

FYE March 2019 Financial Briefing

NAGASE & CO., LTD
May 24, 2019

Summary

■FYE March 2019 Results

- Net sales, profit measures continue to grow from prior period, marking record highs
- Manufacturing and processing businesses report gains, serving as major driver of NAGASE growth (withdrawal from unprofitable businesses also contributed)
- Steady profit contributions from measures executed under our **ACE-2020** mid-term management plan

■FYE March 2020 Outlook

- We are watching the market environment carefully due to the lack of clarity in the external environment, including U.S.-China trade frictions and problems in the Middle East
- Increased sales focused on core businesses, with the forecast anticipating record high sales and profits

■Progress of Mid-Term Management Plan **ACE-2020**

- Accelerating investments in focus areas
- Steadily executing measures in growth areas looking toward medium- and long-term expansion
- Rolling update of **ACE-2020** mid-term management plan
- Establishing overseas regional companies aiming for stronger governance and medium- and long-term growth
- Dividend expected to increase for the 10th consecutive period

Contents

FYE March 2019 Results	P.4
FYE March 2020 Earnings Projections	P.15
Progress of Mid-Term Management Plan ACE-2020	P.20
NAGASE Group Initiatives for Advanced Technologies	P.31
(Reference) Information by Segment	P.44

FYE March 2019 Results

Consolidated Statements of Income



✓ NAGASE recorded record highs for sales and profits

- Net sales: Higher sales overall, due to strong performance in Advanced Materials & Processing, and Automotive & Energy segments
- Operating income: Higher profits, mainly due to higher revenues and improved profitability at manufacturing subsidiaries
- Profit attributable to owners of the parent: Higher, due to an increase in profit categories and higher gains on sale of investment securities

(100 millions of yen)

	18/03	19/03	Change	Vs. PY	Orig. Forecast	Achievement
Net sales	7,839	8,077	+ 238	103%	8,280	98%
Gross profit	1,026	1,054	+ 27	103%	1,073	98%
<GP ratio>	13.1%	13.1%	△ 0.0%	—	13.0%	—
SG&A expenses	785	802	+ 16	102%	818	—
Operating income	241	252	+ 11	105%	255	99%
Ordinary income	259	266	+ 6	103%	275	97%
Profit attributable to owners of the parent	171	201	+ 29	117%	186	108%
US\$ Exchange rate (period average)	@ 110.85	@ 110.92	@ 0.07	weak yen	@105	—
RMB Exchange rate (period average)	@ 16.7	@ 16.5	@ 0.2	strong yen	@ 16.5	—

[Foreign exchange rate impact on 19/03 net sales and operating income results]
 Net sales: △ ¥1.6 billion (approx.); Operating income: △ ¥40million

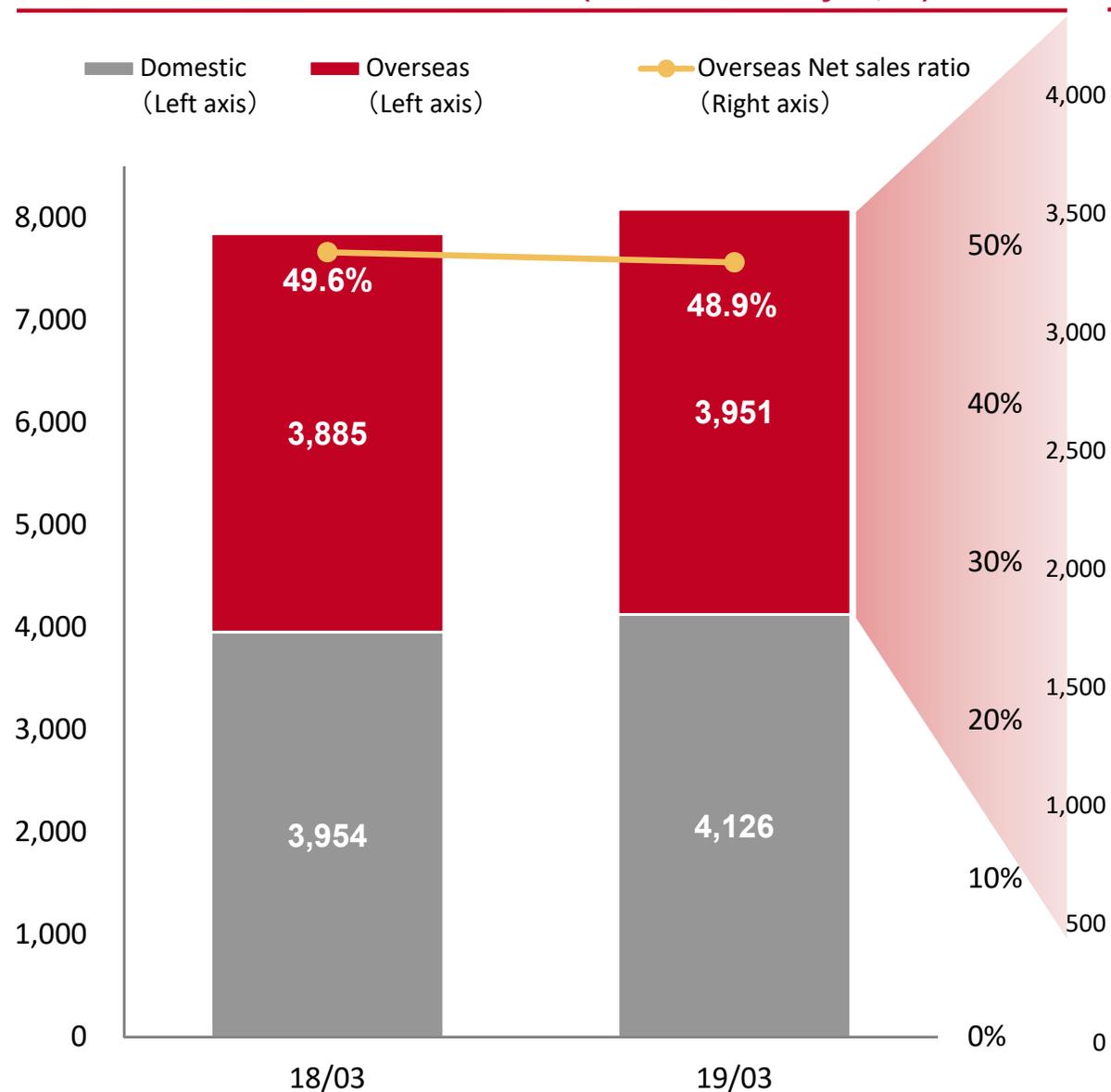
[Per-yen exchange rate impact on net sales and operating income]

	Impact of US\$ /yen	Impact of RMB/yen
Net sales	¥0.69 billion (approx.)	¥7.6 billion (approx.)
Operating income	¥20 million (approx.)	¥220 million (approx.)

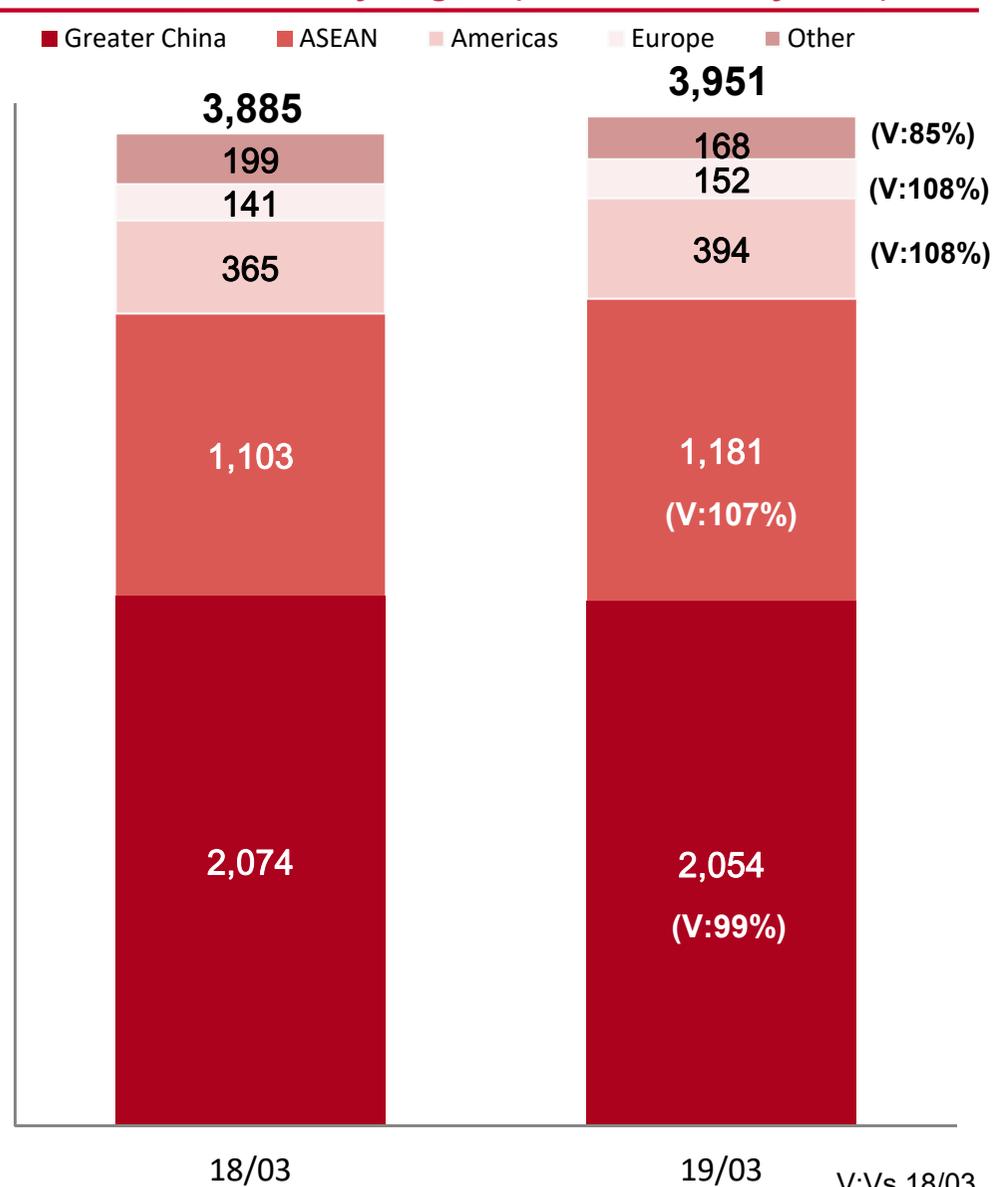
Net Sales by Region (Domestic, Overseas)

■ In addition to domestic businesses, performance was strong overseas, particularly in ASEAN and the Americas (overseas ratio of total sales at 48.9%)

Domestic & Overseas Sales (100 millions of yen, %)



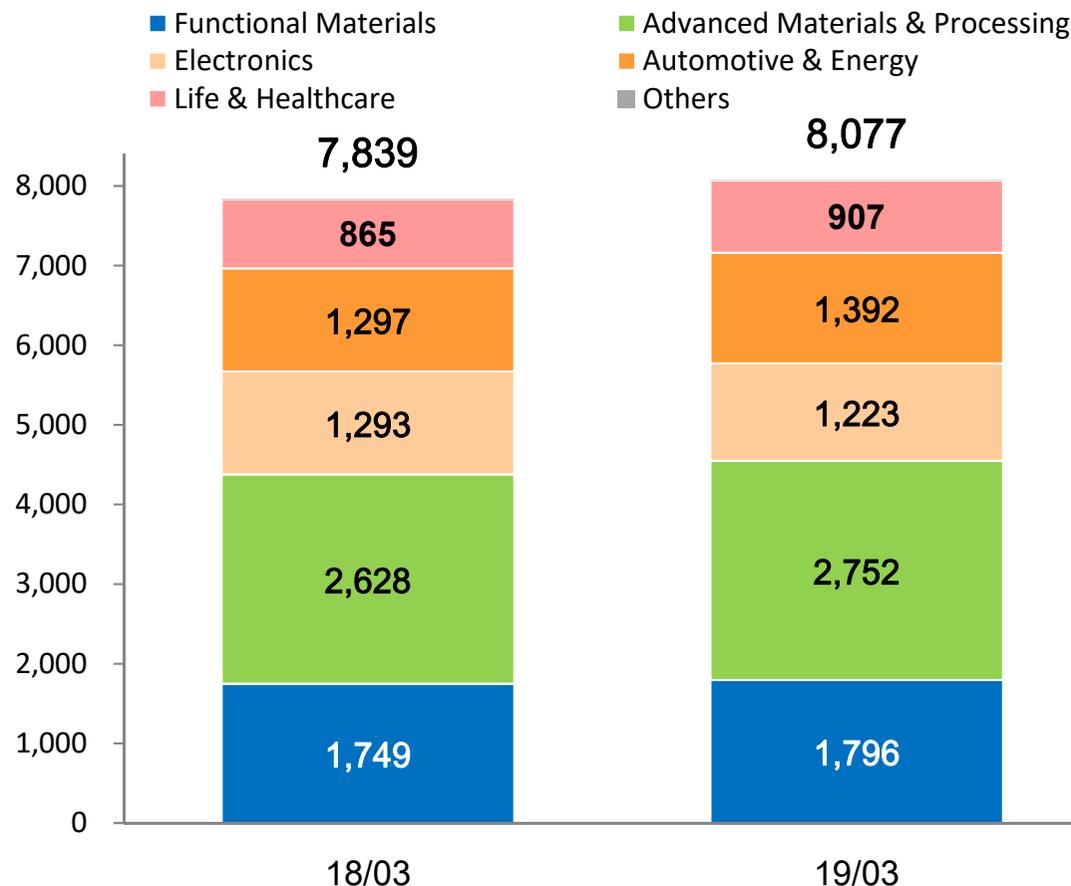
Overseas Sales by Region (100 millions of yen, %)



