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

ISO14001 Certification

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

Environmental Audit

In line with ISO14001 requirements, the Nippon Kayaku Group conducts internal environmental audits. These enable us to confirm the status of activities with respect to environmentally-related legislation and regulations, and help us map out how to promote and improve our groupwide environmental conservation activities.

- Responsible Care Audit

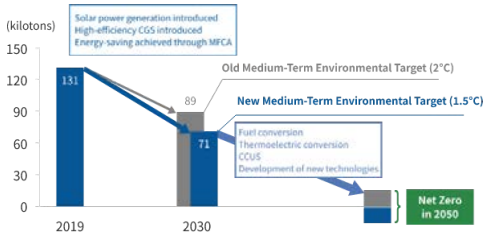
Targets and Results

Sustainability Action Plan and Results

Key sustainability issues	Corresponding SDGs	Action plans	Indicators（KPI）	FY2025 Targets	Results		FY2024 Initiative-related Topics
					FY2023	FY2024	
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 FY2024) Under 111,838 tons	102,704 t-CO_2	111,102 t-CO_2	• We received our first A-List Rating in the CDP's Climate Change Field • Promotion of MFCA and solar-powered PPA models were sequentially introduced • Emissions increased for every item due to increased production volumes, but recycling rates and zero-emission rates still improved • Environmentally-friendly products and technologies are being developed 【Safety Systems Business】 KMY commenced production of a light cylinder inflator (new generation inflator) whose CO_2 emissions are 30% down on previous generation inflators. A green propellant MGG was developed. 【Functional Materials Business】 A prototype of a CFRP/GFRP-use thermosetting resin targeted for use in aircraft was tested and assessed on a real aircraft. Development of a biofuel-containing thermosetting resin that is high-temperature resistant and highly reliable. 【Color Materials Business】 Development of industrial-use inkjet ink (for coated paper and soft packaging). Expanded sales of developers for phenol-free thermal paper. 【Catalysts Business】 Advancement of joint-development of a hydrogen-producing catalyst. Development of a catalyst using materials informatics techniques which contributes to reducing amounts of, and improving yields from, raw materials used. Development of a catalyst to manufacture basic chemicals such as propylene from biofuel. 【Pharmaceuticals Business】 Promoted the adoption of materials posing lesser environmental burdens in response to moves towards resource conservation in the field of packaging.
			VOC emissions	(Non-consolidated) Disclose results	(Non-consolidated) 32.9 tons	(Non-consolidated) 60.3 tons	
			COD emissions	(Non-consolidated) Disclose results	(Non-consolidated) 210.9 tons	(Non-consolidated) 222.2 tons	
			Total waste output	(Non-consolidated) Disclose results	(Non-consolidated) 20,974tons	(Non-consolidated) 28,225tons	
			Recycling rate	(Non-consolidated) 80% or higher	(Non-consolidated) 83.8%	(Non-consolidated) 86.5%	
			Zero emission rate	(Non-consolidated) 1% or less	(Non-consolidated) 0.68%	(Non-consolidated) 0.6%	
			Goal setting in line with SBT and consideration and implementation of specific measures	Progress disclosed	Medium-term Environmental Targets revised to 1.5℃ scenario	Published in Topics	
			Disclosure in line with TCFD recommendations	Progress disclosed	Information disclosed	Information disclosed	
			Develop products and technologies with consideration for environmental issues	Progress disclosed	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 medium-term target for the 2°C warming scenario initially saw us, in the Climate Change field, commence a roll-out of our Scope 1 and 2 greenhouse gas emissions item (for FY2030 emissions to be 32.5% or more down on FY2019 levels) to our (consolidated) group companies. 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. We can say that our VOC and COD emissions are increasing with production quantity, as well as due to changes in goods 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%. Our amount of industrial waste produced during FY2024 was up on FY2023 due to increased production quantities. That said, with respect to rates for recycling and zero emissions, we not only met our targets but achieved improvements on top of those due to continued promotion of both recycling and environmental-burden-reduction measures at every business site.



Trends in Medium-term Environmental Target Results

Area	Covering	Items	Target Figures	2020[*1]	2021	2022	2023	2024
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: FY2024 standards) No more than 111.8 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)	111.1 kilotons (15.3% 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	60.3 tons
		COD[*5]emissions	(Results Report)	122.6 tons	124.2 tons	171.8 tons	210.9 tons	222.2 tons
Industrial waste reduction	Non-Consolidated	Waste quantities	(Results Report)	25,153 tons	28,424 tons	27,621 tons	20,974 tons	28,225 tons
		Recycling rates (excluding container	No less than 80%	81.6%	82.3%	85.0%	83.8%	86.5%

Area	Covering	Items	Target Figures	2020[*1]	2021	2022	2023	2024
		reuse)						
		Rate of zero emissions[*6]	No more than 1%	1.6%	1.0%	0.8%	0.7%	0.6%

*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.

› ESG Aggregate Data

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.

Development of Environmentally-conscious Technology and Products

› The Products and Technologies Creating a Sustainable Future

Environmental Education

Through our online Sustainability Training for all Group directors and employees (including contract and part-time employees) and temp staff, we are presenting opportunities to learn about the environment.

› Sustainability Training

Environmental Communication

Since publishing its CSR Report in 2013, the Nippon Kayaku Group has continually disclosed information pertaining to the environment. Since FY2021, we have integrated these actions into our website in order to enhance the information disclosed. Going forward, we will continue to talk to our stakeholders, and move information disclosures into line with international standards so as to further expand the types of contents disclosed. Furthermore, we will continue to proactively disclose information to stakeholders via Climate Disclosure Project (CDP) surveys concerning climate change, water security and supply chains, and through Environment, Social and Governance (ESG) institution surveys.

Cases of Environmentally-related Violations and Accidents

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 FY2024, 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	2020	2021	2022	2023	2024
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

Each of our business sites has signed various agreements with local authorities and regions. In addition to respecting various environmentally-related agreements and advancing activities designed to reduce environmental burdens, we are contributing to the safety and security of local communities. FY2024 produced no cases of legal violations or penalties incurred with respect to water quality and quantity.

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.

› ESG Aggregate Data(Environmental Accounting)

Climate Change

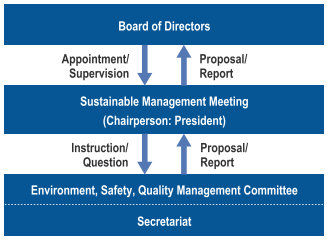
Policy and Basic Approach

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 1.5°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 1.5°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	Large	• 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	• Based on the results of flood simulations, quantify financial impact and implement flood countermeasures
	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 1.5°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	• Reducing greenhouse gas emissions by reviewing packaging formats	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.

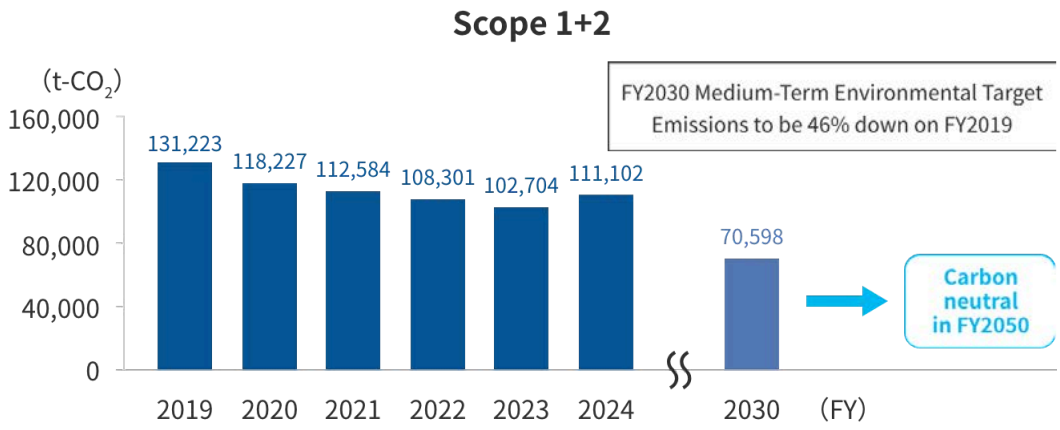
Metrics and Targets

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 com



◆ 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.)

