Environment

Contributions to the Global Environment

Priority Activities
- Realizing a Low Carbon Future
- Implementing Closed Loop Recycling
- Planning a Future of Natural Harmony

SDGs

Our Goals: To Contribute to an Abundant Earth as a Green ICT Company

Expectations are high for activities to protect the global environment at ICT companies. We have established a Green ICT Vision 2020 that focuses on three areas—the realization of a low-carbon society, the promotion of a recycling-based society, and the preservation of biodiversity—and are promoting a multifaceted approach. In fiscal 2016, we implemented results-based enhancements and reforms and established an Environmental Statement and Eco Strategy 2030 as our new vision.

The proactive promotion of activities necessitates the upgrading and strengthening of an environmental management framework. We will make efforts to strengthen a global, seamless environmental management framework as the NTT Group. To this end, we will aggressively pursue protection of the global environment in all processes pertaining to our business activities, ranging from reduced electricity usage and improvements in efficiency as well as procurement to operations and waste disposal.

We will thereby help to establish an environmentally friendly society and ensure that the Earth remains in a healthy state for future generations through our core businesses.

Basic Philosophy and Vision

While emphasizing the philosophy in the Global Environmental Charter established by the NTT Group, our environmental protection activities take shape as the Green ICT Vision that applies that philosophy to the characteristics of our business. We set initiative goals and implement measures on an ongoing basis.

NTT Communications Group Global Environmental Charter

The NTT Group has established the NTT Group Global Environmental Charter to promote Group-wide consideration and action relating to environmental protection from a global perspective. This philosophy and policy form the basis for the NTT Communications Group Global Environmental Charter, which is being disseminated among employees of the Group as a set of guidelines for the implementation of environmental protection activities.

→ **Click here for details regarding the NTT Communications Group Global Environmental Charter.**

Environmental Statement and Putting in Place of Eco Strategy 2030

Seven years have passed since 2010, when the NTT Communications Group announced its Green ICT Vision 2020. On this occasion, the NTT Communications Group has reviewed its environmental activities and, looking to the future beyond 2020, taken into consideration worldwide trends concerning the global environment.

The NTT Communications Group has formulated "The NTT Communications Group Environmental Statement" as its overarching policy for promoting environmental activities. In this statement, we have expressed the type of group we would like to be in order to fulfill our responsibilities toward the global environment in the future. Regarded as a priority issue for realizing the future outlined in "The NTT Communications Group Environmental Statement," the Group has put in place its Eco Strategy 2030.

The NTT Communications Group Environmental Statement

Dedicated to global environmental management for a future in which people and the planet remain in harmony.

We will address three futures by providing technologies and services that pioneer eras

CO₂ Realizing a Low Carbon Future | We are contributing to the reduction of CO_2 emissions and facilitating adaptation to climate change risk.

Implementing Closed Loop Recycling | We are working toward more effective resource allocation.

Planning a Future of Natural Harmony | We are contributing to the preservation of ecosystems.

Contributions to the Global Environment

Working in unison, each and every NTT Communications Group employee around the world will engage in environmental activities to realize a future in which people and the planet remain in harmony by providing technologies and services that pioneer eras.

Eco Strategy 2030

Under the "Eco Strategy 2030," we have set out specific initiatives to help realize the three futures outlined in the "Environmental Statement." In accordance with the putting in place of the Eco Strategy, we have also changed the names of the priority activities.

Activity Achievements in Line with CSR Indexes

In line with the three underpinning themes—"realizing a low carbon future," "implementing closed loop resources" and "planning a future of natural harmony"—in fiscal 2016 we worked to reduce the environmental impact associated with all our business activities and actively engaged in, in particular, reducing CO_2 emissions, improving our final waste disposal ratio and raising awareness of biodiversity activities in Japan and around the world. Specifically, we achieved results across Group companies in Japan and overseas, including the expansion of environmental management at overseas bases, the implementation of measures for new greenhouse gas reduction initiatives and the improvement of our final waste disposal ratio as well as the holding of a biodiversity photo contest.

Including both Japan and overseas, in fiscal 2017 we will continue to globally develop and expand a variety of measures with a focus on, for example, "reduction of electricity consumption, promotion of waste recycling and ecosystem preservation activities."

The NTT Communications Group Eco Strategy 2030

The Three Futures We Are Targeting		Initiative	
CO₂	Realizing a Low Carbon Future	Contribution to reduction of CO_2 emissions across society	We will contribute to reducing CO_2 emissions across society by at least 10 times more than the NTT Group's own emissions.
		Raising of power efficiency in our telecommunications businesses	We will raise power efficiency per data transmission in our telecommunications businesses by at least 10 times compared with fiscal 2014 levels.
		Adaptation to climate change	We will play our part in adapting to climate change by actively promoting initiatives through all our activities and by collaborating with our stakeholders.
	Implementing Closed Loop Recycling	Final waste disposal ratio	We consider 1.5% or less as the final disposal ratio of the waste generated by the NTT Com Group.
	Planning a Future of Natural Harmony	Preservation of ecosystems	We will play our part in preserving ecosystems by actively promoting initiatives through all our activities and by collaborating with our stakeholders.

Fiscal 2016 Activity Achievements and Fiscal 2017 Targets

Priority Activity	Activity Measure	Medium-Term Targets (Form We Want to Take in Five Years' Time)	Fiscal 2016 Targets	Details of Specific Activities (Qualitative Results)	Quantitative Results	Self-Assessment	Fiscal 2017 Targets	Scope of Activities (Within/Outside Organization)	Scope
					Fiscal 2016 Activity Results			Boundaries	
Realizing a Low Carbon Future	Cutting carbon emissions from businesses	We will raise power efficiency per data transmission in our telecommunications businesses (including data centers) by at least 10 times compared with fiscal 2013 levels. (Fiscal 2030 Target)	• Fiscal 2016 CO_2 emission amount of 272,000 t-CO_2 or less - In telecommunications and data center (DC) buildings, implement measures to reduce air-conditioning power consumption centered on removal of equipment that consumes large amounts of power, airflow improvements and optimization of room temperatures (255,000 t-CO_2) - In office buildings, ongoing implementation of a raft of power-saving measures (17,000 t-CO_2)	• Adjustment of telecommunications facility intake/exhaust directions • Improvement of airflow, optimization of indoor temperature, air-conditioning control by humidity sensors • Switching off of unnecessary power usage	• CO_2 emission amount: 245,000t-CO_2 (27,000 tons below plan target) - In telecommunications and DC buildings: 228,000-CO_2 (27,000 tons below plan target) - In office buildings: 17,000 t-CO_2 (on par with plan)	★★★	• Ongoing implementation of, for example, adjustment of telecommunications equipment intake/exhaust direction, improvement of airflow, optimization of indoor temperature, air-conditioning control by humidity sensors, switching off of unnecessary power usage • CO_2 emission amount: 252,000 t-CO_2 - In telecommunications and DC buildings: 235,000 t-CO_2 - In office buildings: 17,000 t-CO_2	Within	Group Companies in Japan
	Cutting society's carbon emissions through products and services	We will contribute to reducing CO_2 emissions across society by at least 10 times more than the NTT Group's own emissions. (Fiscal 2030 Target)	In providing services and ICT solutions, we will add Nexcenter to the assessed services that have received an Environmental Solutions Label and that will contribute to the saving of more than 2 million t-CO_2 in CO_2 emissions across the world in fiscal 2020.	Environmental Solutions Label obtained for Nexcenter	Number of Solutions Awarded the Environmental Solutions Label: 1 Solution	★★★	We are aiming to expand the use of the Environmental Solutions Label System to contribute to reducing CO_2 emissions across society by at least 10 times more than the NTT Group's own emissions in 2030.	Within/outside	Group Companies in Japan

Achievement Levels Self-Assessment Set at Three Levels ★★★ : Target achieved ★★☆ : Target almost achieved ★☆☆ : Target only partially achieved

Contributions to the Global Environment

Priority Activity	Activity Measure	Medium-Term Targets (Form We Want to Take in Five Years' Time)	Fiscal 2016 Targets	Fiscal 2016 Activity Results			Fiscal 2017 Targets	Boundaries	
				Details of Specific Activities (Qualitative Results)	Quantitative Results	Self-Assessment		Scope of Activities (Within/Outside Organization)	Scope
Implementing Closed Loop Recycling	Realization of a low environmental impact business model	Realization of a low environmental impact business model	• Building and maintenance of a low environmental impact business model - Implementation of measures to reduce electricity use - Installation of energy-saving equipment - Appropriate management of hazardous substances	• Nationwide deployment of airflow control • Installation of energy-saving equipment • Appropriate management of PCB/asbestos hazardous substances	—	★★★	• Building and maintenance of a low environmental impact business model - Implementation of measures to reduce electricity use - Installation of energy-saving equipment - Appropriate management of hazardous substances	Within	Group Companies in Japan and overseas
	Thorough implementation of a 3R policy in businesses	• Thorough implementation of a 3R policy—reduce, reuse and recycle—with regard to all the resources relevant to our business activities - Improvement in final waste disposal ratio: final disposal ratio of 1.5% or lower	• Thorough implementation of a 3R policy—reduce, reuse and recycle—with regard to all the resources relevant to our business activities - Improvement in final waste disposal ratio: final disposal ratio of 2.5% or lower • Strengthen measures at the level of individual organizations based on data on multifunction printer usage. Promote paperless working style that utilizes ICT equipment - Amount of paper used per person (office paper, A4 size equivalent): 8,500 sheets (30% reduction compared with fiscal 2010 level)	• Promotion of 3R policy • Confirmation of process flow, implementation of measures to improve final disposal ratio by promotion of thermal recycling • Promote paperless working style based on data on multifunction printer usage	Final disposal ratio: 1.2% Amount of paper used per person: 6,289 sheets	★★★	• Thorough implementation of a 3R policy—reduce, reuse and recycle—with regard to all the resources relevant to our business activities - Improvement in final waste disposal ratio: final disposal ratio of 2.4% or lower • Strengthen measures at the level of individual organizations based on data on multifunction printer usage. Promote paperless working style that utilizes ICT equipment	Within	Group Companies in Japan
Planning a Future of Natural Harmony	Facilities that show consideration for biodiversity	• Facility construction, maintenance and repair based on NTT Group building concepts • Compliance with action guidelines with regard to biodiversity conservation	• Facility construction, maintenance and repair based on NTT Group building concepts • Compliance with action guidelines with regard to biodiversity conservation	• Facility maintenance based on NTT Group building concepts • Compliance with action guidelines with regard to biodiversity conservation	—	★★★	• Facility construction, maintenance and repair based on NTT Group building concepts • Compliance with action guidelines with regard to biodiversity conservation	Within	Group Companies in Japan and overseas
	Contributing to biodiversity by utilization of ICT	Contributions/responses to biodiversity that utilize ICT	Contributions/responses to biodiversity that utilize ICT	• Coral reef conservation activities through business activities at NTT Plala • Expansion of Mimawari Rakutaro	—	★★★	Contributions/responses to biodiversity that utilize ICT	Within/outside	Group Companies in Japan and overseas

Achievement Levels Self-Assessment Set at Three Levels ★★★: Target achieved ★★☆: Target almost achieved ★☆☆: Target only partially achieved

*1 The CO_2 emission coefficient is 0.33 kg-CO_2 per kWh.

