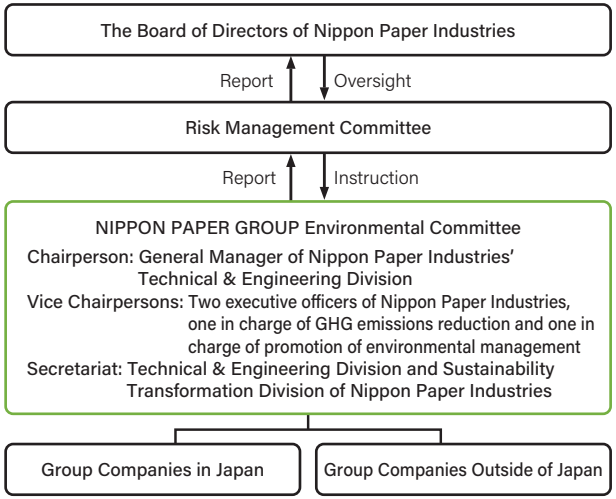
Environmental Management

1 Basic Policy

P94 NIPPON PAPER GROUP Environmental Charter

2 Promotion Structure



- NIPPON PAPER GROUP's management risks related to the environment are identified, and countermeasures are implemented by the NIPPON PAPER GROUP Environmental Committee. The committee is chaired by the General Manager of the Nippon Paper Industries' Technical & Engineering Division, who is the Representative Director of the Company.
- The Committee consists of major Group companies in Japan that have production sites.
- Under the supervision of the Board of Directors, the Committee manages, evaluates, and deliberates on the achievement status of environmental targets based on the NIPPON PAPER GROUP Environmental Charter.
- Once a year, the operational status and deliberations of the Committee are reported to the Board of Directors through the Risk Management Committee.
- In FY2024, the Committee reported to the Board of Directors through the Risk Management Committee on environmental law violations and risks related to the transition to a carbon neutral society.

3 NIPPON PAPER GROUP Environmental Vision 2050, NIPPON PAPER GROUP Environmental Targets 2030

- The Group has set a vision for 2050 and the ideal state of the Group in 2050, and is working on the Environmental Targets 2030 formulated to achieve it.
- In the Environmental Targets 2030, the Group will promote the reduction of greenhouse gas (GHG) emissions, the maximization of forest value, the expansion of recycling, and the reduction of environmental burden throughout the value chain in order to realize a sustainable society.
- The Group aims to achieve a sustainable society where people and nature coexist by providing products that have a low environmental impact throughout their life cycle.

NIPPON PAPER GROUP Environmental Charter

[Philosophy]

NIPPON PAPER GROUP is committed to helping preserve the global environment over the long term and contributing to the development of a recycling based society by carrying out its corporate activities in recognition of the importance of biodiversity.

Environmental Targets 2030 Path to Sustainable Future	Environment Vision 2050 Sustainable Future Vision
Expand recycling (Wastepaper food containers, etc.)	**Create and circulate resources**
Maximize forest value (Improve CO_2 fixation efficiency in overseas plantations by 30% vs. 2013 level)	
Reduce GHG emissions (Scope 1 and 2) (54% reduction vs. FY2013 level*)	**Carbon neutrality**
Reduce environmental burden (Final waste disposal volume from production sites in Japan of 2% or less)	**Minimum impact**

* Emissions related to production except for the Energy Business field

Environmental Management

NIPPON PAPER GROUP Environmental Vision 2050 (Sustainable Future Vision)

1. Carbon Neutrality

Reduce greenhouse gas emissions to virtually zero.

- Minimize greenhouse gas emissions through the efficient use of energy and the use of renewable energy sources.
- Minimize greenhouse gas emissions in the value chain through collaboration with stakeholders.
- Become carbon neutral by offsetting residual emissions through CO_2 absorption and fixation in forests and CO_2 removal technologies.

2. Creation and Circulation of Resources

Create sustainable forests that preserve biodiversity and procure and supply resources.

- Maintain and expand forests with multifaceted value and maximize forest value.
- Procure and supply a variety of woody biomass resources that can be used as raw materials for various products.

Promote the utilization of woody biomass resources to contribute to better living in a circulation-oriented society.

- Provide a variety of materials and products made from woody biomass resources.
- Promote resource circulation and product recycling as a social infrastructure.

3. Minimum Impact

Minimize the environmental impact of the Group's business activities.

- Minimize the input and output of resources that impact the environment.
- Provide society with products and services that have a low environmental impact throughout their entire life cycle.

Environmental Management

Progress and Status of Initiatives in NIPPON PAPER GROUP Environmental Targets 2030 (FY2024)

1. Reduce greenhouse gas emissions

Reduce greenhouse gas emissions through fuel conversion and energy conservation measures.

Target	Progress and status of initiatives
● Reduce direct greenhouse gas emissions by 54% from FY2013 levels*1.	The Group reduced GHG emissions (Scope 1 and 2) by 41% compared with FY2013 levels (progress rate: 76%).
● Accelerate fuel conversion and increase the ratio of non-fossil energy use to at least 60%.	The non-fossil energy ratio to energy used was 44% (progress rate: 73%).
● Improve total energy consumption per unit of production and distribution by 1% from the previous year.	Compared with 2023, the total energy consumption per unit of Nippon Paper Industries in its production processes decreased by 2.8% in the Paper Business and 2.2% in the Paperboard Business, while increasing by 3.8% in logistics processes.
● Reduce greenhouse gas emissions from product transportation in the Paper and Paperboard Business in Japan by 23% relative to FY2020 levels through modal shift and other measures*2.	Greenhouse gas emissions from product transportation in the Paper and Paperboard Business in Japan decreased by 15% relative to FY2020 levels (progress rate: 66%).
● Collaborate with stakeholders to reduce indirect greenhouse gas emissions.	The Group calculated Scope 3 emissions from major pulp and paper companies in Japan, identified categories where efficient reductions are possible, and began considering reduction measures.

*1 Emissions related to production except for the Energy Business field
*2 Applied to Nippon Paper Industries

2. Promote the creation and circulation of resources

Promote the protection and cultivation of forest resources and biodiversity-conscious forest management.

Target	Progress and status of initiatives
● Improve CO_2 fixation efficiency in overseas forest plantations by 30% compared to 2013 levels.	In AMCEL (Brazil), the chip productivity, used as an indicator for CO_2 fixation efficiency, increased by 23.9% compared to FY2013.
● Obtain and maintain forest certification for all company forests in Japan and overseas.	The Company and overseas plantation subsidiaries have obtained and maintained forest certification (FM) (FSC®*1, PEFC, and SGEC) for all of the company-owned forests in Japan and overseas.
● Ensure the traceability and sustainability of all woody biomass resources used.	The Group has worked to confirm sustainability and enhance traceability by making use of forest certification systems, and through other efforts. The wood chips and pulp used for papermaking in FY2024 were all made from wood approved by FSC®*2 or PEFC (including controlled wood and controlled sources).
● Promote the use of domestic forest resources.	The use of domestic wood at all Nippon Paper Industries mills reached 36.0% in FY2024 (based on actual purchases).

*1 FSC® Logo License No. FSC® C023383 (AMCEL: Brazil)
*2 FSC® Logo License No. FSC® C001751 (Nippon Paper Industries)

Promote the circulation of resources.

Target	Progress and status of initiatives
● Work to build a recycling system that promotes resource circulation.	The Group is working with our customers, including processing manufacturers, to establish a recycling scheme for hard-to-use paper products made from laminated paper, which has been a material that could not be recycled. In consultation with various local authorities, the Group has established its own collection routes for paper waste and has begun to achieve results in the recycling of used release paper, beverage paper cups, and other materials.
● Utilize 12,000 t/year of unused wastepaper which has been difficult to recycle, through the development of recovered paper utilization technology.	The actual use of unused and difficult-to-treat wastepaper was 11,908 tonnes in FY2024. (Breakdown: 4,680 tonnes of wastepaper for food and beverage containers, 7,228 tonnes of other difficult-to-use wastepaper)

3. Reduce environmental burden

Reduce the environmental burden of manufacturing processes.

Target	Progress and status of initiatives
● Reduce air pollutants by 15% and water pollutants by 15% compared to FY2018 levels.	Reduction rate at production sites in Japan: SOx 50%, NOx 26%, dust 27%, COD/BOD 35%, and SS 17%
● Reduce the final disposal of industrial waste at production sites in Japan to 2% or less.	The final disposal of industrial waste at production sites in Japan was 1.6%.
● Provide society with products and services that have minimal environmental impact throughout their entire life cycle.	By replacing mechanical pulp with chemical pulp, the Company has developed and launched the "N.Polaris43 Yuki®," a publication paper product, which reduces GHG emissions during production by approximately 17% compared to conventional products.

Environmental Management

4 Strengthening Environmental Compliance

The Group is strengthening its environmental compliance from a preventive standpoint, using a two-pronged approach of building systems to prevent problems and establishing a framework that ensures all problems are covered, and engaging in its business activities while giving priority to legal compliance.

Two-Pronged Approach

(1) Building Systems to Prevent Problems

- Building a workplace that emphasizes the importance of the environment (environmental compliance training)
- Strengthening the system for identifying applicable laws and regulations
- Implementing measures from both the facility and technology perspectives

(2) Establishing a Framework that Ensures All Problems are Covered

- Enhancement of environmental audits
- Enhancement of the environmental management system
- Engaging in environmental communication and active information disclosure

Environment-related* Fines and Penalties

Environment-related fines and penalties (FY2024)	0 Yen

* Laws and regulations regarding the environment of water intake, wastewater, air, and waste

1. Building a Workplace that Emphasizes the Importance of the Environment (Environmental Compliance Training)

To promote the creation of workplaces that emphasize the importance of the environment, the Group is working on systematic environmental training for employees.

- Encourage employees to obtain qualifications related to pollution prevention and to participate in external training to acquire specialized knowledge.
- Photo contest "NIPPON PAPER GROUP Eco Photo Award" (Environment Month every June)
- Environmental e-Learning
- Dissemination on the in-house portal site of environmental education materials and environmental information from each mill and office (FY2024: Posted 8 environmental education materials)

Achievements in Environment-related Employee Education (FY2024)

Topic/Title	Target participants	Number of participants	Number of sessions
Basic Course on Life Cycle Assessment	Sales Department staff (Nippon Paper Industries)	319	1

2. Strengthening the System for Identifying Applicable Laws and Regulations

To respond appropriately to revisions to environment-related laws and regulations, the Group uses a law search system and other means to share information on revisions of laws and their trends and has established a system to ensure compliance with laws and regulations.

3. Implementing Measures from Both the Facility and Technology Perspectives

- The Group extracts the risk of environmental accidents from two perspectives: the possibility of an accident and its impact on the environment, and introduces equipment and measurement equipment necessary for preventing accidents.
- Each Group company is engaged in continuous measures to prevent large-scale leaks of oil or chemical agents, including the installation of liquid containment barriers (oil fences, etc.) and measuring devices.

4. Enhancement of the Environmental Management System

- The Group conducts regular environmental audits based on "The Approach to Environmental Management for Pollution Prevention," which is the action guideline for environmental management efforts issued by the Ministry of the Environment and the Ministry of Economy, Trade and Industry.
- Audits are double-checked by an internal audit by each mill or office, and by an audit by the environmental department at head office.
- In addition to document audits (confirmation of management records for wastewater and other waste materials) and on-site audits (confirmation of facilities such as chemical tanks), the environmental department at head office accompanies internal audits by the Management Audit Office to strengthen audits of the environmental management of Group companies.
- The Group thoroughly manages its environmental impact, including factory wastewater and exhaust gases, on a daily basis through regular measurements by third parties and, at some of the mills, constant monitoring using measuring equipment and inspectors' measurements.

Environmental Management

5. Engaging in Environmental Communication and Active Information Disclosure

- The Group has also established the "NIPPON PAPER GROUP Risk Communication Guidelines" and is implementing initiatives based on the guidelines.
  - Risk communication for local residents and local governments held at each mill/office (in principle, held at least once a year)
  - Preliminary briefing session on the environmental impact of construction and operation when introducing large equipment, etc.
- The Group tries to listen to the opinions of all, including accepting opinions and questions on its website, establishing complaints and inquiries desks at mills, and utilizing an environmental monitor system to request information from local residents.
- When a complaint is received, the Group moves swiftly to determine possible causes, and implement emergency and permanent solutions.
- The Group also explains to the person who lodged the complaint what happened and what was done to resolve the situation, so that they can be satisfied that the Group has responded appropriately.

Environment-related Complaints in Japan (FY2024)

Complaints	Noise/ Vibration	Odor	Dust and mist dispersal	Smoke	Other	Total
Number	1	1	2	0	0	4

5 Acquisition of Major Environmental Certifications and Awards

Status of ISO 14001 Certification Acquisition (as of March 31, 2025)

Company name	Mills/Operating division/Production subsidiaries
Nippon Paper Industries	Asahikawa Mill, Siraoi Mill, Akita Mill, Ishinomaki Mill, Iwanuma Mill*1, Nakoso Mill, Ashikaga Mill, Soka Mill, Fuji Mill, Gotsu Mill, Otake Mill, Iwakuni Mill, Yatsushiro Mill, Higashimatsuyama Mill
Nippon Paper Crecia	Tokyo Mill, Kaisei Mill, Koyo Mill, Kyoto Mill
Crecia Kasuga	Shin-Fuji Mill
Nippon Paper Papylia	Harada Mill, Suita Mill, Kochi Mill
N&E	Head Office Plant
NP Trading	Head Office, Sapporo Branch Office, Chubu Branch Office, Kansai Branch Office, Chugoku Branch Office, Kyushu Branch Office, Shizuoka Sales Office
Nippon Paper Ishinomaki Technology	Head Office (Excluding Power Section, Machinery Section Ⅰ, and Construction Section Ⅰ)*2
Opal	Opal Kiwi Packaging Auckland, Opal Kiwi Packaging Christchurch, Opal Kiwi Packaging Hastings, Opal Australian Paper Maryvale Mill
Jujo Thermal	Kauttua
Siam Nippon Industrial Paper	Siam Nippon Industrial Paper
Nippon Paper Liquid Package Product	Egawa Mill, Miki Mill, Ishioka Mill

*1 Certified for production of pulp and paper such as newsprint paper, second and lower grade paper
*2 Certified for the design and construction related to civil engineering, architecture, electrical equipment, mechanical equipment, steel structures, pipe work, and related incidental work (excluding construction work ordered by NIPPON PAPER GROUP)

- Nippon Paper Industries has obtained ISO 14001 certification for 100% of its production sites.

Status of Eco-Action 21 Acquisition (as of March 31, 2025)

Company name	Mills/Operating division/Production subsidiaries
Akita Jujo Chemicals	Head Office Plant

External Awards for Environmental Conservation Activities (FY2024)

Company name	Award
Nippon Paper Industries	"The Minister of Agriculture, Forestry and Fisheries' Award," from the 33rd Grand Prize for the Global Environment Award
Nippon Paper Industries	"The National Forestry Extension Association President's Award," Competition of Forestation with Low Pollen Trees 2024

Response to Climate Change

1 Basic Policy

P94 NIPPON PAPER GROUP Environmental Charter

2 Achieving Carbon Neutrality in 2050

- Based on one of the basic policies of the 2030VISION, "respond to the rapidly changing social landscape including GHG emissions reduction and environmental issues," the Group is working on reducing greenhouse gas (GHG) and implementing green strategy to achieve carbon neutrality in 2050.
- The Group's GHG emissions reduction initiatives are based on three pillars: "fuel conversion," "energy conservation in the production and logistics processes," and "absorption and fixation of CO_2 through appropriate management of company-owned forests."
- In May 2023, the Group revised its original plan for the GHG emissions reduction target for FY2030 and decided to reduce GHG emissions (Scope 1 and 2) by 54% compared to FY2013*. The Group is also working toward obtaining certification of Science Based Targets (SBT) to realize transition to carbon neutrality that is consistent with the standards of the Paris Agreement.

  * Emissions related to production except for the Energy Business field
- To accelerate GHG emissions reduction, the Company introduced internal carbon pricing in FY2021. However, this operation has been temporarily suspended since FY2022, due to the soaring price of coal and other fuels.
- In the long term, the Group aims to achieve carbon neutrality by 2050 through a multifaceted approach that includes CO_2 absorption by forests, the introduction of carbon-free fuels and CCUS.
- In 2021, the Japan Paper Association, of which the Company is a member, established the "Countermeasures against Global Warming aiming at Net Zero GHG Emissions from the Paper Industry – Long-Term Version 2050" and is working to realize the creation of a carbon-neutral industry by 2050 through the proactive introduction of a range of measures aimed at reducing CO_2 emissions.

- The Company is actively working on various measures to realize the Vision advocated by the Japan Paper Association. Since FY2023, the Company has worked on the development of rules for calculating GHG emissions generated throughout the product lifecycle (carbon footprint).

NIPPON PAPER GROUP's GHG Reduction Initiatives

Fuel conversion | **Energy conservation in the production and logistics processes**

↓

Reduction of GHG emissions from business activities

Absorption and fixation of CO_2 through appropriate management of company-owned forests

↓

Absorption and fixation of CO_2 in company-owned forests

- In the GX League, where groups of companies work together with government and academia to realize green transformation, the Company participates in initiatives such as the formation of market rules and voluntary emissions trading (Green Transformation Emissions Trading Scheme, or GX-ETS*). Its active implementation of measures to reduce GHG emissions resulted in reductions of up to 39% in FY2023. The Company will continue to consider and implement various measures to achieve the targets. In addition, the Company will actively contribute to the "creation of green markets" which is one of the GX League's activities, by providing society with materials and products that have a low environmental impact through GHG emissions reduction.

