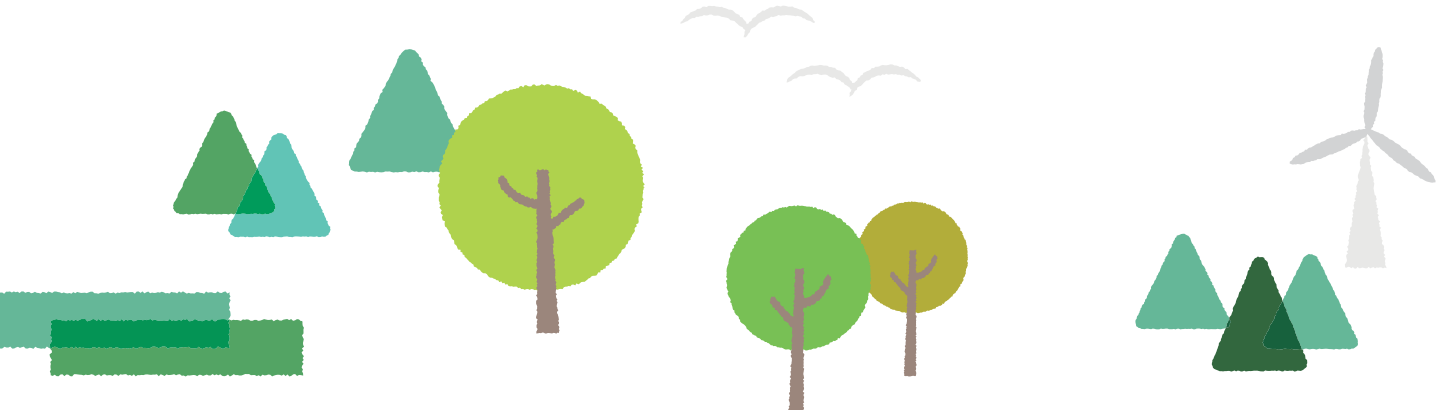


Japan Paper Association Sustainability Report 2022



Contents

- 1. Preface p.1
- 2. Value Creation Model of the Pulp and Paper Industry p.2
- 3. Snapshot p.4
- 4. The Challenge to Sustainability p.6
- 5. Four Strategic Initiatives for the Future p.20
- 6. Examples of Initiatives by Member Companies p.21
- 7. Editorial Note p.25



1 Preface

The Japan Paper Association launched activities in 2020 with its member companies to contribute to the realization of the international goals, SDGs, which aim to achieve a sustainable and better world by the year 2030.

In 2020, we compiled the industry's policies and initiatives into "Towards 2030," and in 2021, we published the first sustainability report of the pulp and paper industry in Japan, which publicized the industry's initiatives both domestically and internationally.

Wood, the raw material for our papermaking, is not only a renewable resource, but also an excellent resource that absorbs and fixes CO₂, which is considered a major cause of global warming. The pulp and paper industry has long embodied the concept of a circular economy: circulate raw materials and products at their highest value, and regenerate nature, through the cycle of planting, growing, using, and planting again, as well as through the circulation of finished paper and paperboard in advanced paper recycling systems.

While demand for newspapers, printing and communication paper, and other graphic paper continues to decline due to the shift to digital media from paper media and the declining birthrate, new demand for package paper is being aroused by changes in lifestyles, and thus the structure of demand is undergoing major changes. Furthermore, we are currently facing a difficult business environment due to the yen's depreciation which is a headwind for our industry as well as high raw material and fuel prices. However, we in the pulp and paper industry will strive to achieve a stable supply of materials and products that support industrial activities and people's lives, while taking into consideration the natural environment, including the challenge of decarbonization to realize a carbon neutral society and preserving biodiversity, promoting respect for human rights, and strengthening our governance.

The target year for the SDGs, 2030, is just around the corner. The year 2050, when the international community aims for a carbon-neutral world, is also not far away. We in the pulp and paper industry are committed to moving toward the goals for carbon-neutral world and sustainable development.



Japan Paper Association
Chairman

M. Kaku



2

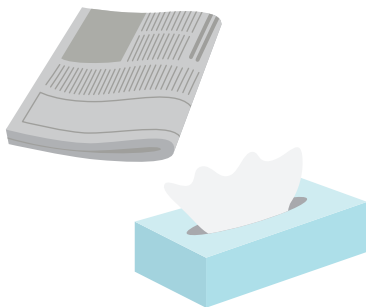
Value Creation Model of the Pulp and Paper Industry

The pulp and paper industry is an essential industry^{※1} that contributes to a sustainable society.

Supply of products that support economic development and social life through production activities

The pulp and paper industry produces and supplies many essential products^{※2} that support industrial activities and home life, such as newsprint, printing paper, corrugated container, toilet paper, and industrial paper.

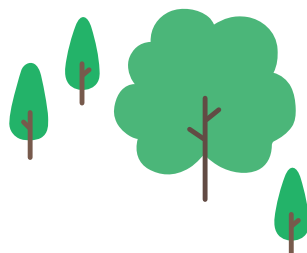
In recent years, we have been contributing to climate change issues through the development and production of products that utilize renewable wood resources, including efforts to develop new materials such as cellulose nanofibers^{※3} and other plastic substitutes like paper straws.



Contribution to environmental conservation through appropriate management of natural capital, such as forest resource circulation and recovered paper recycling

The raw material for paper is wood, a renewable resource. For this reason, the pulp and paper industry has focused on sustainable forest management. Through these efforts, we are contributing to environmental conservation such as preserving the biodiversity that forests nurture and adapting to climate change by absorbing CO₂.

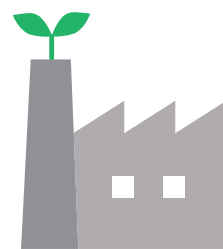
The pulp and paper industry has also created a trend toward recovering used paper (recovered paper) and turning it into paper again. As a producer of paper and also a consumer of recovered paper, the pulp and paper industry is making further efforts to use as much recovered paper as possible and to further improve its recycling technologies.



Proactive efforts to counter global warming through the effective use of energy

The pulp and paper industry actively utilizes biomass energy such as by-products of pulp production from wood (black liquor), wood waste, and paper sludge, as well as combustible waste such as RPF, and plays a role in the effective use of energy and resource recycling in the papermaking process.

In this way, the pulp and paper industry is working to reduce the use of fossil fuels, which are considered a cause of global warming, and in January 2021, we were among the first to declare that we would achieve virtually zero CO₂ emissions by 2050, and we are working toward the development of a carbon neutral^{※4} industry.



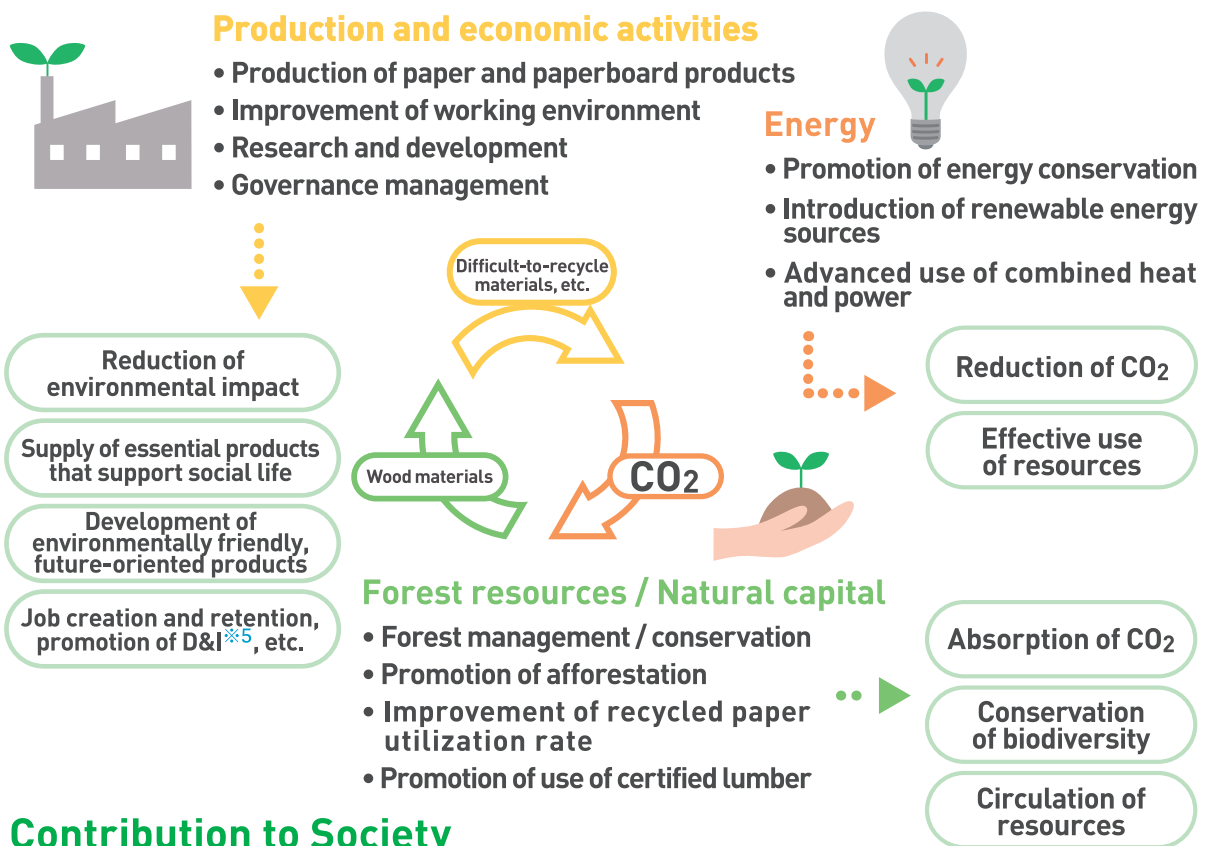
※1) Essential industries are industries that supply products essential to people's lives.
※2) Essential products are products that are essential to people's lives.
※3) Cellulose nanofiber is a material made from wood fibers micronized to the nano-order (one millionth of a millimeter), and is an excellent material that is transparent, light, strong, resistant to deformation, and has a high thickening effect.
※4) Carbon neutral means that the total CO₂ emissions minus CO₂ absorption/removal is zero (neutral).