*2 Final disposal ratio is calculated as the volume of waste transported to the final processing site divided by the total volume of waste generated.

Activity Indexes and Achievements (at Overseas Bases)

Item	Implementation ratio
Switch off unnecessary lighting, air-conditioning, and PCs	92%
Promote the sorting and recycling of waste according to the circumstances of each building	58%
Implement double-sided and double-page office paper printing	97%

Contributions to the Global Environment

Environmental Management

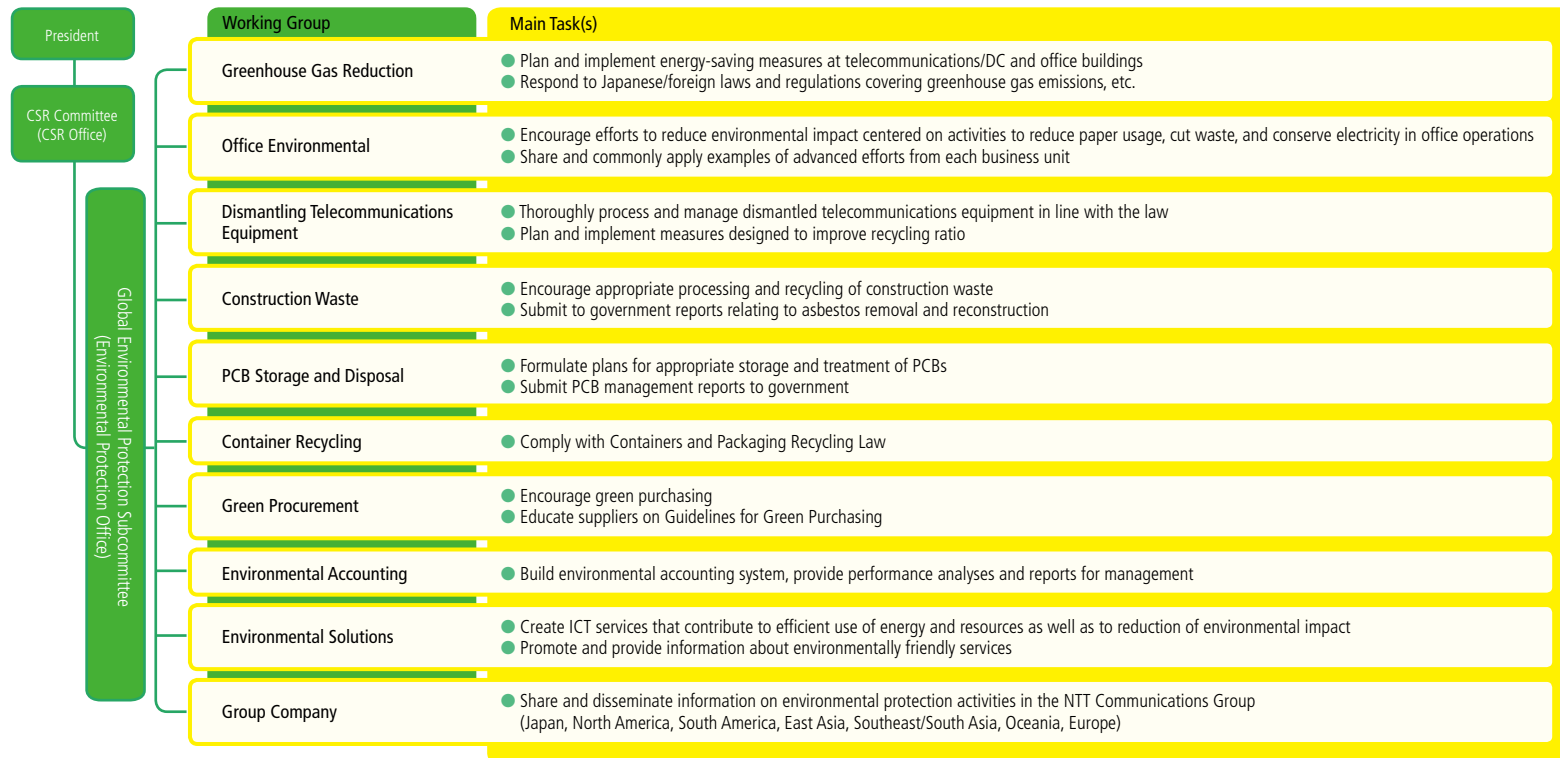## Promotion Framework toward Reduction of Environmental Impact and Fiscal 2016 Initiatives

In order to continuously promote environmental protection initiatives, we formed a working group for each issue, involving the entire NTT Group in tackling environmental issues. Specifically, we hold Environmental Protection Subcommittee meetings at Group companies once a year to formulate an overall plan encompassing a wide range of issues, including the reduction of greenhouse gas emissions and waste and the promotion of environmental solutions. Through these meetings, we also share information on the results of actions taken and promote the horizontal deployment of various initiatives. In recent years in particular, we have been making efforts to ascertain and curb environmental impact by means of Scope 3 at the supply chain level and have expanded the scope of the categories covered since fiscal 2014.

As far as the environmental management structure for our bases in Japan is concerned, we are promoting environmental protection activities at 14 companies. At our overseas bases, with a view to promoting global environmental management we are expanding our management bases, assigning officers responsible for environmental matters, gathering activity information, and encouraging the sharing of information between bases in Japan and overseas. In the years to come, we will hold global environmental management meetings and would like for these to lead to further reductions in environmental impact.
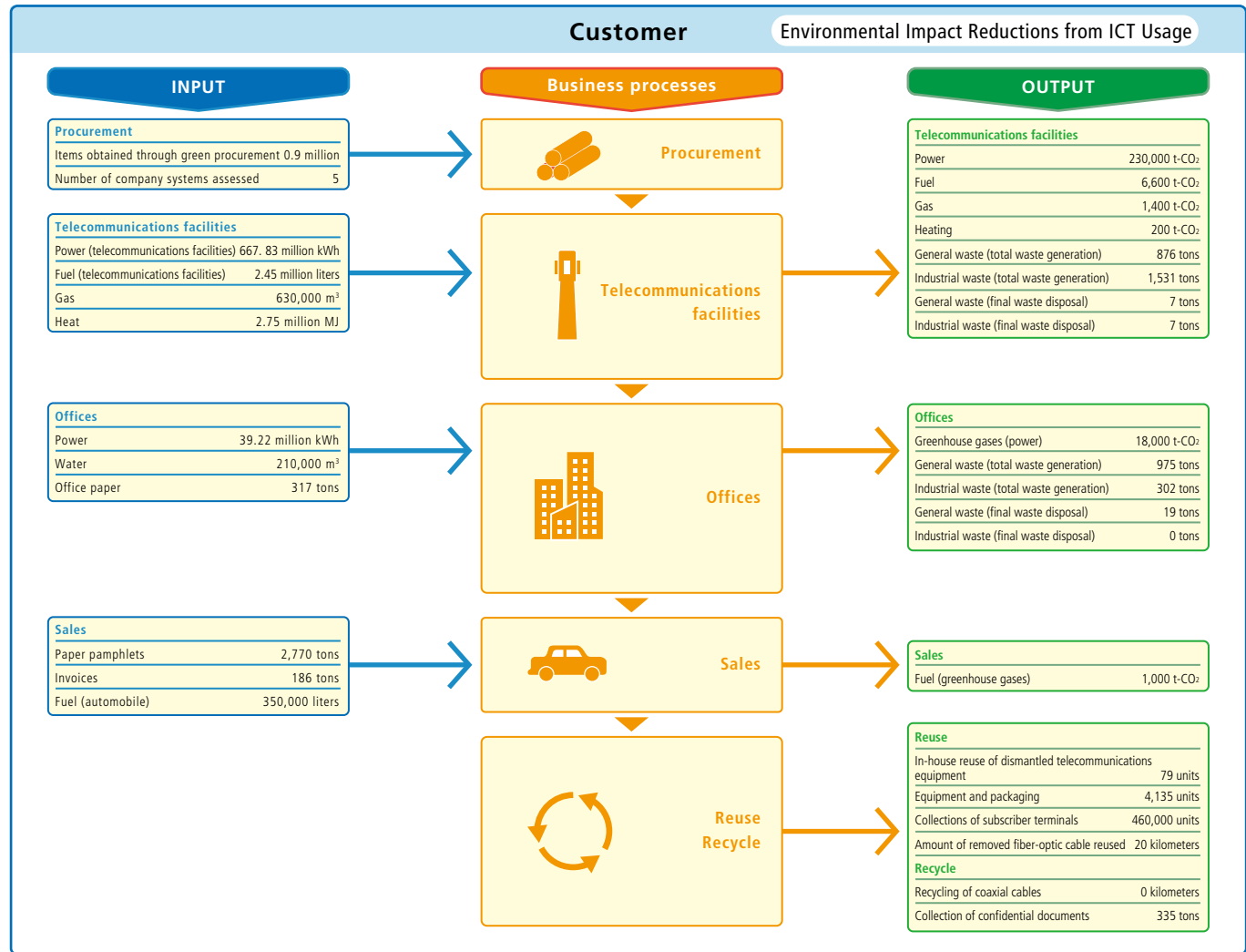
■ Environmental Protection Framework

Working Group	Main Task(s)
Greenhouse Gas Reduction	● Plan and implement energy-saving measures at telecommunications/DC and office buildings ● Respond to Japanese/foreign laws and regulations covering greenhouse gas emissions, etc.
Office Environmental	● Encourage efforts to reduce environmental impact centered on activities to reduce paper usage, cut waste, and conserve electricity in office operations ● Share and commonly apply examples of advanced efforts from each business unit
Dismantling Telecommunications Equipment	● Thoroughly process and manage dismantled telecommunications equipment in line with the law ● Plan and implement measures designed to improve recycling ratio
Construction Waste	● Encourage appropriate processing and recycling of construction waste ● Submit to government reports relating to asbestos removal and reconstruction
PCB Storage and Disposal	● Formulate plans for appropriate storage and treatment of PCBs ● Submit PCB management reports to government
Container Recycling	● Comply with Containers and Packaging Recycling Law
Green Procurement	● Encourage green purchasing ● Educate suppliers on Guidelines for Green Purchasing
Environmental Accounting	● Build environmental accounting system, provide performance analyses and reports for management
Environmental Solutions	● Create ICT services that contribute to efficient use of energy and resources as well as to reduction of environmental impact ● Promote and provide information about environmentally friendly services
Group Company	● Share and disseminate information on environmental protection activities in the NTT Communications Group (Japan, North America, South America, East Asia, Southeast/South Asia, Oceania, Europe)

President

CSR Committee (CSR Office)

Global Environmental Protection Subcommittee (Environmental Protection Office)

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Contributions to the Global Environment