  * Participating unit: Nippon Paper Industries only

Reduction Target (compared to FY2013) and Achievement through GX-ETS

	Target		Results
	FY2025	FY2030	FY2023
Scope 1 and 2	37%	52%	39%

GX League

NIPPON PAPER GROUP's FY2030 Targets

Reduce GHG emissions (Scope 1 and 2) by 54% compared with FY2013*

- Reduce fossil fuel use through energy saving and fuel conversion

Pursuit of green strategy

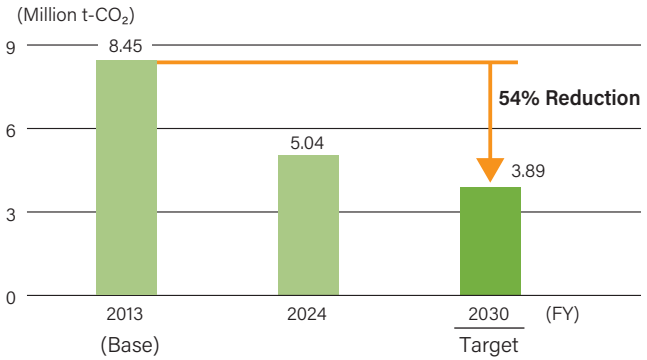
- Maximize forest value (30% improvement in CO_2 fixation efficiency at overseas plantations, compared to 2013)
- Establish a system to produce 10 million elite tree seedlings (FY2030) and register projects to create forest absorption J-Credits equivalent to 200,000 tonnes-CO_2 (FY2027) (increase forest absorption sources)

* Emissions related to production except for the Energy Business field

↓

Carbon neutrality in 2050

GHG Emissions (Scope 1 and 2)



Response to Climate Change

GHG Emissions (Scope 3, FY2024)

	Category	Emissions (thousand t-CO_2)
1	Purchased goods and services	1,891
2	Capital goods	125
3	Fuel- and energy-related activities (not included in scope 1 or scope 2)	1,142
4	Upstream transportation and distribution	741
5	Waste generated in operations	171
6	Business travel	4
7	Employee commuting	10
8	Upstream leased assets	Not applicable
9	Downstream transportation and distribution	216
10	Processing of sold products	317
11	Use of sold products	0
12	End-of-life treatment of sold products	1,168
13	Downstream leased assets	Not applicable
14	Franchises	Not applicable
15	Investments	Not applicable
Others (upstream)		Not applicable
Others (downstream)		Not applicable
Total		5,785

Coverage: Nippon Paper Industries, Nippon Paper Crecia, Nippon Paper Papylia, Opal, Nippon Dynawave Packaging
Target business: Paper and Paperboard Business, Dairy-Life Products Business, Energy Business
Category11: It is assumed that paper and paperboard products, which are our main products, do not use energy during product use.

3 Fuel Conversion

- The Group uses black liquor (produced as a byproduct of the production of pulp) and construction waste materials as woody biomass fuels.
- In addition to woody biomass fuel, the Company actively uses waste fuels such as used tires and RPF*. Its non-fossil energy utilization rate in FY2024 was 44%.

* RPF: Refuse derived paper and plastics densified Fuel. This is a high-grade solid fuel made mainly from those paper and plastic industrial waste materials which are difficult to recycle (From the website of Japan RPF Industry Association)

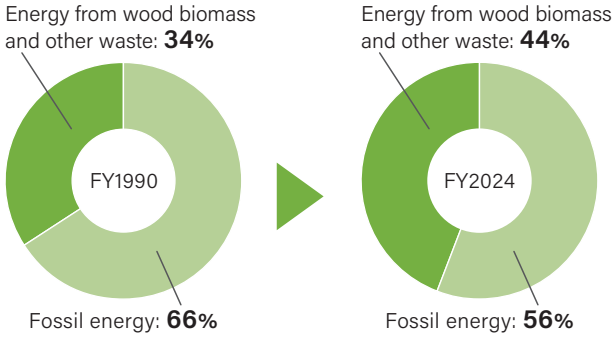
- In its Energy Business, the Company uses biomass fuel appropriately procured in Japan and overseas to expand its renewable energy supplies.
- In 2023, Nippon Paper Crecia, at its Kaisei Mill, introduced a solar-power generation facility under a Power Purchase Agreement (PPA), and from September 2024 it expanded the PPA model to the Tokyo Mill, Koyo Mill, and Kyoto Mill in succession, expecting an annual reduction of approximately 2,183 tonnes of CO_2.

CASE STUDY

Initiatives in the Energy Business

The Yufutsu Energy Center, one of Japan's most extensive power generation facilities that exclusively burn biomass, has been steadily operated since its launch in February 2023. As fuel, the plant uses wood chips, palm kernel shells (PKS), and unused wood, such as forest residue leftovers from Hokkaido. In addition, Nippon Paper Ishinomaki Energy Center carried out renovation work to convert to high biomass cofiring (completed in December 2023) and increased the biomass ratio from 26% to 42%. This will help the center to contribute more to reducing GHG emissions.

Ratio of Fossil Energy Usage (calorie conversion)



CASE STUDY

Business to Strengthen Biomass Product Competitiveness by Significantly Reducing the Amount of GHG Emissions (Nippon Paper Industries)

The Company's Ishinomaki Mill has launched a fuel conversion project to significantly reduce the amount of GHG emissions by installing a high-efficiency black liquor recovery boiler and discontinuing one coal boiler. This project was granted by the Ministry of Economy, Trade and Industry of Japan under the "Energy and Manufacturing Process Conversion Support Program for industries in hard-to-abate sectors." Not only does this securely reduce transition risks related to climate change but also provides society with biomass materials, which emit little GHG during manufacturing, along with environmental value. With this project, the Company will work on the "creation of green markets," achieving both carbon neutrality and economic growth—GX.

<Overview of the capital investment plan>

Installation location	Nippon Paper Industries Ishinomaki Mill
Investment scale	¥55.0 billion (including government support funding of up to ¥18.3 billion)*1
Investment details	High-efficiency black liquor recovery boiler with an evaporation production capacity of 390 t/h Steam turbine and generator with an electricity production capacity of 56 MW
Start of operation	Fourth quarter of FY2028
Amount of GHG emissions reduction*2	500,000 tonnes of CO_2e (accounting for 10% of the Company's emissions*3)

*1 At time of adoption
*2 Including reductions from the discontinuation of the existing coal boiler
*3 Emissions related to production except for the Energy Business field

In-house Production of Solid Fuel from Waste (Nippon Paper Industries)

At the Company's Otake Mill in Otake City, Hiroshima Prefecture, paper sludge*1 and wastepaper residues*2 generated in the production of containerboards are solidified within the mill and used as fuel. Since April 2019, the mill has also accepted and utilized plastic waste produced in Otake City. In-house production and use of waste fuel are beneficial not only by reducing coal consumption and contributing to regional shift to carbon neutrality, but also by extending the lifespan of final waste disposal sites.

*1 A sludge produced in the manufacture of paper, containing mainly cellulose fibers and minerals drained during the paper dewatering/drying process
*2 Foreign matter produced when processing wastepaper

Response to Climate Change

4 Energy Conservation in Production and Logistics Processes

1. Promotion of Energy Conservation in Production Process

- The Group is working hard to conserve energy in Japan and overseas by introducing high-efficiency equipment and reviewing its production processes.
- As for effective initiatives, the Group is expanding them to the mills of Group companies in Japan and overseas in an effort to increase their effectiveness.

<Examples of energy saving in production process>

- Optimization of the number of screens that remove foreign matter from materials and their capability
- Control of dissolved oxygen (DO) in the biological treatment tank in the drainage facility
- Utilization of a co-generation system (Use of steam with high temperature and pressure obtained in combustion at a boiler in power generation and production processes)

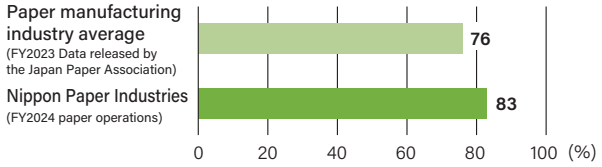
2. Promotion of Energy Conservation in Logistics Processes

From the perspectives of "improving loading efficiency" and "shortening transport distances," the Group is working on green logistics that will lead to a reduction in GHG emissions.

<Promoting energy-saving in logistics processes>

- Promoting a modal shift (Long-distance transportation by loading a large amount of goods at one time on railroads and coastal vessels)
- Promotion of joint transportation in cooperation with distributors

Comparison of Modal Shift Rates



Green Management Certifications*1 (as of March 31, 2025)

Company name	Number of offices with Green Management certification*2
NIPPON PAPER LOGISTICS	5
Nanko Logistics Support	1
HOUTOKU	1
NP-UNYU-KANTO	3
NP-UNYU-FUJI	2
NP-UNYU-KANSAI	1
NP-UNYU-IWAKUNI	2

*1 A system in which the Foundation for Promoting Personal Mobility and Ecological Transportation acts as a certification body and certifies and registers businesses that are making efforts above a certain level based on the Green Management Promotion Manual

*2 Awarded the "Green Management Certification Permanent Award" for all business sites that have been certified and registered continuously for 10 years from the first year of registration

Eco Rail Mark Certifications* (as of March 31, 2025)

Company name	Certification type
Nippon Paper Industries	Eco Rail Mark for companies
	Eco Rail Mark for products (paper, white paperboard)

* The certification, established by the Ministry of Land, Infrastructure, Transport and Tourism, applies to companies (and the products of companies) which use more than given percentage of rail freight transportation, which generates lower unit CO_2 emissions

CASE STUDY

Started Modal Shift Consolidation Transport with NISSIN FOOD PRODUCTS (Nippon Paper Industries)

In FY2024, the Company started modal shift consolidation transport with NISSIN FOOD PRODUCTS CO., LTD. ("NISSIN FOOD") to transport both roll paper and instant noodles in the same cargo between the Tokyo metropolitan area and the Kansai area. Before the initiative, products were transported to the Kansai area by each company's truck. Now, roll paper is loaded into containers at the Nakoso Mill first, and then instant noodles are loaded at the NISSIN FOOD PRODUCTS Kanto Plant. These products are transshipped to a domestic vessel provided by UTOC LOGISTICS CORPORATION and transported by sea from Tokyo Port to Osaka Nanko Port. With this shift, the Company will contribute to creating a sustainable society while reducing GHG emissions from transport by both companies and addressing the "2024 problem" (of reduction of transport capacity expected to result from regulations set to take effect in Japan that year) in the logistics industry, such as the diversification of transport methods.

Response to Climate Change

3. Absorption and Fixation of CO_2 through Appropriate Management of Company-owned Forests

- The Group is in compliance with the Clean Development Mechanism (CDM) under the Kyoto Protocol and considers that the forests absorb CO_2 while growing and the CO_2 is deemed emitted to the atmosphere when trees are harvested.
- The forests owned by the Group in Japan and overseas are harvested and replanted based on the business plan for the purpose of using resources.
- Part of the amount of CO_2 absorbed through proper forest management and continuous thinning has been certified as "J-Credits*" after inspection.
  * A system in which the government certifies as "credits," the amount of CO_2 emissions reduced through the introduction of energy-saving equipment, the use of renewable energy, and the absorption of CO_2 through appropriate forest management
- The net amount of CO_2 absorbed by forests in company-owned forests in Japan and overseas (absorption amount minus logging amount) was about 1 million tonnes-CO_2 from 2022 to 2024, and the total fixation amount was about 32 million tonnes-CO_2 as of the end of 2024.
- The Group estimates that the amount of sequestered CO_2 in forests in environmental protection area established in plantation projects overseas is approximately 10 million tonnes-CO_2.

J-Credit Sales Performance

Company name	Credit name	FY2021	FY2022	FY2023	FY2024
Nippon Paper Industries	Fuji/Kitayama company-owned forest thinning promotion project	2 cases	2 cases	3 cases	1 case
Nippon Paper Lumber	Gunma/Sudagai company-owned forest thinning promotion project	2 cases	3 cases	3 cases	2 cases

CASE STUDY

Initiatives to Create 200,000 tonnes-CO_2 of J-Credits (Nippon Paper Industries)

As one of the themes to be covered in the 2030VISION, the Company has worked toward registering projects to create at least 200,000 tonnes-CO_2 of J-Credits by FY2027. In FY2024, the Company registered Itsuki, Company Forest Carbon Project and the Kosai City-Nippon Paper Industries Forest Partnership Project to make progress on the initiatives as planned.

Response to Climate Change

Information Disclosure on Climate Change Issues

In April 2021, NIPPON PAPER GROUP endorsed the Task Force on Climate-related Financial Disclosures (TCFD) to ensure appropriate disclosure of information on its response to climate change issues.

Governance

The Group has positioned the reduction of GHG emissions as a management issue and is working toward quantitative targets it set in 2008.

The Company's Board of Directors positions responding to climate change issues as vital for realizing the Group Mission. It receives reports on related activities from the Risk Management Committee (at least once a year) and from two executive officers, one in charge of GHG emissions reduction and one in charge of promotion of environmental management (at least four times a year), and supervises the execution of these operations.

Risk Management

The assessment of and responses to climate change-related risks are integrated into the Group's risk management system →P08 and managed by the Risk Management Committee. In order to carry out appropriate risk prediction, NIPPON PAPER GROUP Environmental Committee, established under the Risk Management Committee, collects and analyzes information in order to identify climate-related risks and promote measures against them. In addition, the Group has set up the Climate Change Strategy Working Group that gathers related information and anticipates risks.

Indicators and Targets (FY2030)

In the 2030VISION, the Group set a goal to achieve a 45% reduction in GHG emissions (compared with FY2013). However, as the path to achieving the target has become clearer due to the implementation of various measures and as societal demand for reducing GHG emissions is accelerating, the Group decided to accelerate its efforts toward decarbonization and in May 2023 raised the reduction target to 54%*.

* Emissions related to production except for the Energy Business field

Indicators	Targets		
FY	2030	2024 (Implementation results)	2050
GHG Emissions Reduction Rate	54% Reduction (compared with FY2013)*	41% Reduction 5.04 million t-CO_2	Carbon neutrality
Non-fossil energy use ratio	60% or more	44%	—

* Emissions related to production except for the Energy Business field

- Amount of investment to address climate-related risk: ¥52.0 billion
- Internal carbon price: Introduced in FY2021 but temporarily suspended since FY2022 due to the rising prices of coal and other fuels

Strategy and Scenario Analysis

The Group has envisioned a future society amid a backdrop of growing awareness of ESG issues. Using two types of scenarios (1.5°C scenario and 4°C scenario), the Company conducted qualitative and quantitative assessments of the impact that climate change risks and opportunities in 2030 and 2050 will have on its financial plans, focusing mainly on its business, and reported the results to the Board of Directors.

Scenario Analysis Methods

(1) Establishing an Image of Society

1.5°C scenario (RCP 2.6)

All kinds of policies will be introduced to keep temperature rise below 1.5°C, and at the same time, society as a whole will take action to limit temperature rise. As a result, temperatures will rise slowly, and therefore, by 2030, there will be little change from the current situation in terms of severe disasters, temperature rises, and precipitation patterns. In markets, production and consumption activities giving priority to environment conservation such as an expansion in ethical consumption, will increase.

4°C scenario (RCP 8.5)

No policies will be introduced to control temperature rise. While some stakeholders will take actions to limit temperature rise from the perspective of promoting ESG management, regardless of whether policies are introduced or not and regardless of what society as a whole is doing, society generally will not take actions to limit temperature rise. As a result, temperatures will rise more rapidly than in the 1.5°C scenario, and the frequency of severe disasters will increase, temperatures will rise, and precipitation patterns will be more changeable in 2030 than in the current situation.

(2) Evaluation Items

Risk: likelihood of occurrence, timing of occurrence, timing of impact, financial impact

Opportunity: likelihood of occurrence, timing of occurrence, timing of impact, financial impact, market growth

Summary of Analysis Results

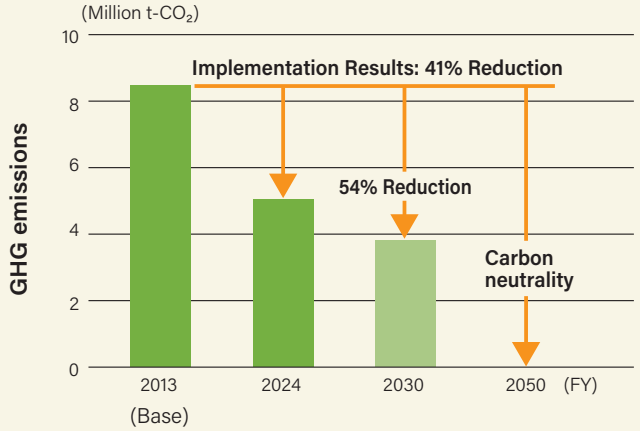
As the pulp and paper industry is energy-intensive, not only transitional factors, such as the introduction of policies and changes in market needs, but also physical factors, such as the increase in severe natural disasters, pose significant risks. Based on the results of analysis, the Company has been focusing on reducing GHG emissions through fuel conversion and energy conservation measures and advancing its green strategy. In particular, to address the increasing social demand to reduce GHG emissions and the trends of various policies, the Company brought forward the scenario presented in the 2030VISION and in May 2023 raised its GHG reduction target to 54% compared to FY2013*. The Company aims to ensure strategic resilience by promptly achieving the GHG reduction target.

At the same time, there are many opportunities for the Company to leverage its strengths to enter and grow in markets that are being created and expanded due to government policy introductions and changes in market needs. Moreover, in response to adaption to climate change, measures to establish multiple production bases will lead to sales expansion, and the development and sales of environmentally friendly and adaptable products that are needed by society will be a growth opportunity for the Company in markets where expansion is expected.

