Environment

Environmental Management

Policy and Basic Approach

The Nippon Kayaku Group's environmental initiatives are aimed at contributing to global environmental conservation, and thus play a role in tackling the Key Sustainability Issues in the **KAYAKU Vision 2025**. They are also promoted in pursuit of targets published in our Responsible Care Policy, which are viewed as priority issues. Taken together, these initiatives constitute a companywide contribution to global environmental conservation. This involves observing both domestic and international laws and regulations related to the environment as well as any agreements we have signed, and, while picturing the environmental risks stemming from our business activities, showing consideration towards reducing environmental burdens, preventing pollution, saving energy and resources, the effects of climate change, and reducing waste.

- Our Declaration on the Environment, Health, Safety and Quality
- Nippon Kayaku Group Responsible Care Policy

System

- Responsible Care Promotion System

Environmental Management System Certification Status

Our current efforts to retain our certification status for ISO14001, the internationally recognized environmental management standard, see us consider the environment during the development and manufacture of products and the provision of services. Having first gained ISO14001 Certification for Environmental Management Systems in 1998, we have now achieved certification for all seven of our domestic plants and seven overseas Group companies. We will continue, going forward, to explore new ISO14001 certification options for Group companies, including for those based overseas.

- ISO14001 Certification

Indicators

Key sustainability issues	Corresponding SDGs	Action plans	Indicators (KPI)	FY2025 Targets	Results FY2022	Results FY2023	FY2023 Initiative-related Topics
Reducing Energy Consumption and Greenhouse Gas Emissions Reduction of Wastewater and Industrial Waste Improving Efficiency of Water Resource Use		• To achieve our FY2030 Environmental Targets by promoting energy-saving and global-warming response initiatives. • To extract issues and clarify our strategies in order to achieve carbon neutrality by FY2050.	Greenhouse gas emissions (Scope 1+2)	(Target achieved in FY2030) Under 70,598 tons (a reduction of over 46% on FY2019) (Target achieved in FY2023) Under 115,715 tons	108,301 tons	102,704 t-CO_2	• Promotion of MFCA and Solar Power Generation PPA Models sequentially introduced. • c. 24% reduction in industrial waste produced compared with FY2022. • Our development status situation for environmentally-conscious products and technologies is as reported below. [Safety Systems Business] Development of a lighter cylinder-type inflator and green propellant MGG. [Polatechno Business] Reductions in waste treatment energy and total waste produced stemming from improvements to production process and product design. [Functional Materials Business] Pilot experiments performed on aircraft-oriented CFRP/GFRP thermosetting resin prototypes with development potential. Development of a high-temperature resistant, high-reliability thermosetting resin from biomass materials. [Color Materials Business] Development of industrial inkjets (for coated paper and soft packaging). Expanded sales of non-phenol developer for thermal paper. Market debut and expanded sales for PLA (biodegradable) dye for fiber processing. [Catalysts Business] Promoting joint-research of catalysts used to manufacture hydrogen. Materials informatics techniques used to develop catalysts which can contribute to lowering amounts of raw materials used and improved yields from target objects. Development of catalysts to help manufacture basic chemicals such as propylene from biomass materials. [Pharmaceuticals Business] Environmentally-conscious wrapping initiatives started.
			VOC emissions	(Non-consolidated) Disclose results	(Non-consolidated) 38.7 tons	(Non-consolidated) 32.9 tons	
			COD emissions	(Non-consolidated) Disclose results	(Non-consolidated) 171.8 tons	(Non-consolidated) 210.9 tons	
			Total waste output	(Non-consolidated) Disclose results	(Non-consolidated) 27,621 tons	(Non-consolidated) 20,974 tons	
			Recycling rate	(Non-consolidated) 80% or higher	(Non-consolidated) 85.0%	(Non-consolidated) 83.8%	
			Zero emission rate	(Non-consolidated) 1% or less	(Non-consolidated) 0.8%	(Non-consolidated) 0.7%	
			Goal setting in line with SBT and consideration and implementation of specific measures	Disclose progress	Gained an A- rating on CDP (Climate Change) Scope 3 Calculations: Implementing improvements to accuracy	Medium-term Environmental Targets revised to 1.5°C scenario	
			Disclosure in line with TCFD recommendations	Disclose progress	Information disclosed	Information disclosed	
			Develop products and technologies with consideration for environmental issues	Disclose progress	Published in Topics	Published in Topics	

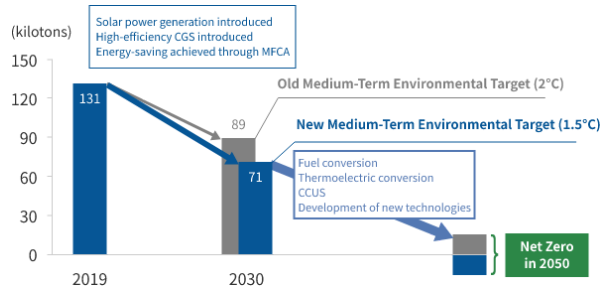
Medium-term Environmental Targets and Results

FY2021 saw the Nippon Kayaku Group kick-start its environmental conservation activities afresh with the fixing of its new Medium-term Environmental Targets.

Our original 2°C warming scenario Medium-term Environmental Targets saw us start out by widening compulsory participation to Group companies (consolidated) as we sought to shave at least 32.5% off FY2019 Scope 1 and 2 greenhouse gas emissions by FY2030 in the area of Holding Down Global Warming. However, with global environmental problems intensifying and moves towards carbon neutrality gaining momentum in recent years, we subsequently revised our standards to fit a 1.5°C warming scenario, committing us to a 46% reduction in FY2019 Scope 1 and 2 emissions by 2030 and an aim of carbon neutrality by FY2050. In relation to these matters, we decided to approve the proposals of the Task Force on Climate-related Disclosures (TCFD) in March 2022, and will continue to follow these proposals as we proactively disclose information on not only greenhouse gas emission status, but climate change risks and opportunities and initiatives related to the building of a Sound Material-Cycle Society.

In the area of Reducing Chemical Substance Emissions, we are yet to fix targets for emissions of Volatile Organic Compounds (VOC) and Chemical Oxygen Demand (COD), and have merely published the current data. VOC emissions are down on the previous financial year, but COD emissions are increasing due to transitions in items produced.

In the area of Reducing Waste, also, we are yet to fix target amounts for industrial waste produced and are merely reporting current figures. We are, however, working towards a fixed recycling rate target of at least 80% (excluding container re-use) and a zero-emission-rate target of less than 1%. As a result of continued waste sorting and reduction practices carried out at each of our plants and business sites, FY2023 saw an even lower volume of waste produced than FY2022. Furthermore, in terms of recycling and zero-emission rates, the continued promotion of moves towards recycling at each business site and sustained commitment to initiatives aimed at reducing environmental burdens have seen us not only meet, but also exceed, our original targets.

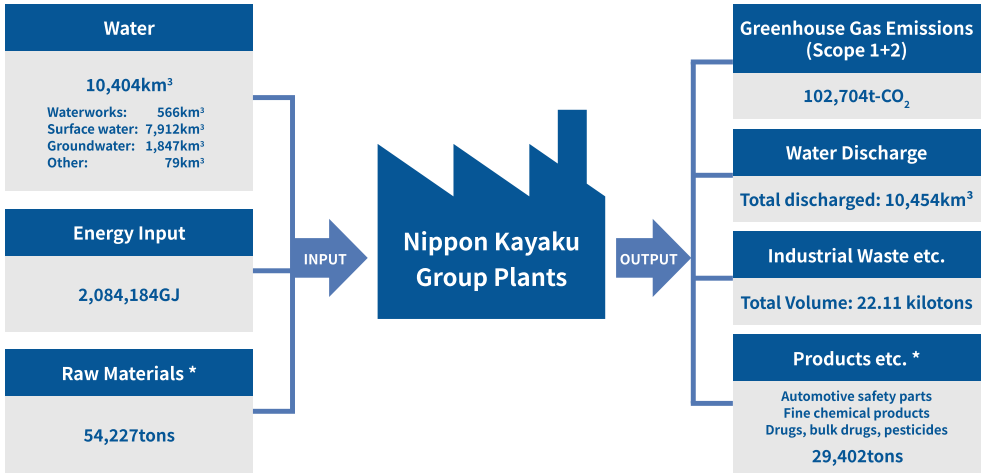


◆ Trends in Medium-term Environmental Target Results

Area	Covering	Items	Target Figures	2020*1	2021	2022	2023
Climate change prevention*2	Consolidated	Greenhouse gases, Scope 1+2*3 emissions	FY 2030 Targets No more than 70.6 kilotons (Over 46% down on FY2019) (Reference: FY2023 standards) No more than 115.7 kilotons	118.2 kilotons (10.0% reduction)	112.5 kilotons (14.2% reduction)	108.3 kilotons (17.5% reduction)	102.7 kilotons (21.7% reduction)
Reductions in amounts of chemical compounds produced	Non-Consolidated	VOC*4 (Quantities of Volatile Organic Compounds produced)	(Results Report)	33.3 tons	52.1 tons	38.7 tons	32.9 tons
		COD*5 emissions	(Results Report)	122.6 tons	124.2 tons	171.8 tons	210.9 tons
Industrial waste reduction	Non-Consolidated	Waste quantities	(Results Report)	25,153 tons	28,424 tons	27,621 tons	20,974 tons
		Recycling rates (excluding container reuse)	No less than 80%	81.6%	82.3%	85.0%	83.8%
		Rate of zero emissions*6	No more than 1%	1.6%	1.0%	0.8%	0.7%

*1 Including our Joetsu Plant. Until FY2020, under our old Medium-term Environmental Targets, the Joetsu Plant was left out of Scope emissions.
*2 Medium-term Environmental Target for FY2030: A reduction of at least 46% on FY2019 levels (from 131.2 kilotons to no more than 70.6 kilotons)
*3 Scope 1: Greenhouse gas emissions directly produced by our company itself (through fuel combustion, manufacturing process emissions, etc.)
Scope 2: Emissions our company indirectly produces through the use of electricity, heat and steam supplied by other companies
*4 The total of VOCs (Volatile Organic Compounds) includes not only those that must be reported under government ordinances (the PRTR Law) but also those specified by the Japan Chemical Industry Association.
*5 COD (Chemical Oxygen Demand): A leading water quality index based on chemical oxygen demand and the amounts of oxygen necessary for oxidizing materials in water.
*6 Rates of zero emissions: Defined as the ratio of internal to external Nippon Kayaku waste disposed of at landfill sites.

