



KURITA GROUP

# ENVIRONMENTAL REPORT 2013

For the Year Ended March 31, 2013

**Kurita Water Industries Ltd.**

Nakano Central Park East, 10-1, Nakano 4-chome,  
Nakano-ku, Tokyo 164-0001, Japan

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For details of the Kurita Group's environmental initiatives, please visit our website:

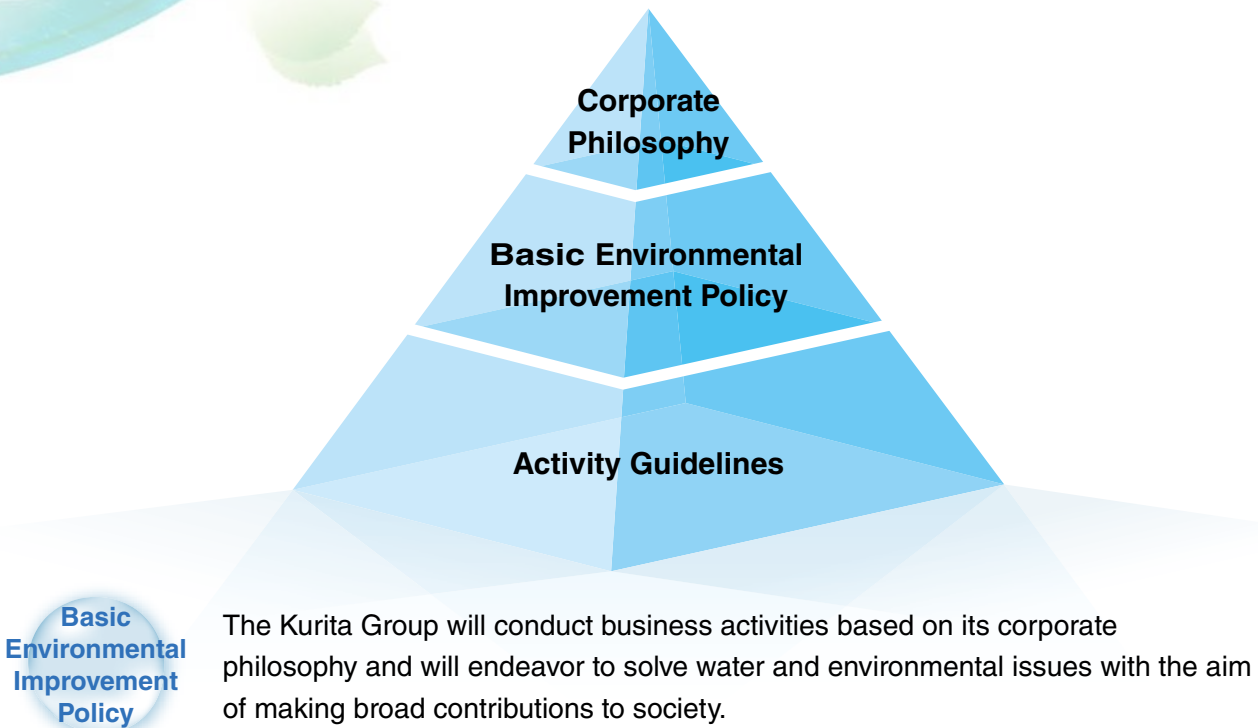
<http://www.kurita.co.jp/english/>

# Approach to Environmental Improvement Activities

The Kurita Group has adopted the Basic Environmental Improvement Policy and Activity Guidelines based on its Corporate Philosophy.

## Corporate Philosophy

Study the properties of water, master them, and we will create an environment in which nature and man are in harmony.

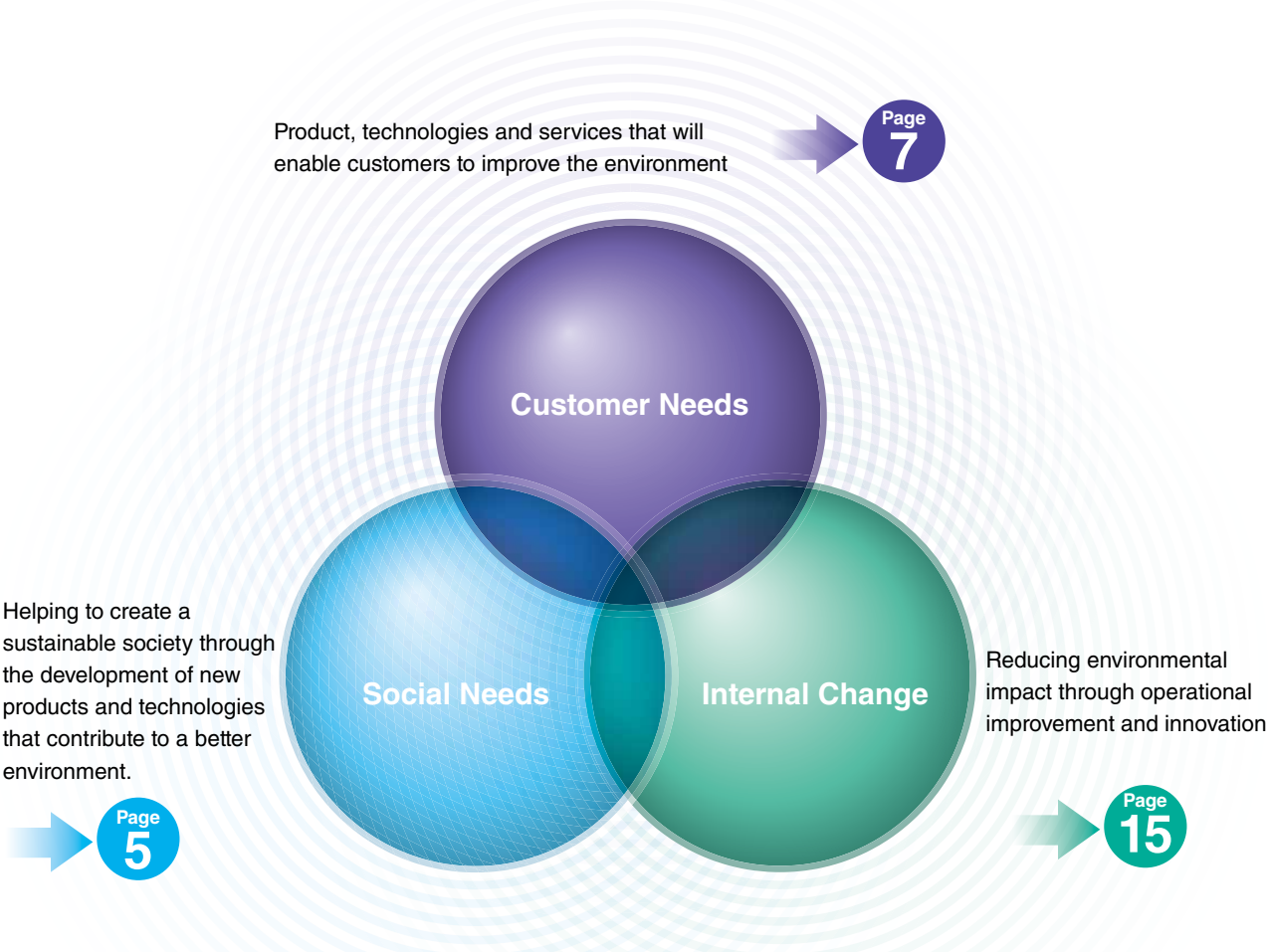


## Activity Guidelines

1. We will contribute to the realization of a sustainable society by developing new products and technologies conducive to environmental improvement.
2. We will work with customers to improve the environment by providing products, technologies, and services that boost productivity, reduce environmental impact and offer innovative energy solutions.
3. In conducting daily business activities, we will reduce environmental impact through operational improvement and innovation.

# The Three Aspects of Kurita's Environmental Improvement Activities

We pursue environmental improvements in three aspects: social needs, customer needs and internal change.



**Editorial Policy**

We have published this report to help our stakeholders have a deeper understanding of the Kurita Group's environmental improvement activities. In the report, we disclose examples and results of our activities in line with the three aspects of "social needs," "customer needs" and "internal change" and based on our Basic Environmental Improvement Policy. In creating this report, we referred to the Environmental Reporting Guidelines 2012 of the Japanese Ministry of the Environment.

