



## Material Issue: Environment

# Initiatives to Conserve the Global Environment

## KDDI's approach

### Recognition of social issue

In these times when global warming is evident, along with measures to mitigate global warming by reducing greenhouse gas emissions, people are asking about adaptations to global warming where nature and society are changing in response to the effect on the global environment. For companies, making simultaneous efforts to mitigate and adapt to this issue is important.

### KDDI's risk and opportunity

KDDI is aware of the risk of global warming and other climate changes, as well as large-scale natural disasters, and is taking the opportunity to mitigate and adapt to those risks. Global warming increases the risk of natural disasters, which greatly increases the chance of damage or disruption to communications equipment and interruption of communications hindering the provision of stable information communication services. Meanwhile, we are taking the opportunity to provide ICT services by using equipment that has a lesser environmental load and developing and proposing services, solutions, and other efforts that reduce the movement of customers. Furthermore, ICT services have become a valuable means of communications during times of disaster functioning as a lifeline that society cannot do without. As such, we are constantly working to provide high quality information communications services 24 hours a day, 365 days a year.

### KDDI's management

KDDI has in place the KDDI GREEN PLAN 2012-2016 Medium-term Environmental Conservation Plan based on the KDDI Environmental Charter, and the KDDI Action Guidelines on the Preservation of Biodiversity based on this Medium-term Environmental Conservation Plan. As of March 31, 2016, we are progressing in line with achieving the KDDI GREEN PLAN 2012-2016, barring one of the items.

### Key Performance Indicators (KPI)

	FY2016 Goal	FY2015 Result
Amount of power consumption (compared to when energy conservation measures are not taken)	30% constraint	Progressing at pace to achieve this goal
Amount of power consumption per subscriber (compared to FY2011)	15% reduction	33.4% reduction
Number of Tribrid Base Stations established	100 stations (FY2012 Goal)	Achieved at the end of March 2013
Achieve zero emissions for retired telecommunications facilities (* Zero emissions is defined as having a final disposal rate of 1% or less.)	Final disposal rate of 1% or less	Final disposal rate of 0.8%
Recycling rate of used mobile phone material	Over 99.8%	99.8%
Recycling rate of general waste material for KDDI buildings and headquarters	Over 90%	85.7%

### Policies



KDDI Environmental Charter

[Link](#) Page\_87



KDDI Action Guidelines on the Preservation of Biodiversity

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## Highlights of FY2015 Activities

We have calculated and released FY2012, FY2013, FY2014, and FY2015 emissions for Scope 3, which indicate the greenhouse gas emissions in the supply chain.



Scope 1 and Scope 2 FY2014 Greenhouse Gas Emission Verification Statement

[Link](#) Page\_108



Scope 3 FY2015 Greenhouse Gas Emission Verification Report

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## Future issues

- Efforts to reduce environmental load for the supply chain
- Transferring environmental technology that considers the environment overseas

# Environmental Management

## Policy

### KDDI Environmental Charter

KDDI Environmental Charter is composed of the Manifesto (Approach to Global Environmental Problems) which is the highest concept, and the Action Guideline for defining the direction of concrete initiatives.

#### Manifesto

KDDI Group recognizes the importance of fulfilling its duty as a responsible global corporate citizen to conserve and protect the Earth's irreplaceable environment so that it can be inherited by future generations. We are committed to pursuing our business in eco-conscious ways, through programs of activities that span the entire company.

#### Action Guideline

1. We will strive to evaluate the quantitative impact of our activities as a company on the global environment, implement effective environmental protection programs and continuously improve these programs. Specifically, we will:
  - (1) Develop and operate environmental management systems necessary to make continuous improvements in such environmental fields as energy conservation, resource conservation and waste reduction.
  - (2) Comply with environmental laws, ordinances and other regulations and requirements. In particular, we will promote measures to reduce our electricity consumption from the perspective of preventing global warming.
  - (3) Promote communication through the appropriate disclosure of information.
2. We will strive to develop and offer services that reduce environmental impact through the use of next-generation information technologies.
3. We will contribute to the development of a recycling-oriented society by promoting measures to mitigate and reduce the environmental impact of activities that necessarily entail mass consumption, such as the supply of mobile handsets.
4. We will promote corporate purchasing policies that favor eco-friendly products and equipment.
5. As a responsible corporate citizen, we will contribute to society and local communities through activities that promote an affluent society that is in harmony with the environment.

## Policy

### KDDI Action Guidelines on the Preservation of Biodiversity

KDDI has established the KDDI Action Guidelines on the Preservation of Biodiversity based on the Third Medium-term Environmental Conservation Plan, which began in FY2012, to multilaterally capture the contributions towards the preservation of Biodiversity. Using this policy, we are pinpointing various opportunities to engage in promoting activities.

#### Preserving Diversity in Business Activities

When formulating business plans, we take into consideration the impact on the related ecosystems and local community.

#### Collaboration and Cooperation with Related Organizations

We strengthen collaboration and cooperation with administrative authorities, NPOs and other organizations, and undertake CSR activities using ICT.

#### Promoting Recycling of Resources

To prevent the depletion of bioresources and minimize degradation of the natural environment, we continuously and proactively engage in recycling of resources.

# Environmental Management

## Message from Executive Officer

The Paris Agreement, an international framework for new climate change mitigation measures that become effective in 2020, was adopted at the COP21 summit held in Paris last year. The Paris Agreement sets international standards that aim to hold the increase in the global average temperature to well below 2°C above pre-industrial levels. Accordingly, the Ministry of the Environment has announced a policy for implementing climate change measures in line with the Paris agreement. Based on this policy, KDDI is moving forward with improving the energy efficiency of base station equipment and other communications equipment, and working to reduce the amount of power that we consume. At the same time, by providing ICT services, we are contributing to the reduction of energy consumption by customers and society and to the reduction of greenhouse gas emissions.



**Akira Dobashi**  
Executive Officer, CSR Environmental Sustainability General Manager, General Administration & Human Resources Division

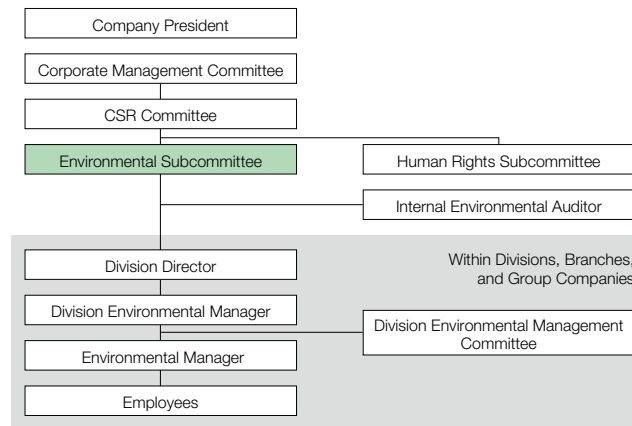
In addition, FY2016 is the final year in our Third Medium-term Environmental Conservation Plan. Moving forward, KDDI will continue promoting activities that aim to achieve our objectives, while working to establish and publicize our next Environmental Conservation Plan for FY2017 and beyond. Through the promotion of various conservation activities with the efforts from customers, business partners, and employees, KDDI will continue striving to fulfill our social responsibility.