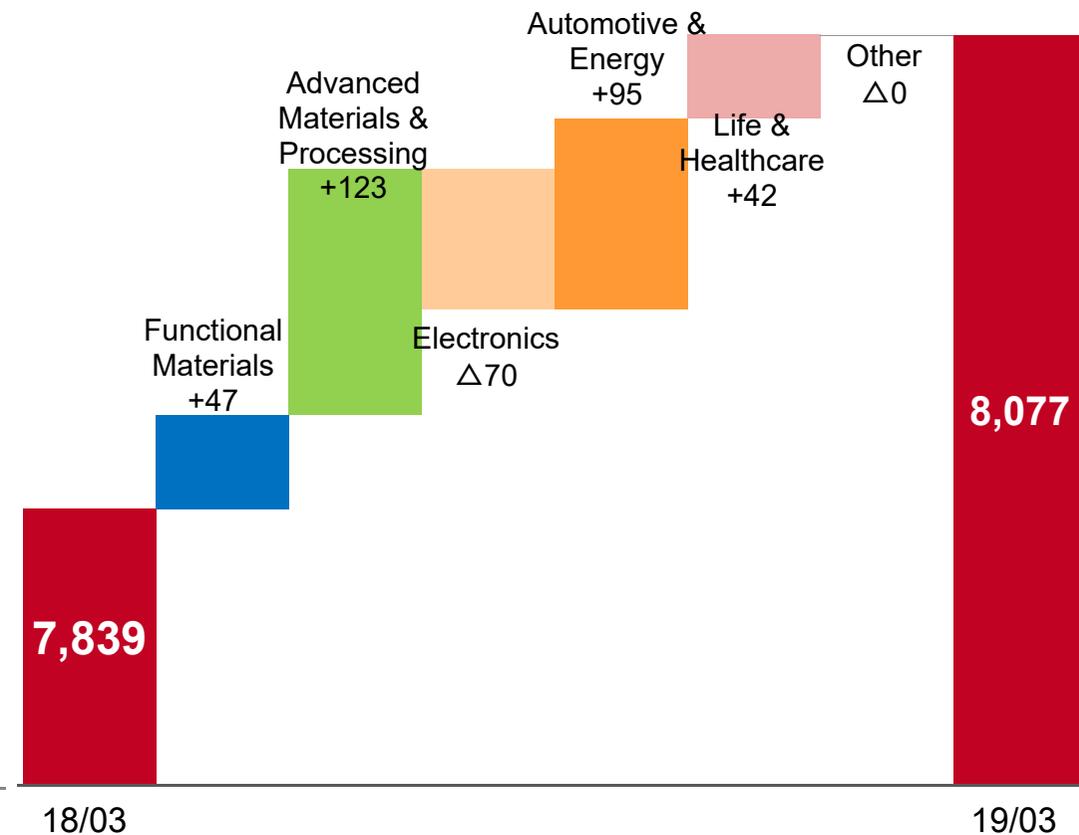
Net Sales: Two-Year Comparison (by Segment)

- **Advanced Materials & Processing** : Higher sales in Japan and overseas, mainly due to increased sales of plastics and digital print processing materials
- **Electronics**: Lower sales, mainly due to sales declines in display-related products and photolithography material, despite growth in the formulated epoxy resins segment
- **Automotive & Energy**: Higher sales due to demand driven by automation and electrification of automobiles, increased sales of engineering plastics and car electronics-related products, and even stronger sales of battery materials.

Net Sales by Segment (100 millions of yen)



Change in Net Sales by Segment (100 millions of yen)



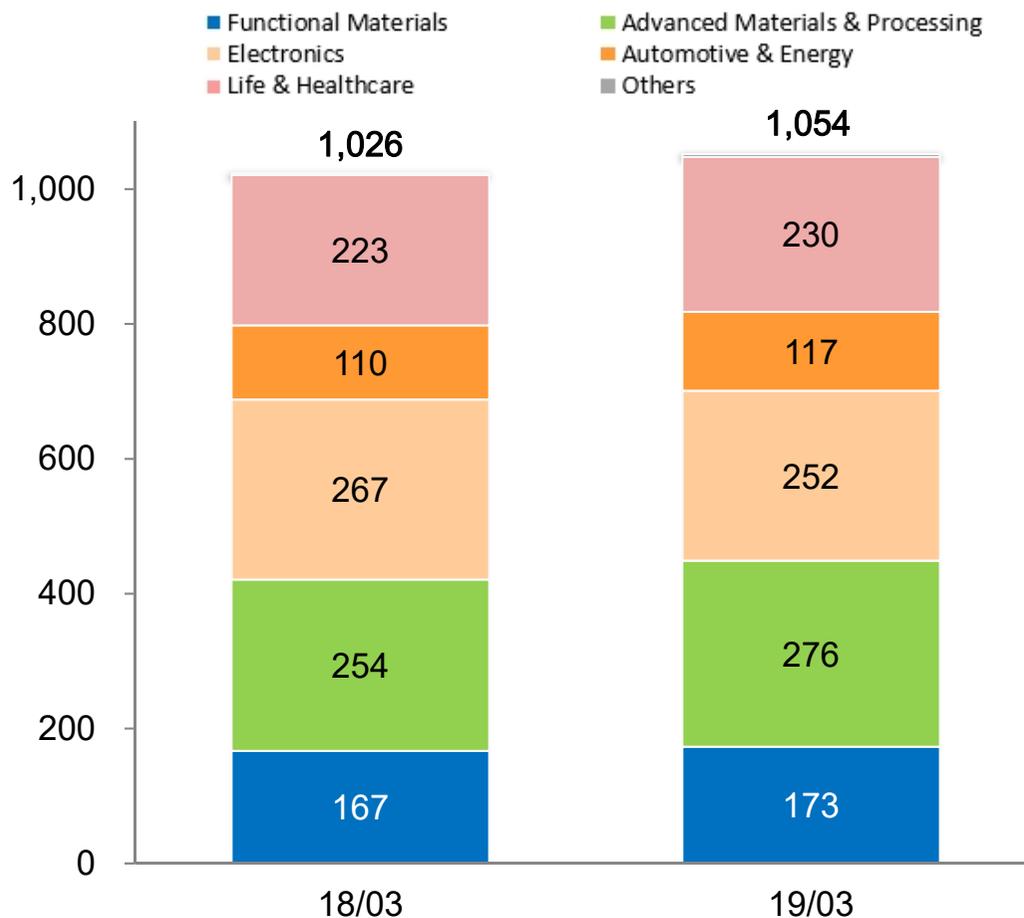
*1 The Company reclassified reportable segments in the current fiscal year (certain businesses in the Functional Materials segment reclassified to the Life & Healthcare segment). Results for fiscal 2018 have been reclassified for comparison.

*2 As of April 1, 2019, the Automotive & Energy Segment has been renamed the Mobility & Energy Segment

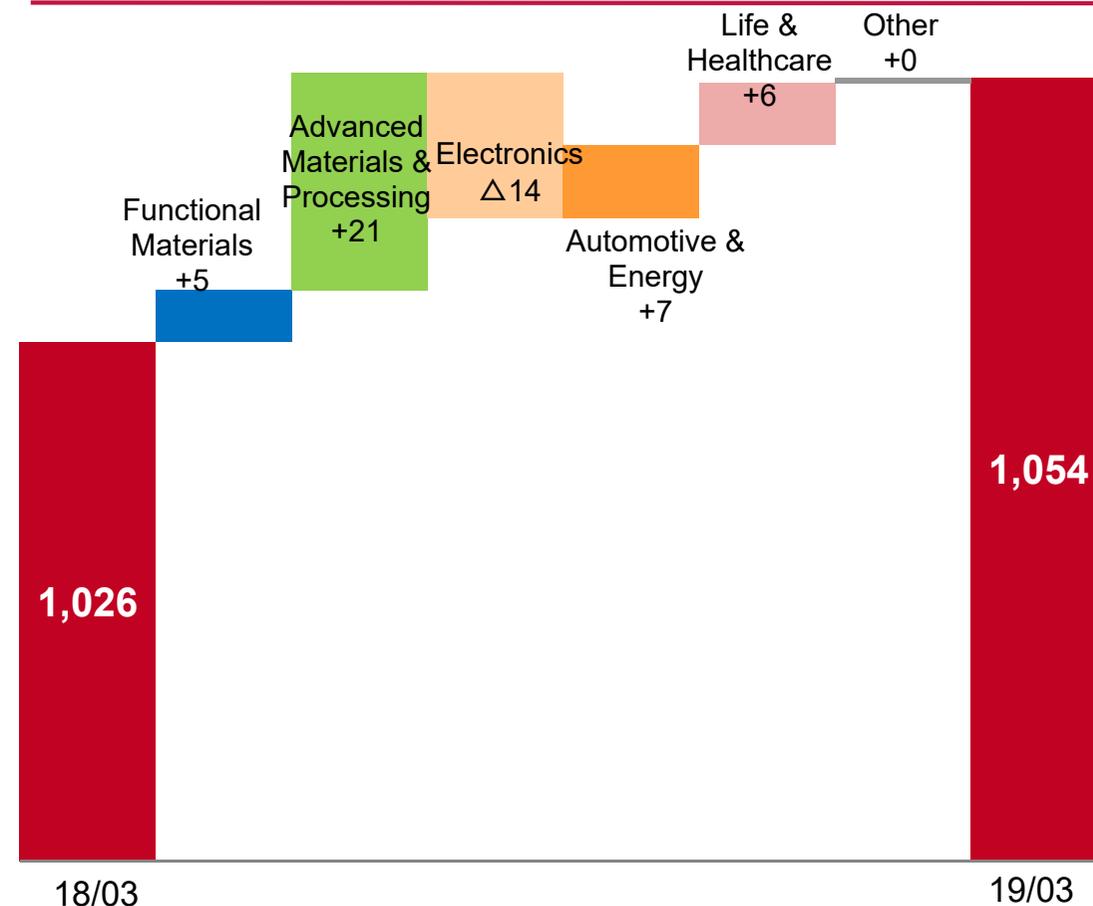
Gross Profit: Two-Year Comparison by Segment

■ Higher profit, mainly due to the impact of increased revenues

Gross Profit by Segment (100 millions of yen)



Change in Gross Profit by Segment (100 millions of yen)



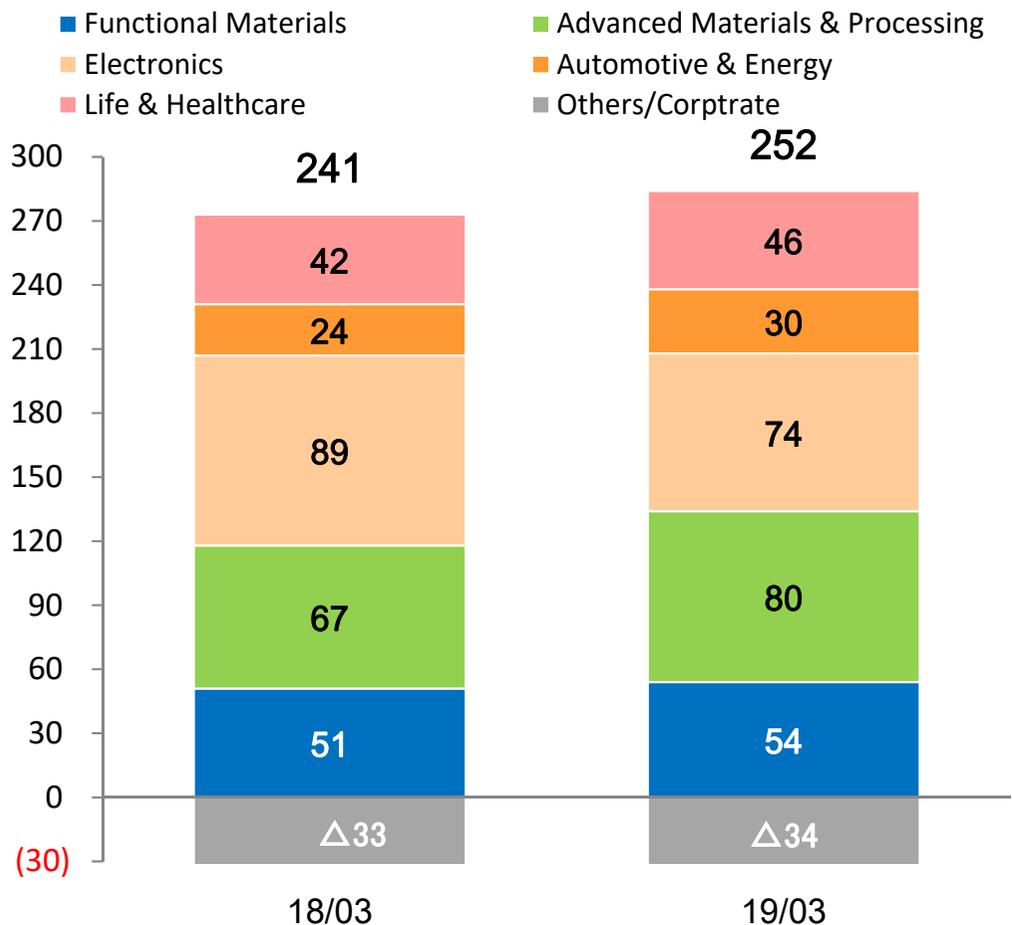
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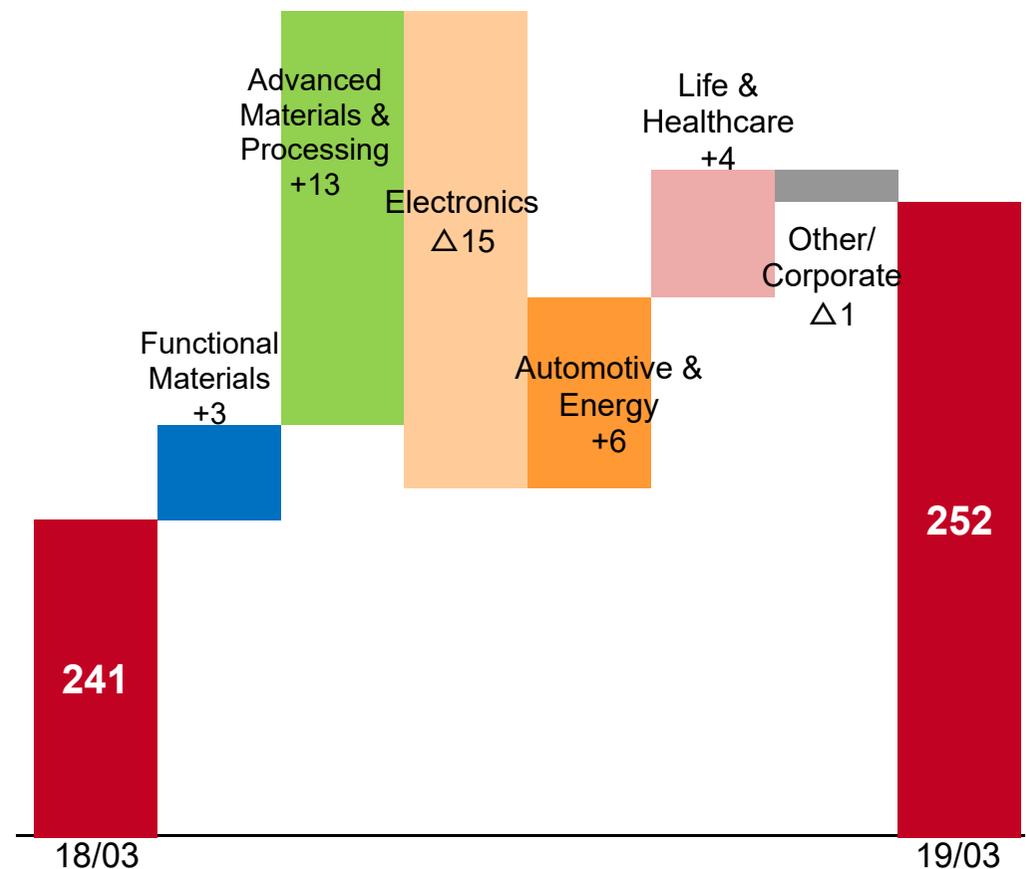
Operating Income: Two-Year Comparison (by Segment)

- Higher profits in all segments except Electronics
- Advanced Materials & Processing: Higher profits, mainly due to improved profitability among manufacturing subsidiaries in Japan and overseas
- Electronics: Lower profits due to lower revenue and a major decline in spot business (sales of electronics component production equipment for smartphones) that had seen a dramatic increase in the prior year

Operating income by Segment (100 millions of yen)



Change in Operating Income by Segment (100 millions of yen)



*1 The Company reclassified reportable segments during the current fiscal year (certain businesses in the Functional Materials segment reclassified to the Life & Healthcare segment). Results for fiscal 2018 have been reclassified for comparison.

