Decarbonization 102-12, 102-15, 103-1

Contribute to global decarbonization by reducing the full lifecycle CO_2 emissions of our products to a level that aligns with a 2°C (or lower if possible) global warming scenario.

Kao's creating value to address social issues

Social issues we are aware of

According to the World Meteorological Organization, in 2018 the average global temperature had risen by 0.98°C compared to levels prior to the Industrial Revolution, and has been at an all-time high for four consecutive years since 2015. Maximum daytime temperatures have been rising, and it has become common to have several consecutive days with temperatures in excess of 40°C. As a result, there has been an increase in the number of people affected by heatstroke, and every year there are reports of people dying from heatstroke. At the same time, rising temperatures have stimulated the growth of pathogenic E. Coli bacteria, which can cause food poisoning, and there is an increased risk of infection.

It was reported in the Special Report on Global Warming of 1.5°C issued by the IPCC[*1] in October of 2018 that if the current situation continues, there is a high likelihood that temperatures will rise by more than 1.5°C between 2030 and 2052, and that in order to keep temperatures from rising by 1.5°C, it would be necessary to reach net ZERO around 2050. There is thus a need to make even greater reductions in CO_2 emissions.

For Kao, forest commodities such as palm oil and paper and paper pulp constitute very important raw materials. In today's world, in order to boost production of these commodities, natural forests are being destroyed and there is an accelerating trend toward the establishment of new plantations, which is being accompanied by a loss of biodiversity and human rights issues relating to local workers, etc. We are very much aware of the risks that exist in relation to the need to realize sustainable development. An additional point is that greenhouse gas emissions deriving from forest destruction and changes in land use account for 6.5% of total global greenhouse gas emissions[*2].

Extreme weather events are already occurring due to global warming, and with this threat expected to grow in the future, there is an immediate need to implement measures to adapt to these changing circumstances.

Reflecting the fact that it is the younger generation that will bear the brunt of the impact of climate change in the future, young people throughout the world are taking action—such as the FridaysForFuture movement—to demand that governments take action in response to climate change.

*1 IPCC
Intergovernmental Panel on Climate Change
An 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 World Resources Institute, World Greenhouses gas Emissions, 2016

Kao's creating value

In order to reduce greenhouse gas emissions associated with our business activity, we have set reduction targets at our plants and other facilities, and are continuing activities which improving energy efficiency and turning energy used into green energy. Additionally, as part of our product lifecycle analysis, we are carrying out activities that reduce raw material procurement and use during necessary stages, waste during each stage, as well as greenhouse gas emissions.

We are working to enrich the lives of people and contribute to the sustainability of society by providing products that respond to changing consumer lifestyles in light of climate change, and that are environmentally conscious in response to transitional and physical risks.

Contributions to the SDGs

Decarbonization 103-2

Risks and opportunities related to realization of our vision by 2030

We have implemented qualitative and quantitative evaluation of the risks and opportunities relating to the realization of our vision of where we want our company to be by 2030, focusing on the 2°C Scenario*1 and 4°C Scenario*2, and we have identified the key items that could have a major impact on our business.

The results of this evaluation confirmed that some of the most important risks included the potential for the adoption and strengthening of carbon taxes, increases in the cost of petroleum-derived raw materials due to rises in the crude oil price, and an increased risk of flood damage due to the trend toward increased short-term precipitation, etc. We also identified a number of opportunities, including increased demand for summer-use products such as deodorant due to rising temperatures, and changes in consumer behavior such as the widespread trend toward ethical consumption.

In respect to realizing our vision for 2030, if no action is taken to reduce emissions, then by 2030 our total CO_2 emissions (Scope 1 + 2) are expected to be 167% higher than in 2017. With the 2°C Scenario, if carbon taxes equivalent to US$89 / t-$CO_2$ are adopted worldwide, then this would lead to an increase in costs of around 9.5 billion yen per year for us. However, in 2006 we introduced an internal carbon pricing system to control CO_2 emissions (Scope 1 + 2), which has now been in operation for 13 years, closely integrated with our business activities. Having set ourselves the target of reducing CO_2 emissions by 22% by 2030 (compared to 2017), we would be able to keep the amount of carbon tax that we would need to pay down to around 4.5 billion yen per year, and keep the increase in overall costs down to around 5 billion yen per year.

*1 2°C scenario
This is equivalent to the IEA's 2DS scenario or the IPCC's RCP 2.6 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 2°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.

*2 4°C scenario
This is equivalent to the IEA's Current Policy Scenario or the IPCC's RCP 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 etc. that is expected to result from such a rise in temperature.

Policies

Climate change poses a major risk in relation to ensuring the satisfaction and enrichment of people's lives, both now and in the future. The Kao Way enunciates our mission to strive for the wholehearted satisfaction, enrichment of the lives of people globally and to contribute to the sustainability of the world, and we are implementing activities to reduce CO_2 emissions in relation to every aspect of our business strategy.

In our Policies Regarding the Environment and Safety, we undertake to "Assess environment and safety aspects throughout the entire life cycle of the products, from manufacture through disposal, when developing products and technologies. Offer products with a lower environmental impact."

Furthermore, the Kao Responsible Care Policy contains the following declaration: "We shall strive to continue to reduce the environmental impact of our business operations by promoting reduction of uses of resources such as water and energy."

Our Environmental Statement 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 materials procurement and manufacturing, to distribution, sales, use and final disposal, we want to engage in 'eco together' with stakeholders and consumers worldwide."

Furthermore, in regard to palm oil and paper and paper pulp, we have formulated the Guidelines for Sustainable Procurement of Raw Materials, and we support the goal of reducing forest destruction to zero by 2020 in the areas where these raw materials are produced.

➡ p. 72 Making thoughtful choices for society > Responsibly sourced raw materials

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

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

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

➡ Guidelines for Sustainable Procurement of Raw Materials
www.kao.com/content/dam/sites/kao/www-kao-com/global/en/sustainability/pdf/procurement-raw-materials-guidelines.pdf

Decarbonization 102-43, 404-2

Education and promotion

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 carbon reduction education 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. 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 Kao's activities and products.

➡ p. 61 Making thoughtful choices for society > Sustainable lifestyle promotion > Collaboration and engagement with stakeholders

"eco together" with business partners

In order to help our customers realize a Kirei Lifestyle, we continue to implement heartfelt *Yoki-Monozukuri* manufacturing and deliver the resulting products to our customers. 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 that we collaborate with 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. As the raw materials stage accounts for around 40% of total product lifecycle CO_2 emissions, we view collaboration with raw materials suppliers as being particularly important.

"eco together" with society

We proactively participate in activities organized by the central government and by local government authorities, NPOs, etc., where we provide information about Kao technologies and exchange opinions with other participants. In order to realize the decarbonized society, reducing the CO_2 emissions associated with by using renewable energy generation is a particularly important approach, and we are working actively to disseminate information about our activities in this area.

Employee education and promotion

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

Decarbonization 102-20, 103-2

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 Committee, under the supervision of the Board of Directors. These committees are headed by the President and CEO.

The Responsible Care Promotion Committee, which manages policy/regulatory regime and technology risks, and the Risk and Crisis Management Committee, which manages market, reputational and acute risks, are under the Internal Control Committee. These committees are headed by the executive officer in charge of the Corporate Strategy.

The Responsible Care Department of Corporate Strategy Division acts as the Responsible Care Promotion Committee Secretariat while the Crisis Management Department of Corporate Strategy Division acts as the Risk and Crisis Management Committee Secretariat.