Environmental Impact of Business Activities
Fiscal 2016 Material Flow

Customer

Environmental Impact Reductions from ICT Usage

INPUT		Business processes	OUTPUT	

Procurement
Items obtained through green procurement 0.9 million	
Number of company systems assessed	5

Procurement

Telecommunications facilities
Power (telecommunications facilities) 667. 83 million kWh	
Fuel (telecommunications facilities)	2.45 million liters
Gas	630,000 m³
Heat	2.75 million MJ

Telecommunications facilities

Telecommunications facilities
Power	230,000 t-CO₂
Fuel	6,600 t-CO₂
Gas	1,400 t-CO₂
Heating	200 t-CO₂
General waste (total waste generation)	876 tons
Industrial waste (total waste generation)	1,531 tons
General waste (final waste disposal)	7 tons
Industrial waste (final waste disposal)	7 tons

Offices
Power	39.22 million kWh
Water	210,000 m³
Office paper	317 tons

Offices

Offices
Greenhouse gases (power)	18,000 t-CO₂
General waste (total waste generation)	975 tons
Industrial waste (total waste generation)	302 tons
General waste (final waste disposal)	19 tons
Industrial waste (final waste disposal)	0 tons

Sales
Paper pamphlets	2,770 tons
Invoices	186 tons
Fuel (automobile)	350,000 liters

Sales

Sales
Fuel (greenhouse gases)	1,000 t-CO₂

Reuse Recycle

Reuse
In-house reuse of dismantled telecommunications equipment	79 units
Equipment and packaging	4,135 units
Collections of subscriber terminals	460,000 units
Amount of removed fiber-optic cable reused	20 kilometers

Recycle
Recycling of coaxial cables	0 kilometers
Collection of confidential documents	335 tons

Estimates of Scope 3 Emissions

In performing these calculations, we have referred to unit emission databases and other materials—produced through studies by the Ministry of the Environment and other government ministries and agencies—and expanded the scope of target categories. Of the 15 target categories, our calculations include 10 that are relevant.

■ **Volumes of Scope 3 Emissions by Category**

Category	Share	Emissions (t-CO₂)
1 Purchased goods and services	29.64%	1,243,688
2 Capital goods	17.02%	714,298
3 Fuel and energy activities not included in Scope 1 and 2	2.33%	97,880
4 Upstream transportation and distribution	0.28%	11,560
5 Waste generated through business activities	0.00%	154
6 Business travel	0.34%	14,378
7 Employee commutations	0.29%	12,185
11 Use of products sold	47.10%	1,976,614
12 Disposal of products sold	2.20%	92,420
14 Franchise	0.80%	33,368
TOTAL	100.00%	4,196,545

Contributions to the Global Environment

Environmental Accounting in Fiscal 2016

The NTT Communications Group tabulates its environmental conservation costs (categories corresponding to business activities) and the economic benefit derived from its environmental conservation activities (real financial impact) in line with Environmental Accounting Guidelines 2005, issued by the Ministry of the Environment, and NTT Group Environmental Accounting Guidelines.

The environmental conservation cost in fiscal 2016 declined by approximately ¥0.21 billion year on year to ¥2.11 billion, consisting of around ¥1.02 billion in investments and about ¥1.08 billion in expenses. This was mainly due to an increase in investment in high-performance air-conditioning equipment.

On the other hand, the economic benefit derived from environmental conservation in fiscal 2016 was ¥1.72 billion, almost the same as the previous fiscal year.

■ Environmental Conservation Costs (Categories Corresponding to Business Activities) (Millions of yen)

Category	Key Measures		Investment		Expenses	
			Fiscal 2015	Fiscal 2016	Fiscal 2015	Fiscal 2016
(1) Business area cost			693	937	468	583
Breakdown	1. Pollution prevention costs	• Oil tank facility for power generator use • Management of items using PCBs	117	204	24	80
	2. Global environmental conservation costs	• Measures to reduce CO_2 emissions resulting from electricity use	576	733	174	156
	3. Resource circulation costs	• Waste disposal and reuse expenses	0	0	270	347
(2) Upstream / downstream costs	• Measures to recover, recycle and reuse telecommunications equipment		7	90	496	379
(3) Administration costs	• Environmental conservation management activities		0	0	69	65
(4) R&D costs	• Allocated portion of NTT Group environmental R&D costs		0	0	169	57
(5) Social activity costs	• Costs of supporting volunteer participation		0	0	5	5
(6) Environmental remediation costs			0	0	0	0
Total			699	1,027	1,206	1,089

■ Economic Benefit Associated with Environmental Conservation Activities (Real Financial Impact) (Millions of yen)

		Fiscal 2015	Fiscal 2016
Revenue	Revenues from sales (cables, metal scrap, etc.)	90	104
Cost reductions	Reductions in expenses derived from measures such as reduced electricity usage	722	617
	Reductions in cost of purchases due to reuse of dismantled telecommunications equipment	408	494
	Decrease in postal and paper costs from utilization of Mypage	480	505
	Other	10	2
Total		1,710	1,723

Target period: April 1 - March 31

Scope: 14 domestic companies of the NTT Communications Group

Tabulation and disclosure: Figures were tabulated in line with the Ministry of the Environment's Environmental Accounting Guidelines 2005 and NTT Group Environmental Accounting Guidelines.

Expenses include personnel expenses but exclude depreciation.

Contributions to the Global Environment

Environmental Management Structure

Acquiring ISO 14001 Certification

Four companies within the NTT Communications Group had acquired ISO 14001 certification as of March 31, 2017. Through contracts with outside environmental consultants, certified departments and companies undergo internal audits once a year to ensure appropriate implementation of environmental management and continual improvements that will allow a steady reduction of the environmental impact of business activities. Regular reviews and renewal examinations are also undertaken by an independent certification body. Outstanding issues are thus identified, and remedial measures swiftly taken. Besides initiatives centering on reductions of office paper and electricity usage and the promotion of waste recycling, we are encouraging measures toward the creation of an environmentally friendly society.

■ ISO 14001-Certified Companies

ISO 14001-Certified Company		Date of Certification
NTT Communications Corp.	Procurement Dept.	October 1999
	Solution Services Dept.	March 2004
NTTPC Communications, Inc.		November 2003
NTT Com Solutions Corp.		April 2007
NTT Plala Inc.		December 2011

As of March 31, 2017

Environmental Audits and Environmental Surveys

Guided by its Global Environmental Charter, the NTT Communications Group issues yearly PDCA and other reports at the Global Environmental Protection Subcommittee, an organization that comes under the CSR Committee. These reports outline details of the various activities administered by the 10 working groups (WGs) that drive the Group's environmental protection activities. In addition to sharing information and calling for further development of effective initiatives, we are promoting environmental management on a Groupwide basis.

Compliance with Environmental Legislation and Regulations

The NTT Communications Group devotes itself to ensuring legal compliance and proper risk management while liaising closely with the other corporations of the NTT Group. Including environmental laws and ordinances that look to curtail pollution, emissions standards and the PRTR Law*, legislation of all kinds is fully communicated to related departments, and independent guidelines have been established for in-house application. We are also enhancing compliance education. We were not involved in any litigation or legal violations pertaining to environment-related accidents, infringements, fines or complaints during fiscal 2016. We plan to continue our Companywide efforts to prevent environmental pollution and comply with related laws and regulations.

* PRTR Law: Act on Confirmation, etc. of Release Amounts of Specific Chemical Substances in the Environment and Promotion of Improvements to the Management Thereof

Promoting Green Procurement

NTT Communications issued its Guidelines for Green Purchasing in 1999. In 2010, the Company brought these guidelines into compliance with the Energy-Saving Performance Guidelines enacted by the NTT Group and, at the same time as adding the energy-saving perspective of ICT itself that was considered an issue, renamed the Energy-Saving Performance Guidelines as the Guidelines for Green Procurement.

By applying these guidelines, NTT Communications has added an environmental conservation element to such areas as its own approaches to environmental conservation in the selection criteria of suppliers with which the Company allows dealings and in procurement.

Through its green procurement initiatives NTT Communications works to improve its environmental conservation activities hand in hand with all its suppliers and would like to continue to be of service in realizing further contributions to society.

■ Status of Green Procurement and Green Purchasing

	Fiscal 2012	Fiscal 2013	Fiscal 2014	Fiscal 2015	Fiscal 2016
Green procurement of goods, excluding office supplies (1,000 units)	138	141	120	105	90
Green procurement of office supplies (1,000 units)	26	24	25	20	20

Environmental Education Initiatives

We offer environmental education to all employees, aiming to raise their awareness of environmental matters. We are also proactive in environmental awareness activities as part of our CSR efforts, extending the scope of participation to include not just employees, but also their families and business partners.

In fiscal 2016, all-employee training sessions covered international trends, such as SDGs and ESG investments. We also undertook a range of environmental awareness and education activities, including a cleanup of the areas surrounding our offices, the promotion of the ecocap movement and the biodiversity photo contest. In addition, woodland conservation activities were carried out at NTT Com Solutions and NTT Com Marketing in a bid to raise the level of understanding regarding the importance of protecting the natural environment.

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Contributions to the Global Environment

Realizing a Low Carbon Future

Our Approach

Although the advancement and spread of ICT have given rise to such benefits as an affluent society and convenient lifestyles, the increase in power consumption due to ICT-related equipment is placing enormous pressure on the environment. Fully aware of this situation, NTT Communications Group employees set targets from three viewpoints — telecommunications facilities, offices and overseas bases — and are working together to reduce CO_2 emissions. Particularly in the case of improvements in the energy efficiency of telecommunications equipment, which account for around 90% of total CO_2 emissions from business activities, they are currently making efforts to be the first in the industry to introduce leading-edge technologies. These activities continue to gain in significance from the standpoint of UN Sustainable Development Goal No. 13 "Climate Action." While continuing activities that show a strong awareness of specific effects, we will continue to strengthen our efforts from a global perspective based on the expansion of the supply chains for our businesses.

Reduction of Greenhouse Gases

Fiscal 2016 Results and Fiscal 2017 Outlook

When calculating the volume of greenhouse gas emissions that we generate, we include in the scope buildings owned by other companies, including those buildings where we rent space as well as data centers (DCs) that provide colocation services, in addition to buildings owned by the NTT Communications Group.

In fiscal 2016, CO_2 emissions[*1] by the NTT Communications Group totaled 245,000 t-CO_2. This was 27,000 t-CO_2 less than the Group's established target and a decrease of approximately 7.8% compared

with the previous fiscal year. Furthermore, in fiscal 2016 sales per unit of CO_2 emissions improved around 5.4% compared with their fiscal 2014 level due mainly to a decrease in the amount of CO_2 emissions and an increase in sales.

In the case of telecommunications equipment, at DC buildings we realized the visualization of power usage in server and machinery rooms and concentrated our efforts on proactively curtailing the power used for air-conditioning by, for example, conducting "airflow improvement" initiatives and expanding the installation of integrated air-conditioning control systems such as SmartDASH. In offices, we conducted year-round energy-saving activities that showed awareness of workplace environments that facilitate work and operational efficiency. Significant beneficial effects are being obtained as a result of taking these initiatives.

