service models.

Waste management

Nokia's goal is to reduce all waste fractions to a minimum, especially those destined to end up untreated in a landfill.

Increased re-use and recycling of packaging in the material flows between Nokia and its suppliers has significantly reduced the volume of waste at production sites.

If local infrastructure supports it, various materials collected for recycling can include papers, cardboard, metals, plastics, glass, electronic waste, wood, and toner cartridges. Some sites also collect biowaste/food scrap for composting. Composted waste is classified as recycled.

Water consumption

Water is mainly used at Nokia facilities for sanitary and catering purposes, with only small volumes used in the production processes, such as for cooling systems. As a result, total water consumption at a plant depends on the number of employees located there. Possibilities of reducing water consumption through technical improvements are being studied through benchmarking and analysis of consumption figures.

Emissions into air

Direct emissions from Nokia facilities into the air are small and insignificant in comparison to the emissions from the production of energy used at the facilities. Of these emissions, carbon dioxide is in Nokia's view of greatest concern because of its direct connection with climatic change.

Volatile organic compounds (VOC) arise from the use of solvents in the soldering process. These emissions have been reduced and are very small. VOCs are associated with odors and production of low-level ozone. Low-level ozone is harmful to animal and plant life and serves as a major constituent of photochemical smog.

Collection of environmental data

The Workplace Resources unit is responsible for the collection, development, and reporting of Nokia's global facilities' related environmental data. The data comprises energy and water consumption, waste, discharges into water, use of ozone depleting substances (which are used in coolants and fire extinguishers), and VOC emissions to air. Based on energy consumption, direct and indirect carbon dioxide emissions are calculated and reported. Please, see p. 61.

During 2004 the global system of facilities' related environmental data collection was renewed and data collection scope expanded.

Risk management

Normal risk management procedures at Nokia cover environmental risks.

Product stewardship

Life cycle responsibility for products includes their packaging, transportation, and take-back and recycling at the end of the life cycle. Properly managed take-back of products and improved consumer information on the products' environmental performance have been stated focus areas during the past couple of years.

Packaging

Nokia has consistently worked to reduce the volume of packaging and to substitute reusable and recyclable materials for non-recyclable materials. In component deliveries from suppliers reusable packaging is used wherever possible.

In the European Union countries, Nokia has producer responsibility for its sales and transportation packaging. All producers pay a levy based on the volume and type of packaging material. Nokia has substituted fiber packaging for plywood in transport packages of base stations, resulting in a financial and environmental gain.

The packaging materials of mobile devices are selected on a global basis. The main packaging material is cardboard with some plastic inside the packages for customer and marketing reasons. The share of cardboard is 96 per cent measured by weight. It is also the main transportation packaging material.

Nokia has piloted the use of biodegradable plastics in consumer sales packages.