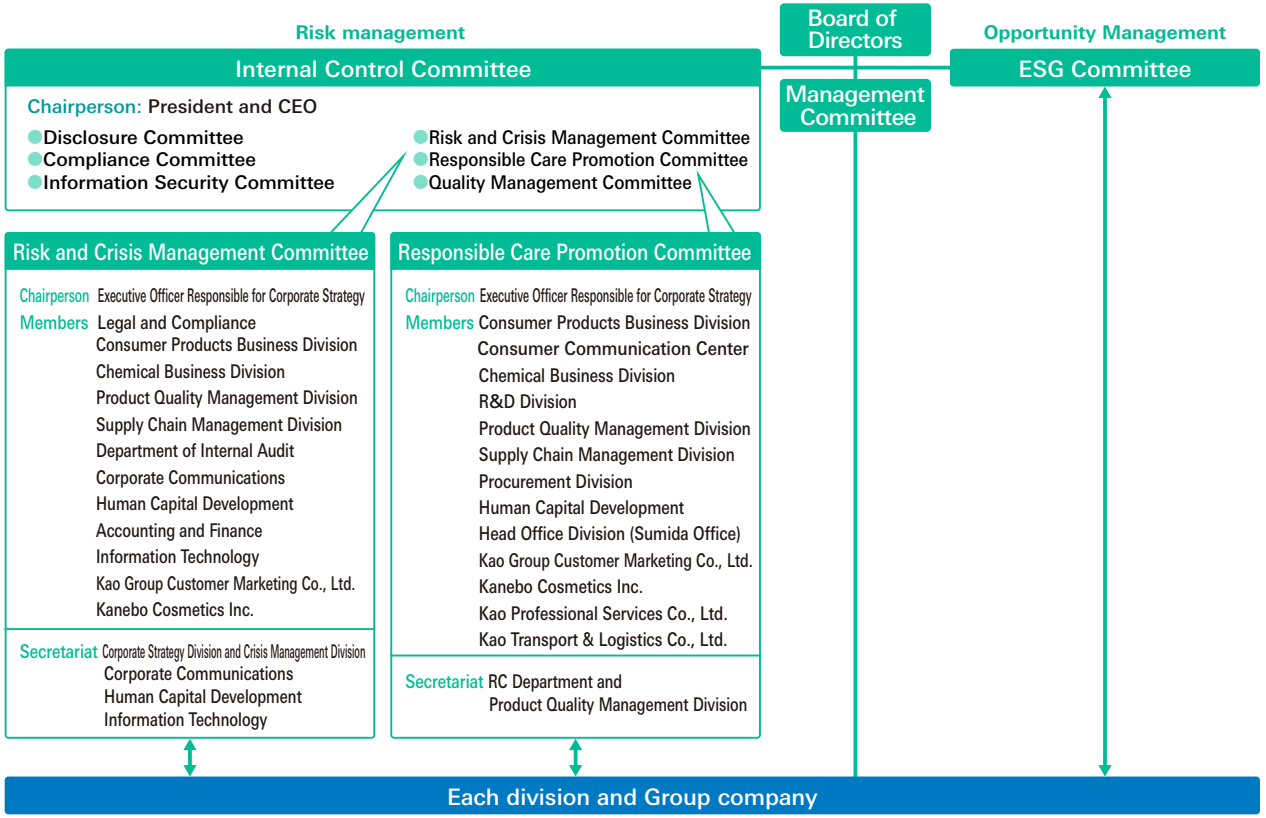
The Responsible Care Promotion Committee meets twice a year to report on and discuss compliance with laws and regulations, status of CO_2 reduction and other matters. It also sets targets for the following year. The Responsible Care Promotion Committee conducts monthly checks on compliance with laws 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 Risk and Crisis Management Committee which manages natural disaster including caused by climate change and reputational risks, meets four times a year.

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

Opportunity management relating to climate change issues is handled by the ESG Committee, which meets four times a year. Committee members are the persons in charge of the business, sales, R&D, SCM and other divisions, an arrangement which connects divisions horizontally. The Internal Control Committee, and the ESG 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.

Decarbonization promotion structure



* As of December 2019.

Decarbonization 103-2, 103-3, 302-1, 302-3, 302-4, 302-5, 305-1, 305-2, 305-3, 305-4, 305-5

Mid- to long-term targets and performance

Targets for 2020

In 2013, we set the 2020 targets for energy consumption and greenhouse gas emissions pertaining to all Kao Group sites and have aimed to achieve a standard 1% reduction each year. In 2009, we set the 2020 reduction targets for CO_2 emissions pertaining to the entire product lifecycle for group companies in Japan, based on the national reduction targets set by the Japanese government at the time (all of the above targets were calculated on a per unit of sales basis).

Targets for energy and greenhouse gas emissions

Index	Scope	2019 targets	2020 targets
Energy consumption	All Kao Group sites	34% reduction	35% reduction
GHG emissions		34% reduction	35% reduction
CO_2 emissions	Across the entire product lifecycle for the Kao Group in Japan	—	35% reduction

2025 mid-term targets

Index	Scope	2025 targets
Purchased power	Kao Group in Japan	100% renewable sources

2030 long-term targets

Index	Scope	2030 long-term targets
GHG emissions (absolute quantity)	Across the entire Kao Group product lifecycle	22% reduction (Compared to 2017)*
	All Kao Group sites	22% reduction (Compared to 2017)*
Energy consumption (Per sales unit)	All Kao Group sites	1% reduction yearly (year-on-year, from 2021)
Purchased power	All Kao Group sites	100% renewable sources

* Kao's greenhouse gas reduction targets have received certification from the Science Based Targets initiative (SBTi).

Anticipated benefits from achieving mid- to long-term targets

Business impacts

Achieving targets (for energy consumption and greenhouse gas emissions) for all sites in the group leads to better profits as they contribute to the reduction of business activity operating costs. Additionally, 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.

As renewable energy generating costs have been falling steadily for the past few years, switching over to having 100% of the electricity that we purchased generated using renewable energy will lead to reduced electricity purchase costs in the future.

Social impacts

By achieving the above goals, we can reduce greenhouse gas emissions and contribute to realizing the decarbonized society. Additionally, products with low CO_2 emissions during usage can contribute to 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 system.

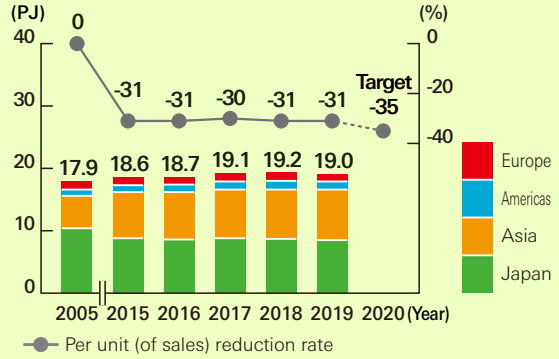
Decarbonization 102-48, 103-2, 103-3, 302-1, 302-3, 302-4, 302-5, 305-1, 305-2, 305-3, 305-4, 305-5

DECARBON-ISATION

Performance in 2019

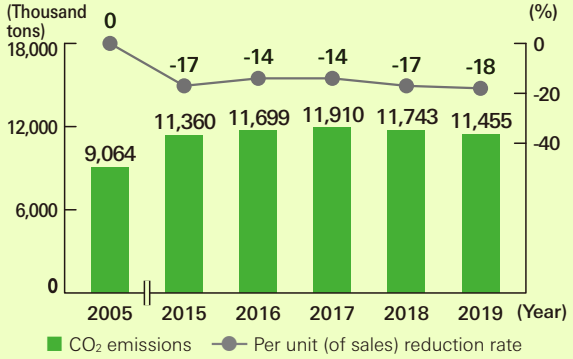
Performance*

Energy consumption☑ (all sites)



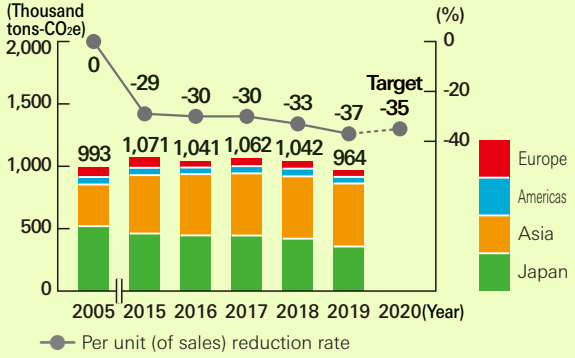
* Boundary: All Kao Group sites including company cars in Japan.
* Assurance provided for energy consumption figures.
* Values for Europe for 2016–2018 have been revised. (The coefficient for purchased renewable power was changed from 3.6 MJ/kWh to the conversion factor for each country.)

