



Abridged Edition

Environmental Report

2018



KOBE UNIVERSITY

Message from the President



President Takeda Hiroshi

From April 2003, Director of Faculty of Physics, Kobe University,
Director of Biosignal Research Center

From April 2007, Director of the Kobe University Library

From April 2009, Administrative Director for Kobe University

From April 2015, University President

Our global society is facing various environmental problems. Global problems such as abnormal weather accompanying global warming, water resource management at national and regional levels, and proper energy balance between nuclear power and renewable energy are difficult to solve without cooperation from all involved countries. Problems such as these are impossible to solve with extreme nationalism.

Kobe University is traditionally strong in both the humanities and sciences, promotes cutting-edge research across all disciplines and collaborates with other universities and research institutions to pioneer new academic fields. At the same time, we are strengthening the connection between undergraduate and graduate schools, placing emphasis on students deepening their creativity and learning in an atmosphere of advanced research.

The above-mentioned characteristics of our university and the environment of Kobe, which is surrounded by mountains and the ocean, help us to nurture talented people with a strong environmental awareness. We promise to con-

tinue promoting the dissemination of academic knowledge from the international city of Kobe to the world, to take the initiative in environmental conservation, and help build a path to the common goal of humanity, namely, a sustainable society.

All activities at our university, particularly tackling the current important topics of conservation of the global environment and the creation of a sustainable society, are based on our Environmental Philosophy as described in the Charter on Environment, and implemented in student curricula from the third term onwards through environmental conservation projects. We need long-term efforts such as waste-related 3R activities aiming at reducing the environmental burden, hazardous substance management, teaching energy conservation awareness, and nurturing students who will contribute to environmental protection and research projects on the environment. We ask Kobe University members, related companies and local communities for their long-term support in these environmental activities.

Charter on 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 Policies

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

Adopted on 26 Sept, 2006

Green Purchasing Award

PDF P.7

<Topics>

Gomi-Japan's Reduced Packaging Shopping

SHIBATA, Yamato, 4th year student, Faculty of Economics

NPO led by the members of Prof. Ishikawa's seminar class, Faculty of Economics.



Zero Waste @ Tokyo



Miki Environmental Festival

Twitter Activity Report

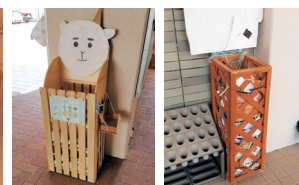
PDF P.8

<Topics>

Kobe University Seikyo Gakusei linkai (GI) Paper Recycling

TERAMOTO, Kenshin, 2nd year student, Faculty of Global Human Sciences

Contributing to environmental activities by recycling paper used as flyers distributed by organizations and print-outs used for lectures and club activities



Recycled paper BOX

Environmental Report as a subject in the Introduction to Environmental Studies

PDF P.9

<Topics>

Environmental education using the Environmental Report

Introducing the Environmental Report to members of the university and gathering their opinions in preparation for future Environmental Reports and environmental conservation activities



Implementation of Interactive Education on Satoyama

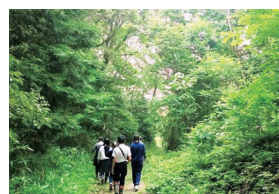
PDF P.10

<Environmental education>

Exploring the Relationship between Satoyama Leaf Area Index and Dissolved Ions in Forest Rain

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

Educating high school students on stem flow, investigation of the relationship between leaf area index and dissolved ion concentration in forest rain



Exploration of Satoyama in order to find a forest rain collection point



Fish-eye lens hemispherical forest photo

National Conference of the UNESCO Associated Schools Commendation Award

PDF P.11

<Environmental education>

Secondary School attached to Kobe University Awarded the ESD Grand Prize (High School Division)

Secondary School attached to Kobe University, Global Education Promotion Office

Development of global career human resources, practical content, highly evaluated ESD award



ESD Grand Prize Award Ceremony



JICA International Exchange

Understanding spatiotemporal fluctuations of ocean water mass and water quality

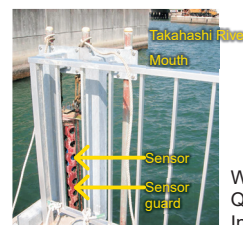
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<Environmental education>

