

# The Sixth Medium-Term Business Plan (April 2018 – March 2021)

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May 28<sup>th</sup>, 2018

NIPPON PAPER INDUSTRIES CO.,LTD.

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Review of Fifth Medium-Term Business Plan

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Business Environment and the Group's Strategies

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The Sixth Medium-Term Business Plan

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SDGs

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Review of Fifth Medium-Term Business Plan

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# 1. Review of Fifth Medium-Term Business Plan

Paper and paperboard business	<ul style="list-style-type: none"> <li>• Overseas business moved into black</li> <li>• Domestic business affected by greater-than-expected slump in domestic demand and hike in raw material and fuel prices</li> </ul>
Livelihood-related business	<ul style="list-style-type: none"> <li>• Implemented measures largely as planned for package, household paper products and healthcare products, and chemical products</li> <li>• Nippon Dynawave Packaging (NDP) of North America, which we acquired, also contributed to earnings</li> </ul>
Energy business	<ul style="list-style-type: none"> <li>• Ishinomaki Hibarino Power Plant (Nippon Paper Ishinomaki Energy Center) started up operations in March 2018</li> </ul>

## ● Operating income (new segment)

(Billions of yen)

	FY15/3	FY16/3	FY17/3	FY18/3
Paper and paperboard business	8.8	6.8	0.5	-5.5
Livelihood-related business	6.5	5.3	12.5	11.9
Energy business	3.9	4.9	3.5	3.9
Wood products and construction related business	2.1	3.5	4.4	4.5
Other businesses	2.4	2.1	2.9	2.8
Total from livelihood-related business to other businesses	14.9	15.8	23.3	23.1
Grand total	<b>23.7</b>	<b>22.6</b>	<b>23.8</b>	<b>17.6</b>

\* Values for each segment are rough estimates.

1 Review of Fifth Medium-Term Business Plan

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**2 Business Environment and the Group's Strategies**

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## 2. Business Environment and the Group's Strategies

### Business portfolio targeting operating income of ¥50 billion (approximate target)

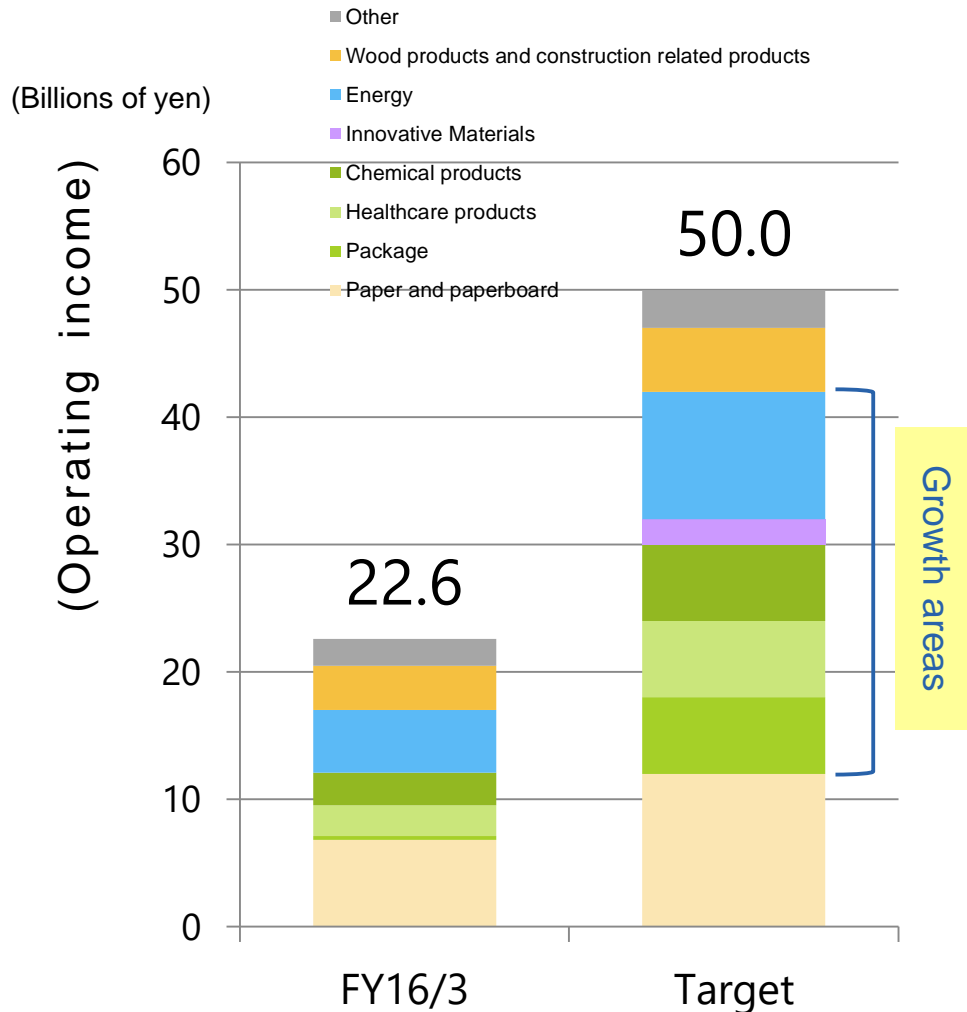
#### ● Operating income

(Billions of yen)

		FY16/3	Target
Paper and paperboard business		6.8	12.0
Growth	Livelihood-related business (package, healthcare products, chemical products, innovative materials)	5.3	20.0
	Energy business	4.9	10.0
Wood products and construction related business		3.5	5.0
Other businesses		2.1	3.0
Total from livelihood-related business to other businesses		15.8	38.0
Grand total		<b>22.6</b>	<b>50.0</b>