Scope3

Category		Covering	Unit	2020	2021	2022	2023	2024
1	Purchased products and services	Consolidated	t-CO_2e	237,300	294,500	275,000	241,800	259,600
2	Capital goods	Consolidated	t-CO_2e	42,900	26,800	29,600	33,400	55,900
3	Fuel- and energy-related activities not included in Scope 1 or 2	Consolidated	t-CO_2e	21,200	22,300	21,000	20,500	22,700
4	Transportation and distribution (upstream)	Consolidated	t-CO_2e	17,600	22,300	19,700	16,600	18,000
5	Waste generated in operations	Consolidated	t-CO_2e	28,800	31,800	16,200	10,800	14,700
6	Business travel	Consolidated	t-CO_2e	800	800	800	800	800
7	Employee commuting	Consolidated	t-CO_2e	2,400	2,400	2,400	2,400	2,500
8	Leased assets (upstream)	Consolidated	t-CO_2e	Included in Scope 1 or Scope 2				
9	Transportation and distribution (downstream)	Consolidated	t-CO_2e	1,000	1,600	1,500	1,200	1,400
10/11	Processing/usage of sold products	Consolidated	t-CO_2e	-	-	-	-	-
12	End-of-life treatment of sold products	Consolidated	t-CO_2e	23,200	26,400	23,000	17,600	17,300
13	Leased assets (downstream)	Consolidated	t-CO_2e	400	400	400	400	400
14	Franchise/investments	Consolidated	t-CO_2e	-	-	-	-	-
Total[*1]		**Consolidated**	**t-CO_2e**	**375,600**	**429,300**	**389,600**	**345,000**	**393,300**

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

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

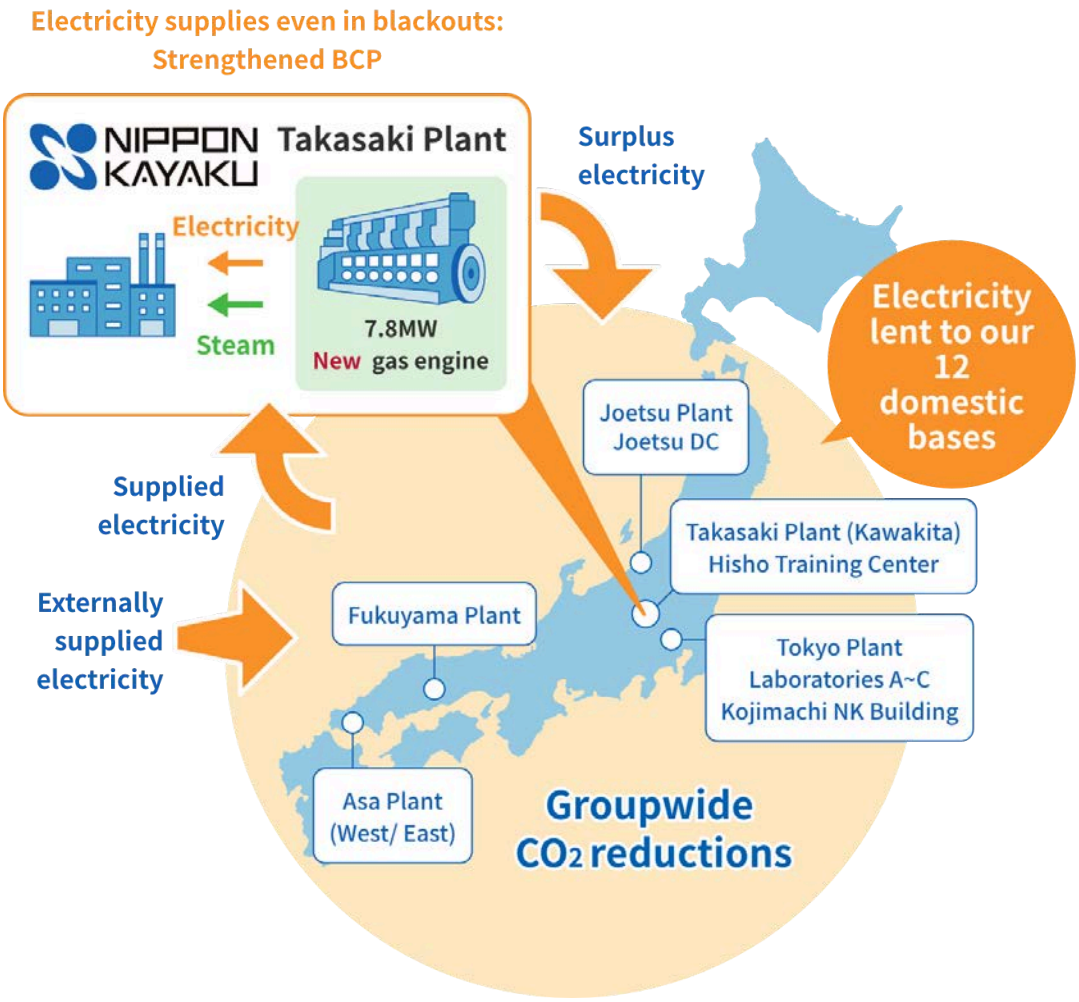
As part of our switchover to low-emission power sources and low-emission-factor renewable energy sources, Nippon Kayaku has introduced solar panels with a view to significantly lowering greenhouse gas emissions.
March 2023 saw the advent of a Solar Power Purchasing Agreement (PPA) Model onsite service 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	2024
MFCA	Non-Consolidated	t-CO_2	60.2	40	77.7
Solar power	Non-Consolidated	t-CO_2	-	658	683

Introduction of a Bundled Energy Network Service for Multiple Sites

April 2025 saw the Nippon Kayaku Group commence the first Bundled Energy Network System geared towards the fields of medicine and science at 12 of its domestic business sites. A new large-scale gas co-generation system was installed at our Takasaki Plant, not only supplying electricity and heat but also allowing for surplus energy to be lent to 12 business sites across Japan. This system generates enough power for around 17,000 homes[*1], and its capacity to lend electricity to other business sites has significantly decreased our Group's overall CO_2 emissions. Furthermore, its Blackout Start (BOS) function[*2] allows for the continuation of electricity and heat supplies to the Takasaki Plant even in times of blackout, thereby contributing to increased business resilience. Overall, this initiative is set to deliver a 45% reduction in CO_2 emissions (compared with FY2023) across all 12 business sites combined, and 18% drop in energy used by the Takasaki Plant (compared with FY2021). The system, which makes us of gas supplied by the city, ensures that heat produced at the time of power generation can be effectively used, thereby ensuring no energy is wasted. As the Takasaki Plant makes use of significant amounts of heat at the time of production, the presence of an onsite power generation system ensures that no heat produced is wasted, and makes a large contribution towards achieving yet higher energy efficiency levels and the transition to carbon neutrality. Henceforth, the Nippon Kayaku Group will continue to pursue CO_2 emission reductions and, through delivering products which contribute to the realization of a decarbonized society, aim for decarbonization across the entire value chain.




Exterior View of the newly-installed Gas Co-generation System


Takasaki Plant

*1 Calculated based on Ministry of Environment data from FY2022 which puts the amount of annual electricity consumed by the average household at 3950kWh Ministry of Environment data:https://www.env.go.jp/earth/ondanka/kateico2tokei/energy/detail/01/

*2 When a blackout (of power systems) kicks in, the system staves off a power cut by generating its own power without the aid of any external power-source.

*3 Covers electricity and gas at the Takasaki Plant and other plants to which power has been lent; emission factors used reflect the adjustments of 2023. Reductions made due to the power system's low CO_2 menu and credits are also included.

Internal Carbon Evaluation

The establishment of our own medium-to-long term internal CO_2 evaluation allows us to not only promote CO_2 reductions across every business unit, but examine and prepare for the introduction of an internal system which encourages decarbonization investments and measures.

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 FY2024.

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 Responsible Care & Technology Division 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.

CDP Disclosure

Since 2020, the Nippon Kayaku Group has provided responses to the CDP, an information disclosure program for the climate-change-related risks faced by businesses. Our responses to the 2024 CDP saw our Climate Change Report graded A and our Water Security Report graded A-.

› External Evaluations and Awards

Management of Chemical Substances

Policy and Basic Approach

The Nippon Kayaku Group, in line with the GFC (Global Framework on Chemicals) international chemical substances management framework, is aiming to minimize the health effects on humans involved in the production and usage of chemical substances, and any negative environmental impacts. Living conveniently and abundantly while using chemical substances requires that we know the properties of each substance and manage them properly. The management and reduction of environmentally hazardous substances which give rise to concerns over human health and environmental impact is an especially important social responsibility for chemical manufacturers. As such, we are organizationally and systematically engaged in the reduction of hazardous chemical emissions through production process improvements and thorough value-chain-wide management of goods containing hazardous chemicals. Furthermore, to prevent industrial accidents caused while handling chemical substances, we are voluntarily advancing our oversight and safety management procedures through taking, for example, hazardous substance exposure prevention measures based on the strengthened risk management approaches of the revised Industrial Safety and Health Act.

Systems

Under our sustainable management system, Nippon Kayaku has set up an Environment, Safety, Quality Management Committee to promote groupwide Responsible Care activities.

› Responsible Care Promotion System

With respect to business activities, each business unit, under the direction of its relevant person in charge, draws up its own chemical substance management-related key issues and specific action plans in order to manage chemical substances appropriately.