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



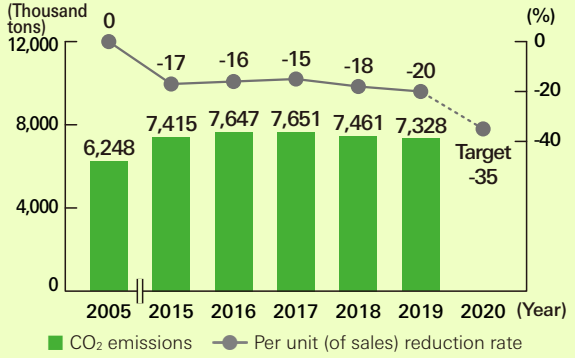
* "CO_2 emissions across the entire product lifecycle" is calculated as the combined total for the amount of lifecycle CO_2 emissions of individual products sold within and outside Japan, multiplied by their annual sales quantity. Among the lifecycle, the estimated emissions from the manufacturing and distribution processes are substituted by the actual emissions from these 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 per unit (of sales) reduction rates.

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.
* Values for Europe for 2017 and 2018 have been revised. (The revisions reflect the revised values for the Olesa Plant of Kao Corporation [Spain].)

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



* "CO_2 emissions across the entire product lifecycle" is calculated as the combined total for the amount of lifecycle CO_2 emissions of individual products sold within and outside Japan, multiplied by their annual sales quantity. Among the lifecycle, the estimated emissions from the manufacturing and distribution processes are substituted by the actual emissions from these 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 per unit (of sales) reduction rates.

∗ Per unit of sales is calculated based on Japanese standards up to fiscal 2015, and on International Financial Reporting Standards (IFRS) from fiscal 2016.

Reviews of performance

CO_2 emissions across the entire product lifecycle in Japan decreased by 288,000 tons over the previous year, representing a fall of 4% compared to 2017. The per unit (of sales) reduction rate improved by 1 point to 18% (2005 baseline) compared to the previous year. CO_2 emissions across the entire product lifecycle in Japan were reduced by 133 thousand tons-CO_2 over the previous year, and the per unit (of sales) reduction rate improved by 2 point to 20% (2005 baseline) over the previous year. The main reason for this improvement was the launch, in Japan, of a new brand of washing detergent specially designed for use in drum-type washing machines, which tend to use less water.

The energy consumption per unit of sales reduction rate at all Kao Group sites remained at 31% as in the previous year, and we did not achieve the reduction target of 34%. Greenhouse gas emissions fell by 9% compared to 2017, and on a per unit of sales basis the reduction rate improved to 37%, meeting the 2019 target of 34% and the 2020 target of 35% one year ahead of schedule. The ratio of renewable energy among purchased energy stood at 28% for the Kao Group as a whole, and at 38% for the Kao Group in Japan.

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. Including these avoided emissions, the contributed lifecycle CO_2 emission reduction was 4,153 thousand tons*.

* Value is calculated as the reduced lifecycle CO_2 emissions of the Kao product in Japan, compared with the standard product as of 2005. The scope includes industrial-use products and household products.

Decarbonization 102-48, 103-2, 103-3, 302-1, 302-3, 302-4, 302-5, 305-1, 305-2, 305-3, 305-4, 305-5

DECARBON-ISATION

Scope 1 CO_2 emissions☑ (Thousand tons-CO_2e)

	2017	2018	2019
Japan	271	263	259
Asia	290	291	291
Americas	43	49	46
Europe	49	49	48
Total	653	652	644

Scope 2 CO_2 emissions☑ (Thousand tons-CO_2e)

	2017	2018	2019
Japan	173	157	98
Asia	208	207	214
Americas	14	14	6
Europe	13	13	2
Total	409	390	320

* 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.
* 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 International Energy Agency (IEA) is used.
* The values for Europe for 2017 and 2018 contained errors and have been revised accordingly.

Purchased electricity, steam, etc. (terajoules)

	2017	2018	2019
Electricity	7,776	7,663	7,810
Heat	0	0	0
Steam	140	140	149
Cooling	0	0	0

* 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)

	2017	2018	2019
Natural gas	9,047	9,123	8,936
Diesel oil	1,383	1,331	1,405
Gasoline	149	135	123
Other	128	145	142
Waste vegetable oil (heat recovery)	486	553	493

Scope 3 CO_2 emissions (Thousand tons-CO_2e)

	2017	2018	2019
1. Purchased goods and services☑	4,496	4,430	4,295
2. Capital goods	239	269	342
3. Fuel- and energy-related activities (not included in scope 1 or scope 2)	29	27	30
4. Upstream transportation and distribution☑	253	253	254
5. Waste generated in operations	58	60	56
6. Business travel	4	4	4
7. Employee commuting	18	21	17
8. Upstream leased assets	0	0	0
9. Downstream transportation and distribution	97	106	107
10. Processing of sold products	119	119	111
11. Use of sold products☑	4,687	4,570	4,510
12. End-of-life treatment of sold products☑	1,415	1,452	1,432
13. Downstream leased assets	0	0	0
14. Franchises	0	0	0
15. Investments	8	8	7
Total	11,423	11,319	11,165

* 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.

CDP* evaluation

Our initiatives for the environment have been highly rated by the CDP. The evaluation for 2019 was as follows.

CDP evaluation

Area	2016	2017	2018	2019
Climate change	A-	A-	A-	A
Forests (Timber)	A-	A-	A-	A-
Forests (Palm Oil)	A-	A-	A-	A-
Water Security	A	A-	A	A
Supplier engagement	B	A	A	A

CDP DISCLOSURE INSIGHT ACTION A LIST 2019 CLIMATE

CDP DISCLOSURE INSIGHT ACTION A LIST 2019 WATER

CDP SUPPLIER ENGAGEMENT LEADER 2019

* CDP
CDP is a London-based NPO operated by institutional investors, and it motivates business enterprises to disclose information related to climate change, water and forests.

➡ CDP results
CDP 2019 Climate change
www.kao.com/content/dam/sites/kao/www-kao-com/global/en/sustainability/pdf/cdp2019-001.pdf
CDP 2019 Forests
www.kao.com/content/dam/sites/kao/www-kao-com/global/en/sustainability/pdf/cdp2019-003.pdf
CDP 2019 Water Security
www.kao.com/content/dam/sites/kao/www-kao-com/global/en/sustainability/pdf/cdp2019-002.pdf

Decarbonization 102-12, 102-43, 308-2

Our initiatives

Efforts in raw materials procurement

Mitigation

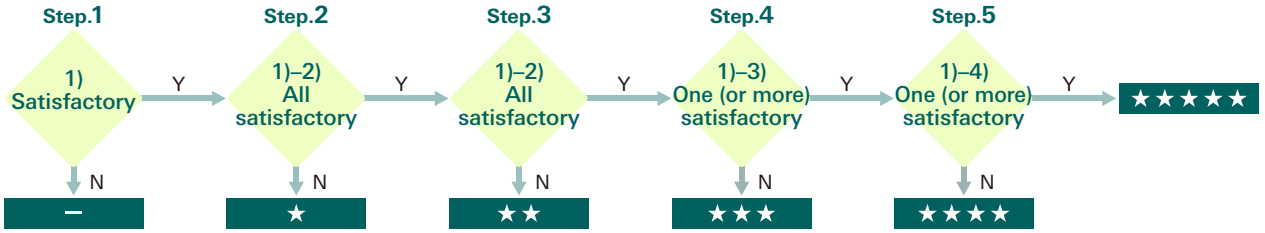
Vendor Summit

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.

CDP Supply Chain Program (Climate change)

In 2009, we became the first Japanese company to participate in the CDP Supply Chain Program. From 2017, in 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. The 2019 survey results showed that the number of suppliers obtaining an evaluation of at least "four stars" had increased by 54 compared to the previous year, indicating that the overall supplier activity level had risen. At the same time, in regard to the roughly 30% of suppliers who failed to respond to the survey, we are working on engagement to encourage these suppliers to respond.

