Zero Waste GRI 306-1, 306-2

Inspired by a philosophy of "Wastefulness—*Mottainai*, never today, nor tomorrow.", we aim to contribute to the realization of a zero waste society by ensuring that used products and product packaging are utilized to the maximum possible extent, if necessary by changing their function.

Social issues

Efforts to build high-level circular economic societies with high-level economic growth are increasingly needed throughout the world. Considering that the world's resources are limited, standards of living are rising, and the resources needed are steadily increasing as the global population continues to grow, the one-way economic models of the past will no longer support the prosperous lifestyles and culture of the future.

In regions where social infrastructure (i.e., waste treatment systems) is not sufficiently developed for the increases in the amount of waste generated including household waste, there are numerous instances of environmental pollution due to waste being dumped or insufficiently treated at disposal facilities. In addition, improper conduct by consumers after use results in waste dumped on land entering the oceans.

Currently, there is a stable supply of plastic products and packaging in particular that are reasonably priced, lightweight, multi-functional and corrosion-resistant, so they play an indispensable role in realizing consumers' Kirei Lifestyle. However, many of these plastics are fossil-based and do not decompose naturally unless they are properly disposed of after use, and the volume of marine plastic waste continues to increase. It is estimated that by 2050, there will be more plastic than fish in the ocean, in terms of weight. This marine plastic is starting to have detrimental impacts on marine ecosystems.

To keep the temperature rise due to climate change under 1.5°C and achieve a carbon neutral society by 2050, consumption of fossil fuels must be drastically reduced. Consequently, production of fossil-based plastics is expected to decrease drastically from the current level. It is clear that existing plastic containers made with large amounts of fossil-based plastics are not sustainable.

In order to both stimulate economic activities and transition to a decarbonized society, the use of fossil-based plastics must be reduced while meeting the growing demand for plastics. In light of this situation, we recognize the growing importance of reducing plastic consumption and of recycling.

An additional issue is that, currently, around one-third of all food produced in the world is thrown away as waste. Given that around 8% of annual GHG emissions derive from food waste, there is a clear need to reduce the amount of food that is wasted.

We supplied products that included 91 thousand tons of plastic packaging, such as bottles and film-type refill packs. In addition, 706 tons of food waste was generated.

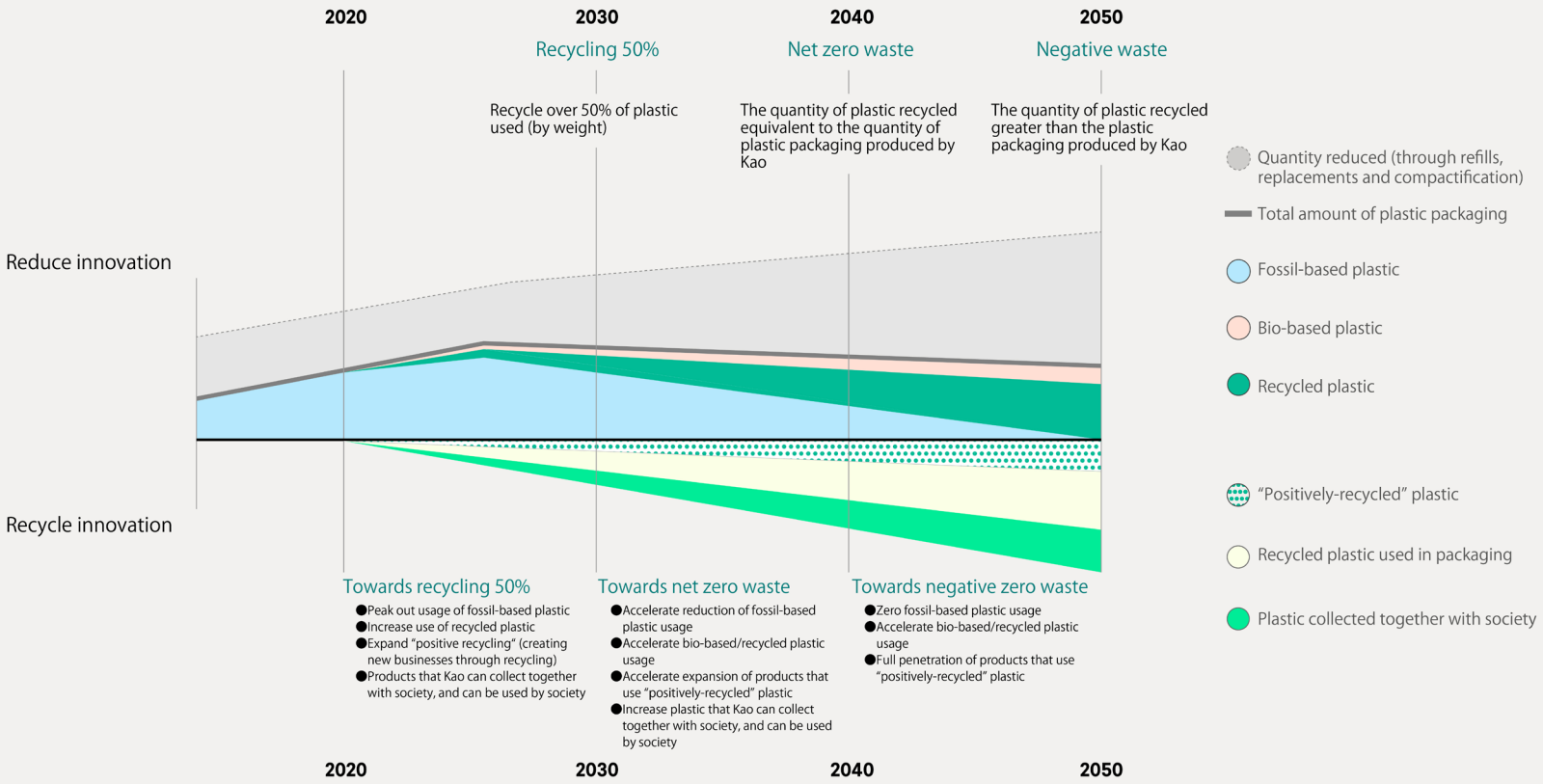
We aim to help realize a zero waste society, not only by minimizing the resources used in all processes from new product development through to disposal of used products, but also by trying to ensure that, after use, all products are reused, recycled, or effectively utilized in some other way. We also believe that, in cases where it is unavoidable for something to be disposed of as waste, it should undergo appropriate treatment.

Zero Waste GRI 306-1, 306-2

What is Kao aiming for?

Kao has established a new roadmap for plastic packaging containers with the aim of quickly moving toward a resource-recycling society. We aim to achieve Zero Waste by 2040 and Waste Negative by 2050. Zero Waste refers to a situation in which the amount of plastic packaging containers used by Kao equals the amount of plastic recycling Kao is involved in. We will reduce the amount of plastic used to the maximum extent possible, and then offset this by developing products and services using plastic waste generated by society, thereby reducing the amount of plastic used to virtually zero. In addition, Waste Negative is defined as a situation where Kao is involved in more plastic recycling than the amount of plastic packaging containers used by Kao.