Initiatives

Risk Management

◆ Risk Management-based Anti-Exposure Measures

At Nippon Kayaku, when introducing new operations and equipment, or making changes to existing operations or equipment, we initially conduct a risk evaluation via safety inspection and construct safety policies around the ensuing results. We also evaluate the safety of each chemical manufacturing process and response equipment to analyze the causes of hazards. By way of measures to reduce risks in the manufacture and handling of chemical substances, and against the backdrop of the revised Industrial Safety and Health Act of 2016 which mandated risk assessments for workplaces either making or handling chemical substances, we have, through the conducting of safety inspections with respect to either new or altered operations that involve the handling of substances covered by the Act and other hazardous substances, constructed our own internal database on which to base our risk management and risk reduction measures. This database has been updated to include the expanded list of chemical substances subjected to risk management in the revised Industrial Health and Safety Act from 2024 onwards, enabling us to conduct risk management in line with the most current laws, promote it companywide, and centralize oversight. We have also put up GHS picture displays in each chemical-substance-handling workplace so that handlers can recognize the harmful effects of the substances to which they might be exposed.

We are raising awareness among workers of the harmful effects of the chemical substances to which they might be exposed.

Reducing Chemicals of Concern

◆ Reducing Emissions of Chemicals of Concern during the Manufacturing Process

So as to reduce emissions of chemical substances to be reported under the “Act on Assessment of Releases of Specified Chemical Substances in the Environment and the Promotion of Management Improvement,” (PRTR Act) Nippon Kayaku is advancing measures to install processing equipment and phase out certain raw materials. Our calculations for emission amounts of the chemical substances to be reported under the PRTR Act are as follows.

Indicators		Covering	Unit	2020	2021	2022	2023	2024*2
PRTR substance emission amounts	Air	non-consolidated	tons	16.8	25.2	38.7	32.9	27.2
	Water regions	non-consolidated	tons	9.1	14.7	51.4	75.0	1.6
	Soil	non-consolidated	tons	0	0	0	0	0
	Total*1	**non-consolidated**	**tons**	**25.9**	**39.9**	**90.1**	**107.9**	**28.8**

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

*2 Since FY2024, only PRTR substances have been published（FY2023 revisions to the law saw changes to the list of substances, with Japan Chemical Industry Association Survey substances excluded）

◆ Initiatives to Reduce, Replace and Eradicate Chemicals of Concern from Products

In order to appropriately respond to accelerating efforts to strengthen regulations across the globe, we are currently operating our own self-designed management structure based on the legislation and international standards relating to each business unit. By striving to reduce Chemicals of Concern in both raw materials and parts all the way from the product design stage, we are making every effort to minimize the risks to people and the environment.

Mobility & Imaging Business Unit

In its efforts to clarify the chemicals whose inclusion in products is banned, or whose presence should at least be grasped, our Safety Systems Group refers to the GADSL* when seeking to strictly manage or reduce the use of Chemicals of Concern in the development, design, procurement, production and distribution phases of the product life cycle. The GADSL* represents the industrial-standard Chemicals of Concern List for leading car makers, parts makers and chemical manufacturers in Japan, the US and Europe, with chemicals categorized as: “Prohibited,” “Prohibited depending on use or declarable,” and “Declarable based on usage exceeding a given threshold.”

* Global Automotive Declarable Substance List

Fine Chemicals Business Unit

Our Fine Chemicals Business Unit defines as “environmentally hazardous substances” those that appear in “Company Regulations for the Management of Chemical Substances in Products” and the “List of Environmentally Hazardous Substances” as threats to the environment and human health, and whose presence in our own products must be carefully managed. Based on the above, we apply proper handling methods to chemicals contained in each business unit’s products at every stage of the life cycle: design, development, purchasing, manufacturing, and shipping. The List of Environmentally Hazardous Substances is based on, and appropriately updated according to, domestic and international regulations such as REACH Annex XVII (Restricted Substances), REACH SVHC（Candidate List of Substances of Very High Concern）, the RoHS Restricted Substances List, and Japan’s “Chemical Substances Control Law: Class 1 Specified Chemicals”. It proves of considerable help when gathering information on chemical substances present throughout our supply chain. This business unit, without exception, takes action to reduce, replace or eliminate Chemicals of Concern from its products as specified in Management of Chemical Substances in Products regulations.

Respecting Legislation and Presentation of Information

◆ Responses to Laws and the Various Standards

The world’s chemical substance laws and regulations are moving away from being based solely on hazardous chemical properties towards being centered on a “risk base” comprised of both hazardous properties and exposure levels. Meanwhile, each country’s chemical substance registration system is moving from a primary focus on new chemical substances towards demanding that existing chemical substances, too, are assessed for hazardousness and environmental effects, and therefore properly managed.
The EU’s REACH regulations*1, South Korea’s K-REACH*2, and Taiwan’s Toxic and Concerned Chemical Substances Control Act all call for the registration of not only new but existing chemical substances, and require that risk assessments collect and manage necessary information on manufactured and imported quantities, applications, uses and supply chains. So as to respond to these added complications and upgrades to chemical substance management, our Fine Chemicals Business Unit has set up a Chemical Substance Management Section in its Quality Assurance Division which: responds to domestic and international chemical substance registration systems; grasps the trends and movements in each country’s chemical legislation and regulations, makes policy suggestions, and accordingly informs and instructs relevant managers; and both unifies and supports product SDS and label management.

*1 REACH Regulations: EU regulations on Registration, Evaluation, Authorization and Restriction of Chemicals

*2 Act on the Regulation of Manufacture and Evaluation of Chemical Substances: The law on chemical substance registration and evaluation

◆ Conveyance of Information on Product Hazards via SDS and Labels

Whilst the GHS[*1] may serve as the international standard for chemical substance classifications and labeling,
the systems and standards for Safety Data Sheets (SDS) and labels differ from country to country. In addition, so that hazard information can be clearly conveyed to handlers of chemical substances, the relevant information is required to be submitted in each relevant country's language. Our Fine Chemicals Business Unit, through reliance on an abundance of translation skills, information pertaining to each country's laws and regulations, and its system for creating SDS with information on physical and hazardous properties, is responding to the demands for SDSs and labels which correspond to the latest laws and standards of each country. In response to ongoing revisions of Japan's Industrial Safety and Health Act and Japanese Industrial Standards, the EU's CLP regulations[*2] and the USA's HCS[*3], we are working towards stable operation of a system which allows for SDSs and labels to be updated efficiently and accurately. So that everyone may use our products safely and securely, we supply all our customers and relevant individuals with SDSs specifying the chemicals used in every single product, and convey all key information along our supply chain. Furthermore, you may use our enquiry form to demand an SDS whenever you desire.

*1 GHS: Globally Harmonized System of Classification and Labelling of Chemicals
*2 CLP: European regulations for the Classification, Labelling and Packaging of Chemicals
*3 HCS: Hazard Communication Standard for the USA

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

Preventing Pollution

Policy and Basic Approach

The Nippon Kayaku Group is working on preventing pollution and conserving the environment via its Declaration on the Environment, Health and Safety, and Quality. We recognize that increasing environmental value through reducing environmental burdens is a key issue for our Group. With respect to emissions released into the air, water and soil from industrial waste produced, we not only respect national and regional laws but manage such emissions in line with our own yet higher numerical targets. In such ways are we striving to decrease pollution and pollutants.

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

System

- Responsible Care Promotion System

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

Targets and Results

Key sustainability issues	Corresponding SDGs	Action plans	Indicators（KPI）	FY2025 Targets	Results	
					FY2023	FY2024
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.	VOC emissions	(Non-consolidated) Disclose results	(Non-consolidated) 32.9 tons	(Non-consolidated) 60.3 tons
			COD emissions	(Non-consolidated) Disclose results	(Non-consolidated) 210.9 tons	(Non-consolidated) 222.2 tons

Initiatives

Reducing VOC and Toxic Air Pollutant Emissions

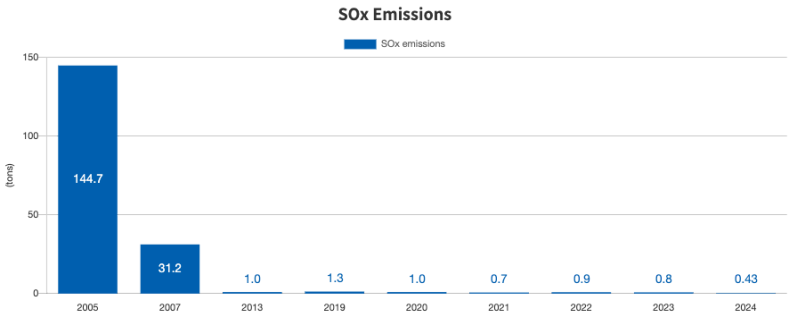
We are not only working to calculate and reduce emissions of VOCs listed in the Air Pollution Control Act, but of VOCs specified by the Japan Chemical Industry Association also. We are also engaged in reducing emissions of toxic air pollutants from 12 substances we have voluntarily agreed to control,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



Wastewater Management

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 FY2024 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

Education and Training

◆ Head Office

A Seminar on the Soil Contamination Countermeasures Act

September 2023 saw our Technology Unit's Responsible Care &Technology 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.