Determination flowchart



Step	Conforming	Implementing	Evaluation targets
1	●	●	1) Replies to some questions
2	●	●	1) Ascertain CO_2 emission amount (Scope 1 + 2)
		●	2) Ascertain changes in CO_2 emission amount (Scope 1 + 2)
3	●	●	1) Leadership / organizational readiness
		●	2) Setting targets
4	●	●	1) CO_2 reduction project recording or CO_2 emission amount reduction recording
		●	2) Scope 3 (procurement) estimation
		●	3) Estimation of the amount of CO_2 emissions associated with the portion supplied to Kao
5	●	●	1) SBT setting
		●	2) Adoption of low-carbon energy
		●	3) Adoption of renewable energy
		●	4) Setting of renewable energy targets

Decarbonization 102-12, 102-43, 308-2

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 paper 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 2019 survey results showed that the number of suppliers obtaining an evaluation of at least "three stars" had increased by 2 compared to the previous year, indicating that the overall supplier activity level had risen. At the same time, in regard to the roughly 15% of suppliers who failed to respond to the survey, we are working on engagement to encourage these suppliers to respond.

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.

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 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 lifecycle CO_2 emissions reductions of Kao products.

➡ p. 72 Making thoughtful choices for society > Responsibly sourced raw materials

Adaptation

CDP Supply Chain Program (Water)

Due to climate change, extreme weather is occurring in different places. For instance, there is an increase in short-term frequent heavy rain. 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.

➡ p. 117 Making the world healthier & cleaner > Water conservation

Decarbonization 302-4

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. At the same time, we evaluate CO_2 emissions across the entire lifecycle. The results of these evaluations are used not only to determine product launches, but are also incorporated in future product development.

Especially regarding products that require water during product usage, we are aware that the process of using purification plants to purify the tap water that is used by households, and the process of treating waste tap water in sewage plants after use, requires a great deal of energy and generates CO_2 emissions, and we are actively promoting the development of water-saving products. Furthermore, as products like shampoos that require hot water to use generate even more CO_2 through the process of producing hot water, it is more effective to focus on improving water conservation for products that require hot water.

➡ p. 117 Making the world healthier & cleaner > Water conservation

Adaptation

As global warming progresses, it is apparent that there is a tendency toward higher temperatures and an increased number of sunny days. Demand for UV care products as well as anti-perspirants, etc. are expected to increase during summer. 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 and 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 2019 was 2,361 million yen, while the total cost of this R&D work was 5,559 million yen.

Kao's Bio IOS won an award for the best poster presentation at the CESIO World Surfactant Congress.

Efforts in manufacturing (plants, offices, logistics centers)

Mitigation

1. Efforts to reduce energy consumption

• Introduction of high-efficiency equipment, 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 2019. Through optimized control using multiple units of air conditioners and compressors, we are more efficiently operating equipment corresponding to fluctuating demand.

In addition, we are switching lights to LED around the world. Our plants, logistics centers and offices 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 wasted energy

As in the previous year, in 2019 we continued to take steps to find areas with wasted energy, reduce energy use to the minimum required and use unused energy 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 sites to reduce the amount of required energy, including lowering the set temperature of heat-insulated tanks and shortening operating times.

Decarbonization 302-4, 305-6

Striving to eliminate energy wastage at our offices. Some of the steps we are taking include turning off unnecessary lights, using person 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 183 energy-saving activities at Japanese plants and offices in 2019, resulting in approximately 7,095 tons of CO_2 reduction and 240 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. The systems installed at the Tochigi Plant and Toyohashi Plant of Kao Corporation have started generating electricity. The total power generating capacity of these systems was 4,251MWh in 2019. The generating capacity of individual facilities is shown on the right.

We are also promoting the purchasing of electric power that is generated using renewable energy. Kao Chemicals GmbH, Kao Manufacturing Germany GmbH, Kao Corporation SA's three plants in Spain, Kao Chimigraf, Molton Brown, Kao USA*, Kao Corporation's Kawasaki Plant* and Kao Sanitary Products Ehime* have all converted to purchasing only electric power that has been generated from renewable sources.

In addition, Kao Corporation's Tochigi Plant, Kashima Plant, Odawara Plant, Toyohashi Plant* and Kao Paper Manufacturing Fuji* are all purchasing electric power generated from renewable sources (with the Toyohashi Plant and Fuji Plant having commenced in 2019).

* Started purchasing renewable power in 2019.

Photovoltaic (solar) power generating facilities at Tochigi Plant.

Total generating capacity of solar power equipment (2019)

Company / Plant	Total generation (MWh)
Tochigi Plant, Kao Corporation	1,522
Toyohashi Plant, Kao Corporation	397
Kao Sanitary Products Ehime	396
Kao Transport & Logistics Atsugi Logistics Center	266
Kao Transport & Logistics Sumida Kita Logistics Center	217
Wakayama Office, Kao Corporation	65
Kao Industrial (Thailand)	807
Kao Corporation Shanghai	331
Kao Penang Group (Malaysia)	197
Kao USA	53

Use of this renewable power reduced CO_2 emissions by 95 thousand tons.

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

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

In addition, we are switching newly installed chillers to those that use low-GWP refrigerant. We installed three systems that use low-GWP refrigerant in Japan.

These systems use R-1233zd(E), an HFO refrigerant, which is readily broken down in the atmosphere. Compared with R-134a, an HFC that is the standard refrigerant for chillers and has a GWP of 1,300, R-1233zd(E) has a GWP of 1, the same as CO_2, and offers excellent performance.

Despite these activities, scope 1 and scope 2 CO_2 emissions at Kao have decreased by 8 thousand tons and 70 thousand tons, respectively, in 2019.

Adaptation

With rising summer temperatures, heat stroke prevention is essential in Japan. Especially for our outdoor workers, we have taken measures such to share the day's heat index, shorten continuous working hours, and prepare drinking water.

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

➡ p. 117 Making the world healthier & cleaner > Water conservation

Decarbonization 305-3

Efforts in distribution

Mitigation

CO_2 emissions during distribution in Japan were 101 thousand tons-CO_2 in 2019, a 30% reduction (per unit of sales, 2005 baseline). One of the main reasons for this result was the increase in the sales share of products that have a large volume relative to their weight.

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.

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. Together with AEON Global SCM Co., Ltd., a consolidated subsidiary of AEON Co., Ltd., which handles logistics, we have adopted a trailer relay transportation system in which drivers switch the trailers they are hauling at a relay point midway between the delivery and return points of the Tokyo metropolitan area and the Chubu region in 2017. This was the first such collaboration between companies of different industries in Japan.

To spread awareness of the two companies' corporate activities, specially-designed containers featuring the corporate colors of Kao and AEON have been used for this initiative.

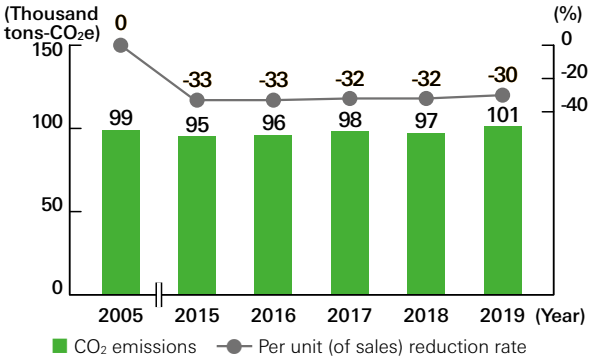
5. To enhance visualization of distribution-related energy usage and CO_2 emissions

We had been making preparations to begin calculating distribution-related energy usage and CO_2 emissions outside Japan starting from 2019. However, the calculation and reporting of distribution-related CO_2 emissions outside Japan for 2019 has been based on estimates. It is anticipated that, for 2020, it will be possible to report amount based on actual distribution data.

Adaptation

With the worsening trend toward short-term, localized torrential rain, there is an increased risk of the supply chain from Kao's factories 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 burden. 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 emission during distribution☑ (Japan)



* Boundary: Kao Corporation and Kanebo Cosmetics Inc.
* Assurance provided for CO_2 emissions.
* Per unit of sales is calculated based on Japanese standards up to fiscal 2015, and on International Financial Reporting Standards (IFRS) from fiscal 2016.

Decarbonization 305-3

Efforts during use

Mitigation

We offer a wide selection of products that reduce CO_2 emissions during the use stage.

Some of these leading products include ultra-concentrated laundry detergents that only require one rinse cycle, and shampoo, body wash and dish detergent that reduce the amount of hot water required for rinsing.

In the laundry detergent segment, in 2009 we launched *Attack Neo*, which reduced 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, sour most advanced ever detergent base, as its main ingredient. 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. Laundry detergents that require only one rinse cycle are offered in Japan and Taiwan.

