

NTT West Group

# Environmental Report 2014

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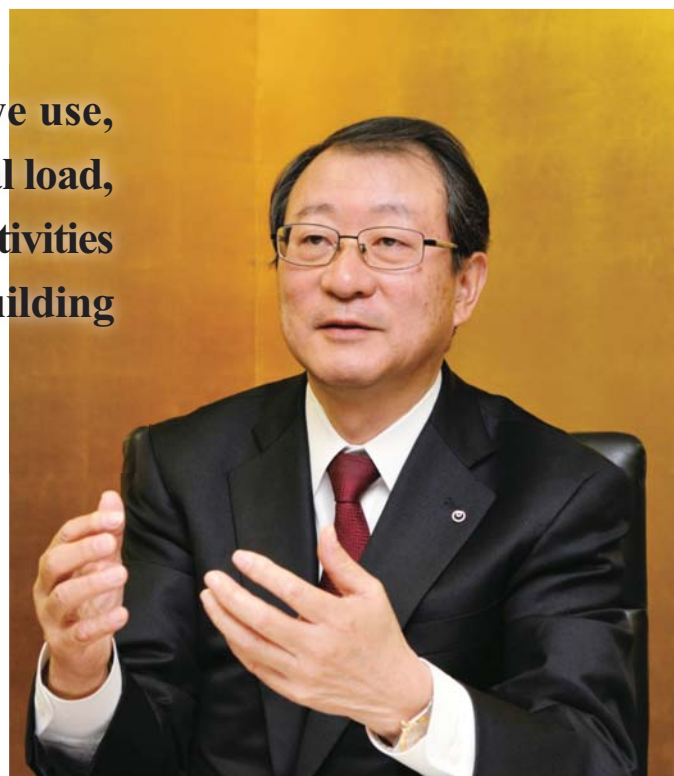
**We will reduce the amount of energy we use, promote a reduction of our environmental load, and carry out biodiversity conservation activities through our business to contribute to building a sustainable society.**

村尾 和俊

Kazutoshi Murao

President

Nippon Telegraph and Telephone West Corporation



NTT West Group has been proactively working on the resolution of environmental issues as the responsibility of a company that consumes a significant 2 billion kWh of electricity per year. NTT West Group established the "Green NTT West Strategy" in June 2012 where we declared our maximum effort in reducing power use and other environmental issues. The year 2013 was set as the year for implementation of this strategy, and since then we have been working on "Achievement of the Environmental Grand Design", "Deployment of Our Environmental and Energy Business", and "Promotion of Activities for Biodiversity Conservation" which are the three pillars of the Green NTT West Strategy. Our achievement and efforts in these pillars are as follows.

First, in "Achievement of the Environmental Grand Design," we aim to reduce our power use by at least 40% by FY 2020 compared to the FY 2010 level. In FY 2013, we promoted expanding the introduction of a system for visualizing our energy use to enhance our energy use management. As a result, we reduced the amount of energy we use by approximately 60 million kWh which is equivalent to the energy use of nearly 20,000 households.

In 115 office buildings where energy use has been visualized, an approximately 20% reduction compared to FY 2010 was achieved in FY 2013, and an approximately 30% reduction was realized in the first half of FY 2014. In addition, for telecommunication facilities, the introduction of new technologies such as "Smart DASH®" which is an automatic air-conditioning control system equipped with a self learning function has been carried out.

For the reduction of paper usage, an internal paperless system and paperless meetings are being promoted to reduce the consumption of paper resources such as forms and meeting materials. For the reduction of waste, we achieved zero emissions\* which means a 1% or less final disposal rate in FY 2013 as well for two consecutive years.

In the "Deployment of Our Environmental and Energy Business," NTT West Group is also contributing to society by using ICT (Information and Communication Technology). NTT SMILE ENERGY INC. is providing

"Eco Megane", a service that enables visualization of electricity use and the amount of power generation, to solar panel users. From June 2013, we started to provide data from solar power generation systems measured by this "Eco Megane" without including personal information and with customer consent to the National Institute of Advanced Industrial Science and Technology, and we are contributing to the spread of renewable energy by promoting the collection of power generation data and management of statistical data.

Furthermore, from April 2014, information regarding solar power projects and so on that are not currently in operation has been collected, and NTT SMILE ENERGY INC. is working on improving the operating rate of solar power generation systems as a power generation entity to contribute to creating a sustainable and geographically distributed energy society.

Meanwhile, in the "Promotion of Activities for Biodiversity Conservation", the "NTT West Midori Ippai Project", which was launched on a scale of approximately 2,000 participants in 18 prefectures, grew into an activity with 7,231 participants in all 30 prefectures comprising NTT West's service area in FY 2013. In FY 2014, the number of participants increased to 9,000 people. We are contributing to the local community and natural environment protection through our efforts on the protection of local biodiversity by individual employees.

Furthermore, we cooperated with the "Afuhi Host Family Summit" of the Afuhi Project which promotes education on the conservation of culture and environment through hollyhock. Hollyhock is used for the Aoi Matsuri (Hollyhock Leaf Crest Festival) which is one of the three major festivals in Kyoto. Our ICT is used to connect three cities in the Afuhi Host Family Summit, and it is used in remote classes connecting host family schools of rosy bitterling which is an endangered species.

NTT West Group promises that the NTT West Group will contribute to building a sustainable society by carrying out further proactive involvement by each and every single NTT West Group employee in environmental conservation activities through these efforts.

\* This is the concept advocated by United Nations University. It aims for production that does not generate any waste overall by using all waste products and by-products generated from industries as resources for other industries. NTT West Group defines a 1.0% or less final disposal rate as zero emission.

The CSR activities of the NTT West Group are based on the “NTT West Spirit” which is a corporate philosophy formulated at the birth of our business. Our CSR activities are comprised of three pillars. The first pillar is “Thorough compliance” which is the origin of CSR activities. The second pillar is “Safe society” which is an expectation of society. The third pillar is the enhancement of various values by “Value creation through business.” To fulfill our corporate social responsibility, the NTT West Group has been working on CSR activities with the above mentioned three pillars to contribute to the realization of a sustainable society.

For our CSR activity efforts overall, CSR reports have been released since FY 2005 as annual reports.

In addition, believing that it is a corporate social responsibility to realize a sustainable society by paying attention to the environment, NTT West Group has been engaging in environmental conservation activities and reporting details of these activities in the annual Environmental Report since FY 2000. Integrated reports as the NTT Group are released as the “Annual Report.” Moreover, the latest information is updated on the “Activity to Protect Global Environment” page of our official website. We appreciate your valuable comments to the following e-mail address.

## NTT West Group 3 Pillars of CSR Activities

## CSR website page

<http://www.ntt-west.co.jp/csr/>



Annual Report “**CSR Report**”  
Publication of an outline of our environmental protection activities.

“NTT West Spirit (NTT West Spirit, Action Policies, Code of Conduct)”

<https://www.ntt-west.co.jp/csr/spirits.html>

“**Activity to Protect Global Environment**”

<http://www.ntt-west.co.jp/kankyo/>

## Annual Report “**Environmental Report**”



Environmental Report FY 2013



Environmental Report FY 2012



Environmental Report FY 2011



Environmental Report FY 2010



## FY 2014 Environmental Report Reporting Scope, etc.

Applicable to

◆35 NTT West group companies

Organization Charts <https://www.ntt-west.co.jp/corporate/about/sosikizu.html>

Group Companies <https://www.ntt-west.co.jp/corporate/about/group.html>

Applicable period

◆Based on records from April 2013 to March 2014

Reference

◆“Environmental Report Guidelines 2012”  
Ministry of the Environment

NTT Group Integrated Report “Annual Report 2014”

<http://www.ntt.co.jp/ir/library/annual/index.html>

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# Feature 1

## Efforts for Reducing Our Power Use

### Introduction

Under the Green NTT West Strategy, NTT West has been proactively working on the resolution of environmental issues as the responsibility of a major user of energy that is derived from fossil fuels. We stipulated a mid-to-long-term plan called the Environmental Grand Design, and, in order to achieve the target of reducing our energy use by a minimum of 20% compared to the FY 2010 level in 2020 (reduction of our power use by a minimum of 40%), in FY2013, the enhancement of management such as visualizing our energy use and progress of reduction measures were implemented. As a result, we reduced our energy use by approximately 60 million kWh which is equivalent to the annual energy use of nearly 20,000 households\* (Figure 1).

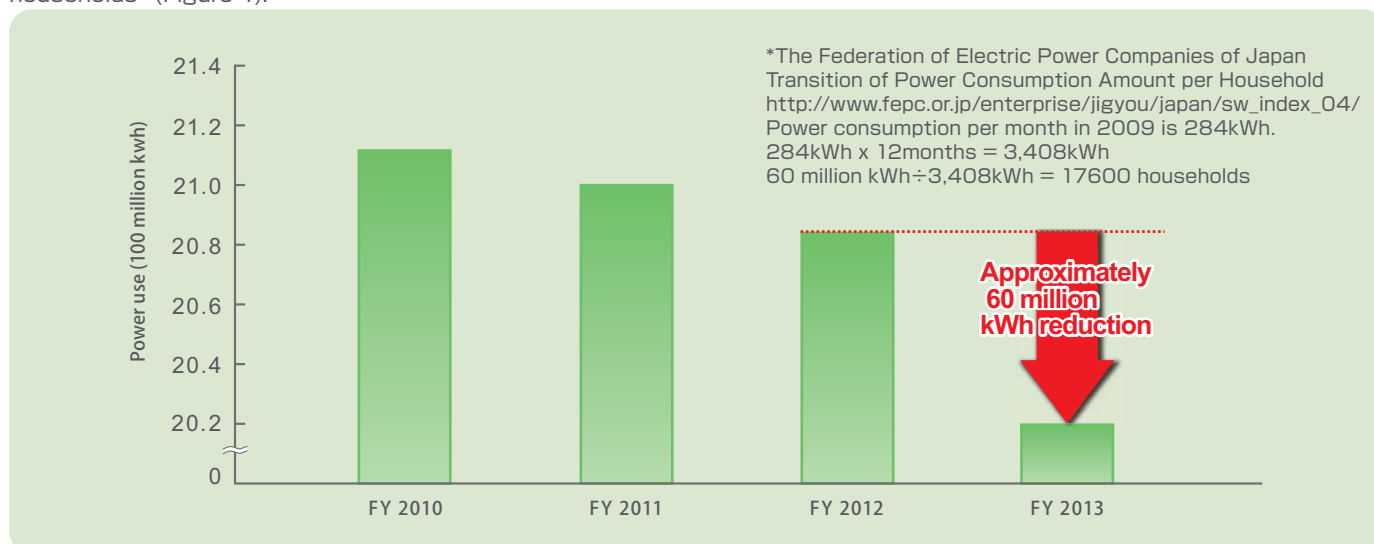


Figure 1: Annual Power Use

### Visualization of Our Power use

NTT West visualizes our power use based on monthly electricity bills from utility companies to promote visualization of our power use further. In addition, to promote a decrease in power use by shortening the PDCA cycle, visualization of our power use every 30 minutes is being carried out in cooperation with group company, NTT FACILITIES, INC.

At the end of FY 2013, roughly 50% of the power use in approximately 450 buildings became understandable (Figure 2), and the power use visualization system has been installed in 115 of the 450 buildings being used as office buildings, and 80% of the total power use in the office buildings is understood as needed. In addition, power use is visualized by organization and purposes of building use so each organization can better manage its power use (Figure 3).

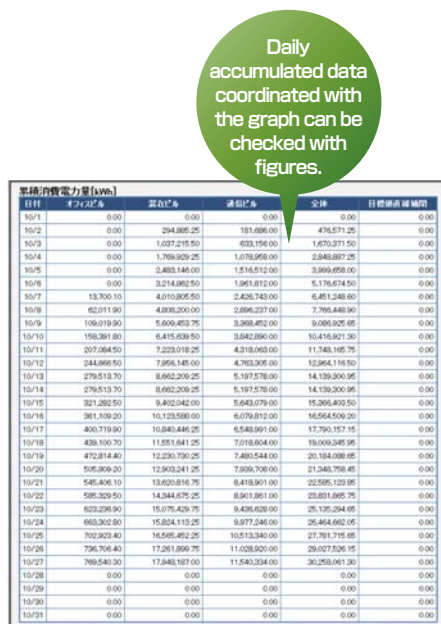


Figure 2: Accumulated Power Consumption (kWh)



Figure 3: Daily Management

### Efforts in Office Buildings

In FY 2013, at the same time as power use visualization, a target (20% reduction compared to FY 2010) for reducing power use was set, and we created and deployed a collection of case examples of power use reduction measures (Figure 4) so individual employees could take action with an awareness of reducing power use. The collection of case examples introduces how to set the proper brightness of lights, power use status of various types of equipment, how to utilize power use visualization data, key points when setting the air-conditioning system, and measures to reduce power use by each organization.

In addition, we implemented measures to improve awareness such as an energy saving idea photo contest (Figure 5) and the distribution of stickers to declare action for reducing the use of power (Figure 6).



Figure 4: Collection of Case Examples of Power Use Reduction Measures



Figure 5: Power Saving Idea Photo Contest Application Website



Power Saving Promotion Poster for Summer 2013

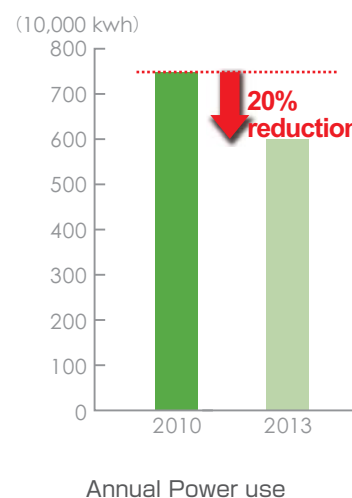
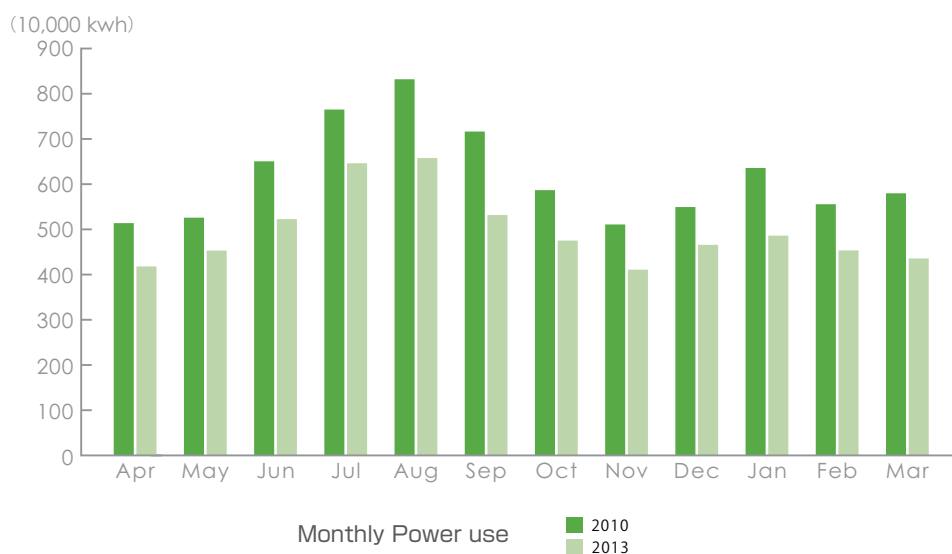


Figure 6: Action Declaration Sticker



Power Saving Promotion Poster for Winter 2013

### Power Use Reduction Status in 115 Office Buildings Where Energy Use is Visualized



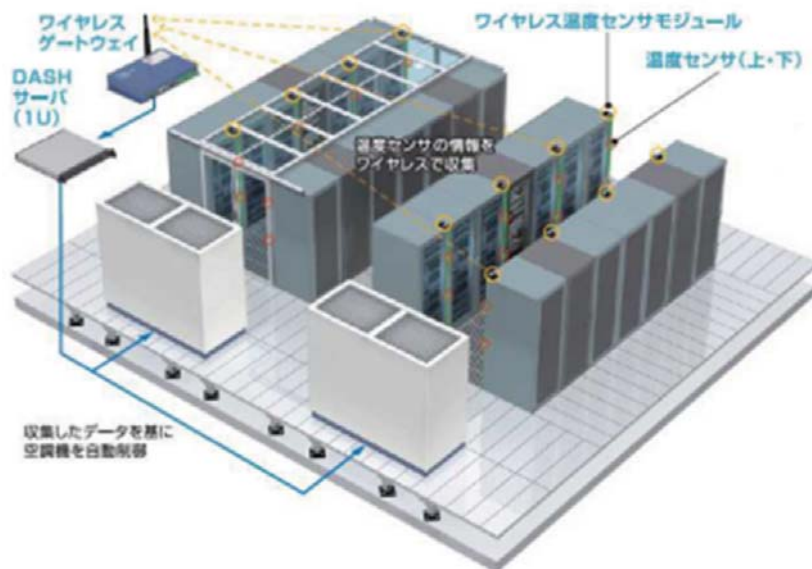


## Efforts in Our Telecommunication Facilities

In our telecommunication facilities that account for most of the power use of NTT West, we are working on reducing the power use of telecommunication equipment itself by introducing new switching equipment and integrating information systems. Furthermore, since power consumption related to air-conditioning is also large, efforts to reduce power consumption for air-conditioning are also being promoted.

### Introduction of Automatic Air-conditioning Control System “Smart DASH®”

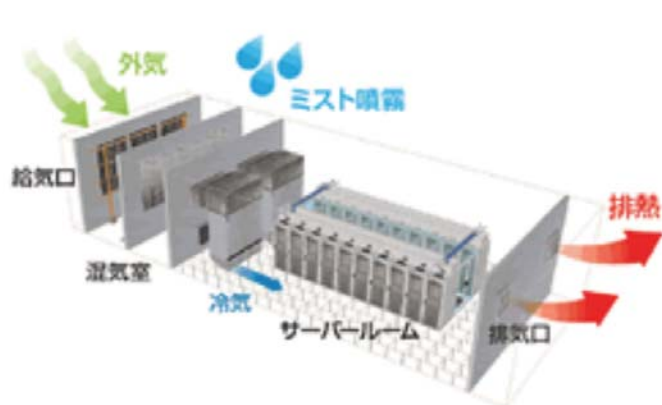
For reducing the power use of our data center, we introduced the automatic air-conditioning control system “Smart DASH®” provided by NTT FACILITIES, INC., which comes equipped with a self learning function, in 7 buildings. As a result, power use for air-conditioning was reduced by 22% on average.



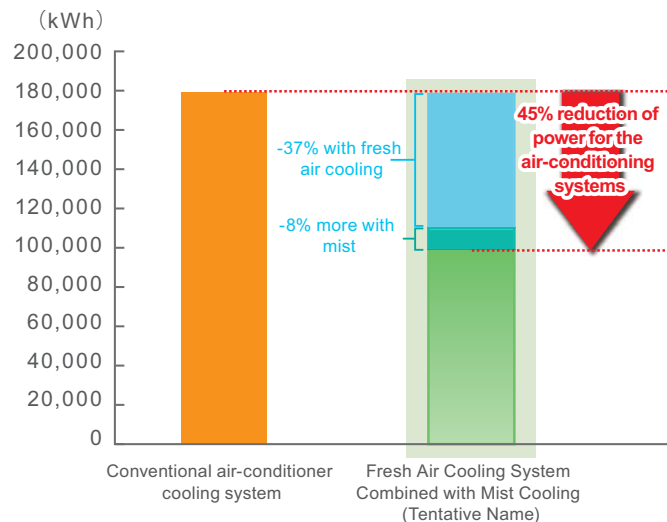
Automatic Air-conditioning Control System “Smart DASH®”

### Efforts for Power Use Reduction by Fresh Air Cooling System Combined with Mist Cooling (Tentative Name)

NTT West Group company NTT SMARTCONNECT CORPORATION launched the trial operation of “Fresh Air Cooling System Combined with Mist Cooling” in its data center building in Osaka City in an attempt to build an urban type data center that pursues energy efficiency. “Fresh Air Cooling System Combined with Mist Cooling” (tentative name) is a system where a “fresh air cooling system” and an “evaporative cooling system that sprays mist” are combined with a “conventional air-conditioner cooling system with an air cooling heat pump package.” By efficiently controlling the system according to external temperature and humidity conditions, the amount of power consumed by the data center’s air-conditioning system will be reduced.



Fresh Air Cooling System Combined with Mist Cooling (Tentative Name)



Simulation of the Reduction of Power Consumed by Air-conditioning Systems

## Feature 2

# Midori Ippai Project (Biodiversity Conservation Activities Using IST)

NTT West's "Midori Ippai Project" inaugurated in November 2012 grew into an activity with 7,231 participants in total in all 30 prefectures comprising NTT West's service area. NTT West Group works on having many people know about and participate in our biodiversity conservation activities. We also focus on biodiversity conservation activities using ICT illustrated in Figure 1.

For example, for many endangered species, their natural environment is unknown. If their biology becomes understood, how to protect and nurture these species can be established, and we may be able to one day save these species from extinction. Moreover, even if we understand how to nurture species to some degree, we cannot protect the species without informing many people about the method and mutually studying the species. NTT West is contributing to the conservation of biodiversity by connecting people working on biodiversity conservation activities in remote areas with the power of ICT.

Feature 2 introduces a "Sensor network and remote education of the rosy bittering protection activity" and the "Afuhi Summit" using ICT.

### "Promotion of Biodiversity Conservation and Environmental Education Using ICT"

<http://www.ntt.co.jp/news2013/1305/130525a.html>

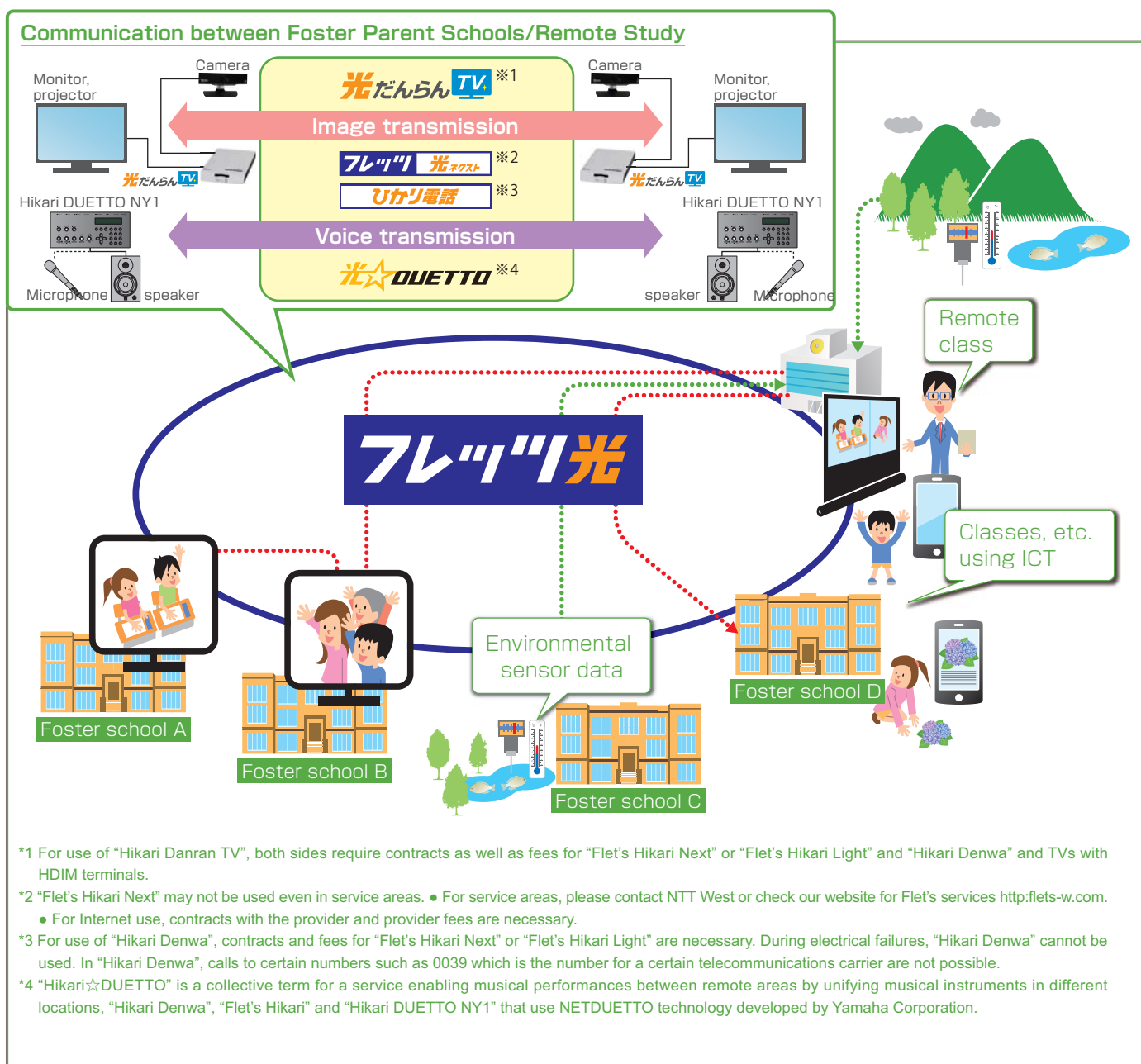


Figure 1: Biodiversity Conservation Education Using ICT



## ICT and Rosy Bitterling

### Discovering Growing Conditions of the Rosy Bitterling with Sensor Network Technology

NTT West Nara Group has been working on the protection of the endangered rosy bitterling and restoration of satoyama environment as part of its "Midori Ippai Project."

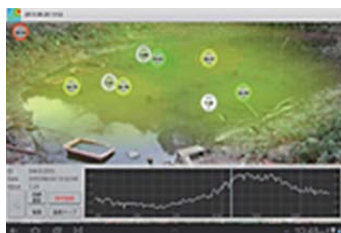
Furthermore, NTT Communication Science Laboratories (hereinafter, NTT CS Lab.) is conducting a habitat monitoring study of the endangered rosy bitterling with sensor networks as joint experiments with the Faculty of Agriculture, Kinki University. For building a sensor network, virtual machines and sensor nodes developed by NTT CS Lab. are being used. Sensors were installed in a pond to protect rosy bitterling in satoyama located on the campus of the Faculty of Agriculture, Kinki University, and 24-hour continuous sensing has been conducted since FY 2013. According to sensing experiments, new findings regarding biology including the relationship of oviposition activity, brightness, and the amount of oxygen were obtained.



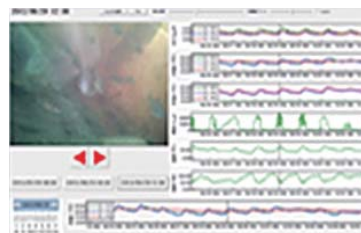
Monitoring Rosy Bitterling



Rosy Bitterling



Continuous Observation with Sensor Networks



### Communication between Foster Parent Schools Using Video-Conferencing

Rosy bitterling bred in a pond dedicated to the protection of rosy bitterling in Kinki University are under the protection and care of elementary and junior high school students acting as foster parents within Nara Prefecture. In July 2013, children from foster parent schools, which previously worked independently, were mutually introduced to the breeding situation and efforts in respective schools in a remote class using video-conferencing. Listening to the breeding conditions of rosy bitterling in other schools enables students to compare their own breeding conditions and conceive new efforts for breeding. In the end, students become further motivated to raise rosy bitterling.

In addition, Professor Jun Kitagawa of the Faculty of Agriculture, Kinki University provided children with advice on breeding rosy bitterling. Bi-directional exchanges such as direct question and answer sessions between students and a specialist were held, and the remote classes proved to be a productive opportunity of study.



Rosy Bitterling Foster Parent Exchange Session

## ICT and Hollyhock

### Thinking About Harmony with Nature by Connecting Three Cities by Video-conferencing – Afuhi Foster Parent Summit—

The Afuhi Foster Parent Summit (research presentations, discussions, chorus, lectures, etc.) was jointly held by three cities connected together with ICT technology by NTT West. The summit was hosted by the NPO Afuhi Project which promotes cultural education and environmental conservation through activities including the raising of hollyhock. Hollyhock is a plant that is used for the Aoi Matsuri (Hollyhock Leaf Crest Festival) which is one of the three major festivals in Kyoto.



Hollyhock

Video-conferencing connecting the foster parent children from elementary schools in Kyoto Prefecture, Shizuoka Prefecture, and Fukui Prefecture with the foster parent employees from WAKASA SEIKATSU Corporation and NTT West Group were held, and research presentations and discussions were conducted to deepen the empathy towards nature and culture. During the summit, a forest of hollyhock located on the grounds of Kamigamo Shrine was also connected via a tablet computer, and when the site of hollyhock propagated by root division from hollyhock raised by foster parents was shown on the screen, the foster parents appeared pleased to see the hollyhock they raised back in its natural home.

Moreover, a song about hollyhock was performed by using the “Hikari☆DUETTO Service” to deepen the bonds. Delays due to the distance were not noticed, and the children in the respective venues were also surprised to discover a sense of unity from everyone being seemingly in the same place. On that day of the summit, live broadcasts were also conducted for remotely located foster parents who were unable to participate. The passion for raising hollyhock by the foster parents seemed to increase since they were able to directly see where their hollyhock would return.

NTT West continues to proactively participate in projects that allow us to think about harmony with nature and the environment such as this summit and contributes to communication expanding across wide distances by using ICT.