Material Flow of Business Activities (FY2023)



Items listed below without additional notes represent combined domestic and overseas values.

* Nippon Kayaku alone

Amounts of Raw Materials Used

Indicators	Covering	Unit	2020	2021	2022	2023
Principal raw materials	non-consolidated	tons	36,614	47,583	44,211	40,707
Auxiliary materials	non-consolidated	tons	16,581	18,529	17,026	12,512
Plastic packaging materials	non-consolidated	tons	194	266	389	180
Cardboard packaging materials	non-consolidated	tons	415	529	480	395
Other packaging materials	non-consolidated	tons	461	489	470	434
Total	**non-consolidated**	**tons**	**54,266**	**67,396**	**62,576**	**54,227**

* Products not included (goods stocked at plants)

Energy Input Amounts

Indicators	Covering	Unit	2019	2020	2021	2022	2023
Amount of energy input (heat quantity equivalent)	consolidated	GJ	-	-	-	-	2,084,184
Renewable energy	consolidated	GJ	-	-	-	-	29,060
Non-renewable energy sources	consolidated	GJ	-	-	-	-	2,055,124

* When converting electricity amounts into heat amounts for fuel, heat and electricity consumed in domestic and overseas business activities, electricity purchased from electricity companies is converted at 1MWh to 8.64GJ, while renewable energy such as solar power is converted at 1MWh to 3.6GJ.

Initiatives

Use of LCAs (Life-Cycle Assessments)

We are also working to maintain and improve the environment, health and safety at every step of the product life cycle, from the research and development stage right the way through production, distribution, sale, recycling and disposal. We are trialing the design of a process which allows us to visualize the value of every Group product or service by assessing and analyzing environmental impacts and potential environmental contributions at every stage of the life cycle. Part of these activities involves promoting calculation of the carbon footprint (CFP) of every Nippon Kayaku product, which allows us to not only grasp its environmental impact but improve the accuracy of our LCA calculations for customer products. We are presently proceeding with such calculations for certain product lines, and are looking at how to systematize this process to enable emissions calculations to be made for every company product.

Disclosure of Figures for Legal Violations

We are currently working on preventing violations of environmental regulations and accidents, and are preparing a rapid response system to deal with such incidents. Across the Nippon Kayaku Group in FY2023, there were no accidents, legal violations or regulatory violations which impacted upon the environment, nor any accidents related to water quality or volume, or violations of any related rules. Furthermore, no punishments or fines were issued.

Indicators	Covering	Unit	2019	2020	2021	2022	2023
Number of violations of environmental laws and regulations	consolidated	cases	0	0	0	0	0
Number of environmental accidents	consolidated	cases	0	0	0	0	0
Violations of laws and regulations; fines issued for enrivonmental accidents; punishment costs	consolidated	yen	0	0	0	0	0

(Key Sustainability Issues) Reducing Energy Consumption and Greenhouse Gas Emissions

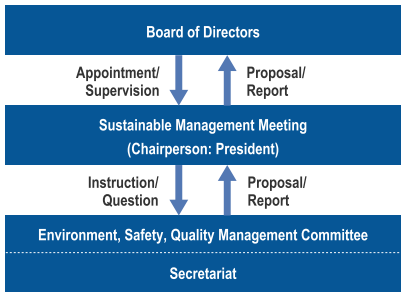
Policy and Basic Approach

Recent years have seen abnormal weather patterns across the globe, damage to the natural environment, and a sense of crisis towards climate change. Against this backdrop did the Conference of the Parties to the United Nations Framework Convention on Climate Change (COP27) lead to accelerated efforts to decarbonize, while the Japanese government declared a green growth strategy based on the Paris Agreement to make the country carbon neutral by 2050. Endorsing this strategy, the Nippon Kayaku Group, in 2020, revised its FY2030 Medium-Term Environmental Targets from pursuing a 2°C warming scenario to a 1.5°C warming scenario. Looking further into the future, our Group has set as its ultimate goal the achievement of carbon neutrality by FY2050.
Our climate change responses have included energy-saving measures and production process optimization, the introduction of low-emission power sources such as solar panels, and the switchover to low-emission-factor renewable sources of electricity. Consequently, we will not only be able to devise ways of greatly reducing greenhouse gas emissions but deliver products geared towards a decarbonized society. We will also, through supplier engagement, aim for decarbonization across the entire value chain.

Information Disclosure based on TCFD Proposals

Governance

The Sustainable Management Meeting, chaired by our President, is tasked with discussing Nippon Kayaku Group business plans which incorporate future climate change responses, and summarizing and evaluating the status of environmental activities. Discussion, summary and evaluation results are reported to the Board of Directors, which assumes the supervisory and directorial role in this system.
We have also organized an Environment, Safety and Quality Management Committee to serve as an advisory body to the Sustainable Management Meeting. Its remit is to take a crosscutting organizational approach towards coordinating the advancement of our climate change measures and to hold yet deeper discussions on climate change issues.



Strategies

We are expanding multiple business operations on a global scale, with each business area bringing its own risks and opportunities. To identify the risks to business presented by climate change, we have, in line with TCFD proposals, assessed risks across the entire Group and examined opportunities in each business area. The time periods in which risks will manifest themselves are categorized as below.

	Period	Reason for adoption
Short-term	The 4-year period spanning FY2022 to FY2025	The same period as that covered by our **KAYAKU Vision 2025** (**KV25**) Medium-term Business Plan
Medium-term	Up to FY2030	To align with FY2030 Targets fixed in the Nippon Kayaku Group's Medium-term Environmental Targets
Long-term	Up to FY2050	To align with Japan's NDC (Nationally Determined Contribution) Target Year

◆ Climate-related Risks

Our 2°C and 4°C warming scenarios for climate-related business risks are based on the IPCC's Representative Concentration Pathways (RCP Scenarios 2.6 and 8.5), as well as the IEA's Sustainable Development Scenario (SDS) and Stated Policies Scenario (STEPS).

◆ The risks of switching to a decarbonized economy in a 2°C target scenario

Category	Principal risks	Risks appearing	Financial impact	Principal measures adopted
Policies and legal regulations	Rise in operating costs due to tougher emissions regulations	Short to long-term	Moderate	• Introduction of decentralized power sources at each business site, such as solar power generation and high-efficiency co-generation • Thorough energy-saving activities and material loss reduction through use of MFCA
	Price hikes for electricity and LNG	Short to long-term	Moderate	
	Rises in raw material prices due to tougher emissions regulations	Short to long-term	Moderate	• Engaging with suppliers to promote reductions in their emissions
Market and rumored developments	Increased costs due to environmental information disclosure requirements and LCA calculations etc.	Medium to long-term	Small	• Rationalizing calculation methods and introducing LCA calculations for industrial waste produced by each business site

Physical impact risks of a 4°C target scenario

Category	Principal risks	Risks appearing	Financial impact	Principal measures adopted
Acute and chronic physical risks	Cost increases from flood damage associated with typhoons, heavy rainfall and high tides	Short to long-term	Moderate	• Factoring in flood risks when establishing new factories, considering site conditions, facility structure and layout
	Water-shortage impacts on business operations	Medium to long-term	Small	• Strengthening water-saving measures in the production process, and exploring ways to reuse and recycle water
	Reduced productivity due to rising temperatures	Medium to long-term	Small	• Working condition improvements such as stronger air conditioning; promoting automazation of high-temperature processes

Opportunities for each business field if moving towards a decarbonized economy in a 2°C target scenario

