KOBE UNIVERSITY

Environmental Report 2016

Abridged Edition

Message from the President

TAKEDA Hiroshi, 14th President of Kobe University
Specialized in high-energy physics.
From 2003, Director of the Faculty of Physics, Kobe University,
From 2007, Director of the Kobe University Library
From 2009, Administrative Director of Kobe University
From 2015, assumed current position as University President.

We conducted an interview with President Takeda to ask for his views regarding the university's work on environmental issues. (Interviewers: Ichikawa Hiroto, Takemoto Marie, Harada Shogo)

Interviewer (Mr. Ichikawa):
Today, we would like to hear your thoughts on environmental activity at Kobe University, especially in relation to the three basic principles of the Charter on the Environment. First, what are your thoughts on promoting research into renewable energy?

President Takeda:
Social science has long been considered a strength of Kobe University, followed by the medical and natural science fields. Nowadays, we are very competent in the social, medical and natural sciences. With the aim of combining the merits of these fields, we established the Graduate School of Science, Technology and Innovation, within which research into renewable energy is encouraged. Currently, a huge project regarding bio production that converts natural materials into fuel is underway. If it is successful, we would be able to produce an alternative energy source unrelated to petroleum or coal.

In regard to environmental issues, while university professors may have been able to discover or invent advanced technologies in the past, it is now necessary that such technologies be used to make profitable businesses. In order for this to happen, a different skill set—business management skills such as financing or fundraising, entrepreneurship, etc.—is definitely needed. Thus, Kobe University has worked to combine the arts and sciences in such a way that our research benefits the community. This is true of renewable energy research as well. We aim to share our research outcomes with society.

Interviewer (Ms. Takemoto):
What would you think about inviting businesses to the university for an exchange of opinions on environmental issues with students?

President Takeda:
We've been working on such joint research ventures. We have been putting most of our efforts into bio production. We have an Integrated Research Center on Port Island where approximately 100 people, including faculty, undergraduate and graduate students, and corporate researchers, are working together on the bio production project. Such a huge project provides direct interaction between students and industry insiders. I think we should promote more collaboration down the road as well. By the way, there are tours of the facility so you should visit when you have a chance.

Interviewer (Mr. Harada):
Let me ask next about the fostering of ecologically-minded students as stipulated in the first basic principle. In terms of the ecological mindset, I feel that liberal arts students like myself are perhaps at a disadvantage compared to students in the sciences. What do you expect of liberal arts students?

President Takeda:
What I expect is that you try to gain a wide variety of experiences, though this is not limited to environment-related issues. For instance, going abroad and immersing yourself in diverse cultures would allow you to see Japan more objectively. In the context of the environment, go to Europe, where there are a number of environmental initiatives being carried out, and see what's happening in people's daily lives; this experience would certainly have an impact on your view. The situation in the US varies as well. The important thing is to place yourself in overseas environments and learn directly where Japan does and does not differ—such experiences will likely bring a flexibility to your way of thinking and help you to imagine things from a different perspective. You will also find that Japan cannot tackle the environmental issues that the world is facing on its own. Japan will never be able to build a green society without collaboration with other countries. We need people on our team who can successfully negotiate with the overseas parties concerned. That is where those in the liberal arts come in. Diplomats play a key role in working out environmental issues. This is the kind of thing needed of liberal arts students.

Message from the President

ICHIKAWA Hiroto, 2nd year, Graduate School of Maritime Sciences

TAKEMOTO Marie, 1st year, Graduate School of Engineering

HARADA Shogo, 2nd year, School of Business Administration

Interviewer (Mr. Ichikawa):
What about the development of human resources who deal with environmental issues, for example fostering leaders in the field of global environmental issues?

President Takeda:
First and foremost, students need to focus on developing their own specialties. There is no need to consider a high level of interdisciplinary integration right from the start. Some people of course insist that they can manage to concentrate on multiple disciplines simultaneously. I think, however, that it is important to gain a deep understanding of one's own specialty and then look at it from a global perspective. In so doing, it should be easier to see what you are missing more clearly and to choose your next steps with wisdom. I think that human development should follow such a process.