Pulp and paper industry resources

- Financial capital
- Manufacturing capital
- Intellectual capital
- Human capital
- Social relations capital
- Natural capital
- Environmental countermeasure technology
 - ✓ Energy conservation / low-carbon
 - ✓ Wastewater and flue gas treatment
 - ✓ Waste treatment
 - ✓ Chemical substance measures



Value creation process in the pulp and paper industry



Major SDGs^{※6} to which we will contribute



Strategic initiatives ▶ p.20

- ✓ Realization of the establishment of a carbon neutral industry
- ✓ Contribution to the circular economy of waste paper utilization system
- ✓ Contribution to green recovery
- ✓ Transmission of the importance of paper in a digital society

※5) D&I stands for Diversity & Inclusion, which means respecting and acknowledging each individual and making the most of their good points, regardless of external attributes such as gender, age, disability, and nationality, as well as internal attributes such as lifestyle, work history, and sense of values.

※6) SDGs stands for Sustainable Development Goals, an action plan consisting of 17 goals and 169 targets unanimously adopted by the United Nations. Also, "Major SDGs to which we will contribute" refers to the eight SDGs targets analyzed and organized in the "Towards 2030" report by the Japan Paper Association (<https://www.jpaa.gr.jp/about/sdgs/index.html>).

Overview of the pulp and paper industry in Japan

Production and economic activities

Supply of essential products^{※1}

Annual production of paper and paperboard (2020)

22.9 million tons

Percentage to the world's production volume

5.7%

Paper and paperboard consumption per capita (2020)

178.4 kg/per capita

Value of manufactured goods shipped (2019)

7.7 trillion yen



Development of future-oriented products

Research and development expenses^{※2}

24.2 billion yen



Domestic production capacity of cellulose nanofibers (2022)^{※3}

1,200 tons/year

Job creation and retention, promotion of D&I

Number of employees^{※4}

69,139



Percentage of female employees^{※4}

15.4%

Intensity rate for occupational accidents^{※5}

0.15

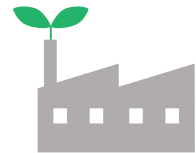
Number of paper, paperboard, and pulp manufacturing establishments in Japan (2020)

343 locations^{※6}

Reduction of environmental impact

Emissions reduction rate of volatile organic compounds (VOC)^{※7} (compared to FY2000)

89.9%



※1) Source: "The Current Status of the Pulp and Paper Industry (2022 Edition)," Japan Paper Association (coverage is nationwide)

※2) Source: listed member companies' annual securities reports for FY2021 (scope of coverage: 9 out of 31 regular member companies)

※3) Surveyed by Yano Research Institute Ltd. (coverage is nationwide)

※4) Survey by the Japan Paper Association (scope of coverage: employees including temporary and part-time employees of 31 regular member companies and their consolidated subsidiaries in Japan).

※5) Intensity rate is an index that represents the severity of occupational accidents.

※6) Source: Industrial Statistics Table 2021, Ministry of Economy, Trade and Industry (coverage is nationwide)

※7) VOC stands for Volatile Organic Compounds, a generic term for organic compounds that are volatile and become gaseous in the atmosphere. It includes a wide variety of substances such as toluene, xylene, and ethyl acetate.

Environment / Energy

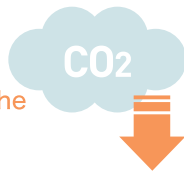
Reduction of CO₂ emissions

Reduction of CO₂ emissions originating from fossil energy (compared to FY2013)

3 million tons

Progress rate compared to the reduction target for FY2030 (7.15 million tons)

41.9%



Effective use of resources

Composition ratio of renewable energy

41.0%

Reduction rate of final waste disposal (compared to FY2000)

85.7%



Forest resources / Natural capital

Absorption of CO₂

Increase in area of afforestation in Japan and abroad over 31 years (compared to FY1990)

235,000 ha

≒ 330,000 soccer court surfaces

≒ Area of Kanagawa Prefecture

1990



275,000 ha

+235,000 ha

2021



510,000 ha

Soccer court surfaces
330,000



Resource circulation ^{※8}

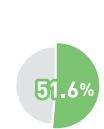
Recovered paper utilization rate

65.9%

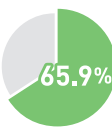
Recovered paper recovery rate

80.0%

FY1990



FY2021



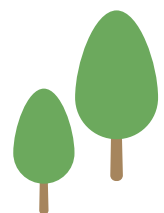
Conservation of biodiversity

Percentage of companies that have positioned it in their management plan

84.6%

Percentage of legality-confirmed wood used

100%



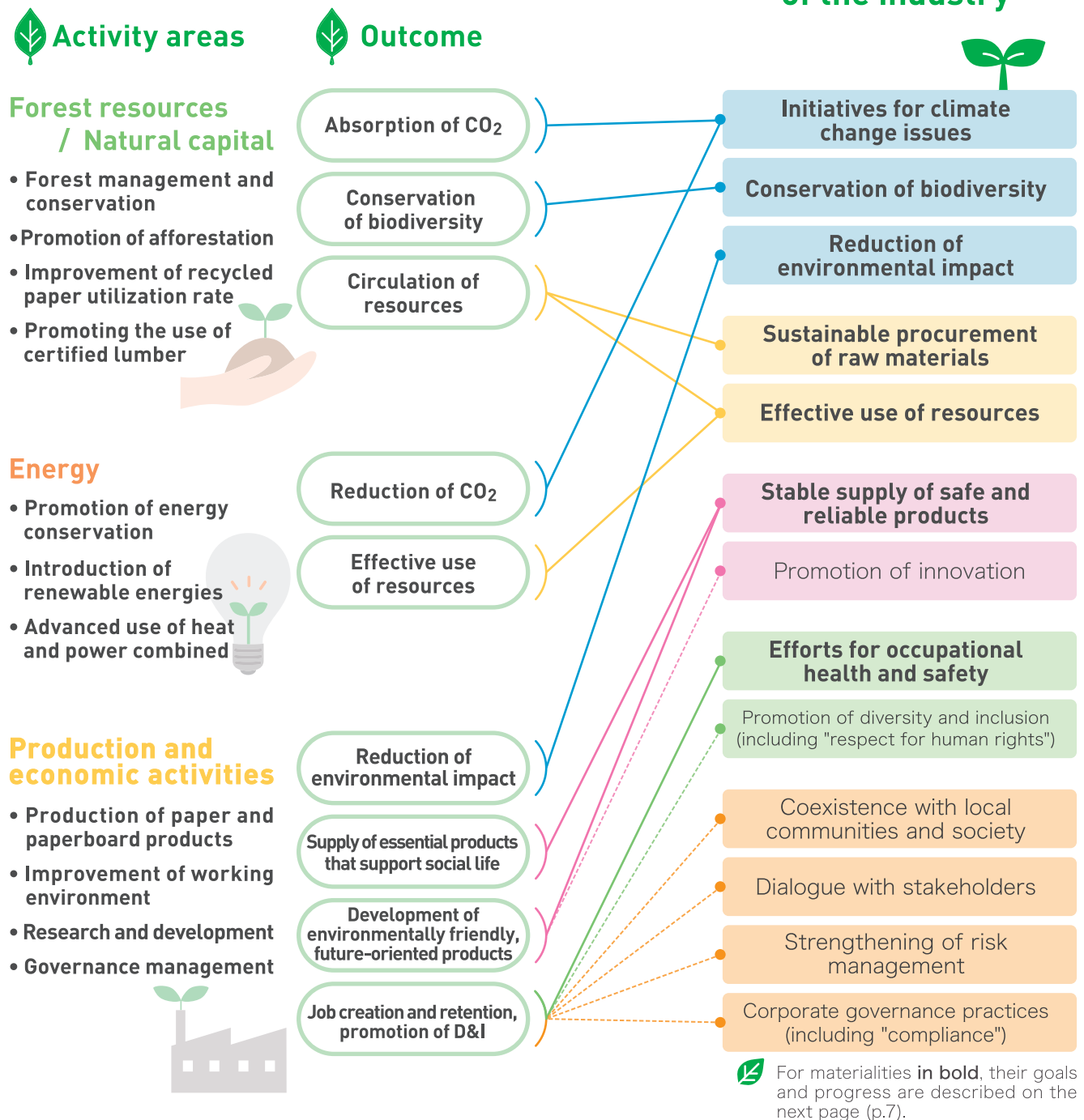
※8) Source: Yearbook of Current Production Statistics, Ministry of Economy, Trade and Industry, and Trade Statistics, Ministry of Finance (coverage is nationwide)

4 The Challenge to Sustainability

Initiatives to improve sustainability and materiality^{※1} in the industry

Value creation process in the pulp and paper industry

Materiality^{※2} of the industry




※1) Materiality refers to events that have a significant impact on the value creation of a company, industry, etc., and are matters that the concerned parties (companies, industries, etc.) place importance on and respond to in order to solve social issues.

※2) Materiality of the industry refers to the 13 materialities analyzed and organized in the "Towards 2030" report by the Japan Paper Association.



Goals and progress toward improving sustainability

Materiality	Goals	FY2021	Remarks
Initiatives for climate change issues	Reduce energy-derived CO ₂ emissions by 38% by FY2030 compared to FY2013	Reduction of 3 million tons (progress rate 41.9%)	From the target of the "Carbon Neutral Action Plan"
	Increase the area of plantation forests to 650,000 ha by FY2030	510,000 ha	From the target of the "Carbon Neutral Action Plan"
	Aim for virtually zero CO ₂ emissions from production activities by 2050	15.83 million tons	From the target of the "Long-Term Vision 2050"
Conservation of biodiversity	For domestic and foreign forests owned or managed by the company, clearly position the conservation of biodiversity in the management and operation plan.	84.6% (11 out of 13 companies)	From the follow-up survey in the "Japan Paper Association Action Guidelines for Biodiversity Conservation"
	Illegally harvested wood will not be used.  Also falls under Materiality "Sustainable Raw Materials Procurement"	100%	From the monitoring project in the "Japan Paper Association Action Guidelines for Illegal Logging Issues"
Reduction of environmental impact	Work to ensure that the VOC reduction rate does not worsen compared to FY2010 results	89.9%	From a follow-up survey on volatile organic compounds (VOCs)
Sustainable procurement of raw materials	Strive to achieve the goal of 65% recycled paper utilization rate by FY2025	65.9%	From the target in the "Environmental Action Plan"
Effective use of resources	Reduce the volume of final disposal of industrial waste to 60,000 tons by FY2025	77,000 tons	From the target in the "Environmental Action Plan"
	Strive to maintain the current effective utilization ratio (FY2019 result: 98.4%)	98.2%	From the target in the "Environmental Action Plan"
Stable supply of safe and reliable products	Conform to voluntarily established standard values from a hygienic standpoint with regard to paper and paperboard intended to come in contact with foodstuffs (permissible elution limit of heavy metals: 1μg/ml or less)	100%^{※3}	From the voluntary standards of "Voluntary Standards for Paper and Paperboard Intended to Come into Contact with Food"
Efforts for occupational health and safety	Zero fatalities at workplaces of member companies and group companies	1 case of member companies	From the goals of the "Action Plan for the Prevention of Occupational Accidents"

※3) The target group consisted of 4 companies and 5 establishments that were sampled and surveyed by the Japan Paper Association.