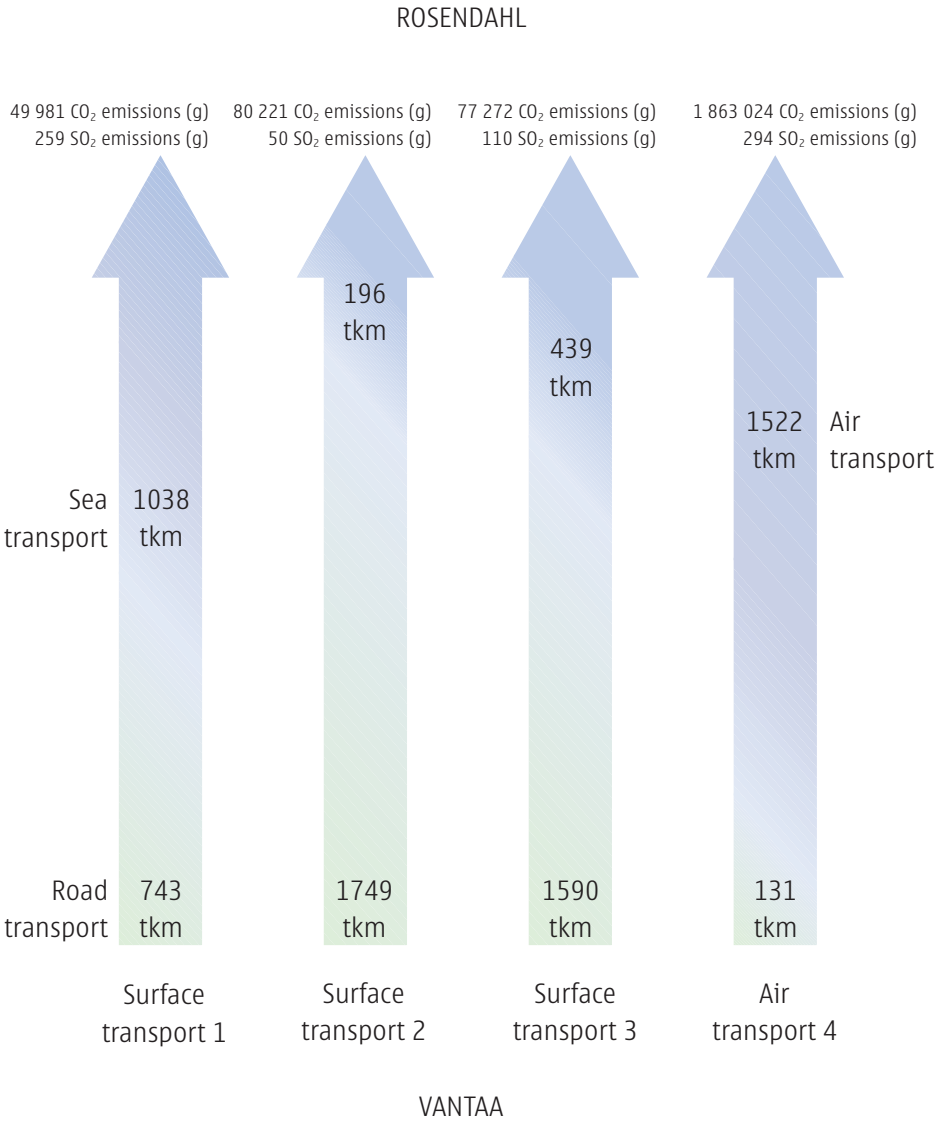
Transportation of products

The transportation of components from suppliers to Nokia's production sites and that of finished products to customers involves the burning of fossil fuels, which releases carbon dioxide into the atmosphere.

Nokia acknowledges the global importance of reduction in emissions of carbon dioxide, which are linked with climatic change, and is intensifying its cooperation with its logistical service providers. Together with them, Nokia is developing methods for reliably assessing the impact of logistics on the life cycle environmental impact of its products.

Business considerations promote eco-efficient transportation, which reduces both the costs and the impact on the environment.

An example of transportation alternatives



Environmental impacts of transportation depend on the chosen transportation alternative.

Consumer and user information

All new mobile phones come with an Eco Declaration that covers energy consumption, material use, packaging, batteries and chargers, and recycling. The aim is to simplify the technical descriptions into messages better addressing the average consumer.

Eco Declarations are available at
http://www.nokia.com/nokia/0,8764,49988,00.html

Nokia provides its network products with material declarations designed to help the users in recycling issues.

Take-back and recycling

There are significant differences between Nokia products with regards to the two end-of-life issues of take-back and recycling. Nokia has promoted the take-back of mobile devices in various ways, but in the end, the consumers make their own free decision on the matter. In contrast, take-back and recycling can be included in the contracts with network and Internet security equipment customers.

Legislation due to take effect in the near future in Europe will make producers of electrical and electronic equipment responsible for financing the collection and recycling of consumer equipment.

Recovery of products

For several years now, Nokia has offered a take-back service of its mobile phones and accessories through authorized Nokia Service and Care Centers globally. The phones collected have been forwarded to approved recyclers. Take-back channels outside Nokia's control include industry sector and municipal schemes and retailers.

The return rate of mobile phones is still quite low globally. Consumer studies confirm that people regard their mobile phone as a personal possession that they prefer to store at home rather than give away for recycling.

