

  
**NTTGroup  
 Environmental  
 Protection  
 Activity Report  
 2001**

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NTTGroup Environmental Protection Activity Report 2001

Environmental Protection Office, NIPPON TELEGRAPH AND TELEPHONE CORPORATION

For more information  
**Environmental Protection Office,  
 NIPPON TELEGRAPH AND TELEPHONE CORPORATION**  
 3-1, Otemachi 2-Chome Chiyoda-ku,  
 Tokyo 100-8116 Japan Fax +81-3-5205-5329  
 URL: <http://www.ntt.co.jp/kankyo/e/index.html>  
 E-mail: [kankyo@hco.ntt.co.jp](mailto:kankyo@hco.ntt.co.jp)



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## Prologue A Message from the President

### Targeting a Society of Sustainable Development 1

### NTT Group's Environmental Conservation Plans 2

With the "NTT Global Environmental Charter", We Will Unify Awareness within the Group

We Will Contribute to Local Communities Through a Variety of Environmental Activities

We Believe State-of-the-Art Information Sharing Technology Will Reduce Environmental Loads

The NTT Global Environmental Charter

### Achievement in the Year 2000 and the Vision for the Future 4

Throughout the Year 2000, We Made Every Effort to Achieve Our Objectives

Towards 2010, We Will Continue to Set New Targets and Goals for Sustainable Business Activities

## Part 1 Special Issue / The NTT Group Faces Environmental Problems Through Service and Technology

### We Believe that the IT Revolution Can Benefit Environmental Preservation 6

### NTT is Tackling Environmental Issues with Expanded Use of IT 11

### NTT R&D Pursues the Most Advanced Technologies and Focuses on Environmental Education 13

## Part 2 Our Environmental Protection Activities

### Environmental Management Systems 16

How Do We Implement Environmental Protection?

Self-Monitoring and Environmental Audits

Environmental Risk Management

Examples of ISO 14001 Certification

### Environmental Accounting 20

### The Guidelines for Procurement, R&D, and Design 22

The Guidelines, Green Procurement Guidelines, Green R&D Guidelines

Green Design Guideline for Buildings, Green Purchasing

### Paper Resource Measures 24

The Utilization of Recycled Paper and a Reduction of the Use of Virgin Pulp

Utilization of Electronic Media and Low-Impact Raw Materials

### Preventing Global Warming 26

Total Power Revolution (TPR) with the NTT Group Environment-Friendly Facility "Forest of CRED"

Introduction of Photovoltaic and Wind Power Generation Systems

Anti-Idling Campaign and Minimizing CO<sub>2</sub> Emissions from Company Vehicles

### Recycle Propulsion 28

Re-Using Dismantled Communication Facilities Uniform Recycling

DoCoMo Come-Back – Hardware Recycling Program The Food Recycle Resources (Kitchen

Refuse) Recycling System

### Waste Measures 30

The Treatment and Management of PCBs Tracking Waste Treatment Procedures by GPS

### Protecting the Ozone Layer 31

Replacement of Turbo Freezers and Maintenance of Internal CFC Banks

### Minimizing Environmental Risks 32

Research Regarding Electromagnetic Waves

## Part 3 NTT Group Efforts on Social Environmental Problems

### Social Contributions of Group Employees 34

Ihatov Ecology Community Plaza – Iwate Branch, NTT EAST

The "Citizen Participation Environmental Information Network," Joint Project – Shiga Branch, NTT WEST

"Our Cities, Our Road Business" – NTT-ME HOKURIKU Toyama Branch

Introduction of Natural Gas Automobiles – NTT WEST Kanazawa Branch, NTT-ME HOKURIKU

Ishikawa Branch, NTT-ME KANSAI

Construction of DoCoMo Forest

### Employee Education and Awards 36

Employee Education and Development Program Employee Awareness Survey

External Cooperation Environmental Awards

### Information Offering and Communication 38

Environmental Advertisements *Kankyoo-goo* Environmental Website

Publication of Environmental Reports

### Relations with Society 40

Worker Relations Customer Feedback

## Part 4 Data

### Economic Performance 42 Corporate & Group Profile 43

### Data of Environmental Protection Activities 44

### Activities Covered in the 2000 Report that are Not Included in the 2001 Edition 48

### Index 48

### URL List of NTT Group Companies Mentioned in this Report

## Guidelines Used to Edit This Report:

■ The 2001 Environmental Report has been made based on data collected from 2000. (The report includes one section on our activities after April 1, 2001 and one section on future trends).

■ The NTT Group's 2001 Environmental Report amalgamates the 2000 data collected mainly from NTT(holding company), NTT EAST and NTT WEST, NTT Communications, NTT DoCoMo's companies, NTT DATA, NTT FACILITIES, and NTT COMWARE. Furthermore, the data before 1998 was collected from the NTT Group before its restructuring. The details of this are included at the end of the report.

■ The NTT Group made unique report guidelines based on various environmental reports from 2000. This year, we made our guidelines based on the Environmental Ministry and GRI guidelines which are international standards. We include the social and economic aspects in our report.

This year, there are only a few items from the GRI guidelines. However, for future activities we plan to include the GRI guidelines in these sections.

■ As a report which pursues corporate sustainability (sustainability report), we have only just begin to include these guidelines into our reports. With your opinions we will continuously seek to improve the standards of our reports and the guidelines which we base them on.

■ NTT Group uses a web site (<http://www.ntt.co.jp/kankyoo/index.html>) for environmental information. Please use the report and web site together.

August 2001

#### \*GRI

Abbreviation of "Global Reporting Initiative".

This is an international organization, established in 1997, whose goals are to create worldwide guidelines for corporations in a sustainability report.

## Cover Page Notes:

As a corporation in the information sharing industry, we would like to be the strongest in providing information about the environment.

In this way, we understand ourselves to be like a ripple on the surface of the information pool with the latest movement and trends in the industry. The environmental activity wire frame symbolizes the NTT Group encompasses the entire group and is to bring the details together as a whole. The Three leaves are the symbol of "NTT Group's Ecology Program 21".

# Targeting a Society of Sustainable Development

It is said that the keyword for the 21st century is "sustainable development." In the 20th century, we pursued affluence and convenience, which produced technology and culture. The technologies and cultures we created certainly achieved wealthy consumer lifestyles, but at the same time, there were by-products which are the seeds of future calamity, such as air pollution, global warming, and the destruction of the ozone layer.

With regret over those by-products, nations the world over are looking to create new social systems, which better balance comfort, lifestyle and sustaining the blessings of our natural environment in perpetuity.

Our unit of NTT has a slogan "Global Information Sharing Group." We use this as the guiding principle of our business activities — to create a wealthy market through "information sharing," the flow of which creates value. The NTT Group has been considering how to deal with creating opportunities of various "informational sharing" businesses as a group, not only in the standard electronic communications field, but also by building a platform to safely and efficiently circulate such content as pictures.

From the view of the impact on the world's environment, there are two aspects of the IT revolution. One is the burden on the environment it creates, from use of energy and resources for networking, servers and information terminals. The other aspect is how IT can ultimately alleviate the burdens on the environment. Taking advantage of the IT revolution, we can share and produce activities more efficiently and control usage of energy and resources. Also, by sharing information about the environment through education and activities, we can enhance a common understanding of the environment.

To solve our environmental problems, it is necessary for all society to have a common understanding of the issues. We believe that as an information sharing group, and not strictly as a business, we bear a social responsibility to contribute to the sharing of environmental information.

We have been working incrementally but actively. We recognize a corporation's social responsibility is not only obeying laws and regulations, but also making efforts in independent social activities.

We would thus like to report that we have completed our outline of activities as an "Environmental Protection Activity Report, 2001," in succession of last year. We consider this report a very important tool to communicate the NTT Group's environmental activities.

I hope this report will help you to understand our activities, and you, in turn, will favor us with your opinion and advice on our activities. We will actively make the best use of your highly-valued ideas for our future business activities.



President, NIPPON TELEGRAPH  
AND TELEPHONE CORPORATION

*Jun-ichi Miyazaki*

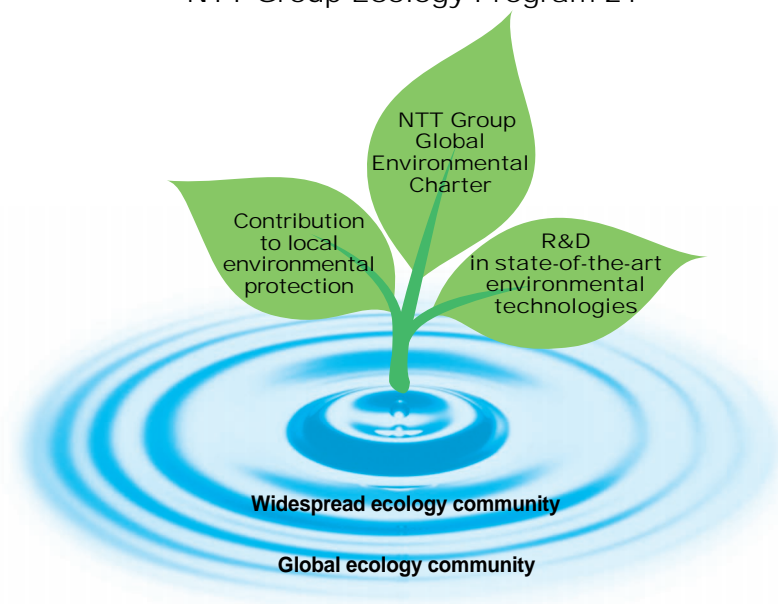
# NTT Group's Environmental Conservation Plans

<http://www.ntt.co.jp/kankyo/e/2001report/0/021.html>

The NTT Group has been actively working on global environmental problems as an entire group company. We established the "NTT Global Environmental Charter" ten years ago (in 1991) and since then dedicated serious thought about counter-

measures for paper resources and CO<sub>2</sub>. Also in July, 1997, taking the opportunity of the NTT Group's reorganization, we established "NTT Group Ecology Program 21," with the basic concept promoting conservation.

NTT Group Ecology Program 21



## Page 3

### \*Nitrogen dioxide monitoring system

It is an important system to monitor air pollution. The reason nitrogen dioxide is important is because its concentration difference needs a spontaneous measuring system and tends to occur in locations difficult to predict.

### \*e-commerce transaction

It is a commerce transaction taking use of informational sharing technologies such as the Internet. It is expected to decrease overall energy consumption.

### \*Intelligent transport system

To relay information about traffic jams to a car and also indicate the general technologies which decrease energy-use such as automatic driving.

## 1) With the NTT Global Environmental Charter, We Will Unify Awareness Within the Group

The NTT Group has been contributing to the reform of the economy and society as an information sharing company. However, it is a fact that higher speed, lower cost and diverse service networks also assault the environment, as it takes natural resources to build these things.

It is a necessary responsibility as a company trusted by society to make an effort to co-exist with the global environment in the 21st century. To be a trusted company, it is important that the NTT Group take an environmentally conservative approach in all our business activities, and show the basic attitude of respect in all we do. The "NTT Global Environmental Charter" was born from those reasons.

## 2) We Will Contribute to Local Communities Through a Variety of Environmental Activities

We have established the "Contribution to Local Community in the Environmental Protection" as a second theme in the "NTT Group Ecology Program 21."

NTT Group has created a model branch such as NTT EAST Iwate branch and NTT WEST Shiga branch and set up an "Ecology Community Plaza." In the plaza, they build a network to think about global environmental conservation and to provide and exchange information with the people in the community. Reflecting the results brought by those model cases, we will gradually expand the program to every branch office nationwide.

In addition, we have witnessed some of our group companies contributing to our society by



voluntarily working on environmental protection activities or collecting donations for these specific activities.

Though these activities are still small in scale, we strongly believe they are the first steps that could bring about big changes.

### 3) We Believe State-of-the-Art Information Sharing Technology Will Reduce Environmental Loads

We are conducting various research and development activities in search of a new way of life. This is our third theme proclaimed in the "NTT Group Ecology Program 21," and that is "Research and Development in state-of-the-art environmental technologies."

NTT Lifestyle and Environmental Technology Laboratories and NTT Telecommunications

Energy Laboratories (both founded in January 1999) are core research bodies taking initiatives in our group companies and local branch offices. We are conducting two kinds of environmental R&D. First is structuring a system to achieve a society of sustained development by utilizing information technology.

Our efforts include building ecology networks, R&D on a nitrogen dioxide monitoring system\*, environmental load simulations using videoconferencing and network services, e-commerce transaction\* model experiments and development of intelligent transport systems\*. Examples of our developments include the long life nickel metal hydride battery\*, a stand-alone photovoltaic power system\*, plastic recycling technology using super critical water\*, and energy reforming machines\*.

**\*Long life nickel metal hydride battery**  
This type of battery lasts 8 years.

**\*Stand-alone photovoltaic power system**  
Power generating system with a solar battery.

**\*Plastic recycling technology using super critical water**  
This is to decompose and recycle plastics by using super critical water as an excellent medium for chemical reaction.

**\*Developing energy reforming machines**  
This improves fuel quality so that diesel engines can eliminate smoky gas or CO<sub>2</sub> emissions.

#### NTT Group Global Environmental Charter

We need to recognize the extent and gravity of current environmental issues, including global warming, ozone layer depletion, destruction of the tropical rain forests, desertification, acid rain, and contamination of the oceans. We must also recognize the degree to which these issues are the direct result of current societal systems, which are intimately linked to corporate activities.

As a business enterprise, we have a responsibility to dedicate ourselves to harmonizing our business activities with global efforts to protect the environment in order to realize sustainable growth and to eliminate problems for future generations. Based on this fundamental recognition, we here establish the NTT Group Global Environmental Charter to clarify our basic policies and actions taken concerning these issues.

#### [Basic Principle]

To ensure the harmonious co-existence of people with nature and to achieve sustainable growth, the NTT Group will do our utmost to protect the global environment in all our corporate activities.



#### [Basic Policies]

##### 1. Compliance with laws and regulations and fulfillment of social responsibilities

To observe all laws and regulations regarding environmental protection issues and to carry out our responsibilities as global corporate citizens.

##### 2. Reducing environmental loads

To establish action plans for energy conservation (reduction of greenhouse gas emissions), resource conservation, (conservation of materials such as paper), and waste reduction, and to strive to make continuous improvements.

##### 3. Establishing and maintaining environmental management systems

To establish an environmental management system enabling each business unit to pursue voluntary environmental protection activities.

##### 4. Developing environmental technologies

To contribute to the reduction of environmental load through various areas of research and development, including multimedia services.

##### 5. Social contribution efforts

To promote daily environmental protection efforts in coordination with citizens and government agencies.

##### 6. Disclosure of environmental information

To enhance both internal and external communications through the disclosure of environmental information.



For the target of our major action plans, see p.5.

# Achievement in the Year 2000 and the Vision for the Future

<http://www.ntt.co.jp/kankyo/e/2001report/0/031.html>

**\*IT revolution**

Abbreviation of Information Technology or Info-Tech. It refers to a drastic change brought about by introducing a new technology to process information.

**\*IP**

Abbreviation of Internet Protocol. IP specifies the format of packets, also called datagrams, and the addressing scheme. It allows you to connect with somebody from a few inches away and to the world famous network.

**Page 5**

**\*eco-efficiency**

"Doing more with less" - using environmental resources more efficiently in economic processes is the basic notion. Often characterized as business' response to sustainable development. If one could produce services or goods of the same quality without putting more burden on the environment, it's regarded to be more eco-efficient.

## Throughout the Year 2000, We Made Every Effort to Achieve Our Objectives

It's the time of IT revolution\*. As this key term indicates, our society and industry are going through a rapid change today. Circumstances surrounding the information sharing market, in particular, are altering every moment. More and more people use mobile communication devices and services, and the use of the Internet has diffused rapidly. The speed of its development is far beyond our expectation.

The NTT Group will contribute aggressively to a social and economic revolution, by increasing the speed, cutting the cost, and maintaining more diversity to our service network (wired and wireless) based on IP.\*

However, by pursuing our economic goals, we are consuming a tremendous amount of paper and energy, while producing tons of waste.

That's why we have hammered out our action plan and target objectives. We here present the year 2000 targets (set in 1991) and how much we have achieved. "Paper resource management," "Prevention of global warming," and "Waste management" are the three activity categories we chose. (Chart 1)

As for paper resources and waste, we have decreased enough to meet our targets. (Fig.1,2) Regarding CO<sub>2</sub> emissions, however, we haven't; the total amount of CO<sub>2</sub> emission is already exceeding the year 2000 target level set in 1990. (Fig. 3)

One reason is the expansion of our business activities that could have caused this increase in

**Chart 1 Targets for action plans**

Item	Targets for action plans (set in 1991)	Results in 2000	Page
<b>Paper resource management</b>	To reduce total virgin pulp consumption to 1990 levels after 2000	Total virgin pulp consumption is reduced by approx. 23% from 1990.	24
<b>Prevention of global warming</b>	To reduce CO <sub>2</sub> emissions to 1990 levels after 2000	Total volume of emissions increased by approx. 53% from 1990, however, steadily improving eco-efficiency has resulted in stabilization.	26
<b>Waste management</b>	To reduce the amount of waste to 1990 levels after 2000	The amount was reduced by approx. 65% from 1990 level.	30
<b>Protection of ozonelayer</b>	Use of CFCs to be totally banned in1995.	Completed in 1995.	31

Regarding protection of the ozone layer, the use of CFCs in new equipment was completely banned in 1995. Regarding paper resource management, prevention of global warming and waste management, target figures have been reviewed and revised targets were included in the 1999 NTT Group targets for major action plans to demonstrate our continuing efforts.

**Chart 2 Setting new targets for 2010**

Item	Targets for action plans (set in 1999)
<b>Paper resource management</b>	Total virgin pulp consumption to be reduced by more than 20% from 1990 levels by 2010.
<b>Prevention of global warming</b>	CO <sub>2</sub> emissions to be reduced below 1990 levels by 2010.
<b>Waste management</b>	Volume of waste to be reduced by more than 85% of 1990 levels by 2010.





CO<sub>2</sub> emission. However, when one looks at eco-efficiency\*, revenue per CO<sub>2</sub>, it has always stayed around an average of 4.7 million yen/CO<sub>2</sub> emissions in tons since 1996. (Fig. 4) This stability in ecoefficiency may show how we have continuously tried to eliminate the amount of CO<sub>2</sub> emission since 1991.

### Towards 2010, We Continue to Set New Targets and Goals for Sustainable Business Activities

In March 2000, the NTT Group revised the targets for our major environmental action plans. (Chart 2) Reviewing the past ten years, it is clear we must continue our efforts to support a sustainable society.

When we say "aiming at sustainable society", we seek to develop business activities that

coexist with sustaining our eco-system. Each individual business unit must make their roles clear and accurate in sustaining our environment. All employees must deal with environmental issues as a matter of daily life. As a corporation, and as individuals, we should work on global environmental activities locally.

Without considering the wisest approach, we may not solve the macro issue of managing the eco-system.

Now, we are developing an accurate understanding of how the NTT Group's business activities affect society and our eco-systems by collecting environmental information. As a result, we have revised our specific targets of where the NTT Group should be in the future.

We will continue to contribute to a sustainable society through environmentally responsible business practices. This is the challenge of our time.

Fig. 1 Paper resource management total virgin pulp consumption

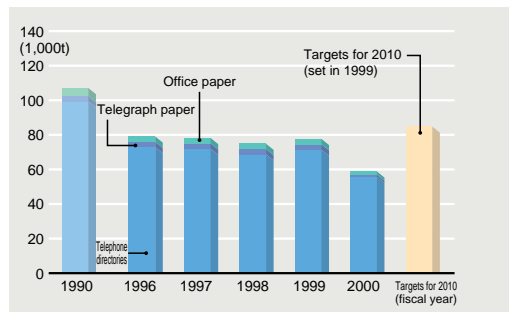


Fig. 2 Waste management volume of waste

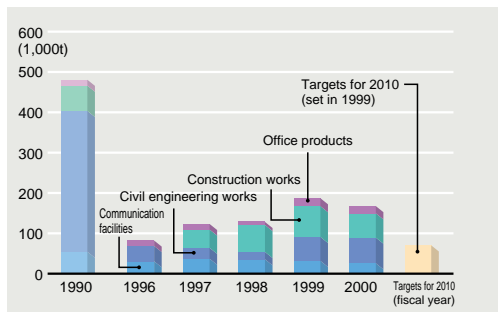


Fig. 3 Prevention of global warming (Volume of CO<sub>2</sub> emissions)

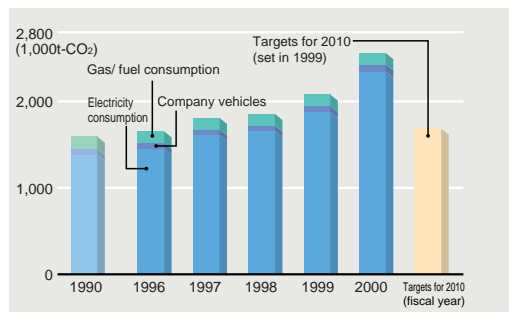
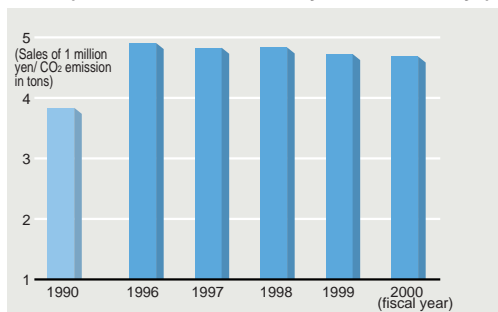


Fig. 4 Prevention of global warming (Environmental efficiency "eco-efficiency")



As of fiscal 1999, the amount of CO<sub>2</sub> emissions exceeded the target set for the year 2000 (at the 1990 level). (Fig. 3) One of the factors for this is the expanded business range of the NTT Group. However, sales per unit of CO<sub>2</sub> emission, an indication of environmental efficiency (eco-efficiency) show yearly improvement and have stabilized at around ¥4.7 million/t-CO<sub>2</sub> since 1996. (Fig. 4) The NTT Group has thus been making continuous progress in reducing the volume of CO<sub>2</sub> emissions since 1991. For 1999, CO<sub>2</sub> emitted by NTT Facilities and NTT Urban Development were included in the figure, thus the increase compared to the previous year.

\*To measure the amount of CO<sub>2</sub> emissions under the same conditions, we included only data of major companies.