## 2. Business Environment and the Group's Strategies

### Reform business portfolio to create corporate value



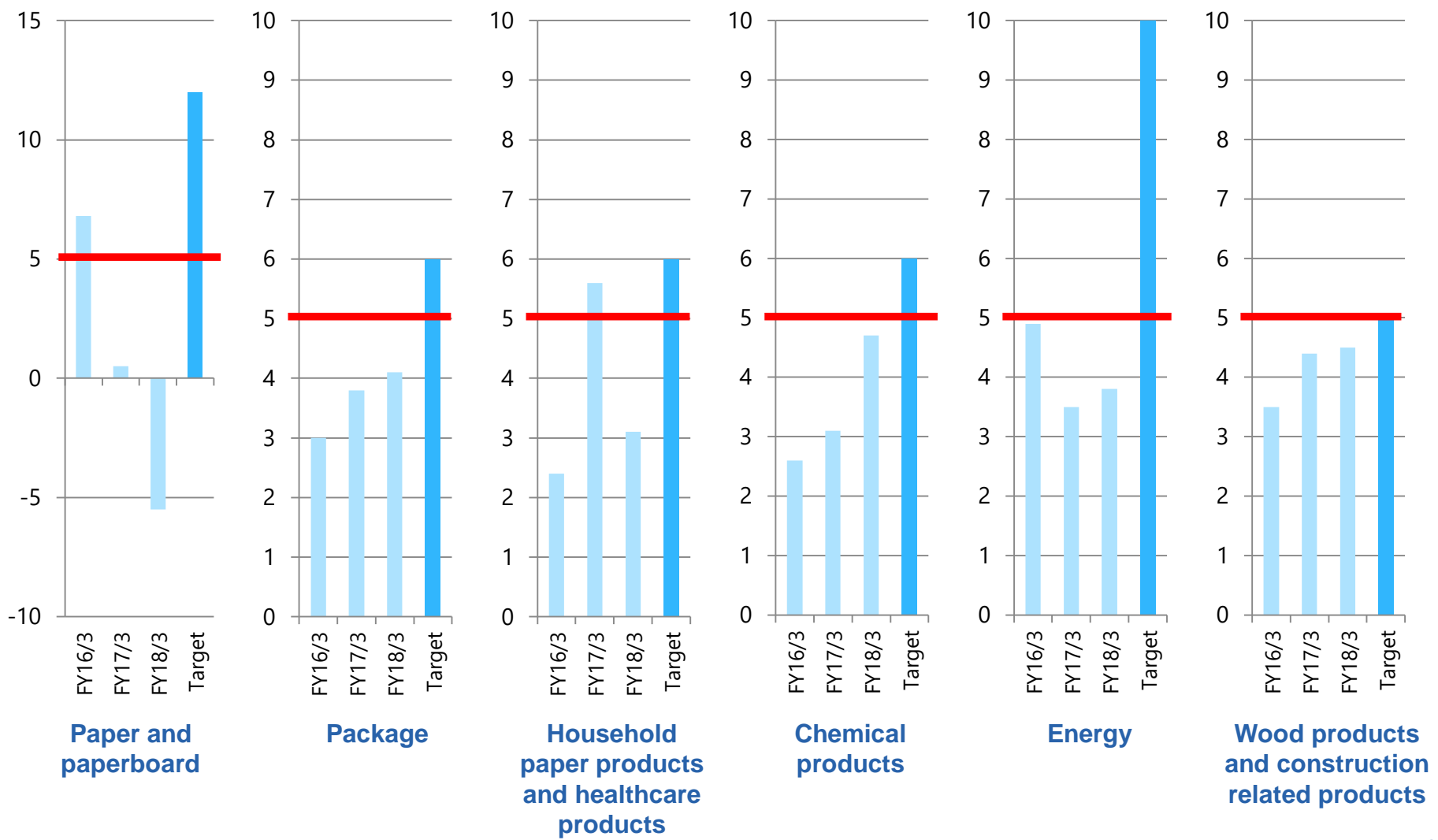
Build multiple business units that could gain operating income of ¥5.0 billion

- Paper and paperboard
- Package
- Household paper products and healthcare products
- Chemical products
- Energy
- Wood products and construction related products

# 2. Business Environment and the Group's Strategies

## Operating income of each business unit

(Billions of yen)

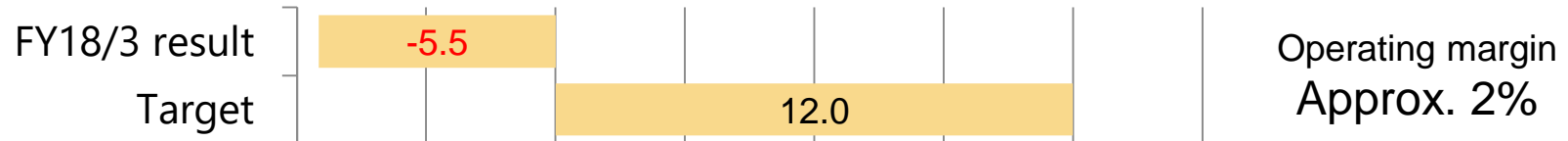




# 2. Business Environment and the Group's Strategies

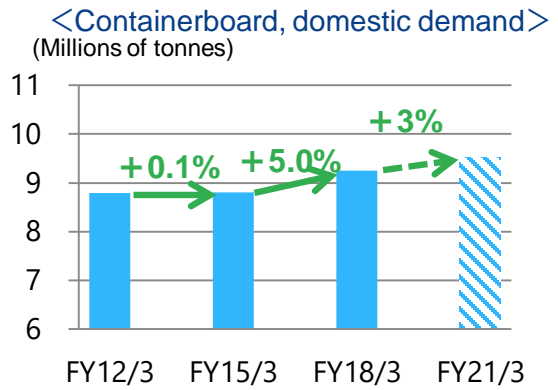
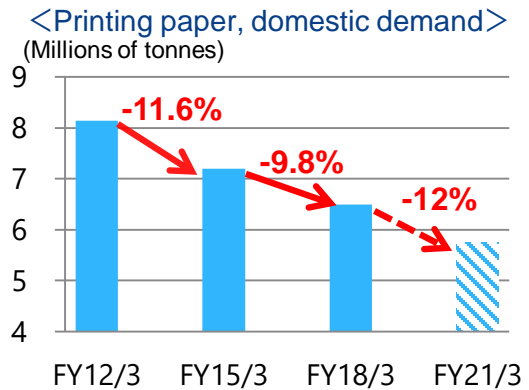
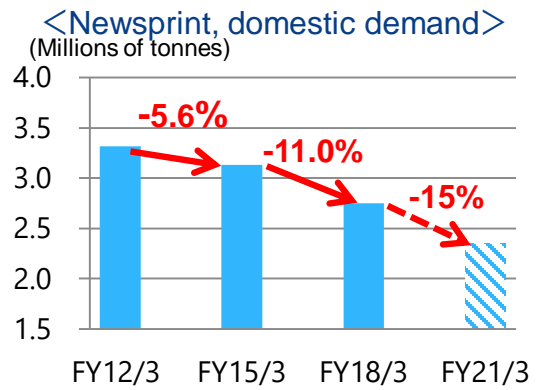
## Paper and paperboard business (1)

### ● Operating income (Billions of yen)



### ● Business Environment and the Group's Strengths and Weaknesses

(Sources: Japan Paper Association, the Company's estimates)



Product	Business Environment	Strengths, weaknesses
Newsprint	<ul style="list-style-type: none"> <li>• Declining circulation, page numbers trending downward</li> <li>• Surplus production capacity</li> </ul>	<ul style="list-style-type: none"> <li>• Able to optimize production structure in step with decreases in demand as a result of having numerous production base</li> <li>• New product development capabilities</li> <li>• Technological capabilities</li> </ul>
Printing paper	<ul style="list-style-type: none"> <li>• Advancing digitization</li> <li>• Declining circulation of magazines, catalogs, flyers</li> <li>• Surplus production capacity</li> </ul>	
Business communication and industrial paper	<ul style="list-style-type: none"> <li>• Solid demand for copy paper and thermal paper</li> <li>• Decreases due to trend of simple packaging and packaging reduction</li> </ul>	

## 2. Business Environment and the Group's Strategies

### Paper and paperboard business (2)

#### ● Business Environment and the Group's Strengths and Weaknesses

Product	Business Environment	Strengths, weaknesses
Paperboard	<ul style="list-style-type: none"><li>• Solid demand for cardboard due to such factors as the increase in mail-order sales worldwide, including Japan</li></ul>	<ul style="list-style-type: none"><li>• Lack of integration with cardboard converting business (downstream)</li></ul>
Overseas	<ul style="list-style-type: none"><li>• Trend toward changeover from plastic to paper</li></ul>	<ul style="list-style-type: none"><li>• Technological capabilities developed through base paper making for paper containers</li></ul>

