

## [Important Issues]

# Reducing Energy Consumption and Greenhouse Gas Emissions

## Policy and Basic Approach

In recent years, we have been faced with a rising sense of crisis about climate change as we witness abnormal weather conditions and devastations of the natural environment in various parts of the world. This has resulted in an acceleration of the global trend toward decarbonization as seen at COP27 (27th UN Climate Change Conference), with the Japanese government declaring a green growth strategy based on the Paris Agreement that seeks to achieve carbon neutrality by 2050. The Nippon Kayaku Group has also endorsed the Paris Agreement, and in addition to the FY2030 medium-term environmental targets adopted in 2020, the Group is working with the ultimate goal to achieve carbon neutrality by FY2050, with an eye to the future.

In order to make a significant reduction to our greenhouse gas emissions, the Nippon Kayaku Group will confront the issues of climate change not only by implementing comprehensive energy-saving efforts but also by installing power sources such as solar power that have low CO<sub>2</sub> emissions and by switching to power derived from recycled energy that has a low emissions coefficient. We also aim to achieve decarbonization throughout our value chain by providing products that contribute toward realizing a decarbonized society and by promoting supplier engagement to that end.

## Information Disclosure Based on the TCFD Recommendations

### Governance

The Sustainable Management Meeting, chaired by the president, deliberates, reviews and evaluates the business plan and other items related to the Nippon Kayaku Group's future responses to climate change. The results of such deliberations, reviews and evaluations are reported to the Board of Directors and, under this structure, are subject to being observed and supervised by the Board. Furthermore, the Environment, Safety, Quality Management Committee (chaired by Executive Director In Charge of Technology Unit) has been created as one of the specialized committees under the Sustainable Management Meeting to oversee the implementation of climate change initiatives. This committee delves deeper into issues related to climate change from a standpoint that extends across the entire Group.



### Strategy

Nippon Kayaku has multiple businesses being deployed on a global scale, and is presented with various risks and opportunities depending on the business area. In order to identify the impact that climate change can have on each business, we evaluated the climate-related risks throughout the Group in accordance with the TCFD recommendations, and further considered the opportunities in each business area. In identifying the risks and opportunities related to climate change, the time period when the risks will emerge has been defined as follows.

	Period	Reason
Short-term	FY2022 to FY2025 (4 years)	Period falling within the Medium-term Business Plan <b>KAYAKU Vision 2025 (KV25)</b> that started in FY2022
Medium-term	Up to FY2030	In line with goals for FY2030 that are set in the Nippon Kayaku Group Environmental Targets of the Medium-term Business Plan
Long-term	Up to FY2050	In line with the year set as the goal for Japan's NDC target

### ◆ Climate-related Risks

Business risks related to climate change are based on the IPCC's Representative Concentration Pathway (RCP 2.6, 8.5) scenarios, IEA's Sustainable Development Scenario (SDS) and the Stated Policies Scenario (STEPS) for both the 2°C and 4°C scenarios.

### ◆ Risks in Transitioning to a Decarbonized Economy for the 2°C Scenario

Category	Major risks	Period of risk emergence	Financial impact	Major countermeasures
Policies & regulations	Increased operation costs from tighter emissions regulations	Short to long term	Medium	<ul style="list-style-type: none"> <li>Implement dispersed power for each site, such as solar power and high-efficiency cogeneration power generators</li> <li>Reduce material loss by utilizing MFCA and implement comprehensive energy-saving activities</li> <li>Encourage suppliers to reduce emissions through engagement activities</li> </ul>
	Rising price of electricity, LNG, etc.	Short to long term	Medium	
	Increased raw material costs from tighter emissions regulations	Short to long term	Medium	
Market & reputation	Increased costs from disclosure of environmental information and LCA calculations, etc.	Medium to long term	Small	<ul style="list-style-type: none"> <li>Rationalize the emissions calculation method at each site and systemize the LCA calculations</li> </ul>