# The NTT Group Faces Through Service

## We Believe That the IT Revolution Can Benefit Environmental Preservation

<http://www.ntt.co.jp/kankyo/e/2001report/1/111.html>

The relationship between the IT revolution and environmental preservation holds an important meaning for the NTT Group with its activities in information sharing. It is believed that the benefits that IT gives us hold many things which will work to the advantage of environmental preservation. What kinds of changes in our lives and beneficial effects on the environment can we imagine once the IT revolution is a reality?

### What is the IT Revolution?

The Internet has grown explosively in Japan with the development of computer and network technology. The growth of information sharing with the IT revolution will change our quality of life as well. For example, virtual reality\*. This is generally translated in Japanese as "temporarily conceived reality" and signifies a virtual world just like reality made using computers. From the standpoint of computer games, one can experience a virtual world for a certain period of time and then return to the "real" world. However, in the world that the IT revolution realizes, the virtual world will approach the real world and gradually we will lose sight of the line separating

the two. (Fig. 1) With the IT revolution, it will be possible to talk and hold meetings with someone far away as if they were right in front of you by using a videophone. In addition, we can imagine using IT in home appliances. You can check the contents of your refrigerator with your cellular phone before going shopping on the way home, start recording a video from outside the home, and ignore distances which until now you could not shorten.

### Facing IT

In 1979, with privatization close at hand, the NTT Group published the INS concept\*, completely digitized many kinds of information, and wrestled with inventing technology which would exchange information through a net-

**\*Virtual reality**

To experience by using physical devices the sensation of really moving around a place.

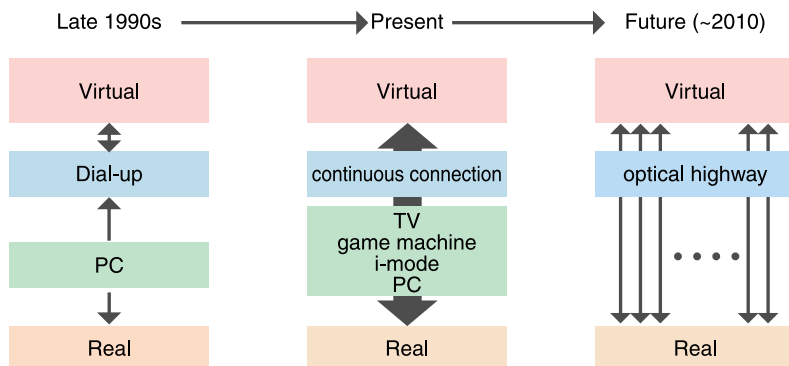
**\*INS concept**

Abbreviation of Information Network System. The concept put forward that the digitalization of all electric communication networks will become the basis for electronic communication networks in the advanced information society of the future.

**\*broadband**

Generally, the ability to share information at over 500kbps.

**Fig. 1 The evolution of information sharing**



Information from the virtual world will penetrate our real world environment and form a new social base.

**Chart 1 Opticalization of access networks (from "Information NTT 1999")**

Area	Coverage			
	1998	1999 (estimated)	2010	
	All Japan	East Japan	West Japan	All Japan
Government-designated city or cities at the level of prefectural government seats	main area	92%	95~97%	90~92%
	all areas	44%	62~64%	49~51%
Cities with populations over 100,000	main area	69%	77~79%	85~87%
	all areas	22%	34~36%	25~27%
Other	8%	12~14%	9~11%	
Overall	27%	approx. 41%	approx. 29%	

Note: The coverage rate shown is the opticalization of wiring up to the feeder point.



# Environmental Problems and Technology

work. Since 1994 we have advocated "conversion from phone to multimedia" and have driven the spread of the Internet and conversion to broadband\* networks. At NTT, we have two goals for information sharing services to challenge us as we face the beginning of the 21st century. The first is HIKARI-Soft service, which realizes "whatever, whenever" using optical networks and large-capacity memory. The other is Ubiquitous\* Service, which realizes "wherever" using wireless technology. With HIKARI Service, we are aiming to be able to use an optical network from nearly all regions by 2010. (Chart 1)

However, the NTT Group cannot create these conditions alone. If attractive services increase, customers increase. And if customers increase, service increases as well. If we can create this kind of cycle, new business chances will open up and, through that feedback, will spur the preparation of optical networks. (Fig. 2)

We are developing FOMA\*, which began testing in 2001, and the third-generation of cellular phones which will be able to use high-speed telecommunications.

## The Influence of the IT Revolution on the Environment

The advancement of information sharing through IT lowers the amount of energy we use and holds the promise of reducing the burden on the environment. This is because IT has three major effects:

- People and materials do not move unnecessarily. (Fig. 3)
- It is possible to use space efficiently. (Fig. 4)
- It is possible to digitize\* materials and use them. (Fig. 5)

In this way, the development of telecommunication technology has the effect of greatly reducing energy consumption.

Of course, sometimes energy consumption grows with the development of technology.

Therefore it is necessary to look comprehen-

Fig. 2 Service categories for HIKARI-Soft service

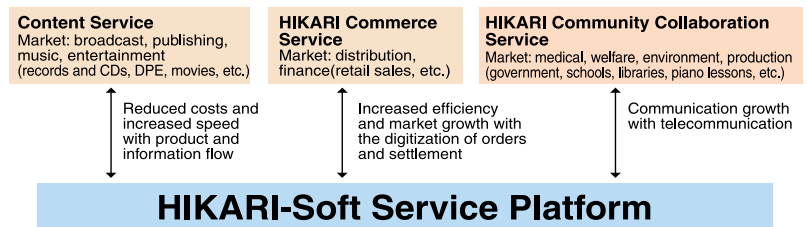


Fig. 3 People and materials do not move unnecessarily



Fig. 4 It is possible to use space efficiently



Fig. 5 It is possible to digitize materials and use them



**Page 7**

**\*HIKARI**

"HIKARI" is the Japanese word for "light." We have used it to suggest "optical" and "photonic." HIKARI also implies the concept of "forefront""hope," and "innovation" as we propose a new life style to consumers.

**\*Ubiquitous**

The property of being at many locations at the same time.

**\*FOMA**

Next generation cell phones. Testing began in 2001 in Tokyo and Yokohama.

**\*digitalization**

Using data without media.

sively at the amount of energy consumption and judge whether IT will really benefit the environment.

So now in addition to thinking about the change in total energy consumption, we look at the movement of real GDP and energy consumption of IT-advanced America and Japan. (Fig. 6)

Both countries' energy consumption and real GDP rise, but we see that among the four trends, the growth of America's real GDP is strong. Therefore when we chart the change of energy consumption with GDP as in the figure below, we see that America's energy consumption by GDP decreases strikingly. The IT revolution which was made real in America in the last half of the 1990s is considered as one of the primary factors for this. From this fact, it is possible that IT decreased the overall social energy consumption in America.

### Information Sharing Society and Global Warming

There is a group called the "Center for Energy and Climate Solutions (CECS)" among American environmental think tanks. CECS presented a report in December 1999 titled "The

Internet Economy and Global Warming."

CECS analyzed three areas; construction facilities, production and shipping. In order to save energy and make the largest profits for the environment, they proposed using environmental e-commerce.

We propose the following seven areas for reducing energy consumption through IT use (Fig. 7) :

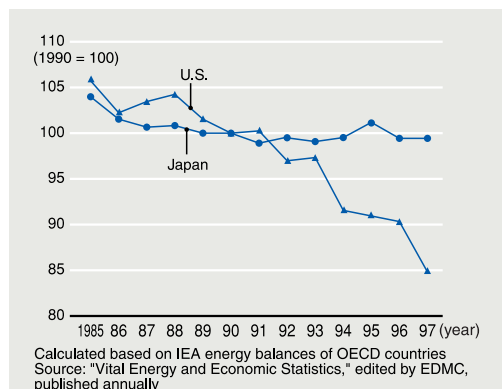
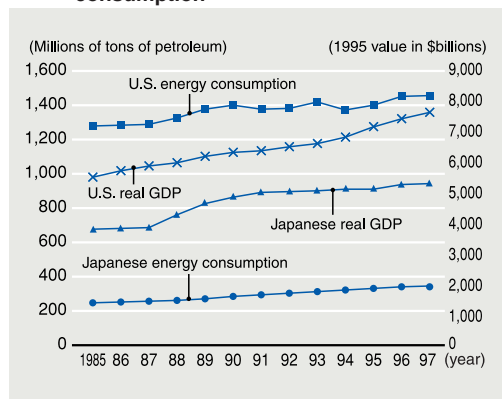
1. Business-to-consumer e-commerce
2. Business-to-business e-commerce
3. Turning resources into electronic information
4. Managing production flow
5. Telecommuting, videoconferencing, remote management
6. Use of information communication technology in recycling
7. Intelligent Transportation Systems (ITS)

Number 1, business-to-consumer e-commerce lets consumers connect with corporations and perform transactions. By using the Internet, the need for wholesalers and retailers disappears and the flow of goods between them and the flow of returned goods is cut back. Furthermore, because it is close to order production, it is possible to control unnecessary production. (Fig. 8) There will be a new need for energy for small package shipping and warehouse operation with e-commerce, but overall we can expect a great reduction in energy consumption. When we put in detailed numbers and calculate, energy reduction by 2010 will become 98.60 PJ, 0.6% of the nation's energy.

Number 2, business-to-business e-commerce, is carried out between companies like makers and retailers, so reductions in business meetings, personnel movement, wholesale-related energy consumption, and accounting-related energy consumption, as well as more efficient physical distribution can be expected. (Fig. 9) Through this, the energy reduced will be 57.28 PJ, or 0.4% of all energy in 2010.

Number 3, turning resources into electronic information, is easily understood through the following example: not selling music and video using media (CD or DVD) but distrib-

**Fig. 6 Trends of U.S. and Japanese energy consumption**



uting the data as-is using the Internet. By selling books, newspapers, videos, CDs, and computer software as "electronic information," media production and printing, physical distribution, and stock management will become unnecessary, and a reduction in related energy consumption is expected. The reduction from this effect will be 32.27 PJ, or 0.2%.

Number 4, the managing of production flow, seeks to increase distribution efficiency, reduce physical distribution and control surplus production by using the Internet in production flow. Physical distribution management systems, like POS\* and others, apply to the increased efficiency of this production distribution. This will reduce energy 200.20 PJ, or 1.3%.

There are three main points to Number 5. First, a reduction in vehicle use with the growth of at-home workers and a reduction in office use. Second, a reduction in vehicle use by holding meetings, which were in remote locations, through videoconferencing instead. Finally, increased efficiency of shipping with remote management of vending machines. Through this, the expected amount of energy reduction will be 43.97 PJ, or 0.3%.

Number 6 reduces the energy of parts production by using recycling markets on the Internet for parts procurement for automobiles, electronic devices and others items. Once recycling is used in the fields of automobile parts, electronic devices, production equipment and others, a reduction of energy consumption of 110.85 PJ, or 1.3%, is expected.

Finally, number 7 mainly relates to traffic using automobiles. Currently in Japan eleven

Fig. 7 Reduction in energy consumption through the utilization of IT

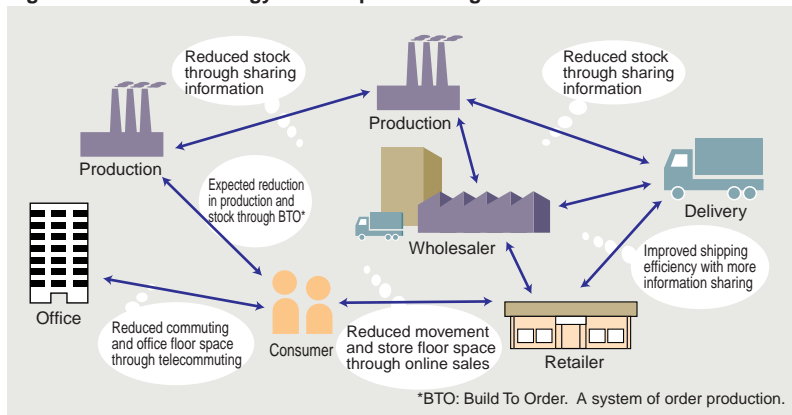


Fig. 8 Business-to-consumer e-commerce

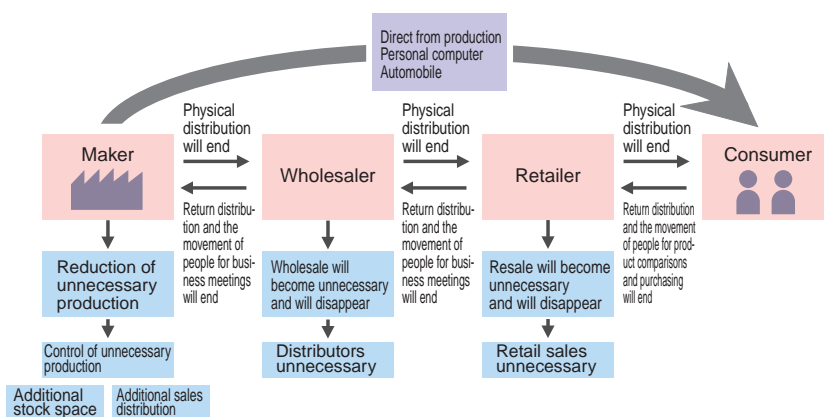


Fig. 9 Business-to-business e-commerce

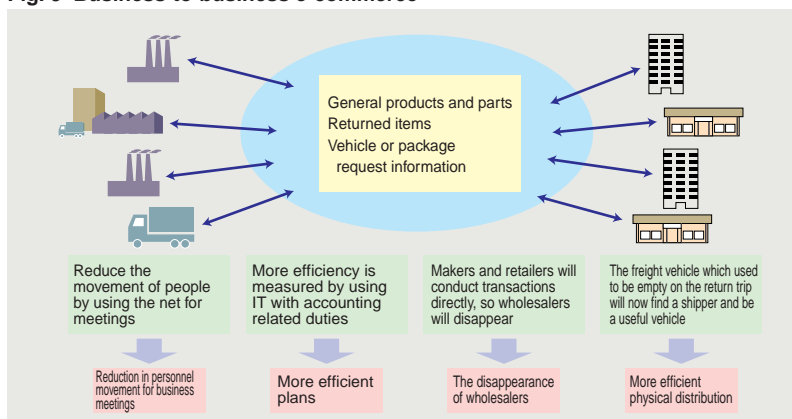


Chart 2 The effects of the reduction of energy consumption through the use of IT

	The amount of reduction of energy consumption (PJ)	Percentage of reduction of energy consumption
1 Business-to-consumer e-commerce	98.60	0.6%
2 Business-to-business e-commerce	57.28	0.4%
3 Digitization materials	32.27	0.2%
4 Production distribution management	200.20	1.3%
5 Telecommuting, teleconferencing, remote management	43.97	0.3%
6 Use of information sharing technologies with recycling	110.85	0.7%
7 Intelligent Transport System (ITS)	19.05	0.1%
Total	562.21	3.6%

Corresponds to 3.6% of Japan's total energy consumption

\*Does not estimate economic growth or other causes and effects.

**\*POS**  
Abbreviation of Point Of Sales (managing information at the time of sale). Item management information such as how many of what items were sold.



percent of energy consumption by automobiles is wasted in delays. By measuring a reduction of road delays with VICS\*, a reduction in wasteful energy consumption is expected. There is also a factor that the infrastructure preparation and production of vehicle parts increases energy consumption, but 19.05 PJ, or 0.1% of energy consumption will be cut back.

When we combine the effects of the reduction of energy consumption in the above seven areas, it becomes a reduction of 3.6% of energy consumption across all Japan. (Chart 2)

### Predictions of the Amount of Electricity Consumption

In order to evaluate the reduction in energy consumption through IT, we must predict the growth in the amount of electricity consumption and compare the amounts of growth and reduction.

Here, we assume two cases, one where Japan's IT change advances rapidly and optical networks and cellular information terminals spread widely. The other where the IT change advances gradually at the same speed as it has until now. We have estimated the amount of electricity consumption by taking the value from those two. According to that estimate, it is predicted that in 2010 consumed energy related to IT through users, communication networks and others will be 1.5 times of current levels, and will correspond to 1.1% of the amount of energy consumption for all Japan.

### IT's Energy Consumption Reduction Effect

Now we can compare the amount of energy consumed and the effects of reduction related to IT. (Fig. 10)

In addition to the elements estimated just now, it is thought that individual lifestyles will change\* with communication technology, and will shift from activities which consume more electricity to things which use less electricity. We cannot get into those points here.

According to this estimate, the controlling effect of energy consumption through the IT revolution is large. And even estimating the growth of the amount of electricity consumption, from the standpoint of environmental preservation, we can see a large effect. Giving specific numbers, in 2010 a reduction effect of 3.6% of energy consumption across Japan is expected. In other words, the IT revolution makes our lives more convenient and comfortable while at the same time reducing the energy burden on the global environment in which we live.

In this way the NTT Group believes IT can face global environmental problems. For the IT revolution to be realized, we are aiming to make information sharing more simple, fast, convenient, secure, and comfortable, and to increase our efforts into the future.

We are certain those efforts will always be useful in helping to solve the global environmental problems that people face today.

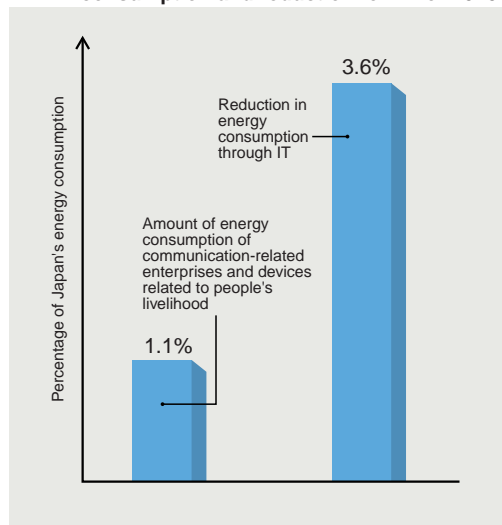
**\*VICS**

Abbreviation of Vehicle Information and Communication System. As a link to Intelligent Transport Systems (ITS), it will be a new traffic information communications system introduced throughout the country in the future.

**\* Individuals' lifestyles will change**

For example, with the spread of cellular phones, the time watching TV or the time riding in an automobile will be reduced.

**Fig.10 The predicted effects of energy consumption and reduction for IT for 2010**



**Conclusions:**

- The NTT Group has a large environmental impact and must work to reduce that impact.
- We can expect that information sharing services will reduce environmental burdens throughout the world.
- For that reason, it is necessary for the NTT Group to work to expand information sharing services which lower environmental impact.



# NTT is Tackling Environmental Issues With an Expanded Use of IT

<http://www.ntt.co.jp/kankyo/e/2001report/1/121.html>

The NTT Group is looking to decrease burdens on the environment by various IT-based activities. Here, we will present a more in-depth look at the activities presented on the preceding page.

## Activities and Contributions to the Environment by NTT

NTT's role is not only working hard to build a foundation for an IT revolution, but also working to make IT an important part of solving environmental problems. (Fig. 1)

### NTT DoCoMo e-billing

This is a service for cellular phone customers who pay their bills automatically by bank transfer. It is a service to provide information and billing via the Internet, instead of monthly "advanced notice and receipts," formerly delivered by surface mail. Customers who want to use this service first register for e-billing. Next, they log-on to e-billing by using i-mode\*, mopera\* (informational terminal unit) and the Internet. When they input their password, they can access their monthly invoice. If customers register for the e-mail service, NTT will e-mail their invoice. NTT DoCoMo has used this service since April, 2000 for i-mode and mopera customers only. Since October, customers can access information through our web-site. As of April, 2001, registration for e-billing has exceeded 500,000 customers. We believe the adoption of electronic invoicing and banking will actualize and enhance our settlement of accounts.

### e-bidding

In Japan, an "electronic government" is to be adopted by the year 2003. As information exchange will be increasingly done online, there will be fewer paper documents, with the possibilities for decreased consumption of paper resources.

NTT Service Integration Laboratories is paying attention to on-line bidding for local government contracts in its drive to increase use of

the Internet among local governments. Local governments currently require bidders to file standard forms as part of the bidding process. But an e-bidding system provides an Internet-based server and maintain all electronic records of the bidding process for the public record. By filing these documents on a server, we can decrease documents and the flow of people. It means our system is effective for decreasing burdens on the environment.

Eventually, we are going to work toward an "electronic government" model by further improvements to our system and using the security technology of the Information Sharing Platform Laboratories to expand electronic applications.

### Internet TOWNPAGE

NTT group is taking several measures to care for the environment by developing our TOWNPAGE\*,

#### \*i-mode

The wireless communication standard for cellular phones, with which you can access the web, and send and receive e-mails for only ¥1.

#### \*mopera

Portable terminal unit, from which you can receive e-mails and information services.

#### \*Electronical public notification system

A system to record and verify the transmission of a document on the network via a third party.

#### \*TOWNPAGE

Internet address is, <http://english.itp.ne.jp/>

Fig. 1 The adaptation of IT technologies to preserve the environment

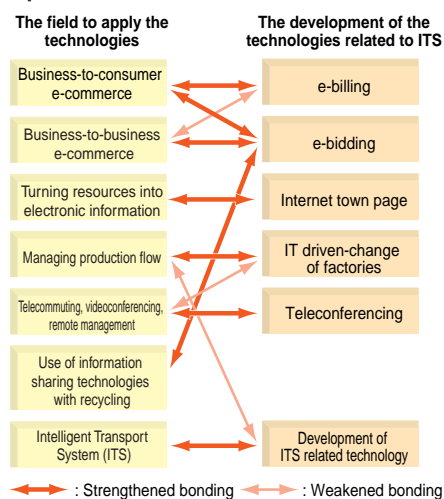
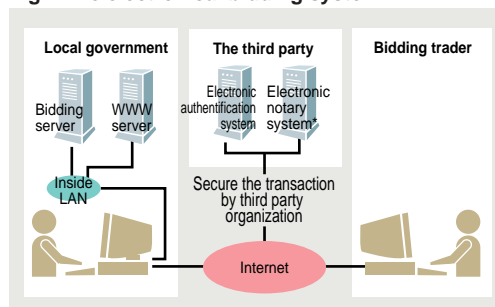


Fig.2 The electronical bidding system



- \*Advanced navigation**  
A navigation system to show the present location and directional support while driving.
- \*Automated toll collection system**  
The system for driving through toll highways without stopping to pay at toll booths.
- \*Safe driving support**  
Usage of electronic signals to guide vehicles, thus decreasing burdens on drivers.