In fiscal 2017, the NTT Communications Group will continue to reduce CO_2 emissions by means of new measures, such as energy-saving activities, R&D technologies and energy-saving rules, and has set a target for CO_2 emissions of 252,000 t-CO_2 or less.

At our overseas facilities, fiscal 2016 CO_2 emissions showed an upward trend, totaling approximately 421,000 t-CO_2 (approximately 418,000 t-CO_2 for DCs and 3,000 t-CO_2 for offices), reflecting a significant increase in demand for cloud services and DCs, the commencement of operations at new DCs, as well as the wider scope of calculation. We are working to reduce electricity use at overseas DCs by operating highly energy-efficient buildings and facilities, such as DC buildings that have acquired LEED[*2] certification. To the same end in Japan, we are also rolling out high-performance solutions designed to reduce air-conditioning energy consumption. We will continue these measures in fiscal 2017.

We are taking steps to consolidate the servers, air conditioning, UPS, lighting, and other equipment and facilities previously set up and operated by customers at DCs with the aim of improving the efficiency of society's power consumption by providing energy-efficient data centers and cloud services.

*1 CO_2 emissions are calculated using the (June 2010) fiscal 2020 CO_2 emission coefficient target of 0.33 kg-CO_2 per kWh of the Federation of Electric Power Companies in Japan.
*2 The acronym for Leadership in Energy and Environmental Design, LEED is a certification system for entire buildings promoted by the U.S. Green Building Council that evaluates energy savings and environmental impact.

■ CO_2 Emissions from Business Activities

(Unit: 10,000 t-CO_2)

- Fuel for corporate vehicles and consumption of heavy oil and gas
- Electricity consumption (emission coefficient see[*1])
- Electricity consumption (emission coefficient see[*2])

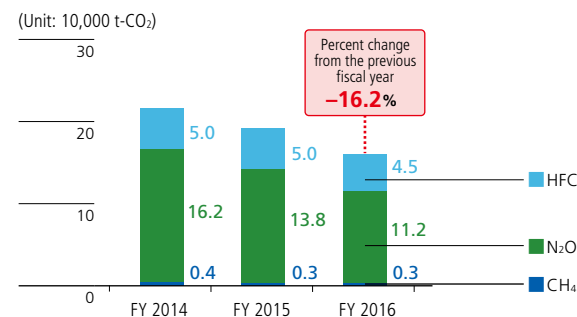|	FY 2014	FY 2015	FY 2016
Fuel	1.4	1.5	1.2
Electricity (*2)	43.4	42.7	37.2
Electricity (*1)	25.6	25.1	23.3
top	1.4	1.5	1.2
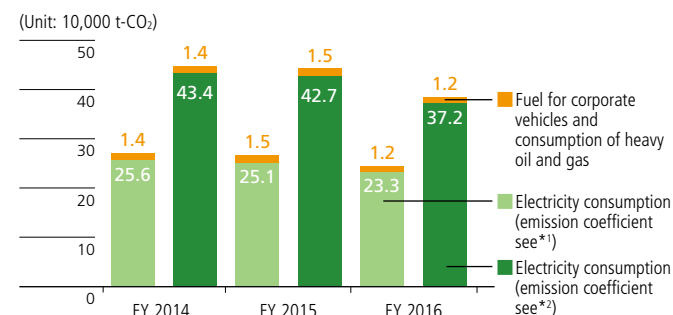
(Scope: 14 domestic companies of the NTT Communications Group)
*1 For the light-green bar graphs, the 0.33 kg-CO_2 per kWh numerical target value for CO_2 emission coefficients of the Federation of Electric Power Companies in Japan was used.
*2 For the dark-green bar graphs, the CO_2 emission coefficients used were from electric power companies.

■ Other Greenhouse Gas Emissions (Converted to CO_2 Equivalents)

(Unit: 10,000 t-CO_2)

Percent change from the previous fiscal year
−16.2%

- HFC
- N_2O
- CH_4

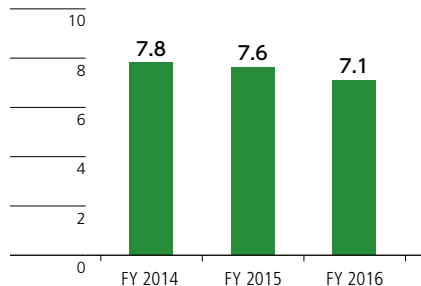|	FY 2014	FY 2015	FY 2016
HFC	5.0	5.0	4.5
N_2O	16.2	13.8	11.2
CH_4	0.4	0.3	0.3

(Scope: 14 domestic companies of the NTT Communications Group)

Contributions to the Global Environment
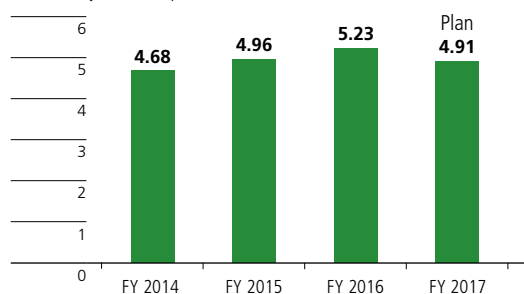
■ **Power Purchases**

(Unit: 100 million kwh)

(Scope: 14 domestic companies of the NTT Communications Group)

■ **CO_2 Emissions per Unit of Sales**

(Millions of yen in sales per ton of CO_2)

Initiatives Related to Telecommunications Facilities
Fiscal 2016 Results and Plans for Fiscal 2017
In fiscal 2016, CO_2 emissions decreased approximately 8.4% from their fiscal 2014 level, to 228,000 t-CO_2 (27,000 t-CO_2 below our target). Despite the start of sales at our new DCs in Tokyo and Osaka and the upgrades to cloud server equipment, the decrease was due to augmented and expanded measures to, for example, reduce electricity use in air-conditioning systems by the visualization of power usage status of machinery and server rooms.

We expect CO_2 emissions to trend upward in fiscal 2017 due to ongoing robust data center and cloud service sales. However, we have set our emissions target at below 235,000 t-CO_2, which we aim to achieve through the expansion of ongoing measures to visualize power usage as well as by new measures that include the application of R&D technologies, airflow improvement initiatives and equipment removal for the purpose of right-sizing telecommunications equipment.

Building Cutting-Edge Data Centers with Advanced Low-Carbon Technologies
Data centers require a constant supply of electric power to operate. As a global ICT company, we proactively introduce the latest equipment and technologies from around the world with the aim of reducing the carbon footprint of our DCs.

For example, in Japan, the Osaka 5 Data Center, which was built in 2016, features improved cooling efficiency and lower power consumption in air-conditioning systems, owing to the deployment of an indirect external air cooling system that takes advantage of cooler temperatures outside the building and an air circulation method that blows air from walls, a first of its kind in the industry. Overseas, our Hong Kong Financial Data Center, one of the largest in Hong Kong, was expanded and upgraded in 2015 with server racks featuring better cooling efficiency and the cooling wall system. Moreover, water-side economizers switch off air-conditioners during cold weather and turn to cooling towers instead as thermal exchangers. This improves energy efficiency by roughly 16% for the entire air-conditioning system.

We are accelerating global efforts to reduce the carbon footprint of our data centers by continuing to introduce leading-edge equipment and technologies.

Ongoing Efforts to Cut Air-Conditioner Power Consumption at Existing Telecoms Facilities
Having targeted a 20% reduction in the electricity consumed by air-conditioning, we have implemented a range of measures. These include SmartDASH, an automated system that visualizes temperature zones in server rooms, detects areas that are too cold, and automatically controls air-conditioning, as well as Aisle Capping, which is a technique that physically separates the intake (low temperature) and exhaust (high temperature) air from IT equipment by strategically placing vinyl sidewalls and ceilings around IT equipment in the aisles between rows of server racks.

For the purpose of optimizing the use of electricity in air-conditioning, we have been implementing measures through cross-organizational teams to reduce various power uses and working to reduce electricity bills. Evolved around the ICT-driven visualization of both temperature and the amount of power being used, the measures have included the implementation of thorough airflow improvement, temperature adjustments and air-conditioning shutdown initiatives based on adjustments to telecommunications facility intake/exhaust directions and temperature sensor information; the removal and power supply disconnection of old types of telecommunications equipment; and air-conditioning controls that take into account outside and room temperatures. Going forward, we will continue to work on more finely tuned air-conditioning power management, such as power peak cutbacks and time-limited temperature adjustments at night and during the winter months by expanding the installation of air-conditioning control systems.

Introducing Solar Power Generation Systems That Actively Utilize Renewable Energy
NTT Communications has been engaged in power generation using solar power generation systems at its communications and DC buildings in Tokyo since 2009.

Currently having four system units in operation, we generated approximately 360,000 kWh of electricity in fiscal 2016. The power generated is used to light communal areas of the buildings.

Contributions to the Global Environment

Overseas, we generate solar power at our DCs in Singapore and Malaysia. We have installed a solar-powered heating system at our Hong Kong DC, a wind power generation system at our DC in India, and hydroelectric power generation systems at our DCs in Vietnam and Germany. In fiscal 2016, these facilities generated approximately 71.5 million kWh of electricity. In the years to come, we will continue to promote the utilization of environment-friendly renewable energy.

■ **Overall Amounts of Electricity Generated by Solar Panels at Data Centers in Japan**

(Unit: kWh)
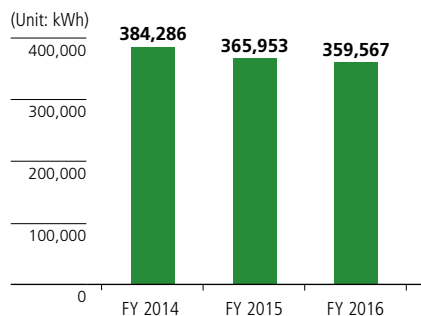
■ Solar panels installed at Tokyo No. 5 Data Center   ■ Solar panels installed on the rooftop of our DC Building in Malaysia

→ **Click here for details regarding solar power generation.**

Office Initiatives
Fiscal 2016 Results and Plans for Fiscal 2017

From the perspective of supplying services to customers, communications facilities—including DCs and telecommunications buildings—necessitate the constant use of a specific amount of electric power. For that reason, drastic measures to save electricity in their offices are to be expected.

In comparison with since the Great East Japan Earthquake, CO_2 emissions in fiscal 2016 amounted to 17,000 t-CO_2 (approximately on target), edging up slightly on those in fiscal 2015. From fiscal 2017 onwards, we will implement energy savings that take into consideration working environments that facilitate work as well as work efficiency, and we are targeting emissions of 17,000 t-CO_2 or less by revising energy-saving rule setting and by increasing the deployment of thin-client PCs.

Summer and Winter Energy-Saving Measures

In addition to summer and winter energy-saving measures, the NTT Communications Group implements ongoing electricity-saving measures—including the use of energy-saving settings on PCs, the operation of fewer lighting fixtures and elevators, and the adjustment of air-conditioner settings—and strives to reduce its energy consumption in Japan.