### ◆ Physical Risks from the 4°C Scenario

Category	Major risks	Period of risk emergence	Financial impact	Major countermeasures
Acute & chronic physical risks	Increased costs from flood damage caused by typhoons, heavy rain events, high tides, etc.	Short to long term	Medium	<ul style="list-style-type: none"> <li>When building new plants, account for the possibility of flooding when considering the geographical situation and the configuration and placement of equipment</li> <li>Strengthen efforts to save water used during production, and consider reusing and recycling water</li> <li>Enhance the work environment such as by improving air-conditioning, and promote the automation of high-temperature work processes</li> </ul>
	Impact on operations due to water shortage	Medium to long term	Small	
	Reduced labor productivity due to increased temperatures	Medium to long term	Small	

## ◆ Opportunities in Each Business Area in Transitioning to a Decarbonized Economy for the 2°C Scenarios

Business area	Business environment		Opportunity	Period of opportunity creation	Financial impact*
Safety Systems	Tightened regulations against greenhouse gas emissions in various countries & regions	<ul style="list-style-type: none"> <li>Demand for methods of mobility and transportation with relatively low emissions is expanding globally.</li> </ul>	<ul style="list-style-type: none"> <li>The compact-size, lightweight characteristics, and shape of automotive safety components are diversifying with the introduction of EVs and autonomous driving.</li> <li>Demand for safety components for unmanned aerial vehicles such as drones is expanding.</li> </ul>	Short to long term	Large
Polatechno		<ul style="list-style-type: none"> <li>Sales of internal combustion engine vehicles are greatly restricted by region.</li> </ul>	<ul style="list-style-type: none"> <li>Demand for safety display device materials such as sensors and HUDs is expanding with the introduction of EVs and autonomous driving.</li> <li>Demand for polarizing plates that contribute to low power consumption of display devices is also expanding.</li> </ul>	Short to long term	Medium
Functional Materials		<ul style="list-style-type: none"> <li>Advances in social changes, such as growth of smart cities</li> <li>Heightened demand for increased energy efficiency of electronics products</li> <li>Increased demand for storage batteries able to handle large output fluctuations in response to expanding use of recyclable energy</li> </ul>	<ul style="list-style-type: none"> <li>Increase in semiconductor materials from growth of smart cities and DX</li> <li>Expansion of functional materials that help reduce energy consumption of display devices</li> <li>Expansion of low-emission materials due to the increased shift in raw materials toward biomass feedstock</li> <li>Expansion of resin materials that help make mobility frames more lightweight</li> </ul>	Short to long term	Large
Color Materials		<ul style="list-style-type: none"> <li>Global expansion of demand for mobility/transport methods that have relatively low emissions</li> </ul>	<ul style="list-style-type: none"> <li>Expansion of ink for digital on-demand that enables low-carbon printing</li> <li>Expansion of dimming glass/film that controls incident sunlight</li> </ul>	Short to long term	Large
Catalysts			<ul style="list-style-type: none"> <li>Growth of catalyst for producing green energy, such as hydrogen</li> <li>Growth of catalyst for promoting the use of biomass-derived raw materials</li> </ul>	Medium to long term	Large
Pharmaceuticals			<ul style="list-style-type: none"> <li>Studying items within the entire range of business activities that will become opportunities</li> </ul>	Short to medium term	Small
Agrochemicals		<ul style="list-style-type: none"> <li>Direct impact is limited</li> </ul>	<ul style="list-style-type: none"> <li>A certain level of temperature increase is expected even for the 2°C scenario, thus expanding the use of biostimulants that help maintain and improve agricultural productivity</li> <li>Expanded use of existing agrochemicals to deal with new problems with pests</li> </ul>	Medium to long term	Small

\* Financial impact: Large = 2 billion yen or more; Medium = 0.5 to 2 billion yen; Small = 0 to 0.5 billion yen

## Risk Management

The Nippon Kayaku Group identifies the reducing energy consumption and greenhouse gas emissions as a key sustainability issue related to climate change.

The M-CFT Mitigation of Climate Change Team was created to coincide with the start of the **KV25** under a governance system comprised of the Board of Directors, the Sustainable Management Meeting and the Environment, Safety, Quality Management Committee. This response team serves a central role in identifying and evaluating climate change risks, while also executing other specific measures such as actively implementing energy-saving efforts and pushing forward with environmental investments.