#### ● The Group's strategies

Product	Strategies
Newsprint and printing paper	<ul style="list-style-type: none"><li>• Enhance our bargaining power by reducing supply-demand gap</li><li>• Strengthen cost competitiveness to maintain market share</li></ul>
Business communication and industrial paper	<ul style="list-style-type: none"><li>• Increase sales of barrier packaging material</li><li>• Cater appropriately to trend toward changing over to paper</li></ul>
Paperboard	<ul style="list-style-type: none"><li>• Maintain appropriate product prices amid solid demand</li></ul>
Overseas	<ul style="list-style-type: none"><li>• Expand value chain</li><li>• Expand sales channels of high-value-added export products</li><li>• Stabilize operations and stabilize energy costs (Paper Australia)</li><li>• Increase sales of high-value-added products and enhance productivity (Jujo Thermal)</li></ul>

## 2. Business Environment and the Group's Strategies

### Livelihood-related business (package)

#### ● Operating income (Billions of yen)



#### ● Business Environment and the Group's Strengths, Weaknesses, Strategies

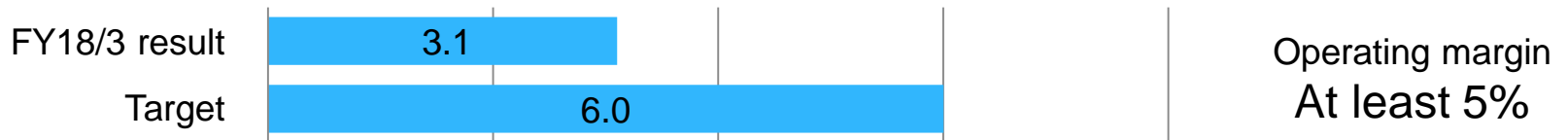
Mainstay businesses	Business Environment	Strengths, weaknesses
Paper cartons	<ul style="list-style-type: none"> <li>• Drinking-milk market annual 3% decline</li> <li>• Growth in health and functional beverages, such as fruit juice beverages with fiber, fermented milk etc.</li> </ul>	<ul style="list-style-type: none"> <li>• Comprehensive services through tripartite structure</li> <li>• Supplier of comprehensive systems (including NDP, etc.)</li> <li>• Technology development capabilities (Technical Center, alliance with Elopak)</li> </ul>
Nippon Dynawave Packaging (NDP)	<ul style="list-style-type: none"> <li>• Changeover to paper containers as environmental awareness increases</li> </ul>	<ul style="list-style-type: none"> <li>• Stable customer base and steady demand in U.S market.</li> </ul>

Mainstay businesses	Strategies
Paper cartons	<ul style="list-style-type: none"> <li>• Increase sales by developing new paper containers and new filling machines</li> <li>• Cost reductions through modernization of equipment, etc.</li> <li>• Strengthen tripartite structure, provide total solutions</li> <li>• Market replaceable paper container SPOPS™ at early timing.</li> </ul>
Nippon Dynawave Packaging(NDP)	<ul style="list-style-type: none"> <li>• Maximize production through stabilization of operations</li> <li>• Maximize pulp sales to fully utilize production facility</li> </ul>

## 2. Business Environment and the Group's Strategies

### Livelihood-related business (Household paper products and healthcare products) (1)

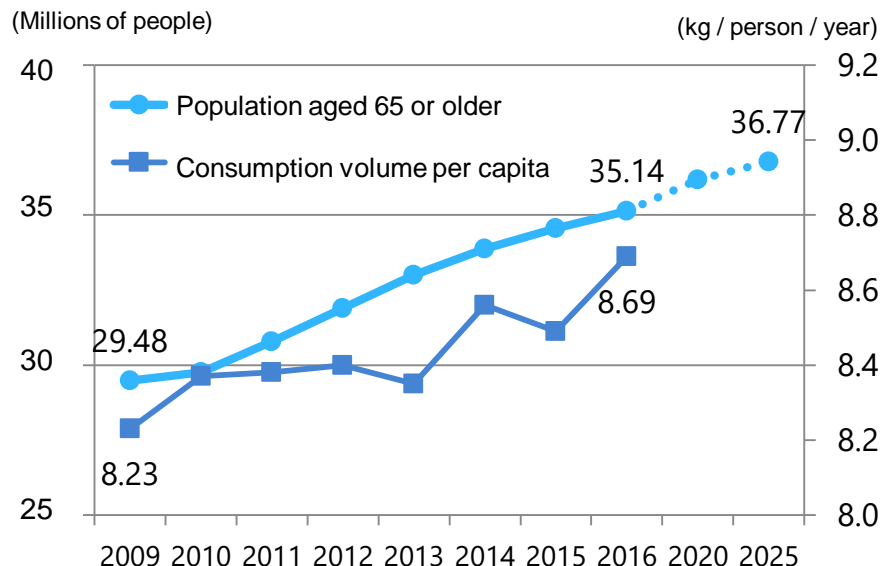
#### ● Operating income (Billions of yen)



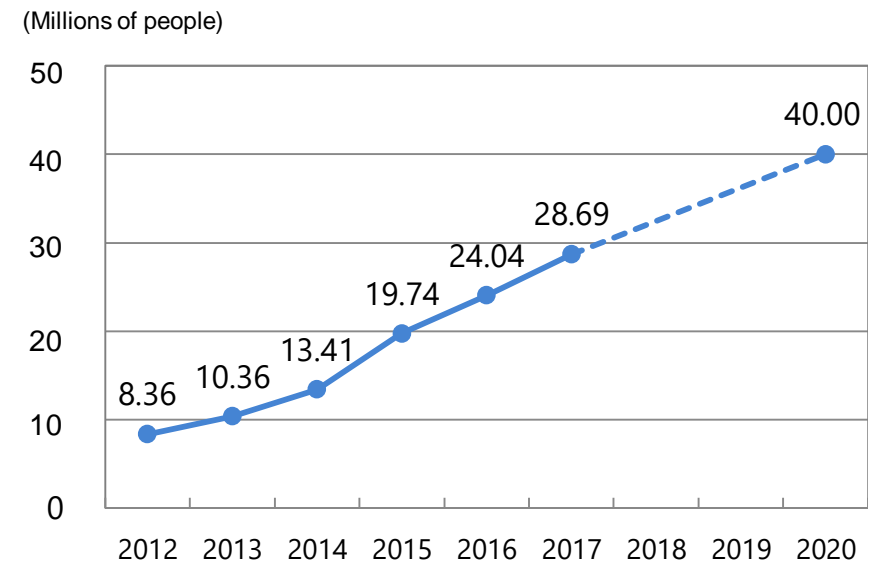
#### ● Business Environment

Further aging of society, increase in visitors to Japan

<Population aged 65 or older in Japan and toilet paper roll consumption volume per capita>



<Visitors to Japan>



Sources: National census; population statistics; *Paper Statistics Annual Report*, Kikaisukiwashi-rengokai; *Tourism Vision to Support the Future of Japan*, Japan National Tourism Organization

## 2. Business Environment and the Group's Strategies

### Livelihood-related business (Household paper products and healthcare products) (2)

- Business Environment and the Group's Strengths, Weaknesses, Strategies  
Accelerate growth by realizing high-quality, high added-value, and low costs