Addressing Global Environmental Preservation

Initiatives for climate change issues

Goal

Reduce energy-derived CO₂ emissions by 38% by FY2030 compared to FY2013



The Japan Paper Association has been working voluntarily to reduce greenhouse gas (GHG) emissions since early on, and has completed its "JPA's Committed Action Plan on the Environment" from FY2008 to FY2012 with results exceeding targets.



Under the "Carbon Neutral Action Plan," we have set a reduction target of "reducing energy-derived CO₂ emissions in FY2030 by 38% from the FY2013 level," and we have been working steadily to achieve this goal. Also, in 2021, we declared to aim to establish a carbon neutral industry by 2050 as the "Countermeasures against Global Warming aiming at Net Zero GHG emission from Paper Industry - Long-Term Vision 2050."



We have been able to reduce CO₂ emissions steadily because of the switch to biomass fuels and fuels with lower carbon intensities, the adoption of more energy-efficient equipment, and a review of our production processes as the major factors. We will continue to switch to carbon-neutral biomass fuels in the future.

Strategic Pillars of Reduction

01

Proactive introduction of the latest energy-saving equipment and technologies

02

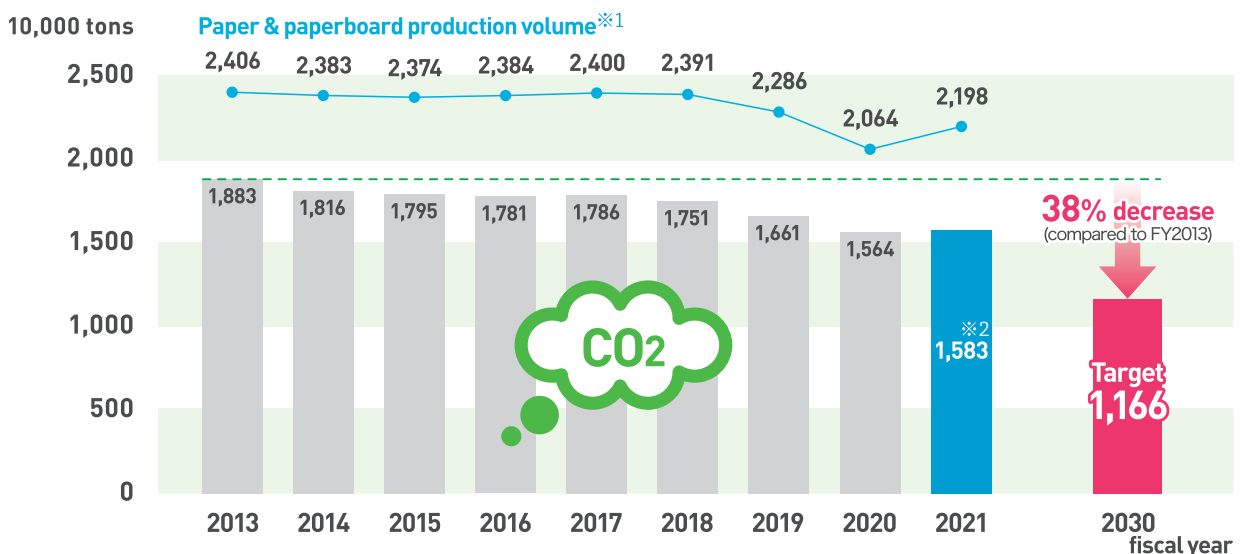
Fuel conversion from fossil energy to renewable energy in on-site generation facilities

03

Proactive adoption of innovative energy-related technologies



Trends and reduction targets for energy-derived CO₂ emissions



※1) Source: "Carbon Neutral Action Plan," Japan Paper Association

※2) Due to the recovery from the COVID-19 pandemic, paper and paperboard production increased (+6.5%), which was accompanied by an increase in CO₂ (+1.2%).

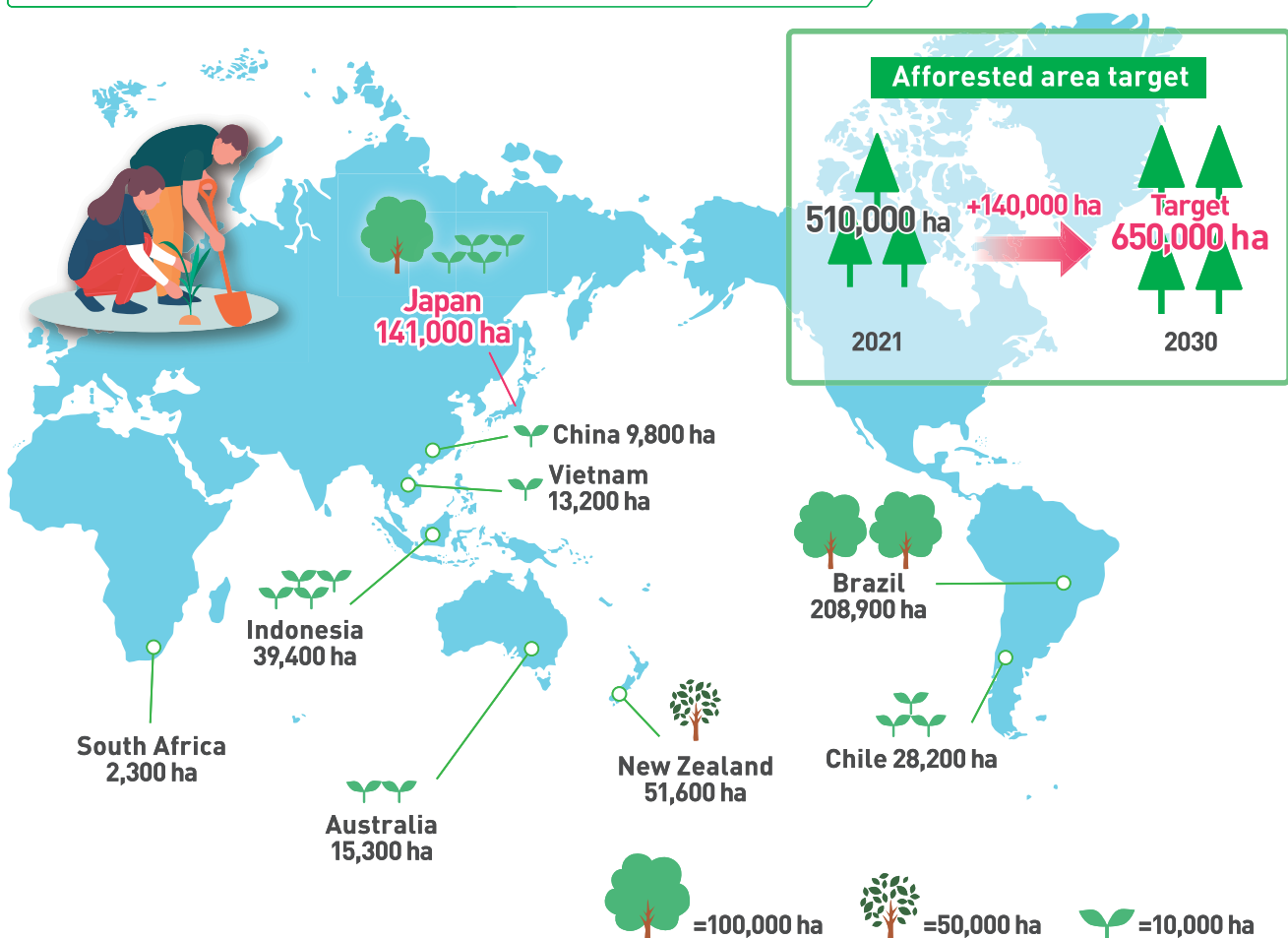


Goal

Increase the area of plantation forests in Japan and abroad by 375,000 hectares to 650,000 hectares by FY2030 compared to FY1990

- In addition to reducing CO₂ emissions from fossil fuels, we are also working to expand the areas for CO₂ absorption as a paper manufacturer that uses wood, a renewable resource, as a raw material.
- In 2020, our "Carbon Neutral Action Plan" revised the target for the creation of absorption areas to 650,000 ha, an increase of 375,000 ha from the FY1990 level, by FY2030.
- In implementing the project, in order to increase the amount of CO₂ absorption in the appropriate areas for afforestation, we will actively promote sustainable forest management, select optimal tree species for planting, develop the breeding of seeds with high growth potential, implement effective fertilizer application and so on.
- In FY2021, the total increase in afforested area was 235,000 ha, which is equivalent to about 330,000 soccer courts, or about the same area as Kanagawa Prefecture.

Domestic and international afforestation of the paper industry



※3) The SDG icons in the margins at the top of p.9 to 19 show the SDG targets for each materiality, as organized in Japan Paper Association's "Towards 2030" report (<https://www.jpa.gr.jp/about/sdgs/index.html>).



Initiatives for climate change issues

Goal

Virtually zero CO₂ emissions in production activities by 2050

(guideline: reduce 21 million tons of CO₂ emissions from FY2013 levels)



As mentioned earlier, the Japan Paper Association has declared its goal of establishing a carbon neutral industry by 2050 through its "Long-Term Vision 2050."



In our "Long-Term Vision 2050," we have set a target (guideline) of reducing CO₂ emissions by 21 million tons, including CO₂ from waste as well as fossil energy, to virtually zero in our production activities, and we will further contribute to the realization of a carbon neutral society through additional efforts to reduce CO₂ emissions outside of our production activities.