Business field	Business environment		Opportunity	Opportunities appearing	Financial impact*
Safety Systems	Tougher regulations for greenhouse gas emissions in every country and region	• Increased demand for yet further energy-saving properties in electrical goods • Sales of automotives with internal-combustion engines to be heavily restricted depending on the region	• Advancements in moves towards smaller and lighter automotive safety components with more diversified shapes, in response to more electric vehicles and automobile transformations • Expansion of safety components for unmanned aerial vehicles such as drones	Short to long-term	Large
Polatechno			• Expanded use of safety display device components, such as sensors and HUDs, in response to more electric vehicles and automobile transformations • Expanded use of polarizing plates which help reduce power consumption of display devices	Short to long-term	Moderate
Functional Materials		• Advancement of social changes such as moves to towards smart cities • Increased demand for yet further energy-saving properties in electrical goods • Increased demand for storage batteries that can handle large output variations geared towards the ever-expanding field of renewable energy • Expanded global demand for relatively low-emission movement and delivery processes	• Expansion of semiconductor-related goods amid moves towards smart cities and digital transformation • Expanded use of functional materials which help reduce power consumption of display devices • Expanded use of low-emission materials and advancement of the switchover to biomass materials • Expanded use of resin materials to help achieve lighter mobility bodies for vehicles	Short to long-term	Large
Color Materials			• Expanded use of ink for digital-on-demand printing which renders low-carbon printing possible • Expanded use of dyes for dimming glass and film used to control incoming light-rays	Short to long-term	Large
Catalysts			• Expanded use of catalysts in the production of green energies such as hydrogen • Expanded use of catalysts for the promotion of biomass materials	Medium to long-term	Large
Pharmaceuticals		• Limited direct impacts	• Opportunities currently being explored within all our business activities	Short to long-term	Small
Agrochemicals			• Expanded use of biostimulants to maintain and improve agricultural productivity amid the rising temperatures expected even if the 2°C target is met. • Application of existing pesticides to newly problematic pests	Medium to long-term	Small

* Financial impact: Large (2 billion yen or more), Moderate (0.5 to 2 billion yen), Small (0 to 0.5 billion yen)

Risk Management

We have specified Reducing Energy Consumption and Greenhouse Gas Emissions as a Climate-related Key Sustainability Issue. (For more on the methods behind specifying such issues, please click here).
Our M-CFT Climate Change Response Team has come to play a core role under our governance system comprised of the Board of Directors, the Sustainable Management Meeting, and the Environment, Safety and Quality Management Committee. Established together with the launch of **KV25**, this team both specifies and assesses climate change risks, and implements specific plans to proactively promote energy-saving and green investments.

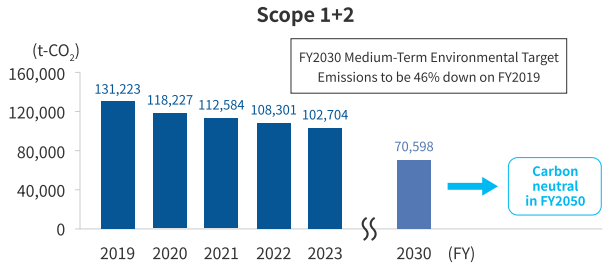
Metrics and Targets

As our original climate change risk indicator, we selected the target of shaving at least 32.5% off FY2019 Scope 1+2 greenhouse gas emission levels by FY2030. However, the April 2024 revision of our Medium-Term Environmental Objectives to a 1.5°C warming scenario saw us raise that FY2030 target to a 46% reduction on FY2019 levels. Achieving that goal requires aiming for a 4.2% reduction in emissions each year from FY2025 onwards. Reaching Scope 1+2 carbon neutrality by FY2050, meanwhile, involves conducting preliminary investigations on switching to green energy sources such as hydrogen and ammonia.
Moreover, in order to set future targets which also include Scope 3, we have implemented improvements to our Scope 3 calculation and aggregation method with a view to calculating the emissions (carbon footprint) of each individual product. Our aggregate calculations for Scope 1+2+3 from FY2022 onwards are currently undergoing third-party verification. We will therefore make concerted efforts to link up with suppliers and reduce the environmental burden across the entire supply chain to ensure Scope 3 reductions are delivered.

◆ Reducing Greenhouse Gas Emissions

The Paris Agreement adopted by COP21 in 2015 called for average global temperatures to rise no more than 2°C above pre-industrial levels, for efforts to be made to hold those rises down to 1.5°C, and for every country to pledge to reduce CO_2 emissions at national level. In line with this Agreement did the Nippon Kayaku Group initially gear its Medium-Term Environmental Objectives towards the 2°C scenario, then revise them in April 2024 towards the 1.5°C scenario. This has caused the entire Group to work on reducing greenhouse gas emissions in order to reach a target of “at least a 46% reduction on FY2019 levels of Scope 1+2 emissions by FY2030.” We are thus implementing energy-saving measures and optimizing our production processes, as well as working towards introducing low-emission power sources, such as solar panels, and switching over to low-emission-factor electricity from renewable energy sources. The trends in our Scope 1+2 indicators for Medium-Term Environmental Targets can be seen below, with year-on-year reductions evident.

Scope 1: Direct greenhouse gas emissions from sources either owned or managed by our own company (e.g. fuel use, production process emissions etc.)
Scope 2: Our company’s indirect emissions stemming from electricity, heat and steam supplied by other companies (the electricity we purchase, etc.)



◆ Disclosure of Scope 3 Data related to Total Supply Chain CO_2 Emissions

Recent years have seen marked movements towards grasping, managing and externally disclosing CO_2 emissions indirectly produced by companies across their entire supply chain. Nippon Kayaku has responded by adding Scope 3 supply chain CO_2-emission calculations to its previous aggregations and management of Scope 1 and Scope 2 data.

We began in FY2017 with Scope 3 calculations for Nippon Kayaku in non-consolidated form, but commenced factoring in domestic and overseas group companies from FY2019 onwards. In future do we plan to continue aggregating and managing Scope 3 data based on the Ministry of the Environment’s Basic Guidelines for the Calculation of Greenhouse Gas Emissions throughout the Supply Chain, and systematically advance initiatives to reduce total supply chain CO_2 emissions.

Scope 3: Indirectly-produced emissions not covered by Scope 2 (through raw material procurement, employee commutes, business trips, waste processing subcontractors, product use and disposal etc.)

Category		Emissions (thousand ton-CO_2/year)				
		2019	2020	2021	2022	2023
1	Purchased products and services	243.6	237.3	294.5	275	241.8
2	Capital goods	42.7	42.9	26.8	29.6	33.4
3	Fuel- and energy-related activities not included in Scope 1 or 2	22.4	21.2	22.3	21	20.5
4	Transportation and distribution (upstream)	19.0	17.6	22.3	19.7	16.6
5	Waste generated in operations	26.5	28.8	31.8	16.2	10.8
6	Business travel	0.8	0.8	0.8	0.8	0.8
7	Employee commuting	2.5	2.4	2.4	2.4	2.4
8	Leased assets (upstream)	Included in Scope 1 or Scope 2				
9	Transportation and distribution (downstream)	1.0	1.0	1.6	1.5	1.2
10/11	Processing/usage of sold products	-	-	-	-	-
12	End-of-life treatment of sold products	15.4	23.2	26.4	23	17.6
13	Leased assets (downstream)	0.4	0.4	0.4	0.4	0.4
14/15	Franchise/investments	-	-	-	-	-
Total of Scope 3		**374.3**	**375.6**	**429.3**	**389.6**	**345.5**
Scope 1		36.2	35.3	37.5	35.5	30.2
Scope 2		94.7	82.5	74.7	72.6	72.5
Total of Scope 1+2+3		**505.2**	**493.4**	**541.5**	**497.7**	**448.7**

Calculation method: As a rule, the amount of CO_2 emitted is calculated based on the General Guidelines on Supply Chain GHG Emission Accounting issued by the Ministry of the Environment and the Ministry of Economy, Trade and Industry, and the emission coefficient listed by the IDEA Research Laboratory at the National Institute of Advanced Industrial Science and Technology’s Research Institute of Science for Safety and Sustainability.

› Environmental Management
› Environment-related Data

◆ Flood Risks

Although flood risks have been highlighted as one of the physical risks of climate change, our calculations for the related financial impact assessments were in qualitative form only. Hence, in order to provide quantitative data for FY2023, we made use of Climate Vision, a highly accurate flood simulation system provided by Gaia Vision Inc. This allowed us to grasp damage scenarios from once-in-100-year and once-in-1000-year floods, and conclude, that of all our domestic and overseas manufacturing sites, five are at risk of flooding. We have calculated the flood risks for each based on methods advocated by the Ministry of Land, Infrastructure, Transport and Tourism, and concluded that in the instance of once-in-100-year floods under a 4°C warming scenario, the manufacturing base with the largest financial risks would suffer damage equating to 13 billion yen. Based on these financial risk assessments, we shall move forward by pursuing further improvements to assessment accuracy and exploring ways of strengthening specific flood prevention measures.

Initiatives

In its drive to shave 46% off FY2019 levels of Scope 1+2 greenhouse gas emissions by FY2030 and achieve carbon neutrality by 2050, the Nippon Kayaku Group is promoting energy-saving and resource-conservation measures at each of its production sites. By way of further initiatives towards meeting these targets, we have introduced Material Flow Cost Accounting (hereafter: MFCA) and solar power generation.

Material Flow Cost Accounting (MFCA)

MFCA is a method which allows firms to devise ways of continually lowering the environmental burden of their production activities by extracting and clarifying energy loss and material loss within the manufacturing process. Nippon Kayaku is also advancing the introduction of MFCA with a view to reducing environmental burdens and manufacturing costs through lowering amounts of waste produced and CO_2 emissions. Our Fukuyama Plant, which serves as our manufacturing base for consumer inkjet printer dyes, introduced MFCA in the latter half of 2018. Based on MFCA results, and having verified the benefits in lab studies and on actual machines, the plant confirmed the benefits of recovering solvents from waste solvents via distillation, and switched to a flow whereby recovered solvent could be reused in future production. The result saw reductions in both externally incinerated waste and amounts of solvent purchased, not only lowering the environmental burden but yielding significant cost benefits as well. We have since expanded MFCA to our Tokyo and Asa Plants (2019), our Kashima Plant (2020), and our Joetsu Plant (2021), and completed our roll-out to all manufacturing bases by FY2023. We will continue to lower environmental burdens and manufacturing costs through use of MFCA processes, and aim to roll out MFCA across the entire Group.