Interviewer (Ms. Takemoto):
Let us move on to the third basic principle: 'To promote environmental preservation activities that set an example for others.' Environmental issues cover a broad variety of areas and so it may be difficult to raise awareness among students immediately. In what respect should the university take the initiative?

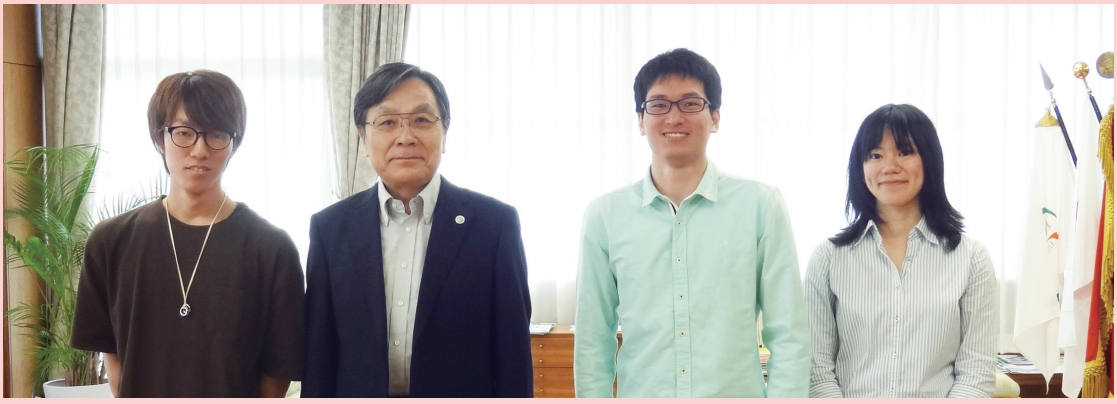
President Takeda:
I think the university should serve as a moral leader. Environmental issues cannot be solved without the involvement of society as a whole. For instance, when people are told to conserve water, they don't necessarily feel a sense of urgency as people are more likely to do whatever is easiest for them. At the university, however, where we take pride in being a community of intelligent people, each and every person concerned is expected to reach a higher moral standard. We can showcase our efforts through being ecologically-minded and living a more frugal lifestyle despite the burden it might represent to each of us personally. The university must become a social model. Rather than overexerting ourselves towards an unclear end, it is important that we embody this model grounded in a strong belief. I believe that we need to persist in being an environmentally-conscious university at any cost.

Interviewer (Mr. Harada):
Japan has faced a number of natural disasters in recent years. While we appreciate the blessings of nature, it is also necessary that we protect ourselves from nature. What are your thoughts generally on nature and conservation thereof?

President Takeda:
Kobe University is located on beautiful Mt. Rokko. However, it is difficult to predict what might happen with the mountains in the near future. If a Nankai Trough quake occurs, as is anticipated, Port Island would likely disappear underwater. No matter how much greenery we produce and how much clean air we contribute to the city, just a single volcanic eruption would ruin everything in a moment. We need to keep that in mind and teach such a mindset as well. Environmental issues and natural disasters are inextricably linked.

Interviewer (Mr. Ichikawa):
Lastly, could you please say a few words to the student body as a whole?

President Takeda:
You are expected to play a principal role in society in about 10 to 20 years when my generation won't be around anymore. You will be the ones who have to take responsibility for environmental issues. With that in mind, it is necessary that proper ecosystems be built and a clear path to solving environmental issues be mapped. My message to students is that now is the time for you to start thinking about what you will do when you become core members of society. At least for the present, you should earnestly support the university's environmental activities, as I believe they will benefit you and your generation in the long run.