### System

## Environmental Management Regime

### KDDI Group's Environmental Management Regime

KDDI Group has formed the KDDI Environmental Subcommittee, comprising members from each division, branch, Group company, and related organization. This subcommittee serves as the center for formulating KDDI's environmental management system and promoting efficient environmental preservation activities throughout the Group.



### KDDI Group's Environmental Management Regime

KDDI has acquired ISO14001 certification for this management system.

As of the end of March 2016, of the 83 companies that make up KDDI and its domestic consolidated subsidiaries, 20 companies (24%) have acquired this certification, along with 1 overseas company and 4 related organizations.

### KDDI Group ISO14001 Certification Acquisition

As of March 31, 2016: KDDI CORPORATION, Okinawa Cellular Telephone Company, KDDI Evolva Inc., KDDI Evolva Okinawa Corporation, KDDI R&D Laboratories Inc., KDDI RESEARCH INSTITUTE INC., KDDI Technology Corporation, KDDI Engineering Corporation, Kokusai Cable Ship Co., Ltd., mediba inc., Japan Telecommunication Engineering Service Co., Ltd., KDDI Group Foundation, KDDI Health Insurance Union, KDDI Pension Fund, KDDI Web Communications Inc., KDDI Challenged Corporation, KDDI Foundation, TELEHOUSE International Corporation of Europe Ltd., Chubu Telecommunications Co.,Inc., WebMoney Corporation, KDDI MATOMETE OFFICE CORPORATION, KDDI MATOMETE OFFICE HIGASHINIHON CORPORATION, KDDI MATOMETE OFFICE CHUBU CORPORATION, KDDI MATOMETE OFFICE KANSAI CORPORATION, KDDI MATOMETE OFFICE NISHINIHON CORPORATION

### Internal Environmental Audits

KDDI conducts internal environmental audits once each year. In FY2015, 57 departments and 84 offices were provided with a checklist and then interviewed by internal environmental auditors in a two-phase evaluation on the state of conformity with environmental legislation. The audit also verifies the functioning of the system for systematic and ongoing improvement of environmental activities.

In FY2015, we had no violations of environmental legislation.

### Appropriate Processing of PCB

KDDI manages the disposal of transformers, capacitors, and other components that previously included high-concentration PCB. In FY2015, disposal could not be performed because the disposal

## Environmental Management

processors were not fully prepared to receive the disposal items. We will continue the disposal of remaining high-concentration PCB devices as soon as disposal processors that can accept them are in place. We are also scheduling the disposal of low-concentration PCB devices.

### ■ Compliance with the Green Purchasing Law

Read about KDDI's compliance with the standards required by the Law Concerning the Promotion of Procurement of Eco-friendly Goods and Services by the State and Other Entities (enacted in 2000; subsequently referred to as "Green Purchasing Law") and the Basic Policy for the Promotion of Procurement of Eco-friendly Goods and Services.



Link Website

State of Compliance with Green Purchasing Law (Japanese)



Link Website

List of Compatible Models (Japanese)



Link Website

Product Line-Up

### ■ Acquiring the Eco ICT Mark

KDDI acquired the Eco ICT Mark established by the ICT Ecology Guidelines Council\* as part of our endeavor to further environmental conservation and the reduction of environment load.

\* Council founded for the purpose of establishing energy-saving indices to be referenced when procuring ICT devices and data centers. The constituting members are: Telecommunications Carriers Association (TCA), Telecom Services Association (TELESA), Japan Internet Providers Association (JAIPA), Communications and Information Network Association of Japan (CIAJ), and ASP-SAAS Industry Consortium (ASPIC).

Infusion





### Environmental Awareness for Employees

In order to deepen understanding with regard to KDDI's environmental initiatives, each year the company periodically institutes e-learning programs targeting all employees. In FY2015, during June, which is Environment Month, KDDI held e-learning sessions about climate change and Scope 3 in which 12,677 participants attended (participant rate of 93.2%).







# Environmental Management

Activity and Results

## Self-evaluation Check List for CO<sub>2</sub> Emission Reduction Efforts by Telecommunication Operators

		Evaluation item	If implemented, description of actions taken
Formulation of voluntary environmental action plan, etc.	1	Has the organization formulated a voluntary environmental action plan that describes actions for reducing CO <sub>2</sub> emissions? Has the plan been implemented?	<p>KDDI has formulated a Medium-term Environmental Conservation Plan based on the KDDI Environmental Charter, and the plan is being implemented.</p> <p> <a href="#">Link</a> Page_87</p> <p>KDDI Environmental Charter/Action Guidelines</p>
	2	Does the voluntary environmental action plan include specific actions for which quantitative goals for CO <sub>2</sub> emission reduction are stated?	<p>The Third Medium-term Environmental Conservation Plan (KDDI GREEN PLAN 2012-2016) sets the following targets.</p> <ul style="list-style-type: none"> <li>30% reduction in energy use estimated for FY2016 compared with not taking any energy-saving measures</li> <li>15% reduction in energy use per subscriber estimated for FY2016 compared with FY2011</li> <li>Expansion of Tribrid Base Stations to 100 by March 31, 2012 (Target achieved)</li> <li>Achieve zero emissions for retired telecommunications facilities (*Zero emissions is defined as having a final disposal rate of 1% or less)</li> <li>Recycling rate of used mobile phone material Over 99.8%</li> <li>Recycling rate of general waste material for KDDI buildings and headquarters Over 90%</li> </ul> <p> <a href="#">Link</a> Page_92</p> <p>Third Medium-term Environmental Conservation Plan – KDDI GREEN PLAN 2012-2016</p>
	3	Does the organization put efforts into informing and enlightening employees about environmental conservation actions to improve their environmental awareness, as well as publishing the organization's voluntary environmental action plan internally and externally?	<p>The Medium-term Environmental Conservation Plan is published inside and outside the company by means of the Integrated Report (Detailed ESG Version) and the corporate website. KDDI also provides e-learning programs and internal seminars for employees whenever necessary.</p> <p> <a href="#">Link</a> Page_89</p> <p>Environmental Awareness for Employees</p>
	4	Are the implementation statuses of and the targeted achievements for actions given in the voluntary environmental action plan disclosed to the public?	<p>The attainment statuses of trend targets toward the achievement of the Medium-term Environmental Conservation Plan are published in the Integrated Report (Detailed ESG Version) and the corporate website.</p> <p> <a href="#">Link</a> Page_86</p> <p>Material Issue: Environment</p>