A market is emerging for second-hand phones. A major operator has estimated that 75 per cent of the phones that were recovered through various campaigns will be reused. Nokia does not carry out refurbishment business as a company and is not in favour of refurbishment over which it has no control. Nokia does not want the emerging markets to become a dumping ground for old technologies of the industrialized world. In Nokia's view, the more sustainable solution is to utilize the significant technological progress during the past decade and offer the emerging markets products that are optimized for these markets. The first such product was the Nokia 2100 which is a cost optimized phone based on the latest mobile technologies.

case

Where is your used mobile phone?

In Europe, only 10 per cent of used mobile phones are currently returned to service providers for recycling. Most of the old handsets are stored at home.

Accenture conducted a survey including 800 mobile phone users in 2003 in order to find out where the used mobile phones are going.

"More then 60 per cent are kept at home and 18 per cent have been handed on to someone else. A mobile phone can have even three users during its life cycle," says Manager **Jaana Järvinen** of Accenture.

At the moment, Nokia phones can be returned to Nokia's own Service Points or Care centers, collection points of the industry sector's take-back schemes, or to municipal collection. Also, operators are organizing campaigns for take-back. The mixture of take-back channels varies from country to country depending on the infrastructure and recycling culture. Only Nokia's own take-back channels are under Nokia control.

A forthcoming EU directive makes producers of electrical and electronic equipment partly responsible for the waste handling of this equipment in all EU member states. Studies indicated that the share of telecommunications equipment out of electronic scrap is about 1 percent.

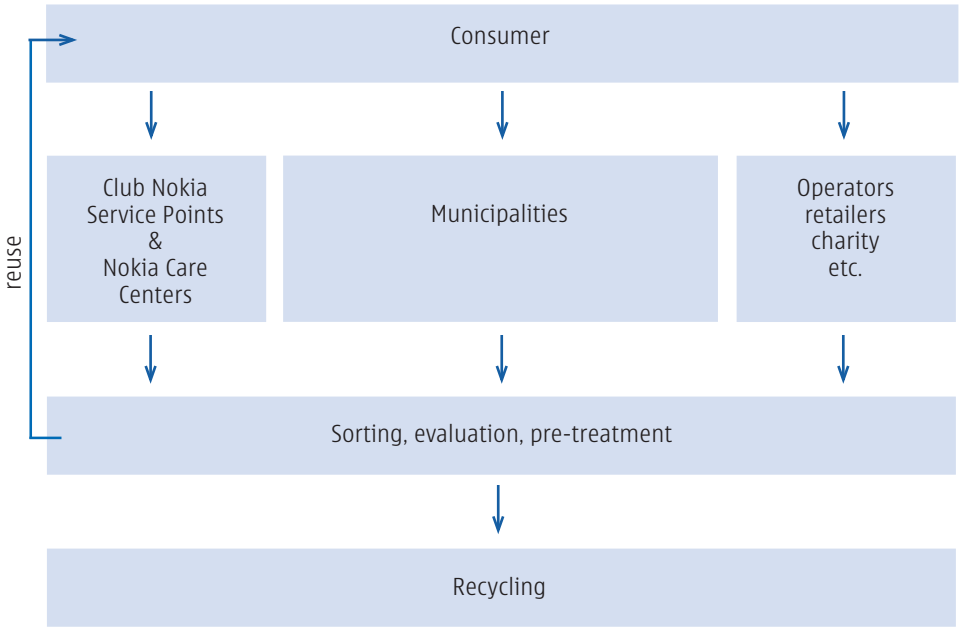
Nokia estimates the global market volume for mobile phones was around 471 million units in 2003. If the average weight of a phone is 130 grams, the total mass of the phones would be about 61 000 tons. The share of Nokia phones would be about 23 000 tons, which equals a single cargo shipment.

For the electronics companies, take-back and recycling add value. They support brand value and customer loyalty and inspire customer insights. They also demonstrate environmental responsibility and improve the bottom line.

The challenge faced in take-back programs will be how to make mobile phone users to do their share and return the used products for recycling. By bringing the used mobile to a take-back point the customers make sure that used phones will not end up in landfills in their own or other countries'. Instead, the recyclable raw materials can be used again in new products.

Equipment sold to network operators and enterprises are traceable, and recycling arrangements are often included in commercial contracts. Nokia has offered its network customers a take-back and recycling service since 1999. The service was renewed in 2004 to consist of four independent fee-based end-of-life services ranging from on-site removal and packaging to project management.

