Decarbonization GRI 201-2

As we work toward the goal of becoming carbon zero by 2040, and becoming carbon negative by 2050, besides aiming to reduce CO_2 emissions in our own business activities, we also aim to contribute toward realizing the decarbonized society and sustainable business by helping to reduce emissions in society as a whole, and through carbon fixation to reduce the amount of carbon dioxide in the atmosphere.

Social issues

Societal ideals and current issues

Today, the vision for society is to realize net zero emissions of greenhouse gases by 2050, so that the average rise in global temperature can be kept to within 1.5°C higher than pre-industrial revolution levels.

However, according to the Working Group I contribution to the Sixth Assessment Report published in 2021 by the Intergovernmental Panel on Climate Change (IPCC)*1, it is highly likely that human activity has already caused average global temperatures to rise by around 1.1°C over the period between 1850–1900 and 2010–2019, and if the current situation continues, it is possible that this rise will exceed 1.5°C before 2030.

Due to global warming, we have already begun having an increase in the scale of damage caused by localized torrential rain and typhoons, frequent forest fires, the melting of the Siberian permafrost and other climatic abnormalities. In reaction to these, U.N. Secretary-General Guterres is strongly concerned that the era of global boiling has arrived.

In response to this situation, in recent years, countries and regions around the world, including the European Union (EU), have been issuing carbon neutrality declarations, and in October 2020 Japan also announced that it would seek to become carbon neutral by 2050. In addition, many local governments within Japan have been declaring a climate emergency in relation to the crisis posed by climate change, and large numbers of business enterprises have announced that they are aiming to realize net zero emissions. In addition, COP28 was held in the UAE in November 2023 and made more effective action all the more important. There have also been movements demanding effective action on climate change, such as Fridays For Future, in which young people—who represent the future—have played a key role.

Recently, we have been receiving a significant number of requests to advocate for and execute policies relating to the environment from corporate organizations, external organizations and investors. For example, corporate organizations such as JCLP*2 are approaching the government to prompt formulation of environmentally friendly policies. External organizations, such as Carbon Trust, and investors, on the other hand, are making more requests to implement environmentally friendly efforts with respect to companies. Moreover, requests for the disclosure of information on financial reports and CSRDs are also increasing, showing that information disclosure for companies' sustainable growth is becoming even more important.

*1 IPCC
Intergovernmental Panel on Climate Change
This organization was established by the United Nations Environment Programme and the World Meteorological Organization in 1988 for the purpose of conducting comprehensive evaluations from scientific, technical and socio-economic perspectives regarding climate change, its impact, adaptation and mitigation measures.

*2 JCLP
Japan Climate Leaders' Partnership: Inter-company partnership for promoting efforts relating to measures against climate change in Japan.
Platform to promote companies' approaches to climate change, including the reduction of greenhouse gas emissions and the use of sustainable energy.

Policies

Climate change poses a major risk to the realization of an enriched Kirei Lifestyle, both now and in the future. The Kao Way, which is Kao's corporate philosophy, enunciates our mission to "create a Kirei life for all, providing care and enrichment for the life of all people and the planet," and we are accurately implementing initiatives to both mitigate and adapt to global warming in relation to every aspect of our business strategy.

More specifically, we are advancing our efforts in line with the following policies.

• Basic Principle and Basic Policies on Environment and Safety

We have committed ourselves to contributing to social sustainability by giving thorough consideration to environmental conservation and human safety in every aspect of our operations, including product development, materials procurement, manufacture, distribution, sales, usage and waste disposal.

• Kao Group Responsible Care Policy

We have made a pledge to continuously reduce the environmental impact of our business operations by promoting reduced usage of resources such as water and energy.

• Environmental Statement

We have declared our resolve to take advantage of original Kao-developed technologies to continuously manufacture environmentally friendly products, not only during the creation process but even in the use phase, and engage in "eco together" with various stakeholders throughout the product lifecycle from raw materials procurement to final disposal.

• Kao Sustainable Product Development Policy

We have committed ourselves to seriously minimizing the effects on the global environment, biodiversity and human rights through the technologies based on our Essential Research, and maximizing value toward a variety of customers, society and the future.

• "High-Risk" Supply Chain Management and Sourcing

We have committed ourselves to a raw materials procurement policy that recognizes the risks relating to the sustainable development of palm oil, paper and pulp.

Through these activities, we aim to reduce net carbon emissions to zero by 2040, and become carbon

Decarbonization GRI 201-2

negative by 2050. At the same time, we are accelerating the provision of products and services that are adapted to the changing climate, and aiming to realize a Kirei Lifestyle for consumers.

P100 Responsibly Sourced Raw Materials

Web
Basic Principle and Basic Policies on Environment and Safety
https://www.kao.com/global/en/sustainability/klp/policy/environment-safety-policy/

Kao Group Responsible Care Policy
https://www.kao.com/global/en/sustainability/klp/policy/responsible-care-policy/

Kao Environmental Statement
https://www.kao.com/global/en/sustainability/klp/policy/environmental-statement/

"High-Risk" Supply Chain Management and Sourcing
https://www.kao.com/global/en/sustainability/we/procurement/procurement-supply-chain/

Strategy

Risks and opportunities

Risks

Transitional risks that we have identified include a possible increase in costs relating to regulatory compliance due to the introduction of carbon taxes, increased expenses relating to product development in response to climate change, and rising raw material costs due to restrictions on the use of fossil fuels.

With regard to physical risks, important risks that we have identified include the risk of flood damage to Kao plants due to the increased frequency of concentrated heavy rainfall occurring over a short period of time, and the possible impact of supply chain disruption on the supply of products.

Item	Content
Policies, laws and regulations	Increase in costs for responding to regulations resulting from the introduction of carbon taxes
	Increase in costs of raw materials due to restrictions on the use of fossil fuels
Technology	Increase in costs for product development in response to climate change
Markets	Drop in sales of seasonal products due to global warming
Reputation	Reputation risk due to insufficient response to climate change
Physical risk	Flood damage to Kao plants due to the increased frequency of concentrated heavy rainfall occurring over a short period of time and the possible impact of supply chain disruption on the supply of products

Opportunities

We have identified opportunities that may contribute toward reduced operating expenses due to the effective utilization of resources based on strategies adopted in response to climate change. We have also identified opportunities for increased sales resulting from the ongoing development of products that contribute toward mitigating the impact of climate change, in response to the changes in market demand caused by a shift toward ethical consumption by consumers.

Strategy

Kao is promoting decarbonization activities based on the above policies, and at the same time, is working not only to reduce the CO_2 emissions at its own worksites, but also to reduce CO_2 emissions throughout the entire product lifecycle. In addition, we are working actively to provide products and services that contribute toward reducing CO_2 emissions for society as a whole. We are also investing in the development of technologies for using the CO_2 in the atmosphere as raw material, and in activities to realize carbon fixation through tree-planting, etc. With regard to offset measures to support decarbonization in sectors outside our business areas, we recognize the importance of such measures—particularly during the transition period—and we are working to implement them.

We are formulating resilient corporate strategies to respond to identified risks and opportunities.

For climate change, which is a problem that affects the whole of society, we have set ambitious goals of reducing net carbon emissions to zero by 2040 and becoming carbon negative by 2050. We aim to demonstrate solutions to the problem of climate change by actively developing applications for cutting-edge technologies and other new technologies, both within Kao and in the wider society, in collaboration with various stakeholders.

In order to reduce greenhouse gas emissions associated with our business activities, we are improving the energy efficiency of our worksites and shifting over to green energy use.

We are continuing to implement initiatives aimed at reducing emissions in collaboration with our stakeholders by cutting emissions at every stage in the product lifecycle, from raw materials procurement through to product use, disposal and recycling. We are also working actively to provide products and services that contribute toward reducing greenhouse gas emissions associated with product use.

Aiming to reduce CO_2 emissions in our business operations to zero by 2040 and to become carbon negative by 2050, we are applying Innovation in Reduction and Innovation in Recycling initiatives with respect to greenhouse gases. To achieve this target, we will fully utilize all of our existing assets (including production systems and equipment, intellectual property, human capital, internal and external networks and investments), and will build an organizational structure capable of speedy decision-making in relation to the promotion of decarbonization. Moreover, to maximize our R&D capability to undertake innovation based on Kao's Essential Research, we are promoting further collaboration with external stakeholders.

Decarbonization GRI 201-2

Social impact

By achieving the goals described on the previous page, we can reduce greenhouse gas emissions and contribute toward mitigating global warming. Additionally, products with low CO_2 emissions at the use stage in the product lifecycle can contribute to a reduction in consumer spending because they consume less energy and water. Furthermore, they are also effective in reducing the burden of social infrastructure maintenance and renewal concerning energy, water and sewage systems.