* Emissions related to production except for the Energy Business field

Response to Climate Change

NIPPON PAPER GROUP Plan for Shift to Carbon Neutrality



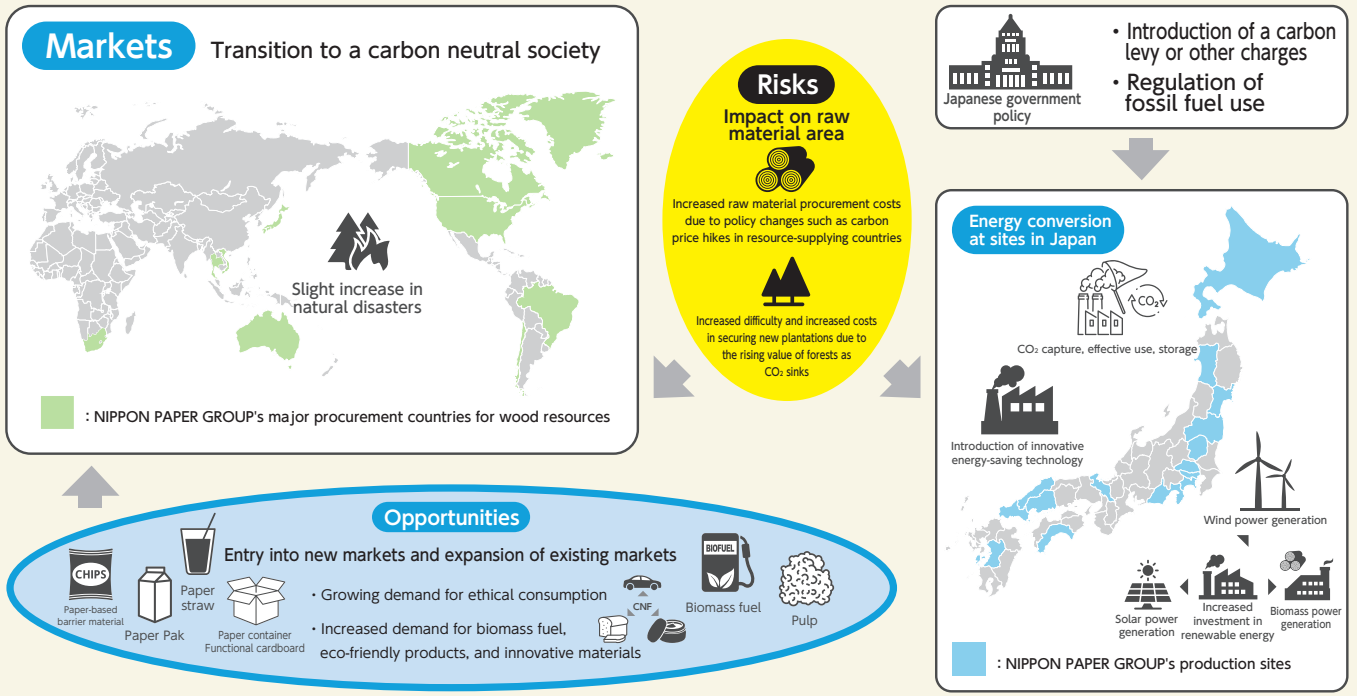
Period	Short-term	Mid-term	Long-term
Target	54% reduction compared with FY2013 (Scope 1 and 2)*		Carbon neutrality in 2050
Priority measures	Continuation and reinforcement of energy-saving measures Improve the basic unit by 1% or more compared to the previous fiscal year		
	Conversion to non-fossil fuels Non-fossil energy ratio of 60% or more by FY2030		
	Improved production efficiency Reorganization of production systems		
			Introduction of carbon-free fuels and CCUS
	Maximizing forest absorption of CO_2 Sustainable forest management and utilizing breeding/propagation technology		

* Emissions related to production except for the Energy Business field

【1.5℃ scenario】

2030

Costs, such as a carbon levy, increase.
On the other hand, new business opportunities such as biofuels, environmentally friendly products, and innovative materials will emerge.

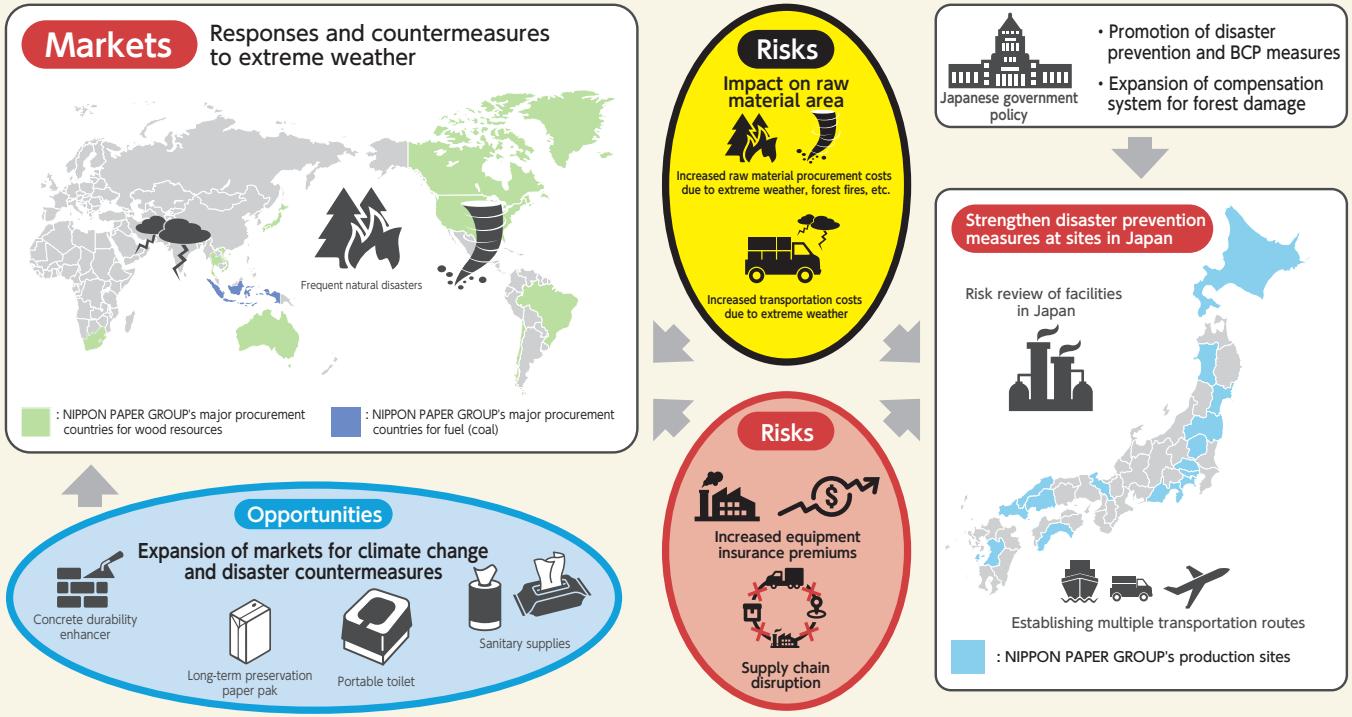


Response to Climate Change

[4°C scenario]

2030

Increased physical risk.
On the other hand, business opportunities for climate change and disaster-response products will expand.



Response to Climate Change

Climate Change-Related Risks

Risks as of 2030

Factors		Impact on the Group	Financial impact	
			1.5°C scenario	4°C scenario
Transition factors	Policy introduction	Carbon prices and energy procurement costs will Increase.	High*	Low*
		Capital investment costs for fuel conversion and energy conservation will increase.	High	Low
		Raw material procurement costs will increase.	High	Low
		Increased acquisition cost of plantation project sites.	High	Low
	Changes in market needs	Increased procurement costs for certified wood chips.	Medium	Medium
		Development costs and capital investment costs for reducing environmental impact will increase.	Medium	Low to Medium
		Sales from non-renewable power generation projects will decrease.	High	Low
Physical factors	Increase in the number of severe disasters (frequent typhoons and heavy rains)	Stoppage of raw material procurement, production, product transportation, etc., resulting in reduced production volume and delayed or halted deliveries of products.	Medium to High	High
		Procurement, manufacturing, and logistics costs will increase.		
		Increase in turbidity of rivers, etc., from which water is taken, resulting in production stoppage and delay or stoppage of deliveries of products.		
	Increase in temperature and change in precipitation patterns	Losses in the company's plantation assets.	Medium	High
		Raw materials will become difficult to procure and procurement costs will increase.		
		Costs for search for alternative materials and technology development will increase.		
		Sales volume decreases or sales price declines due to difficulty in maintaining quality.		

* Amount of impact: less than 10 billion yen (Low), 10 billion yen or more but less than 50 billion yen (Medium), 50 billion yen or more (High)
Qualitative evaluations, except for those marked with "*"
Carbon prices are set based on the IEA's NZE (Net Zero Emissions) scenario

1. Transition Factors

1-1. Risks Mainly Due to the Introduction of Policy

<Hikes in carbon and fuel prices due to the introduction of carbon pricing policy>

In the 1.5°C scenario, the introduction of policies such as carbon levies, emissions trading schemes, and the prohibition of coal-fired power generation is expected to be the main factor in raising carbon prices and fossil fuel prices, which will increase fuel procurement costs. As the pulp and paper industry is energy-intensive, there is a risk that introducing these policies could significantly impact its financial planning.

Under the 4°C scenario, carbon prices will not increase and fossil fuel prices are not expected to rise significantly because no policies will be introduced, but changes in supply and demand for fossil fuel will occur and fuel prices will fluctuate. This is already part of the Company's normal risk management and the risk of being affected is considered small.

In response to the risk of higher fossil fuel prices expected in the 1.5°C scenario in which all manner of policies are introduced, to reduce this risk the Company will accelerate the shift to non-fossil fuels by maximizing the biomass procurement network of Nippon Paper Lumber, which has one of the most extensive timber procurement records in Japan.

Regarding the rise in carbon prices due to the introduction of emissions trading schemes and carbon levies, the Company aims to accelerate the reduction of GHG emissions to reduce the risk of impact on its financial plans related to carbon price rises as soon as possible. To reduce GHG emissions, the Company continues to implement energy-saving measures at its paper and paperboard mills to reduce coal consumption, with an index of improvement of 1% or more in energy consumption per unit each year. At the same time, the Company is also working on conversion to recycled fuels, such as biomass and waste fuels, and is maximizing the use of black liquor,* which is a carbon-neutral fuel.

By studying the reorganization of the production systems and GHG emissions reductions in an integrated manner, proceeding with the output reduction and shutdown of coal boilers, and transitioning to low-carbon consumption at an early stage, the Company will reduce, at an early stage, the risk of impact on financial plans related to carbon price hikes.

Although carbon prices are likely to increase in Japan in the future due to the introduction of emissions trading schemes and carbon levies, the Company will work to reduce risks by actively participating in the development of systems and rules and other activities in the GX League →P28 so that such policies will be conducive to corporate growth.

* Black liquor is comprised mainly of a wood component, lignin, and created as a by-product during the course of pulp manufacturing

<Changes in energy composition>

In the 1.5°C scenario, there is a risk that the demand for biomass fuels will increase due to policies to promote the introduction of renewable energy, causing fuel prices to rise and procurement costs to increase. At the same time, under the current FIT system, there is a risk that the procurement cost of wood chips for paper production will also increase due to competition with biomass fuels.

This phenomenon is already apparent, but under the 4°C scenario, no further policy tightening will take place, and price fluctuations will remain within the Company's normal risk management.

In response to the procurement risks associated with the increased demand for biomass fuel due to the introduction of various policies, the Company believes that it can procure biomass fuels stably and at a relatively attractive price by making maximum use of its Nippon Paper Lumber biomass procurement network, which has among the best wood procurement performance in Japan. With regard to wood chips for papermaking, the Company will reduce risks by securing raw materials and stabilizing purchase prices by strengthening relationships of trust based on our long track record with existing suppliers, and developing and adopting inexpensive local resources.

<Impact on raw material procurement>

Since the Company imports most of the raw materials necessary for its manufacturing from overseas, it may be affected by the policy trends of resource-supplying countries. In the 1.5°C scenario, there may be a risk of increased raw material procurement costs due to higher carbon trading prices arising from stricter policies in resource-supplying countries and CO_2 emissions levies imposed on raw materials and transportation.

By diversifying its supply sources, the Company is working to mitigate risks from geopolitical factors, policies in resource-supplying countries , and climate change.

Response to Climate Change

<Expansion of the carbon credit market>

In the 1.5°C scenario in which the world aims to become carbon neutrality (net zero CO_2), the market is expected to expand due to increased demand for carbon credits. Along with this, the demand for credits from forest absorption is also expected to be higher. As forest investment aimed at creating credits increases, there is a risk that the price of land suitable for plantation will rise, increasing the cost of acquiring land suitable for the Company's plantation business. This trend is already being seen.

On the other hand, under the 4°C scenario, some stakeholders may obtain plantations in view of government policies, social trends, and the promotion of ESG management. However, risks to the plantation business from such activity are considered insignificant.

While expanding the plantation business requires large areas of land suitable for plantation, and rising land prices may pose a risk to the Company, the amount of fixed CO_2 can be increased to generate credits by harnessing the Company's strengths, including utilizing its unique technology for breeding and proliferating highly efficient CO_2-fixing trees and promoting the plantation business in cooperation with third parties.

1-2. Risks Arising Primarily from Changes in Market Needs

<Rapid increase in demand for environmentally friendly products>

Under the 1.5°C scenario, demand for environmentally friendly products is expected to increase, and there is a risk that technology development costs, capital investment costs, etc. will increase in response to this demand while products and services with high environmental burden will no longer be selected in the market.

In the future, the market is expected to favor products and services derived from renewable raw materials, due to expectations of being environmentally friendly. Therefore, the Company believes that by accurately identifying and forecasting customer needs and further promoting the "paperization" that it is already working on, the Company will be able to promote the replacement of materials with renewable biomass materials, reduce risks associated with changes in market needs, and at the same time seize this as an opportunity to expand its business.

The Company will further accelerate reduction of GHG emitted over the course of product manufacturing. At the same time, by taking advantage of the fact that its production sites are dispersed throughout Japan, the Company will offer products that contribute to the reduction of GHG emissions throughout the supply chain by shortening the transportation distance to delivery destinations and reducing GHG emissions during transportation through the use of multiple production sites.

In addition, regarding changes in market needs, the 1.5°C scenario predicts that greater public awareness of the importance of proper forest management and use will result in even greater demand than now for certified paper made from sustainable forest resources, such as those verified by a forest certification system. Certified wood chips are a limited resource, and higher demand may result in the risk of increased procurement costs.

To reduce this risk, the Company will continue to maintain good relationships with certified wood suppliers, while at the same time working to expand certified resources by obtaining certification for new plantations and supporting its suppliers, thereby ensuring a stable and efficient supply of certified resources.

2. Physical Factors

2-1. Risks Caused by an Increase in Severe Disasters

<Damage to production sites and distribution networks>

Under the 4°C scenario, severe disasters such as typhoons and torrential rains are expected to become more frequent, and the probability of damage to production sites and distribution networks is expected to increase, so the risk of a decrease in production volume due to temporary production stoppages and delays or stoppages in deliveries will become greater. In addition, in the event that the power supply is interrupted due to damage to power lines or other essential services, there is a risk that production sites that do not have their own power generation facilities will be forced to temporarily suspend production.

Although the Company cannot control the occurrence of natural disasters, it is working to reduce risks by establishing elaborate systems to ensure business continuation, such as backup systems for production and inventory controls. The Company is also trying to reduce risks by promoting measures to adapt to climate change, such as bulking up equipment installation sites and installing in-house power generation equipment for use in times of disaster.

<Deterioration of water intake quality>

The Company's main business, pulp and paper, uses water in its manufacturing process. If the water quality (turbidity) of the rivers, etc. from which water is taken deteriorates due to typhoons or heavy rains, product quality cannot be maintained, and there is a risk that production will be suspended until the water quality improves. This event is already occurring, but is expected to become more frequent under the 4°C scenario.

Natural disasters are unavoidable, but the Company is taking measures to ensure that operations can continue as long as possible by strengthening its water intake purification facilities and methods, and at the same time, working to reduce risks by developing a detailed system for business continuity in case production is suspended.

2-2. Risks Caused by Rising Temperatures and Changes in Precipitation Patterns

<Forest fire occurrence>

As temperature rises, under the 4°C scenario, forest fires are expected to occur more frequently around the world.

As the Company has developed a business model based on forest resources, fires in forests owned by wood chip suppliers or company-owned forests could result in a significant risk in terms of stable procurement of raw materials and procurement costs. Moreover, if a company-owned forest is destroyed by fire, there is a risk that its value will decrease, and the profitability of the Company's plantation business is likely to deteriorate.

In order to mitigate this risk, the Company is strengthening the fire prevention and extinguishing systems in its own forests, and decentralizing its forests and suppliers to multiple countries and regions.

<Deterioration in plant growth>

The growth of plants is greatly affected by temperature and precipitation. Since the Company uses plant-derived raw materials such as wood chips, various types of pulp, starch, etc., there is a risk that procurement of raw materials will become difficult and procurement costs will rise in the 4°C scenario where plant growth is expected to decline due to rising temperatures and changes in precipitation patterns. In the event that the Company has difficulty in procuring raw materials, it would be hard to maintain the quality and function of its products, which may be a risk that its sales volume and price decrease. However, the Company is working to reduce these risks by diversifying its raw material supply sources and continuing to search for alternative materials.