#### Used ICT Service

Video-conferencing: Biz Hikari Cloud “Meeting Plaza”/ Chorus: “Hikari☆DUETTO”/ Live broadcasting: “SmartSTREAM” (NTT SmartConnect)



Venue in Fukui



Venue in Kyoto



Venue in Shizuoka  
(Aoi Elementary School)



Afuhi Foster Parent Summit Using ICT Technology

## Midori Ippai Project Activities Coordinated with “Green goo”

NTT West Group will contribute to protection of the environment by driving ICT use, and we will continue to work on reducing our load on the global environment. In this context, NTT West Group began cooperating with “Green goo” provided by NTT Resonant, and started the promotion of its internal use 5 years ago for the purpose of further promoting our activities to contribute to society and educating our employees so they become aware of contributing to the environment.

More specifically, employees are encouraged to register the “Green goo” website on the start-up page of computers in the office or bookmark the website so each employee voluntarily works on activities for the environment.

We are also working on “Green goo” as a part of our “Midori Ippai Project” launched in FY 2012. The frequency of using “Green goo” in FY 2014 increased by approximately 40% compared to the previous fiscal year.

In the period from April 2014 to September 2014, NTT West Group’s contribution to the overall use of “Green goo” was approximately 8% or 2,867,392 hits.



## Environmental/Energy Business

Under the Green NTT West Strategy, NTT West Group has been making various efforts to introduce/spread renewable energy with the aim of becoming an environmentally-friendly company.

NTT SMILE ENERGY INC. is providing “Eco Megane”, a service that enables visualization of electricity use and the amount of power generation, to solar panel users. From June 2013, we began to provide data from solar power generation systems measured by this “Eco Megane” without including personal information and with consent of the customers to the National Institute of Advanced Industrial Science and Technology, and we are contributing to the spread of renewable energy by promoting the collection of power generation data and management of statistical data.

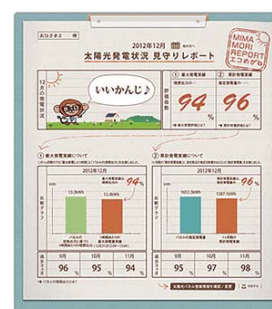
In addition, “Eco Megane” received the “Solar Award 2013” which is given to products, etc. contributing to the spread of natural energy in Japan.



Eco Megane Power Plant



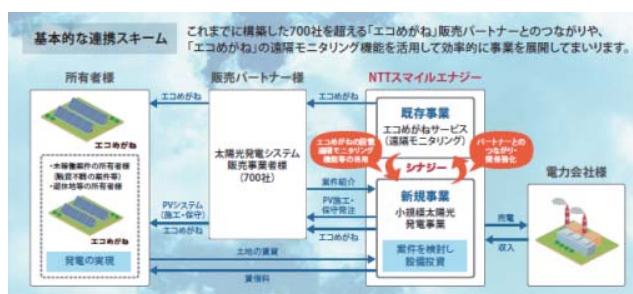
### “Eco Megane” Display Screen Example



“Solar Power Generation  
Status Watchdog Report” Screen

Furthermore, from April 2014, by using our know-how in solar power generation cultivated with “Eco Megane” and our network with solar power generation system sales companies that are currently handling “Eco Megane” and their customer owners of idle land/solar power generation projects that are not yet in operation, we have been collecting information on non-operating solar power projects, and so on. Based on the information, NTT SMILE ENERGY INC. provides capital investment in idle land and these currently non-operating projects as the power generation entity. Thus, we are working on improving the operating rate of solar power generation systems.

We are positioning this power generation business as a business looking ahead to new service creation after the retail liberalization of electricity, and we will contribute to creating a sustainable and geographically distributed energy society.



Power Generation Scheme by NTT SMILE ENERGY INC.

In addition, NTT West has been proactively promoting the introduction of renewable energy by building large-scale solar energy systems in real estate (roof tops of telecommunication facilities and former company housing lots) owned by NTT West. These businesses have been carried out in cooperation with NTT FACILITIES, INC., and by conducting business in each NTT West area. NTT West is promoting the spread/expansion of natural energy and a reduction of environmental load of all society.



F Suzuka Solar Power Plant  
(Suzuka City, Mie Prefecture)



F Niida Solar Power Plant (Image)  
(Kochi City, Kochi Prefecture)



F Miyakonojo Solar Power Plant  
(Miyakonojo City, Miyazaki Prefecture)

## 1-1 NTT West Group Charter for Global Environment

Based on the belief that corporations, which are inseparable from the society, are responsible for promoting activities to protect the environment, we established the “NTT West Charter for Global Environment.” Based on the provisions of the charter, our Group set forth targets and execution management items for promoting activities to conserve the environment.

### NTT West Group Charter for Global Environment

#### Basic Philosophy

In order to harmonize with the nature and to realize sustainable development for years to come, NTT West Group shall, in compliance with the charter, make the best effort in all its business activities together with its group companies toward protecting the global environment.

#### Main Principles

##### 1. Legal Compliance & Social Responsibility

We shall comply with the relevant laws and regulations on environmental protection, and fulfill our corporate responsibilities from a global perspective.

##### 2. Reduction of Environmental Load

We shall set action goals for reducing greenhouse gas emission, saving energy, saving materials such as the amount of paper used, and cutting down wastes, and we shall strive to make continuous improvements.

##### 3. Establishment & Maintenance of Environmental Management System

By establishing an environmental management system, each office shall take actions voluntarily to protect the environment in order to prevent pollution and reduce environmental risks.

##### 4. Dissemination of Eco-technology

We shall contribute to reducing the environmental load through actively disseminating the achievements of research and development efforts such as through multi-media services.

##### 5. Contributions via Social Support

Cooperating with local residents and the government offices, we shall strive to support the activities for environmental protection.

##### 6. Disclosure of Environment-related Information

We shall engage in active communication within and outside the Group by disclosing information related to the environment.

##### 7. Preservation of Biodiversity

We shall grasp the relationship of biodiversity with business, and promote efforts for it to be inherited by future generations.



## Reference: NTT Group Environment Vision "THE GREEN VISION 2020"

With the aim to realize the development of a sustainable society with man and the Earth coexisting in harmony, NTT Group has, in November 2010, established the NTT Group Vision for Environmental Contributions, named "THE GREEN VISION 2020," which sets forth policies on new efforts up to FY 2020 (Figure 1).

"THE GREEN VISION 2020" positions three ongoing environmental themes to be tackled in the future. They are "realization of a low carbon society," "formation of a circulating society," and "conservation of biodiversity."

### ▶ 3 Environmental Themes

#### 1. Realization of a low carbon society

To prevent global warming, we aim to realize a low carbon society by cutting down on CO<sub>2</sub> emission from our business activities, while at the same time spread the use of ICT services to contribute to CO<sub>2</sub> reduction in the entire society.

#### 2. Formation of a circulating society

To make effective use of limited resources, we aim to realize the formation of a resource-circulating society by reducing all wastes generated from our business activities as well as cutting down on paper use.

#### 3. Conservation of biodiversity

To contribute to the conservation of biodiversity, we aim to improve and further develop our existing efforts based on the concept of the two newly-formulated approaches.

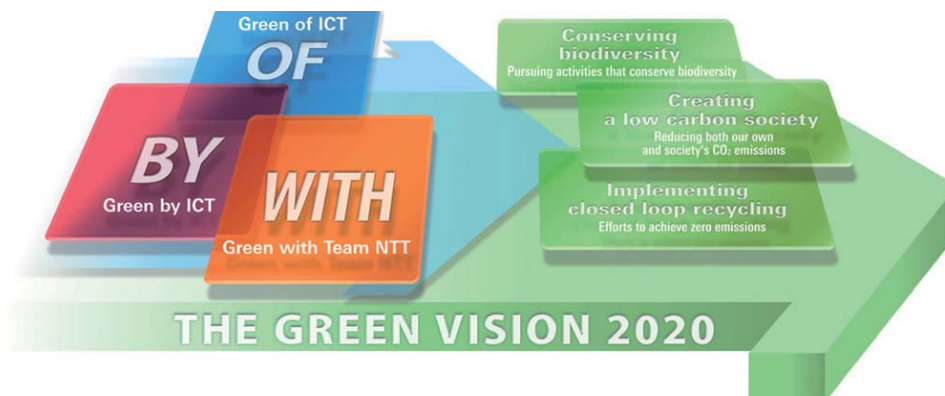


Figure 1: "THE GREEN VISION 2020"

### ▶ Implementing Three Approaches

In THE GREEN VISION 2020, the NTT Group proposes the three approaches of "Green of ICT", "Green by ICT", and "Green with Team NTT." "Green of ICT" refers to efforts to reduce the environmental impacts of our own business activities. "Green by ICT" refers to our efforts to reduce CO<sub>2</sub> emissions across society through providing ICT services. "Green with Team NTT" refers to efforts by group employees and their families to work with local communities to help protect the environment.

NTT West Group is also working on activities for protecting the environment by implementing three approaches, namely, "Green of ICT", "Green by ICT", and "Green with Team NTT."

## 1-2 Policy Regarding the Global Environment and Mid-to-long-term Targets

NTT West has continually been working on the reduction of environmental load. In addition, when considering our corporate social responsibility in the consumption of as much as 2 billion kWh of electricity per year, in order to declare our maximum effort in reducing the use of power and other environmental issues, NTT West Group established the “Green NTT West Strategy” in June 2012. The “Green NTT West Strategy” consists of three pillars. The first pillar is “Achievement of the Environmental Grand Design.” In this activity, we will contribute to society by reducing our environmental load. In the “Deployment of Our Environmental and Energy Business”, which is the second pillar, we will contribute to the environment by deploying business activities using and utilizing ICT. Finally, the third pillar is “Promotion of Activities for Biodiversity Conservation.” In biodiversity conservation activities, individual employees contribute to environmental protection in society.

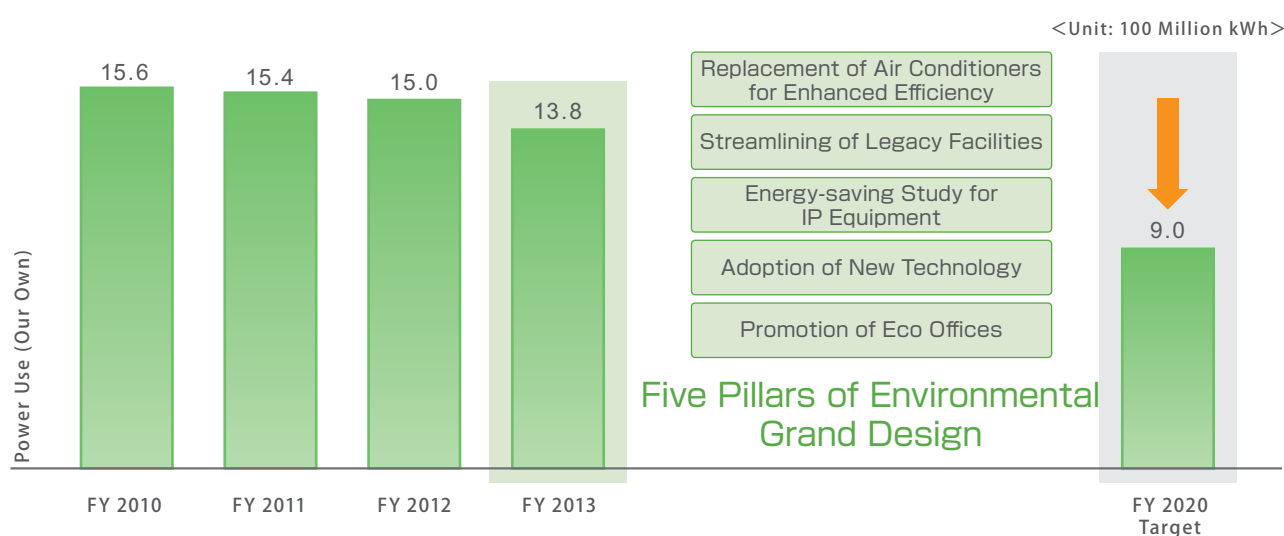
### Achievement of the Environmental Grand Design

NTT West is contributing to society by setting numerical targets in our Environmental Grand Design and reducing our environmental load.

NTT West will reduce its power use and paper consumption by at least 40% by FY 2020 compared to the FY 2010 level and achieve a final waste disposal rate of 1% or less.

For details, please refer to 1-3. Environmental Grand Design (Page 14) and 3-2. Progress of the Green NTT West Strategy (Page 23).

#### Target for FY 2020 -40% Power Use Reduction



\*Our power use is calculated based on the following conditions.

Tenant: 120kWh/m<sup>2</sup>  
 Colocation: 30% of contracted power, PUT (1.6)  
 Data center: PUE (1.6)

### Deployment of the Environmental and Energy Business

We will contribute to the environment through the deployment of business activities using ICT.

For example, we can contribute to energy saving and CO<sub>2</sub> emission reduction through the visualization of power consumption. NTT West provides a cloud-based power consumption visualization service, “Flet’s Eco Megane.” In addition, there is an “Eco Megane” service that visualizes power generation by solar power panels. The provision of power generation data from solar power panels as statistical renewable energy data is used for the spread of renewable energy all across Japan. In deployment using ICT technology and real estate, a hydroponic culture rental farm called “Mieru Eco Bata” and a rental outdoor vegetable garden known as “Mieru Saien” have been deployed to enable people to feel closer to the natural environment. Furthermore, we rent land suitable for solar power generation in order to build large-scale solar energy systems. In this way, we are promoting the spread of renewable energy.

### Promotion of Biodiversity Conservation Activities

We contribute to the local community and natural environment protection through our efforts on the protection of local biodiversity by individual employees as representatives of our companies.

More concretely, we have been implementing the “NTT West Midori Ippai Project” which mainly focuses on tree planting in cooperation with local organizations with the aim of implementing the project in all prefectures comprising NTT West’s service area and creating an activity participation scale numbering 10 thousand people.

## 1-3 Environmental Grand Design

NTT West Group has established the “Environmental Grand Design,” which sets forth, in particular, targets for power usage reduction, paper usage reduction, and final waste disposal rate, in order to realize a low carbon society and form a circulating society, moreover, implementation of the “Environmental Grand Design” is being managed under a structure which includes executive personnel from our Group.

The targets to achieve by FY 2020, which are set forth in the Environmental Grand Design, are as follows.

### Global Warming Countermeasures

To reduce total CO<sub>2</sub> emission by at least 40%\*<sup>1</sup>, our power use by at least 40% and total power use by at least 20% by 2020 compared to FY 2010.

(Reference)

CO<sub>2</sub> emission in FY 2010 was 933,000 t.\*<sup>2</sup>  
Our power use: 1.56 billion kWh  
Total power use: 2.108 billion kWh

### Reduction of Paper Resources

To reduce total paper usage by 2020 by at least 40% compared to FY 2008 (Reference)

Total paper usage in FY 2008 was 39,900 t

To reduce office paper usage per head by FY 2015 by at least 50% compared to FY 2008.

(Reference)

Office paper usage per head in FY 2008 was 9,900 sheets

### Reduction of Wastes

To reduce total paper usage by 2020 by at least 40% compared to FY 2008 (Reference)

Final disposal rate in FY 2008 was 2.1%.

To maintain the final disposal rate for wastes from dismantled telecommunication facilities at 0.1%.

\*1 Calculation is based on the target emission coefficient of 0.33 kg/kWh to achieve by FY 2020, which was announced by the Federation of Electric Power Companies of Japan prior to the Great East Japan Earthquake.

\*2 The target value may be subject to change following any changes in the emission coefficient due to impact of the said earthquake. Performance in FY 2010 is calculated based on the emission coefficient of 0.44 kg/kWh announced by the Federation of Electric Power Companies of Japan.

\*3 Proposed by the United Nations University, this is a concept that aims at production that does not generate wastes on the whole by utilizing all wastes and byproducts generated by an industry as resources for another industry. NTT West Group defines zero emission as a final disposal rate of 1.0% or lower.

We have implemented a wide variety of endeavors to help achieve the targets set forth in the Environmental Grand Design.

### Reduction of Power Use

NTT West Group is aiming to reduce power use, which has an effect on the amount of greenhouse gas emission, by promoting the five pillars of efforts as shown below.

#### Streamlining of legacy equipment, etc.

To promote energy saving during renewal of old switching equipment models into new ones, and to optimize the air conditioning system in the telecommunication equipment rooms.

#### Development of energy-saving IP devices

To develop energy-saving type IP devices, and promote their introduction.

#### Renewal of air-conditioning and enhancement of efficiency

To renew old air-conditioners that are still running, and to ensure efficient operation of air-conditioners through thorough temperature control.

#### Promotion of eco office

To promote efforts to save electricity within the offices, such as ensuring proper air-conditioner temperature setting and proper brightness of lights, and cutting down on unnecessary use of lights.

#### Employment of new technologies

To utilize new technologies, such as recyclable energy including solar cells and fuel cells.

The types of paper used by NTT West Group include office paper, bills, telegrams, and phone directories. Phone directories, in particular, consume a relatively large amount of paper. Thus, we are making efforts to cut down on paper use by ensuring thorough collection of old directories and increasing the ratio of used paper in them (p.43 to p.46).

### Reduction of Wastes

Industrial wastes generated by NTT West Group can be divided into office wastes, such as unwanted computers, furniture and fixtures, construction wastes following dismantlement of facilities such as telecommunication buildings and offices, wastes from civil engineering works following duct line and telephone tunnel works, as well as wastes from telecommunication facilities as a result of dismantling transmission cables and switching equipment. We are working to improve the final disposal rate \*<sup>4</sup> (p.28 to p.40).

\*4 Final disposal rate: the final landfill ratio that is calculated based on (final disposal amount / total amount generated).

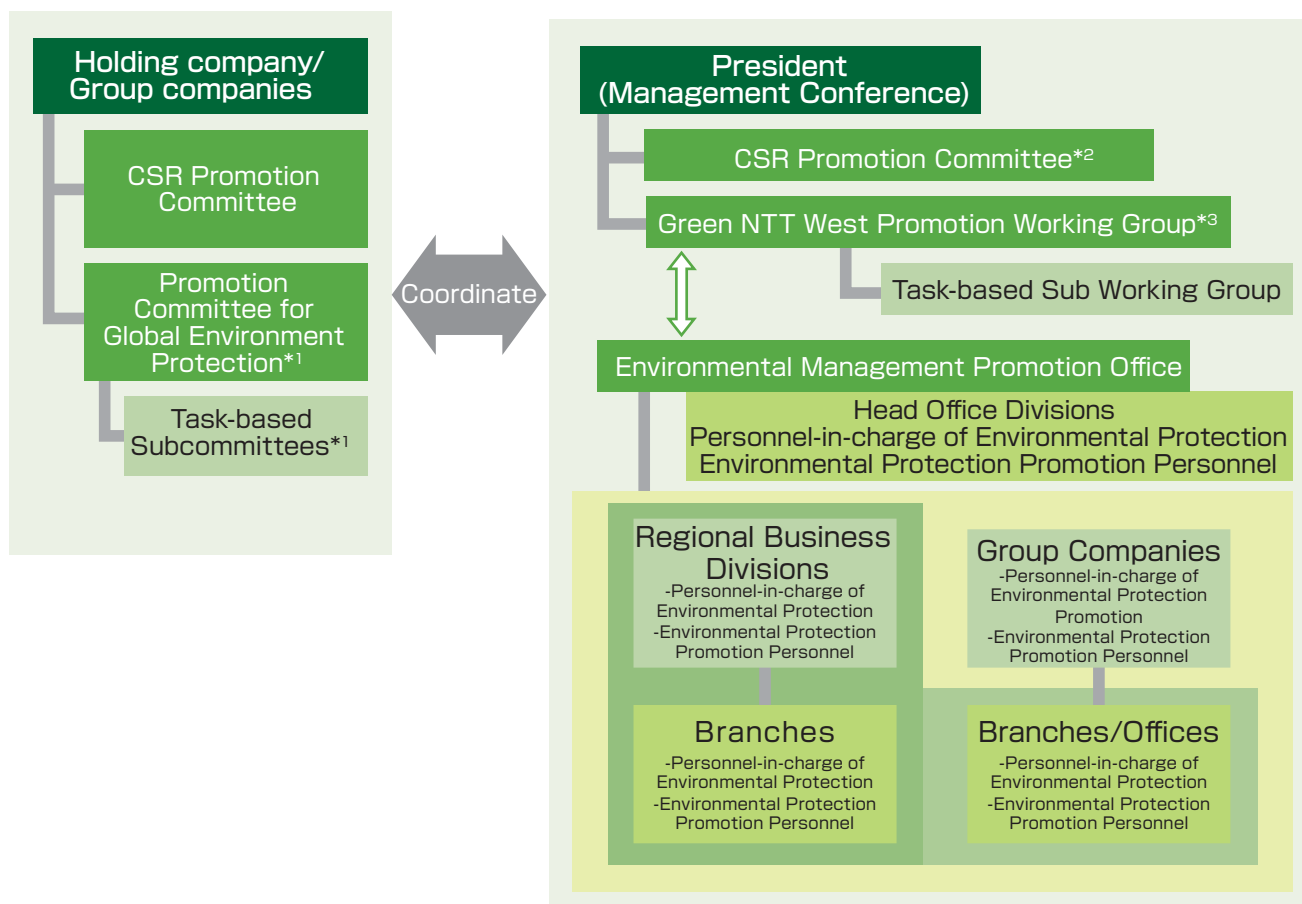


## 2-1 Environmental Management Promotion System

The CSR Promotion Committee was established under NTT West's management conference for conducting deliberations on the formulation of environmental policies and environmental protection measures for the entire NTT West Group. In addition, the Green NTT West Promotion Working Group (hereinafter, WG) examines measures regarding environmental protection and shares progress of the measures in the NTT West Group.

Decisions by the committee are conveyed to the whole NTT West group from the NTT West Environmental Management Promotion Office through the personnel-in-charge for promotion of environmental protection at each regional branch and respective group company.

Coordinating with NTT Group (holding company) and group companies like NTT East and NTT Communications, we have built a system for promoting environmental protection as a group by sharing the latest trends, examining measures jointly, and reviewing progress toward achieving the target with regard to each task.



\*1 Decide, manage and review NTT Group's environmental policies and measures for each task.

\*2 Establishes basic principles in NTT West Group's promotion of CSR, and strive to ensure a consistent stance at the management level.

\*3 Deliberations, formulation of measures and sharing of progress of various efforts in promotion of environmental protection by the NTT West Group are conducted.

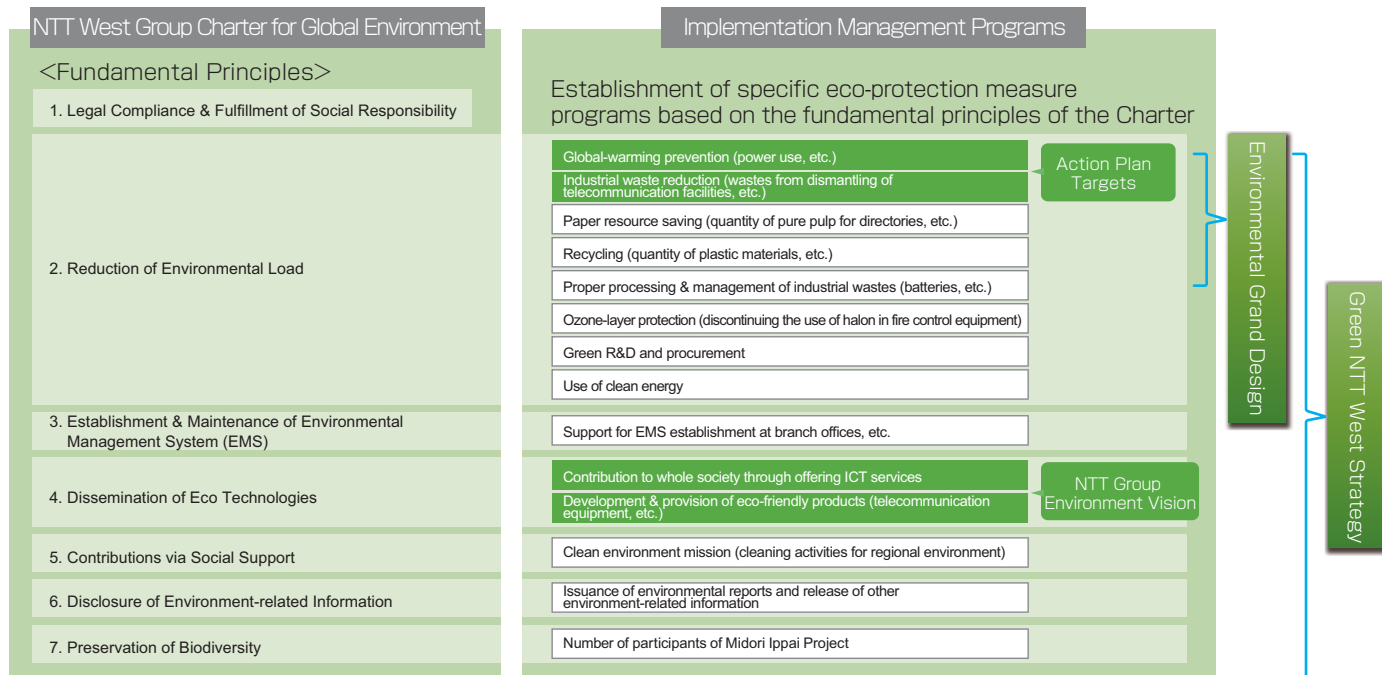
\*4 While coordinating with NTT Group companies, as the administration office of the Green NTT West Promotion WG, the Environmental Management Promotion Office examines environmental policies and measures of the NTT West Group, deploys policies and measures, and shares the progress with NTT West Group companies.

### Environmental Management Promotion System

## 2-2 Implementation Management Programs

### Policies/Targets and Implementation Management Programs

Based on the NTT West Group Charter for Global Environment, the NTT West Group formulated various indicators for environmental contribution as “Implementation Management Programs” and manages the level of implementation using numbers toward achievement of the Green NTT West Strategy and the Environmental Grand Design, furthermore, for achievement of the “NTT Group Environment Vision.”



Correlations of Charter and Implementation Management Programs

### Management Items (KPI)

For the Implementation Management Programs above, the following items (numerical value data, etc.) are collected/analyzed periodically, and measures as well as policy making based on the numerical values are carried out.

#### ■ Items on Numerical Value Management

Measure	Implementation Management Item
Global Warming Prevention	CO <sub>2</sub> emission from use of electricity
	CO <sub>2</sub> emission from vehicles
	CO <sub>2</sub> emission from gas & fuel consumption
Industrial Waste Reduction	Amount of waste disposal from civil engineering works
	Amount of waste disposal from construction works
	Amount of waste disposal from dismantled telecommunication facilities
	Amount of waste disposal from offices
Paper Resource Saving	Amount of paper used for directories, amount of pure pulp used
	Amount of paper used for telegraph paper, amount of pure pulp used
	Amount of paper used for office paper, amount of pure pulp used

#### ■ Items on Recycling Quantity Management

Measure	Implementation Management Item
Recycling	Quantity of displaced soil from civil engineering works
	Quantity of displaced soil from construction works
	Recycle quantity of plastic from dismantled telecommunication facilities
	Recycle quantity of small secondary batteries for telecommunication equipment
	Quantity of polystyrene foam used for packagings

#### ■ Items on Proper Processing Management

Measure	Implementation Management Item
Proper Processing & Management of Wastes	Control of products with PCB content
	Remaining amount of asbestos in bridge support
	Proper processing of disposed telecommunication equipment
	Proper processing of disposed batteries
Ozone Layer Protection	Proper processing of medical wastes
	Discontinued use of halon for fire control equipment

#### ■ Items on Progress Management

Implementation Management Item
Green R&D and procurement
Use of clean energy
Development & provision of eco-friendly products (telecommunication equipment, etc.)
Clean environment mission (cleaning activities for regional environment)
Promotion of social contributions
Support for establishment of EMS at branch offices, etc.
Coordination with group companies
Issuance of environmental reports and release of other environment-related information

Implementation Management Programs for Protection of Global Environment

## 2-3 Environmental Audit

### Audit Methods and Results

#### Self-check

Each relevant section conducts an annual self-check on compliance with the environmental laws, progress of the implementation management programs, and the degree of establishment of environmental protection activities.

The items for this self-check, which are classified into three levels as follows, are subject to an annual review by the responsible sections according to amendments of the relevant laws and internal regulations.

A. Matters related to laws and administrative directives

B. Matters related to internal regulations

C. Other matters to be implemented

#### Environmental Audit Reporting

During the audit conducted in FY 2013, one minor case was brought to attention, which was subsequently corrected. No administrative penalty or fine was imposed for violation of the environmental laws.

#### Environmental Audit by Audit Department

With the environmental laws and regulations becoming stricter each year, our Audit Department performs an environmental audit on environment-related operations that particularly require legal compliance. Unlike the self-check, this audit is objectively conducted by auditors from specialized organizations, and plays the additional role of verifying the effectiveness of the self-check.

### NTT West Group's Business Activities and Environmental Laws

The following list shows the major laws and regulations for which the business activities of NTT West Group are subject to.