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		Evaluation item	If implemented, description of actions taken
Eco-efforts in procurement	5	Has the organization formulated, with a view to energy-saving, procurement standards for ICT devices and data centers? Does procurement conform to the established standards?	KDDI conducts its procurement activities in accordance with the KDDI Green Procurement Guidelines.  Promoting Green Procurement <a href="#">Link</a> Page_98
	6	Does the organization procure office supplies and other goods as well as logistics service in an energy-saving manner (Green purchasing, etc.)?	KDDI promotes green purchasing under the KDDI CSR Procurement Policy.  Supply Chain Management <a href="#">Link</a> Page_78
Promotional system for eco-efforts	7	Is there an assigned group or personnel in charge of CO <sub>2</sub> emission reduction actions?	The CSR & Environment Management Department is established as the internal organization responsible for CO <sub>2</sub> emission reduction efforts.
	8	Does the organization have a system for appropriately monitoring and checking the status of implementation and the achievement level of targets given in the voluntary environmental action plan as well as for conducting internal audits?	KDDI monitors the status of implementation and the achievement level and conducts inspections and improvements through internal audits, both of which are realized through the ISO environmental management system.
Other eco-efforts	9	Does the organization undertake eco-friendly actions beside energy-saving efforts?	The promotion of 3R (Reduce, Reuse, Recycle) is also a core KDDI challenge, and the following goals are pursued: Promotion of recycling communications equipment; Improvements in recovering resources Promotion of recycling used mobile phones; Improvements in recovering resources Reduction in paper resource use via "Green by ICT" (Bill on WEB, KDDI paperless fax service, slimmed-down au mobile phone manual, compact individual packaging, etc.); Reduction in office waste and improvements in recovering resources. KDDI is also engaged in improving the supply chain through Scope 3 and LCA efforts, and support for Biodiversity.  Low-carbon society <a href="#">Link</a> Page_99  Recycling-oriented society <a href="#">Link</a> Page_102  Biodiversity <a href="#">Link</a> Page_104
	10	Does the organization perform activities for environmental conservation in collaboration with the community?	KDDI implements forest conservation activities in which employees and customers work together across the country.  Environmental Conservation Activities by Employees <a href="#">Link</a> Page_104

# Environmental Management

Policy

## Third Medium-term Environmental Conservation Plan KDDI GREEN PLAN 2012-2016

As a 5-year Environmental Conservation Plan beginning from FY2012, KDDI established the KDDI GREEN PLAN 2012-2016 Third Medium-term Environmental Conservation Plan. This plan takes three material issues – Low-carbon society, Recycling-oriented society, and Biodiversity – and establishes concrete targets for each. By promoting the 3G – Green of ICT, Green by ICT, and Green Road Project – we will continue further contributing to the conservation of the global environment.



3Gs	Issue addressed	Example of initiatives
Green of ICT	Low-carbon society	Reduction of power consumption in base stations and disaster preparedness initiatives
	Recycling-oriented society	Reuse and recycling of communications equipment
Green by ICT	Low-carbon society	Environmental monitoring that uses M2M/IoT
	Biodiversity	Research on behavior of endangered river dolphins
Green Road Project	Recycling-oriented society	Promotion of mobile phone recycling
	Biodiversity	Environmental conservation activities by employees

Material issues and specific targets

Material Issues	Targets
Low-carbon society	(1) By FY2016, reduce electric power consumption by 30%, compared with the level if energy-saving measures had not been implemented. (2) By FY2016, lower electric power consumption per subscriber by 15%, compared with FY2011. (3) By the end of FY2012, increase the number of Tribrid Base Stations to 100.
Recycling-oriented society	(1) Achieve zero emissions for retired telecommunications facilities.* (2) Achieve material recycling ratio of 99.8% or more for used mobile phone handsets. (3) Achieve a material recycling ratio for general waste of 90% or more at KDDI-owned buildings and in the headquarters building.
Biodiversity	(1) Pursue activities based on our action guidelines for preservation of biodiversity.

\* Zero emissions is defined as having a final disposal rate of 1% or less.

Activity and Results

## Progress of the Third Medium-term Environmental Conservation Plan

Looking toward the target FY2016, we are promoting concrete targets for the Third Medium-term Environmental Conservation Plan established in FY2012. At the end of March 2016, barring the target of the over 90% recycling rate of general waste material for KDDI buildings and headquarters, we are progressing at a pace to achieve our goals including already having achieved the goal of expanding to 100 Tribrid Base Stations. The recycling of general waste material is dependent on equipment specifications of processors and other conditions of the processing area, which is making it difficult to achieve our target.

# Environmental Management

## Activity and Results

### Environmental Accounting

Noteworthy changes in parameters of environmental accounting during FY2015 were twofold: (1) the expansion of the scope of calculation and the addition of 1 domestic consolidated subsidiary (Kokusai Cable Ship Co.,Ltd) and 5 overseas consolidated subsidiaries (TELEHOUSE Beijing Co.,Ltd., TELEHOUSE Shanghai Co.,Ltd., KDDI Korea Corporation, KDDI Singapore Pte Ltd., TELEHOUSE International Corp. of Vietnam), and (2) the increase in electric power consumption (MWh) and greenhouse gas (t-CO<sub>2</sub>) compared with the preceding fiscal year.

KDDI and 30 major consolidated subsidiaries <sup>(1)</sup>

Period: April 1, 2015 to March 31, 2016

Environmental Protection Costs		Transaction Examples	FY2014 (Millions of Yen)		FY2015 (Millions of Yen)		Change from Previous Year (Millions of Yen)	
			Investment	Cost	Investment	Cost	Investment	Cost
Business area costs	Pollution prevention costs	Pollution prevention costs stipulated by law, costs for proper disposal of PCB, etc.	0	10	0	43	0	33
	Global environmental protection costs	Power-saving wireless equipment for mobile base stations (Investment amount is calculated proportionally based on the power-saving effect.)	6,602	22,176	9,512	23,202	2,909	1,027
	Resource recycling costs	Reduction of paper resources, processing and disposal of waste products	0	282	0	560	0	278
Upstream/downstream costs		Collection, recycling, and reuse of merchandise and products	0	1,186	0	1,281	0	95
Administrative costs		Operation and updating of environmental ISO standards, disclosure of environmental information	0	78	0	134	0	56
R&D costs		R&D of technology, equipment, handsets, products, services, and other items conducive to reducing the environmental burden	0	143	0	340	0	197
Social activity costs		Donations and support for forest conservation activities and to environmental protection groups	0	44	0	56	0	12
Environmental damage restoration costs		Measures for prevention of asbestos spraying, restoration of polluted soil	0	0	0	0	0	0
Total			6,602	23,919	9,512	25,616	2,909	1,696



## Environmental Management

1. Environmental Protection Benefits (Physical)		Indicator Category (Unit)	FY2014	FY2015	Change from Previous Year
(1) Benefits derived from business area	1) Benefits related to resources invested in business activities	Power consumption (MWh)	2,296,470	2,438,952	142,482
		Paper usage (t)	13,469	12,047	△1,423
		Paper reduced by Bill on WEB (t)	3,665	3,834	169
	2) Benefits related to environmental burden and waste products discharged from business activities	Greenhouse gas emissions (t-CO <sub>2</sub> ) <sup>[2]</sup>	1,298,422	2,376,524	1,078,102
Industrial waste emissions related to telecommunications facilities and buildings (t)		7,556	5,298	△2,258	
(2) Benefits derived from upstream/downstream costs	Benefits related to goods and services produced by business activities	Number of used mobile phones and other devices collected (10,000 units)	424	348	△77

2. Economic Benefits of Environmental Protection Measures (Yen)	Substantive Benefits (Major Effects)	FY2014 (Millions of yen)	FY2015 (Millions of yen)	Change from Previous Year
Revenues	Revenues from sales through disposal of telecommunications facilities and buildings	566	333	△233
Costs reductions	Reduction in energy costs by adopting the use of low-pollution vehicles	10	12	2
	Reduction in costs of new purchases by reusing disposed of telecommunications facilities	2,361	3,879	1,519
Total		2,936	4,224	1,288