Products	Business Environment	Strengths, weaknesses
Household paper products	<ul style="list-style-type: none"> <li>• Lifestyles changing</li> <li>• Society aging further</li> <li>• Households increasing</li> </ul>	<ul style="list-style-type: none"> <li>• Strong brand power of Kleenex</li> <li>• Utilization of paper and paperboard resources infrastructure, technology, locations, competitiveness of Crecia-Kasuga</li> <li>• Strong product development capabilities (extra-length toilet paper rolls)</li> </ul>
Healthcare products	<ul style="list-style-type: none"> <li>• Society aging further</li> </ul>	<ul style="list-style-type: none"> <li>• Product differentiation through innovative material(CNF) extra-deodorizing functions on adult incontinence product</li> </ul>
Business-Use products	<ul style="list-style-type: none"> <li>• Visitors to Japan increasing</li> </ul>	<ul style="list-style-type: none"> <li>• Strong brand power of Kleenex</li> <li>• Extensive product lineup (ability to meet customers' request)</li> </ul>
Overseas	<ul style="list-style-type: none"> <li>• Demand increasing in Asian regions</li> </ul>	<ul style="list-style-type: none"> <li>• Utilize group sales network in Asia</li> </ul>

Products	Strategies
Household paper products	<ul style="list-style-type: none"> <li>• Provide the product with lower costs as well as increase the sales of high-quality and value added product by taking maximum advantage of Group resources. e.g.) strengthen competitiveness of Crecia-Kasuga, increase the sales of extra-length toilet paper rolls</li> </ul>
Healthcare products	<ul style="list-style-type: none"> <li>• Capture increasing demand by expanding CNF product lineup and increasing installation of processing machines, etc.</li> <li>• Utilize group procurement network to enhance cost competitiveness.</li> </ul>
Business-Use products	<ul style="list-style-type: none"> <li>• Increase sales to hotel and develop new market such as medical, etc., supported by strong brand power and high quality.</li> </ul>
Overseas	<ul style="list-style-type: none"> <li>• Target China, Thailand, and Vietnam, which promise demand growth</li> <li>• Increase sales by utilizing sales bases in Asia to offer Japan-level quality</li> </ul>

## 2. Business Environment and the Group's Strategies

### Livelihood-related business (chemical products) (1)

#### ● Operating income (Billions of yen)



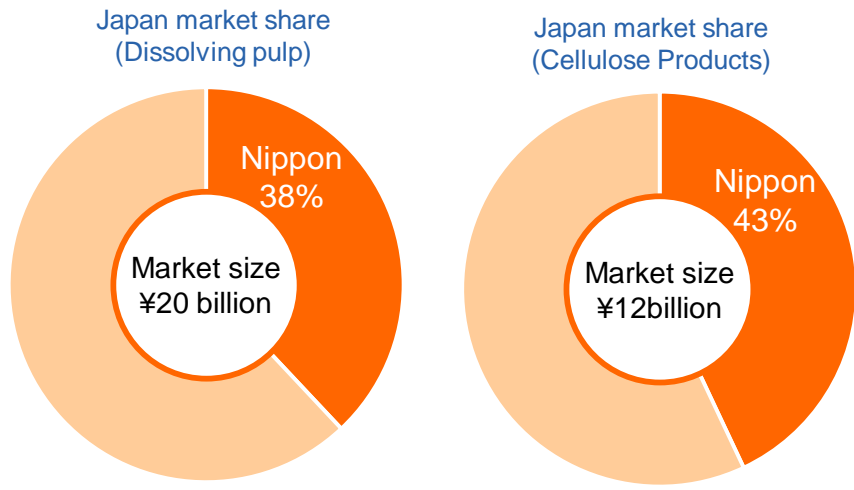
#### ● Business Environment and the Group's Strengths, Weaknesses

Products	Business Environment	Strengths, weaknesses
Dissolving pulp	• Firm demand for products for rayon	• High-quality dissolving pulp realized through SP method
Functional coating resin products	• Increasing introduction of resin to automotive components	• For automotive painting, 60% market share in Japan, 30% market share overseas
Lignin	• Japan market reaches saturation	• Japan's only general manufacturer of lignin
Cellulose derivatives	• Electric vehicle, hybrid vehicle market expanding worldwide mainly in China	• Technology and development capabilities fostered over many years
Functional films	• Market for organic EL displays for mobile phones growing • Practical applications for such new technologies as flexible displays, wearable technology being introduced	• Technological capabilities and development capabilities in small and medium-sized markets, such as PCs and mobile phones

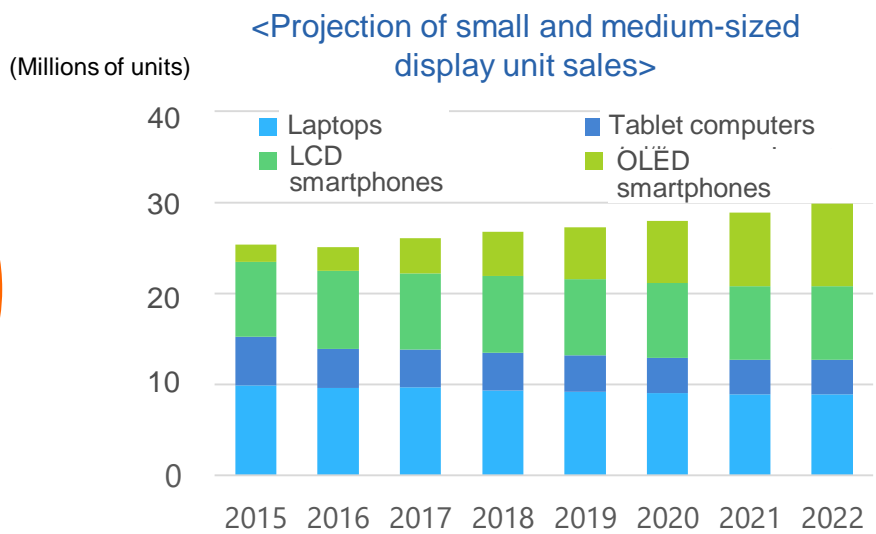
## 2. Business Environment and the Group's Strategies

### Livelihood-related business (chemical products) (2)

#### ● Business Environment and the Group's Strengths, Weaknesses



(Source: The Company's estimates)



(Source: Fuji Chimera Research Institute)

#### ● The Group's strategies

Products	Strategies
Dissolving pulp	<ul style="list-style-type: none"> <li>• Enhance quality, increase sales of high-value-added products</li> <li>• Optimize production system of Gotsu Mill that makes lignin, nucleic acids, etc.</li> </ul>
Functional coating resin products	<ul style="list-style-type: none"> <li>• Rapidly commercialize new products centered on water-based products, increase market share in overseas markets</li> <li>• Strengthen sales efforts targeting Chinese manufacturers centered on products for automotive painting, products for food packaging</li> <li>• Implement measures to increase production in line with demand growth</li> </ul>