Continuous Measurements of the Marine Environment in the Fukae Campus Port

HAYASHI, Mitsuru (Associate Professor, Research Center for Inland Seas)

Measurements of the tidal levels, atmospheric pressure, wind direction and speed, temperature, humidity and solar radiation



Water Quality Instrument



Demand-control of temperature in public spaces

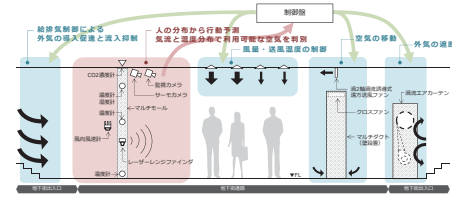
PDF P.13

<Environmental research>

Development and application of air flow control method in open spaces using human flow and air flow sensors

TAKEBAYASHI, Hideki (Associate Professor, Graduate School of Engineering)

Minimizing energy consumption for cooling and heating by controlling air conditioning according to the user's location ("human flow") and outside temperature ("air flow").



Imaging of Human Flow / Airflow Sensing and Airflow Control in Santica Underground Public Passages

Wind power generation at sea = Offshore wind power generation

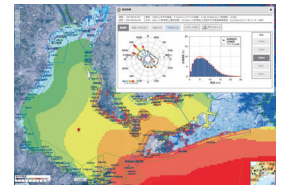
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<Environmental research>

The New Era of Offshore Wind Power - from being a navigational nuisance to becoming the savior of humanity

OHSAWA, Teruo (Professor, Graduate School of Maritime Sciences)

Analyzing wind information gathered in simulations, categorizing it in order to create an "Offshore Wind Map", then utilizing it for selection of suitable offshore wind farm locations and evaluation of business performance.



Offshore Wind Map (NeoWins)

Investigating How to Plan a City that satisfies not only Environmental Aspects, but also Economic and Social Requirements

PDF P.15

<Environmental research>

Proposing a design for sustainable cities from the viewpoint of the environment, economy and society

TABATA, Tomohiro (Associate Professor, Graduate School of Human Development and Environment)

- (1) Investigating the impact of consumer behaviour on garbage separation and energy consumption
- (2) Analyzing the effects of renewable energy introduction to regional areas, measures taken against global warming, effects on economics and employment
- (3) Analyzing the effects of garbage disposal methods on environmental load and cost reduction



Using Livestock Biomass for the Local Production of Renewable Energy for Local Consumption

PDF P.16

<Environmental research>

Creation of Biogas from Unused Biomass in the Region

IHARA, Ikko (Associate Professor, Graduate School of Agricultural Science)

Experimental use of small devices (biogas units) for extraction of biogas from small quantities of animal biomass such as manure, urine and unused livestock food in an urban dairy farm



Biogas unit



An example of Biogas use

Building an Independent and Self-sufficient Research Facility Center for Science and Technology

PDF P.17

<Environmental preservation activities>

The Research Facility Center for Science and Technology Activities to Secure Reusable Equipment

PARK, Pyoyun (Project Professor, Research Facility Center for Science and Technology)

- (1) Organization · System optimization
- (2) Realization of research facilities sharing
- (3) Promotion of human resource development
- (4) Managing maintenance activities



Area beautification and reduction of environmental burden

PDF P.18

<Environmental preservation activities>

Raising awareness for environmental conservation etc.

- (1) Campus Clean Day conducted 4 times every year
- (2) Establishment of the research and evaluation system of the energy impact of newly built facilities and buildings



Environmental Performance at Kobe University

Environmental Management Projects

- (1) Based on the "Basic Policy on Environmental and Facility Management at Kobe University", we have established basic policies for promoting environmental management and implemented environmental conservation activities during the third midterm period.
- (2) We are promoting the reduction of paper waste by displaying recycling information posters and have installed containers for recycling miscellaneous paper waste.
- (3) We are making and distributing Kobe University thermometer-attached magnets in order to raise environmental awareness regarding air conditioning temperature settings.