Kao Plastic Packaging Circularity Roadmap



Zero Waste GRI 306-2

Policies

We believe that, in all processes from new product development through to disposal of used products, we should make an effort, as far as possible, to reduce the quantity of product that is subject to being disposed of and recycled, and that we should try to ensure that all waste, regardless of whether it is solid or liquid, is utilized in a way that is useful for society, with the ultimate goal of achieving a net zero waste society. As we see it, we should seek to maximize recycled resources, and when the generation of waste is unavoidable, it should be utilized appropriately.

Our Basic Principle and Basic Policies on Environment and Safety states that "We shall contribute to social sustainability by giving thorough consideration to environmental conservation and human safety in every aspect of our operations, including product development, manufacture, distribution, usage and waste disposal." Furthermore, the Kao Group Responsible Care Policy contains the following declaration: "We shall reduce, reuse and recycle waste and strive to continuously reduce environmental impact."

We will also promote "eco together" activities in line with the Kao Environmental Statement, which embodies our commitment to ensuring that "Kao products utilize original Kao-developed technologies to minimize the impact they have on the environment, not just in the manufacturing process, but in the daily life of the customers who use them. From raw materials procurement and manufacturing, to distribution, sales, usage and final disposal, we want to engage in 'eco together' with stakeholders, including consumers, throughout the product lifecycle."

With the aim of realizing these policies in concrete terms, in October 2018 we announced Our Philosophy & Action on Plastic Packaging, which clearly enunciates that our action on plastic packaging is driven by our 4R (reduce, reuse, replace, recycle) program based on continuous improvement and bold innovation.

In September 2019 we announced that, as part of our efforts to realize "ESG-driven *Yoki-Monozukuri*," we would be taking responsibility for our products not only until they are sold, but until they are disposed of, and that we would be focusing heavily on Innovation for Reduction and Innovation for Recycling aimed at building the plastic resource circulating society. To realize our vision, we are collaborating with other business enterprises, local governments and universities as we seek to realize a resource-circulating society.

A further point is that food waste connected to our businesses is of relevance to Kao's beverage business. In regard to food waste, we are working to reduce the amount of waste generated as much as possible, and striving to ensure that when the generation of waste is unavoidable, this waste is recycled.

P132 RecyCreation activities

Web
Our Philosophy & Action on Plastic Packaging
https://www.kao.com/content/dam/sites/kao/www-kao-com/global/en/sustainability/pdf/plastic-packaging-001.pdf

Kao's New Challenges for the Future: Accelerating Purposeful Business Commitment with ESG
https://www.kao.com/global/en/newsroom/news/release/2019/20190926-001/

Basic Principle and Basic Policies on Environment and Safety
https://www.kao.com/content/dam/sites/kao/www-kao-com/global/en/sustainability/pdf/environment-safety-principle-policies.pdf

Kao Group Responsible Care Policy
https://www.kao.com/content/dam/sites/kao/www-kao-com/global/en/sustainability/pdf/responsible-care-policy.pdf

Kao Environmental Statement
https://www.kao.com/content/dam/sites/kao/www-kao-com/global/en/sustainability/pdf/environmental-statement.pdf

Efforts in raw materials procurement

To reduce the waste generated when transporting raw materials, we continuously work with external suppliers to adjust the volume and frequency of raw materials deliveries. This contributes to reducing the amount of packaging materials our suppliers procure as well as reducing CO_2 emissions from the transport of raw materials.

In addition, we are continuing our efforts to improve the production methods used by our subcontractors for contracted product manufacturing, for example by providing them with the relevant technology. This contributes to reducing CO_2 emissions associated with raw materials procurement.

Zero Waste GRI 306-2

Initiatives taken in relation to our products

We offer products such as baby diapers and cleaning sheets that become waste after consumer use. While ensuring product performance, we are developing technologies to reduce the amount of raw materials used in products and contribute to reducing waste in order to reduce the amount of waste generated after product use. This also reduces costs and CO_2 emissions in conjunction with waste processing.

We also use recycled plastic for some of our products. As a result, we are able to reduce the amount of virgin plastic used, which leads to a reduction in the use of fossil fuels, the raw material for plastic. We are aware that these measures are important for solving the plastic problem and creating a decarbonized society.

Initiatives targeting packaging

We are aiming to realize net zero waste for plastic packaging by 2040, and negative waste for plastic packaging by 2050. To achieve these goals, we are undertaking measures in compliance with the ISO 18600 series standards for packaging and the environment. Specifically, we are reducing the amount of materials used in packaging, and in particular we are reducing the use of plastic packaging, which has become a serious issue for society, by adopting a 4R (reduce, reuse, replace, and recycle) approach from the perspectives of innovations for reduction and recycling.

Innovation for Reduction

This involves initiatives to reduce the amount of fossil-based plastic used.

Reduce

This involves initiatives to reduce the amount of plastic used in packaging containers. In addition to reducing the quantity of plastic used, we will reduce the use of fossil-based plastics while aiming to achieve a carbon-neutral society by 2050.

Reuse

We are promoting the adoption of refill and replacement products. The use of plastic film packaging enables us to slash the use of plastic by around 75% compared to plastic bottles. To expand the use of film packaging, we have continued to make improvements to these refill products according to bottle size, the viscosity of the contents and so on to make refilling easier for consumers, and we encourage the internal and external use of innovative film packaging. We are exploring the possibility of in-store refilling whereby consumers bring packaging to the store and purchase only the products they are filled with. In addition, we have adopted a take-back system for some products, whereby we take back used containers from customers and then clean them and reuse them.

Replace

We are implementing initiatives to replace fossil-based plastics with alternative materials such as paper and metal. We are also proceeding with initiatives to use plant-based plastic as an alternative for fossil-based plastics. We have been using recycled paper for the carton boxes and instructional inserts for many products, including powdered laundry detergent, since the 1960s, and we plan to expand their use.

Innovation for Recycling

This involves projects to recover used packaging and recycle it so that it can be used again as recycled plastic.

Recycle

Based on the fundamental technology that we have accumulated until now, we are focused on creating innovative recycling technologies for used plastic, including the use of recycled plastic for packaging, as well as developing and using high-quality, low-cost recycled plastics, encouraging activities that generate value from used plastic, and using plastic waste for industrial applications. Recycling also includes initiatives to develop packaging that is easy to recycle. We are undertaking initiatives to replace refill packs made from multiple layers of different plastic materials with a single material.

We are establishing a framework to recover used packaging and recycle it, in collaboration with stakeholders such as distributors, competitors and local government authorities, with the aim of helping to build the resource-circulating society. We are also working actively to promote the use of recycled plastic.

Efforts in development, manufacturing and sales

We are reducing the amount of waste generated at our plants and offices, and we are reusing and recycling waste and other materials inside and outside the company. We have set reduction targets for how much waste we generate and are working companywide to achieve them.

At plants, we are reducing loss of raw materials and products. For example, wastewater sludge is generated as a result of cleaning the mixing and storage tanks for liquid products at the production facility when the product produced is switched. For sheet-type products, a portion of the sheet material is left unused when the material is switched out. We are studying loss reduction countermeasures on an ongoing basis according to the type of loss that occurs.

Zero Waste GRI 306-1, 306-2

Because products that are returned from retailers are ultimately disposed of as waste, considerable expense and environmental impact arise including the waste of resources and GHG emissions during the disposal process as well as considerable disposal-related expense. Going forward, we will work with retailers to review product shipping and stock replenishment methods in an effort to minimize waste.