## 2. Business Environment and the Group's Strategies

### Livelihood-related business (chemical products) (3)

#### ● The Group's strategies

Products	Strategies
Lignin	<ul style="list-style-type: none"><li>• Develop high-value-added water soluble polymers</li><li>• Increase market share in oversea market</li></ul>
Cellulose derivatives	<ul style="list-style-type: none"><li>• Increase sales of products for vehicle-mounted lithium batteries amid expanding electric vehicle market</li><li>• Implement measures to increase production in line with demand growth</li></ul>
Functional films	<ul style="list-style-type: none"><li>• Develop new products for organic ELD</li><li>• Develop products for flexible component, wearable component applications</li></ul>
Overseas	<ul style="list-style-type: none"><li>• Increase sales in overseas markets for functional coating resin products, lignin, cellulose derivatives, dissolving pulp, etc., with the automotive market and China as main targets</li></ul>



## 2. Business Environment and the Group's Strategies

### Energy business

#### ● Operating income (Billions of yen)

FY18/3 result

3.8

Target

10.0

Operating margin

Approx. 20%

#### ● Business Environment and the Group's Strengths, Weaknesses, Strategies

Products	Business Environment	Strengths, weaknesses
Renewable energy	<ul style="list-style-type: none"> <li>• FiT system for renewable energy purchases</li> <li>• Worldwide trend toward curbing of CO<sub>2</sub> emissions</li> </ul>	<ul style="list-style-type: none"> <li>• Expertise for operation of power generation facilities</li> <li>• Land, infrastructural facilities (plant located adjacent to port, etc.)</li> <li>• Ability to procure, and technology to utilize biomass resources</li> </ul>

#### Strategies

- Nippon Paper Ishinomaki Energy Center (operational since March 2018)  
Contribute to the Group through stable earnings, establish technology of high biomass contents (currently, co-firing ratio approx. 30%)
- Akita biomass co-firing power generation project (operational start-up target: FY22/3)  
Take on the challenge of increasing biomass co-firing ratio (co-firing ratio approx. 70%)
- Yufutsu biomass power generation project (operational start-up target: FY22/3)  
Take on the challenge of large-scale biomass mono-fuel combustion facility  
Convert Yufutsu site from paper business (utilize location adjacent port and personnel engaged at own power generation facilities)

## 2. Business Environment and the Group's Strategies

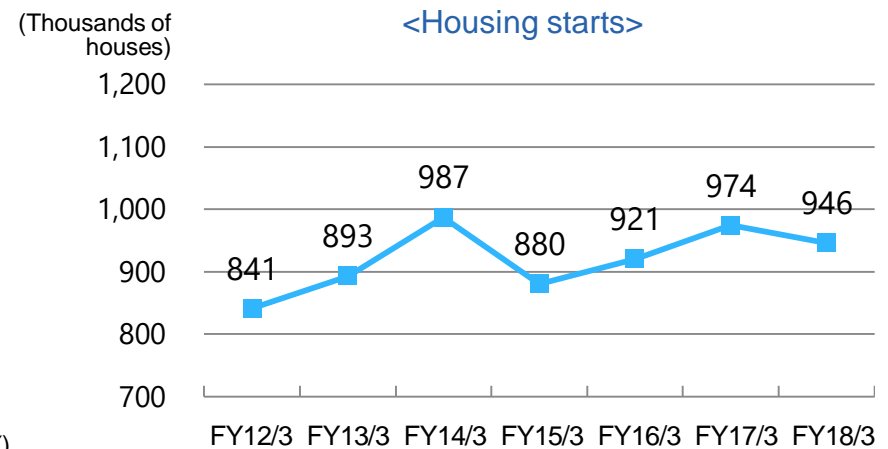
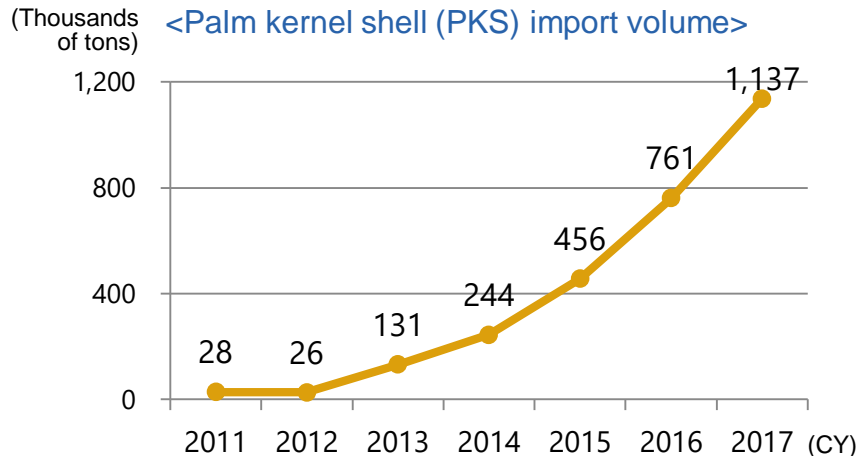
### Wood products and construction related business (1)

#### ● Operating income (Billions of yen)



#### ● Business Environment and the Group's Strengths, Weaknesses, Strategies

Products	Business Environment	Strengths, weaknesses
Logs, building materials	<ul style="list-style-type: none"> <li>Increasing self-sufficiency of domestic lumber based on plan for regeneration of forests and forestry industry</li> <li>Enactment of the Clean Wood Act</li> <li>Housing starts expected to decline after the Tokyo 2020 Olympic Games</li> </ul>	<ul style="list-style-type: none"> <li>90,000 ha of Group-owned forest</li> <li>Handling volume of products made from lumber from northern regions or tropical lumber</li> <li>Proven record of domestic lumber procurement capability</li> <li>Manufacture and sale of MDF domestic lumber</li> </ul>
Raw materials and fuel for paper manufacturing	<ul style="list-style-type: none"> <li>Demand for fuel for biomass boilers increasing based on FiT system</li> </ul>	<ul style="list-style-type: none"> <li>Japan's leading network for procurement of raw materials and fuel for paper manufacturing</li> </ul>



Sources: Trade Statistics, Ministry of Finance; Statistics on Building Construction Started, Ministry of Land, Infrastructure, Transport and Tourism

### Wood products and construction related business (2)

#### ● The Group's strategies

Products	Strategies
Logs, building materials	<p>Increase domestic lumber handling volume, advance differentiation from other companies further</p> <ul style="list-style-type: none"><li>• Make maximum use of certified lumber produced from Group-owned forests</li><li>• Focus efforts on increasing sales for non-housing fields, such as in packaging applications</li></ul>
Raw materials and fuel for paper manufacturing	<p>Supply biomass fuel inside and outside the Group in earnest, aim for supply volume in 2020 that is 1.2 times higher than that of 2017</p> <ul style="list-style-type: none"><li>• Leverage our procurement infrastructure for domestic lumber to establish procurement network for unused lumber</li><li>• Develop overseas suppliers for stable procurement of PKS</li></ul>

## 2. Business Environment and the Group's Strategies

### Search for innovative materials based on pulp

#### ● Business Environment and the Group's Strengths, Weaknesses, Strategies

Business Environment	Strengths, weaknesses
<ul style="list-style-type: none"> <li>• Heightening environmental awareness worldwide, including SDGs, etc.</li> <li>• Trend toward changeover from plastic to paper for packaging and containers due to garbage problems, etc.</li> <li>• Environmental problems due to microplastics</li> <li>• Heightening interest in wood as biomass material</li> </ul>	<ul style="list-style-type: none"> <li>• Possible to manufacture a variety of pulps</li> <li>• Pulp can be used for diverse applications</li> </ul>