Take back of used mobile phones and accessories



Only a small percent of returned mobile phones are under Nokia's control.

Enterprise Solutions has organized the removal of disused equipment from customer sites and its delivery through reverse logistics to Nokia approved recyclers. It is currently a paid service to those who request it. The request can be made via Enterprise Solution's website, and the charge is collected by way of an on-time fee. All Enterprise Solutions equipment is delivered with recycling information and customers are reminded in various ways of recovery and recycling when the end of service life approaches. The logistics partner handles the removal and transportation of the equipment.

Recycling

Recycling is aimed at recovering the material and energy content of end-of-life products and ensuring safe treatment of substances that can cause harm to people or the environment if not properly disposed of.

The product recycling capability is a focus area in Nokia product design. Design decision on the material content and structural design of the product has a direct bearing on its recyclable capabilities and the ease of disassembly. Nokia provides its recyclers with product and recycling information. For example, the main parts of the latest mobile phones are clearly marked for recycling.

Nokia has a network of audited, Nokia approved recyclers in all business regions. Nokia has consistently monitored recyclers and different recycling arrangements, and an assessment tool has been developed for this purpose.

Recycling recovers value

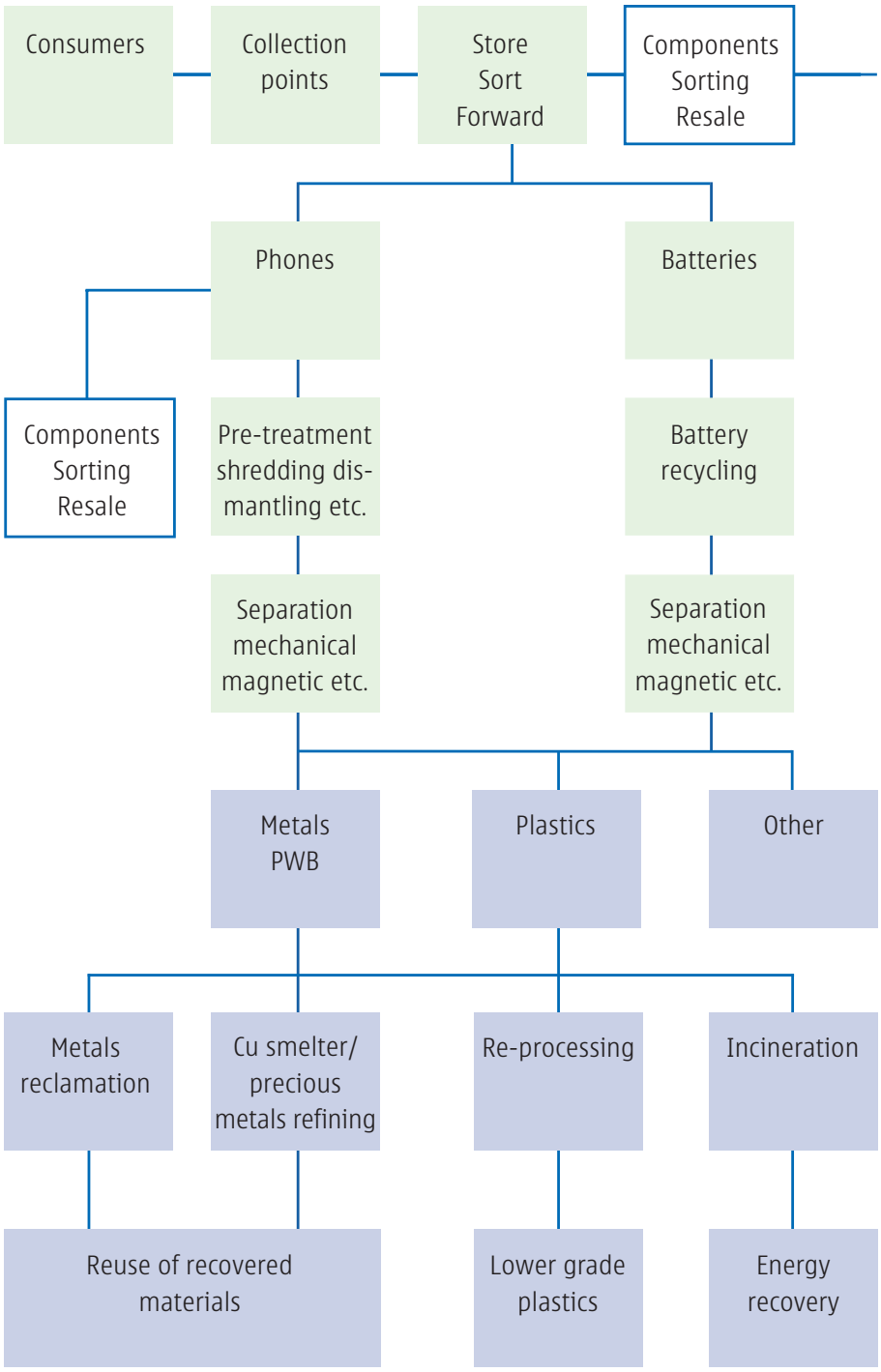
The recycling of both mobile phones and network equipment can be a good business proposition. The recovered value of the precious metals in the PWBs is considerable. In countries where commercial companies handle recycling, competition has considerably reduced recycling fees.