In addition, promotional materials are discarded after use, so we are making a transition to disseminating information using digital means.

Enhancing waste recycling

It would be difficult to reduce generated waste to zero with the currently available technology. Accordingly, we ensure that generated waste is thoroughly sorted, and we select the most appropriate recycling methods in cooperation with contracted waste treatment providers. We monitor the amount of waste recycled and sent for final disposal along with the amount of waste generated to improve how waste is treated overall.

Preventing illegal dumping of waste

When contracting waste treatment service providers to dispose of waste generated at our plants and offices, there is a risk of illegal dumping. To reduce this risk, we regularly visit the service providers to verify that the contracted waste is being disposed of appropriately. The Kao Group in Japan has created a database containing information including contracts with waste treatment service providers and the results obtained from surveys of appropriate waste treatment to prevent illegal dumping. This system is also connected to the Electronic Manifest System, which also ensures prevention of illegal dumping.

Proper storage and treatment of PCB waste

Polychlorinated biphenyls (PCBs) were formerly used in insulating oil, such as in transformers and ballasts, but they have low degradability and therefore pose a risk to human health and can create hazards in living environments. We store and treat waste containing PCB appropriately in accordance with the law until its disposal is contracted to a service provider.

Reducing food waste

We monitor the generated food waste that is treated through wastewater treatment or incineration and cannot be effectively used for other purposes.

Since food waste is generated when products close to their expiration dates are returned, we are working with our suppliers to extend expiration dates and review return policies. Some returned products can be utilized effectively in methane fermentation and composting. Through activities such as these, we are taking steps to reduce food waste.

Strategy

Risks and opportunities

Risks

Item	Content
Policies, laws and regulations	Stricter regulations on the processing of waste generated at offices, increased regulation on consumption of plastic packaging (mandatory use of recycled plastic, taxation), mandatory labeling of information on plastic consumption, etc.
Technology	Increased volumes of waste generated from offices in conjunction with the manufacture of new products and unsuccessful attempts to develop technology for reducing plastic consumption or using recycled plastic
Markets	Higher disposal costs as a result of increases in the volume of waste generated in excess of disposal capacity throughout society, changes in consumer preferences, rising costs for virgin plastic or recycled plastic, increased consumption of hygiene-related product packaging due to enhanced consumer hygiene awareness resulting from the COVID-19 pandemic, etc.
Reputation	Criticism of the industry or of individual companies, stronger concerns among stakeholders, changes in consumer preferences, etc.

Zero Waste GRI 3-3, 306-1, 306-2

Opportunities

Item	Content
Resource efficiency	Lower disposal costs as a result of decreases in the volume of waste generated from offices and lower costs for packaging, better transportation efficiency, etc. as a result of reducing plastic consumption
Products, services	Reduction in the volume of waste generated through the development of resource-saving products, higher sales due to expanded use of packaging using less plastic and development of innovative packaging, higher income due to licensing of development technology
Markets	Higher sales due to improved access to new markets, use of public incentives for developing innovative technologies, etc.
Resilience	Improved resilience through actively continuing to promote 3R activities for plastic packaging, and by providing even more environmentally friendly plastic packaging, rather than merely returning to the situation that existed before the COVID-19 pandemic

Strategy

Plastic packaging containers play an important role in our products because of its versatility and flexibility. At the same time, recognizing that the excessive use of plastic is a common concern for Kao and consumers in terms of its impact on the global environment, we believe that plastic resources used for packaging containers should be recycled as much as possible to create a recycling society. Stakeholders will be aware of our initiatives for the transition to a recycling society that reduces and recycles waste, not just plastics, and will share our values, which will lead to product selection and contribute to increased sales.

Social impact

We are continuously implementing 3R activities to reduce, reuse and recycle waste generated at plants, distribution sites and offices and with regard to products and packaging.

In the area of plastic packaging in particular, we are undertaking ongoing development and use of film packaging that reduces plastic consumption by around 75%, and products in refillable film packaging are becoming popular in Japan. We are also rolling out these technologies to overseas group companies, making it possible to reduce the quantity of plastics used in packaging.

Besides our efforts in regard to film packaging, we are also implementing initiatives to reduce plastic consumption through the reuse of bottles.

Through effective coordination between the recycler and the manufacturer, we are getting used products recycled to create recycled products that are useful in consumers' daily lives. Working together with distributors, competitors, local government authorities and other stakeholders, we are putting in place a framework for the collection of used packaging. Having as many other stakeholders as possible participate in this initiative will help make the benefits even more substantial.

Furthermore, efforts to recover waste that has already been released into the environment greatly contribute to the protection of marine and land ecosystems.

By curtailing waste and the like generated from business activities, promoting recycling to achieve zero waste, and developing a society where innovative film packaging that can drastically reduce the quantity of plastics used (to around one-sixth of the former level) is widespread both internally and externally, we will contribute to enhancing resource productivity throughout society as a whole. Doing this will contribute to realizing a circular society and make it possible to offer consumers clean products in a future society with limited resource availability. These are important approaches for carrying out the Kirei Lifestyle and achieving One Planet Living vision.

Contributions to the SDGs

Business impact

It will be necessary to raise productivity in order to curtail the amount of waste and the like generated from business activities. If productivity is raised, manufacturing costs can be reduced. In addition, promoting recycling can also be expected to reduce waste processing costs.

By using innovative film packaging both internally and externally and meeting our targets for reducing plastic consumption, we can boost sales in new markets and earn revenue from licensing our patents.

By increasing consumption of recycled and recyclable plastics, we can also avoid new taxes on the use of fossil-based plastics.

Governance

Framework

Under the supervision of the Board of Directors, risk management in relation to zero waste issues is carried out by the Internal Control Committee and opportunity management is carried out by the ESG Managing Committee. These committees are both headed by the President & CEO.

Zero Waste GRI 3-3, 306-2, 404-2

Risk management related to zero waste issues is carried out by the Internal Control Committee (which meets twice a year) and its subordinate body, the Risk & Crisis Management Committee (which meets four times a year). These committees are headed by the Executive Officer Responsible for Corporate Strategy.

The ESG Managing Committee (which meets six times a year) is responsible for managing opportunities related to zero waste issues. Comprising outside experts, the ESG External Advisory Board provides advice and suggestions on issues raised by the ESG Managing Committee and offers outside viewpoints to be reflected into management, and the ESG Promotion Meeting executes the strategies.

In addition, the Plastic Packaging Steering Committee has also undertaken strategy formulation and implementation planning under board-level ownership, working to ensure reliable and rapid execution.

Education and promotion

Many of our products become waste after use. We are facing this fact earnestly and recognize the importance of giving our employees the chance to learn about the generation of waste from our business activities and used products through various programs and to actively engage in waste reduction measures of their own accord. To this end, we have created many opportunities for employee education. We have been making educational videos for internal use that are specific to the themes of the Kirei Lifestyle Plan (KLP), and we are disseminating one on zero waste.

If, in addition to plants' waste-material reduction activities and technology development that is oriented toward using fewer resources in manufacturing, there is also a strengthening of employees' waste awareness, then this will help to enhance our activities in this area. A further point is that employees are also consumers, and in their role as consumers it is important that they choose products more carefully and take steps to deal with waste properly.