Inspecting paper waste (indoors)



Paper recycling box

Environmental Caravan and Environmental Improvement Caravan

- (1) Environmental Caravan: visiting randomly chosen rooms of the main university complex in order to set air-conditioning temperatures, turn off the lights in those rooms which are not in use, sort waste, and conduct research activities to gather information necessary for future planning and improvement of the environment.
- (2) Environmental Improvement Caravan: reporting the results of the above-mentioned activities to relevant departments, and conducting sessions for exchanging opinions and making suggestions on solving environmental problems.
- (3) After the implementation of the Environmental Improvement Caravan, as a follow-up, we report the results of the meeting to relevant departments, ensure the implementation of relevant actions, and thus carry out the PDCA cycle.
- (4) As a result of these activities and initiatives taken in each department, the inappropriate temperature setting of air conditioners, office waste and scattered garbage are being reduced every year.



Environmental Caravan
(Environment research and evaluation)



Caravan briefing session
(Reporting results, exchanging opinions)

University-wide environmental briefing session

Even prior to FY2013 the University has held environmental lectures at the Center for Environmental Management (now the Environmental Conservation Promotion Center). Since FY2014, due to restructuring of the organization, new activities concerning environmental protection such as environmental education for the members of our university, surveys and research on environmental conservation have begun, and we are conducting university-wide environmental briefing sessions every year.

This marks the fourth year since the establishment of the Environmental Conservation Promotion Center, and it is essential to further promote environmental protection activities throughout the university. This year we have introduced the mission of the Environmental Conservation Promotion Center to all members of the Center, including the Environmental Conservation Promotion staff, and explained the policies and the outline of the activities of the Center to all members of the University.



University-wide briefing session




Material Balance

Material balance is the amount of energy and resources used in business activities (input) and the resulting amount of environmentally harmful substances caused by the activity (output). Kobe University is promoting the 3R strategy (Reduce, Reuse, Recycle) as the basic policy of environmental management, and we are actively working to reduce resource consumption as well as industrial and other waste.

INPUT	
Energy	880,038 GJ
Electricity used	70,021 MWh
Oil used	12 kℓ
Paper used	211 t
Tap water used	237 th.m ³
Well water used	181 th.m ³



 神戸大学 KOBE UNIVERSITY	
Number of Students (Undergraduate, Graduate, High School)	17,639
Number of Foreign Exchange Students	1,201
Number of Graduates	10,402
Teaching Staff (Including High School)	5,260
Number of Collaborations with Foreign Universities	392



OUTPUT	
CO ₂ emissions	34,680 t-CO ₂
General waste	211 t
Industrial waste	1,151 t
Water drainage	418 th.m ³

Energy Conservation and Prevention of Global Warming

(1) Energy Consumption

In FY2017, the energy we consumed from electricity, gas, heavy oil, etc., was around 880 thousand GJ. The CO₂ emissions from that energy were around 35 thousand tonnes.

The energy consumption was 1.2% less than in 2016. Also, the energy consumption per unit area (the energy consumption divided by the building floor area) was 1.2% less than in 2016.

We have been striving to conserve energy on all our campuses and we will continue to promote energy conservation moving forward.

In addition, due to our financial situation, we have appealed inside and outside the university for the necessity of upgrading air conditioners and switching to LED lighting, but we have not received enough in budgetary measures. We will continue to strive to secure the required amount and carry out maintenance aimed at reducing energy consumption.

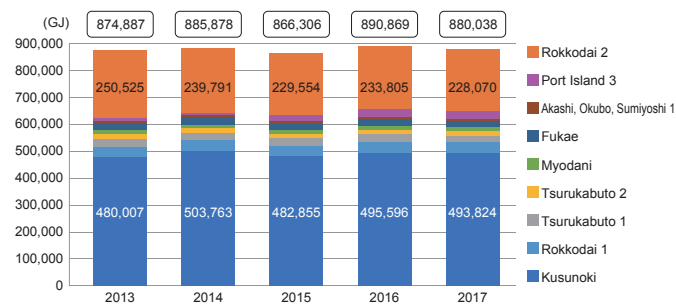


Chart 1 Energy Consumption

FY2016: 1,767 GJ/1000m² → FY2017: 1,746 GJ/1000m² (1.2% Reduction)

(2) CO₂ Emissions

The CO₂ emissions and CO₂ emissions per unit area across 11 locations fell slightly compared to FY2016.

