



The market for environmentally sound technologies is growing at 5 per cent every year and will be worth US\$300 billion per annum by the year 2000.

# A bridge to sustainable development

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*Environmentally sound technologies (ESTs) are a key tool for implementing Agenda 21 – and the fast growing market for both end-of-pipe and cleaner production technologies confirms that industries and companies are taking up the challenge, with some impressive results. But, as the United Nations General Assembly Special Session (UNGASS) in June 1997 confirmed, serious environmental problems remain – and there are still major barriers preventing the wider adoption of ESTs, especially in developing countries. These obstacles need to be removed before significant progress can be achieved.*

Agenda 21 emphasizes the importance of environmentally sound technologies (ESTs). They “protect the environment, are less polluting, use all resources in a more sustainable manner, recycle more of their wastes and products, and handle residual wastes in a more acceptable manner than technologies for which they are substitutes”. Agenda 21, adopted at the United Nations Conference on Environment and Development in Rio de Janeiro in 1992, also called on governments and other players to develop new funding mechanisms to accelerate the transfer of ESTs from the ‘haves’, mainly in the industrialized countries, to the ‘have nots’, chiefly in the developing world. And it underlined the point by urging business leaders to give environmental management “the highest priority” in the move towards sustainable industrial practices, calling on business and industry to “develop techniques and technologies that reduce harmful environmental impacts”. Agenda 21 also stressed that “new and efficient technologies will be essential to increase the capabilities, in particular of developing countries, to achieve sustainable development, sustain the world’s economy, protect the environment, and alleviate poverty and human suffering”.

The five years since Rio have seen noticeable progress on these issues. In its *Global*

*Environment Outlook 1997* (GEO-1), for example, UNEP reported “significant progress”, with several countries achieving “marked progress” in curbing environmental pollution and reducing the intensity of resource use. At the same time, the rate of environmental degradation in several developing countries has been slower than in industrial countries at a similar stage of economic development. The wider use of ESTs and cleaner production approaches have contributed significantly to these improvements.

Overall, however, the UNEP report states that “progress towards a global sustainable future is just too slow, and the necessary sense of urgency is lacking”. Serious environmental problems persist. The critical ones, according to the World Bank, are water pollution, air pollution, severe land degradation and atmospheric changes. These problems affect urban areas in particular: making cities sustainable would contribute enormously to global sustainable development. In addition, according to UNEP, “current patterns of energy use require drastic changes” while modern farming practices are also exacting a heavy price on the planet’s resources.

The United Nations General Assembly Special Session (UNGASS), held in June 1997, was equally trenchant in its analysis. “Significant environmental problems remain



## PEOPLE REACHING OUT

Twenty-five years ago, a group of Nortel (Northern Telecom) executives crafted a statement they called the “Spirit” of Nortel: “People reaching out to meet the challenge of bringing the world together through communications – all in the spirit of leadership, innovation, dedication and excellence.” In keeping with this core company ideology, we at Nortel have been reaching out over the past decade to meet the challenge of bringing the world closer to sustainability.

Nortel designs, builds and integrates digital networks for customers in the information, communication, entertainment, education, and commerce markets. With headquarters in Canada, Nortel works with customers in more than 150 countries around the globe. We create telecommunications solutions that enable nations and businesses to access the precious commodities of experience and information that can fuel development without harming the environment.

At the same time, we know that our business activities impact on the environment: we use energy, raw materials and chemicals, and generate wastes. We’ve come to understand that actions taken to protect and enhance the environment not only benefit the communities in which we work and live, but also contribute to customer value and employee satisfaction, help us strengthen relationships with suppliers, and lead to improved shareholder value.

In the early 90s, a network of dedicated Nortel employees redesigned our technology and processes to help Nortel become the first multinational company in the electronics industry to end the use of ozone-depleting CFC-113 solvents. The project clearly contributed to shareholder value – we spent \$1 million on research and development, but saved about \$4 million in the three-year project period alone.

In the years that followed we devoted substantial time and energy to sharing our CFC experience. Between 1992 and 1995, Nortel played a lead role in World Bank-supported technology cooperation projects in Mexico, India, China, Turkey and Viet Nam, collaborating with local governments and the International Cooperative for Environmental Leadership. Although we believe this activity is part of our social responsibility as a global corporate citizen, our reasons for sharing are not just altruistic. Technology cooperation helps to build brand image, goodwill and strong relationships with customers in emerging markets.