[1] KDDI Web Communications Inc., mediba Inc., KDDI R&D Laboratories Inc., KDDI Research Institute, Inc., KDDI Engineering Corporation, KDDI Evolva Okinawa Corporation, KDDI Challenged Corporation, KDDI Technology Corporation, WebMoney Corporation, KDDI MATOMETE OFFICE CORPORATION, KDDI MATOMETE OFFICE HIGASHINIHON CORPORATION, KDDI MATOMETE OFFICE CHUBU CORPORATION, KDDI MATOMETE OFFICE KANSAI CORPORATION, KDDI MATOMETE OFFICE NISHINIHON CORPORATION, Okinawa Cellular Telephone Company, KDDI Evolva Inc., Japan Telecommunication Engineering Service Co., Ltd., Chubu Telecommunications Co., Inc., Kokusai Cable Ship Co., Ltd, TELEHOUSE International Corp. of Europe Ltd. (UK), TELEHOUSE International Corp. of Europe Ltd. (France), TELEHOUSE International Corp. of America. (US), TELEHOUSE Deutschland GmbH (Frankfurt), HKCOLO.NET LTD. (Hong Kong), TELEHOUSE Beijing Co., Ltd (Beijing), TELEHOUSE BEIJING BDA Co., Ltd (Beijing), TELEHOUSE Shanghai Co., Ltd (Shanghai), KDDI Korea Corporation (Seoul), KDDI Singapore Pte Ltd. (Singapore), TELEHOUSE International Corp. of Vietnam (Hanoi)

[2] Emission coefficient used per telecommunications operator

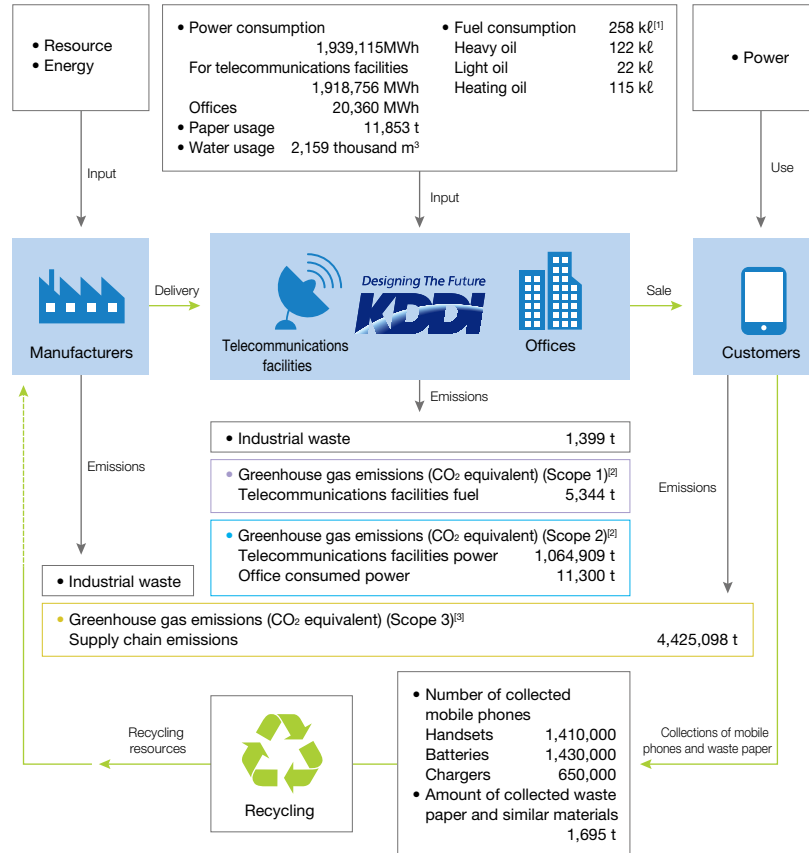
# Environmental Data

## Activity and Results

### Environmental Impact of Business Activities

Most input energy is electric power for telecommunications facilities. Heavy oil, light oil, heating oil and other fuels are input when test running emergency power generation facilities. Most water usage is generated by everyday business activities in the offices. Greenhouse gas emissions were calculated in three areas, Scope 1, Scope 2 and Scope 3 (all items), and third-party verification was received.

### Environmental Impact of FY2015 Business Activities (Coverage: KDDI)



[1] Used for air conditioning of telecommunications facilities and for emergency generators.

[2] CO<sub>2</sub> emissions are calculated using a conversion coefficient of 0.555kg-CO<sub>2</sub>/kWh for the power consumption and the emission coefficients for fuel consumption applied to the calculation, reporting, and disclosure systems based on the "Act on Promotion of Global Warming Countermeasures."

[3] CO<sub>2</sub> emissions are calculated using emission factors indicated in the Ministry of the Environment's "Overview of Basic Conversion Guidelines Related to the Calculation of the Greenhouse Effect through the Supply Chain."

# Environmental Data

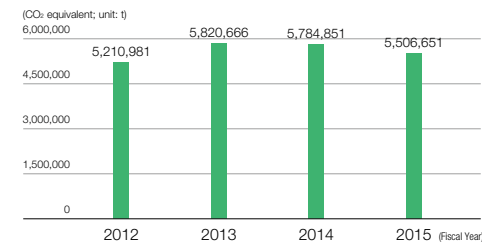
Activity and Results

## Environmental Load Data (KDDI)

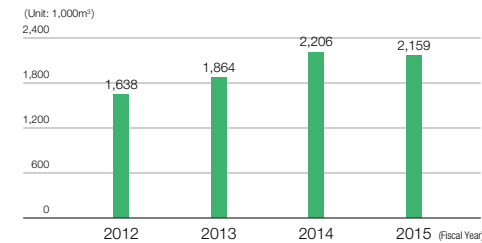
	FY2012	FY2013	FY2014	FY2015	
Greenhouse gas emissions (CO <sub>2</sub> equivalent; unit: t) *	5,210,981	5,820,666	5,784,851	5,506,651	
Electric power consumption (unit: MWh)	1,885,703	1,686,480	1,873,293	1,939,115	
Electric power consumption per subscriber (unit: MWh)	464.7	385.4	398.9	390.4	
Fuel consumption (unit: kℓ)	308	260	254	258	
Paper usage (unit: t)	17,924.0	43,429.2	13,303	11,853	
Water usage (unit: 1,000m <sup>3</sup> )	1,638	1,864	2,206	2,159	
Industrial waste emissions (unit: t)	1,401.1	1,445.7	1,283	1,399	
Number of mobile phones and other devices collected by KDDI (unit: 10,000 devices)	Mobile phones	181	154	163	141
	Batteries	182	161	182	143
	Chargers	83	72	79	65
Amount of waste paper and similar materials collected for recycling (unit: t)	2,394	2,235	2,531	1,695	
Equipment-related energy usage at centers (unit: MWh)	685,885	664,798	747,016	779,504	

\* CO<sub>2</sub> emissions are calculated using a conversion coefficient of 0.555 kg-CO<sub>2</sub>/kWh for the power consumption and the emission coefficients for fuel consumption applied to the calculation, reporting, and disclosure systems based on the "Act on Promotion of Global Warming Countermeasures."

