

Protect Environment

P. 039

Use ICT to contribute to the environment

12.5 times

Amount of contribution to the reduction of CO₂ emissions of all society

P. 039

Reduce the environmental impact of business operations

5.4 times

Power efficiency of communications services compared to FY2013

1.45%

Ratio of EV adoption in Japan

P. 046

Effectively use resources

1.13%

Final disposal ratio of waste

Protect Environment

CSR Priority Activities	Medium-term Targets	CSR Quantitative Indicators	KPI	Target Achievement FY	Results (FY)		
					2017	2018	2019
Use ICT to contribute to the environment	While reducing CO ₂ emissions of the Company, contribute to the reduction of CO ₂ emissions of all society, including value chains, through the use of ICT	Amount of contribution to the reduction of CO ₂ emissions of all society	At least 10 times the Company's emissions	FY2030	10.1 times	10.8 times	12.5 times
Reduce the environmental impact of business operations	Improve the ratio of renewable energy usage by developing renewable energy sources and promoting the active use of renewable energy by the Company	Renewable energy usage ratio for the Company* ¹	30% or higher	FY2030	—	—	7.9%
	Improve power efficiency to reduce the environmental impact of business operations	Power efficiency of telecommunications services (power efficiency per data transmission)	At least 10 times higher than in FY2013	FY2030	3.6 times	4.5 times	5.4 times
			At least two times higher than in FY2017 ²	FY2025	—	1.2 times	1.5 times
		Ratio of EV adoption in Japan* ²	100% 50%	FY2030 FY2025	—	0.4%	1.45%
Effectively use resources	Control the final disposal ratio of waste and work toward the effective use of resources	Final disposal ratio of waste	1% or below	FY2030	1.18%	0.91%	1.13%

*1 Newly established in fiscal 2020

*2 Newly established in fiscal 2019

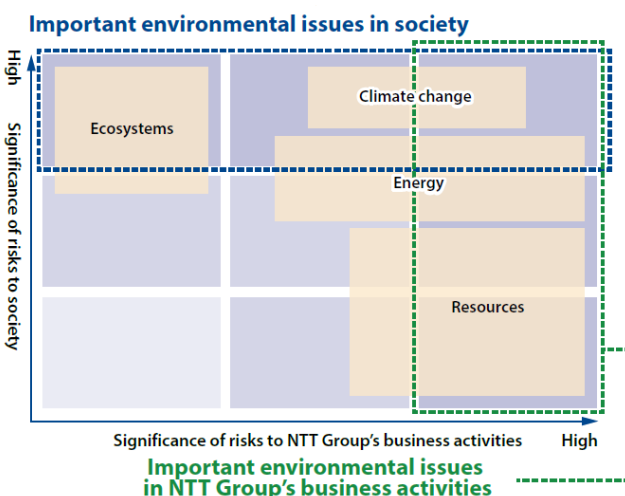
Our Thinking Concerning the Environment

Relevant GRI Standards: 102-16/103-2

Identifying the Priority Environmental Issues of NTT Group

When identifying NTT Group's CSR Priority Activities, we carried out a detailed materiality analysis of environmental issues. Consequently, climate change and ecosystems have been identified as important environmental issues in society. Climate change, energy (electricity) and resources have been identified as important environmental issues to NTT Group's business activities. We are contributing to solving important environmental issues in society through all our activities, such as by providing ICT services and developing groundbreaking technologies and activities undertaken by our employees. Based on this perspective, we have identified using ICT to contribute to the environment, reducing the environmental impact of business operations, and effectively using resources as NTT Group's CSR Priority Activities.

We will work to reduce our own environmental impact with regard to the environmental issues of significant importance to NTT Group's business activities.



Important environmental issues in society

Priority issues	Climate change	Ecosystems
Risks	Climate change may cause various risks including abnormal weather and shortages of water or food.	Blessings from ecosystems, including biodiversity, are essential to all life, including humankind, and the loss of ecosystems may cause stagnation in social activities.
Response	We must pursue initiatives on mitigation aimed at reducing CO ₂ emissions for all society. We must also pursue adaptation initiatives.	Efforts must be made across society to coexist with nature and ensure that we receive the blessings from the ecosystems on a sustainable basis.



Contribute to resolving environmental issues for society through all our activities

Important environmental issues in the NTT Group's business activities

Priority issues	Climate change Energy	Resources
Risks	Disasters associated with climate change may lead to a suspension of our operations. Energy, electricity in particular, is essential for the provision of our services, and a shortage may lead to a suspension of our operations.	Depletion of resources, both metal and nonmetal, affects the maintenance of the communications infrastructure (communications networks) and may disrupt business continuity.
Response	Approximately 95% of the NTT Group's CO ₂ emissions are generated by electricity. Therefore, initiatives to address electricity use are important both as measures for mitigating climate change and for reducing power shortages.	It is important to use resources in sustainable ways.



Reduce our own environmental impact

NTT Group Global Environmental Charter

The NTT Group established the NTT Group Global Environmental Charter under the NTT Group CSR Charter, which lays out the basic policy of our CSR activities. The NTT Group Global Environmental Charter expresses the basic principles and policies on protecting the global environment.

We based “The NTT Group Environmental Statement” and “The Eco Strategy 2030” upon the foundations of these basic principles and policies.

NTT Group Global Environmental Charter

Basic principle

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

Basic policies

1. Compliance with laws and regulations and fulfillment of social responsibilities
2. Reducing environmental loads
3. Establishing and maintaining environmental management systems
4. Developing environmental technologies
5. Social contribution efforts
6. Disclosure of environmental information
7. Conservation of biodiversity

 [NTT Group Global Environmental Charter](https://www.ntt.co.jp/kankyo/e/management/charter.html)

<https://www.ntt.co.jp/kankyo/e/management/charter.html>

The NTT Group Environmental Statement

The NTT Group has formulated The NTT Group Environmental Statement to serve as a framework for our environmental activities. In the statement, we have expressed the future of our planet that stakeholders and the NTT Group are creating and the kind of enterprise we would like to be in that future.

In the future of “People & Planet in Harmony,” a sustainable society has been realized and everything in the world is connected and communicating. To realize that future, the NTT Group will engage in environmental activities with the aim of becoming a member of eco-friendly corporations in the world.

We envision three futures in which people are living in harmony with the planet. While focused on realizing those futures, we will continue to develop our core competencies: developing and providing the most advanced ICT services and technologies.

The NTT Group Environmental Statement

**People & Planet in Harmony
Dedicated to Environmental Preservation**

To ensure a future that is better for all life on Earth, we are devoting a great amount of resources to groundbreaking technological advances and superior eco-oriented ICT services.



Realizing a Low Carbon Future

We are contributing to the reduction of CO₂ emissions and facilitating adaptation* to climate change.



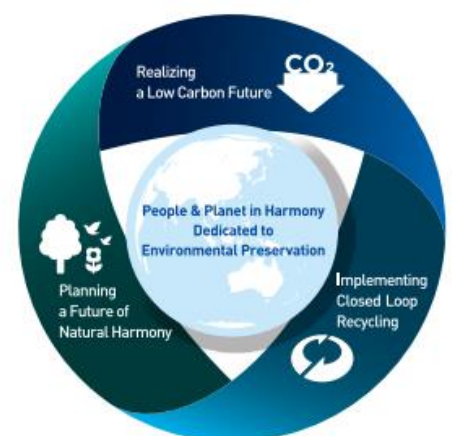
Implementing Closed Loop Recycling

We are working toward more effective resource allocation.



Planning a Future of Natural Harmony

We are contributing to the preservation of ecosystems.

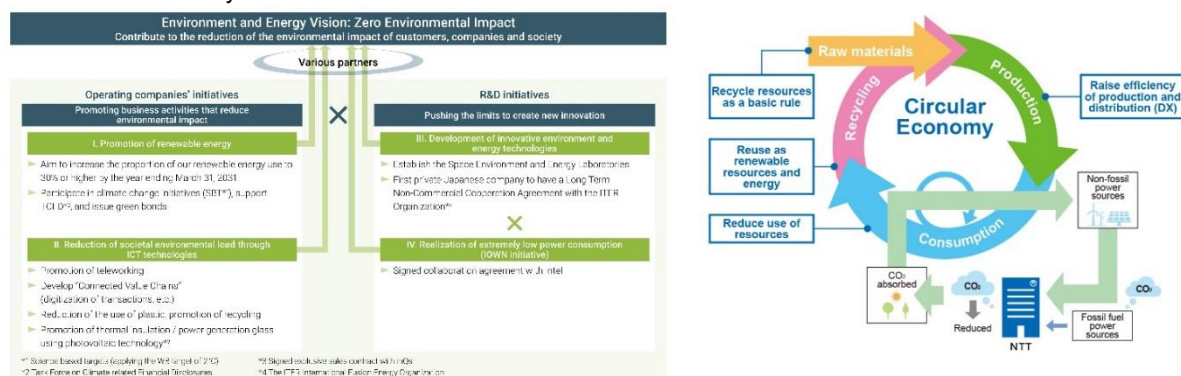


* Adaptation: A response to the effects of climate change defined as “an action that moderates harm or exploits beneficial opportunities” according to the Intergovernmental Panel on Climate Change. Adaptation is positioned as an action that complements the effects of mitigation, such as reducing CO₂ emissions.

Environment and Energy Vision

We formulated the Environment and Energy Vision in May 2020 to promote ESG management, one of the pillars of our medium-term management strategy, “Your Value Partner 2025.” The vision consists of four core initiatives: promoting renewable energy, reducing environmental impact on society through ICT technologies, developing innovative environment and energy technologies, and realizing extremely low power consumption. We will help reduce environmental impact for customers, companies, and society at large by pursuing business activities toward reducing that impact through our R&D for generating breakthrough innovations.