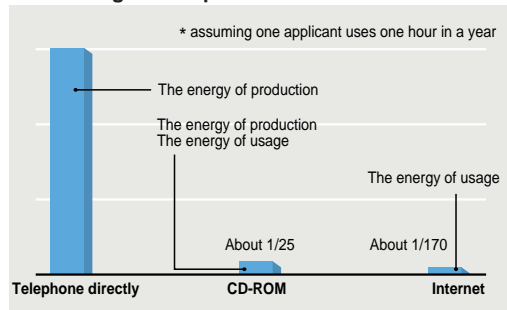
a multimedia telephone directory to be used side by side with the traditional printed directory. (Fig. 3)

Also we have just completed a trial CD-ROM which contains names of corporations listed in the 23 wards of Tokyo, and the city of Osaka. The target is for these CD-ROMs to be used regularly after 2001. This CD-ROM is an option, and although not generally used as a supplement to the published directory, will eventually be a service which will lead to a saving of paper resources.

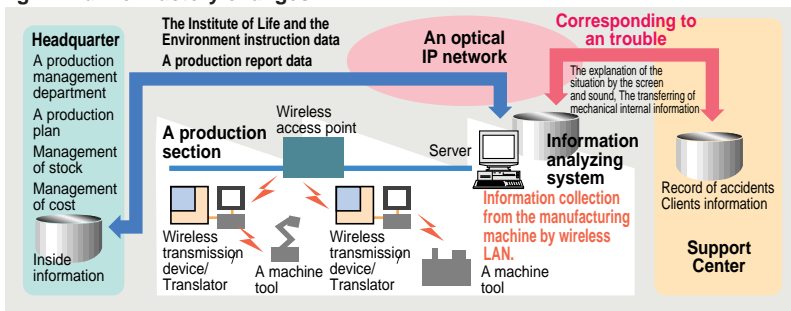
**IT Driven Factory Changes**

Factory facility maintenance is generally divided into regularly scheduled and emergency work. In both cases, staff need to be transported. In the case of an emergency, a factory needs to arrange and send in parts to be exchanged and frequent transportation of these parts is needed. To decrease necessary energy consumption and to conserve and inspect a

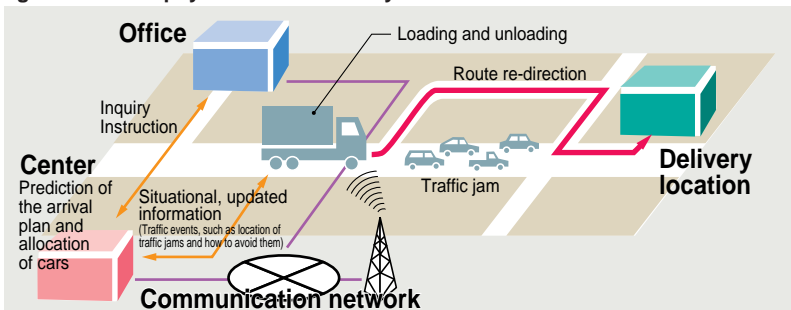
**Fig.3 The effect for saving energy by IT driven change of telephone number reference**



**Fig. 4 IT driven factory changes**



**Fig. 5 Simulated physical distribution system**



factory, NTT Cyber Solution Laboratories is developing a maintenance system to supervise and regulate a factory facility from a remote area.

This system will accumulate and provide an operation record, sensing information, supervised screen information and sound information which are necessary to maintain the facilities. (Fig. 1) We are going to develop a prototype of this system in 2001.

**Videoconferencing**

NTT Lifestyle and Environmental Technology Laboratories performed a simulation to find out how much we can contribute to decrease burdens on the environment; the conditions we used for simulation are as follows.

- The total numbers (1657) of the videoconferences NTT (holding company) had in the past year.
- Assuming the length of a conference is two hours and calculating the burden on the environment by the amount of the energy consumption from the tools they used for the videoconference.
- Calculating the burden on the environment from various transportation systems assuming two persons join the conference from each area for each two hour conference.
- Comparing the environmental burdens between a business trip and videoconferencing.

As a result, we found that videoconferencing can save about 85% of the CO<sub>2</sub> exhaust and 74% of the energy consumption compared to a business trip conference.

**Intelligent Transport Systems (ITS)**

NTT Service Integration Laboratories is trying to actualize a seamless service which connects a person, a vehicle and a road through a network by researching ITS or Intelligent Transport Systems.

Usually, ITS consists of developing fields such as "advanced navigation\*", "automated toll collection system\*" and "safe driving support\*". The NTT Group is researching and developing a car navigation system using a cellular phone network. This system can be used to provide the location of parking lots and gas stations and simulate a physical distribution system and, the parking reservation system. (Fig. 5)





# NTT R&D Pursues the Most Advanced Technologies and Focuses on Environmental Education

<http://www.ntt.co.jp/kankyo/e/2001report/1/131.html>

In the R&D field, we are developing systems which decrease the burden on the environment. The educational aspects are a necessary to increase children's interest in the environment.

## R&D Diminishes Environmental Burdens

### Polymer Electrolyte Fuel Cell System

In December 2000, NTT started the field test for our co-generation\* system which uses a Polymer Electrolyte Fuel Cell (PEFC), widely considered a potential candidate as a leader among the next generation of fuel batteries. This work is being done in cooperation with Ebara Corporation and Ebara Ballard Corporation.

A fuel battery directly converts chemical properties of the fuel into electric energy. It is expected to be a clean and highly efficient power generator. The PEFC used for this test has a lower temperature for the operation than the Phosphoric Acid\* type and the Solid Oxide\* type and it is easy to start and stop. Thus, it is attracting attention as a fuel battery for the next generation and is expected to be in wide demand as a power line for automobiles and as a power generator system for home use. As it can be used for automobiles, it is expected to be mass-produced and predicted that the cost will go down rapidly.

Feasibility test will be performed for two years from December, 2000. As a system, it will provide power, which is generated by a fuel battery in the center, and it will make use of the exhaust heat by air conditioning equipment. (Fig. 1) As a co-generation system, it will evaluate the stability and conservancy of the system through the general efficiency and long use of the system which includes a lower temperature absorbing freezer. Furthermore, it will develop various operation technologies such as peek-cut operation\* which makes use of the special quality of the orbit and the stop

of PEFC.

### Building Evaluation/Investment Simulation System

As an environmental countermeasure in the architectural field, "Green Design Guideline for Buildings\*" predicts the burden on the environment from the construction, operation, repair, dismantling and waste at the stages of building and is considered a very efficient system.

NTT Facilities has developed a "Building Evaluation/ Investment Simulation System". In this system, when you choose and input the content of the environmental technologies and countermeasures introduced for the building, it will output the data of an environmental index, a chart for each case which introduces an environmental technology and comparison the environmental quality and economic quality. (Fig. 2)

Fig.1 The construction of the system for the co-generation

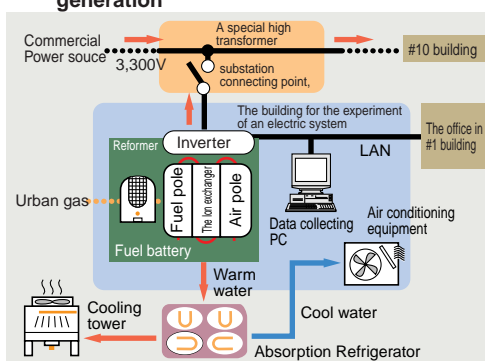
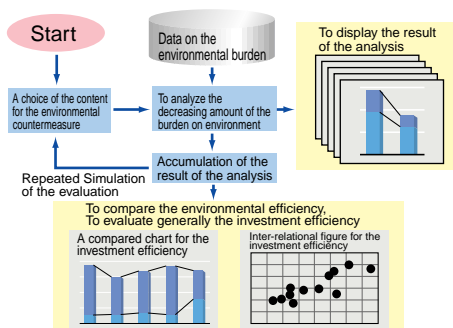


Fig.2 Building Evaluation/ Investment Simulation System



### \*Polymer Electrolyte Fuel Cell System

It makes use of a high polymer film for electrolyte. The power generating efficiency 40-50%, Operating temperature 80°C. It is sufficient in the quality of starting up and stop as the operation temperature is low.

### \*Co-generation

A system which makes use of the exhaust heat which occurs when a gas turbine and diesel engine generate power.

### \*Phosphoric Acid Fuel Cell (PAFC)

It makes use of a phosphoric acid solution for electrolyte. The power generating efficiency is 40%, the operating temperature 200°C. More than 100 systems are operated now in the world and we must continue to lower the costs.

### \*Solid oxide fuel cell (SOFC)

It makes use of a ceramic for electrolyte. The power generating efficiency is 50%, operating temperature 1,000°C. As it operates with high temperature, the heat usage is easy and highly efficient.

### \*Peek-cut operation

The method which operates to provide power only when the electrical usage is high.

### \*Green Design Guideline for Buildings

See page 23.

## Environmental Education Using Informational Technologies

### WebAngel

There is much information about environmental issues on the Internet.

NTT Cyber Solution Laboratories has developed a system called "WebAngel" which gives limits to surfing on the Internet to a student and also navigates how to surf on the Internet.

A 5th grade classroom at N elementary school in Mitaka City, Tokyo, had a lesson about "Whose is the blue earth?" in February and March, 2001 using WebAngel. (Photo 1) Acid rain, air pollution, desertification and waste problems were chosen as themes and students researched the issues using WebAngel and presented reports about their research including their opinions.

### Electronic Field Notebook

To record data for environmental research and field observation, precise location data is necessary.

NTT Lifestyle and Environmental Technology Laboratories has developed a Field Notebook system, which matches a GPS\* locator in a portable computer system with data input on a map. In this system, there is software not

**\*GPS**

Global Positioning System. The system which the Department of National Defense in the United States has developed. It is a system to locate a specific spot by using an electronic wave which is sent from 24 artificial satellites and is used as a car navigation system.

**\*Iwate-UNU-NTT**

**Environmental network**  
Iwate prefecture, United Nations University. The environmental information network by NTT.

only to find your present location but also to input the data of your research content. For the research of the water quality of a river, you can input the data for 'clearness of a river' and 'speed of a stream' in addition to an observation spot and it will work as an electronic filed notebook. Also by hosting collected data on a server, you can publicly provide an environmental map of your research.

Usually, field research was considered as a job for experts, but by using this new electronic field notebook, children can easily do field research. This will increase interest in environmental issues for children interested in personal computers.

### Cherry Blossom Research

In 2002, "general study time" will be held for an environmental study which received huge attention last year. In spring 2000, as a part of "Iwate-UNU-NTT Environmental Network\* Collaboration Project", research for a cherry blossom event was held using the Internet. From April 10 to May 31, 74 elementary schools, 26 middle schools, 1 school for the blind and 3 special education schools from Iwate prefecture participated in this research.

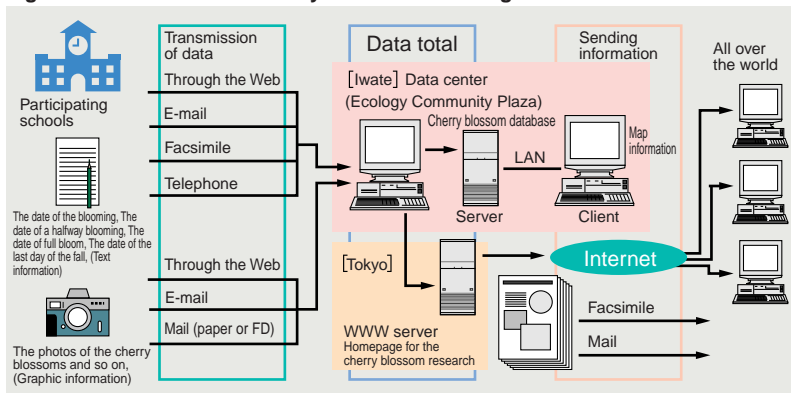
The data which was gathered with the collaboration of the students was sent to a data center hosted by the Ecology Community Plaza in the Iwate Branch of NTT EAST. This data was used to create a cherry blossom front map of Iwate prefecture and is presented to the public on the homepage. (Fig. 3,4)

We will continue to increase the use of this kind of technology for various research projects.

**Photo. 1** The children who research the theme of their choice



**Fig.3** The flow of data for cherry blossom blooming research



**Fig.4** Web page for cherry blossom research  
<http://ecology.mcon.ne.jp/edu/sakura/>





# Our Environmental Protection Activities

As for our corporate activities we understand that we impact the environment in many ways. Thus we seek to raise our awareness level of the degree to our impact on the environment and minimize unnecessary loads. In this section, we look at how we should work with the environment and our business practices as well as what we have done so far to make our business environmentally responsible.

## **Environmental Management Systems 16**

How Do We Implement Environmental Protection?

Self-Monitoring and Environmental Audits

Environmental Risk Management

Examples of ISO 14001 Certification

## **Environmental Accounting 20**

### **The Guidelines for Procurement, R&D, and Design 22**

The Guidelines

Green Procurement Guidelines

Green R&D Guidelines

Green Design Guideline for Buildings

Green Purchasing

## **Paper Resource Measures 24**

The Utilization of Recycled Paper and a Reduction of the Use of Virgin Pulp

Utilization of Electronic Media and Low-Impact Raw Materials

## **Preventing Global Warming 26**

Total Power Revolution (TPR) with the NTT Group

Environment-Friendly facility "Forest of CRED"

Introduction of Photovoltaic and Wind Power Generation Systems

Anti-Idling Campaign and Minimizing CO<sub>2</sub> Emissions from Company Vehicles

## **Recycle Propulsion 28**

Re-Using Dismantled Communication Facilities

Uniform Recycling

DoCoMo Come-Back—Hardware Recycling Program

Food (Kitchen Refuse) Recycling

## **Waste Measures 30**

The Treatment and Management of PCBs

Tracking Waste Treatment Procedures by GPS

## **Protecting the Ozone Layer 31**

Replacement of Turbo Freezers and Maintenance of Internal CFC Banks

## **Minimizing Environmental Risks 32**

Research Regarding Electromagnetic Waves



# Environmental Management Systems

<http://www.ntt.co.jp/kankyo/e/2001report/2/211.html>

The NTT Group is working to establish an environmental management system in accordance with ISO14001\*. This project is based on our belief that in order to prevent pollution and to reduce negative impacts on the environment it is essential for each of our group affiliates and their local branch offices to put forward as much effort as possible. The NTT Group is providing active support through consulting services so that each office can establish and apply our environmental management systems. We also utilize environmental audits to continuously improve our systems.

## How Do We Implement Environmental Protection?

Companies in the NTT Group share the basic concepts of the NTT Group Ecology Program 21. With this common ground, we are working to establish the system to implement our environmental protection activities. (Fig. 1)

### PDCA for Promotion of NTT Group Environmental Protection Activities

What's PDCA? It's a keyword to promote the NTT Group's Environmental Protection Activities. To make sure it gets concrete results, the NTT Group has established an action management system that will overview the activities

of the group as a whole. (Fig. 2)

#### PLAN

Based on the NTT Group's corporate mission and its Global Environmental Charter, the NTT Group Global Environmental Protection Promotion Committee established the following four criteria; "Basic environmental policies," "Mid-to-long term plans," "Annual plans," and "Targets."

Based on these guidelines, each group company must develop detailed division-specific programs for implementing environmental protection activities.

#### DO

Each Group company promotes action plans for implementing environmental protection activities.

#### CHECK

Implementation status is self-checked, and further assessed by the Environmental Protection Promotion Organization of each NTT Group company. And each Group company or NTT Group Global Environmental Protection Promotion Committee will check compliance with the regulations.

#### ACTION

The results will be reflected by the improvement of environmental policies, annual plans,

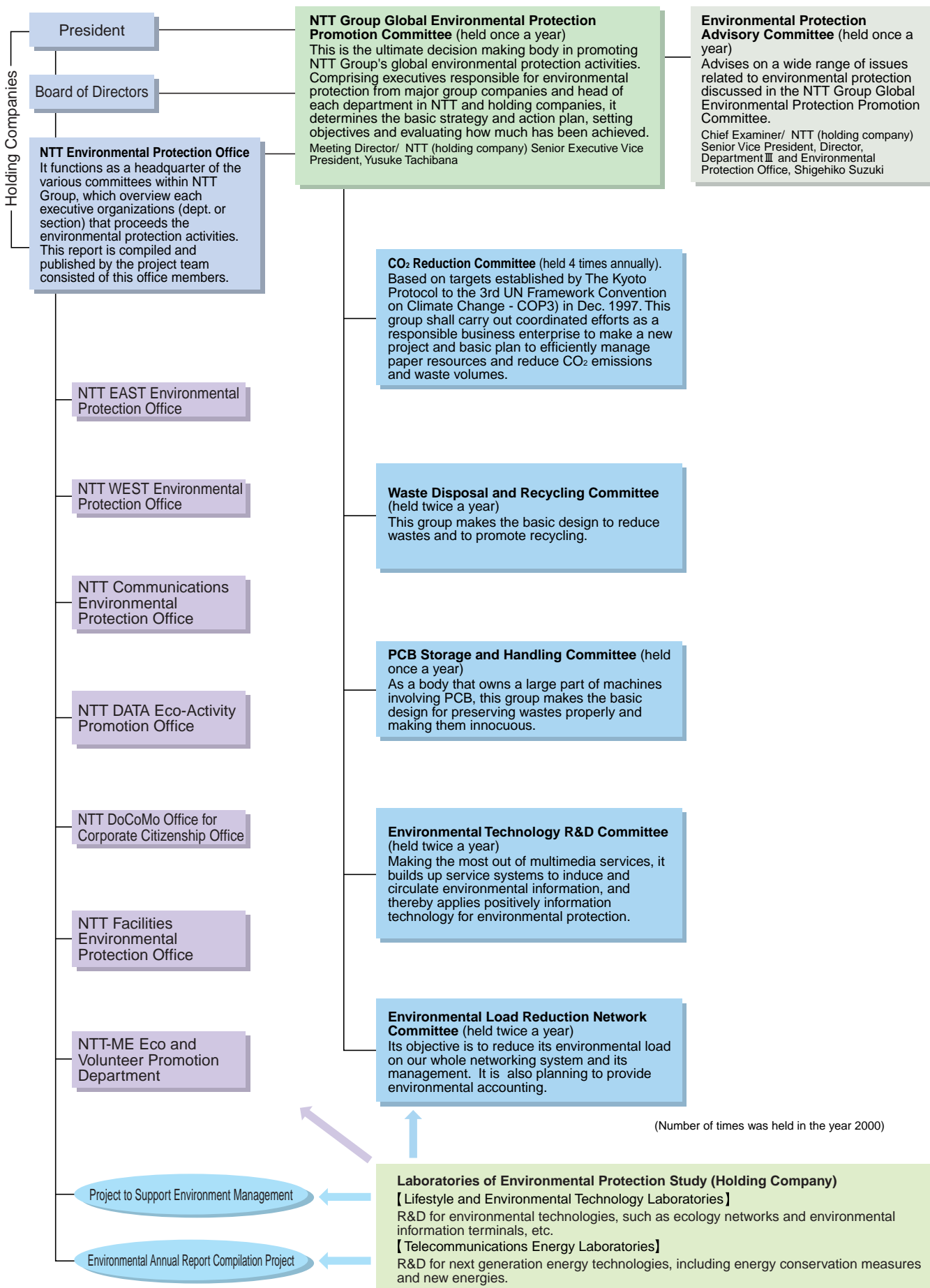
\*ISO14001  
International standard for environmental management system.

Fig.2 PDCA for promotion of NTT Group environmental protection activities





Fig.1 NTT Group organization for promoting environmental protection



mid-to-long term plans, and action goals for the year to come.

**Environmental Consulting**

In July 2000, NTT Group launched the "Project to Support Environmental Management". The aim is to implement the NTT Group's Ecology Program 21 and to support environmental protection activities, providing consulting services for all environment-related matters.

In the fiscal year 2000, we worked on supporting environmental consulting audits and the self-monitoring of eight group companies, providing skill-up opportunity for EMS staff.

**Self-Monitoring and Environmental Audits**

According to the "NTT Group Global Environmental Charter", we will establish and maintain an environmental management system. In order to establish the environmental management system and to handle it properly, self-monitoring is essential. For better auditing within the organization, we have broken down the whole auditing process into three levels. (Fig. 3)

LEVEL 1 is initial environmental auditing, which ensures proper compliance with laws and regulations. The NTT Group has complied with all laws and regulations on environmental

**\*LCA**  
Abbreviation of Life Cycle Assessment. A method of environmental assessment for a product that considers the entire process from acquisition of materials to disposal of waste. If the cost is included, LCC (Life Cycle Cost) will be used.

protection, including local ordinances and reference values specified by various agreements. The Group also regularly reports to local governments as to its regulatory implementation.

LEVEL 2 is environmental management system audits in compliance with ISO14001.

LEVEL 3 is the most sophisticated environment audit which applies LCA\* or environmental accounting.

**Self-Monitoring**

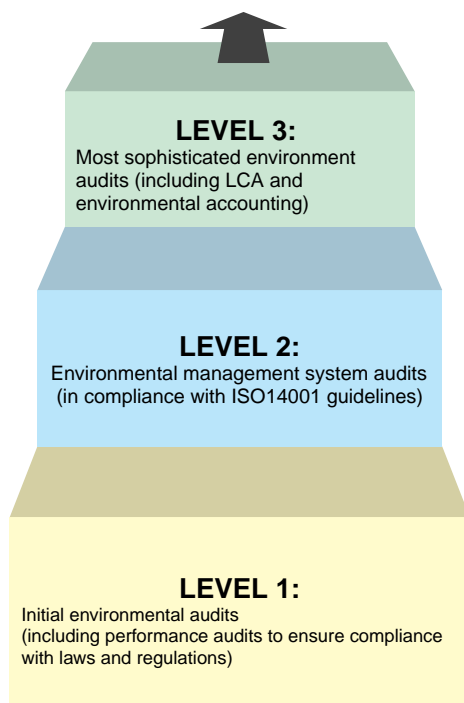
Since 1995, all business offices within the NTT Group have conducted self-monitoring at least once a year to ensure proper compliance with laws and regulations (including ordinances, agreed-upon reference values, and internal regulations and standards). NTT EAST, NTT WEST and NTT Communications, for example, conducted their auditing by using environmental check-lists covering all legal matters, on-site inspections, document inspections, and hearings. The results are reported to the NTT departments in charge of environmental protection.

**Environmental Audits**

Based on the self-monitoring results, every three to four years the environmental management system is checked to see if its activities are productive and legal, and if its rules are followed.

For other group companies, they send and collect a questionnaire to maintain the regulatory implementation. For a sample of the environmental check-list, please see Fig. 4.