Additionally, we offer shampoos and other products that prevent hair from tangling, making it easier for heated air from hair dryers to penetrate hair and shorten drying time, reducing their energy consumption.

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, and we have compiled and distributed our "Let's eco together" brochure, which communicates our initiatives to consumers.

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 temperature to reduce CO_2 emissions from fuel consumption, a water-based precision substrate cleanser that replaces fluorocarbon-based cleansers, 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 dispersion of a required material for fuel-efficient tires to demonstrate their performance.

Attack ZERO concentrated liquid clothing detergent, which has won the Ten Greatest Products Award (organized by Nikkan Kogyo Shimbun, Ltd.), and the Nikkei Marketing Journal Awards for Superiority (organized by Nikkei).

Essential Smart Blow-Dry
Prevents hair from getting tangled and reduces the time needed for drying by 20% by making the direction of dryer air more precise.

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 products that will be useful in the unfortunate event of a natural disaster occurring, with a particular focus on products that can help people to maintain good hygiene while living in an evacuation facility.

➡ Kao *sonaeru* website (Japanese)
www.kao.co.jp/hisaiji/

Decarbonization 102-12, 102-43, 305-3

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 made from petroleum degrade when packaging, diapers and other materials disposed of by consumers after use are incinerated, or when wastewater containing cleansing and other agents is treated. The other type is CO_2 emitted from using energy required to operate incinerating and recycling equipment and wastewater treatment facilities. We are working to reduce the raw materials used in packaging and diapers as well as cleansing agents to reduce these CO_2 emissions. We are also using biomass and plant-based plastics deemed to be carbon neutral in terms of the CO_2 emitted during decomposition.

Adaptation

In the future, while the human population continues to increase, it is anticipated that increasingly strict restrictions will be placed on the extraction of fossil fuels, in order to meet the goals of the Paris Agreement, and as a result resource constraints can be expected to become more and more challenging. With this in mind, we are focusing on innovation in reduction*, which reduces the amount of raw materials that we use, and on innovation in recycling, which involves recycling product packaging etc. after use.

* We define innovation in reduction as reducing the quantity of material that needs to be disposed of or recycled by reducing the quantity of raw materials utilized in production.

➡ p. 103 Making the world healthier & cleaner > Zero waste

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.
- Cool Choice 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 (JCIA). Publicly disclosing corporate carbon lifecycle analysis (c-LCA) to communicate contributions to CO_2 reductions from the use of chemical products.

Kao representatives attending the Japan Climate Action Summit 2019 (organized by the Japan Climate Initiative)

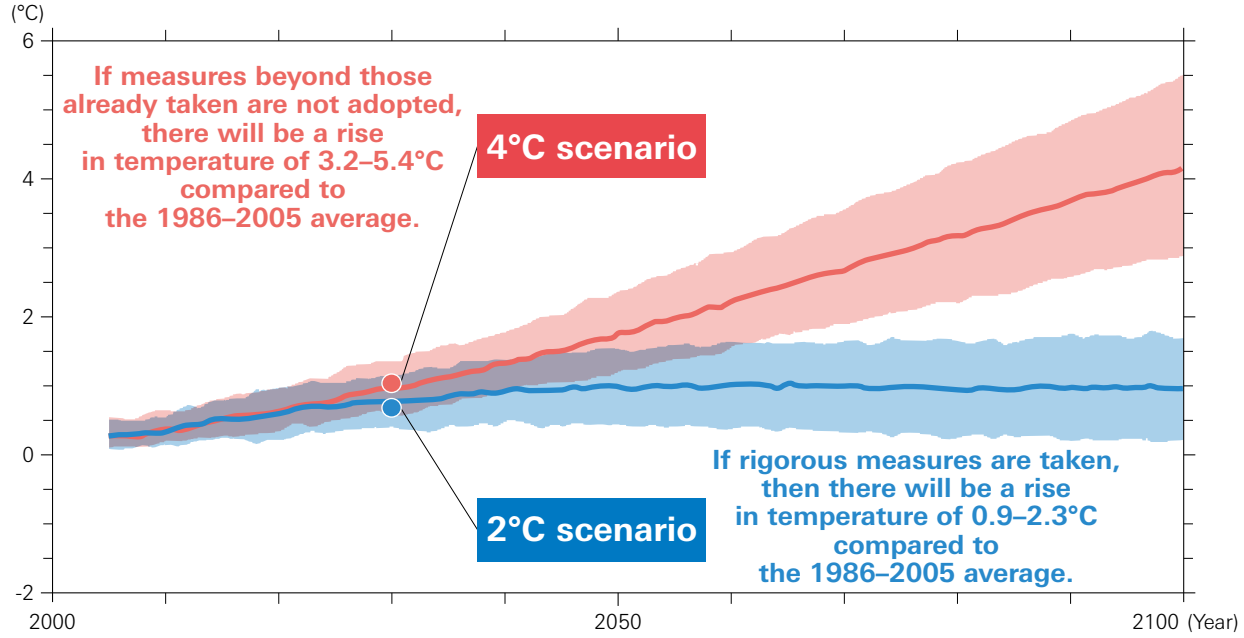
Decarbonization 102-15, 201-2

Scenario Analysis

Climate change scenario selection

The Task Force on Climate-related Financial Disclosures (TFCD) final report requires evaluation based on multiple climate-related scenarios, including a scenario that assumes an average rise in global temperature of 2°C or lower. In 2018, we undertook qualitative assessment of risks and opportunities and evaluation of business resilience based on three scenarios: the 2°C scenario, the 1.5°C scenario, and the Nationally Determined Contribution (NDC) scenario. In 2019, we took on the challenge of undertaking quantitative assessment of risks and opportunities. For the implementation of quantitative assessment, we opted to use the 2°C scenario (such as the IEA 2DS Scenario and the IPCC RCP2.6 Scenario, etc.) and the 4°C scenario (such as the IEA Current Policy Scenario and the IPCC RCP8.5 Scenario, etc.), which are have been widely used by many organizations throughout the world for impact assessment.

Source: Japan Meteorological Agency, Changes in Average Global Surface Temperature (Deviation from 1986–2005 average)



Source: IPCC Fifth Assessment Report

Analysis process

The scenario analysis that we implemented in 2018 covered the entirety of Kao's corporate activities. However, this made it difficult to examine the impact on individual businesses and individual brands. With this in mind, in 2019 we clarified the objects of analysis, adopting a "story-driven" approach to see how each climate change scenario would affect individual objects of analysis, and performed quantitative assessment of the impact that climate-related risks and opportunities would have on our ability to achieve our corporate vision for 2030, as well as considering possible countermeasures.

1. Refining the objects of analysis

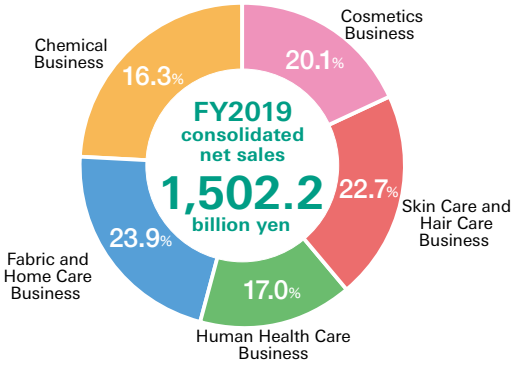
First, out of Kao's five business segments, we selected four business segments to be the objects of analysis, leaving out the Cosmetics business, which is deemed likely to be relatively unaffected by climate change. In each segment, we decided to focus on a particular product line, each of which has its own unique characteristics: body wash and body care products from the Skin Care and Hair Care business, disposable diapers and sanitary products from the Human Health Care business, laundry detergents from the Fabric and Home Care business, and oleo chemicals from the Chemical business.

These product lines include our three mega-brands. By assessing the impact that climate change would have on these product lines, we can infer by analogy what the impact of climate change would be on our other product lines.