Under the vision, we are also working to achieve our goal of zero environmental impact, not only in terms of reducing waste but also with regard to climate change, by incorporating the circular economy concept toward realizing a society that can enable sustainability of both business and the environment.



• Promotion of renewable energy

We will actively incorporate renewable energy to meet our need for electricity, the major source of the NTT Group's greenhouse gas emissions. We have declared our quantitative goal of increasing the proportion of renewable energy use by the NTT Group as a whole by 30% or more by fiscal 2031. To achieve this goal, the NTT Group will develop renewable energy sources and promote a shift to renewable energy at its domestic office buildings, telecommunications buildings, data centers and research laboratories. As a concrete goal for reducing the environmental impact of our business activities through the promotion of renewable energy, NTT began participating in the SBT*1 international climate change initiative in May 2020 and declared its support for the TCFD*2.

• Reduction of societal environmental load through ICT technologies

We believe that ICT will play an instrumental role in reducing the environmental load of society at large. For example, teleworking, digitization of the value chain, and computerization are all expected to limit energy usage throughout society. We will reinforce our efforts to reduce the environmental load of society by applying ICT. We will also pursue initiatives for creating a closed loop society, such as by reducing the use of plastics and promoting recycling.

• Development of innovative environment and energy technologies

We will address climate change and other environmental issues by developing innovative technologies in addition to promoting a shift to renewable energy use in our operations. In July 2020, we established the Space Environment and Energy Laboratories for regenerating the global environment and realizing a sustainable and inclusive society. We will create technologies that will drive innovation in the field of smart energy, including next-generation energy, and for the future of the global environment. We also became the first private company in Japan to conclude a Long-Term Non-Commercial Cooperation Agreement with the International Fusion Energy Organization (IFER). We will work to successfully develop nuclear fusion reactors that hold significant promise as a future source of energy by offering support through IOWN's ultra-low-latency, high-speed, large-capacity data transmission and simulations based on digital twin computing.

• Realization of extremely low power consumption (IOWN initiatives)

We will pursue efforts to realize the IOWN initiatives announced in May 2019, which are expected to vastly reduce the power consumption of computers and networks by applying optical technologies. As part of this drive, we concluded a three-year joint research agreement with Intel Corporation, our partner in the IOWN Global Forum. Together, we will create IOWN technology as the communications infrastructure of the future that will break through current technological limits in areas such as significantly reducing electricity consumption. We will harness the NTT Group's industry-leading technologies in photonics, digital signal processing (DSP), computing and network infrastructure management with Intel's abundant technological portfolio, support systems, and expert knowledge in hardware and software to develop technologies for processing the explosive rise in data volume, which is necessary for realizing a smart, connected world.

*1 Science Based Targets: Greenhouse gas reduction targets set by companies to be attained in five to fifteen years that are consistent with levels required by the Paris Agreement, of constraining the increase in global temperatures at well below 2°C (WB2°C) or below 1.5°C from before the industrial revolution.

*2 Task Force on Climate-related Financial Disclosures established by the Financial Stability Board in response to a request from the G20 countries as a framework for corporate information disclosure on climate change initiatives.

The Eco Strategy 2030

As a result of our materiality analysis, we have identified the NTT Group's key environmental issues to be climate change, energy (electricity), resources, and ecosystems. Related to these important issues, we have set "The Eco Strategy 2030" as the targets of the environmental activities of fiscal 2030.

 Realizing a Low Carbon Future	We will contribute to reducing the CO₂ emissions of society by at least 10 times more than the NTT Group's own emissions.
	We will raise power efficiency per data transmission in our telecommunications businesses by at least 10 times compared to fiscal 2014 levels.
	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	We will achieve zero emissions* with regard to the final disposal rate for waste discharged from the NTT Group.
 Planning a Future of Natural Harmony	We will play our part in preserving ecosystems by actively promoting initiatives through all our activities and by collaborating with our stakeholders.

* Zero emissions: The NTT Group considers a final disposal rate of 1% or less to satisfy zero emissions conditions.

 **Eco Strategy 2030** <https://www.ntt.co.jp/kankyo/e/management/strategy.html>

Information Disclosure in Response to TCFD Recommendations

We declared our support for the TCFD in May 2020 as part of our effort to promote ESG management, one of the pillars of our medium-term management strategy. We will be disclosing information related to climate change according to the TCFD recommendations.

Content and Location of Information Disclosed in Line with TCFD Recommendations

Outline of TCFD Recommendations		Location of Information
Governance: Disclose the organization's governance around climate-related risks and opportunities		
a	Board-level oversight of climate-related risks and opportunities	pages 010, 035, 041, 105
b	Role of senior executives in assessing and managing climate-related risks and opportunities	pages 035, 041
Strategy: Disclose the actual and potential impacts of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning where such information is financially material		
a	Short-, medium-, and long-term climate-related risks and opportunities identified by the organization	pages 031, 041–044
b	Impact of climate-related risks and opportunities on the organization's operations, strategies, and financial plans	pages 031, 041–044
c	Resilience of the organization's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario	pages 031, 041–044
Risk Management: Disclose how the organization identifies, assesses, and manages climate-related risks		
a	Process adopted by the organization to identify and assess climate-related risks	pages 035, 039, 041
b	Process adopted by the organization to manage climate-related risks	pages 035, 039, 041
c	How the process for identifying, assessing and managing climate-related risks is integrated into the organization's overall risk management	pages 041, 103
Metrics and Targets: Disclose the metrics and targets used to assess and manage relevant climate-related risks and opportunities where such information is material		
a	Metrics used by the organization for assessing climate-related risks and opportunities in line with the organization's own strategy and risk management process	pages 030, 034
b	Scope 1, Scope 2, and, if appropriate, Scope 3 greenhouse gas (GHG) emissions, and the related risks	pages 040–041, 049–050
c	Targets used by the organization to manage climate-related risks and opportunities, and performance against targets	pages 030, 034, 040

Environmental Management

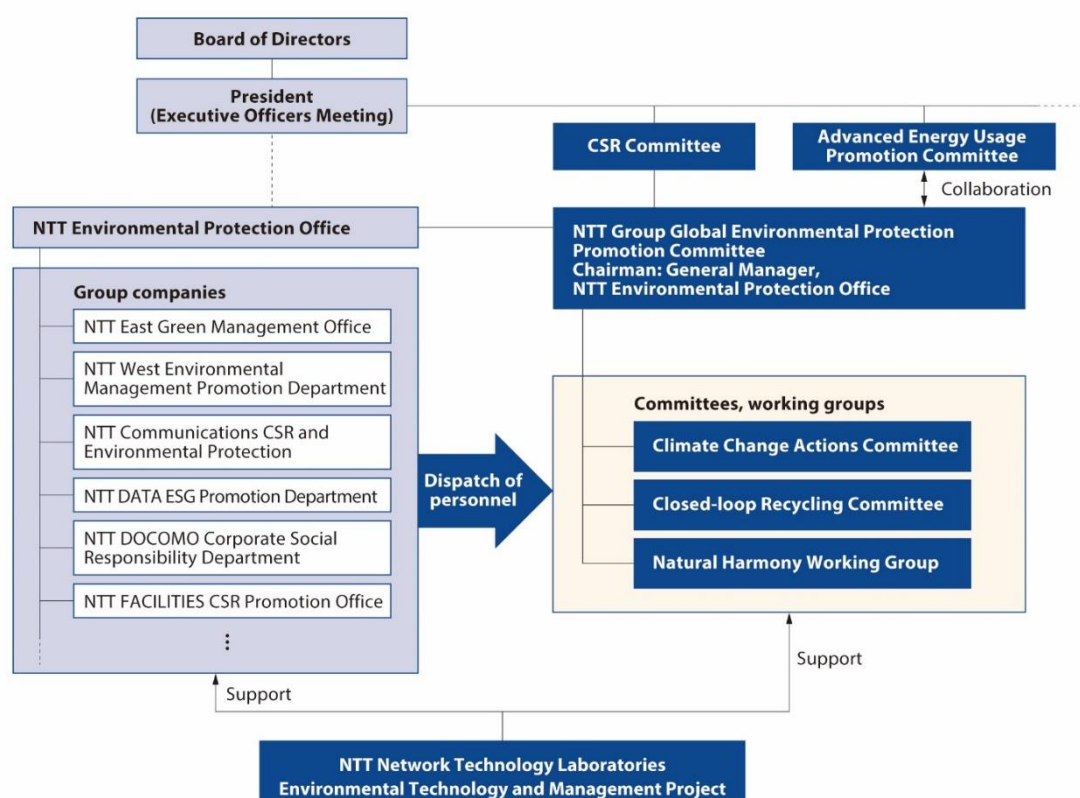


Relevant GRI Standards: 102-18/103-2/307-1

Organization for Environmental Management

We established the NTT Group Global Environmental Protection Promotion Committee as an internal unit under the CSR Committee (see page 010) to discuss and determine the environmental activities policies for the entire Group.

The NTT Group Global Environmental Protection Promotion Committee, which meets twice a year, is chaired by the NTT executive vice president, who is the head of NTT's Environmental Protection Office (Head of Research and Development Planning), with membership comprising the heads of the environmental departments at major Group companies (NTT East, NTT West, NTT Communications, NTT DOCOMO, NTT DATA, NTT Urban Solutions, NTT COMWARE, NTT Ltd. Japan, NTT Anode Energy and NTT Advanced Technology). The committee formulates environmental activity policies based on the decisions of the CSR Committee and deploys environmental activities throughout NTT Group companies.



The committee reports its decisions to the CSR Committee. Particularly important decisions on environmental issues, such as the formulation of environmental targets for the NTT Group as a whole, are based on discussions with the Board of Directors. For example, the NTT Environment and Energy Vision announced in May 2020 was determined following discussions by all board members, including outside directors.