*2 As of April 1, 2019, the Automotive & Energy segment has been renamed the Mobility & Energy segment

Earnings at Major Consolidated Subsidiaries

- Nagase Plastics Co., Ltd. recorded higher sales and profits driven by favorable performance of new trade rights acquired in the prior year
- Nagase (Thailand) Co., Ltd. recorded higher sales and profits driven by strong performance in sales of automotive engineering plastics

(100 millions of yen)

	Company Name	Net sales	Vs. PY	Operating Income (Note 2)	Vs. PY
Manufacturing Companies	Hayashibara Co., Ltd.	254	104%	51	102%
	Nagase ChemteX Corporation	260	100%	28	95%
	Total for manufacturing (Note 1)	1,087	101%	116	102%
Domestic Sales Companies	Nagase Plastics Co., Ltd.	370	103%	9	103%
	Nishinihon Nagase Co., Ltd.	92	114%	5	128%
	Nagase Chemical Co., Ltd.	188	102%	3	105%
	Total for domestic sales (Note 1)	946	104%	28	113%
Overseas Sales Companies	Nagase (Thailand) Co., Ltd.	401	106%	13	111%
	Shanghai Hua Chang Trading Co., Ltd.	360	94%	9	107%
	Shanghai Nagase Trading Co., Ltd.	447	109%	9	118%
	Total for overseas sales (Note 1)	3,835	105%	90	102%

Note 1: Totals for each category are the simple sums of each company in the category. These sums do not equal consolidated figures.

Note 2: Operating income does not reflect amortization of goodwill and depreciation of technology-based assets.

State of Two Major Manufacturing Subsidiaries



- **Hayashibara:** Higher sales and profits as the company recorded increased sales of TREHA™ and AA2G™, while bolstered by increased sales due to new adoptions of Hayashibara Hesperidin S and Fibryxa™. (Net sales marked record highs since becoming part of the NAGASE Group)
- **Nagase ChemteX:** Lower profits despite favorable performance in the Epoxy Resin Business, the Performance Chemicals Business, and the Bio Chemicals Business. The impact of lower customer operating rates resulted in lower sales in the Photolithography Materials Business with flat sales volume with higher R&D costs for new development.

Hayashibara Co., Ltd.

(100 millions of yen)

	18/03	19/03	Change	Vs. PY
Net sales	243	254	+10	104%
Operating income	50	51	+1	102%

- High sales of TREHA™, due to favorable sales to the staple foods (bread, etc.) industry
- Sales of AA2G™ were higher because of capture of domestic inbound demand, and cultivation of new overseas customers
- New applications in the food industry led to higher sales of Hayashibara Hesperidin S and Fibryxa™
- Higher sales of pullulan for use in hard capsules for medical and health food products, and in mouth-refreshing film
- Operating income was slightly higher due to rising raw materials costs and increased general and administrative expenses incurred to bolster the company's sale structure for future growth

Nagase ChemteX Corporation

(100 millions of yen)

	18/03	19/03	Change	Vs. PY
Net sales	259	260	+1	100%
Operating income	29	28	△1	95%

- The Epoxy Resin Business recorded higher sales, mainly due to strong performance in smart phone-related products in the first half of the year, and strong performance in the heavy electrical/light electrical industries and semiconductor applications throughout the year
- The Photolithography Materials Business recorded lower sales and profits, mainly due to the impact of lower customer capacity utilization (we expect to launch a new business during the second half of FY2019)
- The Performance Chemicals Business recorded higher sales, driven by solid sales of conductive materials to the LCD industry, and epichlorohydrin derivatives for use in 3D printers and tires
- The Bio Chemicals Business recorded higher sales, driven by solid sales of actinomycete-derived enzymes and other products for the health food and food industries
- The Photolithography Materials Business saw a large drop in sales, with sales volumes level with the previous year. Increased R&D costs targeting new development have led to lower operating income.

Consolidated Balance Sheets

■ Shareholders' Equity Ratio down 0.9 points to 54.2%

Assets

	18/03	19/03	Change
Total current assets	3,533	3,658	+ 125
Cash and time deposits	433	440	+ 7
Notes and accounts receivable	2,259	2,304	+ 44
Inventories	736	810	+ 73
Other	103	102	+ 0
Total non-current assets	2,161	2,015	△ 146
Property, plant and equipment	672	664	△ 7
Intangible fixed assets	410	372	△ 38
Investments, other assets	1,078	977	△ 100
Investments in securities	1,004	902	△ 101
Other	74	75	+ 0
Total assets	5,694	5,673	△ 21

Liabilities and Net Assets

(100 millions of yen)

	18/03	19/03	Change
Total current liabilities	1,929	2,018	+ 88
Notes and accounts payable	1,180	1,172	△ 7
Short-term loans and current portion of CP	480	579	+ 99
Other	269	266	△ 2
Total long-term liabilities	676	528	△ 147
Long-term loans and Bonds	379	275	△ 103
Net defined benefit liability	145	124	△ 20
Other (Deferred tax liabilities, etc.)	152	128	△ 23
Total liabilities	2,606	2,547	△ 59
Total net assets	3,088	3,126	+ 38
Shareholders' equity	2,502	2,628	+ 126
Accumulated other comprehensive income	533	447	△ 85
Net unrealized holding gain on securities	507	418	△ 89
Translation adjustment	29	32	+ 3
Other	△ 3	△ 2	+ 0
Non-controlling interests	51	49	△ 2
Total liabilities and net assets	5,694	5,673	△ 21

Consolidated Cash Flows



Cash Flows

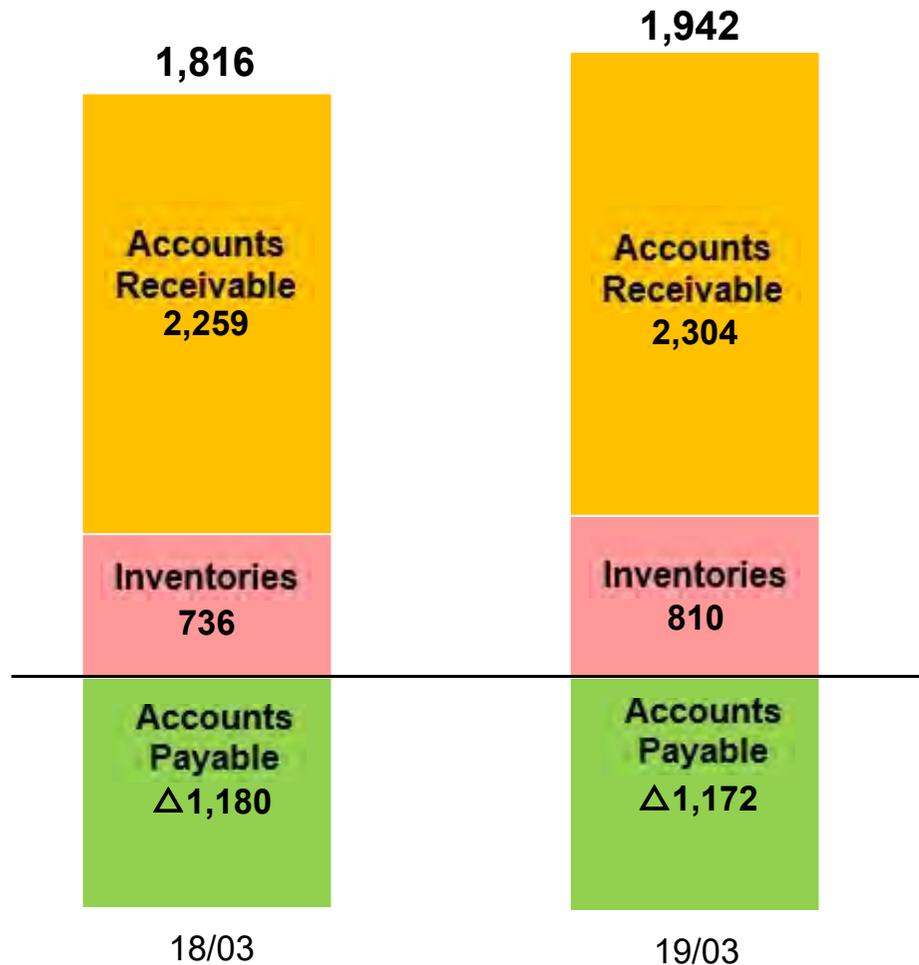
(100 millions of yen)

	19/03		18/03
Net cash provided by (used in) operating activities	173	Profit before income taxes +282 Depreciation and amortization other than amortization of goodwill, amortization of goodwill +111 Working capital ▲125 Income tax paid ▲48	210
Net cash provided by (used in) investing activities	▲ 73	Proceeds from sales of investments in securities +54 Purchases of tangible and intangible fixed assets ▲107 Purchases of investment in securities ▲25	▲ 144
Net cash provided by (used in) financing activities	▲ 89	Net increase (decrease) in commercial papers +70 Repayments of long-term loans ▲111 Cash dividends paid ▲51	▲ 31
Effects of exchange rate changes on cash and cash equivalents	1		▲ 1
Net increase (decrease) in cash and cash equivalents	12		32
Cash and cash equivalents at beginning of the year	428	Japan 226 , Greater China 105 , , ASEAN 46 , Europe 30 , Americas 4 , Other 12	397
Decrease in cash and cash equivalents resulting from exclusion of subsidiaries from consolidation	▲ 0		▲ 1
Cash and cash equivalents, at end of the period	440	Japan 225 , Greater China 123 , ASEAN 47 , Europe 21 , Americas 3 , Other 18	428

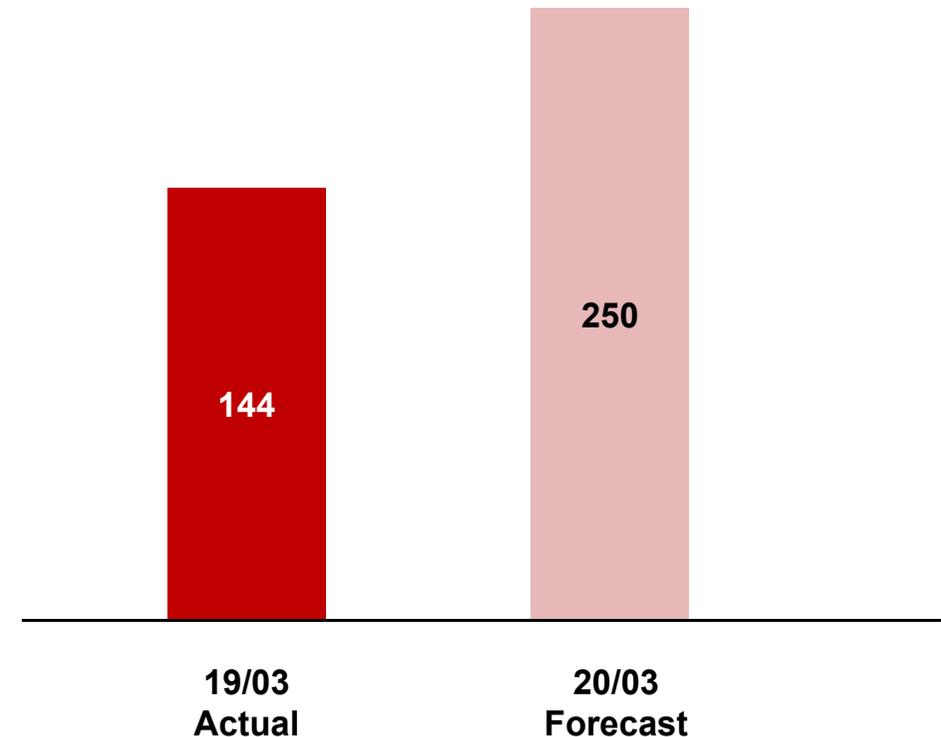
Working Capital and Investments

- Working Capital: Increased sales led to increased working capital
- Investments: Growth investment, mainly in focus areas of Life & Healthcare and Electronics

Working Capital (100 millions of yen)



Investment (100 millions of yen)



FYE March 2020 Earnings Projections

FYE March 2020 Earnings Projections

- While uncertainty continues due to global factors such as U.S.-China trade frictions and problems in the Middle East, we are seeing increased sales among core businesses. Accordingly, we are anticipating record-high year-on-year sales and profits.