With regard to packaging, our research laboratories, Procurement, SCM, Business divisions, the ESG Division, etc., engage in a periodic exchange of views regarding our strategy in this area, the issues faced, and how to address them.

Collaboration with stakeholders

We recognize that in order to help consumers realize the Kirei Lifestyle it is vital for us to deepen mutual understanding with a wide range of stakeholders and collaborate with them by developing mutual communication.

As the waste generated by our production activities impacts local communities, having good communication with local communities is also vitally important. Many of our plants compile an annual environmental report, and communicate with local residents.

Methods of processing waste generated from our business activities as well as waste generated by consumers and customers after using our products are regulated by government agencies. To recycle more waste and make it easier to process waste, it is important to implement initiatives in collaboration with municipalities, retailers, recyclers, and commodity manufacturers.

It is also vitally important to share ideas with suppliers and undertake collaborative R&D with them, in order to reduce the amount of plastic used in packaging and enhance its recyclability.

Consumer behavior needs to change in order for consumers to attain the Kirei Lifestyle. We provide opportunities to think about the Kirei Lifestyle through visits to museums and plants that take Kao products as the theme. This visit program includes displays that enable participants to get a real feel for the amount of waste generated from products manufactured using limited amounts of resources.

Risk management

In the process of assessing risks and opportunities, the ESG divisions identify risks anticipated at Kao, and conduct risk and opportunity assessments based on feedback from outside experts and staff in internal departments that are implementing initiatives. These are approved by the Internal Control Committee and ESG Managing Committee, respectively.

On behalf of the Kao Group, the secretariat of the Risk & Crisis Management Committee (Risk Management & Responsible Care) conducts comprehensive and topical risk surveys on each division and subsidiary to identify key risks and adjust measures. In principle, the division in charge takes the lead in addressing these risks, but cross-organizational and common risks are addressed in collaboration with related divisions to strengthen the response and are treated as corporate risk issues as appropriate.

P280 Risk and Crisis Management > Governance > Education and promotion > Risk surveys

Zero Waste GRI 306-2, 306-3, 306-4

Targets and metrics

Mid- to long-term targets and 2022 results

We are aiming to realize net zero waste for plastic packaging by 2040, and negative waste for plastic packaging by 2050. We will also be maximizing our contribution toward helping society as a whole to reduce plastic packaging usage. Furthermore, we will promote the reduction of waste, not only plastic.

2025 mid-term targets

Item	Scope	Targets for 2025
% of recycled plastic used in PET containers	Kao Group in Japan (consumer products)	100%

2030 long-term targets

Item	Scope	Target for 2030
Quantity of fossil-based plastics	Kao Group	Will peak and begin to decline
Quantity of innovative film-based packaging penetration	Kao Group and other companies	300 million*1
Recycling rate of plastics involving Kao	Kao Group	50%
Amount of waste generated*2	Kao Group Production sites*3	0 (less than 1%)
Reduction rate of discarded products and discarded sales promotion materials	Kao Group in Japan	95%

We aim for Kao's involvement in plastic recycling to account for at least 50% of the volume of plastic packaging containers used.

We are aiming to reduce the amount of plastic packaging*4 used by Kao and by society as a whole by 200 thousand tons.

We are also aiming to use recycled materials for 40% of the plastic packaging containers used by Kao and to peak out the use of fossil-based plastics.

*1 Annual penetration amount
*2 Amount of waste not recycled from business sites
*3 Beginning with production sites
*4 Amount reduced through the use of innovative film-based packaging, refill and replacement products, and development of more concentrated products

2040 long-term targets

We are aiming to reduce plastic packaging waste to zero*5.

*5 This is the state in which the amount of plastic packaging used by Kao is roughly equivalent to the amount of plastic for which resource recovery*6 is implemented by Kao.
*6 Amount of plastic that is upcycled + Amount of recycled plastic that is used by Kao for containers and packaging + Amount of plastic that is collected by Kao and society in general and used by society.

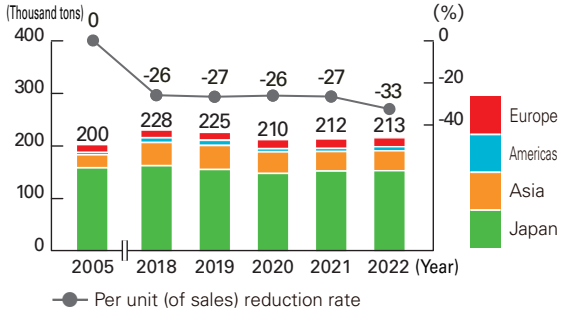
2050 long-term targets

We are aiming to reduce the quantity of fossil-based plastics used to zero.

We are also aiming to achieve negative plastic packaging waste*7.

*7 This is the state in which the amount of plastic for which Kao implements resource recovery*6 is more than the amount of plastic packaging used by Kao.

Amount of generated waste and other unwanted materials☑ (all sites)



* Boundary: For 2005, all Kao Group production sites, and all non-production sites in Japan. From 2015, some non-production sites outside Japan are also included.
* Assurance provided for amount of generated waste and other unwanted materials.
* Per unit of sales was calculated based on Japanese GAAP in FY2005, and based on International Financial Reporting Standards (IFRS) from FY2017 onwards.

Amount of generated waste and other unwanted materials

In 2022, the amount of waste generated totaled 213 thousand tons, representing an increase of 1 thousand tons compared to the previous year. As there was an increase in sales, the reduction rate (per unit of sales) was 33%, representing a significant improvement.

Amount of hazardous waste generated

Of the generated waste, 27 thousand tons constituted hazardous waste. No hazardous waste was transported internationally under the Basel Convention.

Waste plastics

In 2022, the volume of waste plastics discharged in Japan (including in-house treatment, excluding valuable resources) was 7,340 tons, lower than the previous year result (8,670 tons). Kao Corporation was the only corporate unit to discharge more than 250 tons, with 6,770 tons of waste plastic discharged, which was less than the previous year result (8,110 tons). We will continue our initiatives to reduce the amount of waste by aiming to keep it below the previous year level.

Recycling

We are promoting the reuse of waste, such as offcuts generated in the production of baby diapers, etc., for example by turning such waste into pallets or using it to make paper products.

Reuse and recycling* of waste, etc. was 195 thousand tons☑ with a recycling rate of 91%.

We maintained our target of a 0.1% or lower final disposal ratio for waste. We have achieved our target of zero emissions for the 18th consecutive year since the target was set (final disposal ratio to generated waste for all Kao Group offices in Japan).

Zero Waste GRI 301-2, 306-2, 306-3, 306-4

Starting from 2021, as a new zero waste indicator, we have begun to calculate a combined landfill disposal and incineration rate, which was 4.2% for all production sites combined in 2022. We are aiming to reduce this rate to under 1% (i.e., to more or less zero) by 2030.

The combined landfill disposal and incineration rate is the share of industrial waste (as defined in Japan) generated by production sites that is disposed of either by landfill disposal (direct disposal by landfill without intermediate processing) or incineration (incineration without heat recovery). Waste that individual countries' laws require be disposed of by landfill or incineration, and waste in countries where there are no facilities for disposal otherwise than by landfill or incineration, is excluded.