Distillation Recovery Facility

Solar Power Generation

As part of our switchover to low-emission power sources and low-emission-factor renewable energy sources, Nippon Kayaku has introduced solar panels with a view to significantly lowering greenhouse gas emissions.
March 2023 saw the advent of a Solar Power Purchasing Agreement (PPA) Model onsite service at our Fukuyama Plant. The PPA model involves Nippon Kayaku loaning land or roof space to third parties for the installation of solar panels, then purchasing the energy produced over the long term. It is hoped this allows us to not only utilize renewable energy sources but save on electricity costs too. The Fukuyama Plant alone seeks to cut greenhouse gas emissions by 731t-CO_2 through use of the solar energy generated onsite. We are now looking to roll this model out to other manufacturing bases, as well as install solar panels that are in our own possession.

Amounts Contributed to Greenhouse Gas Emission Reductions

Indicators	Covering	Unit	2022	2023
MFCA	Non-Consolidated	t-CO_2	60.2	40
Solar power	Non-Consolidated	t-CO_2	-	658

Responding to and Upholding Public Regulations

At all domestic and overseas business sites, Nippon Kayaku can be seen upholding and appropriately responding to laws, regulations and measures pertaining to climate change and reducing energy consumption. In Japan, for example, we follow both the Act on Promotion of Global Warming Countermeasures and the Act on Rationalizing Energy Use (the “Energy-Saving Law”). Listed as a specified business under the latter, Nippon Kayaku is thereby dutybound to pursue a 1% reduction in its energy consumption rate. Through setting annual targets at every business site and rolling out various energy-saving policies, we are currently delivering reduced rates of energy consumption. Under the Energy-Saving Law’s evaluation system, which classes companies in terms of performance, we received an S-class evaluation (signifying targets achieved) for FY2022.

Involvement with Industrial Groups

Nippon Kayaku is a member of The Japan Chemical Industry Association (JCIA), on whose Audit Board our President serves. The JCIA is participating in The Japan Business Federation’s Carbon Neutral Action Plan (formerly the Low-Carbon Society Implementation Plan), which Nippon Kayaku has approved and will itself join from 2030.
So that our company position on climate change policies is consistent with that of the industrial association, we join seminars held by the industry and by government departments such as the Ministry of Economy, Trade and Industry, the Ministry of the Environment, and the Ministry of Health, Labor and Welfare. This allows us to gather information, hold committee posts in each organization which enable us to join climate-change-related discussions, then share any information gleaned internally. We also assess whether our company’s position aligns with the contents of a seminar. In instances where that is not the case, our Environmental Conservation Committee will discuss, and our Environment, Safety and Quality Management Committee, chaired by our Technology Unit In-charge, will make the relevant adjustments. Through such a process can we align our own climate change strategies with industrial association activities.

Air Pollution Prevention

Policy and Basic Approach

When it comes to air pollutants produced by our plants and R&D labs, such as sulfur oxides, nitrogen oxides, particulate matter and volatile organic compounds (VOCs), Nippon Kayaku not only observes both national and regional laws but adopts yet stricter emission standards. We take proper preventative measures against pollution of the air surrounding our manufacturing and research sites.

System

› System for Promoting Responsible Care

Indicators

Indicator	Covering	Unit	2019	2020	2021	2022	2023
Volatile organic compounds (VOCs)	Non-consolidated	tons	28.6	33.3	52.1	38.7	32.9
Dichloromethane	Non-consolidated	tons	4.9	4.0	3.6	3.2	2.7
Formaldehyde	Non-consolidated	tons	0.04	0.04	0.15	0.13	0.13
NOx*1	Non-consolidated	tons	9.1	7.5	7.7	8.3	6.7
SOx*2	Non-consolidated	tons	1.3	1.0	0.7	0.9	0.8
Dust*3	Non-consolidated	tons	0.9	0.5	0.5	0.4	0.2

*1 NOx (nitrogen oxide): NOx is produced when burned chemical substances react to nitrogen in the air and when fuels and chemical substances that contain nitrogen compounds such as coal are burned. Not only is it a major cause of air pollution including photochemical smog and acid rain, but NOx also has a harmful effect on the human respiratory system.

*2 SOx (sulfur oxide): SOx is emitted when fossil fuels that contain sulfur are burned. SOx reacts with moisture in the atmosphere to form sulfuric acid and sulfurous acid, which are causes of air pollution and acid rain.

*3 Dust: Dust mainly refers to fine particles (soot) found in dust smoke produced when burning fossil fuels. In addition to being a major cause of air pollution, dust can cause humans to contract pneumonoconiosis or other harmful health conditions when breathed in in high concentrations.

› Environmental Management

Initiatives

Reducing VOC and Toxic Air Pollutant Emissions

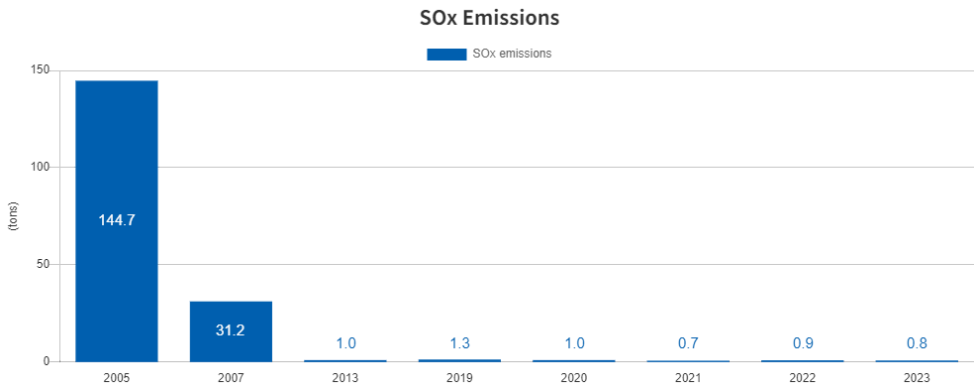
We are not only working to calculate and reduce emissions of VOCs listed in the Air Pollution Control Act, but of VOCs specified by the Japan Chemical Industry Association also. We are also engaged in reducing emissions of toxic air pollutants from 12 substances we have voluntarily agreed to control, including dichloromethane and formaldehyde. Key examples of initiatives we have taken are listed below.

- Exhaust gas processing equipment installed
- Gas absorption equipment installed
- Regenerative combustion equipment installed
- Working practice reform; review of possible substitutes for chemical substances used
- Leakage prevention measures

Reducing Sulfur Oxides (Sox), Nitrogen Oxides (NOx) and Particulate Matter

Below can be found a list of Nippon Kayaku measures taken thus far to keep emission levels of SOx, NOx and particulate matter below even the legal requirements.

- Switchover of combustibles from C-class heavy oil to A-class heavy oil, LPG and natural gas
- Introduction of low NOx boilers and small-sized once-through boilers
- NOx denitrification equipment installed
- Dust collectors installed



(Key Sustainability Issues)
Reduction of Wastewater and Industrial Waste

Policy and Basic Approach

The Nippon Kayaku Group, in the course of its business activities, uses and discharges vast amounts of water resources. We view water resource use as an issue for all of our business sites, and are therefore mindful of using water appropriately and conserving the local environment. With respect to water discharge, we hold ourselves to yet stricter standards than those laid down in law and at regional and local government regulatory level.

When it comes to waste, we must drive forward efficient use and recycling of substances from production through to consumption and disposal, so as to minimize resource usage and advance towards a recycling society with low environmental burdens. That is why our **KAYAKU Vision 2025** (**KV25**) lists recycling rates and zero-emission rates among our key performance indicators (KPIs), and why, in addition to working on waste reduction, we are perceiving waste produced in the course of business as a future resource which should be efficiently used.

Furthermore, April 2022 saw the implementation of a Law on Plastic Resource Recycling, underlining the fact that the conditions imposed on plastics are ever-changing and ever-stricter. The backdrop of problems stemming from climate change and plastic refuse has led to yet livelier moves towards plastic waste recycling in Japan as much as anywhere. With respect to the waste discharged from the plastic used by the Nippon Kayaku Group, we are moving forward with 3R initiatives (reduce, reuse and recycle) firmly in our minds.

System

› System for Promoting Responsible Care

Audit

In order to confirm whether wastewater and waste are being appropriately managed at every business site and Group company, the Nippon Kayaku Group conducts audits in the form of Core Environment, Safety and Health Diagnostic Checks. These Checks allow us to confirm any problems or inadequacies regarding compliance with laws and regulations on wastewater and waste treatment, run our eye over wastewater treatment areas and waste disposal areas, and grasp any problems with the management situation.

› Responsible Care Audits

Indicators

› Environmental Management

Initiatives

Wastewater

◆ Protection of the Water Environment

The Nippon Kayaku Group holds itself to yet tougher standards than those laid down by laws or regional and local regulations, and makes sure to comply with them when discharging. We also handle color material products such as dyes and inkjet printing ink, and the plants which manufacture them, Fukuyama and Tokyo, make sure that any colored wastewater produced during manufacturing is given decoloring treatment prior to discharge.

