

# The New Medium-Term Management Plan

May 11, 2018

**MITSUBISHI GAS CHEMICAL COMPANY, INC.**

TSE : 4182

## FORWARD-LOOKING STATEMENTS

These materials contain performance forecasts and other statements concerning the future. These forward-looking statements are based on information available at the time. These materials were prepared and on certain premises judged to be reasonable. None of these forward-looking statements are intended to be guarantees of future performance. Various factors may cause actual performance to differ significantly from forecasts.

## Contents

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- 1 | Review of Previous Medium-Term Management Plan,  
MGC Advance2017**
- 2 | Overview of New Medium-Term Management Plan,  
MGC Advance2020**
- 3 | Business Plans by Segment  
New Medium-Term Management Plan, MGC Advance2020**

## Contents

---

- 1** | **Review of Previous Medium-Term Management Plan,  
MGC Advance2017**
- 2 | Overview of New Medium-Term Management Plan,  
MGC Advance2020
- 3 | Business Plans by Segment  
New Medium-Term Management Plan, MGC Advance2020

## Review of Previous Medium-Term Management Plan, MGC Advance2017

### Fundamental objectives and numerical targets

#### Fundamental objectives

##### **Strengthening the earning power of existing businesses with a focus on the core businesses**

Mainly invest management resources in core businesses to further enhance profitability.

##### **Restructuring underperforming businesses**

Find exit strategies for underperforming businesses.

##### **Creating and developing new businesses**

Create business in new areas meeting future market needs,  
in addition to areas surrounding existing businesses.

##### **Improving group-wide operational efficiency**

Maximize corporate value through Group management.

##### **Improving total enterprise quality to support sustainable growth**

Achieve further improvements in quality to continuously enhance the MGC Group's competitiveness.

#### Numerical targets

##### **Consolidated performance targets for fiscal 2017 (JPY)**

Sales: ¥700 billion Operating income: ¥40 billion Ordinary income: ¥55 billion ROE: 9% or higher

## Review of Previous Medium-Term Management Plan, MGC Advance2017

Qualitative assessment (fundamental objectives)

**Restructure underperforming businesses to create a balanced earnings structure encompassing all segments**

**Strengthening the earning power of existing businesses with a focus on the core businesses**

Achieve the operating income, ordinary income, and ROE earnings targets for fiscal 2017.

**Restructuring underperforming businesses**

Restructure businesses that have been underperforming since the global financial crisis.

**Creating and Developing new businesses**

Continue actively working to create and develop new businesses.

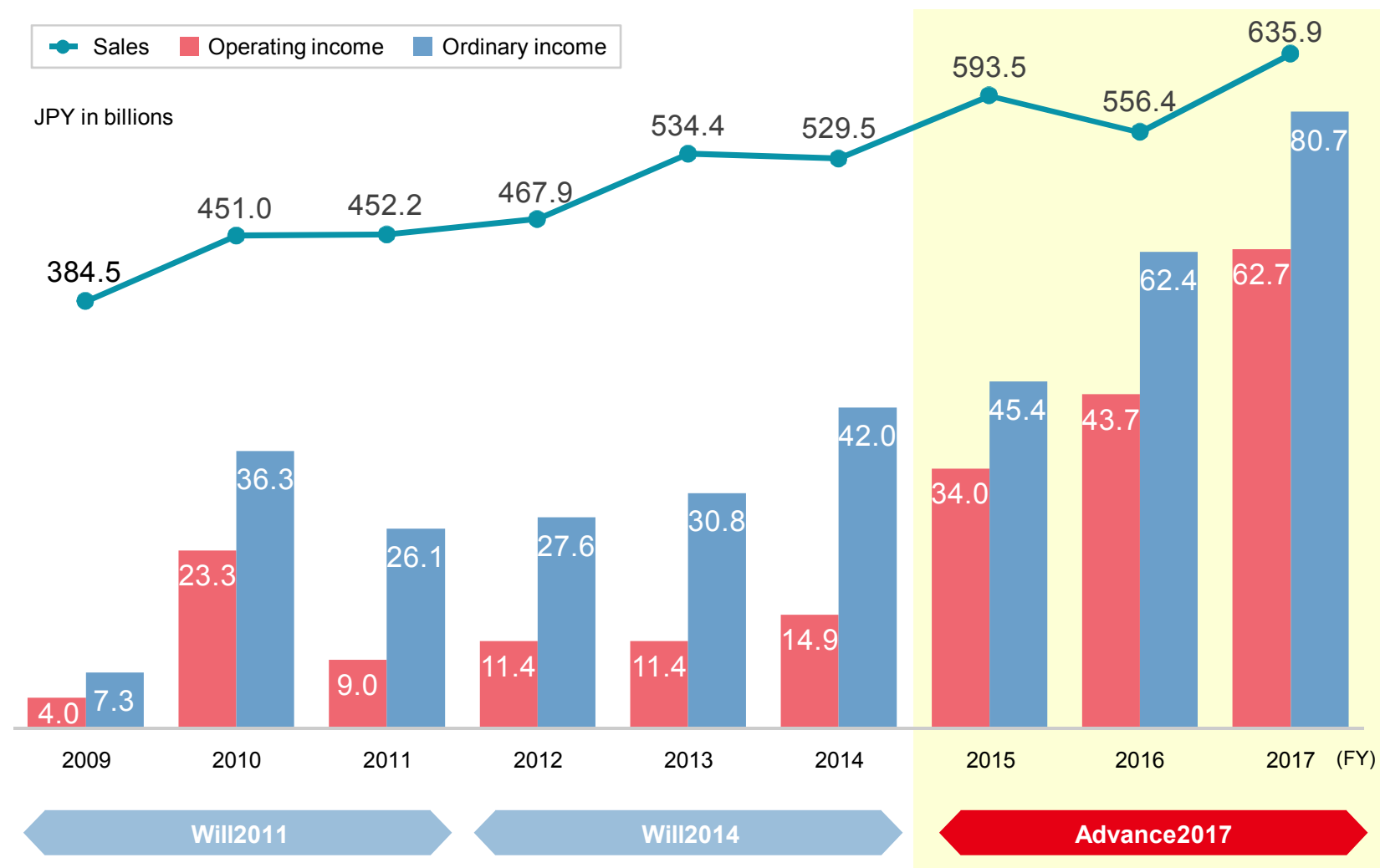
**Improving group-wide operational efficiency**