The NTT Group Global Environmental Protection Promotion Committee oversees the organizations placed under it while planning basic policies on environmental protection, managing targets, and addressing issues. It also worked on preparing and establishing The NTT Group Environmental Statement and The Eco Strategy 2030.

Furthermore, risks and opportunities identified as having a significant impact on business, such as environmental laws, regulations, and systems, will be reported to the Business Risk Management Committee, which determines enterprise risk, and presented to the Board of Directors.

In addition to working with the environmental departments, the committee also cooperates with other departments to pursue related initiatives. Particularly with regard to electricity usage, which accounts for more than 90% of the NTT Group's CO₂ emissions, the committee collaborates with the Advanced Energy Usage Promotion Committee, which is responsible for promoting the Total Power Revolution (TPR) campaign, the NTT Group's energy conservation activities. As for the risks and opportunities presented by environmental issues to our facilities and equipment, monitoring and assessment are conducted through a collaborative effort between staff in charge of environmental issues and those responsible for facilities, and these individuals are appointed for every Group company.

Environmental Management System

The NTT Group has been seeking to introduce environmental management systems (EMS) including voluntary programs in addition to ISO 14001 certification and Eco-Action 21. Additionally, when including Eco Action 21 and voluntary programs, more than 90% of our business sites have introduced EMS.

To improve operational efficiency of obtaining and maintaining certifications, which includes guarantees from external auditing institutions, we also support the construction and maintenance of EMS through internal audits by employees with environmental auditor qualifications. Many NTT Group employees are qualified as auditors, including lead auditors, and sharing the list of auditors within the Group has enabled us to conduct mutual internal audits and thereby optimize the cost of maintaining the EMS.

Environmental Accounting

The NTT Group introduced environmental accounting in fiscal 2001 to boost the efficiency and effectiveness of its environmental conservation efforts by quantitatively determining the costs of environmental conservation programs undertaken as part of its business activities as well as their effects (economic and material benefits).

Moving forward, we aim to implement even more efficient and effective environmental management by continuously carrying out quantitative monitoring and analysis to understand the effects of our environmental activities, clarifying outstanding issues, and sharing information.

Category	Environmental investment (billion yen)		Environmental costs (billion yen)		Economic benefits (billion yen)			Material benefits (thousands of tons)		
	Fiscal 2018	Fiscal 2019	Fiscal 2018	Fiscal 2019		Fiscal 2018	Fiscal 2019		Fiscal 2018	Fiscal 2019
(1) Business area costs	8.60	9.35	15.93	19.83						
• Pollution prevention costs	0.14	0.24	2.42	5.05						
• Global environmental conservation costs	8.07	8.92	3.14	3.01	Cost reductions through energy conservation	5.95	6.37	Reductions in CO ₂ emissions through energy conservation measures	184	119
• Resource recycling costs	0.38	0.19	10.37	11.77	Revenues from sale of recyclable waste (decommissioned telecommunications equipment, etc.)	7.34	6.51	Recycled decommissioned communications equipment	176	146
					Waste disposal cost reductions through recycling	0.12	0.16	Recycled construction waste	222	325
					Cost reductions through reuse of decommissioned telecommunications equipment	26.96	23.02	Recycled civil engineering works waste	115	228
					Cost reductions through reuse of telecommunications devices	10.60	13.86	Recycled office waste	32	27
					Cost reductions through reuse of office waste materials	0.00	0.00	Other recycled items	18	9
(2) Upstream/downstream costs	0.02	0.08	10.35	9.77	Revenues from sale of recyclable waste (subscriber communications devices, etc.)	0.52	0.47	Number of communications devices collected from customers (thousands)	9,372	7,581
					Cost reductions in postal expenses through computerization	14.17	13.77			
(3) Administrative costs	0.12	0.17	5.27	5.13						
(4) R&D costs	3.61	3.16	8.10	8.45						
(5) Social activity costs	0.02	0.00	0.26	0.06						
(6) Environmental remediation costs	0.00	0.00	0.00	0.00						
Total	12.37	12.76	39.90	43.24	Total	65.67	64.16			

• Scope of data

The companies subject to consolidated environment accounting are NTT, NTT East, NTT West, NTT Communications, NTT DATA, NTT DOCOMO and their group companies.

• Applicable period

- Data for fiscal 2019 is from April 1, 2019 to March 31, 2020.
- Data for fiscal 2018 is from April 1, 2018 to March 31, 2019.

• Accounting method

- Accounting is based on the NTT Group Environmental Accounting Guidelines. These guidelines comply fully with the Environmental Accounting Guidelines 2005 issued by the Ministry of the Environment.
- Environmental conservation costs are tabulated separately as environmental investments and environmental costs. Personnel costs and depreciation costs are also included in environmental costs.
- Reductions in CO₂ emissions through energy conservation measures are calculated by subtracting actual emissions from projected emissions in the event that no such measures were taken.

Main Initiatives

Environmental Guidelines

NTT Group operations have the following four key attributes: (1) procurement of a great many products; (2) possession of many buildings; (3) high electricity consumption by telecommunications equipment; (4) in-house R&D facilities. To promote the effective reduction of our environmental impacts, we have drafted the following green guidelines that address each of these four key attributes: Guidelines for Green Procurement; Green Design Guidelines for Buildings; Energy Efficiency Guidelines; and Green R&D Guidelines. In particular, the development and procurement of ICT devices with outstanding energy efficiency is essential for the effective reduction of the CO₂ emissions of the NTT Group.

To address this issue, we have been applying the NTT Group Energy Efficiency Guidelines since May 1, 2010. These guidelines give concrete form to the ICT device-related energy-saving stipulations of our Guidelines for Green Procurement and Green R&D Guidelines, and define our basic philosophy and device-specific targets with respect to the development and procurement of routers, servers and other ICT devices used in the NTT Group. Under the Energy Efficiency Guidelines, the NTT Group develops and procures ICT devices with consideration for energy-efficient performance in addition to function, performance and cost. We are endeavoring to apply these initiatives to the reduction of electricity consumption and concomitant CO₂ emissions related to customer communications.

Disseminating Environmental Activities Policies and Measures among Employees

NTT Group conducts environmental education to disseminate NTT Group policies and measures among employees and develop a shared understanding of Group-wide activities for promoting environmental protection. In fiscal 2019, we also provided training related to the Group's environmental activities for all employees, such as group training and e-learning.

The NTT Environmental Protection Office organizes environmental education for staff in charge of environmental issues at each Group company and has been holding study sessions every year since fiscal 2001. Along with lectures for disseminating our environmental policies and sharing outstanding issues, we invite outside lecturers to speak on recent topics. These study sessions are intended for the NTT Group throughout Japan and are therefore offered via a teleconferencing system so that staff in remote areas can attend and ask questions through two-way connections.

In fiscal 2019, we invited experts on environmental management and CSR to explain the SDGs and ESG and to speak about environmental management. Furthermore, related staff in Group companies introduced their environmental initiatives with the aim of promoting environmental activities at each Group company.

Compliance with Environmental Laws and Regulations

The NTT Group complies with laws and regulations related to the environment and works to reduce its impacts on the environment.

We have established a mechanism that can deal with cases of legal violations on a Group-wide basis by reporting to the Global Environmental Protection Promotion Committee. There were no legal violations nor payments of penalties in fiscal 2019, following the same result for fiscal 2018.

As part of its environmental management measures, the Group also tracks the number of complaints related to the environment for each fiscal year. In fiscal 2019, no complaints related to environmental impact were submitted, handled or resolved through our systems for dealing with complaints.

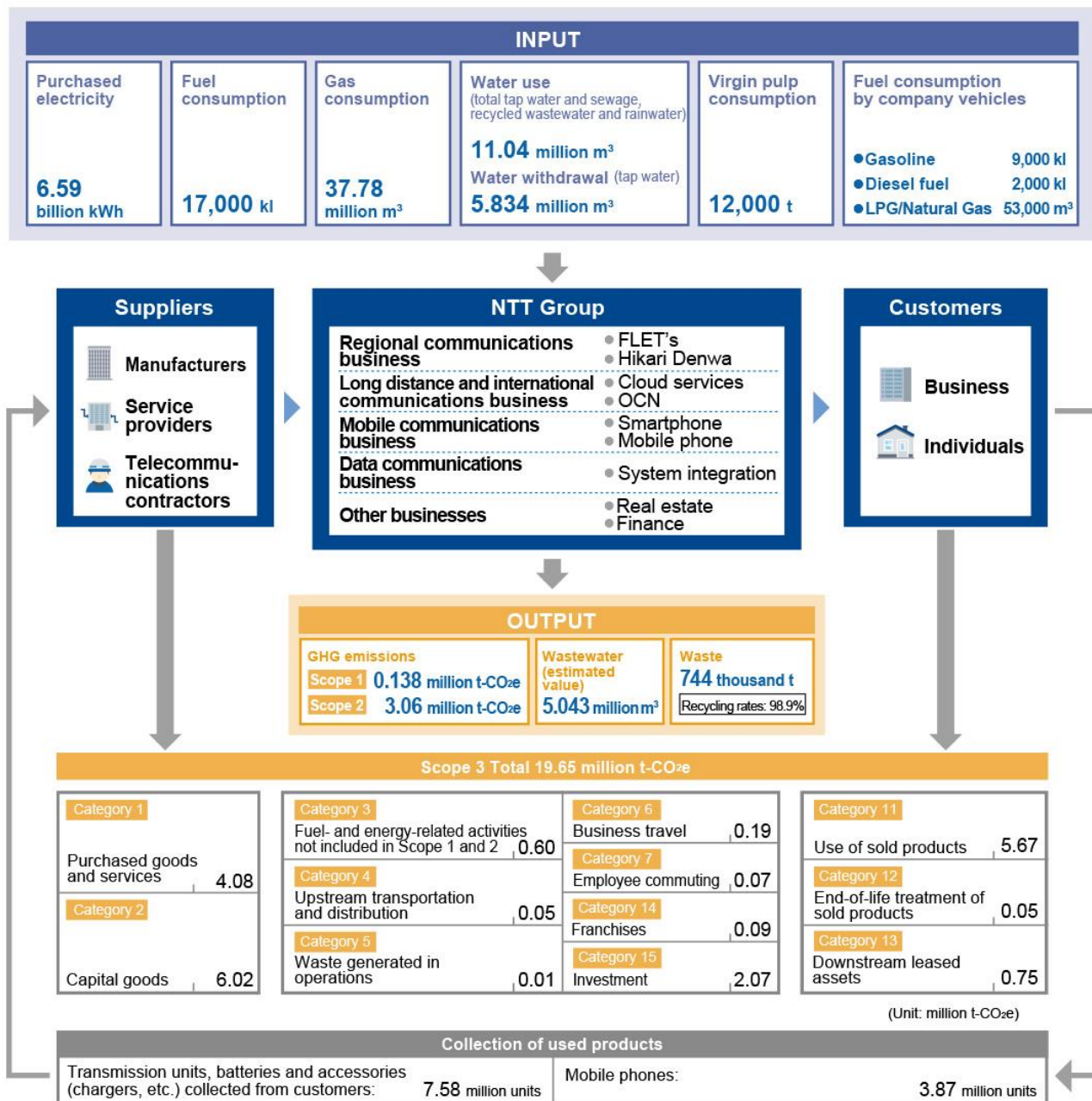
Going forward, we will maintain compliance with existing laws and regulations as well as set up a working group on environmental laws and regulations to help step up our preparations for complying with laws and regulations under review or scheduled to take effect.