* Boundary: All Kao Group sites, including company cars in Japan
* Assurance provided for the amount of material recycled

Reduction rate of discarded products and discarded sales promotion materials

The target for this activity was set in 2021. The performance achieved in 2022 was a 20% reduction rate (14% in 2021).

Food waste

Since 2018, we have been implementing activities to reduce food waste. For Kao, food waste is generated when products are returned because of damage to packaging or because they are past the best-before dates. In 2022, the amount of food waste disposed of by the Kao Group as a whole totaled 706 tons, of which 8 tons was utilized effectively for methane fermentation or composting*. We have also been working together with our business partners to revise the rules relating to the return of products that are approaching their expiry date.

* Besides methane fermentation or composting, this figure also includes the effective utilization of packaging (such as cans or cartons).

Changes in amount of food waste ☑ (in tons)*1

Item	2018	2019	2020	2021	2022
Amount of food waste generated	1,081	251	592	723	706
Amount of food waste utilized effectively*2	54	20	27	43	8
In-house disposal	1,027	230	565	680	698

*1 Third-party assurance was obtained for these data from 2021 onwards.
Boundary: Kao's food businesses
*2 Contracted disposal: Contracted disposal includes methane fermentation or compositing, and also effective utilization of packaging (such as cans or cartons)

Inspection of waste treatment facilities

In 2022, although the impact of the COVID-19 pandemic remains, the number of waste treatment facilities at which on-site inspection could be performed was higher than in normal years. However, by using documentary review, etc. we still managed to evaluate a total of 148 facilities (in Japan), thanks to collaboration from 122 waste treatment companies. The evaluation results showed that there were no waste treatment companies that did not meet Kao's evaluation criteria.

Amount of packaging materials used, by material type

In 2022, the amount of paper and pulp used was 174 thousand tons. Of this, the ratio of certified paper and pulp was 97%. The amount of metal used in packaging was 4.3 thousand tons, and the amount of glass used was 0.6 thousand tons.

Horizontal material recycling of film packaging

Since June 2021, we have been developing and verifying recycling technology at our pilot plant for film packaging recycling set up at Wakayama Research Laboratories. Since October 1, 2021, we have also been participating in the project of Kobe Plastic Next: Joining Forces to Recycle Refill Packs. In this project, retailers, consumer product manufacturers, and recyclers (resource recycling business operators) collaborate with the city of Kobe to recycle used refill packs of household and personal care items, with the aim of becoming a circular society.

We are examining easier-to-recycle packaging designs with the aim of raising recycling rates and realizing horizontal material recycling.

Shift to 100% recyclable, reusable packaging

Plastic packaging used for household products in Japan is required by Containers and Packaging Recycling Law to have a framework in place for recycling. Our plastic packaging is thus already 100% recyclable.

Outside Japan, definitions of what constitutes recyclable packaging vary depending on the country or region, and recyclability also depends on the recycling systems that exist in each country or region. We are therefore working to confirm not only packaging specifications but also the sales areas for each type of packaging.

* Cardboard, paper, plastic, metal and glass

Zero Waste GRI 301-2, 306-2, 306-3, 306-4

Amount of plastic packaging used

Plastic packaging usage in 2022 was 91 thousand tons. Of this, fossil-based plastic usage amounted to 88 thousand tons.

Kao Corporation now offers 389 refill and replacement products (as of December 2022), with a penetration rate of 79% and approximately 80%. The refill ratio for fabric bleach in particular now stands at approximately 90% (unit basis).

Plastic consumption has been reduced by 84.6 thousand tons through the use of refill and replacement products. If the impact of making products more concentrated is also factored in, then the overall amount of reduction was 144.0 thousand tons, and the reduction rate (compared to if the products had been packaged in the original plastic packaging) was 79.0%.

Changes in amount of plastic packaging used (in thousand tons)

Item	2019	2020	2021	2022
Amount of plastic packaging used	65.6	116.6	92.9*	90.8*
Recycled material usage rate	0.07%	0.37%	1.5%*	2.9%*

* Recalculated due to double counting partly

Quantity of innovative film packaging penetration

In 2022, the total number of products manufactured using innovative film packaging, calculated as the combined total of products that included *Raku-raku Eco Pack Refill* and *Air-in Film Bottle*, was approximately 13 million items.

Quantity of recycled plastic used

Recycled plastic made from used plastic is utilized for shampoo, conditioner, and body wash products by Kao (Taiwan) Corporation, and it is also used by the salon-oriented *Kerasilk* brand in EMEA and by the *Oribe* brand in the U.S., as well as by brands such as *Attack ZERO* and *CuCute* in Japan. The total amount of recycled plastic used in 2022 was 2,559 tons (1.5 times as much as in 2021).

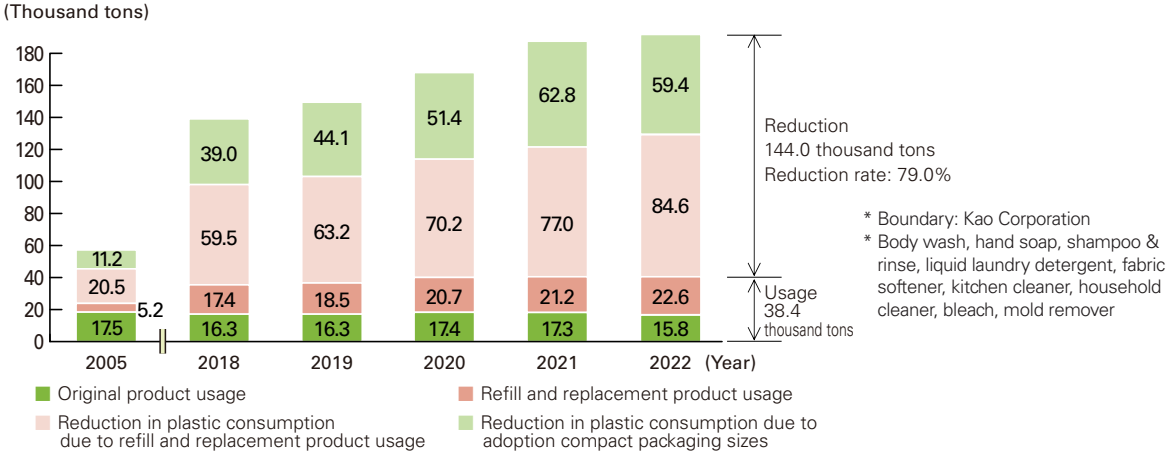
Recycled plastic usage rate in PET packaging

In an initiative targeting household products sold in Japan, we have begun using recycled plastic in the manufacturing of PET packaging, starting with the packaging of *Attack ZERO* and *CuCute Clear Foam Spray*. In 2022, 69% of the plastic used in this PET packaging was recycled plastic.

Quantity of plant-based plastics used

Plant-based plastics are used for *Merit* shampoo and conditioner, *Segreta* shampoo and conditioner, *CuCute* 1,380 ml containers, *Raku-raku Eco Pack Refill, and* shampoo and treatment, and other products, and the total amount used has reached 513 tons (1.1 times the amount in 2021).

