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

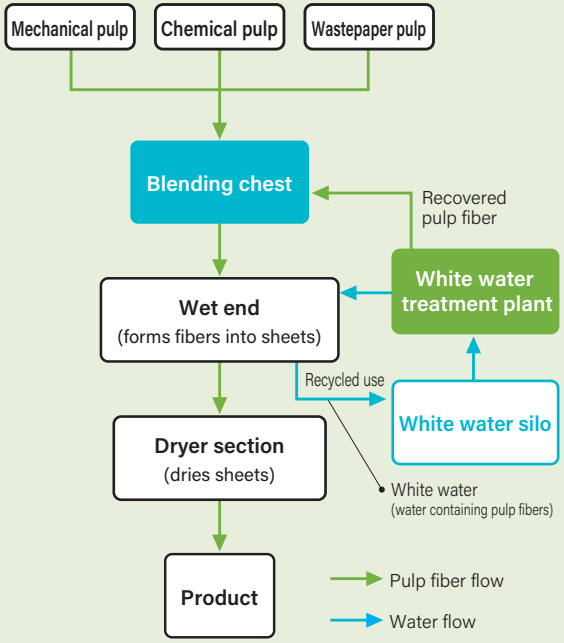
- The Group actively reuses water in production processes to reduce the amount of water used.
- The reuse of water in the production process leads to energy saving of equipment by reducing the amount of inflow water.

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)

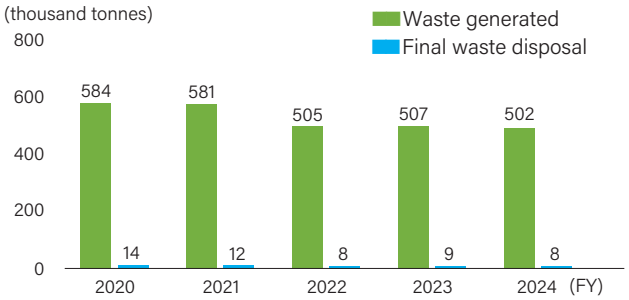
Jujo Thermal (Finland) participates in the JOKI programme, which aims to strengthen the protection of water resources in operating areas and improve water quality.

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.