Environmental Impacts Overview

Relevant GRI Standards: 301-1/302-1/303-3,4/305-1,2,3/306-1,2

To minimize the environmental impacts of our business activities, the NTT Group endeavors to gather and analyze information on the resources and energy that it consumes and the resulting environmental impacts.

Material Balance of the NTT Group (Fiscal 2019)



Realizing a Low Carbon Future



Relevant GRI Standards: 102-11, 12, 15, 29/103-2/201-2/305-1, 2, 5

Policies and Concepts

Reducing emissions of CO₂ and other greenhouse gases, which are the principal cause of climate change, is an important social issue. Additionally, in recent years, it has also been considered important to devise adaptation measures to prepare for the effects of climate change.

There is growing demand for conserving energy given the rising amounts of electricity use associated with the development of ICT. At the same time, ICT is expected to contribute to energy savings, the reduction of CO₂ emissions across society, and the provision of adaptation measures.

To achieve our zero environmental impact goal under the Environment and Energy Vision, the NTT Group will endeavor to curb CO₂ emissions from its own business activities by shifting to renewable energy. We will also contribute to the reduction of CO₂ emissions across society and adaptation to climate change by striving to develop and disseminate the most advanced ICT services and technologies.

Organization for Implementation

The NTT Group has established a Climate Change Actions Committee which works under the NTT Group Global Environmental Protection Promotion Committee. The Actions Committee has the senior manager of the NTT Environmental Protection Office as its chair and the people responsible for the environment at eight major Group companies as members. The committee investigates and promotes climate change-related measures in the NTT Group, promotes measures aimed at achieving our targets for climate change, formulates policy and implements measures concerning application, and advances appropriate responses to climate change-related laws and ordinances.

The working groups (WG) under the committee advance activities according to their respective themes. The Environmental Contribution Promotion WG undertakes consideration and diffusion of our environmental labeling system for solutions, and target value management for contributing to the reduction of CO₂ emission amounts across society. The Low-Carbon Promotion WG addresses target value management and promotion of measures for power efficiency, while the Climate Change-Related Legal Compliance WG tackles management of environmental measures related to climate change.



Targets and Results

Reduction of CO₂ Emissions across Society

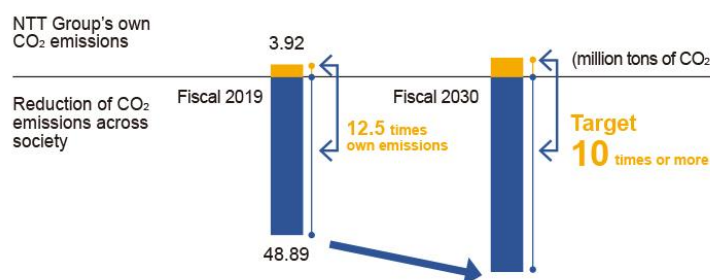
The NTT Group has established a target for fiscal 2030 calling for it to contribute to reducing the CO₂ emissions of society as a whole by at least 10 times more than the NTT Group's own emissions through its services and technologies.

This target is intended to contribute to the reduction of CO₂ emissions across society by providing ICT services and technologies while curbing CO₂ emission amounts from our own business activities.

The use of information communication, which is expanding each year through the spread of smartphones and high-speed and large-capacity networks, requires energy. On the other hand, by improving efficiency and reduction of goods through digitalization, the use of information also contributes to the reduction of CO₂ emissions across society by reducing environmental load more than the energy consumption it requires.

Notes:

- The amount of reducing CO₂ across society quantifies the energy savings effects obtained through ICT services using CO₂ volume. The energy saving effect is quantified with references to the Telecommunication Technology Committee (TTC) Standard "Methodology for the assessment of the environmental impact of information and communication technology goods, networks and services (JT-L1410)" and the calculation method specified by the "LCA of Information and Communication Technology (ICT) business organizations" research group of the Life Cycle Assessment Society of Japan.
- The effects of energy savings obtained through the introduction of ICT services include, for example, reduced electricity usage by homes, companies and factories from energy management, alleviation of traffic congestion using analysis of congestion and operation information, and reduced electricity usage from the streamlining and optimization of transportation schedules.
- The amount of CO₂ emissions for the NTT Group includes the emissions from facilities necessary for other telecommunication carriers and data centers to provide their services.



Power Efficiency of the Telecommunications Business

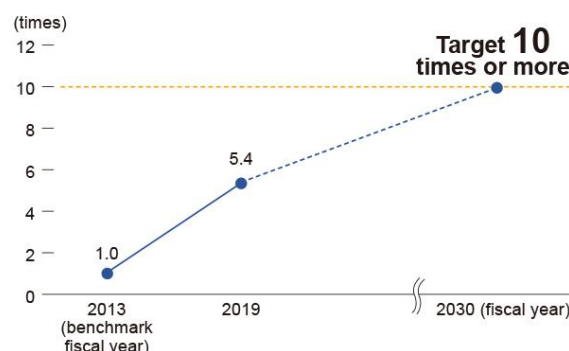
The NTT Group has established the target for fiscal 2030 to improve the power efficiency per data transmission in our telecommunications business to at least 10 times higher than in fiscal 2013*¹. Electricity is essential to the continuity of the telecommunications business and it also accounts for more than 90% of the NTT Group's CO₂ emissions. We set this target because improving the efficiency of using electricity both reduces the risk of business disruptions and helps mitigate climate change.

We are introducing highly energy efficient equipment and improving the efficiency of network structures based on our Energy Efficiency Guidelines.

In October 2018, NTT became the first telecommunications carrier in Japan to join the EP100*² international initiative on energy efficiency led by The Climate Group. By participating in such an international initiative, we intend to publicly declare the NTT Group's commitment to the environment and express our stance on international environmental issues.

*¹ The telecommunications businesses subject to the calculation for power efficiency are the domestic businesses of the telecommunications business segment appearing in our Annual Report (NTT East, NTT West, NTT Communications, NTT DOCOMO, and NTT DATA).

*² An international initiative comprising companies pledging to double the energy efficiency of their operations (improve energy efficiency by 50%) as participants.



CO₂ Emissions from Business Operations

As part of its efforts to promote the Environment and Energy Vision, the NTT Group announced its participation in the SBT in May 2020. We will set our reduction targets for greenhouse gas emissions based on the SBT as an initiative for achieving zero environmental impact.

GHG Emissions of the NTT Group

More than 90% of the NTT Group's CO₂ emissions are indirectly generated emissions produced through electricity usage. We are working to curb these CO₂ emissions by reducing electricity usage with the goal of raising power efficiency per data transmission in our telecommunications businesses by at least 10 times compared to fiscal 2013 levels. We are also seeking to reduce CO₂ emissions from company vehicles by introducing low-emissions vehicles such as hybrid and electric vehicles into our fleet.

In fiscal 2019, the NTT Group's Scope 1 (directly generated GHG emissions) GHG emissions fell by 16% year-on-year to about 0.138 million t-CO₂e and Scope 2 (indirectly generated GHG emissions) CO₂ emissions fell by 7% to 3.06 million t-CO₂e*.

In addition to disclosing the environmental impact generated by our business activities, the NTT Group also calculates and discloses Scope 3 emissions (GHG emissions produced over the entire value chain), which includes indirect emissions that have been generated while providing ICT services and other activities. In fiscal 2019, Scope 3 emissions amounted to about 19.65 million t-CO₂e.

* The NTT Group provides equipment and the like necessary for other telecommunications carriers and data centers to provide their services. To date, we have included the fuel and electricity required for this equipment in our disclosed CO₂ emissions in accordance with reporting methods outlined by the Act on Promotion of Global Warming Countermeasures. However, as calculation methods have been established based on the Ministry of the Environment's Basic Guidelines on Accounting for Greenhouse Gas Emissions Throughout the Supply Chain (ver. 2.3), we have adopted these for calculating the above CO₂ emissions as Scope 3 from fiscal 2019.