Response to Climate Change

Opportunities for Business Expansion

Opportunities as of 2030

Factors			The Group's opportunities	The Group's strength	Market growth	
					1.5°C scenario	4°C scenario
Transition factors	Policy introduction (e.g., carbon levies, changes in energy mix)	Renewable energy will be introduced	Demand for power generation facility locations will increase	▪ Company-owned forests and land in Japan, etc. ▪ Procurement network for domestic wood materials ▪ Biomass fuel production technology ▪ Procurement network for non-fossil fuels ▪ Utilization of existing boilers	Expansion	Stable
			Demand for biomass fuels will increase			
			Waste-derived fuels, such as RPF (refuse derived paper and plastics densified fuel), waste tire-derived fuel, and other fuels, will be utilized more often			
		Next-generation vehicles are becoming increasingly popular	Storage batteries will spread and demand for raw materials for storage batteries will increase	▪ CMC Technology and Production Facilities ▪ CNF Technology and Production Facilities	Significant expansion	Expansion
			Demand for CNF will increase due to the need to reduce the weight of automobiles			
		Carbon credit market will be activated	Demand for forest absorption credits will increase	▪ Company-owned forests in Japan ▪ Elite tree seedling business ▪ Overseas plantation business ▪ Forest management technology ▪ Breeding and propagation technology	Significant expansion	Stable
		Resources will become more difficult to obtain due to stricter policies in resource-supplying countries	Demand for domestic lumber will increase	▪ Company-owned forests in Japan ▪ Procurement network for domestic wood materials ▪ Elite tree seedling business ▪ Collaboration with Stakeholders	Expansion	Stable
			Demand for wastepaper will increase	▪ Wastepaper procurement network (including unused wastepaper) ▪ Collaboration with Stakeholders		
		Carbon recycling is advancing (utilization of carbon resources)	Increasing demand for carbon fixation and utilization by forests	▪ Breeding technology for high-efficiency CO_2-fixation trees ▪ Company-owned forests in Japan ▪ Elite tree seedling business ▪ Overseas plantation business	Expansion	Stable
			Growing demand for chemical raw materials using wood-derived CO_2	▪ Biomass-derived CO_2 supply infrastructure (recovery boilers) ▪ Chemical CO_2 fixation and utilization technology	Significant expansion	Stable
	Transition to a decentralized society	Increasing local production and local consumption of energy	Small scale fuel demand will increase	▪ Procurement network for domestic wood materials ▪ Company-owned forests in Japan	Expansion	Stable
		Decentralization of product consumption	Increased opportunities to sell products with reduced CO_2 emissions during distribution while handling shipments from each production site	▪ Multiple production sites	Expansion	Stable
	Changes in market needs	Demand for environmentally friendly products will increase	Demand for biomass materials will increase as the need for paperization increases due to decarbonization	▪ Woody biomass materials development technologies (CNFs, paper-based packaging materials, liquid containers, functional corrugated cardboards, biocomposites, etc.) ▪ Technologies to extract and utilize lignin ▪ Technology for recycling unused wastepaper	Significant expansion	Expansion
			Demand for lignin products will increase			
			Demand for paper made from sustainably sourced forest materials will increase	▪ Track record of procuring certified forest materials ▪ Relationship of trust with excellent suppliers ▪ Sustainable forest management	Expansion	Expansion
			Demand for products that reduce GHG emissions from livestock farming will increase	▪ Cellulose material utilization technology	Expansion	Stable
			Demand for halogen-free resins with low environmental burden will increase	▪ Increased demand for functional coating resin "AURORENⓇ"	Expansion	Expansion
			Demand for sustainable aviation fuel will increase	▪ Technology for producing bioethanol from wood resources ▪ Multiple kraft pulp manufacturing facilities	Expansion	Expansion
Physical factors	Increase in the number of catastrophic disasters	A rise in demand for stable product supply	Growing demand for purchasing from suppliers with established flexible BCP systems	▪ Multiple production sites	Expansion	Significant expansion
		Overseas raw material suppliers and distribution networks are damaged	Demand for domestic wood materials will increase. Demand for elite tree seedlings will increase due to greater area for reforestation in Japan	▪ Company-owned forests in Japan ▪ Elite tree seedling business ▪ Wastepaper procurement network ▪ Procurement network for domestic wood materials ▪ Forest management technology ▪ Breeding and propagation technology ▪ Procurement network for non-fossil fuels ▪ Collaboration with Stakeholders ▪ Unused wastepaper recycling technology	Expansion	Significant expansion
			Demand for wastepaper will increase			
			Domestic demand for waste-derived fuels and biomass fuels will increase			
		Increasing need to strengthen buildings	Demand for concrete admixtures and other materials will increase	▪ Admixture for concrete (fly ash) technology	Expansion	Expansion
		Demand for long-term food storage will increase	Increasing demand for aseptic paper cartons for long-term storage of contents	▪ Total system supplier	Expansion	Expansion
	Increase in temperature and change in precipitation patterns	Decline in plant growth	Demand for environmental stress tolerant trees will increase	▪ Breeding and propagation technology	Expansion	Expansion

Response to Climate Change

1. Transition Factors

1-1. Opportunities Associated with the Introduction of the Policy

<Increase in demand for renewable energy>

In the 1.5°C scenario, policies are expected to promote the introduction of renewable energy, which will increase the demand for locations to install solar, wind, and small hydroelectric power generation facilities, as well as the demand for biomass fuels.

The Company owns its forests and land in Japan, and it has an opportunity to expand its business of supplying renewable energy in cooperation with power generation companies. Increasing demand for biomass fuels will provide an opportunity to expand the biomass fuel sales business by making maximum use of the procurement network of Nippon Paper Lumber, one of the largest wood collection and sales companies in Japan.

In the 1.5°C scenario, where a rapid increase in demand for renewable energy is expected, the Company believes that it has the tangible and intangible assets, such as biomass boilers and facilities and technologies that use black liquor, a carbon-free fuel, to meet this demand, and can quickly respond to this market expansion and capture business opportunities.

<Dissemination and expansion of next-generation vehicles>

Since the transportation sector accounts for about 20% of Japan's CO_2 emissions, it is predicted that next generation vehicles such as electric vehicles will become more popular in the future.

In 2021, the New Industry Creation Hatchery Center (NICHe) at Tohoku University announced that it had discovered that CNF*1's have a powerful energy storage effect, and that it had succeeded in developing the world's first dry, lightweight supercapacitor by using the Company's TEMPO-oxidized CNF to create an uneven surface with a controlled CNF surface shape. The Company participated in the Expo 2025 Osaka, Kansai, Japan, from June 10 to 16, 2025, as Nanocellulose Japan (NCJ) and unveiled a prototype device that uses this CNF supercapacitor in the Future Life Experience exhibition facility of the Future Life Expo. In addition to enabling high-voltage charging in a shorter period of time than conventional lithium-ion batteries, CNF-based energy storage is a technology that is expected to solve the problem of increasing energy storage capacity, which is currently an issue for electric vehicle batteries, and could make a significant contribution to the spread of electric vehicles, etc.

The global market for supercapacitors was worth US$5.16 billion in 2023 and is predicted to grow at a compound annual growth rate (CAGR) of 20.35% from 2024 to 2032 to reach US$27.33 billion by 2032*2.

In addition, with the spread of next-generation vehicles, the need for lighter-weight vehicles is expected to be even greater in the future. The market for composite material fiber-reinforced plastics (FRP), which reinforce a polymer matrix with fibers such as glass, carbon, or aramid, is projected to be worth US$85.69 billion in 2023 and US$92.8 billion by 2024 and is predicted to grow at a CAGR of 8.38% to reach US$150.6 billion by 2030*3. While glass (glass fiber) and carbon (polymer-reinforced carbon fiber) are the most widely used fibers for reinforcing materials at present, due to the spread of electric vehicles, etc., there is a rising need for lightweight materials to achieve even greater fuel efficiency. The relative gravity (weight per unit volume) of CNF is lower than that of other fibers, making it an extremely lightweight fiber. Furthermore, CNF is a carbon-neutral, plant-derived material with multifaceted value in environmental conservation, as it suffers less performance degradation due to material recycling than glass fiber-reinforced plastics does. The global market for CNF is projected to be worth ¥6.29 billion in 2024. However, it is projected to expand to around ¥7.7 billion in 2025 as more businesses use it for composite reinforcement material, including in automotive components (from 132 tonnes in 2024 to 221 tonnes projected for 2025)*4.

The dissemination of next-generation vehicles is a highly feasible event in both scenarios, with or without the introduction of policies, but in the 1.5°C scenario, the diffusion will be rapid due to policy support. The Company believes that it has the technological superiority and technological development capability to respond to this rapid spread, and that it can promptly respond to the rapid market expansion and grow the Company's business.

*1 Cellulose Nano Fiber

*2 Straits Research "Supercapacitors Market Size and Share Report, 2032" (report dated July 22, 2024)

*3 360iResearch "Fiber-Reinforced Plastic Market by Material (Aramid, Basalt, Carbon), Application (Gas Distribution Networks, Oil Flow Lines, Water Injection Lines), Industry - Global Forecast 2025-2030" (report dated October 31, 2024)

*4 Yano Research Institute "CNF (Cellulose Nanofiber) Market 2024"

<Expansion of the carbon credit market>

In the 1.5°C scenario where the world is aiming for carbon neutrality (net zero CO_2), the carbon credit market is expected to expand due to increased demand, and the demand for forest absorption credits is expected to increase accordingly.

The Company owns approximately 90,000 hectares of its forests in Japan and is expanding its overseas plantation business in various countries. In addition to forest management technology cultivated through the management of company-owned forests in Japan and overseas plantation business, the creation of carbon credits by utilizing the Company's unique breeding and propagation technology that enables highly efficient CO_2 fixation is expected to enable the Company to enter the expanding market and capture business opportunities. Specifically, the Company will work toward registering projects that will create 200,000 tonnes of J-Credits in company-owned forests in Japan by FY2027. The Company is committed to contributing to the formulation of rules regarding how forest absorption credits should be shaped and utilized from a forest owner's perspective, through such initiatives as the GX League advocated by the Ministry of Economy, Trade and Industry.

<Strengthen the policies of resource-supplying countries>

Since a significant portion of its raw materials and fuel for manufacturing are imported from overseas, the Company could be impacted by policy trends in resource-supplying countries. In the 1.5°C scenario, there may be a risk of increased raw material procurement costs due to higher carbon trading prices arising from stricter policies in resource-supplying countries. On the other hand, the Company owns forests in Japan and utilizes such resources, and at the same time, it operates a seedling business that contributes to creation of new resources. The Company has also established diversified procurement networks in Japan for resources such as fuels and wastepaper. Accordingly, the Company is able to make a shift to utilization of domestic resources. In addition, the Company has already become one of the top-ranked companies in Japan in terms of the domestic timber utilization rate.

The Company is working with stakeholders to create a closed-loop recycling system for wastepaper and at the same time, it is leveraging its strengths to make efficient and stable use of diverse resources, such as utilizing technologies to make use of paper that is difficult to recycle, such as used paper containers for food and beverage applications.

In order to develop a used paper container recycling business, the Company began operating recycling facilities for food and beverage paper containers at the Fuji Mill in 2022, and its Group Company also began operating shredding and washing plant in 2023.

Response to Climate Change

The Company is working on recycling paper containers used in restaurants, shopping malls, and sports events such as marathons, increasing the recycling volume every year. By 2030, the Company aims to stably collect and utilize unused wastepaper (12,000 tonnes per year), such as used paper containers. Under the 1.5°C scenario, the Company expects the impact of the policies of resource-supplying countries to occur within five years, but the Company believes it can maintain and expand its business by taking advantage of its access to domestic resources.

<Promotion of carbon recycling >

In the 1.5°C scenario, carbon recycling, which is the process of capturing and reusing CO_2 from the atmosphere, is expected to progress rapidly, along with the reduction of GHG emissions through the reduction of fossil fuel use. In the overseas plantation business, the Company uses wood materials as a woody biomass resource by continuing the cycle of planting, nurturing, harvesting (wood chip production), and then replanting, allowing forests to freshly absorb and fix CO_2 from the atmosphere every year. As an example, the annual production volume of wood chips by AMCEL (Brazil), the Group's plantation company, is equivalent to approximately 1.5 million tonnes of forest CO_2 absorption. By positioning its overseas plantation business as a carbon recycling business and promoting the use of its proprietary breeding and propagation technologies that enable highly efficient CO_2 fixation, the Company can improve its CO_2 absorption and fixation capacity and contribute to the recycling of carbon resources, not just in the Company's own forests.

The Company aims to improve the CO_2 fixation efficiency in overseas plantation business by 30% by FY2030, as compared with 2013. The Company intends to secure future resources for the Company by contributing to improvement of productivity of forests across the globe and an increase in CO_2 fixation through provision of our breeding and propagation technologies, and plantation technologies to other companies. As an example, the Company entered into a strategic partnership agreement concerning an afforestation project in Indonesia with Marubeni Corporation in 2022, and commenced provision of technological support. In addition, the Company aims to secure about 100,000 hectares of new plantation resources mainly in Asia. In Japan, the Company has developed tree breeding and propagation technologies based on its knowledge accumulated overseas to promote a business that produces selective seedlings of Japanese cedar and cypress that are called elite trees. Elite trees have their excellent properties, with growth rates more than 1.5 times faster and pollen production less than half that of conventional varieties. The Japanese government also supports the spread of elite trees to expand the forestry industry and combat pollen allergies. The Company aims to establish a system to produce 10 million elite tree seedlings by 2030. By promoting the widespread use of elite tree seedlings, the Company will not only ensure a stable supply of domestic raw materials, but also contribute to promoting the carbon recycling in Japan, expanding GHG sinks, enhancing resource security and self-sufficiency, supporting balanced land development through the return of economic benefits to local regions, and more. Since CO_2 derived from biomass obtained from sustainable forests is considered carbon neutral, carbon negativity (negative emissions) can be achieved by separating and recovering the CO_2 generated from the combustion of biomass fuels and storing it underground or recycling it. In the future, with the practical application of technologies for CO_2 separation, underground storage, and recycling, the Company can expect to achieve carbon negativity using CO_2 generated from biomass boilers and black liquor-fueled recovery boilers operating in Japan.

1-2. Opportunities Associated with Transition to a Decentralized Society

Under the 1.5°C scenario, the transition from a metropolitan-intensive society to a decentralized society is expected to proceed. As a result, local production and local consumption of energy will increase, and small-scale demand for fuel will likely increase. This trend has already begun, but it is expected to accelerate under the 1.5°C scenario. In response, the Company will have the opportunity to expand its biomass fuel sales business by making full use of the biomass procurement network of Nippon Paper Lumber, which is one of the largest wood collection and sales networks in Japan. In addition, with the shift to a decentralized society, the places of consumption of products are also expected to become more dispersed.

In the 4°C scenario, regardless of the temperature rise, there will be a shift to decentralization, but at a slower rate than in the 1.5°C scenario, in part due to the impact of increased risk of infectious diseases. In both scenarios, the Company believes that it can maintain and expand its business by taking advantage of the fact that the Company's mills are dispersed throughout Japan and by responding to the decentralization.

1-3. Opportunities Arising from Changes in Market Needs

<Increase in demand for biomass materials>

The Company has built a business model based on carbon neutral forest resources, which enables it to provide products that meet the needs of customers who prefer environmentally friendly products. The shift in packaging materials from plastic to paper has continued as one way to address the marine plastics problem. Under the 1.5°C scenario, this trend is expected to accelerate further in conjunction with the problem of climate change, leading to increased demand for the use of biomass materials in a variety of products other than packaging materials.

As part of the Company's strategy to meet the increasing demand for biomass materials, it is promoting "paperization" under the slogan, "Let paper do what it can do." In addition to developing and marketing "SHIELDPLUS®," a paper packaging material with unprecedentedly excellent barrier properties against oxygen and water vapor, the Company has developed and begun selling other products, including "Waterproof Liner," a multifunctional containerboard that is a sustainable packaging material alternative to styrofoam boxes, "SPOPS®," a replaceable paper container that reduces plastic use by replacing plastic pouches with paper containers, and "School POP®," a strawless drinking carton. "SPOPS®" has been adopted mainly for hotel amenities in Japan since 2019, when products using this container were launched, and it was also adopted in South Korea in 2024. The Company has promoted it globally as an environmentally friendly container made in Japan. "School POP®" was first adopted by a dairy product manufacturer in January 2021, and since then, it has been increasingly adopted amid growing environmental awareness. In FY2025, about 600 million School POP® containers are expected to be used, accounting for 40% of school milk cartons. The Company also developed "LiterLyte®," which uses base paper that is 8% lighter than conventional products, as a new line of paper carton NP-PAK products, and has supplied it since October 2023. As a reduction in pulp use also reduces GHG emissions, the Company has promoted it as an environmentally friendly product to expand its application.

Response to Climate Change

Moreover, biomass composites, which are made of "KC FLOCK®," powdered cellulose created by finely grinding pulp, and plastic, are under consideration for various applications as a material with low environmental burden, as the Company can reduce the use of plastic while improving the strength by using biomass composites. It believes that, by providing powdered cellulose suitable for composite material, it can respond to changing market needs and capture and expand business opportunities.

<Increased demand for products derived from sustainable forests>

The Company confirms the legality and sustainability of all woody raw materials it procures and ensures traceability through its supplier questionnaires, site visits and audits. Additionally, all of its woody raw materials are either FM (Forest Management) materials under the forest certification system or risk-assessed and controlled wood.

In addition to utilizing the forest certification system, the Company has adopted a due diligence system to confirm the legality and sustainability of its woody raw materials, and it has established a system that enables it to promptly respond to inquiries from customers regarding raw material procurement. Furthermore, in order to supply certified paper, for which demand has been increasing in recent years, the Company has been working to strengthen its procurement system to secure certified forest materials. This includes securing new plantation sites, mainly in Asian regions, and establishing NPL Resources Asia as a base for resource procurement activities in the region.

The Company's sustainable procurement of forest resources ensures reliability through supply chain management, which is based on the trust it has built with its suppliers over many years, and the creation of forest resources. In 2022, the Group updated its "Principles and Basic Policies Concerning Raw Materials Procurement" to enhance its content and established the "Wood Resources Procurement Guidelines" under that policy. The Company continues to strengthen its efforts to further improve the reliability of the wood-based raw materials used and will continue to meet customer requests.

With the aim of fully utilizing its wood resources, the Company produces pulp and various products, including industrial dispersants and additives for lead-acid batteries made from lignin. The Company is committed to continuing to provide environmentally friendly products that use sustainable wood resources as raw materials.

<Increase in products that reduce greenhouse gas emissions>

The amount of greenhouse gases from livestock accounts for about 30% of the total emissions from the agriculture, forestry, and fisheries sectors in Japan, and research is being conducted to reduce these emissions.