Environmental Education and Research, and Related Topics

Topic

White Paper on Reduced Packaging Shopping

WAKATSUKI Yusuke, SOMEKAWA Ryotaro
(Senior, Faculty of Economics)
NAKAYAMA Masato (3rd year, Faculty of Economics)

'Serve as a bridge between businesses and consumers'

Topic

Kobe University Seikyo Gakusei linkai (GI) Activity Report 2015

KISHIMOTO Shoji (2nd year, School of Business Administration)

'Countermeasures to prevent a massive amount of leaflets'

Topic

The 5th Meeting to Read the Environmental Report during the Introduction to Environmental Studies

'Making the Environmental Report accessible to a wider audience'

Environmental Education

Exploring the causes of aquatic environmental pollution from Satoyama field work

ASAOKA Satoshi (Assistant Professor, Kobe University Research Center for Inland Seas)

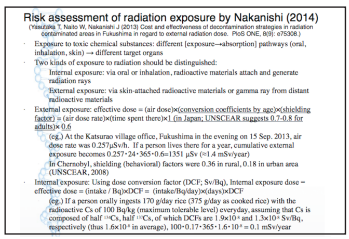
'Correlation between forests and marine areas'

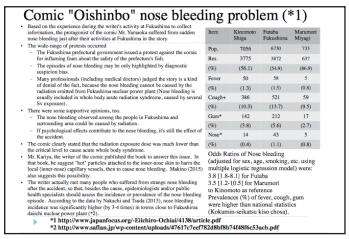
Environmental Education

Concerning Environmental Health Study I, II

NAKAZAWA Minato
(Professor, Graduate School of Health Sciences)

'About lectures on Environmental Health Sciences in English'





Environmental Education

In Collaboration with an Affiliated School: Coexistence of the Environment and the Economy

ISHIKAWA Masanobu
(Professor, Graduate School of Economics)

'Why has waste seen a reduction?

For details, please see the Environmental Report on the Kobe University website.

Environmental Education and Research, and Related Topics

Environmental Education

Regional Creation Collaborative Project in Taka-cho, Taka-gun, Hyogo

FUJIOKA Yoshihide
(Professor, Graduate School of Economics)

'Cultivating sundried "Yamada Nishiki" with no fertilizer or pesticides'

Environmental Research

Fukaemaru' s Measurement of Air Pollution in Pacific Coastal Areas

YAMAJI Kazuyo (Associate Professor, Graduate School of Maritime Sciences)

'Identifying the causes of air pollution around the Osaka Bay Area and the Seto Inland Sea'

Environmental Research

Possibilities for Environmental Finance Led by Regional Financial Institutions

YAMORI Nobuyoshi (Professor, Research Institute for Economics and Business Administration)

'What role can local banks play in environmental preservation activities?'

Environmental Research

Hosting of the EPR-Asia in Kobe

ISHIKAWA Masanobu
(Professor, Graduate School of Economics)

'Responses to the increasing amount of waste in the world...'

Environmental Research

Analysis of Energy Consumption for Energy Saving Policies at the University Hospital

TAKEBAYASHI Hideki (Associate Professor, Graduate School of Engineering)
KITTAKA Kosuke (Technical Staff, Graduate School of Engineering)

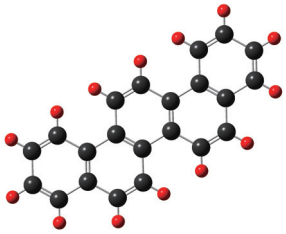
'Realizing an energy saving policy at the University Hospital'

Environmental Research

Development of a Water-based Hydrogen Production Method Using the Organic Semiconductor Thin-film Catalyst

ICHIHASHI Yuichi (Associate Professor, Graduate School of Engineering)

'When an organic semiconductor is used for photocatalysis…'



For details, please see the Environmental Report on the Kobe University website.

Saving Energy and Preventing Global Warming

1. Energy Usage

The total amount of energy used at Kobe University, including electricity, gas, fuel oil, etc. in FY 2015 reached approx. 870,000 GJ (*1). (*1 This is an energy value converted based on the Article 4 'Regulations for the Enforcement of a Law Concerning the Rationalization of Energy Usage')

Total energy usage decreased by 2.2% from FY 2014. While energy use on Port Island 3 has increased due to the opening of an Annex building with a total floor area of 4.540m^2, use in other areas decreased. Looking at energy usage per unit area (divided by the total floor area), it has declined by 4.3% from FY2014, likely the result of the reduction in gas usage.