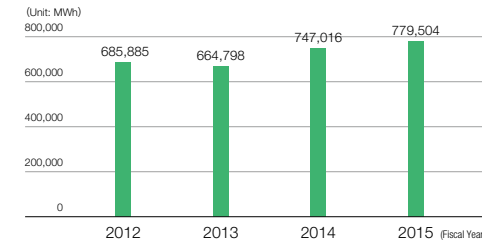
### Greenhouse gas emissions



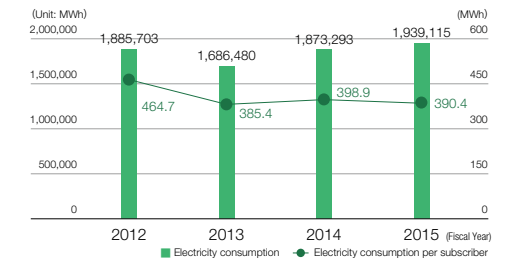
### Water usage



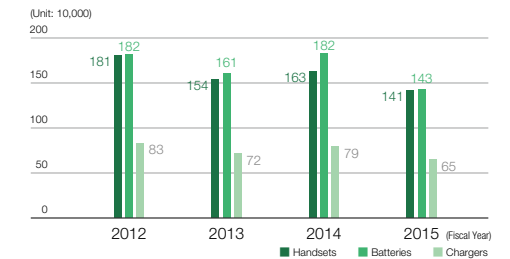
### Equipment-related energy usage at centers



### Electricity consumption and electricity consumption per subscriber



### Number of mobile phones collected by KDDI



# Supply Chain Approach

## Activity and Results


### Response to Scope 1, 2, and 3 Emissions


KDDI conducts periodic life-cycle assessments (LCA),<sup>[1]</sup> which assess environmental load, by calculating CO<sub>2</sub> emissions in every step of its products and services from manufacturing to use, disposal, and recycling. KDDI uses these assessments to quantitatively determine and disclose its environmental load. In recent years, the movement for the visualization (determining and disclosing of management and information) of emissions from the supply chain of telecommunications carriers has intensified, and KDDI has established guidelines<sup>[2]</sup> to respond to this need. Using these guidelines, we have calculated greenhouse gas emissions of the supply chain since FY2012. For FY2015 business activities, Scope 3 accounted for 80.36% of total greenhouse gas emissions (Scope 1, 2 and 3), and when looking at individual categories, we saw that Category 1 and Category 2 continued to account for a large percentage of emissions but were lower than in the previous fiscal year. We will continue analyzing these key categories and promote initiatives to reducing their emissions. The Scope 1 and 2 calculations were subjected to independent third party verification by Lloyd's Register Quality Assurance Limited. In addition, to enhance the reliability of the Scope 3 calculations, the results were subjected to third party verification by Waseda Environmental Institute Co.,Ltd..

KDDI plans to continue its efforts to determine its Scope 1, 2, and 3 emissions and reduce its environmental load.

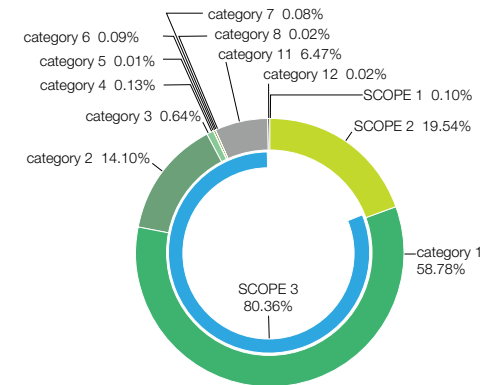
[1] Environmental load at the disposal and recycling stage includes environmental load at the manufacturing stage.

[2] Green Value Chain Platform

 Scope 1 and Scope 2 FY2014 Greenhouse Gas Emission Verification Statement  
[Link](#) Page\_108

 Scope 3 FY2015 Greenhouse Gas Emission Verification Report  
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Comparison of GHG emission ratio of each categories (FY2015)



GHG emissions and the proportions of each categories

Category		FY2012		FY2013		FY2014		FY2015	
		t-CO <sub>2</sub>	%	t-CO <sub>2</sub>	%	t-CO <sub>2</sub>	%	t-CO <sub>2</sub>	%
Scope 1	All direct GHG emissions	2,857	0.05	3,505	0.06	4,680	0.08	5,344	0.10
Scope 2	Indirect GHG emissions from consumption of purchased electricity, heat or steam	1,046,565	20.08	935,996	16.08	1,039,677	17.97	1,076,209	19.54
Scope 3	category 1	2,733,364	52.45	3,343,506	57.44	3,306,863	57.16	3,236,999	58.78
	category 2	952,799	18.28	1,093,184	18.78	1,053,203	18.21	776,711	14.10
	category 3	34,439	0.66	31,480	0.54	34,967	0.60	35,379	0.64
	category 4	8,261	0.16	4,994	0.09	7,003	0.12	7,370	0.13
	category 5	921	0.02	588	0.01	500	0.01	681	0.01
	category 6	5,154	0.10	5,080	0.09	4,590	0.08	4,831	0.09
	category 7	3,497	0.07	2,671	0.05	5,031	0.09	4,574	0.08
	category 8	1,751	0.03	1,519	0.03	1,367	0.02	1,309	0.02
	category 9	0	0.00	0	0.00	0	0.00	0	0.00
	category 10	0	0.00	0	0.00	0	0.00	0	0.00
	category 11	419,922	8.06	397,324	6.83	325,364	5.62	356,359	6.47
	category 12	1,451	0.03	819	0.01	1,606	0.03	886	0.02
	category 13	0	0.00	0	0.00	0	0.00	0	0.00
	category 14	0	0.00	0	0.00	0	0.00	0	0.00
	category 15	0	0.00	0	0.00	0	0.00	0	0.00
TOTAL		4,161,559	79.86	4,881,165	83.86	4,740,493	81.95	4,425,098	80.36
TOTAL		5,210,981	100.00	5,820,666	100.00	5,784,851	100.00	5,506,651	100.00

\* CO<sub>2</sub> emissions are calculated using a conversion coefficient of 0.555 kg-CO<sub>2</sub>/kWh for the power consumption and the emission coefficients for fuel consumption applied to the calculation, reporting, and disclosure systems based on the "Act on Promotion of Global Warming Countermeasures."

# Supply Chain Approach

System

## LCA Initiatives

KDDI conducts life-cycle assessments (LCA) to quantitatively assess and show the environmental load, by calculating CO<sub>2</sub> emissions in every step in the life of its products and services, from manufacturing to use, disposal, and recycling\*.

In FY2015, KDDI conducted LCA for “au HIKARI” and “au” as a follow-up to the LCA conducted in FY2008 and FY2012. (Calculated by KDDI Research Institute, Inc.)

The environmental load of “au HIKARI” increased slightly as a result of the manufacturing costs and power consumption of computers, and improvements to network equipment. As for the environmental load of “au”, although there was a decrease due to the reduced size and power consumption of base stations, there was also an increase due

to a rise in manufacturing resulting from the spread of smartphones, resulting in a slight overall increase in the environmental load. Moving forward, KDDI will continue to periodically conduct LCA activities.