Related Data

› ESG Aggregated Data(Industrial Waste and Pollutants)

Effective Use of Resources

Policy and Basic Approach

To contribute to the realization of a sustainable society through efficient use of finite resources, the Nippon Kayaku Group unites as one behind eco- and sustainability-conscious initiatives across the entire product life cycle, through R&D, production, distribution, sales, recycling and disposal. Our Sustainability Action Plan highlights recycling rates and zero-emission rates as key indicators, meaning that in addition to reducing waste, we increasingly view waste produced through business activities as a future resource and strive for its effective use.

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

System

- Responsible Care Promotion System

Audit

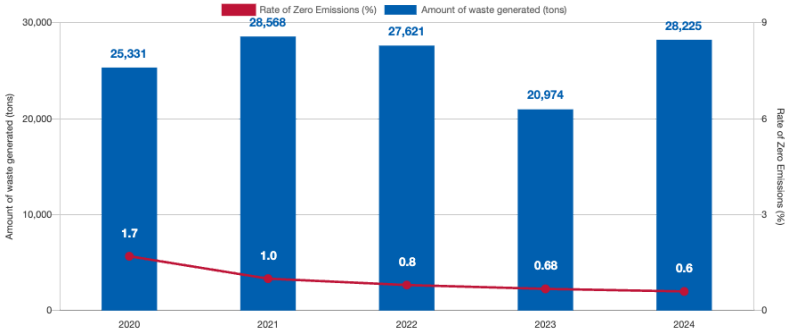
In order to confirm whether wastewater and waste are being appropriately managed at every business site and Group company, the Nippon Kayaku Group conducts audits in the form of Core Environment, Safety and Health Diagnostic Checks. These Checks allow us to confirm any problems or inadequacies regarding 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

Targets and Results

Key sustainability issues	Corresponding SDGs	Action plans	Indicators (KPI)	FY2025 Targets	Results		FY2024 Initiative-related Topics
					FY2023	FY2024	
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.	Total waste output	(Non-consolidated) Disclose results	(Non-consolidated) 20,974tons	(Non-consolidated) 28,225tons	• Emissions increased for every item due to increased production volumes, but recycling rates and zero-emission rates still improved
			Recycling rate	(Non-consolidated) 80% or higher	(Non-consolidated) 83.8%	(Non-consolidated) 86.5%	
			Zero emission rate	(Non-consolidated) 1% or less	(Non-consolidated) 0.68%	(Non-consolidated) 0.6%	

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



Initiatives

Waste reduction

◆ 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	2024
Plastic waste emissions	Non-Consolidated	tons	954	888	885	788	780
	Group companies	tons	235	277	326	326	294
	Total	**tons**	**1,619**	**1,593**	**1,602**	**1,375**	**1,074**
Recycling rate	Non-Consolidated	%	80.2	80.8	81.8	91	95

◆ Business Unit Initiatives

Mobility & Imaging Business Unit

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.

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. Waste sorting not only takes place on the shop floor, but also in such areas as the employee break room, where general waste is sorted. FY2024 saw us team up with regional customers to begin deploying reusable polystyrene packaging-a project which we are now working to a greater number of customers.

Recycling amounts

Category		Covering	Unit	2021	2022	2023	2024
Metals		KSM	tons	1	3	9	9.7
Plastics		KSM	tons	50	73	77	48.1
Lumber		KSM	tons	10	4	9	10.5
Cardboard		KSM	tons	24	23.3	26	36.5
Municipal waste		KSM	tons	160	165	112	114.4
Packing material	Trays	KSM	pieces	-	-	-	5,975
	Polystyrene	KSM	tons	-	-	-	0.3
	Saving	KSM	10,000 yen	-	-	-	86.5

Fine Chemicals Business Unit

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. As a result of our exploration of using this sludge as a resource that could help decrease environmental burdens, it is now being effectively used by one incineration firm as a heat-adjustable fuel (or so-called “reduced fuel”) and by another incineration firm which converts incinerated ash into materials for cement or roadbeds. 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.

Life Science Business Unit

Pharmaceutical Product Initiatives

Our environmentally-friendly packaging initiatives see us respect domestic and overseas legislation and regulations related to the environment, envisage the risks associated with product development, manufacturing processes and business activities, and advance efforts to reduce environmental burdens, prevent pollution, save energy, mitigate climate change, conserve resources, and reduce waste.
Our pharmaceutical packaging has been certified by the Forest Stewardship Council (FSC) and has acquired an FSC license. We are sequentially switching over our pharmaceuticals packaging boxes, patient brochures and shipping boxes to FSC certified paper, as well as widening the use of eco-friendly (non-VOC) inks. As of February 2025, of our 66 products with 122 items, 21 products with 37 items (30%) of packaging material and 48 of 117 leaflet materials (41%) have been switched over to environmentally-friendlier alternatives. FY2025 has seen our new carbon neutral initiative rise in prominence, with efforts made to reduce plastic use and CO_2 emissions through, for example, switching from cup-shaped to pedestal-shaped protective wrapping.

Related Data

› ESG Aggregated Data(Industrial Waste and Pollutants)

Water Resource Conservation

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

Responsible Care Promotion System

Initiatives

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. 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 (FY2024)[*1]

Region or Country Name		Unit	Water amounts used at each water stress level				
			High	Medium-high	Medium	Low-medium	Low
Asia	Japan	thousand m^3(Number of bases)	0	1,600 (2)	17 (3)	8,891 (5)	0
	China	thousand m^3(Number of bases)	18 (1)	477 (3)	0	0	-
	Malaysia	thousand m^3(Number of bases)	0	0	0	0	48 (1)
Europe	Czech Republic	thousand m^3(Number of bases)	0	20 (1)	0	0	0
	Netherlands	thousand m^3(Number of bases)	0	0	0	0	3 (1)
	UK	thousand m^3(Number of bases)	1 (1)	0	0	0	0
North and Central America	America	thousand m^3(Number of bases)	75 (1)	0	0	1 (1)	0
	Mexico	thousand m^3(Number of bases)	9 (1)	0	0	0	0
Total[*2]		thousand m^3(Number of bases)	103 (4)	2,097 (6)	17 (3)	8,891 (6)	52 (2)

*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 exactly match the sum of each item above.

Water Management Plan and Reductions

◆ 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

As part of its capital investment activities to promote environmental conservation, Kayaku Safety Systems Europe (KSE) introduced a water storage tank system in 2017 so that rainwater may be used more efficiently. It has installed the equivalent of 750.5 m^3 tank. 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	2020	2021	2022	2023	2024
Volume of water store (planned)	KSE	m^3	4,877	5,040	5,040	5,040	5,040
Volume of water stored (actual)	KSE	m^3	6,177	7,234	6,802	7,786	7,043
Economic benefits	KSE	10,000 yen	361	411	335	428	477

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 FY2024 resulted in a 44% (6870-liter) reduction in use of water resources.

Indicators	Covering	Unit	2022	2023	2024
Volume of water consumed (actual)	KSM	m^3	15,762	12,792	8,892
Volume of water saved*	KSM	m^3	-	2,970	6,870
% Volume of water saved*	KSM	%	-	19%	44%
Economic benefits	KSM	10,000 yen	-	63	146

* Compared with FY2022

CDP Disclosures

Since 2020, the Nippon Kayaku Group has provided responses to the CDP, an information-disclosure program concerning climate change risks to business. Our responses to the 2024 CDP gained us an A grade for our Climate Change Report and an A- grade for our Water Security Report.

› Recognition and Awards

Related Data

› ESG Aggregated Data(Water)

Natural Capital and Biodiversity

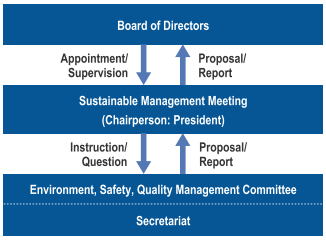
Policy and Basic Approach

In addition to climate change, recent years have seen the decline of ecosystem services brought on by losses of natural capital and biodiversity gain increasing focus as a cause of serious harm to business activities. We now have a heightening realization of not only business dependency on natural capital, but of how business activities hugely impact the natural environment.
Against that backdrop did the 2022 UN Biodiversity Conference (COP15) adopt a new Kunming-Montreal Global Biodiversity Framework with its vision of “living in harmony with nature” by the year 2050. Furthermore, its targets for 2030 require companies to evaluate the dependency and effects of their business on the natural environment, as well as associated risks and opportunities, and disclose relevant information.
The Nippon Kayaku Group supports that line of thinking and, based on the framework provided by the Taskforce on Nature-related Financial Disclosures (TNFD), is identifying and evaluating how our business depends on natural capital and what kinds of impacts upon nature that brings. We are also continually analyzing and examining the nature-related risks and business opportunities that potentially stem from the above.
Going forward, we will work on improving our resilience and human capital conservation though procurement of sustainable raw materials, increasingly efficient use of water resources in the production process, and reductions in chemical usage. In that way shall we aim for a sustainable society in which we live in harmony with nature.