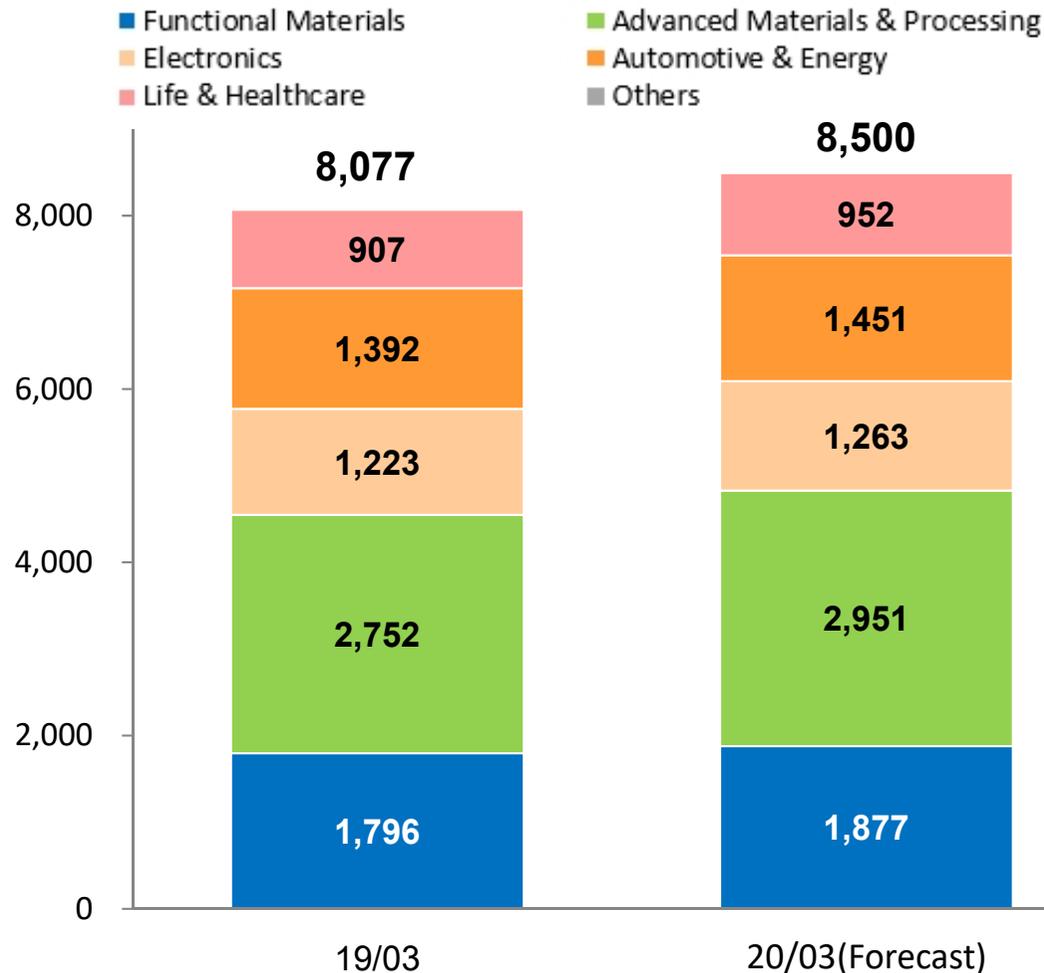
(100 millions of yen)

	19/03	20/03	
	Actual (A)	Full Year Forecast (B)	Vs. PY (B/A)
Net sales	8,077	8,500	105%
Operating income	252	260	103%
Ordinary income	266	270	101%
Profit attributable to owners of the parent	201	205	102%
US\$ Exchange rate (period average)	@110.9	@110.0	–
RMB Exchange rate (period average)	@16.5	@16.0	–

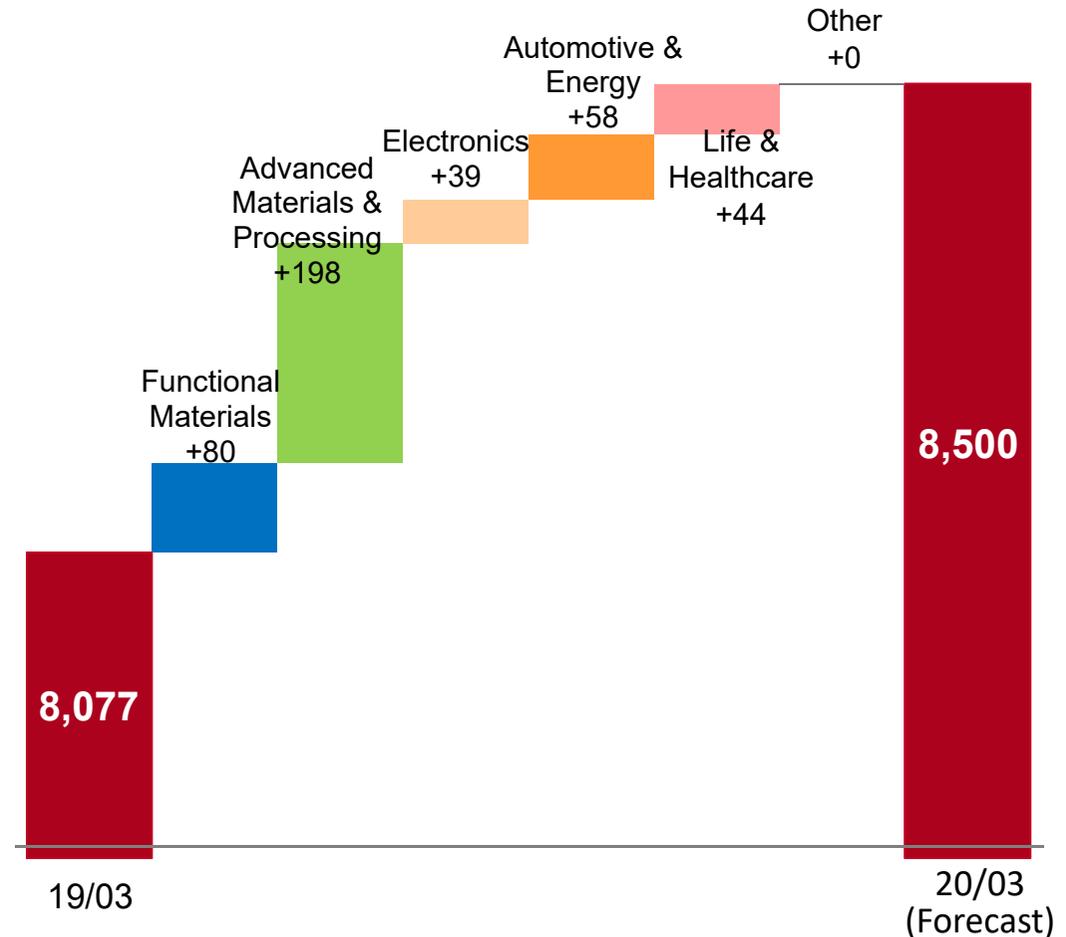
Net Sales Forecast (by Segment)

- **Functional Materials:** Forecasting increased sales as we establish new environmental businesses in addition to existing businesses
- **Advanced Materials & Processing:** Forecasting increased sales stemming from favorable sales of resins and digital print processing materials both in Japan and overseas
- **Mobility & Energy:** Expecting increased sales in car electronics-related products and functional materials as we capture demand driven by automation and electrification in the mobility sector

Net Sales by Segment (100 millions of yen)



Change in Net Sales by Segment (100 millions of yen)

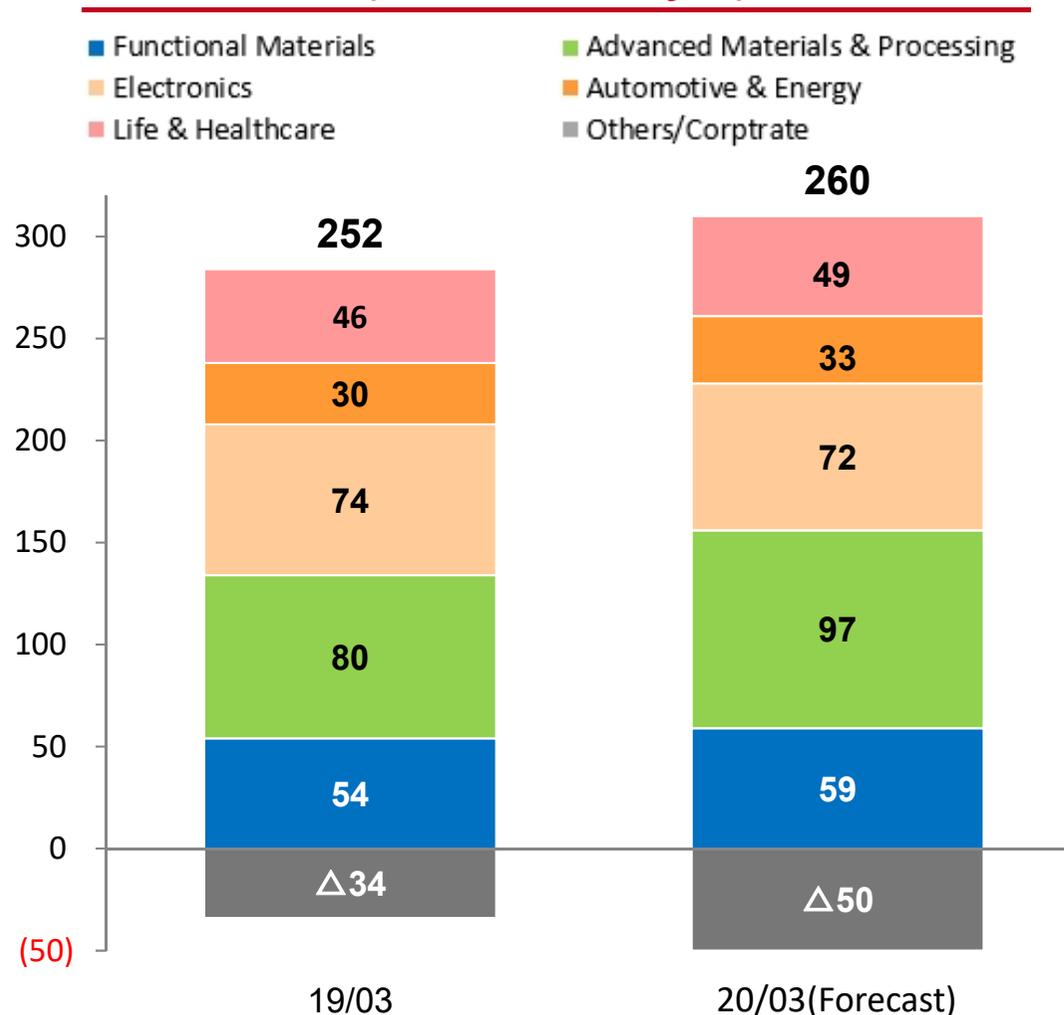


*As of April 2019, the Automotive & Energy Segment has changed its name to the Mobility & Energy Segment.

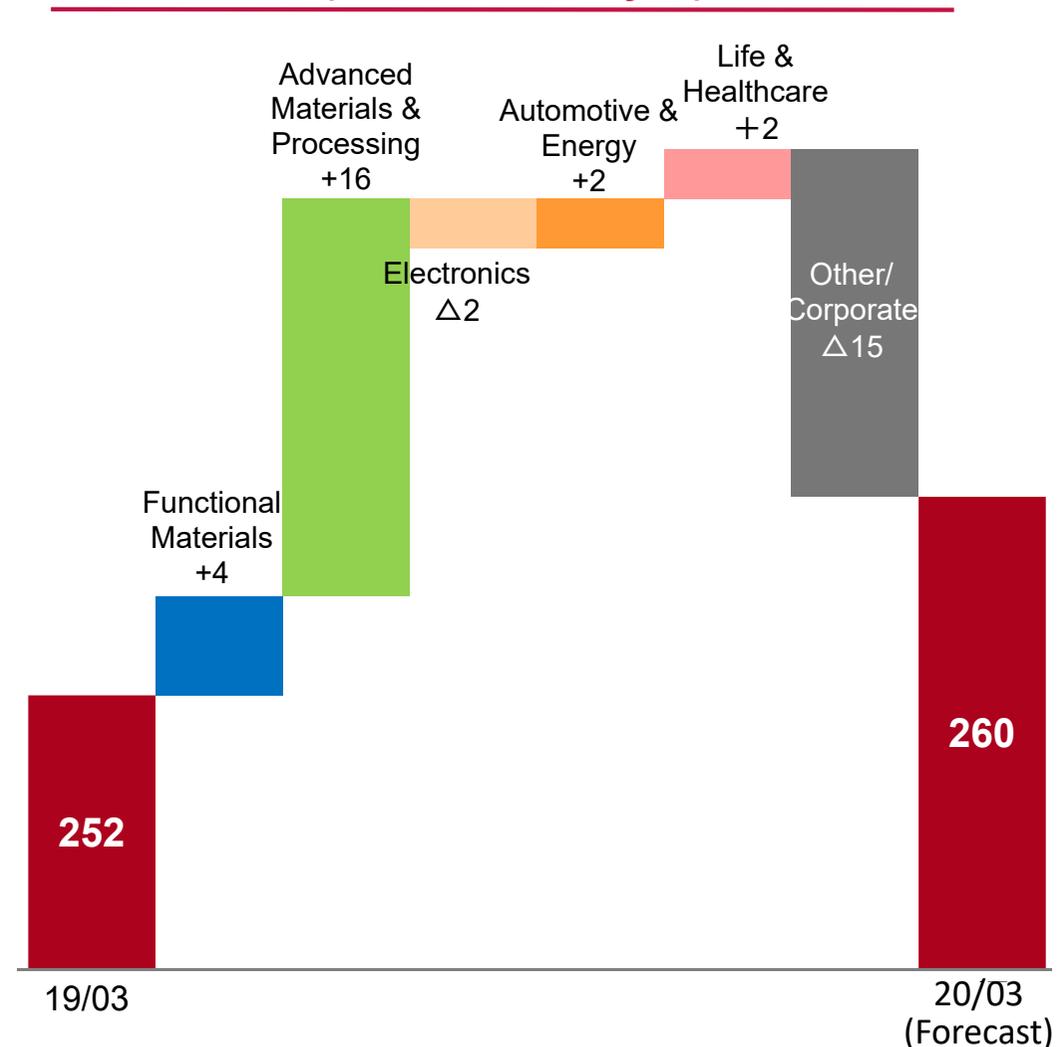
Operating Income Forecast (by Segment)

- We forecast an increase of 800 million yen in profits in all segments except Electronics
- Improvements in manufacturing and processing business revenues should contribute to profits
- Other/Corporate: Expecting a 1.5 billion yen decline year on year due to increased costs required to create new businesses and execute other measures for medium- to long-term growth

Operating Income by Segment (100 millions of yen)