**Fig.3 Level of Environmental Audits**



**Fig.4 Sample Environmental Check-list**

Category	Main Title (sample)
Environmental management	Environmental Protection Action Structure
Paper Resource Saving Policy	Office Paper Management Measure
Measures for prevention of global warming	Measures for compliance with revised energy conservation laws, implementation of daily energy conservation activities, power-receiving systems, telecommunication power sources, air conditioning, lighting, gas, oil, boilers, small boilers, oil tanks, low pollution vehicles
Waste management	Office waste, obsolete communication facilities, medical wastes, PCBs (stored and currently used), others (bridge asbestos, construction asbestos, etc.)
Protection of ozone layer	Turbo freezers, halon fire extinguishers
General issues	Water, septic tanks, office supply procurement



## Environmental Risk Management

We always face a risk that our facilities, equipment or materials which contribute to our corporate activities may possibly have an adverse influence on the environment. Therefore, it is essential to conduct risk management to ensure that the possibility of adverse affects is kept to zero. Thanks to these efforts, no penalties or fines regarding the environment were imposed on the Group in 2000.

### Abiding by Environmental Laws and Regulations

The NTT Group, which mainly conducts information services, is regulated by various environmental laws such as Waste Disposal and Public Cleaning Law\*, Law Concerning the Rational Use of Energy\*, and others shown below.

#### Waste Disposal and Public Cleaning Law

The NTT Group disposes industrial waste only with certified specialists and tracks the waste through the entire disposal process with the use of "manifest\*." We also control storage of industrial waste under strict guidelines. Some of our group companies have stricter rules on this issue, tracking the waste through the entire disposal process by GPS and inspecting the disposal process regularly.

#### Law Concerning the Rational Use of Energy\*

Our 138 facilities with large-scale telecommunication equipment and host-computers consume more than 6 million kWh annually. We manage these facilities with extreme caution, recording all the energy consumption and making every effort to reduce consumption.

#### Air Pollution Control Law\*, Water Pollution Control Law\*, Sewerage Law

We have 156 facilities regulated by our air pollution control law. Most of them are boiler facilities that produce electricity or heat, and they emit smoke in the air. We keep our emissions under the quality standard designed by the air pollution control law. We apply the same principle with the water pollution control law and sewer management law.

#### Law for Promotion of Sorted Collection and Recycling of Containers and Packaging\*

This regulation is implemented among our Group companies such as NTT EAST, NTT WEST, NTT DoCoMo, NTT DATA. Under these law, we control the amount of our packaging materials.

#### Fire Service Act\*

It is required that our oil tanks undergo regular inspection and other reports to authorities by fire and disaster management law.

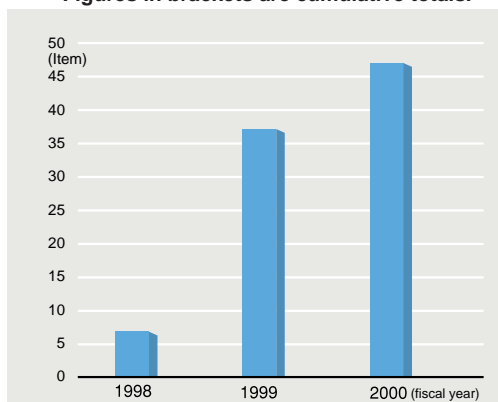
#### Prevention of Soil Contamination (Automatic Oil Leakage Detection System for Underground Tanks\*)

The NTT Group has installed underground tanks for storing fuel for auxiliary generation in various pivotal locations throughout Japan. Automatic oil leakage detection system for these underground tanks has been introduced to prevent oil leakage from the tanks. This system constantly supervises the tanks and it ensures that accidents do not happen. These measures are further strengthened through the use of double-wall structures on all newly installed underground tanks.

## Examples of ISO 14001 Certification

The NTT Group's first acquisition of ISO-14001 certification was that of the NTT Material Department in November 1997. Since then 47 organizations (as of March 2001) have acquired certification, such as 5 of NTT EAST, 10 of NTT WEST and 16 of NTT DoCoMo. (Fig. 5)

Fig.5 ISO14001 certifications within the NTT Group (as of March, 2001)  
Figures in brackets are cumulative totals.



#### \*Waste Disposal and Public Cleaning Law

It regulates how to dispose industrial wastes. This was enacted in 1970 and revised in 2000.

#### \*Law Concerning the Rational Use of Energy

It defines basic policies regarding energy preservation. This was defined in 1980 and revised in 1998.

#### \*Air Pollution Control Law

This 1968 law establishes emission standards for industrial soot and smoke as well as exhaust gases from motor vehicles, in order to protect public health.

#### \*Water Pollution Control Law

This 1970 law regulates industrial waste liquids, promotes cleaner drainage from households, and establishes liability without negligence for those polluting water.

#### \*Manifest

It is a card tracking disposal process for industrial waste. Such processes are required for all the industrial waste since December 1, 1998.

#### \*Sewerage Law

It was enacted in 1958 in order to maintain a high standard of public water safety by promoting a well-maintained sewer system.

#### \*Law for Promotion of Sorted Collection and.....

It promotes disposal by classifying package materials, and establishes liability for recycling.

#### \*Fire Service Act

It was enacted in 1948 in order to minimize damages caused by fire and earthquakes.

#### \*Automatic oil leakage detection system for underground tanks

It has been introduced in order to prevent oil leakage from underground tanks. This system constantly supervises the tanks, and ensures that accidents do not happen.



# Environmental Accounting

<http://www.ntt.co.jp/kankyo/e/2001report/2/221.html>

Environmental accounting, for the NTT Group, is a plan to grasp and disclose the costs necessary for environmental preservation and their effects on our industry activities. The NTT Group hopes that environmental accounting will increase understanding of the information sharing industry even more and will continue its efforts step-by-step.

## Purpose of Environmental Accounting

The NTT Group has implemented an environmental management system and disclosed the environmental performance of activities and the results of following its own environmental procedures and environmental goals.

Moreover, we are aiming at more transparent business operations by disclosing environmental accounting in environmental reports.

We hope to use environmental accounting effectively as an important index of judging if procedures, purposes and objectives relating to the environment have been achieved as well as a tool for the improvement of our environmental performance.

## Introduction of Environmental Accounting

In 2000, for the first time, the NTT Group tried out environmental accounting to evaluate the costs of investments and expenses related to environmental preservation and their results as a link to the accountability which businesses should achieve.

Particularly, we evaluate the results of the decreased environmental burden on society as a whole by the information sharing services.

## Environmental Accounting Methods and Results

As our main efforts, we can give examples such as risk management activities of costs of environmental protection for each NTT Group company, researching the social value of information sharing services and researching the effects of environmental preservation.

### 1. Scope of Totalization

NTT (holding company), NTT EAST, NTT WEST, NTT Communications, NTT DoCoMo Group (the NTT DoCoMo Group is NTT DoCoMo and eight regional DoCoMo companies: Hokkaido, Tohoku, Tokai, Hokuriku, Kansai, Chugoku, shikoku, and Kyushu.), NTT DATA

### 2. Period of Totalization

April 1, 2000 ~ March 31, 2001

### 3. Method of Totalization

(1) Totaled using "Developing an Environmental Accounting System (Year 2000 Report)" from the Office of the Environment (now, Ministry of the Environment) published in May 2000.

(2) Environmental cost is totaled after separating it into "facilities investment" and "expenses." Furthermore, personnel expenses are included in expenses, but depreciation was not.

(3) The amount of the economic effects were drawn from "Profits Gained from Recycling," "Reducing Monetary Expenses of Electricity by Curtailing Energy," and "Reducing Expenses through Reuse and Recycling," which are all easily understood. We have not totaled the unseen effects or effects of avoiding risk, for which the preconditions of independence within the company will become important.

(4) The cost of facilities investment and personnel expenses, where the entire amount could not be judged as an environmental cost, were calculated through difference totalization\* or percentage totalization\* (proportional totalization).

(5) Basic research and development is carried out by NTT (holding company), while applied research and development is carried out by the group companies.

(6) We have totaled the research and development related to the environment, such as low-energy devices, clean energy, recycling, and the promotion of the distribution of environmental information.

#### \*Difference totalization

Totaling environmental preservation costs, when they compositely relate to costs of other purposes, after removing the costs outside of environmental preservation.

#### \*Percentage totalization

Totaling only the percentage of the effects of environmental preservation within the effects of a certain cost.



#### 4. Results of Totalization

(1) The environmental costs corresponding to "Guidelines for the Introduction of Environmental Accounting" from the Office of the Environment and the totaled results of economic effects are shown in Charts 1 and 2.

(2) The effects of environmental preservation are shown together with the specific efforts on the pages shown in Chart 2.

(3) The environmental cost total was ¥54.65 billion. (about ¥16.1 billion in investments and ¥38.55 billion in expenses)

(4) The economic effects were ¥25.72 billion.

### The Future Direction of Environmental Accounting

In the future we would like to make environmental accounting even more complete in the following ways:

(1) Continued examination of calculation methods and improved accuracy for grasping costs and effects.

(2) Future efforts for calculation of unseen effects such as the effects of avoiding risk and the social environmental effects of information sharing services.

(3) Not just a value of profit and loss, but implementing better plans as effective tools for practicing environmental management, such as grasping the efficiency index. (for example, reduced environmental burden ÷ environmental preservation costs)

(4) Overlap the creation of unified guidelines for related companies and the examination of data gathering for more accurate "environmental accounting linked to the NTT Group".

(5) Ensuring accuracy comprehensiveness by incorporating the opinions of third parties.

Environmental accounting is an important way of thinking to show compliance with environmental indexes. Our company is creating plans to use even more useful tools for managing environmental accounting.

Chart 1 Fiscal year 2000 costs and effects of NTT Group environmental preservation

Item	Environmental preservation cost		Environmental preservation effect
	Environmental investment	Environmental expense	Material effect
	¥100 million		
(1) Total cost within business areas	95.0	196.5	◆ Amount of CO <sub>2</sub> reduced: 110,000t-CO <sub>2</sub>
Pollution prevention costs	5.5	27.3	◆ Amount of old telephone books collected: 58,000t
Global environmental preservation costs	71.0	8.7	◆ Amount of dismantled telecommunication equipment reduced: 37,000t
Resource circulation costs	18.6	160.4	◆ Amount of used telecommunications devices and batteries collected: 19.92 millions of unit
(2) Fluctuation costs	0.0	24.8	
(3) Management activities costs	0.1	24.3	
(4) Research and development costs	44.5	131.9	
(5) Social activities costs	21.4	8.0	
(6) Costs corresponding to environmental damages	-	-	
Total	161.0	385.5	

Chart 2 Effects of environmental preservation

Item	Page	Economic effect
		¥100 million
Amount gained from recycling	28 ~ 29	54.1
Reduced expenses by curtailing energy	26 ~ 27	15.8
Reduction of waste disposal expenses with recycling	28 ~ 30	0.1
The amount of reduced expenses of new purchases through reuse and recycling of dismantled telecommunications facilities	28 ~ 29	184.9
Other economic effects	-	2.3

Chart 3 Fiscal year 2000 NTT Group investments and research and development costs

	¥100 million
Total amount of investments during the period	26,658.5
Total amount of research and development costs during the period	4,060.2

Note: The total amount of investments and research and development costs for the period is the total value from the interrelated NTT Group companies.

# The Guidelines for Procurement, R&D, and Design

<http://www.ntt.co.jp/kankyo/e/2001report/2/231.html>

The NTT Group has established "Green Procurement Guidelines," "Green R&D Guidelines" and "Green Design Guideline for Buildings" to promote the development of environmentally aware business activities. (Fig. 1) These three sets of guidelines reflect three unique characteristics of the NTT Group.

## The Guidelines

### Characteristic #1: Does Not Have a Manufacturing Division

Because the NTT Group has no manufacturing divisions, it is necessary to purchase products from suppliers. We have therefore developed Green Procurement Guidelines from the efforts to procure environmentally friendly products, and they are being implemented by our procurement divisions.

### Characteristic #2: Has a Research and Development Division

The R&D division is engaged in the research and development of services, systems and products, but it is necessary to plan newly developed products from the development stage to consider the environment. Our Green R&D Guidelines were established to conduct environmentally friendly research and development.

### Characteristic #3: Owns a Huge Number of Buildings Nationwide

By incorporating environmentally friendly building design from the initial stage, it is possible to achieve a considerable reduction in environmental impact in later operational stages. From this viewpoint, we have established our Green Design Guideline for Buildings and are applying them to the construction of NTT Group buildings and facilities.

ment. (Fig. 2, Photo 1)

The NTT Group as a whole procures approximately 100,000 specific items, and we use approximately 250 businesses on a regular basis to provide basic supplies. These supplier and item assessments are based on our "corporate policy" and "product assessment."

As of March 2001, we have conducted corporate policy assessments of 40 companies. Product assessment was conducted on approximately 10 new procurement products, while assessments of spec sheets for approximately 20 existing products were conducted when their specifications were revised. We have also received approximately 60 cases for assessment to coincide with VA\* proposals.

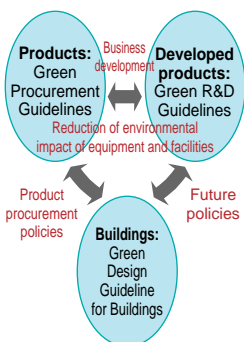
## Green R&D Guidelines

In March 2000, the NTT Group adopted "Green R&D Guidelines" (Photo 2) for research and development of new services, systems and products. These guidelines are our response to the emergence of a "recycling-based society."

By following these guidelines from the initial stages of R&D, we aim to reduce harmful effects on the environment in ways such as controlling waste and promoting recycling.

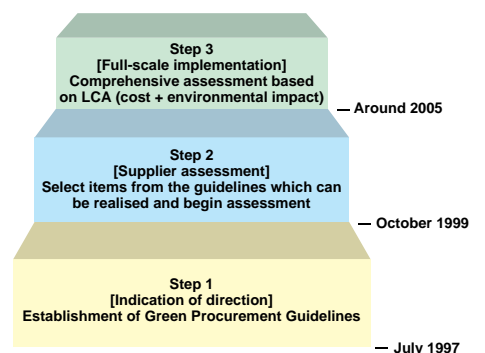
Furthermore, detailed guidelines will be drawn up beginning with Energy R&D Guidelines, then detailed guidelines for harmful substances, detailed guidelines for indication of material names and detailed guidelines

Fig.1 NTT Group environmental guidelines



\*VA Value Analysis. Proposals for improvements from suppliers including price reductions, improved functions, etc., for material/components and articles which we purchase on a continuous basis.

Fig.2 Steps for implementation of Green Procurement Guidelines





for saving resources, with the process scheduled for completion by 2004.

For example, the Energy R&D Guidelines were established in March 2000 in view of such needs, with the aim of promoting reduced energy consumption and lessening the environmental impact of R&D throughout the NTT Group. (Fig. 3)

In order, however, to counter expected increases in energy consumption, it is essential to reduce the amount of energy consumed by newly developed communication facilities. Adoption of energy-saving measures from the initial stages of R&D is a vital portion of our environmental agenda.

## Green Design Guideline for Buildings

The NTT Group owns approximately 30,000 buildings throughout Japan. Significant amounts of energy are consumed and waste generated in the process of construction, demolition, refurbishment and repair of these buildings.

The Green Design Guideline for Buildings established by NTT in 1997 and revised in 2000, outlines our concepts for environmentally sound building design and summarize items to be considered in developing those concepts in more concrete terms. (Fig. 4, Photo 3) These guidelines reflect basic considerations for the design and planning stages of construction projects with the objective of reducing the impact on the global environment throughout

the entire life cycle of the building.

Furthermore, each NTT Group company is creating a guide for Green Design Guideline for Buildings.

The Green Design Guideline for Buildings define seven strategic concepts for NTT building design (1) extending building life, (2) restricting use of halon and CFCs, (3) restricting use and removal of harmful substances, (4) conservation of resources and energy, (5) reduction of waste, (6) promoting reuse and recycling and (7) consideration for local environment.

## Green Purchasing

In line with our policy to prioritize environmentally friendly materials and components, the NTT Group makes an effort to take environmental impact into consideration when purchasing office supplies such as copy paper, stationery and office equipment.

Within the NTT Group, each group company and office has established its own policies to actively promote Green Purchasing. NTT (holding company), NTT EAST, NTT WEST, NTT Communications, NTT DoCoMo, and NTT DATA participate in the Green Purchase Network\* (GPN), adopting GPN product guidelines to promote procurement of environmentally friendly office supplies.

Within all office products, the percentage of ecologically friendly products on the procurement list has reached 53%.

Photo 1

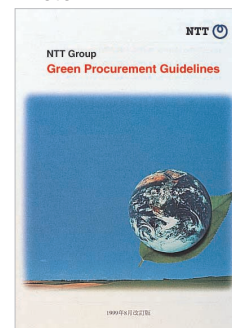


Photo 2

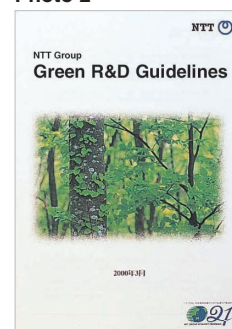


Photo 3

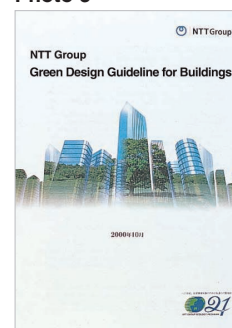


Fig.3 Steps for implementation of Green R&D Guidelines

\* R&D management reflecting environmental concerns

\* Development of products with reduced environmental impact

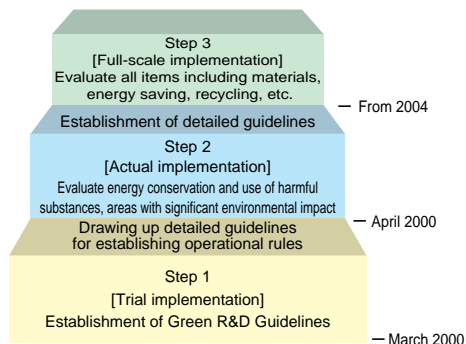
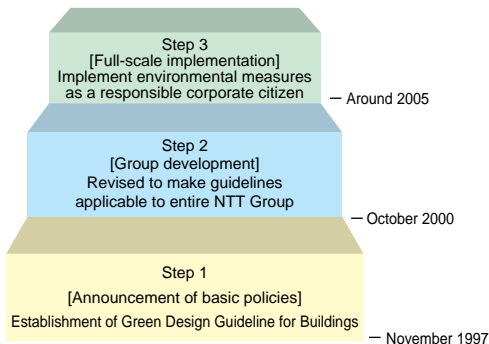


Fig.4 Steps for implementation of Green Design Guideline for Buildings



### \*Green Purchase Network (GPN)

A nationwide network of consumers, businesses, and government agencies who voluntarily promote priority purchasing of environmentally friendly products and services.



# Paper Resource Measures

<http://www.ntt.co.jp/kankyo/e/2001report/2/241.html>

Protection of forests is a major topic in globally. This is because it holds the power to relieve air pollution and to hold off the progression of global warming. The NTT Group is making a significant effort to minimize consumption of paper resources, making an effective contribution to protecting our valuable forests.

## The Utilization of Recycled Paper and a Reduction of the Use of Virgin Pulp

### Efforts with Telephone Directories

Through the services to its customers, the NTT Group consumes large quantities of paper resources. In particular, some 125 million tele-

phone directories a year are published, consuming approximately 150,000 tons of paper. The NTT Group has been working since 1973 to economize paper resources. We have put a special effort in controlling the amount of virgin pulp used, reducing the amount from 90,000 tons in 1993 to 58,000 tons in 2000. In addition to this, according to the results of improvements in the percentage of used paper composition, we were able to raise the rate to 60%. (Fig. 1)

We are working to reduce our use of forest resources through various efforts such as revising the method of publication for Hello Pages, calculating an appropriate number to publish, and publishing a CD-ROM telephone directory\*.

### Telephone Directory Closed Loop Recycling

The "Telephone Directory Closed Loop Recycling" system which started this year aims at cyclically recycling old telephone directories into new telephone directories. In order for this recycling system to work efficiently, the collection of old telephone books is very important (Fig. 3). Therefore when new ones are delivered, we collect the old telephone directories.

Moreover, in December 1999 we began the "Eco-Challenge! Telephone Directory\*," an activity to advance environmental measures for telephone directories (Photo 1).

\*Telephone directories are published in periods of twelve months or eighteen months, depending on the year.

#### \*CD-ROM telephone directory

A service to find telephone numbers through a CD-ROM (under testing)

#### \*Eco-Challenge! Telephone Directory

Website address is <http://www.tpnet.nttds.co.jp/networks/kanky>

Fig.1 Year-long amounts of paper used and virgin pulp used and the rate of used paper incorporation

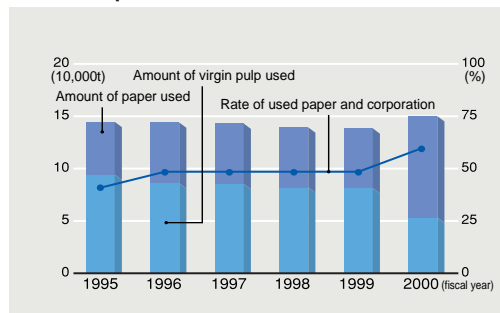


Fig.2 Telephone directory closed loop recycling (CLR)

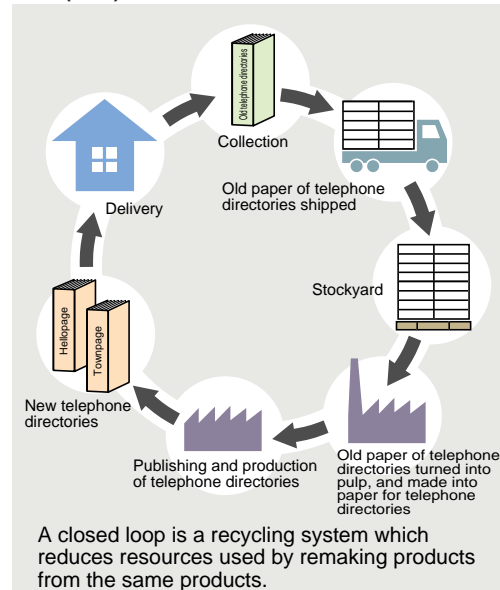


Fig.3 Amount of old telephone directories collected

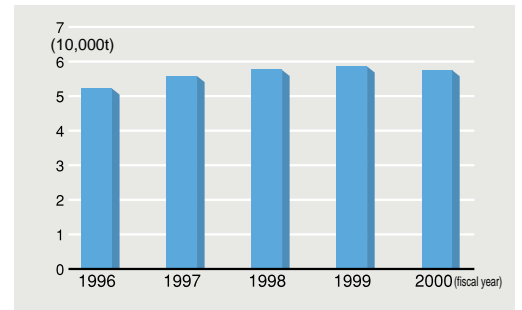
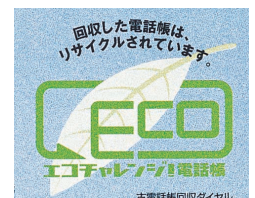


Photo 1 This logo mark identifies our Eco-Challenge! Telephone Directory





### Efforts Within the Company to Utilize Recycled Paper and Reduce Virgin Pulp

We are utilizing recycled paper in various products. As for telegram boards our objective is to make the core of the boards from 100 % used paper and have over 40% of the entire board composed of old paper. Furthermore, the recycled paper content in customer invoices and invoice envelopes has reached 40 to 50%. Still we are raising the effects of reductions steadily by working intensely to reduce the use of virgin pulp within the company. We are including the meaning of raising each employee's awareness of paper resource reduction, introducing wood-free paper (100% Kenaf\*) for business card materials depending on the office, and making unified efforts across all companies.