	Major Laws & Regulations	Wastes Generated from NTT West Group's Business Activities
Wastes/ Recycling	Wastes Disposal and Public Cleansing Law	<ul style="list-style-type: none"> <li>Wastes from dismantled telecommunication facilities</li> <li>Wastes generated from construction works</li> <li>Wastes generated from civil engineering works</li> <li>Wastes generated from office activities</li> <li>Medical wastes generated from hospitals</li> <li>Asbestos used in fire-resistant materials of bridge (pipes and installed metal items).</li> </ul>
	Law for Promotion of Effective Utilization of Resources	<ul style="list-style-type: none"> <li>Small secondary batteries used for information terminals, etc.</li> </ul>
	Construction Materials Recycling Law (Law Concerning Recycling of Materials from Construction Work)	<ul style="list-style-type: none"> <li>Wastes generated from construction works</li> <li>Wastes generated from civil engineering works, etc.</li> </ul>
	Containers and Packaging Recycling Law (Law for Promotion of Sorted Collection and Recycling of Containers and Packaging)	Polystyrene foam, plastic bags, wrapping paper for packaging information terminals
	Act on Promoting Green Purchasing (Law Concerning the Promotion of Procurement of Eco-friendly Goods and Services by the State, etc.)	Procurement of office supplies, etc
Energy & Global Environ- ment	Energy Saving Act (Law Regarding the Rationalization of Energy Use)	<ul style="list-style-type: none"> <li>Electricity &amp; gas consumed at telecommunication facilities &amp; offices</li> <li>Goods &amp; facilities transported in business activities</li> </ul>
	Ozone Layer Protection Act (Act for Protection of the Ozone Layer through the Control of Specified Substances, etc.)	<ul style="list-style-type: none"> <li>Halon used for fire control equipment at buildings</li> <li>Old-type air-conditioners used in company vehicles, etc</li> </ul>
	Fluorocarbons Recovery and Destruction Law (Law Concerning the Recovery and Destruction of Fluorocarbons)	Old-type air-conditioners used in company vehicles, etc.
Chemical Substances	Act on Special Measures Concerning the Proper Treatment of Polychlorinated Biphenyl Waste	Electrical equipment (fluorescent ballasts, transformers, capacitors, etc.)
Air Pollution	Automobile NOx PM Control Law (Law Concerning Special Measures for Total Emission Reduction of Nitrogen Oxides and Particulate Matters)	Exhaust gas from use of company vehicles
	Air Pollution Control Law	Exhaust gas from boilers installed in buildings, etc.

Environmental Laws and Regulations Related to Business Activities



## 2-4 Environmental Communication

The NTT West Group plans various types of internal seminars and training and provides proactive training sessions on the environment as listed below so individual employees can voluntarily become aware of environmental protection and implement efforts toward reducing their environmental load during daily business activities.

### Training Session for Environmental Protection for All Employees and Internal Website

#### Training Sessions for Environmental Protection

In order to develop awareness in each employee of NTT West Group toward activities for environmental protection, we conducted web-based training sessions on environmental protection to about 80,000 employees.

In addition to conveying the importance of environmental measures, the sessions have designed action plans for each employee through acquiring knowledge such as that on NTT West Group's approach toward environmental management.

#### Internal Website

By posting internal publicity documents related to environmental conservation as well as the efforts and topics of each section, the site has helped to promote exchange of information between sections, enhance the efficiency of implementing environmental measures by each section, and heighten employees' awareness toward environmental conservation.



### Environmental Self-check Seminars for Environmental Audit Ability Enhancement

NTT West Group holds environmental self-check seminars for the personnel who are in charge of conducting self-checks (Page 17) at each section.

Being a part of the overall environmental education, the seminars are designed not only to enable participants to learn the skills for performing self-check, but also to familiarize them with the relevant environmental laws and related social trends as well as enhance their awareness toward activities for protecting the environment. In FY 2013, 125 employees participated in the seminars. Since FY 2006, the seminars have been held in the form of distant training to help ease the burden on the environment.



Environmental Self-check Seminar

## Midori Ippai Project Training Session to Learn about the Importance of Protecting the Global Environment

The environmental education session for environmental personnel for FY 2013 was held on June 20 and June 21 in the Okunoto area of Ishikawa Prefecture.

In the previous session, a great deal of feedback requesting information on “Midori Ippai Activities” in each respective area, creative points in the activities, and characteristics of the activities were received, therefore, this year’s education session targeted mutual information exchange.

Participants took part in the removal of weeds in rice terraces in Yoshigaik Village in Okunoto and voluntarily removed weeds and mulching near fields, and the following classes, facilitated by instructor Nami Moriyama from Satoyama Creation Coordinator Training Center, were provided in the bus to make use of the travel time. The participants learned about respective activity methods and tasks.

### “Efforts for Satoyama & Satoumi by Ishikawa Prefecture”

(Instructor Mika Yamazaki, Satoyama Creation Office, Environment Division, Ishikawa Prefecture)

### “Fresh Fish Delivery Project Using a Traditional Freshness Control Method (Iki-jime (spiking))” Connecting Efforts for Satoumi to Business Creation

(Instructor Junya Sasaki, Chacca)

### Satoyama Revitalization Activities through Events Including the “Yamawarai” Kinameri Satoyama Conservation Project in the Kinameri Area

(Instructor Yuka Kosugi, Kinameri Satoyama Conservation Project)

In addition, a reporting session on activities by environmental personnel from three regions that have been expanding their activities proactively was held in a conference room at Noto Satoyama Airport.



Midori Ippai Project Environmental Education Session

## Public Information Disclosure

## Website on Our Environmental Activities

We have launched a “Global Environmental Protection Activities” website to disclose NTT West Group’s general efforts toward environmental protection. On this website, you can find the NTT West Group Charter for Global Environment, the main pillar of the group’s environmental protection activities, as well as reports that give a full picture of these activities.

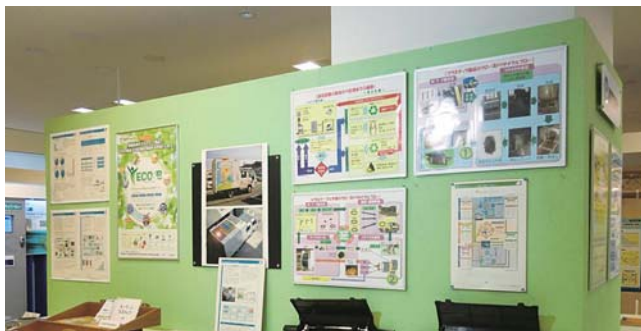
Also, the “Main Efforts” page on the website contains links related to environment that are available on the NTT West official website, thus fulfilling the function as a portal site on environmental information at the same time.

Website <http://www.ntt-west.co.jp/kankyo/>



## External Exhibition Activities

At the Osaka ATC Green Eco Plaza, NTT West Group’s environmental activities and goods related to environmental protection are displayed and exhibited using panels for easy understanding by visitors.



Website  
[http://www.ecoplaza.gr.jp/corp/exhibitors/ntt\\_w/index.html](http://www.ecoplaza.gr.jp/corp/exhibitors/ntt_w/index.html)

## External Awards

Award	Description	Award subject	Organization
Solar Award 2013	“Since sales of the “ ‘Eco Megane’ All-in-one Mobile Package” exceeded 3,000 sets in total, it was certified as a product that contributed to the spread of natural energy in Japan.	NTT SMILE ENERGY INC.	Business Planning Department

## Release of CSR Report

NTT West Group’s attitude toward CSR (Corporate Social Responsibility) and the corresponding systems, together with the concrete actions taken in each fiscal year are disclosed in simple terms for our stakeholders. By allowing stakeholders to gain a better understanding of our group’s CSR efforts, we hope to widen our network of communication.

CSR reports have been released since FY 2005, and are scheduled to be prepared on a yearly basis. For the conservation of biodiversity, activities to have nature and the environment known are also important. We provide hands-on environmental education sessions for children by taking advantage of the afternoons on days where tree planting activities are held.

Website <http://www.ntt-west.co.jp/csr/>



## Provision of Hands-on Environmental Education Sessions for the Conservation of Biodiversity

For the conservation of biodiversity, activities to have nature and the environment known are also important. In the afternoons on days when tree planting activities are held, we provide hands-on environmental education sessions for children.





## 2-5 Management Including Partners

### Green Guidelines

In the provision of telecommunication services, NTT West owns numerous telecommunication facilities and buildings for housing these facilities. Furthermore, we procure many materials from the outside to build our telecommunication facilities. It can be assumed that there is an environmental load due to the construction, possession, operation, and dismantling of buildings, as well as business activities including research and development. Thus, we stipulated "Green Guidelines" to reduce this environmental load. In the Green Guidelines, "Guidelines for Green Procurement" regarding telecommunication facilities, "Green Design Guideline for Buildings" regarding the planning, design, management and dismantling of buildings, and "Green R&D Guidelines" regarding research and development were established, and a reduction of environmental load generated from our service provision has been promoted.

### Recycling of Telecommunication Materials

For end-of-life telecommunication materials that were removed, NTT West has been working toward the 100% recycling of resources in mutual coordination with suppliers, collection/transport companies, and recycling companies. For example, we established a closed loop recycling system for cable jackets on telecommunication cables (metal, optic), ready access terminal boxes, support guards, etc., where plastics used in these items can be recycled into the same products. In addition, in FY 2013, we reused free bending optical fiber cords and sold various types of removed routers that are still usable as used items. In this way, NTT West is striving to contribute to a circulating society.

### Efforts for Energy Efficiency Guidelines

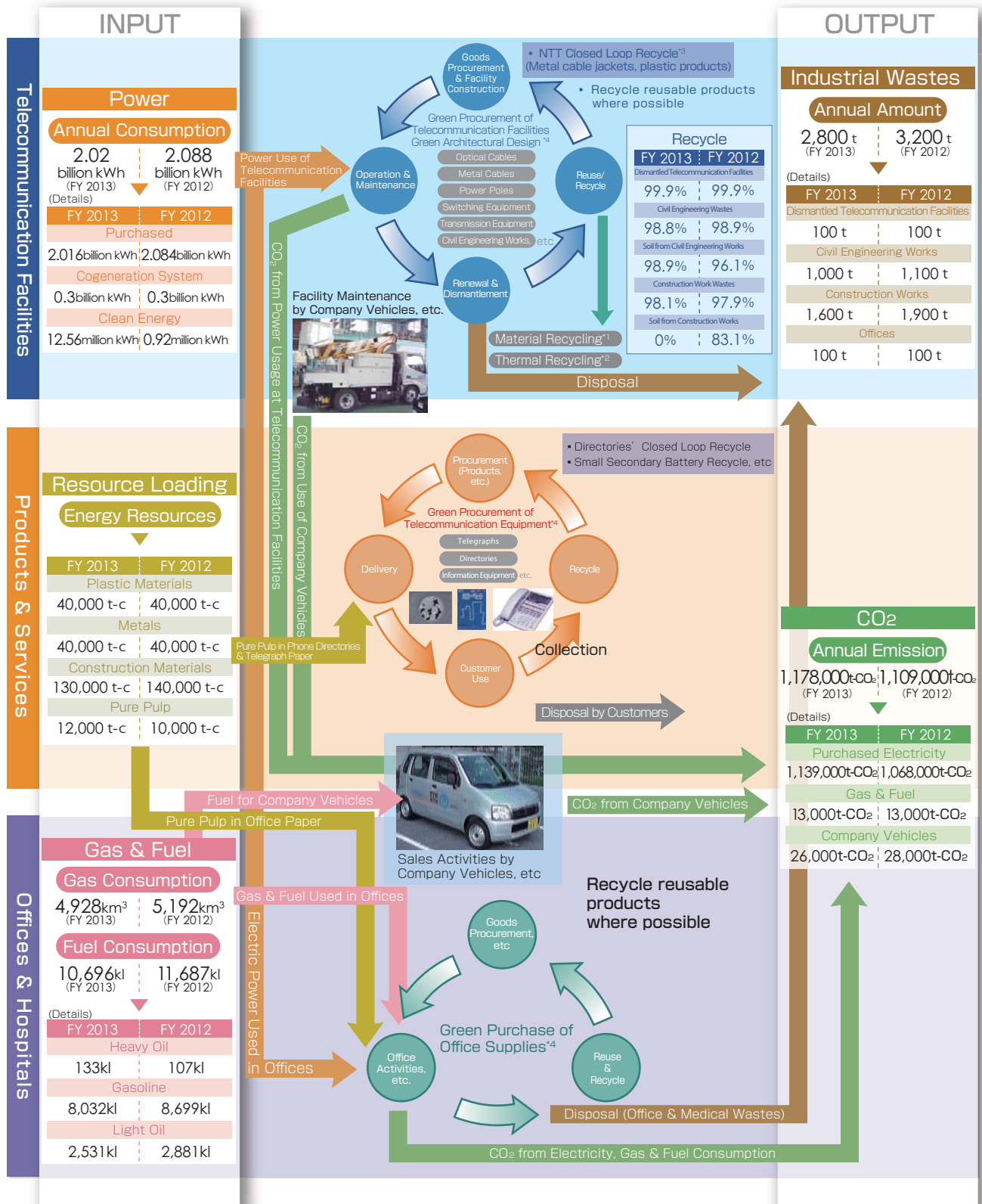
At least 90% of the greenhouse gas (CO<sub>2</sub>) emissions of the NTT West Group results from power use in telecommunication facilities and offices. To reduce these emissions effectively, it is essential we develop and procure equipment with high energy efficient performance/functions when introducing new equipment.

Therefore, we stipulated a basic concept and target value for each piece of equipment in the development and procurement of routers, servers and other ICT equipment to be used internally as "NTT Group Energy Efficiency Guidelines", and we have been working on controlling our emissions of greenhouse gas.

### Efforts through Suggestions/Recommendations from Suppliers

We procure diversified products from suppliers of telecommunication facilities, and at the same time, the suppliers provide us with various suggestions and recommendations regarding environmentally-friendly materials and production methods toward increasing energy efficiency and improvement in the environmental aspect. In this way, NTT West procures environmentally-friendly products while mutually cooperating with suppliers.

### 3-1 Material Flow (Environmental Load Associated With Business Activities)



\*1 Material recycling: reusing collected wastes as raw materials of products.

\*2 Thermal recycling: wastes collected are burned and reused as thermal energy.

\*3 NTT closed loop recycle: a form of material recycling. The name comes from the process of recycling wastes produced in our operations as NTT products. For example, old phone directories are used to produce new directories.

\*4 Green Procurement/Design/Purchase: refers to eco-minded procurement, design and purchase operations ranging from the construction of telecommunications facilities to office supplies and products offered to our customers.

## 3-2 Progress of Green NTT West Strategy

Since FY 2012, along with reporting on our environmental protection activities to a CSR Committee, the following progress situation of the Environmental Grand Design is reported to management every quarter, and discussions are held for further improvement. The results are disseminated to the entire NTT West Group through the employees of the Group companies who are responsible for the activities.

These efforts realized a 60 million kWh reduction of our power use in FY 2013 (Refer to Feature 1). In addition, we continue to achieve zero emissions for our final waste disposal rate.

### Implementation of Global Warming Countermeasures

#### Global Warming Countermeasures

The contributing factors of CO<sub>2</sub> emission at NTT West Group are our use of power, company vehicles and fuel (gas and oil). Among these, power use is the largest emission source.

In FY 2013, our power use fell in comparison to FY 2012 due to the understanding of our monthly power use situation in conferences held by the Power Use Reduction Task Force (Refer to Figure 1 and Feature 1.). However, CO<sub>2</sub> emissions went up due to a rise in the emission coefficient following the stoppage of the nuclear plants in FY 2013 compared to previous fiscal year (Figure 2).

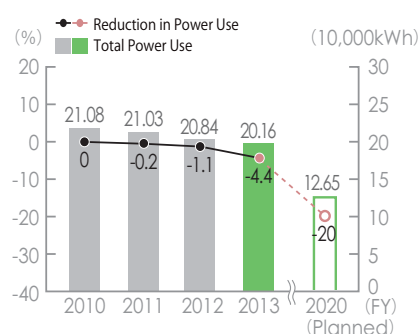


Figure 1: Power Use

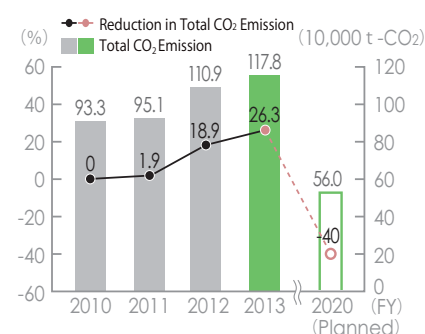
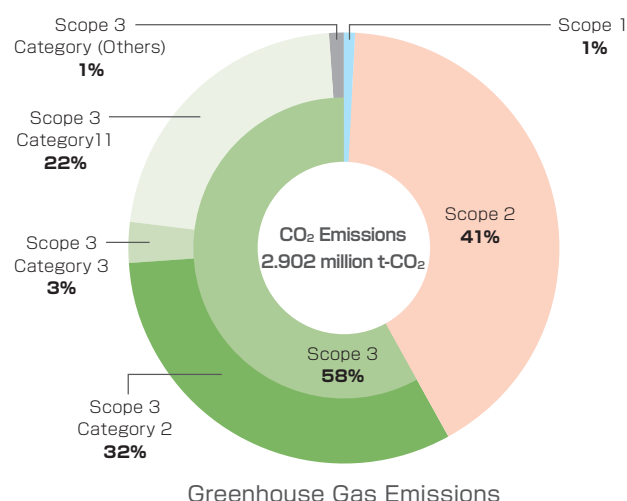


Figure 2: Total CO<sub>2</sub> Emission

#### Greenhouse Gas Emission of Entire Supply Chain "Scope 3"

For conservation of the global environment, efforts to reduce the environmental load including all supply chains related to business activities are important. In addition to "Emissions generated directly by fuel use, etc. (Scope 1)" and "Emissions generated indirectly in conjunction with electrical and other energy use, etc. (Scope 2)" that were items we have reported on in the past, we calculated "Indirect emissions generated over the whole value chain (Scope 3)" based on the "Basic Guidelines on Accounting for Greenhouse Gas Emissions Throughout the Supply Chain (Ver2.1)" (Revision in March 2014, Ministry of the Environment & Ministry of Economy, Trade and Industry). We will continue to make efforts toward the reduction of our entire environmental load related to our business activities.

Scope & Category		Emissions (10,000t-CO <sub>2</sub> )
Scope 1 (Emissions generated directly by fuel use, etc.)		3.9
Scope 2 (Emissions generated indirectly in conjunction with electrical and other power use, etc.)		118.4
Scope 3 (Indirect emissions generated over the whole value chain)		167.9
Category 1	Purchased goods and services	—
Category 2	Capital goods	93.8
Category 3	Fuel and energy related activities not included in Scope 1 or 2	8.0
Category 4	Transportation and delivery (upstream)	0.2
Category 5	Waste generated in operations	0.3
Category 6	Business travel	0.2
Category 7	Employee commuting	0.2
Category 8	Leased assets (upstream)	—
Category 9	Transportation and delivery (downstream)	—
Category 10	Processing of sold products	—
Category 11	Use of sold products	64.6
Category 12	End-of-life treatment of sold products	0.7
Category 13	Leased assets (downstream)	—
Category 14	Franchises	—
Category 15	Investments	—
Total of Scope 1, 2, and 3		290.2





## Reduction of Paper Use

NTT West Group uses paper for phone directories, bills, office work and telegraphs.

The total amount of paper used during FY 2013 was 27,500 tons (Figure 3), of which 22,800 tons (city life guide 1,800 tons as mentioned elsewhere) were used for directories, while for bills, office work, and telegraphs, we consumed 2,300, 2,000 and 400 tons respectively.

Besides being committed to paperless meetings and making thorough and systematic efforts to reduce paper use within the company, we are also promoting a web-based paperless billing service, My Billing, with understanding and support from our customers.

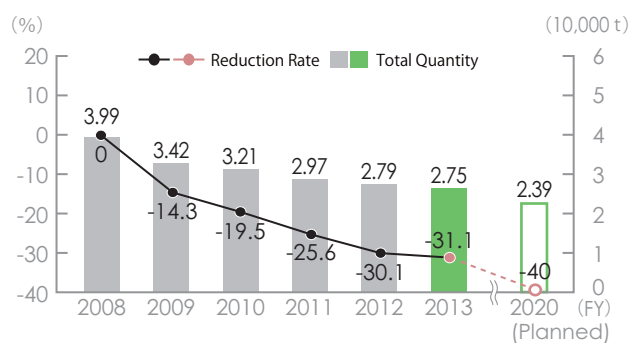


Figure 3: Total Paper Use

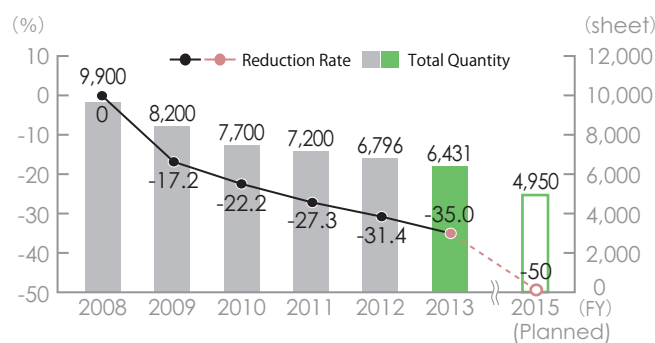


Figure 4: Quantity of Office Paper Used Per Employee

## Reduction of Final Waste Disposal Rate

Industrial wastes are generated mainly from dismantled telecommunication facilities, civil engineering projects, construction projects, and office work.

The final industrial waste disposal rate for FY 2013 was 0.9% (Figure 5), and we achieved zero emissions for the second consecutive year. For the breakdown, 0.04% was from dismantled telecommunication facilities while civil engineering projects, construction projects, and office work generated 1.2%, 1.9%, and 1.1% respectively.

While the rate for dismantled telecommunication facilities was low, that of office work was comparatively high. Because of this reason, we keep in mind to procure environmentally-friendly office supplies that can be easily reused or recycled.

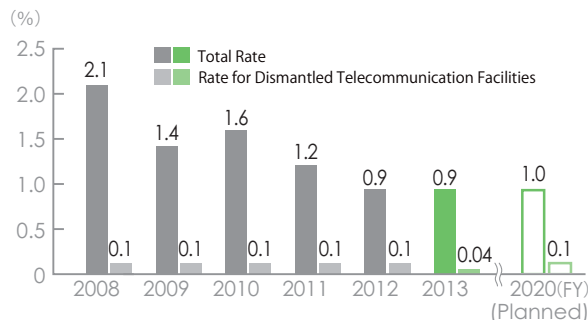


Figure 5: Final Industrial Waste Disposal Rate

## Biodiversity Conservation Activity

The activity, originally launched on an approximately 2,000 participant scale in 18 prefectures with the aim of 10,000 participants in all 30 prefectures comprising NTT West's service area, grew into an activity with 7,231 participants in 30 prefectures in FY 2013. Partnerships with local organizations as well as activities using ICT such as summits (Afuhi Summit) connecting remote areas and classes on biodiversity (protection of rosy bitterling) were also deployed.

NTT West will continue to proactively work on the conservation of regional biodiversity with the aim of 10,000 participants.

## 4-1 Efforts for Reducing Our Environmental Load

### 4-1-1 Action for Global Warming Prevention

#### • TPR Campaign

As part of our effort to reduce the consumption of electricity, NTT West Group launched the Total Power Revolution (TPR) Campaign about 10 years ago. Back then, one of the issues was how to slow down the accelerating pace of energy consumption as a result of prolonged and high-volume network connections following the expansion of multimedia services. To resolve the issue, we expanded our scope of effort, which ranged from the establishment of facilities to their operation, to include the R&D phase. The TPR Campaign was therefore introduced to achieve collective reduction (Figure 1).

With the subsequent development of an information sharing society, there is a continuous increase in the development of high-speed and large-capacity facilities as well as the amount of energy consumed, making the importance of the TPR Campaign even greater.

The TPR Campaign is promoted with the concerted effort of all relevant departments based on the system shown below.

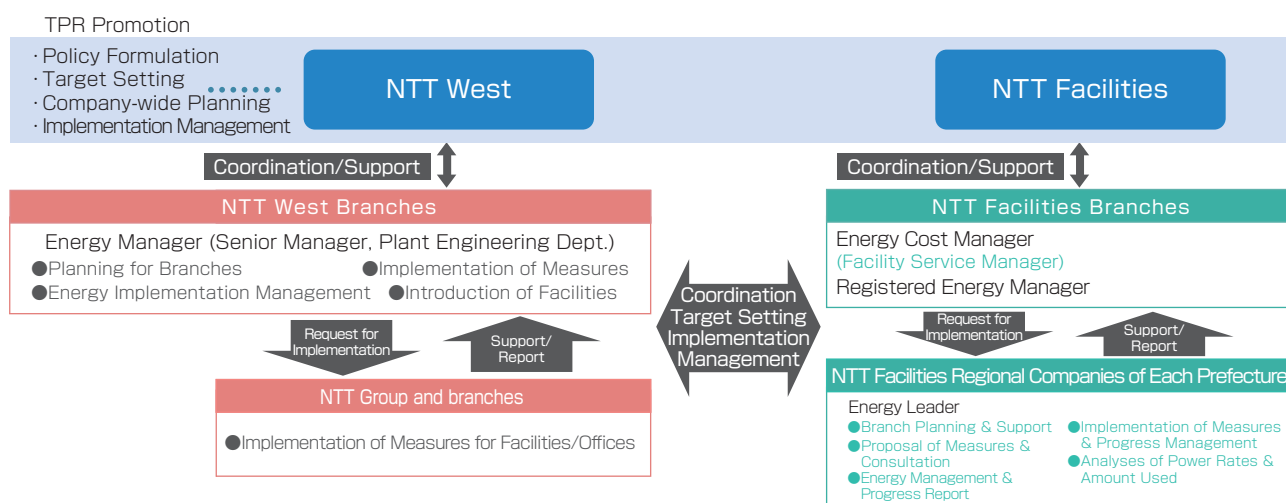


Figure 2: Organization in FY 2013

#### • Performance in FY 2013

In FY 2013, while the scale of our optical IP services grew, our TPR activities contributed to reducing power use by 530,000 kWh. With a higher emission coefficient, our CO<sub>2</sub> mission increased by 71,000 t-CO<sub>2</sub> (Figure 2).

We will continue to promote the TPR Campaign and efficient migrations (transition to next generation) so as to lower the amount of emission.

CO<sub>2</sub> Emission  
(10,000 t-CO<sub>2</sub>)

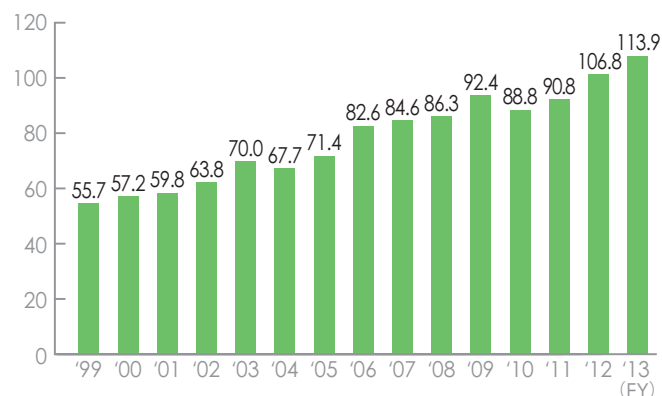


Figure 2: CO<sub>2</sub> Emission by Power Use

#### • Power Saving for New Facilities

##### ▶ Improving Air-DC Power Supply

Efficient power supply to ICT equipment is able to attain equally effective energy-saving results as reducing the power consumption needed for ICT equipment, such as routers and servers, or enhancing the efficiency of the air-conditioning system. Being a power-saving system with fewer conversions than an AC supply, a DC power supply can help reduce power consumption by about 15% (including that for air-conditioning). It has been adopted in existing telecommunication systems, and 96% of the NGN facilities also support DC supply.

As there are very few servers and storage systems that support DC power supply, we are now encouraging our vendors to expand the lineup of compatible products.

##### ▶ Introduction of High-efficiency Facilities

In addition to upgrading the facilities for our new services, we are also implementing a systematic conversion of digital telephone switches to power-saving models.

## ● Improving Efficiency of Existing Facilities

Increasing the efficiency of existing facilities is fundamental in advancing energy conservation. We are making everyday efforts to improve the utilization rate of facilities and enhance the efficiency of air-conditioning systems by consolidating the telecommunication facilities and power supply systems, as well as rationalizing the number of the units and packages.

### ▶ Improving Air-conditioning Efficiency

For proper application of telecommunication facilities, the telecommunication equipment rooms are air-conditioned all year round.

We are keeping a close watch particularly on the maintenance and improvement of air-conditioning efficiency, as a vast amount of electricity is required to power the air conditioning system.

Firstly, we are making company-wide efforts to optimize the thermal environment in the equipment rooms, such as by controlling the air flow to improve the efficiency of cool air supply to areas that emit a large amount of heat, as well as to enhance the recovery efficiency of heat generated from the telecommunication facilities. These efforts make it possible for us to further reduce electricity consumption by the air-conditioning system, while maintaining the stability of the telecommunication services. Secondly, to minimize a drop in the cooling efficiency of equipment, the outdoor units and filters of the air conditioning system are regularly cleaned.

### ▶ Reduction of Energy Used for Air-conditioning Systems by Smart DASH®

NTT West has been working on reducing the amount of energy used for air-conditioning systems by introducing "Smart DASH®", an automatic air-conditioning control system for data centers, and blank panels in our telecommunication buildings and data center buildings.

The "Smart DASH®" system enables efficient air-conditioning by optimizing the operation of each air-conditioning system. For example, "Smart DASH®" automatically measures the temperature distribution in telecommunication machine rooms and data center rooms and detects locations which have excessively cooled. In other words, "Smart DASH®" visualizes the cooling situation on the floor. Then, "Smart DASH®" controls the wind volume of air-conditioning systems and temperature of expelled air, etc. in detail.

Furthermore, we improved air flow by the optimal arrangement of double flooring panels and co-use of "blank panels" that cover the front sections of unused space on server racks to increase the cooling effect within the racks. As a result, we reduced the energy used for air-conditioning systems by approximately 20%. Sequential deployment will be carried out for further reducing the amount energy used for air conditioning systems.