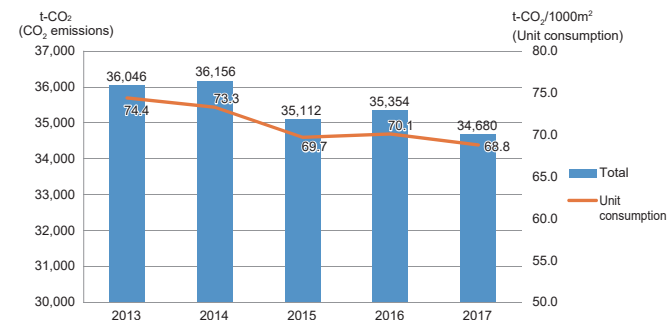


Chart 2 CO₂ Emissions

We have been aiming for a 1% annual reduction in CO₂ emissions for our total floor space with FY2004 (our first year as a national university) as a reference, and the students and teaching staff have acted as one to tackle this. Due to various activities such as securing necessary facilities for new educational research activities (installation of animal experiment facilities and chemical experiment facilities) and promotion of advanced medical care (minimally invasive advanced medical treatment, strengthening cancer diagnosis functions, providing women-friendly treatment spaces) CO₂ emission factors are increasing. However, through promotion of energy conservation activities, the CO₂ emissions (34,680t-CO₂) for the total floor space (504,131m²) in FY2017 were down 16% from the standard year and the goal has been achieved.

FY2004: 81.94 CO₂ tonnes/1000m² → FY2017: 68.8 CO₂ tonnes/1000m² (16.0% Reduction)

(3) Electricity Consumption

Electricity consumption in FY2017 across our 11 locations was down 0.9% from the previous fiscal year. This is thought to be due to the effects of the weather and of energy conservation promotion activities.

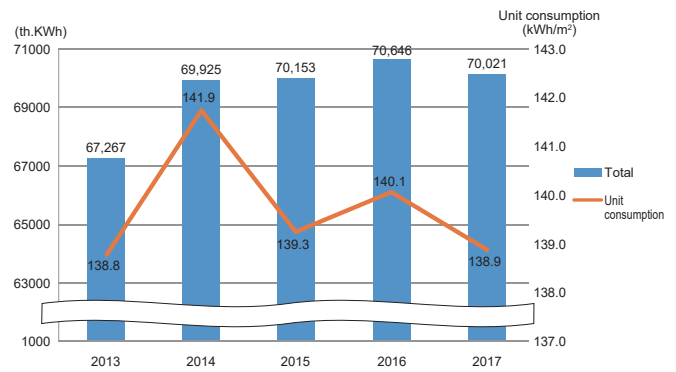


Chart 3 Electricity Consumption

(4) City Gas Consumption

City gas consumption in FY2017 across our 11 locations was down 0.8% from the previous fiscal year. This is thought to be due to the effects of the weather and of energy conservation promotion activities.

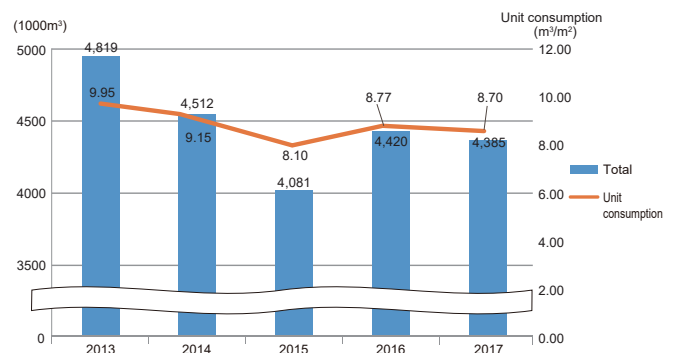


Chart 4 City gas consumption

(5) Fuel Oil Consumption

Fuel oil consumption in FY2017 was down 75.8% from the previous year due to the phasing out of boiler facilities. Fuel oil consumption was mainly reduced due to the switch from absorption type cold/hot water devices to the use of electric heating pumps in the Fukae area.