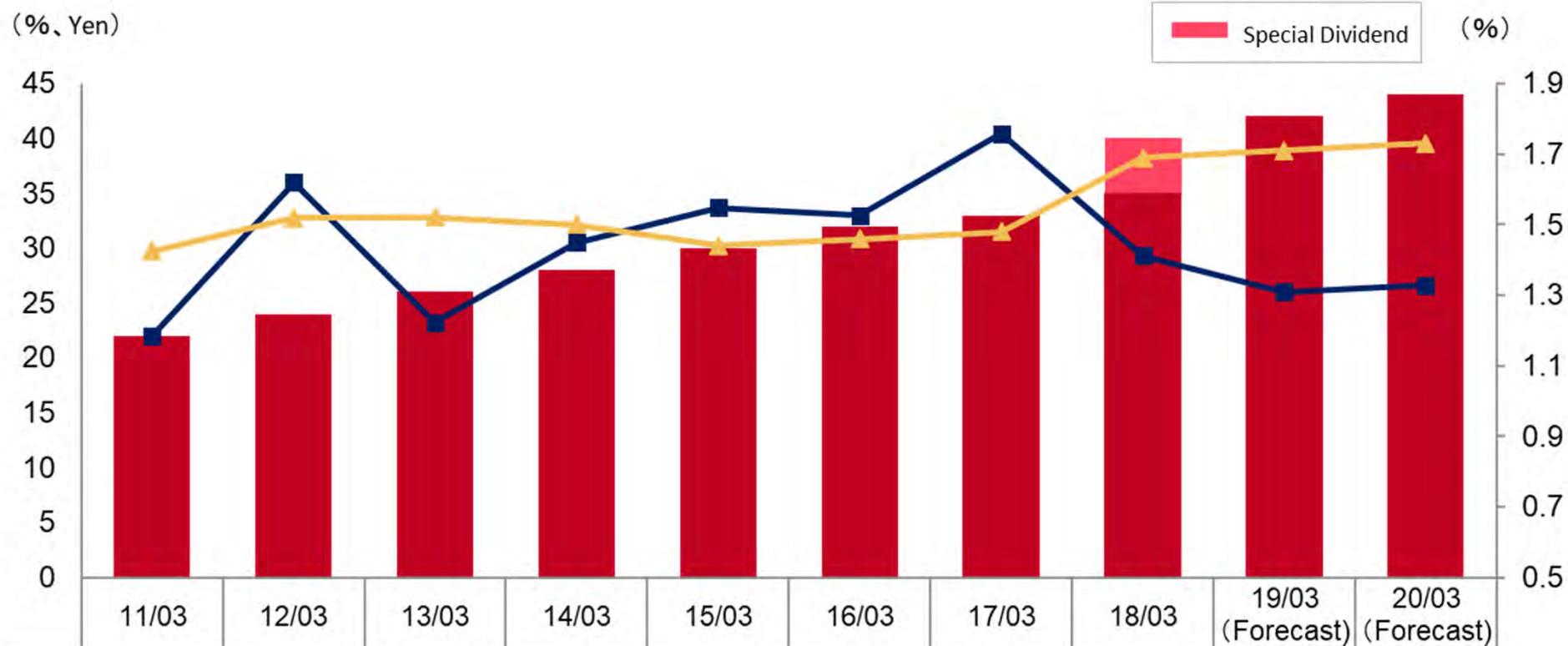
Change in Operating Income by Segment (100 millions of yen)



*As of April 2019, the Automotive & Energy Segment has changed its name to the Mobility & Energy Segment.

Dividends

- Current period: Total annual dividend of ¥42 per common share (¥18 interim dividend, ¥24 year-end dividend)
- Next period: Total annual dividend of ¥44 per common share (¥22 interim dividend, ¥22 year-end dividend)
(Dividend expected to increase for 10th consecutive period)



■ Dividend per Share (left axis)	22	24	26	28	30	32	33	40	42	44
■ Payout Ratio (left axis)	22.0	36.0	23.2	30.5	33.7	33.0	40.4	29.3	26.0	26.6
▲ DOE (right axis)	1.42	1.52	1.52	1.50	1.44	1.46	1.48	1.69	1.71	1.73

*1 18/03 dividends include a special dividend of ¥5 per share.

*2 19/03 year-end dividend will be an agenda item for the 104th Shareholders' Meeting planned for June 21, 2019.

Progress of Mid-Term Management Plan *ACE-2020*

Accountability / **C**ommitment / **E**fficiency



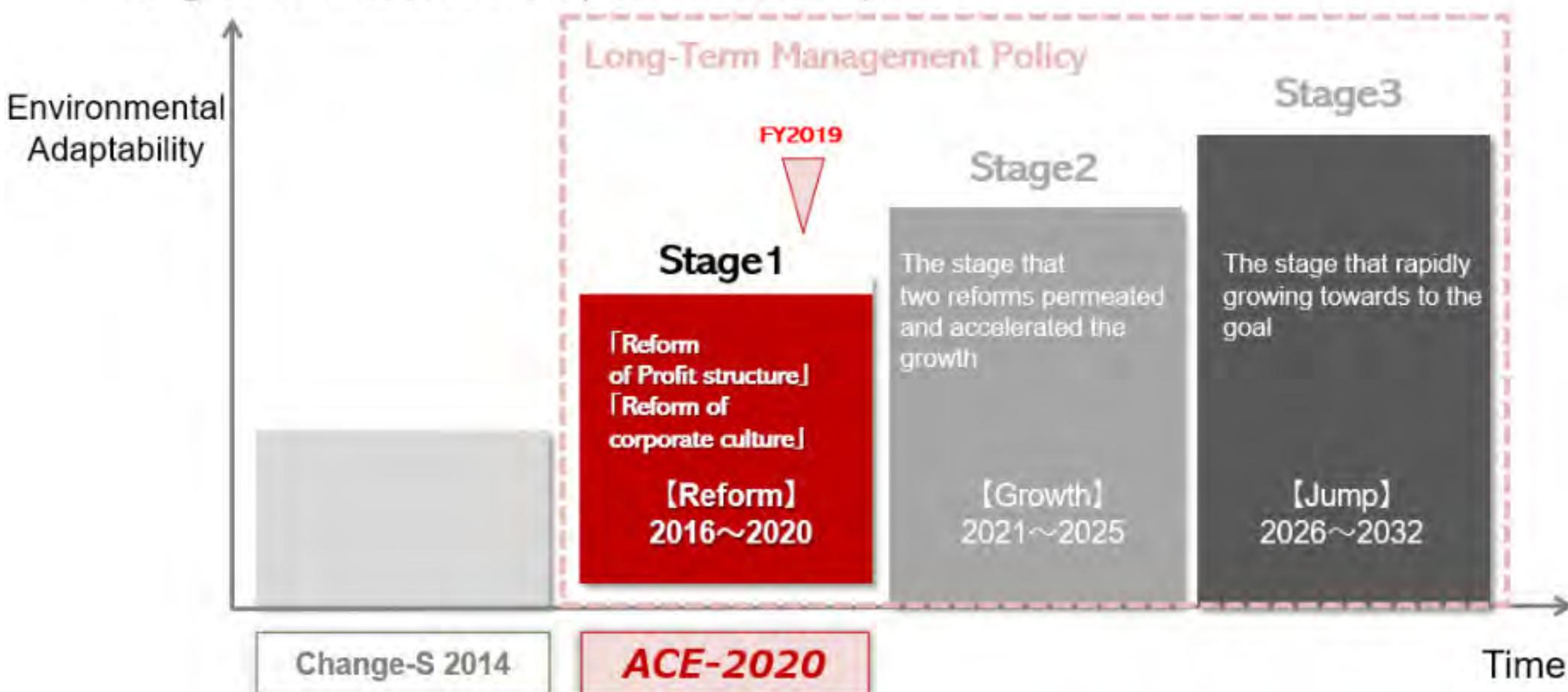
NAGASE Transforms from *Shosha/Trading* to *Business Designer*

Positioning of **ACE-2020**

To achieve our goal by 2032, the last year of Long-Term Management Policy, we divide 17 years of its term into 3 and start stage 1 as the beginning of the Mid-Term management Plan **ACE-2020**.

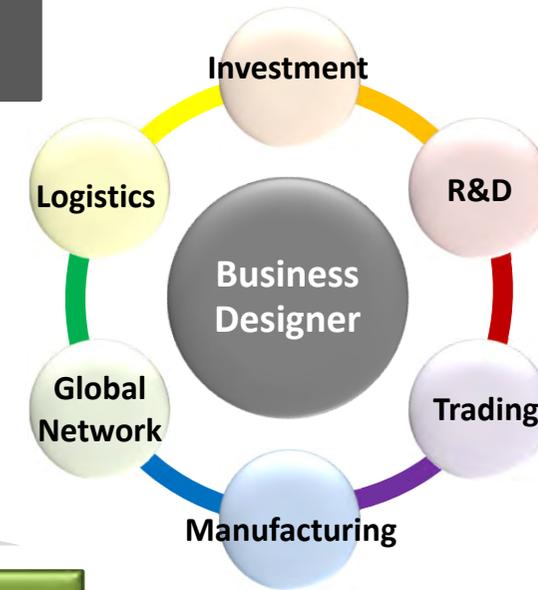
In FY2019 we will continue the fourth year of **ACE-2020** and continue reforming the business aiming for significant growth.

*Our goal: Normalization of the profit more than tripled.



NAGASE Transforms from “Shosha/Trading” to “Business Designer”.

NAGASE strings all the groups together to create and provide new value to the world through 6 key functions.



【6 Functions】

Leverage Group functions to achieve the quantitative and qualitative targets.

Reform Profit Structure

Portfolio Optimization

- Categorization of business and execution of strategy that matches with the area
- Replacement of asset and reallocation of resources
- Acceleration in investment that creates core business of group

Expand and Strengthen Revenue Base

- Accelerate globalization ” G6000”
- Improve manufacturing profitability

Reform Corporate Culture

Mindset

- Breed independence and responsibility
- Share the management’s message
- Thorough monitoring and PDCA

Strengthen Management Platform

- Pursue efficiency
- HR development

FY2018 Accomplishments

Categorize businesses and execute strategies suitable for each category/ Asset replacement and reallocation

Focus Expected further increase in profit

[Electronics]

- Investment in 3D Glass Solutions, Inc.
Roll out products for high-frequency products compatible with 5G standard and expand semiconductor business
- Integration of Electronics segment divisions
Look out over the entire industry, responding flexibly to changes in technology, applications, and industry structure

[Life & Healthcare]

- Hayashibara signed long-term partnership contract with Lonza launching new plant for pullulan and enzymes
Stronger strategically cooperative relationship for expanding the pullulan capsule market
- New Food Division Strategy Office
Companywide strategic structure and business expansion for food materials market

Base Contributed to stably increase the corporate value

- Respond to stronger global environment regulations, risk chemicals team activity
- Tritan™ material utensils adopted in all Saizeriya restaurants
- Pat!naLock™ won Infrastructure Maintenance Grand Award, continue to promote sales

Growth/Emerging Transform to "Focus" in 3 years

- Launched joint development for materials informatics
Search for new, alternative materials using AI
- Participate in autonomous driving technologies (LiDAR-related)
Launched joint projects with TriLumina (U.S.) and LeddarTech (Canada)
- Established Infinite Material Solutions LLC
Aiming to commercialize water-soluble support materials for 3D printers
- Continuing development work with Axonerve™
FPGA implementation solutions for content addressable memory in the 5G and IoT era

Improvement Immediately required drastic improvement in profit structure

- China: Withdrew from synthetic resin hose manufacturing business

Non-Business Asset Replacement

- Sold idle assets

FY2018 Accomplishments

Invested in 3D Glass Solutions, Inc.

- Start-up company designing and manufacturing high-frequency 5G devices
- Continue joint framework by applying NAGASE's mass production technology and quality management system



Target Market

5G, IoT, semiconductor markets

Hayashibara: Entered into a long-term partnership agreement with Lonza Co., Ltd. and will launch a new factory for pullulan and enzymes

- Pullulan is a natural polysaccharide produced by enzymes.
- Preparing the latest equipment for increased demand
- Construction scheduled to start in Feb. 2019 and end in Sep. 2020



Strengthening the strategic collaboration

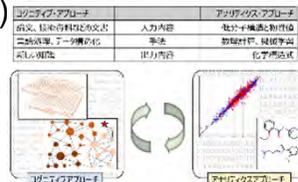
An image of the new factory

Target Market

Food materials market

Materials informatics joint development

- Joint development with IBM in the USA
- Utilizing artificial intelligence and the latest data processing technology
- Save cost and time to develop new (alternative) materials
- Aiming to begin services FY2020



An image of the platform

Target Market

Markets requiring new (alternative) materials

Establish regional headquarters in China and the Americas

- Devise a plan to strengthen the governance of overseas operations and accelerate the locally driven creation of new business
- China, including Taiwan and Hong Kong; Americas, including Mexico and Brazil



Target Market

Independent area markets in China and the Americas

New Initiatives to Achieve KGIs (2)

FY2018 Accomplishments

Entry into the autonomous driving technology sector (LiDAR-related)

- Begin cooperative partnership with TriLumina in the USA and Leddar Tech in Canada
- Become sales agent for critical autonomous driving technology; expand lineup and shorten development time for auto components manufacturers

Target Market

Mobility market



Establish Infinite Material Solutions, LLC

- Joint venture with Interfacial Consultants LLC
- Aimed at making products with water-soluble support filament using the FDM (fused deposition modeling) method
- AquaSys® : Industry's first water-soluble support material that also supports super engineering plastic

Target Market

3D Printer Market



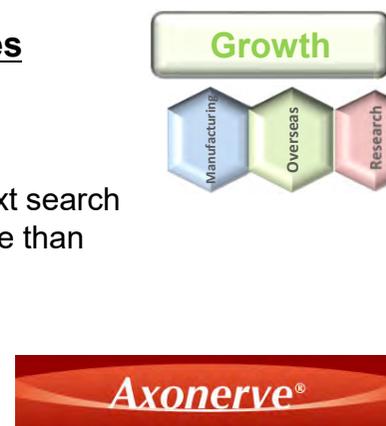
Awarded the 2018 Best Development in 3D Printing Award

Continued Axonerve™ R&D activities

- Hyper-FiRe: Ultra-fast text search and replacement accelerator
- Uses regular expressions to perform text search and replace on Linux OS software; more than 2,000-times speed improvement

Target Market

5G, IoT markets



Introducing Tritan™ tableware at all Saizeriya restaurants and cafes

- Japanese distributor of Tritan™, a plastic manufactured by Eastman Chemical (U.S.A.)
- Superior transparency, durability, and design
- Sponsoring joint research with product-design students (Musashino Art University and Tama Art University)

Target Market

Household goods and medical device markets



Joint research with Tama Art University

Reform Corporate Culture: Mindset/Strengthen Management Platform

ACE-2020 Issues

Mindset

- Build Accountability, Responsibility and Risk Awareness
Instill a shared vision of the mid-term management plan
- Thorough Monitoring and PDCA
Improve investment quality
- Share Management's Message
Create better communication

Strengthen Management Platform

- Pursue efficiency
Eliminate excess/duplication and increase efficiency of the organization/function
- HR Development

FY2016 to FY2018

FY2019

Delegation of authority, review organizations company-wide

Strengthen monitoring system, create dashboard, review meeting structure

ACE-2020 Rolling update, company-wide questionnaires; identify and address new issues

Strengthen governance at overseas manufacturing operations

Update investment guidelines, M&A promotion project

Branding activities (implement Top Management Tour), publish president videos, hold town meetings