All of the product names listed in this report are registered trademarks or trademarks of the Kurita Group or other companies.

Organizations covered: Kurita Water Industries Ltd. and other domestic Kurita Group companies  
Period covered: Fiscal 2013 (April 1, 2012 to March 31, 2013). The report also mentions some policies and targets set for April 2013 onwards

## CONTENTS

P1	Approach to Environmental Improvement Activities
P2	The Three Aspects of Kurita's Environmental Improvement Activities
P3	Interview with the President
P5	Social Needs
P7	Customer Needs
P15	Internal Change
P17	Environmental Management
P18	Third-Party Opinion

## Corporate Data

Company name:	Kurita Water Industries Ltd.
Address:	Nakano Central Park East, 10-1, Nakano 4-chome, Nakano-ku, Tokyo 164-0001, Japan
Paid-in capital:	¥13,450,751,434
Representative (President):	Toshiyuki Nakai
Date of establishment:	July 13, 1949
Fiscal year-end:	March 31
Number of employees:	1,543 (parent company) 4,640 (on a consolidated basis) (As of March 31, 2013)

## Profile

The Kurita Group comprises of the parent company, Kurita Water Industries Ltd., its 40 subsidiaries and one affiliate. The Group's business is divided into two main categories: the water treatment chemicals business, in which we manufacture and sell water treatment chemicals, and the water treatment facilities business, in which we manufacture and sell water treatment facilities and provide related maintenance services

We have long been contributing to the development of industry and society as a leading company in the field of

water treatment based on our corporate philosophy, "Study the properties of water, master them, and we will create an environment in which nature and man are in harmony." In the 21st century, which is sometimes called the "century for the environment," we are committed to making contributions to society by achieving advanced water management with our latest products, technologies and services to ensure that water of appropriate quality and quantity will always be available, whenever and wherever it is needed.



## Contributing to Society Through Further Evolution of Environmental Improvement Activities

Professor Katsuhiko Kokubu of Kobe University's Graduate School of Business Administration, an expert in environmentally sustainable management, spoke with President Toshiyuki Nakai of Kurita Water Industries Ltd. about how the Kurita Group should evolve its activities for responding to the growing needs in Japan and overseas from the community and customers for environmental impact reductions.

### Enhancement of Environmental Improvement Activities in Japan

**Kokubu:** Two years after the Great East Japan Earthquake, the energy situation has remained difficult and I feel that environmental management has been growing more important for companies. In addition to measures against power shortages, an increasing number of companies have been strengthening cooperation with other companies, cooperation with communities, and more than anything, efforts to promote environmental improvement activities among employees, strengthening their bonds. For example, some companies share internal case examples of activities across the entire company in an attempt to raise employees' environmental awareness. There are also cases in which companies adopt a variety of advanced environmental measures by following the example of another company's activities, which has led to a sense of achievement and has boosted employees' confidence.

**Nakai:** I think it is very important to raise the awareness of employees. At the Kurita Group, we have held regular meetings to outline our environmental report since the year before last. We encourage understanding of environmental improvement activities among employees and have them feel that they are contributing to environmental improvement through their daily work, in an effort to stimulate those activities themselves. We also exchange

opinions with employees who participated in the activities and conduct questionnaires after the event. Using the information obtained through these and other initiatives, we will take creative measures and increase employee awareness of environmental improvement activities. We will thus continue to increase employees' motivation toward the future.

**Kokubu:** A characteristic of the Kurita Group is that it helps customers and society to reduce their environmental impact through its business. I therefore think that awareness and attitudes of people involved in sales and production are especially important, because they implement environmental improvement activities on the front line.

**Nakai:** At the Kurita Group, we conducted a customer satisfaction survey last year. In the survey, many of the customers asked us to "make proposals which are more effective" when it comes to environmental improvement. We believed that we had made such proposals but they did not meet our customers' expectations. We view those severe comments as their expectations for the Kurita Group. Therefore, we link environmental improvement activities with quality improvement activities more closely to achieve greater results. At the same time, we are focusing on activities to check and verify the effects of our proposals that have been adopted by customers and reporting the results to customers to link them to subsequent proposals.



**Kokubu:** Environmental impact reduction is a great theme for society in general. Both the community and customers have great expectations that the Kurita Group will propose solutions concerning this theme. So I suggest that you give a comprehensive proposal jointly with other companies instead of on your own. I think this will let you operate new businesses that will lead to reduced environmental impacts.

**Nakai:** A new proposal that combines Kurita's anaerobic water treatment with gas power generation of another company was adopted by a customer. We collaborated with a power generator manufacturer to develop a system that makes effective use of methane gas from anaerobic treatments to generate power. The new business model permits the user to make use of the "feed-in-tariff system," under which power generated by using renewable energy is purchased by an electric power company at a fixed price. We will promote this proposal further because it contributes to spreading renewable energy and gives customers many benefits, including environmental impact reductions.

We will link environmental improvement activities with quality improvement activities for better outcomes and confirmation and verification of their effects. We will also create new products, technologies and services, while of course raising environmental awareness of each employee. Through these and other initiatives, we aim to enhance our environmental improvement activities.

### Expanding Environmental Improvement Activities in Overseas Countries

**Kokubu:** Overseas, water is an important issue especially in China and many other countries and regions. This means increasing opportunities for the Kurita Group, which has impressive wastewater reclamation and recycling technologies, to demonstrate its capabilities. I hear that, given this situation, you have decided to have overseas Kurita Group companies start full-scale environmental improvement activities along with their business expansion. How will you proceed with the activities specifically?

**Nakai:** First of all, in terms of "social needs," we launched new initiatives in China, including the development of a facility for collecting and reusing blow water from the cooling water system of a factory and participation in an advanced treatment project for collecting wastewater from an industrial park and reusing it

as industrial water. In the aspect of "customer needs," we will take initiatives not only in China but in other areas. For example, we will make proposals that will lead to effective use of water resources, by exerting our comprehensive strength enabled by the combination of the three business functions of supplying water treatment chemicals, delivering water treatment facilities and providing related maintenance services. For "internal change," overseas Kurita Group companies that have obtained ISO14001 certifications have already begun the activities. Looking at the entire Group, however, there are actually gaps in employees' awareness and initiatives due to differences in system, culture, custom and other factors that are specific to each country or region. We will first understand the current situation well and start by creating a mechanism for the activities, which covers systems for promoting activities, checking results of the activities and setting targets. In one or two years we would like to shift to activities under a unified policy and mechanism for the entire Kurita Group, including Japan and overseas.

**Kokubu:** In promoting environmental improvement activities internally in the same way as you do in Japan, it is extremely important to increase the motivation of the employees of each overseas Kurita Group company. Possible methods include converting the activities into costs, having employees understand that the activities are necessary for maintaining the ISO14001 certification, which applies to companies that have obtained the certification, and linking the activities with employee assessments. In addition, cooperation among staff members working for the Group is essential. For example, it is important to create a mechanism in which all staff members work together to find a solution for reducing waste, seeing it as an issue for the entire company.

**Nakai:** What I believe is important for this purpose is that each employee understands the purposes and significance of the environmental improvement activities of the Kurita Group and that the employees discuss the purposes and significance at each workplace. I would like employees of overseas Kurita Group companies to engage in environmental improvement activities in the three aspects of "social needs," "customer needs" and "internal change," which are characteristics of the Kurita Group, based on the understanding that these efforts are contributing to the creation of a sustainable society.

Conducted in June 2013



**Katsuhiko Kokubu**  
Professor at Graduate School  
of Business Administration,  
Kobe University

**Toshiyuki Nakai**  
President,  
Kurita Water Industries Ltd.



Social Needs

We are committed to creating new products and technologies that help solve problems related to water and the environment.

Developing New Products and Technologies That Contribute to Environmental Improvement

The Kurita Group is committed to developing new products and technologies, focusing on the themes it has set based on the understanding of its customers' needs and challenges in the field of water and the environment.