During the summer months, the Group targeted a reduction in electricity consumption of 30% from the fiscal 2010 level. Over the period in question, the Group accordingly undertook a variety of measures. For example, every effort was made to maintain higher air-conditioner settings (at 28°C in summer), cut back the number of lights employed, encourage the use of stairs when going up four floors or down five, and encourage employees to wear summer clothing and switch off office automation equipment when leaving the office. Thanks largely to these endeavors, in fiscal 2016 the Group achieved a reduction in electricity consumption measured in kWh of approximately 29% at its three principal Hibiya, Shiodome, and Tamachi buildings. As in summertime, we introduced measures to save energy in winter, including setting air-conditioning temperatures at 20°C.

In the same way as at our bases in Japan, we are adopting an aggressive stance on measures to save energy at our overseas facilities. Having established as an indication the switching off of unnecessary lighting, air-conditioning and personal computers, we are aiming for a 12% improvement in the implementation rate compared with the previous fiscal year. The main initiatives involve switching off lighting, air-conditioning and PCs when not in use and at the end of the work day; using the power saving setting on PCs; and making a thorough effort to adjust office thermostats. In this way, we are promoting the same level of energy saving awareness as at our offices in Japan. Besides these, we are implementing a variety of initiatives in each region.

- East Asia region: Upgraded to LED lighting, adjustments to air-conditioner settings in the summer and winter, stopped using air-conditioners in the spring and fall
- Southeast and South Asia region: Turn off lights during lunch hour and while working when possible, deploy LED lighting, make sure power is turned off when the last person leaves the office
- Europe region: Automatically turn off lighting and air-conditioners, car leasing
- United States: Environment Day, make sure power is turned off when the last person leaves the office

In China and Vietnam, we also set power saving targets, take a proactive and progressive approach to reduction measures and aim to meet these targets.

■ **Average Electrical Consumption in Office Buildings between June and September**

(Unit: billion kWh)
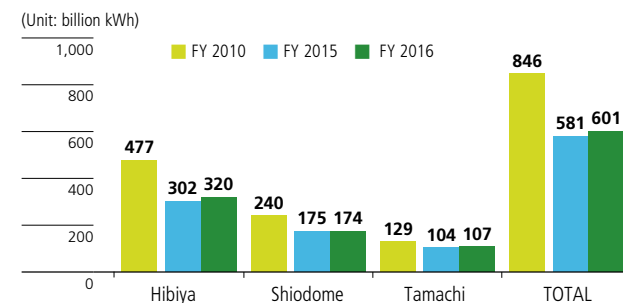
Contributions to the Global Environment

Encouraging Energy Conservation in Offices by Finely Managing Individual Air-Conditioners

NTT Communications manages individual air-conditioners for each floor section of its office buildings as a way to conserve energy. At the Hibiya Building, our head office, employees are prohibited in principle from using individual air-conditioners. However, individual air-conditioners can be used in the event that building temperatures (28°C in the summer and 20°C in the winter) impede work or employee health, or when the building-wide air-conditioning system is off. As an example of energy conservation using individual air-conditioners, a logbook is kept for when they are used, by whom and for how long. The individual air-conditioners work on a three-hour timer, just in case someone forgets to turn them off. The last person to leave the office is responsible for making sure each floor air-conditioner is turned off. All of our offices take these and other incremental steps with the aim of having a major conserving effect on energy usage.

Promoting Use of the Company's Internal Cloud

NTT Communications possesses a number of internal systems to provide its services to customers. Migrating these internal system networks to and integrating them with internal ICT infrastructure by means of a private cloud using server virtualization not only lessens environmental impact by rationalizing the number of servers, but the move also contributes to more robust service business continuity plans (BCPs) for customers utilizing the system. Based on the awareness of these kinds of aims, the Company is working to develop utilization of its internal cloud.

As of the end of fiscal 2016, we had migrated 223 internal systems to the internal ICT infrastructure, a move that reduced the number of servers that accommodate the migrated system by around 57%.

Looking ahead, we plan to migrate and integrate our internal ICT infrastructure in Japan with that overseas, while working on efforts to reduce environmental impact on a global basis.

Transportation Initiatives
Fiscal 2016 Results and Fiscal 2017 Outlook

We annually audit the amount of transportation for invoices, sales promotion tools, and office waste. We voluntarily seek ways to streamline transportation, such as reducing the number of transportation trips, the volume of items transported and the transportation distance, and otherwise enhance logistics.

In fiscal 2016, NTT Communications worked to reduce the amount of paper by digital versions of sales tools and manuals as well as by expanding online application forms. As a result, transportation decreased 26.2% year on year to 329,000 metric ton-kilometers.

In fiscal 2017, we will continue efforts to reduce transportation volume by encouraging the use of digital versions of internal tools and pamphlets as well as online application forms.

■ **Goods Transportation Volume under the Revised Energy Conservation Law**

(Unit: 10,000 metric ton-kilometers)

Percentage change from the previous fiscal year −26.2%

FY 2014: 39.5
FY 2015: 44.6
FY 2016: 32.9

Legend: Other, Office waste, Sales promotion tools, Telecommunications equipment dismantled, Connection notes, Invoices
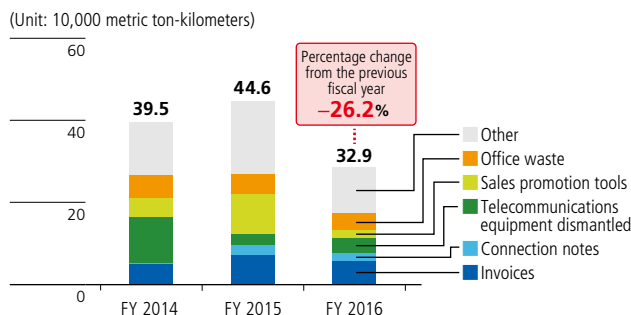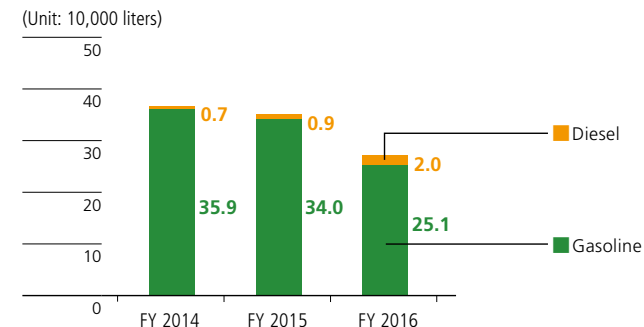
(Scope: NTT Communications [non-consolidated])

Reducing Fuel Use by Company Vehicles

To help solve pollution problems and contribute to the realization of a low-carbon society, we have devised measures to introduce environmentally friendly vehicles and are addressing a reduction in the amount of fuel used by Company vehicles across the entire group.

The Company is currently reviewing the number of its sales vehicles and steadily promoting measures that include the more widespread adoption of driving techniques that show consideration for the environment. As a result, gasoline and oil consumption by Company vehicles in fiscal 2016 totaled 251,000 liters and 20,000 liters, respectively. Compared with the previous fiscal year, this figure represents a decrease of approximately 78,000 liters (approximately 23%).

We will continue to use environmentally friendly company vehicles based on our Eco-car Introduction Policy.

■ **Fuel Consumption by Company Vehicles**

(Unit: 10,000 liters)

FY 2014: Diesel 0.7, Gasoline 35.9
FY 2015: Diesel 0.9, Gasoline 34.0
FY 2016: Diesel 2.0, Gasoline 25.1

(Scope: 14 domestic companies of the NTT Communications Group)

Contributions to the Global Environment

Preventing Air Pollution and Promoting Energy Conservation through Electric Propulsion Ships

The subsea cable-laying vessels Kizuna and Subaru utilize an electric propulsion system* that optimizes the number of engines in operation in accordance with the load from the type of the subsea cable being laid and changes in the weather at sea. By controlling the number of engines in operation, we keep down the amount of heavy fuel oil A used while reducing emissions of, for example, CO_2 (carbon dioxide), NOx (nitrogen oxides), and SOx (sulfur oxides).

When in operation, we work to optimize fuel consumption by the most effective operating methods (which include optimum route selection that takes into consideration the ship's speed, ocean currents and weather conditions as well as other factors) in order to curtail the amount of CO_2 emitted based on a Ship Energy Efficiency Management Plan (SEEMP).

We are also promoting the saving of energy by the partial installation of LED lighting for ships.

* A type of ship that turns a generator with its engines, driving motors with the electrical power obtained, and turns propellers and bow thrusters for propulsion.

■ The cable-laying ship Subaru (9,557 tons)

■ Construction work completed on the cable-laying ship Kizuna (8,598 tons) in March 2017.

Reducing the Carbon Footprint of Society through Our Services

Fiscal 2016 Results and Fiscal 2017 Outlook

In addition to naturally reducing carbon ourselves, we are aiming to help society as a whole reduce its carbon footprint by promoting our low-carbon services to customers.

To this end, we believe that the development of technologies that are ahead of the times and the provision of state-of-the-art services utilizing them are important factors. Based on this idea, as an ICT solutions company we will continue to create services that will lead to a reduction in environmental impact as well as to a host of technical innovations and contribute to a future where people and the Earth are in harmony. In fiscal 2016, we planned to measure the environmental impact of Nexcenter facilities, expanded sales of cloud services and DC services and contributed to a reduction in the environmental impact caused by society.

In fiscal 2017, we will continue to promote the development of solutions and services with high CO_2 reduction effects and, at the same time, work to raise the profile of the Environmental Solutions Label System outside the Company. We plan to actively promote activities so that we are recognized as a company that contributes to a reduction of CO_2 emissions.

Reducing CO_2 by Enterprise Cloud Service

On a global basis, NTT Communications provides ICT solutions, including networks, cloud services, applications and security. In addition to contributing to society, these solutions help reduce environmental impact by curtailing CO_2 emissions.

Linking DCs, networks and servers, Enterprise Cloud is one example of a cloud service for companies that we are uniquely positioned to offer as a telecommunications operator. The service features a host of options, such as the ability to allocate resources flexibly in accordance with customer needs. As the core service can be used for backbone operations, customers can utilize Enterprise Cloud as a virtual server in place of servers and storage that they previously had to install and operate themselves. This service reduces the number of servers that companies need to operate, achieving a decrease equivalent to 97 t-CO_2 per year (approximately 74%) for small- and medium-sized companies. The service's system environment can be configured to use consistent specifications in Japan and overseas, thereby reducing configuration and operational costs substantially compared with what a client would experience if installing their own independent systems.

■ CO₂ Reduction Effect from Using Enterprise Cloud Service

(Unit: t-CO₂/year)

	Conventional means	Enterprise Cloud
	131.6	34.5

−74 %
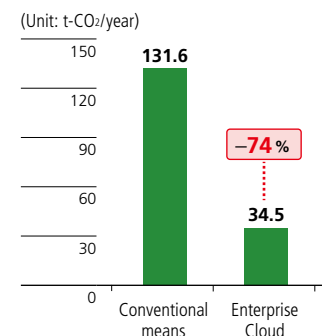
Sacramento 3 Data Center Supports ICT Companies in Silicon Valley

The United States represents over 50% of the global DC market, reflecting its robust ICT industry and growth in the outsourcing of ICT environments, as companies increasingly use cloud resources. This market in the United States has been expanding by 19% or so annually. In April 2015, NTT Communications opened its third DC in Sacramento, the California Sacramento 3 (CA3) Data Center, to better serve its customers there.