Usage and reduction volume of plastic in refill and replacement categories



Zero Waste GRI 301-2, 301-3

Main initiatives

Initiatives taken in relation to our products

Reducing the amount of product materials used

We continue to reduce the materials used in making products that become waste after product use by consumers. For example, we reduced the product weight of medium-sized *Merries* disposable taped diapers by 37% while improving the product function compared to its 1990 version.

Paper hot water pipes

Paper hot water pipes handled by Chemical Business combine molding technologies with high-temperature material technologies and are made from waste paper. Compared to general ceramic hot water pipes, the amount of raw materials used is reduced to one-tenth and post-use waste to one-sixteenth.

Healthya Green Tea

Healthya Green Tea, which can help to reduce visceral fat, utilizes a drip method to effectively extract tea catechins, which are the active ingredient, from the tea leaves. In this way, the amount of tea leaves that need to be disposed of by the contract manufacturer as food waste after use is reduced by 37%.

Products that use recycled materials

We use recycled materials for some of our products. We have been using recycled paper in the carton boxes and instructional inserts of many products since the 1960s, including powder-type laundry detergents. We use recycled polypropylene (PP) in the measuring spoon for *Attack* powder type laundry detergent, which was first put on the market in 1987, and recycled polyethylene terephthalate (PET) in the fibers of *Quickle Wiper* floor dry cleaning sheets, which first appeared on the market in 1994.

Using waste PET to make NEWTLAC 5000 asphalt modifier

The Chemical Business has used our proprietary modification and compounding techniques on discarded PET materials (waste PET) to develop *NEWTLAC 5000*, a new type of asphalt modifier, through positive recycling. The full-scale commercial launch of the new product took place in late 2020.

Besides improving the durability of road surfaces in the same way as conventional asphalt modifiers, asphalt road surfaces that are durable and environmentally conscious can also be created because *NEWTLAC 5000* uses waste PET, the disposal of which has become a problem for society (approximately 1,430 PET bottles are used to cover a road area of 100 m^2).

Recycling of used baby diapers

Field testing of technology to convert used disposable diapers into carbon material began in January 2021, in collaboration with Saijo City, Ehime Prefecture, where Kao Sanitary Products Ehime is located. We have developed carbonization technology that reduces the amount of CO_2 emitted during recycling, while also sterilizing and eliminating odor, and reducing the volume occupied by the recycled material. We are proceeding with activities to develop applications for the carbon material obtained through recycling, including industrial uses, air and aquatic environment purification, and plant cultivation.

The recycling system development has been undertaken through joint research with Kyoto University Open Innovation Institute, with the aim of realizing social implementation by 2025.

Initiatives targeting packaging

Initiatives to reduce

Smart Holder and Raku-raku Eco Pack Refill

In 2017, we proposed *Raku-raku Eco Pack Refill*, which can be used with our *Smart Holder*, improving usability and allowing the product to be completely consumed, thus reducing environmental impact. This eliminates the need for an original plastic bottle.

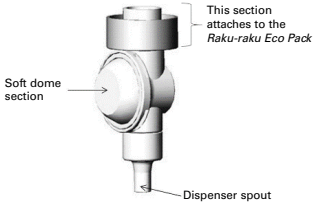
Until now, these were sold only on our online site, but we implemented a full-scale rollout to stores in April 2020. We believe this will make them accessible to more consumers and will encourage use.

Smart Holder and *Raku-raku Eco Pack Refill*

Zero Waste

Launch of the Raku-raku Switch for dispensing a fixed amount from film packaging with one light push

Bioré u The Body—Body Lotion for Wet Skin, which was launched in September 2020, uses a *Raku-raku Switch* that, when attached to a *Raku-raku Eco Pack Refill*, makes it possible to extract a fixed amount of liquid with just a light touch. Compared to bottles with pumps, *Raku-raku Switch*-equipped products reduce the quantity of plastic used by around 50%. From a universal design perspective, these products have the outstanding feature of being easy to use even for people who do not have much strength.



Raku-raku Switch

P74 Sustainable Lifestyle Promotion > *Yoki-Monozukuri* in plan and action and proposing activities: Addressing the environmental challenges presented by containers

Air-in Film Bottle technology adopted for use in MyKirei by KAO products sold in the U.S.A.

In April 2020, *Air-in Film Bottle* film packaging developed by Kao began to be used for the first time in *MyKirei by KAO* products sold in the U.S.A. The film is the same kind of soft material used in refill packaging. The bottles gain their rigidity through an air fill, allowing them to stand upright, and compared to conventional pump bottles, they use approximately 50% less plastic.

Additionally, compared to conventional bottles there is less liquid left in the bottles when they are disposed of.

MyKirei by KAO

P80 Purpose Driven Brands > Purpose driven brand activities

Thin-film packaging

Film packaging already uses less plastic than regular containers, but we are proceeding with efforts to further improve it by making it even thinner. *Attack Easy*, sold in Thailand, uses film packaging that is 29% thinner.

Use of plant-based plastics

We are actively developing technologies for using plant-based plastics for bottles and refills. Since we began this initiative in 2012, our consumption of plant-based plastics and the range of products for which they are used have continued to expand.

For example, *Raku-raku Eco Pack Refills* are made from 15% plant-based plastic based on its weight.

Initiatives to reuse (promoting the adoption of refill and replacement products)

We continue to provide refill and replacement products and expand sales of *Smart Holder*.

Refillable in stores

At *Molton Brown*, following on from the packaging reduction initiative implemented in 2020 (specifically, in-store refill for handwashing products), starting from 2021, reusable bottles and *Aroma Reed Diffuser refills* have been on sale both in-store and online in EMEA and in the Americas. Utilizing refills makes it possible to reduce the amount of single-use plastic and plastic that is disposed of as waste by 82%.

Aroma Reed Diffuser refill

Zero Waste GRI 301-2, 301-3

Initiatives to recycle

RecyCreation activities

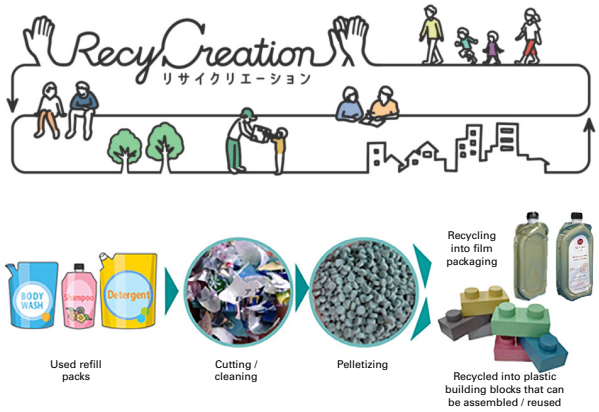
We have been engaged in research toward creating a new resource recycling system. We have proposed the RecyCreation approach, which generates new value by adding technology and the knowledge and ideas of various people to used items. To date, we have continuously conducted verification in five areas with members of the community.

In a trial, we collected used refill packs for laundry detergent, shampoo and other products from members of the community and recycled them to create a block of recycled plastic that symbolizes the creation of various objects and values that will be useful for community development and lifestyle development. In September 2020, we made the decision to collaborate with Lion Corporation on RecyCreation, and began field testing at the Ito-Yokado Hikifune store in Sumida-ku, Tokyo of a program to implement in-store collection and recycling of used refill packs. Over a period of approximately one year from October 30, 2020 to the end of October 2021, we collected approximately 9,500 pieces* of film packaging. Going forward, we will be aiming to realize horizontal material recycling that makes it possible for film packaging to be recycled for use in the production of film packaging.