We identify annual results achieved in the aspect of "social needs" in terms of the products, technologies and services that we developed to contribute to environmental improvement and the environmental benefits that we brought to customers in the fiscal year. We quantify the environmental benefits to customers based on the environmental impact reductions that our customers will achieve at their factories and other sites by adopting the new products and technologies that we have developed focusing on specific themes.

New products and technologies developed to contribute to environmental improvement

Type of benefit	New products and technologies
CO <sub>2</sub> emissions reduction	<ul style="list-style-type: none"><li>Low pressure boiler steam condenser treatment chemicals for food-processing plants</li><li>Cooling water treatment chemicals for the Chinese market, which are applicable to the low quality water.</li><li>Boiler water treatment chemicals for bioethanol and sugar plants</li><li>Wastewater reclamation and recycling systems for beverage container sterilization process</li><li>Reclamation and recycling system for blow water released from cooling towers</li><li>Software system to support water and energy saving at water treatment facilities</li></ul>
Waste reduction, wastewater treatment	<ul style="list-style-type: none"><li>Anaerobic wastewater treatment processes for wastewater containing suspended solids</li><li>Pellet-forming high-speed coagulation and sedimentation device</li></ul>
Reduction of environmentally harmful substances	<ul style="list-style-type: none"><li>Cooling water treatment chemicals with reduced environmental impact for blast furnaces of steel refineries</li><li>Cleaning technology with reduced environmental impact for LED substrates</li></ul>

Environmental benefits brought to customers

Type of benefit	
Water pollutants (m³)	Soil and groundwater pollutants (m³)
365,000	39,000

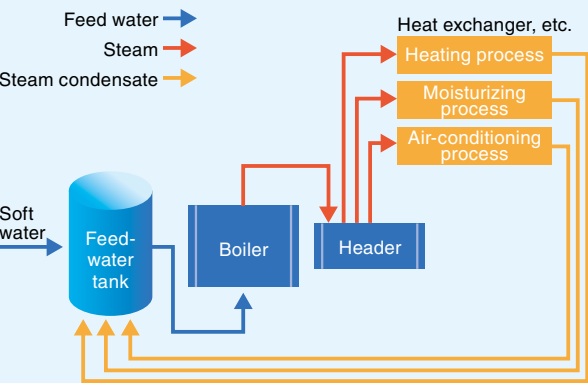


Low pressure boiler steam condenser treatment chemicals for food-processing plants

At food factories, steam generated by heating water is used to add moisture or heat to raw materials and products. For ensuring stable steam supply and efficient operation of manufacturing equipment, it is essential to maintain equipment of the steam condensate return system, such as steam pipes and heat exchanger for using steam heat. Specifically, water treatment of these pieces of equipment, which are made of iron or copper, is needed to prevent them from corroding due to oxygen or carbon dioxide gas. However, the safety of water treatment chemicals used for steam condensate return systems had been an issue for food factories, where top priority is given to product safety.

In response, Kurita Water Industries developed Japan's first treatment agent for steam condensate return systems for low-pressure boilers that is made only from food and food additives. This chemical can be used at factories which have obtained the Food Safety System Certification 22000 (FSSC22000), not to mention ones where the steam directly contacts products in the production process. Accordingly, we will recommend this chemical to food factories.

Flow of water/steam in a steam condensate return system in a food factory



Range of treatment by this chemical in the flow of water/steam in the steam condensate return system (red and orange parts)



Pellet-forming high-speed coagulation and sedimentation device

Coagulation-sedimentation method is a method for separating and eliminating suspended solids contained in wastewater discharged from plants. This method has the coagulant and suspended solids react with each other, thereby making them into solids (floc), and precipitates them by using the difference in specific gravity between the floc and the water. Because of the simplicity of the treatment, this method is used widely for wastewater treatment. On the other hand, the coagulation reaction and floc sedimentation require certain length of time and a large device, which has been an issue.

To overcome this issue, Kurita Water Industries has developed the "pellet-forming high-speed coagulation and sedimentation device," a space-saving system which applies a unique floc-forming technology. This system turns the floc into high-density, near-spherical pellets, thereby significantly reducing the time required for sedimentation. At the same time, it applies a "line mixture" mechanism, which has the coagulant and suspended solids react with each other in the pipe. This has made a reaction tank and a flocculation tank no longer necessary. As a result, the installation area of this system is one-fifth that of the previous systems from Kurita Water Industries. A stirrer for the reaction tank and the flocculation tank also becomes unnecessary, helping to save energy and resources. In addition, this coagulator has enabled waste reduction at a metal processing factory which has introduced it because the pelletized floc has resulted in higher dewaterability of the sludge.



Pellet-forming high-speed coagulation and sedimentation device

TOPICS

Kurita's "Recovery of Phosphoric Acid (H<sub>3</sub>PO<sub>4</sub>) System" Awarded the Director-General's Prize from the Industrial Science and Technology Policy and Environment Bureau of Japan's Ministry of Economy, Trade and Industry

The system, which embodies Kurita's unique technologies for recycling resources, was awarded the Director-General's Prize from the Industrial Science and Technology Policy and Environment Bureau of Japan's Ministry of Economy, Trade and Industry at the 38th Excellent Environmental Equipment Awards hosted by the Japan Society of Industrial Machinery Manufacturers (JSIM).

Phosphoric acid is used in tremendous quantities in the etching and plating processes of manufacturing electronic devices. Generally, used phosphoric acid is subject to chemical coagulation treatment in the discharge process, in which it is made into sludge, before it is disposed of as waste. Recovery and recycling of phosphoric acid have long been sought because it is a valuable resource, whose possible depletion is a matter of concern worldwide.

In response, Kurita Water Industries has developed this system, which condenses and separates phosphoric acid from wastewater with a reverse osmosis membrane, thereby allowing the recovery of phosphoric acid in high concentrations. This system enables plants using phosphoric acid to reduce the amount of use of chemicals and waste. Therefore, we will recommend this system to companies in the electronic industry of Japan and other countries.



Recovery of Phosphoric Acid (H<sub>3</sub>PO<sub>4</sub>) System

# Customer Needs

As an advanced water and environmental management company, the Kurita Group helps customers reduce their environmental impact through its business.

## Environmental Benefits for Customers

CO<sub>2</sub>



Fuel use reduction with the use of water treatment chemicals for boilers and cooling facilities, and water conservation with the use of wastewater reclamation systems

Waste



Reduction of sludge with the use of dehydration agents and anaerobic wastewater treatment facilities, and waste reduction with the introduction of drying machines

**CO<sub>2</sub> emissions reduction**  
**105,328 tons per year<sup>\*1</sup>**

On average, a single household emits about 5,060 kg<sup>2</sup> of CO<sub>2</sub> per year. The emissions reduction of 105,328 tons is therefore equivalent to the total amount of CO<sub>2</sub> emitted by about 20,800 households in one year.

**Water savings**  
**26,345,000 m<sup>3</sup> per year**

On average, a single household consumes about 300 m<sup>3</sup><sup>3</sup> of water per year. A 26,345,000 m<sup>3</sup> saving of water is therefore equivalent to the total amount of water consumed by about 87,800 households in one year.

**Waste reduction**  
**92,155 tons per year**

On average, a single household generates about 1,420 kg of waste<sup>4</sup> per year. The waste reduction of 92,155 tons is therefore equivalent to the total amount of waste generated by about 64,900 households in one year.