\*\*"Smart DASH®" is a registered trademark of Vigilant Corporation.  
NTT FACILITIES, INC. is an agent of Vigilant Corporation.

## ● Promotion of Eco Office

### ▶ Use of LED Lights for Lighting for Offices

Toward the further reduction of our energy use, we have been sequentially implementing measures to reduce our energy use in offices after verifying the effects. For office lighting, first of all, we converted from fluorescent lights which use a large amount of power to LED lights. In addition, along with this conversion, we selected only lighting spots that were absolutely essential in an attempt to further reduce our energy use. In the future, we will switch from high frequency fluorescent lights to LED lights and carry out trials to introduce smart lighting controller (SLC) for overall optimization. In addition, we built and are operating a check system of optimal use of lighting and air-conditioning systems, and patrols for energy saving are also being conducted.



Essential Lighting Spots are Selected

## ● Reduction of Gas & Oil Fuel Consumption

### ▶ Performance in FY 2013

In FY 2013, the amount of CO<sub>2</sub> emission from gas fuel (mainly for cogeneration systems) and oil fuel (mainly for boilers) at the main buildings owned by NTT West Group was 12,700 t-CO<sub>2</sub> (compared to about 12,800 t-CO<sub>2</sub> in the previous fiscal year) (Figure 3).

We will continue our effort to further reduce the consumption of gas and oil.

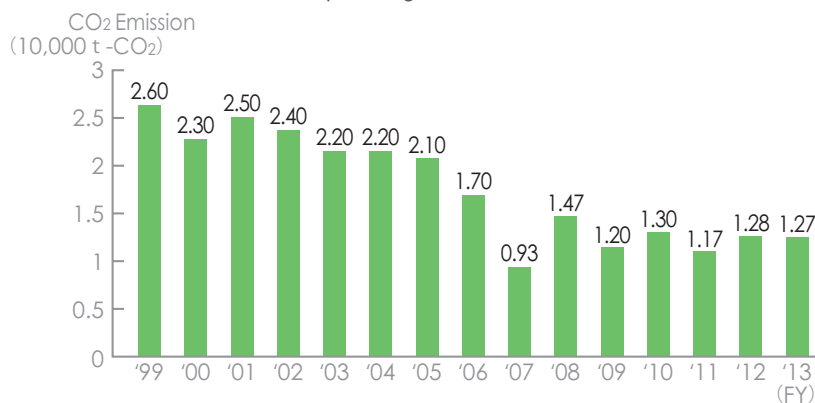


Figure 3: Change in CO<sub>2</sub> Emission from Gas and Oil Fuel



## Reduction of CO<sub>2</sub> Emission from Company Vehicles

### Performance in FY 2013

In order to bring down the amount of CO<sub>2</sub> emission from the company vehicles, NTT West Group has launched an “Eco Drive” as described below. We are also taking the initiative to rationalize the number of vehicles and introduce fuel-efficient and low-emission vehicles. In FY 2013, the amount of CO<sub>2</sub> emission from our company vehicles was 26,300 t-CO<sub>2</sub> (Figure 4).

\*1 NTT West up to 2001

\*2 NTT NEOMEIT and NTT Marketing Act included from FY 2002

\*3 39 NTT West Group companies and NTT BUSINESS ASSOCIE Co., Ltd from FY 2007

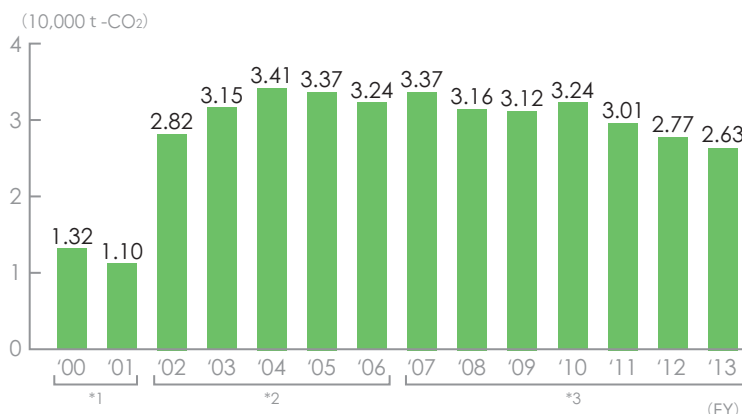


Figure 4: CO<sub>2</sub> Emission from Company Vehicles

### Eco Drive

NTT West Group owns about 13,000 vehicles. To reduce the CO<sub>2</sub> emission from these vehicles, we launched the “Eco Drive” in FY 2004, which added information on new eco friendly driving techniques to the preexisting “Idling Stop Campaign.” (Figure 5)

As part of the measures to further enhance the awareness of our employees, we are putting in efforts to participate in the “Eco Drive Declaration” campaign organized by the Japan Automobile Federation (JAF).



Figure 5: Manual for Eco Drive

## 4-1-2 Reduction and Proper Processing of Wastes

### Overview

Facilities and equipment such as cables and telephone switches are necessary for the telecommunication services we offer to our customers.

They are dismantled for upgrading, such as upon reaching the end of life or for making functional improvements, and subsequently treated as wastes.

In addition to setting a mid-to-long term target “to achieve a final disposal rate of 1.0% (zero emission\*) by FY 2020,” NTT West Group has been making efforts toward the following targets for FY 2013.

(1) To reduce the final disposal rate for dismantled telecommunication facilities to 0.1% and below

(2) To reduce the final disposal rate for civil engineering projects to 1.2% and below

(3) To reduce the final disposal rate for construction projects to 2.1% and below

(4) To reduce the final disposal rate for office work to 4.5% and below

(5) To reduce the total final disposal rate for FY2013 to 1.4% and below

\* Zero emission

Proposed by the United Nations University, this is a concept that aims at production that does not generate wastes on the whole by utilizing all wastes and by-products generated by an industry as resources for another industry. NTT West Group defines zero emission as a final total amount of non-recycled wastes that is 1.0% or lower.

### ► Performance in FY 2013

Our performance in FY 2013 toward meeting the target set for the year was steady, achieving a reduction of 500 tons (Figure 1) compared to the previous fiscal year, and a final disposal rate of 0.9% against our target of 1.4% (Figure 5 on Page 24). We achieved zero emission for the second consecutive year.

For the breakdown, 0.04% was from dismantled telecommunication facilities while civil engineering projects, construction projects, and office work generated 1.2%, 1.9%, and 1.1% respectively.

\* Wastes

Wastes include those generated from dismantled telecommunication facilities, civil engineering and construction works, and also offices.

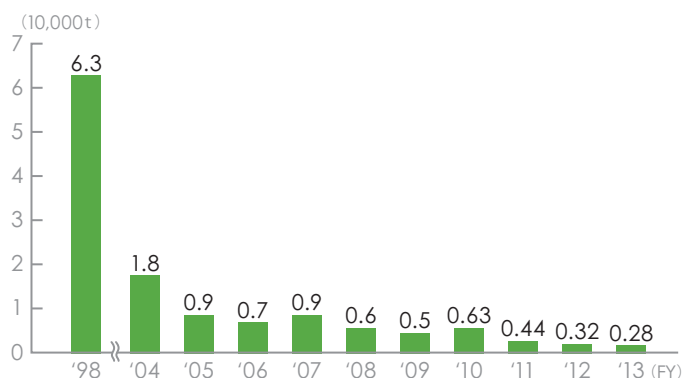


Figure 1: Final Total Amount of Wastes \*

### ● Proper Handling and Reduction of Dismantled Facilities

Instead of simply disposing dismantled facilities, we have implemented the three Rs: Reduce, Reuse and Recycle to further reduce the final total amount of wastes.

### ► Performance in FY 2013

Though the telecommunication facilities dismantled in FY 2013 amounted to as much as 126,300 tons, 126,200 tons of which was recycled, leaving a final disposal amount of 100 tons (Figure 2 and Figure 3 on Page 29).

Thanks to the thorough instructions provided by our branches and regional companies to the waste disposal companies as well as the effort of the disposal companies, an overall recycling rate of 99.9% was achieved. Meanwhile, the recycling rate for plastic materials from terminal equipment was 99.7% (Figure 6 on Page 31). We will make more effort to improve the slightly lower rate for plastic wastes so as to maintain the zero emission rate.

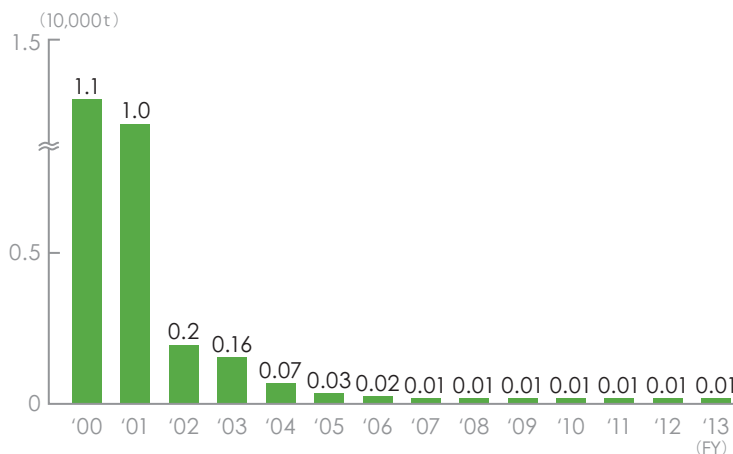


Figure 2: Final Total Amount of Wastes from Dismantled Facilities

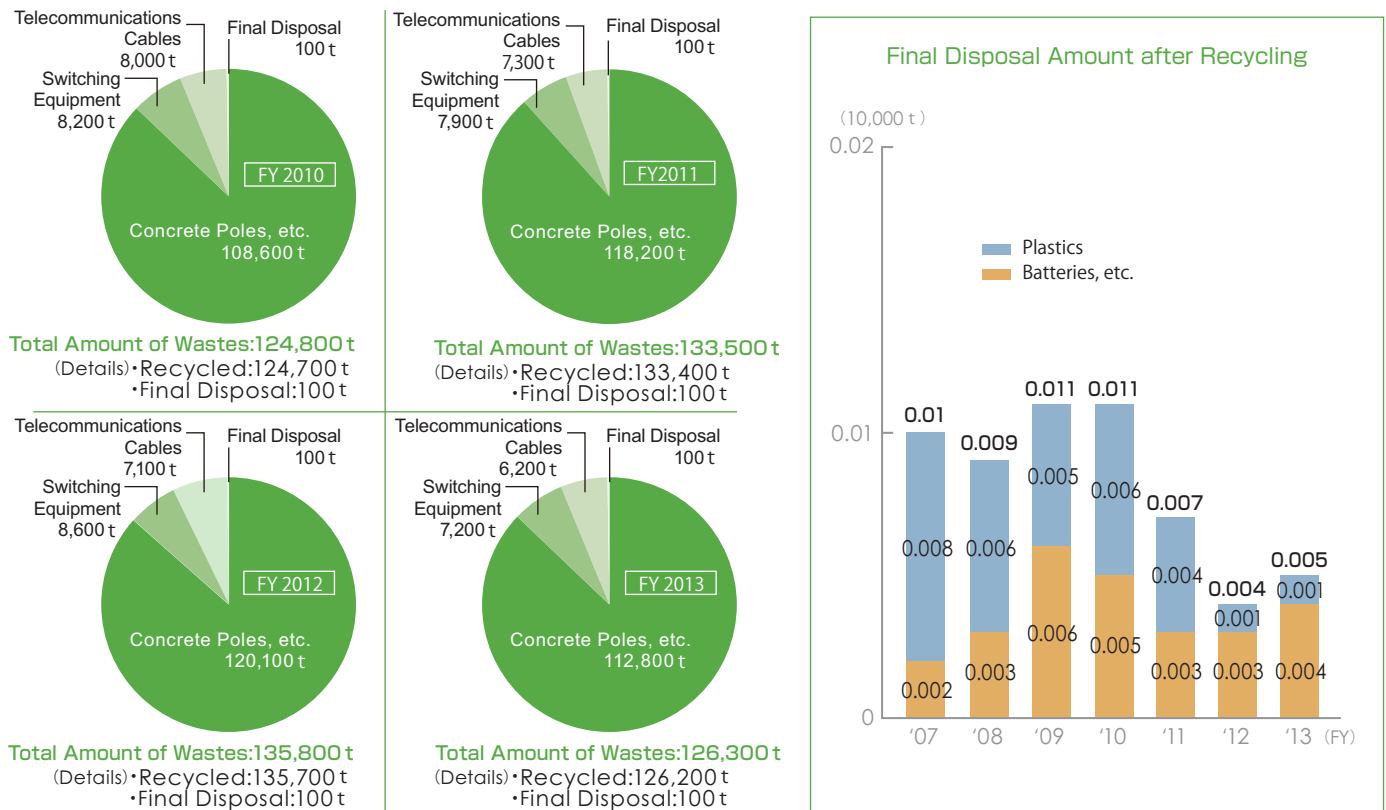


Figure 3: Total Amount of Wastes from Dismantled Facilities and Final Disposal Amount

#### ● Industrial Waste Subject to Special Control

A type of waste that is subject to special control\* is batteries for emergency power supply, such as those used in telephone switches. All waste types that require special control are handled according to the laws by the assigned managers at every branch. While the total amount of such wastes generated in FY 2013 was 4,560.6 t, recycling of the lead polar plates and plastic housings helped to reduce the final disposal amount to 6.5 t.

\* The Waste Disposal Law defines "explosive, toxic or infectious wastes that may cause damage to people's health or the living environment" as general and industrial wastes subject to special control, and sets forth required disposal standards to regulate these wastes more strictly than other types of wastes.

#### ● Proper Processing of Wastes from Dismantled Facilities

In order to offer telecommunication services, we make use of many kinds of facilities and equipment, including telecommunication cables and telephone switches. During upgrading of the facilities following the introduction of new services, dismantling works for the existing facilities take place.

The recyclable parts of the dismantled facilities are reused, and when reuse is impossible, we will select qualified companies for waste disposal and outsource disposal of parts that are not reusable to them upon strictly assessing the companies' past records, handling capacity, and costs of disposal.

Moreover, we require the selected disposal companies to report on dismantlement and disposal works performed in Japan. We also conduct onsite inspections from time to time to ensure that the works are being performed properly (Figures 4 and 5 on Page 30).



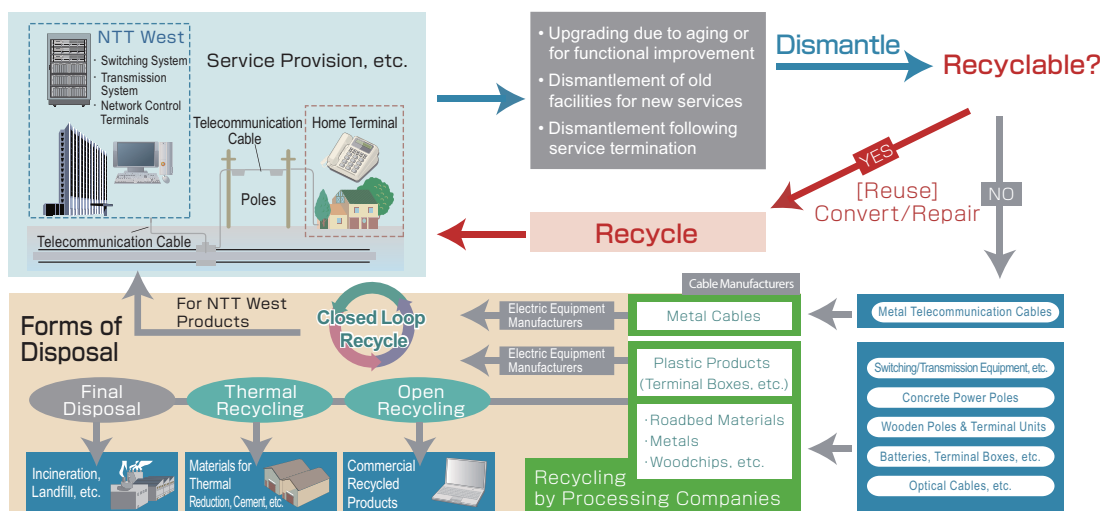


Figure 4: Flow from Dismantlement of Facilities to Recycling/Disposal

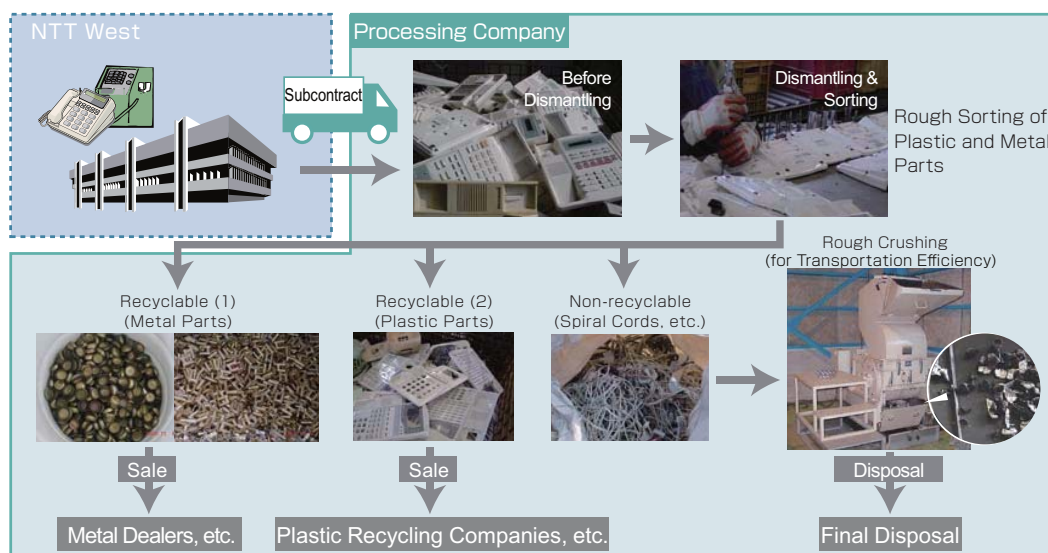


Figure 5: Flow from Dismantlement of Facilities to Recycling/Disposal

### ● Electronic Management of Waste Disposal

In FY 2001, we introduced to the entire western Japan region an electronic manifest system\* for the “manifest for industrial waste,” for which its issuance by waste-producing companies is made mandatory under the Wastes Disposal and Public Cleansing Act. The electronic manifest system helps us to thoroughly manage operations from waste production to final disposal, and collect data of processing results efficiently.

#### \* Electronic manifest system

A system that converts manifest information, which was previously paper-based, into electronic data for distribution on the Internet. It is administered by the Japan Industrial Waste Technology Center, designated by the Ministry of Health, Labor and Welfare. Its advantages include preventing omission in the entries, and eliminating the need to store and manage the paper data for five years. Also, central control of data by the data processing center makes manifest management easier and stricter.

### Voices of Our Employees

**Ryosuke Nakao**, Procurement Planning Subgroup, First Procurement Section, Procurement and Supply Center, Network Department

NTT West is constantly tackling the issue as to increase the recycling rate, in other words, how we can reduce the amount of the final waste disposal from the disposal of dismantled telecommunication facilities while taking appropriate actions during the generation of wastes. The NTT West employees who are responsible for the disposal of dismantled telecommunication facilities request our recycling contractors to introduce detailed sorting processes and are steadily working to persuade them on the importance of efficient resources. As a result, we have been able to maintain a minimum 99% final disposal rate. I hope we can contribute to reducing the global environmental load as much as possible by examining efforts to increase closed loop recycling while maintaining the current final disposal rate.



## • Recycling of Dismantled Facilities

### ▶ Promoting Recycling of Dismantled Facilities

In promoting measures for recycling, the first thing that NTT West considers is material recycle\*1 (closed loop recycle).

NTT West sees it as part of its responsibility to do so, and promotes such an effort as a measure for contributing toward the formation of a circulating society, which would help to overcome national issues such as depletion of natural resources and shortage of final disposal sites.

Parts of our telecommunication facilities that are not reused are recycled for various usages according to the item and material (Figure 6). While promoting recycling, we prioritize the different methods of recycling (Figure 7). In other words, NTT West first considers whether the wastes it generated can be used for material recycle to create things that it uses (closed loop recycle). When closed loop recycle is not possible, the wastes are considered for external recycle (open recycle). If open recycle is also not possible, they will be considered for use as heat sources (thermal recycle).

#### \*1 Material recycle

Reusing of wastes as materials. Specifically, it refers to collecting used products or wastes generated from manufacturing processes, and processing them into readily usable forms, so that they can be utilized as materials for new products.

Waste Item	Main Use after Recycling	Recycling Rate*2
Telecommunication Cable	Metal Recycled Metal Cable	100.0%
	Optical Jacket for Recycled Optical Cable	
Indoor Facilities (Switching Equipment, etc.)	Imitation Wood, Construction Material, Cement Material, Fuel	100.0%
Concrete Power Pole	Metal Material, Construction Material	99.9%
Wooden Pole	Roadbed Material, Metal Material	100.0%
Terminal Unit, etc.	Square Log, Board, Woodchip, Fuel	100.0%
Battery	Metal Material, Plastics, Imitation Wood, Construction Material, Fuel	99.7%
Battery	Recycled Battery	99.7%
Total		99.9%

#### \*2 Estimate

Figure 6: Recycling of Dismantled Facilities

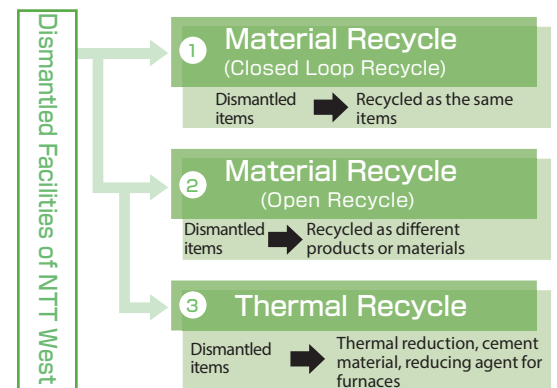


Figure 7: Recycling Method Prioritization

### ▶ Efforts for Closed Loop Recycle of Facilities

To resolve the national issues of depletion of natural resources and shortage of final disposal sites, we need to "implement closed loop recycling." To make it happen, NTT West takes up the promotion of recycling as part of its responsibility. As already described, in promoting recycling, it is our top priority to examine material recycle (closed loop recycle), which recycles items into the same forms for our own use.

A representative example of NTT West's material recycle is shown in Figure 8 and the following page.

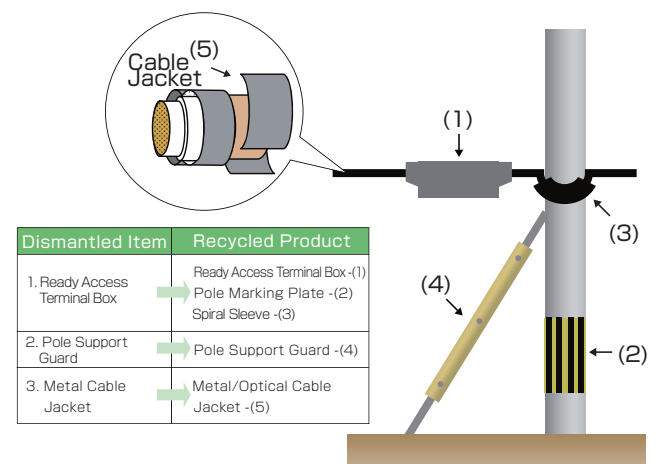


Figure 8: Closed Loop Recycling of Plastic Parts

### ► Recycling of Metal Cable Jackets

For dismantled metal cables, we used to implement the closed loop recycle for only metal materials, such as the copper parts of core wires. In FY 2002, we established and started operating a circulating recycling system for the plastic parts of metal cable jackets to recycle them into the same types of jackets.

It is the first attempt in the world to build a circulating recycling system for recycling products that require a high quality standard into the same products, such as jackets for telecommunication cables. Our pioneering effort as a telecom carrier was highly rated at the 5th International Conference on EcoBalance<sup>\*1</sup>.

By using this know-how, we succeeded in FY 2005 in the reuse of jackets for metal cables as those for optical-fiber cables, establishing a closed loop recycling system of metal cable jackets (Figure 9).

<sup>\*1</sup> International Conference on EcoBalance

Supported by the Ministries of Education, Culture, Sports, Science and Technology, Agriculture, Forestry and Fisheries, Economy, Trade and Industry, Land, Infrastructure, Transport and Tourism, and the Environment, this international conference focuses on the discussion of eco-harmony evaluation, including life cycle assessment (LCA)<sup>\*2</sup>, and also studies on and implementation of evaluation methods. Starting from 1994, the conference has been held biennially in Tsukuba, Japan. About 450 professionals participated in the fifth meeting (6 to 8 November 2002). There were 93 overseas participants from 21 foreign countries, mainly in Europe and Asia.

<sup>\*2</sup> LCA Life Cycle Assessment

LCA attempts to measure the "cradle-to-grave" load of products on the environment quantitatively and comprehensively.

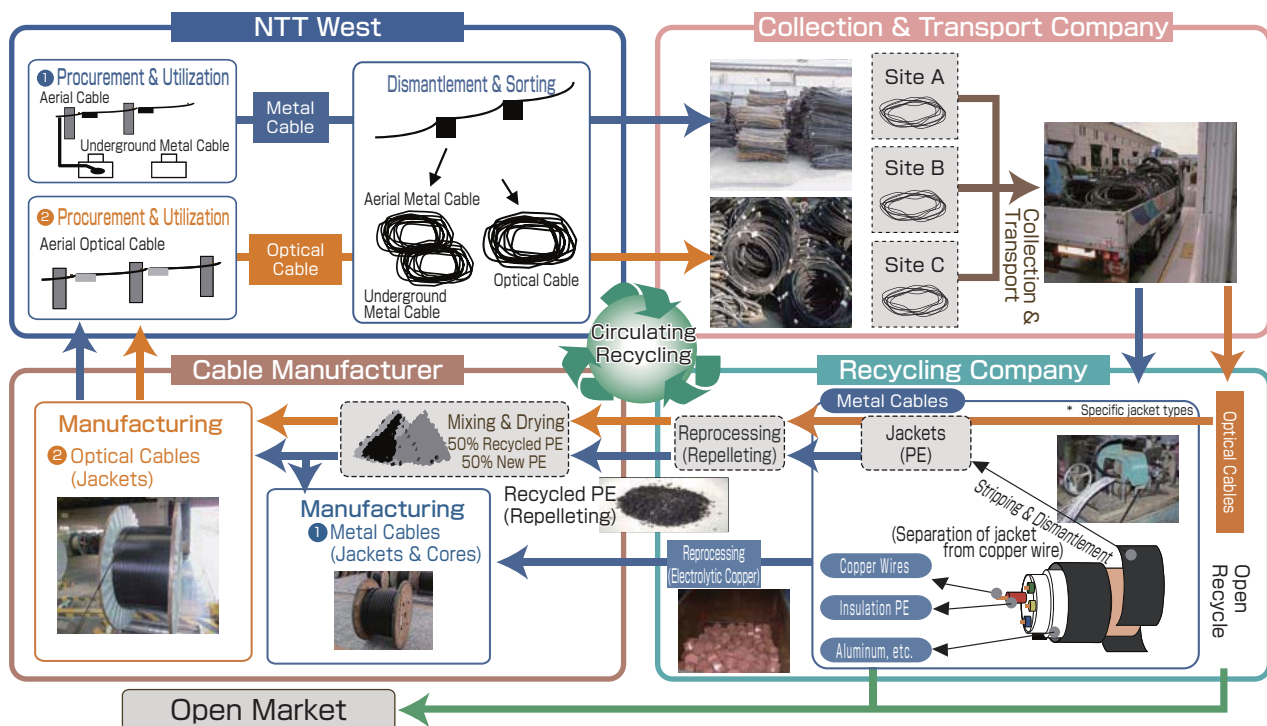


Figure 9: Closed Loop Recycle Flow of Cable Jackets

### ► Efforts for Closed Loop Recycle of Optical Cable Jackets

To realize a large-capacity and high-speed (broadband) telecommunication environment, NTT West is moving rapidly from the use of metal cables to optical fiber ones.

Previously, we had been cooperating with the manufacturers to implement the open recycling of wastes from dismantled optical fiber cables according to each type of material. Currently, however, we are studying the potential of establishing a circulating recycling system in which the plastic parts of dismantled optical cable jackets can be recycled into the same products.

As optical cables are structurally more complex than metal ones, sophisticated technology is required for jacket stripping. To address the anticipated increase in the amount of wastes, we hope to set up a closed loop recycle system.



#### ▶ Closed Loop Recycle of Plastic Products (Terminal Boxes, Pole Support Guards, etc.)

We are currently implementing a closed loop recycling system for recycling plastic products such as terminal boxes and power pole support guards into the same products (Figure 10).