## Metrics and Targets

As a metric against the risk of climate change, the Nippon Kayaku Group has established the target of reducing greenhouse gas emissions (Scope 1 and 2) for the entire Group by 32.5% in FY2030 compared to FY2019. In order to achieve this target, we are starting by aiming to reduce greenhouse gas emissions by 3% every year during the **KV25** period. We are also conducting advanced studies on making a shift to green energy such as hydrogen and ammonia in order to achieve carbon neutrality for Scope 1 and 2 by FY2050. Also, in order to enable us to include Scope 3 in establishing future targets on reducing emissions, we have been working on enhancing the accuracy of our Scope 3 calculation methods in anticipation of being able to individually determine the amount of emissions for each product (carbon footprint). Our calculation results for Scope 1, 2 and 3 have been examined by a third party since FY2022. In order to reduce Scope 3 emissions, we will work together with our business partners in reinforcing efforts to reduce environmental impacts throughout the entire supply chain.

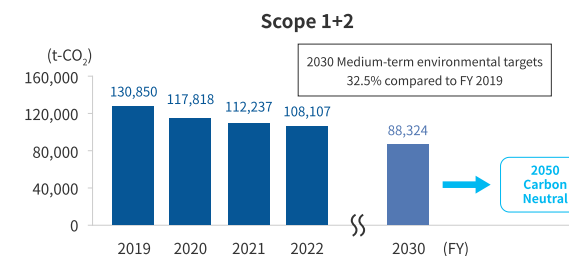
## ◆ Reduction in the Amount of Greenhouse Gas Emissions

In the Paris Agreement adopted at COP21, held in 2015, each country pledged to pursue CO<sub>2</sub> emission reduction targets at the national level, with the aim of limiting the increase in global average temperatures to "below 2°C," and working towards a level of "below 1.5°C" above pre-industrial levels. The Nippon Kayaku Group has also adopted medium-term environmental targets, specifically of reducing the amount of CO<sub>2</sub> emitted from energy sources by at least 32.5% or more by FY2030, compared with FY2019, as a standalone target for Nippon Kayaku (non-consolidated) in FY2020, and expanded the scope to the entire Nippon Kayaku Group in FY2021.

In addition to energy saving and optimization of production processes, the Nippon Kayaku Group is also working to introduce power sources with low CO<sub>2</sub> emissions, such as solar power, and switch to low-emission-factor electric power derived from renewable energy. Our Scope 1 and 2 emissions, which are used as metrics in our FY2030 medium-term environmental targets, have been diminishing every year as shown below.

Scope 1: Direct emissions of greenhouse gas generated from a source owned or managed by the business operator themselves (emissions from fuel usage, manufacturing processes, etc.)

Scope 2: Indirect emissions of greenhouse gas from the use of power, heat or steam supplied by another business (emissions from purchased power, etc.)



## ◆ Disclosure of Data on CO<sub>2</sub> Emissions (Scope 3) throughout the Supply Chain

In recent years, there has been an increasing tendency for companies to keep tabs on, manage and disclose information on indirectly emitted CO<sub>2</sub> throughout the supply chain. At the Nippon Kayaku Group, we are not only aggregating and managing Scope 1 and Scope 2 emissions as before, but are also calculating Scope 3 emissions within the supply chain.

Since FY2017, Nippon Kayaku has been calculating Scope 3 emissions on a non-consolidated basis, but from FY2019, this has been expanded to include both domestic and overseas Group companies. The Nippon Kayaku Group will continue to calculate and manage our data based on the General Guidelines on Supply Chain GHG Emission Accounting issued by the Ministry of the Environment, in order to systematically implement initiatives to reduce CO<sub>2</sub> emissions throughout the supply chain.

Scope 3: Indirect emissions other than Scope 2 (emissions from raw material procurement, employee commuting, business travel, waste processing consignment, product usage, disposal, etc.)