<sup>\*1</sup> CO<sub>2</sub> conversion factors used for the calculations: electricity: 0.35 kg-CO<sub>2</sub>/kWh, gas: 2.23 kg-CO<sub>2</sub>/m<sup>3</sup>, Class-A heavy oil: 2.71 kg-CO<sub>2</sub>/l, tap water and sewage water: 0.65 kg-CO<sub>2</sub>/m<sup>3</sup>. The conversion factor used for electricity is the one in the "Environmental Action Plan of Electric Power Companies" that was announced by the Federation of Electric Power Companies of Japan in September 2011. Reduced CO<sub>2</sub> emissions attributable to water conservation is also included.  
<sup>\*2</sup> According to data on CO<sub>2</sub> emissions from households provided by the Japan Center for Climate Change Actions [http://www.jccca.org/chart/chart04\\_06.html](http://www.jccca.org/chart/chart04_06.html)  
<sup>\*3</sup> Calculated based on the average water consumption per month at four-person households, which is shown in a document on tips to save water from the Bureau of Waterworks, Tokyo Metropolitan Government [http://www.waterworks.metro.tokyo.jp/customer/life/g\\_jozu.html](http://www.waterworks.metro.tokyo.jp/customer/life/g_jozu.html)  
<sup>\*4</sup> Amount of waste generated by a household of four members, which is calculated based on per-capita waste generation shown in the Annual Report on the Environment, the Sound Material-Cycle Society and the Biodiversity in Japan 2012 (released by the Japanese Ministry of the Environment in June 2012)

The Kurita group calculates the environmental impact reductions that customers have achieved by adopting the Kurita Group's improvement proposals as "environmental benefits for customers."

We quantified the environmental benefits for customers in fiscal 2013 based on the difference between the levels of the customers' environmental impact before and after adopting our proposals. These proposals are included in the specifications and written proposals we submitted to customers who had placed orders to us during the period from April 2012 to March 2013.

**Environmentally harmful substances**



Removal of hazardous substances by the use of heavy metal stabilizers, and reduction in the use of chemicals through replacement with a regeneration-type demineralizer

**Reduction of environmentally harmful substances**  
**3,132 tons per year**

**Water pollutants**

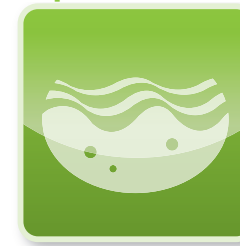


Reduction in the amount of wastewater treated by wastewater treatment systems

**Wastewater treatment**  
**15,830,000 m<sup>3</sup> per year**

The standard size of a swimming pool is 50 m long, 20 m wide, and 1.7 m deep, and its volume is 1,700 m<sup>3</sup>. The 15,830,000 m<sup>3</sup> of wastewater treated is therefore equivalent to the volume of water from about 9,300 swimming pools.

**Soil and groundwater pollutants**



Reduction in the volume of contaminated soil and groundwater removed by excavation or treated by in-situ purification

**Remediation of contaminated soil**  
**288,000 m<sup>3</sup> per year**

The remediation of 288,000 m<sup>3</sup> of contaminated soil (1 m<sup>3</sup> of soil weighs 1.8 tons) is equivalent to about 51,800 10-ton truckloads.

**Air pollutants**



Amount of exhaust air containing odor components treated with catalytic decomposition systems

**Air pollutant treatment**  
**103 Nm<sup>3</sup>**

## The Kurita Group's Business

The Kurita Group is engaged mainly in two types of business: the water treatment chemicals business and the water treatment facilities business.

**Water treatment chemicals business**

### Manufacture and sale of water treatment chemicals

- Boiler water treatment chemicals
- Cooling water treatment chemicals
- Process treatment chemicals (for the petrochemical, steel, and pulp and paper industries)
- Wastewater treatment chemicals
- RO membrane water treatment chemicals
- Equipment and systems for water treatment chemicals (chemical dosing systems, remote water quality management systems, etc.)
- Water treatment effect monitoring/diagnosis services

### Sale of boiler systems and related maintenance services

### Water treatment management for boiler and cooling water systems

- Contract-based services (steam supply contracts, comprehensive management contracts for factories, etc.)

### Water and environmental analysis



**Water treatment facilities business**

### Manufacture and sale of water treatment facilities

- Ultrapure water production systems
- Water treatment systems
- Wastewater treatment systems
- Wastewater reclamation and reuse systems

### Maintenance services

### Ultrapure water supply business

### Operation and maintenance services

### Chemical cleaning / Plant facilities flushing services

### Tool cleaning services

### Soil and groundwater remediation

### Manufacture and sale of general household products

- Water purifiers





## Example 1

### Reducing the Environmental Impact with Anaerobic Wastewater Treatment

Denki Kagaku Kogyo K.K., Omi Plant

Denki Kagaku Kogyo K.K. manufactures and sells various chemical products, including organic and inorganic materials, electronic materials, and pharmaceutical products. The company is striving to reduce its environmental impact based on the "Responsible Care Activities," in which companies handling chemical substances engage commonly. At the company's Omi Plant, the load on wastewater treatment facilities is expected to increase due to rising production of chemical products as materials for adhesives, coating agents, and other products. The plant faced a need to increase the capacity of the wastewater treatment facilities to ensure stable treatment.

Kurita Water Industries' Facilities Division proposed an improvement measure to increase the treatment capacity by installing an anaerobic wastewater treatment system, which features high treatment capacity for high-concentration wastewater, before the existing wastewater treatment system. The new system retains a high concentration of anaerobic microorganisms in the carrier. This enables the system to treat plant wastewater containing chemicals, something that used to be difficult. As a result of adopting this proposal, the customer is expected to reduce the BOD contained in wastewater by 170 tons\* per year.

 **Treatment of 170 tons of BOD**

\* A value estimated based on the current operational status



Anaerobic wastewater treatment system using a carrier

#### Customer's Voice

This is the first anaerobic wastewater treatment system that we have introduced. We are satisfied with it because it treats high-concentration wastewater stably at low power. Kurita also gave us a proposal to improve the method of operating and managing our existing wastewater treatment system, which has allowed us to manage the entire wastewater treatment systems with peace of mind. We welcome Kurita's proposed application of this anaerobic wastewater treatment system to wastewater from other processes in this plant.



**Kazutoshi Hioki** (right)  
1st Organic Division  
**Shin Sugimura** (left)  
1st Organic Division

## Example 2

### Contributing to Achieving COP1.36 by Preventing Increase of the LTD Value

Tobu Energy Management Co., Ltd.

Tobu Energy Management Co., Ltd. engages mainly in heat supply to Tokyo Sky Tree Town® and its surrounding area by using a community central heating and air-conditioning system. The company has introduced facilities with high energy-saving performance, such as a state-of-the-art turbo refrigerator, aiming not only to ensure stable operations but also to achieve at least COP1.35, one of the highest targets in Japan for a community central heating and air-conditioning system. What was important for achieving and maintaining these targets was to keep the heat-exchanging part of the cooling water system attached to the heating and air-conditioning equipment clean, that is, to prevent increase of the LTD value, which is an indicator of heat-exchange efficiency.

Kurita Buil-Tech and Kurita Water Industries' Chemicals Division proposed a water treatment program that integrates a technology for monitoring the LTD value on a real-time basis and consultations on refrigerator inspections and data analyses, in addition to cooling water treatment chemicals matching the water quality and operating conditions. The customer adopted this proposal. As a result, about one year after the operation began, the LTD value has not increased, and together with other initiatives, the program has enabled the customer to achieve COP1.36.



Turbo refrigerator

#### Customer's Voice

The proposal has enabled us to prevent an increase in the LTD value and achieve stable operation of our facilities and the targeted value of COP1.36. We are grateful to Kurita for that. Kurita is a reliable partner because the company has monitoring technologies for predicting and preventing water treatment troubles and a wealth of know-how in solving those issues. We expect Kurita to continue giving us detailed follow-ups because water treatment will play an increasingly important role in maintaining high energy efficiency as we operate the facilities for the long term.



**Tomoyuki Hidaka**  
Director of the Energy Center

## Example 3

### Reducing Chemicals with an Electrodeionization System

Tohoku Electric Power Co., Inc., Hachinohe Thermal Power Station

Tohoku Electric Power Co., Inc. engages mainly in electric power businesses such as the generation, transmission, and distribution of electric power. The company has adopted measures aimed for the early recovery of power supply, which was reduced significantly following the Great East Japan Earthquake. The company was planning to install a gas-turbine power generator (Unit 5) at Hachinohe Thermal Power Station urgently as an emergency power supply to substitute the company's other power stations which were damaged by the tsunami. It was necessary to install pure water facilities for reducing NOx from the gas-turbine generator. The facilities were required to accommodate the limited capacity of the existing wastewater treatment facilities and to have a low environmental impact that conforms to the company's environmental policy.