The recycling of mobile phones starts with the shredding of the phone, with the shredded metals and plastics then separated. Precious metal refining and copper smelting are used to recover the metals. As far as mobile phones are concerned, plastics and materials attached to metals can be utilized as fuel in the metal recovery processes.

The recycling rate of plastics has remained low. Different plastics would often require separate recycling, which is expensive in view of the value of products made of recycled plastic. Also, recovered plastics are often contaminated with impurities that can cause problems in the molding process.

> “To support environmentally sustainable product End-of-Life Practices, we continue to offer a comprehensive service to our customers for the take-back and recycling of their obsolete electronic and electrical equipment. We are committed to supporting our customers in providing environmentally sustainable communications technology, over the whole life-cycle of the networks.”
>
> **Simon Beresford-Wylie**
> Executive Vice President and General Manager
> Networks, Nokia

Recycling mobile phones



In the recycling process the substances contained in the mobile phone are recirculated to the economic system.

Producer responsibility

When the EU's Directive on Waste Electronic and Electrical Equipment (WEEE) is implemented in the member countries in August 2005, Nokia as well as all other producers and importers of electronic products for household consumers will have financial responsibility for environmentally sound handling and recycling of these products. National legislation, setting the final requirements in each member state, was available for only a few countries at the end of 2004. Nokia has experience in the implementation of EU producer responsibility concerning packaging materials.

The take-back and recycling of household electrical and electronic equipment will be organized in different ways in different EU countries. Nokia follows the development, and its policy is to join the national schemes.

Meanwhile, Nokia continues its own take-back service of mobile devices and accessories through authorized Nokia repair shops globally. The Nokia Recycling Map on Nokia's external web-site www.nokia.com/environment gives simply accessible and concrete advice to consumers about their nearest Nokia mobile devices and accessories collection point.

> "One key challenge for the mobile phones industry is to ensure an effectively organized and environmentally sound end-of-life treatment for our products. We will continue our efforts in developing efficient and environmentally sound end-of-life treatment practices for our products in each geographical region."
>
> **Olli-Pekka Kallasvuo**
> Executive Vice President and General Manager
> Mobile Phones, Nokia

case

Closing the loop for cobalt

Recycling and using the same raw material again and again for the same purposes brings cost savings and reduces environmental impact. Cobalt, a dominant material in Lithium-Ion (Li-ion) batteries, is well suited for closed re-circulation.

Nokia's Technology Platforms has studied the use of cobalt of Li-ion batteries for closed loops.

"Li-ion batteries are collected or recycled not because of their hazardous nature but because of the precious metal content", says Senior Research Engineer **Pia Tanskanen** of Nokia Research Center.

"A battery contains about 32 per cent cobalt compounds by weight. And as cobalt is a rare, precious metal and there are only few suppliers of it in the world, it makes sense to close the loop and use the metal over and over again."

The critical factor for cobalt reuse is to get the used batteries returned for recycling. Customers do not appear interested in battery technologies as such, but rather look for easy take-back options.