Indicators	Covering	Unit	2019	2020	2021	2022	2023
COD	consolidated	tons	231.9	218.8	223.6	243	274
Total phosphorus	consolidated	tons	10.6	3.2	11.2	7.1	18.5
Total nitrogen	consolidated	tons	74.8	83.2	73.5	114.0	68.5
SS*	consolidated	tons	46.0	48.4	49.9	49.2	44.6

* SS - Suspended solids: Refers to particulate matter of 2mm diameter or less either floating or suspended in water, including fine particles from minerals, plant and animal plankton or the carcasses of such, sewage, organic matter and metal sediments originating from plant wastewater. If present in large amounts, suspended solids can negatively affect water transparency and appearance, and – through impeding light-ray penetration – underwater photosynthesis as well

◆ Business Site Initiatives

Education and Training
Head Office
A Seminar on the Soil Contamination Countermeasures Act

September 2023 saw our Technology Unit's Technical Administration & Engineering Division open a seminar on the Soil Contamination Countermeasures Act for domestic business site in-charges and environmental protection managers, aimed at deepening understanding of environmental laws. The Soil Contamination Countermeasures Act is geared towards grasping soil pollution situations and implementing relevant measures to prevent health hazards. As Nippon Kayaku handles a multitude of chemical substances, we must gather the requisite knowledge on soil contamination prevention measures in order to appropriately apply the law when, for example, decommissioning facilities which handled designated hazardous chemicals or encountering changes in soil characteristics (due to excavations or embankment-building). The seminar saw around 50 employees given the chance to learn about the outline and purpose of the Act and the process for filing applications from a specialist who introduced actual case studies. The future will see us hold such internal seminars periodically to deepen employee understanding as we work on fully observing the law.

Joetsu Plant
Training on Wastewater Issues

The Joetsu Plant manufacturing process for polarizing plates gets through some 20,000m^3 of water a month.
Such manufacturing operations cause discharged wastewater to contain various chemical substances. Once put through treatment equipment, though, we can reuse such wastewater as process water and thereby decrease industrial waste volumes. We also use analyzers to monitor wastewater discharged into rivers, and hold ourselves to standards yet higher than those laid down in regulations, discharging only wastewater which meets those standards.
The same plant also hosts training seminars given by Facility Safety Division employees on water treatment equipment and discharge methods, with production employees and managers learning how water used in production is treated prior to discharge into rivers. We will continue holding these training sessions on a regular basis so as to deepen employee understanding and lower environmental burdens.

Waste

◆ Responding to the Law on Plastic Resource Recycling

Amid the ever-changing, ever-stricter environment around plastics did Japan introduce a Law related to the Promotion of Recycling of Plastic-related Materials (Law on Plastic Resource Recycling) in April 2022. Under this Law, Nippon Kayaku can be defined as a “heavy waste producer”. Hence, in order to contribute to a sustainable society, we are mindful of the 3Rs (Reduce, Reuse and Recycle) as we drive forward efforts to systematically fix plastic waste targets and reduce the volumes produced.

Plastic Waste Emission Amounts

Indicators	Covering	Unit	2020	2021	2022	2023
Plastic waste emissions	Non-Consolidated	tons	954	888	885	788
Recycling rate	Non-Consolidated	%	80.2	80.8	81.8	91.0

◆ Business Unit Initiatives

Fukuyama Plant
Pursuing Zero Emissions through Effective Use of Waste

In addition to cutting volumes of waste produced, Nippon Kayaku promotes exploring the reuse of waste as a future resource. Of the many types of waste generated by the Fukuyama Plant, sludge produced during microbial water treatment comes in particularly large amounts. As the moisture component of sludge makes it difficult to treat, we formerly sent it to landfill after the proper management processes. But after we examined its resource potential with the aim of decreasing environmental burdens, an incineration company informed us that sludge could potentially be recycled as a heat-adjustment fuel (a so-called “heat-reducing fuel”), and is currently using our sludge for that purpose. Additionally, the ash from the incineration process is now being effectively repurposed for cement and roadbed materials. The Fukuyama Plant is also looking at ways of utilizing other forms of industrial waste, and continues to achieve rates of 0% landfill and 100% recycling.

Going forward, we will endeavor to maintain the proportion of industrial waste earmarked for incineration (the Zero-Emissions Rate) at 1% or less, and raise recycling rates to 80% or more.

Kayaku Safety Systems de Mexico
Industrial Waste Management

Kayaku Safety Systems de Mexico (KSM) properly sorts its solid waste into wood, cardboard, nonferrous metals, aluminums and plastics, and is constantly on the lookout for external suppliers who can reuse these materials. The materials are stored in a fixed place for 2 to 3 months before being collected by government-certified suppliers.
The recyclable elements of industrial waste are delivered to various recycling companies so that wood being can be repurposed for wooden palettes, cardboard is also reused, and new materials can be generated from plastic, aluminum and steel.
This program also extends into areas outside production. One example would be the setting up of a breakroom which allows users to sort plastic bottles, organic and inorganic waste.
The end of 2021 brought waste management improvements. Prior to that, we had no proper sorting system, meaning that waste was sent for treatment while containing resources that could yet be effectively used. We have now rectified that by fixing reuse and waste standards for each type of waste, and sorting in line with those standards. This has made sorting decisions easier for workers, thereby increasing efficiency, accuracy, and recyclable amounts of metals, wood and plastic. We have also boosted reusable materials by reassessing plastics formerly designated as waste. Our higher recycling amounts have also produced the secondary benefits of less municipal waste and landfill disposal.
FY2023 saw negotiations with customers result in permission being given for the reuse of polyester packaging materials, which we plan to commence during FY2024.

Recycling amounts

Category	Covering	Unit	2021	2022	2023
Metals	KSM	tons	1	3	9
Plastics	KSM	tons	50	73	77
Lumber	KSM	tons	10	4	9
Cardboard	KSM	tons	24	23.3	26
Municipal waste	KSM	tons	160	165	112

Waste Data

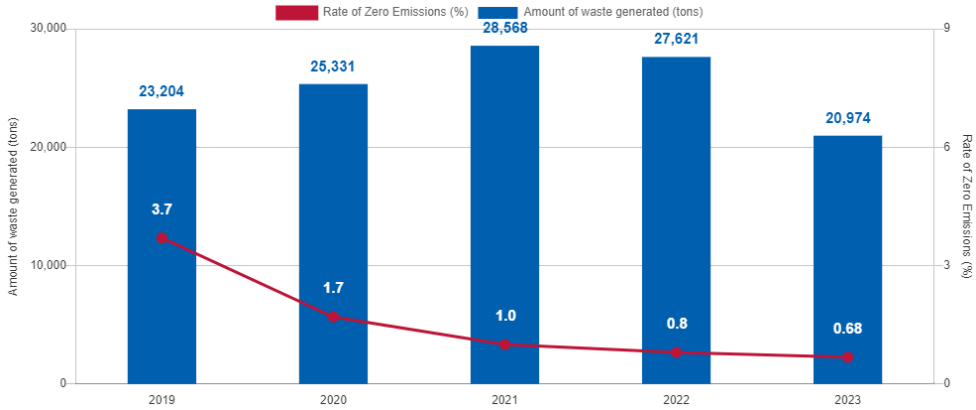
The total volume of waste produced by the Nippon Kayaku Group in FY2023 ran to 22,030 tons, which was 24% down on the 28,934 tons produced in FY2022. In our non-consolidated business, we have also been promoting the recycling of waste previously landfilled or incinerated. Our continued efforts at reducing the environmental burden in this way have yielded a 143-ton (39%) year-on-year reduction in landfilled waste, and a further 0.1% year-on-year fall in zero-emission rates from 0.8 to 0.7%.
We will continue promoting waste volume reduction and effective use of waste, easing the heavy environmental burdens posed by landfilled waste, and working towards environmental conservation and a sustainable society.