We are now reaching out to key stakeholders – customers, employees, suppliers, and the communities in which we have a presence – to develop new environmental initiatives that contribute to business success.

We are learning that several environmental activities clearly help the company deliver superior value to customers. Initiatives such as product recovery, packaging reduction and the development of environmentally preferable products such as lead-free phones matter to our customers. We’re collaborating with customers on projects aimed at minimizing the environmental impacts of our products throughout their life cycles. We’re also entering into innovative supplier arrangements that provide incentives to reduce the use of harmful chemicals.

Like other large global corporations, Nortel has a substantial base of committed employees, scientific expertise and significant influence. By mobilizing these resources and reaching out to stakeholders, we’re trying to ensure that economic development and environmental protection go hand in hand.

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deeply embedded in the socio-economic fabric of nations in all regions”, it stated. Despite some progress, “overall trends are worsening” and “remain unsustainable”, with the result that “increasing levels of pollution threaten to exceed the capacity of the global environment to absorb them, increasing the potential obstacles to economic and social development in developing countries”.

A particular problem area is the transfer of technologies to developing countries. As the United Nations Department of Public Information reported before UNGASS, while “some progress has been made through the United Nations on improving information about new technologies and encouraging financing partnerships in developing countries, many countries continue to be marginalized from private sector investment and the technologies it can bring”. However, UNGASS failed to make any significant headway on this issue.

As a result, many industries and companies in the developing countries (including those industrializing at a very rapid rate) are not supporting ESTs, even though they are indispensable tools for industry to use to move towards sustainable development. This is vital because Agenda 21 will only be implemented if industry worldwide uses fewer natural resources and progressively reduces pollution and waste from its processes and products.

### A wide range

What are ESTs? They cover a wide range of process and product technologies. Some, such as solar energy photovoltaics, fibre-optic devices, electric or ultra fuel-efficient vehicles, and biotechnology-based solutions, are available now, but are not yet economical enough to be commercially applied on a wide scale. In time, these and other emerging technologies will transform both production and consumption patterns, drive much of industry towards sustainable production, and eventually move

some industrial sectors to the goal of zero emissions.

But the crucial point is that, meanwhile, many other ESTs, both end-of-pipe and prevention technologies, are already available to achieve significant, sometimes dramatic, environmental improvements. Cleaner production technologies focus on achieving process and product change both to reduce pollution and also to prevent it occurring in the first place. End-of-pipe ESTs are more limited in scope, but they do control and reduce waste and emissions, as well as clean up pollution after it has happened. There is now a paradigm shift taking place towards the cleaner production approach. As Agenda 21 makes clear, ESTs “are not just individual technologies, but total systems which include know-how, procedures, goods and services, and equipment as well as organizational and managerial procedures”.

### Growing use

Industry worldwide, though mainly in the industrialized countries, is using ESTs on a wider scale. One measure – and it is only one measure – is that the global market for environmental products such as water and wastewater treatment, waste management and recycling, air pollution control, noise reduction systems and services, is growing fast. It is increasing by around 5 per cent every year and is set to reach, conservatively, an annual total of US\$300 billion by the year 2000. The United Nations Development Programme (UNDP) projects the global compliance market (including ESTs required to meet mandatory environmental standards) to reach US\$500 billion a year by 2000. It forecasts that the future global market for environmental investments will expand to US\$300-600 billion annually for pollution control, a total of US\$1 trillion for power from 1993 to 2000, and a total of US\$250 billion for energy conservation over the next 20 years.

What is difficult to calculate from these figures is the split between end-of-pipe and cleaner production technologies, although at the moment the market for the latter is certainly much smaller. While end-of-pipe ESTs do help to reduce emissions, they are transitional rather than longer-term technology and should be used in conjunction with cleaner production approaches. Eventually, cleaner production processes should take over and completely replace end-of-pipe technologies. Nonetheless, the market growth in ESTs does show that industry is moving to tackle environmental pollution problems.

This market for ESTs has grown for two main reasons.

- Companies have been required to meet increasingly strict regulatory rules, national regulations and international treaties for pollution and waste reduction. For many companies, the first step has been to use end-of-pipe technologies, which is a short-term and expensive solution. The ultimate goal should be to move beyond this and use cleaner production processes.
- Many corporate leaders, accepting that sustainable development is an integral part of the business agenda, have moved proactively to improve their companies' environmental performance without waiting to be mandated to do so. More and more companies have recognized that minimizing, better still eliminating, undesirable harmful effluents, emissions and wastes, improves their performance both environmentally and economically. An emphasis on technological innovation has been a feature of this approach.