* Calculated by dividing the total weight of collected film packaging (170.2 kg) by the average weight per piece of packaging, which was 18.0 g.
(In the 2021 report, the calculation was based on an estimated average weight of 14.4 g.)

Web RecyCreation on Facebook
https://www.facebook.com/RecyCreation.jp/ (Japanese)

The RecyCreation Concept



Commencement of the verification process for a resource-circulating model project involving horizontal material recycling* of single-use plastics

Since October 2021, we have been participating in the project of Kobe Plastic Next: Joining Forces to Recycle Refill Packs. In this project, retailers, consumer products manufacturers, and recyclers (resource recycling business operators) collaborate with the city of Kobe to recycle used refill packs of household and personal care items, with the aim of becoming a circular society.

The city of Kobe encourages every resident of Kobe to recycle used refill packs from detergents and shampoo products, etc. by dropping them off in collection boxes placed in 75 locations at retail outlets throughout the city. By leveraging "return trip operations" from retail outlets and cooperation of existing waste collection operators, used refill packs can be collected effectively with minimum environmental impact. Recyclers and manufacturers are working together to achieve horizontal material recycling for film packaging from the collected refill packs, as well as turn them into recycled products that are useful in daily life. Kobe and 16 companies and organizations are collaborating to realize resource circulation. The project aims to set an example to help promote similar activities across Japan.

KOBE PLASTIC NEXT みんなでつなげよう。つめかえパック リサイクル

* Recycling of materials into products with the same application

Use of recycled materials

Kao (Taiwan) has been using recycled plastic for regular containers since 2016. In 2021, Kao (Taiwan) also started recycling polyethylene, and in 2022, also started recycling polypropylene, which is more challenging to recycle, for use in this way.

Zero Waste GRI 301-2, 301-3, 404-2

In EMEA and the U.S. salon launched products made with recycled products in March 2023 for *Kerasilk* and *GUHL* products. The tubes for these products are made of PCR material recovered from the market and recycled.

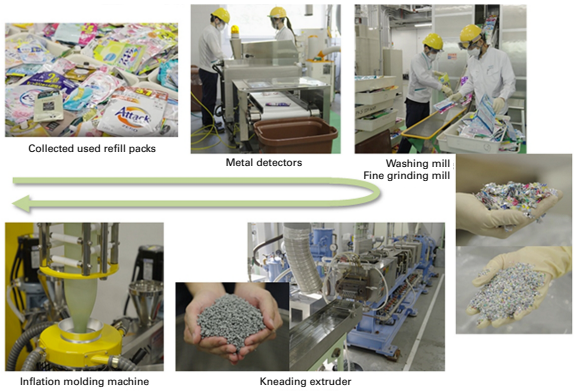
Development of film packaging recycling technology

Refill packs can significantly reduce the quantity of plastic used compared to rigid containers and are made from composite materials with many layers rather than a single raw material, as with PET bottles, in order to protect its contents from heat, moisture and UV rays with a thin film. In doing so, the different varieties of recycled ingredients make inhomogeneous plastic, which is difficult to reuse in film packaging under present circumstances.

We aim to improve the rate of recycling and achieve horizontal material recycling by developing and verifying recycling technology at our pilot plant for film packaging recycling set up at Wakayama Research Laboratories in June 2021. The plant will examine effective processes for separation and collection from consumers and easier-to-recycle packaging designs.

In collaboration with Lion Corporation, we have commercialized refill packs that use a portion of horizontal-recycled regenerated materials for liquid detergent refill containers, which will be available in limited quantities at select stores*.

* Kao and Lion products at certain Ito-Yokado stores and Welcia Yakkyoku stores; Kao products only at certain AEON stores.



Initiatives adopted at our business sites

Reducing the amount of waste produced

We handle a large number of liquid products, and reducing the sludge produced from treating concentrated wastewater generated in the process of cleaning tanks and switching products is a major issue.

Kao Industrial (Thailand) treats wastewater using separate wastewater treatment facilities according to the COD concentration of the wastewater, which has successfully reduced the amount of sludge produced and contributes to reducing waste. Fatty Chemical (Malaysia) has also reduced waste through the adoption of sludge dewatering equipment.

Also, to contribute to reducing the amount of generated waste at retailers, we are working with the understanding and cooperation of retailers to reduce the number of boxes used in the delivery of products.

Enhancing waste recycling

Waste recycling in manufacturing

One example of this is recycling the waste generated by the manufacture of diaper and feminine products to be turned into plastic pallets. We began test operation of this system at our plants in 2016, with cooperation from research laboratories and related divisions using the strengths of our matrix management.

By 2020, we were able to recycle 772 tons of waste into approximately 49,620 plastic pallets. This project has now been put on hold, as the required number of plastic pallets had already been secured.

Spreading internal awareness of zero waste

Global RC Meeting

As part of our Responsible Care (RC) activities, RC managers in Japan and RC managers of overseas subsidiaries with manufacturing plants hold an annual meeting. The aims are to invigorate RC activities and raise their level including reducing waste produced by subsidiaries.

In 2022, this activity had to be held through the exchange of documents, because of the COVID-19 pandemic.

Zero Waste GRI 308-2, 404-2

RC Environment Committee of the SCM Division
The RC Environment Committee of the SCM Division meets twice annually to gain an understanding of the conditions at each plant and share information on best practices with the objectives of curtailing the production of waste from plants in Japan and promoting recycling.

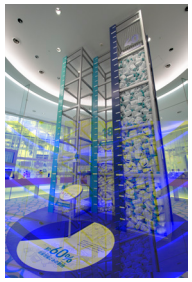
Packaging review meetings
To promote activities and understanding internally, Packaging Technology Research holds packaging review meetings when new and improved products are launched. Members from the relevant divisions, including business units, the SCM Division and the Consumer Communication Center, evaluate the environmental performance of the packaging.

In 2022, a total of 47 meetings were held in Japan, and 9 elsewhere in Asia. All of these meetings were held online.

Collaboration with stakeholders based on "eco together"

"eco together" with consumers/customers

Awareness-raising activities at the Kao Eco-Lab Museum
To encourage more consumers to choose refill and replacement products that greatly reduce plastic consumption, overviews of our packaging initiatives have been presented at the Kao Eco-Lab Museum and at the EcoPro exhibition.



Display enabling visitors to get a real feel for how much plastic is used in packaging

Ways to look after and wash eco-friendly reusable shopping bags to keep them clean
With the rise in awareness and concern for the environment, as well as the fact that consumers are increasingly having to pay for plastic shopping bags, 88% of people reported taking an eco-friendly reusable shopping bag with them when they go shopping (according to a survey conducted by Kao in December 2019).

In relation to new legislation in Japan that came into effect in July 2020, requiring consumers to pay for plastic shopping bags in shops, the Kao Consumer Research Center has posted hints on ways to look after eco-friendly reusable shopping bags, which are now being used more frequently, and to keep them clean, on the life information website (Japanese).