Fig.4 Screen for TOWNPAGE



### Utilization of Electronic Media and Low-Impact Raw Materials

#### Utilizing the Internet

The NTT Group is expecting results by having widespread use of "TOWNPAGE," (Fig. 4) the Internet version of the telephone directory. Likewise, we are offering billing information such as monthly statements and telephone statements through the B-EDI Service. (Fig. 5) This B-EDI service can be downloaded through INS-Net, and we provide the needed data transmission completely free-of-charge.

#### Relieving the Impact on the Environment and Humans

We are promoting "Green Procurement," which uses raw materials that do not have an effect on the environment and humans. Furthermore, we are controlling the creation of harmful materials the like dioxin by using the material "OPS film\*" (Photo 2) in the windows of invoice envelopes. We are using materials which comply with Welfare Ministry levels in the cloth for Winnie the Pooh DENPO (Photo 2) and Doraemon DENPO.

#### \*Kenaf

Hibiscus cannabinus L. An annual plant which is gaining notice as a raw material for tree-free paper. It also absorbs large amounts of CO<sub>2</sub> through excellent photosynthesis.

#### \*TOWNPAGE

The Internet address is <http://english.itp.ne.jp>

#### \*OPS film

A plastic film which will not produce dioxin or other harmful materials even if it is burned.

Photo 2 Invoice envelope using OPS film

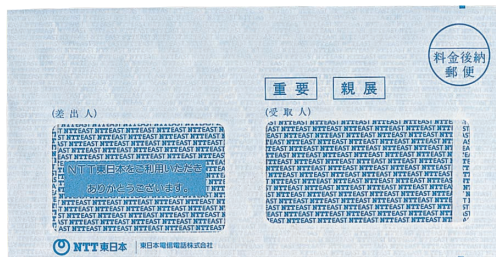


Fig.5 Image of B-EDI service

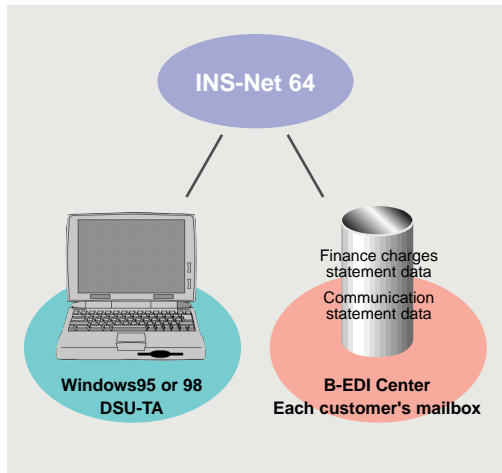


Photo 3 Winnie the Pooh DENPO



# Preventing Global Warming

<http://www.ntt.co.jp/kankyo/e/2001report/2/251.html>

With worldwide rise of the concern about global warming, reducing emissions of carbon dioxide (CO<sub>2</sub>) has become the most crucial goal in recent years. The NTT Group has considered tackling this issue as one of its corporate missions and has been engaged in various efforts to reduce consumption of electric power.

## Total Power Revolution (TPR) with the NTT Group

The TPR\* campaign has been implemented since October 1997 incorporating a decade worth of efforts to reduce consumption of electric power made by individual branches and departments into sweeping measures as a coherent group. This campaign can be classified into four major areas;

### 1. Energy Reduction Through R&D

We are advancing a wide area of research relating to changing communication devices to low power consumption and to the creation, conversion, transmission, and collection of energy.

### 2. Introduction of Facilities for Electricity Reduction

We are comprehensively researching and appropriately implementing methods for utilizing facilities designed for low energy consumption.

### 3. Use of Facilities for Electricity Reduction

We are managing the energy for each company and each office building-by-building and are implementing energy cost management within our daily activities.

### 4. Installation of an Optimal Energy System for Electricity Reduction

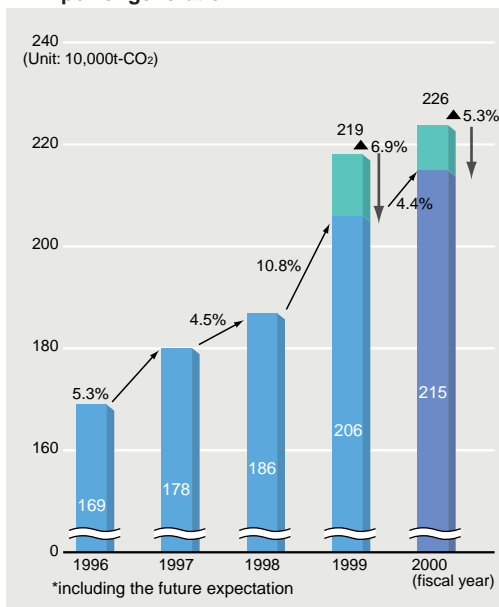
We have introduced co-generation\* systems (CGS) which have high rates of energy production efficiency and waste heat recovery. In 2000, we improved our rate of electric self-sufficiency to 3%, twice that of our previous results.

We also proposed a "Vision for Electric Energy Reduction for 2010" in February 1998, to ensure this campaign's effectiveness. The TPR campaign made it possible to slow down

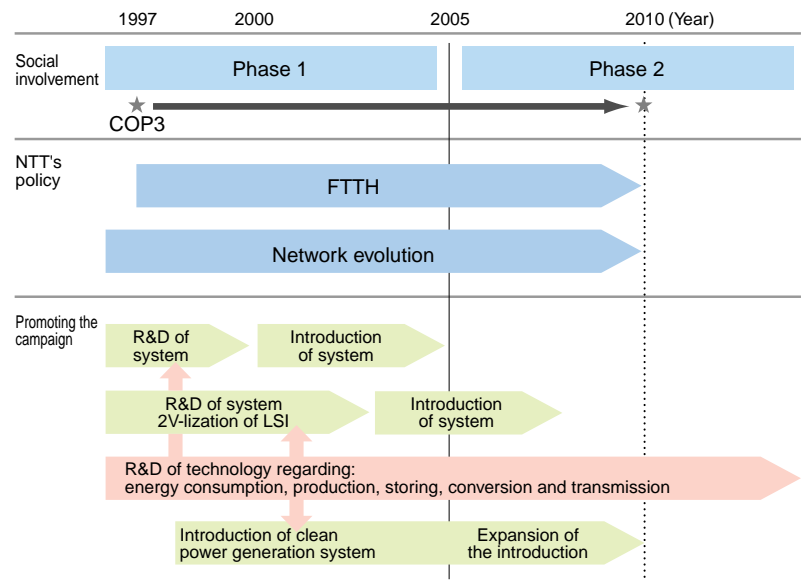
**\*Total Power Revolution**  
A campaign to reduce consumption of electric power, which the NTT Group has promoted since October 1997.

**\*Co-generation**  
An energy preservation system to use heat energy produced by gas turbines and diesel engines.

**Fig.1 CO<sub>2</sub> emissions produced in connection with NTT Group electricity consumption and power generation**



**Fig.2 Progress of TPR campaign**





the increase in CO<sub>2</sub> emissions in fiscal year 2000 to 4.4 %, less than half of the estimated 9.7 %. (Fig. 1)

The NTT group hopes to achieve its target by 2010. (Fig. 2)

## Environment-Friendly Facility "Forest of CRED"

In April 2001, NTT Urban Development Co. opened "Forest of CRED," an open-air garden inhabited by birds, fish, insects and animals. This garden is located on the sixth floor of NTT Motomachi CRED Building in Hiroshima City. A recycling filtration system provides clean water, which creates an ideal environment for killifish and fireflies. Moreover, some thirty nest boxes are planted on box trees and other evergreen trees, and visitors may observe birds hatching eggs. This facility provides fresh air in the urban area as well as a recreation spot. (Photo 1)

## Introduction of Photovoltaic and Wind Power Generation Systems

In March 1996, the NTT Group introduced one of the world's largest photovoltaic power generation system, which can produce 555 kW, at the present NTT EAST Training Center in Chofu City, Tokyo. (Photo 2) By March 2001, the NTT Group also had installed an additional 89 photovoltaic power generation systems in various areas of Japan. These facilities supply approximately 1,600,000 kWh of electricity annually, which translates into a reduction of

Photo 1 "Forest of CRED" nature existing in the middle of an urban area



some 570 tons of carbon dioxide emissions. In addition, we have six wind power generation systems. Our efforts continue on this front.

## Introduction of Stand-alone Power Systems

We have introduced stand-alone power systems based on the use of photovoltaic power generation in NTT DoCoMo's wireless station at Chihoku-toge in Hokkaido and eight other locations since December 1999. Analysis of past meteorological data and research on supply reliability using power generative simulations have made it possible to create a highly reliable electric power system from photovoltaic energy.

## Anti-Idling Campaign and Minimizing CO<sub>2</sub> Emissions from Company Vehicles

Helping Japan's target of reducing 6 % of emissions of greenhouse gases set in the 1997 Kyoto Protocol,\* the NTT Group has set its own target to decrease the amount of CO<sub>2</sub> emitted by company vehicles below the 1990 level. To do so, we have promoted an anti-idling campaign (TAKO ZERO campaign) (Photo 3), introduced low-pollution vehicles and reduced the number of vehicles in our fleet by means of efficient use. These efforts will curb the amount of emissions of blacksmokes and nitrogen oxide (NO<sub>x</sub>)\* as well as CO<sub>2</sub>.

### \*Kyoto Protocol

An official agreement of the United Nations Framework Convention on Climate Change held in Kyoto in 1997. The agreement has set a target of reducing the amount of greenhouse gases emitted by thirty eight nations and the EU.

### \*NO<sub>x</sub>

It can cause health hazards. It produces photochemical oxidants through photochemical reactions caused by ultraviolet rays.

Photo 2 Photovoltaic power generation system



Photo 3 "TAKO ZERO" anti-idling campaign mark





# Recycle Propulsion

<http://www.ntt.co.jp/kankyo/e/2001report/2/261.html>

It has been 10 years since Law for Recycling began. Recycling is a major project in the wake of the Law for Recycling of Specified Kinds of Home Appliances\* that began in 2001. The NTT Group is continuing to recycle various things – starting from communication facilities – with maximum efficiency.

## Re-Using Dismantled Communication Facilities

The NTT Group is re-using things which are capable of being recycled such as telephone poles, public phones and communication cables by registering information to an in-house LAN and sharing information.

Also the NTT Group is recycling copper, iron and other metals used in communication cables and facilities. It is also promoting the use of concrete electric poles and recycling batteries.

Recycling plastics is a major undertaking in the current recycling market, because of the costs of separating new materials. The NTT Group is trying to proceed under the principle "action is the only alternative." For recycling plastics, the NTT Group first looks to see if recycled materials can be used in-house before

attempting to sell them in the open market-place.

Also, the NTT Group contributes plastic to be used for cement or steel production as energy recovery. The NTT Group takes what is called the "Three R's" program to dismantling – Reduction of waste volume, Reuse and Recycling. In addition, the group is working to circulate materials as much as possible, and avoiding the creation of waste.

## Uniform Recycling

NTT WEST is recycling used uniforms as soundproofing material for automobiles. Instead of discarding them, uniforms are collected and sent to a subcontractor four times a year. There, they are cut, garnetted (recycled into fiber components) and made into felt. These felt materials are then made into soundproofing materials used between the body and seating of a car. (Photo 1) To avoid the unnecessary release of dioxins in the air, NTT WEST enforces recycling, a step toward a society where materials are recycled\*. This know-how is being introduced and actively promoted to each group inside the entire NTT company.

### \*Law for Recycling

The formal name is "Law for Promotion of Effective Use of Resources". It was begun in 1991 to promote recycling.

### \*Law for Recycling of Specified Kinds of Home Appliances

It is the law enforced to establish a "recycling-based society." The four targeted objects are air conditioners, televisions, refrigerators and washing machines.

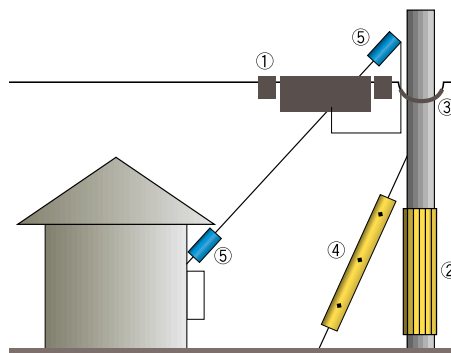
### \*Energy recovery

The technologies collects the heat resources such as steam and warm water to warm water and the energy for the coolers by burning abandoned plastics.

### \*Recycling-based society

Society regulates waste disposal; and commercial goods should be re-circulated as resources.

Fig.1 The case for the material recycling of the plastic goods



Dismantled equipment/components	Recycled items
Connection terminal boxes	① Connection terminal boxes
	② Telephone pole indication panels
	③ Spiral sleeves
Support line guards	④ Support line guards
Black PVC telephones	⑤ External line clasps

Photo 1 Used uniform recycling



## "DoCoMo Come-Back" Hardware Recycling Program

The components of NTT DoCoMo Group hardware components are completely recyclable. Even after its usefulness is over, it is an efficient source of its own materials. To realize this plan, NTT DoCoMo Group actively promotes a collecting and recycling campaign called, "DoCoMo Come Back." (Photo 2, Fig.2)

The used goods such as cellular phones, the terminal units of car telephones, battery packs

and chargers are collected at NTT DoCoMo shops in collaboration with customers.

Cellular phones and PHS phones are sorted by recycling companies and processed to be recycled by burning and pulverizing. Gold and silver are extracted from the base of the cellular phones. The metal parts of the batteries are processed into lumps of nickel, cobalt and cadmium by separating and smelting. Nickel becomes stainless steel, cobalt is converted into magnets for speakers and cadmium is processed into Ni-Cd batteries. (Fig.3)

Recycling these materials is certainly a first step toward realizing a "recycling-based society".

## Food (Kitchen Refuse) Recycling

NTT-ME commercialized the Bio-Runner, a kitchen refuse high speed fermentation disposal machine which recycles a kitchen refuse into fertilizer, improved soil and feed. The Bio-Runner is a disposal machine which is able to ferment all kinds of kitchen refuses in 24 to 48 hours by using bacterial materials (several dozens kinds of bacteria) without creating any harmful materials.

Things generated from the machine are confirmed safe for human use, and can be used as material for the organic fertilizer or material to improve the soil. This is a recycling system which realize a circulating society without any environmental pollution.

Photo 2 "Docomo Come Back" poster



Fig.2 The situation of the collecting of terminal units NTT DoCoMo Group

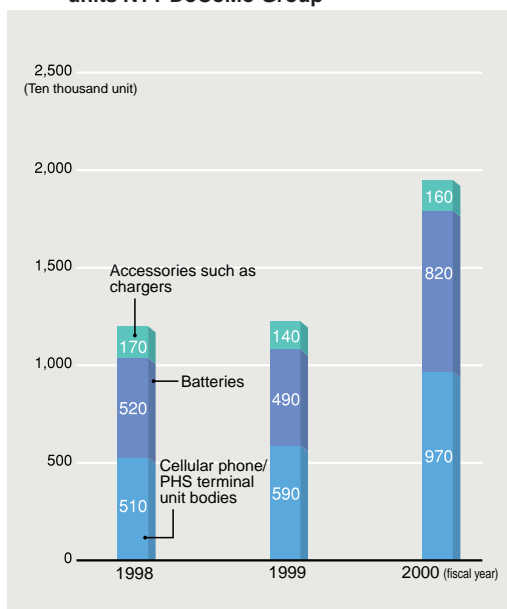
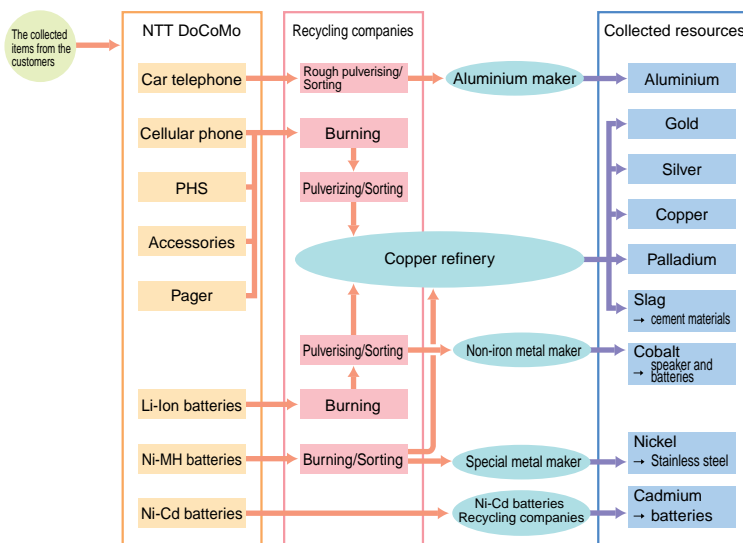


Fig.3 Recycling flow of the terminal units



# Waste Measures

<http://www.ntt.co.jp/kankyo/e/2001report/2/271.html>

In order to prevent global warming and poisonous gas emissions, it is urgent that the NTT Group controls waste and deals with appropriate waste disposal.

The NTT Group is actively dealing with waste with the intention of not using our limited resources.

## The Treatment and Management of PCBs

PCB\* (polychlorinated biphenyl) is a poisonous chemical which does not decompose easily in the environment and accumulates inside the fat of the living things. Japan banned its production in 1974. However, since then there have been no radical reforms, and independent reduction has become an obligation for businesspeople.

From these conditions, NTT has promoted research to deal in-house with the PCBs which it stores and manages. It has become possible to implement a treatment to make PCBs harmless through a method of chemical decomposition that came from the reforming of waste treatment methods. Now we can safely breakdown currently stored PCBs and have decided to avoid the current conditions of risking envi-

ronmental pollution. In the future, we are planning to begin creating treatment with the cooperation of local governing bodies.

## Tracking Waste Treatment Procedures by GPS

Illegal dumping of industrial waste is developing into a social problem, but with a revision of the law, it has been decided that people in the waste elimination industry will check on waste treatment through the "Industrial Waste Management (Manifest\*)" which was created by the people in the treatment industry. However, the situation is still not perfect for stopping illegal dumping as the checking is done only on paper.

NTT-ME is working on the selection of businesses and duties of management for the treatment of industrial waste created in the Kanto Koshinetsu area of NTT EAST, and we have selectively witnessed the processes in order to check the treatment conditions for this waste.

As a result, NTT-ME introduced a system which can successively check through the Internet the situation of waste treatment and transport using GPS (Global Positioning System) and digital images, and it has commenced offering it as "the Industrial Waste Image Tracking Service." The disposal workers, even though they are there, can check the progress of treatment through recorded images and routes. (Fig. 1)

The following effects have been obtained through this service:

1. The prevention of illegal dumping by directing transport vehicle behavior and packing methods.
2. Verifying legal and appropriate treatment by analyzing the treatment process through the images and weight.

If this service is used widely, it will become a strong preventative measure against illegal dumping, and at the same time by actively advancing resource collection and recycling. In this way, we can contribute to a cyclical society.

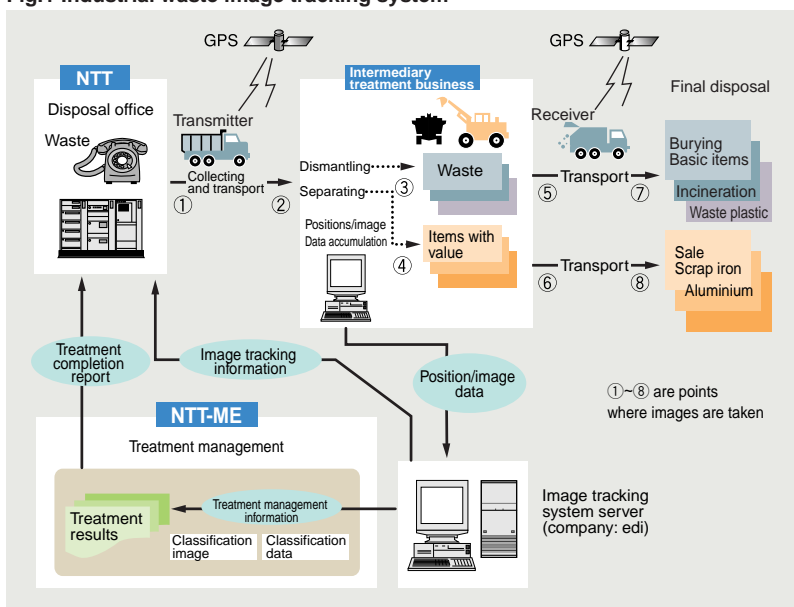
**\*PCB**

Polychlorinated biphenyl. It has been used in transformers and condensers for its excellent insulating quality. However, it is highly poisonous, and it has recently been noticed as an environmental hormone.

**\*Manifest**

Industrial waste management charter which confirms the flow of industrial waste when the treatment of building waste is assigned. Applied widely to all industrial waste from December 1, 1998.

Fig.1 Industrial waste image tracking system



# Protecting the Ozone Layer

<http://www.ntt.co.jp/kankyo/e/2001report/2/281.html>

The problem of ozone holes threatens the existence of all animals on the earth and is an important global topic. We are actively taking steps with CFC regulation activities to protect the ozone layer, and we are dealing with the CFCs which we already hold in a safe manner.