Contributions to the SDGs

Business impact

We think that various business impacts can be expected through the promotion and putting into practice of activities based on the above strategies. Concrete examples of impacts are as follows.

Achievement of targets for energy consumption and greenhouse gas emissions
This achievement leads to higher profits as the reduction of energy consumption and greenhouse gas emissions contributes to the reduction of business activity operating costs.

Reduction of CO_2 emissions across product lifecycles
The reduction of CO_2 emissions across product lifecycles can be achieved by reducing raw material use and increasing sales of products with low CO_2 emissions during usage, leading to reduced operating costs and sales growth.

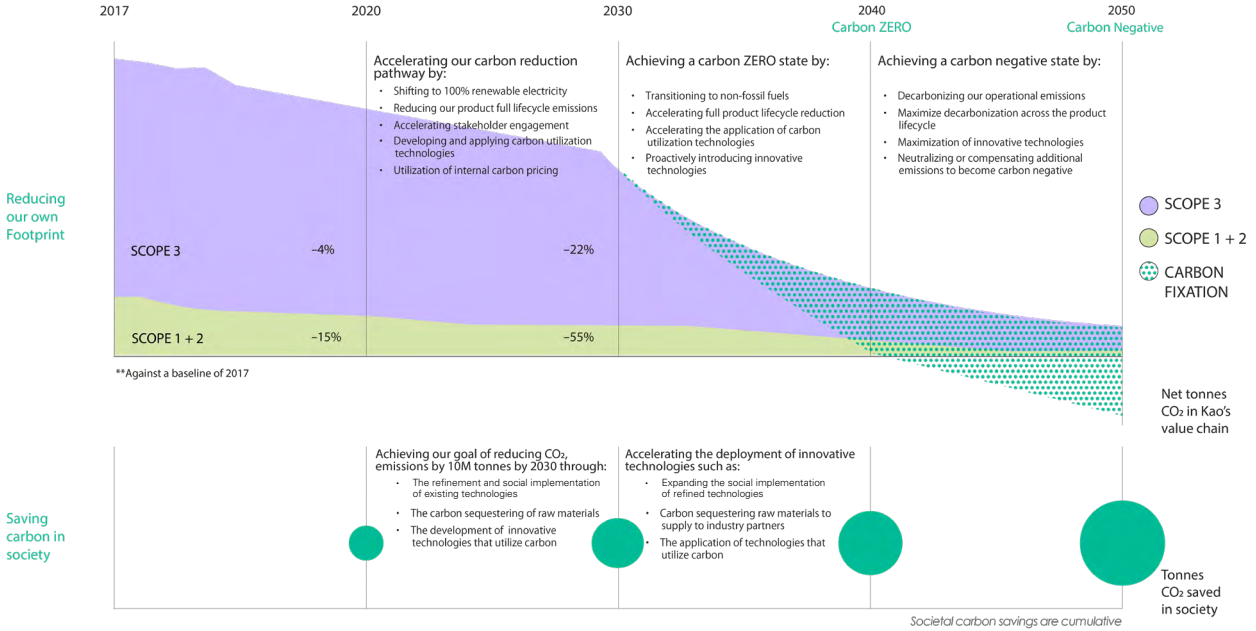
Use of renewable energy
As renewable energy generating costs have been falling steadily for the past few years, switching over to having 100% of the electricity that we purchase generated using renewable energy will lead to reduced electricity purchase costs in the future. By entering into the first PPA for Kao, which is a type of corporate PPA*1, and promoting the introduction of renewable energy, we have achieved 100% renewable energy for purchased electricity in Japan by the end of 2023.

*1 A PPA Scheme for electricity users to purchase renewable energy directly from power producers over a long period.

Introduction and use of an internal carbon price system
Since we introduced an internal carbon price system in 2006, we have been promoting the adoption of energy-saving equipment and equipment with low CO_2 emissions, as well as the procurement of renewable energy.

Today, we have set the internal carbon price at 168 dollars/ton-CO_2 and adopted the introduction of hot water heat pumps at the Wakayama Plant (scheduled to be operational from April 2024) and photovoltaic power generation systems at Kao Industrial (Thailand)

Decarbonization roadmap towards "carbon zero" by 2040 and "carbon negative" by 2050



Decarbonization GRI 201-2

(scheduled to be operational from January 2025). In this way, we have been actively introducing energy-saving production facilities and decarbonizing technologies to promote the use of renewable energy for electric power. In July, we built a new plant for biomass heat utilization at our chemical plant in Spain, which will enable us to reduce CO_2 emissions from the plant by 95%.

At the same time, because the CO_2 emissions of the products that we manufacture are reduced, we can meet the demand for low-CO_2 products in the market.

Estimation of business impacts by 2030

We estimate that CO_2 emissions (scope 1 + 2) in 2030 will increase by 67% compared to 2017 unless we take any measures. If carbon taxes equivalent to 130 dollars/ton-CO_2[*1] are adopted by achieving the goal of reducing CO_2 emissions by 55% (scope 1 + 2) by 2030, then, assuming that the target outlined above is achieved, our carbon tax burden will be approximately 7.8 billion yen, around 21.0 billion yen less than it would be if we failed to take any action.

We evaluated the business impacts in relation to What Kao Aims to Be by 2030 by four product groups. More specifically, we set baseline Profit and Loss (P&L) data for 2030 on the assumption that our company's sales would reach 2.5 trillion yen by 2030 (1.67 times as high as in 2018), and that P&L would grow proportionately compared to 2018. Business impacts were estimated on the basis of this baseline P&L. In order to compare the respective impact of individual factors on our business based on different climate

Decarbonization scenario analysis

		Evaluation items	Evaluated financial impact	Impact of climate-related risks and opportunities, and financial planning, for 2030 (+ indicates a positive impact, - indicates a negative impact, ND indicates no impact, and numbers indicate the size of the impact)				Kao's response status
				1.5°C scenario[*1]		4°C scenario		
Transitional	Policies, laws and regulations	Introduction and/or raising of carbon tax	Increased operating costs due to introduction and/or raising of carbon tax	Increased operating costs due to introduction of new taxes and/or raising of tax rates	---	New carbon taxes are not introduced, and tax rates are not raised	ND	Scope 1+2 emissions reduction targets are set, and emissions reduction activities continue
		Introduction of restrictions on plastics	Taxation of fossil-derived raw materials for packaging	Increased procurement costs due to introduction of new taxes	-	New taxes are not introduced	ND	Public announcement of an Innovation in Reduction implementation strategy Annual adoption targets are set for innovative film packaging, and activities to reduce plastics usage continue
			Increased costs due to use of recycled plastic becoming compulsory	Increased procurement costs due to a rise in the unit price of recycled plastic resulting from the use of recycled plastic becoming compulsory	-	The use of recycled plastic is not made compulsory	ND	Public announcement of an Innovation in Recycling implementation strategy Expanded adoption of packaging made from recycled plastic
	Markets	Rising energy prices	Volatile electricity retail price	Increased costs due to a rise in the electricity retail price	-	Reduced costs due to a fall in the electricity retail price	+	Setting of energy use reduction targets, and proactive installation of solar panels to generate electricity for own use
		Rising raw materials prices	Rising prices for fossil-derived raw materials	Increased procurement costs due to rising crude oil prices	- -	Increased procurement costs due to rising crude oil prices	---	Continuing activities to reduce usage of fossil-derived raw materials in product groups that utilize such raw materials
			Rising prices for procurement of palm oil	Increased procurement costs due to supply shortages resulting from tighter restrictions on forest development	-	Unchanged costs due to increased supply resulting from the development of new plantations	ND	Promotion of the development of substitute raw materials (such as algae-derived fats and oils, and unused biomass), and commencement of use
			Rising prices for procurement of pulp	Costs remain unchanged because, although forests fires increase, there is no shortage of supply	ND	Costs remain unchanged because, although forests fires increase, there is no shortage of supply	ND	—
		Changes in consumers' behavior	Increased sales of ethical products	Sales increase because of increased demand for ethical products on the part of the generation that will be the main purchasers of Kao products in 2030	+ +	Sales increase because of increased demand for ethical products on the part of the generation that will be the main purchasers of Kao products in 2030	+ +	Inviting Ms. Rika Sueyoshi, CEO of the Ethical Association, to become a member of Kao's ESG External Advisory Board Development and provision of ethical products
Physical	Acute	Intensification of abnormal weather conditions	Increased damage from flooding	Increased risk of flooding, but difficulty in accurately predicting the amount of damage	-	Increased risk of flooding, but difficulty in accurately predicting the amount of damage	-	BCP adjustment Implementation of supplier water risk surveys
	Chronic	Rising average temperatures	Increased sales of sunscreen and antiperspirant products Increased sales of products against infectious diseases	Increased sales in regions and seasons with higher temperatures	+	Sales increase due to more expansion of regions and seasons with higher temperatures	+	Production planning adjustment Development and launch of products against infectious diseases
		Demand for water outstripping supply	Rising operating costs due to increased water use charges	Rising operating costs at plants operating in regions with water shortages	-	Rising operating costs at plants operating in regions with water shortages	-	Setting of water use reduction targets, and continued implementation of water use reduction activities

*1 Kao's assessment based on scenario analysis using the 2°C scenario

Decarbonization GRI 201-2

change scenarios, we performed an evaluation for both the 1.5°C scenario*2 and 4°C scenario*3. For this reason, evaluation was not performed for some factors even though there was the potential for them to have a significant impact. There were also some factors which might have a major impact by 2050, but which will have only a relatively small impact by 2030.