Initiatives of the Japan Paper Association

Overview of the "Countermeasures against Global Warming aiming at Net Zero GHG emission from Paper Industry - Long-Term Vision 2050"

In support of the "Carbon Neutral by 2050" declaration announced by the government in October 2020, we formulated our "Long-Term Vision 2050" in January 2021, aiming to maintain a sustainable global environment and realize a decarbonized society as a pulp and paper industry, and to realize a carbon neutral industry with virtually zero greenhouse gas emissions in terms of CO₂.

The "Long-Term Vision 2050" sets forth the following three areas in which the pulp and paper industry can make further contributions in the future, based on a vision of an uncertain future in the year 2050 and the shape and direction in which the industry should be heading.

Efforts toward a carbon neutral industry

1 Zero CO₂ emissions in production activities through promotion of energy conservation and fuel conversion

1. Proactive introduction of the latest energy-saving equipment and technologies
2. Expanding the ratio of renewable energy used in on-site power generation facilities
3. Promotion of innovative technology development related to papermaking
4. Proactive adoption of innovative energy-related technologies^{※1}

Efforts to contribute to a carbon-neutral society

2 Reduction of CO₂ emissions over the life cycle through development of environmentally friendly materials

1. Social implementation of cellulose nanofibers
2. Use of paper material products as an alternative to fossil-based plastic packaging materials
3. Conversion from fossil-based products to bioplastic materials and biochemicals

3 Expanding contribution as a CO₂ sink through afforestation

1. Promotion of sustainable forest management
2. Promotion of forest tree breeding with high environmental adaptability and fast growth

Virtually zero CO₂ emissions in production activities

Reduction of 21 million tons of greenhouse gas emissions, including not only fossil energy but also waste-derived CO₂ (base year: FY2013)

Additional CO₂ reduction outside of production activities

※1) If CO₂ emitted from biomass boilers is recovered by CCS/CCUS (technology for capture, storage, and effective utilization of carbon dioxide), it becomes a "negative emission" (absorption of CO₂ from the atmosphere).



Conservation of biodiversity

Goal

For domestic and foreign forests owned or managed by the company, clearly position the conservation of biodiversity in the management and operation plan.



Forests, which are home to many plants and animals, are the core of biodiversity, and the pulp and paper industry, which uses these forests as a source of raw materials, is closely related to biodiversity. For this reason, we believe that the pulp and paper industry has a natural social obligation to actively engage in the preservation of biodiversity.



Thus, given the extreme importance of biodiversity conservation to the pulp and paper industry, the Japan Paper Association formulated the "JPA's Action Guidelines on the Preservation of Biological Diversity" in 2014, and has been implementing these guidelines.



The Action Guidelines set forth guidelines for a total of 21 items in five areas, such as "sustainable forest management" and "responsible raw material procurement," and we have been promoting member companies' initiatives through follow-up surveys since FY2014.

Percentage of companies that position biodiversity conservation in their management and operation plans.

85%
(FY2021)



Column

30by30 Target —By 2030, more than 30% of the country's land area is to be conserved as natural environmental areas—

30by30 is a goal that seeks to effectively conserve more than 30% of the land and sea as healthy ecosystems by 2030 with the goal of halting and restoring biodiversity loss by 2030 (Nature Positive).

It is being considered as a major goal of the "Post-2020 Global Biodiversity Framework," and the "G7 2030 Nature Compact," agreed to as an annex to the communiqué at the G7 Summit held in the UK in June 2021, commits each G7 country to conserve and protect at least the same percentage of its own biodiversity to achieve the goal of halting and reversing the loss of biodiversity by 2030.

In Japan, in order to achieve 30by30, efforts have begun to register lands where biodiversity conservation is being promoted by local communities, companies, and organizations, such as Satoyama landscape, corporate forests, and shrine and temple forests, as [OECMs \(other effective area-based conservation measures\)](#) in an international database, and to promote their conservation.

The Ministry of the Environment has launched the "[30by30 Alliance for Biodiversity](#)" consisting of volunteer companies, local governments, and organizations in order to expand Japan's current protected areas (approximately 20% land areas and 13% marine areas) and to promote efforts to certify areas that have been conserved by the private sector and others as OECMs in order to achieve the 30by30 target.

Six member companies of the Japan Paper Association (as of November 30, 2022) are also participating in the 30by30 Alliance and working to achieve the 30by30 target.

Reference) Ministry of the Environment website:
<https://policies.env.go.jp/nature/biodiversity/30by30alliance/>



Conservation of biodiversity

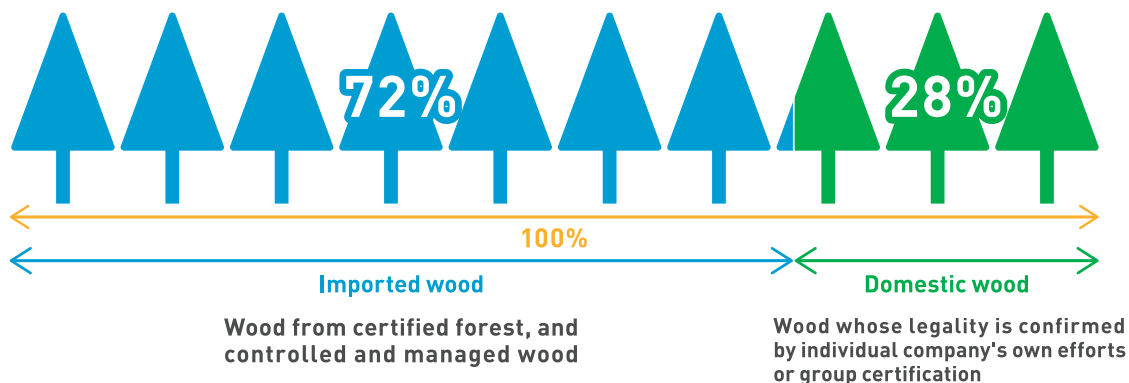
Goal

Illegally harvested wood will not be used.

Also falls under Materiality "Sustainable procurement of raw materials"

- Forests play an important role in supplying wood, maintaining ecosystems, and preventing global warming, among others.
- In 2006, the Japan Paper Association formulated the "Code of Conduct of the Japan Paper Association for Issues on Illegal Logging" as a measure to combat illegal logging and illegal wood trade, which undermine the sustainable fulfillment of forest functions, and has since been taking action to address these issues.
- In addition, the Japan Paper Association confirms the certification method used by its member companies to verify the legality of wood, in accordance with the Forestry Agency's guidelines. As a result, the amount of legal wood used reached 100% of the total amount of wood raw material collected in FY2021, and no illegally logged wood is used.

Breakdown of legal wood certification methods in the amount of wood raw material collected



Column

Proposed regulation on mandatory due diligence to prevent deforestation — Examples of EU initiatives —

The European Commission has published a draft regulation on mandatory due diligence (preliminary survey) aimed at preventing deforestation in November 2021. The proposed regulation aims to prevent deforestation caused by the expansion of agricultural land for commodity crops, which is considered a major cause of global warming and loss of biodiversity.

Because the EU is a major consumer of these commodity crops and their environmental impact is significant, the EU requires *due diligence to ensure that commodity crops supplied to or exported from the EU are not produced on agricultural lands that have been developed through deforestation (deforestation-free).*

Commodity crops subject to the due diligence obligations under the proposed regulation include palm oil, beef, *wood (including pulp and paper)*, coffee, cocoa beans, and soybeans, as well as derivative products such as leather, chocolate, and furniture made from these products. Prior to supplying these products to the EU market, businesses are required to conduct due diligence to ensure that the products are "deforestation-free" and in compliance with the laws and regulations of the country of origin, and to report this to the competent member state authorities.

It was discussed by the Council of the European Union in June 2022 and will then be considered with the European Parliament in the coming months.



Reduction of environmental impact

Goal

Work to ensure that the VOC^{※1} reduction rate does not worsen compared to FY2010 results



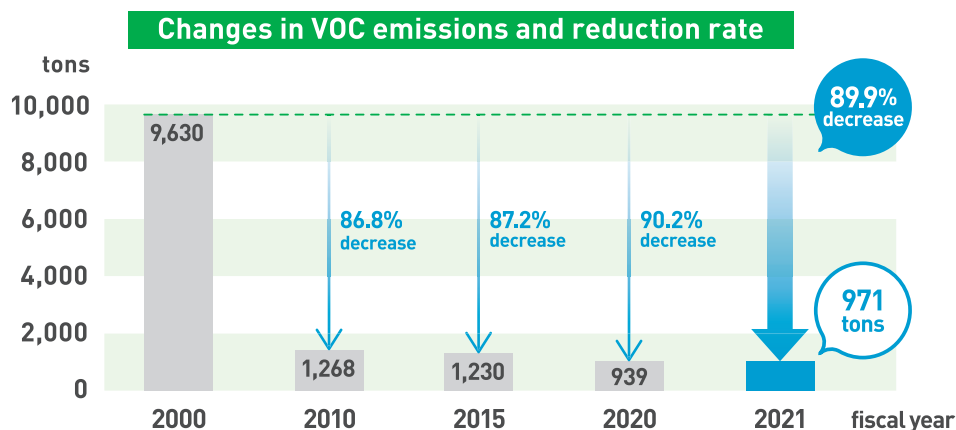
Following the enactment of the Air Pollution Control Law in April 2006, the Japan Paper Association has specified "risk management of chemical substances" in its Environmental Action Plan as a response to environmental risk issues, and has been working to reduce emissions of volatile organic compounds (VOCs).



In FY2010, we achieved a reduction of more than 80%, far exceeding the government target of a reduction of about 30% compared to FY2000, and the annual follow-up survey shows that we have maintained this level for 11 years until FY2021.



We will continue our efforts to reduce all VOC emissions and to maintain and improve the reduction rate by substituting chemicals with fewer VOC components and strengthening management of manufacturing processes.



Initiatives of the Japan Paper Association

Environmental measures

Measures for Hazardous Air Pollutants

The Japan Paper Association has established a "Plan for Voluntary Control of Hazardous Air Pollutants" covering three substances of formaldehyde, chloroform, and benzene, and has achieved strict voluntary control targets for each of these substances by introducing alternative chemicals and promoting process improvements.