Indicators		Covering	Unit	2019	2020	2021	2022	2023
Non-hazardous waste		non-consolidated	tons	17,971	19,411	22,069	21,154	16,146
		Group companies	tons	4,240	996	1,199	1,242	1,087
		Total	**tons**	**22,211**	**20,407**	**23,268**	**22,396**	**17,233**
	General waste	non-consolidated	tons	714	643	673	648	464
		Group companies	tons	647	504	449	559	513
		Total	**tons**	**1,361**	**1,147**	**1,122**	**1,207**	**977**
	Industrial waste	non-consolidated	tons	17,256	18,768	21,396	20,506	15,682
		Group companies	tons	3,593	493	750	682	574
		Total	**tons**	**20,849**	**19,261**	**22,146**	**21,188**	**16,256**
Hazardous waste		non-consolidated	tons	5,231	5,925	6,503	6,467	4,828
		Group companies	tons	190	92	86	71	59
		Total	**tons**	**5,421**	**6,017**	**6,589**	**6,538**	**4,887**
	Source-specific hazardous industrial waste	non-consolidated	tons	131	221	146	182	182
		Group companies	tons	0	0	0	0	0
		Total	**tons**	**131**	**221**	**146**	**182**	**182**
Total[*1]			**tons**	**27,631**	**26,426**	**29,857**	**28,934**	**22,119**

Indicators		Covering	Unit	2019	2020	2021	2022	2023
Types of waste	Sludge	non-consolidated	tons	2,206	1,979	2,309	2,338	2,291
		Group companies	tons	267	131	336	258	115
		Total	**tons**	**2,473**	**2,110**	**2,645**	**2,596**	**2,406**
	Waste oil	non-consolidated	tons	5,296	5,766	6,386	5,848	4,809
		Group companies	tons	95	94	87	71	59
		Total	**tons**	**5,391**	**5,860**	**6,473**	**5,919**	**4,868**
	Spent acid	non-consolidated	tons	617	2,244	2,185	1,523	1,116
		Group companies	tons	1,916	3	2	8	13
		Total	**tons**	**2,533**	**2,247**	**2,187**	**1,531**	**1,129**
	Waste alkali	non-consolidated	tons	13,399	13,382	15,784	16,064	11,219
		Group companies	tons	631	17	11	11	8
		Total	**tons**	**14,030**	**13,399**	**15,795**	**16,075**	**11,227**
	Plastic waste	non-consolidated	tons	642	954	888	885	788
		Group companies	tons	731	235	277	326	326
		Total	**tons**	**1,373**	**1,189**	**1,165**	**1,211**	**1,114**
	Others	non-consolidated	tons	1,041	1,010	1,021	962	751
		Group companies	tons	790	609	572	640	624
		Total	**tons**	**1,831**	**1,619**	**1,593**	**1,602**	**1,375**
Landfill amount		non-consolidated	tons	844	404	298	233	144
Recycling rates[*2]		non-consolidated	%	84	81	82	87	84
Zero-emissions rates		non-consolidated	%	3.7	1.6	1	0.8	0.7

*1 As figures have been rounded off, the totals in some columns do not exactly match the sum of each item above.
*2 Includes recovered and reused solvent

Trends in Waste Generation Amounts and Rates of Zero Emissions (Nippon Kayaku alone)



Costs Associated with Pollution, Waste and Resource Reuse

> Environmental Accounting

Responses to Environmental Regulations

At every plant do we prepare treatment equipment to deal with manufacturing process wastewater depending on its composition, and hold ourselves to higher standards than those imposed by law and local authority regulations when keeping tabs on water pollution figures. We are happy to report that FY2023 saw no violations of laws such as the Water Pollution Prevention Law and related regulations, and zero violations of wastewater discharge laws such as the Waste Disposal and Public Cleaning Law.

> Numbers of Environmental Violations

Management of Chemical Substances

Policy and Basic Approach

Nippon Kayaku has mobilized an organizational response to recent changes in the chemical substance management environment, promoting activities based on its Responsible Care Policy to fulfil its responsibilities as a chemical manufacturer. We have been particularly focused on preparing self-directed chemical substance management systems on every business site in response to the revised Occupational Safety and Health Act of FY2024.

System

› System for Promoting Responsible Care

Indicators

Substance Reduction based on the Pollutant Release and Transfer Register (PRTR)

FY2023 saw the Nippon Kayaku Group deal with chemical substances listed in the Act of the Assessment of Releases of Specified Chemical Substances in the Environment and the Promotion of Management Improvement. To limit effects on the external environment, we are promoting measures such as the installation of treatment devices and the conversion of raw materials.

Indicator		Covering	Unit	2019	2020	2021	2022	2023
Emissions of PRTR substances	Atmosphere	Non-consolidated	tons	18.9	16.8	25.2	38.7	32.9
	Water bodies	Non-consolidated	tons	13.3	9.1	14.7	51.4	75.0
	Soil	Non-consolidated	tons	0	0	0	0	0
	Total*	**Non-consolidated**	**tons**	**32.2**	**25.9**	**39.9**	**90.1**	**107.9**

* Value for each item is rounded off, which often results in an inconsistency between the total value indicated and the aggregate of all the relevant items.

Initiatives

Responses to Laws and the Various Standards

Nippon Kayaku, under its sustainable management system and via its Environment, Safety and Quality Management Committee, is proceeding with desirable initiatives on chemical management matters and the specific action plans based upon them.

◆ Responses to Domestic Chemical Laws and Regulations

Bringing a new product to market requires the filing of numerous application, registration and report documents in line with each country's regulations. Inside Japan, the Chemical Control Act*1 and Safety and Health Act*2 demand that we file new chemical substance applications and, particularly in the case of the former, numerous other documents. Our responses to the revised Chemical Management Act*3 taking effect in 2023, and the revised Industrial Safety and Health Act taking effect in 2024, involve enhancing our systems for appropriate emissions management and self-directed chemical substance management.
With the worldwide fixing and revision of chemical laws and regulations progressing apace, we are utilizing a searchable database of all laws and regulations in Japan, Europe and America to gain up-to-date information on regulatory trends and amendments, and thereby mount appropriate responses.

*1 Law Concerning the Examination and Regulation of Manufacture etc. of Chemical Substances
*2 Occupation Safety and Health Act
*3 Act on the Assessment of Releases of Specified Chemical Substances in the Environment and the Promotion of Management Improvement

◆ Reponses to GHS, and SDS for all products

The worldwide introduction of GHS* has spawned demands for Safety Data Sheets (SDS) conforming to local laws and regulations to be issued in the language of the country in question, and for product labels to be attached. Nippon Kayaku initiatives have included appropriately responding to the revised Japanese Industrial Standard (JIS) of 2019 by altering SDS and labels accordingly.
The Fine Chemicals Business Unit operates the "3E generate" SDS-creation system equipped with abundant translations, each country's legal and regulatory data, substance properties and toxicity data, to issue SDS compliant with both local laws and regulations and attach relevant GHS product labels.

* GHS: Globally Harmonized System of Classification and Labeling of Chemicals (A globally harmonized system for the classifying and labeling of chemicals)

◆ Responses to Overseas Laws and Regulations on Exported Chemicals

The EU's REACH* regulations were implemented in June 2007. Drawing no distinction between existing and new chemical substances, these regulations made it compulsory to provide safety test data when registering chemicals (including chemical products containing chemical compounds) either manufactured or exported into the European region in annual volumes of one ton or more. Their implementation has led to a toughening of chemical substance registration regulations in numerous countries, causing us to forever confirm the latest regulatory trends and respond without omissions.
In our Fine Chemicals Business Unit, our efforts to respond to domestic and international chemical substance registration systems; grasp each country's trends regarding chemical laws, draft relevant proposals, inform relevant departments and offer guidance on relevant responses; and manage product SDS and labels as part of chemical quality control are coordinated and supported by our Chemical Quality Control Division.

* REACH = Registration, Evaluation, Authorisation and Restriction of Chemicals

◆ Centralized Management of Chemical Substance Information

With the aim of boosting appropriate use of chemical substances, Nippon Kayaku centrally manages the information for chemical substances contained in all its products and raw materials via its own internal database.
We are making efforts to convey information to customers on compliance, product toxicity and safe product handling through conducting database management of information on the composition of chemicals and products we handle, hazard statements, and the relevant laws and regulations both inside and outside Japan.
We are also working to grasp information related to chemical substances present in raw materials by demanding that our raw material suppliers use the latest safety data sheets and chemSHERPA processes, and present us with due diligence reports.
The future will see us continue responding to tougher chemical substance regulations and move ahead with efforts to build a yet stronger chemical substance information management system.

*chemSHERPA: Chemical information SHaring and Exchange under Reporting PArtnership in supply chain
A scheme for conveying information on chemical substances contained in products across the supply chain.

◆ Risk-reduction Measures for the Manufacture and Handling of Chemical Substances

Against the backdrop of compulsory risk assessments for business sites involved in the manufacture and handling of chemical substances introduced under the revised Occupational Safety and Health Act of 2016, Nippon Kayaku has, through use of its own independently-constructed database, implemented both risk assessments and risk-reduction measures relating to all new work or work changes which involve the handling of chemical and toxic substances specified within the Act. In response to further revisions to this Act which have expanded the list of substances to be risk assessed from 2024, we have improved our database, adjusted our risk assessments to conform to those revisions, centralized controls, and promoted companywide risk management.
We have also put up GHS pictorial guides in each area where chemicals are handled, so that handlers can recognize the hazardous nature of chemicals giving rise to exposure concerns.

As the picture shows, our displays allow workers to recognize the hazardous nature of chemicals that give rise to exposure concerns.

◆ Education

We provide education programs at every plant, and for each workforce layer, aimed at improving safety consciousness. We are currently enriching the education contents on chemical laws and regulations, including the so-called “Three SDS Laws”: The Chemical Management Act, The Safety and Health Act, and the Poisonous Substances Act.

◆ Industrial and International Initiatives

The Nippon Kayaku Group belongs to the Japan Chemical Industry Association and has signed up to Long-range Research Initiatives (LRI) since 1999. In addition to shouldering part of the research funding burden, we also sit on the committee.
The LRI proceeds under the umbrella of the Japanese, American and European chemical industries (The Japan Chemical Industry Association, The American Chemistry Council, and the European Chemistry Industry Council). A voluntary activity conducted by the International Council of Chemical Associations (ICCA), it focuses on increasing the accuracy of risk assessments for internal secretion and endocrine disrupting action, neurotoxicity, chemical carcinogenesis and immunotoxicity, and supports long-term research of the effects of chemical substances on the environment and people’s health.