	FY2011	FY2012	FY2013	FY2014	FY2015
Rokkodai 1	43,062	41,710	39,305	40,310	40,023
Rokkodai 2	254,960	252,521	250,525	239,791	229,554
Tsurukabuto 1	27,979	27,357	27,735	26,731	26,045
Tsurukabuto 2	17,962	18,334	18,090	17,798	17,743
Kusunoki	481,414	477,834	480,007	503,763	482,855
Myodani	14,324	13,141	13,979	13,591	13,298
Fukae	29,791	28,322	28,572	26,547	25,215
Sumiyoshi 1	3,128	3,182	3,457	3,614	3,927
Akashi	3,207	2,661	2,598	2,867	2,270
Okubo	1,127	1,079	1,128	1,052	1,204
Port Island 3	2,841	6,321	9,491	9,814	24,172
Total	879,795	872,462	874,887	885,878	866,306

Table 1 Energy Usage (GJ)

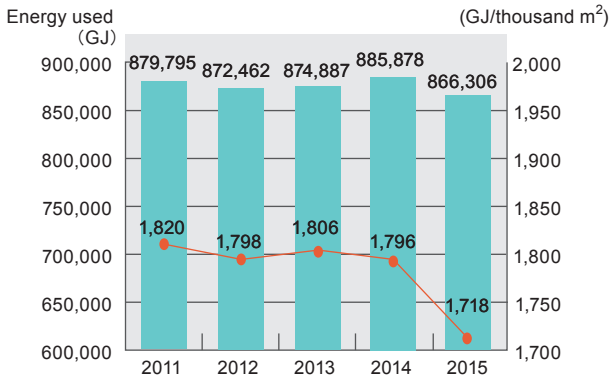


Chart 1 Energy Usage

2. CO_2 Emission Reduction

Kobe University successfully reduced its annual average CO_2 emission by 570 CO_2 tons (average since 2011) through implementing changes closely connected to CO_2 emissions, such as installing high-efficiency air conditioners and light fixtures, the removal/replacement/integration of refrigerators, and the raising of environmental awareness among the faculty, administrators, and students (environmental caravan, environmental improvement caravan, introduction of energy visualization equipment, distribution of thermometer-equipped magnets), as well as the reduction of combustible waste by promoting the 3Rs (Reduce, Reuse, Recycle) since 2011.

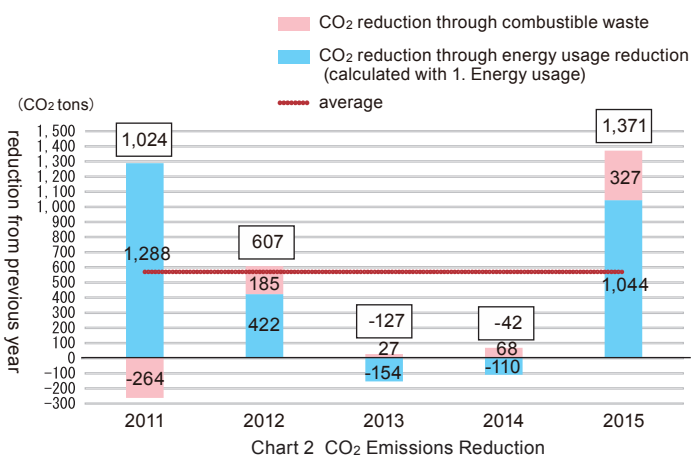
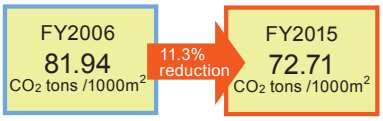


Chart 2 CO_2 Emissions Reduction

With FY2006 emissions (first year as a National University Corporation) as the base for measurement, the faculty, administrators, and students have made a concerted effort to achieve a 15% CO_2 emissions reduction per total floor area over the 2011-2015 period. The rate of reduction in 2015 per total floor area, however, was just 11.3% (9.23 CO_2 ton/thousand m^2), due to the securing of facilities required for innovative education and research and the promotion of highly advanced medical treatment.