Category		Emissions (thousand ton-CO <sub>2</sub> /year)			
		FY2019	FY2020	FY2021	FY2022
1	Purchased products and services	243.6	237.3	294.5	275
2	Capital goods	42.7	42.9	26.8	29.6
3	Fuel- and energy-related activities not included in Scope 1 or 2	22.4	21.2	22.3	21
4	Transportation and distribution (upstream)	19.0	17.6	22.3	19.7
5	Waste generated in operations	26.5	28.8	31.8	16.2
6	Business travel	0.8	0.8	0.8	0.8
7	Employee commuting	2.5	2.4	2.4	2.4
8	Leased assets (upstream)	Included in Scope 1 or Scope 2			
9	Transportation and distribution (downstream)	1.0	1.0	1.6	1.5
10/11	Processing/usage of sold products	-	-	-	-
12	End-of-life treatment of sold products	15.4	23.2	26.4	23
13	Leased assets (downstream)	0.4	0.4	0.4	0.4
14/15	Franchise/investments	-	-	-	-
Total of Scope 3		374.3	375.6	429.3	389.6
Scope 1		36.2	35.3	37.5	35.5
Scope 2		94.7	82.5	74.7	72.6
Total of Scope 1+2+3		505.2	493.4	541.5	497.7

Calculation method: As a rule, the amount of CO<sub>2</sub> 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](#)

➤ [Environmental data](#)

## Initiatives

The Nippon Kayaku Group is actively pursuing energy and resource efficiency measures in the manufacturing processes at each of our production facilities, in order to achieve our medium-term environmental targets of reducing greenhouse gas emissions (Scope 1+2) for the FY2030 by 32.5% compared to the FY2019 levels and carbon neutrality by FY2050. To accomplish this goal, we are implementing Material Flow Cost Accounting (MFCA) and solar power generation initiatives.

### Material Flow Cost Accounting (MFCA)

MFCA is a methodology aimed at continuously reducing environmental impact resulting from production activities by identifying and clarifying energy and material losses during the manufacturing process. Nippon Kayaku is working to cost savings and reduce environmental impact, including waste generation and CO<sub>2</sub> emissions in the manufacturing processes, through the implementation of MFCA.

At our Fukuyama factory, which specializes in the production of pigments for consumer inkjet printers, the effectiveness of recovering solvents from waste solvents through distillation was confirmed as a result of laboratory studies and practical testing based on MFCA results since the latter half of 2018, and it led to a shift in our processes to reuse recovered solvents in manufacturing. As a result, we not only reduced the amount of waste sent for external incineration and solvent purchases but also achieved significant environmental impact reductions and cost savings.

We have expanded the use of MFCA to other manufacturing facilities, introducing it at the Tokyo factory and Atsusa factory in 2019, the Kashima factory in 2020, and the Joetsu factory in 2021, in order to commit to further promoting environmental impact reduction and manufacturing cost reduction. Our ultimate goal is to extend MFCA implementation to the entire group.



Distillation Recovery Facility

## Solar Power Generation

Nippon Kayaku is working to significantly reduce greenhouse gas emissions by introducing solar power generation as a means of introducing power sources with low CO<sub>2</sub> emissions and switching to electricity with a low emission coefficient derived from renewable energy sources.

In March 2023, we introduced the on-site service of the solar power generation PPA model to the Fukushima Plant.

The solar power generation PPA model is a model in which Nippon Kayaku leases its premises and roof to a third party to install solar power generation equipment and purchases the generated power for a long period of time, and it enable us to use power generated from renewable energy sources and to reduce electricity costs. We expect to reduce greenhouse gas emissions by 731 t-CO<sub>2</sub> per year by using electricity generated by the solar power generation system installed at the Fukuyama Plant.

Nippon Kayaku will promote the installation of company-owned solar power generation equipment at our manufacturing sites other than the Fukuyama Plant, in addition to the solar PPA model.



### Contribution to Greenhouse Gas Emission Reduction

Initiatives	Unit	FY2022
MFCA	t-CO <sub>2</sub>	60.2
Solar power generation	t-CO <sub>2</sub>	-