This last point is proving an increasingly important factor, for there is abundant evidence of the considerable financial benefits from using ESTs from companies themselves. The return on the investment has been significant and, as the World Business Council for Sustainable Development says, companies that

introduce new technology to improve environmental performance before mandated to do so by regulations cut costs and boost competitiveness.

### Impressive results

Thanks to ESTs, industry has been improving, and continues to improve, its environmental performance. For example, the industrialized countries have achieved major environmental quality gains during the past 20-25 years at a time when their economies have grown by 80 per cent. The industrialized countries account for 80 per cent of the market for environmental products. The cost has been 0.8 to 1.5 per cent of gross domestic product (GDP), borne equally by the private and public sectors. The fact that many environmental problems remain, and in some cases are worsening, takes nothing away from what industry has achieved, but it does underline how much more still has to be done.

The Organisation for Economic Co-operation and Development (OECD) says that one lesson from the progress achieved is that "many of the environmentally sound technologies and practices developed in the industrialized countries can be adapted to the needs of the developing countries". They need to be because achieving sustainable economic growth in the developing countries poses an increasingly formidable challenge.

### Main needs

There are several pressing requirements if further progress is to be achieved:

- to develop and commercialize new, advanced ESTs;
- to continue the shift from end-of-pipe approaches to cleaner production and eco-efficiency – that is, to move faster from pollution control to pollution prevention;
- to accelerate the knowledge and adoption of both new and existing ESTs throughout

industry, in the industrialized world and, in particular, in the developing countries;

- to make the policy changes that will support the wider use of ESTs at the national and local level;
- to support the development of local ESTs.

As the UNEP GEO-1 report states: “Appropriate technological improvements, which result in more effective use of natural resources, less waste, and fewer pollutant by-products, are required in all economic sectors. Truly global availability and worldwide application of best available and appropriate technology and production processes need to be ensured through the exchange and dissemination of know-how, skills and technology, and through appropriate finance mechanisms.”

## Barriers

The UNEP report highlighted two of the main barriers to accelerating the use of ESTs: lack of knowledge about the existence of commercially available technologies and the benefits they bring; and lack of financial resources to get them where they are needed. A third important barrier is the lack of political action to create the right framework conditions for industry. While some governments are now using a mix of command-and-control policies and market-based incentives to push industry faster towards cleaner, more resource-efficient production, actual delivery on the political commitments made in Rio has, generally, fallen far short of what was promised.

The first two barriers apply particularly to developing countries though they are also a concern to small and medium-sized enterprises (SMEs) in many industrialized economies. The third relates to both developing and industrialized countries because there is a direct cause and effect between government policies and industry actions to improve environmental performance. There is no doubting the crucial role that government has in encouraging a faster take-up

of ESTs as part of its move to promote sustainable development.

## Unfinished agenda

The June 1997 UNGASS was held to review progress on the implementation of Agenda 21. Technology transfer and financing developing countries’ needs were among the issues examined without any conclusive results. For example, the meeting simply repeated that industrialized countries should reach the United Nations target of spending 0.7 per cent of their GDP on official development assistance (ODA) “as soon as possible”, even though the average level of ODA fell to 0.25 per cent of GDP in 1996. There were no specific commitments by the industrialized countries to reverse the decline.

UNGASS did approve a 129-point programme designed to guide further implementation of Agenda 21, and also endorsed a six-paragraph ‘statement of commitment’ as a preamble. This emphasized that the comprehensive implementation of Agenda 21 is “more urgent now than ever” and committed governments to ensure more progress will be achieved by 2002 when Agenda 21 is reviewed again.

In this report, UNGASS acknowledged the “urgent need” for developing countries to acquire greater access to ESTs, and urged the international community to “promote, facilitate and finance, as appropriate, access to and the transfer of ESTs and corresponding know-how, in particular to developing countries, on favourable terms, including on concessional and preferential terms, as mutually agreed”.