(Used the 2006 electric utility coefficient for electricity emission coefficient, covering Rokkodai, Kusunoki, Myodani, and Fukae campuses)

Chart 3 CO_2 Emissions (per 1000m^2)

3. Electricity Usage

The total amount of electricity used in FY2015 increased by 228,000kWh (0.3%) from the previous fiscal year. This was due mainly to the opening of a new laboratory building in the Port Island 3 area at the end of FY2014 (electricity usage increased by 1,465,000kWh in that area alone). All departments will make a concerted effort to save energy and promote conservation activities. Future building renovations will continue to include the introduction of more efficient equipment, with the goal of further reducing energy consumption.

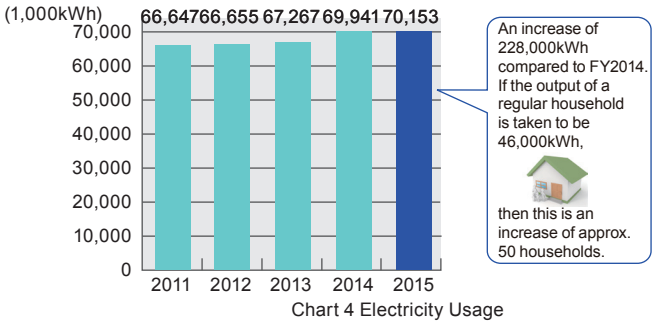


Chart 4 Electricity Usage

4. City Gas Usage

Total gas usage in FY2015 decreased by 431,000 m^3 (9.6%) from the previous fiscal year. This was mainly due to the unusually warm winter (the average temperature in Kobe (Dec-Mar) was 1.4℃ higher than FY2014), and the improvement of the heat source facilities in the Kusunoki area. All departments will make a concerted effort to save energy and promote conservation activities. Future building renovations will continue to include the introduction of more efficient equipment, with the goal of further reducing energy consumption.

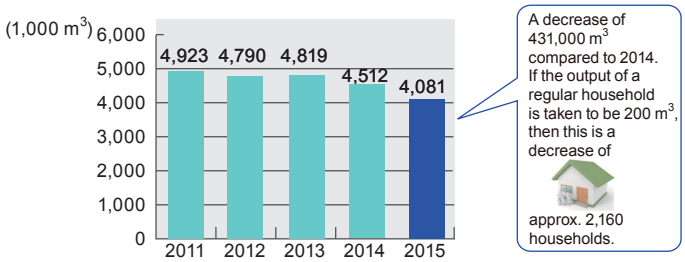


Chart 5 City Gas Usage

5. Fuel Oil Usage

Total fuel oil usage in FY2015 increased by 3.3700kl (8%) from the previous fiscal year. The fuel oil is mostly used in heating boilers in the Fukae area, which increased in the summer season.

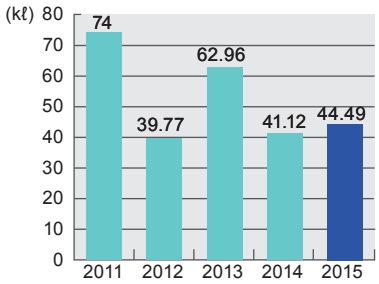


Chart 6 Fuel Oil Usage

Conserving Resources and Recycling

Water Usage

Total water usage in FY2015 decreased by 8,000 m^3 (1.7%) from the previous fiscal year. This was mainly due to the introduction of water-saving facilities and awareness-raising activities for the people concerned. In the Rokkodai area, water resources have been conserved by using Rokko Mountain river water as reclaimed wastewater for flushing toilets, in laboratories, and elsewhere. In addition, the Kusunoki area started using well water in February 2012. Efforts toward the efficient use of water resources will continue.