## Replacement of Turbo Freezers and Maintenance of Internal CFC Banks

### Turbo Freezers Which Used Specified CFCs

In 1992, the Fourth Conference at the Parties to the Montreal Protocol set forth the schedule for a reduction of specified CFCs\*. It completely abolished specified CFCs by the end of 1995 and abolished substitute HCFCs in principle by 2020. Following this, the NTT Group determined our basic policies in November 1992. They are to cease installation of new turbo freezers using specified CFCs and to replace the majority of existing turbo freezers by the year 2000. When this decision was made, 166 turbo freezers required replacing in four companies of the reorganized NTT. Reductions accumulate every year, and as of year-end 2000, only 4 remain. The rate of replacement has reached 98%. (Fig. 1)

### CFC Banks and Specified CFC Treatment

Since July 1994, specified CFCs have been managed effectively at CFC banks which the NTT Group's internal CFC bank machinery controls. Destruction of specified CFCs was carried out in fiscal 2000. There are about 46 tons of specified CFCs held in the five CFC banks throughout Japan. This is dealt with appropriately based on the CFC Decomposition Guidelines\* prepared by the former Air Quality Preservation Bureau of the Environmental Agency. For dealing with specified CFCs, we selected a heated steam reaction method and combustion method of decomposition for its safety and high decomposition efficiency. (Fig. 2)

#### \*specified CFCs

CFC. A material which damages the ozone layer of the stratosphere.

#### \*substitute CFCs

HCFC. Chemical developed as a substitute for specified CFCs. They do not harm the ozone layer, but the effects causing global warming are billions of times higher than that of CO<sub>2</sub>.

#### \*CFC Decomposition Guidelines

Guideline for dealing with specified CFCs which were prepared by the former Environmental agency.

Fig.1 Replacement schedule for turbo freezers using specified CFCs

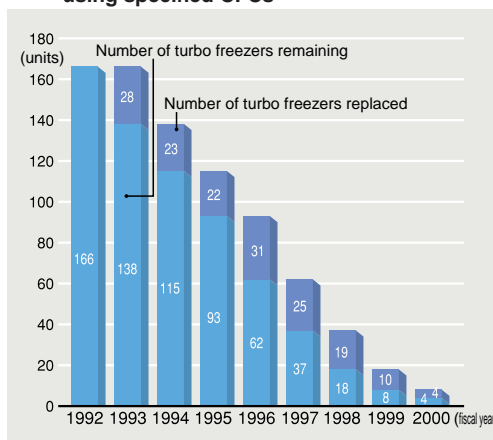
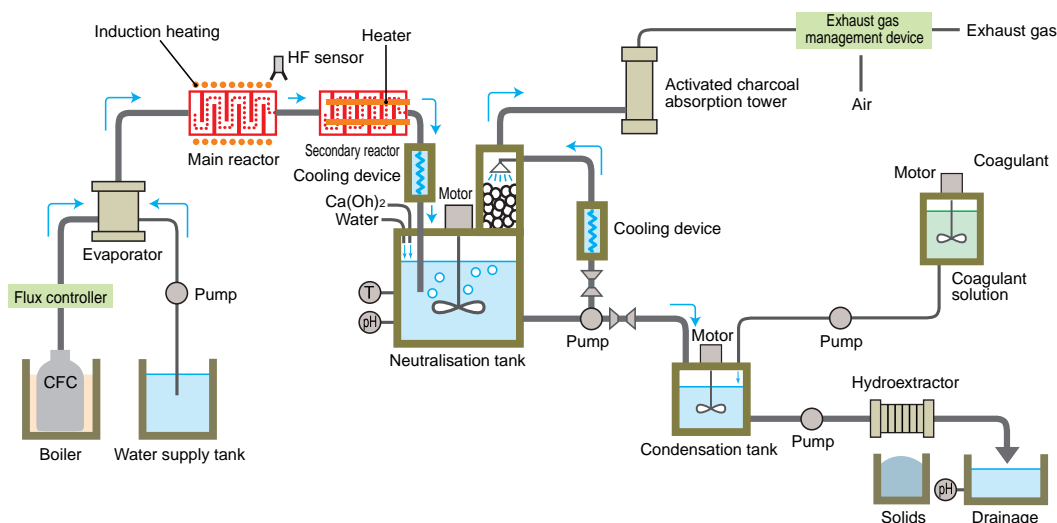


Fig.2 System flow for CFC destruction machinery by the heated steam reaction method





# ■ Minimizing Environmental Risks

<http://www.ntt.co.jp/kankyo/e/2001report/2/291.html>

NTT Group, a leading company in information sharing services, actively participates in investigating and researching the interactions between electromagnetic waves and various environmental issues, which make people worry about cellular telecommunications.

## Research Regarding Electromagnetic Waves

With the spread of cellular phones, the proliferation of radio transmissions created by cellular phones and base stations has led to mounting concerns about the adverse effects of radio waves upon humans. When considering such effects, we need to separate physiological effects on humans as living organisms from the effect on electronic medical equipment, such as pacemakers, and other electronic devices.

### Utilization of Environmentally-Friendly Radio Waves

The International Commission on Non-Ionized Radiation Protection (ICNIRP) has assessed research results and presented basic restriction values as safety guidelines for using radio waves. These values are far below those which are presumed to adversely affect humans. The WHO is recommending using these as the maximum limitations for safe use of electromagnetic waves. Based upon various countries' recommendations including ICNIRP\* guidelines, the Telecommunications Technology Council has submitted reports outlining guidelines for protecting humans when using radio waves in Japan. Following this, the Ministry of Public Management, Home Affairs, Posts and Telecommunications has already systematized the creation of guide values for base stations, and has announced that it will implement rules for cellular phones from 2002.

NTT DoCoMo thinks that it is most important to utilize radio waves strictly in compliance with these guidelines.

DoCoMo cellular phones are designed so that electromagnetic power absorbed by human users is well below the guide values.

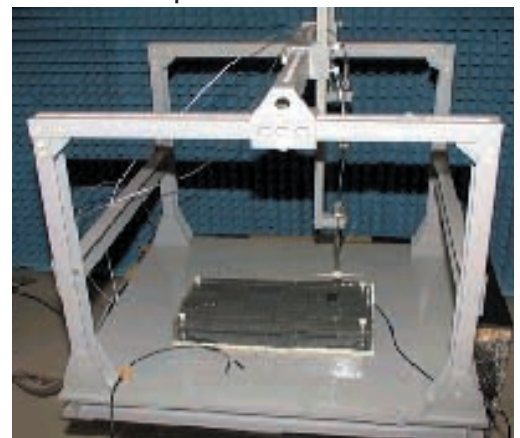
### Electromagnetic Waves and Medical Equipment

NTT DoCoMo has made active efforts to ensure that its cellular phone radio wave does not adversely affect medical equipment such as pacemakers. As part of these efforts, we have conducted research to develop testing equipment and measurement methods to accurately assess the radio interference effects on implantable cardiac pacemakers. (Photo.1) Using developed testing equipment and protocol, all types of pacemakers and DoCoMo cellular phones available in Japan have been checked. Based upon obtained data, the Japan Pacemaker Committee has developed the safety guideline for using cellular phones. This guideline permits people with pacemakers to use cellular phones without any radio interference if the cellular phone is kept at least 22 cm away.

Currently, experiments and research of radio interactions between FOMA\* cellular phones and new pacemakers are being conducted. Within those experiments, insofar as introducing safety guidelines, it has been confirmed that people using pacemakers are able to use any FOMA\* cellular phones safely.

There is much information about electromagnetic waves, but the NTT DoCoMo Group is confident that customers can use DoCoMo cellular phones with peace of mind.

**Photo.1 Radio Interference testing equipment for Implantable cardiac pacemaker and cellular phone**



#### \*International Commission on Non-Ionizing Radiation Protection

A specialized international commission that is one of the cooperation organs of the WHO and established in 1992. They study the biological effects of non-ionizing radiations and act to create international guidelines for human protection from non-ionizing radiation exposure.

#### \*FOMA

Will begin testing usage in Tokyo and Yokohama in 2001 of next generation cellular phones.



# NTT Group Efforts on Social Environmental Problems

We conduct business within society. That is to say, we are active within the ecosystem. Therefore our activities are deeply connected to all living things like society, humans, and others and must give value to contribute to people and society. Here we report the results of efforts that the company or workers have made outside of business activities for active environmental preservation even for regional societies.

## **Social Contributions of Group Employees 34**

Ihatov Ecology Community Plaza

Iwate Branch, NTT EAST

The "Citizen Participation Environmental Information Network "Joint Project

Shiga Branch, NTT WEST

"Our Cities, Our Road Business"

NTT-ME HOKURIKU Toyama Branch

Introduction of Natural Gas Automobiles

NTT WEST Kanazawa Branch, NTT-ME HOKURIKU Ishikawa Branch, NTT-ME KANSAI

Construction of DoCoMo Forest

## **Employee Education and Awards 36**

Employee Education and Development Program

Employee Awareness Survey

External Cooperation

Environmental Awards

## **Information Offering and Communication 38**

Environmental Advertisements

*Kankyou-goo*

Environmental Website

Publication of Environmental Reports

## **Relations With Society 40**

Worker Relations

Customer Feedback

# Social Contributions of Group Employees

<http://www.ntt.co.jp/kankyo/e/2001report/3/311.html>

The NTT Group promotes "Positive Contributions to Environmental Protection in the Local Community." NTT branches and offices enthusiastically engage in various activities.

## Ihatov Ecology Community Plaza

### Iwate Branch, NTT EAST

At "Ihatov\* Ecology Community Plaza", we offer space for environmental education activities, information distribution and networking as part of our support for various environmental protection activities. (Chart 1)

#### Main Support Activities

##### 1. Providing workspace

The Plaza can be used for environmental protection groups and youth organizations. It offers space for meetings and on-site computers and facilities for holding videoconferencing.

##### 2. Supporting implementation and operation of environmental education programs

We provide communication facilities for implementing and administering programs by environmental education groups.

##### 3. Supporting environmental information databases and the collection and dissemination of the information

The Iwate environmental database will be sent

to various environmental organizations. Classes to broaden interest in the Internet and website production workshops are also offered.

#### 4. Building human ecology networks

The Iwate Branch supports mutual exchange among environmental groups. Within that interchange, an environmental activity coordinator will be raised and will advance the creation of networks .

#### Goals for the Iwate Branch in the Future

We will campaign for regional contributions and environmental preservation to active businesses and support regional citizen groups, groups active in environmental preservation and environmental education for children.

Iwate Eco-Plaza Web Site:  
<http://eco.iwate.isp.ntt-east.co.jp/>  
 Aomori Ecology Community Plaza,  
 Aomori Branch, NTT EAST  
<http://www.ntt-east.co.jp/aomori/e3aomori/eco-plaza/index.html>

## The "Citizen Participation Environmental Information Network" Joint Project Shiga Branch, NTT WEST

With "Save beautiful lake Biwa for our future" as its slogan, the Shiga branch has engaged in environmental protection activities that are closely tied to the local community. The branch and Ohmi Network Center for Voluntary Organizations joined together to offer various training sessions and seminars as well as advice on communication tools such as lines and terminals.

#### Joint Project with Shiga Prefecture

Shiga-prefecture and NTT Lifestyle and Environmental Technology Laboratories have initiated a joint project to create a Citizen Participation Environmental Information Network. The project included environmental research along Akanoi Bay\*, an effort of the International Conference on the Conservation and Management of Lakes. The Shiga branch will continue its activities. (Chart 2, Fig.1)

#### \*Ihatov

"Ihatov" is the Esperanto-style name that Kenji Miyazawa (1896-1933), poet and children's books author, gave to named his home, Iwate.

#### \*Akanoi Bay

Akanoi Bay is located on the east shore of the southern portion of Lake Biwa. Shallows of an inlet running from east of Biwako Bridge in Moriyama-city to roughly north of Karasuma Peninsula constitute the so-called Akanoi Bay.

Chart 1 Main activities in the past activity title details

Item	Description
<b>Iwate Cherry Blossom Survey</b> (April-May, 2000)	Under the slogan of "Let's All Create the Hometown Cherry Blossom Front!" 104 schools in Iwate Prefecture participated in the survey, and the progress of the cherry blossom flowering at each school was shown on the website.
<b>Ecology Plaza Opening Ceremony</b> (May 2000)	The Ecology Plaza opening ceremony focused on promoting exchanges among children living in remote areas by TV conference.
<b>Observation Camera</b> (May-July 2000)	A live broadcast of Umineko sea gull chicks. The program was offered to children who were not able to go to the site, such as those attending schools for disabled children.
<b>Homepage Design Workshops</b> (June 2000)	Homepage production workshops were offered to Kids' Eco Club members. (Ichinoseki)
<b>Northern Tohoku Kids' Environment Summit</b> (September 2000)	Implementing website creation courses which value physical experiences. In addition, children served as eco-reporters. (Abi)
<b>Aquatic Life Surveys</b> (September 2000)	With Kids' Eco Club members, aquatic life surveys were conducted with using PC microscope. (Daito-town, Sanriku-town)
<b>Environmental Millennium Forum</b> (November 2000)	At the prefecture's Millennium Ecology Fair, we sponsored a booth on environmental education through Internet.



## "Our Cities, Our Road Business"

### NTT-ME HOKURIKU Toyama Branch

This branch was registered as a volunteer organization in Toyama prefecture's road protection volunteer system, "Our Cities, Our Road Business." This was begun as one part of the Participation in Planning Global Environmental Preservation Activities, and Toyama branch employees clean the streets around the offices monthly. (Photo 1)

Photo 1 Employees cleaning the streets



## Introduction of Natural Gas Automobiles

### NTT WEST Kanazawa Branch, NTT-ME HOKURIKU Ishikawa Branch, NTT-ME KANSAI

In March 2001, the Kanazawa Utilities Bureau inaugurated the Eco-station for natural gas automobiles\*. The NTT WEST Kanazawa Branch introduced seven natural gas automobiles and the NTT-ME HOKURIKU Ishikawa Branch three. NTT-ME KANSAI introduced natural gas automobiles in February 2001. Natural gas automobiles is one effort towards preservation of the global environment. (Photo 2)

## Construction of DoCoMo Forest

The NTT DoCoMo Group has been advancing the construction of DoCoMo Forests since

Photo 2 Natural gas automobile introduced by NTT-ME KANSAI



1999. They conduct activities for the protection of forests through Group employee volunteers. The activities have been held four times throughout Japan, where one can have fun while learning lessons from local forest instructors and volunteers. Details of the last two events can be found in Chart 3.

**\*Natural gas automobile**  
When compared to current vehicles, the amount of emissions such as NO<sub>x</sub>, HC, and CO which become the causes of environmental pollutions like photochemical smog and acid rain is drastically decreased.

**\*Electronic field notebook**  
See page 14.

Chart 2 Description of main activities

Item	Description
Elementary school walk rally (July 2000)	Participation as staff in data collection of a water analysis put on by students on Biwako Day
NPO environmental (water analysis) investigation (August 2000)	Collection of water analysis data using electronic field notebook* and participation in an examination of improvements and reforms for electronic field notebook at a post-investigation review
Southeast Asia trainee water analysis investigation (November 2000)	Support of World Work trainees
Environmental Festival (November 2000)	Choosing ten living things in our environment and creating an aggregate "living thing map" which participants mark.
"Child Eco Club" Nationwide festival (March 2001)	Implementation of the lending of digital cameras to nationwide Child Eco Clubs, and examining the environment around the grounds. The children created activity reports on web pages.

Fig.1 Shiga Branch Ecology Community Plaza

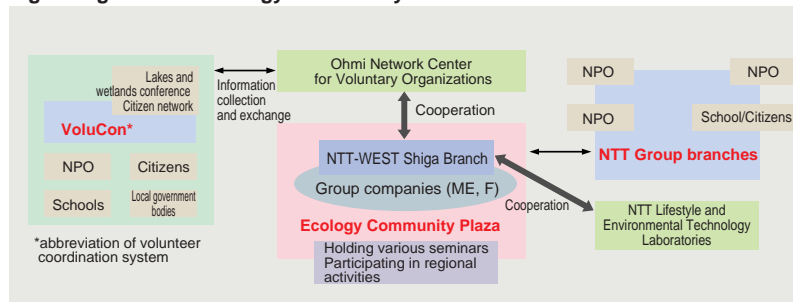


Chart 3 Details on the implementation of the DoCoMo Forest

<b>June 2, 2000 (Friday)</b>	
<b>Location</b>	Hokkaido Tomakomai Shiraoi Tarumae National Forest
<b>Area</b>	5 hectares
<b>Planted Tree Types</b>	A total of 2,760 trees of Sakhalin spruce, cucumber trees and cherry trees
<b>Participating staff</b>	About 60 employees from NTT DoCoMo and NTT DoCoMo Hokkaido
<b>March 10, 2001 (Saturday)</b>	
<b>Location</b>	Kagawa Ayauta Ayakami Kashiwara National Forest
<b>Area</b>	3.12 hectares
<b>Planted Tree Types</b>	Pines and others (The main activity was preparing the forest by removing the invading bamboo and trimming cedar trees)
<b>Participating staff</b>	About 90 employees from NTT DoCoMo and NTT DoCoMo Chugoku



# Employee Education and Awards

<http://www.ntt.co.jp/kankyo/e/2001report/3/321.html>

\*Offered to the public on the website

The address is:  
<http://www.ntt.co.jp/kankyo/e/video>

The NTT Group would like for its employees to be concerned about environmental protection activities. We have set forth measures for programs with that purpose over the course of the year. (Chart 1)

## Employee Education and Development Program

The NTT Group is advancing internal education regarding environmental preservation activities, like holding seminars and having various development programs. Moreover, we

are working hard for development by always providing a page to publish topics about our efforts for environmental preservation in the internal newsletter (NTT EAST), providing a website for environmental activities (NTT "holding company", NTT EAST, NTT WEST, NTT Communications, NTT Facilities, NTT DoCoMo, NTT DATA, etc.), and creating the video "The Boy and the Forest" and the CD-ROM "Telecommunications in Symbiosis with the Earth - NTT" for environmental education. "The Boy and the Forest" explains the contents of the NTT Group Ecology Program 21. This video was also offered to the public on the website\*.

Each group company is putting together its own environmental activities into an environmental report and creating handbooks on the specific ways that they are dealing with environmental preservation. (Photo 1)

## Employee Awareness Survey

In fall 2000 and spring 2001, the NTT Group surveyed the level of understanding regarding employees' environmental awareness and environmental measures.

There are about 1,000 NTT Group employees dubbed "environmental monitors." Through a web-based questionnaire, we grasped the comprehension level of general group employees' environmental awareness and various environmental preservation measures. We intend to

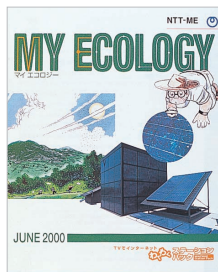


Photo 1 Each group company's printed materials which publish the objectives and methods for environmental activities.

Chart 1 Education and development program

Item	Time	Target	Description
NTT EAST Group Magazine "Plaza"	Monthly	All employees Group employees	Introduce the latest topics related to our company's environmental preservation efforts Special series in "Plaza" on the dangerous conditions of the global environment
NTT EAST TV	Hourly	All employees	
Internal Websites	Hourly	All employees	Offer information to people in charge of the environment through the internal webpages
New Employee Training	April	New employees	Education about the importance of environmental preservation and NTT's environmental preservation activities
Environmental ISO seminars	June 1996	All employees	Reports on the hard fight for ISO
Environmental Accounting Seminar	February 2000	Environmental Staff	Regarding the Introduction of Environmental Accounting
Energy Forum	Anytime	Energy-related people	Regarding energy problems
For the Construction of an Environmental Management System	June 1999	All employees	Report on the Struggle for ISO
NTT Group Environmental Report	December 1999	All employees	Overall environmental activities
Environmental Pamphlet	March, 2000	All employees	Introduction of NTT Group Ecology Program 21
NTT Group Environmental Protection Activity Report	October, 2000	All employees	Overall environmental activities





make them the basic materials for environmental measure proposals. We also receive proposals from the Group employees.

The results show that the environmental awareness of employees is high, and 93% said they are concerned about environmental problems.

Moreover, 30% said they were very interested. Still the main way of thinking about this issue is that environmental protection activities should not be done separately by each company, but should be conducted by unified policies and activities of the Group.

## External Cooperation

The NTT Group is working for even better environmental protection activities by joining,

supporting, and cooperating with a variety of groups. (Chart 2)

## Environmental Awards

Within the promotion of our business, the various environmental protection activities of the NTT Group have received support from many people. As a result, we received several awards in 2000. (Chart 3) Moreover we created a President's Commendation System for measures which produced a noticeable effect in environmental preservation, and support efforts for active environmental preservation internally as well.

The NTT Group will continue to make positive efforts in environmental preservation activities.

**Chart 2 Groups the NTT Group cooperates within global environmental protection activities**

Organization	Activities
Green Purchasing Network (GPN)	Established in 1996 for promotion of Green Purchasing. A nationwide network of consumers, corporations and administrative organizations, GPN promotes priority purchase of goods and services with less impact on the environment.
Nature Conservation Fund Project Selection Committee	Renders active support to domestic and overseas NGOs' nature conservation projects, while developing Japanese human resources for international activities and promoting seminars for better understanding of nature conservation.
World Business Council for Sustainable Development (WBCSD)	Founded in 1995, WBCSD is a coalition of approximately 150 international corporations, united by a shared commitment to sustainable development and advocating closer cooperation between business, government and other organizations concerned with the environment and sustainable development.
Global Environmental Action (GEA)	Established in 1991 for the purpose of solving environmental issues and contributing to sustainable development. In 1999, the United Nations Environmental Project (UNEP) awarded this NGO a Global 500 Prize for its long contribution to global environment and sustainable development.
Global Environmental Forum (GEF)	Engaging in scientific and political research and study of environmental issues and sharing results and global/local environmental information with society at large. GEF's extensive support and cooperation for domestic and international environmental protection is expanding the network of individuals and organizations involved in environmental issues.
Japan Environmental Education Forum (J.E.E.F)	Founded in 1987 as "Kiyosato Forum", this organization was renamed in 1997. Activities for the promotion of environmental education include the establishment of Nature Schools, open seminars, and support for developing countries.