Decarbonization 102-15, 201-2

The business segments and product lines covered in the analysis

Business	Selected product lines	Significant characteristics based on product lifecycle assessment
Skin Care and Hair Care Business	Body wash and body care products	Water consumption during product has a significant impact.
Human Health Care Business	Disposable diapers and sanitary products	The raw materials procurement process and the waste disposal and recycling process have a significant impact. Large amounts of paper pulp are used as raw materials.
Fabric and Home Care Business	Laundry detergents	The raw materials procurement process and the product use process have a significant impact.
Chemical Business	Oleo chemical products	(Palm oil is used as a raw material, and is also used in the household products business)



On the basis of the scenario analysis performed in 2018, we assessed the relative importance of the impact on sour business operations of each risk or opportunity item for the individual brands. Then, in those cases where the results of quantitative assessment showed a significant disparity between the 2°C scenario and the 4°C scenario, we implemented further quantitative analysis.

Refining the objects of analysis

		Assessment item	Impact on business	Selection results	For reference (Current state of Kao's response measures)
Transition risk	Policies, legal restrictions	Adoption and increase of carbon tax	• Taxation of greenhouse gas emissions. • Additional energy-saving capital investment.	Target	Setting of Scope 1 + 2 emissions reduction target: 22% reduction
		Adoption of restrictions on plastic usage	• Taxation of packaging made using petrochemical-derived plastics. • Cost of switching over to substitute materials.	Target	Setting of an annual adoption target for revolutionary new plastic-film containers: 300 million units
		Adoption of water intake restrictions	• Cessation of operations at production plants.	Excluded	Setting of a water usage reduction target: 45% reduction Implementation of a water risk survey of production plants
	Technology	Switching over to low-carbon products	• More rigorous requirements to implement decarbonization and adopt 100% renewable energy.	Excluded	Essential Research
		Adoption of low-carbon energy sources	• Increased plant operating costs.	Excluded	Setting of a renewable energy target: 100% (for purchased electricity)
	Markets	Rising price of energy	• Increased plant operating costs.	Target	Setting of an energy usage reduction target: 1% reduction per year
		Rising price of raw materials	• Rising procurement costs for petrochemical-derived raw materials. • Rising procurement costs for palm oil.	Target	Reducing the quantity of raw materials used, and developing technology to use previously unused biomass-materials.
		Changes in consumer behavior	• Increased demand for products that help to mitigate or are adapted to climate change	Partial target	Development and provision of low-carbon, water-saving products.
	Reputation	Customers' assessment	• Change in perceived brand value.	Excluded	Implementation of appropriate disclosure of information and of communication with stakeholders.
		Investors' assessment	• Change in investors' assessment	Excluded	Implementation of appropriate disclosure of information and of communication with stakeholders
Physical risk	Acute	Intensification of abnormal weather conditions	• Supply chain disruption due to severe weather conditions.	Partial target	Business continuity planning (BCP) formulation, testing and updating. Implementation of a water risk survey of production plants.
	Chronic	Rising average temperatures	• Growing demand for sunscreen and anti-perspirant products. • Rising air-conditioning costs and heatstroke-prevention costs.	Target	Proactive development and provision of sunscreen and anti-perspirant products, etc. Heatstroke-prevention measures for persons working outdoors.
		Demand for water outstripping supply	• Rising water use charges and raw materials prices. • Growing demand for water-saving products.	Partial target	Setting of a water usage reduction target: 45% reduction Setting of a lifecycle water usage reduction target: 10% Provision of water-saving products
		Rising sea levels	• Cessation of operations at production plants located near the coast.	Excluded	Implementation of a water risk survey of production plants located near the coast.

Decarbonization 102-15, 201-2

2. Scenario definitions

The process by which the impact of climate changes is actualized is defined below.

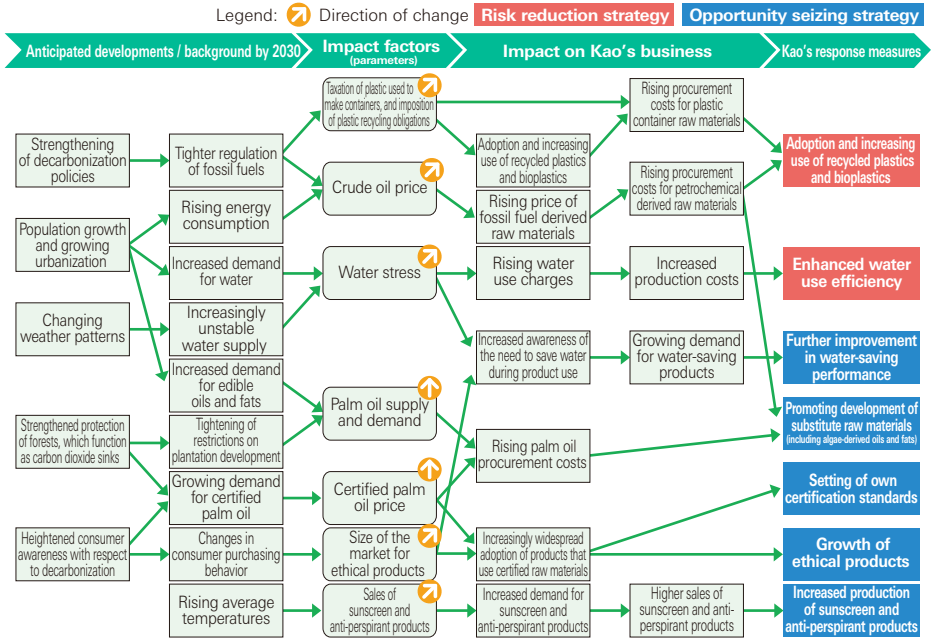
Body wash and body care products

Postulated 2°C scenario

Decarbonization policies are strengthened throughout the world, restrictions on the use of fossil fuels and raw materials are tightened, and forest conservation policies are strengthened. In addition, consumer awareness with respect to decarbonization is heightened. Against this background, demand for certified raw materials increases. At the same time, there is growing demand for energy and water, and for raw materials, accompanying the increased demand for manufactured goods resulting from population increase. Average temperature rises by 1°C above the current level.

It is anticipated that this will result in a rise in the price of crude oil, the imposition of taxation on fossil fuel derived plastics used for containers or packaging and requirements to use recycled plastic, an increased market for ethical products, higher demand for raw materials, a rise in the price of certified raw materials, increased sales of sunscreen and anti-perspirant products, etc.

From the point of view of Kao's business operations, these trends will lead to increased costs for purchasing fossil fuel derived raw materials (particularly in regard to the procurement of certified raw materials), increased use of recycled plastic, higher demand for water-saving products, and increased demand for sunscreen and anti-perspirant products. Measures that Kao will be implementing in response would include the development and widespread adoption of revolutionary new plastic-saving plastic film containers, the setting of water usage reduction targets at production plants and lifecycle water usage reduction targets, the adoption of substitute raw materials (e.g. use of algae and previously unused raw materials), etc.

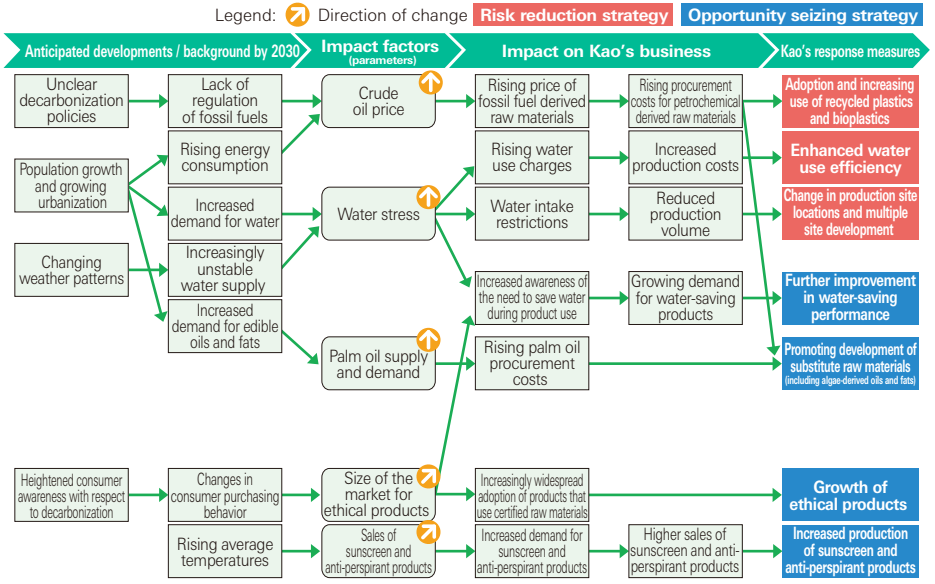


Postulated 4°C scenario

Decarbonization policies are unclear, and new restrictions are not placed on the use of fossil fuels, but consumer awareness with respect to decarbonization is heightened to some extent, and demand for certified raw materials also increases. At the same time, there is growing demand for energy and water, and for raw materials, accompanying the increased demand for manufactured goods resulting from population increase. Average temperature rises by 3°C above the current level.