Initiatives for Tackling Climate Change

Environmental issues related to climate change, energy (electricity), resources, and ecosystems carry the potential to be both risks and opportunities for the NTT Group's business activities. These risks and opportunities are prioritized by the Global Environmental Protection Promotion Committee, and major KPIs are reported to the CSR Committee. Further, risks and opportunities identified as having a significant impact on business, such as laws, regulations, and systems related to the environment, are presented to the Business Risk Management Committee, which identifies Companywide risks, and to the Board of Directors.

Among these, risks and opportunities posed by climate change are specifically recognized as environmental issues of particular significance for society as well as the NTT Group. We are seeking to more closely integrate our management strategies and environmental management with regard to risks and opportunities driven by future climate change by implementing assessments and actions in accordance with our management strategies.

Scenario Analysis

The NTT Group formulated the medium-term management plan "Your Value Partner 2025" to resolve social issues by advancing digital transformation through the Group's business activities. Under the keywords "Your Value Partner," we are working to achieve this plan by utilizing the Group's management resources and capabilities, such as R&D, ICT infrastructure, and personnel as well as collaborating with partners.

In accordance with TCFD recommendations, we decided to examine climate-related risks and opportunities involved in the Group's operations based on different climate-related scenarios. The following is a report on the results of our latest scenario analysis for transition risks and physical risks.

Scenario	Outline	References for Methodology
Transition Risk Scenario	Scenario in which the decarbonization of society is rapidly achieved (a future in which the target increase of 2°C has been attained)	IEA World Energy Model Documentation 2019
Physical Risk Scenario	Scenario in which physical risks materialize (a future in which the average temperature has risen by 4°C)	IPCC Fifth Assessment Report Synthesis Report on Observations, Projections and Impact Assessments of Climate Change, 2018

Under the above scenarios, we considered possible future events and the NTT Group's business developments in the coming years to identify the risks and opportunities and then organized the NTT Group's response to the risks and opportunities accordingly.

Climate-Related Risks

Risk Category		Timescale	Outline of Risks	NTT Group's Response
Transition Risks	Policy and Legal Risk	Medium-term	<ul style="list-style-type: none"> • Heavier burden of environmental taxes and FIT • Introduction of carbon pricing 	<ul style="list-style-type: none"> • Promote green energy • Enhance energy efficiency
	Market and Reputation Risk	Short-term	<ul style="list-style-type: none"> • Losing customers and damage to the corporate image if considered efforts are insufficient 	<ul style="list-style-type: none"> • Promote ICT services that contribute to mitigating climate change • Publicize the effects of ICT services in reducing CO₂ emissions
Physical Risks	Acute Risk	Short-term	<ul style="list-style-type: none"> • Frequent service interruptions caused by an increase in frequency of natural disasters such as torrential rains and flooding 	<ul style="list-style-type: none"> • Ensure the stability and reliability of telecommunications services in anticipation of large-scale disasters
	Chronic Risk	Medium- and long-term	<ul style="list-style-type: none"> • Higher operating costs caused by increases in electricity consumption for air conditioning 	<ul style="list-style-type: none"> • Promote measures for reducing electricity consumption of air conditioning equipment

Climate-Related Opportunities

Opportunity Category	Timescale	Outline of Opportunities	NTT Group's Response
Products and Services	Short- and medium-term	Rise in demand for ICT services that improve energy efficiency due to the growing momentum for addressing climate change	Promote ICT services that contribute to mitigating climate change
Low-Carbon Products (Renewable Energy)	Medium- and long-term	Rise in demand for renewable energy aimed at realizing a decarbonized society	Expand the business of a new company (NTT Anode Energy Corporation) established to promote renewable energy
Investment in R&D	Long-term	Need for technological innovations for further improving the energy efficiency of telecommunications and data centers	Promote the IOWN concept
Products and Services	Short- and medium-term	Rise in demand for business continuity services due to the frequent occurrence of natural disasters	Expand in the business continuity solution business

Risks Driven by Changes in Laws, Regulations and Systems

Changes in laws, regulations, and systems pose the risk of raising our operating costs through higher electricity prices.

The Act on Special Measures concerning the Procurement of Renewable Electric Energy by Operators of Electric Utilities, which came into force on July 1, 2012, stipulates that costs due to the feed-in tariff (FIT) will be recovered from users through a surcharge on electricity charges. Also, electricity prices have been hiked due to the tax introduced in October 2012 on the use of all fossil fuels for global warming countermeasures (environmental tax). As such, risks driven by changes in laws, regulations and systems have already materialized in the form of higher electricity costs.

FIT taxes are increasing every year, resulting in the risk of higher electricity charges in the future. It is also possible that carbon pricing will be introduced in Japan toward achieving the below 2°C target*1, which may further increase the risk of operating costs.

Since the NTT Group uses more than 8 billion kWh of electricity each year to operate its telecommunications facilities in Japan, revisions in the laws, regulations, and systems may create the risk of suffering a severe financial impact.

*1 The target of constraining the increase in global temperatures at well below 2°C from before the industrial revolution, as designated under the Paris Agreement that came into effect in November 2016.

Note: Scale of Assumed Risks: The environmental tax burden resulting from phased-in hikes has increased electricity charges by 0.11 yen/kWh, resulting in an additional financial burden of 720 million yen a year for the NTT Group. In addition, we estimate the tax burden resulting from the FIT system will cause electricity charges to increase by between 2.9 and 3.45 yen/kWh. In this case, the NTT Group will incur an additional financial burden of between 19.1 and 22.7 billion yen a year (estimated from actual electricity usage in fiscal 2019 of 6.59 billion kWh). With regard to carbon pricing, the NTT Group is expected to incur an additional burden of 13.2 billion yen based on an estimated carbon price of 2 yen/kWh.

Risk Avoidance Measures

We have been pursuing measures for reducing electricity usage to minimize the increase in operating costs.

Specifically, we have reduced electricity usage by focusing on consolidating telecommunications equipment, which account for most of the NTT Group's electricity usage, and upgrading to equipment with higher levels of energy efficiency (or carrying out upgrades ahead of schedule). We are also working to enhance air conditioning and power supply facilities by introducing air conditioner optimal control systems (Smart DASHR) and high-voltage direct current (HVDC) systems. With regards to electricity purchases, we have introduced systems to analyze electricity usage to reduce actual electricity charges.

We are also preparing for the introduction of carbon pricing in the future by promoting the shift to renewable energy to reduce CO₂ emissions arising from electricity usage in our own business operations. In the Environment and Energy Vision, announced in May 2020, we stated our quantitative target of raising the proportion of renewable energy for the NTT Group as a whole by 30% or more by 2030.

Risks Driven by Rising Temperatures

Increases in electricity consumption by air conditioning equipment in response to rising temperatures may pose the risk of higher operating costs.

The equipment used at our telecommunications facilities and data centers is set to operate within a specific range of temperatures. Those exceeding this range could cause equipment shutdowns and failures. For this reason, we maintain room temperatures within a certain range, including through the use of air conditioners. When ambient temperature rises, the energy efficiency of air conditioners declines and that in turn raises electricity consumption.

Therefore, the NTT Group faces the risk of suffering a severe financial impact due to increases in energy costs caused by rising electricity usage.

There is also a risk of service interruptions due to the growing number of natural disasters caused by rising temperatures.

The NTT Group has operations both domestically and abroad, and supports society and business activities through its telecommunications networks and information systems. In addition, the NTT Group provides a multitude of services that serve as necessary lifelines that ensure people's safety in their everyday lives. Natural disasters such as earthquakes,

tsunamis, typhoons, and floods could cause system and network failure. As a result, there may be occasions when disruptions in the NTT Group's business operations make it impossible to provide reliable services, which may lead to the NTT Group being held liable for related damages, potentially damaging the NTT Group's credibility and corporate image. A large-scale disaster in particular might not only severely damage the NTT Group's telecommunications networks; it could also harm NTT Group employees or inflict damage to systems that could take a long time to restore, and the resulting emergency electricity use restrictions could hinder the NTT Group's ability to provide reliable services. These events may lead to reductions in income and substantial repair costs.

* Scale of Assumed Risks: We estimate that a 1°C rise in ambient temperature results in increasing electricity charges for air conditioning used at our telecommunication facilities and data centers between 0.1 and 0.3 yen/kWh. In this case, the NTT Group will incur an additional financial burden of between 660 million and 2.0 billion yen a year (estimated from actual electricity usage in fiscal 2019 of 6.59 billion kWh).

Risk Avoidance Measures

We have been pursuing measures for reducing electricity usage related to air conditioning equipment to minimize the increase in operating costs.

Specifically, we operate air conditioner optimal control systems that save energy. We have installed wireless temperature sensor modules that automatically control the air conditioners in response to temperatures detected by the sensors. We also seek to conserve electricity by maintaining appropriate temperature settings for air conditioners, by installing diffusers and blank panels to release exhaust heat from equipment, and by efficiently laying out double flooring to improve airflow and prevent hotspots.

In fiscal 2019, we invested approximately 8.9 billion yen into measures for reducing electricity usage, including those related to air conditioning facilities discussed above (service life of these measures: 15 years). To reduce the risk of service interruptions due to natural disasters, the NTT Group is working to strengthen the resilience of our equipment and ensure early restoration of telecommunications services by expanding base stations equipped to deal with disasters, deploying and enhancing the functions of mobile power supply vehicles, portable satellite equipment, and other mobile equipment as well as participating in disaster drills held in the respective regions. NTT's telecommunications equipment and buildings are designed to withstand natural disasters. For example, our facilities are equipped with flood doors and other defenses according to their location to prevent the inundation of telecommunications equipment.