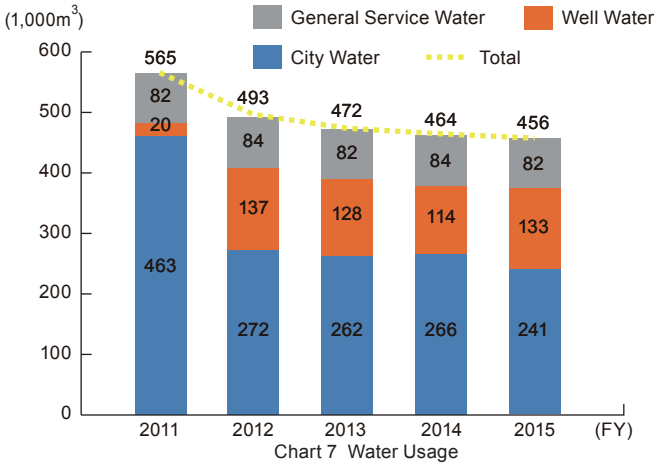


Chart 7 Water Usage

		FY2011	Total	FY2012	Total	FY2013	Total	FY2014	Total	FY2015	Total
Rokkodai 1 campus	City water	14,431	29,563	13,429	28,614	10,971	26,621	11,617	26,563	10,290	24,410
	General service water	15,132		15,185		15,650		14,946		14,120	
Rokkodai 2 campus	City water	46,231	93,009	43,458	93,766	45,937	93,595	41,738	92,509	42,077	89,253
	General service water	46,778		50,308		47,658		50,771		47,176	
Tsurukabuto 1 campus	City water	10,455	22,348	11,651	21,813	10,338	20,194	11,119	21,096	13,562	25,402
	General service water	11,893		10,162		9,856		9,977		11,840	
Tsurukabuto 2 campus	City water	7,168	15,320	6,523	15,333	5,928	14,709	6,850	15,380	7,440	16,103
	General service water	8,152		8,810		8,781		8,530		8,663	
Kusunoki area	City water	270,972	290,753	152,921	289,517	143,131	270,920	153,229	267,155	128,892	261,614
	Well water	19,781		136,596		127,789		113,926		132,722	
Myodani area	City water	6,705	6,705	6,796	6,796	7,112	7,112	6,000	6,000	5,877	5,877
	General service water	0		0		0		0		0	
Fukae area	City water	22,424	22,424	21,157	21,157	20,093	20,093	17,709	17,709	17,915	17,915
	General service water	0		0		0		0		0	
Sumiyoshi 1 area	City water	67,913	67,913	3,869	3,869	3,876	3,876	3,664	3,664	4,508	4,508
	General service water	0		0		0		0		0	
Akashi area	City water	12,488	12,488	8,286	8,286	9,911	9,911	9,554	9,554	6,389	6,389
	General service water	0		0		0		0		0	
Okubo area	City water	3,787	3,787	3,849	3,849	4,112	4,112	3,439	3,439	3,560	3,560
	General service water	0		0		0		0		0	
Port Island 3 area	City water	117	117	434	434	583	583	944	944	843	843
	General service water	0		0		0		0		0	
Total	City water	462,691	564,427	272,373	493,434	261,992	471,726	265,863	464,013	241,353	455,874
	Well water	19,781		136,596		127,789		113,926		132,722	
	General service water	81,955		84,465		81,945		84,224		81,799	

Table 2 Water Usage (m^3)

Non-Industrial Waste

Chart 8 shows the amount of non-industrial waste produced from FY2012 to FY2015. The volume recycled indicates the volume of waste converted back into resources, and the numbers in the chart itself show exact values for FY2015. Bulk waste had slightly decreased up until FY2011, but increased by roughly 15% in FY2012 due to building renovations and the relocation of laboratories within the university. In FY2013 it decreased again as the renovations and the relocation neared completion, and it reached FY2011 levels in FY2014. FY2015 saw another significant decrease.

Although the amount of office paper waste, which makes up the largest share of paper waste, has been successfully reduced since FY2012 thanks to efforts to reduce paper usage and promotion of computerized documents, this reduction seems to have plateaued recently. Other paper waste, including wrappings and advertisements, is on the decrease, but for the most part is still being discarded. We should focus on the collection of used papers.