› LRI

Initiatives to Reduce Chemicals of Concern

So as to appropriately respond to accelerated movements towards tightening regulations in countries across the globe, Nippon Kayaku has determined the chemicals to be managed under the laws and regulations pertaining to each business, and carries out chemical substance management. Right from the raw materials and parts procurement stage do we work to reduce reliance on Chemicals of Concern to minimize the risks to individual health and the environment.

◆ Mobility & Imaging Business Unit

Our Safety Systems Business Unit makes use of the GADSL* to clarify the chemical substances that must either be banned from products or whose presence must at least be grasped. In addition to strictly managing Substances of Concern, Safety Systems is working to reduce use of such substances at every step of the product process: development, planning, procurement, production and distribution. The GADSL is a global-standard list of Substances of Concern compiled by leading automobile makers, parts makers and chemical manufacturers in Japan, Europe and the USA. It divides Substances of Concern into various categories such as: Prohibited (P), Declarable or Prohibited (D/P) and Declarable (D).

* Global Automotive Declarable Substance List

◆ Fine Chemicals Business Unit

In line with chemical substance management regulations, our Fine Chemicals Business Unit defines substances posing environmental and health hazards to be managed in Nippon Kayaku products as “Environmental Impact Substances.” These are further divided into the categories of “Prohibited Substances” and “Controlled Substances”, and managed accordingly. “Prohibited Substances” constitute those chiefly comprised of chemicals regulated under the RoHS Directive (see below) or constituting Class 1 Specified Chemicals in the Chemical Substances Control Law, whose use, manufacture and sale we have decided, in principle, to ban. “Controlled Substances” refer to those included in the REACH Annex XIV (Authorization List), REACH Annex XVII (Restricted Substances) and REACH SVHC (Candidate List of substances of very high concern for Authorization). Along with minimizing their use, we assess the risks of their appearance in a product and set up appropriate management practices based on domestic and international laws and regulations, and customer demands.

RoHS Directive

The RoHS Directive (Restriction of the use of certain Hazardous Substances in electrical and electronic equipment) is an EU law implemented in July 2006 which proscribes the inclusion of hazardous substances in electrical and electronic devices. In order to lighten environmental burdens, Nippon Kayaku is working to reduce use of the following RoHS-designated hazardous substances: cadmium, mercury, lead, hexavalent chromium, PBB (polybrominated biphenyl), PBDE (polybrominated diphenyl ethers), and 4 phthalic acid ester substances: DEHP (Di(2-ethylhexyl) phthalate), BBP (benzyl butyl phthalate), DBP (dibutyl phthalate) and DIBP (diisobutyl phthalate).

(Key Sustainability Issues)
Improving Efficiency of Water Resource Use

Policy and Basic Approach

Water risks can be broadly divided into two categories: the physical risks constituted by the effects of drought, flooding and pollution, and the regulatory risks stemming from tougher water quality standards, revisions to water and sewage rates, and cessation of industrial water supplies necessitating switchovers to potable water. As water is a precious resource in limited supply, its conservation is a key global sustainability issue.
The Nippon Kayaku Group manufactures products in 12 countries and regions across the globe, with water resources especially indispensable to business operations in the making of chemical products. We therefore pay heed to water conservation at all locations of Group activity, and try to make sure that no water we use is wasted.

System

› System for Promoting Responsible Care

Indicators

› Environmental Management

Initiatives

Responding to Environmental Regulations

We have tied up various agreements between our business bases and relevant local authorities and regions. While observing our multiple environmental agreements and working on reducing environmental burdens, we also contribute to the safety and security of the local community. FY2023 saw zero violations or fines issued with respect to water quality or excessive use.

› Number of Environmental Rule Violations

Use of Water Resources

Indicators		Covering	Unit	2019	2020	2021	2022	2023
Amount of water taken	Waterworks	consolidated	1,000m^3	706	763	805	754	566
	Surface water (industrial water)	consolidated	1,000m^3	7,758	7,897	8,138	8,003	7,912
	Groundwater (well water)	consolidated	1,000m^3	2,388	1,918	1,947	1,819	1,847
	Others (reservoirs, rainwater storage)	consolidated	1,000m^3	0	0	68	81	79
	Total*1	**consolidated**	**1,000m^3**	**10,852**	**10,578**	**10,958**	**10,657**	**10,404**
	From water-stressed regions*2	consolidated	1,000m^3	36	23	33	29	28
Amount of water discharged*3	Sea areas	consolidated	1,000m^3	7,374	7,014	7,142	6,726	6,966
	Rivers	consolidated	1,000m^3	2,682	2,400	2,410	2,351	2,443
	Sewers	consolidated	1,000m^3	928	974	987	910	1,045
	Total*1	**consolidated**	**1,000m^3**	**10,984**	**10,388**	**10,539**	**9,987**	**10,454**
Amount of water recycled		consolidated	1,000m^3	0	0	0	0	0
Recycling rates		consolidated	%	0	0	0	0	0

*1 As figures have been rounded off, the totals in some columns do not exactly match the sum of each item above.
*2 We have used the Aqueduct Water Risk Atlas with its 5 levels of water stress. Sites at Level 4 or above are considered "water-stressed regions."
*3 Water of equal or higher quality is returned to the intake source

Grasping Locations of Water-stressed Regions

In order to grasp the risks involved with the use of water resources and respond to these risks more effectively, the Nippon Kayaku Group has used the World Resources Institute's Aqueduct Water Risk Atlas to investigate the water stress conditions of its plant locations. As of end-March 2024, we were able to confirm that no plant using water for manufacturing operations is located in a high water-stress area (which, in Aqueduct terms, is the level above medium-high). For Kayaku Safety Systems (Huzhou), located in a comparatively highly-stressed area (medium-high), we have drawn up plans for periodical Core Environment, Safety and Health Checks, and are currently confirming whether water resources are being appropriately managed. From now, we will roll out such confirmatory checks to all plants in high water-stress areas, and proceed with the finalizing of our future water reduction plan.

Water-stress Investigation Results for Nippon Kayaku Group Manufacturing and R&D sites (FY2023)*1

Region or Country Name		Unit	Water amounts used at each water stress level				
			High	Medium-high	Medium	Low-medium	Low
Asia	Japan	1,000m^3(Number of bases)	0	0	2,799 (6)	7,216 (4)	0
	China	1,000m^3(Number of bases)	0	15 (1)	0	0	213 (3)
	Malaysia	1,000m^3(Number of bases)	0	0	0	0	45 (1)
Europe	Czech Republic	1,000m^3(Number of bases)	0	0	0	21 (1)	0
	Netherlands	1,000m^3(Number of bases)	0	0	0	0	3 (1)
	UK	1,000m^3(Number of bases)	0	1 (1)	0	0	0
North and Central America	America	1,000m^3(Number of bases)	0	0	5 (1)	74 (1)	0
	Mexico	1,000m^3(Number of bases)	12 (1)	0	0	0	0
Total*2		**1,000m^3(Number of bases)**	**12 (1)**	**16 (2)**	**2,804 (7)**	**7,311 (6)**	**261 (5)**

*1 We are currently using the Aqueduct Water Risk Atlas to investigate these points.
*2 As figures have been rounded off, the totals in some columns do not eaxctly match the sum of each item above.

Business Unit Initiatives

Fukuyama Plant

Initiatives Aimed at Reducing Water Use

At the Fukuyama Plant, wastewater emanating from the dye production process is treated onsite, then released into the Seto Inland Sea. The plant has been producing inkjet printer dyes since the year 2000, and has consequently invested effort into improving wastewater treatment methods, looking into individual processes tailored to production type and examining numerous ways of altering production processes to lower environmental burdens.
The fruits of such activities can be seen in the form of phased reductions in contracted industrial water amounts, which fell from 24,000m^3 to 23,000m^3 per day in FY2015, and to 22,000 m^3 per day in FY2018. Thanks to further polishing of its wastewater treatment methods, the plant is now able to produce more on the same amounts of industrial water. It is also working on reducing the amounts of regular water used both production and equipment cleaning.

Kayaku Safety Systems Europe

Introduction of Rainwater-utilizing Equipment

Kayaku Safety Systems Europe (KSE)'s capital investment activities aimed at promoting environmental protection include a water storage tank system to make effective use of rainwater. The system was introduced in 2017, and had a tank capacity of 750.5m^3 by FY2020. By using both rainwater and the water released by the shop floor air conditioning system for purposes other than drinking, the plant has not only achieved more efficient use of water resources but also lowered its costs.
Water reuse is currently of pivotal importance to the Czech Republic, which has seen rainfall decrease under the impact of climate change. The amount of water that KSE has stored up post-FY2020 exceeds the annual drinking amounts of all KSE employees and their families (around 4000 people). This particular project therefore marks a contribution towards a sustainable society.

Indicators	Covering	Unit	2019	2020	2021	2022	2023
Volume of water store (planned)	KSE	m^3	-	4,877	5,040	5,040	5,040
Volume of water stored (actual)	KSE	m^3	4,433	6,177	7,234	6,802	7,786
Economic benefits	KSE	10,000 yen	282	361	411	335	428

Kayaku Safety Systems Mexico

Initiatives Aimed at Reducing Water Use

As part of its commitment to environmental conservation, Kayaku Safety Systems Mexico (KSM) has embarked upon improving its use of water resources to help resolve issues concerning limited usable water in the surrounding region. KSM mainly uses water for cleaning equipment and containers, and for manufacturing processes.
Improvement activities have involved raising standards for the production process and water treatment, and providing education to make employees more water-resource conscious. KSM's activities throughout FY2023 resulted in a 27% (2970-liter) reduction in use of water resources.