It is anticipated that this will result in a rise in the price of crude oil, increased water stress, higher demand for palm oil, and increased sales of sunscreen and anti-perspirant products, etc.

From the point of view of Kao's business operations, these trends will lead to increased costs for purchasing fossil fuel derived raw materials, restrictions on water intake, higher demand for water-saving products, and increased demand for sunscreen and anti-perspirant products. Measures that Kao will be implementing in response would include the development and widespread adoption of revolutionary new plastic-saving plastic film containers, the setting of water usage reduction targets at production plants and lifecycle water usage reduction targets, the adoption of substitute raw materials (e.g. use of algae and previously unused raw materials), etc.



Decarbonization 102-15, 201-2

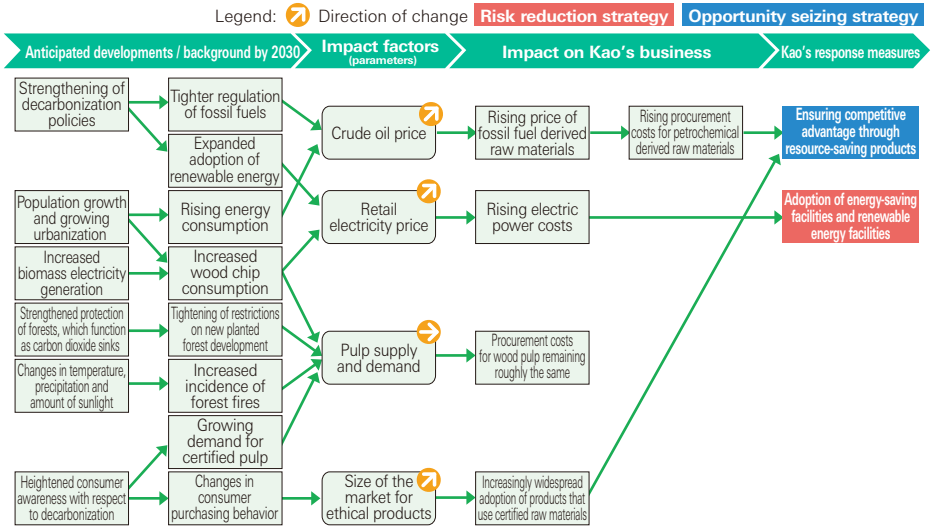
Disposable diapers and sanitary products

Postulated 2°C scenario

Decarbonization policies are strengthened throughout the world, restrictions on the use of fossil fuels and raw materials are tightened, and there is increased use of biomass to generate electric power. In addition, consumer awareness with respect to decarbonization is heightened. Against this background, demand for certified raw materials increases. At the same time, there is growing demand for energy and raw materials, accompanying the increased demand for manufactured goods resulting from population increase.

It is anticipated that this will result in a rise in the price of crude oil, higher retail electricity prices, changes in the paper pulp supply and demand situation, and an expanded market for ethical products, etc.

From the point of view of Kao's business operations, these trends will lead to increased costs for purchasing fossil fuel derived raw materials, higher electricity purchase costs, and increased production of products made using certified raw materials. Measures that Kao will be implementing in response would include the development of resource-saving diapers, and continued investment in energy-saving facilities and facilities that utilize renewable energy.

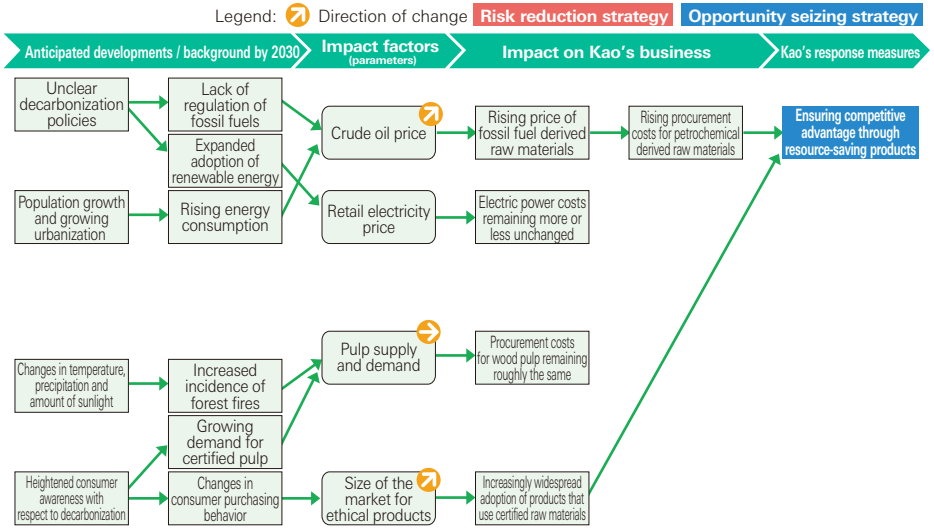


Postulated 4°C scenario

Decarbonization policies are unclear, and new restrictions are not placed on the use of fossil fuels, but consumer awareness with respect to decarbonization is heightened to some extent, and demand for certified raw materials also increases. At the same time, there is growing demand for energy and raw materials, accompanying the increased demand for manufactured goods resulting from population increase. Average temperature rises by 3°C above the current level.

It is anticipated that this will result in a rise in the price of crude oil, an expanded market for ethical products, and an increased frequency of forest fires, etc.

From the point of view of sour business operations, these trends will lead to increased costs for purchasing fossil fuel derived raw materials, and increased production of products made using certified raw materials. Measures that Kao will be implementing in response would include the continued development of resource-saving diapers.



Decarbonization 102-15, 201-2

DECARBON -ISATION

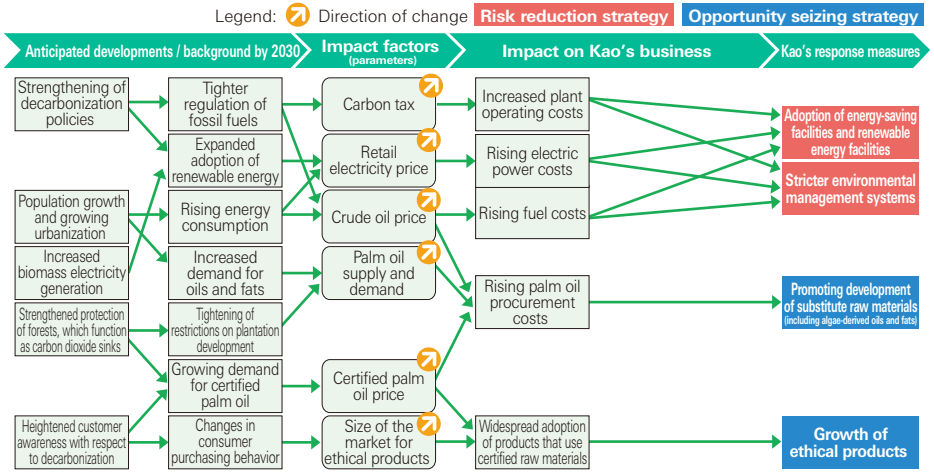
Oleo chemical products (Chemical Business)

Postulated 2°C scenario

Decarbonization policies are strengthened throughout the world, restrictions on the use of fossil fuels are tightened, forest conservation policies are strengthened, and there is increased use of biomass to generate electric power. In addition, consumer awareness with respect to decarbonization is heightened. Against this background, demand for certified raw materials increases. At the same time, there is growing demand for energy and raw materials, accompanying the increased demand for manufactured goods resulting from population increase.

It is anticipated that this will result in higher carbon taxes, higher retail electricity prices, an increase in the price of certified palm oil, and an expanded market for ethical products, etc.