Climate-Related Opportunities

Damage from such natural disasters as heavy rains and more frequent typhoons is becoming more common as the climate changes, and there is a growing risk of water and lightning damage and power outages, which also cause extensive damage when they occur. As a consequence, many companies need to take measures to ensure that if emergency situations such as disasters occur in the future, the organizations are able to continue important operations and restore order quickly.

The NTT Group has developed a solution business that leverages its reliable track record and expertise in business continuity planning gained over 100 years of protecting and sustaining Japan's telecommunications, which cannot be allowed to be interrupted in the event of a disaster, and considers this to be an exceptional opportunity. The NTT Group is able to develop business continuity solutions across a wide range of fields, including the cloud technology from NTT Communications, NTT DATA, NTT COMWARE and NTT Ltd., and the technology relating to buildings and power from NTT FACILITIES. In particular, NTT FACILITIES has been making substantial efforts toward winning new business.

Various measures are currently being considered to fulfill the goal of keeping the rise in global temperatures below 2°C compared to before the Industrial Revolution. The use of ICT has been recommended as one such measure. The NTT Group provides diverse ICT services as a telecommunications carrier and expects climate-related businesses will expand in the following areas.

- Further expansion in demand for smart energy businesses such as energy management using ICT, and energy-saving data centers resulting from the growing interest in efficient energy use in local communities, buildings, and households
- Expansion in a business for business continuity solutions using ICT and cloud technology accompanying corporate transition to cloud services and advances in digitization
- Expansion in demand for ICT services that ultimately reduce environmental loads, such as work style and operational reforms due to the spread and establishment of teleworking and remote work, and digital transformation (DX)
- Rise in demand for BCP-related ICT services addressing contingencies including natural disasters and system failures

Data centers are essential for using ICT in the ways described above. The NTT Group operates a large number of highly reliable and energy efficient data centers as part of its longstanding data center business that mainly involves NTT Communications, NTT DATA, NTT COMWARE, and NTT Ltd. Because of the need to provide solutions to climate change, we believe demand will grow for the NTT Group's data centers, which have a reliable track record as well as the largest floor area in the world.

Adaptation to Climate Change

The NTT Group is moving forward with initiatives for the adaptation of the NTT Group and of society to play our part in

adapting to climate change, and in developing and disseminating examples of adaptation.

Contributing to Adaptation to Climate Change

Disaster-resilient telecommunications networks and equipment

The NTT Group is striving to develop disaster-resilient telecommunications networks and equipment. These initiatives are disaster mitigation measures to continue providing telecommunications services in the event of a disaster as well as adaptation measures for disasters caused by climate change.

Adaptation of Society by Providing ICT

Installation of Wi-Fi and Storage Batteries in Public Phone Booths

We are installing backup power sources for Wi-Fi access points set up inside public phone booths to secure a means of communication during prolonged power outages. The initiative mitigates damages from disasters and serves as an adaptive measure against disasters caused by climate change.

Backup Power Supply Service based on Distributed Power Technology

The NTT Anode Energy Group provides renewable energy along with backup power for equipment needed during a power outage by installing distributed power systems including solar power generators and storage batteries at facilities that serve important functions at times of a disaster, such as shelters, with the aim of bolstering disaster prevention capacity of local communities. The company is also conducting verification tests to develop backup services with even higher resilience against disasters by using the direct-current power supply technology it accumulated through storage batteries installed at NTT station buildings and telecommunications businesses.

Main Initiatives

Shift to Renewable Energy

As one of the pillars of the Environment and Energy Vision, we are promoting the shift to renewable energy for the NTT Group as a whole. In 2020, we have been driving the switch to 100% renewable energy at the head office of NTT Holdings and four facilities of NTT Laboratories.

Furthermore, the NTT Group is developing renewable energy sources while also promoting their use in its own business activities. For example, NTT Anode Energy is focusing on the development of renewable power stations such as solar power plants while using the NTT Group's ICT and direct-current power supply technologies to develop and provide solutions that make advanced use of distributed energy resources such as renewable energy generators and storage batteries. This is to contribute to the establishment of social infrastructure that facilitates the spread of renewable energy and realize a sustainable society.

Pursuing Initiatives across the Industry for Energy-Efficient ICT Devices

NTT is a member of the Telecommunications Carrier Association (TCA) and in that capacity, participates in the ICT Ecology Guideline Council,^{*1} an organization that seeks to enhance the energy efficiency of telecommunications-related products. The council formulates guidelines on the criteria for evaluating the energy efficiency of telecommunications devices, and NTT has contributed to the technical aspect of this effort. The NTT Group's Energy Efficiency Guidelines are based on the guidelines created by this council.

In August 2010, eight NTT Group companies^{*2} acquired the Eco ICT Logo on submitting self-evaluations of their CO₂ emissions reduction efforts, including the establishment of Energy Efficiency Guidelines. The Eco ICT Logo was created by the ICT Ecology Guideline Council to signify efforts by telecommunications service providers to reduce CO₂ emissions.

We will continue to drive the development and procurement of energy-efficient equipment, and work with the ICT Ecology Guideline Council to help bring both vendors and carriers together to promote the industry-wide procurement of energy-efficient equipment. We will ensure that vendors are consistently provided with requirements for NTT Group specification processes, and include energy efficiency information disclosure and our corporate stance on energy efficiency in our criteria for selecting vendors.



^{*1} ICT Ecology Guideline Council: An organization established jointly by the Telecommunications Carriers Association, Telecom Services Association, Japan Internet Providers Association, Communications and Information Network Association of Japan and ASP-SaaS-IoT Cloud Consortium to drive industry-wide efforts to address the issue of global warming.

^{*2} The eight NTT Group companies are NTT, NTT East, NTT West, NTT Communications, NTT DOCOMO, NTT DATA, NTT FACILITIES, and NTT COMWARE.
ICT Ecology Guideline Council WEB <https://www.tca.or.jp/information/ecoict/index.html> (Japanese only)

Environmental Labeling System for Solutions*

The NTT Group has been implementing an environmental labeling system for solutions formulated in fiscal 2009, which enables us to communicate the environmental contributions made by ICT to customers in a manner that is easy to


understand, and to promote Group environmental efforts.

Under the system, ICT solutions offered by Group companies that provide a certain level of environmental load reduction effects are certified as environmentally friendly solutions and the companies are allowed to display the environmental label designated by the NTT Group. A solution must meet the criteria of demonstrating a reduction rate of over 15% based on a quantitative assessment of the reduced volume of CO₂ emissions.

Certified solutions and their assessment results are published in the Environmental Labeling System for Solutions section under NTT Group Environmental Protection Activities on the official NTT website.

In fiscal 2019, 6 solutions were certified as environmentally friendly, bringing the total number of certified solutions to 84 (as of March 31, 2020).

* The Environmental Solution Label is a self-declared program (TYPE II) formulated by the NTT Group.

 [Environmental Solution Label](https://www.ntt.co.jp/kankyo/e/protect/label/index.html) <https://www.ntt.co.jp/kankyo/e/protect/label/index.html>



Group-Wide TPR Campaign to Reduce Electricity Usage

The NTT Group has been working on Group-wide energy conservation activities named the TPR (Total Power Revolution) Campaign since October 1997 with respect to the electricity it consumes, which accounts for over 90% of the CO₂ emissions from its business activities. By promoting efficient energy management at buildings owned by NTT and installing energy-efficient electrical power units, air conditioning systems and telecommunications equipment, we managed to continue to reduce electricity usage across the NTT Group by approximately 260 million kWh from projected levels in fiscal 2019.

Energy-Saving Data Centers

NTT Communications offers data centers with a PUE* of less than 1.2, and NTT COMWARE offers data centers with a PUE of less than 1.1, which are at the top worldwide for energy efficiency. We are striving to enhance PUE for our other data centers as well, introducing five-star equipment with the highest level of energy efficiency in accordance with the NTT Group Energy Efficiency Guidelines. NTT FACILITIES has been developing technology for reducing the electricity consumption of data centers by incorporating higher efficiency technology for electrical power units and air conditioning systems as well as central air conditioning control systems.

* Power Usage Effectiveness: PUE is calculated by dividing the total power consumption of a data center by the power consumption of the computing equipment it houses. It is a figure larger than 1, with higher efficiencies represented by values approaching 1.

Promotion of EV100

The NTT Group is committed to reducing its corporate fleet and converting to electric vehicles (EV). We will replace 50% of our general-purpose vehicles with EV by 2025 and 100% of our fleet by 2030. Accordingly, we are establishing battery charging stations for EVs on the grounds of our telecommunications buildings.

To convey our initiative to the public, in October 2018 NTT became the first telecommunications operator in the world to become a member of the Climate Group's EV100* international initiative. In May 2020, we established the Electric Vehicle Promotion Consortium in a joint effort with Hitachi, Ricoh, and Tokyo Electric Power to expand the use of electric vehicles in the commercial sector. Looking ahead, we will promote the shared use of vehicles, decarbonization in the area of mobility, use of EV at times of a disaster, and initiatives related to systems and regulations.

* EV100: International initiative for promoting commercial use of EV and development of the service environment.

Initiatives for Realizing the IOWN Concept

The development of ICT has dramatically increased the volume of information being transmitted through networks. Up to now, energy has been saved by enhancing power efficiency through the introduction and renewal of highly energy-efficient telecommunications equipment. However, the performance and efficiency of integrated circuit technology which has grown in line with Moore's law, is thought to be approaching its limits in terms of speed and energy consumption due to the restrictions of nanoscale fabrication and integration density. NTT Laboratories is advancing research and development that incorporates optical technology into signal processing with the aim of using photonics to realize a base for a new kind of computing. This has resulted in the development of a modulator with the lowest ever reported energy consumption and an optical transistor which transfers a high-speed optical signal to another light with gain (announced in April 2019).