Flue gas treatment

We are working on measures to control sulfur oxides (SO_x) and nitrogen oxides (NO_x) generated from heavy oil and coal used as fuel, which are considered to be one of the causes of acid rain.

Soot and dust control

Soot and dust generated from recovery boilers was a problem for a while, but it has now been solved by enhancement of wet scrubbers (a device that removes soot and dust from flue gas by spraying it with water) and electrostatic precipitators.

Odor control

Odors have been a common occurrence at chemical pulp (especially kraft pulp) mills. Since there are individual differences in perception, we believe that simply complying with laws and agreements is not enough. Therefore, we thoroughly investigate the sources of odor emissions, and at the same time, implement the most appropriate odor countermeasures for each source, such as collecting and burning the odor.

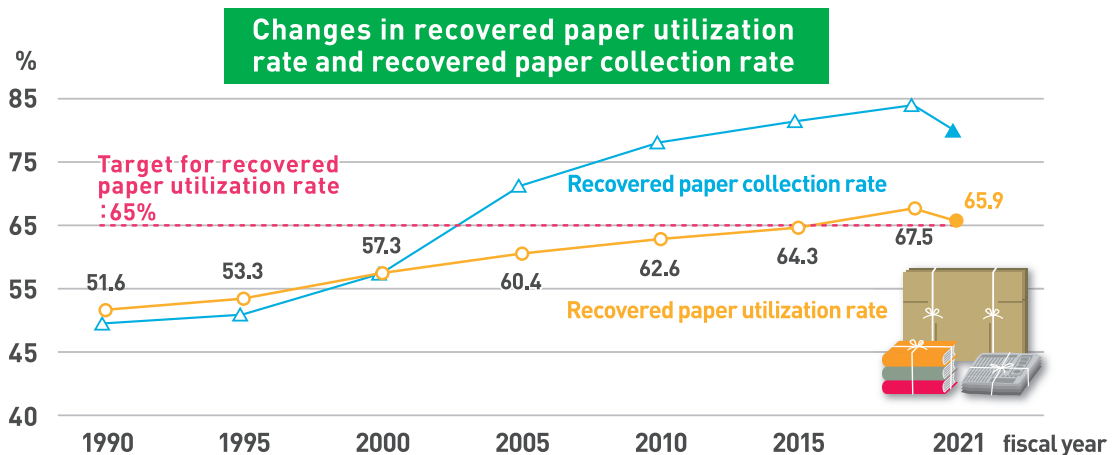
※1) VOC stands for Volatile Organic Compounds, a generic term for organic compounds that are volatile and become gaseous in the atmosphere. It includes a wide variety of substances such as toluene, xylene, and ethyl acetate.

Sustainable procurement of raw materials

Goal

Strive to achieve the goal of 65% recycled paper utilization rate by FY2025

- Paper is an indispensable commodity in modern society, and at the same time, it supports industry and culture from the side. With the development of society and the economy as well as the improvement of lifestyle and culture, the uses of paper are diversifying, and it is being used more and more in various fields. In addition, the value of recovered paper is becoming increasingly important from the perspective of securing raw materials.
- Japan's recovered paper utilization rate is among the highest in the world. In order to further improve this world-class utilization rate, it is essential that the paper manufacturing industry and the recovered paper industry, as well as consumers, consumer industries, and local governments, work together to make strong efforts.
- Specifically, we will continue to focus on expanding the use of printing and information paper, securing raw materials such as recovered office paper, and energy-saving and fuel conversion measures to reduce CO₂ emissions from the recycling of recovered paper.



※The difference between the recovered paper collection rate and the recovered paper utilization rate indicates the paper that is exported mainly to the Asian region and effectively recycled as high-quality recovered paper in the international market.

Initiatives of the Japan Paper Association

Support for the establishment of waste paper collection and recycling systems in Asian countries

Recovered paper is a valuable raw material for the pulp and paper industry, and the advancement of recovered paper collection and recycling systems is a common challenge for the paper industry worldwide. In Japan, the government, the public, and the industry have worked closely together to develop an advanced collecting and recycling system for recovered paper ahead of any other country.

Global demand for paper and paperboard is increasing year by year, especially in China, Southeast Asia, and other Asian countries. However, in these regions, the collecting and recycling systems for recovered paper and paperboard have not yet been developed, and the early advancement of these systems is an urgent issue.

The Japan Paper Association is actively cooperating with the Ministry of Economy, Trade and Industry's project to support the establishment of a recovered paper collection and recycling system in the Asian region, and is providing the know-how it has accumulated through the project. In the project targeting India, an organization similar to Paper Recycling Promotion Center in Japan is being established.

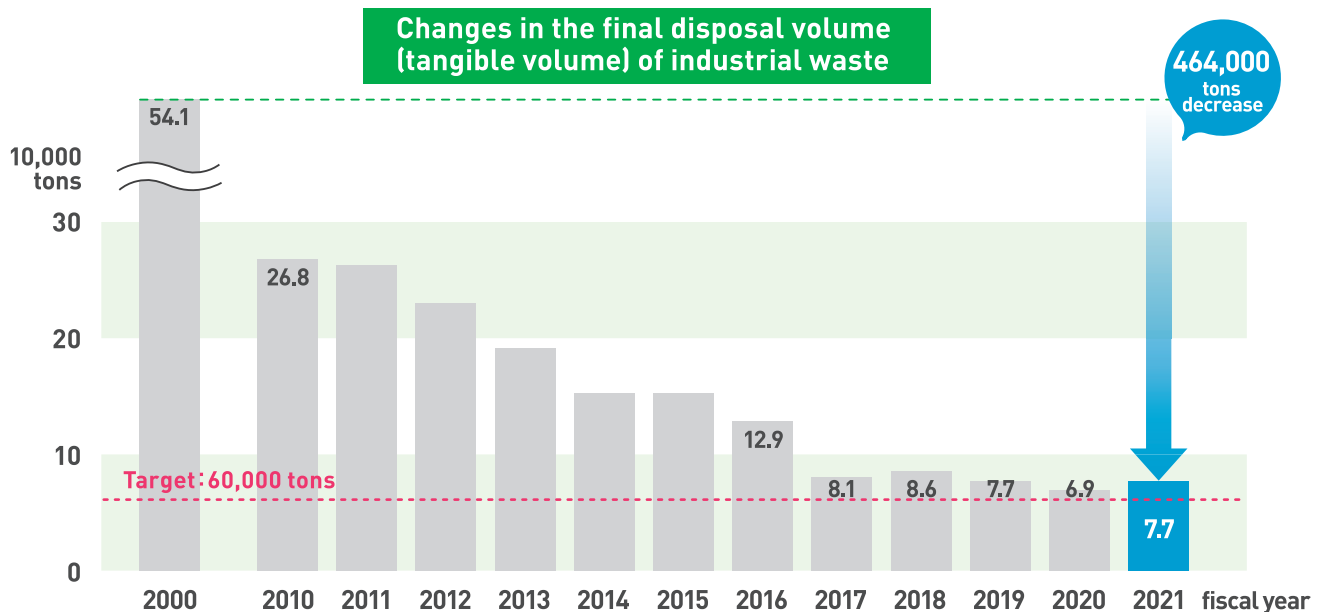


Effective use of resources

Goal

Reduce the volume of final disposal of industrial waste to 60,000 tons in tangible form by FY2025

- Sludge makes up the majority of waste from paper mills, along with waste wood, waste paper, and waste plastic. Most of this waste is incinerated, and much of it is used as energy for the mill. The remaining ash is also effectively used as a raw material for cement and other purposes.
- The pulp and paper industry set a numerical target to reduce the final waste disposal to 130,000 tons by FY2020, and achieved the goal by reducing the final disposal to 69,000 tons in FY2020.
- Since FY2021, we have set a new numerical target of reducing final waste disposal to 60,000 tons by FY2025, and we are continuing to make efforts to reduce waste.



Column

Act on Promotion of Resource Circulation for Plastics

The "Act on Promotion of Resource Circulation for Plastics" (hereinafter referred to as the "New Plastics Law"), which went into effect on April 1, 2022, requires businesses, local governments, and consumers involved in the entire lifecycle of plastics to work together for the circulation of resources.

Although the pulp and paper industry rarely manufactures or sells plastic products themselves, it discharges waste plastic, etc. mixed into recovered paper. In this case, businesses that emit 250 tons or more of industrial waste of plastic-using products are required to set targets for the reduction and recycling of industrial waste of plastic-using products, and to systematically implement measures to achieve these targets.

The pulp and paper industry has long been working to recover heat from solid fuels (RPF: Refuse derived paper and plastics densified Fuel) made from waste plastics, which are difficult to recycle as materials, and the industry as a whole has reached a level where about 6.3% (in FY2021) of the energy required for product manufacturing, etc., is covered by recycled fuels such as RPF.

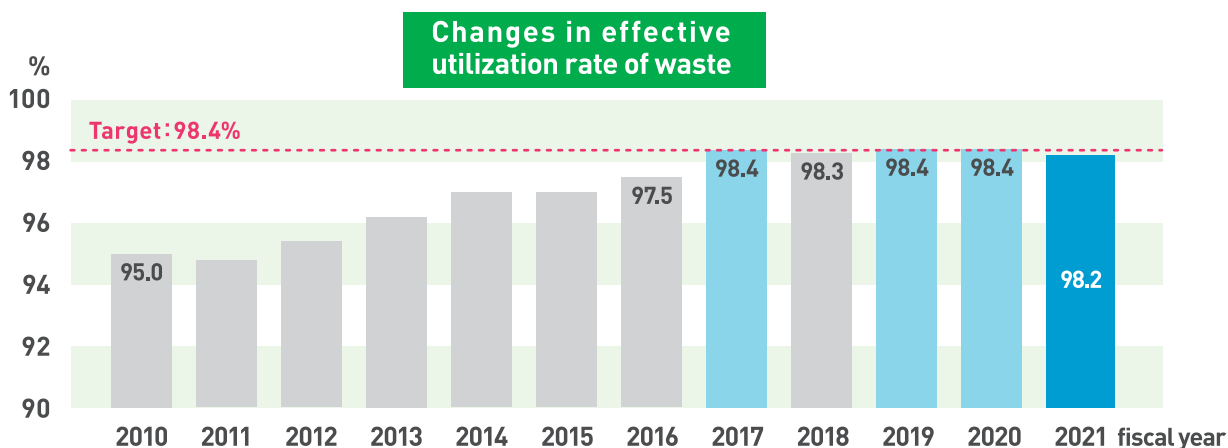
The Japan Paper Association will continue to contribute to the promotion of plastic resource circulation and reduce fossil fuel consumption by promoting this initiative.