In response, Kurita Water Industries' Facilities Division made a proposal to introduce facilities whose core is a deionization system which electrically regenerates ion-exchange resins. As a result of adopting this proposal, the customer could reduce both regenerated wastewater and regenerated chemicals to zero and reduce the use of chemicals by 891 tons per year compared with a case in which a conventional ion exchange resin system would be used.

 **Volume of chemicals reduced by 891 tons**



Electrodeionization system

#### Customer's Voice

We are grateful to Kurita because the introduction of the system, which generates less wastewater and uses fewer chemicals, has reduced the environmental impact. In addition, the company met the deadline despite the limited time to the start of operation. We would like Kurita to continue supporting us for the conversion of the Unit 5 to a combined-cycle system that we are working on at the moment.



**Tsuyoshi Kanno**  
Power Generation Environment Group


## Example 4

### Reducing the Use of Chemicals by Improving the Method of Operating the Wastewater Reclamation System

Toppan Electronics Products Co., Ltd., Mie Plant (Kameyama)

Toppan Printing Co., Ltd. is engaged in a wide range of businesses based on the printing technologies it has developed over many years of operation. The company is conducting group-wide environmental activities under the Toppan Group Declaration on the Global Environment. Toppan Electronics Products Co., Ltd. is responsible for manufacturing electronic products from Toppan Printing. Its Mie Plant (Kameyama) faced a need to stabilize wastewater treatment against load fluctuations and reduce the use of chemicals, for facilities for reclamation and recycling wastewater discharged from the plant.

Kurita Water Industries' Chemicals Division undertook improvements to the management method, including reviews of chemicals, by collaborating with Toppan Techno Co., Ltd., which is responsible for managing the facilities of the plant. Specifically, Kurita made a proposal to introduce poly-electrolytes, which have specific effects for pollutants derived from microorganisms and do not affect the RO membrane system for reclaiming wastewater, to change the point of injection of inorganic coagulant and to improve the method of operation and management. As a result of adopting this proposal, the customer has reduced the use of chemicals including inorganic coagulant by 252 tons per year, and at the same time, reduced the waste derived from chemicals by 107 tons per year.

 **Volume of chemicals reduced by 252 tons**  
 **Waste reduced by 107 tons**



Wastewater recovery system

#### Customer's Voice

The proposal has allowed us to reduce the use of chemicals significantly. We very much appreciate the proposal because it has stabilized our wastewater treatment, resulting in lower risk in operation and management, and also reduced the amount of waste derived from chemicals, which has resulted in reduction in the annual operating hours of the hydroextractor.

The proposal applies to part of the overall wastewater treatment facilities, so we hope Kurita will continue to make proposals with even greater effects.



**Ken Hashimoto**  
3rd Section, 5th Department,  
Facilities Division,  
Toppan Techno Co., Ltd.

## Example 5 Reducing Waste by Reducing the Use of Inorganic Coagulant

Nissan Motor Co., Ltd., Tochigi Plant

Nissan Motor Co., Ltd., which is mainly engaged in the manufacture and sale of automobiles, makes company-wide efforts to promote its medium-term environmental action plan "Nissan Green Program 2016" toward the achievement of "Symbiosis of People, Vehicles and Nature," which is the environmental philosophy of the company. Nissan's Tochigi Plant pursues initiatives based on the program, including the reduction of CO<sub>2</sub> emissions and waste and the efficient use of resources. The plant needed to reduce the sludge generated from the general wastewater treatment facilities, which is disposed of as waste.

Kurita Water Industries' Chemicals Division made a proposal to reduce the use of inorganic coagulant by introducing an organic coagulant to enhance the function of the inorganic coagulant, because inorganic coagulant, which is added to separate pollutants in the wastewater, constitutes part of the sludge. The customer adopted this proposal after checking the data thoroughly on site and confirming the effect through tests using the actual equipment, because the property of the wastewater changes with the operational status of the production line between weekdays and holidays. As a result, the customer has reduced the waste derived from inorganic coagulant by 336 tons per year.

 Waste reduced by **336 tons**



General wastewater treatment facilities and organic coagulant injector

### Customer's Voice

We are satisfied because we were able to achieve more than we had anticipated at the time of the proposal. Our plant is located close to a research base of Kurita, and Kurita responded promptly to technical problems. We highly appreciate that.

Our plant is going to take steps to reduce the use of water. So we hope that Kurita will provide us with knowledge on water treatment facilities and know-how on operation and management and make a proposal to reclaim and recycle wastewater.



**Tadashi Watanabe** (center)  
Manager,  
**Akio Nakayama** (right)  
Instructor,  
**Kazumi Yoshida** (left)  
Instructor,  
Environment and Energy  
Group, Facilities Maintenance  
Section No.1, Production  
Control and Engineering  
Department

## Example 6 Reducing Waste with High Density Sludge Generation Method

Nippon Light Metal Co., Ltd., Shimizu Works

Nippon Light Metal Co., Ltd. is Japan's sole fully integrated aluminum manufacturer offering varieties of products ranging from aluminum raw material to fabricated products. The company's Shimizu Works, which manufactures alumina as a raw material for aluminum, needed to introduce new wastewater treatment facilities at the time of launching a "Project for Shifting to a New Raw Material," or shifting from bauxite to aluminum hydroxide. The plant faced a need to minimize the waste generated from wastewater treatment in accordance with the company's "Environmental Policy and Action Guidelines."

Kurita Water Industries' Facilities Division made a proposal to introduce wastewater treatment facilities that use "high density sludge generation method," which reduces the volume of dehydrated cake to about 50%. This method improves the sedimentation property and dewaterability of precipitate by circulating it to coagulate it repeatedly. As a result of adopting this proposal, dewaterability of the precipitate is expected to be improved, resulting in 30% reduction of waste.

 Waste reduced by **30%**



Wastewater treatment facilities

### Customer's Voice

We can treat wastewater beyond what is required by the environmental standards and have reduced the waste thanks to the introduction of wastewater treatment facilities that use the "high density sludge generation method." At this plant, we are planning to introduce a new project, and we look forward to Kurita continuing to propose water treatment solutions.



**Toshihiro Kato** (left)  
Mechanical Engineer,  
Engineering  
Shimizu Works Chemical DIV.  
**Go Wada** (right)  
Product Dept.  
Shimizu Works Chemical DIV.

## Example 7 Reducing Electricity by Preventing Energy Loss from Refrigerating System

Nippon Mektron, Ltd., Okuhara Plant

Nippon Mektron, Ltd. manufactures and sells a range of electronic components including flexible printed circuit boards used for mobile phones and hard disks. The company designs and manufactures products in an eco-friendly manner in accordance with its environmental policy. At the Okuhara Plant of Nippon Mektron, Ltd., saving the energy consumed by the refrigerating system, which consumes 25% of all electricity used by the entire plant, had been a priority.

Kurita Water Industries' Chemicals Division drew attention to the fact that foul consisting mainly of slime is attached to the heat exchanger inside the refrigerator, causing an increase of the operation load and in the use of electricity. Kurita made a proposal to apply a water treatment chemical that inhibits the generation and attachment of foul and to introduce a management method with which chemical concentration in the cooling water system is monitored. As a result of adopting this proposal, the customer can prevent energy loss, having reduced the use of electricity by 7%. The proposal has also enabled clarification of the inside of the cooling water system, which has led to a reduction in the amount of blow water from the cooling water system and a reduction in the use of water by 17%.

 Electricity reduced by **7%**

 Use of water reduced by **17%**



Cooling tower

### Customer's Voice

We are satisfied with the effects of the proposal. In the overhaul we conducted after adopting the proposal, we checked the surface of the heat exchanger and found it to be very clean. In addition, the use of electricity was reduced more than we had expected when the proposal was made. We hope Kurita will develop and provide more environmentally friendly water treatment chemicals with higher safety. We will strive to improve our knowledge of chemicals and pursue a better method of operation and management.



**Shinya Suzuki**  
Preservation Technology Section,  
Facility Maintenance Dept.,  
Production Technology Headquarters

## Example 8 Reducing the Use of Fuel by Lowering the Water Content of Dehydrated Cakes

Hyogo Pulp Industries, Ltd.