\* The environmental load at the disposal and recycling stage is included in the environmental load at the manufacturing stage.

Policy and System

## Promoting Green Procurement

KDDI formulated “KDDI Green Procurement Guidelines” to promote purchasing of more environment-friendly products, and since April 2010 we have procured business equipment (communications devices, air conditioning systems, power supply facilities, etc.) with high energy-saving performance. The Guidelines set standards for 29 kinds of equipment, of which the standards for 15 kinds of equipment

are based on guidelines specified by the ICT Ecology Guideline Council, while those for the remaining 14 are based on KDDI's own standards set with reference to public standards in Japan and abroad (Top Runner Standards, ATIS [USA], CoC [Europe], etc.).

Furthermore, in FY2015, we implemented a CSR procurement survey for business partners, and obtained responses from nearly 100% of our business partners.

Conservation of the Global Environment  
ICT Ecology Guideline Council

[Link](#) Page\_11

KDDI Green Procurement Guidelines (Japanese)

[Link](#) Website

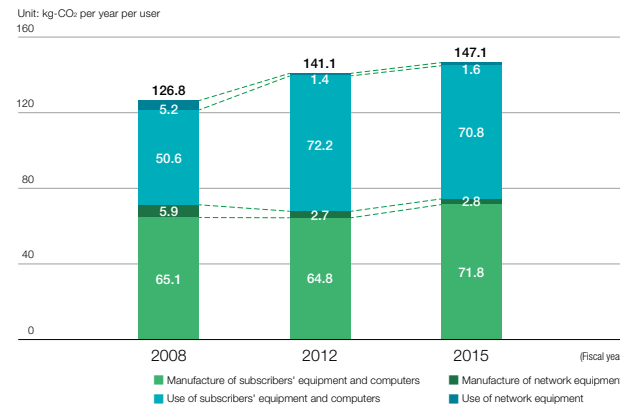
Activity and Results

## Cooperation with Suppliers

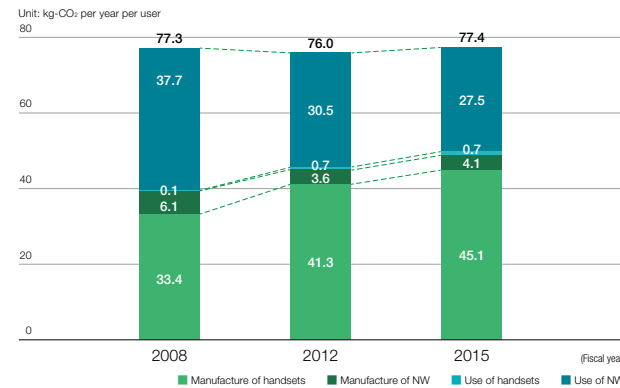
KDDI aims to reduce its environmental load and is making efforts to make its base stations lighter and more energy efficient, among other efforts. In FY2014, KDDI worked with its base station equipment suppliers to develop equipment that is lighter and consumes less power (approximately 45% lighter and approximately 22% less power consumption than previous base station equipment). In FY2015, KDDI continued working to reduce the environmental load by implementing this equipment.

KDDI will continue promoting approaches to suppliers and work with suppliers to reduce its environmental load.

### Environmental Load of au HIKARI



### Environmental Load of au



## Low-Carbon Society

### Activity and Results

### Green by ICT

#### ■ Providing Services Approved for Environmental Eco Label

The Environmental Eco Label is provided to services that contribute to reducing the environmental burden of customers and society (reducing carbon dioxide emissions) through the use of ICT services offered by KDDI.

Services approved for the Environmental Eco Label are indicated by the KDDI Eco Mark.



#### <KDDI Cloud Platform Service>

KDDI has provided the KDDI Cloud Platform Service since July 2012.

KDDI conducts the operation and maintenance of the platform through this service, enabling customers to increase and decrease server capacity remotely from their own office, without having to travel to the data center where the servers are located.

Furthermore, customers can reduce the amount of CO<sub>2</sub> that they generate by moving the servers that they install, operate, and maintain by themselves (on-premises environment) to the KDDI Cloud Platform Service. With the KDDI Cloud Platform Service, server operations are performed with an economy of scale that only a telecommunications operator can provide, enabling an approximately 38% reduction in CO<sub>2</sub> emissions per server per year, compared to when customers operate their servers individually.



Link Website

KDDI Cloud Platform Service

#### Results of verification

Equipment	Annual amount of CO <sub>2</sub> emissions (kg-CO <sub>2</sub> /year)		
	On-premises	KDDI Cloud Platform Service	Reduction
Streamlining of remote work environment	276.6	172.9	△ 103.7
Improvement of task accuracy through introduction of integrated monitoring and early warning detection functions	368.8	230.5	△ 138.3
Reduction in number of physical units	6,994.4	4,367.1	△2,627.4
Simplification of air flow design	125.6	78.5	△ 47.1
Use of high-efficiency batteries	0.5	0.3	△ 0.2
Use of Energy Star certified products	0.8	0.5	△ 0.3
Use of low-loss cables	0.3	0.2	△ 0.1
Total	7,767.0	4,850.0	△2,917.0

#### Greenhouse gas emissions

Reduction of 2.9 t-CO<sub>2</sub>/year per server (△38%)

#### <TELEHOUSE Data Center Services>

The TELEHOUSE data centers provided by KDDI are equipped with high-capacity electric power, and they incorporate the latest in energy-saving technology, such as highly efficient and reliable power supply equipment, energy-efficient air conditioning, LED illumination, and outdoor lighting that uses wind and solar power, in an effort to reduce power consumption, achieve low PUE, and provide significantly lower CO<sub>2</sub> emissions than conventional data centers.



Link Website

TELEHOUSE Data Center Services

	Conventional Data Center	TELEHOUSE
Air conditioning for ICT equipment	Air conditioning for ICT equipment	Air conditioning for ICT equipment (Optimized temperature settings)
Interior lighting	Fluorescent lighting	High-efficiency light fixtures and LED lighting
Motion sensors	Normally equipped with manually operated lighting	Motion sensors
Street lighting outside buildings	Fluorescent lighting	Lights that use wind and solar power

\*1 Measured values of FY2010 Green IT Promotion Council

\*2 Design values of TELEHOUSE OSAKA 2

#### Results of evaluation

Equipment	Annual amount of CO <sub>2</sub> emissions (t-CO <sub>2</sub> /rack)		
	Conventional Data Center	TELEHOUSE	Reduction
Air conditioning	40.2	20.1	△20.1
Interior lighting	0.1	0.1	△0.0
IT equipment	54.3	54.3	△0.0
Total	94.6	74.5	△20.1

\* Calculated based on design values of TELEHOUSE OSAKA 2

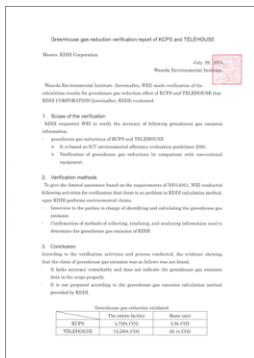
# Low-Carbon Society

## Greenhouse gas emissions

Reduction of 20.1 t-CO<sub>2</sub>/year per rack (△21%)

<Note on third-party verification>

To increase the credibility of calculations for the reduced environmental burden (reduced carbon dioxide emissions) of the services approved for the Environmental Eco Label, KDDI receives third-party verification from Waseda Environmental Institute Co., Ltd.