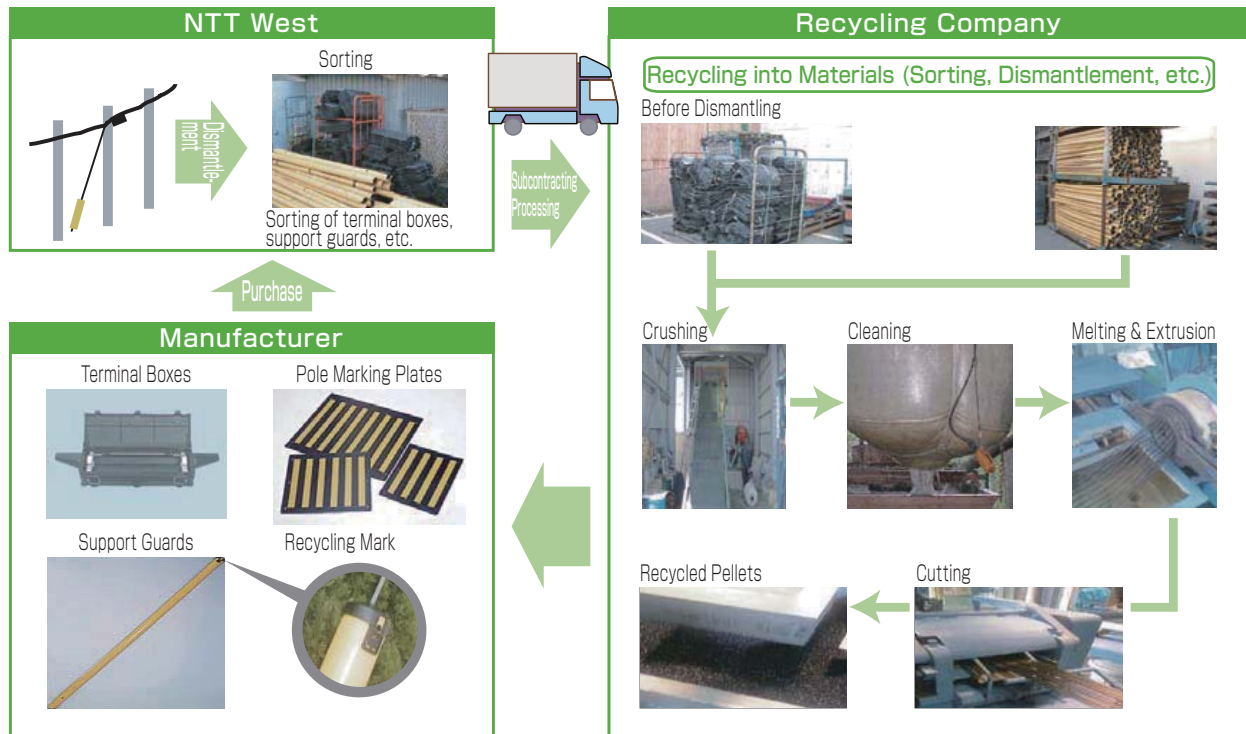


Figure 10: Closed Loop Recycle Flow of Plastic Products

### Topic: Reuse of Flet's Terminal

The network services that NTT West offers require different information equipment (including ONUs, CTUs, VoIP adapters, home gateways and ADSL modems) to be installed at the customers' premises (Figure 11). Following the spread of broadband services, the number of such equipment has increased greatly. At the same time, with the advancement of high-speed and diversified services to address the needs of the customers, equipment required for a particular service is utilized for a shorter period of time due to the shorter demand cycle for services.

In response to this situation, NTT West Group is promoting the effective utilization of resources by reinforcing activities to reuse information equipment for the network services we are offering (Figure 12).

Due to reasons such as customers changing the type of services they subscribe to or moving to a different address, most equipment that are no longer needed as a result are retrieved in the "collection kit" through couriers or dismantlement works. NTT West Group cleans the collected equipment, replaces missing components, and performs thorough checks on their operation before repackaging them for reuse. The aim of these recycling actions is to reinforce our contribution to a circulating society by reducing wastes and utilizing the limited resources efficiently. In FY 2013, about 1.2 million equipment were reused (Figure 13). We will continue to advance our efforts toward protecting the environment.

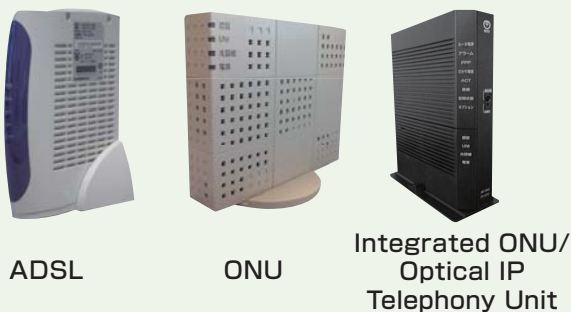


Figure 11: Flet's Terminal Equipment

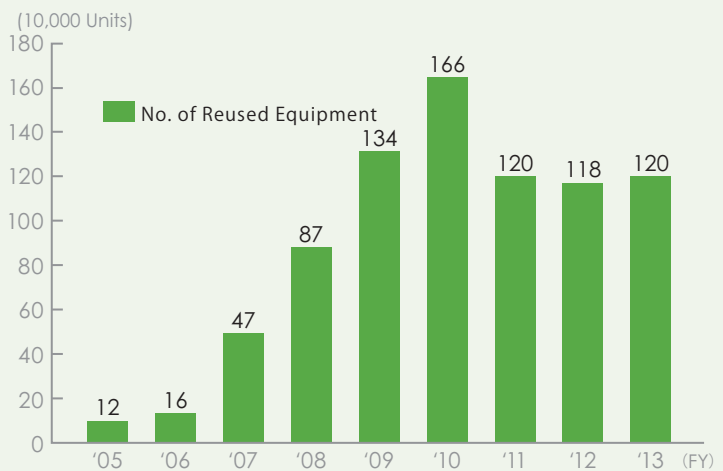
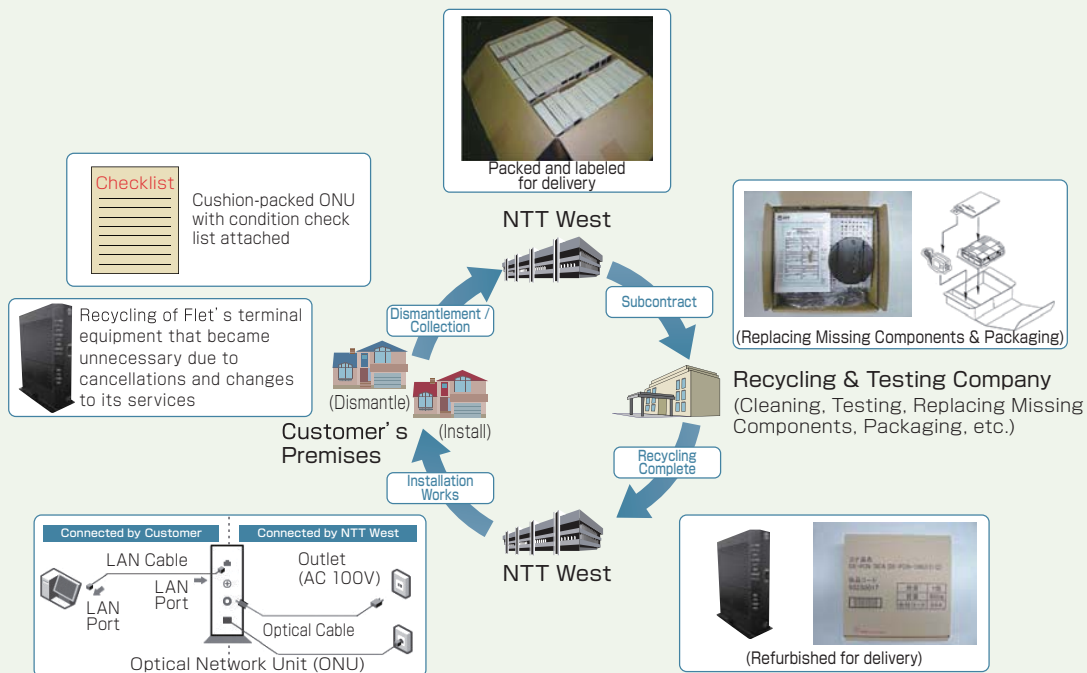


Figure 13: Reuse Quantity of Flet's Terminal Equipment, etc.



Optical Network Unit (ONU): An equipment that is installed at the customers' premises for converting from optical fiber signal to Ethernet ones such as 100BASE-TX, 1000BASE-T, etc.

Figure 12: Reuse of Flet's Terminal Equipment, etc.

## ● Recycling of Resources Used in Information Equipment

### ▶ Collection and Recycling of Used Rechargeable Batteries for Wireless Phones, etc.

Since the “Law for Promotion of Effective Utilization of Resources” went into effect in April 2001, awareness in the society on small secondary batteries\*1 (henceforth “rechargeable batteries”), such as those used for wireless phones, has been enhanced with each manufacturer beginning to take voluntary actions such as collecting used rechargeable batteries.

A rechargeable battery contains nickel, cadmium, lithium, and other metal compounds that can be recycled. In 1994, NTT West started its collection and recycling of nickel-cadmium batteries. Since April 2001, we have expanded it to nickel-hydrate and lithium-ion batteries. Collecting used rechargeable batteries upon repair visits to our customers, we have been engaging in the recycling and efficient reuse of resources. In FY 2013, we collected a total of 28,000 of used rechargeable batteries.

Also, our customers can bring used batteries to any of our recycling-partner shop\*2 to dispose of them into the Recycling Box (Figure 14).

Furthermore, the NTT West Supply Product Receiving Center (Miyazaki) has been collecting and recycling toner cartridges in addition to used batteries sold by NTT West in coordination with NTT LOGISCO Inc.

For details of NTT West Group's collection activities to promote recycling of resources used in information equipment, please visit the following websites.

“Collection and Recycling of Used Batteries for Wireless Phones, etc.” and “Collection and Recycling of Used Toner Cartridges for Plain Paper Fax Machines”

Website:

[http://www.ntt-west.co.jp/kiki/support/eco/eco\\_c3.html](http://www.ntt-west.co.jp/kiki/support/eco/eco_c3.html)

“Collection and Recycling of Used PCs (‘Southern Cross’ PCs) from Residences”

Website:

<http://www.ntt-west.co.jp/kiki/support/southern/recycle.html>

To ensure the recycling of information equipment, we have also released a “Handbook on Global Environmental Protection Activities by Sales, Equipment Works and Maintenance Personnel” as part of our in-house educational activities. At the same time, each employee who is involved in the sales, equipment works and maintenance operations of NTT West Group is also actively promoting the reuse of these equipment to help protect the global environment.

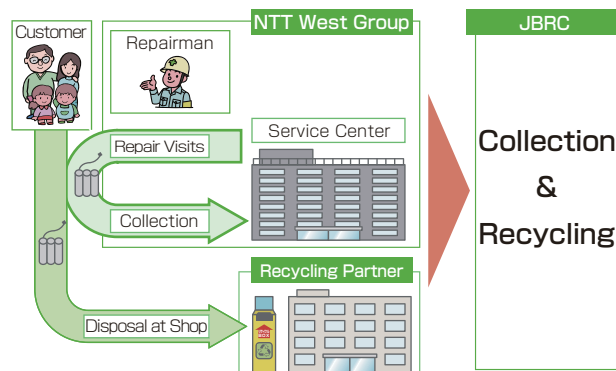


Figure 14: Recycle Flow of Small Secondary Batteries

#### \*1 Secondary Battery

Batteries are classified into two types, disposable primary (dry cell, lithium, etc.) and reusable secondary batteries. The secondary type can be further divided into a large type, such as those used for vehicles, and a small type for portable equipment.

<Representative Small Secondary Batteries>

Nickel-cadmium, nickel hydrate, and lithium-ion batteries

#### \*2 Recycling-partner shop

A shop that is registered as a member of the Japan Bioassay Research Center (JBRC), and assists in the collection of small secondary batteries.

The JBRC members include electrical appliance shops, supermarkets, hardware stores and bicycle shops.

## Voices of Our Employees

**Tamiyoshi Hamabata**, Supply Product Receiving Center, Service Promotion Section, Kyushu Branch, NTT MARKETING ACT

For the collecting and recycling of resources used in information devices (used batteries for cordless phones, etc. and used toner cartridges in everyday paper fax machines), we ask our customers to cooperate with our recycling efforts by enclosing a bag for returning used products when new supply products are delivered to the customers. We will continuously promote a “circulating society” so that we may provide safe and reliable products to our customers.



### ► Minimizing Use of Polystyrene Foam in Equipment Packaging

From the viewpoint of protecting the global environment, we are minimizing the use of polystyrene foam, which we have been using for packaging information equipment and as a cushioning material.

We make use of polystyrene foam for packaging equipment we offer as the material possesses excellent properties: it provides fine cushion and strength to protect products against impact, can be shaped easily according to the product, and allows us to reduce transportation costs because of its lightweight.

Despite these merits, however, polystyrene foam has environmental drawbacks as, when disposed of, it cannot be readily decomposed under natural conditions.

Taking into consideration that cushioning materials for home-use equipment are likely to be disposed of by our household customers, instead of using those made of polystyrene foam, NTT West now employs cardboards, which can be recycled easily and economically.

At the same time, for large products such as office-use fax machines and telephone switches, as well as precision equipment, for which there is no alternative that has the same strength as polystyrene foam, we have been reducing the amount of use, for example, by thinning the foam.

For certain products launched since FY 2012, stable transport has been essential due to the characteristics of the products. In addition, the products sold well, therefore, the amount of polystyrene foam ended up increasing (Figure 15).

Currently, out of about 1,800 items we have on the market, approximately 98% of them do not make use of polystyrene foam packaging. For the optical network products which saw an increase in shipment in recent years (about 1.27 million units in FY 2013), we have completely eliminated the use of polystyrene foam ever since the release of these products.

We will continue to promote reduction of the amount of polystyrene foam use and using alternative materials aiming for a reduction of polystyrene foam use.

Complying with the mandatory recycling regulations set forth in the Containers and Packaging Recycling Act, which took effect in April 2000, recycling work is currently subcontracted to qualified companies.

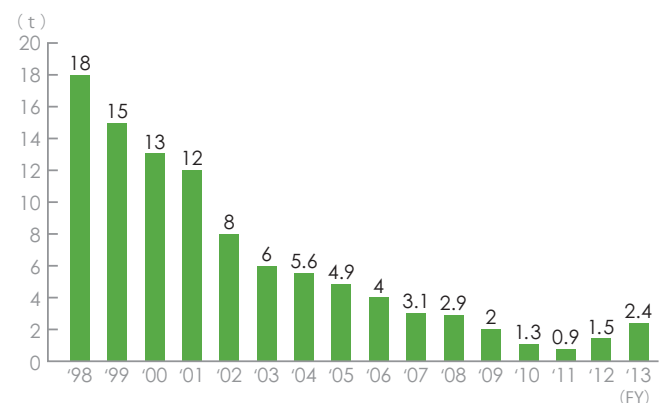


Figure 15: Use of Polystyrene Foam for Cushioning Information Equipment



## ● Reduction and Recycling of Wastes and Soil Generated from Civil Engineering Works

### ▶ Performance in FY 2013

NTT West Group owns underground pipes (conduits) and telephone tunnels for laying telecommunication cables. Wastes are generated from civil engineering works for their construction and expansion.

The disposal amount in FY 2013 was 1,000 tons which is the same as the previous year. (Figure 16)

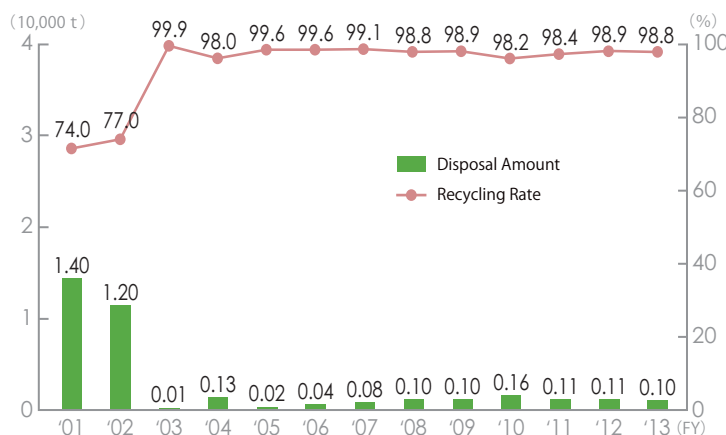


Figure 16: Disposal and Recycling of Wastes from Civil Engineering Works

Active recycling efforts were made to leverage intermediate processing in the basic wastes disposal flow (Figure 17), thereby improving the recycling rate to as high as 98.8% (98.6% on average in the past 5 years).

In FY 2014, we will continue our endeavor to reduce wastes so as to improve the recycling rate further.



Figure 17: Flow of Industrial Waste Disposal in Civil Engineering Works

### ▶ Recycling of Wastes and Soil Generated from Civil Engineering Works

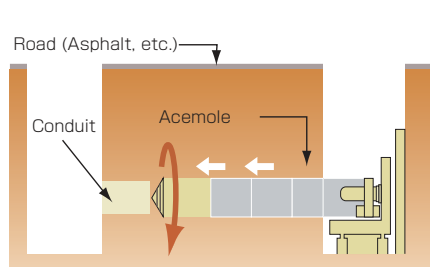
In order to minimize the amount of wastes (concrete, asphalt sludge, etc.) and soil generated from civil engineering works, we put into practical use the pipe jacking (trenchless) method (Figure 18) as a replacement for the traditional technique of digging a trench in the road. Since FY 2001, we have been making further improvements to expand the scope of application to different types of ground.

Also, in order to cut down facility upgrading works due to aging underground ducts that we own (total of about 330,000 km), NTT West has been actively promoting efficient utilization of facilities by developing and introducing the TM lining method for renewing conduits in FY 2001 (Figure 19). Furthermore, in FY 2012, we developed the PIT Lining Method (Figure 20) that can be used even for conduits where cables are laid, and we have been promoting the effective use of facilities.

Under the Construction Material Recycling Act, which went into

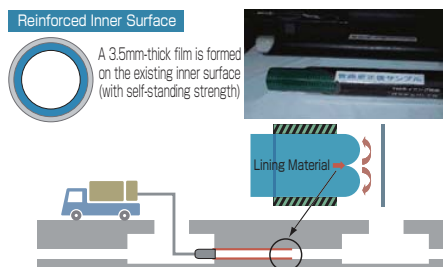
effect on 30 May 2002, it has become obligatory to perform dismantlement and sorting at work sites, and also recycle specific construction materials, including concrete and asphalt, for works larger than a certain size. Based on this law, NTT West duly revised the agreements with our civil engineering subcontractors, making it mandatory for them to subcontract recycling operations to intermediary processing companies. This has contributed to an increase in the recycling rate since 2003.

In FY 2013, we also instructed our civil engineering contractors to ensure that recycling of wastes inevitably generated due to the work conditions or environment are also outsourced to intermediary processing companies. Moreover, we are also making consistent efforts to make sure that the intermediary processing companies take thorough actions to achieve the recycling rate, final disposal amount, and also final recycling rate targets.



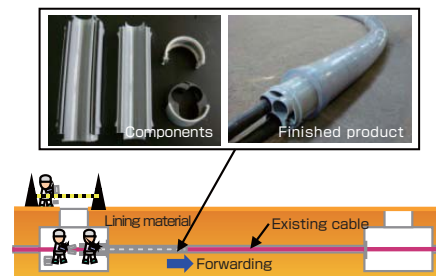
A method for constructing conduits while generating a minimum amount of waste and soil by employing an "Acemole," which is able to advance underground without the need to dig a trench.

Figure 18:  
Trenchless Method (Schematic Diagram)



This is a method for repairing conduits by inserting a lining material inversely into the conduit, followed by hardening the material, such as by using hot water, so that a new layer of resin film can be formed.

Figure 19:  
TM Lining Method (Schematic Diagram)  
\* "TM lining" stands for "Thick Membrane Lining."



This is a method for securing a new space to store cable (3,000 cores) by attaching short length lining materials and inserting in a conduit while encompassing existing cables. "PIT lining" stands for Pipe Insertion Type Lining

Figure 20:  
PIT Lining Method (Schematic Diagram)  
"PIT lining" stands for Pipe Insertion Type Lining

### Voices of Our Partner Companies

The C-Cube Group ensures the improvement of environmental awareness and compliance with laws and regulations of individual employees through study sessions in safety meetings, etc. and works on continuous improvement to promote work according to the environmental management system. We, the engineering departments, are implementing the following waste reduction and efforts for the proper handling of waste.

- (1) In small scale paving recovery construction work with scattered locations, occasionally the hot asphalt mixture cools and cannot be kept at the necessary temperature during transfer to multiple sites. Since hardened asphalt mixture due to cooling is disposed of, we purchase an extra amount in anticipation of disposing hardened asphalt mixture. As a countermeasure, we now use a self-developed asphalt heating and thermal box. This thermal box allows us to keep the asphalt mixture warm for a long period of time with a power supply, and it can be loaded on dump trucks. By using this thermal box, we prevent quality deterioration due to temperature decreases, and we are working to reduce to our industrial waste by eliminating the extra amount of materials we previously purchased.
- (2) A circular construction method in replacing iron covers can minimize the scale of pavement destruction of roads and contribute to a reduction of waste. Including the circular construction method, during the pavement cutting of roads, water for cooling the blade mixes with powder generated from the pavement cutting. This waste water must be disposed of properly by collection with a suction machine. However, the discharge amount per day is small, and it is difficult to transfer the waste water daily. Therefore, a Group company that conducts construction with a circular construction method set up a facility for temporary storage and disposes of the waste water properly after storage.

As individuals working on engineering work, we would like to contribute to circulating society through efforts for 3R's (Reduce, Reuse and Recycle of waste).



Hironari Ida, Planning Section,  
Planning Sales Department, Engineering Division, C-Cube Co. Ltd.

## Reduction and Recycling of Wastes Generated from Construction Works

### Performance in FY 2013

As NTT West Group owns many structures including telecommunication facilities and offices, wastes are generated during their demolition, such as when the lands are sold off.

In FY2013, the total amount of wastes from construction works decreased by 11,600 tons to 81,300 tons (92,900 tons in the previous fiscal year). We also achieved the annual recycling rate target of 98% which is the same as in previous fiscal year (Figure 21).

We will continue our effort for a better recycling rate in FY 2014 while reducing the final amount of wastes.

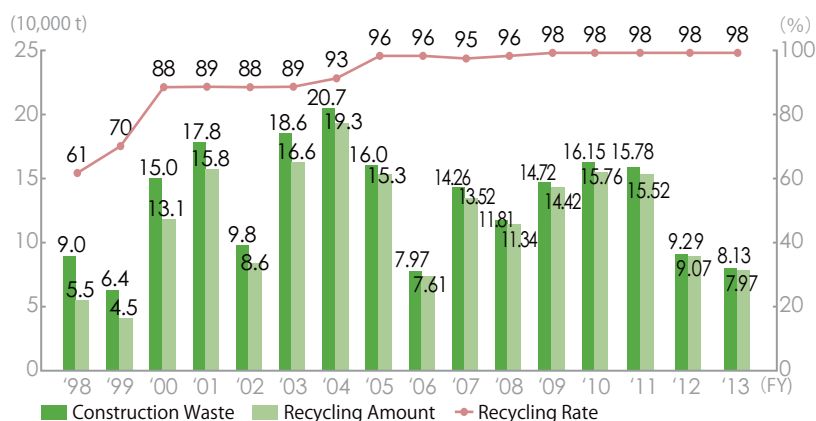


Figure 21:  
Disposal and Recycling of Wastes from Construction Works

### Reduction of Wastes and Recycling of Soil Generated from Construction Works

NTT West is promoting the efficient utilization of recyclable resources, such as concrete mass, and minimization of wastes generated by making it obligatory for its main construction contractors to prepare plans for processing wastes. For construction works, in particular, not only do we manage the total amount of wastes generated, we make sure that recycling is being promoted regardless of any fluctuations in the total waste amount.

Taking into account our social responsibility as the outsourcer, we ensure that industrial wastes generated from all our construction works (including industrial types subject to special control) are properly processed by using the manifest system.

Although soil generated from construction works is not classified as an industrial waste, we have implemented voluntary efforts to minimize its production and set a target recycling rate.

## ● Reduction and Proper Processing of Industrial Wastes at Offices

### ▶ Performance in FY 2013

Promoting the reuse and recycling of unnecessary office computers and furniture such as desks, chairs, and bookshelves, NTT West Group aims at reducing the amount of industrial wastes generated at our offices.

In FY 2013, our thorough efforts on reusing and recycling have reduced the amount to 100 tons (Figure 22).

Industrial wastes at offices are properly handled by strictly complying with the Wastes Disposal and Public Cleansing Act. At the same time, as an industrial waste discharge company, we ensure that agreements concluded with processing companies and the administrative procedures are appropriate.

As with FY 2014, we will continue to advance our efforts to reduce wastes in FY 2013 such as by further promoting recycling, while setting targets for each office and ensuring more thorough progress management.

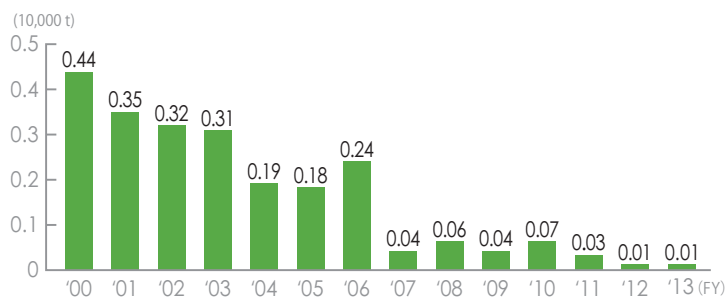


Figure 22:  
Final Disposal Amount of Industrial Wastes at Offices

### Voices of Our Partner Companies

To promote the reduction of waste and recycling with the aim of effectively using limited resources, we will work on reducing waste by establishing a system of collecting and separating waste by type.

**Ayako Kono**, General Affairs Subgroup (Office/Welfare),  
General Affairs Section, General Affairs Department.



### ● Proper Processing of Medical Wastes

Generally, medical wastes can be divided into infectious wastes<sup>\*1</sup> and non-infectious wastes. Wastes of an infectious nature are classified as "industrial wastes subject to special control,"<sup>\*2</sup> and are subject to particularly strict storage and disposal regulations.

The medical facilities of NTT West generate medical wastes. At each medical facility, thoroughgoing efforts are made to ensure the proper processing of infectious wastes, with all employees exercising utmost care in their disposal.

<sup>\*1</sup> Infectious wastes

These wastes may contain blood, etc. and be contaminated with pathogens that may transmit infectious diseases to humans.  
(Syringe needles, blood products and pathological wastes such as surgically removed human organs)

<sup>\*2</sup> Industrial wastes subject to special control

Wastes that are explosive, toxic or infectious, or those that may pose a potential hazard to human health or the living environment.  
(Article 2-5 of the Wastes Disposal and Public Cleansing Act)

### ● Storage of Polychlorinated Biphenyl

Polychlorinated biphenyl (PCB) is a chemically stable substance that cannot be thermally decomposed readily. Because of its excellent insulation and incombustible properties, PCB has been widely used as the insulating oil for transformers and capacitors of electrical equipment, heating medium, and pressure-sensitive copying paper. However, the toxicity that PCB poses became an issue, and although its production was terminated and use minimized in 1972, not much advancement has been made on its detoxification process. To this day, the storage of PCB wastes has been entrusted to the relevant companies. For these companies, which have been storing them for many years, the detoxification of PCB wastes has become an important issue.

Under the Law Concerning Special Measures against PCB Waste, which was enacted on 15 July 2001, companies storing PCB wastes are obliged to dispose of the stored PCB wastes by 31 March 2027 on their own or by subcontracting their disposal to other parties and produce annual reports on the storage.

In accordance with the instructions from the Ministry of the Environment, we are performing more detailed classification of the PCB wastes to enable more appropriate management of their storage. NTT West, as a PCB-storage company, has formulated a storage guideline on the functions of the required facilities and the storage procedures to ensure appropriate storage of PCB wastes. Among the items that we store, those over 10kg were registered at an early stage with our contractor, Japan Environmental Safety Corporation (JESCO), and in FY 2013, 30 capacitors were detoxified.

In FY 2014, we will continue our detoxification efforts at the plants.



## Battery Recycling

Based on the "3Rs + CO<sub>2</sub>" concept, which adds "CO<sub>2</sub> reduction" to the "environmental 3Rs (Reduce, Reuse and Recycle)," Telwel West Nippon is providing support to advanced measures by eco-minded companies. From the viewpoint of "Reduce," Telwel West Nippon has built a battery recycling plant to engage in battery recycling more actively.

By promoting "battery recycling," we can reduce the number of disposed batteries, which amounts to 40 million annually. Also, we can contribute to the formation of a circulating society by preventing environmental pollution or leakage of hazardous electrolytic solution.

- |                             |  |
|-----------------------------|--|
| [ Objectives ]              | To contribute to the reduction of industrial waste (CO <sub>2</sub> , etc.), as well as to cut costs.  |
| [ Batteries for recycling ] | (Small) nickel-cadmium batteries, nickel hydride batteries   |
| [ Recycling procedure ]     | (1) Perform a discharge test before recycling and check the condition.<br>(2) Perform recycling processing with a special pulse current.<br>(3) After the recycling process, perform a discharge test to check the regenerative effect.<br>(4) After charging, ship the recycled batteries to customers. |

Deteriorated batteries are recycled in the procedure shown below.

(1) Discharging

(2) Recycling

(3) Discharge test

(4) Charging

After recycling processing, the performance of recycled batteries is checked with either one of the following tests.

### (1) Actual load test

A discharge test by applying the same load as the one used by customers for the device is performed.

[e.g.] Largest load of a device 3A At least 30 minutes must be maintained until the voltage drops to the level where the device stops.

### (2) JIS standard test

When the condition of the actual load is unknown, a discharge test is performed according to JIS standards.

## Hard Disk Deletion Services Contributing to a Reduction of Environmental Load

NTT HOMETECHNO\* contributes to the promotion of the reuse and recycling of PCs by completely deleting the hard disk data of used PCs.

Old PCs are recycled as secondhand machines and supplied to the market for reuse. We believe that doing so helps to yield marked results for lessening the impact on the environment, as the processes from resource mining to manufacturing can be eliminated (Figure 23).

We believe that disassembling and recycling old computers, which are not reused as secondhand ones, will contribute positively to reducing the environmental load.