*1 As it is assumed that new equipment adopted in the future will still be in use after 2030, we have estimated the likely carbon tax rate in 2035 based on the IEA's World Energy Outlook 2021, and changed the base currency from Japanese yen to U.S. dollars from February 2023.
*2 1.5°C scenario
This is equivalent to the IEA's NZE 2050 Scenario, 2DS Scenario, IPCC's RCP 1.9 scenario or SSP1-1.9 scenario, etc. It refers to the economic measures that would be needed in order to keep the average global temperature rise down to less than 1.5°C compared to the situation prior to the Industrial Revolution, and to the environmental damage that is expected to result from such a rise in temperature.
*3 4°C scenario
This is equivalent to the IEA's Current Policy Scenario, IPCC's RCP 8.5 scenario or SSP5-8.5 scenario, etc. It refers to the economic measures that would be needed in order to keep the average global temperature rise down to less than 4°C compared to the situation prior to the Industrial Revolution, and to the environmental damage that is expected to result from such a rise in temperature.

Hot water heat pumps at the Toyohashi Plant in 2022 (left: completed in May 2023) and photovoltaic power generation at the Kashima Plant (right: completed in January 2024), which were adopted using the internal carbon price system in 2022

Governance

Framework

Risk management in relation to climate change issues is carried out by the Internal Control Committee and opportunity management is carried out by the ESG Managing Committee, under the supervision of the Board of Directors. These committees are both headed by the President & CEO.

The Responsible Care Promotion Committee, which manages policy / regulatory regime and technology risks, and the Risk & Crisis Management Committee, which manages market, reputational and acute risks, are under the Internal Control Committee. These committees are headed by the Executive Officer Responsible for Corporate Strategy.

The Responsible Care Promotion Committee meets twice a year to report on and discuss compliance with laws and regulations, the status of CO_2 reduction and other matters. It also sets targets for the following year.

P25 Our ESG Vision and Strategy > Governance

The Responsible Care Promotion Committee Secretariat, which is served by the Responsible Care Department of the Corporate Strategy Division, conducts monthly checks on compliance with laws and regulations, monitors CO_2 emission and water use, mainly at plants which have a large impact, and keeps abreast of the amount of chemical substances in wastewater, reporting on these and other matters to the head of the committee, committee members, members of the Internal Control Committee, auditors and others. The Core Technology Committee for Environment and Energy-Saving of the Supply Chain Management Division makes efforts to improve energy performance by conducting annual audits of the Energy-Saving Committee through sampling for plants within and outside Japan.

The Crisis Management Department of the Corporate Strategy Division acts as the Risk and Crisis Management Committee Secretariat. The Risk and Crisis Management Committee, which meets four times a year, manages risks caused by natural disasters and reputational risks.

The Internal Control Committee meets one or more times a year, receiving activity reports from the Responsible Care Promotion Committee, the Risk and Crisis Management Committee and other subordinate committees that it oversees and auditing the activities of those committees.

Opportunity management relating to climate change issues is handled by the ESG Managing Committee, which meets six times a year. Committee members are the persons in charge of the Business, Sales, R&D, SCM and other divisions, which is an arrangement which connects divisions horizontally. The Internal Control Committee, and the ESG Managing Committee which it supervises, discuss climate change and environmental issues as well as social and governance issues.

The committee reports on its activities to the Board of Directors one or more times a year and is audited by the Board of Directors.

Education and promotion

Our employees are not only in a position to develop and supply products, but once they leave the company, they are consumers for the rest of their lives and are among those who select such products. We thus recognize the importance of giving our employees the opportunity to learn about global warming through various programs and to actively engage in decarbonization activities of their own accord.

We began the creation and delivery of an e-learning program that provides essential knowledge for promoting the Kirei Lifestyle Plan in 2020. In 2022, we delivered updated information on decarbonization globally in both English and Japanese.

In 2023, aiming to foster a new generation of leaders who can consider business and organizational operation

Decarbonization GRI 302-1, 302-4, 302-5

from an ESG perspective through lifecycle assessments (LCA), we held a master course (a workshop in which people can learn about the concept of LCA and the calculation method) with affiliates in Japan and Asia.

Collaboration with stakeholders

In line with the "eco together" motto of the Kao Environmental Statement, we are working together with a wide range of stakeholders to promote activities aimed at realizing decarbonization. We are also implementing education about decarbonization and working to spread awareness of our initiatives.

"eco together" with consumers/customers

As the product usage stage accounts for around 40% of total product lifecycle CO_2 emissions, raising consumers' awareness is extremely important. For example, even if a consumer buys single-rinse laundry detergent, if the consumer sets the washing machine to do two rinses, then there will be no reduction in CO_2 emissions. We think it is thus very important for us to accurately communicate the environmental value that Kao products can provide and encourage consumers to use them properly. By organizing a wide range of different events, we aim to get across the importance of CO_2 emission reduction and the environmental value of our activities and products.

P79 Sustainable Lifestyle Promotion > Collaboration with stakeholders

"eco together" with business partners

We aim to realize the Kirei Lifestyle for consumers through "ESG-driven *Yoki-Monozukuri*." However, this is not something that can be achieved by Kao acting alone. We believe that it is important to share our vision with the business partners at every stage, from raw materials procurement through production to delivery and sales, so that we can take action together, and we have established a number of different venues for sharing information with them.

In particular, as the raw materials stage accounts for nearly 40% of total product lifecycle CO_2 emissions, we view collaboration with raw materials suppliers as being especially important.

We also view dialogue with investors and other stakeholders as being very important for the sustainable growth of business enterprises and of the planet, and in March 2019 we announced our support for the Task Force on Climate-related Financial Disclosures (TCFD). By proactively implementing the disclosure of information relating to climate change, we are promoting dialogue with investors and other stakeholders.

TCFD | TASK FORCE ON CLIMATE-RELATED FINANCIAL DISCLOSURES

Web TCFD
https://www.fsb-tcfd.org/

"eco together" with society

We proactively participate in activities organized by the United Nations, the central government, local government authorities, NPOs, etc., where we provide information about our technologies and exchange opinions with other participants.

In order to realize a decarbonized society, reducing the CO_2 emissions associated with electric energy generation is a particularly important approach, and we are working actively to disseminate information about our activities in this area in such a manner as to work on the procurement of renewable energy.

Risk management

With regard to transition risk, we are developing and launching low-carbon products. Both SCM, R&D, and related business units will promote the introduction of renewable energy for purchasing in order to produce low-carbon products. For physical risks, we will calculate the cost of risk avoidance for the entire group and formulate a business continuity plan (BCP) that assumes long-term shutdowns.

Metrics and targets

Mid- to long-term targets and 2023 results

We aim to be carbon zero by 2040, and carbon negative by 2050, and we are accelerating our activities to achieve these goals. We will also be maximizing our contribution toward reducing greenhouse gas emissions throughout society as a whole.

2030 mid-term targets

We set ourselves the target of reducing the amount of energy consumed at all Kao Group sites by at least 1% per year, and we have maintained this target every year since 2013.

Our target for the reduction of greenhouse gas emissions at all Kao Group sites (Scope 1+2) has been set, based on the Science Based Targets (SBT) 1.5°C scenario, as a reduction of 55% (in absolute terms, compared to 2017). Our target for the reduction of greenhouse gas

Decarbonization

GRI 302-1, 302-3, 302-4, 302-5, 305-5

emissions throughout the product lifecycle (Scope 1+2+3) has been set, based on the SBT 2°C scenario, as a reduction of 22% (in absolute terms, compared to 2017). Both of these targets have been approved by the SBTi.

In addition, in June 2021 we joined the RE100 global corporate renewable energy initiative, and we have set ourselves the target of having 100% of electricity purchased by all Kao Group sites being generated using renewable energy by 2025, and of having 100% of the electricity used by the Kao Group sites being generated using renewable energy by 2030.