Products	Strategies
MinerPa	<ul style="list-style-type: none"> <li>• Install demonstration facilities at Fuji Mill (Yoshinaga), plan to start operations in autumn 2018</li> <li>• Search for applications that take advantage of such functions as antibacterial and deodorizing properties and flame retardancy, aim for early realization of practical applications</li> </ul>
SHIELDPLUS Premier	<ul style="list-style-type: none"> <li>• Consider installation of mass production equipment (use strategic capital investment budget)</li> </ul>
Cellulose nanofiber (CNF)	<ul style="list-style-type: none"> <li>• Develop and realize practical applications suited to each of the three types of CNF</li> <li>• TEMPO oxidized CNF (Ishinomaki): Strengthen sales as functional additive for rubber and paint applications</li> <li>• CM-CNF (Gotsu): Strengthen sales of applications for cosmetics, food</li> <li>• CNF-reinforced plastic (Fuji): Develop hydrophobization technology, mixing technology</li> </ul>
Biorefinery	<ul style="list-style-type: none"> <li>• Develop technologies that convert wood into a variety of products (fuel, chemical products, etc.)</li> <li>• Search for new usage possibilities for lignin</li> </ul>

- MinerPa: Material to which such functions as antibacterial and deodorizing properties and flame retardancy are added by bonding mineral materials to the surface of pulp
- SHIELDPLUS Premier: Environment-friendly barrier material made from paper, has oxygen and water vapor barrier properties equivalent to such barrier films as aluminum vapor deposition film

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### 3. The Sixth Medium-Term Business Plan

## Priority tasks and business objectives

<b>Themes</b>	<ul style="list-style-type: none"> <li>• Reorganize production structure of paper business and make maximum utilization of in-house facilities</li> <li>• Expand business in growth areas and early commercialization of new businesses</li> </ul>	
<b>Priority tasks</b>	<ul style="list-style-type: none"> <li>• Complete reorganization of production structure</li> <li>• Grow continuously in growth areas</li> <li>• Achieve EBITDA of ¥100 billion early</li> </ul>	
<b>Business objectives</b>	<b>FY18/3</b>	<b>FY21/3</b>
<b>Net sales</b>	¥1,046.5 billion	¥1,115.0 billion
<b>Overseas sales ratio</b>	18 %	19 %
<b>Operating income</b>	¥17.6 billion	¥47.0 billion
<b>EBITDA*</b>	¥78.1 billion	¥110.0 billion
<b>Debt-equity ratio</b>	1.61 times	1.5 times or less
<b>ROA</b>	1.8 %	3.8%
<b>ROE</b>	1.8 %	At least 5%

\* EBITDA = Operating income + interest income + dividend income + depreciation

### 3. The Sixth Medium-Term Business Plan

## Net sales and operating income by segment

(Billions of yen)

		Net sales				Operating income			
		FY18/3	FY19/3	FY21/3	Change (FY21/3–FY18/3)	FY18/3	FY19/3	FY21/3	Change (FY21/3–FY18/3)
Paper and paperboard business		741.4	740.0	730.0	-11.4	-5.5	-2.3	14.0	19.5
Growth	Livelihood-related business (packaging, healthcare products, chemical products)	192.8	210.0	235.0	42.2	11.9	13.7	18.0	6.1
	Energy business	17.8	35.0	36.0	18.2	3.9	7.3	7.5	3.6
Wood products and construction related business		62.8	63.0	77.0	14.2	4.5	3.7	4.5	0.0
Other businesses		31.7	32.0	37.0	5.3	2.8	2.6	3.0	0.2
Total from livelihood-related business to other businesses		305.1	340.0	385.0	79.9	23.1	27.3	33.0	9.9
Grand total		<b>1,046.5</b>	<b>1,080.0</b>	<b>1,115.0</b>	<b>68.5</b>	<b>17.6</b>	<b>25.0</b>	<b>47.0</b>	<b>29.4</b>

### 3. The Sixth Medium-Term Business Plan

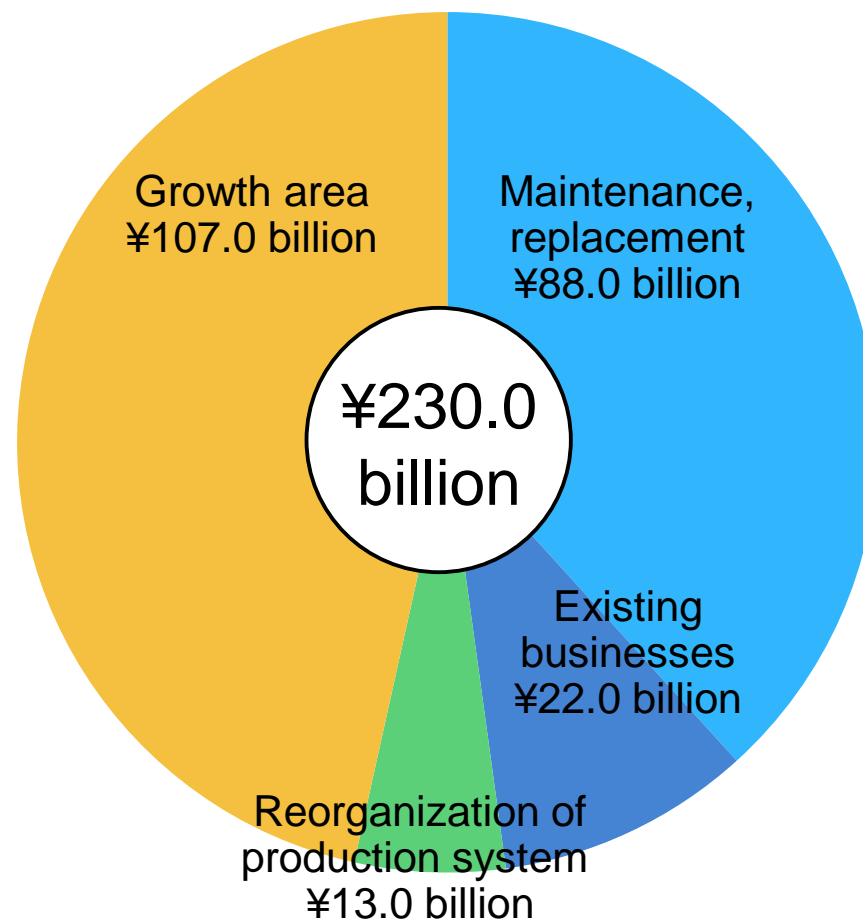
## Major assumptions

Domestic Sales	Volume	Newsprint : -5%/year      Printing paper : -4%/year Business communication and industrial paper : Flat Paperboard : +1%/year
	Sales price	Newsprint, printing paper : Remain at current level. Will consider price increase depending on trend of raw material and fuel prices Kraft paper, white paperboard : Include price increase initiatives Containerboard : Remain at current level
Raw Materials & Fuel prices	Wastepaper	ONP, OCC : Almost same as average price in FY2018/3 OMG : Remain at current level
	Crude oil	\$70/BL(Dubai)
	Coal	\$95/t (Australian coal benchmark price)
Other	FOREX	US\$ ¥110/\$



### 3. The Sixth Medium-Term Business Plan

## Capital investment (including M&A, etc.)



•¥107.0 billion for growth area includes ¥25.0 billion budget for strategic investment

### 3. The Sixth Medium-Term Business Plan

#### Reorganization of production structure

Given that challenging changes in demand structure are expected to continue, we will reduce production bases and reorganize to achieve a production structure that can realize solid profitability.