Since used PCs store important information such as personal information and confidential corporate information on their hard disks, in order to promote safe reuse and recycling, accidents whereby information is leaked must absolutely be prevented by completely deleting the data recorded on the hard disks.

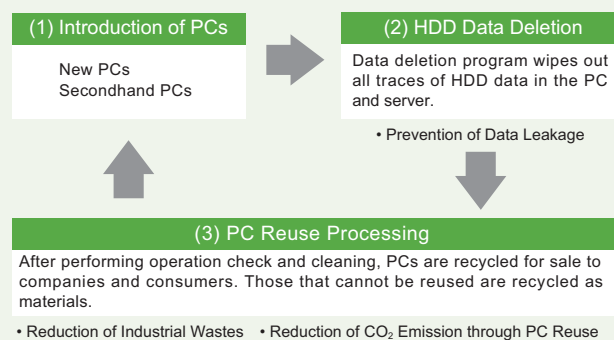
NTT HOMETECHNO\* has been providing "Hard Disk Data Deletion Services" mainly within NTT West Group since 2002 and has prevented information leak accidents and contributed to smooth reuse and recycling through the complete deletion of data recorded on hard disks in used PCs.

Generally, formatting a HDD does not delete data completely. The data can be restored easily using some data recovery programs. For this reason, the Japan Electronics and Information Technology Industries Association (JEITA) made public its guidelines for data deletion, which set forth that the user is responsible for deleting data. The guideline also recommends that (1) data be deleted by overwriting the data at least once using a software program designed for data deletion, or (2) the HDD be destroyed physically or electromagnetically to make the data inside unreadable (Table1).

\* NTT HOMETECHNO underwent a name change to NTT FIELDTECHNO in October 1, 2013.

## [FY 2013 Hard Disk Data Deletion Result]

NTT West Group 42,000 units



Method	Description	PC Reuse	Environmental Effects
By Software	Overwriting of the whole HDD area with deletion program	Yes	Fewer new PCs, Resource utilization
Physical	Data destruction electromagnetically or physically, e.g. drilling holes can be completed within a relatively short time	No	Resource utilization

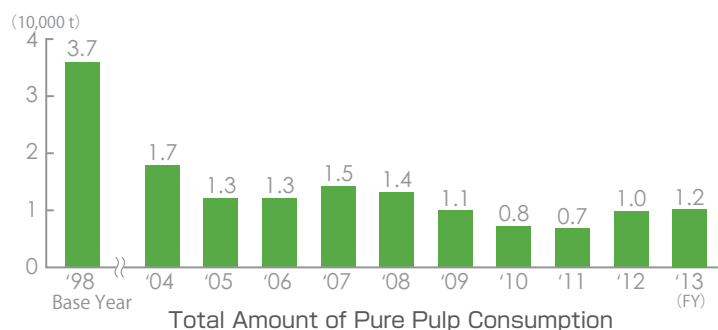
Table 1: HDD Data Deletion Methods

Figure 23: Flow of PC Reuse

## 4-1-3 Resource Saving Activity

## Overview

"Reducing the total amount of pure pulp used to 40,000 tons or lower by FY 2010" was one of the medium-to-long-term action plan targets of NTT West Group. As of FY 2006, we have already substantially achieved this "target on the total amount of pure pulp." In addition, with the ratio of used paper in telephone directories, which consume a vast majority of the amount of paper, reaching its technological limit, and our offices now purchasing only recycled paper supplies, we will continue to control the amount of pure pulp used, and strive to achieve further reductions.



## ● Use of Recycled Paper for Phone Directories

NTT West publishes about 40.52 million copies of phone directories with an approximate paper quantity of 23,000 t (Figure 1).

Precisely because the directories are consuming so much paper, we are implementing many eco measures to strike a balance between the directory business and reduction of the environmental load. The specific measures we are taking are described at our "Eco Challenges! Directories" website.

\* "Eco Challenges! Directories"

"Eco challenges" is a slogan that declares our active environmental stance, with "Eco" referring to the "environment," and "Challenges" representing our actions and attitudes.

Website: <http://eco.tpnet.ntt-tp.co.jp>

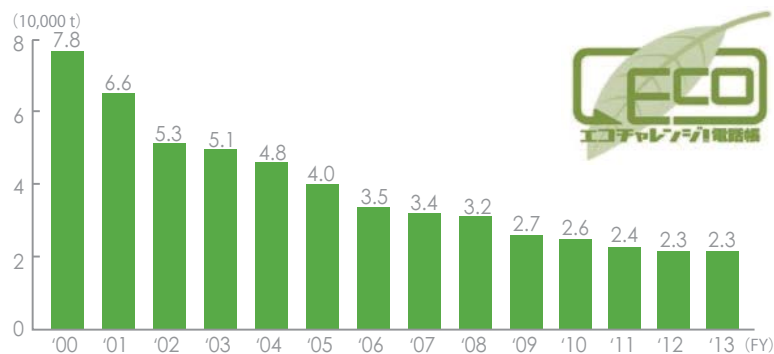


Figure 1: Amount of Paper Consumption for Phone Directories

## ▶ Reduction of Pure Pulp Use

Aiming at reducing the amount of pure pulp consumption, we have taken various measures over the past years in publishing telephone directories.

The pages of phone directories are made with a blend of pure woodchip pulp\* and paper pulp recovered from used directories. For the procurement of paper materials for our directories, we have set clear requirements for blending recovered pulp. Also, by encouraging paper manufacturers to formulate their own effort, we are committed to reducing the use of pure pulp, therefore increasing the content of recovered pulp. Because of our effort, we have exceeded the standard set..., exceeded the standard set by the Japan Paper Association "to increase the recovered pulp content to over 64% by 2015." Today, we continue to maintain a high standard (Figure 2).

In an attempt to determine the correct number of directories to be printed, we take thorough actions to check with new and moving subscribers whether they wish to have a copy, and do not distribute directories to those who do not wish to receive one. We have also been printing two editions of "Hello Page" (white pages), one corporate and the other residential, and have started selective distribution to subscribers who need a copy based on prior check of their demands for residential directories.

In FY 2014, we will continue to advance our efforts toward reducing paper use.

\* To maintain a certain level of quality in paper used for directories, pure pulp is indispensable. However, to minimize direct consumption of forest resources, we are using remaining wood materials from housing construction works.

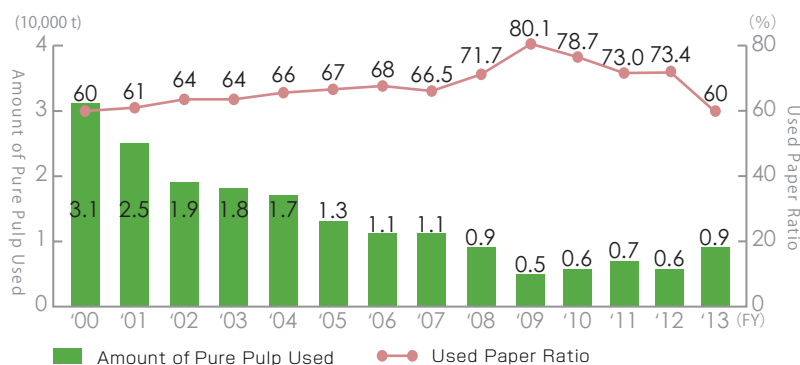


Figure 2: Amount of Pure Pulp Used and Ratio of Used Paper



Woodchips



Type of Directories

## ► Recycling of Directories

### Establishment of “Closed Loop Recyclesystem for Directories”

We have established a circulating “closed loop recyclesystem for phone directories,” in which old directories are reprocessed into new ones (Figure 3).

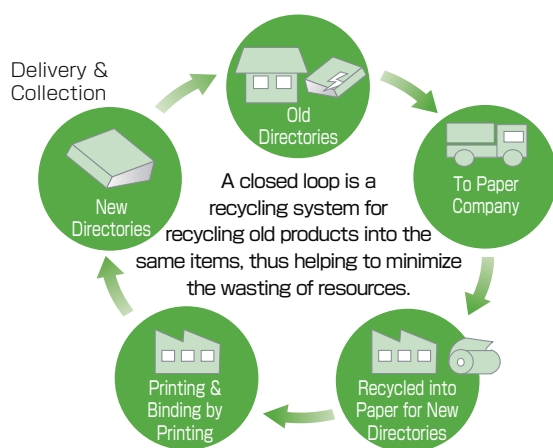
A closed loop is a system for recycling old products into the same items, and is said to help minimize the wasting of resources. At NTT West, we are recycling old directories that we have collected into new ones.

The first step to establishing this system was taken in February 2000, when we started publishing directories using white recycled paper\*. By March 2001, we have employed the same type of paper to all directories.

As illustrated in Figure 3, collected directories are processed by a paper company into recycled paper, after which they are printed and bound into new directories. The copies our subscribers receive are recycled using such a system. In addition, since September 2001, we have been publishing directories by collecting old copies made from white recycled paper and transforming them into new ones.

In the past, we have been collecting outdated copies of directories while we deliver new ones. With improvements made to the quality, old directories can now be recycled as normal used paper.

We will continue to make contributions toward building an environment-friendly community by reviewing the collection method, while at the same time implement efforts including those to reduce CO<sub>2</sub> emission.



\* Directories using white recycled paper

In other countries, business-classified directories are called “Yellow Pages”- because of the color of the paper used. The Yellow Pages of NTT West, “Townpage,” used to be printed on yellow-dyed recycled paper. However, an issue with this type of paper was that it could not be fully decolorized in the recycling process. For this reason, we adopted the use of white recycled paper instead, and created yellow pages by applying yellow ink to the white paper.

\* Townpage Center

Phone: 0120-506-309 (operating hours: 9:00 to 17:00 on weekdays, closed on Saturdays, Sundays, public holidays and new-year holiday season)  
Fax: 0120-817-548 (24 hours)

Figure 3: Closed Loop Recycle System for Directories



### ● Use of Recycled Paper for Telegrams

NTT West is taking measures to promote the use of recycled paper for telegrams, so as to reduce the consumption of pure pulp. As of 31 March 2014, there are 78 types of telegram package paper for different occasions, such as celebration, condolence and others, and the materials used include fabric as well as paper.

In FY 2013, we handled as many as 5.03 million telegrams (out of 9.51 million nationwide), and the amount of paper used for the package paper was 408 tons, which fell below our annual target value (500t) that we achieved.

In addition, as part of our telegram package paper recycling efforts, we have been implementing measures to raise the ratio of used paper when we develop new types of package paper or renew existing ones. As a result, the ratio of used paper to the total amount of paper consumption reached 70% and maintained the same level compared to the previous year (68%).

To address the needs of our customers further, we have plans to launch new products in FY 2014. We will continue our efforts to develop products that utilize recycled paper as well as eco-friendly paper materials.

In addition to the package paper, we also have fabric stuffed-toy telegrams such as "Hello Kitty Denpo," "Dear Daniel Denpo," "Doraemon Denpo," "Mickey Mouse Denpo," "Minnie Mouse

Denpo," "Winnie the Pooh Denpo" and "Stitch Denpo." The fabric used for these telegrams are materials that do not impact the environment, such as those that are compliant with the ordinance on acetylacetone method (with a formalin content of 75 ppm or below) issued by the Ministry of Health and Welfare (No. 34, 1974). Another measure that we adopted to help reduce the consumption of pure pulp is the employment of eco-friendly recycled paper for the tubes into which telegrams are inserted.

We will advance further our effort in the development of telegram package paper using materials that have "less impact on the environment," such as recycled paper.



Embroidery Telegram  
"Kikusetsuka"  
(Consolatory)



Embroidery Telegram  
"Shochikubai"  
(Congratulatory)

### ● Reduction of Pure Pulp Used for Office Supplies

We have already switched to 100% use of recycled paper as paper supplies at our offices (Figure 4). As we have been classifying eco-friendly pulp\* as pure pulp since FY 2008, the amount consumed has increased. We will continue our efforts to reduce the consumption of pure pulp.

#### \* Eco-friendly pulp

\*This type of pulp is produced in compliance with the laws and regulations in effect in the country of origin (logging area).

\*The raw materials for eco-friendly pulp are FSCC-certified, planted or recycled/unused wood.

\*Eco-friendly pulp is not bleached without chlorine gas.

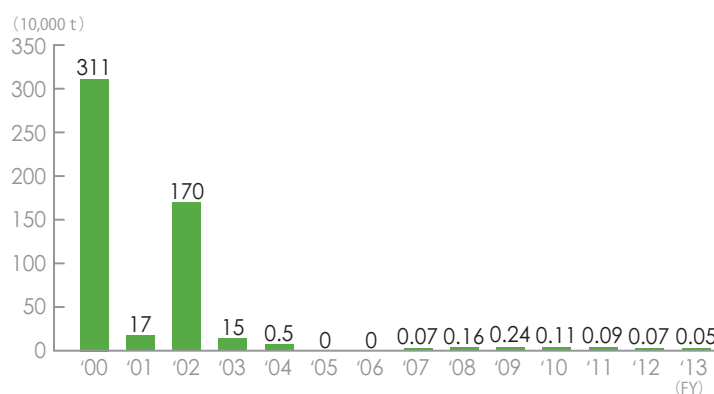


Figure 4:  
Amount of Pure Pulp Used as Office Supplies

#### ● Reduction of Paper Use for Bills, etc.

For NTT West customers who settle their bills by credit card or account transfer, we are recommending them to use our Web-based system, "My Billing\*" (membership service), which allows subscribers to check the service charges on the Internet, instead of sending out printed bills to them.

Our attempt to cut down paper resources for printed bills and envelopes has resulted in a reduction of 329.2 tons in FY 2013, while the number of subscribers for the "My Billing" service has increased to 1.951 million (Figure 5).

#### \* My Billing (membership service)

- Subscribers will need to bear the Internet connection charges when using this service.
- Users can view the monthly billing notices and also paid bills for the previous 12 months. However, this is only applicable to users who have subscribed to the My Billing service.

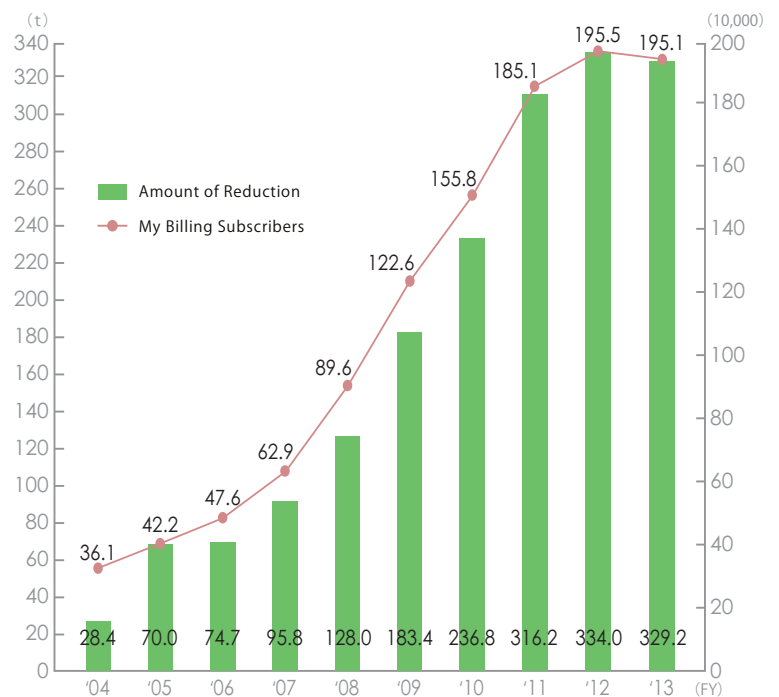


Figure 5:  
Number of "My Billing" Subscribers and Accompanying  
Reduction in Paper Use

## 4-1-4 Effort on Environmental Pollution

## ● Removal of Asbestos

## ▶ Removal of Asbestos from Bridge Facilities and Telecommunication Cable Bridges

We had been using fire-retardant asbestos to protect the facilities (conduits and cables) attached to bridges from fire that could break out under the bridges (Figure 1).

However, following the amendment of the "Ordinance on Prevention of Hazard Due to Specified Chemical Substances" and the "Wastes Disposal and Public Cleansing Act," asbestos has been defined as a substance subject to special control given its hazards. In response to this, we developed and adopted the rockwool method<sup>\*1</sup>, which makes use of new harmless materials for protecting the bridge facilities from fire. In 1983, we have started the removal and upgrading of asbestos fire protection facilities.

Through further technical improvements made to the fire protection methods, we have, in 1997, introduced the precast construction method<sup>\*2</sup>(Figure 2), which excels in fire resistance and economic efficiency, and have since then been active in promoting the upgrading our fire protection facilities.

Specifically, for the removal and upgrading of the facilities, we investigated their conditions while developing the method. We then prepared a "checklist for upgrading old fire protection facilities" to judge the extent of degradation and damage through periodic checks. As a result of such effort, and based on works such as bridge replacement planned by the managers responsible for bridges, we

expected fire protection facilities containing asbestos (total 550 tons approximately) as of end FY 1999 to be fully eliminated by the end of FY 2003. However, during the course of our inspections and construction works in FY 2003, more bridges that required removal and upgrading were found, and 14 t of asbestos remained at the end of FY 2005. We ensured that removal and upgrading of the remaining facilities were performed, and systematically completed our works on removal of asbestos from and upgrading of bridge facilities and telecommunication cable bridges by the end of FY 2006.

Unfortunately, fragments of the remaining asbestos were discovered in some of the upgraded bridges in FY 2007, and we have conducted works to remove them appropriately. We will perform inspections of the bridge facilities to check if there are any other remaining fragments, and will duly remove them should any be found.

## \*1 Rockwool method

A construction method that uses harmless new materials to wrap the heatinsulating material (rockwool) and covering material individually.

## \*2 Precast construction method

A construction method that uses harmless new materials to wrap the heat insulating material (ceramic fiber) and covering material together.

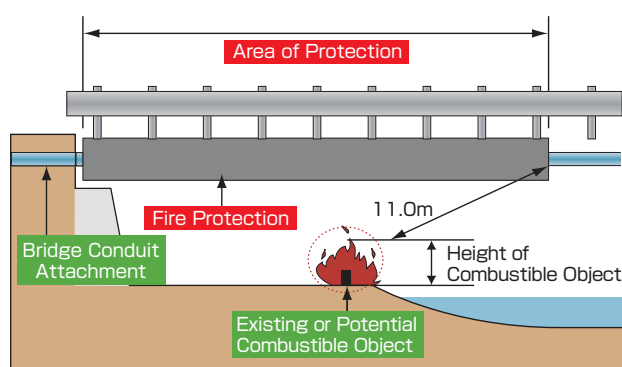


Figure 1:  
Fire protection Area of Bridge Facilities

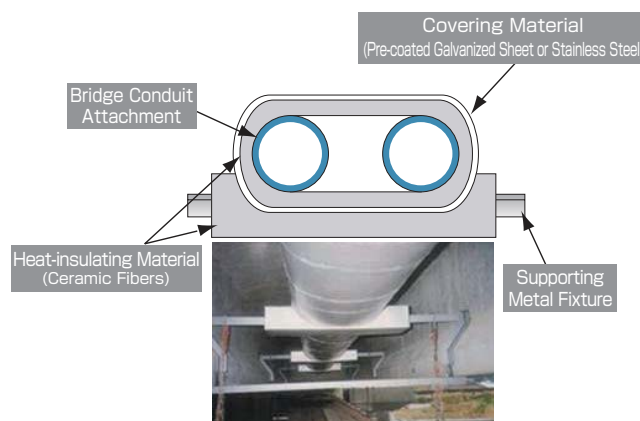


Figure 2: Precast Construction Method

## ▶ Removal of Spraying Material with Architectural Asbestos

NTT West had about 120,000 m<sup>2</sup> of spraying asbestos in its buildings. To reinforce our asbestos removal plan, we set a target "to remove all asbestos for which this is feasible by the end of FY 2000," and we were able to do so as planned for all of the spraying asbestos for architectures. Meanwhile, based on the directive for inspection of private structures issued on 14 July 2005 by the Ministry of Land, Infrastructure, Transport and Tourism, we performed a stricter investigation in FY 2005. As a result of this investigation, spraying materials with asbestos content equivalent to about 65,000 m<sup>2</sup> were newly found, and we

removed about 500 m<sup>2</sup> in FY 2008, about 1,200 m<sup>2</sup> in FY 2009 and 5,800 m<sup>2</sup> in FY 2010. The remaining asbestos either cannot be removed or are unlikely to detach, and we are monitoring the condition by performing yearly measurements of the air condition. From FY 2011 onward, we will conduct asbestos removal works accordingly if the measurements for an area exceed the criteria.

In FY 2014, we will continue to implement removal measures. Materials that do not contain asbestos are used for ongoing construction works.

### ● Discontinuing Use of Halon for Extinguishers

As part of our measures to protect the ozone layer, we have been advancing efforts to discontinue the use of halon in fire-extinguishing equipment, while introducing halon alternatives at the same time. The main substance that has been used for fire suppression is halon 1301 due of its excellent fire-extinguishing performance and properties such as high insulation, low toxicity and low ozone depletion. At NTT West, halon 1301 is employed at locations including equipment rooms, computer rooms, and power rooms, and we possess approximately 410 t of it. Since 1992, we have stopped constructing any new structure that contained halon.

As a substitute for halon, we are introducing a halon-alternative fire-extinguishing system, which provides high fire-extinguishing performance and safety to human body and telecom systems by adopting new extinguishing agents\*1 that pose no risk to the ozone layer.

For the halon extinguishers, we are also taking measures to prevent accidental release, and are progressively adopting an early detection system to increase the level of safety against fire (Figure 3). Equipped with an air-sampling smoke detector, which is superbly sensitive, the system is capable of detecting low-concentration smoke. This enables it detect a fire quickly in a large space where airconditioned air circulates, leading to enhanced safety.

In 2014, we will continue to implement the necessary measures.

\*1 The agent is any of the three substances, NN100\*2, Inergen\*3 or FM200\*4. The most appropriate substance is selected for each building based on comprehensive consideration of issues such as construction costs.

\*2 NN100

An inert agent, which, employing nitrogen gas, has zero ozone depletion potential and zero global warming potential.

\*3 Inergen

An inert agent, which is a mixture of three gases, nitrogen, argon and carbon dioxide. It has zero ozone depletion potential and zero global warming potential.

\*4 FM200

A fluorochemical agent with a limited releasing time. Compared with NN100 and Inergen, FM200 requires a fewer number of tanks as the agent is stored in the liquid form. It has zero ozone depletion potential and a global warming potential of 2050.

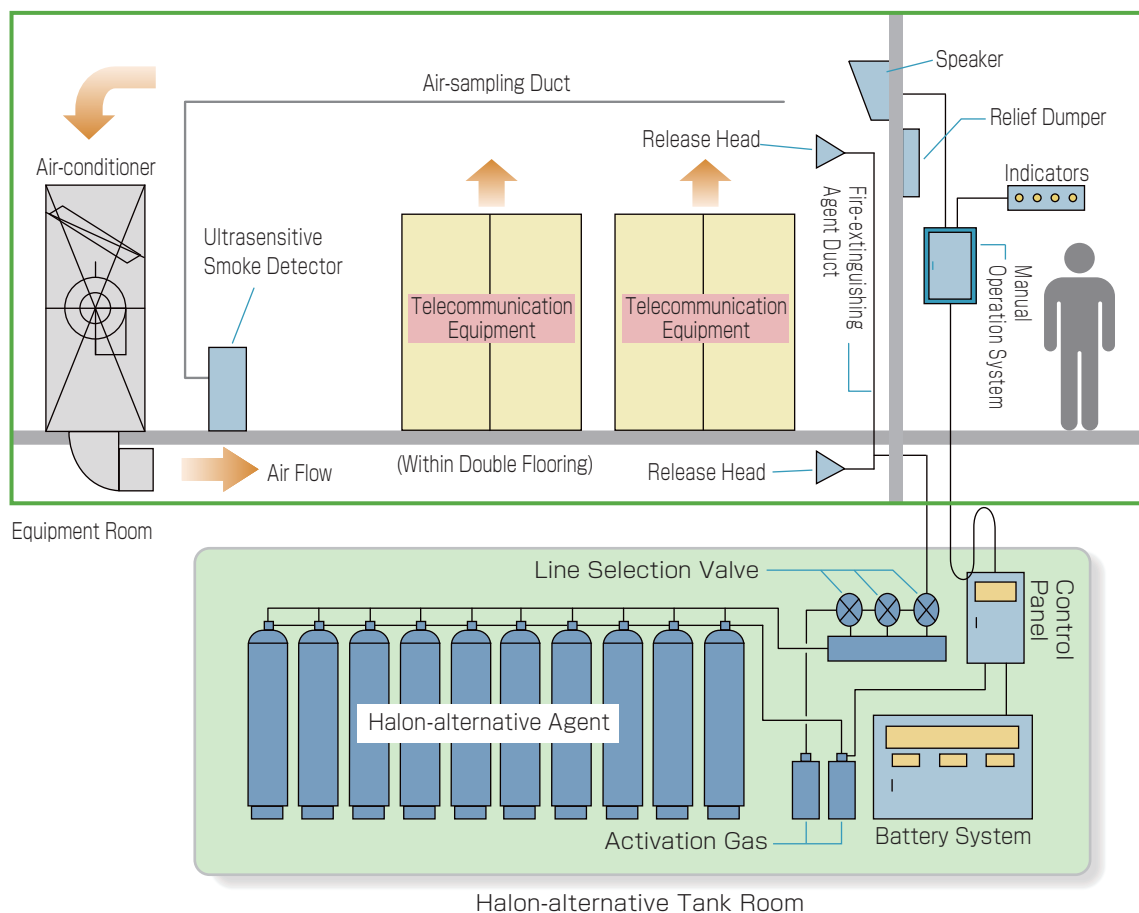


Figure 3:  
New Fire-extinguishing/Fire Protection System for Equipment Rooms



## 4-2 Environmental/Energy Saving Effort Using ICT

### 4-2-1 Efforts for the Expansion and Spread of Clean Energy

As one of our global warming countermeasures, NTT West is proactively promoting the introduction of renewable energy. In addition to the amount of power that we use, we have been carrying out the "Green NTT" Project promoted by the NTT Group since 2008, and furthermore, in FY 2013, we leased real estate owned by NTT West to NTT FACILITIES, INC., which resulted in the operation of large scale solar energy systems in 3 locations in Niida (Kochi), Miyakonojo (Miyazaki) and Suzuka (Mie).

Currently, the power generated in 46 operating facilities within the NTT West area reached 1,256 MWh (Figure 1).

In addition, NTT SMILE ENERGY INC. is cooperating with the activity of managing the statistical data of power generated by solar power generation systems in Japan by providing data from solar power generation systems measured by "Eco Megane" to the System Team of the Research Center for Photovoltaic Technology, The National Institute of Advanced Industrial Science and Technology. The data is provided with consent from customers and without including personal information.

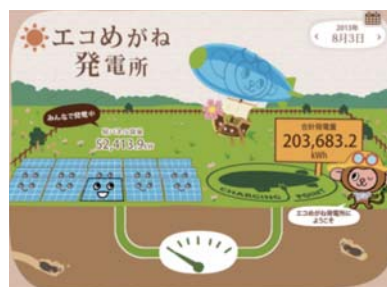
The standard solar power panel generation capacity of "Eco Megane" users has reached 200MW\*, and the area of the panels is 24 times greater than the area of Tokyo Dome.

Under the Green NTT West Strategy, NTT West Group will continue to promote efforts for reducing the use of power and increasing the use of clean energy with the aim of becoming an environmentally-friendly company.