The NTT Group is advancing the development of photonic technology and we have established the IOWN (Innovative Optical & Wireless Network) concept as one of the pillars of an all-photonic network that incorporates photonic-based technology throughout entire networks, including terminals. The target of this all-photonic network will be to realize power efficiency that is 100 times greater in areas where photonics technology is applied, and we expect it will radically reduce energy consumption. We are collaborating with global partners and specialists in a wide range of research and technological fields with the aim of realizing the IOWN concept.

Please see page 026 for details about initiatives on realizing the IOWN concept.

Implementing Closed Loop Recycling



Relevant GRI Standards: 103-2/301-1,2,3/303-1,2,3/306-3

Our Approach

Although our one-way society of mass production, mass consumption and mass disposal has brought affluence and convenience to our lives, it has brought about various problems such as the creation of massive amounts of refuse, illegal dumping and concern about the depletion of natural resources. To resolve these issues we must first review how companies manage their businesses as well as our social and economic systems, and shift to a closed loop society.

In an effort to realize a future with closed loop recycling, the NTT Group promotes the 3Rs (reduce, reuse and recycle), working to reduce the amount of materials consumed by our business activities and reuse or recycle the resources that are consumed.

Organization for Implementation

The NTT Group has established a Closed-loop Recycling Committee, which works under the NTT Group Global Environmental Protection Promotion Committee. The Closed-loop Recycling Committee has the senior manager of NTT West's real estate planning department as its chair and the people responsible for the environment or facilities at eight major Group companies as members. The committee investigates and promotes closed loop recycling-related measures in the NTT Group, promotes measures aimed at achieving our targets for waste disposal, considers targets and measures for resource procurement and retention, and manages the implementation of these measures.

The working groups (WG) under the committee advance activities according to their respective themes. The Construction Waste WG promotes measures and keeps track of results regarding the disposal of industrial waste produced by construction and public works, the Decommissioned Telecom Facilities WG promotes measures and keeps track of results regarding the disposal of industrial waste produced by decommissioned telecom facilities, the Business and General Waste WG promotes measures and keeps track of results regarding the disposal of office and business-related waste, and the PCB Storage and Disposal WG engages in the storage of PCB waste so that it can be disposed of in an appropriate way.



Targets and Results

The NTT Group has established a target to continually achieve zero emissions by fiscal 2030 in which the final disposal ratio of waste generated by the NTT Group is under 1%. We require a large amount of resources in order to sustain our business operations and provide various services including information communication. This is why we have set a target to contribute to both the avoidance of business continuity risks and achievement of closed loop recycling.

In fiscal 2019, the percentage of final disposal waste was 1.13%. We will continue to work hard to promote the 3Rs toward our goal of achieving zero emissions.

Regarding decommissioned telecommunications equipment, we have achieved zero emissions for 16 consecutive years since fiscal 2004.

Main Initiatives

Reuse and Recycling of Telecommunications Equipment

The NTT Group owns various types of telecommunications equipment and related items including telephone poles, switching equipment, communications cables, public telephone booths and public telephones. These are decommissioned and disposed of when they reach the end of their service life or are replaced during system upgrades for new services and so forth.

We promote the reuse, or recycling, of telecommunications equipment within the NTT Group; for example: recycling concrete waste from discarded concrete poles as road building material. Public telephone booths and public telephones are taken to a specialized intermediate treatment plant, where parts of the booths are sorted into aluminum, stainless steel, glass and plastic. Similarly, the baseboards, copper wires and various plastics in the public telephones are meticulously sorted. They are then sent to a recycling plant to become recycled materials such as rare metals, copper and pellets. The recycling rate there is reflected in the precision, as a result of careful hand sorting, at the intermediate treatment plant.

To prevent the inappropriate treatment of the materials, such as illegal dumping, NTT East collaborated with NTT-ME

to construct a system that uses GPS and photography to confirm proper disposal from the site of discharge to the disposal plant.

Reduction in Plastics Use and Promotion of Recycling

The NTT Group is seeking to reduce the use of plastics and promoting recycling. For example, plastic parts of telecommunications equipment such as coverings for branch lines and ready access terminal boxes are used in a closed recycling system in which similar types of disposed covers are recycled into plastics to manufacture new products. We are also seeking to abolish the use of plastic packaging materials for devices used at customers' homes when connecting optical lines such as optical network units (ONU) and home gateway (HGW) units.

Recycling Process for Mobile Phones

Containing gold, silver, copper, palladium and other metals, mobile phones could be regarded as a valuable recycling resource in Japan with its paucity of mineral resources. NTT DOCOMO has accordingly collected used mobile phones from customers since 1998 at its approximately 2,300 docomo shops throughout Japan, and through various events. In fiscal 2019, we collected about 3.87 million* mobile phones, bringing our cumulative total to 115.23 million units collected.

In fiscal 2011, the company introduced a new recycling process for pyrolyzing any plastic used in mobile phones to turn it into oil for use as a fuel, after which gold, silver and other metals are recovered from the residues of this process.

Going forward, we will continue to implement recycling initiatives and contribute to realizing a sustainable society.

* The number of units collected for reuse is included in the figure after fiscal 2015.

Hazardous Waste

For NTT Group operations, hazardous waste as defined by law applies to asbestos contained in waste generated from construction work on relay stations, waste such as transformers and condensers containing PCBs, and lead batteries. These are disposed of appropriately and in compliance with the Waste Management and Public Cleansing Law (Waste Disposal Law) as well as other laws and regulations, and the NTT Group does not have a record of disposing of such waste in foreign countries. We also pay meticulous attention to the proper storage and management of equipment containing PCBs and PCB contaminated wastes, and dispose of them with safe and appropriate methods in conformity with the Law Concerning Special Measures Against PCB Waste.

Water Management

Due to the nature of the NTT Group's business, little water is consumed in our operations. In Japan, one-year domestic and industrial water consumption totaled 25.9 billion m³*, while the NTT Group's water consumption totaled 5.834 million m³, only about 0.03% of the total for all of Japan. Moreover, our water use is spread out across the country and so we believe our water intake does not have any significant impact on water sources.

The NTT Group reduces its consumption of tap water by using recycled wastewater and rainwater.

Research centers where we use chemical substances in our research activities implement individual measures against leakages of chemical substances into wastewater. For example, at the Atsugi R&D Center, which carries out research on the physical properties of materials, we have installed equipment to treat chemical-infused waste liquid discharged by the laboratories. Furthermore, we regularly monitor the quality of this wastewater to confirm that it is within legal regulation values. The NTT Group has not been involved in any significant spills.

* From the Ministry of Land, Infrastructure, Transport and Tourism website: Actual water use in fiscal 2015 (water intake basis) was approximately 79.9 billion m³ per year (domestic and commercial use of water: approximately 14.8 billion m³; water for industrial use: approximately 11.1 billion m³; water for agricultural use: approximately 54.0 billion m³).

Paper Management and Recycling

Paper consumption of the NTT Group in fiscal 2019 was 32 thousand tons. As for telephone directories, which account for more than 70% of our paper consumption, we established a closed loop recycling system in 1999 to collect old directories and recycle them to produce new ones. We undertake numerical management for our use of virgin pulp.

Also, we are working to reduce paper consumption of society through the use of ICT, which includes measures such as our Web billing service*.

* A service enabling customers to check their charges and usage at any time online.

Planning a Future of Natural Harmony



Relevant GRI Standards: 103-2/304-2

Our Approach

The NTT Group's businesses have an impact on ecosystems. For example, the telecommunication equipment essential to our business operations, particularly telephone poles and communications cables, is installed in the natural environment. At the same time, we are sometimes affected by the ecosystem, for example cables are bit and damaged by squirrels or crows.

Ecosystems full of biodiversity provide the bounty, such as water and food, which is critical to supporting all forms of life on earth. The NTT Group is working to preserve the ecosystems, which are the foundation of society's activities, while also considering the mutual influence between ecosystems and the NTT Group.

Organization for Implementation

The NTT Group has established a Natural Harmony Working Group, which works under the NTT Group Global Environmental Protection Promotion Committee. It is led by the senior manager of the NTT Environmental Protection Office and its members include the people responsible for the environment at the holding company and eight major Group companies. The working group investigates and promotes ecosystem preservation measures in the NTT Group.

Main Initiatives

Environmental Assessments during the Construction of Data Centers and Other Buildings

When planning to construct new data centers or other buildings, we research the historical, social, geographical, biological and environmental attributes of the prospective building site and surrounding district based on our NTT Group Green Design Guideline for Buildings, and endeavor to reflect the necessary aspects in the facility's design.

For example, we use native plant species as vegetation for greening our data centers, which have in recent times become the core components of ICT infrastructure. When drawing up proposals for the construction of new data centers for customers, the NTT Group applies the Comprehensive Assessment System for Built Environment Efficiency (CASBEE*) and submits proposals designed to obtain the highest CASBEE rank of S.

While paying due consideration to the environment in this way, we also take care to minimize noise and vibration and maintain the scenic appeal of the district during construction while endeavoring to ensure that exhaust heat and noise from the air conditioning outdoor units and emergency generators of functioning data centers will have minimal impact on neighboring areas.

* CASBEE: A system for the comprehensive assessment of the quality of a building from such perspectives as environmental performance, interior comfort and scenic appeal

Activities That Contribute to Preservation of the Ecosystem

As a company providing ICT services, we are working on contribution activities that harness our information dissemination capabilities. As with the portal site "Midori no goo" that makes it possible to contribute to environmental protection by using it, we are working to disseminate information and support information exchanges for raising greater awareness about the importance of the ecosystem among society.