Effective use of resources

Goal

Strive to maintain the current rate of effective utilization of waste (FY2019 result: 98.4%)

- In addition to reducing the final disposal volume of industrial waste as mentioned above, the Japan Paper Association has set the industry's own target of maintaining the current rate of effective utilization (FY2014 results: 97.0%), and has been working toward the realization of a recycling-oriented society.
- In the "Environmental Action Plan" revised in October 2020, we set the target year to FY2025 in line with the government's 4th Fundamental Plan for Establishing a Sound Material-Cycle Society, and raised the new target value to 98.4%.
- In order to achieve the new goals, we will continue our efforts under the three policies of "expanding recycling of by-products through industry-wide collaboration," "promoting volume reduction of organic waste and its conversion to fuel," and "promoting research and surveys for the development of new applications."



Initiatives of the Japan Paper Association

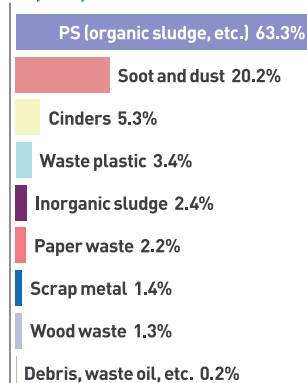
Efforts for effective utilization of waste

The pulp and paper industry has been promoting initiatives to reuse incinerator ash, paper sludge ash, and other waste materials as soil conditioners and roadbed materials. The Japan Paper Association has also conducted annual follow-up surveys on the waste management measures stipulated in its "Environmental Action Plan," and has compiled and published responses from its member companies on the volume of industrial waste generated, volume reduced, volume recycled, final disposal volume, effective utilization rate, and other data.

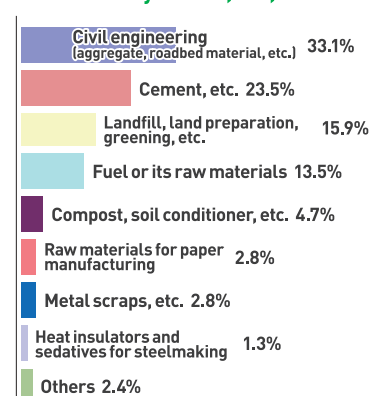
The survey results for FY2021 are shown in the figure on the right, all of which satisfy the targets set in the Environmental Action Plan.

We will continue to work with member companies to reduce and reuse waste.

Industrial waste generated : 4,219,000 tons



Amount recycled : 2,130,000 tons



Stable supply of safe and reliable products

Goal

Conformity to voluntarily established standard values for paper and paperboard intended to come in contact with foodstuffs from a hygienic standpoint.

(maximum allowable elution limit of heavy metals present in paper and paperboard: 1µg/ml or less (as lead))

Pursuant to the Ministry of Health, Labour and Welfare's directive to establish voluntary standards to ensure the safety of paper containers and packaging for food products, the Japan Paper Association established the "Voluntary Standards for Paper and Paperboard Intended to Come into Contact with Food" in May 2007 and began implementing them in October of the same year.

In addition, the Japan Paper Association has prepared a Negative List (NL)^{※1} based on domestic and international regulations and hazard information, and updates the list annually to keep it in line with subsequent changes in regulations and hazard information. Furthermore, the chemical substance information retrieval system "JPA Chemi-net" has been established and operated, and member companies have registered chemical substances used in the production of papermaking chemicals for the confirmation of safety information.

As of October 2021, approximately 3,000 and 2,000 substances are registered in NL and JPA Chemi-net, respectively.



Paper food container as an alternative to plastic



Recyclable paper cup

Initiatives of the Japan Paper Association

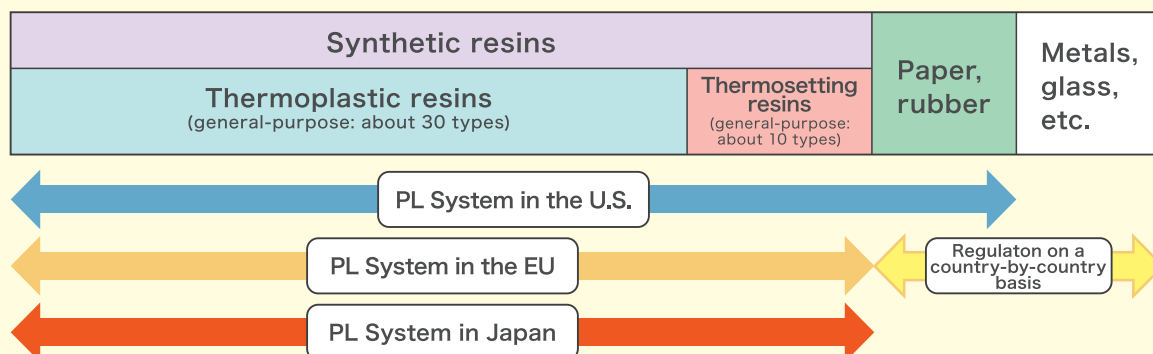
Creation of a voluntary Positive List

The Positive List (PL) is a list of chemical substances that have been confirmed as safe. By limiting the substances used in paper and paperboard that come into contact with food to those listed in the PL, it is possible to ensure the safety of products derived from raw materials.

In Europe and the U.S., legislation for PL management has been progressing, and also in Japan, a PL system targeting synthetic resins came into effect in June 2020.

The Japan Paper Association is currently studying the feasibility of a voluntary positive list.

Comparison of the Regulations in Japan, Europe, and the United States^{※2}



※1) Negative list is a list of substances whose use is, in principle, permitted, although their use is prohibited or regulated.

※2) Source: Ministry of Health, Labour and Welfare, "Overview of amendments to the Food Sanitation Act"



Stable supply of safe and reliable products

Column

Voluntary action plan for the promotion of appropriate transactions with subcontractors

The paper industry supplies materials that are essential for industrial activities and daily life. Each of the member companies of the Japan Paper Association has business relationships with a large number of companies, and it is essential to establish appropriate business relationships with suppliers, including small and medium-sized enterprises, and to improve trading conditions throughout the supply chain through cooperation between both parties.

To this end, in accordance with the Act against Delay in Payment of Subcontract Proceeds, etc. to Subcontractors and the promotion standards, etc. under Article 3, Paragraph 1 of Act on the Promotion of Subcontracting Small and Medium-sized Enterprises, the member companies of Japan Paper Association have formulated voluntary action plans with regard to transactions with subcontractors and are working to promote appropriate transactions by the member companies, and furtherly have been improving the trade practices of the member companies by revising the voluntary action plans as necessary through evaluation of the implementation status based on the periodical follow-up on the implementation status of their voluntary action plans by the member companies.

Note that 16 member companies have registered for the "Declaration of Partnership Building" established by the Chairman of Keidanren (Japan Business Federation), the President of Nissho (Japan Chamber of Commerce and Industry), the President of RENGO (Japan Trade Union Confederation), and the relevant ministers as members.

Items to promote proper transactions

1. Issuance of documents at the time of order placement
2. Promotion of reasonable pricing
3. Appropriate cost sharing
4. Implementation of "work style reforms"
5. Improvement of payment conditions
6. Efforts for maintaining the supply chain
7. Dealing with freelancers
8. Creating an environment in which it is easy to raise transactional issues
9. Protection of intellectual property



Column

"White Logistics" Promotion Campaign

The shortage of truck drivers, who play an essential role in logistics for people's daily lives and corporate activities, has become an extremely serious social problem.

This is due to the long working hours caused by long waiting times at the origin and destination of shipments and the physical burden of loading, unloading, and other cargo handling work. In order to improve the length of waiting time for cargoes and cargo handling time, and the burden of cargo handling, it is essential to improve the efficiency of logistics operations at the origin and destination of shipments.

In response to these social issues in logistics, in December 2019, the Japan Paper Association endorsed the purpose of the "White Logistics" (labor-friendly logistics) promotion campaign promoted by the government and declared its commitment to tackle them as shown on the right.

Note that 9 member companies have endorsed the "White Logistics" Declaration, which was established by the government to ensure stable logistics necessary for people's daily lives and industrial activities, as well as to contribute to the growth of the economy.



「ホワイト物流」
推進運動

—Declaration of voluntary action to realize sustainable logistics—

Policy of Initiatives

Recognizing that it is a challenge for the industry to ensure the sustainable and stable logistics necessary for the business activities of member companies, we will support member companies in their efforts to improve logistics based on mutual understanding and cooperation with suppliers, logistics providers, and other related parties to realize highly productive logistics and work style reforms.

Consideration for Compliance with Laws and Regulations

As an industry, we will conduct necessary educational activities to ensure that member companies and their logistics business partners comply with laws and regulations related to labor and the freight forwarding business, such as appropriately responding to reviews of contracts and transportation details when there is a possibility of legal violations.

Clarification and Compliance with Contractual Terms

As an industry, we call on our member companies to clarify the details of contracts for transportation and non-transportation services such as cargo handling and inspection, etc., and we, as an industry, strive to comply with such contracts with the cooperation of our business partners, logistics providers, and other related parties.