\*As of May 2014



F Suzuka Solar Power Plant



Management of Statistical Generated Electricity Data Using Eco Megane



"Solar Power Generation Status Watchdog Report" Screen

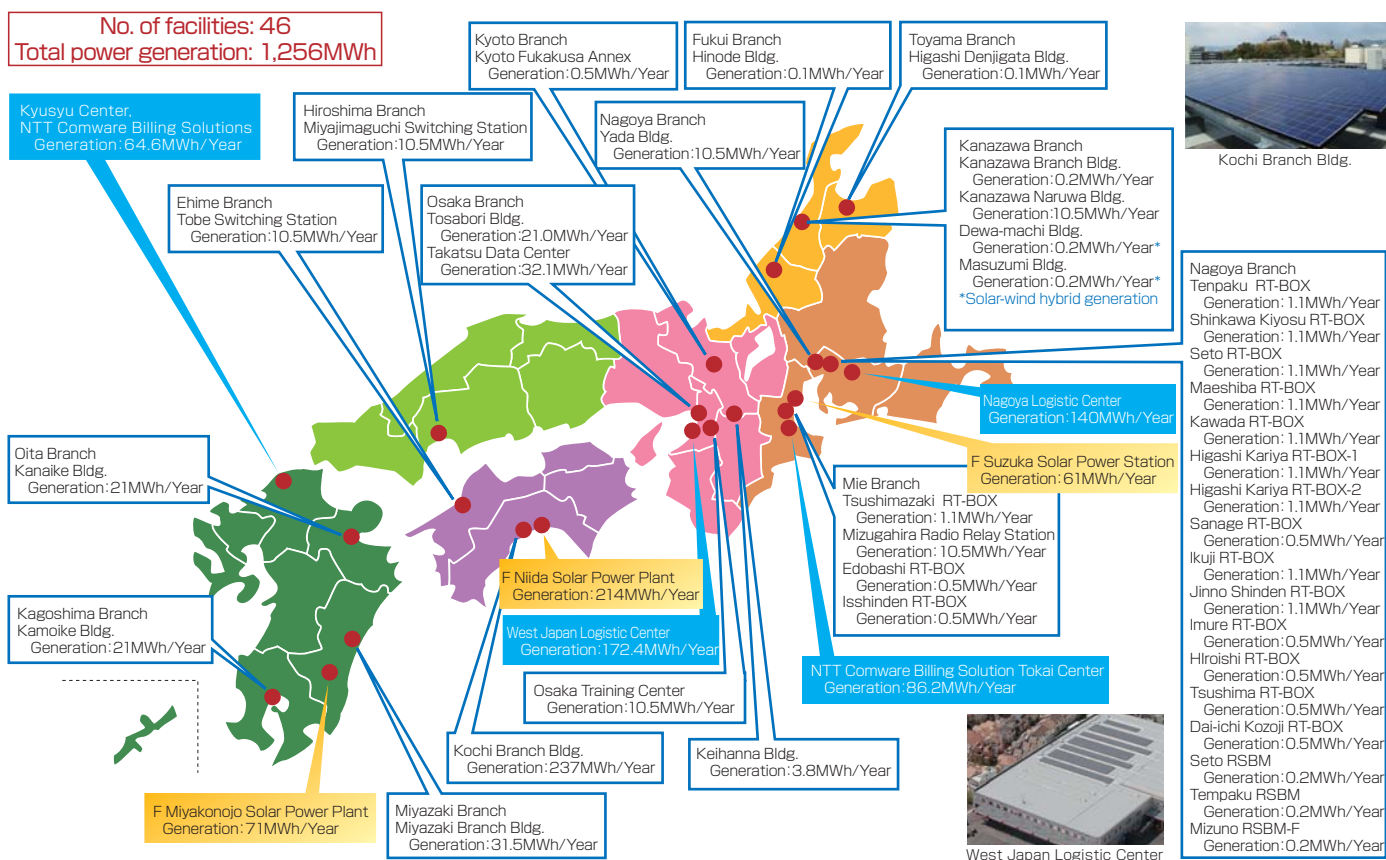


Figure 1: Solar Power Generation (as of 30 September 2014)

## 4-2-2 Paper Resource Use Reduction through e-comics

## —from Hard to Soft Media—

Given the improved broadband infrastructure and the prevalent use of mobile phones, NTT Solmare is offering a web-based service for comics, which used to be read as books (Figure 1).

In this service, each frame of a manga work is digitized to allow the subscribers to view it on their mobile phone and tablet screen. It realizes an unprecedented reading style, which allows readers to enjoy their favorite comics on their mobile terminal anytime and anywhere.

The advantages of such a paperless electronic service on the environment are not limited to reduction of paper resources. We believe that it can help to further ease the environmental load in many respects, including a reduced amount of CO<sub>2</sub> emission as it involves no printing and transportation.

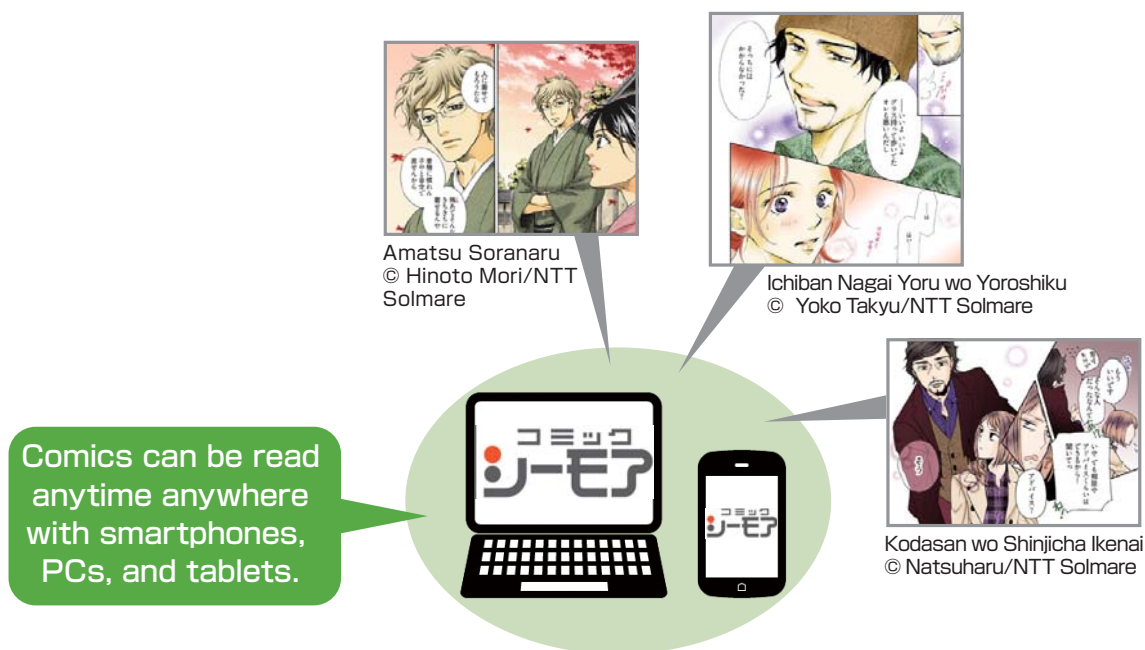


Figure 1: e-comics Frame

## 4-2-3 Efforts for Environmental Load Reduction by Cloud Service

## ● Green by ICT –Efforts of LCA in Hosting and Housing Services–

It was found that our hosting service (Biz Hikari Cloud) has an 83% CO<sub>2</sub> reduction effect and that our housing service (Biz Hikari Cloud) has a 17% CO<sub>2</sub> reduction effect compared to on-premises.

## ▶ About LCA

As part of “Green by ICT” efforts, under the cooperation of NTT SmartConnect Corporation, we conducted a Life Cycle Assessment (LCA) of “Biz Hikari Cloud.”

While promoting the “Green of ICT,” NTT West Group has also been working on “Green by ICT” where we are working to make how we work and live environmentally-friendly by using IT along with improving the efficiency of the business. ICT not only enables saving energy and a paperless existence by systemizing business, it leads to a decrease in the movement of people and reforms how we work, therefore, it plays a large role in reducing the environmental load. LCA is a method of displaying the effects quantitatively.

Generally, the process is (1) setting of objectives for assessment and range of research, (2) estimating (inventory analysis) the emissions of environmentally hazardous substances (CO<sub>2</sub>, etc.) along with the lifecycle of the products, and (3) impact assessment due to the calculated environmental load. The figures below illustrate a comparison of procedures up to the emission of CO<sub>2</sub> in (2) above among existing on-premise environments, general data centers, and services in NTT West.

This assessment was carried out based on The “Guideline for Information and Communication Technology (ICT) Eco-Efficiency Evaluation” published by the Japan Forum on Eco-Efficiency in March 2006.

## ▶ LCA of Posting Services

As a result of calculations based on the assessment conditions and assessment models illustrated below, it was found that our hosting service (Biz Hikari Cloud) has an 18,728t-CO<sub>2</sub>/year or 83% CO<sub>2</sub> reduction effect compared to on-premise. When our hosting service (Biz Hikari Cloud) is used, network infrastructure use increases, while on the other hand, the use of ICT devices, movement, and work of people can be reduced.

## Basic Conditions of LCA Assessment (Hosting)

## [Function Unit]

Use including maintenance and operation of a server under contract for a year

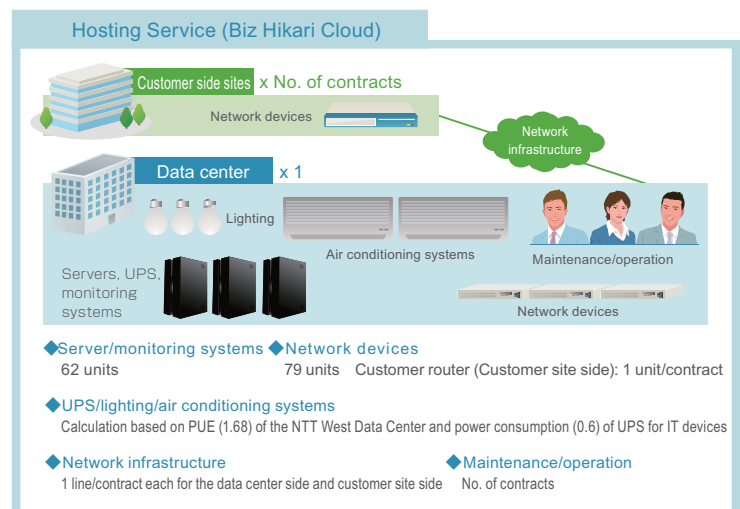
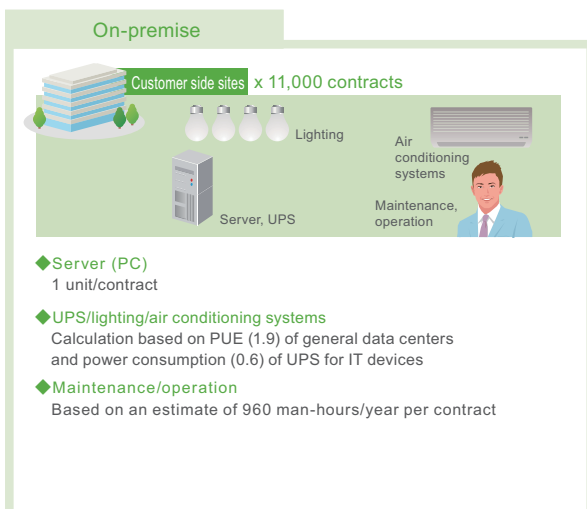
## [Basic Unit Database]

Embodied Energy and Emission Intensity Data for Japan Using Input–Output Tables (3EID)

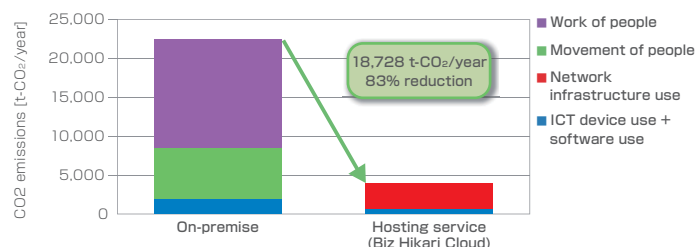
## Hosting Service Assessment Model (All Contracts)

## [System Boundary]

Environmental pact Factors	On-premise	Hosting service (Biz Hikari Cloud)
ICT device use	Servers, UPS, air conditioning systems, lighting	Servers, UPS, network devices (Data center sides, customer site sides), air conditioning systems, lighting
Network infrastructure use	—	Network lines
Software use	—	Data center monitoring systems
Movement of people	Commuting related to maintenance and operation	Commuting related to maintenance and operation
Movement of objects	—	—
Material and energy consumption	—	—
Object storage	—	—
Work of people	Maintenance and operation	Maintenance and operation



## Hosting Service Assessment Results



PUE: Power Usage Effectiveness (Ratio of IT equipment and other power use) UPS: Uninterruptable Power Supply

	ICT device use + software use	Network infrastructure use	Movement of people	Work of people	Total
On-premise	1,770	0	6,811	14,096	22,677
Hosting service (Biz Hikari Cloud)	642	3,300	2	5	3,949

Unit: t-CO<sub>2</sub>/year

## ▶ LCA of Housing Services

As a result of calculations based on the assessment conditions and assessment models illustrated below, it was found that our housing service (Biz Hikari Cloud) has an 11.6t-CO<sub>2</sub>/year or 17% CO<sub>2</sub> reduction effect per contract compared to on-premise. When our housing service (Biz Hikari Cloud) is used, network infrastructure use increases, while on the other hand, the use of ICT devices, movement and work of people can be reduced.

### Basic Conditions of LCA Assessment (Housing)

[Function Unit]

Use of 18.55 servers (per contract out of 200 contracts) for a year including maintenance and operation

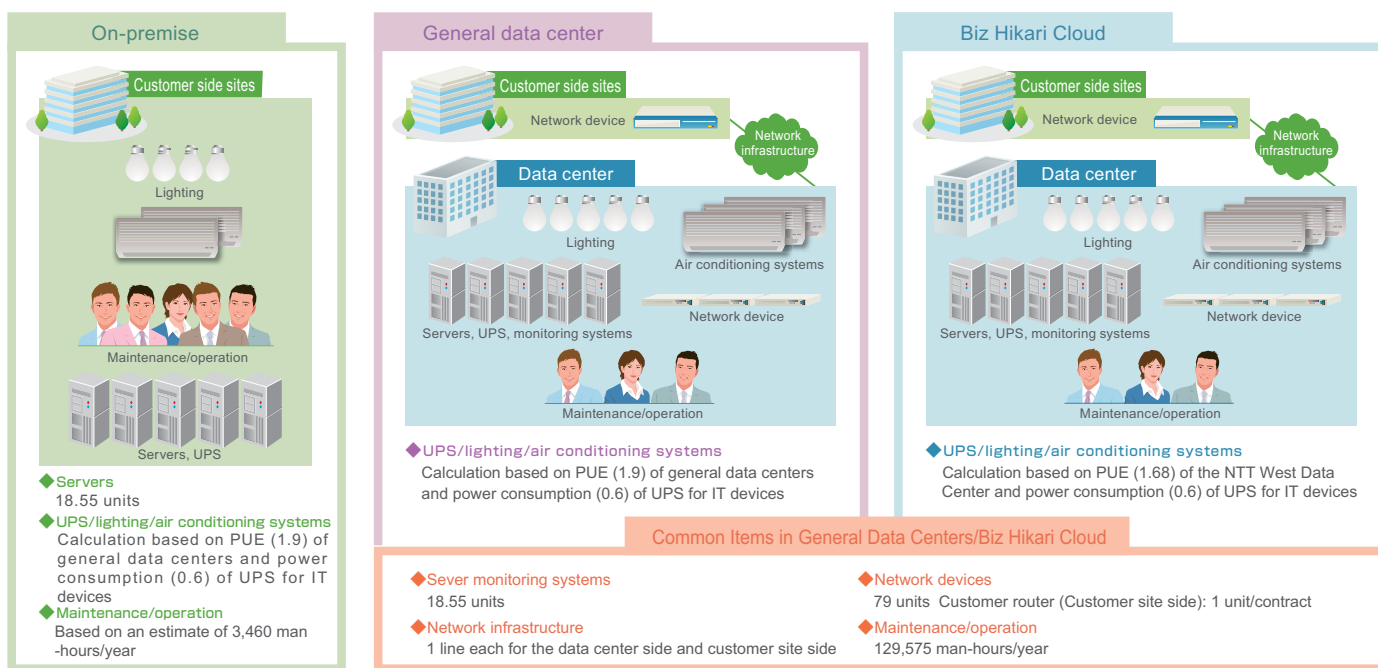
[Basic Unit Database]

Embodied Energy and Emission Intensity Data for Japan Using Input–Output Tables (3EID)

### [System Boundary]

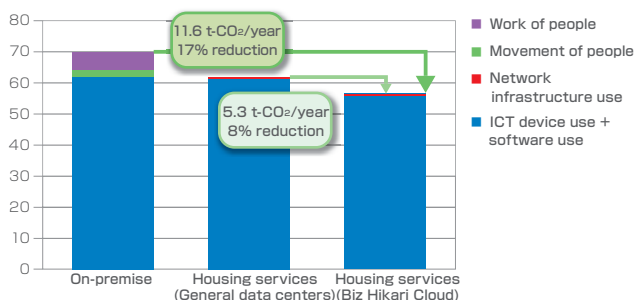
Environmental Impact Factors	On-premise	General data centers	Biz Hikari Cloud
ICT device use	Servers, UPS, air conditioning systems, lighting	Servers, UPS, network devices (data center side, customer site sides), lighting, air conditioning systems	Servers, UPS, network devices (data center side, customer site sides), lighting, air conditioning systems
Network infrastructure use	—	Network lines	Network lines
Software use	—	Systems such as data center monitoring	Systems such as data center monitoring
Movement of people	Commuting related to maintenance and operation	Commuting related to maintenance and operation	Commuting related to maintenance and operation
Movement of objects	—	—	—
Material and energy consumption	—	—	—
Object storage	—	—	—
Work of people	Maintenance and operation	Maintenance and operation	Maintenance and operation

### Housing Service Assessment Model (Per Contract)



PUE: Power Usage Effectiveness (Ratio of IT equipment and other power use) UPS: Uninterruptable Power Supply

### Housing Service Assessment Results



	ICT device use + software use	Network infrastructure use	Movement of people	Work of people	Total
On-premise	62.9	0.0	2.2	4.6	69.8
Housing services (General data centers)	62.9	0.3	0.1	0.2	63.5
Housing services (Biz Hikari Cloud)	57.7	0.3	0.1	0.2	58.2

\*For the electrical power consumption rate, the default value of the environmental impact assessment system is used.  
Default value: 2010 (The Federation of Electric Power Companies of Japan/ Published value of the Federation)

### [References]

"Embodied Energy and Emission Intensity Data for Japan Using Input–Output Tables (3EID) 2005 version" Issued by the National Institute for Environmental Studies, Japan

<http://www.cger.nies.go.jp/publications/report/d031/jpn/datafile/index.htm> \*CO<sub>2</sub> emission base unit related to the manufacturing of ICT devices and CO<sub>2</sub> emission base unit related to disposal are quoted.

"Regarding Examination of the Data Center Energy Efficiency Evaluation Index DPPE from Japan in Global Conferences" Issued by the Green IT Promotion Council

[http://www.greenit-pc.jp/topics/release/pdf/dppe\\_j\\_20110228\\_2.pdf](http://www.greenit-pc.jp/topics/release/pdf/dppe_j_20110228_2.pdf) \*Average PUE value is quoted.

"Electrical Efficiency Modeling for Data Centers" Issued by American Power Conversion

[http://www.apc.com/jp/s/products/isx/APC\\_WP\\_No113\\_J\\_Final.pdf](http://www.apc.com/jp/s/products/isx/APC_WP_No113_J_Final.pdf) \*Electrical power consumption volume by UPS for ICT devices is quoted.



## 4-2-4 Efforts for Environmental Load Reduction through Solution Provision

## ► Environmental Load Reduction through Environmental Solutions

We offer a wide variety of solutions to assist our customers in tackling environmental issues. These solutions not only contribute to environmental protection, but also have benefits with regard to cost management and enhancement of business efficiency.

In the initial stage, we held interviews with customers to sort out their situations and challenges, based on which we put forward appropriate proposals. For example, if they do not know where to start, we would help them analyze their current situations, formulate approaches and plan how to implement them.

If a customer is not sure of what specific measures to take to reduce CO<sub>2</sub> emission, we would offer solutions for conserving energy and resources by means of systems for video-conferencing or e-learning (Figure 1).

In addition, for a customer who wishes to establish an efficient data collection system for calculating the amount of CO<sub>2</sub> emission, we would propose the introduction of an "environmental monitoring system."

## Video-conferencing System

**Overview**

A remote conference system that utilizes a network.

**Benefits**

Reduces environmental load due to transportation with a fewer number of meeting trips.

## Environmental Monitoring System

**Overview**

A data collection system for measuring the consumption of energy, such as electric power.

**Benefits**

By obtaining a detailed grasp of the amount of energy consumed, conservation plans and reports can be created more efficiently.

Figure 1: Environmental Solution Examples Offered by NTT West

## 4-3 Efforts with Communities and Partners

### 4-3-1 Green Purchasing & Green Design

#### ● Green Procurement at Telecommunication Facilities

While constructing telecommunication facilities, NTT West procures all necessary materials from external sources, which means that the impact of the procured materials on the environment is directly reflected on how our business activities affect the environment. For this reason, we set up the “NTT Group Guidelines for Green Procurement” in July 1997 (amended in April 2010, Figure 1), according to which we started green procurement activities. These activities aim at easing the impact on the environment by prioritizing products to be procured based on how eco-friendly they are.

In January 1998, we also drew up the “Guidelines for Green Procurement (Supplement)” (amended in December 2010) to request cooperation from our suppliers.

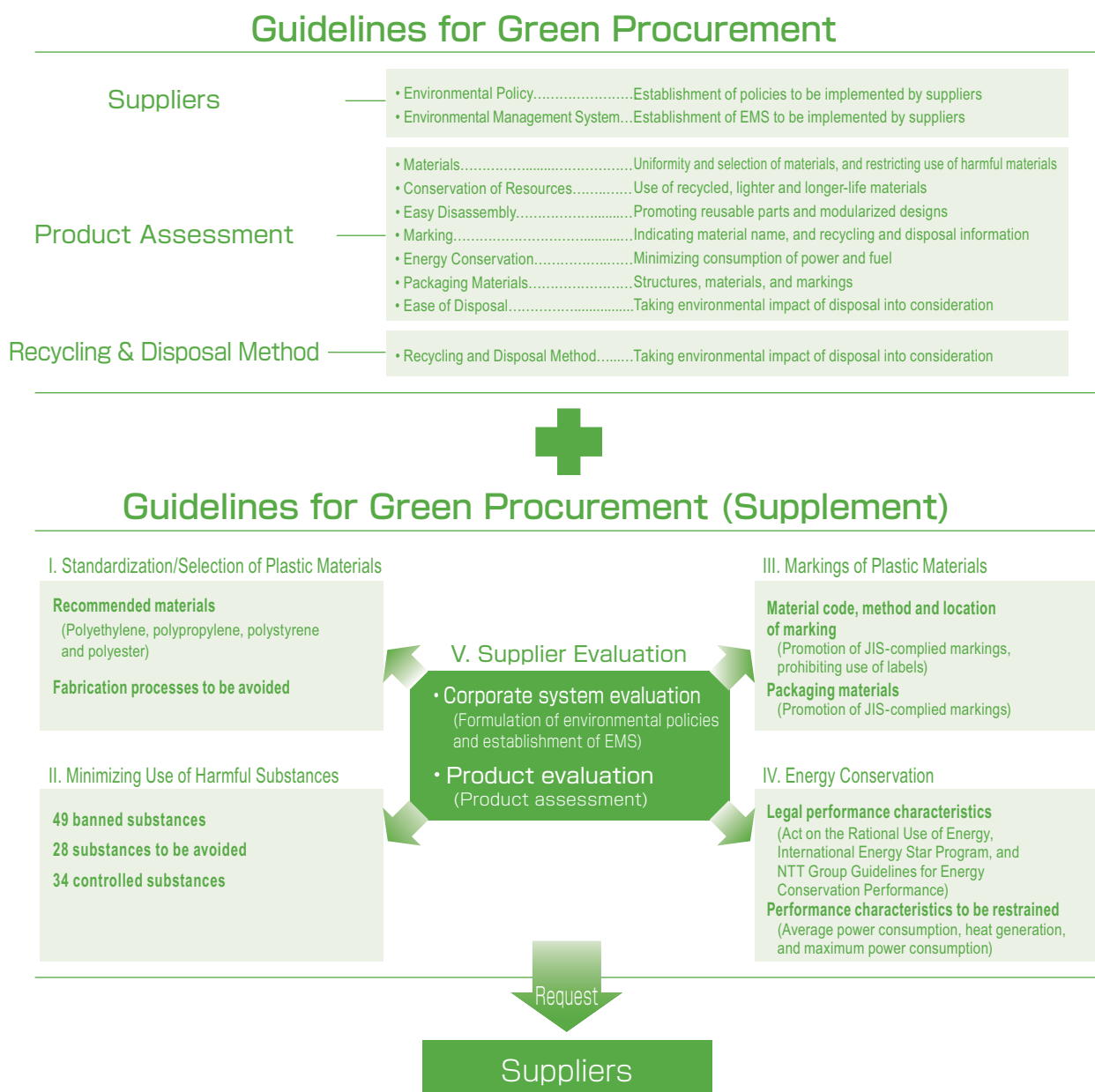


Figure 1: Outline of “NTT Group Guidelines for Green Procurement”

## ▶ Green Procurement through Supplier Evaluation

In April 2002, we organized an evaluation system by drawing up the "Guideline for Supplier Evaluation" based on the request items to suppliers already set forth in our "Guidelines for Green Procurement."

The evaluation guidelines intend to determine and evaluate the eco-friendliness of the products we procure quantitatively in terms of both the suppliers' corporate system and the product specifications.

Our full-scale green procurement activities began with the implementation of the evaluation guidelines.

In principle, the evaluation applies to all products that NTT West procures. Particularly, the products we purchase, or expect to purchase, in large volumes are our main focus. In FY 2013, we evaluated 8 products.

### (1) Corporate System Evaluation

Evaluations are performed on the environmental protection system adopted by the supplier (Figure 2).

This is to determine the willingness of the suppliers toward tackling environmental issues. We consider it significantly important to the whole society that more suppliers are actively involved in measures to protect the environment as having such suppliers can also enhance the eco-friendliness of our own products.

### (2) Product Evaluation

We are requesting our suppliers to assess all components of products whenever it is possible. We also ensure the fairness of our evaluation by assigning scores to suppliers according to the number of components they evaluated.

In accordance with the "Guidelines for Green Procurement," the evaluation criteria include items such as "uniformity and selection of plastic materials," "restriction of use of harmful materials," "marking of plastic materials" and "energy conservation."

Website: <http://www.ntt-west.co.jp/procure/activity/>

Figure 2: Supplier Evaluation Sheet

## ▶ Environmental Value Analysis Proposals

As a part of its effort to ward mitigating the environmental impact in the whole product life cycle from the R&D stage to disposal, NTT West is welcoming proposals for the products it procures from suppliers, such as ideas on the use of eco materials and improvement in manufacturing. This is called "Environmental Value Analysis (VA) Proposals."

## ● Green Designs of Buildings

Generally, a large amount of resource energy is required to construct, own and manage buildings, while the load on the environment increases from the wastes generated when they are dismantled. NTT West, owning many buildings, is advancing a “Green Design” concept to minimize the impact on the environment by paying attention to the protection of global environment from the planning and designing stages of buildings.

In October 2000, NTT Group established the “NTT Group Green Building Design Guidelines,” which summarize the basic ideas and aims for promoting eco-friendly building designs. To ensure that the guidelines are adhered to throughout the company, NTT West created another “Green Building Design Guidelines (NTT West Commentary),” which describe the measures in more detail. The “Green Building Design Guidelines” are reviewed to comply with the enactment and amendment of eco-related laws, including the Building Standards Act, Soil Contamination Countermeasures Act and Health Promotion Act. The current guidelines are the third edition, released in May 2004.

The third edition describes the details of our proactive efforts to realize building designs that are harmonious with the environment, including how we run the facilities.

## ● Green Procurement of Office Supplies

When purchasing office supplies such as copy paper and stationeries, NTT West Group considers not only their costs and qualities, but also their impact on the environment. Being a member of the Green Purchasing Network (GPN)\*<sup>1</sup>, we are applying the product guidelines of the network to promote the procurement of office supplies with a low environmental load.

After selecting items, 3,964 office items with a low environmental load have been introduced at the end of FY 2013 into the group-wide accounting system\*<sup>2</sup> (Figure 3).

An “Environmental Classification” is included in the unit-price list for office supplies to ease the identification of products with a low environmental load.

### \*1 Green Purchasing Network (GPN)

The GPN is a loose network established in February 1996. The members comprise companies, government offices and consumers. As of 18 November 2011, there is a total of 2,657 corporate and government organization members.

### \*2 Group-wide accounting system

Introduced in FY 2008 for the entire NTT Group, the system mainly manages credits and debts, and fixed assets. With an e-procurement function, procedures from purchase to payment can be processed.



Figure 3: Green Procurement of Office Supplies



### 4-3-2 Development of Eco-friendly Information Equipment

For the information equipment that NTT West provides, further effort to promote the lowering of their impact on the human body and natural environment is needed, as they are used at the residences of our customers, touched by them and disposed of by them. In March 2000, we established the "Guidelines for Green Procurement of Telecommunication Equipment," a supplementary document to our "Guidelines for Green Procurement." Based on the guidelines, certain products are certified with the "Dynamic Eco" mark.

#### ► Dynamic Eco Certification

To make known to the society information on our contributions through environmental protection activities, such as reduction of the environmental load, NTT West instituted the ISO 14021-compliant Dynamic Eco mark system in March 2001. The purposes of this self-declared system are to "promote ecofriendly products to our customers" and to "improve the product competitiveness with an enhanced corporate image by making our eco attitude widely known" (Figure 1).

The "Dynamic Eco" certification is given only to products that meet the stringent standards based on the provisions of the "Guidelines for Green Procurement of Telecommunication Equipment (Supplementary Edition)."

In order for our customers to gain a better understanding of our environmental conservation efforts through the information equipment we use, we have publicized the "Dynamic Eco" certification criteria on NTT West website.



Figure 1:  
Dynamic Eco Certification Mark

Website:  
[http://www.ntt-west.co.jp/kiki/support/eco/eco\\_c2.html](http://www.ntt-west.co.jp/kiki/support/eco/eco_c2.html)

#### ► Dynamic Eco-certified Products

Every year since our launch in November 2001 of the first Dynamic Eco-certified product, which was an office use fax machine, we have been promoting the certification of such products (Figure 2).

Now, the Dynamic Eco certification applies to a wide range of products from office-use phones to office-use fax machines, VoIP adapters for "Hikari Denwa," and home-use phones and fax machines. We are making an effort to ensure that the newly released successor models of existing products are certified.

#### Dynamic Eco Certification Criteria

##### <Eco-friendly Materials>

- None of the banned substances specified by NTT West shall be used in the products.
- The use of restricted substances specified by NTT West shall be minimized, and the type and quantity of such substances to be used shall be administered.
- The use of lead that is hazardous to the human body when seeped into the ground due to acid rain shall be minimized.
- The use of polyvinyl chloride (PVC), which produces dioxin when incinerated, and halogenated fire retardants, with the exception of non-Deca-based flame retardants, shall be minimized.
- Taking disposal and recycling into consideration, recommended plastic materials (polyethylene, etc.) and recommended metal materials shall be used for the products
- The operation manual for the product shall make use of recycled paper, and the ink for printing the manual shall not contain any prohibited substance, such as ozone-depleting substances.