Information Disclosure based on TNFD Proposals

Governance

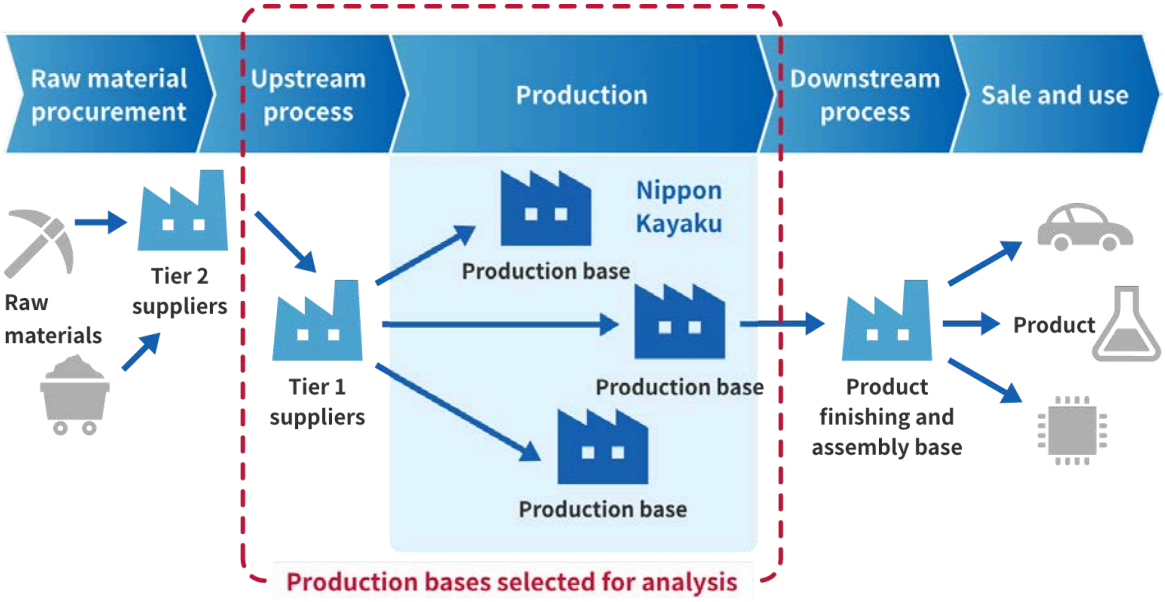
In addition to climate change mitigation, the environmental aspects of our Group’s sustainability issues include “Reductions in Waste and Wastewater” and “More Efficient Use of Water Resources,” showing how sustainable use of natural capital occupies a prominent position in our Key Sustainability Issues. These issues are managed under a similar promotion and audit system to that surrounding our climate change mitigation measures.
Our Sustainable Management Meeting, chaired by our President, considers our natural-capital-related initiatives pertaining to, for example, use of water resources, waste and pollutants. It discusses these initiatives in tandem with climate change mitigation measures as part of business planning, coordinating and evaluating current activity status. The results of such discussions are reported to the Board of Directors, which performs the Audit and Supervisory functions for this particular system.
Furthermore, one of the Sustainable Management Meeting’s advisory committees, the Environment, Safety, Quality Management Committee (chaired by the Director In-charge of the Technology Unit), coordinates all environmentally-related policies including those pertaining to climate change mitigation. By taking a cross-cutting perspective on Group matters, this committee helps deepen discussion over issues concerning natural capital and biodiversity.
While driving forward our nature-related initiatives, we believe it important to consider our links with stakeholders and the local communities surrounding our operation sites. We have therefore installed respect for human rights as the foundation of sustainable management under our Nippon Kayaku Group Human Rights Policy–based on international human rights standards–and are carrying out this commitment across all business activities.
We require all suppliers (business partners) to observe our human rights policies and, out of consideration for the safety and health of local residents, also conduct human rights impact assessments which include anti-pollution and water stress elements. We therefore plan how to avoid or reduce risk in line with international standards.
We have additionally fixed a Sustainable Mineral Procurement Policy to govern our purchases of mineral resources. Avoiding raw material purchases from conflict zones and high-risk regions allows us to also avoid complicity in human rights violations, environmental destruction and dishonest practices. We require that our suppliers attend our Sustainable Procurement Guidebook seminars and sign a related consent form. We have also carried out a Sustainable Procurement Survey aimed at both suppliers comprising the top 90% of our purchases and all new suppliers.
Step-by-step are we advancing our human rights system for all regional stakeholders involved in our business, including indigenous peoples, and looking to expand the scope of our human rights due diligence going forward.
For details on our human rights due diligence, please see here. For details on Sustainable Procurement, please see here.



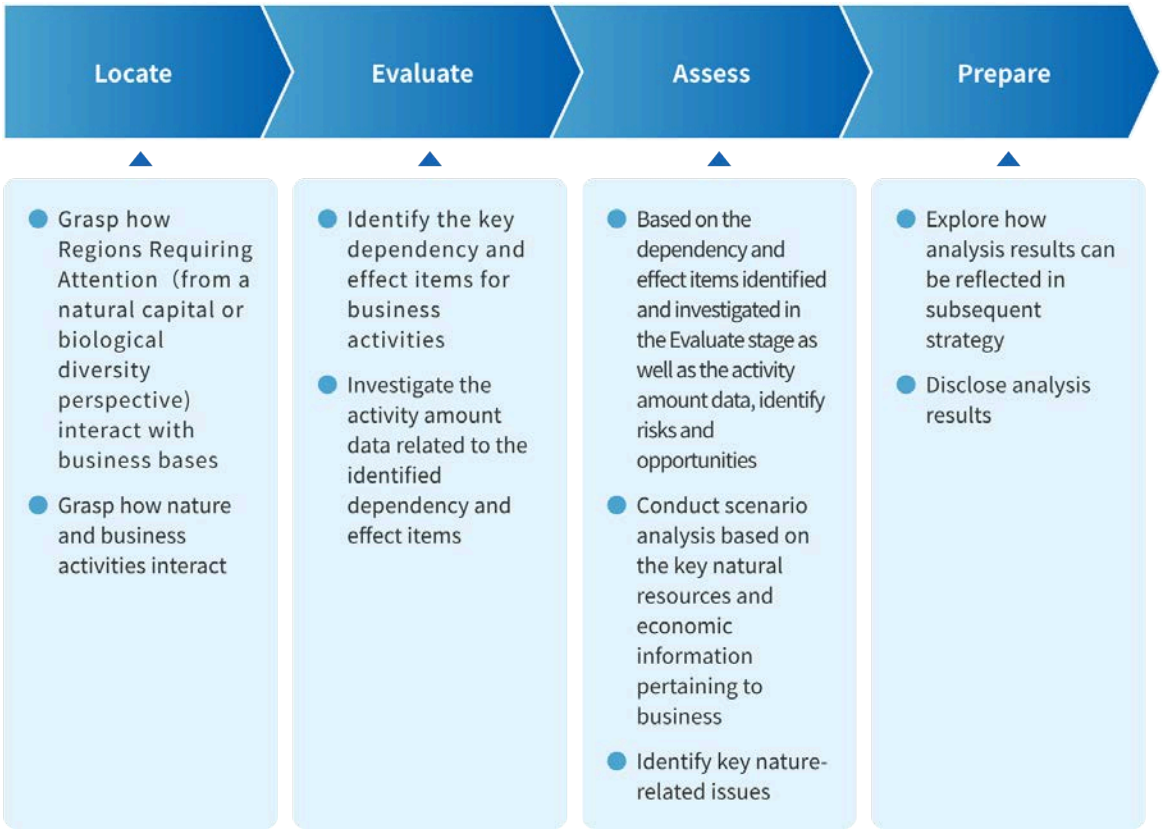
Strategies

In expanding several businesses onto a global scale, the Nippon Kayaku Group feels it essential to ascertain and evaluate the nature-related risks and opportunities facing each business unit. As such, we have utilized the LEAP approach recommended in the TNFD framework to implement our risk and opportunity assessments for natural capital and biodiversity.
FY2024 saw our analysis trained on two of our Group's three business units: Mobility & Imaging's Life Sciences Group (automobile safety parts) and Fine Chemicals. We prioritized such an analysis as these business units make use of raw materials which have significant impacts on nature and mineral resources, while their products also impact the natural environment during the stages of processing and use.
Our analysis focused on both the product manufacturing sites and main supplier bases of the business concerned, thereby allowing us to identify risks and opportunities across the entire business process.

Schematic Diagram of the Main Value Chain



Analysis Flow based on the LEAP Approach



◆ Locate: Identification of Regions Requiring Attention

As our relationship with nature means that we greatly depend on the environments around our business bases, we studied these environments from three standpoints: “Key Biodiversity Areas,” “Highly-Sufficient Ecosystem Areas” and “High Water-Risk Areas.” The tools we used and the relevant standpoints are listed in the table below.