For producers two separate flows of handsets and batteries and manual sorting of different batteries increase cost. "The environmental risk of end-of-life batteries is related to improper incineration or leaching from the landfill", says Pia. "Getting batteries recycled by responsible recyclers helps to protect the environment." ■

Nokia's environmental milestones

Nokia's environmental work is based on continuous improvement

1980's
Nokia fulfilling legal requirements

1991
Nokia signs International Chamber of Commerce's Business Charter for Sustainable Development

1993
Eco-label for Nokia monitors

1994
Nokia Environmental Policy published

1997
Environmental page in Annual Report

Take-back pilot in UK and Sweden

1998
First ISO 14001 certified Environmental Management Systems

Nokia and the Environment publication

Induction video

2000
Nokia joins World Business Council for Sustainable Development

Nokia as component to Dow Jones Sustainability Index

Nokia signs the EU's voluntary Code of Conduct on Efficiency of External Power Supplies

European Quality Award

All Nokia's manufacturing units ISO 14001 certified

2001
Nokia again to Dow Jones global and European Sustainability Indexes and to FTSE4 Good

Nokia subscribes to Global Compact

Implementation of Nokia Materials Database, NOMAD

2002

Nokia subcribes to the Sustainable Partnership on the Environmentally Sound Management of End-of-Life Mobile Phones Initiative

First Environmental Award granted as a part of Nokia Quality Award

Nokia in Dow Jones Sustainability Indexes, FTSE4Good

New mobile phones equipped with Eco Declarations

2003
Nokia in Dow Jones Sustainability Indexes (DJSI and DJSI STOXX)

DJSI STOXX nominated Nokia as leader among its listed technology sector companies

Nokia in FTSE4Good

Mobile phone Eco Declarations available on Nokia's Internet site

Three-year global cooperation agreement signed with WWF

2004
Integrated Product Policy pilot with European Union

RosettaNet information-exchange solution into use

Nokia came in first place for the second year running in the Dow Jones Sustainability Index European Technology and Global Communications Technology categories.

Environmental data

Energy consumption	2004 * GWh	2004 * GJ	2003 GWh	2003 GJ	2002 GWh	2002 GJ	2001 GWh	2001 GJ	2000 GWh	2000 GJ
Energy, total	770	2 770 000	713	2 566 800	690	2 484 713	693	2 496 384	564	2 030 400
Americas	148	533 000	134	482 400	111	401 065	113	408 060	91	327 600
Asia-Pacific	124	447 000	99	356 400	106	382 118	97	384 516	54	194 400
Europe & Africa	498	1 790 000	480	1 728 000	473	1 701 529	483	1 739 808	419	1 508 400
Electricity, total	603	2 170 000	540	1 944 000	528	1 901 516	532	1 914 480	412	1 483 200
Americas	130	468 000	116	417 600	106	382 230	105	378 720	81	291 600
Asia-Pacific	109	392 000	85	306 000	88	316 128	92	330 120	48	172 800
Europe & Africa	363	1 310 000	339	1 220 400	334	1 202 958	335	1 205 640	283	1 018 800
District heating, total	94	338 000	102	367 200	104	376 189	116	415 800	104	374 400
Americas	0	0	0	0	0	0	0	0	0	0
Asia-Pacific	0	0	0	0	0	0	0	0	0	0
Europe & Africa	94	338 000	102	367 200	104	376 189	116	415 800	104	374 400
District cooling, total	2.4	8 480								
Americas	0	0								
Asia-Pacific	0.4	1 300								
Europe & Africa	2	7 180								
Gas, total	69	250 000	67	241 200	57	206 215	40	144 720	34	122 400
Americas	17	63 000	17	61 200	5	18 515	6	20 520	1	3 600
Asia-Pacific	13	47 000	14	50 400	18	65 318	4	13 680	4	14 400
Europe & Africa	39	140 000	36	129 600	34	122 382	31	110 520	29	104 400
Oil, total	2	7 100	1	3 600	0	792	6	21 384	14	50 400
Americas	0.1	270	0.9	3 240	0	320	2	8 820	9	32 400
Asia-Pacific	1.4	5 200	0.1	360	0	472	1	4 716	2	7 200
Europe & Africa	0.5	1 630	0	0	0	0	2	7 848	3	10 800