Contributions to the Global Environment

This DC is located in a seismically stable area within 15 minutes of an international airport. Many ICT companies are drawn to this DC for its security and excellent environmental performance. Specifically, the DC features leading-edge air-conditioning systems that utilize external air and cold water for cooling, realizing strong energy conservation through efficient temperature management.

Environmental Solutions Label System

The NTT Group is exploring the idea of an Environmental Solutions Label System for self-certification of environmentally friendly ICT solutions and services. To qualify, ICT solutions and services will have to achieve CO_2 reductions of at least 15%, as assessed through objective evaluation of environmental impact reduction benefits. The entire NTT Group provides these environmentally friendly services in order to help reduce the environmental impact caused by society.

In utilizing this certification system, we at NTT Communications Group obtained Environmental Solutions Label registration for Nexcenter in fiscal 2016 and now have a cumulative total of 10 solutions registered. We aim to obtain more certifications for the Environmental Solutions Label System.

■ Environmental Solutions Label System

Acquisition of eco-ICT Mark

After performing a self-assessment of our CO_2 reduction measures, we submitted an application in accordance with the ICT Ecology Guidelines created by the ICT Ecology Guideline Council* and acquired the eco-ICT Mark.

The Council created and published guidelines for appropriate CO_2 reduction measures to be implemented by telecommunications carriers, clearly defining the standards for procuring systems and DC services from the viewpoint of reducing power consumption. These guidelines have been subsequently revised, with a seventh version publicly announced in February 2016. We will continue to participate in this initiative and work to instill the guidelines throughout the Group on an ongoing basis.

* ICT Ecology Guideline Council: The council was established on June 26, 2009, by the following five industry organizations: The Telecommunications Carriers Association, the Telecom Services Association, the Japan Internet Providers Association, the Communications and Information Network Association of Japan, and the ASP-SaaS Industry Consortium (a designated nonprofit organization).

■ eco-ICT Mark

→ **Click here for details on the eco-ICT Mark for telecommunications carriers.**

Contributions to the Global Environment

Implementing Closed Loop Recycling

Our Approach

As symbolized by UN Sustainable Development Goal No. 12 "Responsible Consumption and Production," the thoroughness and extent of penetration of a recycling-oriented society continues to gain in importance as a problem shared by us all. To contribute to the realization of a recycling-oriented society, we work to improve our reuse and recycling ratios on a daily basis while building business models with low environmental impacts. Specifically, the NTT Communications Group is working to reduce the volume of waste in three areas—dismantled telecommunications equipment, construction waste and office waste—and promoting reuse and recycling in various aspects of its business.

Fiscal 2016 Results and Fiscal 2017 Outlook

In fiscal 2016, the final disposal of waste from dismantled telecommunications equipment amounted to 6.6 tons, construction waste 105.4 tons and office waste 26.4 tons. The total volume of final waste disposal increased 3.1 tons compared with the previous fiscal year to 138.4 tons, while the total volume of waste generated increased 8,266 tons to 14,797.4 tons.

These initiatives led to a remarkable improvement in the final waste disposal ratios for office waste in particular. Compared with the previous fiscal year, we were able to report a movement in the office final waste disposal ratio from 1.87% to 1.24%.

■ NTT Communications Group Final Waste Disposal and Total Waste Generation
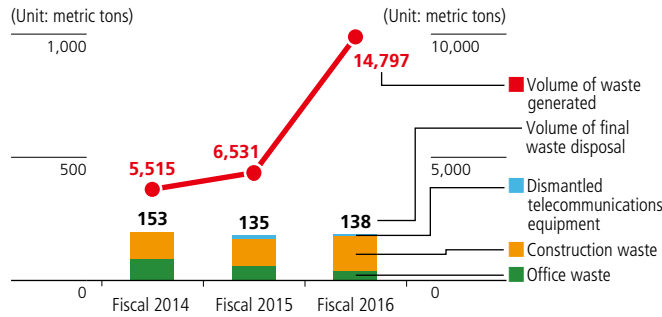
(Scope: 14 domestic companies of the NTT Communications Group)

■ Total Volume and Final Disposal Ratio of Dismantled Telecommunications Equipment
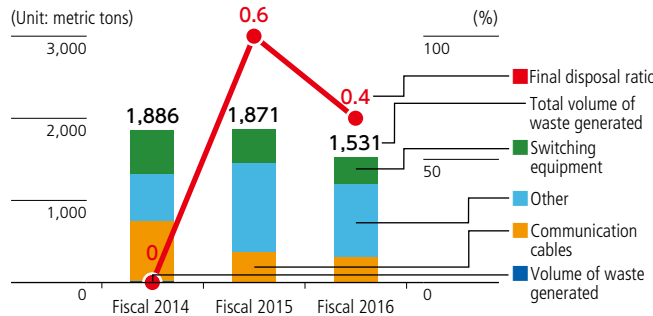
(Scope: 14 domestic companies of the NTT Communications Group)

■ Volume of Reused Fiber-Optic Cable
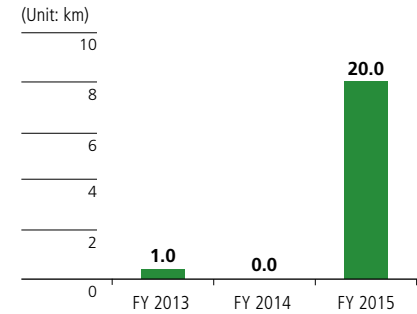
(Scope: 14 domestic companies of the NTT Communications Group)

■ Construction Waste Generation and Final Disposal Ratio
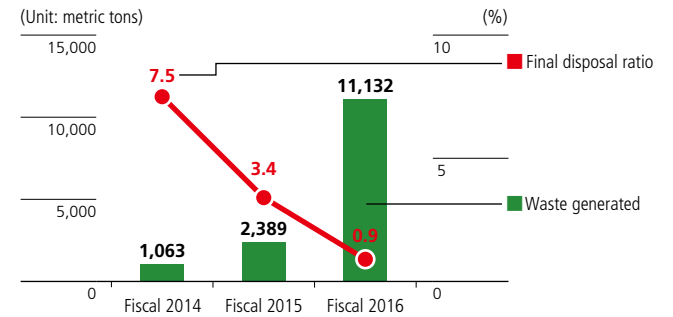
(Scope: 14 domestic companies of the NTT Communications Group)

Contributions to the Global Environment

■ **Total Office Waste and Final Disposal Ratio**

(Unit: metric tons)

- Final disposal ratio
- Total volume of waste recycled
- Volumes recycled
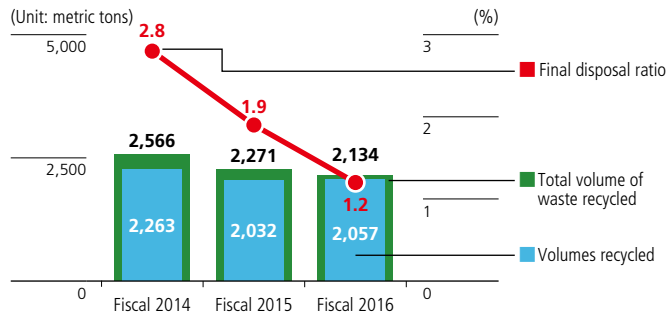
(Scope: 14 domestic companies of the NTT Communications Group)

Building Business Models with Low Environmental Impact

Initiatives to Improve Final Disposal Rate

We believe one of our most important obligations as a company that provides ICT services is to create business models that emphasize recycling. In line with this belief, in the case of our DCs, telecommunications buildings and office buildings we painstakingly select processing business operators that emphasize recycling ratios and, since fiscal 2013, have been accelerating efforts to improve the final disposal ratio.

We implement these measures focusing in particular on 7-8 buildings each year, starting with local surveys, checking the disposal workflow, and interviewing waste management companies about their disposal methods and requesting changes when needed. As a result, the final office waste disposal ratio, which was 6.1% in fiscal 2013, has been reduced to 1.2% as of fiscal 2016.

Thorough Implementation of 3Rs in Office Buildings

Reduction in Paper Use for Business Purposes

NTT Communications is working to reduce usage of all kinds of paper

for business purposes, including paper for business purposes and paper for printing customer billing statements. In fiscal 2007, we established a paper usage indicator per full-time employee in order to reduce office paper usage.

Specifically, we encourage reduction efforts that include the number of sheets used and the double-sided printing rate by the use of printing log data from IC card multifunction printers. Initiative status data are collected by individuals and sections, with the results disclosed to all employees on a monthly basis. As a result of having continued to encourage the digitization of paper documents and paperless meetings that make use of projectors and tablets, in fiscal 2016 paper consumed per full-time employee (converted to A4-size office paper) was 6,289 sheets, which was less than the previous year.

Turning to our operations outside Japan, Group companies also reduced copy paper usage and promoted paperless meetings. Targets were set, and initiatives accelerated in China, Korea, Hong Kong, Thailand, Indonesia, Vietnam, Malaysia, Singapore, the United States and Germany.

■ **Total and Per-Employee Office Paper Usage**

(Unit: metric tons)

Percentage change from the previous fiscal year
−0.4%

- Per-employee Usage
- Total paper usage
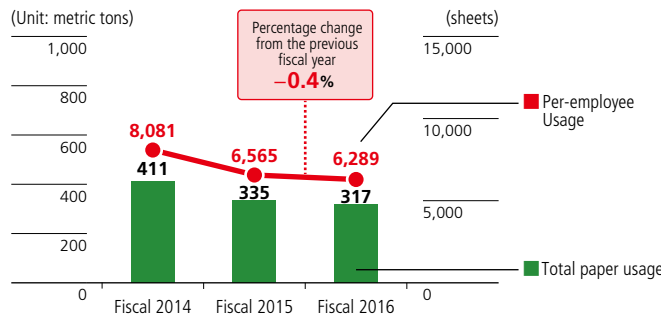
(Scope: 14 domestic companies of the NTT Communications Group)

Water Conservation Initiatives in Offices

NTT Communications is working to reduce the amount of water used in its offices. As one aspect of these activities, in May 2013 we began installing water-saving valves on the toilet units at our head office building (the NTT Hibiya Building). As the water-saving valves are capable of measuring and separating the flow of the amount of water necessary, we were able to cut our water use by around 45%. The valves also employ usage data to verify water savings and the degree of environmental contribution.

We have installed these water-saving valves in 90 toilet units within the NTT Hibiya Building. The annual water-saving effect for fiscal 2016 was a decrease of approximately 6% compared with the NTT Hibiya Building's overall water usage prior to the valves' installation.

Effective Utilization of Food Waste

In addition to giving due consideration to the effective utilization of materials in offices, dealing with waste from cafeterias is taking on added importance. NTT Communications has introduced a raw garbage disposal machine to deal with the waste generated by its employee cafeteria. A system to recycle the waste into organic compost is in operation, with the Gunma branch of NTT East Kanshinetsu acting as subcontractor.