Third-party verification received from Waseda Environmental Institute Co., Ltd.

Activity and Results

## Green of ICT

### Reducing Power Consumption in Base Stations and Undertaking Disaster Measure Initiatives

The dense blanket of mobile phone base stations covering Japan accounts for 60% of the total energy consumed by KDDI, and reducing the power that base stations consume is a topmost priority.

Furthermore, 77% of the base stations that ceased to operate in the aftermath of the Great East Japan Earthquake that struck in March 2011 (in six Tohoku prefectures, as of March 12, 2011) did so because of power outages. Clearly, disaster preparedness measures that address power outages are a pressing topic.

In regard to these issues, KDDI has promoted initiatives combining reduction of environmental impact and disaster preparedness measures by increasing the number of Tribrid Base Stations and extending the life of base station batteries to 24 hours.

Tribrid Base Stations are base stations that employ tribrid power control technology to determine which of three types of power to use depending on the time of day and changes in the weather. Tribrid power control involves the use of technology to efficiently control the source of electric power by the hour, combining typical commercial electric power with generation from solar panels and charging batteries with nighttime power. Compared with base stations that only use conventional electric power, Tribrid Base Stations have been proved to reduce CO<sub>2</sub> emissions by as much as 30% a year. As of March 31, 2016, 100 Tribrid Base Stations were installed throughout Japan.

Furthermore, serving as backup in case power is interrupted, KDDI has installed batteries with life extended to 24 hours, focusing on prefectural and municipal government offices and train stations serving more than 100,000 passengers per day. As of March 31, 2016, extended life batteries have been installed at 2,200 base stations throughout Japan. We will continue installing extended life batteries while measuring the effect on the reduction of environmental load.



Tribrid Base Stations

A video about the advancement of Tribrid Base Stations is available for viewing (Japanese).

 R&D related to adaptive utilization technology for limited network resources in the event of disaster  
[Link](#) Website <R&D of Highly-Efficient Disaster-Adaptive Communication Facility Operation Technology>

Together with “Research and development related to variable-capacity optical network control systems” and “Research and development of obstruction estimation in times of disaster and restoration plan analysis and calculation technology,” the “Study on advancement of Tribrid Base Stations” (KDDI project name) forms part of the “Research and development of management and control technology for disaster-proof networks guaranteeing communications even during large-scale disasters,” sponsored by the FY2011 supplementary budget of the Ministry of Internal Affairs and Communications.

### Portable Batteries

In FY2013, KDDI introduced and utilizes portable batteries with reduced environmental impact at five maintenance bases throughout Japan as a substitute for the mobile power supply vehicles used in the past to power mobile phone base stations during electricity outages.

In the portable battery trial conducted in FY2012, assuming a power outage of approximately 10 hours per base station and wireless device power consumption of 1kW,



Portable batteries

## Low-Carbon Society

whereas a mobile power supply vehicle would consume 8.2 liters per time (equivalent to 21.5kg of CO<sub>2</sub> emissions), a portable battery required 10kWh per time (equivalent to 4.1kg of CO<sub>2</sub> emissions). Given this 17.4kg difference in CO<sub>2</sub> emissions, we expect an approximate 80% reduction in emissions compared with mobile power supply vehicles. KDDI plans to expand the number of portable batteries introduced in readiness for the future increase in base stations and to continue to work toward reduction in CO<sub>2</sub> emissions.

### Renewable Energy (Internal use)

In order to actualize even better energy conservation and CO<sub>2</sub> emissions cuts at KDDI, a portion of the electric power used at large scale communications stations like the Yamaguchi Satellite Earth Station, Oyama Network Center No. 2 and Tokyo Technical Center, and almost all electrical power at six mobile telephone base stations including Hokkaido and Aomori come from natural energy sources such as solar power. We have been making progress in introducing renewable energy, establishing 100 Tribrid Base Stations (base stations utilizing tribrid electric power control technology to efficiently supply three kinds of electric power - ordinary commercial power, power generated by solar panels, and midnight power saved in storage batteries - according to the time of day and changes in the weather) throughout Japan. The amount of natural energy produced by each Tribrid Base Station is approximately 4.2 kWh/day,\* accounting for 18% of the power used by every device. Furthermore, by utilizing midnight power, we are predicting that CO<sub>2</sub> emissions will reduce 20 to 30%\*



Large scale communications station using natural energy

\* Includes values researched by KDDI where average energy production is predicted from 6 solar batteries installed in test stations during clear skies

### Renewable Energy (Solar power generation business)

KDDI launched its solar power generation business on November 18, 2013, with the aim of contributing to reduction of CO<sub>2</sub> emissions. We constructed solar power generation facilities on some idle land owned by KDDI in three locations around the country, and we sell the power generated to electric power companies based on the Feed-in Tariff Scheme for Renewable Energy. Total power generation (total power sales) amounted to 3,034MWh in FY2013, 14,403MWh in FY2014 and 13,674MWh in FY2015. In FY2016, KDDI plans to expand its solar power generation facilities to provide approximately 3,000MWh of additional power per year.

Location of solar power generation facilities	Start of operation	Site area	Generating capacity
KDDI Oyama Network Center (Oyama, Tochigi Prefecture)	February 26, 2014	Approx. 41,000m <sup>2</sup>	Approx. 3,500kW
Adjacent to KDDI Yamata Transmitting Station (Koga, Ibaraki Prefecture)	January 24, 2014	Approx. 57,000m <sup>2</sup>	Approx. 3,300kW
Former site of Kitaura Receiving Station (Namegata, Ibaraki Prefecture)	November 18, 2013	Approx. 78,000m <sup>2</sup>	Approx. 2,000kW

### Road Heating that Uses Waste Heat

The Sapporo Technical Center in the KDDI Hokkaido Building is contributing to the reduction of CO<sub>2</sub> through a road heating system that uses water heated by the waste heat generated in communications equipment rooms (unlike conventional road heating systems that use heating oil and natural gas). Road heating systems

consist of underground pipes that circulate hot water to warm the roads and sidewalks and prevent the accumulation of snow and ice, thereby contributing to the prevention of accidents such as pedestrians slipping and falling.



Road heating facilities

### Activity and Results

## Green by ICT

### Environmental Monitoring that Uses M2M/IoT

The KDDI M2M Cloud Service is a secure one-stop cloud service solution for configuring essential M2M/IoT business functions, such as collecting and compiling data from sensors and displaying data reports. For example, by installing temperature and humidity sensors in their offices or shops, customers can record the temperature and humidity and visualize the usage conditions, which can then help in the implementation of plans for optimizing and improving the energy efficiency of the air conditioning.

By providing M2M/IoT-related services, KDDI helps customers improve their work efficiency, consolidate their IT resources through the cloud, improve their energy efficiency, and save resources through the shared use of facilities. Moving forward, KDDI will continue to provide ICT services that aim to solve customer issues while also reducing the environmental impact of society.