By utilizing its unique technology to extract from wood chips only cellulose fibers that are easily digestible by cattle, the Company has sold "Genki MoriMori™," a livestock feed high in fiber content and nutritional value. Feeding cows with easily digestible feed is expected to lower the amount of excrement and reduce GHG emissions generated when compost is made. Reducing GHG emissions from the livestock industry has become a global issue. In the 1.5°C scenario, efforts to address the problem may accelerate and create greater market demand for feed with this reduction effect. The Company believes that it can capture this business opportunity by utilizing the technologies it has accumulated in the Pulp and Paper Business.

<Increased demand for sustainable aviation fuel (SAF)>

SAF*1 is often used for decarbonization in the aviation sector, but the supply of waste cooking oil-derived SAF, which is currently the most common, is limited. Therefore, the market for ethanol-based SAF (ATJ*2) is expected to grow. This ethanol is assumed to be bioethanol, which is derived from corn or sugarcane, but it induces competition with food use, and its domestic demand is covered by imports.

Having strengths in the procurement of domestic wood materials that produce less GHG emissions due to short transport distances, the Company makes pulp-based non-food bioethanol using these materials to respond to climate change and expand the range of applications of pulp. Specifically, the Company has launched the "Morisora Project" with the slogan "Turning the Power of Forests into the Power of Flight" in collaboration with Sumitomo Corporation and Green Earth Institute Co., Ltd., and is considering starting to produce tens of thousands of kiloliters of bioethanol using domestic wood materials per year by FY2030. Japan Airlines Co., Ltd. and Airbus SE have also joined the project, and all the companies will work together on producing SAF from bioethanol in Japan.

At the same time, the Company will raise the environmental value of non-food bioethanol made from domestic wood materials as a pilot operator of the SAF Certification Task Group of the Public-Private Council to Promote the Introduction of Sustainable Aviation Fuel (SAF) and a member of "ACT FOR SKY," which aims to commercialize and promote the use of SAF produced in Japan. By incorporating its propagation business of elite trees, which absorb more CO_2 and grow faster than conventional varieties, into this project by leveraging the "Power of Forests," the Company will contribute to the circulation of forest resources, the revitalization of local communities, and the creation of a carbon neutral society.

*1 SAF: Sustainable Aviation Fuel. This sustainable aviation fuel significantly reduces CO_2 emissions in its lifecycle, from production and collection to manufacturing and combustion, compared to conventional fuels, and can be utilized as is with existing infrastructure

*2 ATJ: Alcohol to Jet. This refers to aviation fuel made from alcohol (ethanol or butanol)

2. Physical Factors

2-1. Opportunities Due to the Increase in the Number of Severe Disasters

<Increase in demand for stable supply of products>

Severe weather disasters, such as typhoons and torrential rains, are expected to cause damage to production sites and distribution networks, further intensifying the demand from customers to maintain a stable supply of products.

In response, the Company is working to formulate a detailed system for business continuity. It is developing a system that will allow it to manufacture products at multiple plants. Since severe disasters are expected to become more frequent in the 4°C scenario, the Company believes that it can take advantage of the fact that its mills are dispersed throughout Japan to accelerate the transition to a more flexible production system and further strengthen its system for business continuity, thereby leading to business expansion.

Also, in the event that its overseas raw material suppliers are damaged and opportunities for domestic timber, wastepaper and domestic non-fossil fuel use expand significantly, the Company can take advantage of its strong timber, wastepaper and fuel procurement network as well as its efforts to secure wastepaper raw materials in collaboration with its customers. Furthermore, it believes that it can also maintain and expand its business by utilizing its unused wastepaper recycling technology and making extensive use of domestic resources.

Response to Climate Change

<Increase in demand for long-term storage food containers>

The market for containers for long-term storage is expected to grow, as local governments and households are becoming increasingly concerned about the importance of storing emergency food supplies to prepare for severe disasters that are expected to occur not only in a 4°C scenario but also in a 1.5°C scenario.

In addition to "FUJIPAK®," which enables room-temperature distribution and long-term storage of beverages and tofu, the Company sells a "non-aluminum FUJIPAK," which allows room-temperature distribution without using aluminum foil. This product has drawn attention as an environmentally friendly container that improves recyclability and reduces GHG emissions. The Company has also developed and launched "NSATOM®" as a new container designed for solid-particle, long-fiber, and high-viscosity beverages, which can hold a wider variety of contents and has a long-term storage function. As paper containers capable of long-term storage are believed to help eliminate plastic and reduce food waste, the Company will continue to develop new containers that meet market needs and strengthen its system of stable supply.

2-2. Rising Temperatures and Changing Precipitation Patterns

<Increasing demand for environmental stress tolerant plants>

Plants cannot move on their own, which means that environmental changes like higher temperatures can stress them and hinder their growth. So, efforts have been made for many years to breed plants that can withstand high temperatures, salt damage, dry conditions, and the like.

Under the 4°C scenario, the demand for environmental stress tolerant plants may increase because the appropriate areas for plant growth are expected to change and decrease due to climate change.

The Company has been developing tree breeding and propagation technologies for many years and has developed a number of proprietary technologies for these.

Because tree breeding takes time, it will be difficult to expand the business rapidly in 2030, but the Company will work to expand its business quickly after 2030, when the value of forests will further increase toward carbon neutrality.

Promotion of Resource Circulation

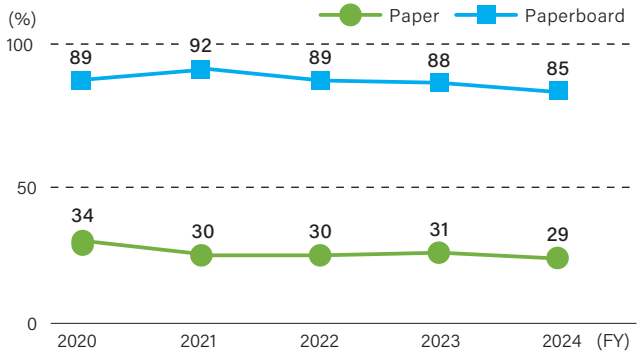
1 Basic Policy

P94 NIPPON PAPER GROUP Environmental Charter

2 Initiatives for Using Wastepaper

NIPPON PAPER GROUP considers wastepaper as important raw material and is working on the recycling of unused wastepaper.

Trend of Wastepaper Utilization Rate (in Japan*)



* From FY2021, Crecia Kasuga is also included in the scope

CASE STUDY

Launch of Recycling Facilities for Food and Beverage Paper Containers (Nippon Paper Industries)

In 2022, the Company's Fuji Mill began operating facilities dedicated to producing recycled pulp from wastepaper of food and beverage paper containers, and in 2023, the Company began operating shredding and washing plant in the Kanto region. Using wastepaper derived from food and beverage paper containers that have been sorted accurately makes it possible to produce high-quality recycled pulp that has a high degree of brightness. By leveraging the characteristics of recycled pulp produced at this plant and promoting their recycling into various paper products with high added value, the Company will popularize the recycling of used paper containers and build a new resource circulation business.

CASE STUDY

Paper Cup Recycling through Three-Company Collaboration with JAL and TOKAN KOGYO (Nippon Paper Industries)

Since 2022, the Company has collaborated with Japan Airlines Co., Ltd. (JAL) to recycle paper cups and other items. The JAL Group properly sorts and collects the paper cups used in some domestic in-flight services, while NIPPON PAPER GROUP provides a unique route for their transportation, accumulation, and packing. This recycling project was initially limited to materials such as containerboards. However, through a three-way collaboration with paper cup manufacturer TOKAN KOGYO CO., LTD., in 2024, the Company became the first in Japan*1 to achieve horizontal recycling, turning paper cups back into paper cups*2.

*1 According to research by the Company
*2 Recycled paper containing used paper cups is used as part of the raw material

Recycling of Paper Containers from Restaurants, Sporting Events, and the Like (Nippon Paper Industries)

Since 2024, the Company has collaborated with McDonald's Company (Japan), Ltd., collecting used paper cups from four of its stores in Saitama Prefecture and recycling them.
The Company recycled the paper cups used by roughly 40,000 runners in Tokyo Marathon 2025. Similar recycling efforts are being carried out in marathons nationwide.
The Company has also begun collecting and recycling used paper containers at games played by Alvark Tokyo, a B. LEAGUE professional basketball team.
In this way, the Company is working to tackle environmental issues by recycling difficult-to-use wastepaper in various situations and by supplying recycled paper products.
It is also continuing its efforts with Kandu to foster greater awareness among the children who will be responsible for the recycling of the future, aiming to raise future recycling rates.

Upcycling Project of Used Paper Containers Centering on "choito®" (Nippon Paper Industries, NP Trading)

In 2024, the Group launched "choito®," a brand of fabric products partially made of paper yarn from used food and beverage paper containers. Through this project, the Company has begun recycling collected used paper containers into high-quality recycled pulp at the Company's Fuji Mill and producing fabric products, such as towels and aprons, using paper yarn created from the pulp. Products with original tags and embroidery have been sold based on requests from Japan Airlines Co., Ltd., Kyobashi-Sembikiya, Ltd., and the UCC Group. Through this project, the Company is promoting collaboration with many business partners and is helping expand the recycling of used paper containers which were previously disposed of.

Initiatives to Recycle Release Paper (Nippon Paper Industries)

The Company produces base paper for the release paper used for stickers and labels. It is implementing initiatives to recycle release paper, which has been disposed of in the past, from the perspective of extended producer responsibility. Currently, used release paper is collected and recycled into materials such as containerboards and notebook covers. The Company also coordinates with Japan-Earth Conscious Labeling association* (J-ECOL) to collect used release paper from users such as Nichiban Co., Ltd. and recycle it. To make it easier to recycle release paper, the Company proposes the use of base paper for release paper (paper coated on one side) that does not need a layer of PE laminate, thereby contributing to the reduction of plastic consumption.

* This association was founded in May 2023 to promote the resource circulation of used release paper. It consists of companies and organizations related to the use, production, and recycling of stickers and labels

Promotion of Resource Circulation

CASE STUDY

"Closed Loop" Initiatives (Nippon Paper Industries)

The Company has established a "closed loop" scheme in which it directly purchases wastepaper from its customers in order to make long-term, stable use of collected waste newspaper and catalog paper as a raw material. In April 2023, the Company signed a new contract with DINOS CORPORATION regarding the sale and recycling of wastepaper, for the purpose of domestic circulation of resources by building a "closed loop" of catalog wastepaper, and started operations.

Collection and Recycling of Paper Cups (Nippon Paper Industries)

Since 2019, the Company has been collecting used paper cups at its head office and recycling them as raw materials for containerboards at its Ashikaga Mill. In FY2024, the Company collected approximately 175,000 paper cups.

Paper Carton Recycling "PakUpcycle®" (Nippon Paper Industries)

The Company has conducted various initiatives with a catch phrase of "PakUpcycle®," coined by the Company by combining "Pak" (beverage paper pack) and "Upcycle" (to reuse unnecessary items through processing to add value as a product).

<Paper-Pak Carton Collection and Recycling>

The Company has installed Paper-Pak collection boxes at Group company sites and is working to increase employee awareness of paper pack recycling. In addition, the Company has positioned the collection of paper packs as an activity that enables society as a whole to make effective use of resources, and is working with collection companies to strengthen the efforts to promote recycling at various facilities and schools. In 2017, the Company commenced collection activities using a proprietary method, primarily in Nerima City, Tokyo. The collected paper packs are used as raw material for household paper products. (Results for FY2024: 4.3 tonnes)

<Recycling of Beverage Paper Packs with Aluminum>

The Company is working with RIPRO Corporation, Japan, and Hagihara Industries Inc. to jointly develop uses for a mixture of polyethylene and aluminum ("PolyAl") in order to perform material recycling* of the mixture that is processed as waste during the process of recycling beverage paper cartons made with aluminum. Boundary piles made from PolyAl are used by several forest cooperatives.

* Recycling method in which waste is recycled as raw material for a new product

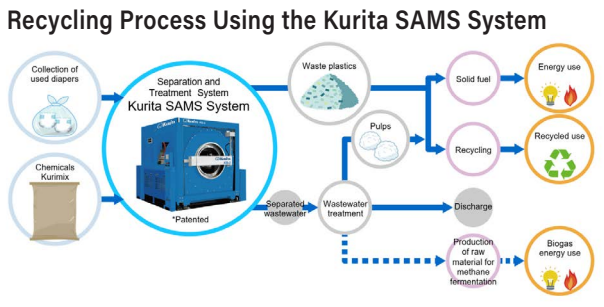
<Recycling of Milk Paper Packs from School Lunches>

In 2023, School POP® →P62 was adopted by CHUOMILK, which supplies milk for school lunches in areas surrounding Toyohashi City. In response, Toyohashi City began recycling school lunch milk paper packs to reduce waste and recycle resources, and to promote environmental education at schools it also holds activities such as visiting lectures. Employees of the Company, together with employees of CHUOMILK, participated in this visiting lecture to help with instruction and with a paper-making workshop. The Company has received feedback from schools that says that the lectures stimulated students' interest in recycling and taught them the importance of milk.

Joint Development of Environmentally Friendly Paper Diapers with Kurita Water Industries (Nippon Paper Crecia)

Most of the used diapers in Japan are incinerated in general or industrial waste treatment plants. As Japan's population ages, the volume of used paper diapers is forecast to increase, so there is a rising need to recycle them. Group company Nippon Paper Crecia is developing environmentally friendly paper diapers with Kurita Water Industries Ltd. ("Kurita Water Industries"). In this development project, Nippon Paper Crecia is providing information regarding paper diaper products and Kurita Water Industries is providing information about separation and processing performed using the Kurita SAMS System. Together, they are deliberating product specifications for paper diapers that would increase the quality of separated and processed plastic and pulp materials. Through the project, the companies are helping create a recycling-based economy and society and realize a decarbonized society with the aim of further contributing to societal sustainability.

Recycling Process Using the Kurita SAMS System



Start of Empty Tissue Box Recycling Verification Testing in Soka City (Nippon Paper Crecia)

Group company Nippon Paper Crecia has signed an agreement on initiatives for creating a recycling-based society with Soka City, Saitama Prefecture. From April 2024, it has launched an empty tissue box recycling verification project in five public facilities within the city. The collected empty boxes are reused by the Group as raw material for cardboard, and Nippon Paper Crecia is donating toilet paper to elementary schools and junior high schools in the city based on the amount of empty tissue boxes that are collected. Some of the collected boxes are turned into miscellaneous paper storage bags and distributed to elementary schools in Soka City to deepen students' understanding of recycling. Nippon Paper Crecia will continue to strengthen its collaboration, promoting paper recycling and contributing to the realization of a sustainable society.

Reduction of Environmental Burden

1 Basic Policy

P94 NIPPON PAPER GROUP Environmental Charter

2 Effective Management of Water Resources

- NIPPON PAPER GROUP sources water for its production activities from tap water, industrial water, groundwater, and rivers.
- For the sustainable use of water resources, the Group is working to reduce water consumption and the amount of water pollutants in its wastewater.
- In FY2024, the Group did not receive any information from the government or local residents that the Group's mills and business offices were impacting the environment due to their water intake.
- The Group conducts assessments in order to identify water risks for each major production site in Japan and overseas, such as the frequency of risks to water supply and flooding, and to formulate appropriate countermeasures.
- In FY2024, the Group conducted a comprehensive water risk analysis, using the Baseline Water Stress (5-point scale) in the Aqueduct 4.0 Water Risk Atlas tool by the World Resources Institute (WRI), at 42 sites (27 production sites and 15 non-production sites) in Japan and 47 sites (33 production sites and 14 non-production sites) overseas. The sites both in Japan and overseas have achieved high efficiency of water usage, maintaining a stable risk management system. No extreme water risks were found in the production sites in Japan, and each site continues to manage water according to its characteristics. Going forward, the Group is committed to using sustainable water resources and reducing risks.

1. Reducing the Amount of Water Used

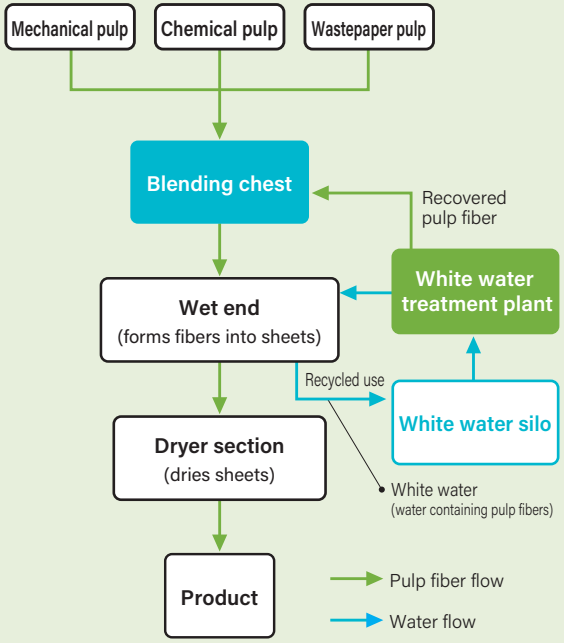
- The Group actively reuses water in production processes to reduce the amount of water used.
- The reuse of water in the production process leads to energy saving of equipment by reducing the amount of inflow water.

CASE STUDY

White Water Recycling

At the Group's paper mills, they collect water containing fine pulp fibers generated in the wet end called white water. The collected white water is separated into pulp fibers and reused water by the treatment equipment, the pulp fibers are returned to the blending chest and the reused water is returned to the wet end for recycling, in an effort to reduce water consumption.

White Water Circulation Flow Diagram



CASE STUDY

Recycling of Water Using Jet Nozzles (Nippon Paper Industries)

As the amount of recycled water in the manufacturing process increases, hydrogen sulfide is generated due to fouling within the system caused by closed processes and the rotting of accumulated fine pulp. In order to save water and achieve improved operational efficiency by controlling the production of unpleasant smells, submersible jet nozzles that utilize the eductor* effect have been installed in the Company's mills in Japan. The powerful liquid flow cleans the system by removing dirt and deposits from the bottom of the pit, thereby promoting the circular use of water.