Hyogo Pulp Industries, Ltd. manufactures and sells pulp and also produces and sells electric power by reusing the heat generated in manufacturing pulp and by using biomass fuels. Under its environmental policy, the company has implemented diverse energy-saving measures over many years. To protect the environment, the company burns black liquor generated in the production process, converting it into green liquor. It then has the green liquor react with lime to separate it into white liquor and sediment. The company then dehydrates and calcines the sediment to extract calcium oxide for reuse. The company needed to reduce the heavy oil used for the process of calcining the dehydrated cakes.

Kurita Water Industries' Chemicals Division proposed a new chemical, one highly effective for reducing the water content of dehydrated cakes. As a result of adopting this proposal, the customer could reduce the energy used for evaporating the water content and slashed CO<sub>2</sub> emissions by 177 tons per year.

 CO<sub>2</sub> emissions reduced by **177 tons**



Rotary kiln for calcining dehydrated cakes

### Customer's Voice

We appreciate the proposal because it has stabilized the amount of chemicals used for the process of reclaiming calcium oxide, which used to fluctuate, has made operation and management easier and has reduced the use of heavy oil. We hope Kurita will make proposals that will give even more effects based on the water treatment situations of the entire plant.

We look forward to Kurita demonstrating its knowledge as a water treatment manufacturer for reviewing our wastewater treatment facilities and reducing our industrial waste.



**Tetsuhisa Adachi** (left)  
Assistant General Manager,  
Pulp Products &  
Power Plant Dept.  
**Toshihiro Nishida** (right)  
Deputy Section Chief,  
Motor Section,  
Pulp Products &  
Power Plant Dept.





## Example 9

### Reducing Waste by Introducing a Vacuum Dehydrator

Fujitsu Facilities, Ltd., Nagano Office

Nagano Office of Fujitsu Facilities, Ltd. works to ensure stable operation and management of utility facilities at the Nagano Plant of Fujitsu, Ltd. The company pursues diverse environmental improvement initiatives to carry out the "Fujitsu Group Environmental Policy" at the plant. At this plant, some of the special waste liquid generated in the copper plating process cannot be treated with existing wastewater treatment facilities, and all of this waste liquid is disposed of as industrial waste. The plant needed to reduce this waste liquid.

Together with the customer, Kurita Water Industries' Facilities Division looked at introducing a vacuum dehydrator, which reduces the pressure to lower the boiling point of the waste liquid before heating it to evaporate the water content. The customer adopted this proposal after verification tests that were conducted using the actual equipment. As a result, the customer has reduced the amount of waste liquid disposed of as waste to 10% of the original level.



Waste reduced by **90%**



Vacuum dehydrator

#### Customer's Voice

We were able to reduce the amount of waste significantly thanks to the vacuum dehydrator. As a result, we now need to have the waste collected only around every other month, compared to every week before. The equipment has thus reduced labor for the administration as well.

The wastewater treatment facilities of the plant have aged, so we hope that Kurita will continue to propose efficient new products and new technologies as our partner on water treatment.



**Masahiko Kobayashi**  
Facilities and Environmental  
Services Department

### Examples of Environmental Benefits to Customers

<b>Food factory</b>	CO <sub>2</sub> emissions reduction: 22 tons/year
Wastewater discharged from this factory needed to be diluted with industrial water because the wastewater was difficult to treat with coagulant. The factory has introduced organic coagulant, which has made it possible to coagulate its wastewater without diluting it, thereby reducing the use of industrial water.	
<b>Multiple factories</b>	CO <sub>2</sub> emissions reduction: 1,400 tons/year
The factories promoted use of returnable containers for water treatment chemicals, thereby reducing CO <sub>2</sub> emissions from the incineration of containers.	
<b>Petroleum refining plant</b>	Waste reduction: 735 tons/year
The plant reduced waste volumes by applying portable wastewater treatment facilities for treating waste wash water generated during the jet-cleaning of the heat exchanger, which could not be treated with existing wastewater treatment facilities and would be disposed of as waste.	
<b>LCD plant</b>	CO <sub>2</sub> emissions reduction: 2,132 tons/year
The plant removed stains attached to certain parts of the LCD manufacturing equipment, such as chemical substances, to make the parts reusable and prolong their lives. It has thus reduced CO <sub>2</sub> emissions related to manufacturing of new parts.	
<b>Electronics factory</b>	Reduction of chemicals: 252 tons/year Waste reduction: 52 tons/year
The factory introduced an organic coagulant to enhance the function of inorganic coagulant, thereby reducing the use of coagulant and the amount of sludge derived from coagulant.	
<b>General households</b>	CO <sub>2</sub> emissions reduction: 42,211 tons/year
The use of both tap water and fuels for heating was reduced at general households that have purchased and installed water-saving shower heads.	

<b>Paper mill</b>	CO <sub>2</sub> emissions reduction: 2,000 tons/year
It was difficult to reclaim water and heat efficiently from "white water" discharged from the milling process, which contains a large quantity of fibers. The paper mill has improved the performance of filters by using a water treatment chemical, thereby making it possible to reclaim water and heat. As a result, the paper mill reduced the use of water and heating steam.	
<b>Food factory</b>	CO <sub>2</sub> emissions reduction: 12 tons/year
The factory has improved safety by introducing boiler water treatment chemicals made only from food additives. At the same time, the factory has also reduced the amount of blow water by increasing the concentration rate of the boiler water, thereby reducing the use of gas as the fuel.	
<b>Metal factory</b>	Waste reduction: 600 tons/year
The factory has combined the interface sensor installed in the flocculation tank with a coagulant that is appropriate for the property of the wastewater, thereby raising the level of concentration of the sludge in the flocculation tank and improving the efficiency of dehydration. As a result, the factory has reduced the amount of waste generation and the operating time of the dehydrator.	
<b>Chemical factory</b>	CO <sub>2</sub> emissions reduction: 226 tons/year
The factory has reduced the use of electricity by installing an interface sensor in the aeration tank to optimize the operation management of the blower used for supplying oxygen to microorganisms. This has enabled the factory to prevent excessive injection of air and reduce the use of electricity.	
<b>Beverage factory</b>	CO <sub>2</sub> emissions reduction: 37 tons/year
The factory has adopted facilities that collect wastewater used for washing product containers and sterilize and purify it. This has enabled the factory to reuse the abovementioned water as wash water, thereby reducing the use of water.	
<b>Semiconductor plant</b>	CO <sub>2</sub> emissions reduction: 55 tons/year
The plant has remodeled its facilities so that the volume of pure water production can be changed depending on the status of use of the ultrapure water for washing in the production process. The plant has thus minimized the operating time of the demineralizer and reduced the use of electricity.	

### Glossary of Terms

<b>Responsible care</b>	Voluntary activities by business operators manufacturing or dealing in chemical substances, in which such operators pledge in their management policy to secure "environmental protection, safety, and health" in all processes involving chemical substances, from their development through manufacturing, distribution, use, and final consumption to their disposal, and act and make improvements accordingly
<b>Anaerobic microorganisms</b>	Microorganisms which degrade organic matter contained in wastewater where there is little or no oxygen
<b>BOD</b>	BOD stands for biological oxygen demand, which is an indicator of the amount of organic matter contained in water as pollutants.
<b>LTD</b>	LTD (Leaving Temperature Difference) means the difference between the condensing temperature of refrigerant used in a refrigerator and the cooling water temperature at the outlet. It is used to understand how many stains are attached to the heating surface of a copper tube, for example. The more stains are attached to the surface, the greater the LTD value is.
<b>COP</b>	COP stands for coefficient of performance. It is indicated as a ratio of generated energy (e.g., cooling water, hot water) to used energy (e.g., electricity, gas) for refrigerator and heat pumps. The greater the value is, the more energy-saving the subject equipment is.
<b>Ion-exchange resin</b>	A type of synthetic resin that exchanges ions in water and its own ions, which is regenerated for reuse when there are no more ions to be exchanged
<b>Demineralizer</b>	Equipment to demineralize water by removing suspended solids, salts, and organic matter contained in the water.
<b>Combined cycle</b>	A power generation method combining a gas turbine and a steam turbine, in which steam is generated by using high-temperature gas discharged from the gas turbine and used to rotate the steam turbine, which generates power
<b>RO membrane system</b>	A system which filters water by using a reverse osmosis (RO) membrane, which does not transport impurities such as ions and bacteria across it
<b>Poly-electrolyte</b>	A chemical which is made from polyacrylamide, a chemical substance, and collects and coagulates suspended solids in water, thereby separating it from water efficiently
<b>Inorganic coagulant</b>	A chemical that collects and coagulates suspended solids in water, thereby separating it from water efficiently. Compared with poly-electrolyte, inorganic coagulant has less power to collect suspended solids and the solids break more easily.
<b>Dehydrator</b>	Equipment to reduce the water content of sludge by giving pressure or centrifugal force to sludge containing water
<b>Organic coagulant</b>	A chemical agent that coagulates suspended solids in water. The level of its function is between that of poly-electrolyte and that of inorganic coagulant.
<b>Dehydrated cake</b>	Dehydrated sludge
<b>Precipitate</b>	Grounds at the bottom of a liquid
<b>Slime</b>	A filthy matter formed by microorganisms in water such as bacteria and algae
<b>Biomass</b>	Energy and resources of biological origin, including wood, food waste, paper, manure and planktons
<b>Utility facilities</b>	Ancillary facilities for utilities of a factory or building, such as electricity, steam, gas, air conditioners, water and wastewater