Begin studying ESG activity disclosure policies

Sustainability management policies, set materialities

Back Office Functionality and Efficiency Project

Consolidate operations to NAGASE Business Expert for greater efficiency

Run operations under new HR system

Develop new technology through company-wide cross-departmental efforts



DO IT
Poster



Corporate Newsletters
Left: NAGASE & CO., LTD.
Right: NAGASE ChemteX Corporation



President Video
(New Year's Message)



Top Management Tour
(China: Shenzhen)



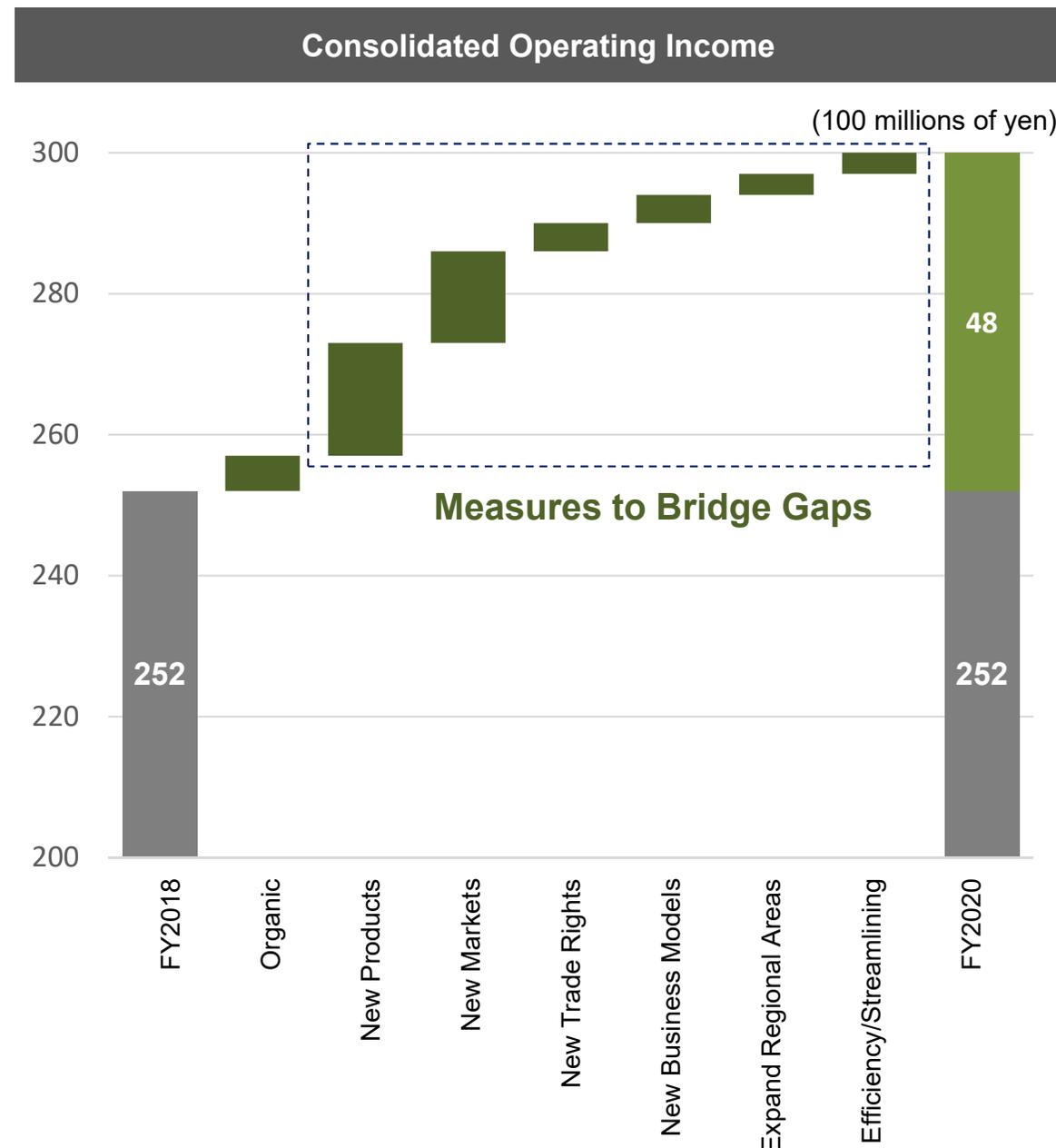
Town Meeting
(Hayashibara Co., Ltd.)

ACE-2020 Rolling Plan

- No changes to the framework of the mid-term management plan or qualitative and quantitative targets
- Enhance effectiveness in achieving targets by reviewing external factors and carefully examining measures to bridge any gaps

Qualitative Issues of Newly Arising Importance

- Supply issues caused by tightened environment regulations around the world
- Global governance addressing expanding overseas business opportunities
- Further enhancement of compliance systems at manufacturing businesses



KGI(Key Goal Indicator)

KGI	FY2017	FY2018	FY2019 (Plan)	FY2020
Consolidated Sales Amount	783.9 Billion Yen	807.7 Billion Yen	850.0 Billion Yen	1.0 Trillion Yen or more
Consolidated Operating Income	24.1 Billion Yen	25.2 Billion Yen	26.0 Billion Yen	30.0 Billion Yen or more
ROE	5.8%	6.6%	6.5%	6.0% or more

KPI(Key Performance Indicator): Factor index to achieve KGI

Reform/Strategy	Measures	KPI (Index)	FY2017	FY2018	FY2019 (Plan)	FY2020
Profit Structure Reform Indicator	Increase Focused Business (Portfolio Optimization)	*Operating Profit in Focus Area Growing Investment Distribution Ratio in Focus Area	13.1B Yen 52%	12.6B Yen 82%	13.1B Yen 46%	16.9B yen 35% <
	Accelerate Globalization (Expand and Strengthen Profit Structure)	*Overseas Group Sales Sales Growth Rate in USA	389B Yen 103%	405.3B Yen 118%	420.5B Yen 125%	600 B Yen 170%
	Increase Manufacturing Profitability (Expand and Strengthen Profit Structure)	* Operating Profit from Manufacturing * Break-Even Point Sales Ratio	11.4B Yen 76%	11.6B Yen 76%	12B Yen 76%	14.4B Yen 73%
	Corporate Culture Reform Indicator	• Pursue efficiency (Strengthen Management Platform)	Consolidated Selling, General and Administrative Ratio	10.0%	9.9%	10.0%
Financial Strategy Indicator	Investment	**Growth Investment	23.5B Yen	32.4B Yen	52.9B Yen	100B Yen
	Financial Structure	Rating (R&I)	[A]	[A]	[A] or more	[A] or more

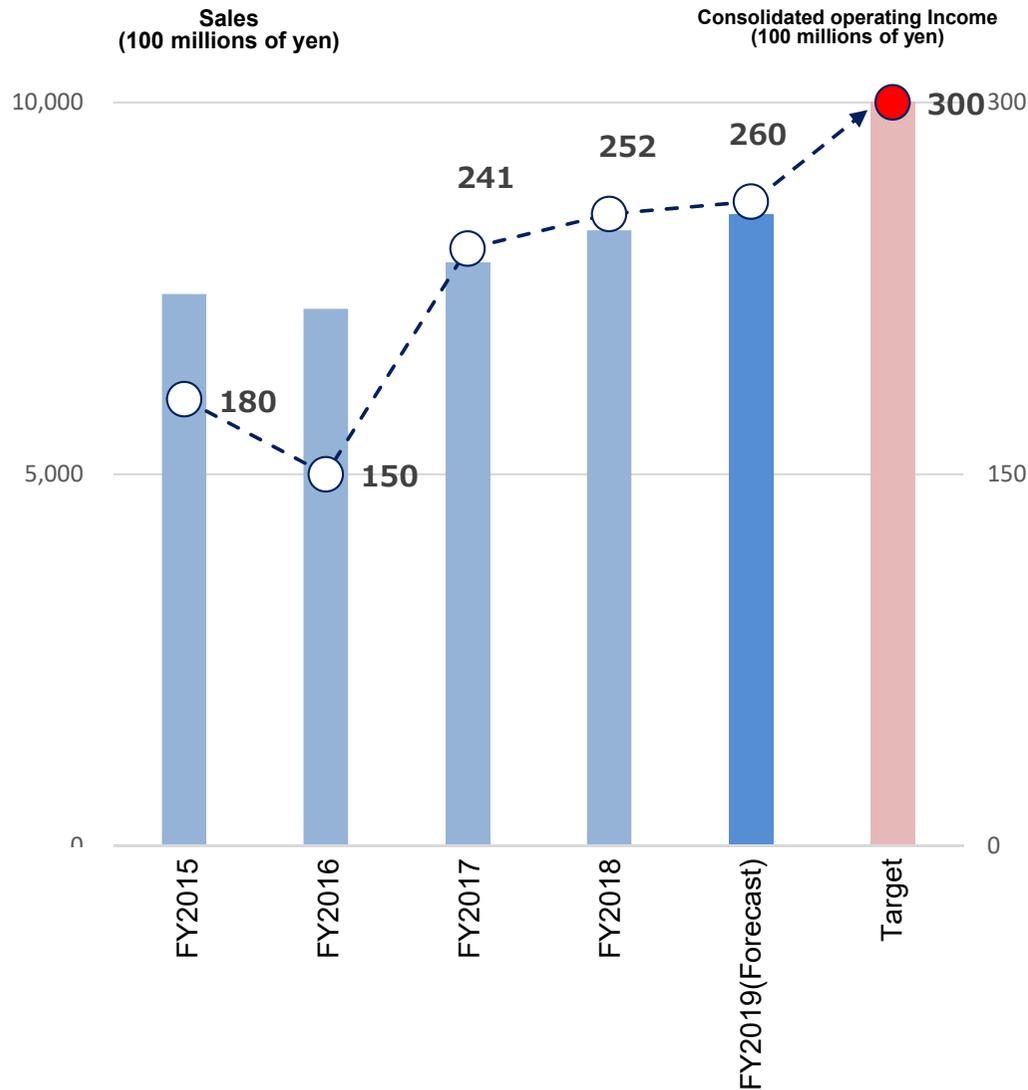
* The figures in this document are all management accounting data (simple sums)
It is different from the figures disclosed on the consolidated financial statement.

** Total numbers in 5 years

Appendix : Past Results and *ACE-2020* Target

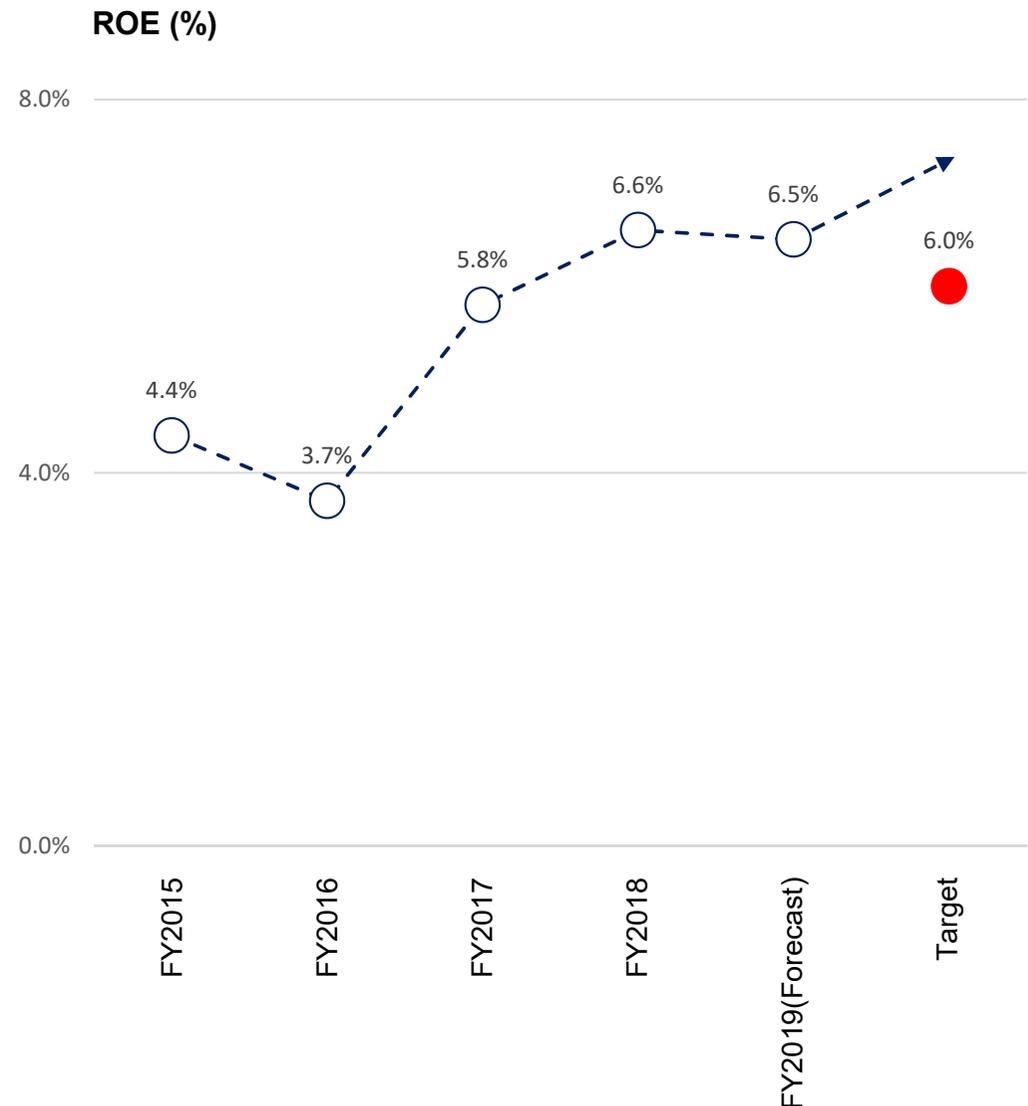
Consolidated Sales/Operating Income

1.0 Trillion Yen/30 Billion Yen or more



ROE

Normalize Over 6% at early stage



1. Establish a Nomination Committee

We will establish a nomination committee consisting of a majority independent directors. This committee will increase the objectivity and transparency in nominating directors and executive officers.

2. Reduce number of directors (from ten to seven)

We have decided to reduce the number of our directors from ten to seven (eliminating three inside director positions). This move is intended to revitalize and improve the effectiveness of the board of directors.

*A resolution to elect directors is scheduled to be presented at the 104th General Shareholders' Meeting scheduled for June 21, 2019.