Introduce methods of business analysis that increase management connectivity across the Group.  
Strengthen unified management of the Group.

**Improving total enterprise quality to support sustainable growth**

Continue enhancing the safety and stability of our operations and strengthen on-site competencies and safety.

## Review of Previous Medium-Term Management Plan, MGC Advance2017 Results for fiscal years 2009–2017



## Review of Previous Medium-Term Management Plan, MGC Advance2017

### Initial targets and actual results

Sales and profits **remained on a growth track** even though sales fell short of the plan in the final year.

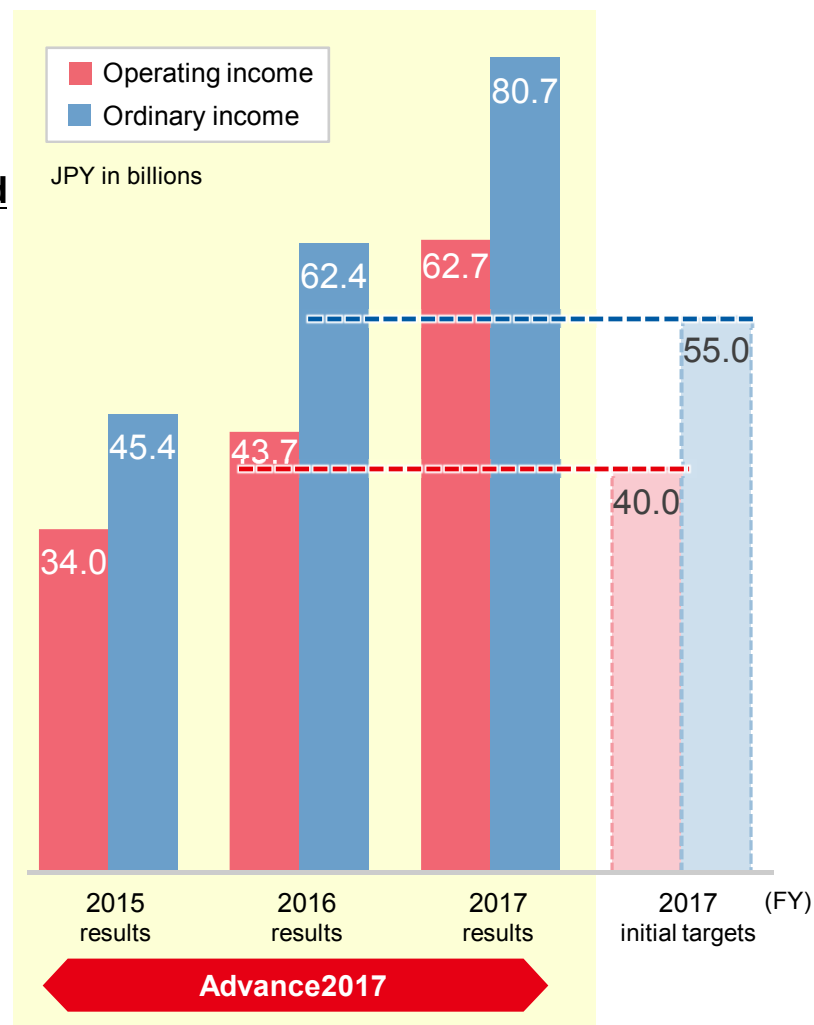
Operating income and ordinary income both **reached target figures one year early.**

ROE also increased significantly from the first year of the plan.