External Tools used in our Regions Requiring Attention Assessment

Tool Name	Outline	Supplied/ Developed by	Research Perspectives
IBAT（Integrated Biodiversity Assessment Tool）	An online tool providing highly reliable data on protected areas across the world, important habitats, distribution of information on endangered species etc., and biodiversity	International Union for Conservation of Nature and Natural Resources (IUCN) World Conservation Monitoring Center (WCMC) BirdLife International Conservation International	Are business bases present in important biodiversity areas? (IUCN protected areas and Key Biodiversity Areas (KBA))?
Global Forest Watch	An online platform providing high-frequency, high-resolution satellite data on worldwide deforestation, tree-felling and regeneration	World Resource Institute（WRI）	
GLOBIO Model	An estimation model for making integrated evaluations and predictions about human impacts on biodiversity, such as land use, climate change and infrastructure preparation	Netherlands Environmental Assessment Agency (PBL)	Are business bases located in areas with a highly-sufficient ecosystem?
Aqueduct	An online water risk evaluation tool for assessing and mapping out systematic risks and multiple water-related factors such as water stress, water shortage, flooding and droughts.	World Resource Institut (WRI)	Are business bases located in regions with high physical water risks such as water stress?
Climate Vision	An online platform for analyzing climate change risks such as flooding and storm tides on a global scale with high-resolution images, and which allows for risk assessments and financial impacts to be calculated based on future climate scenarios	Gaia Vision Inc.	Are business bases located in high-flood-risk regions?

List of Regions Posing Risks to Directly-operated Business Bases

Related Units	Business Base Name	Important regions for biological diversity	Regions with high ecosystem sufficiency	Regions with high physical risks
Safety Systems Business	Safety Head Plant	Located in a Designated Conservation Area in which biological diversity takes on high importance	-	-
	Kayaku Safety Systems (Huzhou) Co., Ltd.（KSH）	-	-	Located in a high water stress region
	Kayaku Safety Systems de Mexico, S.A. de C.V.（KSM）	-	-	Located in a high water stress region
Fine Chemicals Business Unit	Asa Plant	-	-	Located in a high flood-risk region
	Tokyo Plant	-	-	Located in a high flood-risk region
	KAYAKU CHEMICAL (WUXI) CO.,LTD.（KCW）	-	-	Located in a high flood-risk region
	WUXI ADVANCED KAYAKU CHEMICAL CO., LTD.（WAC）	-	-	Located in a high flood-risk region

As shown in the table, the results of our study helped us identify that, of the Nippon Kayaku Group’s operation bases, the Safety Head Plant (Himeji) is located in a region of importance to protecting biodiversity, while KSH (China) and KSM (Mexico) are situated in high water-stress regions. Though KSH and KSM do not use large quantities of water per se, we have realized they need to strengthen their water resource management. We also recognize the flood risks posed by climate change and are studying the effects in detail through a scenario analysis in line with TCFD disclosure requirements. Of the business sites analyzed this time, four (Asa Plant, Tokyo Plant, KCW (China) and WAC (China)) fall under high-risk status, and we are continually looking at how to strengthen relevant response measures. Meanwhile, all business sites assessed from the ecosystem sufficiency standpoint are located in areas which have changed beyond a certain degree due to human social activities; none can therefore be said to be located in a “sufficient” ecosystem. Henceforth, to ensure that no further ecosystem sufficiency is lost due to business activities, we will continue to mount initiatives aimed at reducing environmental burdens. We have also analyzed the sites of our 20 biggest suppliers by volume and, through an audit process, have pressed for improvements at sites located in regions with high environmental risks. We are therefore promoting consideration of the natural environment across the entire supply chain.

◆ Evaluate: Identification and Assessment of Dependency and Effects

For our assessment of how our Group's business activities depend and impact upon natural capital, we made use of ENCORE* to construct a heat map of every step of the manufacturing process from the upstream stage. The analysis results can be found in the table below.

* ENCORE（Exploring Natural Capital Opportunities, Risks and Exposure）was co-developed by organizations such as the Natural Capital Finance Alliance and the UN Environment Program World Conservation Monitoring Centre. It is a tool which helps us visualize the types of natural capital on which the business sector and industrial activities depend, and the concomitant effects.

Results of the ENCORE Dependency Item Assessment

Activity				Dependency											
				Service supplied	Adjustment and maintenance services										
Business	Value Chain Step		Business Activity	Water supply	Climate matters for the region as a whole	Rain pattern adjustments	Regional climate matters	Air purification	Soil and sediment preservation	Purification treatment for solid waste	Water purification	Water current adjustments	Flood controls	Storm relief	Others (Natural excesses)
Across all business areas	Upstream	Crude oil/ Natural gas	Drilling for crude oil and natural gas	M	H	-	L	VL	L	L	VL	M	H	L	M
			Manufacture of refined oil products	L	VL	-	L	VL	M	L	H	M	M	M	L
			Manufacture of plastic products	L	VL	VL	L	VL	L	L	M	M	M	M	L
		Minerals	Mining of ferrous and non-ferrous metals	H	H	VH	L	VL	M	L	VH	H	H	M	M
			Manufacture of Type 1 steel, precious metals, non-ferrous metals	H	VL	M	L	M	L	L	M	H	M	M	-
			Manufacturing business for other metal products, metal processing service activities	M	VL	-	L	-	L	M	M	M	M	M	L
		Common	Manufacture of electrical parts and circuit boards	M	VL	VL	L	VL	L	L	M	M	M	M	L
Safety Systems Business	Direct operations	Automobile parts manufacturing		L	VL	VL	L	VL	M	L	M	M	M	M	L
Fine Chemicals Business Unit		Chemical manufacturing		M	VL	VL	L	VL	M	M	M	M	M	M	L

Results for the ENCORE Effect Item Assessment

Activity				Effect										
				Impact					Output					
Business	Value Chain Step		Business Activity	Land are used	Freshwater area used	Seafloor area used	Water use	Non-bioresource use	GHG emissions	Air pollutant emissions	Soil and water pollutant emissions	Emissions of soil and water-polluting nutrient salt	Solid waste	Interference (noise pollution, light etc.)
Across all business areas	Upstream	Crude oil/ Natural gas	Drilling for crude oil and natural gas	L	VH	VH	M	-	H	H	VH	-	M	VH
			Manufacture of refined oil products	L	-	-	L	-	M	H	VH	-	M	VH
			Manufacture of plastic products	L	-	-	L	-	M	M	VH	-	M	M
		Minerals	Mining of ferrous and non-ferrous metals	M	VH	VH	M	H	M	H	VH	-	VH	VH
			Manufacture of Type 1 steel, precious metals, non-ferrous metals	L	-	-	M	-	H	H	VH	M	M	VH
			Manufacturing business for other metal products, metal processing service activities	L	-	-	M	-	L	L	VH	-	L	M
		Common	Manufacture of electrical parts and circuit boards	L	-	-	L	-	VL	L	H	-	L	M
Safety Systems Business	Direct operations	Automobile parts manufacturing		L	-	-	L	-	VL	L	M	-	L	M
Fine Chemicals Business Unit		Chemical manufacturing		L	-	-	M	-	M	M	VH	-	M	VH

Our assessment results revealed that manufacturing bases in both our Safety Systems and Fine Chemicals business have a moderate level of dependency on their surrounding environments, as the self-maintenance functions of nearby soil and river environments are influenced by natural-disaster risks. As it was also indicated that traces of pollutants could be present in wastewater produced from manufacturing activities, these sites have been assessed as moderately dependent on underwater microorganisms and their water purifying actions.
We also noted that our Fine Chemicals business, through its dependency on water resources, emissions of pollutants, waste production and noise pollution, is having an increasingly sizable impact on nature. We have not only appropriately grasped the amounts of activities behind the inputs and outputs, but are taking steps and conducting relevant monitoring to try and limit these activities below the applicable regional standards. As it has furthermore been indicated that pollutant emissions and noise pollution are having major environmental impacts across our entire value chain, we consider it important to grasp the extent of those issues at supplier business sites, especially those located in Regions Requiring Attention. As natural environmental impacts are especially pronounced in mineral mining at the commencement of the upstream stage, we will strive for a more detailed grasp of upstream processes and are fully aware of the need to encourage that necessary steps be taken.

◆ Assessment: Identification and Evaluation of Risks and Opportunities

Our consideration of nature-related risks and opportunities was based on the Regions Requiring Attention analyzed in our Locate and Evaluate phases, as well as the dependency and effect relationships. We also made use of environmental data from business sites to identify both risks and opportunities posed by nature to our business, and, conversely, the impact our business has on nature. The risks and opportunities we identified can be found in the table below.