In addition, we aim to enable society as a whole to reduce greenhouse gas emissions by the equivalent of 10,000 thousand tons-CO_2 through the provision of Kao Group products and services.

Item	Scope	Target for 2030
GHG emissions (absolute quantity)	**Across the entire product lifecycle for the Kao Group**	22% reduction (compared to 2017)
	All Kao Group sites	55% reduction (compared to 2017)
Energy consumption (Per sales unit)	**All Kao Group sites**	1% reduction yearly (year-on-year, from 2021)
Electricity used	**All Kao Group sites**	100% renewable sources
Contribution to emissions reduction	**Products, services**	10,000 thousand tons-CO_2

RE100 | CLIMATE GROUP | CDP

SCIENCE BASED TARGETS
DRIVING AMBITIOUS CORPORATE CLIMATE ACTION

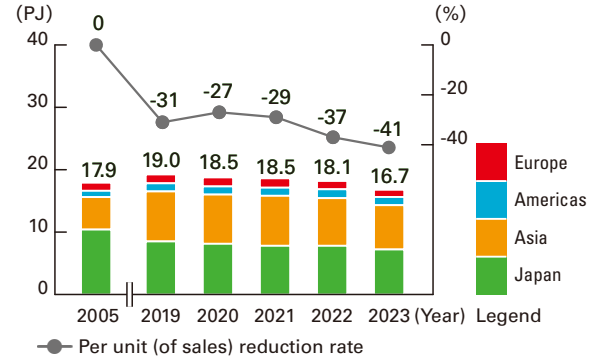
Long-term targets

Reduction of net carbon emissions to zero by 2040 and becoming carbon negative by 2050

Through our Innovation in Reduction and Innovation in Recycling CO_2 emissions reduction initiatives, and through the various activities that we undertake in collaboration with stakeholders, we are aiming to reduce CO_2 emissions to zero by 2040 and to become carbon negative by 2050.

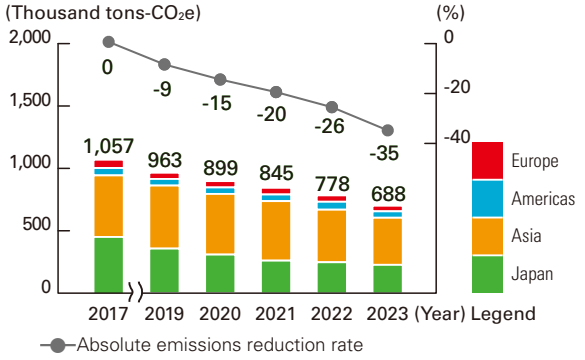
2023 results

Energy consumption ☑(all sites)



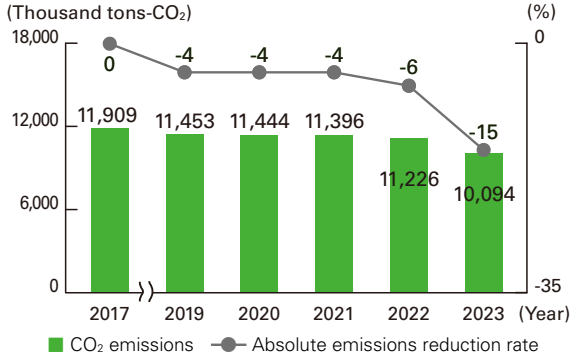
* Boundary: All Kao Group sites, including company cars in Japan
* Assurance provided for energy consumption figures

GHG emissions ☑(all sites)



* Boundary: All Kao Group sites, including company cars in Japan
* Gases included: The seven GHGs specified by the Kyoto Protocol (only CO_2 for sites outside Japan)
* Assurance provided for GHG emissions figures

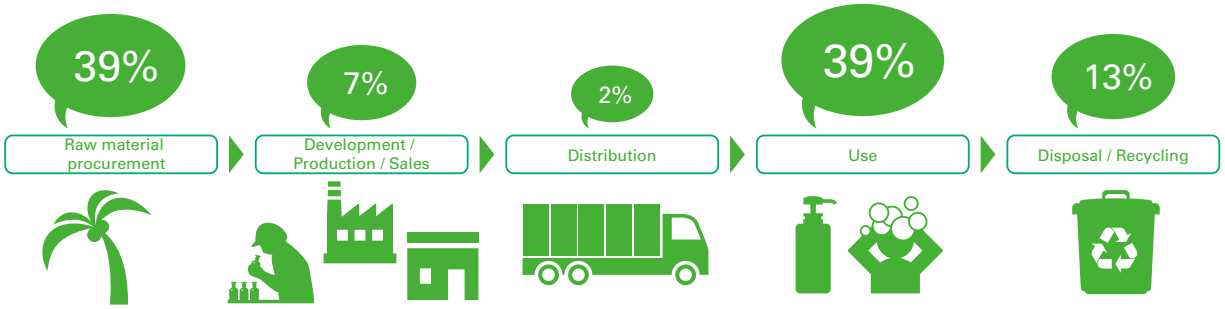
CO_2 emissions across the entire product lifecycle ☑(Kao Group)



* "CO_2 emissions over the entire product lifecycle" is calculated by multiplying the CO_2 emissions over the product lifecycle per unit volume of products sold both within and outside Japan (excluding the Group's production and logistics processes) by the annual sales volume of the product in question and adding up the actual amount of CO_2 emissions over the Group's production and logistics processes. However, this amount does not include emissions related to the use and disposal of Chemical products.
* Assurance provided for CO_2 emissions figures and absolute emissions reduction rate

Decarbonization GRI 302-1, 302-4, 302-5, 305-5

Share of CO_2 emissions accounted for by each state of the product lifecycle for Kao products



Avoided emissions

Avoided emissions in Kao's business operations totaled 4,485 thousand tons. We are advancing the development of technologies for products and services that contribute to a decarbonized society in our consumer products business and chemical business. In so doing, we compare the CO_2 emissions in the total product lifecycle between products/services to be newly provided and conventional products/services and take the amount reduced (avoided emissions) as the indicator. In our consumer products business, we provide packaging containers with less plastic and products which contribute to water saving. In our chemical business, aiming to realize Kirei of People, Society and the Earth in the future through the power of chemicals, we strengthen the deepening of eco-chemical products and suggestions of eco-solutions, and thus are developing various eco-related products, such as chemicals for fuel-efficient tires, low-temperature detergent for steel and low-temperature fixing toner. We are also working on developing saccharification enzymes used to convert waste and unused resources into bio-feedstock. In 2023, Kao Corporation concluded a memorandum of understanding with the Research Association of Biomass Innovation for Next Generation Automobile Fuels[*1], aiming to supply saccharification enzymes to manufacture automotive bioethanol fuel.

*1 A research association comprised of ENEOS Corporation, Suzuki Motor Corporation, Subaru Corporation, Daihatsu Motor Co., Ltd., Toyota Motor Corporation, Toyota Tsusho Corporation, and Mazda Motor Corporation. The organization promotes technological research related to the use of biomass and efficient manufacturing of automotive bioethanol fuel toward realizing a carbon-neutral society.

Amortization of carbon credits

The total amount of carbon credits amortized by Kao came to 7 thousand tons.

Electricity purchased and electricity used that is derived from renewable energy (%)

	2019	2020	2021	2022	2023
Electricity purchased	28.3	37.2	51.8	63.4	72.1
Electricity used	21.6	28.8	39.5	48.6	57.1

In 2023, we achieved the purchase of electric power in Japan through the use of 100% renewable energy-derived power.

Reviews of 2023 results

Total lifecycle CO_2 emissions were 1,132 thousand tons lower than the previous year, a 15% reduction compared to both 2017 and last year. The primary factor in the reduction is the reflection of water heater data and the reduction of Kao's sales in Japan. However, the increase in the sales ratio of products that contribute to CO_2 reduction, such as stick-shaped laundry detergent for which one rinse cycle is enough, as well as shampoo and dishwashing detergent that reduce how much water is used for rinsing, and low-carbon products, such as UV care products, are partly to blame for the reduction.

Energy consumption for all Kao Group sites combined was 16.7 PJ. Energy consumption per unit of sales was reduced by 6% compared to the previous year, surpassing the target of a 1% reduction. Greenhouse gas emissions fell by 35% compared to 2017 due to the effect of our initiatives on our production sites worldwide, including the achievement of the use of 100 % renewable energy for electricity purchased by the plant in Thailand, the initiation of the purchase of renewable electric power in Vietnam, Indonesia and Mexico, the introduction of low-carbon equipment such as hot water heat pumps at one of our plants in Japan, and the response by production according to demand. Renewable energy accounted for 72% of all electricity purchased, and 57% of all electricity used by the Kao Group.