**Chart 3 Year 2000 Environmental Awards**

Award Title	Sponsor	Recipient
Letter of appreciation for a donation (instead of trees) to the Asakuragawa Planting Festival	The Asakura Living Water Forum, Non Profit Organization	NTT WEST Nagoya Branch
Year 2000 Clean Kochi Promotive Association Presidential Commendation Special Award for contributions to waste reduction and recycling and improving awareness of environmental preservation.	Clean Kochi Promotive Association	NTT WEST Kochi Branch
Selected as a Facility Commended for Excellence by the Green Council for green preparation based on the Green Promotion Regulations of Sapporo	Sapporo City	NTT DoCoMo Hokkaido Building #2
Letter of appreciation for help in promoting forests and the creation of more greenery through a donation to the Green Fund	Minister of Agriculture, Forestry, and Fisheries	NTT DoCoMo Tokai
Letter of appreciation for help in giving to Foundation of Osaka Green Trust	Osaka Prefecture	NTT DoCoMo Kansai
Letter of appreciation for great help in promoting forests and the creation of greenery inside and outside of Japan through a contribution to the Green Fund	National-Land Afforestation Promotion Organization	NTT DoCoMo Kyushu Oita Branch
Letter of appreciation for its years of service in its endeavors to make the nation greener.	National Land Afforestation Promotion Organization	NTT DoCoMo Kyushu
Nagano Eco Circle Silver Rank for business activities which considered the environment	Nagano City	NTT LOGISCO Shin-etsu Branch

# Information Offering and Communication

<http://www.ntt.co.jp/kankyo/e/2001report/3/331.html>

The NTT Group does not just promote efforts related to environmental preservation, but also conveys information related to the environment to consumers and provides a place to offer information about the environment. These activities, while indirect, will come to offer a chance to think broadly about the environment.

## Environmental Advertisements

The NTT Group does not just conduct its own environmental preservation activities. It also provides consumers an outline of those activities. In order to reach a wide range of people, we are developing communication activities using newspaper and magazine advertisements and now Internet advertisements as well. (Photo 1)

To do that, we made the word "ecomunication" our keyword, combining "ecology" and "communication," and started by advertising environmental problems which the NTT Group is currently taking specific actions about. We also introduced various examples of how the NTT Group is dealing with these matters.

\**Kankyou-goo*  
<http://eco.goo.ne.jp>

\*portal site  
A website used to connect to connect to other web-sites from a browser.

\*NGO  
Non-Governmental Organization. Civilian international cooperative groups which are active in areas like human rights, humanitarian efforts, the environment, and arms reduction, and others.

We also conduct an environmental monitoring survey every year on NTT Group employees. From the results of this survey, we grasp the concern for environmental problems of Group employees and their awareness of NTT Group's basic principles, action objectives, and various activities for environmental preservation.

## Kankyou-goo

*Kankyou-goo*\* is a web based portal site\* specializing in environmental information run by NTT-X. The site started on August 4, 1999.

*Kankyou-goo* is characterized by:

- "*Kankyou-goo* Search," allowing environmental information searches from various angles.
- "*Kankyou-goo* News," sending the latest information surrounding the environment.
- "*Kankyou-goo* Business," backing up businesses working on responses to environmental problems
- Providing "*Kankyou-goo* Communication Area," offering a place for businesses, NGOs\*, and general consumers to exchange information.

## Kankyou-goo Held a Web Symposium to Think about NGO and Business Partnerships

On June 21, 2000, *Kankyou-goo* held a Web Symposium to think about NGO and Business partnerships which looked at possibilities for the way future businesses and NGOs should be, based on the results of an investigation through the Internet of the current conditions and themes of Japanese NGOs.

This symposium was composed of the following 3 parts:

- Implemented a survey regarding NGO activities
- Implemented a research lecture: NGOs and businesses act together
- Implementation of "Symposium: "About Consumer, Business And NGO Information Exchange" and "Web Forum"

In order to contribute to the information exchange between consumers, businesses and NGOs, *Kankyou-goo* reports current informa-

Photo 1 Ad placed in the February 26 "Newton"







tion relating to each standpoint's activities the most quickly and accurately. We also pursue the possibility of creating a sustainable society from the communication between the three parties of consumers, businesses, and NGOs.

### Kankyoo-goo Grand Prize

In 2000, *Kankyoo-goo* sponsored the first *Kankyoo-goo* Grand Prize to support information sharing. It invited New Plans for Environmental Preservation from groups and individuals active in each area of Japan and donated funds from *Kankyoo-goo*'s advertising revenue to the most epoch-making proposal.

For the memorable first *Kankyoo-goo* Grand Prize, they received 147 applications from across Japan. From those applications, thirty-two became the objects of the final judging through a vote by *Kankyoo-goo* members. Each judge selected awards after evaluating the description of the information sharing, design inventiveness, originality, and the expected effects. (Fig.1)

Through these kinds of activities in the future, *Kankyoo-goo* will actively support everyone's information sharing.

## Environmental Website

We launched Telecommunications in Symbiosis with the Earth - NTT in 1995. The content of this environmental website\* was entirely updated

in February 2000 to coincide with the publication of the NTT Group Environmental Protection Activity Report 1999 and the adoption of the NTT Group Global Environmental Charter in 2000. The website also provides information in English. (Fig. 2) The NTT Group Environmental Protection Report can also be reviewed on this site.

## Publication of Environmental Reports

Following 1999, the NTT Group Environmental Protection Activity Report 2000 was published in November 2000. This report contains descriptions of the main environmental protection activities of 1999. (Photo 2)

\*Environmental website  
http://www.ntt.co.jp/kankyoo/e/index.html

Fig.2 Top page of the environmental website (English version)

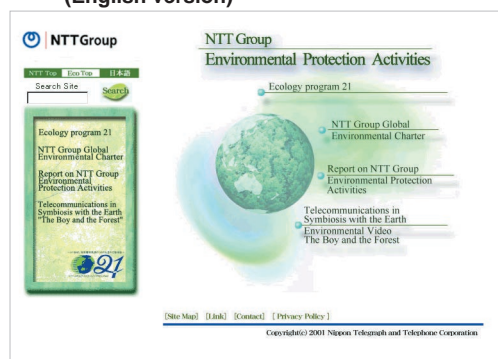
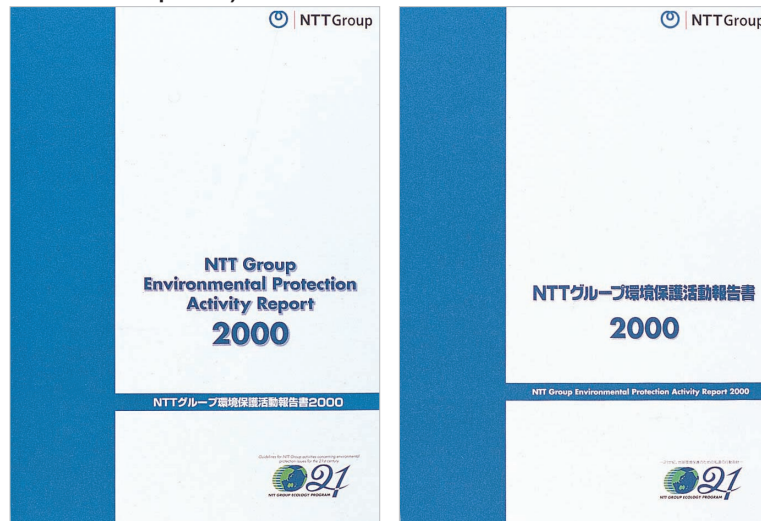


Fig.1 Page presenting the *Kankyoo-goo* Grand Prize



Photo 2 NTT Group Environmental Protection Activity Report 2000 (English and Japanese)





# Relations with Society

<http://www.ntt.co.jp/kankyo/e/2001report/3/341.html>

Business is one of the key elements of society's foundation. Therefore, workers, citizens and others advance their activities while cooperating with people related by various interests.

## Worker Relations

### Welfare Benefits

While the NTT Group obviously builds good relations with people outside of the group, we also make relations with workers within the group important. For that reason, we have laid out welfare beginning with a variety of facilities and a vacation system. (Chart 1)

## Customer Feedback

### Survey on Environmental Advertisements

NTT-X conducted a survey on the Internet aimed at *goo Research*\* members about the NTT Group's environmental advertisements. There were 1,171 respondents. Based on the totals of that survey, we would like to introduce customer opinions on environmental advertisements as well as individual comments.

About three quarters of the people agreed with using advertisements on environmental problems. As a trend, there were many answers of "approve" among people who were very concerned about environmental problems. (Fig. 1)

There is a unified view that it is only right that businesses help environmental problems.

Regarding whether or not to put those efforts into advertisements, opinions divided mainly into "approval because if large businesses take out ads, they will raise the general population's awareness of the environment" and "disapproval because if they have the money to take out ads, they should put it into environmental measures".

\**goo Research*  
Surveys in which anyone can participate over the internet. <http://research.goo.ne.jp/>

\**i-mode*  
A cellular phone that can access many sites. Mail can be sent and received for ¥1.

Chart 1 Welfare Benefits

Insurance	Health insurance, welfare pension insurance
Property Formation	Employee stock system, property formation savings (general, home, pension), in-advance land financing, etc.
Vacations	Annual paid vacation (20 days), various special vacations, year-beginning and year-end holidays, Lifepan vacation, etc.
Leave System	Childcare leave, seniorcare leave
Facilities	Office, independent dormitories, hospital and health management center, a variety of recreation facilities, recovery offices (in each region throughout Japan)

### From the Free Response Comments:

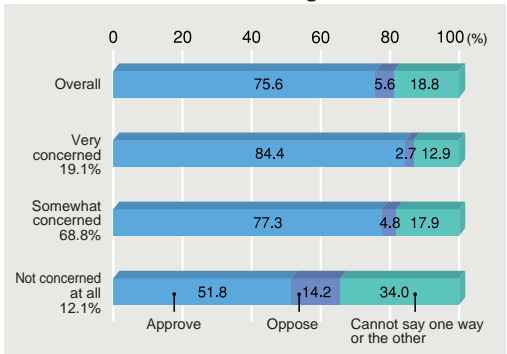
- I approve of advertising the efforts on environmental problems. That's because for the consumer, environmental problems will be felt closer. (female, 25 years old)
- I feel taking out ads is important for consumers to know business's level of social contribution. I feel consumers will choose whether to accept or reject companies according to that, and companies will come to be weeded out socially. (female, 29 years old)
- I feel they should use that advertising cost in particular for environmental problems. A tool for businesses to improve their image. I think that is an environmental problem with business. (female, 29 years old)

These will become a reference for how future advertisements should be.

### From the Free Response Comments:

- I think a strong impression might be made if they created i-mode\* games related to environmental problems, or showed a recycling commercial with a famous performer as a character. (female, 24 years old)
- If they made clear how the cost for recycling old telephone books is different from that of making new ones and why it costs that much, a variety of opinions would come out. (male, 42 years old)
- Of course they should help as businesses, so I wonder where the merit is in taking the trouble to advertise. If they put their website address on bills to individuals, then people who are interested would look at it, so excessive advertising is useless. (female, 43 years old)

Fig.1 Level of concern for the environment and relationship to approving or not environmental advertising





# Data

Here we use several figures to indicate environmental protection activities. This year, the following performance index was made based on the GRI guideline.

1. For the amounts of materials used, the unit "t (tons)" is used.
2. For energy charts, the unit "J (joules)" was used. Still, "kWh(kilowatt hours)" was lined up together with some of the data of the amount of electricity used in order to make it easier to understand. In order to convert kWh to J, we have used the figure 10,250 kJ/kWh based on the "Law Enforcement Policies for the Rationalization of Energy Use."
3. We use "t-CO<sub>2</sub>" on the greenhouse gas chart. In order to convert the amount of CO<sub>2</sub> expelled with the use of electricity, we have used the average electricity discharge coefficient 0.357 kgCO<sub>2</sub>/kWh.

**Economic Performance 42**

**Corporate & Group Profile 43**

**Data of Environmental Protection Activities 44**

**Activities Covered in the 2000 Report That are not Included in the 2001 Edition 48**

**Index 48**

**URL List of NTT Group Companies Mentioned in this Report.**

# Economic Performance

<http://www.ntt.co.jp/kankyo/e/2001report/4/411.html>

Profile of NIPPON TELEGRAPH AND TELEPHONE CORPORATION (as of March 31, 2001)

Corporate name: NIPPON TELEGRAPH AND TELEPHONE CORPORATION (NTT)

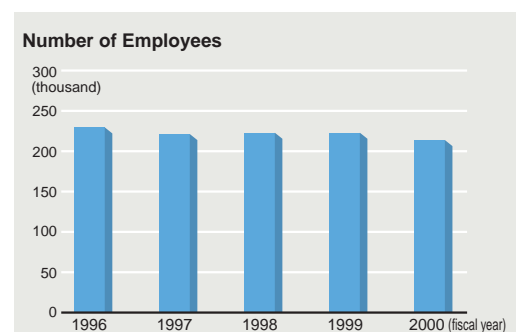
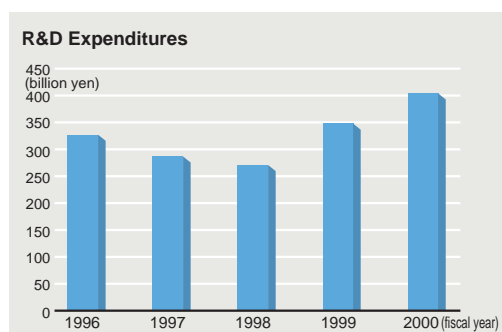
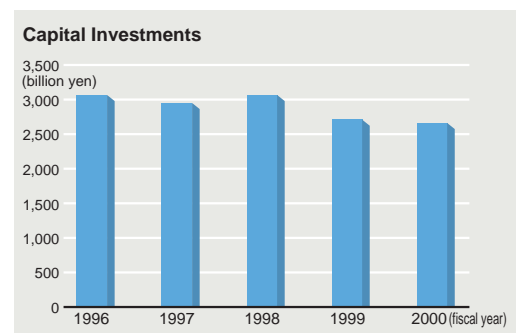
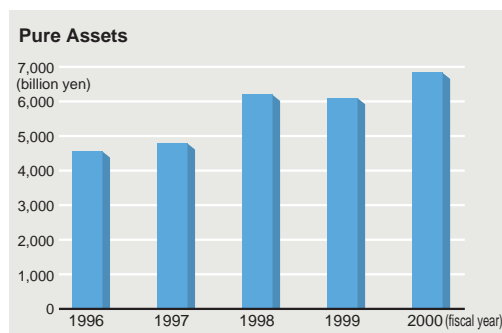
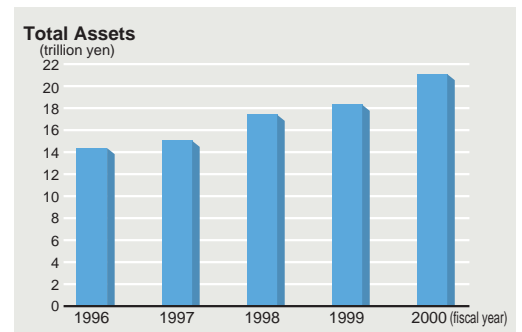
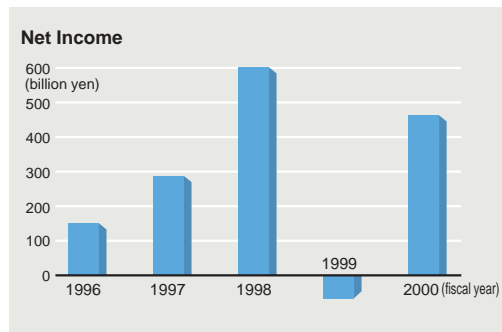
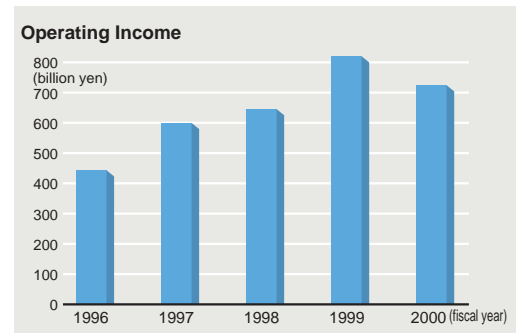
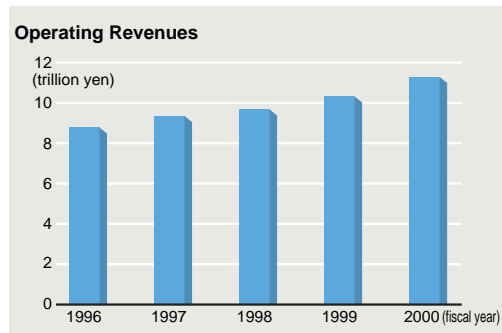
Headquarters: 3-1, Otemachi 2-chome, Chiyoda-ku, Tokyo 100-8116 Japan

Established: April 1, 1985 Capital: ¥937,950,000,000 Employees: 3,314

URL: [http://www.ntt.co.jp/index\\_e.html](http://www.ntt.co.jp/index_e.html)

Consolidated Profile (as of March 31,2001) Employees: 215,000 Number of companies: 65

## Consolidated Data

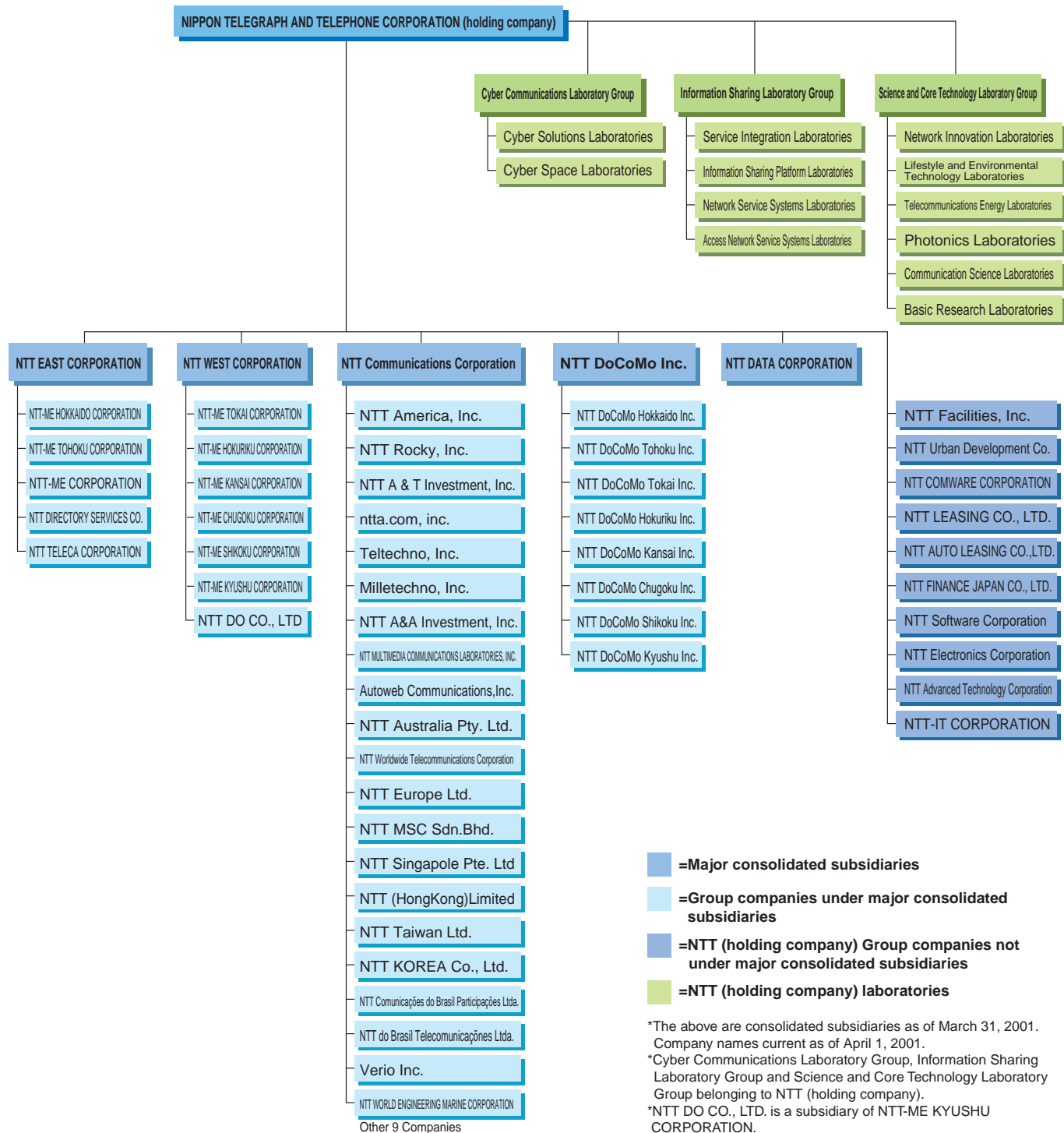




**Corporate & Group Profile**

The NTT Group, organized under a holding company structure with NTT (holding company) at the core, offers a wide range of customer services through wholly- owned subsidiaries NTT EAST, NTT WEST, NTT Communications, NTT DoCoMo, and NTT DATA. Group companies such as NTT COMWARE, NTT-ME, and NTT Facilities maintain resources for the entire group, including software, communication facilities, power facilities and buildings. Each subsidiary actively explores new business possibilities and endeavors to expand its business domains. These efforts are supported by two types of research and development: basic R&D, centralized at the holding company level, and specific application R&D engaged in by each subsidiary. While it is unusual for a holding company to operate its own R&D department, NTT considers R&D a driving force for the management and development of the NTT Group today and into future.