“Much of the most advanced environmentally sound technology is developed and held by the private sector. Creation of an enabling environment, on the part of both developed and developing countries, including supportive economic and fiscal measures, as well as a practical system of environmental regulations and compliance mechanisms, can

“ Now that we are all walking together on the right path, we must accelerate our pace ”

Carlos Saúl Menem,  
President of Argentina

“ The emphasis must shift from process to outcome ”

Robert Hill,  
Minister of Environment, Australia

“ Developing countries cannot and should not follow the same old development patterns of developed countries in “pollution first, treatment later”, but take the road of sustainable development right from the initial stage of development ”

Song Jian, State Councillor, China

“ Now we must go from Rio to results. We must aim for measurable results and report on our progress. For our children and grandchildren, we have an obligation to create a healthier, cleaner world ”

Jean Chrétien,  
Prime Minister of Canada

“ It is imperative for the developed countries to mobilize new, additional financial resources to the developing countries, and there must also be the transfer of environmentally sound technologies on concessional and preferential terms ”

Carlos Lemos-Simmonds,  
Vice President of Colombia

help to stimulate private sector investment in and transfer of environmentally sound technology to developing countries. New ways of

financial intermediation for the financing of environmentally sound technologies, such as ‘green credit lines’, should be examined.”

UNGASS applauded public-private partnerships, within and between developed and developing countries, as “essential for linking the advantages of the private sector (access to finance and technology, managerial efficiency, entrepreneurial experiences and engineering expertise) with the capacity of governments to create a policy environment conducive to technology-related private sector investments and long-term sustainable development objectives”.

It urged governments and international development institutions to bring together companies from developed and developing countries to create “sustainable and mutually beneficial business linkages”, and also urged governments of developing countries to strengthen South-South cooperation for technology transfer and capacity building, including setting up sector-specific regional centres. It further called for attention to be given to technology needs assessment as a tool for governments to identify a portfolio of technology transfer projects and capacity-building activities to “facilitate and accelerate the development, adoption and diffusion of ESTs in particular sectors of the national economy – as well as ... a tool for evaluating the technologies themselves”.

The special session also added several new items to the sustainable development agenda, including a global sustainable energy policy (to be a focus of future work by the United Nations Commission on Sustainable Development) and eco-efficiency. On this, UNGASS said that action to change unsustainable consumption and production patterns should include considering proposals for improving energy and materials use efficiency in industrialized countries by a factor of ten in the long term, and by a possible factor of four in the next two to three decades. Achievement of either goal will require the adoption of ESTs.

Some concerns were expressed following

### BOX 1.1

## *ISO 14001 – a major driving force?*

The new ISO 14001 standards for environmental management may encourage moves to environmentally sound technologies (ESTs) in due course – although opinions vary over this.

ISO 14001 aims to improve overall environmental performance in industry worldwide, harmonize national and regional standards to reduce the likelihood that they can be used as trade barriers, and cover such areas as the use of raw and waste materials, internalizing and accounting of environmental costs, reducing emissions and – significantly – the transfer and implementation of ESTs worldwide.

However, ISO 14001 is more about production than technology and there is some debate about the impact that the standards will have on the use and transfer of ESTs. In fact, they could be more of a barrier to new technologies because often the goal is certification, not environmental improvement. The one thing ISO 14001 does not do as yet is provide a ‘how to’ method for improving performance: ISO 14001 provides a systemized way of giving companies assurances that a system is in place to manage and enhance environmental effects. Some observers maintain that the standards are unlikely to have an immediate effect on emissions and wastes, or raw materials’ use – and while some improvements are likely to come about, this is not guaranteed by ISO 14001 certification.

But the United Nations Commission on Sustainable Development (CSD) says that governments may promote ISO 14001 participation through fiscal and market policies, while financial institutions may promote the transfer of ESTs by offering better financial terms to ISO 14001 certified companies. “The standards will have an immediate effect on the amount of emissions and wastes being produced, as well as towards the optimization in the use of raw materials in both developed and developing countries, as their industries attempt to meet ISO 14001 certification.”

The CSD adds: “The expected accelerated growth in EST transfer and use must be dealt with by improving awareness of the problems, and improving preparedness of governments, international organizations, financial institutions and industry groups to better attend to the need developing as a result of ISO certification. Policy measures have to be taken to help make the adaptation process at national level less ‘traumatic’, and thus promote the development, transfer, use and diffusion of ESTs.”

UNGASS that developing countries may be losing interest in the concept of sustainable development, partly because of their frustration



## TELECOMMUNICATIONS – a key to sustainable development

Sustainable development demands reducing the use of energy, raw materials and transport, as well as waste and pollution. Telenor AS is contributing to this goal by providing telecommunications products and services to replace energy and resource-demanding activities.