# Recycling-Oriented Society

Activity and Results

## Green of ICT

### Reuse and Recycling of Telecommunications Facilities

KDDI promotes reuse activities that regenerate and effectively employ retired telecommunication facilities. We also use material recycling to effectively employ equipment, components and materials that have become unnecessary.

In FY2015, KDDI recycled the materials in old deteriorated rechargeable batteries installed in telephone exchange stations used in test environments, to effectively utilize their resources. We will also make proactive efforts to reuse and recycle the retired equipment generated during periodic upgrades of communications equipment for base stations and other facilities.



Rechargeable batteries that are no longer needed

Activity and Results

## Green by ICT

### Reduction of Paper

KDDI is making efforts to slim down the operation manuals of its au mobile phones through the introduction of operation manual apps in smartphones and through other means. We are also making packaging on au mobile phones more compact.

We will continue to further reduce the use of paper and expand operation manual apps to improve usability that is kind to the environment.



From left, successive operation manuals with the most recent on the far right.



Paper Recycling at au shops

[Link](#) Page\_103

# Recycling-Oriented Society

Activity and Results


## Green Road Project

### Promoting Recycling of Mobile Phones

Used mobile phone handsets that have been collected from customers at au shops are manually disassembled, separating out substrates, displays, cameras, plastics, screws, iron, antennas, motors, speakers and other items, in a secured room. Gold, silver, copper, palladium and other resources are extracted from the substrates, while screws and antennas are recycled into steel products and plastics are recycled into plastic products. When a machine is used to disassemble a mobile phone, plastics are burned up in the incineration process and so cannot be used as a recycled resource. In addition, recycling eliminates the need to conduct new mining and refining of mineral resources such as oil, iron, gold, silver, and copper, while also reducing the amount of carbon dioxide that is generated through the mining and refining processes. KDDI performs all disassembly manually to prevent recyclable resources from being wasted.

#### Recycling rate in FY2015

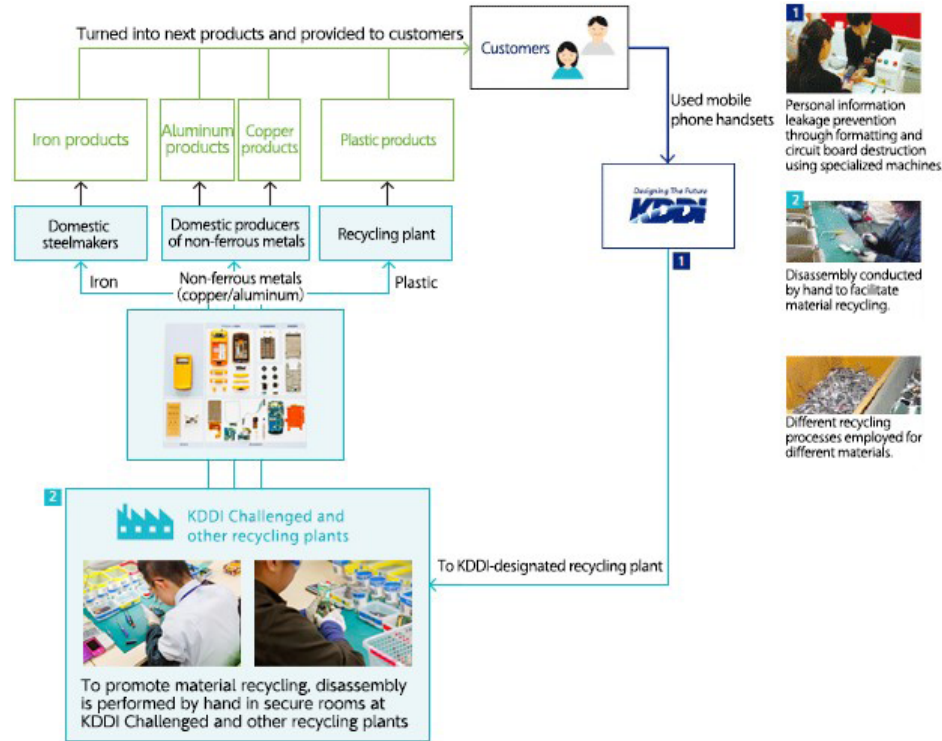
99.8%

 [au shop Locator \(Japanese\)](#)  
Link Website

### Paper Recycling at au shops

Throughout Japan, au shops collect and recycle various types of paper material such as mobile phone flyers, pamphlets, and cardboard packaging. In FY2015, we collected 1,695 tons of paper material, which was recycled into paper for new printed items.

### Basic flow for Recycling of Mobile Phones



# Biodiversity

## Activity and Results

### Green by ICT

#### Biodiversity Consideration for Base Station Installation

Along with energy efficiency, KDDI is also taking biodiversity into concern for the construction of base stations. One example is cooperating with municipalities and environmental conservation associations to delay base station construction when it falls during the time that the Northern Goshawk and Oriental Stork build nests and lay eggs. Another example is the transplanting and afforestation of rare plants that exist on sites with guidance from the Ministry of the Environment. Furthermore, we select construction methods that do not produce pile driving noise so that the delivery, breeding, and milking of livestock is not effected by construction noise. Even though we have their understanding on the necessity for base station construction, we take great effort to build reliable relationships with municipalities and neighbors by minimizing the effect that base station construction has on the environment.

#### Research on Behavior of Endangered River Dolphins

KDDI R&D Laboratories is utilizing the acoustic technology cultivated by maintenance and inspection of submarine cables that connects continents and collaborating with the Institute of Industrial Science, The University of Tokyo, Kyushu Institute of Technology, Indian Institute of Technology Delhi, and WWF-India to observe the ecology of the Ganges River dolphin.

The Ganges River dolphin is a species of dolphin that live in the basin of the Ganges River. There are about 2,000 dolphins and are in danger of becoming extinct. To determine the surrounding environment of the murky waters where they live, these dolphins emit

high frequency ultrasonic waves known as "clicks". By catching these ultrasonic clicks with underwater microphones, we hope to survey the dolphins' behavior underwater. One advantage of using this method is that it enables the observation of large numbers of dolphins without having any effect on their behavior. Because observers simply listen to the ultrasonic waves that the dolphins emit, there is no need for them to physically touch the dolphins, thereby eliminating any impact.

In FY2015, KDDI received the Fuji Sankei Group Award of the 25th Grand Prize for the Global Environment Award in recognition of the contribution of these efforts to biodiversity protection.

In addition, the same type of ultrasonic wave monitoring equipment is being installed on floating homes in the Mahakam River in Borneo, to research the behavior of Irrawaddy dolphins and evaluate the impact of the growing river traffic. Moving forward, KDDI will continue to conduct research on river dolphins that face the threat of endangerment in various regions.

## Activity and Results

### Green Road Project

#### Environmental Conservation Activities by Employees

In FY2015, as in previous years, KDDI conducted environmental conservation activities in regions across Japan. Employees and their families participated in volunteer activities in a variety of settings in each region, ranging from mountains to rivers and beaches.

On Mt. Takao (Hachioji, Tokyo), KDDI continued conducting activities that began in FY2014, involving students from Tokyo Metropolitan KOGEI High School in an industry-academic partnership. Together, we made effective use of cypress wood obtained through tree-thinning activities by constructing benches and donating them to local retirement homes and other locations.