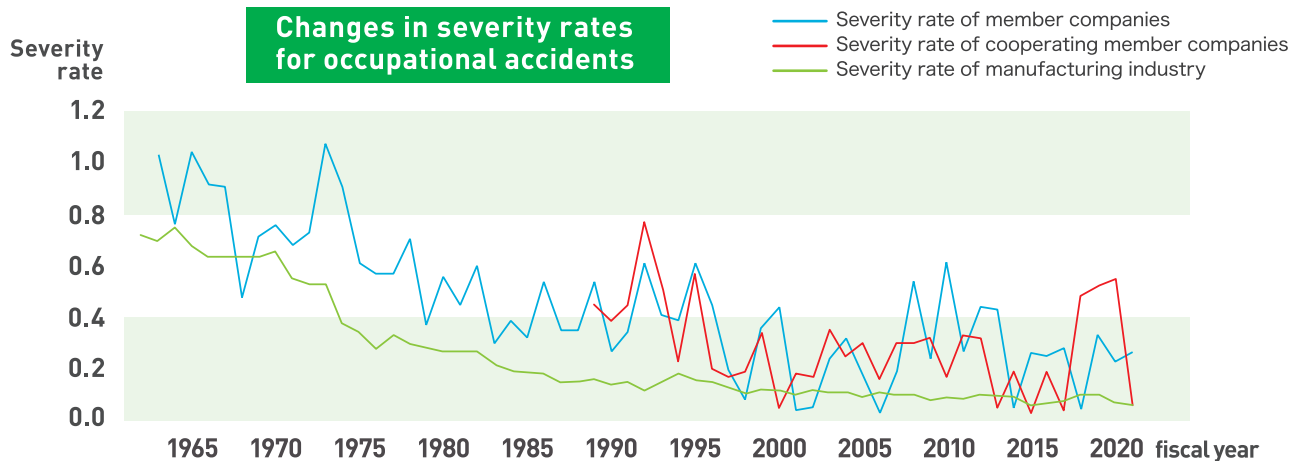
Addressing the working environment



Efforts for occupational health and safety

Goal Achieve zero fatalities at member companies and group company workplaces

- In order to protect the safety and health of all working companions of the pulp and paper industry and to realize better workplace environment, Japan Paper Association is engaged in various cross-industry and cross-sector programs, such as sharing information on best practices and accident cases among member companies, and conducting various educational activities.
- Adhering to the belief that "it is the responsibility of the head of the workplace and of the top management to ensure that anyone who is received into the company's workplace fulfills the purpose of entering and leaves uneventfully," we set out an action plan in February 2018 aiming to achieve the ultimate goal of "eliminating fatal accidents." This is consistent with the activities of the "Public-Private Council for Safety Measures in the Manufacturing Industry."
- However, fatal accidents are still occurring every year throughout the cooperating member companies. Therefore, the severity rate, which expresses the severity of accidents, tends to be higher than that of the manufacturing industry.



Initiatives of the Japan Paper Association

Occupational Safety & Health

National Pulp and Paper Safety and Health Convention

The event has been held continuously every year since 1961, and celebrated its 61th anniversary in 2021. It consists of safety and health awards, lectures, and breakout sessions.

Safety and health award

The purpose of this award is to contribute to the improvement of safety and health standards and the eradication of accidents in the pulp and paper industry by recognizing workplaces and contractors that have excellent safety and health performance and serve as models for others. In addition to the awards presented by Japan Paper Association, we also recommend the "Green Cross Award" given by the Japan Industrial Safety and Health Association, and the "Outstanding Safety Supervisor Commendation" given by the Minister of Health, Labor and Welfare.

Response to the Public-Private Council for Safety Measures in the Manufacturing Industry

The Ministry of Health, Labor and Welfare, the Ministry of Economy, Trade and Industry, and the Japan Industrial Safety and Health Association established the Public-Private Council for Safety Measures in the Manufacturing Industry on March 6, 2017 to further strengthen safety measures in the manufacturing industry and to disseminate relevant information. Japan Paper Association has been actively participating in the Council's various activities, including serving as the Council's first Acting Chair in FY2017.

Educational activities

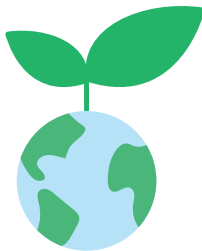
We provide training sessions, plant tours of different industries, and educational materials for managers and staff in charge of safety and health at member companies.

Realization of the establishment of a carbon neutral industry

~Contribution to climate change issues through forest CO₂ absorption and reduction of CO₂ emissions in the production process~

The pulp and paper industry has been working to maintain a sustainable global environment and to realize a low-carbon society by expanding CO₂ absorption volume through sustainable forest management and reducing fossil energy consumption through the proactive use of biomass energy and waste.

On this basis, the pulp and paper industry aims to establish a carbon neutral industry by 2050 by endorsing the government's "2050 Carbon Neutrality Declaration" and proactively working on various measures to reduce CO₂ emissions.



Contribution to green recovery

"Green Recovery" is a recovery policy that aims for a more sustainable future while preventing global warming and preserving biodiversity in the recovery from the COVID-19 pandemic.

As the pulp and paper industry has a wide range of interfaces with forests through its business activities, it can directly contribute to climate change countermeasures and biodiversity conservation, which are the two cornerstones of green recovery, and through them it will support economic recovery from the COVID-19 pandemic and prosperous social life.



Contribution to the circular economy of waste paper utilization system

The "circular economy" refers to an economic system that preserves and maintains the value of products, materials, and resources for as long as possible while minimizing the generation of waste, and it is a concept that aims to break away from the one-way "linear economy" of the past.

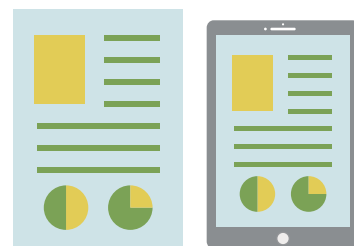
The pulp and paper industry's advanced system for utilizing recovered paper is the very essence of circular economy, and we will continue to contribute to the virtuous cycle of resources and the economy by further improving our recycling technology in addition to the use of recovered paper.



Transmission of the importance of paper in a digital society

Recent developments in ICT^{※2} technology have led to the digitization of paper media. However, research has shown that there are differences in brain activity and learning effects between paper and digital media. For example, in the field of education, the combination of using different media depending on the situation and using both concomitantly is considered to be the key to improving learning efficiency.

Thus, paper plays an important role even in the digital society, and the pulp and paper industry is committed to communicating the role and importance of paper in the digital society.



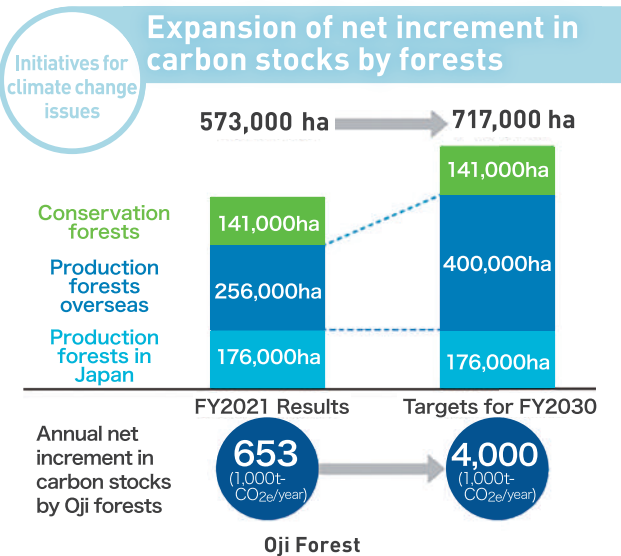
※1) The four strategic initiatives are four themes that the industry should focus on in the future, as analyzed and organized in the "Towards 2030" report (<https://www.jpa.gr.jp/about/sdgs/index.html>) by the Japan Paper Association.

※2) ICT is an abbreviation for "Information and Communication Technology." It refers to technology that connects people to the Internet and people to each other using communication technology.

6

Examples of Initiatives by Member Companies

The cases listed here are some of those submitted by member companies in the SDG Committee. All cases are updated as needed and posted on the website of the Japan Paper Association (<https://www.jpaa.gr.jp/about/sdgs/index.html>).



Targets for expansion of forest area and net absorption of CO₂

The Oji Group owns and manages 573,000 hectares of forests in Japan and overseas, and practices sustainable forest management in consideration of the environment, society, and the economy, with the actual carbon stocks in living biomass reaching 109 million tons of CO₂.

In the Environmental Action Program 2030, we have set a target of absorbing the equivalent of 50% of GHG emissions in the base year (FY2018). Accordingly, we are aiming to expand our production forests overseas to 400,000 hectares by FY2030. In addition, we will promote CO₂ absorption by developing and planting fast-growing trees suited to the regions in which we operate.



Nippon Paper Industries Co., Ltd. has become the first major private-sector company to begin mass production of elite tree seedlings, which have superior characteristics compared to standard varieties, including growth speed and CO₂ absorption that are 1.5 times greater and pollen production that is less than half. The company will work with the Ministry of Agriculture, Forestry and Fisheries, local governments, and local seedlings business to expand the production business throughout Japan. The spread of elite trees not only contributes to the stable procurement of wood resources, lower costs, and the revitalization of the forestry industry, but also to the creation of a carbon-neutral society by increasing the value of forests as a source of absorption of CO₂.

Declaration of "Zero CO₂ 2050"



In November 2020, the Hokuetsu Group declared "Zero CO₂ 2050" and launched an initiative to reduce CO₂ emissions from paper production to virtually zero by the year 2050. Currently, 70% of the Group's paper products are produced using zero CO₂ energy.

They will continue to achieve the "Group Environmental Target 2030" and make capital investments, such as the construction of a new biomass boiler.



Pan Pac Forest Products (New Zealand), a member company of the Oji Group, conducts activities for protecting kiwi, a rare bird species, in cooperation with the Ministry for the Environment of New Zealand, citizen volunteers, and other parties. For these activities, the company has designated land of an area of approximately 40 hectares as a kiwi sanctuary for protecting kiwi chicks. Chicks and eggs in the surrounding area are captured and collected, and chicks that are captured or hatched from the collected eggs are nurtured in the sanctuary before being returned to the wild. In June 2019, Pan Pac was awarded 'Community corporate sponsor of the Year' at a national kiwi conference held by "Kiwis for Kiwi," a kiwi protection organization.

Examples of Initiatives by Member Companies

Reduction of environmental impact

Milk cartons as an opportunity to think about the earth ~paper packs for straw-less school lunches "SchoolPOP"®~



Nippon Paper Industries Co., Ltd. developed paper cartons for straw-less school lunch in 2020. The company designed the packs to be easy to open and hygienic, while retaining the straw hole in consideration for those who need a straw. Two hundred million packs were planned to be supplied in FY2022, and if each straw weighs 0.5 g, approximately 100 tons of petrochemical-derived plastic will be reduced per year. In addition to contributing to solving the problem of climate change by reducing CO₂ emissions, it is also expected to reduce the burden of sorting and to raise environmental awareness from an early age.