Direct CO_2 emissions	2004 (tons) *	2003 (tons)	2002 (tons)	2001 (tons)	2000 (tons)
CO_2, total	14 445	13 600	11 600	9 800	10 400
Americas	3 506	3 700	1 100	1 500	2 600
Asia-Pacific	3 010	2 800	3 700	1 500	1 300
Europe & Africa	7 929	7 100	6 800	6 800	6 500

Indirect CO_2 emissions	2004 (tons) *	2003 (tons)
CO_2, total	189 640	168 285
Americas	52 280	44 266
Asia-Pacific	25 119	11 001
Europe & Africa	112 241	113 018

VOC emissions to air	2004 *
Total, kg	33 345

Environmental data

Water	2004 (m3) *	2003 (m3)	2002 (m3)	2001 (m3)	2000 (m3)
Water, total	1 281 500	1 050 449	1 163 000	1 138 000	754 000
Americas	465 400	347 593	388 000	516 000	229 000
Asia-Pacific	402 846	335 838	427 000	286 000	267 000
Europe & Africa	413 254	367 018	348 000	336 000	258 000

Discharges to water	2004 (tons) *	2003 (tons)	2002 (tons)	2001 (tons)	2000 (tons)
BOD5	333	306	316	323	362
TSS	440	404	418	426	477
N	53	49	51	52	58
P	13	12	13	13	14

Waste	2004 (tons) *	2003 (tons)	2002 (tons)	2001 (tons)	
All waste, total	27 072				
Solid waste, total	26 605	25 600	24 600	26 200	
Americas	6 133	7 860	6 900	9 200	
Asia-Pacific	3 734	2 900	3 200	3 200	
Europe & Africa	16 738	14 840	14 500	13 800	
Recovery rate %	84	78	76	67	
Other waste ,total	467				
Americas	70				
Asia-Pacific	21				
Europe & Africa	376				
Recovery rate %	71				

Use of ODS	2004 *	2003	2002	2001	2000
ODP, total	139	54	59	45	20

Environmental data in relation to net sales	2004 *	2003	2002	2001	2000
Net sales (EURm)	29 267	29 500	30 016	31 191	30 376
Energy consumption (GJ/ EURm)	95	87	83	80	67
Direct CO_2 emission (tons/EURm)	0.49	0.46	0.39	0.31	0.34
Water consumption (m^3/EURm)	44	36	39	37	25
Solid waste (tons/ EURm)	0.91	0.87	0.82	0.84	
Total waste (tons/ EURm)	0.92				
Use of ODS (ODP kg/ EURm)	0.005	0.002	0.002	0.001	0.001

Notes:

* Data collection scope expanded in 2004 to cover all buildings and sites of over 3000 sqm. The figures of 2004 are thus not directly comparable with previous years.

- The increase of regional and global consumption figures/amounts is mainly due to the increased number of buildings included in the reporting scope, and partly also due to the increased production volume and increased number of employees.
- Overall electricity consumption shows little change and included, among other things, the impact of increased 3G testing.
- Oil is used for production of reserve power.
- Higher total water consumption is mainly due to a significant increase in water consumption in Americas. A project to investigate the reasons for this will be started during 2005.
- In general the reported total waste amount has increased due to the increase in production volume and headcount as well as expanded data collection scope.
- Other waste includes fractions that are considered separate from solid waste streams because of their specific nature.
- In all regions the recovery rate is higher than in previous year.
- Nokia uses no ODS in its products or production. The reported ODS figures are due to ODS contained in cooling systems in facilities.
- The collection systems and metrics are under further development.

Definitions and abbreviations

BASE STATION
Fixed transceiver (transmitter and receiver) equipment used for communicating with mobile phones in a mobile network. A base station may cover one or more cells or a part of a cell of the network.

DEMATERIALIZATION
An environmental term, which means that less material is needed to create better products. Mobile phone manufacturing is a good example of this: years ago, a portable phone that may have weighed 15 kilograms delivered an indifferent talk-only service. Today, mobiles weighing just less than 100 grams can provide a variety of high-speed, high-quality digital services including voice, text messages, fax, and the Internet.

DfE
Design for Environment systematically integrates environmental considerations into the design of products, processes, and services.