# Internal Change

We are working to reduce our own environmental impact.

## Results in Fiscal Year Ended March 2013

### Energy use reduction

Item	Target	Result
Energy use (A production sites <sup>*1</sup> )	Below 104,546 kL	90,337 kL

<sup>\*1</sup> Kurita Group companies which are specified business operators and designated energy management factories of Kurita Water Industries

To ensure compliance with the Act on Rational Use of Energy of Japan (Energy Saving Act), the Kurita Group made efforts to reduce its per-unit energy consumption at its sites as “specified business operators” and “designated energy management factories” under the law. The Group sought to reduce the operating time of air-conditioning fans at night and on holidays and managed the per-unit energy consumption of each one of the units constituting ultrapure water production systems and wastewater treatment systems. Thanks to these and other reduction efforts, the Kurita Group has achieved its target energy use in a crude oil equivalent.

Item		Result	
		FY2012	FY2013 <sup>*2</sup>
CO <sub>2</sub> emissions		158,121 tons	162,748 tons
Breakdown	A production sites	149,604 tons	157,672 tons
	B Production sites <sup>*3</sup>	3,843 tons	3,524 tons
	Non-production sites <sup>*4</sup>	4,673 tons	1,552 tons

<sup>\*2</sup> Starting from the fiscal year ended March 2013, the subjects of CO<sub>2</sub> emissions have been those under the Energy Saving Act. Accordingly, the subjects exclude gas, tap water and sewage water, and copying paper, which used to be included. For electricity, the actual emission factor in the “CO<sub>2</sub> Emission Factors of Each Electricity Utility” publicized by the Ministry of the Environment of Japan in January 2012 was used and calculation was made for each site of the Kurita Group.

<sup>\*3</sup> B production sites: Kurita Group companies and sites that manufacture water treatment chemicals and systems

<sup>\*4</sup> Non-production sites: Kurita Group companies and sites other than those listed above

To reduce CO<sub>2</sub> emissions, the Kurita Group implemented energy-saving initiatives such as the promotion of Cool Biz and introduction of high-efficiency lighting and air conditioning equipment. However, CO<sub>2</sub> emissions of the entire Kurita Group increased from the previous fiscal year because energy use increased at some ultrapure water supply sites due to changes in customers’ production situations.

### Waste Reduction and Increase of Recycling Rate

Item	Target	Result
Waste generation	Below 47,181 tons	41,561 tons
Breakdown	C production sites <sup>*5</sup>	Below 45,584 tons
	D production sites <sup>*6</sup>	Below 1,310 tons
	Non-production sites <sup>*7</sup>	Below 287 tons
Recycling rate	59.4% or more	61.3%
Breakdown	C production sites	59.2% or more
	D production sites	68.5% or more
	Non-production sites	43.7% or more

<sup>\*5</sup> C production sites: Kurita Group companies and sites where the amount of waste generated is influenced by the production activities of specific customers

<sup>\*6</sup> D production sites: Kurita Group companies and sites engaged in R&D and the manufacture of water treatment chemicals and facilities

<sup>\*7</sup> Non-production sites: Kurita Group companies and sites other than those listed above

There was a time when a large volume of waste was generated due to the disposal of equipment used for disaster-relief work in areas affected by the Great East Japan Earthquake and large-scale office relocations. However, waste was reduced significantly at ultrapure water supply sites due to the improvement of methods for operating and managing wastewater treatment facilities. Consequently, the entire Kurita Group achieved its reduction target.

In addition, the Kurita Group has also begun to reduce waste generated from construction sites and made preparations for beginning full-scale activities for reducing such waste in the fiscal year ending March 2014.

### Improvement Examples

#### Energy Conservation at Yamaguchi Plant of Kurita Water Industries Ltd.

Yamaguchi Plant of Kurita Water Industries Ltd. (located in Yamaguchi-shi, Yamaguchi) provides a manufacturing base for the Kurita Group’s water treatment facilities. At this plant, pure water is used to wash the ion-exchange resin containers. Because the water retains a high level of purity after being used for the washing, pipes were altered to permit reuse of the water for washing reverse osmosis membranes. In addition, aging demineralizers were replaced with new ones which use less energy. This has reduced the operating time of demineralizers, resulting in a reduction of electricity use by 59,532kWh, down 13% from the previous fiscal year.



New demineralizer

#### Recycling of Waste as Valuable Resources at the Kurita Global Technology Center of Kurita Water Industries Ltd.

The Kurita Global Technology Center of Kurita Water Industries Ltd. (Nogi-machi, Shimotsuga-gun, Tochigi) is a research and development base of the Kurita Group, which has state-of-the-art equipment for research, experiments, and analyses. At this center, analyses and experiment equipment which was no longer used would be disposed of as waste. As a measure for reducing waste, however, metals were collected as valuable resources from such equipment.



Metals were recovered as valuable resources from equipment that was no longer used.

#### Reuse of Office Furniture and Fixtures

To ensure employee safety and better business continuity at the time of disaster, the Kurita Group has relocated the Head Office of Kurita Water Industries, Ltd., Hiroshima Office, Kashima Sales Branch, and Oita Sales Branch. Furniture and fixtures such as desks and cabinets that were no longer necessary due to the relocations are reused at other sites of the Kurita Group or have been donated to a Brazilian school in Ibaraki, for example.



Furniture and fixtures reused at a Brazilian school

## Targets for Fiscal Year Ending March 2014

Target		Approach
Energy use	Reduce per-unit energy consumption by 1% or more annually in fiscal 2010 onwards	<b>A production sites</b> Each of the specified business operators and designated energy management factories within the Group will set a per-unit energy consumption reduction target in a crude oil equivalent and implement measures to achieve the target.
		<b>B production sites and non-production sites</b> Each site will set a reduction target for one or two items (electricity and/or gas) according to its features and implement measures to achieve the target.
Waste generation	Below the previous fiscal year level	Each site will set the reduction target and continue implementing measures to achieve it.
Recycling rate	Above the previous fiscal year level	



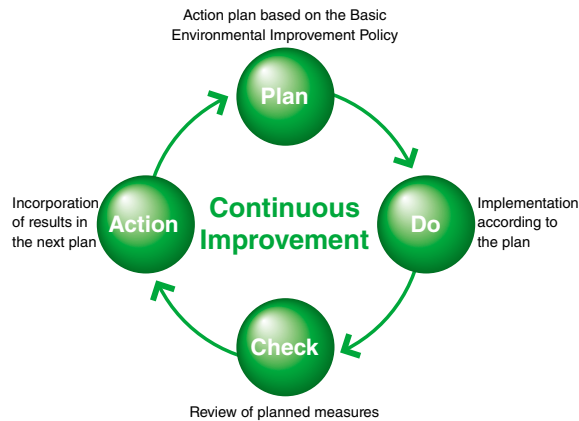
# Environmental Management

In order to execute a PDCA cycle for environmental improvement activities more effectively, we have built up an organizational system to promote the activities across the Group.