**NTT Group consolidated companies**



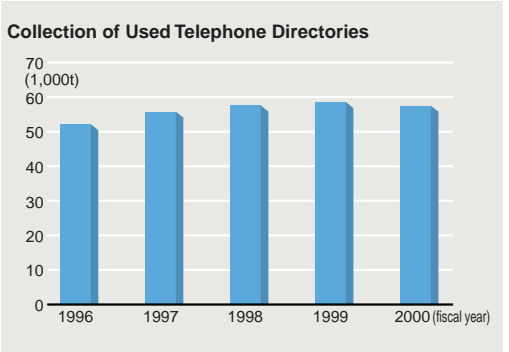
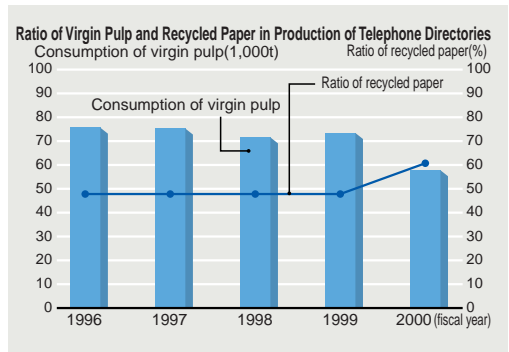
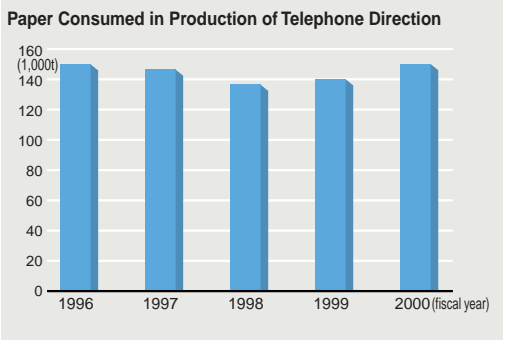
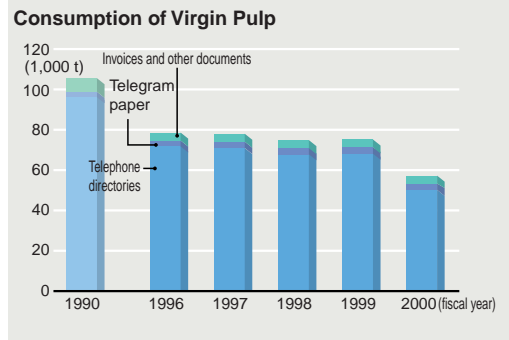


## Data of Environmental Protection Activities

### Group member companies covered in this report

Data collected		NTT (holding company)	NTT EAST	NTT WEST	NTT Communications	NTT DoCoMo Group	NTT DATA	NTT Facilities	NTT COMMWARE	NTT Urban Development	NTT-ME Group	53 other companies
FY	Item											
<b>Thru fiscal 1998</b>												
	Data on measures against global warming	○	○	○	○	○	○	○	○	○		
	Other data	○	○	○	○							
<b>Fiscal 1999</b>												
	Data on measures against global warming	○	○	○	○	○	○	○	○	○	○	
	Other data	○	○	○	○	○	○	○	○			
<b>Fiscal 2000</b>												
	Data on measures against paper resource	○	○	○	○	○	○	○	○			
	Data on measures against global warming	○	○	○	○	○	○	○	○	○	○	○
	Data on measures against waste management	○	○	○	○	○	○	○				
	Data on measures against protection of the ozone layer	○	○	○	○	○	○	○	○			

### Management of Paper Resources

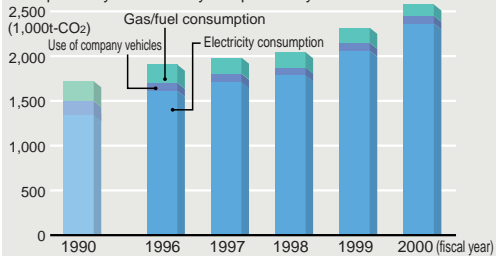




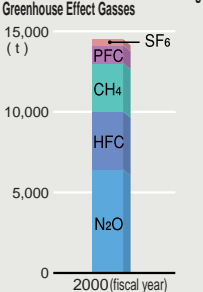
**Prevention of Global Warming**

**CO<sub>2</sub> Emissions**

\*CO<sub>2</sub> emissions from gas/fuel consumption and company cars partially estimated by sample surveys.



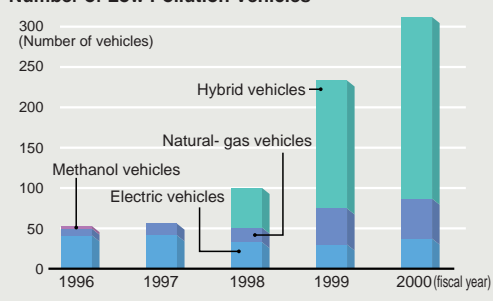
**Converted Rate of Other Gases Causing Greenhouse Effect Gases**



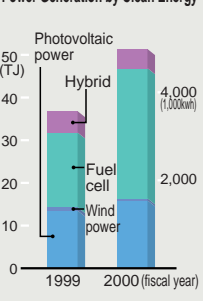
**Evaluation of greenhouse gas emissions**

Until recently, major companies calculated CO<sub>2</sub> emissions. However, beginning with the year 2000, they also grasp the emissions of greenhouse gases set forth in the Kyoto Protocol, such as CH<sub>4</sub> (methane), N<sub>2</sub>O (nitrous oxide), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulphur hexafluoride (SF<sub>6</sub>).

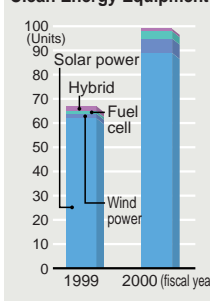
**Number of Low Pollution Vehicles**



**Power Generation by Clean Energy**



**Clean Energy Equipment**



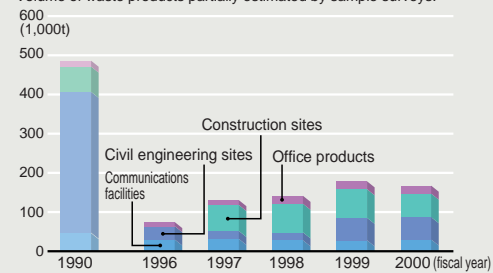
The companies calculating those amounts expanded from the main company to NTT Group companies. For understanding the emissions amounts, we created a calculation manual for the NTT Group using Guidelines for Regional Community Organizations, which the Office of the Environment created in August 1999, as reference.

Additionally, we created a simplified version for mid- and small-sized companies which could not measure electricity directly and made a way for them to calculate the amounts of emissions.

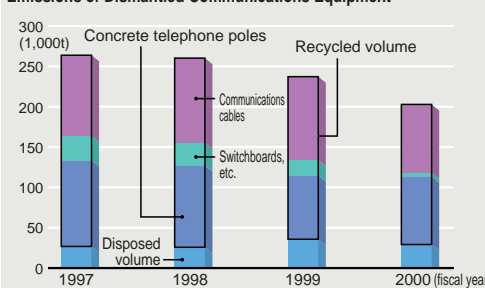
**Waste Management**

**Waste Products**

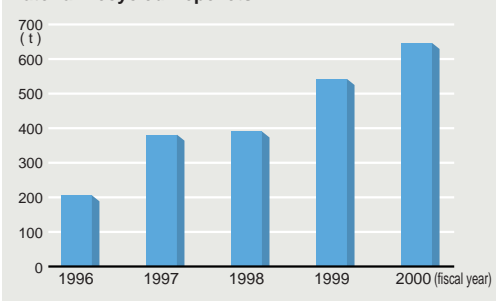
\*Volume of waste products partially estimated by sample surveys.



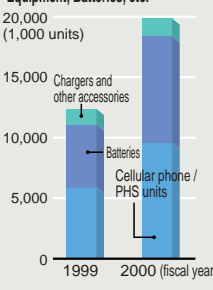
**Emissions of Dismantled Communications Equipment**



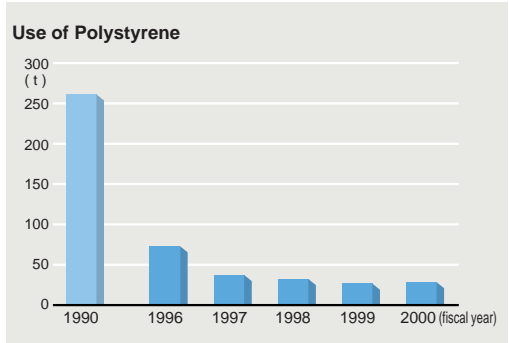
**Material Recycled Repellets**



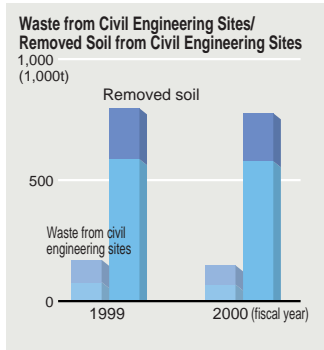
**Collection of Used Communications Equipment, Batteries, etc.**



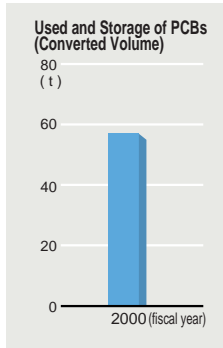
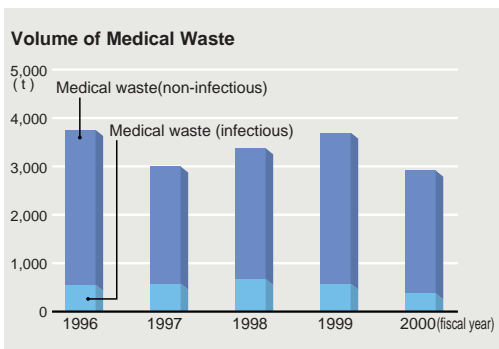
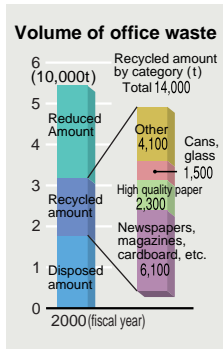
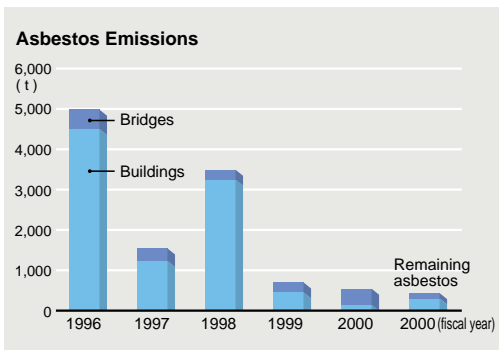
**Waste Management**



Upper: Recycled Amount  
Lower: Disposed Amount



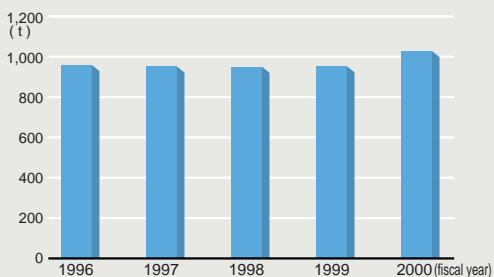
Upper: Recycled Amount  
Lower: Disposed Amount



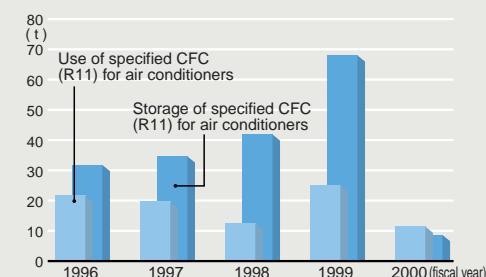


Protection of the Ozone Layer, Other Activities

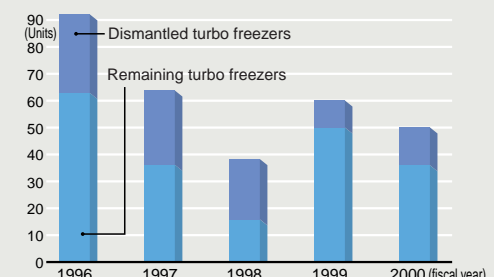
Use of Specified Halon for Fire Extinguishing Equipment



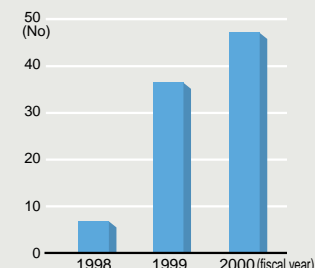
Amount of Specified CFCs for Air Conditioners



Number of Dismantled Turbo Freezer Units



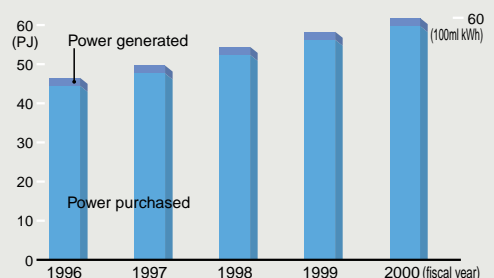
ISO 14001 Certification for NTT Group



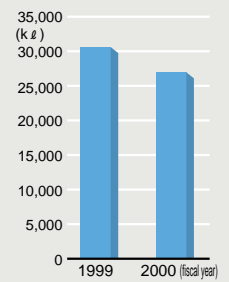
Number of dismantled turbo freezer units

We reduce the number of special fluoro-carbon using turbo freezers. However the total number increased with NTT DATA and NTT COMWARE.

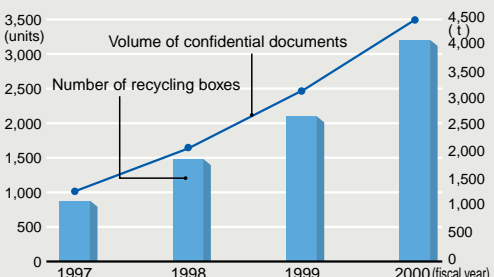
Electricity Consumption



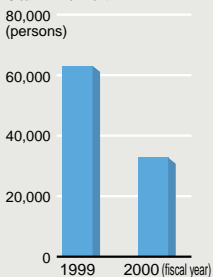
Fuel of Company Vehicles



Recycling Boxes Installed / Volume of Confidential Documents



Number of Participation in Operation Clean Environment





Activities covered in the 2000 report that are not included in the 2001 edition

Action plan	Page	Item	Current status
Global Warming	28	New Shipping Network System	Ongoing
Waste Management	29	Manifests to Ensure That Dismantled Communications Facilities	Ongoing
Promoting Recycling	31	Improvements in Product Packing and Packaging Materials	Ongoing
Promoting Recycling	32	Zero Kitchen Garbage	Ongoing
Promoting Recycling	32	Recycling Box for Confidential Documents	Ongoing
Minimizing Environmental Risks	34	EMC (Electro-Magnetic Compatibility)	Ongoing
Contributing to a Sustainable Society through IT	36	Nitrogen Dioxide Monitoring System	Ongoing
Contributing to a Sustainable Society through IT	38	Odor-based Water Quality Monitoring System	Ongoing
R&D to Promote Environmental Protection	39	Long-life Nickel Metal Hydride Batteries	Ongoing
R&D to Promote Environmental Protection	40	Multifunctional Rapid Disposal Vehicle for Sewage and Sludge	Ongoing
Information Sharing	43	World Bird Count	Ongoing
Social Contributions to Environmental Protection	48	DoCoMo Volunteers' Club	Ongoing

Index

Advanced navigation .....	12	International Commission on Non-Ionizing Radiation Protection .....	32	Portal site .....	38
Air Pollution Control Law .....	19	IP .....	4	POS .....	9
Akanoi Bay .....	34	ISO14001 .....	16	Recycling-based society .....	28
Automated toll collection system .....	12	IT revolution .....	4	Safe driving support .....	12
Automatic oil leakage detection system for underground tanks .....	19	Iwate-UNU-NTT Environmental network .....	14	Sewerage Law .....	19
Broadband .....	6	<i>Kankyo-goo</i> .....	38	Solid oxide fuel cell .....	13
CD-ROM telephone directory .....	24	Kenaf .....	25	Specified CFCs .....	31
CFC Decomposition Guidelines .....	31	Kyoto Protocol .....	18	Stand-alone photovoltaic power system .....	3
Co-generation .....	13, 26	Law Concerning the Rational Use of Energy .....	19	Substitute CFCs .....	31
Developing energy reforming machines .....	3	Law for Promotion of Sorted Collection and Recycling of Containers and Packaging .....	19	Total Power Revolution .....	26
Difference totalization .....	20	Law for Recycling .....	28	<i>TOWNPAGE</i> .....	11, 25
Digitization .....	7	Law for Recycling of Specified Kinds of Home Appliances .....	28	Ubiquitous .....	7
Eco-Challenge! Telephone Directory .....	4	LCA .....	18	VA .....	22
Eco-efficiency .....	5	Long life nickel metal hydride battery .....	3	VICS .....	10
e-commerce transaction .....	3	Manifest .....	19, 30	Virtual-reality .....	6
Electronical public notification system .....	11	mopera .....	11	Waste Disposal and Public Cleaning Law .....	19
Energy recovery .....	28	Natural gas automobile .....	35	Water Pollution Control Law .....	19
Environmental website .....	39	NGO .....	38		
Fire Service Act .....	19	Nitrogen dioxide monitoring system .....	3		
FOMA .....	7, 32	NO <sub>x</sub> .....	27		
<i>goo Research</i> .....	40	OPS film .....	25		
GPS .....	14	PCB .....	30		
Green Purchase Network .....	23	Peek-cut operation .....	13		
HIKARI .....	7	percentage totalization .....	20		
i-mode .....	11, 40	Phosphoric Acid Fuel Cell .....	13		
Ihatov .....	34	Polymer Electrolyte Fuel Cell System .....	13		
Individuals' lifestyles will change .....	10				
INS concept .....	6				
Intelligent transport system .....	3				

URL List of NTT Group Companies Mentioned in this report.

Company Name	URL
NIPPON TELEGRAPH AND TELEPHONE CORPORATION	<a href="http://www.ntt.co.jp/index_e.html">http://www.ntt.co.jp/index_e.html</a>
Cyber Solutions Laboratories	<a href="http://www.ntt.co.jp/cclab/index.html">http://www.ntt.co.jp/cclab/index.html</a>
Service Integration Laboratories	<a href="http://www.islab.ecl.ntt.co.jp/e/index.html">http://www.islab.ecl.ntt.co.jp/e/index.html</a>
Lifestyle and Environmental Technology Laboratories	<a href="http://kankyo.lelab.ecl.ntt.co.jp/eng/index2.htm">http://kankyo.lelab.ecl.ntt.co.jp/eng/index2.htm</a>
Telecommunications Energy Laboratories	<a href="http://www.sctlg.ecl.ntt.co.jp/ntt_en/ntt_en_e/index.html">http://www.sctlg.ecl.ntt.co.jp/ntt_en/ntt_en_e/index.html</a>
NTT EAST CORPORATION	<a href="http://www.ntt-east.co.jp/index_e.html">http://www.ntt-east.co.jp/index_e.html</a>
NTT WEST CORPORATION	<a href="http://www.ntt-west.co.jp/index_e.html">http://www.ntt-west.co.jp/index_e.html</a>
NTT Communications Corporation	<a href="http://www.ntt.com/index-e.html">http://www.ntt.com/index-e.html</a>
NTT DoCoMo, Inc.	<a href="http://www.nttdocomo.com/top.shtml">http://www.nttdocomo.com/top.shtml</a>
NTT DoCoMo Hokkaido, Inc.	<a href="http://www.nttdocomo-h.co.jp/">http://www.nttdocomo-h.co.jp/</a>
NTT DoCoMo Tokai, Inc.	<a href="http://www.docomo-tokai.co.jp">http://www.docomo-tokai.co.jp</a>
NTT DoCoMo Kansai, Inc.	<a href="http://www.docomo-kansai.co.jp">http://www.docomo-kansai.co.jp</a>
NTT-ME CHUGOKU CORPORATION	<a href="http://www.docomo-chugoku.co.jp/">http://www.docomo-chugoku.co.jp/</a>
NTT DoCoMo Kyushu, Inc.	<a href="http://www.docomokyusyu.co.jp">http://www.docomokyusyu.co.jp</a>
NTT DATA CORPORATION	<a href="http://www.nttdata.co.jp/en/index.html">http://www.nttdata.co.jp/en/index.html</a>
NTT Facilities, INC.	<a href="http://www.ntt-f.co.jp/profile-e/index.html">http://www.ntt-f.co.jp/profile-e/index.html</a>
NTT Urban Development Co.	<a href="http://www.nttud.co.jp/toshi-e/index.html">http://www.nttud.co.jp/toshi-e/index.html</a>
NTT COMWARE CORPORATION	<a href="http://www.nttcom.co.jp/english/index.html">http://www.nttcom.co.jp/english/index.html</a>
NTT-ME CORPORATION	<a href="http://www.ntt-me.co.jp/">http://www.ntt-me.co.jp/</a>
NTT-ME HOKURIKU CORPORATION	<a href="http://me-hokuriku.hkr.co.jp/">http://me-hokuriku.hkr.co.jp/</a>
NTT-ME KANSAI CORPORATION	<a href="http://www.me-kansai.co.jp">http://www.me-kansai.co.jp</a>
NTT LOGISCO Inc.	<a href="http://www.ntt-logisco.co.jp">http://www.ntt-logisco.co.jp</a>
Nippon Telematique Inc.,	<a href="http://www.nti.co.jp/eng_main/index_eng.html">http://www.nti.co.jp/eng_main/index_eng.html</a>
NTT-X, Inc.	<a href="http://www.nttx.co.jp/">http://www.nttx.co.jp/</a>



Paper  
 SELF RETURN Co. Ltd.  
 Self Return paper produced to NTT specifications  
 Paper recycled from used paper collected by the NTT Group



Paper  
 Japan Environment Association  
 Paper certified to bear the "eco-mark"  
 Manufacturing paper from recycled paper consumes much less energy than producing paper from forest products. This is because the former virtually eliminates the need for pulp production.



古紙配合率100%  
 白色度70%再生紙を使用しています  
 Composition of paper  
 Waste Reduction Promotion Committee  
 Paper certified to bear the "R100" mark  
 Recycled paper with recycled paper ratio of 100% and brightness of 70%



Printing ink  
 The American Soybean Association  
 Ink made from soybean oil  
 Soybean ink is made by replacing a part of the petroleum solvent in printing ink with soybean oil. Compared to conventional printing ink, soybean ink produces less volatile organic compounds that cause air pollution, eliminating complicated procedures for disposal. It also lends itself to recycling as it is easily separated from paper.

\*In the process of creating this recycled paper, there has been no use of chlorine.

**Editor's Postscript**

This year, our goal was to reduce the number of pages in the environmental report by twenty percent from last year. As a result, we could not include all of the contents of the NTT Group environmental activities. Thus, we would be grateful if you use this report in conjunction with the information that is on our web site. This year's report has not been reviewed by a third party, however we vouch that the contents are accurate. This report is an extremely important element in fulfilling our corporate responsibility to society. We are a corporation involved in the information exchange industry. Today, information flow is not one way. Thus, we would like to know your opinions and reflections on our corporate environmental activities as outlined in our report. We strive to be a corporation which changes with society as it grows.

NTT Group Environmental Protection Activity Report 2001

Published in September 2001

Published by:

Environmental Protection Office

NIPPON TELEGRAPH AND TELEPHONE CORPORATION

3-1, Otemachi 2-Chome Chiyoda-ku, Tokyo

100-8116 Japan

Fax +81-3-5205-5329

URL <http://www.ntt.co.jp/kankyo/e/index.html>

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