"eco together" with business partners

Recognizing that it is essential to collaborate with manufacturers that are producing materials, recycled plastics, and packaging when developing and launching new packaging, we work together with a wide range of business partners.

"eco together" with society

Clean Ocean Material Alliance
We are participating in the Clean Ocean Material Alliance, which was established to encourage global initiatives for solving the ocean plastic pollution problem. The Kao Corporation Director and Chair is chairman of the alliance, and Kao is taking a leading role among Japanese businesses.

Web Clean Ocean Material Alliance
https://cloma.net/english/

Japan Partnership for Circular Economy (J4CE)
The trend toward development of the circular economy is picking up speed throughout the world, and we are participating in the Japan Partnership for Circular Economy, which was established to strengthen collaboration between government and the private sector, with the aim of promoting an enhanced understanding of the circular economy among a wide range of stakeholders, including Japanese companies, and of promoting related initiatives. We provided case studies for inclusion in a collection of case studies, and our representatives were included in the panelists for a panel discussion held to accompany the official ceremony that marked the publication of the collection of case studies and the launching of the related website.

Web Japan Partnership for Circular Economy (J4CE)
https://j4ce.env.go.jp/en

Zero Waste

Package collection measures

Together with outside organizations, we are involved in recovering packaging, etc., discharged into the natural environment.

In October 2020, we signed a cooperation agreement with Wakayama City. To protect the ocean from pollution, including marine plastic waste, arising from land-based activities, we have undertaken surveys and collection of marine plastic waste that has accumulated at Tomogashima, Kataonami and Hamanomiya Beach. We are promoting research on reusing recovered marine plastic to make tables and chairs for oceanside facilities, and using it as a road strengthening agent on the oceanside cycling path. We are also engaging in unique clean-up activities for river and ocean waste and in the community.

Introducing cases at seminars on waste

In Japan, it has been reported that many incidents occur at waste treatment companies, which are caused by not providing sufficient information on the chemical substances to the contractor when contracting the waste treatment.

Therefore, we present cases at various seminars regarding waste with the aim of spreading our knowledge about past successful cases of improving communication with waste treatment companies, and identifying points of improvement in how we communicate information.

Thanks to these activities, there were again no incidents involving waste contracted for disposal from us in 2021.

Employees' opinions

Efforts to address the problem of plastic waste in the ocean

Akiyoshi Saito
Material Science Research Laboratory and Corporate Culture, Corporate Strategy, R&D

In October 2020, we concluded a cooperation agreement with Wakayama City for promotion of the Sustainable Development Goals (SDGs). The Wakayama Office, the largest business base in Japan, is located in Wakayama City. Through this collaboration, Kao contributes to the sustainable development of local communities in a wide range of business areas and in the research technologies that support them. Meanwhile, the R&D Division has established the Recycling Science Research Center (a cross-institute project) to address the issues of recycling used plastics and waste with the goal of achieving "zero plastic waste." As a member of this group, I have been working on the issue of plastic waste in the ocean and the promotion of "matters related to inheriting a rich natural environment, including the sea," which is one of the objectives of our partnership agreement with the city of Wakayama.

Our efforts to address the problem of plastic waste in the ocean began with "learning" about the problem. The Tomogashima Archipelago off Wakayama City is a group of uninhabited islands in the Kitan Strait, the southern opening of Osaka Bay. It is an enclosed sea area that is known for the large amount of garbage that washes ashore from the Osaka Bay economic zone catchment area. We participated in a survey of the islands with the government and nonprofit organizations and learned that an unimaginable amount of plastic waste was washing ashore. Kao products were no exception there. We were able to find packaging containers for some of our products that had been on the market more than 50 years ago. Through this experience, the issue of plastic waste in the ocean became a personal matter for me as a Kao employee who delivers products to consumers. I realized that we need to seriously address "the collection and recycling of plastics that have already been released into the natural world," as stated in Our Philosophy & Action on Plastic Packaging.

For the Collection project, we came up with the idea of characterizing ocean litter as an effective inducement for collecting ocean litter from the perspective of human science and worked with the Kao Institute of Sensory Sciences to create models and content that would lead to changes in consumer awareness and behavior. This project was selected as the Ministry of the Environment's Local Blue Ocean Vision Promotion Project in fiscal 2021, and as it was recognized as a successful example of balancing the environment and tourism, it was selected again in fiscal 2022. Demonstration experiments are now being conducted. As for recycling, we are studying recycling methods suitable for the materials, properties, and characteristics of discarded materials (especially PET bottles) from the perspective of materials science and conducting research with the aim of applying these methods to infrastructure using Kao's research resources.

Although these efforts are still in the demonstration experiment stage, we intend to widely publicize our efforts to address plastic waste in the ocean, which we are promoting in cooperation with Wakayama City, and through this issue strengthen the resource recycling system and promote the social implementation of technologies to further realize the 3Rs.

Zero Waste

Stakeholder engagement

Masanobu Ishikawa
Specially Appointed Professor /
Assistant to the President
Eikei University of Hiroshima

In 2022, Kao's activities moved further ahead. Working together with various groups across Japan, the company made progress in action to collect and recycle plastic containers. The circle of the activity expanded not just quantitatively, but also qualitatively, steadily producing results by aiming to use recycled packaging for company products as planned.

In Kobe there was a total of 16 companies participating in a program to start with, namely 10 manufacturers, four courier companies, and two recycling business operators. The program now involves 12 manufacturers, collecting plastic packaging containers at 76 retail outlets. At the time this article was written (April 27, 2023), the number of collection spots has increased from one in 2022 to 10.

Qualitatively, we have come as far as establishing a technology to manufacture films by recycling materials from collected plastic packaging, producing garbage bags which Kobe City and other municipalities will then use for clean-up events. We have also achieved the original goal of producing refill packs from materials collected from horizontal recycling products, steadily moving forward toward productization. This technology is unheard of elsewhere in the world, in that practical films were made from PE and PET compound films through material-recycling.

The next step in the collection and resource circulation business in Kobe is to warrant economic sustainability. To do that, much larger amounts of plastic need to be collected, and the cost of collecting, filtering, and storing the plastic needs to be reduced significantly. This problem is consistent with the issues concerning the RecyCreation activities conducted throughout Japan and other similar activities. But solving it will impart enormous and universal value for society as a whole.

Also, the asphalt modifier produced from collected PET bottles is a wonderful invention, in that it not only promotes recycling of plastic, but delivers performance such as making asphalt road surfaces five times more durable and damping down dust. This will help to solve environmental issues and contribute significantly in no small way to economic sustainability by reducing infrastructure maintenance costs.

The two examples mentioned above are both based on interface science—Kao's core competence. Kao expects to shine further as leader of such activities by demonstrating that an arterial industry can generate new value by applying its core competence to resource circulation.

Kao's response to the views expressed last year

To reach the objectives of achieving carbon zero in 2040 and carbon negative in 2050, as proposed in the previous year, we established the ESG Steering Committees and strengthened our ESG governance structure.

In response to a suggestion that communication is important to obtain cooperation from consumers, we have been preparing posters, flyers, and videos. As for the utilization of collected products, we have been developing recycling technologies and are one step closer to the realization of recycled products. In 2023, we will work with our stakeholders to utilize such communication materials and recycling technologies to gain more cooperation from consumers.