The total amount of non-industrial waste in FY2015 decreased by nearly 30% from the previous year. This is mainly due to the decrease in bulk waste as the renovation work to enhance earthquake safety has been mostly completed. This decrease may also be attributed to efforts to reduce the difficult-to-recycle waste. The recycling rate increased sharply to 19.3% from the previous year. (Chart 9)

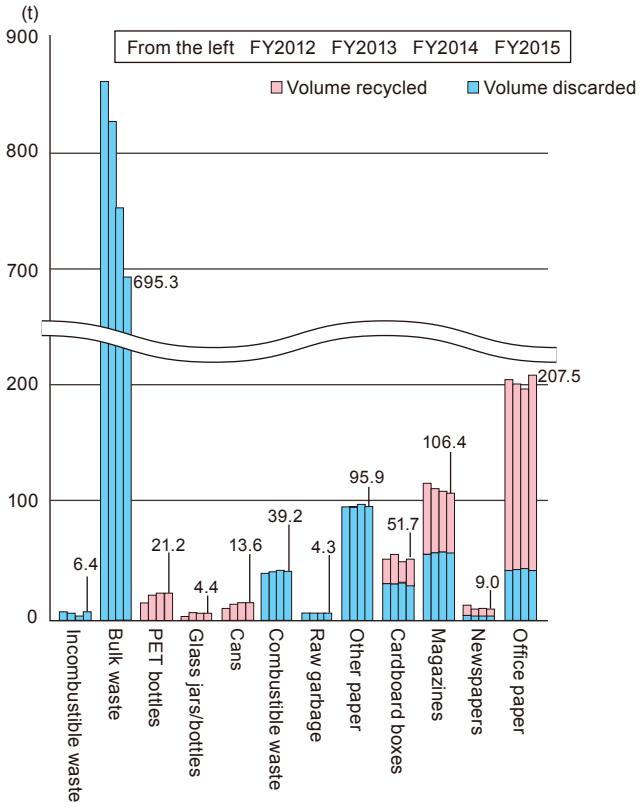


Chart 8 Non-Industrial Waste Production by Waste for FY 2012 - FY 2015

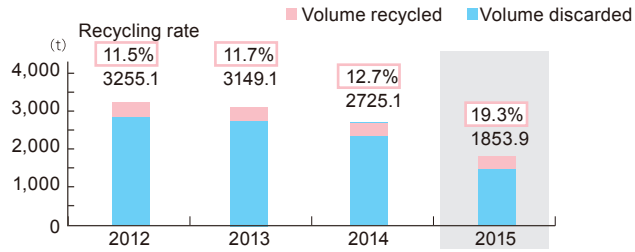


Chart 9 Changes in the Total Non-industrial Waste Produced from FY2012 through FY 2015

Trends in Paper Usage Across the University

Chart 10 shows trends in the amount of office paper used from FY2013 to FY2015. The volume of office paper used decreased by 0.31% (approx. 0.65 tons) from the previous fiscal year. We must continue our efforts to reduce office paper use by making it common practice to have paperless meetings and lectures, to make copies using both sides of the paper, to make consolidated printings, and to use the blank side of paper that has been used on only one side.

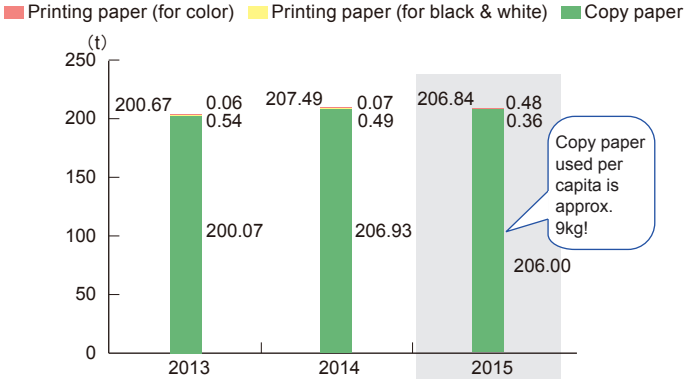


Chart 10 Volume of Office Paper Used

Kobe University Charter on the Environment

Environmental Philosophy

As a world-class research and education institution, Kobe University pledges itself, through all of the university's activities, to the preservation of the global environment and to the creation of a sustainable society, the two most important challenges the world faces today.
Located between the Pacific Ocean and the Rokko Mountains, Kobe University utilizes this regional locality to its advantage for the fostering of environmentally-conscious students and the dissemination of knowledge gained from academic research to the world. Through these efforts, and by setting an example in the preservation of the environment, Kobe University pledges to build a path toward the realization of a sustainable society as a common goal of humanity.