#### ● Paper machines and coaters that will cease production from FY19/3

Plants, mills	Equipment	Production capacity (Thousand t/year)	Products	Expected Timing
Kushiro Mill	No.8 paper machine	143	Newsprint	July 2019
Hokkaido Mill (Yufutsu)	No.2 paper machine	24	Base paper for paper packages	January 2020
	No.4 paper machine	25	Commercial miscellaneous use paper, adhesive base paper	
	No.5 paper machine	88	Woodfree paper, copy base paper, base paper for thermal paper	
	No.6 paper machine	116	Newsprint, telephone directory paper, mechanical paper	
Akita Mill	No.1 coater	147	Coated woodfree paper, light weight coated paper	May 2018
Ishinomaki Mill	No.2 coater	86	Coated woodfree paper	
Fuji Mill (Fuji)	No. 2 paper machine	17	Woodfree colored paper, kraft paper	September 2019
	No.11 paper machine	49	Mechanical paper, light weight coated paper	June 2019
	No.12 paper machine	69	Telephone directory paper, recycled PPC	March 2019
Total		764	(including newsprint 259,000 tons/year)	

\* Shutdowns of Akita Mill's No.1 coater and Ishinomaki Mill's No.2 coater were announced in August 2017.

### 3. The Sixth Medium-Term Business Plan

## Reorganization of production structure

- Reestablish and strengthen cash generation capabilities of paper business, which have a major impact on our total cash
- Reduce fixed costs by consolidation of production bases, make maximum use of in-house facilities
- Utilize infrastructure and locations for changeover to growth areas

#### ● Next Step

Kushiro Mill	Newsprint	<ul style="list-style-type: none"><li>• Shift to other paper making machine at Kushiro Mill, Iwanuma Mill and Yatsushiro Mill.</li><li>• Cost reductions by increasing efficiency of each mill</li></ul>
	Kraft paper	<ul style="list-style-type: none"><li>• Transfer part of heavy duty sack kraft, unbleached kraft paper, and semi-bleached wrapping paper from No. 6 paper machine to Asahikawa of Hokkaido Mill and Shimada Mill of Shin Tokai Paper</li></ul>
Hokkaido Mill (Yufutsu)	New businesses	<ul style="list-style-type: none"><li>• Biomass power generation business currently under consideration</li><li>• Will consider potential for new businesses utilizing infrastructure, location</li><li>• Chemical business (cellulose powder) will continue</li></ul>
Akita Mill	Paper	<ul style="list-style-type: none"><li>• Reduce fixed costs by shutting down coater</li><li>• Convert paper machine to business communication paper</li></ul>
Ishinomaki Mill	Paper	<ul style="list-style-type: none"><li>• Reduce fixed costs by shutting down coater</li><li>• Convert paper machine to base paper for paper containers</li></ul>
Fuji Mill (Fuji)	New businesses	<ul style="list-style-type: none"><li>• Household paper products production facility of Crecia-Kasuga to start up operations in May 2018</li><li>• Will take advantage of location near metropolitan area to promote business convert to as household paper production base</li></ul>

### 3. The Sixth Medium-Term Business Plan

## Reorganization of production structure

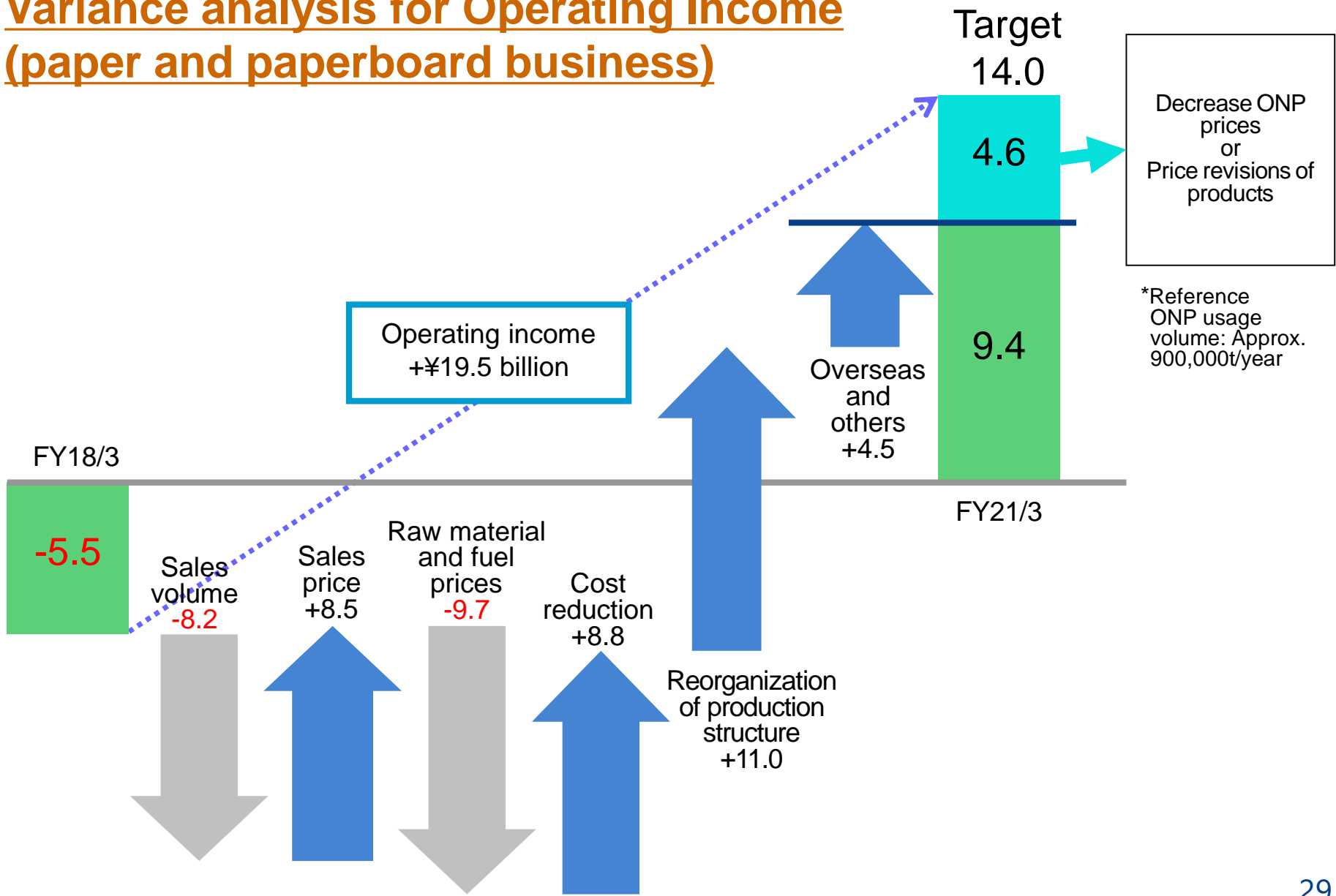
#### ● Other measures to strengthen paper business