In fiscal 2016, we processed 23 tons of kitchen waste. As a result, this was recycled and generated 2.3 tons of compost, which was put to use by farmers in the Kanto region and elsewhere.

This initiative is not merely an effective utilization of resources, as it is also important to note the CO_2 reduction effect from disposing of less waste by incineration. In continuing to promote this initiative we are strengthening environmental considerations in our day-to-day operations and at the same time improving employee awareness.

Contributions to the Global Environment

Planning a Future of Natural Harmony

Our Approach

As advocated in goals 14 and 15 of UN SDGs, conserving the biodiversity of life below water and on land—together with the prevention of global warming and the preservation of ecosystems where living things co-exist in an intricate balance—has recently developed into a major environmental challenge with regard to the creation of a sustainable society.

NTT Communications has established a set of action guidelines with regard to biodiversity conservation in order to promote activities that take concerns in this area into consideration. Giving thorough consideration of all aspects of business activities, from the construction of facilities to their operation and dismantling, the Company implements multifaceted initiatives along the lines of environmental contribution activities that naturally include participation in local conservation activities and the dissemination of information.

Development of Activities in Line with Action Guidelines

Having formulated Biodiversity Conservation Action Guidelines, we have been proactively developing approaches. There is a growing awareness, on a global scale, with regard to biodiversity conservation. In the years to come, we will promote inspection efforts, identify issues and promote improvements across the Group as a whole, including at overseas bases.

■ Action Guidelines with Regard to Preservation of Biodiversity

1. Basic Policy: NTT Group Biodiversity "Approach Concept," Established by NTT Group
● Development Centered on Business Activities
The Group recognizes that all activity is inextricably linked to the planet and to biodiversity, understands that the scope and impact at home and overseas are related depending on the nature of a business, and promotes initiatives that are recognized as having a preservation effect.
● Development Centered on Contribution to Society
In partnership with its stakeholders the Group widely promotes initiatives toward the preservation of biodiversity, regardless of their relevance to its business.

2. Action Guidelines
● Implement actions that take into account the preservation of biodiversity in business activities
● Contribute to preservation of social biodiversity in business activities
● Deepen understanding of biodiversity, promote nature conservation activities together with employees, their families and the planet

Considerations during Data Center Construction

As a global ICT company, we promote biodiversity considerations at our DCs. We promote a multifaceted approach at DCs in Japan and overseas.

Minimizing the Influence and Impact on Local Ecosystems

Large-scale facilities like DCs make it necessary to keep in mind the effect they have on the surrounding ecosystem, such as the use of water resources at such facilities, pollution and drought. Without compromising any unique vegetation in the surrounding area, times of construction and on-site maintenance require a basis that implements ways to derive benefits from them while conserving biodiversity.

For example, at the Serangoon DC, a way was thoroughly developed to ensure that hazardous substances such as oil do not become mixed into the on-site water and cooling water that makes effective use of rainwater and recycled water (desalination and re-treated water). While actively incorporating a wide range of trees that are native to the area, great consideration is given to the on-site vegetation by conducting tree felling in consultation with the National Environment Agency (NEA).

■ Data Center plantings show consideration for indigenous species.

Consideration for Local Landscaping and Greening

We feel it is important to show consideration for biodiversity in facility designs that contribute to local greenery and in the surroundings.

At the Tokyo No. 6 Data Center, a large-scale urban facility, we took advantage of funding from the Tokyo Metropolitan Park Association's Urban Green Fund, working closely with the community to promote greening activities. The green spaces within the site have been planted into two zones: spring/summer and autumn/winter, so that visitors can enjoy seeing flowers at the site throughout the year. We have sought to achieve harmony between the DC and the surrounding community. For example, we have set up a wind-simulation environment and planted evergreen trees in the southwest corner, which is affected by wind.

Contributions to the Global Environment

■ Spring/summer zone

■ Autumn/winter zone

■ Cables laid on sand, away from coral reefs
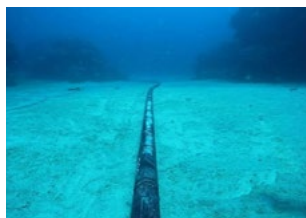
■ Debris collected from the seabed

■ General views of in-dock ship painting work

Laying of Subsea Cables

In constructing its subsea communications cable network, NTT Communications' fundamental policy is to prevent marine pollution. We are signatories to treaties on the prevention of marine pollution and, in addition to complying with environmental legislation, undertake initiatives that place importance on coexistence with marine organisms and the fishery industry.

Group company NTT World Engineering Marine Inc. (NTT-WE Marine), which handles the laying, burying and maintenance of subsea cables, develops business with a strong awareness toward the preservation of the marine environment.

Consideration Given to Impact of Cable-Laying

Prior to subsea cable-laying and burying work, we conduct an environmental assessment and cooperate with related government authorities and municipalities in carefully designing cable routes and drawing up construction plans. For example, in shallow sea areas we give consideration to the preservation of the marine environment, such as by deciding on cable-laying routes that avoid coral reefs and other inhabited areas.

There are also cases in which minesweeping operations are undertaken on the seabed prior to laying or burying the cables. We collect debris from the seabed, including fishing nets, rope and wire pulled out by the minesweeping operations, and properly process this as industrial waste after returning to port.

Measures to Preserve Ecosystems Taken on Cable-Laying Ships

There are concerns that the marine organisms that infest the ballast water used to maintain the stability of vessels will destroy ecosystems by being discharged into other parts of the ocean as vessels navigate from one area to another. In order to prevent the destruction of ecosystems by ballast water, the subsea cable-laying vessels Kizuna and Subaru are equipped with ballast water treatment equipment, based on the Ballast Water Management Convention* set by the International Maritime Organization (IMO), so that they discharge water that does not contain marine organisms.

Furthermore, the ballast water treatment equipment installed on both of our cable-laying vessels is an ultraviolet sterilization system, which does not use chemical substances and is thus regarded as having low environmental impact.

With regard to ship paints, we use those that are in compliance with the AFS Convention (the International Convention on the Control of Harmful Anti-fouling Systems on Ships), which regulates the use of anti-fouling paint containing organic tin compounds on the bottom of ship hulls.

* Ballast Water Management Convention: Adopted by the IMO in 2004 to prevent the movement of marine organisms across habitat boundaries from affecting the marine environment, the convention came into effect on September 8, 2017.

Upon Construction and Dismantling of Relay Stations

Underpinning data communication networks, wireless relay stations are often located in rich natural areas, such as on hills and islands. We thus emphasize consideration for biodiversity in their operation.

As of March 31, 2016, 12 of our 105 wireless stations were in national parks or quasi-national parks. The NTT Communications Group carefully builds micro-roads, recognizing that we need to patrol and maintain these facilities, while adhering strictly to the law and our own environmental assessment methods. In undertaking assessments, we establish specific areas of concern and align construction processes accordingly. We adopt a multifaceted approach toward avoiding and minimizing any impact on the ecosystem. In addition, we strive to restore the environment to its original state prior to construction when dismantling wireless stations. We consult with residents and use local soil in our restoration activities.

We have also been acting appropriately and conducting activities that provide facilities from the perspective of wildlife conservation. For example, every year since September 2012, the Amami Ornithologists' Club NPO has held a Chinese sparrow hawk migration birdwatching meeting within the NTT Communications wireless relay station in Amami City, Kagoshima Prefecture. Wireless relay stations are normally off limits, but having received a request saying that the area is suitable for monitoring the status of the ecosystem, events are held with employees in attendance.

Contributions to the Global Environment

■ **Chinese sparrow hawk migration**

Contributing to Ecosystem Conservation Using ICT
Contributing through Products and Services
The damage to agriculture caused by wild boars and deer is becoming an issue of increasing concern across Japan's farming and mountain communities. The setting of traps is being used as one countermeasure to minimize the damage caused by wildlife. NTT PC Communications Inc. has developed "Mimawari Rakutaro" as one part of its "field cloud service." This is a wildlife observation and alarm device which utilizes an outdoor sensor that transmits data. In this manner, the company is contributing to countermeasures aimed at minimizing the damage caused by wildlife. Employing the communication services of NTT Docomo to automatically transmit a message to a designated mail address when a trap has been activated, the Mimawari Rakutaro device has brought about a significant reduction of the burden placed on patrols. As one version of Mimawari Rakutaro also comes equipped with a camera, the transmission of images further ensures an immediate response should a person be caught in a trap by mistake. Since first going on sale in July 2011, Mimawari Rakutaro has been adopted by more than 50 local governments across Japan and contributed to ecosystem conservation in woodlands. As a recent example of

its use, Saga City is utilizing subsidies for a Ministry of Internal Affairs and Communications ICT project to realize more efficient countermeasures against wildlife damage.

■ **Mimawari Rakutaro**

Work to Preserve Coral Reefs through Business Activities
As a leader in media services, NTT Plala, Inc. has taken action to protect coral reefs, which play a vital role in the ecosystem of our oceans, by enlisting the help of its six million members.

Specifically, NTT Plala, Inc. offers tours of coral grafting to members of its Bukatsu DO! service, an online community for adults. Participants in the tour experience coral grafting with employees. NTT Plala engaged in a campaign to preserve coral reefs by donating a number of coral seedlings that matched the number of members of Hikari TV Shopping who participated in this project.

In addition, NTT Plala, Inc. produced and distributed 4K videos about the state of coral reefs and activities to protect them, creating opportunities for people to think more about protecting coral reefs. In January 2016, we began donating a portion of proceeds from people who watched the video for initiatives to protect coral reefs.

NTT Plala, Inc. will continue to protect the environment with help

from its members by providing enjoyable projects linked with its business activities.

Educational Activities by goo Green Label Information Dissemination
As an ICT company, we are increasingly expected by society to disseminate information and educational materials online. We will continue such activities through online media to convey the importance of biodiversity, and encourage a diverse range of people to engage in conservation activities.

Activities by goo Green Label
The goo Green Label portal donates a portion of the profits generated through use of the site to organizations engaged in environmental protection and social activities. All users can participate in this initiative simply by changing over to "goo Green Label," the top design version of the "goo" web portal, and using the search engine. A total of 55 companies, including those in the NTT Group, have currently signed up as "Corporate Partners," a program that has been recommended for in-house use within those companies. Since its inception in August 2007, donations totaling ¥55.8 million have been made to organizations, the majority of which are NPOs engaged in global environmental protection activities.

🌱 Environment Contributions to the Global Environment

Preventing Environmental Pollution

Our Approach

The NTT Communications Group is taking various steps to avoid a broad range of environmental risks stemming from business activities, such as environmental pollution and hazardous substance leaks. Measures include the formulation of guidelines covering the introduction of low-emission vehicles, improvements to facilities and methods of operation, the bolstering of management, and education and training.