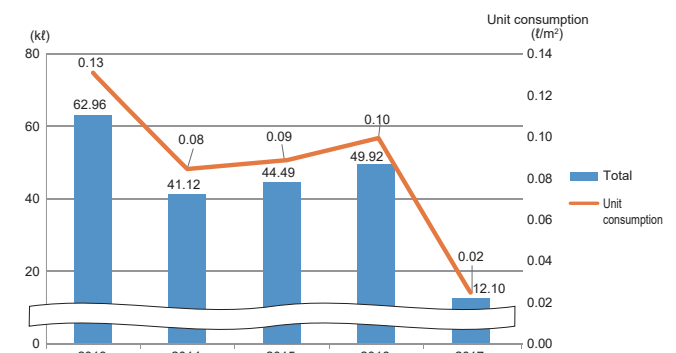


Chart 5 Fuel Oil Consumption

Resource Conservation and Recycling

(1) Water Consumption

The water consumption in FY2017 was roughly the same amount (418,000 m³) as the previous year.

In the Rokkodai district, Mount Rokko's river and stream water is used as general service water for flushing toilets, for experiments, and so on, and we are aiming to conserve resources. In addition, we started using well water in the Kusunoki district from February 2012.

Moving forward, we will continue to strive to use water resources efficiently.

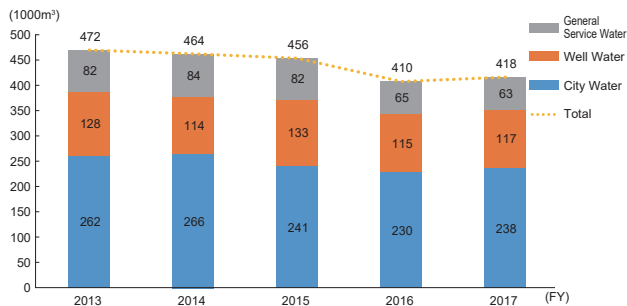


Chart 6 Water Usage

(3) University-Wide Office Paper Consumption

The office paper consumption trend from FY2013 to FY2017 is as indicated in Chart 10. FY2017 increased by 13.85% (25.72 t) compared to the previous fiscal year.

We will continue to promote the practice of paperless meetings and lectures, 2-sided printing, aggregated printing and use of the reverse side of paper used for copying, to reduce consumption.

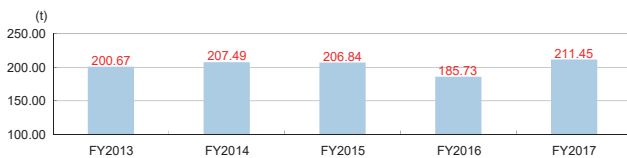


Chart 10 University-wide paper consumption

(4) Green Purchases and Procurement Status

Based on "the law concerning promotion of procurement of environmental goods by country (green purchase law)", Kobe University creates a policy regarding procurement of environmental goods each fiscal year and procures goods according to this policy.

Kobe University surveyed 274 items in 21 categories, and in FY2017 achieved a specified item procurement rate of 100%.

Category	Item	Total Procurement Amount	Specified procurement Item Procurement Rate (%)
Paper	Copier paper	210,294kg	100%
	Toilet paper	26,820kg	100%
	Other (tissue paper, etc.)	1,044kg	100%
Stationery	Ball pens	10,912	100%
	Envelopes (paper)	262,780	100%
	Other (marker pens and mechanical pencils, etc.)	155,374	100%
Office furniture, etc.	Chairs, desks, etc.	2,401	100%
PA Equipment	Photocopiers, printers etc.	4,865	100%
Lighting	Fluorescent lights	14,410	100%
Interior Items	Curtains	256	100%
Work gloves		6,511	100%
Other textile products	Blue Sheets	79	100%
Service	Printing	653	100%
Average			100%

FY2017 Green Purchasing and Procurement Results

(2) Waste

Chart 7 shows the amount of waste produced from FY2013 to FY2017. The waste produced in FY2017 increased by 0.66% compared to FY2016.