3. Decision to repeal anti-takeover measures

We have had anti-takeover measures in place since 2007. However, we have decided to repeal these measures as of the conclusion of the 104th General Shareholders' Meeting scheduled for June 21, 2019.

NAGASE Group Initiatives for Advanced Technologies

**Executive Officer
Takahiro Okumura**

Overview of Latest innovations	P.33
Overview of 5G	P.34
5G Communications Module Market Trends	P.35
New Developments for 5G	P.36
Overview of 3D Glass Solutions, Inc	P.37
3D Glass Solutions, Inc Application Development	P.38
NAGASE Group Technology Network	P.39
NAGASE Group Creating Synergy	P.40
NAGASE Group Global Manufacturing Bases	P.41
Mobility Solutions	P.42
Summary	P.43

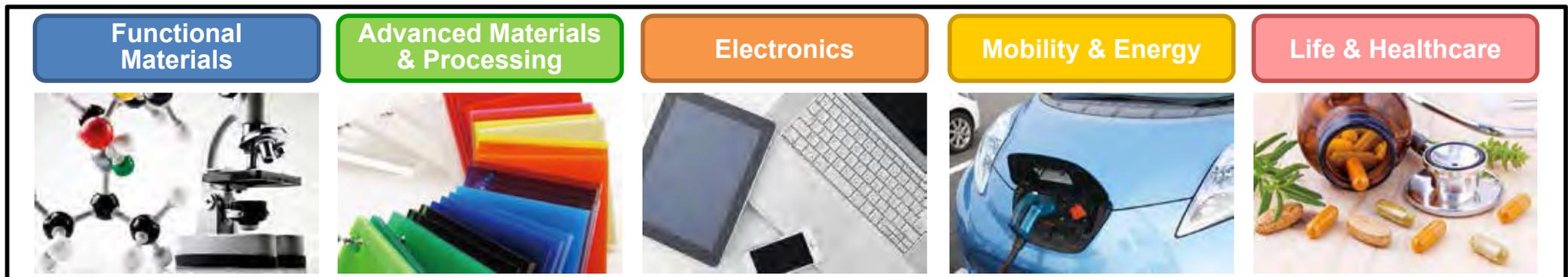
Development of 5G-Related Materials



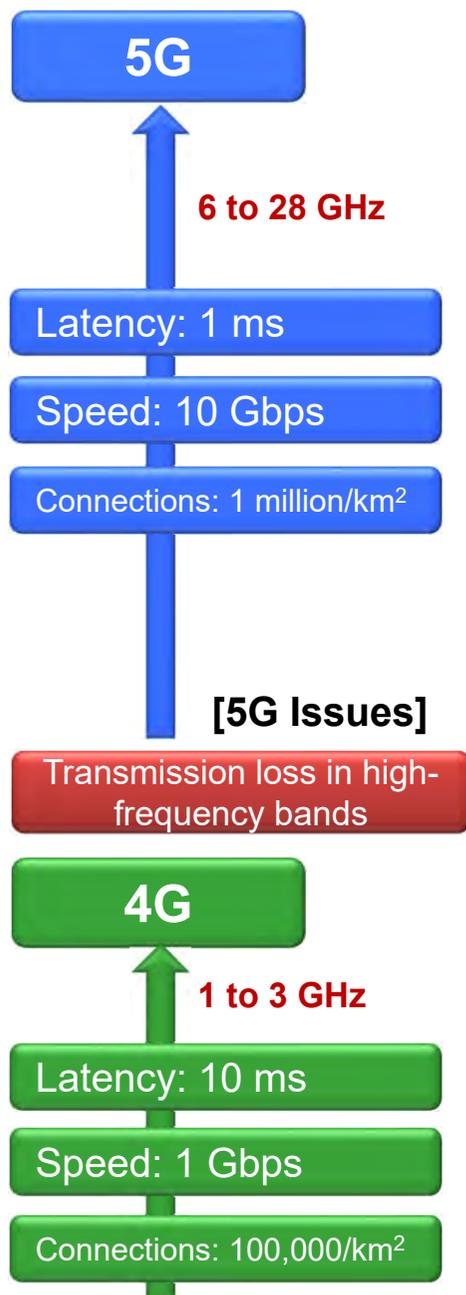
Mobility Solutions



Existing Businesses



Overview of 5G



[Breakthroughs in achieving 5G]

- ✓ Big Data through IoT ⇒ Total data usage up to 44 ZB by 2020
- ✓ Reduced load on cloud ⇒ Edge computing diversity
- ✓ Requires high-speed, large capacity communications methods ⇒ Transition to high frequency (5G) band

Low loss substrate technologies are necessary

[Features of 5G]



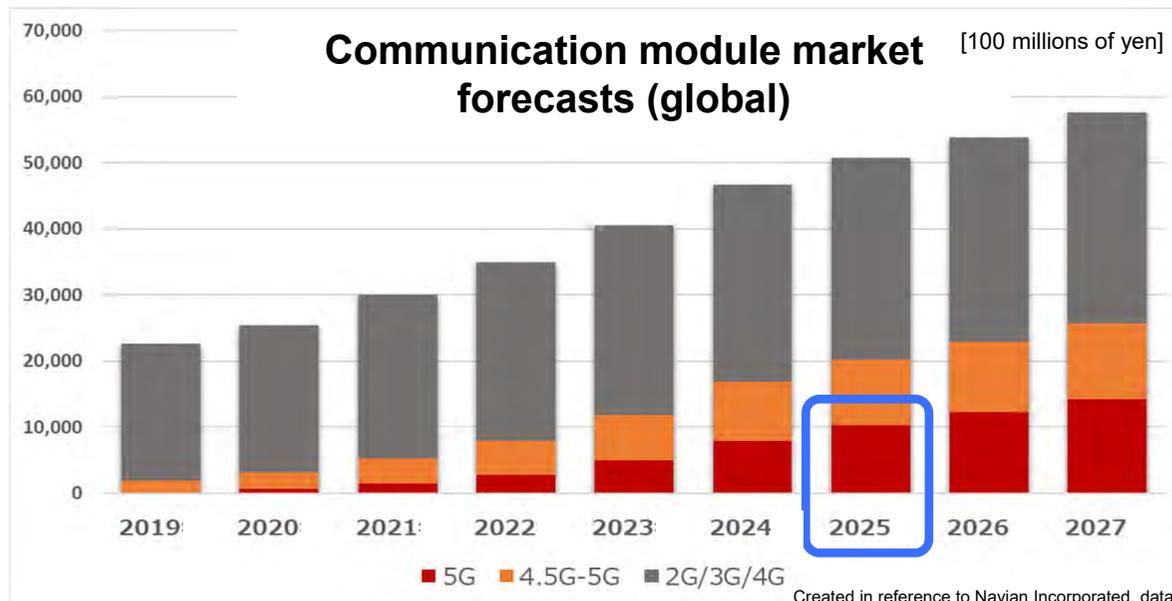
5G Communications Module Market Trends

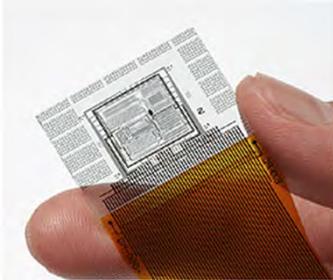
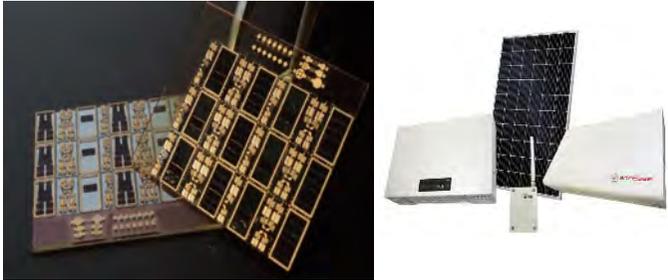
The 2025 Global Market for 5G Communications Modules will Grow to 1 Trillion Yen

[5G-related Equipment]



[5G Modules]



<p>Features</p>	<p>Enhanced Mobile Broadband (eMBB)</p>	<p>Ultra-Reliable and Low Latency Communications (URLLC)</p>	<p>Massive Machine Type Communications (mMTC)</p>
<p>Target</p>	 <p>High-resolution imaging, VR, etc.</p> <p>Bit rate: 10 GB/sec.</p>	 <p>Autonomous driving, remote surgery, control of drones, etc.</p> <p>Latency: About 1 ms</p>	 <p>Smart cities, smart factories, emergency batteries, etc.</p> <p>Number of connected devices: 1 million/km²</p>
<p>Focus Technologies</p>	<p>Low-Dielectric Materials</p> 	<p>Interposer Materials</p> 	<p>Embedded Antennas Storage Batteries</p> 

Overview of 3D Glass Solutions, Inc



Company name: 3D Glass Solutions, Inc.

Established: 2006

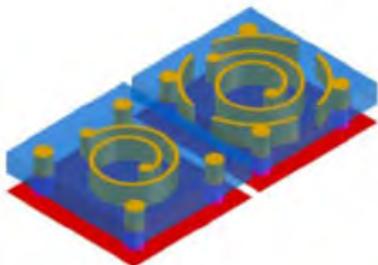
Location: Albuquerque, NM, U.S.A.

Number of employees: 20

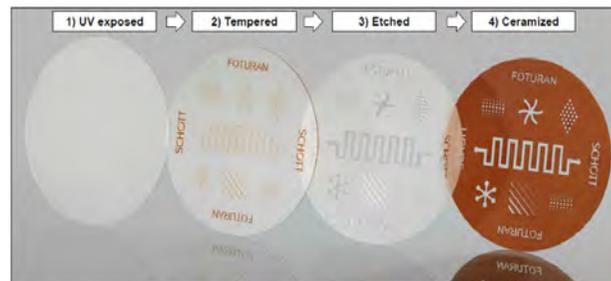
Business overview: Production and sales of semiconductor packages and devices using photosensitive glass

Technologies: Low-cost, 3D glass processing technologies using patented glass compositions
High-frequency device and module design technologies using specialized CAD

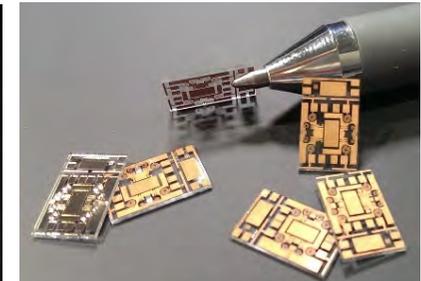
[Parts design technologies]



[Photosensitive glass technologies]

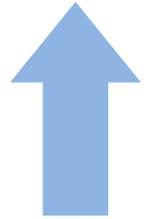


[Device processing technologies]

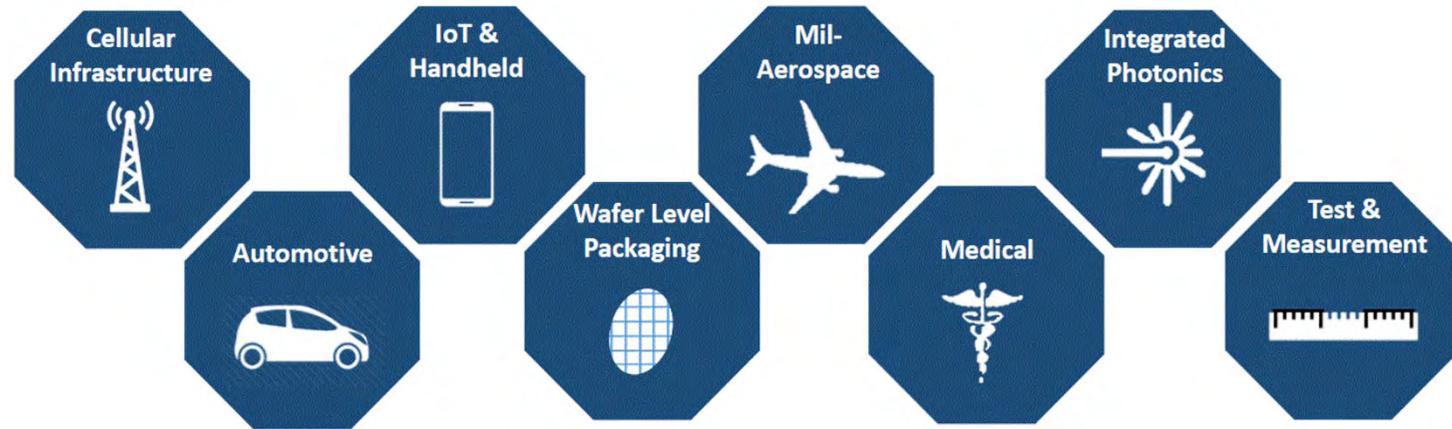
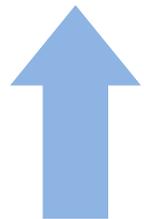


3D Glass Solutions, Inc Application Development

Application development



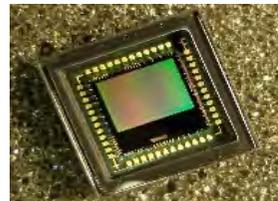
Applicable devices



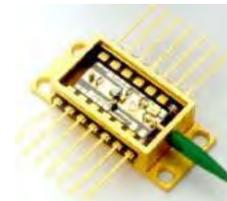
RF modules



Image sensors



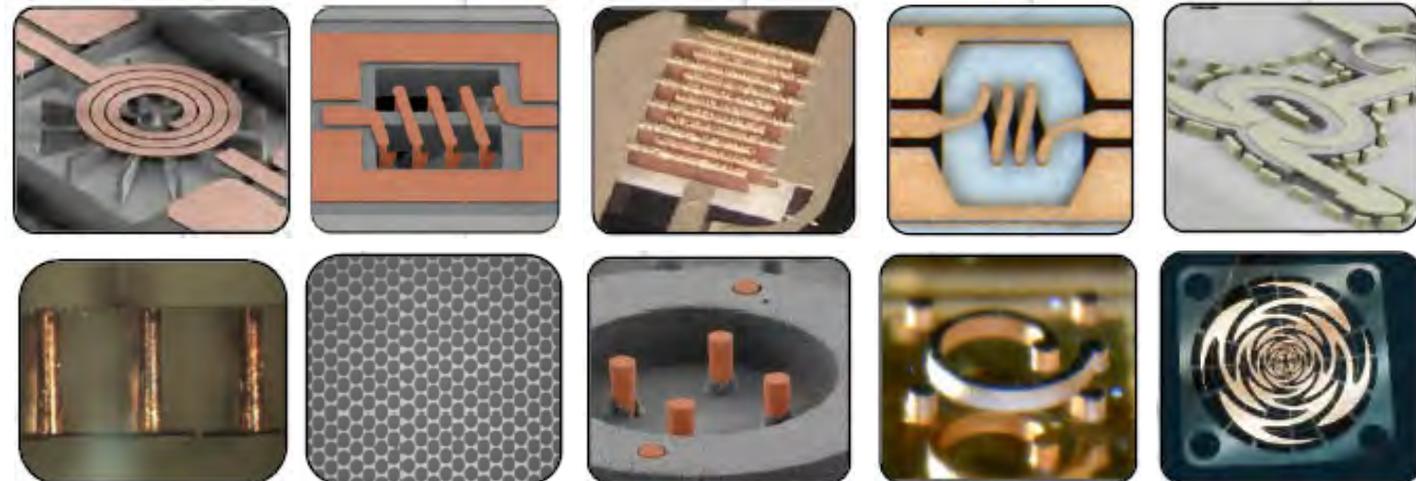
Optical communications modules



Power modules



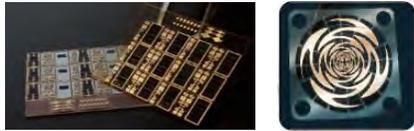
CPU/Memory modules



3D Glass Solutions Core Technologies



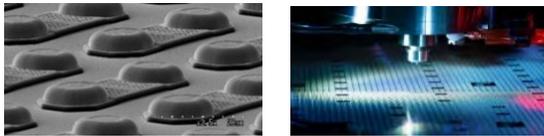
- 5G-compatible base stations using photosensitive glass processing technology and electronic device antennas for communications modules