Risk Chart

Category	Main risks to business activities	Impact on nature	When the risk will emerge	Financial impact	Chief measures
Policy, legal and regulatory	Increased costs of responding to strengthened emissions regulations for air, water and soil pollutant, and operational restrictions	Improved local environments through strengthened emissions regulations on air, water and soil pollutants	Medium to long-term	Moderate	・Emissions status for every pollutant measured and disclosed ・Combustion facilities renewed at high VOC-producing plants; emissions reductions confirmed ・Waste water treatment equipment renewed ・Zero emissions into soil of PRTR listed substances
	Raw material price increases stemming from strengthened emissions regulations for air, water and soil pollutants		Medium to long-term	Moderate	・Engaging our suppliers with the aim of promoting sustainable procurement
	Increased costs of responding to strengthened regulations on waste emissions	Fewer hazardous substances emitted through reduction of waste	Medium to long-term	Moderate	・Tracking implemented in pursuit of newly-fixed 1% or less zero-emissions targets ・Waste volume measurements per-sales-unit completed for high-waste-producing business sites
Market	Raw material price increases due to demand concentrating around eco-friendly materials	Loss of existing ecosystems due to excess felling of biomass materials and human land reclamations	Medium to long-term	Large	・Engaging our suppliers with the aim of promoting sustainable procurement
Reputational	Worsening ESG evaluations and reputation from non-eco-friendly operations including raw material purchases, leading to blacklisting by customers	An improved environment through heightened importance of environmental considerations	Medium to long-term	Moderate	・Zero use of restricted chemical substances inside Japan and in certain overseas countries ・Taking steps to ensure zero procurement of raw materials containing chemical substances appearing in a survey based on Green Procurement Regulations
Acute physical risks	Suspended operations and repair costs incurred at certain business sites due to flooding of nearby rivers and landslides caused by typhoons and heavy rain etc.	Collapse of ecosystems in surrounding regions, including rivers; soil deterioration	Short to long-term	Moderate	・Quantification of financial impacts, and firming up of flood measures based on flood simulation results
Chronic physical risks	Operational restrictions or suspensions due to water shortages	Declining river levels and groundwater shortages will cause the balance of river and neighboring ecosystems to collapse, triggering biodiversity loss	Medium to long-term	Moderate	・Strengthening of water-saving measures during the production process; examination of water reuse and recycling methods ・Water intake efficiency with respect to sales ascertained through water intake measurements ・Measures to reduce water use and introduce water storage tanks at water-stress-risk business bases have commenced

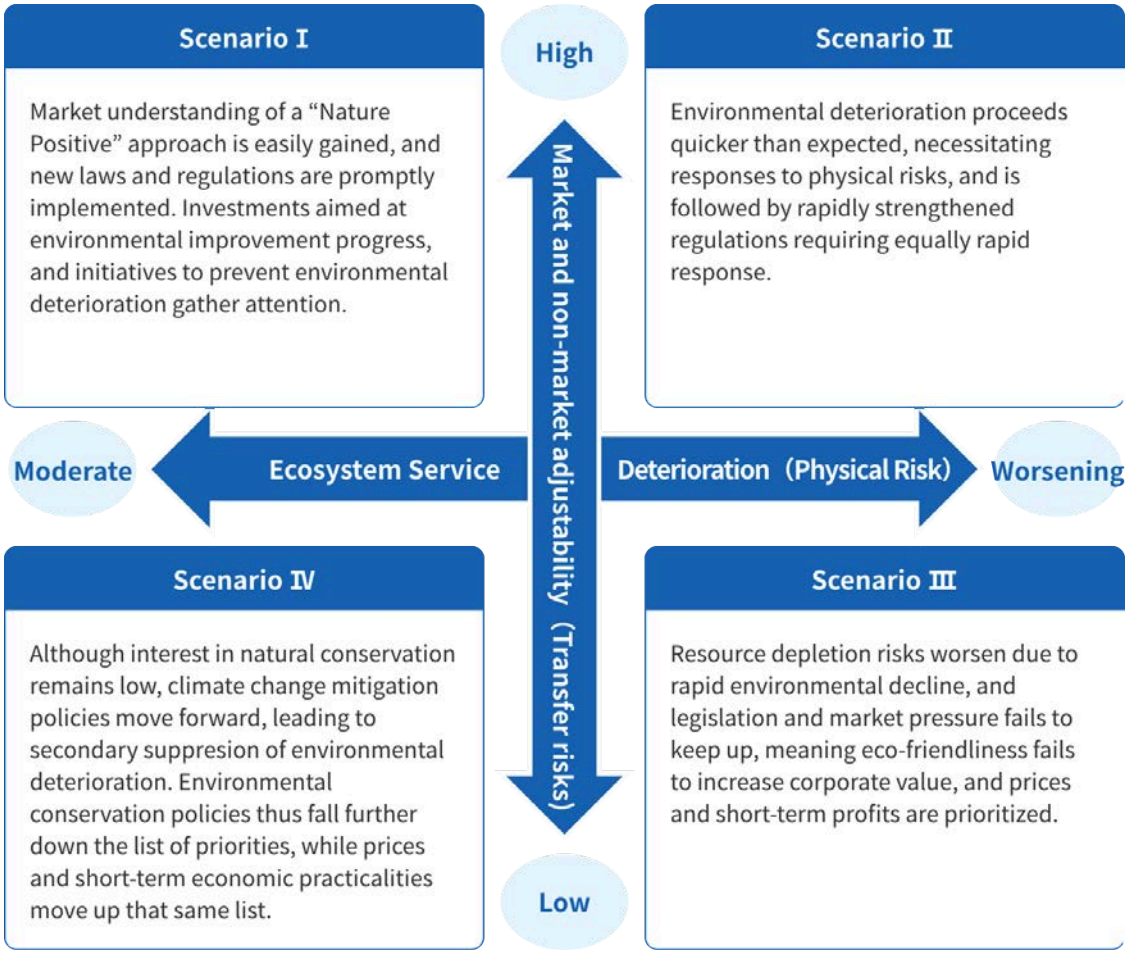
Opportunities Chart

Category	Main opportunities for business activities	Impact on nature	When the opportunities will emerge	Financial impact	Chief measures
Resource efficiency	Production cost savings due to more efficient use of water resources	Water resources in the rivers and ground will be conserved, in turn preserving the ecosystems of rivers and surrounding areas	Short to long-term	Small	・Water use reduction measures implemented at every plant ・Specific targets under examination
	Cost savings due to waste recycling and reuse	Fewer hazardous waste emissions due to sustainable reuse of resources	Short to long-term	Small	・Measures for recovery of heavily-used solvents generally implemented ・Investigating and exploring the merits of other solvent recoveries
Products, services and market	Expanded demand for products that contribute towards reducing environmental burdens across their entire life cycle	Improved environment due to reduced environmental burdens	Medium to long-term	Large	・Looking at switching over from petroleum-derived to biomass-derived organic materials ・Aiming for development of lighter products which use fewer resources and reduce environmental burdens at the point of use
Reputational	Increased corporate value from improved ESG evaluations and reputation due to natural conservation activities during the conduct of business	Improved environment due to promotion of eco-friendly activities	Medium to long-term	Moderate	・Proactive disclosure of environmental information ・Examination of environmentally-related goals

◆ Scenario Analysis

Our identified risks and opportunities were then assessed against TNFD Scenario Analysis Guidance. With a focus on the present, we imagined several possible future worlds (scenarios) and considered the uncertainty each would add to nature-related risks and opportunities, and the various degrees of impact.
Based on TNFD guidance, our analysis for FY2024 saw us think up four potential nature-related scenarios, applicable to any company, around the twin pillars of “Ecosystem Service Deterioration (Physical Risk)” and “Market and Non-Market Adjustability (Transfer Risk).” The prospective scenarios are outlined in the table below.

Scenario Images



Based on these four scenarios, each business site's interactions with nature and environmental data,
and the policy directions of regions and national governments, the strategies demanded of the Nippon Kayaku Group can be organized as follows.

Scenario Ⅰ

In order to appropriately catch up with domestic and international environmental regulations, suitable establishment of product development and business processes becomes a must. Furthermore, the promotion of nature-positive-focused initiatives means environmental decline lessens and risks become more limited, but reducing the environmental burdens of business activities remains important from a reputational perspective in the eyes of stakeholders. Additionally, appropriate and highly-transparent information disclosures will take on added importance.

Scenario Ⅱ

Water resources become the natural capital on which business activities most depend and, based on previous water extraction restrictions imposed due to droughts, drought policies modeled on water shortage assumptions will grow in importance. Furthermore, as monitoring of natural environment decline will only strengthen, we will face a greater onus on devising initiatives designed to increase water use efficiency and disclosure of related information-especially appropriate information on the external effects of business activities.

Scenario III

Similarly to Scenario II, of primary importance will be to heighten our resilience against physical risks through water-resource-related initiatives. Additionally, in a market which prioritizes short-term profit and prices, value should presumably be created through aiming for short-term profits and deployment of physical risk mitigation measures from the standpoint of lowering running costs through better resource efficiency.

Scenario IV

Climate change proceeds apace, meaning natural capital conservation falls down the list of priorities. This suggests that over the longer term, the situation will move to somewhere in-between Scenarios II and III. We therefore assess that initiatives conducted from long-term viewpoints will take on especial importance. In order to enable prompt responses to physical risk manifestations and increased focus on nature conservation, we will also find it important to prepare for the gathering and disclosure of nature-related information, and developing a product design process which contributes to lowering environmental burdens and more efficient natural resource use.