We offer a wide selection of household products such as water-saving products that reduce CO_2 emissions during the use stage, and also provide various industrial-use products that do the same. We will further expand our range of products that reduce water / hot water and power consumption in the use stage, which contributes a large portion of total lifecycle emissions, and take steps such as reducing the amount of raw materials used and switching raw materials to those made from renewable sources.

Decarbonization

GRI 302-1, 302-4, 302-5, 305-1, 305-2, 305-3, 305-5

Scope 1 GHG emissions ☑ (Thousand tons-CO_2e)

	2017	2020	2021	2022	2023
Japan	271	242	244	240	223
Asia	290	278	264	256	237
Americas	43	45	45	51	46
Europe	49	51	50	48	34
Total	653	616	605	595	539

Scope 2 GHG emissions ☑ (Thousand tons-CO_2e)

	2017	2020	2021	2022	2023
Japan	173	68	19	3	0
Asia	208	208	213	173	143
Americas	14	6	8	7	5
Europe	8	1	1	1	0
Total	404	282	240	183	149

Note: Emissions by scope conform to the Greenhouse Gas Protocol initiative
Scope 1: GHG emissions emitted directly by the company/ organization
Scope 2: Indirect GHG emissions from purchased electricity, heat, etc.
Note: Emission factors
Scope 1: In principle, uses factors defined in the Act on Promotion of Global Warming Countermeasures
Scope 2: In principle, uses the specific factors of the country's laws or regulations. When the specific factor cannot be obtained, the country-based factor released by the IEA is used.

Purchased electricity, steam, etc. (terajoules)

	2020	2021	2022	2023
Electricity	7,952	7,934	7,634	7,062
Heat	0	0	0	0
Steam	177	232	210	201
Cooling	0	0	0	0

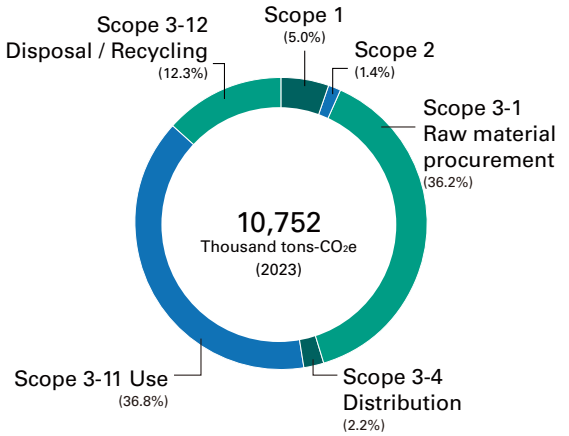
Note: Electricity is calculated as the calorific value of the primary energy (at the receiving end in Japan, generating end outside Japan).

Fuel consumption by fuel type (terajoules)

	2020	2021	2022	2023
Natural gas	8,579	8,723	8,553	7,847
Diesel oil	1,334	1,095	1,077	938
Gasoline	99	104	110	109
Other	132	126	123	116
Waste vegetable oil (heat recovery)	347	304	346	252

Scope 3 GHG emissions (Thousand tons-CO_2e)

	2017	2020	2021	2022	2023
1. Purchased goods and services ☑	4,496	4,215	4,228	4,109	3,892
2. Construction and building of capital goods	239	259	264	285	281
3. Fuel- and energy-related activities (not included in scope 1 or scope 2)	29	59	60	58	57
4. Upstream transportation and distribution ☑	253	249	245	241	234
5. Waste generated in operations	58	65	68	66	58
6. Business travel	4	4	4	5	4
7. Employee commuting	18	18	18	18	18
8. Upstream leased assets	0	0	0	0	0
9. Downstream transportation and distribution	97	111	108	109	104
10. Processing of sold products	119	116	131	131	128
11. Use of sold products ☑	4,687	4,653	4,647	4,680	3,956
12. End-of-life treatment of sold products ☑	1,415	1,438	1,432	1,417	1,324
13. Downstream leased assets	0	0	0	0	0
14. Franchises	0	0	0	0	0
15. Investments	8	6	5	5	8
Total	11,423	11,193	11,210	11,125	10,064



Category 1: Purchased goods and services
This value is calculated by multiplying CO_2 emissions associated with raw materials per unit of product sold (both within and outside Japan) by the total annual sales volume of the product in question.
CO_2 emissions associated with raw materials are calculated by multiplying the weight of raw materials purchased by inventory data (using supplier surveys, documentary data, commercially available databases, etc.).

Category 4: Upstream transportation and distribution
CO_2 emissions associated with transporting products (both within and outside Japan) while Kao Group acts as consignor.
For Japan, the calculation is made using the criteria specified by the Energy Conservation Act. For areas outside Japan, the calculation is made by Kao based on data for Japan.

Category 11: Use of sold products
This value is calculated by multiplying CO_2 emissions associated with product use per unit of product sold (both within and outside Japan) by the total annual sales volume of the product in question.
Industrial-use products are excluded.
CO_2 emissions associated with product use are calculated by multiplying the amount of water, hot water and electric power consumed during product use by inventory data (using documentary data, commercially available databases, etc.)

Category 12: End-of-life treatment of sold products
This value is calculated by multiplying CO_2 emissions associated with the disposal or recycling of sold products (both within and outside Japan) by the total annual sales volume of the product in question.
CO_2 emissions associated with the disposal or recycling of industrial-use products are excluded.
CO_2 emissions associated with disposal or recycling are the sum of CO_2 emissions associated with the disposal or recycling of product content and product packaging. Emissions from product content are calculated by converting all content that consists of fossil-derived carbon into CO_2. Emissions from product packaging are calculated by multiplying packaging material weight broken down by the appropriate percentage of disposal by incineration, landfill or recycling for each category of material in line with each country's performance in this regard by inventory data (using documentary data, commercially available databases, etc.)
* Kao focuses on the categories of 1, 3, 4, 5, 11 and 12 related to site activities to save energy and reduce waste materials, as well as on the product lifecycle.

Decarbonization GRI 308-2

CDP*1 evaluation

Our initiatives for the environment have been highly rated by the CDP. In 2023, we obtained an A score for each of Climate Change, Water Security and Forests, becoming a Triple A company for the fourth consecutive year, and the only Japanese company to ever do so. Only two companies in Japan, and 10 worldwide, received a Triple A score in 2023.

*1 CDP
A non-governmental organization run by institutional investors and headquartered in London. The organization's activities include requiring companies to disclose information on climate change, water, and forests.

CDP evaluation

Area	2019	2020	2021	2022	2023
Climate Change	A	A	A	A	A
Forest (Palm Oil / Timber)	A-/A-	A/A-	A/A	A / A	A/A
Water	A	A	A	A	A
Supplier engagement	A	A	A	A	A

CDP DISCLOSURE INSIGHT ACTION A LIST 2023 CLIMATE FORESTS WATER

Web
Results of CDP response
CDP 2023 Climate Change
https://www.kao.com/content/dam/sites/kao/www-kao-com/global/en/sustainability/pdf/cdp2023-001.pdf

CDP 2023 Water Security
https://www.kao.com/content/dam/sites/kao/www-kao-com/global/en/sustainability/pdf/cdp2023-002.pdf

CDP 2023 Forest
https://www.kao.com/content/dam/sites/kao/www-kao-com/global/en/sustainability/pdf/cdp2023-003.pdf

Main initiatives

Efforts in raw materials procurement

Mitigation

Vendor Summit

We hold the Kao Vendor Summit, which important suppliers are invited to attend, where we give presentations on our ESG-related initiatives, including decarbonization, and request suppliers' collaboration. The event featured presentations on the activities being implemented by Kao together with suppliers, and invitations to collaborate, with the aim of strengthening ESG-driven procurement (including joining Sedex, participation in the CDP supply chain initiative, etc.) and stable procurement (traceability of raw materials, responding to BCP requirements, etc.).

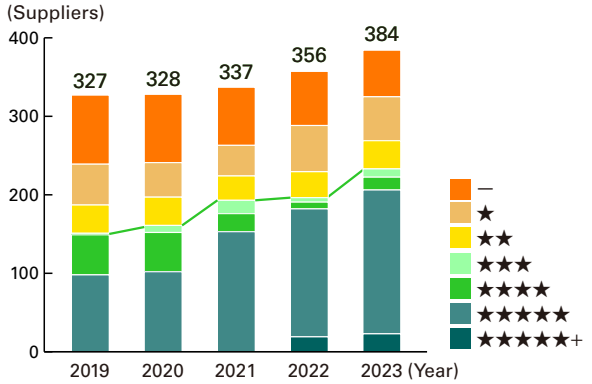
CDP Supply Chain Program (Climate Change)

In 2009, we became the first Japanese company to participate in the CDP Supply Chain Program. Since 2017, in the expectation that our suppliers will become more active toward promoting CO_2 reduction activities, we have been evaluating CO_2 reduction activities and have been working to provide the results of these evaluations back to our suppliers. In recognition of these initiatives, Kao was awarded the CDP Supplier Engagement Leader, the highest rating for CDP supplier engagement, for the seventh consecutive year.