Reduction of environmental impact

No-Car Day campaign for employees commuting to work



Combining Reducing CO₂ emissions and improving health

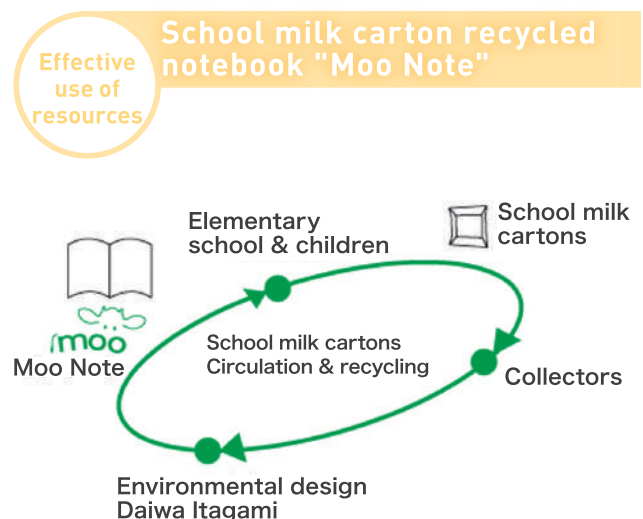
Employees working for Marusan Paper Mfg. Co., Ltd., which has mills in small and medium-sized regional cities, go, of course, to work by their own car, but since 2009, the company has been encouraging their employees to commute to work using a bicycle or on foot without using their own car, calling it "No-Car Day" movement, partly as health promotion. Although they often have to rely on cars during the night shift or when it rains, they have been able to accumulate small efforts in small steps, and in FY2021, 24 employees, equivalent to 10% of the total workforce, participated in the project and achieved a CO₂ reduction of 2,946 kg.

Reduction of environmental impact

Contributing to microplastic oceanographic research



Marusumi Paper's second woodchip carrier, the STELLAR HARMONY (launched in August 2022), is one of NYK Line's sampling vessels engaged in an open-sea survey of microplastic distribution. Microplastics sampled from seawater pumped on the route will be analyzed by Chiba Institute of Technology for research and investigation of actual conditions of marine plastic pollution.



Recycling school milk cartons is time-consuming due to their small size, and even if they were recycled into toilet paper, it would be too expensive, so they have been shunned as difficult paper to recycle. Daiwa Itagami Co., Ltd. believed that the use of paper that is difficult to recycle is necessary for the environment in the future, and succeeded in reusing school milk cartons as the cover of Moo Note, a notebook, by building a local recycling system. This is a small and steady effort that is so small that we can see the faces of the people in the local community, and they believe that the accumulation of these efforts will support the global environment and so value this effort.



Confidential paper waste processing equipment

Rengo Co., Ltd.'s three paper mills (Yashio Mill, Amagasaki Mill, and Toneyama Division) have installed equipment dedicated to processing confidential paper waste, which was previously incinerated to prevent information leaks, to use such confidential documents as a raw material for papermaking.

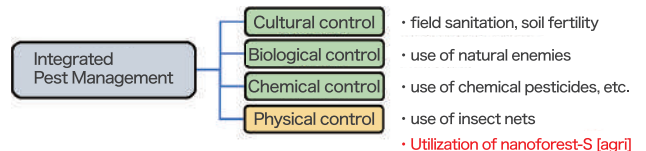
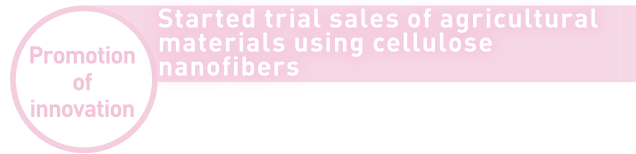
In using confidential paper waste, the company has acquired ISO 27001 certification, an international standard for information security management, and carries out appropriate security management, such as receiving raw materials in a dedicated and fully secured facility.



Yodogawa Logistics Center

Rengo Co., Ltd.'s Yodogawa Logistics Center, the Rengo Group's largest distribution center in the Kansai region, has introduced a warehouse management system (WMS), a truck guidance system, and an automatic lifting system that utilize AI, IoT, and RFID to further improve logistics efficiency.

In addition to improving transportation quality and services, the company is promoting operational reforms at logistics sites and promoting "White Logistics" (labor-friendly logistics).



"Strategy for Sustainable Food Systems, MeaDRI" KPI and Target Setting Status Partially excerpted and simplified from Ministry of Agriculture, Forestry and Fisheries data (June 2022)

	KPI	Reference value (base year)	Target for 2030	Target for 2050
ENVIRONMENTAL	50% reduction in the use of chemical pesticides	2019	10% reduction	50% reduction
	30% reduction in the use of chemical fertilizers	2016	20% reduction	30% reduction
	Organic farmland ratio expanded to 25%	2017	63,000 ha	1 million ha (25%)

The goal is to reduce the use of chemical pesticides by 10% by 2030 and 50% by 2050.

Chuetsu Pulp & Paper Co., Ltd. has begun trial sales of a new agricultural material for corporate customers that uses ACC cellulose nanofiber (CNF) "nanoforest®" that it manufactures. It is a new agricultural material for "physical control" of Integrated Pest Management (IPM), which is promoted in the "Strategy for Sustainable Food Systems, MeaDRI" formulated by the Ministry of Agriculture, Forestry and Fisheries of Japan. While the emergence of resistant bacteria and the environmental impact of chemical pest control, such as pesticides, have become major issues, they aim to contribute to the agricultural sector through physical pest control using CNF.



Example of mixed loading and relay transportation



Example of loading in a 31-foot rail container

Since 2022, the paper products of Daio Paper Corporation have been transported together with the products of Suntory Holdings ("mixed loading") in their railroad containers from Osaka to Tokyo. Furthermore, Daio Paper is establishing a new scheme that enables one-day round-trip trailer transportation in the Kanto and Kansai regions, using Daio Paper's intermediate location as a switch point, as well as mixed loading in available space. This initiative is expected to reduce CO₂ emissions by approximately 216 metric tons per year, and will also lead to a reduction in drivers' working hours (work style reform).

Examples of Initiatives by Member Companies

Efforts for occupational health and safety

Safety awareness level reform



In FY2021, **Mitsubishi Paper Mills, Inc.** worked to reform the safety awareness level of all employees by (1) strengthening hazard prediction (*kiken-yochi*, KY) activities and thoroughly alerting workers when they work alone during troubleshooting, and (2) providing thorough safety guidance to temporary workers. Since serious accidents tend to occur when one person is working alone during troubleshooting, network cameras have been installed in some locations. They have a system in place that allows them to check the site in real time from a TV monitor.

Promotion of diversity and inclusion (including "respect for human rights")

"Period Product Provision" Initiative



"Period poverty," the inability to purchase sanitary products due to economic reasons, has emerged as a social issue and has become an important concern for the health and dignity of women. **Daio Paper Corporation's** sanitary napkin brand "elis" is part of the "meet my elis" project to declare that we are here for every individual who experiences periods in this diverse society by focusing on the period poverty issue with the message "Here for none other than you." In order to support Generation Z who will support the future, they are working on a "period product provision" program that provides free sanitary napkins for one year to students who have difficulty obtaining sanitary napkins for various reasons.

Coexistence with local communities and society

Experiential environmental learning



Mitsubishi Paper Mills, Inc. is implementing a program to contribute to SDGs by combining lectures with observation, measurement, planting, and tree raising in company-owned forests, as well as paper making and paper crafts as part of the manufacturing experience, to consider forest conservation, global warming prevention, and biodiversity, under the theme of collaboration between nature and industry. In FY2021, while adopting a new lifestyle as a measure against the COVID-19 pandemic, they held 17 forest environment studies and nature observation tours in Tokyo and Fukushima Prefecture, with a total of 592 participants.

Dialogue with stakeholders

Support and cooperation with Road to Hope activities



Accepting applications for membership in the Community Support Foundation

As part of its efforts to coexist with local communities, the **Hokuetsu Group's** group company (AI-Pac) supports the "Road to Hope Community Support Foundation." The Foundation is a non-profit organization that helps cancer patients access treatment outside the community. AI-Pac employees and retirees support the idea of the company and cooperate with "Road to Hope" activities, including transportation of cancer patients.

7 Editorial Note

Due to high raw material prices and energy shortages associated with global political instability, signs of a slowdown in the response to global warming in each country have come to be seen here and there. However, discussions on how to respond to the climate change issues and biodiversity conservation were made among countries at COP27 and COP15 Phase 2 held in November and December 2022, respectively, as in the previous year, and the importance of sustainability measures centered on these two areas has been increasing.

The pulp and paper industry has extensive interfaces in these two areas, which are the two cornerstones for establishing a sustainable society because forests are our source of business, so that we must respond to them responsibly.

For this reason, in May 2021, the Japan Paper Association organized the SDGs Committee, which consists of 22 member companies, and started to shed light on the activities of the pulp and paper industry from a sustainability perspective. As part of these activities, we published our first Sustainability Report 2021 last fiscal year, with the aim of confirming progress within the industry and enhancing the industry's presence by publicizing it to society.

In publishing the Sustainability Report 2022, we update the graphs and other information to make them more visually appealing, and unleash our creativity and ingenuity in reducing the number of words and enhancing the columns to make the structure more reader-friendly. Also, as in the previous year, the "Value Creation Model," which is the engine of the industry's activities, is placed at the center of the report as a compass for the pulp and paper industry as it moves forward into the future. Furthermore, we include a "Snapshot" of the industry based on this Value Creation Model, which shows a cross-sectional picture of the industry using 20 items with current figures, and a list of "Goals and Progress" for each materiality to provide a comprehensive picture of the industry's activities, and at the end, we provide an "Examples of Initiatives" section that introduces some of the specific activities of each member company.

The editorial team would be delighted if this report, which provides a one-stop shop for understanding the sustainable activities of the pulp and paper industry, could further deepen dialogue with stakeholders and contribute to the building of a sustainable society, even if only in a small way.

Scope of reporting on numerical values

In principle, the report covers the 31 regular members of the Japan Paper Association (as of March 31, 2022). In cases where the scope of coverage differs, a statement to that effect is provided.

Period of reporting on numerical values

The period from April 1, 2021 to March 31, 2022 is covered. If the period covered is different, it is indicated accordingly.





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