- Insulation, conducting, and optical materials for electronic devices supporting 5G
- Microlens, nanomaterials for recordable media, low-temperature burning-type wiring inks



- Bumping process, bonding technologies, and equipment for 5G-compatible electronic devices



- Insulation, conducting, and optical materials for 5G-compatible electronic devices
- Stretchable conductive inks for wearables



- High-performance lithium-ion storage battery systems
- Emergency-use power supply systems using renewable energy



- Siloxane insulation and conducting materials for 5G-compatible electronic devices
- Functional inks and optical coating materials containing nanoparticles and dispersed materials



5G-related product application examples



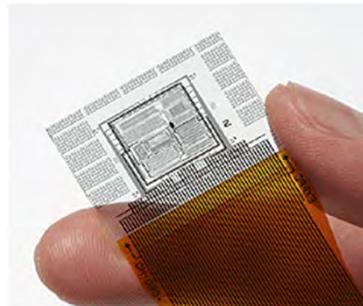
Low dielectric materials



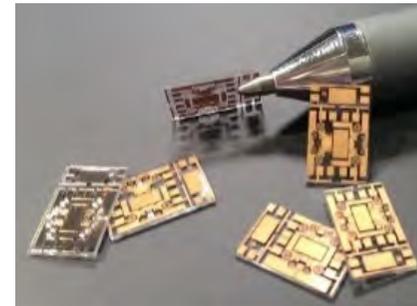
Wiring forming



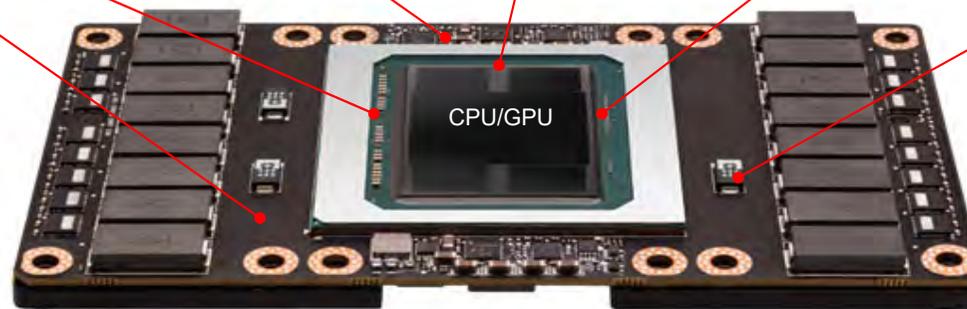
Glass substrates



Passive glass components



Embedded antennas



High-speed image processing board

NAGASE Group Global Manufacturing Bases

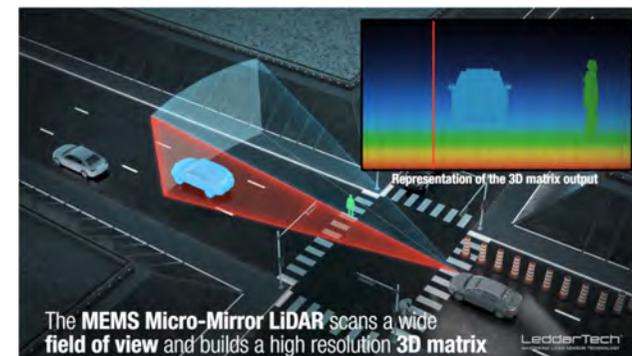


Developing new businesses for sensors and peripheral devices required in anticipation of an autonomous driving society

Keywords in advanced mobility



LiDAR sensing systems for autonomous driving

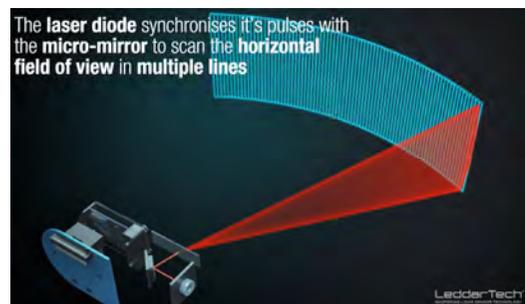
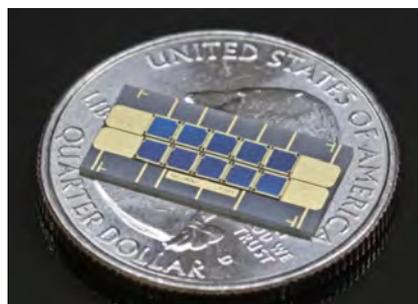


*LiDAR: Light Detection and Ranging

Autonomous driving-related product examples

[TriLumina]

Plane emission laser modules for 3D sensing



[LeddarTech]

Semiconductors for high-precision distance calculations



■ Building 5G high-frequency device-related businesses

- ✓ Develop and commercialize **low-loss materials** technologies for high speed and high capacity, low delay, and multiple simultaneous connections
- ✓ Develop and commercialize **substrate materials** and **glass antenna** technologies through the synergy of NAGASE Group technologies and the high-precision glass processing technologies from 3D Glass Solutions, Inc.

■ Providing mobility solutions

- ✓ Grow sensor and peripheral device businesses required for an autonomous driving society
Sell **LiDAR-related products for autonomous driving** through cooperation between TriLumina and LeddarTech

(Reference) Information by Segment

Functional Materials Segment

<Net Sales/Operating Income by Location>

(100 millions of yen)

	FYE 03/19		FYE 03/20		
	Year Actual	Vs. PY	Year Forecast	Vs. PY	
Net sales	Domestic	1,662	103%	1,730	104%
	Overseas	587	104%	614	104%
	Eliminations	▲454	-	▲467	-
	Total	1,796	103%	1,877	104%
Operating Income	Domestic	42	105%	44	106%
	Overseas	14	90%	16	109%
	Eliminations	▲2	-	▲1	-
	Total	54	106%	59	107%

*Figures above are a combination of consolidated entities by location. Inter-region eliminates are not reflected; adjusted provided in the eliminations column. (Includes amortization of goodwill)

FYE March 2019 Actual

Net sales ¥179.6 billion (103%)

- ◆ The Performance Chemicals business recorded higher sales year on year, mainly due to improved sales of coating raw materials and urethane materials, spurred by strong automotive production, as well as naphtha price increases. Another contributing factor was the additional sales of U.S. company FitzChem acquired in the second quarter of the prior fiscal year, reflected through all quarters of the current consolidated fiscal year.
- ◆ The Specialty Chemicals business recorded slightly higher sales year on year, mainly due to an increase in sales of electronics chemicals and plastic materials/plastic additives for the semiconductor and other related electronics industries in Japan. However, overseas sales dropped slightly.

Operating income ¥5.4 billion (106%)

- ◆ Higher profits due to higher revenues

FYE March 2020 Outlook

- ◇ We project higher revenues and profits due to increased sales of coatings and urethane materials as a result of customer strategies and the development of new products, higher sales of electronics chemicals for semiconductors and other electronics industries and of epichlorohydrin derivatives for 3D printers, and as a result of establishing environment-related businesses.

Advanced Materials & Processing Segment



<Net Sales/Operating Income by Location>

(100 millions of yen)

		FYE 03/19		FYE 03/20	
		Year Actual	Vs. PY	Year Forecast	Vs. PY
Net sales	Domestic	1,760	106%	1,918	109%
	Overseas	1,717	108%	1,822	106%
	Eliminations	▲725	-	▲789	-
	Total	2,752	105%	2,951	107%
Operating Income	Domestic	50	131%	57	112%
	Overseas	30	106%	39	127%
	Eliminations	▲1	-	1	-
	Total	80	121%	97	120%

*Figures above are a combination of consolidated entities by location.
Inter-region eliminates are not reflected; adjusted provided in the eliminations column.

FYE March 2019 Actual

Net sales

¥275.2 billion (105%)

- ◆ The Colors & Advanced Processing business recorded higher sales as a whole, driven by growth in Japan for plastic resins for industrial and packaging applications and dyes/additives, as well as growth in digital print processing materials in both Japan and overseas.
- ◆ The Polymer Global Account business recorded higher sales overall, driven by growth in Japan, Greater China, and ASEAN.

Operating income

¥8.0 billion (121%)

- ◆ Higher profits, mainly due to higher revenues and improved profitability at manufacturing subsidiaries

FYE March 2020 Outlook

- ◇ We project higher sales and profits as a result of increased sales of resins and digital print processing materials both in Japan and overseas, with a production recovery in our compound business and other improvements in manufacturing and processing business revenues contributing to profits

Electronics Segment

<Net Sales/Operating Income by Location>

(100 millions of yen)

	FYE 03/19		FYE 03/20		
	Year Actual	Vs. PY	Year Forecast	Vs. PY	
Net sales	Domestic	1,189	92%	1,274	107%
	Overseas	744	99%	735	99%
	Eliminations	▲710	-	▲746	-
	Total	1,223	95%	1,263	103%
Operating Income	Domestic	38	77%	44	117%
	Overseas	35	88%	30	86%
	Eliminations	+0	-	▲2	-
	Total	74	83%	72	97%

*Figures above are a combination of consolidated entities by location. Inter-region eliminates are not reflected; adjusted provided in the eliminations column. (Includes amortization of goodwill)

FYE March 2019 Actual

Net sales ¥122.3 billion (95%)

- ◆ Despite favorable performance in formulated epoxy resin sales to the semiconductor industry, lower photolithography materials and device sales drove Electronic Chemicals business sales down
- ◆ The Electronic Materials business recorded lower sales due to decreases in display-related products, despite strong performance in our business for abrasives used in connection with interim processing in semiconductors

Operating income ¥7.4 billion (83%)

- ◆ Lower profits, due to lower revenue, and a large decline in spot business (sales of equipment) that had seen a dramatic increase in the prior year

FYE March 2020 Outlook

- ◇ We forecast strong formulated epoxy resin sales for semiconductors, heavy electrical, and light electrical industries, despite a decrease in equipment-related sales. Sales of photolithographic materials should recover due to the start of new businesses and an improvement in customer operation rates. Sales of display related products will also remain strong leading to an increase in sales. However, performance at certain manufacturing businesses will be slow, resulting in lower profits.

<Net Sales/Operating Income by Location>

(100 millions of yen)

	FYE 03/19		FYE 03/20		
	Year Actual	Vs. PY	Year Forecast	Vs. PY	
Net sales	Domestic	786	117%	839	107%
	Overseas	856	102%	880	103%
	Eliminations	▲250	-	▲268	-
	Total	1,392	107%	1,451	104%
Operating Income	Domestic	10	377%	13	121%
	Overseas	19	90%	20	104%
	Eliminations	0	-	0	-
	Total	30	126%	33	108%

*Figures above are a combination of consolidated entities by location. Inter-region eliminates are not reflected; adjusted provided in the eliminations column.

FYE March 2019 Actual

Net sales

¥139.2 billion (107%)

- ◆ The Automotive Solutions business recorded higher sales, driven by strong performance in our resins business in Japan, Greater China, and ASEAN. Sales growth for car electronics-related products was another positive factor.

Operating income

¥3.0 billion (126%)

- ◆ Higher profits due to higher revenues

FYE March 2020 Outlook

- ◇ While automotive production is expected to remain flat, we project increased sales of engineering plastics as well as car electronics-related products as a result of expanded sales of materials both within Japan and overseas. We also expect improved profitability at our manufacturing subsidiaries

<Net Sales/Operating Income by Location>

(100 millions of yen)

		FYE 03/19		FYE 03/20	
		Year Actual	Vs. PY	Year Forecast	Vs. PY
Net sales	Domestic	1,047	104%	1,097	105%
	Overseas	147	109%	152	103%
	Eliminations	▲287	-	▲297	-
	Total	907	105%	952	105%
Operating Income	Domestic	72	102%	74	103%
	Overseas	6	206%	7	112%
	Eliminations	▲32	-	▲32	-
	Total	46	111%	49	105%

*Figures above are a combination of consolidated entities by location. Inter-region eliminates are not reflected; adjusted provided in the eliminations column. (Includes amortization of goodwill and technology-based assets)

FYE March 2019 Actual

Net sales

¥90.7 billion (105%)

- ◆ Overseas sales of TREHA™ and other products in the food ingredients field grew, with slight increases in Japan. Sales of AA2G™ to customers in the skin care and toiletries sectors were higher both in Japan and overseas. In the medical and pharmaceutical field, sales of pharmaceutical raw materials and intermediates, medical materials, and pharmaceutical business products increased, driving increased revenue for the business as a whole.
- ◆ The Beauty Care Products business recorded lower sales stemming from weak performance across all product categories.

Operating income

¥4.6 billion (111%)

- ◆ Higher profits due to higher revenues

FYE March 2020 Outlook

- ◇ Although we expect sales in the medical and pharmaceutical fields to decline, sales of TREHA™ in the food materials field should rise in Japan and overseas. We also forecast higher sales resulting from the adoption of Hayashibara Hesperidin S and Fibryxa™. Meanwhile, sales of AA2G™ and raw materials should continue to perform well, resulting in increased sales. As a result, we forecast overall sales and profit growth for the segment.



Bringing it all together

<https://www.NAGASE.co.jp/>

These presentation materials contain forward-looking projections based on assumptions, forecasts, and plans as of May 24 , 2019. Actual earnings may differ from projections due to risks and uncertainties in the future global economy, competitive landscape, currency exchange rates, etc.