The 2023 survey results showed that the number of suppliers obtaining an evaluation of at least "three stars" had increased to 196 compared to the previous survey, indicating that the overall supplier activity level had risen. The number of suppliers who failed to respond to the survey was smaller than in the previous year. We are working on engagement to encourage further enhancement of the level of activity implementation.

CDP SUPPLIER ENGAGEMENT LEADER 2023

Supplier activity level (Climate Change)



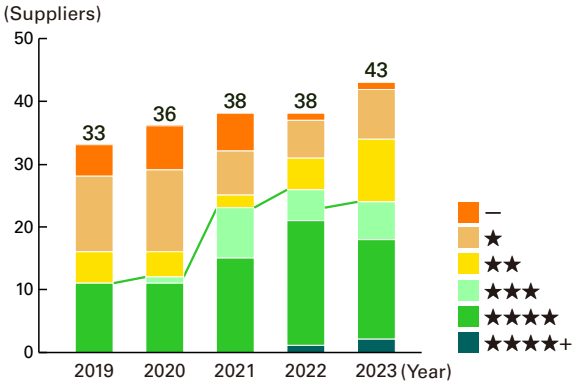
CDP Supply Chain Program (Forests)

We have participated in the CDP "Forest" Supply Chain Program since 2018. We expect suppliers providing palm oil, paper or pulp to begin sustainable and responsible procurement, which includes procurement preventing deforestation. We assess forest activity status and provide suppliers with feedback on the results of this assessment.

The 2023 survey results showed that 24 suppliers obtained an evaluation of at least three stars, but one supplier did not respond to the survey. We will continue to promote ongoing engagement.

Decarbonization GRI 308-2

Supplier activity level (Forests)



Low-carbon raw materials procurement

In collaboration with suppliers, we are working actively to adopt raw materials with lower CO_2 emissions by using plant-based and recycled plastics and thinner cardboard. This can make a substantial contribution to reducing CO_2 emissions not only in the manufacturing process but also at the time of disposal and recycling. We have also launched a new initiative to reduce CO_2 emissions from a mid- to long-term perspective, and have joined Genomatica, a leading sustainable materials company, and Unilever as founding members of a venture company to be established in the United States with the aim of supplying alternative palm oil raw materials to the market.

Furthermore, by optimizing the volume and frequency of raw materials deliveries, we are reducing CO_2 emissions in the transport of raw materials.

More precise calculation of the environmental burden of raw materials for calculating product lifecycle CO_2 emissions (LC-CO_2)

With the cooperation of those suppliers from which we purchase raw materials that have particularly high CO_2 emissions, we are collecting data on CO_2 emissions produced in the procurement and processing of raw materials. This measure not only improves the accuracy of our CO_2 emission calculations during the raw material procurement process but also allows us to evaluate the CO_2 emissions reduction initiatives adopted by suppliers, which can then be reflected in the lifecycle CO_2 emissions reductions of Kao products.

In 2020, we received the Industrial Science and Technology Policy and Environment Bureau Director-General's Award (Ministry of Economy, Trade and Industry), the highest award, at the Life Cycle Assessment Society of Japan (LCA) Awards, in recognition of our continued initiatives in relation to suppliers.

P104 Responsibly Sourced Raw Materials > Collaboration with stakeholders

Adaptation

CDP Supply Chain Program (Water)

Reflecting our focus on strengthening suppliers' awareness of the need to put water risk systems in place in relation to flooding of rivers and sewage systems caused by heavy rain, and on getting them to take appropriate action, we have been participating in the CDP "Water" Supply Chain Program since 2015.

P149 Water Conservation > Efforts in raw materials procurement

Developmental efforts

Mitigation

When deciding to launch new and improved products, we verify that the products satisfy the environmental standards outlined by the Design for Environment Guidelines. We also evaluate CO_2 emissions over the entire product lifecycle using the same standards. The results of these evaluations are not only used to determine product launches, but are also incorporated in future product development.

In particular, with regard to products that make use of water during the usage process, we recognize that both the water purification plants that provide drinking water for household use and the wastewater treatment plants that process households' wastewater use a great deal of energy and generate CO_2 emissions, and so we are working actively to develop water-saving products. Furthermore, products such as shampoo that require the use of hot water during the usage process also involve the generation of CO_2 emissions in relation to the heating of the water, so making products that use hot water into water-saving products can be very beneficial.

In addition, we aim to achieve "Maximum with Minimum," or in other words achieving the highest possible quality with the minimum possible raw materials. Based on this approach, we developed the Bio IOS surfactant. This surfactant is used in our *Attack ZERO* laundry detergent product. For *Attack ZERO Perfect Stick*, a laundry detergent in the shape of a stick, we have successfully reduced the use of plastic (per laundry cycle) by using pouch packaging for all sizes without using a hard plastic detergent container*1.

*1 Ratio by weight of the container compared with the conventional product

Decarbonization GRI 302-4

P150 Water Conservation > Efforts during use

Adaptation

As global warming progresses, it is apparent that there is a tendency toward higher temperatures and an increased number of sunny days. Due to this, the demand for UV care products, as well as antiperspirants, etc., is expected to increase during the summer. The UV care product to protect skin from UV rays, *Bioré UV Aqua Rich Aqua Protect Mist*, a non-gas mist-type sunblock that can be used comfortably on the entire body, has been favorably received, and received the Award for Excellence in the 2023 Nikkei Excellent Products and Services Award. In addition, climate change increases the risk of infectious diseases. In addition, climate change increases the risk of infectious diseases. In June 2022, *Bioré GUARD Mos Block Serum*, a repellent lotion with innovative Kao proprietary technology, was launched in Thailand to a great response. Additionally, as the probability of droughts occurring increases, the demand for water-saving products is also expected to increase. We are working actively to develop products for which there is high demand in summer, along with water-saving products.

Given that there are expected to be significant restrictions on resource use in future, in order to meet the goals set in the Paris Agreement, there will be high demand for biomass materials that do not compete with food. We have developed Bio IOS surfactant, which uses a type of biomass that does not compete with food and which has not previously been used. Bio IOS surfactant is already in use in our *Attack ZERO* laundry detergent product.

Our total investment in environmentally friendly R&D, including climate change response measures, in 2023 was 407 million yen, while the total cost of this R&D work was 7,890 million yen.

Efforts in manufacturing (plants, offices, logistics centers)

Mitigation

1. Efforts to reduce energy consumption

Introduction of high-efficiency equipment and efficient operation of equipment

Continuing from the previous year, equipment such as chillers, air conditioners and compressors were replaced with Best Practice Technologies (BPT) equipment in 2023. Through optimized control using multiple units of air conditioners and compressors, we are operating equipment more efficiently to correspond to fluctuating demand.

In addition, we are switching lights to LED worldwide. Our plants, offices and logistics centers in Japan have accomplished plans announced in 2015, reducing CO_2 emissions by approximately 4.65 thousand tons annually. Affiliated companies outside Japan are also proactively switching to LED lights.

Eliminating energy wastage

As in the previous year, in 2023 we continued to take steps to find areas with wasted energy, reduce energy use to the minimum required, and use energy that was unused in other processes.

Aiming to improve the efficiency of steam use, we are continuing to strengthen our steam trap maintenance and increase the amount of steam we recover. We are also actively implementing improvement activities at worksites to optimize the amount of required energy, including lowering the set temperature of heat-insulated tanks and shortening operating times.

Striving to eliminate energy wastage at our offices, some of the steps we are taking include turning off unnecessary lights, using presence sensors to automatically turn lights on and off, optimizing air conditioner temperature settings and encouraging people to take the stairs to reduce unnecessary elevator use.

We undertook 180 energy-saving activities at Japanese plants and offices in 2023, resulting in approximately 5,771 tons of CO_2 reduction and 170 million yen in cost reduction for the year.

2. Efforts to use cleaner energy

Clean-burning fuel

Gas fuel, especially natural gas, is the cleanest fossil fuel. We use natural gas at all plants outfitted with the necessary infrastructure. Our plants do not use any coal.

Use of renewable energy

We are promoting the introduction of solar photovoltaic power generation systems for on-site power generation at Kao-owned facilities. In 2023, we added facilities at Pilipinas Kao, Kao Corporation Shanghai and Kao Industrial (Thailand). The total power generating capacity of these systems was 14,199 MWh in 2023. The generating capacity of individual facilities is shown on the next page.