◆ Material Regions

Based on the results of the above scenario analysis, we have determined that the Nippon Kayaku Group's appropriate response to nature-related risks and opportunities is to prioritize securing water resources and promote highly efficient use of them, and install a product development process which contributes to nature conservation. With this in mind, we have identified a water-resource-dependency standard based on water-intake-to-sales, and have defined high-dependency regions as "Material Regions." The affected business sites can be found in the table below.

Materiality Regions for Directly-operated Business Bases

Related Business	Business Base Name
Fine Chemicals Business Unit	Nippon Kayaku Fukuyama Plant
	WUXI ADVANCED KAYAKU CHEMICAL CO., LTD.（WAC）

Going forward, with the focus on the above business bases and those with high levels of water stress, we will examine the setting of targets for water use amounts and efficiency, and promote relevant initiatives.
（For the Nippon Kayaku Group's current initiatives on water resource use, please see here）.

◆ Upcoming Analysis

While our FY2024 analysis focused on our Safety Systems Business and Fine Chemicals Business Unit, our upcoming analysis will cover our PolaTechno and Life Science businesses in identical style. Based on results which showed particularly strong interactions with natural capital in the raw material procurement stage, we shall also survey our mining partners, strengthen initiatives, and aim to construct a due diligence system covering the entire value chain.

Management of Risks and Impacts

The Nippon Kayaku Group has fixed "Reduced Energy Consumption and Greenhouse Gas Emissions," "Reductions in Waste and Wastewater," and "Efficient Use of Water Resources" as Key Sustainability Issues, and is proactively tackling these issues as important elements of its companywide responsible care activities. (For more on how we identified our Key Sustainability Issues, please see here).
Our Responsible Care and Technology Division takes the lead in identifying and evaluating our dependencies and effects on natural capital, as well as nature-related risks and opportunities. It conducts investigations and analyses based on the TNFD-recommended LEAP approach, and uses the results to determine our Group's key priority issues.
The issues are organized along the lines of the LEAP approach and assessed against two criteria: seriousness and frequency. "Seriousness" is evaluated from the size of the figures in the relevant indexes for business sites facing the risks in question, "frequency" is evaluated from the number of bases related to each particular business, and the issues receiving the highest overall scores are selected for prioritization.

Selected issues are then reported to our Environment, Safety, Quality Management Committee which coordinates our responsible care activities. Such reports consist of current policy and status updates, issues, problematic points and response status updates, and form the basis for examination of policy drafts for the next financial year. Our Sustainable Management Meeting then discusses that financial year's policy further before making its final decision.
Based on the new fixed policy for the financial year, each business site and group company rolls out its responsible care activities which include natural-capital related initiatives, the status of which is confirmed and audited through periodical Central Environment, Safety and Health Inspections.
（For further information on our Responsible Care Policy and key issues, relevant systems and audits, please see here）.

Metrics and Targets

The Nippon Kayaku Group has installed “Reduced Energy Consumption and Greenhouse Gas Emissions”, “Reductions in Waste and Wastewater” and “Efficient Use of Water Resources” as Key Sustainability Issues, and has set the following targets geared towards their realization.

Nature-related Targets

Indicators(KPI)	FY2025 Targets	FY2024 Results	FY2024 Initiative-related Topics
Greenhouse gas emissions (Scope 1+2)	(Target achieved in FY2030) Under 70,598 tons (a reduction of over 46% on FY2019) (Target achieved in FY2024) Under 111,838 tons	111,102 t-CO_2	• We received our first A-List Rating in the CDP's Climate Change Field • Promotion of MFCA and solar-powered PPA models were sequentially introduced • Emissions increased for every item due to increased production volumes, but recycling rates and zero-emission rates still improved • Environmentally-friendly products and technologies are being developed 【Safety Systems Business】 KMY commenced production of a light cylinder inflator (new generation inflator) whose CO_2 emissions are 30% down on previous generation inflators. A green propellant MGG was developed. 【Functional Materials Business】 A prototype of a CFRP/GFRP-use thermosetting resin targeted for use in aircraft was tested and assessed on a real aircraft. Development of a biofuel-containing thermosetting resin that is high-temperature resistant and highly reliable. 【Color Materials Business】 Development of industrial-use inkjet ink (for coated paper and soft packaging). Expanded sales of developers for phenol-free thermal paper. 【Catalysts Business】 Advancement of joint-development of a hydrogen-producing catalyst. Development of a catalyst using materials informatics techniques which contributes to reducing amounts of, and improving yields from, raw materials used. Development of a catalyst to manufacture basic chemicals such as propylene from biofuel. 【Pharmaceuticals Business】 Promoted the adoption of materials posing lesser environmental burdens in response to moves towards resource conservation in the field of packaging.
VOC emissions	(Non-consolidated) Disclose results	(Non-consolidated) 60.3 tons	
COD emissions	(Non-consolidated) Disclose results	(Non-consolidated) 222.2 tons	
Total waste output	(Non-consolidated) Disclose results	(Non-consolidated) 28,225tons	
Recycling rate	(Non-consolidated) 80% or higher	(Non-consolidated) 86.5%	
Zero emission rate	(Non-consolidated) 1% or less	(Non-consolidated) 0.6%	
Goal setting in line with SBT and consideration and implementation of specific measures	Progress disclosed	Published in Topics	
Disclosure in line with TCFD recommendations	Progress disclosed	Information disclosed	
Develop products and technologies with consideration for environmental issues	Progress disclosed	Published in Topics	

Furthermore, disclosure status for nature-related indexes whose disclosure is either encouraged or requested by TNFD guidance can be seen in the table below.

Nature-related Index Calculation Table

Index Number	Index	Measurement Index	Disclosure location
—	GHG Emissions	Scope1,2	ESG Aggregated Data＞Greenhouse Gas Emissions
C2.0	Total amounts per-type of pollutants released into soil	Total amounts per-type of pollutants released into soil	ESG Aggregated Data＞Industrial waste and Pollutants＞PRTR substances
C2.1	Waste water	Waste water amount（Total and breakdown）	ESG Aggregated Data＞Water
		Main pollutants within wastewater（COD, total phosphorus, total nitrogen, SS）	ESG Aggregated Data＞Industrial waste and Pollutants＞Wastewater Management
C2.2	Generation and treatment of waste	Waste amounts (hazardous/non-hazardous, general waste, industrial waste breakdown, waste breakdown, treatment method breakdown)	ESG Aggregated Data＞Industrial waste and Pollutants＞Waste
C2.3	Plastic Pollution	Plastic use amounts（Plastic packaging materials）	ESG Aggregated Data＞Material Flow＞Amounts of Raw Materials Used
C2.4	Air-pollutants other than greenhouse gases (GHG)	Breakdown of non-GHG air pollutants (VOC, NOx, SOx etc.)	ESG Aggregated Data＞Industrial waste and Pollutants＞Air Emissions
C3.0	Water removal and consumption from water-scarce regions	Per-country water use amounts and numbers of bases given for Water-stress Regions	ESG Aggregated Data＞Water＞Water-stress Investigation Results for Nippon Kayaku Group Manufacturing and R&D sites (FY2024)
C7.3	Opportunities	Capital outlays on nature-related opportunities; capital financing and invested amounts	ESG Aggregated Data＞Environmental Accounting＞Environmentally-related capital investments

Moving forward, we will press on with the releases of indexes not yet disclosed and, based on the results of such analyses as the LEAP approach, plan to determine targets centered upon the water-resource-related indexes deemed most important.
In such a way shall we strive to improve transparency around the environmental burdens of business activities, and aim to continuously reduce environmental impact on a groupwide scale.

Initiatives

Water-related Initiatives

- Preventing Pollution
- Water Resource Conservation

◆ Business Site Initiatives

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 Prefectural Park Gunma-no-Mori 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 occupies a vast site of some 560,000m^2, with the 110,000m^2 of green land reported under the Factory Location Act remaining virtually in a state of natural vegetation, meaning its original ecosystem remains intact amid this natural cluster of trees within the Takasaki urban landscape. The site’s eastern, southern and northern sides are enclosed by three rivers within the Tonegawa river system: the Class A Karasu River; the Ino River, a tributary; and the Class A Kasu River within the Hirose River tributary. The northern side also abuts Gunma Prefectural Park: Gunma no Mori, which is home to deer, racoon dogs and kingfishers. We will continue to protect this abundant natural environment and ecosystem.

In addition to the Green Zone, our on-premises environmental facilities include a creek. This is part of the facility which used hydropower to drive manufacturing equipment in the days when the site served as a gunpowder factory. The vertical axis water turbine used at the time has also been carefully stored and preserved. The creek temporarily pools the water subjected to activated sludge processing by the onsite wastewater treatment facility. Only after confirming that creek water quality complies with water management standards do we release it into the river, thereby taking every precaution to prevent environmental pollution. Located far away from residential areas within a natural cluster of trees, and close to various rivers, the creek represents a safe place for animals to come, and serves as an annual oasis for migratory birds seeking food from the forests and rivers. Observing the arrival or migratory birds and their northward departures makes for an interesting seasonal employee event.