EICTA
European Information, Communications, and Consumer Electronics Technology Industry Association

EMS
Environmental Management System

EoL
End-of-Life

GRI
Established in 1997, the mission of the Global Reporting Initiative is to develop and disseminate globally applicable Sustainability Reporting Guidelines for voluntary use by organizations reporting on economic, environmental, and social dimensions of their activities, products, and services. The GRI's Sustainability Reporting Guidelines, released in June 2002, have served as a guide in the drawing up of this report.

HAZARDOUS WASTE
Waste, or combination of wastes, which because of its quality, or physical, chemical, or infectious characteristics, may cause or significantly contribute to an increase in serious irreversible, or incapacitating reversible illness, or pose a substantial present or potential hazard to human health, safety, or to the environment when improperly treated, stored, transported, used or disposed of, or otherwise managed (the formulation varies from country to country).

ICC
International Chamber of Commerce

IMMATERIALIZATION
A term used to describe how technology can supplant the need for physical products by replacing them with services. For example, downloading a video over the Internet can save a journey to the video shop. Equally, network services can dispense with the need for a telephone answering machine.

ISO 14001
International Organization for Standardization's standard for Environmental Management Systems, including specification and guidance for use.

LCA
Life Cycle Assessment is an objective process for the evaluation of environmental burdens associated with a product, process, or activity by identifying and quantifying energy and materials used and wastes released to the environment. LCA is a tool for the evaluation of opportunities for environmental improvements.

LIFE CYCLE
The life cycle of a product begins with the acquisition of raw materials and includes the processing of bulk materials, production of engineered materials, manufacture, use, retirement, disassembly, and disposal of residuals produced in each stage.

NGO
Non-governmental organization

RoHS
The European Union's Directive on the Restriction of the use of certain Hazardous Substances in electrical and electronic products.

VOC
Volatile organic compounds

WEEE
The European Union's Directive on Waste Electrical and Electronic Equipment makes the producer responsible for financing the take-back and recycling of its products.

It should be noted that certain statements herein which are not historical facts, including, without limitation, those regarding:

A. the timing of product and solution deliveries;
B. our ability to develop, implement and commercialize new products, solutions and technologies;
C. expectations regarding market growth, developments and structural changes;
D. expectations and targets for our results of operations;
E. the outcome of pending and threatened litigation; and
F. statements preceded by "believe," "expect," "anticipate," "foresee","target" or similar expressions are forward-looking statements.

Because these statements involve risks and uncertainties, actual results may differ materially from the results that we currently expect. Factors that could cause these differences include, but are not limited to:

1. the extent of the growth of the mobile communications industry and the new market segments in which we have recently invested;
2. price erosion;
3. timing and success of the introduction and roll-out of new products and solutions;
4. competitiveness of our product portfolio;
5. our failure to identify key market trends and to respond timely and successfully to the needs of our customers;
6. the impact of changes in technology and the success of our product and solution development;
7. the intensity of competition in the mobility industry and changes in the competitive landscape;
8. our ability to control the variety of factors affecting our ability to reach our targets and give accurate forecasts;
9. the availability of new products and services by network operators and other market participants;
10. general economic conditions globally and in our most important markets;
11. our success in maintaining efficient manufacturing and logistics as well as the high quality of our products and solutions;
12. inventory management risks resulting from shifts in market demand;
13. our ability to source quality components without interruption and at acceptable prices;
14. our success in collaboration arrangements relating to technologies, software or new products and solutions;
15. the success, financial condition, and performance of our collaboration partners, suppliers and customers;
16. any disruption to information technology systems and networks that our operations rely on;
17. our ability to have access to the complex technology involving patents and other intellectual property rights included in our products and solutions at commercially acceptable terms and without infringing any protected intellectual property rights;
18. our ability to recruit, retain and develop appropriately skilled employees;
19. developments under large, multi-year contracts or in relation to major customers;
20. exchange rate fluctuations, including, in particular, fluctuations between the euro, which is our reporting currency, and the US dollar, the UK pound sterling and the Japanese yen;
21. the management of our customer financing exposure; and
22. the impact of changes in government policies, laws or regulations; as well as
23. the risk factors specified on pages 12-22 of the company's Form 20-F for the year ended December 31, 2004 under "Item 3.D Risk Factors."