Environmental Principles

1. To foster and support environmentally-conscious students.
2. To promote research to create and sustain the global environment.
3. To promote environmental preservation activities that set an example for others.

Enacted on September 26, 2006

Third-Party Review

Reading through the Kobe University Environmental Report 2016, I was deeply impressed to know that Kobe University, as a leading university in Japan, has worked seriously with a firm stance on global environmental issues.
First, the Kobe University Charter on the Environment presents the university's basic philosophy on and principles of environmental issues in an extremely clear and articulate manner so that university students and local citizens can easily understand what Kobe University is aiming for. I could see that the report's structure and content are consistent with the philosophy and principles set forth.

The most impressive part to me was the students' interview with the President, which successfully exemplifies the fact that the university's environmental preservation activities are being undertaken in an extensive way, involving not only administration and staff, but students and other concerned parties as well. From the 'Environmental Education and Research, and Related Topics', which introduces a wide variety of activities within the university, including curriculum, activities led by students or activities led by the Seikyo Gakusei Iinkai (GI), research outcomes across various fields—I thought the Charter's third principle, 'To promote environmental preservation activities that set an example for others' was being vigorously carried out. More noteworthy still is the hosting of the annual Meeting to Read the Environmental Report, conducted since 2011, with the aim of making the Report known to more students. The opinions gathered from students are reflected in the following year's reports. I believe that maintaining such interactive communication has brought about the current reader-friendly report.

The 'Environmental Performance at Kobe University' illustrates environmental preservation efforts that the university has taken. The consistency in layout and the use of charts makes it easy to understand. In particular, the use of the unit 'household' in explaining reduction in electricity or gas use is effective in presenting the outcome to students in an understandable way. The only thing I want to point out is about the chart for CO_2 emission: it uses amount reduced compared to the previous year while the other energy charts use the absolute value. I'm pretty sure that CO_2 emission data is used in working out this chart. Applying that absolute value in addition to amount reduced from the previous year would more effectively portray Kobe University's performance.

Kobe University has promoted environmental conservation activities with the goal of a 15% CO_2 emission reduction for 2011-2015 compared to the 2004 standard. The final figured was 11.3%, to which various factors, such as the 3.11 Tohoku Disaster, must have contributed. Regardless of whether the goal was met or not, it is important to carefully analyze and review the contributing factors both inside and outside the university. Passing the outcome along to the next generation would feed the next cycle. With this in mind, I have high expectations for the next round of environmental reports.

Lastly, I want to stress that the report is an extremely high-quality publication that covers a broad range of related content and has a consistent and reader-friendly design, giving a sense of unity as a university. I expect Kobe University, as a pioneer of university environmental preservation activities, to lead other universities in Japan by maintaining the quality of their environmental preservation activities.

YAMAMOTO Hitoshi
Professor and Deputy Head of the Department for the Administration of Safety and Hygiene,
Osaka University

<Profile>

Doctor of Science specializing in Polymer Science. He completed his Ph.D at the Graduate School of Science, Osaka University. He became a researcher at the Osaka Agency of Industrial Science and Technology in 1991, a postdoctoral researcher in the Faculty of Science at the University of Alberta in 1997, and chief researcher at the Osaka Agency of Industrial Science and Technology in the same year. He has been an assistant professor in the Graduate School of Science, Osaka University, since 2000 and an assistant professor in the Department for the Administration of Safety and Hygiene, Osaka University, since 2004. He has served in his current positions since 2007. Author of several publications including 'Biotechnology Experiments Safety Orientation' (Tokyo Kagaku Dojin).

Cover

Kobe University,
YONEDA Kosuke, Freshman,
Faculty of Human Development
Location: In front of Building D
at Tsurukabuto Campus 1

■Fiscal year of project : Fiscal year 2015 (April 2015 to March 2016)
■Date of issue : September 30, 2016
■Department in charge of publication: Center for Environmental Management

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