* Sucking up the liquid inside the pit and discharging it with supplied water using pressure difference

2. Reducing Water Pollutants

- The Group is working toward reducing water pollutants by 15% compared to FY2018 by FY2030.
- The Group purifies wastewater using activated sludge treatment equipment and other equipment to reduce the amount of organic substances in the wastewater to below the standard values stipulated by laws and regulations and agreed upon with local governments before discharging it into public waters and sewerage systems.
- Wastewater from some of the mills and business offices is thoroughly controlled through constant monitoring using measuring equipment and daily water quality inspections by inspectors.

Reduction of Environmental Burden

3. Initiatives in Collaboration with Other Companies

The Group is working with other companies to implement initiatives for the sustainable use of water resources.

CASE STUDY

Participation in the JOKI Programme (Jujo Thermal)

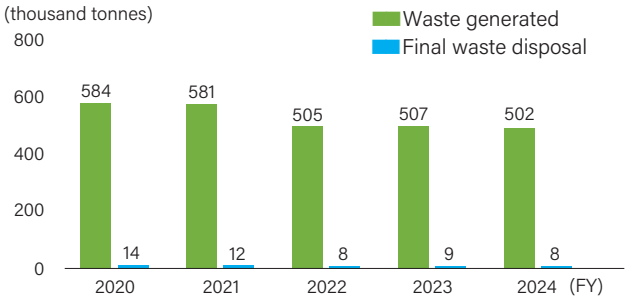
Jujo Thermal (Finland) participates in the JOKI programme, which aims to strengthen the protection of water resources in operating areas and improve water quality.

3 Waste Reduction

1. Waste Recycling

The Group is advancing initiatives such as revising production processes and making effective use of boiler ash as civil engineering material in order to reduce the amount of industrial waste sent to landfill and other forms of final disposal.

Waste Generated and Final Waste Disposal (in Japan*)



* From FY2021, Crecia Kasuga is also included in the scope

CASE STUDY

Circular Use of Quicklime (Nippon Paper Industries)

At its papermaking mills, the Group uses quicklime to recover chemicals used in the pulp manufacturing processes and to manufacture fillers that impart functionality to paper. Quicklime waste is generated in this process. The Group has so far disposed of this material as an industrial waste. However, the Company's Ishinomaki and Iwanuma mills have started collaborating with a supplier that can recycle quicklime waste. Under this collaboration, the Ishinomaki and Iwanuma mills are working to reuse quicklime waste as a resource.

Processing Coal Fly Ash from a Boiler into a Construction Material (Nippon Paper Industries)

The Ishinomaki Mill operates a coal boiler to privately generate electricity on site. In the process, combustion ash is generated in its coal boiler. The Company processes the combustion ash through heat modification, and sells the material as CfFA® (Carbon-free Fly Ash) concrete admixture. Mixing CfFA® into concrete has the effect of making it more durable and longer lasting. CfFA® has so far been adopted in earthquake recovery construction (bridges and seawalls, etc.) in the Tohoku region of Japan.

Effective use of local waste (Nippon Paper Industries)

At the Company's Nakoso Mill, waste generated in neighboring areas is actively used as fuel. This waste includes shiitake mushroom beds and rubber chips from artificial turf. The use of waste as fuel allows the Nakoso Mill to reduce its use of fossil fuels. The local production and consumption of fuel has not only contributed to reducing GHG emissions from the Nakoso Mill, but it has also helped to reduce waste generated in local areas. In 2022, the Company won the Special Award of the 7th Fukushima Industrial Award sponsored by the Fukushima-Minpo Co., Ltd.

Recycling of Paper Pallets

The Group is contributing to the effective use of renewable resources by collecting and reusing pallets through Pallet Recycle Co., Ltd.

2. Response to the Plastic Resource Circulation Act

The Group is working on the control of generation and discharging of waste plastic and its recycling pursuant to the "Plastic Resource Circulation Act," established in April 2022.

<Control of generation and discharging>

- Through the Japan Paper Association, the Group encourages wastepaper suppliers to reduce plastic contamination in wastepaper.
- The Group chooses high-strength and long-life plastic products for use in production.

<Recycling>

- The Group prioritizes the outsourcing of work to processing companies that can recycle resources.
- Waste plastic that is difficult to recycle is used by the Group internally as fuel. →P29

<Others>

- The Group develops and provides products that can help reduce the amount of plastic used in society as a whole.

4 Controlling Chemical Substances

- The Group examines the chemical substances it uses in its production processes in accordance with its Chemical Substance Management Guidelines. The Group implements risk management by monitoring how much of these substances is used and how much is released into the environment. The Group also takes corrective actions as necessary.
- At risk communication →P27 held at its mills and business offices, the Group discloses to local stakeholders the amounts of released and transferred chemical substances subject to the PRTR system.

Reduction of Environmental Burden

Amounts of Substances Subject to the PRTR System Released and Transferred*1 (FY2024)

Chemical Substance	Amount released	Amount transferred	Total released and transferred
Water-soluble compounds of zinc	300.0	0.0	300.0
Acrylamide	6.9	0.0	6.9
Acrylic acid and its water-soluble salts	13.0	0.0	13.0
Acrylonitrile	0.8	0.0	0.8
EPN	1,500.0	0.0	1,500.0
Ethylbenzene	0.2	0.0	0.2
Ethylene glycol monoethyl ether	580.0	5,300.0	5,880.0
Xylene	132.8	0.0	132.8
Glutaraldehyde	24.1	1.6	25.7
Chloroform	54,190.4	44,588.4	98,778.8
Tetrachloromethane	0.0	39,656.1	39,656.1
Cyclohexylamine	700.0	0.0	700.0
Methylene chloride	9,000.0	180.0	9,180.0
N,N-Dimethylacetamide	23.0	167.2	190.2
N,N-Dimethylformamide	110.0	410.0	520.0
Mercury and its compounds	7.3	0.0	7.3
Selenium and its compounds	0.4	0.0	0.4
Dioxins*2	1,130.3	13,334.4	14,464.7
O,O-Dimethyl O-(3-methyl-4-nitrophenyl) phosphorothioate	9.0	0.0	9.0
Water-soluble copper salts (except for complex salts)	2.6	0.0	2.6
Toluene	23,618.1	51,174.0	74,792.1
Naphthalene	0.4	0.0	0.4
Carbon disulfide	5,301.0	0.0	5,301.0
Arsenic and its inorganic compounds	0.4	0.0	0.4
Hydrogen fluoride and its water-soluble salts	15,112.0	0.0	15,112.0

Chemical Substance	Amount released	Amount transferred	Total released and transferred
Hexane	0.9	0.0	0.9
Benzene	0.1	0.0	0.1
Boron compounds	17,833.9	0.0	17,833.9
PCB	0.0	3,977.0	3,977.0
Poly(oxyethylene) alkyl ether	1,366.2	0.0	1,366.2
Formaldehyde	440.9	0.0	440.9
Manganese and its compounds	685.0	0.0	685.0
Methacrylic acid	2.1	0.0	2.1
Methyl methacrylate	21.0	0.0	21.0
Methylnaphthalene	816.4	0.0	816.4
1,3-Dichloro-2-propanol	1.4	0.0	1.4
Methyl benzimidazol-2-ylcarbamate	2,400.4	0.0	2,400.4
Polycondensation products of adipic acid / 2-(chloromethyl)oxirane	26,214.7	2.1	26,216.8
Alkan-1-amine, (Z)-octadec-9-en-1-amine, -octadeca-9,12-dien-1-amine	432.0	0.0	432.0
Mixture of polyaddition products of oxirane to alkan-1-amine, polyaddition products of oxirane to (Z)-octadec-9-en-1-amine and polyaddition products of oxirane to -octadeca-9,12-dien-1-amine	9,213.0	0.0	9,213.0
Alpha-Alkyl-omega-hydroxypoly	15.1	0.0	15.1
Salt of alkyl(benzyl)(dimethyl)ammonium (limited to those the alkyl group is C=12-16)	920.0	0.0	920.0
Ethylene glycol monobutyl ether	58.0	410.0	468.0
Ethylenediaminetetraacetic acid and its potassium and sodium salts	3,640.0	0.0	3,640.0
Chloric acid and its potassium and sodium salt	4,502.5	0.0	4,502.5
Cyclohexane	1,242.0	7,929.0	9,171.0
Salt of N,N,N-trimethyldodecan-1-aminium	1,560.0	0.0	1,560.0
Trimethylbenzene	86.7	0.0	86.7

Reduction of Environmental Burden

Amounts of Substances Subject to the PRTR System Released and Transferred*1 (FY2024)

Chemical Substance	Amount released	Amount transferred	Total released and transferred
Nitrilotriacetic acid and its sodium salt	400.0	0.0	400.0
1-Hydroxyethane-1,1-diyl diphosphonic acid	3,224.0	0.0	3,224.0
Hexahydro-1,3,5-tris-1,3,5-triazine	178.1	0.0	178.1
Methyl isobutyl ketone	360.0	5,900.0	6,260.0
2-(2-Methoxyethoxy)ethanol	8,551.1	0.5	8,551.6
Total*3 Unit : kg	194,798	159,696	354,494

*1 A summary of the volumes Group companies reported in accordance with the PRTR system
*2 Unit : mg-TEQ
*3 Dioxins are not included in total data

5 Prevention of Soil and Air Pollution

- The raw materials and chemicals used by the Group's mills and business offices contain almost no heavy metals, trichloroethylene, or other soil contaminants.
- The Group is working toward reducing air pollutants by 15% compared to FY2018 by FY2030.
- The Group has introduced NOx removal equipment, desulfurization equipment, and a dust collector to reduce atmospheric pollutants, such as sulfur oxides (SOx) and nitrogen oxides (NOx) generated in fuel combustion, to below the standard values stipulated by laws and regulations and agreed upon with local governments before discharging them.

6 Preventing Noise and Vibration

The Group is engaged in efforts utilizing IoT technologies to prevent the occurrence of noise and vibrations. →P61

7 Centralizing Environment-Related Data

The Group has introduced an environment-related data collection and aggregation system for all the Group companies. Environment-related data, such as water quality, air, waste, and chemical substances, is centralized to share and use environmental information within the Group.

Preservation of Biodiversity

1 Basic Policy

P94 NIPPON PAPER GROUP Environmental Charter
P94 Basic Policy on the Preservation of Biodiversity

2 Preserving Biodiversity in the Value Chain

- The Group strives to reduce its impact on biodiversity throughout the entire value chain, from procurement of raw materials and fuel to paper and other manufacturing processes, wastewater treatment, and GHG emissions control.
- The Group sustainably procures wood resources, which are the raw materials for the Group's products, from properly managed forests.

3 Preserving Biodiversity in Forest Management

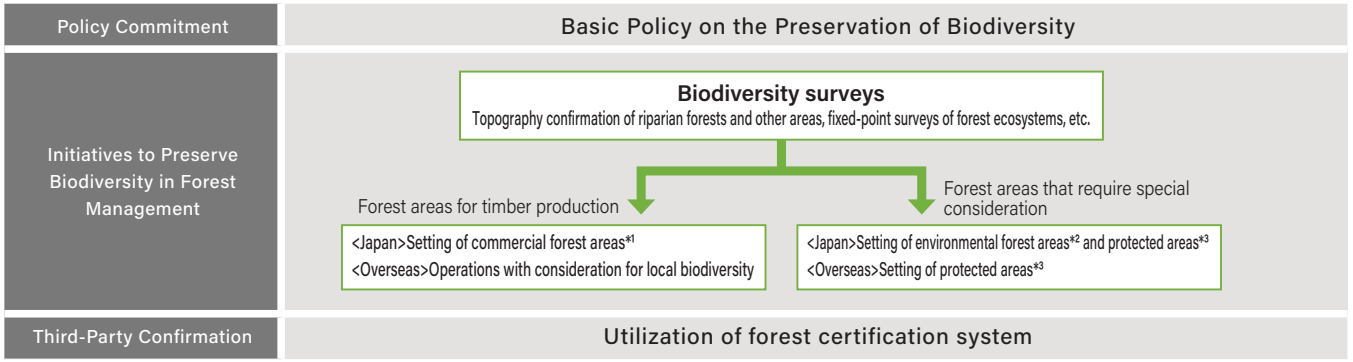
1. Initiatives to Preserve Biodiversity in Forest Management

- The Group manages sustainable forests in the company-owned forests in Japan and overseas.
- The Group conducts biodiversity surveys based on its "Basic Policy on the Preservation of Biodiversity" in the company-owned forests in Japan and overseas.
- In existing businesses, the Group confirms topographical information that should be considered, such as riparian forests, and conducts fixed-point surveys of forest ecosystems.
- Based on the results of biodiversity surveys, in areas that require special attention, the Group has established environmental forests, protected areas, and protected forests where logging is not performed.
- In commercial forest areas where lumber is produced, the Group appropriately manages the forests by considering the location and timing of logging and implementing operations that consider local biodiversity.

2. Third-Party Confirmation

- By utilizing the forest certification system, the Group can have third-party confirmation that its forest management is being implemented, considering biodiversity.
- Nippon Paper Industries and overseas plantation subsidiaries have obtained forest certification for all company-owned forests in Japan and overseas.

Initiatives to Preserve of Biodiversity in Forest Management



*1 Forest areas that are operated for the sustainable production of timber *2 Forest areas that are not cultivated or logged for the production of timber
*3 Forest areas where logging and other operations are restricted to preserve biodiversity

CASE STUDY

Ministry of the Environment: Participation in the Nature Positive* Management Promotion Platform

The Nature Positive Management Promotion Platform, which is based on the National Biodiversity Strategy and Action Plan of Japan, was established as a platform through which companies and local governments would work together to further the adoption of nature positive management and technologies and to promote business matching. The Group is registered in the platform as an NPE Partner, promoting nature positive management, and as an NPE Solution Partner possessing nature positive technologies. Based on the NIPPON PAPER GROUP Environmental Charter, the Group engages in business activities that take biodiversity into consideration, practices sustainable forest management, and uses unique technologies such as elite tree seedling propagation technologies to coordinate with a broad range of stakeholders and promote nature positive management.

* Stopping and reversing biodiversity loss in order to set nature back on a recovery track

Certified as a site of "Nationally Certified Sustainably Managed Natural Sites" by the Ministry of the Environment (Nippon Paper Industries)

The Company has participated in the "30by30 Alliance for Biodiversity," run by the Ministry of the Environment, since the alliance was founded in FY2022. "30by30" is an international commitment to achieve nature positivity by preserving at least 30% of land and sea as natural environmental areas by 2030. After taking part in the trial and verification of the screening process in FY2022, the Ho-oh company-owned forest (1,359 ha in Yamanashi Prefecture) was certified as a "Nationally Certified Sustainably Managed Natural Sites"* by the Ministry of the Environment when the certification system began in October 2023. In the future, the Company will consider expanding the target area.

* In this project, to achieve "30by30," the Ministry of the Environment certifies areas where biodiversity is preserved through private initiatives

Preservation of Biodiversity

CASE STUDY

Preserving Blakiston's Fish Owl* Habitat While Pursuing Timber Production Business

~Collaborating with the Wild Bird Society of Japan~ (Nippon Paper Industries)

The Company is collaborating with the Wild Bird Society of Japan to preserve the precious habitat of the Blakiston's fish owl while pursuing timber production activities.
In 2015, standards which included forestry operation restrictions were defined for areas of a company-owned forest which were frequently used by Blakiston's fish owls. These standards were revised in 2024, and Blakiston's fish owl habitats are being protected based on the bird's actual behavior while the Company also continues its timber production.
Multiple chicks have been confirmed as successfully leaving artificial nesting boxes installed in the company-owned forest, and the collaboration is assisting in the restoration of biodiversity.
Through this initiative, the Company is contributing to the realization of "Nature Positive."

* Blakiston's fish owl was identified as a national protected species in 1971, and placed on the Red List of critically endangered species by Japan's Ministry of the Environment

Collaborating with the Wild Bird Society of Japan

Year	Activities
2010	Entered into an agreement on the protection of wild birds with which forestland owned by the Company in Eastern Hokkaido was identified as a sanctuary
2015	Set new standards for the compatibility of business activities with the preservation of Blakiston's fish owl habitat in a company-owned forest in Eastern Hokkaido. Won Biodiversity Action Award of the Ministry of the Environment
2020	Installation of artificial nest boxes to support Blakiston's fish owl breeding
2021	Won "Hokkaido Biodiversity Conservation Awards" of the Hokkaido Government
2023	Introducing the initiatives at the NIPPON PAPER GROUP sustainability lecture →P02
2024	Revised the standards set in 2015 in line with the actual behavior of Blakiston's fish owl

Conducting Biodiversity Surveys on Overseas Company-owned Land (AMCEL)

AMCEL (Brazil) has about 170,000 hectares as protected areas of approximately 300,000 hectares of company-owned land. The protected areas are a habitat for many wildlife species and they also include forests with high conservation value where rare and endangered species live. AMCEL conducts biodiversity surveys on the company-owned land.

Biodiversity Preservation Initiatives of AMCEL

Activities	Description
Periodic water quality inspections	Water quality and water level monitoring equipment was installed within the plantation and is being used for periodic inspections
Wild animals and plants habitat research in company-owned land	AMCEL conducts habitat research and monitoring of wild animals and fish in plantation areas in a joint effort with ecologists
Monitoring of vegetation in protected areas	AMCEL conducts continuous monitoring research of vegetation in protected areas

Supporting the Activities of the "Association for the Protection of Shirane-aoi*"

To protect the Shirane-aoi, the "Association for the Protection of Shirane-aoi (Japanese wood poppy)" was established in 2000 by Gunma Prefectural Oze High School and Katashina Village, Tone District, Gunma Prefecture. Nippon Paper Development, which manages the Sugenuma company-owned forest, has provided operational support since the association's establishment and has opened a portion of the company-owned forest to the public. Since 2002, Group employees have participated in these activities as volunteers.