Biodiversity

Policy and Basic Approach

At the Nippon Kayaku Group, we recognize that biodiversity forms an important base for a sustainable society. However, such biodiversity is currently being lost, in large part due to environmental pollution and deforestation. Thanks to the Nippon Kayaku Group's Responsible Care Policy, environmental considerations, efficient use of resources, climate change initiatives, and preventing pollution of water and air are forever in our minds when we conduct our business activities.

System

› System for Promoting Responsible Care

Initiatives

Water-related initiatives

› (Key Sustainability Issues) Reduction of Wastewater and Industrial Waste
› (Key Sustainability Issues) Improving Efficiency of Water Resource Use

◆ Initiatives at every business site

Takasaki Plant

Plant operations in harmony with the natural environment

Following the disposal of the former Tokyo 2nd Army Arsenal Gunpowder Manufacturing Plant into company hands, the site of the current Takasaki Plant restarted operations in April 1946 as a manufacturer of black gunpowder, before subsequently switching to medical manufacturing operations in August 1971. From the off, the plant aimed for "coexistence with nature", and ultimately secured ISO14001 certification in January 2001.

Surrounded by the natural environments of Gunma-no-Mori Forest Park and the Karasu River, the plant's slogan reads: "The Takasaki Plant: Continuing to Protect Life and the Environment." Based on this has the plant fixed its environment policy as: "Each and every person here shall be sufficiently conscious of working in an industry connected to human life, and, based on such consciousness, work towards promoting environmental conservation and plant harmony with the abundant natural environment."

The plant boasts a vast 560,000m^2 site, of which 110,000m^2 have been registered as a Green Zone under the Factory Location Act. This Green Zone was once a gunpowder warehouse which fell into disuse after the plant's switchover to medical manufacturing. It has simply been left among the natural flora to become an extremely precious natural habitat within urban Gunma, and is believed to have retained the ecosystem of its active days.
The site's eastern, southern and northern sides are bordered by three Class A rivers in the Tonegawa system: the Karasu; the Ino, of the Karasu tributary; and the Kasu, of the Hirose tributary. The northern side also adjoins the Gunma Prefectural Forest Park named "Gunma-no-Mori." We will continue to preserve this precious green forest community whose inhabitants include raccoon dogs and kingfishers.

In addition to the Green Zone, our on-premises environmental facilities include a creek. It originally served as part of a hydro-electric power generation facility in the plant's previous incarnation, and we have taken care to preserve and manage the structure of the foreign-made generator used during the postwar years.
The creek exists in a naturally forested area that sits apart from nearby residential districts. Its proximity to the river makes it a safe place for animals, and an annual oasis for migratory birds who feed off the blessings of the forest and river. The annual arrival of migratory birds and their northward departures make for an enjoyable seasonal event for employees.

In addition to carbon neutral efforts aimed at responding to climate change, the Takasaki Plant's environmental conservation initiatives include measures such as the discharge control of the site's treated wastewater as described below.
We have built a dam to divide our on-premises creek into two areas. The first creek temporarily pools plant wastewater which has been detoxified via an activated sludge process. The second creek's water quality is measured daily and, subject to levels being confirmed as normal, has its sluice gate opened to allow for water discharge of into the river. We are thereby taking every possible measure to prevent environmental pollution.

Transitioning to Forest-certified Products

Nippon Kayaku has switched its copy paper over to forest-certified products. This certified paper is now used for all printed company reports, notices, sustainable management pamphlets, and other documents issued company-wide. We are now proceeding with the sequential switchover of our wrapping materials, where possible, to forest-certified products. Moving forwards, we will continue to focus on the initiatives of which employees can be most conscious within their familiar environment, and, to the best of our powers, reduce the Nippon Kayaku Group's overall environmental impact.

Environmental Accounting

Environmental Accounting

For the purpose of effectively driving forward environmental conservation efforts, Nippon Kayaku is publishing the aggregate costs of conserving the environment incurred during business activities. Our environmental accounting covers the period April 2023 to March 2024, and follows the Ministry of the Environment's Environmental Accounting Guidelines (2005) and the Japan Chemical Industry Association's Environmental Accounting Guidelines for Chemical Companies. Investment values are aggregated from capital investments connected to environmental conservation during the accounting period, while total costs are based on those connected to maintaining and administering equipment and facilities, human resources, and depreciation.

◆ Environmental Accounting

Environmental Protection Cost for FY2023

Points		Covering	Unit	Invested amount	Cost	Contents
I. Internal costs per business area		Non-Consolidated	million yen	795	1,324	Environmental protection costs to limiting the environmental burdens emanating from production and service activities within business areas
Breakdown	① Pollution control costs	Non-Consolidated	million yen	(366)	(298)	Air pollution, water pollution control, underseepage prevention, investments and costs associated with soundproofing and vibration-proofing
	② Costs for protecting the Earth's environment	Non-Consolidated	million yen	(426)	(88)	Energy saving, costs associated with installing and maintaining equipment used to combat global warming
	③ Resource recycling costs	Non-Consolidated	million yen	(3)	(579)	Resource conservation, recycling, costs associated with appropriate treatment of industrial waste
	④ Others	Non-Consolidated	million yen	(0)	(360)	Levies imposed on pollution loads
II. Upstream/downstream costs		Non-Consolidated	million yen	0	80	Costs associated with limiting the environmental burdens emanating from upstream and downstream production and service activities
III. Management activity costs		Non-Consolidated	million yen	3	252	Inspection costs for updating and maintaining our ISO14001 certification, environmental burden monitoring, information disclosure, education and training, tree-planting
IV. R&D costs		Non-Consolidated	million yen	0	86	Costs linked to R&D with environmentally-conscious themes and product development
V. Social activity costs		Non-Consolidated	million yen	0	10	Staging site observation visits, financial contributions to regional activities, association membership fees
VI. Costs for responding to environmental damage		Non-Consolidated	million yen	0	0	Costs associated with restoration of natural environments
Total		Non-Consolidated	million yen	798	1,752	

◆ Economic Benefits from Environmental Protection Measures

Economic Benefits from Environmental Protection Measures in FY2023

Tangible benefit points		Covering	Unit	Economic benefits	Main Contents
Internal benefits per business area	Pollution control benefits	Non-Consolidated	million yen	0.3	Renewal of detoxifying towers, waste liquid pit level sensors, dehydrators
	Benefits from protecting the Earth's environment	Non-Consolidated	million yen	109.3	Installation of solar equipment (PPA), renewal of transformers, adoption of energy-saving devices (LED lighting, high-efficiency pumps, electric motors etc.), renewal of biolers, less leakage from steam traps, replacement of air conditioning devices and light fittings with high-efficiency models
	Resource recycling benefits	Non-Consolidated	million yen	90.1	Recovery and reuse of solutions, scrap iron; resale of used drum cans Benefits from recycling junk metal and plastic waste
Upstream/downstream benefits		Non-Consolidated	million yen	38.8	Rinsing and reuse of SUS drums and polydrums etc.
Others		Non-Consolidated	million yen	0.0	Tree-planting
Total		**Non-Consolidated**	**million yen**	**238.5**	

Investments in the Environment, Safety and Health

At Nippon Kayaku, we systematically and continually make capital investments related to the environment, safety and health. FY2023 saw our environmentally-related capital investments reach 794.7 million yen, and our safety and health capital investments rise to 856.1 million yen.

Environment-related Capital Investments

Category	Covering	Unit	2019	2020	2021	2022	2023
Air pollution prevention equipment	Non-consolidated	Million yen	40.2	20.9	37.1	68.1	40.5
Water pollution prevention equipment	Non-consolidated	Million yen	70.5	109.7	266.9	206.7	304.5
Underground seepage prevention equipment	Non-consolidated	Million yen	13.4	5.5	4.9	7.2	5.0
Noise and vibration prevention equipment	Non-consolidated	Million yen	2.4	17.2	6.0	6.0	16.1
Industrial waste processing equipment	Non-consolidated	Million yen	30.9	106.6	111.2	5.1	2.9
Plant greening	Non-consolidated	Million yen	1.0	1.8	0.5	3.3	0.0
Energy conservation and global warming prevention equipment	Non-consolidated	Million yen	40.3	172.6	244.6	236.6	425.6
Total	**Non-consolidated**	**Million yen**	**198.7**	**434.3**	**671.3**	**533.0**	**794.7**

Safety- & Health-related Capital Investments

Category	Covering	Unit	2019	2020	2021	2022	2023
Equipment aging measures	Non-consolidated	Million yen	469.0	292.9	490.9	245.0	454.9
Safety and work environment measures	Non-consolidated	Million yen	165.3	171.4	171.4	86.6	281.6
Explosion, fire and leakage measures	Non-consolidated	Million yen	39.4	9.2	14.1	60.6	54.4
Earthquake and other natural disasters measures	Non-consolidated	Million yen	2.6	51.4	4.4	6.5	65.2
Other	Non-consolidated	Million yen	4.0	4.5	6.4	32.0	0.0
Total	**Non-consolidated**	**Million yen**	**680.3**	**529.4**	**687.1**	**430.7**	**856.1**