## Environmental Management System

We have established the Kurita Group's Environmental Improvement Promotion Committee chaired by the Kurita director responsible for environmental improvement activities. This committee discusses and sets the Group's policies on environmental improvement activities and related issues.

### PDCA Cycle for Environmental Improvement Activities



### Introduction of Environmental Management Systems

Kurita Water Industries has been fostering the establishment and operation of ISO 14001-certified environmental management systems as part of its environmental improvement activities.

### Acquisition of ISO 14001 Certification by the Kurita Group

Company name	Site	Acquired date
Kurita Water Industries Ltd.	Shizuoka, Tsuruga, Toyoura, and Yamaguchi	Jul. 1998
Kurita Buil-Tech Co., Ltd.		Mar. 2002
Kurita Chemicals Oita Ltd.		Jun. 2002
Kurita Chemical Manufacturing Ltd.	Head office and Ako	Mar. 1997
Kuritaz Co., Ltd.		Feb. 2000
Kuritec Service Co., Ltd.	Head office and Tobu, Mie, Iga, Harima, and Oita	Feb. 2003

### Supporting Surveys, Research and International Exchanges in the Fields of Water and the Environment

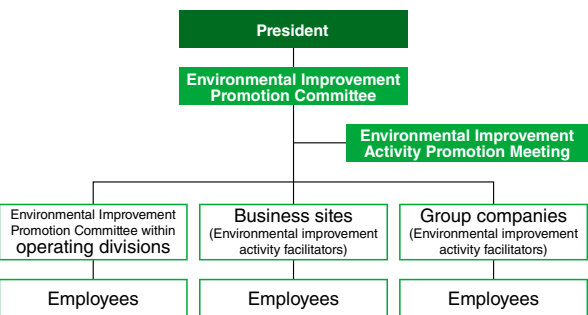
In 1997, the Kurita Group established the Kurita Water and Environment Foundation in order to help create and conserve a rich water environment by promoting science and technology. The Foundation became a public interest incorporated foundation in November 2009. Through this Foundation, we provide subsidies for surveys, research projects, and international exchange programs in the scientific field concerning water and the environment.

In fiscal 2013, the Foundation selected 43 research projects from among 366 applicants and awarded subsidies to selected applicants. Moreover, the Foundation granted prizes of excellence to researchers selected from among those who had received research grants from the Foundation in the past, in recognition of their outstanding research results and social contributions. In addition, the Foundation is supporting the commendation program (Kurita Award) implemented by the Japan Society on Water Environment to motivate young researchers and foster international exchange activities to contribute to the solution of water- and environment-related problems in Asia.



Subsidy granting ceremony held for fiscal 2013

### Organizational System for Promoting Environmental Improvement Activities



### Compliance with Environmental Laws and Regulations

In the fiscal year ended March 2013, we received no administrative punishments for noncompliance with laws, regulations, or ordinances nor did we cause any large accidents that had an impact outside the company. However, a Kurita Group company site was instructed to improve the maintenance and management of its waste water treatment facility. We immediately investigated the cause of the problem and took steps to prevent a recurrence. As a result, the site was confirmed to be compliant by the government and the corrective action was completed.

### Major Environmental Laws That Govern the Business Activities of the Kurita Group

- Water Pollution Control Act
- Act on the Rational Use of Energy
- Act on Promotion of Global Warming Countermeasures
- Sewerage Act
- Noise Regulation Act
- Waste Management and Public Cleansing Act
- Vibration Regulation Act
- Poisonous and Deleterious Substances Control Act
- Air Pollution Control Act
- Fire Service Act
- Act on Confirmation, etc. of Release Amounts of Specific Chemical Substances in the Environment and Promotion of Improvements to the Management Thereof
- Soil Contamination Countermeasures Act

# Third-Party Opinion

To ensure the disclosure of highly reliable information on a continual basis and to improve the quality of our environmental management, we ask the Institute for Environmental Management and Accounting (IEMA), as a third party, to give us their opinion concerning our environmental activities.



## Environmental Management Evaluation Report

To: Kurita Water Industries Ltd.

### Outline of the purpose of this report and implemented procedures

As a third party, independent of Kurita Water Industries Ltd., we herein state our opinions with the aim of enhancing the credibility of Kurita Group Environmental Report 2013, through an evaluation of the environmental management efforts described in the report.

To examine how the Kurita Group's environmental management activities were planned and executed, and how environmental performance data resulting from these activities (which serve as a basis for publicly disclosed information) were evaluated and utilized, we interviewed Toshiyuki Nakai, president of Kurita Water Industries, questioned key persons at the company's head office and visited one of its corporate customers. We have also visited Kurita Analysis Service Co., Ltd. to check related documents, ask questions to persons in charge, and check whether the source documentation for publicly disclosed data is being handled systematically in a predefined manner.

### Evaluation and comments

We can say that the Kurita Group has reached a certain level in its environmental improvement activities in Japan in the three aspects of "social needs," "customer needs," and "internal change." The Group has established a system for the activities and holds regular events to outline its environmental report in an effort to promote the activities among employees. We hope the events will continue to be held for a long time so that all employees of the Group participate. In the aspect of "social needs," the Kurita Group launches products that meet social requirements, aiming to solve social issues through its business. It is important that new social needs be recognized on a real-time basis and that the response be timely. Sales, research, and development divisions are required to cooperate more closely than ever. In terms of "customer needs," the Group contributes to reducing the environmental impact of society by committing to making good proposals to customers for reducing their environmental impact as appropriate for individual issues, supporting sales divisions and Group companies, and providing products, technologies, and services that make use of the Group's unique network. In the aspect of "internal change," at some of its designated energy management factories, the Group undertakes energy management and efficient capital expenditures based on the energy management. Group-wide expansion of these activities is believed to be the next challenge.

The Kurita Group has been expanding its overseas businesses so will be required to expand the activities in the three aspects to overseas countries. The Group should basically aim to introduce the same management systems as the one used in Japan, including measures and targets that are tailored to the situations of each country. Above all, expanding our business in China requires creative measures that will link higher environmental improvement awareness with higher employee motivation to improve the environment. Because social issues related to "water" are global ones, the Kurita Group is expected to demonstrate its capabilities further.

Within the scope of our basic examination, we found no serious discrepancies with the calculation of environmental performance data.

### Contributing to reducing the environmental impacts of customers

We visited a corporate customer of the Kurita Group to interview the company about the Group's business activities. We confirmed that the Group is highly evaluated by the company for the variety of its proposals matching the circumstances and needs of the company, which range from a method for reducing the environmental impact with a simple device to tools for reducing the impact provided as a solution. We have also found that the Group includes in its proposals numerical information based on data on "environmental benefits to customers," which makes the proposals persuasive. The Group has accumulated data on the "environmental benefits to customers" for a long time and makes use of it as a property of the Group. We hope that the Group will enhance its measures for checking and examining the environmental benefits of its proposals to corporate customers to ensure better results and make use of the results for developing new technologies and products and for making more detailed proposals for reducing the environmental impact.

### The Kurita Group's environmental improvement activities

In fiscal 2013, we visited Kurita Analysis Service Co., Ltd., where we interviewed employees about their environmental improvement activities and looked at the results of the activities. Because analyses are the main business of the company, management of samples for analyses collected from customers is an important task. The samples are disposed of by the company as waste, so the company strives to improve its analysis technologies further to enable analyses with smaller samples, which means less waste. With these and other efforts, Kurita Analysis Service engages in environmental activities in its business. The company also aims to reduce its energy use when renewing its analysis and storage facilities. We believe more efficient renewals will be possible if the company applies MFCA, which is a tool for utilizing environmental data and visualizing the effects.

June 14, 2013  
Institute for Environmental Management and Accounting  
Katsuhiko Kokubu (Director/ Professor at Graduate School of Business Administration, Kobe University)  
Eriko Nashioka (Representative Director/ CPA & Certified Public Tax Accountant)  
Hiroshi Okada (Senior Researcher and Professor at Hiroshima University of Economics)