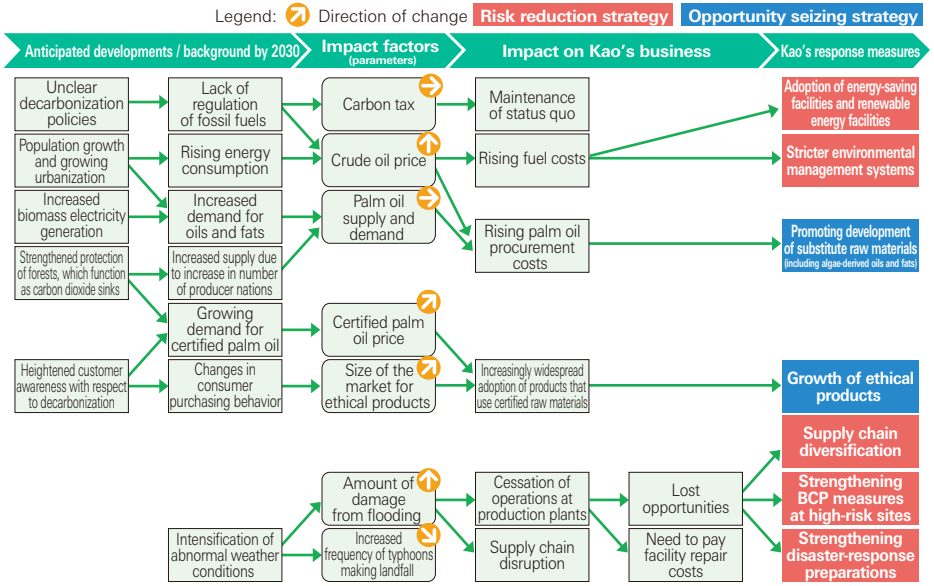
From the point of view of sour business operations, these trends will lead to increased operating costs (including carbon taxes, electric power costs, fuel costs and palm oil purchasing costs), and increased production of products made using certified raw materials. Measures that Kao will be implementing in response would include the setting of energy-saving targets, greenhouse gas emissions targets and renewable energy adoption targets, the adoption of substitute raw materials (e.g. use of algae and previously unused raw materials), etc.



Postulated 4°C scenario

Decarbonization policies are unclear, and new restrictions are not placed on the use of fossil fuels, but consumer awareness with respect to decarbonization is heightened to some extent, and demand for certified raw materials also increases. At the same time, there is growing demand for energy and for palm oil, accompanying the increased demand for manufactured goods resulting from population increase. However, restrictions relating to forest conservation will be limited, and an increase in the number of countries engaged in palm oil production will lead to increased supply of palm oil. There will be an intensification of abnormal weather conditions. It is anticipated that this will result in a rise in the price of crude oil, an expanded market for ethical products, and an increased level of damage from typhoons and flooding, etc.

From the point of view of Kao's business operations, these trends will lead to increased fuel costs, higher palm oil purchasing costs, cessations of factory operation and disrupted supply chains. Measures that Kao will be implementing in response on a continuing basis would include the adoption of energy-saving facilities and facilities that utilize renewable energy, more rigorous environmental management systems, development of substitute raw materials, strengthening of business continuity planning (BCP) measures in relation to the supply chain, etc.



Decarbonization 102-15, 201-2

3. Estimation of business impacts in 2030

We assessed the impact on "What Kao Aims to Be by 2030" separately for each of the four product lines. More specifically, we assumed that by 2030 Kao would have annual sales of 2.5 trillion yen (representing 167% growth compared to 2018), and the baseline profit / loss for 2030 was calculated on the assumption that profit / loss would grow in proportion to the increase in sales from the profit / loss level in 2018. We estimated the business impacts on this baseline profit / loss. In order to compare the impact of the factors affecting our business across the different scenarios, we performed the assessment only on factors whose differing impact between the 2°C scenario and the 4°C scenario could be quantified. For this reason, there were some factors for which the assessment was not performed, even if the potential impact of that factor could be quite substantial. There were also factors where, although the potential impact by 2050 was significant, the potential impact in 2030 was limited.

		Assessment item	Assessed financial impact	Assessment results for 2030 (+: a positive impact, -: a negative impact, ND: no significant impact, the number of symbols: the size of the impact)				Kao's response measures
				2°C scenario		4°C scenario		
Transition risk	Policies, legal restrictions	Adoption of and increase in carbon tax	Increase in operating costs due to adoption of and increase in carbon tax	Increase in operating costs due to adoption of new taxes and increase in tax rates	– –	No adoption of carbon tax or increase in tax rates	ND	Setting of Scope 1 + 2 emissions reduction target, and ongoing emission reduction activities
		Adoption of restrictions on plastic usage	Taxation of packaging made using petrochemical-derived plastics	Increase in procurement costs due to adoption of new taxes	–	No adoption of new taxes	ND	Publicization of the innovation in reduction implementation strategy Setting of an annual adoption target for revolutionary new plastic-film packages, and ongoing plastic use reduction activities
			Increased costs due to requirement to use recycled plastic	Increased procurement costs due to the rising price of recycled plastic resulting from the introduction of requirements to use recycled plastic	–	No new requirements to use recycled plastic	ND	Publicization of the innovation for recycling implementation strategy Increasing use of packages made using recycled plastic
	Markets	Rising price of energy	Fluctuations in the retail electricity price	Increased costs due to the rising retail electricity price	–	Reduced costs due to the falling retail electricity price	+	Setting of energy consumption reduction targets, and proactive installation of solar panels for the company's own use
		Rising price of raw materials	Rising procurement costs for fossil fuel derived raw materials	Rising procurement costs for fossil fuel derived raw materials	– –	Increased costs due to the rising price of crude oil	– – –	Ongoing activities to reduce the quantity of fossil fuel derived raw materials included in products that use fossil fuel derived raw materials
			Rising procurement costs for palm oil	Increased procurement costs due to supply shortages resulting from tighter restrictions on forest development	–	No change in procurement costs due to increased supply resulting from the development of new palm oil plantations	ND	Promoting development of and commencing utilization of substitute raw materials (including algae-derived oils and fats, and previously unused biomass materials)
			Rising procurement costs for paper pulp	No change in procurement costs because supply remains adequate to meet demand despite the increase in forest fires	ND	No change in procurement costs because supply remains adequate to meet demand despite the increase in forest fires	ND	—
		Changes in consumer behavior	Increased sales of ethical products	Increased demand for ethical products among the generation who will account for the largest share of overall consumption in 2030 leads to sales growth.	+ +	Increased demand for ethical products among the generation who will account for the largest share of overall consumption in 2030 leads to sales growth.	+ +	Ms. Rika Sueyoshi, Director General of the Ethical Association, has been invited to join our External ESG Advisory Board, and we are also engaged in the development and provision of ethical products.
Physical risk	Acute	Intensification of abnormal weather conditions	Increased damage from flooding	While flood risk is increasing, it is difficult to accurately forecast the amount of damage that will be suffered	–	While flood risk is increasing, it is difficult to accurately forecast the amount of damage that will be suffered	–	BCP adjustment Implementing water risk surveys with respect to suppliers
	Chronic	Rising average temperatures	Higher sales of sunscreen and anti-perspirant products	Increased sales in Japan between March and November each year	+	Increased sales in Japan year-round	+	Production planning adjustment
		Demand for water outstripping supply	Increase in operating costs due to increased water charges	Increased operating costs at factories operating in drought-affected areas	–	Increased operating costs at factories operating in drought-affected areas	–	Setting of water use reduction targets, and ongoing water use reduction activities

4. Strategy for the future

On the basis of the results obtained in this quantitative assessment of the impact on "What Kao Aims to Be by 2030," we were able to determine the existence of the following limits.

1) Regarding the increase in sales of ethical products, which will have the biggest positive impact, we did not identify any information indicating a disparity between the two scenarios.

2) It was not possible to quantify the damage that our business operations will suffer from localized torrential rain and typhoons, risks which have already been actualized in Japan.

3) There was a lack of information indicating the possibility of a disparity between the two scenarios in terms of the impact on the production of palm oil, which constitutes an important raw material for us.

In the future, we will be implementing follow-up surveys on these items. If quantitative assessment is not practicable, then we will strive to enhance the precision of qualitative assessment.

Regarding the state of our response to financial impact assessment items, we were able to confirm that, at the present time, the response is broadly satisfactory.