* Plants of the Ranunculaceae (buttercup) family designated as an endangered species in Gunma Prefecture

Eradicating Invasive Plant Species from Iriomote Island

~Cooperation with the Iriomote Island Ecotourism Association~

(Nippon Paper Industries)

Following an agreement concluded in 2017 with the Okinawa Forest Office of the Kyushu Forestry Department of the Forestry Agency, in about 9 hectares of national forest on Iriomote Island, the Company has collaborated with the NPO Iriomote Island Ecotourism Association in efforts to eradicate Bay Biscayne creeping oxeye*, an invasive species, and is investigating invasion by exotic plants. The island is registered as a world natural heritage site and is home to rare wild animals and plants such as Iriomote cats, which have been designated by the Japanese government as a natural monument. Measures must be taken to prevent the intrusion of invasive plants. The creeping-oxeye is almost never seen anymore within the activity area, and based on this project achievement, in March 2022, the project agreement was renewed for another five years.

* A plant in the Asteraceae family which originated from the Americas, but was introduced throughout Okinawa for greenifying slopes and embankments, etc. It has strong propagating capabilities, and there are concerns over its impact on local ecosystems

Mutual Cooperation in Forest Management with Coca-Cola Bottlers Japan

The Company and Group company MARUNUMA KOGEN RESORT are coordinating with Coca-Cola Bottlers Japan, Inc. ("CCBJ") in the conservation and protection of forest and water resources. They are working together to maintain "healthy forests" that nurture "bountiful water." Part of the Sugenuma company-owned forest in Katashina Village, Gunma Prefecture (1,747 ha), is located in the water source area of CCBJ's Saitama Mill and Iwatsuki Mill. To maintain its water source retention capability, the Group promotes forest conservation and maintenance activities.

Preservation of Biodiversity

Information Disclosures Based on TNFD

1. Basic Stance on Natural Capital

Under its philosophy of "carrying out its corporate activities in recognition of the importance of biodiversity," NIPPON PAPER GROUP provides society with biomass products that contribute to its sustainability by utilizing forest resources.
The Group's business activities heavily rely on natural gifts such as water resources, wood resources, and soil health, all of which are supported by biodiversity.
Therefore, the Group recognized the preservation of biodiversity as a critical management issue when it established its "Basic Policy on the Preservation of Biodiversity" in 2016.
In compliance with this basic policy, the Group conducts business activities to promote nature-positive initiatives and achieve a society in harmony with nature, by achieving both "preservation and restoration of biodiversity" and "sustainable business growth."

2. Disclosure Items

The Group is actively working to disclose information based on the information disclosure framework of TNFD (Taskforce on Nature-related Financial Disclosures).
The Group is conducting an assessment of nature-related risks using the LEAP approach* in accordance with the final TNFD Recommendations v.1.0 published in September 2023.
This fiscal year, the Group is disclosing analysis results covering the A (Assess risks and opportunities) and P (Prepare countermeasures) stages, in addition to the L (Locate interface with nature) and E (Evaluate) stages of direct operation (manufacturing) and the upstream supply chain (procurement).

* This is a process proposed by the TNFD to systematically assess nature-related risks and opportunities based on scientific evidence. It proceeds in the order of the following four steps: L (Locate your interface with nature), E (Evaluate your dependencies and impacts on nature), A (Assess your nature-related risks and opportunities), and P (Prepare to respond to nature-related risks and opportunities and to report to stakeholders on your material nature-related issues)

(1) Governance Structure

The Group is promoting the protection, development, and utilization of forest resources while taking into consideration biodiversity. The Board of Directors pursues business activities that are in harmony with the sustainable use of ecosystem services by recognizing the preservation of biodiversity as a critical management issue. It receives reports on the progress of initiatives related to biodiversity, risk analysis results, and other key data points from two executive officers, one in charge of GHG emissions reduction and one in charge of promotion of environmental management (at least twice a year) and the Risk Management Committee (at least once a year), and supervises the execution of these operations.

(2) Strategy

In FY2024, risk analysis was performed utilizing ENCORE[*1] for direct operation (manufacturing of paper products) and the upstream supply chain (coal, plantations, and production of wood chips). Analysis determined that there was a high level of dependence on water supply services in both the plantation and paper manufacturing businesses. In particular, the plantation business was confirmed to have an especially high level of reliance not only on water resources but also on ecosystem regulating and maintenance services such as climate regulation, water flow and soil maintenance, disease and pest control, and the like. In identifying priority locations, the WWF Biodiversity Risk Filter[*2] was utilized to perform Tier 1 evaluation for wood chips, for which procurement volume is high, and tracing was performed through Tier 3 for suppliers with major impacts. Dependence on ecosystem services and impacts on natural capital were evaluated in detail.
Also, with respect to water risk, from FY2024, the Company has utilized the World Resources Institute (WRI) Aqueduct to perform comprehensive analysis of domestic and global production sites and sales sites. Based on the results of these analyses, the Company expanded the evaluation scope to the A and P portions of the LEAP approach and performed analyses.

*1 ENCORE (Exploring Natural Capital Opportunities, Risks and Exposure) is an analysis tool that enables users to understand the impact of corporate activities on nature and the degree of their dependencies

*2 WWF Biodiversity Risk Filter is a tool for evaluating biodiversity risks that is offered by the World Wide Fund for Nature (WWF)

Preservation of Biodiversity

(3) Results of Analysis Utilizing ENCORE (LEAP approach: L)

Dependencies on Ecosystem Services

	Dependencies													
	Supply services*1				Control services*2									
	Ground-water	Surface water	Fiber and other materials	Animal-derived energy	Soil	Water quality	Flood prevention	Erosion prevention	Contaminant filtration	Epidemic preparedness	Pest control	Pollination	Preservation of the water cycle	Climate control
Manufacturing of paper products	Very High	Very High	Medium	—	—	—	—	—	—	—	—	—	Medium	Very Low
Upstream supply chain (forest and wood products)	Very High	Very High	Very High	—	High	High	Very High	Very High	—	High	High	High	Medium	Very High
Upstream supply chain (coal)	High	High	—	—	—	—	—	Medium	—	—	—	—	High	High

*1 Supply services provide the necessities of life, such as water, food, wood, clothing, and pharmaceuticals
*2 Control services purify the air and water and control the climate

Impact on Natural Capital

	Impacts											
	Change due to use of land, freshwater, or seawater (land transformation)			Use and supplementation of resources		Climate change	Pollution and removal of pollution					Invasion and removal of invasive species
	Use of terrestrial ecosystem	Use of freshwater ecosystem	Use of seawater ecosystem	Use of water	Use of other resources	Greenhouse gas emissions	Air pollutants other than greenhouse gas	Water pollutants	Soil pollutants	Solid waste	Nuisance	—
Manufacturing of paper products	—	—	—	Very High	—	—	Medium	High	High	—	—	—
Upstream supply chain (forest and wood products)	Very High	—	—	—	—	High	—	High	High	—	—	—
Upstream supply chain (coal)	Very High	High	—	Very High	—	High	High	High	High	High	High	—

(4) Identifying Priority Locations (LEAP approach: E)

In identifying priority locations, the WWF Biodiversity Risk Filter was used to evaluate 35 items related to biodiversity impact for directly operated areas and procurement areas (Tier 1) in Japan and overseas. Priority locations were defined as areas with a high level of dependence and impact on nature and which were material and important to business. WWF evaluation results and locations with high procurement volumes were taken into consideration in their selection.
These analyses identified Tier 1 wood chip suppliers in South Africa and Vietnam, and a plantation company in Brazil, as priority locations, so the scope of analysis was expanded to Tier 3 for South Africa and Vietnam. The Company will extend its analyses to other procurement areas in the future.

(5) Initiatives by an Overseas Plantation Business (Brazil) (LEAP approach: E)

The overseas plantation business (in Brazil) is a habitat for many wildlife species. It is a forest with a high conservation value that contains rare and endangered species. Various initiatives, such as habitat studies, are being conducted to confirm biodiversity conditions.

Activities	Description
Periodic water quality inspections	Water quality and water level monitoring equipment was installed within the plantation and is being used for periodic inspections
Wild animals and plants habitat research in company-owned land	AMCEL conducts habitat research and monitoring of wild animals and fish in plantation areas in a joint effort with ecologists
Monitoring of vegetation in protected areas	AMCEL conducts continuous monitoring research of vegetation in protected areas

Preservation of Biodiversity

(6) Biodiversity Preservation Initiatives (LEAP approach: A)

The Group is working not only to preserve forest biodiversity and reduce the environmental impact of production activities, but also to use resources sustainably while preserving the ecosystem through company-owned forest management and the use of unique technologies.

(7) Water Risk Evaluation Using WRI AQUEDUCT (LEAP approach: E)

ENCORE confirmed that due to the nature of its business, the Group was highly dependent on and had a major impact on water. In FY2024, the Company conducted water risk analysis using the Water Risk Atlas Baseline Water Stress (5-point scale) in the WRI/AQUEDUCT (4.0)* tool. This analysis was performed at 42 sites (27 production sites and 15 non-production sites) in Japan and 47 sites (33 production sites and 14 non-production sites) overseas, for a total of 89 sites.

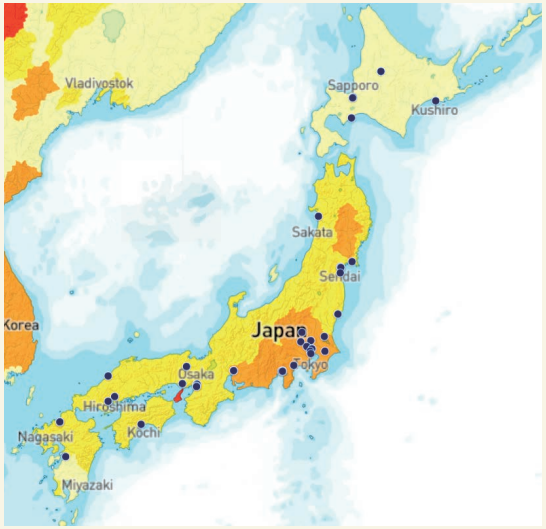
* WRI/AQUEDUCT (4.0) Water Risk Atlas Baseline Water Stress (5-point scale): This indicates latent competition for water usage with other water users. The higher the number, the more severe the competition risk

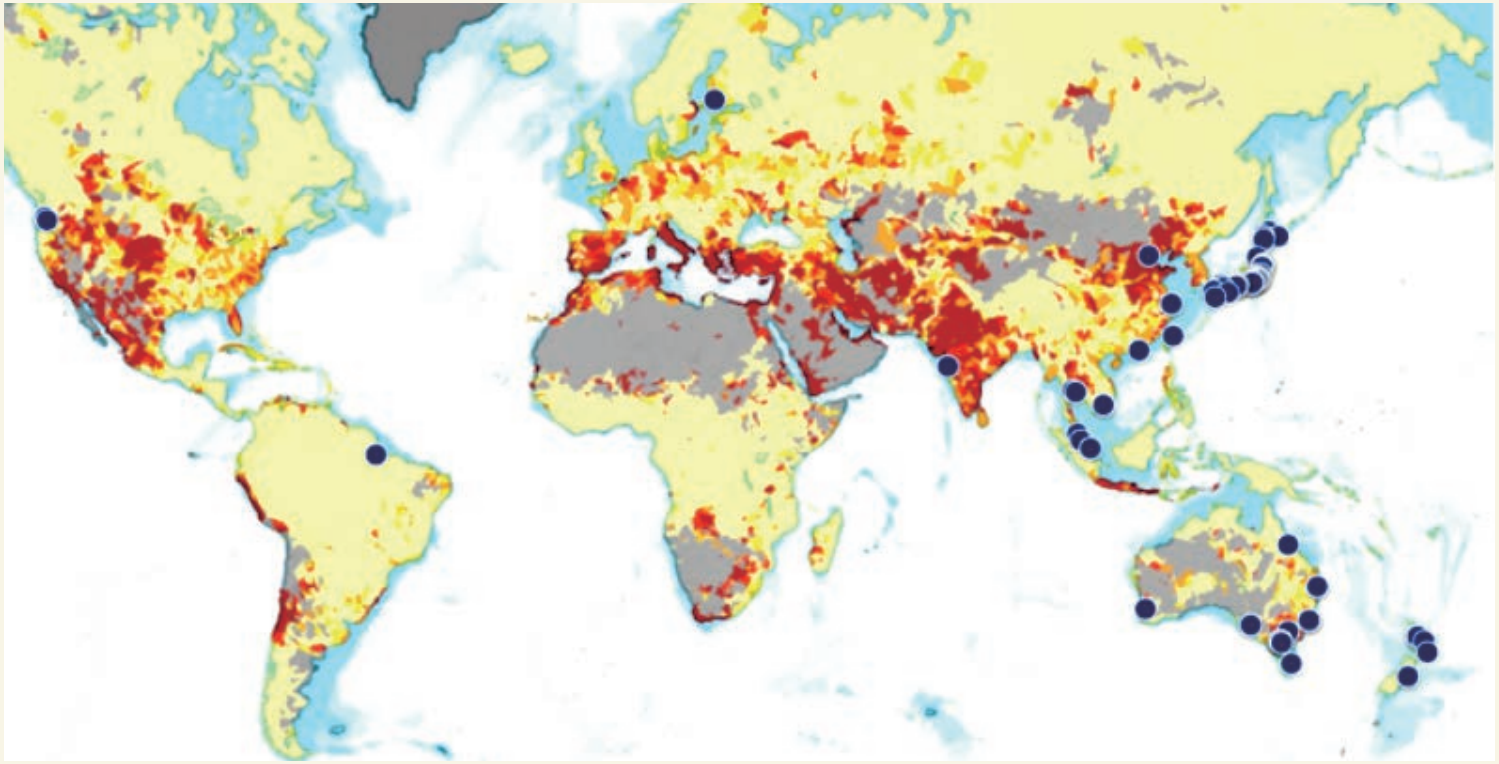
	Japan		Overseas												Japan		Overseas	
	Japan		Asia		Southeast Asia		Oceania		North America		South America		Europe		Percentage	Percentage	Percentage	Percentage
	Production sites	Non-production sites	Production sites	Non-production sites	Production sites	Non-production sites	Production sites	Non-production sites	Production sites	Non-production sites	Production sites	Non-production sites	Production sites	Non-production sites	Production sites	Non-production sites	Production sites	Non-production sites
Low	4	2			1	3	10		1	2	1				15%	13%	39%	36%
Low to Medium	11	9	1	2		2	1						1		41%	60%	9%	29%
Medium																		
Medium to High	12	4			1										44%	27%	3%	
High						1	13	1									39%	14%
Extremely High				3			3										9%	21%
Total number of sites	27	15	1	5	2	6	27	1	1	2	1		1		100%	100%	100%	100%

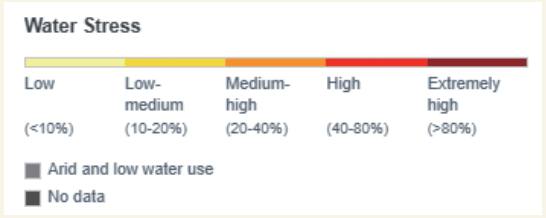
		FY2022		FY2023		FY2024	
		Japan	Overseas	Japan	Overseas	Japan	Overseas
Water intake	Million m³	779.5	119.7	761.9	100.7	767.0	107.2
Wastewater	Million m³	741.1	117.9	728.8	99.0	734.7	105.1
Consumption volume	Million m³	38.4	1.8	33.2	1.7	32.4	2.1
Consumption ratio	%	4.9	1.5	4.4	1.7	4.2	2.0
Wastewater ratio	%	95.1	98.5	95.6	98.3	95.8	98.0

Preservation of Biodiversity

NIPPON PAPER GROUP
Water risk and mills, business sites, plantations, branches, and sales sites







Analysis results

(1) Japan

◆ Within Japan, the majority of sites were sites with "Low to Medium" or "Medium to High" risk, and there were some sites with "Low" risk. There were no sites with "High" or "Extremely High" water risks, and overall the risk distribution has been kept steady. 44% of mill sites had "Medium to High" risk, so the Group will perform continuous monitoring and promote water-saving measures. The Company is steadily reducing its water intake and wastewater emissions, and it is maintaining a high level of water usage efficiency in Japan, with a water consumption rate of 5% or below.

(2) Overseas

◆ At overseas sites, the risk distribution is wide, ranging from "Low" to "Extremely High" due to regional characteristics and location conditions. In Oceania, in particular, there are numerous production sites, and due to regional characteristics, water risks are "High" or "Extremely High" for some sites. This is because of Oceania's dry climate, geographical disparities in the amount of rain, and the distribution of water resources. The Group is enhancing its water resource management based on local conditions. On the other hand, production sites in other regions (such as North America or Europe) primarily have "Low" or "Low to Medium" water risks, and they do business in stable water resource environments. Additionally, risk was "Extremely High" for some overseas non-production sites. These sites, such as branches, are primarily responsible for administrative functions, and do not have a direct impact on production activities. Therefore, these are not considered to involve major risks in terms of business continuity. The Group is actively reducing its water intake and wastewater emissions at overseas sites, as well, and it has achieved an even higher level of water usage efficiency than in Japan, with a water consumption rate of 2% or below. The Group will continue to manage water risk based on the characteristics of individual sites and further lower risk levels.

Preservation of Biodiversity

(8) Risks and Opportunities (LEAP approach: A)

Nature-related risks and opportunities were identified based on the results of evaluations of dependence and impact on nature. The key risks, opportunities, and countermeasures involving biodiversity and natural capital related to business activities are as indicated below.