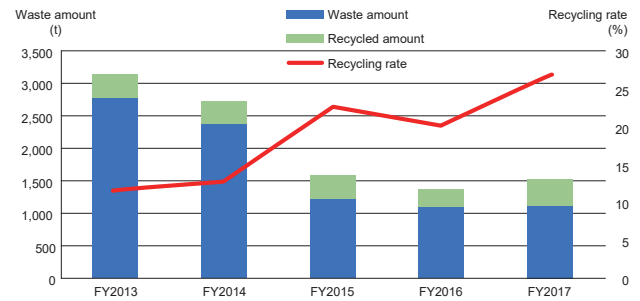


Chart 7 General waste disposal amount

Chart 8 shows the volume of waste recycled in each faculty in FY2017. The recycled amount legend indicates the amount recycled out of that produced (t).

The resource recycling rate was 11.7% in FY2013, 12.7% in FY2014, 22.6% in FY2015, 20.0% in FY2016, and 27.0% in FY2017.

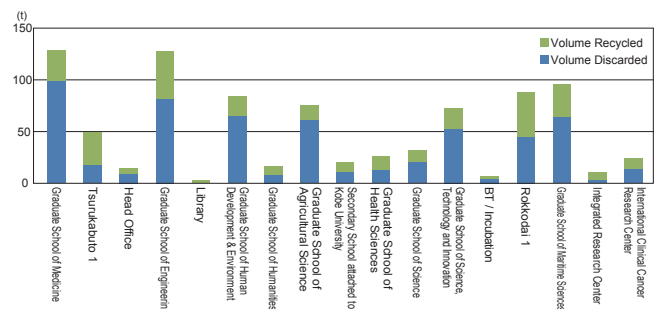


Chart 8 FY2017 Resource Recovery Amount from Waste by Department

Chart 9 shows the resource recovery rate by waste type in FY2017. The figure shows that the resource recovery rate for office paper, newspaper, magazines and cardboard has not progressed. If we can recover 90% of the resources of these miscellaneous papers, the resource recovery rate for waste as a whole will go from around 27.0% to around 37.8% (calculating based on the amount produced in FY2017). In accordance with the basic policy for promoting environmental management, moving forward, Kobe University strives to further improve the resource conversion rate.

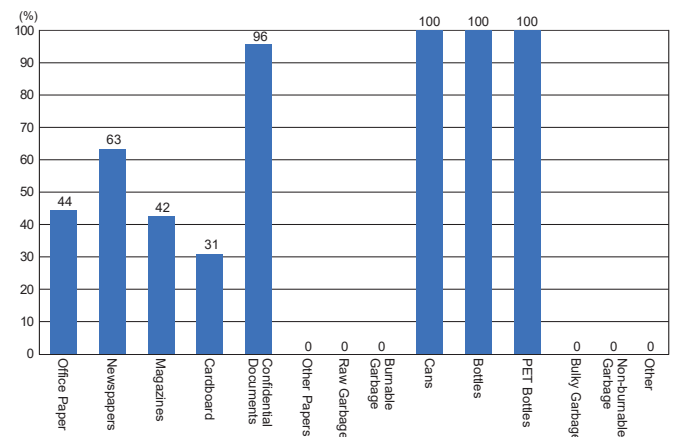


Chart 9 FY2017 Resource Recovery Rate by Waste Type

Third-Party Review

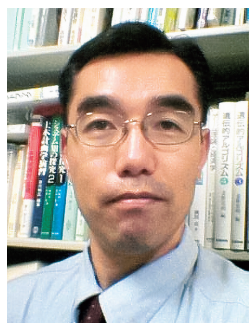
I am thankful for this opportunity to review the 2018 Kobe University Environmental Report. Kobe University upholds the three basic policies listed in the Charter on Environment and considers them its mission, continuing to conserve the global environment and to help build a sustainable society through making full use of its tradition as a university strong in both social and natural sciences.