We are also promoting the purchasing of electric power that is generated using renewable energy. Kao Corporation's Ehime Plant, Toyohashi Plant, Odawara Office, Sumida Office, Sakata Plant, Arida Training Center, Kao Group Customer Marketing (76 locations), Kao Logistics (51 locations), Head Office of Kao Corporation, Osaka Office, Minato Club, Kiwa Dormitory, Seiwa Dormitory, Ibaraki SP, iCONM, Tonomachi RGB Annex, Miyaumi Warehouse, Wasa, FC Sengoku, Techno School, Jogen Dormitory, Yoshikawa Dormitory, Keiyo SP, Ginza BPS, NIVEA Kao Corporation

Decarbonization GRI 302-4, 305-3, 305-6, 403-7

Head Office, e'quipe, LTD., Molton Brown Corporation, Kao Chemicals Germany, Kao Manufacturing Germany, Molton Brown (UK headquarters and factory), KCSA (Mollet, Santiga), Chimigraf (3 plants), Kao USA (headquarters, plant, logistics), China (3 plants), Kao Germany, Kao Consumer Products (Southeast Asia), and Kanebo Cosmetics (Thailand) have replaced all electricity consumption with renewable electricity.

Kao Industrial (Thailand), Pilipinas Kao, Kao Penang Group, Kao Indonesia Chemical, Kao Vietnam, Kao Specialties Americas, and Quimi-Kao also purchase renewable electricity. The use of this renewable power reduced CO_2 emissions by 232 thousand tons.

Photovoltaic (solar) power generating facilities at Sakata Plant

Total generating capacity of solar power equipment (2023)

Company / Plant	Total generation (MWh)
Sakata Plant, Kao Corporation	2,777
Tochigi Plant, Kao Corporation	1,474
Wakayama Plant, Kao Corporation	789
Kawasaki Plant, Kao Corporation	421
Kao Sanitary Products Ehime	407
Toyohashi Plant, Kao Corporation	386
Atsugi Logistics Center, Kao Logistics	243
Sumida Kita Logistics Center, Kao Logistics	179
Sumida Office, Kao Corporation	86
Kao (Hefei)	2,980
Kao Corporation Shanghai	990
Quimi-Kao, S.A. de C.V.	780
Kao Industrial (Thailand)	775
Kao (Taiwan)	551
Pilipinas Kao, Incorporated	500
Kao (Shanghai) Chemical Industries	251
Kao Penang Group	168
KAO CHIMIGRAF, SOCIEDAD LIMITADA	140
Kao Spain Olesa Plant	123
Kao USA	99
PT Kao Indonesia Chemicals	44
Kao Austria Handelsgesellschaft mbH	37

3. Reducing the volume of leaked refrigerants and other greenhouse gases

Air conditioners and chillers used in manufacturing are charged with fluorocarbon, which has extremely high global warming potential. To reduce the volume of fluorocarbon leaks from equipment, we have been strengthening our regular equipment inspections.

4. Initiative to secure ZEB Ready certification for office buildings

In August 2020, a newly-built office building forming part of our Sumida Office (in Sumida Ward, Tokyo) was awarded ZEB (Net Zero Emission Building) Ready certification. Through the installation of highly efficient, energy-saving equipment such as highly-insulating external walls and water-based radiant air-conditioning, the new building realizes a reduction in energy consumption of 58% compared to a building with standard specifications. The new building also has solar panels on its roof, along with an emergency generator unit, ensuring that the building is ready to cope with natural disasters.

Adaptation

With rising summer temperatures, heat stroke prevention is essential. Especially for our outdoor workers, we have taken measures such as sharing the day's heat index, shortening continuous working hours and preparing drinking water.

Additionally, as new water risks, including more powerful typhoons and localized torrential rains, are likely to emerge as a result of climate change, annual water risk surveys are conducted at our plants.

Efforts in distribution

Mitigation

CO_2 emissions during distribution in Japan were 99 thousand tons-CO_2 in 2023, a 1.4 % increase (compared to 2017).

1. Increase shipment volumes per shipment

We are proactively making adjustments including improving loading efficiency, changing product sizes and using larger vehicles.

2. Shorten shipping distances

We are continuing to look at ways to revise shipping routes, optimize manufacturing plants and shift which logistics center is used.

Decarbonization GRI 302-4, 302-5, 305-3

3. Use cleaner shipping methods

We are pursuing steps such as switching from truck to shipping methods such as rail and ship, which have lower CO_2 emissions (modal shift).

4. Improve loading ratios

Having trucks return from their shipping destination with a load, instead of returning empty after unloading, i.e., improving the loading ratio, contributes to improving energy efficiency and CO_2 emissions in shipping.

We are participating in the Cross-ministerial Strategic Innovation Promotion Program promoted by Japan's Cabinet Office. We have partnered with Lion Corporation to launch a smart logistics initiative, with scheduled deliveries having started in October 2020.

The aim is to enhance the productivity of truck transport and reduce CO_2 emissions by implementing two-way transport that integrates deliveries between Kao's Kawasaki Plant (in Kanagawa Prefecture) and the Sakaide Logistics Center (in Kagawa Prefecture), as well as from the Sakaide Plant (in Kagawa Prefecture) of Lion Chemical (a Lion Corporation affiliate) and the logistics centers at Kazo (in Saitama Prefecture), Kashiwa (in Chiba Prefecture) and Sagamihara (in Kanagawa Prefecture).

Collaborative delivery with Lion Corporation

This new initiative will achieve shorter empty running distances for the trucks in comparison with conventional transportation methods, and is expected to result in a 45% reduction in CO_2 emissions and a 23% reduction in transport costs for both companies' combined.

5. To enhance visualization of distribution-related energy usage and CO_2 emissions

We had been making preparations to begin calculating distribution-related energy usage and CO_2 emissions outside Japan starting from 2020. However, the calculation and reporting of distribution-related CO_2 emissions outside Japan for 2020 has been based on estimates. We are proceeding with preparations to begin reporting of emissions based on actual distribution performance as soon as possible.

6. Distributive innovation through the use of reusable folding containers

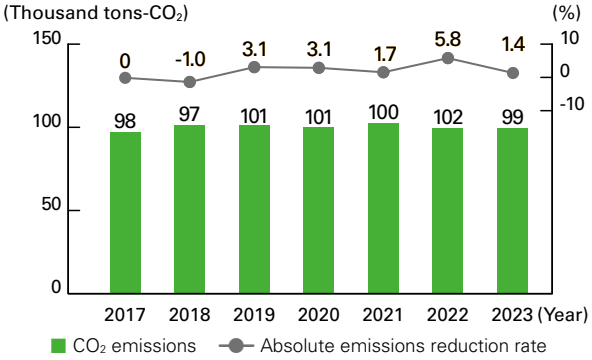
Recyclable corrugated cardboard has been the primary packaging material used to pack products for delivery to retailers. However, there have been issues related to the burden of opening and disposing of packaging at the store and CO_2 emissions in the recycling process. To this end, Kao and Costco Wholesale Japan have worked together to introduce reusable folding containers and have launched an effort to collect and reuse them. We will expand stores that use such containers, and at the same time, we will aim to standardize the use of reusable folding containers on an industry-wide basis in the future.

Incidentally, this effort was embodied for the first time in 0★1Kao, a system for achieving project commercialization and internal structural reform after soliciting ideas from each employee, which started in July 2021.

Adaptation

With the worsening trend toward short-term, localized torrential rain, there is an increased risk of the supply chain from Kao's plants to our customers being disrupted, with Kao being unable to deliver products on schedule, and a possible need to use roundabout routes over an extended period, leading to an increased environmental impact. When risks appear, in order to take appropriate measures in a short amount of time, subsidiaries are charged with managing product transport to our main market in Japan.

CO_2 emissions from transportation☑ (Japan)



* Boundary: Kao Corporation and Kanebo Cosmetics Inc.
* Assurance provided for CO_2 emissions

Efforts during use

Mitigation

We offer a wide selection of products that contribute to the reduction of CO_2 emissions during the use stage.

Important examples include ultra-concentrated laundry detergents that only require one rinse cycle, and shampoo, body wash and dishwashing detergent that reduce the amount of hot water required for rinsing.

Decarbonization GRI 302-5, 305-3

In the laundry detergent segment, in 2009 we launched *Attack Neo*, which reduces the lifecycle CO_2 emissions per wash by approximately 22%. In 2019, we introduced *Attack ZERO*, a concentrated liquid clothing detergent that has redefined the whole concept of clothes washing, which uses *Bio IOS*, our most advanced ever detergent base, as its main ingredient, and which was followed by *Attack 3X* in 2020. Within Japan, the way in which consumers do their washing has begun to be transformed, with washing machines that come equipped with a button allowing the user to select a single rinse cycle as a standard feature becoming the norm. For *Attack ZERO Perfect Stick*, a laundry detergent in the shape of a stick, we made it possible to reduce the number of rinses to one, even for the powder detergent. Kao offers laundry detergents that require only one rinse in Japan, Taiwan and Hong Kong.