<List of risks in priority locations>

Category	Risks	NIPPON PAPER GROUP Initiatives
Physical	Lower timber productivity due to extreme weather and forest fires	▪ Utilize fire insurance usage and enhance monitoring systems ▪ Strive to level forest age composition ratios to create diverse forests that are resistant to natural disasters
	Lower timber productivity due to water pollution or water shortages	▪ Conserve water sources in company-owned forests including forest reserves such as water source retention forests through forest management and reforestation
	Reduced tree growth due to ecosystem deterioration	▪ For planted forests and secondary forests, strive to level out forest age composition ratios to rejuvenate forests and increase forest biodiversity ⇒ In company-owned forests, promote regeneration cutting to rejuvenate forests and maintain their diverse functions ⇒ In third party-owned forests, improve logging efficiency and develop innovative biomass products and materials to maintain and expand timber demand, indirectly regenerating forests ▪ Deepen Company users' understanding of the diverse functions of forests, promote conservation and restoration activities in company-owned forests, and strive to maintain sustainable forest ecosystems
Policies	Limitations on land that can be used for plantations as a result of the expansion of protected areas, lower timber productivity	▪ Perform zoning of environmental forests and economic forests ▪ Reduce the pressure put on developing precious forests that should be preserved by increasing forest productivity ▪ When forests, even economic forests, are confirmed to be habitats for rare wildlife, collaborate with NPOs, etc., to protect and conserve species while continuing timber production ⇒ Case study: Protect Blakiston's fish owls and promote their breeding in forestland owned by the Company in Eastern Hokkaido while also continuing with timber production

<List of Opportunities>

Category	Opportunities	NIPPON PAPER GROUP Initiatives
Markets	Increase in economic value of the diverse functions of forests (CO_2, biodiversity, soil, nutrition, water source retention)	▪ Implement projects that will create 200,000 tonnes of J-Credits in company-owned forests in Japan ▪ As part of natural capital accounting, participate in ISFC and take part in establishment of system for quantifying forest value to increase value of company-owned forests in Japan and overseas plantations ▪ Use Nationally Certified Sustainably Managed Natural Sites support certification system, etc., to share environmental protection initiatives and value with third parties, spreading the importance of sustainable forest management to society at large
	Increase in inquiries regarding sustainable wood resources	▪ In forests with solid development histories, utilize high quality tree species and elite trees to increase forest productivity, thereby supplying sustainable wood resources
	Development of business through technologies for improving forest productivity	▪ Expand elite tree seedling business in Japan, establishing 10-million-unit production system by FY2030 (forest industry demand for seedlings is predicted to reach 100 million units by 2030) ▪ Develop and popularize logging technologies and implement consistent forestry cost reductions to expand forest resource business in Japan ▪ Overseas, supply technologies for performing early selection of high quality varieties and plantation technologies to existing plantation operators, connecting them with the Company's overseas procurement activities
Products	Increase in sales of environmentally friendly products made from wood resources	▪ Meet rising demand for paper and biomass-derived products driven by moves away from plastic and the growth of sustainable consumption. Develop and expand sales of environmentally friendly products to capture new markets and increase brand value. At the same time, expand the biomass material business through biomass power generation, biochemicals, cellulose nanofiber, SAF (sustainable aviation fuel), and the like
	Increase of environmental value by utilizing forest certification system to procure sustainable raw materials and by managing the supply chain	▪ Build in-house Due Diligence System (DDS), including supplier questionnaires and engagement, local confirmation, etc., perform supply chain management and procure sustainable woody material ▪ Expand in-house DDS to all raw material procurement
	Increase in the number of inquiries regarding domestic timber and products derived from it as a result of rising environmental awareness and the uncertain international situation	▪ Reinforce and expand the Group's domestic material supply chain by leveraging the strength of Nippon Paper Lumber, a Group company, which possesses one of Japan's largest domestic timber distribution networks (approx. 4 million m^3 per year) ▪ Perform stable paper raw material procurement (approx. 36% of paper raw material used by the Group is procured in Japan, which is higher than the industry average of 26%, based on actual figures for FY2024)

Preservation of Biodiversity

(9) Indicators and Targets (LEAP approach: P)

Global core disclosure indicators based on TNFD recommendations v1.0

	Drivers of natural change	Metric No.	Indicators	Data (as of March 2025)			Remarks
Drivers of nature change (dependencies and impacts)	Climate change	-	GHG emissions (Scope 1, 2, and 3)	Scope 1	4.1	Million t-CO_2	
				Scope 2	0.9	Million t-CO_2	
				Scope 3	5.8	Million t-CO_2	
	Land/ freshwater/ ocean-use change	C1.0	Total spatial footprint	Company-owned forests in Japan	90	kha	Owns about 400 company-owned forests in Japan with a total area of about 90,000 ha
				Overseas plantation	69	kha	Owns approximately 65,000 ha of forestland in Brazil and approximately 4,000 ha of forestland in Australia
		C1.1	Area where sustainable forestry management is implemented	Company-owned forests in Japan	90	kha	Equivalent to 100% of the plantation business
				Overseas plantation	69	kha	
	pollution/ pollution removal	C2.1	Wastewater total	Public waters + sewage	840	Million t	
			Concentrations of key pollutants in the wastewater discharged	COD/BOD	43	Thousand t	
			Concentrations of key pollutants in the wastewater discharged	SS	22	Thousand t	
			Concentrations of key pollutants in the wastewater discharged	Nitrogen	1.5	Thousand t	
			Concentrations of key pollutants in the wastewater discharged	Phosphorous	0.4	Thousand t	
		C2.2	Amount of industrial waste generated		771	Thousand BDt	
			Amount of final waste disposal		91	Thousand BDt	
			Amount effectively utilized		680	Thousand BDt	
		C2.4	Total amount of Non-GHG air pollutants	Nitrogen oxides	9.0	Thousand t	
				Sulfur oxides	2.1	Thousand t	
		C3.1	Rate of maintenance of forest certifications in Japan and overseas within the plantation business and paper production business		100	%	FSC® forest certification and PEFC forest certification have already been acquired
			Percentage of procured timber confirmed as legal		100	%	Conduct supplier questionnaires

Global disclosure indicators other than those above are currently being deliberated on.

Targets

Category	Indicators	FY2030 target
Response to climate change	GHG reduction	54% Scope 1 and 2 reduction compared to FY2013
	Energy consumption per unit	1% reduction from the previous fiscal year
Protection of forests, maintaining of biodiversity, nature positive initiatives	Forest resource conservation	Establishment of a production system for 10 million elite tree seedlings/year for forestry
	Improving forest productivity and increasing CO_2-fixing through use of breeding/propagation technologies	30% improvement in CO_2 fixation efficiency at overseas plantations compared to 2013
	Expansion of plantation areas	Securing of roughly 100,000 ha of plantation area, primarily in Asia
	Creation of J-credits for company-owned forests	Fixing of 200,000 tonnes of CO_2 by company-owned forests nationwide (by FY2027)
Reduction of Environmental Burden	Reduction of environmental impact of manufacturing processes	Reduction rate at domestic manufacturing sites (compared to FY2018) : 15% reduction in air and water pollutants
Realization of a circulation-oriented society	Promotion of use of difficult-to-treat wastepaper	12,000 t/year utilized domestically

Other Environment-related Data

1 Environmental Accounting (Domestic)

- Calculation standards are based on the Environmental Accounting Guidelines 2005
- Scope of organizations covered
  - Consolidated: Nippon Paper Industries; Nippon Paper Crecia; Crecia Kasuga; Nippon Paper Papylia; GAC; Nippon Paper Sacks; Nippon Paper Ishinomaki Energy Center; N&E; Nippon Paper Development
  - Non-consolidated: Osakakako; Nippon Paper Liquid Package Product; Nichimoku Pallet; MANTSUNE PACKAGE; Seikosha Printing; Akita Jujo Chemicals
  - Affiliated company: Fukuda Paper MFG

Environmental Conservation Costs (FY2024)

(Millions of Yen)

Categories	Main contents	Investment	Cost
(1) Business area costs	—		
1. Pollution prevention costs	Ex) Measures against air pollution, water pollution, noise and vibration	1,558	13,366
2. Global environmental conservation costs	Ex) Cultivation of company-owned forests in Japan, overseas plantation business, energy-saving investment	4,123	586
3. Resource circulation costs	Ex) Efficient use of resources, cost of waste management	277	9,343
(2) Upstream/downstream costs	Expenses related to collection, recycling, and disposal of pallets and packing materials	—	3,122
(3) Administration costs	Ex) Costs for employee training, maintaining ISO 14001, analysis of air and water quality, and management of various conferences	—	348
(4) R&D costs	Ex) Product development that contributes to environmental conservation, such as promoting the use of wastepaper, and reduction of environmental impact at the manufacturing stage	—	4,260
(5) Social activity costs	Ex) Social contribution activities, support for organizations, corporate action report	—	44
(6) Environmental remediation costs	Pollution Health Compensation Levy	—	379
Total		5,958	31,448

Environmental Benefits of Environmental Conservation (FY2024)

(Millions of Yen)

Effect	Amount
Income from company-owned forests in Japan	538
Reduced expenses from energy saved	3,364
Reduced disposal expenses through the effective use of waste	3,193
Gain on sales from the recycled waste	458
Reduced expenses through the recycling of shipping material	1,458
Total	9,011

Environmental conservation impacts (FY2024)

Categories	Environmental impact indicators		Results	YoY change
Effects related to resources introduced to business activities	Overseas plantation business	Overseas plantation areas	69kha	Down 3kha
	Energy-saving measures	Fuel reduction (Heavy oil equivalent)	43,588kl	UP 2,025kl
Effects related to environmental impact and waste from business activities	Greenhouse gas emissions		4.24Mt	Down 0.11Mt
	Air pollutant emissions	NOx emissions (NO equivalent)	6,442t	UP 144t
		SOx emissions (SO_2 equivalent)	1,784t	Down 609t
		Soot and dust emissions	840t	Down 101t
	Effluent		735Mt	UP 6Mt
	Water contaminant emissions	COD/BOD emissions	33,790t	UP 320t
		SS emissions	16,550t	Down 130t
	Final waste disposal		8kt	Down 1kt
Effects related to goods and services produced from business activities	Product recycling	Wastepaper utilization rate (paper)	29%	Down 2.2%
		Wastepaper utilization rate (paperboard)	85%	Down 3.1%
	Shipping material recycling	Pallet recovery rate	42%	Down 1%

Other Environment-related Data

2 Balance of Materials

Balance of Materials for All Businesses (Principal Materials) (3 years)

[Units] GWh = Gigawatt hours, BDt = Bone-dry tonnes, ADt = Air-dry tonnes Note: t indicates Tonnes(also called Metric Tons)

		Unit	FY2022*1	FY2023*1	FY2024*1
Input					
Energy Input	Purchased electricity	GWh	1,931	1,681	2,184
	Oil	Thousand kl	178	157	154
	Coal	Thousand t	1,192	1,156	1,304
	Gas	Thousand t	399	372	292
	Other fossil fuels	Thousand t	19	17	21
	Non-fossil fuels*2	Thousand t	5,268	5,103	6,667
	(Of which Black liquor)	Thousand t	3,995	3,496	3,550
Chemical substances subject to the PRTR system*3	Amount handled	t	10,840	29,700	29,324
Water intake (water consumption)	Total amount of water intake (water consumption)	Million t	899	863	874
	River water	Million t	660	639	650
	Industrial water	Million t	190	177	176
	Well water	Million t	48	46	46
	Public water supply	Million t	2	2	2
	Rainwater	Million t	0	0	0
	Seawater, sea, ocean	Million t	0	0	0
	External wastewater	Million t	0	0	0
Raw Material	Wood chips	Thousand BDt	5,640	5,226	5,191
	Logs	Thousand BDt	1,305	1,157	1,035
	Pulp	Thousand ADt	670	604	660
	Wastepaper (Pulp)	Thousand ADt	3,335	3,260	3,467
	Base Paper	Thousand ADt	136	163	153
	Others	Thousand ADt	103	107	102

		Unit	FY2022*1	FY2023*1	FY2024*1
Output					
Gas Emissions	GHG emissions (Scope 1 and 2)	Million t-CO_2	5.95	5.30	5.04
	(Scope 1)	Million t-CO_2	4.86	4.40	4.10
	(Scope 2)	Million t-CO_2	1.09	0.90	0.94
	Emissions by type of greenhouse gas (Scope 1)				
	CO_2	Million t-CO_2	4.43	4.22	3.95
	CH_4	Million t-CO_2	0.03	0.01	0.01
	N_2O	Million t-CO_2	0.40	0.17	0.14
	SOx emissions	Thousand t	3.41	2.84	2.06
	NOx emissions	Thousand t	8.15	8.16	9.04
	Soot and dust	Thousand t	1.11	1.03	0.95
Chemical substances subject to the PRTR system*3	Amount released	t	131	2,290	195
	Amount transferred	t	89	141	160
VOCs (volatile organic compounds)*4	Emissions	t	97	93	90
Wastewater	Wastewater total	Million t	859	828	840
	Public water	Million t	849	818	830
	Sewerage	Million t	10	9	9
	COD/BOD	Thousand t	48	43	43
	BOD	Thousand t	9	8	9
	COD	Thousand t	39	35	35
	SS	Thousand t	25	22	22
	Nitrogen	Thousand t	1.2	1.2	1.5
	Phosphorous	Thousand t	0.2	0.2	0.4
Waste	Total Waste Generated	Thousand BDt	743	735	771
	Final disposal subtotal	Thousand BDt	102	92	91
	Recycled subtotal	Thousand BDt	585	643	680
	Hazardous waste generation*5	BDt	4,484	11,236	8,075
Products manufactured	Paper, Household Paper	Million t	3.8	3.2	3.3
	Paperboard	Million t	2.2	2.0	2.6
	Pulp	Thousand t	283	325	271
	Paper container	Thousand t	83	83	78
	Chemical products	Thousand t	92	100	82
	Building materials+others	Thousand t	214	207	182
Electricity	Electricity	GWh	2,241	2,603	2,615

*1 Covered: FY2022 https://www.nipponpapergroup.com/english/csr/npg_esgdb2023_e_contents.pdf
FY2023 https://www.nipponpapergroup.com/english/csr/npg_esgdb2024_e_contents.pdf
FY2024 https://www.nipponpapergroup.com/english/csr/npg_esgdb2025_e_contents.pdf
*2 Biomass fuels (including black liquor) and waste fuels
*3 Japan only, including unintentionally generated substances. Dioxins are not included in total data.
*4 Coverage: Nippon Paper Industries, Nippon Paper Crecia, Nippon Paper Papylia
*5 Only in Japan, Aggregated by specially controlled industrial waste

Other Environment-related Data

Balance of Materials in the Pulp and Paper Businesses in Japan (Principal Materials) (3 years)

[Units] GWh = Gigawatt hours, BDt = Bone-dry tonnes, ADt = Air-dry tonnes Note: t indicates Tonnes(also called Metric Tons)

		Unit	FY2022*1	FY2023*1	FY2024*1
Input					
Energy Input	Purchased electricity	GWh	765	618	1,054
	Oil	Thousand kl	173	151	151
	Coal	Thousand t	1,166	1,127	1,047
	Gas	Thousand t	137	126	113
	Other fossil fuels	Thousand t	19	17	21
	Non-fossil fuels*2	Thousand t	3,804	3,535	4,300
	(Of which Black liquor)	Thousand t	2,737	2,481	2,570
Chemical substances subject to the PRTR system*3	Amount handled	t	490	17,246	18,052
Water intake (water consumption)	Amount of water intake	Million t	709	662	668
	Water intensity	t/product-t	158	163	166
Raw Material	Wood chips	Thousand BDt	3,745	3,383	3,517
	Logs	Thousand BDt	14	8	8
	Pulp	Thousand ADt	480	439	491
	Wastepaper (Pulp)	Thousand ADt	2,324	2,134	2,269
	Base Paper	Thousand ADt	98	99	93
	Others	Thousand ADt	16	15	21

		Unit	FY2022*1	FY2023*1	FY2024*1
Output					
Gas Emissions	GHG emissions (Scope 1 and 2)	Million t-CO_2	4.80	4.29	4.18
	(Scope 1)	Million t-CO_2	4.24	3.83	3.67
	(Scope 2)	Million t-CO_2	0.56	0.46	0.51
	GHG emissions intensity during production	t-CO_2/product-t	1.07	1.05	1.04
	Emissions by type of greenhouse gas (Scope 1)				
	CO_2	Million t-CO_2	3.81	3.65	3.52
	CH_4	Million t-CO_2	0.03	0.01	0.01
	N_2O	Million t-CO_2	0.40	0.17	0.14
	SOx emissions	Thousand t	2.3	1.8	1.5
	NOx emissions	Thousand t	5.8	5.3	5.4
	Soot and dust	Thousand t	0.9	0.9	0.8
Chemical substances subject to the PRTR system*3	Amount released	t	90	2,223	241
	Amount transferred	t	90	19	37
VOCs (volatile organic compounds)	Emissions	t	60	50	69
Wastewater	Wastewater total	Million t	671	636	644
	Public water	Million t	669	634	638
	Sewerage	Million t	2	2	6
	COD/BOD	Thousand t	28	26	26
	SS	Thousand t	15	13	13
	Nitrogen	Thousand t	1.1	1.0	1.3
	Phosphorous	Thousand t	0.1	0.1	0.4
Waste	Total Waste Generated	Thousand BDt	494	468	466
	Final disposal subtotal	Thousand BDt	8	8	8
	Recycled subtotal	Thousand BDt	484	460	458
Products manufactured	Paper, Household Paper	Million t	2.8	2.5	2.4
	Paperboard	Million t	1.5	1.5	1.5
	Pulp	Thousand t	158	122	125

*1 Coverage : FY2022 Nippon Paper Industries, Nippon Paper Crecia, Nippon Paper Papylia, Crecia Kasuga, Fukuda Paper MFG
FY2023 Nippon Paper Industries, Nippon Paper Crecia, Nippon Paper Papylia, Crecia Kasuga, Fukuda Paper MFG
FY2024 Nippon Paper Industries, Nippon Paper Crecia, Nippon Paper Papylia, Crecia Kasuga, Fukuda Paper MFG
*2 Biomass fuels (including black liquor) and waste fuels
*3 Including unintentionally generated. Dioxins are not included in total data. Excludes Chemical Business