In particular, I felt that education and research topics on the environment stand out as the main theme of the university. As other commentators have previously mentioned in the "Third-Party Review" section, the university continuously carries out environmental education using the annual Environmental Report, and the opinions of the students are reflected in planning future activities. Environmental lectures are also carried out at the university to which I belong, but, in my opinion, the environmental education at Kobe University is both richer and deeper and includes such activities as lectures and experiments on laboratory waste and drainage, introduction of omnibus environmental studies at the undergraduate school, etc. In addition, the university makes continuous efforts in education for sustainable development (ESD) at the affiliated middle and high schools which can be called "long-time efforts", to use the words of the University Dean. Furthermore, the student-directed NPO organization Gomi-jp that received the 2017 Green Purchasing Award for its project "Herasou Shopping" seemed very unique to me and addressed one of the priority issues in sustainable development targets (SDGs). Among the academic activities of Kobe University, I was particularly interested in the cutting-edge studies on important environmental issues such as offshore wind simulation necessary for offshore wind power generation planning, the creation of natural biogas by miniaturized biogas units, and the estimation of the amount of disaster waste.

Regarding environmental performance, I noticed the new inclusion of

the material balance of Kobe University in this report. This is a very important piece of information that allows us to evaluate the environmental performance of Kobe University as a whole by measuring the total amount of input of resources and energy into university activities and the output of the environmental load required to support such activities. Promotion of concrete energy conservation activities such as switching from heavy oil boiler facilities to electric heat pumps has resulted in energy conservation, CO₂ emissions were reduced despite implementing activities related to new research and education and promotion of highly advanced medical treatment facilities, and it seems that the university maintains a good balance between business activities and environmental conservation.

According to the Ministry of the Environment's 2018 Environmental Report Guidelines revised in June this year, the establishment of an international framework for promoting the transition to a sustainable society by following SDGs and the Paris Agreement has resulted in a substantial move forward in that direction. As a future initiative, the Environmental Report will not only focus on environmental management information but also on reports of medium and long term environmental management initiatives being undertaken by business organizations, including their plans to contribute to society and the environment. It is stated that such information will be one of the important factors for creating and maintaining sustainability of business operators. At universities, clarification of governance regarding environmental risk management, participation in environmental management activities and sharing of this information, including suggestions on dealing with important environmental issues will become increasingly necessary. I hope that Kobe University will take a leading role in building the "Environmental and Life Centered Civilized Society" as stated in the Fifth Basic Environment Plan.



Name YOSHIDA Noboru
Position Professor, Faculty of
Systems Engineering,
Department of Systems
Engineering, Wakayama
University

Profile

- Graduated OsakaU Faculty of Environmental Engineering
- Fullbright Researcher at Cornell University (2002-2003)
- Field Industrial Ecology
- Main Publications
 - Industry Aims at Zero Waste (Morikita Publishing, 1998)
 - New Area Civil Engineering Handbook (Asakura Shoten, 2003)
 - Environmental Engineering: Formulas, Models and Figures (Civil Engineering Society, 2004)
- Committee Memberships
 - Hyogo Eco-Town Promotion Committee
 - Wakayama Prefecture Environment Council
 - Wakayama Prefecture Waste Treatment Facility Committee (Specialist)

Cover

When designing the cover page, we collected photos from undergraduate and graduate students and affiliated schools with the aim of making them familiar with the Environmental Report. This image was awarded first prize by the evaluation committee of the Center for Environmental Management. Thank you to all applicants for your participation.

YAMADA Junki, 1st year Kobe University
Faculty of Global Human Sciences
Location: In front of the Natural Science
Research Building No.3

"Kobe University Illuminated by
Early Summer Sunlight"



- Fiscal Year of Project 2017 (April 2017 - March 2018)
- Date of issue 2018/9/30
- Department in charge of publication Center for Environmental Management
- For inquiries

Environmental Management Group, Safety and Health/Environmental Management Division,
Facilities Department, Kobe University
1-1 Rokkodai-cho, Nada-ku, Kobe, Hyogo 657-8501
TEL 078-803-6654 E-mail shis-kankyo@office.kobe-u.ac.jp
URL <http://www.kobe-u.ac.jp/report/environmental/2018/>



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