Our core products are:

- Electronic post ('bits instead of atoms')
- Telephone meetings/picture telephones and video conferences
- Telephone commuting
- Telephone banking/shopping
- Telephone medicine
- Electronic information
- Remote teaching

Telenor – a government-limited company with an annual turnover of £2.3 billion, one of Norway's largest businesses and a market leader in telecommunications, computer services and media arrangements – is bringing those products to international markets.

- In Bangladesh, as a major shareholder in Grameen Phone, we will be the first GSM operator in the country to offer services which will enable people in 40,000 villages to be able to call neighbouring villages for commercial information.
- In Bosnia, we were assigned by the telecom and broadcasting authorities to carry out

two projects aimed at rebuilding basic infrastructure in the country.

- In Eritrea, we have updated network plans for the cities of Massawa and Keren and assisted Telecom Services of Eritrea in preparing tender documents for the procurement of cables and turnkey outside plant installation work.
- In January 1997, we signed a contract with the United Nations Development Programme (UNDP) to provide INMARSAT services.

Telenor is also working to reduce the influence of its own activities on the environment. We have developed Telenor Agenda 21 and our plans for 1997-2000 are in the process of being finalized.

Environmental plans for our vehicles have been completed and a strategic waste plan is in preparation. All 18,500 Telenor employees have been given their own environmental handbook explaining the procedures that need to be followed.

Sustainable development is a long-term perspective. It will require, among other things, more democracy and participation. Information is critical to this. Telenor is playing an important role in expanding the information society globally.

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at the failure to get stronger financial commitments from industrialized countries, and partly because their focus is on classic economic growth. If this does turn out to be the case, it augurs ill for introducing ESTs at a faster rate in developing countries, even if the funding issues can be overcome. In many developing countries, legislation mandating environmental standards is either non-existent or weakly enforced. If governments lose enthusiasm for environmental protection, there is the risk that companies will be under even less pressure to adopt ESTs.

The outcome of the Third Conference of the Parties to the United Nations Framework Convention on Climate Change, held in Kyoto, Japan, in December 1997, was also disappointing in many respects. Industrialized countries agreed to reduce their greenhouse gas emissions by an overall 5.2 per cent from 1990 levels by 2008-2012, but this was less than the European Union (EU) and some governments had proposed originally. However, the agreement does cover six gases: carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride, while initially only the first three were to be included. Although the Kyoto agreement does not detail specific policies and measures for reducing greenhouse gas emissions, it does say that each industrialized country is to “implement and/or further elaborate policies and measures in accordance with its national circumstances”. These should include:

- enhancement of energy efficiency;
- promotion of sustainable agriculture;
- promotion, research, development and increased use of new and renewable forms of energy, and “advanced and innovative environmentally sound technologies”.

As the *Earth Negotiations Bulletin* commented after the meeting: “It is the economic engine rooms of the world – the United States, Japan and Europe – who have built their power-

bases on unsustainable technologies and who must now lead the world in reversing the trends they have led.” Despite its shortcomings, the Kyoto agreement could provide an important fillip for the promotion and adoption of ESTs. A post-Kyoto study said that Germany would meet its greenhouse gas emissions reduction targets if, among other measures, it increased subsidies for renewables and energy efficiency improvements.

In summary, much has been achieved but much more still needs to be accomplished. Agenda 21 is not yet half completed. Certainly, there will be continuing progress. New driving forces such as the ISO 14001 standards, international environmental agreements (such as the Montreal Protocol on Substances that Deplete the Ozone Layer and the Framework Convention on Climate Change), and the growing acceptance and adoption of life-cycle analysis will force the pace further. More companies will invest in improving environmental performance, particularly as they see the competitive benefits of doing so and the competitive disadvantages of not doing so. More widely, the importance of telecommunications to sustainable development will become increasingly apparent as it becomes commonplace to do tasks using the computer or by telephone.

The question is how fast will the situation change? The answer will depend to a great extent on whether the international community can make considerably more progress in the next five years than it has in the past five on dismantling the barriers that are blocking the wider diffusion and adoption of ESTs, particularly in developing countries, but also by industries and companies in industrialized economies. It is perfectly possible to make much faster progress in tackling today’s environmental problems: the technologies exist already – the challenge is to remove obstacles impeding their use.