We also offer other products, such as *Bioré-u the Body Foaming Type*, a body wash, which can be expected to reduce the amount of water used by washing by hand, and as a result, cut CO_2 emissions by approximately 10%.

To help ensure that when consumers use these products, which are capable of effectively reducing CO_2 emissions, they use them properly, we participate in environmental events hosted by local governments and distribution companies.

We also offer a wide selection of products for industry that allow customers to reduce their CO_2 emissions during the use stage. These include a toner with low-temperature fixing, which reduces the photocopier's power consumption, washing and rinsing agents that can wash and rinse steel plates at low temperatures to reduce CO_2 emissions from fuel consumption, a semiconductor wafer cleanser that contributes toward CO_2 emissions reduction by reducing the amount of ultra-pure water and chemical agents used during the cleaning process, an additive for coating material that helps improve fuel economy by reducing the coating weight of wire harnesses for automobiles, and an additive essential to improving the dispersion of a material required for fuel-efficient tires to demonstrate their performance.

Attack ZERO, a concentrated liquid laundry detergent

Bioré-u the Body Foaming Type, a body wash, which can be expected to reduce the amount of water used by washing by hand

Adaptation

As global warming progresses, the period of time for which there is high demand for anti-perspirants etc. in the summer is lengthening, and demand is expected to rise. We are therefore working to strengthen our development of these types of products. Additionally, as the probability of droughts occurring increases, the demand for water-saving products is also expected to increase.

Our *sonaeru* website provides information about household products that will be useful in the unfortunate event of a natural disaster occurring, with a particular focus on products that can help people maintain good hygiene while living in an evacuation facility.

Web Kao *sonaeru* website
https://www.kao.co.jp/content/dam/sites/kao/www-kao-co-jp/hisaiji/index/pdf/Kao_Sonaeru_en_rev4.pdf

Efforts in disposal and recycling

Mitigation

CO_2 emissions in the disposal and recycling stage consist of the following two types. One type is the CO_2 emitted as materials and ingredients degrade when packaging, diapers and other materials disposed of by consumers after use are incinerated, or when wastewater containing cleansing and other agents

Decarbonization GRI 2-28, 302-5, 305-3

made from petroleum is treated. The other type is CO_2 emitted from using the energy required to operate incinerating and recycling equipment and wastewater treatment facilities. In order to simultaneously address these two types of emissions, the most important thing is to reduce the volume of material subject to disposal and recycling. For this reason, as far as possible, we recycle waste that is subject to disposal and recycling. In the case of waste that cannot be recycled and can only be disposed of as waste, we adopt a carbon neutral approach.

In line with this philosophy, we refer to initiatives that reduce the amount of waste that needs to be dealt with as Innovation in Reduction. We are applying Innovation in Reduction to the raw materials used in manufacturing packaging and diapers, and to the cleaning agents used in cleaning products. We refer to initiatives in the area of recycling as Innovation in Recycling. We are applying Innovation in Recycling to packaging and to used diapers.

Used diapers are carbonized using carbonization equipment, and the resulting material is then utilized for environmental purification and plant cultivation. We are also undertaking R&D aimed at conversion to new types of carbon material.

We are proceeding with the utilization of biomass plastic and other raw materials that are carbon neutral in terms of the amount of CO_2 emitted during disposal. As a new initiative, we have started research on a manufacturing model to utilize cassava residue as biomass as a commissioned project by the New Energy and Industrial Technology Development Organization (NEDO), a national research and development corporation.

P138 Zero Waste > Initiatives taken in relation to our products

Examples of major collaboration projects with stakeholders

- Participation in the Green Value Chain Platform and 2°C Target Network Corporate Edition administered by Japan's Ministry of the Environment, offering Kao's scope 3 efforts as an example and contributing to the calculation of scope 3 emissions by corporations
- DECOKATSU awareness, promoted by the Ministry of the Environment, and the contribution to lifestyle change for consumers toward decarbonization
- Participation in the Japan Climate Initiative and the spread of information and opinion exchange on climate change measures promoted by various constituents besides the national government
- Participation as a member of the LCA Working Group organized by the Japan Chemical Industry Association. We have disclosed case studies of our carbon lifecycle analysis efforts, and disseminated information to society about the contribution that chemical products can make toward reducing CO_2 emissions.
- Participation in the Supply Chain Program run by the CDP for 14 consecutive years. We are contributing toward the enhancement of suppliers' awareness, and toward promoting a transformation of the types of action taken by suppliers.
- As a member of the steering committee of the TCFD Consortium of Japan, we are contributing toward the disclosure of climate change-related information, and toward the promotion of dialogue.

In 2023, we were involved with three lectures, interviews, etc. relating to decarbonization. Our decarbonization initiatives have contributed toward enhancing awareness in society.

Employees' opinions

Distributive innovation project through the use of 0★1Kao reusable folding containers

Miki Asayama
Logistics Reform Division, Logistics Center,
Sumida Office,
Kao Corporation

Kao has sales companies and logistics companies within its own group, and I held a series of discussions with many co-workers about contributing to ESG. After having many discussions, our dream has become to realize both the reuse of packaging materials for reducing the environmental load in distribution through the sale of products and streamlining efforts at shops in response to a manpower shortage. In response, 0★1Kao, a new system that allows any employee to propose a business project, was established. We immediately started taking action to accomplish our dream using this system. As a result, we received empathy from many employees and business partners. We then began trial sales half a year later, and our proposal was adopted officially a year and a half after the submission of our proposal. The packaging material was named *GURU-GURU* BOX.

We will add refinements as needed, and I hope that this project will become a dream for the entire business world.

Decarbonization

Stakeholder engagement

Norihiro Itsubo
Professor, Faculty of Science and Engineering, Waseda University

A paper published in Science in 2022 (Mckay et al.) pointed out that seven of the 16 climate tipping points, including ice sheet melting in Greenland and west of Antarctica and loss of coral reefs at low latitudes, could not be avoided worsening the situation even if the 2°C target is achieved. In addition, it was noted that the North Atlantic ocean circulation, which is essential for global climate stability, may cease as early as the middle of this century. We must do our utmost to avoid the consequences of the worst. Kao is a leader in actively leading initiatives to build a decarbonized society, but more efforts are expected to be made to break out of the status quo. I would like to offer my main opinions and recommendations below.

Reduction strategies and enhanced efforts from a life cycle perspective

The SCOPE 3 calculation results were approximately 10 million tons-CO_2, with the largest categories being the use of products sold (Category 11) and up to raw material procurement (Category 1). The water- and energy-saving products offered by Kao contribute to a significant reduction in the environmental impact of the usage stage, and are presumed to be of the highest standard in the world. Guidelines for the evaluation of reduction contribution have been published in the WBCSD. It is recommended to quantify the reduction contribution by referring to these methods. Activities to raise consumer awareness through plants, exhibitions, school education, etc. are also favorable. Further dissemination to the world is expected, including communicating the importance of handwashing in developing countries. Regarding raw material procurement, it is also excellent that Kao voluntarily sets up ESG promotion guidelines and monitors the activities of its suppliers. On the other hand, if I were to raise an issue, it is unclear to what extent this contributes to the reduction of CO_2 emissions. In particular, how far have you managed land use up to the production of palm oil, the raw material? About half of the greenhouse gas emissions in Southeast Asia are associated with land use. The management of farms that provide raw materials is extremely important, but this part is not explained. You mentioned that the emission factors used for LCA implementation are provided by suppliers, but please clarify whether you have verified the emission factors for land use change.

Positioning of negative emissions

To achieve carbon neutrality, it is not possible to reduce emissions alone; negative emissions, or increased CO_2 absorption, are required. In the current long-term goals at Kao, the development of innovative technologies, storage in raw materials, and artificial photosynthesis are keywords. The above is envisioned to begin implementation in the 2020s and expand its scale over time, but it is unclear what is currently being done with these initiatives. Even if the project is still in the research and development stage, it is desirable to introduce the initiative, and it is expected to clarify whether there is a prospect for long-term implementation.

Active use of internal carbon pricing

According to the CDP report, 20% of prime market firms have already adopted carbon pricing and approximately 50% will do so within the next two years, which together means that 70% of firms will adopt carbon pricing within the next two years. In Kao's decarbonization efforts, explanations of the use of carbon pricing regarding reduction of Scope 1 and 2 emissions can be seen. Carbon pricing should be used in project budgets for reducing Scope 3 emissions. For example, will there be development of detergents that can be cleaned with water in areas where hot water is used for laundry, or detergents that require less drying time in dryers? It is expected that ideas for various product developments will expand.