##### <Designs for Easy Recycling>

- The recycling rate for the products shall be 70% or higher.
- In order to make recycling easier, the materials' names shall be displayed on all plastic products in such a way that does not impede recycling.

##### <Eco-friendly Packaging Materials>

- The use of polystyrene foam shall be minimized.

##### <Energy Conservation>

- The product design shall take energy conservation into consideration.
- For products subject to the International Energy Star Program, they shall be designed in compliance with the program.



Certified Business Phone  
"Netcommunity SYSTEM  
αNXII S Series"  
(Telecommunication Device)



Certified VoIP Adapter  
"Netcommunity OG400Xa"  
(Telecommunication Device)

Figure 2: Dynamic Eco-certified Product

### 4-3-3 Energy Efficiency Guidelines

#### ● Energy Efficiency Guidelines

At least 90% of greenhouse gas (CO<sub>2</sub>) emissions of the NTT West Group are due to power use in telecommunication facilities and offices. For the effective reduction of emissions, it is essential that we develop and procure devices with high energy efficient performance/functions when introducing new devices.

Therefore, we stipulated a basic concept and target value for each piece of equipment in the development and procurement of routers, servers and other ICT equipment to be used internally as "NTT Group Energy Efficiency Guidelines."

#### ● Efforts for Energy Efficiency Guidelines

According to the guidelines, NTT West Group has been developing and purchasing equipment by considering energy efficient functions and performance in addition to functions, performance, and costs for ICT equipment to be used internally.

#### ● Establishment of the Guidelines

The guidelines were established by referring to the "ICT Ecology Guidelines" stipulated by the ICT Ecology Guideline Council.

#### ● Outline of the Guidelines

For details of the basic concept of our development and procurement of equipment, our Group's target value for each piece of equipment, and functional requirements related to energy efficiency, refer to the NTT Group's website on environmental activity.

Reference URL <http://www.ntt.co.jp/kankyo/management/guideline/energy.html>

## 4-3-4 Biodiversity Conservation (Midori Ippai Project)

● **NTT West Midori Ippai Project** – Activities for biodiversity conservation focusing on tree-planting –

Annually, NTT West Group uses approximately 2 billion kWh of electricity which is accompanied by a large volume of CO<sub>2</sub> emissions. Thus, we believe it is the responsibility of NTT West Group as a major energy user to actively work on protecting the global environment as well as reducing our energy use.

Therefore, aside from efforts toward reducing the environmental load generated from our businesses, based on the “NTT West Spirit Code of Conduct”, “NTT West Group Environmental Policies,” and “NTT West Group Charter for Global Environment”, we inaugurated the “Midori Ippai Project.” In this project, activities for biodiversity conservation focusing on tree-planting are deployed, and the activity to kick off the project was held on November 27, 2012.

Together with these efforts, we will contribute to reducing the environmental load by deploying our environment/energy business using ICT.

▶ **NTT West Midori Ippai Project Outline**

In order to conserve biodiversity according to natural and social conditions of the area, NTT West aims to implement activities for biodiversity conservation focusing on tree-planting as listed below in coordination with municipalities/NPOs in all prefectures in western Japan and to create an activity participation scale numbering 10 thousand people which includes our employees, their families, and retired employees under the unified name of “Midori Ippai Project” across NTT West business regions.

▶ **Examples of the “Midori Ippai Project”**


<b>Hyogo</b> <ul style="list-style-type: none"> <li>Implementation of the conservation activity of planting cherry trees in Tatsuno City in Hyogo Prefecture</li> <li>Participation in an activity encouraging residents to create flowerbeds by Kobe Parks and Greenery Association</li> </ul>	<b>Head Office</b> <ul style="list-style-type: none"> <li>Planting an equivalent number of trees to the amount of paper use that was reduced from switching to My Billing, etc. in Sakai City</li> <li>Raising hollyhock nursery trees and planting mature hollyhock at Kamigamo Shrine by employees and their families</li> </ul>	<b>Shiga</b> <ul style="list-style-type: none"> <li>Participation in fishing events to remove alien species to protect the crucian carps in Lake Biwa</li> <li>Participation in reed mowing to protect crucian carps and little grebes</li> </ul>
<b>Yamaguchi</b> <ul style="list-style-type: none"> <li>Participation in forest conservation activities through “Akiyoshidai NTT Forest”</li> <li>Participation in satoyama restoration activities in Akiyoshidai Family Travel Village</li> </ul>	<b>Nara</b> <ul style="list-style-type: none"> <li>Participation in activities for satoyama restoration and protection of the endangered rosy bitterling</li> </ul>	<b>Kanazawa</b> <ul style="list-style-type: none"> <li>Participation in “Ishikawa Reforestation” project organized by the Ishikawa Reforestation Association</li> </ul>
<b>Oita</b> <ul style="list-style-type: none"> <li>Participation in tree-planting activities promoted by the Oita Government</li> </ul>	<b>Nagoya</b> <ul style="list-style-type: none"> <li>Participation in thinning and planting activities organized by Nagoya City Forester Club</li> <li>Participation in the Hana Ippai Project at Higashiyama Zoo and Botanical Gardens</li> </ul>	<b>Toyama</b> <ul style="list-style-type: none"> <li>Participation in forest conservation activities at the piedmont of Mount Tate by Toyama City</li> </ul>
<b>Kochi</b> <ul style="list-style-type: none"> <li>Participation in collaborative tree-planting activities by green companies and Kochi Government</li> </ul>	<b>Wakayama</b> <ul style="list-style-type: none"> <li>Organizing “NTT Hikari no Mori (Bright Forest)” activities (classes on thinning and woodwork)</li> </ul>	<b>Gifu</b> <ul style="list-style-type: none"> <li>Participation in cleanup activities to conserve the ecosystem of Nagara River</li> </ul>
<b>Kumamoto</b> <ul style="list-style-type: none"> <li>Hosting ecological education activity “Smart Lake Ezu Explorers” in Kumamoto City</li> </ul>	<b>Mie</b> <ul style="list-style-type: none"> <li>Participation in “Hikari no Mori (Bright Forest)” forest conservation activities with Mie Government</li> <li>Participation in cleanup activities to conserve the environment of Akogiura Beach in Tsu City Government</li> </ul>	

## NTT West Group Environmental Report 2013 Data Sheet

			Unit	2001 Performance	2002 Performance	2003 Performance	2004 Performance	2005 Performance	2006 Performance	2007 Performance	2008 Performance	2009 Performance	2010 Performance	2011 Performance	2012 Performance	2013 Performance	
Management of Action Plan Targets	Global Warming Prevention Measures	Power	CO <sub>2</sub> Emission	10000t-CO <sub>2</sub>	16.3	17.4	19.1	18.4	28.6	82.55	84.57	86.34	92.4	88.8	90.8	106.8	113.9
			Purchased Quantity	100milKWh	16.2	16.9	17.2	17.9	18.9	20.05	20.33	20.43	20.76	21.08	21.03	20.84	20.16
			Electricity Generated by CGS	100milKWh	0.25	0.24	0.25	0.25	0.24	0.22	0.07	0.03	0.03	0.03	0.04	0.03	0.03
		Clean Energy System	No. of Equipment Introduced	Sets	42	43	46	48	48	49	51	63	61	61	50	45	41
			(Breakdown) Solar-generated Electricity, etc	Sets	40	41	44	46	48	47	49	61	59	59	48	43	46
			Fuel Batteries	Sets	2	2	2	2	2	2	2	2	2	2	2	2	2
		Electricity Generated	10000KWh	189.5	168.9	183.4	163.5	156.2	140.76	36.59	46.16	50.47	45	74.1	92.0	125.6	
		Company Car	CO <sub>2</sub> Emission	10000t-CO <sub>2</sub>				0.93	3.37	3.24	3.37	3.16	3.1	3.24	3.01	2.77	2.63
			No. of Low Emission Vehicle	Cars	105	244	252	248	252	250	224	213	171	202	219	295	333
			(Breakdown) Electric Vehicle	Cars	3	0	0	0	0	0	0	0	0	0	0	3	3
	Natural Gas Vehicle		Cars	56	168	172	170	167	160	132	106	77	69	53	38	21	
	Hybrid Vehicle		Cars	46	76	80	78	85	90	92	99	94	133	166	254	309	
	Fuel	CO <sub>2</sub> Emission	10000t-CO <sub>2</sub>				0.61	0.58	1.73	0.93	1.47	1.2	1.3	1.3	1.28	1.27	
	Waste Reduction Measures	Telecommunications Facility	Disposal Quantity	10,000t	1	0.2	0.16	0.07	0.03	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01
			Total Emission	10,000t	14.3	10.5	9.8	11.95	12.38	11.91	12.74	12.87	13.2	12.47	13.35	13.58	12.63
			Recycled Quantity	10,000t	13.3	103	9.6	11.88	12.35	11.9	12.73	12.86	13.19	12.46	13.34	13.57	12.62
			(Breakdown) Telecommunication Cables	10,000t	3.2	1	0.9	1.58	0.75	0.76	1.18	1	0.88	0.89	0.85	0.85	0.62
			Switching Equipment	10,000t	0.7	0.6	0.8	0.85	0.9	0.76	0.76	0.79	0.84	0.82	0.79	0.86	0.72
			Concrete Poles	10,000t	9	7.8	6.9	9.44	10.01	9.67	10.14	10.46	10.54	10	11.1	11.1	11.28
			Others	10,000t	0.4	0.8	1	0	0.64	0.7	0.65	0.61	0.93	0.75	0.6	0.6	0
			Disposal Quantity of Waste Batteries (Industrial Wastes Subject to Special Control)	t	924	525	500	184	45	15	4	30	58	185	32	10	7
			Quantity of Waste Batteries Generated	t	4,621	5,718	5,261	3,961	2,669	2,788	2,229	2,895	6,689	4,981	3,578	3,693	4,561
			Recycled Quantity of Waste Batteries	t	3,697	5,193	4,761	3,777	2,624	2,773	2,225	2,865	6,631	4,930	3,546	3,683	4,554
		Wastes from Civil Engineering Works	Disposal Quantity	10,000t	1.4	1.2	0.01	0.13	0.02	0.04	0.08	0.1	0.11	0.16	0.11	0.11	0.11
			Quantity Generated	10,000t	5.6	5.2	7.9	6.4	2	4	9.06	8.52	9.57	9.07	7.02	10.2	8.4
			Recycled Quantity	10,000t	4.2	4	7.8	6.27	1.98	3.96	8.98	8.42	9.47	8.9	6.91	10.1	8.3
			Recycle Rate	%	75	77	99.9	98	99	99	99.1	99.8	98.9	98.2	98.4	98.9	98.8
			Wastes from Construction Works	Disposal Quantity	10,000t	2	1.2	2	1.4	0.7	0.35	0.74	0.47	0.31	0.3	0.3	0.19
		Quantity Generated		10,000t	17.8	9.8	18.6	20.7	16	7.97	14.26	11.81	14.7	16.1	15.8	9.3	8.1
		Recycled Quantity		10,000t	15.8	8.6	16.6	19.3	15.3	7.61	13.52	11.34	14.4	15.6	15.5	9.1	7.9
Recycle Rate		%		89	88	89	93	96	95.6	94.8	96.0	97.9	97.76	98.4	97.9	98.1	
Offices		Disposal Quantity *2	10,000t	0.35	0.32	0.31	0.19	0.18	0.24	0.04	0.06	0.04	0.07	0.03	0.012	0.009	
Medical		Disposal Quantity of Medical Wastes	t	1,279	1,305	1,211	1,162	1,095	1,139	1,108	1,179	1,135	1,018	438	487.7	426.4	
	(Reprocessed) Disposal Quantity of Infectious Wastes (Industrial Wastes Subject to Special Control)	t	281	274	278	311	326	335	389	360	369	388	47	44.7	41.4		
Paper Resource Reduction Measures	Phone Directories	Quantity of Pure Pulp Used	10,000t	2.5	1.9	1.8	1.7	1.3	1.1	1.1	0.9	0.5	0.6	0.7	0.6	0.9	
		Usage Rate of Old Paper	%	61.4	63.5	64.1	65.5	67.2	67.6	66.5	71.7	80	78.7	73.0	73.4	60	
		Quantity of Paper Used	10,000t	6.6	5.3	5.1	4.8	4	3.5	3.4	3.2	2.7	2.6	2.4	2.27	2.28	
		Quantity Collected	10,000t	3.3	3.3	3.1	2.8	2.6	2.1	1.8	1.9	1.5	1.4	0.9	0.62	0.44	
		Quantity of Pure Pulp Used	10,000t	0.03	0.03	0.03	0.02	0.02	0.02	0.03	0.03	0.03	0.005	0.03	0.01	0.01	
	Office Paper	Quantity of Pure Pulp Used	10,000t	0.01	0.02	0.02	0.01	0	0	0.07	0.04	0.04	0.01	0.09	0.07	0.05	
	Telecomm-unications Facility	Repelleting Quantity of Dismantled Facilities (Plastic)	t	208	567	462	303	272	292	428.9	189	157	159	146	143	164	
		Recycled Quantity of Optical Cables	t	207	331	716	725	224	796.5	883.3	1024.0	1,027	933	1,148	1,398	709	
		Quantity Generated	10,000t	30.7	23.7	36.6	31.7	24.3	30.5	34.9	35.6	33.1	18.5	28.3	27.3	23.6	
		Recycled Quantity	10,000t	8.9	12.3	27.5	21.2	22.9	28.67	33.2	34.8	30.6	18	27.2	26.2	23.3	
Recycle Rate		%	29	52	75	67	94	94	95	97.9	92.7	97	96	96	98.9		
Resource Recycle Management	Soil Generated from Civil Engineering Works	Quantity Generated	10,000t	0.48	0.05	0.28	0.1	0.06	6.53	0.03	0.007	0.29	0.3	0.13	0.024	0.00002	
		Recycled Quantity	10,000t	0.48	0.05	0.28	0.1	0.06	6.52	0.03	0.005	0.07	0.29	0.12	0.02	0	
		Recycle Rate	%	100	100	100	100	100	99.8	100	69.2	26	98.4	97	83.1	0	
		Quantity Collected	10,000	15	13	10	9	6.8	75.6	63.5	4.75	4.79	5.53	2.22	2.8	2.8	
		Packing Material	Quantity of Polystyrene Foam Used for Products	t	12	8	6	5.2	4.9	4	3.1	2	1.4	1.5	0.9	1.5	2.38
	Proper Disposal & Management of Wastes	Asbestos	Quantity of Remaining Construction Asbestos	10,000t	0	0	0	0	6.12	6.8	5.93	6.62	6.61	6.04	6.65	0.015	0.015
			Quantity of Remaining Bridge Asbestos	t	11	2	42	19	13.7	0	0	0	0	0	0	0	0
		CFC	No. of Remaining Air-cons Using Specified CFCs	Sets	0	0	0	0	0	0	0	0	0	0	0	0	0
		Implement Status	No. of ISO14001 Certified Organizations	Organizations	14	22	33	42	45	33Br. +2Org.	43Br. +2Org.	42Br. +2Org.	42Br. +2Org.	30Br. +2Org.	16Br. +Org.		9
			Total No. of Participants in Clean Environment Campaign	Persons	13,200	14,800	21,536	16,900	17,628	14,948	32,178	41,500	64,003	64,000	53,000	61,741	50,736
No. of NTT West Employees			Persons	50,450	14,750	13,750	12,850	12,250	5,800	5,800	5,700	5,700	5,550	5,300	5,100	4,900	
Operating Revenue of NTT West			100mil yen	24,067	22,150	21,669	20,980	20,296	19,515	19,012	18,243	17,808	17,508	16,763	16,279	15,896	

CO<sub>2</sub> Emission (Achieved)

FY2001Performance	645,000 t-CO <sub>2</sub>
FY2002Performance	693,000 t-CO <sub>2</sub>
FY2003Performance	754,000 t-CO <sub>2</sub>
FY2004Performance	733,000 t-CO <sub>2</sub>
FY2005Performance	769,000 t-CO <sub>2</sub>
FY2006Performance	875,000 t-CO <sub>2</sub>
FY2007Performance	889,000 t-CO <sub>2</sub>
FY2008Performance	910,000 t-CO <sub>2</sub>
FY2009Performance	967,000 t-CO <sub>2</sub>
FY2010Performance	933,000 t-CO <sub>2</sub>
FY2011Performance	951,200 t-CO <sub>2</sub>
FY2012Performance	1,109,000 t-CO <sub>2</sub>
FY2013Performance	1,178,000 t-CO <sub>2</sub>

\* Up to FY 2003, the official coefficient of the Federation of Electric Power Companies of Japan had been used as the CO<sub>2</sub> emission coefficient for power consumption. From FY 2004 onward, coefficients based on the "Law Enforcement Ordinance on Promotion of Countermeasure against Global Warming" are used (0.378 kg-CO<sub>2</sub>/kWh in FY 2004, 0.555 kg-CO<sub>2</sub>/kWh in FY 2005).

For FY 2013 and FY 2012, the following coefficients are used.

Electric power company	Actual emission coefficient (kg-CO <sub>2</sub> /kWh)	
	2013 actual use value	2012 actual use value
Tokyo Electric Power Company	0.525	0.464
Chubu Electric Power Co., Inc.	0.516	0.518
Hokuriku Electric Power Company	0.663	0.641
Kansai Electric Power Co., Inc.	0.514	0.450
Chugoku Electric Power Co., Inc.	0.738	0.657
Shikoku Electric Power Co., Inc.	0.700	0.552
Kyushu Electric Power Co., Inc.	0.612	0.525
Okinawa Power Company, Incorporated	0.903	0.932
ENNET Corporation	0.429	0.409

## Final Industrial Waste Disposal (Achieved)

FY2001Performance	48,000 t
FY2002Performance	29,000 t
FY2003Performance	25,000 t
FY2004Performance	18,000 t
FY2005Performance	9,000 t
FY2006Performance	7,000 t
FY2007Performance	9,000 t
FY2008Performance	6,000 t
FY2009Performance	5,000 t
FY2010Performance	6,000 t
FY2011Performance	4,000 t
FY2012Performance	3,000 t
FY2013Performance	3,000 t

\*1 Since data for the 2012 performance was written incorrectly, it is revised. \*2 Since data for the 2001 to 2011 performances were written incorrectly, they were revised.

\* Starting from FY 2002, the targets of control have been expanded to the performance of NTT Marketing Act and NTT NEOMEIT group companies.

\* Target organizations: 35 NTT West Group companies and NTT BUSINESS ASSOCIE Co., Ltd

## Environmental Accounting in FY 2013

With the aim to efficiently and effectively promote environmental conservation efforts, NTT West Group introduced an environmental accounting system in FY 2000. This system gathers and analyzes the costs for conserving the environment in business activities, as well as the economic effects obtained from these activities.

Data acquired from environmental accounting is utilized as the base data for promoting environmental management.

\*Environmental conservation costs refer to the investments and expenses required for implementing corporate environmental protection measures.

Investments refer to investments in depreciable assets that are intended for environmental conservation. Expenses refer to costs incurred by environmental conservation activities.

Environmental conservation costs include items ranging from 1. Business Areas to 6. Environmental Damages.

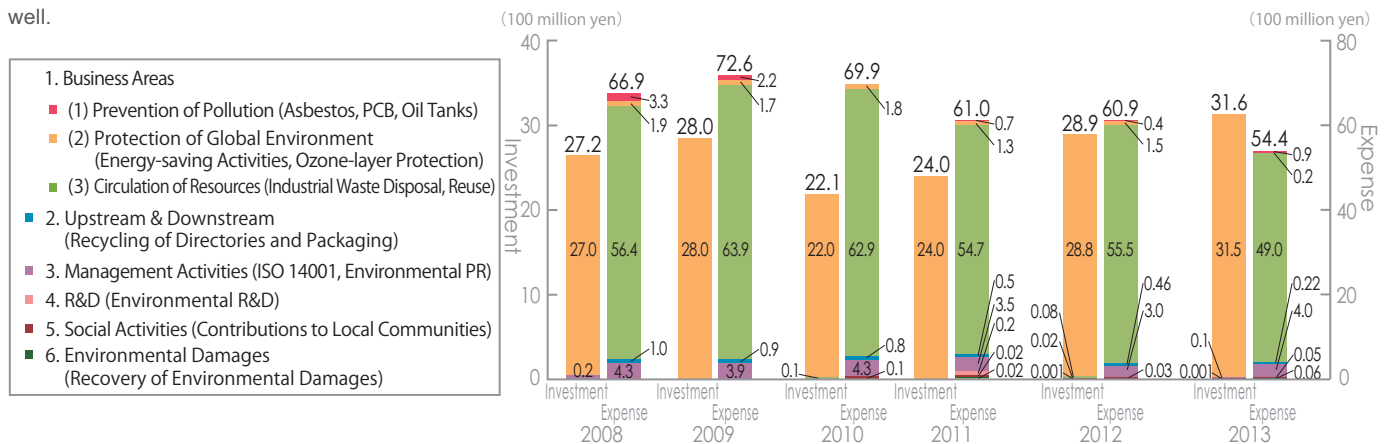
\*Environmental conservation effects (economic) refer to the economic effects on corporate management, including reduction in cost of disposal and gains from the sale of valuable resources, as a result of promoting environmental conservation.

Environmental conservation effects (economic) include items ranging from 1. Cost Reduction by Energy Saving to 4. Postage Expense Reduction through Online Correspondence.

## Environmental Conservation Costs

As investment has increased due to the introduction of energy saving equipment for air conditioning and lighting, the investment for FY 2013 increased to 3.16 billion yen from 2.89 billion yen in FY 2012.

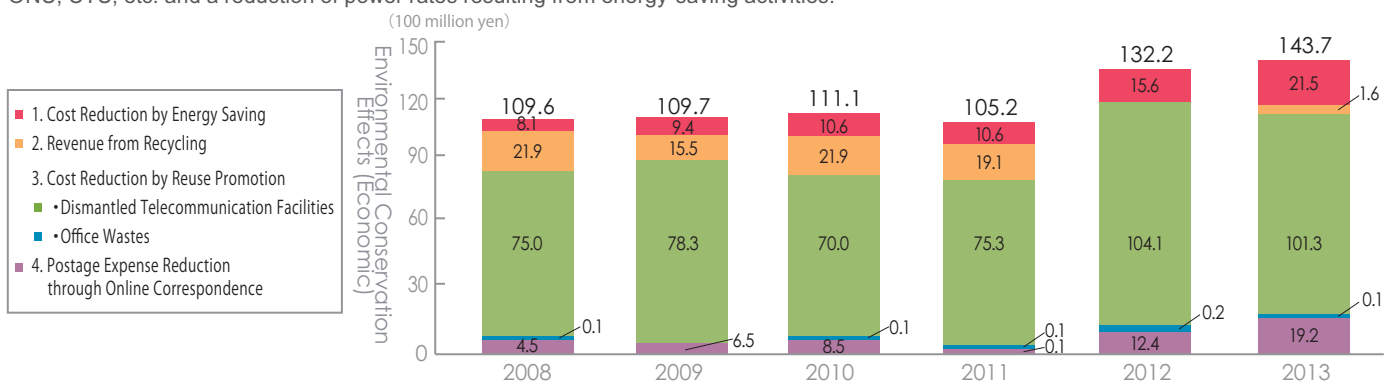
Although the construction waste recycling cost increased, the cost for FY 2013 decreased to 5.44 billion yen from 6.09 billion yen in FY 2012 due to the reduction in disposal costs caused by recycling promotion and reduction of construction by-product disposal costs caused by a decrease in construction work. In addition, from FY 2013, the Kitakyushu Branch began handling the disposal of PCB wastes less than 10kg as well.



## Environmental Conservation Effects (Economic)

Environmental conservation (economic) effects for FY 2013 reached 143.7 billion yen which exceeded the result of FY 2012, which is 132.2 billion yen.

The increase is attributable mainly to cost reductions from promoting the reuse of telecommunication equipment such as home gateways, ONU, CTU, etc. and a reduction of power rates resulting from energy-saving activities.



### 1. Target Companies

•35 companies of NTT West Group and NTT BUSINESS ASSOCIE Co.,Ltd.

### 2. Applicable Period

•FY 2013 data: from 1 April 2013 to 31 March 2014, FY 2012 data: from 1 April 2012 to 31 March 2013

FY 2011 data: from 1 April 2011 to 31 March 2012, FY 2010 data: from 1 April 2010 to 31 March 2011

FY 2009 data: from 1 April 2009 to 31 March 2010, FY 2008 data: from 1 April 2008 to 31 March 2009

### 3. Data Tabulation Method

•Based on the "NTT Group Guidelines for Environmental Accounting 2005," which is in compliance with the "Environmental Accounting Guidelines" issued by the Ministry of the Environment.



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Professor Kokubu completed his doctoral program at the Graduate School of Business, Osaka City University, where he was conferred the degree of Doctor in Business Administration. After working as an associate professor at Osaka City University and Kobe University, he became a professor at the Graduate School of Business Administration in Kobe University in 2011. In 2014, he was promoted to Dean of the Graduate School. Professor Kokubu also holds posts such as Chairman of ISO/TC207/WG8 and Chairman of MFCA Forum Japan, etc. His major publishing works include "Innovation of Environmentally Conscious Management 5 Accounting System to Support Environmental Management Decisions" (Chuokeizai-sha, 2010), "Material Flow Cost Accounting" (Nikkei Publishing, 2008), and "Environment Management and Accounting" (Yuhikaku Publishing, 2007).

### Steady Achievements for Environmental Conservation Activities

NTT West sufficiently understands its characteristics as a company in an industry that consumes a large amount of power, and the company has been proactively promoting environmental conservation activities under the Green NTT West Strategy. For power use, NTT West has been working on activities for reduction by setting a challenging target of reducing its power use by at least 20% by 2020 compared to FY 2010. As a result, the company has successfully reduced its energy use by as much as 60 million kWh in FY 2013, which deserves high praise. However, despite the greatness of this achievement, if we consider the target of a 20% reduction by 2020, further efforts are necessary. Now, the company is at the point where it only has approximately 5 years until 2020, and specific policies, etc. regarding how to achieve the target of a 20% reduction need to be clearly indicated once again. For that

purpose, I expect that investment in facilities and innovation will be inevitable, and I believe that expressing the attitude of the company regarding these aspects will be important.

### Reduction of Environmental Load in the Supply Chain

As a global trend in environmental management, importance is being placed on the supply chain. A reduction of the environmental load by a single company is limited, and cooperation in the supply chain is essential. According to an NTT West report, some interesting activities regarding the supply chain are listed. One such activity is the implementation of Green Procurement based on the "Guideline for Supplier Evaluation" and the encouragement of Environmental Value Analysis. In these activities, cooperation between buyers and suppliers becomes important. Enhancement of the relationship in the environmental aspect by measures such as presenting awards to excellent suppliers is expected. In addition, in FY 2013, greenhouse gas emissions of the entire supply chain (Scope 3) were calculated. This is also a highly commendable effort, and I therefore expect to see activities by NTT West toward the reduction of greenhouse gas in the supply chain in the future.

### Communication with Stakeholders

Since NTT West is a company with close ties to its final consumers, communication in the environmental aspect with stakeholders as consumers is very important. In this meaning, I believe that "biodiversity conservation activities using ICT" are very meaningful. Together with promoting these efforts further, I suggest they consider holding stakeholder dialogue, etc. to incorporate the opinions of stakeholders in their environmental conservation activities. In the Sustainability Reporting Guidelines (GRI Guidelines) of the Global Reporting Initiative (GRI), importance is placed on the identification of the materiality of reporting contents. For that purpose, listening to the opinions of stakeholders broadly is necessary. I believe that such steady activity will make the environmental conservation activities of NTT West truly and socially effective and will enhance the reputation of the company.

## Response to Third Party Opinions

We have only 5 years until 2020 the year of our target in the Environmental Grand Design. We have already achieved a 1% or less final disposal rate of waste, and we have greatly reduced our power use and paper consumption. However, we need to implement even more specific measures than before. For example, we announced the policy of shifting the feeding method to telecommunication devices to the more energy efficient HVDC (high-voltage direct current) method. However, this is not published in this report because it is not included in the reporting year for this report. Moreover, for our offices, in addition to the switch to LED lighting, the introduction of new technologies is also being carried out systematically. In this way, the entire company and the Group are united in efforts to ensure we achieve the target.

In addition, for reduction of the environmental load, we also strongly realize that reduction by a single company is limited and that cooperation in the supply chain is essential. In the area of recycling and resource saving in telecommunication materials, the NTT West Group was able to reduce its final amount of dismantled telecommunication facilities which was previously as much as 11,000 tons in 2000 to 100 tons or less for 7 consecutive years particularly due to cooperation from suppliers. For greenhouse gas reductions as well, we will deploy excellent efforts together with continuously conducting measurements in cooperation with everyone.

Regarding communication with stakeholders, the Middori Ippai Project where we engage in biodiversity conservation activities together with the local communities has taken root. Based on this activity, we will conduct examination so that we can hold stakeholder dialogue regarding an environmental load reduction and biodiversity conservation activities using ICT. Moreover, while also referring to the Sustainability Reporting Guidelines (GRI Guidelines) that were revised this year, we will make efforts to conduct appropriate activities together with many more people.

Under our "Green NTT West Strategy," and recognizing that every aspect of our business imposes load on the environment, we, NTT West Group, understand that it is our corporate social responsibility to lead efforts that contribute to the realization of a sustainable, environment-friendly society. We will strive to engage in more active efforts than before.

Environment Management Promotion Office  
Technology Innovation Department  
Nippon Telegraph and Telephone West Corporation