In addition, we are working on tree planting and *satoiyama** preservation with NTT Group employees working together in every corner of Japan.

* Traditional agricultural landscapes of Japan that are mosaics of arable land, woodlands, and other types of land that have been exploited sustainably for centuries and support rich biodiversity

Environmental Performance Data

Environmental Management System

	unit	Fiscal 2015	Fiscal 2016	Fiscal 2017	Fiscal 2018	Fiscal 2019
Status of ISO 14001 Certification Acquisition (employee coverage)	%	46.7	47.1	47.9	45.1	46.5

Note: Disclosure Boundary B

Realizing a Low Carbon Future

			Unit	Fiscal 2015	Fiscal 2016	Fiscal 2017	Fiscal 2018	Fiscal 2019
GHG emissions (Scope 1)			Millions of t-CO ₂ e	0.197	0.190	0.185	0.164	0.138
GHG emissions (Scope 2)* ²			Millions of t-CO ₂ e	4.69	4.40	4.21	3.29 (4.14)	3.06 (3.79)
CO ₂ Emissions from Business Operations* ¹ , * ²	Total CO ₂ emissions (thousands of t-CO ₂)		Millions of t-CO ₂ e	4.87	4.58	4.38	3.44 (4.29)	3.19 (3.92)
	Breakdown	Use of electricity		4.665	4.375	4.183	3.259 (4.115)	3.031 (3.764)
		Use of gas and fuel		0.139	0.134	0.135	0.118	0.101
		Company vehicle operation		0.042	0.038	0.033	0.031	0.027
		Use of heat		0.027	0.029	0.027	0.029	0.030
Greenhouse Gas Emissions other than CO ₂ Emissions (CO ₂ emissions-equivalent)	Total GHG emissions other than CO ₂		Thousands of t-CO ₂ e	14	18	16	16	11
	Breakdown	CH ₄		2	2	3	2	2
		N ₂ O		3	3	2	2	2
		HFC		5	10	7	7	6
		PFC		3	3	3	4	0.5
		SF ₆		1	1	1	1	0.4
		NF ₃		0	0	0	0	0
Electric Power Consumption	Electricity purchased* ²		Billion kWh	8.74	8.36	8.23	6.54 (8.24)	6.59 (8.20)
	Renewable energy generated			0.09	0.09	0.08	0.07	0.07
Total amount of non-renewable energy used* ² , * ³			Billion kWh	9.77	9.36	9.20	7.43 (9.13)	7.38 (8.98)
Clean Energy Generation (Solar power, wind power, etc.)			Thousand kWh	5,428	5,204	5,822	5,858	6,764
Number of Clean Energy Generators (Solar power, wind power, etc.)			Units	184	258	336	360	332
Number of Low-Emission Company Vehicles (Hybrid vehicles, electric vehicles, natural gas vehicles, and methanol vehicles)			Units	1,906	2,065	2,181	2,346	1,740
Fuel Consumption by Company Vehicles	Gasoline consumption		kl	14,642	12,545	10,631	10,111	8,767
	Diesel consumption		kl	3,316	3,347	2,970	2,701	1,868
	LPG/natural gas consumption		m ³	6,969	12,937	30,760	39,320	52,905

*1 The CO₂ emissions from business operations exclude emissions of greenhouse gases other than CO₂.

*2 The NTT Group provides equipment and the like necessary for other telecommunications carriers and data center providers to carry out their businesses. To date, we have included the fuel and electricity required for this equipment in our disclosed emission and consumption volumes in accordance with reporting methods outlined by the Act on Promotion of Global Warming Countermeasures. However, as calculation methods have been established based on the Ministry of the Environment's Basic Guidelines on Accounting for Greenhouse Gas Emissions Throughout the Supply Chain (ver. 2.3), we have adopted these for calculating the above CO₂ emissions as Scope 3. Emission amounts calculated using the previous method have been placed within parentheses. Similarly, for amounts of electricity purchased and total amount of non-renewable energy, from fiscal 2018 onward we are excluding the amount consumed by other telecommunications carriers and data center providers, and values calculated using the previous method will be placed within parentheses, and we have adopted these for calculating the above CO₂ emissions as Scope3 from fiscal 2019.

*3 For the total amount of non-renewable energy used, the volume of fuels such as gasoline and utility gas consumed have been converted into Wh values and added to the amount of electricity purchased.

Note: Disclosure Boundary B

Fiscal 2019 Scope 3 Emissions

Scope category	Scope and method of calculation	Emissions (millions of t-CO ₂ e)
GHG emissions (Scope 1 + 2 + 3)	—	22.84
Scope 1 (direct emissions)	—	0.138
Scope 2 (indirect emissions from energy use)	—	3.06
Scope 3 (indirect emissions from the value chain)	—	19.65
Category 1: Purchased goods and services	Calculation based on the number of units and monetary value of purchases of devices and services sold to customers	4.08
Category 2: Capital goods	Calculation based on capital investment costs on telecommunications and other equipment	6.02
Category 3: Fuel- and energy-related activities not included in Scope 1 and 2	Calculation based on annual consumption by energy type	0.60
Category 4: Upstream transportation and distribution	Calculation based on weight and distance, or number of devices with regard to the transport of devices sold to customers	0.05
Category 5: Waste generated in operations	Calculation based on volume of waste by type	0.01
Category 6: Business travel	Calculation based on paid expenses for business travel	0.19
Category 7: Employee commuting	Calculation based on paid expenses for employee commuting	0.07
Category 8: Upstream leased assets ^{*1}	Excluded from calculation ^{*1}	—
Category 9: Downstream transportation and distribution ^{*2}	Excluded from calculation ^{*2}	—
Category 10: Processing of sold products ^{*3}	Excluded from calculation ^{*3}	—
Category 11: Use of sold products	Calculation based on number of service subscriptions, number of devices and monetary value of telecommunications services and devices used by customers	5.67
Category 12: End-of-life treatment of sold products	Calculation based on number of service subscriptions, number of devices and monetary value of communications devices used by customers	0.05
Category 13: Downstream leased assets	Calculation based on average use of leased assets	0.75
Category 14: Franchises	Calculation based on total floor area of sales franchises	0.09
Category 15: Investments	Calculation based on Scope 1 and 2 emissions of investees in proportion to shareholding	2.07

*1 We have excluded Category 8 (upstream leased assets) from the calculation because the fuel and electricity used by leased assets is included in Scope 1 and 2 calculations.

*2 We have excluded Category 9 (downstream transportation and distribution) from the calculation because these emissions are almost entirely from our own transportation and use in our own facilities (included in Scope 1 and 2) or from outsourced transportation (included in Category 4).

*3 We have excluded Category 10 (processing of sold products) from the calculation because our main businesses involve no processing of intermediate products.

Notes:

In fiscal 2013, the NTT Group became the first telecommunications carrier in Japan to calculate and disclose emissions from all 15 Scope 3 categories based on actual data for that year, in addition to the emissions generated directly from fuel use, etc. (Scope 1) and emissions generated indirectly in conjunction with electrical and other energy use, etc. (Scope 2). We based our calculations on the Ministry of the Environment's Basic Guidelines on Accounting for Greenhouse Gas Emissions Throughout the Supply Chain (Ver. 2.3). We will endeavor to improve the precision of our data collection while continuing to calculate and disclose Scope 3 emissions.

Disclosure Boundary B

Implementing Closed Loop Recycling

				Unit	Fiscal 2015	Fiscal 2016	Fiscal 2017	Fiscal 2018	Fiscal 2019
Final Disposal Ratio	All waste			%	0.82	1.03	1.18	0.91	1.13
	Decommissioned telecommunications equipment			%	0.10	0.07	0.07	0.05	0.06
Waste and Final Disposal Waste	Total Waste			Thousands of tonnes	680	608	531	562	744
	Recycling	Total amount of recycling			674	601	524	556	735
		Breakdown	Recycled decommissioned telecommunications equipment		242	240	220	176	146
			Recycled construction works waste		244	175	133	223	325
			Recycled civil engineering works waste		141	140	129	115	228
			Recycled office waste		37	36	33	30	27
			Others		10	10	8	12	9
	Amount of waste reduced by incineration				1	1	1	1	1
	Amount of final disposal waste				6	6	6	5	8
	Asbestos Removed from NTT Group Facilities	Total amount of asbestos removed			Tonnes	15	18	19	6
Breakdown		Buildings		6		5	4	4	19
		Bridges		9		12	15	2	32
Use of Water Resources	Water Use*			Million m³	11.68	12.42	12.59	12.07	11.04
	Water Withdrawal (tap water)				-	-	-	6.275	5.834
	Volume of recycled wastewater and rainwater		Reused	Thousands of m³	548	524	492	489	167
			Reuse rate*	%	4.7	4.2	3.9	7.2	2.8
Virgin Pulp Consumption	Total			Thousands of tons	21	19	17	14	12
	Breakdown	Telephone directories			15	13	12	9	7
		Telegrams			0.2	0.2	0.2	0.2	0.2
		Office paper			2	2	2	2	2
		Billing statements			4	4	3	3	3
Paper Consumption Reductions from Web Billing Service	Number of users			Millions	37.28	36.07	35.36	33.71	33.64
	Paper consumption reductions			Tonnes	3,384	3,362	3,216	3,082	2,981

* The reuse rate shown up to fiscal 2017 corresponds to the total volume of tap water and sewage, recycled water, and rainwater used, while the reuse rate from fiscal 2018 onward corresponds to the total volume of tap water, recycled water, and rainwater.

Note: Disclosure Boundary B

Planning a Future of Natural Harmony

	Unit	Fiscal 2016	Fiscal 2017	Fiscal 2018	Fiscal 2019
Expenditures on Biodiversity Preservation Projects	million yen	488.0	421.4	544.7	558.0