With regard to chemical substance management systems, in which society has shown a growing interest, the Company has implemented proper management in maintenance departments over the course of its history—based, for example, on the Waste Disposal and Public Cleansing Act, the Law Concerning Special Measures Against PCB Waste and the Electricity Business Act—including the assigning of vice presidents as managers. While conducting storage inspections on a regular basis, we are thoroughly overhauling the system to implement the rapid coordination of information to include senior management under the leadership of the president in the event of an earthquake or other disaster. By means of training sessions on environmental laws, we always keep abreast of the content of law revisions, share information among all Environmental Working Groups and plan optimization of our operations in a timely manner.

■ Framework for Preventing Environmental Pollution at Each Business Stage
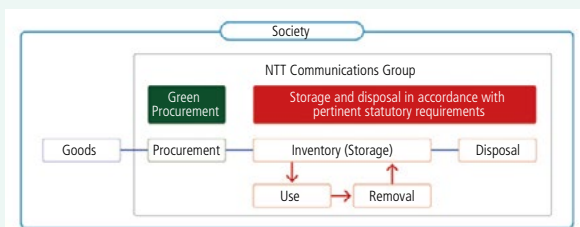
Fiscal 2016 Results and Future Plans

Air Pollution Countermeasures

Our business activities emit NOx and SOx, which cause air pollution. Approximately 77% of the NOx emissions are attributable to the use of gasoline and diesel in our operational vehicles, while the remaining 23% are emitted during the generation of electric power in communications buildings and other facilities. Most SOx (around 88%) is emitted during generation of the electricity we use.

In fiscal 2016, we reduced our emissions of both NOx and SOx, by 350 tons (a year-on-year decrease of 24%) and 40 tons (56%), respectively, thanks to the lower levels of electric power consumed. In the years to come, we will encourage driving techniques that show consideration for the environment and review our vehicle fleet numbers while promoting the mitigation of global warming and the prevention of air pollution by taking steps to reduce electricity usage in our businesses.

■ NOx Emissions
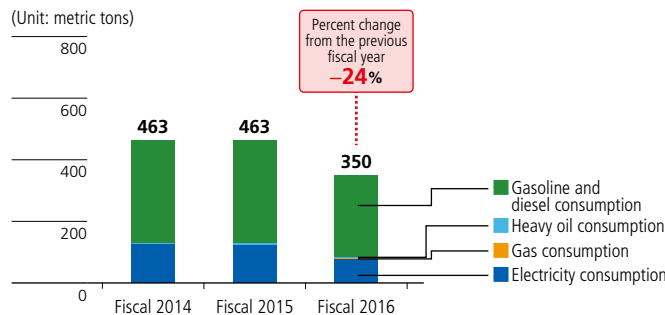
(Scope: 14 domestic companies of the NTT Communications Group)

■ SOx Emissions
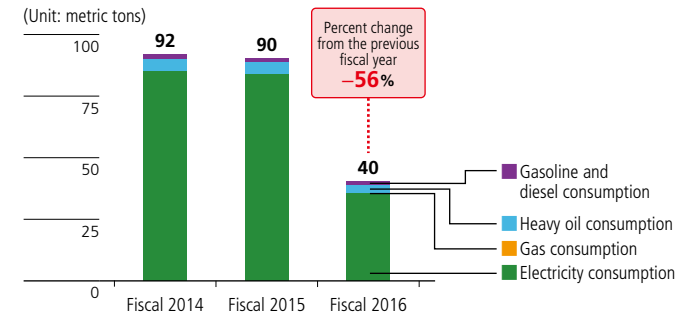
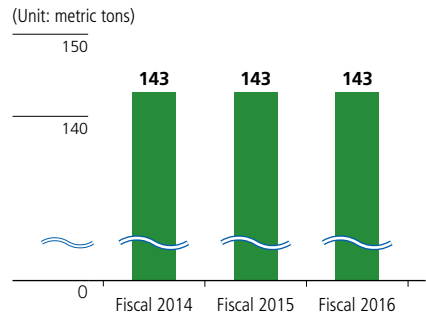(Scope: 14 domestic companies of the NTT Communications Group)

Ozone-Depleting Substance Countermeasures

We dispose of ozone-depleting substances in an appropriate manner. The volume of specified halons used in our fire extinguishing equipment in fiscal 2016 was approximately 143 tons, roughly the same as in the previous fiscal year. Meanwhile, the volume of specified Freon gas (CFCs) used in our air-conditioning equipment in fiscal 2016 was down by around 1 ton from the preceding fiscal year, to approximately 276 tons.
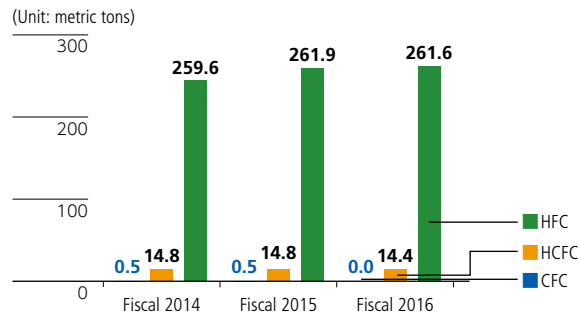
Contributions to the Global Environment

■ Volume of Specified Halons Used in Fire-Extinguishing Equipment

(Unit: metric tons)

	Fiscal 2014	Fiscal 2015	Fiscal 2016
	143	143	143

(Scope: 14 domestic companies of the NTT Communications Group)

■ Volume of Specified CFCs Used in Air-Conditioning Systems

(Unit: metric tons)

|	Fiscal 2014	Fiscal 2015	Fiscal 2016
HFC	259.6	261.9	261.6
HCFC	14.8	14.8	14.4
CFC	0.5	0.5	0.0

(Scope: 14 domestic companies of the NTT Communications Group)

Asbestos Countermeasures

Asbestos countermeasures for buildings and offices involved implementation of airborne asbestos surveys of buildings for which asbestos had been spray-applied to confirm that levels did not exceed statutory limits, which were revised in September 2006. As there were no buildings demolished in fiscal 2016, there were no asbestos emissions. We are going to continue the systematic implementation of appropriate measures, such as the removal, containment or enclosure of asbestos in buildings where it is present, in line with manuals issued by the Japan Construction Occupational Safety and Health Association and individual local authorities.

■ Asbestos Emissions

(Unit: metric tons)

|	Fiscal 2014	Fiscal 2015	Fiscal 2016
	0	0	0
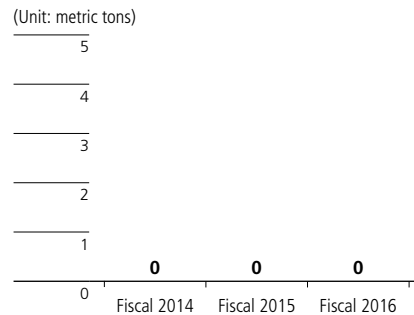
(Scope: 14 domestic companies of the NTT Communications Group)

Storage and Management of PCB

NTT Communications appropriately manages devices that contain polychlorinated biphenyl (PCB). Such devices were used in the past as insulators for electrical facilities. As a policy for PCB storage, we have established a set of guidelines prescribing early detoxification treatment as well as methods for ascertaining conditions and management when the use of equipment containing PCBs is to be continued.

In fiscal 2014, we undertook the proper detoxification processing of 1,415 systems, comprising high-concentration PCB systems stored in Kyushu and Hokkaido and trace PCBs from all over Japan. For our currently stored high-concentration PCB systems, we are coordinating plans with waste disposal companies to commence detoxification processing in fiscal 2016 for inventory held in Tokyo and in fiscal 2018 for systems stored in Osaka.
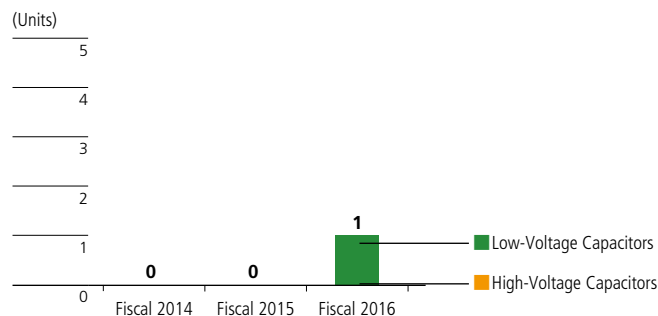
■ Number of Transformers Stored
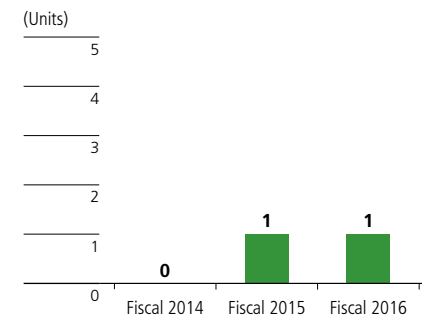
(Units)

	Fiscal 2014	Fiscal 2015	Fiscal 2016
	0	1	1

(Scope: nonconsolidated NTT Communications Group)

Contributions to the Global Environment

■ Number of Capacitors Stored

(Units)

Fiscal 2014: 0
Fiscal 2015: 0
Fiscal 2016: 1

■ Low-Voltage Capacitors
■ High-Voltage Capacitors

(Scope: nonconsolidated NTT Communications Group)

■ Number of Electric Ballasts Stored

(Units)

Fiscal 2014: 2,203
Fiscal 2015: 2,235
Fiscal 2016: 1,537
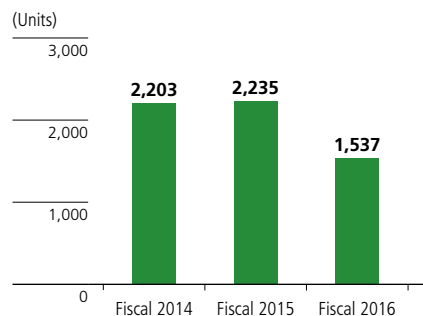
(Scope: nonconsolidated NTT Communications Group)

Chemical Substance Management in Anticipation of Emergency Situations

Against a backdrop of natural disasters that are occurring frequently on a global scale, in recent years society has shown a growing interest in the management systems needed for environmental pollutants in times of emergency. Owning and operating IT infrastructure throughout the world, we have been thorough in establishing storage and management systems while bearing "unlikely events" in mind for some time.

In the management of pollutants and PCBs in particular, we have implemented measures that recognize such factors as earthquakes, fires, flood controls, lightning protection, puncture resistance, ventilation and security. By carrying out periodic inspections, we are constantly confirming that such substances are properly managed. With regard to such events as major earthquakes and disasters, we have built a rapid verification system designed not only to prevent damage when a disaster first strikes but also from the perspective of preventing secondary disasters. We exercise great care in conducting uninterrupted operations safely and securely.

■ PCB storage location   ■ Storage of PCBs

Cases of Major Leakage

There were no incidents involving major leakages in the NTT Communications Group in fiscal 2016.

Transport, Import or Export of Toxic Waste

In line with our policy of making an early effort to conduct the detoxification processing of PCBs, we started the processing of waste stored in Kyushu and Hokkaido in fiscal 2014. We conducted the detoxification processing of that held in Tokyo in fiscal 2016 and plan to process the remainder, held in Osaka, in fiscal 2018. We have no plans to transport, import or export any toxic waste.