Improvement of product mix	<ul style="list-style-type: none"><li>• Decrease in exports Reduce non-strategic export products that have relatively low profit margins compared with domestic products</li></ul>
Maximize use of in-house facilities	<ul style="list-style-type: none"><li>• Improve operation rate Paper machines will be at full production after reorganization Surplus of kraft pulp due to changes in mix of product types will be supplied within the Group for household paper products, etc.</li><li>• Move forward with use of pulp for multiple applications Amid declining paper demand, consider and advance use of pulp for other applications.</li></ul>
Stabilization of operations	<ul style="list-style-type: none"><li>• Rebuild maintenance system Integrate Nippon Paper Unitec's maintenance division in Nippon Paper Industries to integrate mills' on-site operations and plant engineering section</li><li>• Strengthen predictive maintenance by utilizing AI/IoT</li></ul>
Reduction of logistics costs	<ul style="list-style-type: none"><li>• Reduce inventories Reduce warehouse charges by optimizing inventories in line with reorganization of production structure Reduce logistics costs by using in-house facilities</li><li>• Consider modal shift</li></ul>
Other	<ul style="list-style-type: none"><li>• Further reduction of procurement costs Strengthen procurement of low price materials (chips, coal, etc.)</li></ul>

### 3. The Sixth Medium-Term Business Plan

## Variance analysis for Operating Income (paper and paperboard business)

(Billions of yen)



1 Review of Fifth Medium-Term Business Plan

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2 Business Environment and the Group's Strategies

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3 The Sixth Medium-Term Business Plan

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**4** **SDGs**

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## Realization of Group Mission = Contribution to SDGs

### ○ Mission

The Nippon Paper Group aims to contribute to better living and cultural progress everywhere it does business.



- Since our primary raw materials are based on biomass (lumber and pulp), our businesses have a strong affinity with the SDGs.
- We aim to develop products and materials that contribute to SDGs, as it could be seen as a business opportunity .
- We are currently preparing to transition to an integrated report during the term of the Sixth Medium-Term Business Plan.

# Reference Material

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NIPPON PAPER INDUSTRIES CO.,LTD.



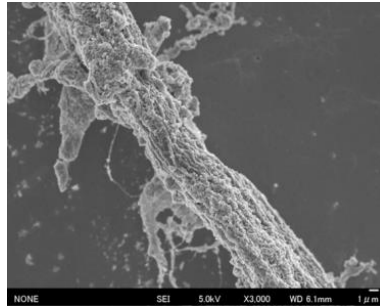
# Developing products that help address social issues

(Related SDGs)

• SHIELDPLUS®



• MinerPa®



• CELLENPIA®



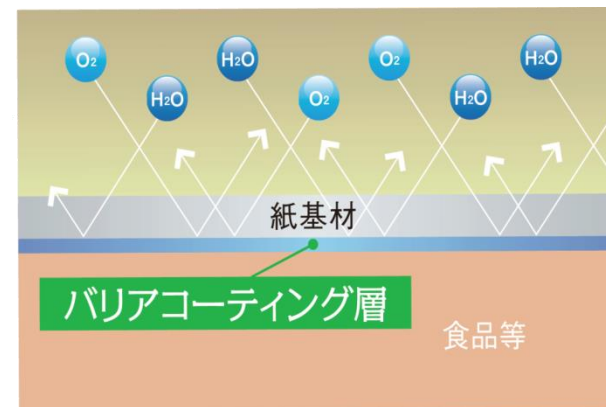
## This paper-based material with high-level barrier properties shields oxygen and flavors.



This paper-based material is developed with the application of our coated paper making expertise and can be attached with excellent barrier properties.

### ◆ Points

1. Oxygen and vapor barrier properties
2. Flavor barrier properties
3. Friendly to environment



### ◆ Various packaging applications

(Tube) (Bag) Little odor leakage



For chocolate, tea, coffee, incense, and aromatic



For shopping bag, gift bag, and toiletry

(Flexible packaging)

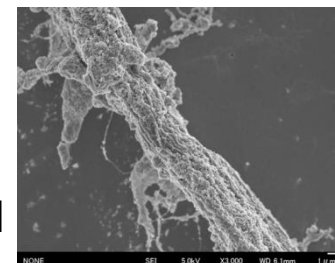


New functional materials created by densely bonding inorganic mineral particles onto surface of cellulose fibers.



## ◆ Characteristics

- Able to provide functionality and characteristics that minerals contain.
- Possible to increase content ratio of inorganic mineral particles up to 90%.
- Possible to process into different shape, such as wet pulp, sheet, board and powder.



Electron micrographs of mineral-particles composite fiber

## ◆ Possible functions and applications

### 1. Flame retardant (magnesium carbonate)

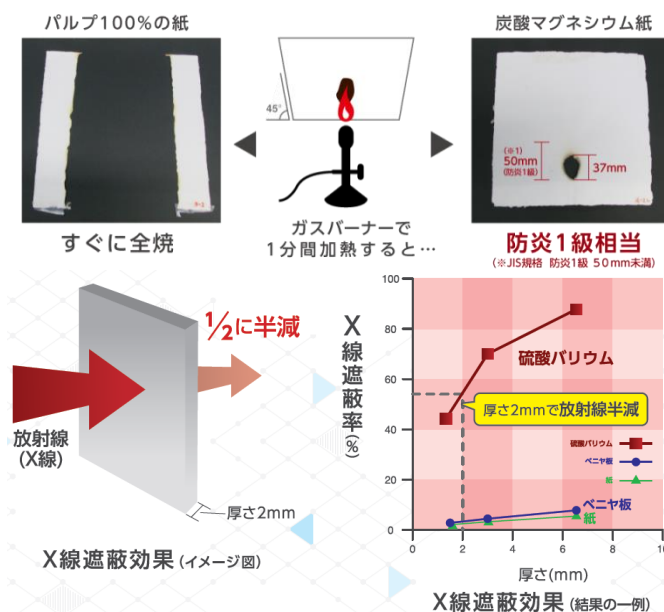
- No asbestos and no glass fiber. Good for human body.

### 2. Deodorizing and antibacterial properties (zinc compound)

- Over 95% sweat and other odors can be cut.

### 3. Radiation shielding effects (barium sulfate)

- No lead. 2mm shut the half of radiation.



## CNF production facilities



The CNF mass production facility at the Gotsu Mill

Gotsu mill (Mass production facility)

- CM-CNF
- 30~100t/yr
- Started in Sep 2017



The CNF mass production facility at the Ishinomaki Mill

Ishinomaki mill (Mass production facility)

- TEMPO oxidised CNF
- 500t/yr
- Started in Apr 2017

Iwakuni mill (demonstration plant)

- demonstration plant
- 30t/yr
- started in 2013

Fuji mill (demonstration plant)

- CNF-Reinforced Resin
- 10t/yr
- Started in Jun 2017



Hydrophobization facilities for raw pulp at the Fuji mill

## <Disclaimer>

Any statements in this presentation document, other than those of historical fact, are forward-looking statements about the future performance of Nippon Paper Industries Co., Ltd., and its Group companies. These statements are based on management's assumptions and beliefs in light of information currently available and involve risks and uncertainties. Actual results may differ materially from these forecasts.

**NIPPON PAPER INDUSTRIES CO.,LTD.**