JPY in billions

Consolidated performance	Fiscal 2015 results	Fiscal 2016 results	Fiscal 2017 results	Fiscal 2017 targets
Sales	593.5	556.4	635.9	700.0
Operating income	34.0	43.7	62.7	40.0
Ordinary income	45.4	62.4	80.7	55.0
ROE	9.0%	12.0%	13.6%	9% or higher

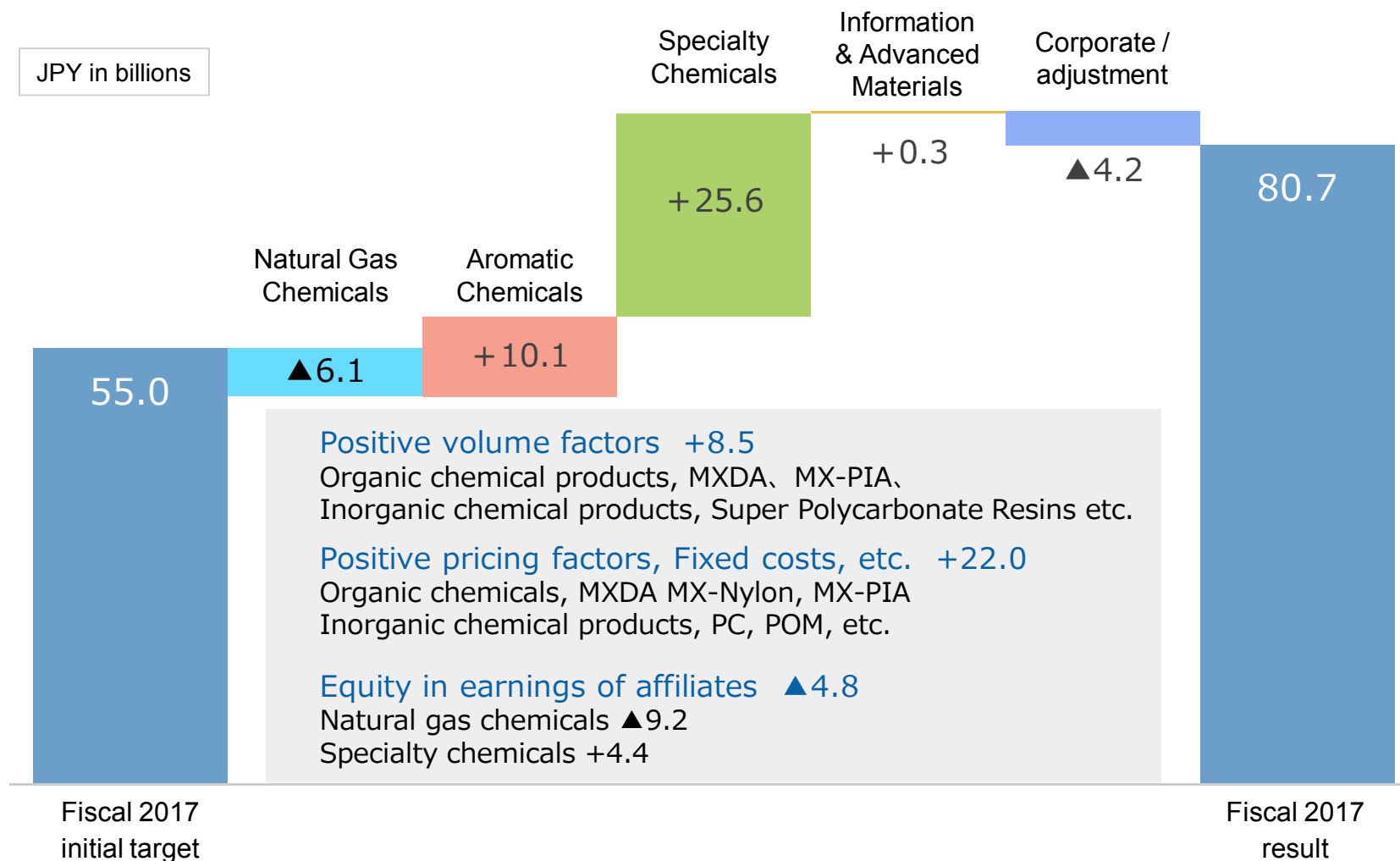
Assumptions	2017 (Result)	2017
Exchange rate (JPY/USD)	111	115
Crude oil (Dubai) (USD/bbl)	56	65





## Review of Previous Medium-Term Management Plan, MGC Advance2017

### Changes in ordinary income by segment



## Review of Previous Medium-Term Management Plan, MGC Advance2017

Major investment projects (total investment: ¥120 billion)

- Strengthening of Production Capacity for Super Polycarbonate Resins (2016)
- Strengthening of Production Capacity for Glycidyl Methacrylate (2017)
- Establishment of QOL Innovation Center Shirakawa (2017)
- Establishment of Joint Venture Company for MAB\*1 Production (2018)
- **Participation in Natural Gas-Fired Power Generation Project at Soma Port in Fukushima Prefecture (2020)**

Establishment of Super-pure Hydrogen Peroxide R&D Center (2017)

Japan

Taiwan

Indonesia

Participation in an Ammonia production Project (2017)

**Participation in a Shale Gas Development and LNG Production project**

Canada

Oregon

Texas

**Construction of Two New Plants for Super-pure Hydrogen Peroxide (2019)**

Trinidad and Tobago

**Participation in a Methanol/DME production project (2019)**

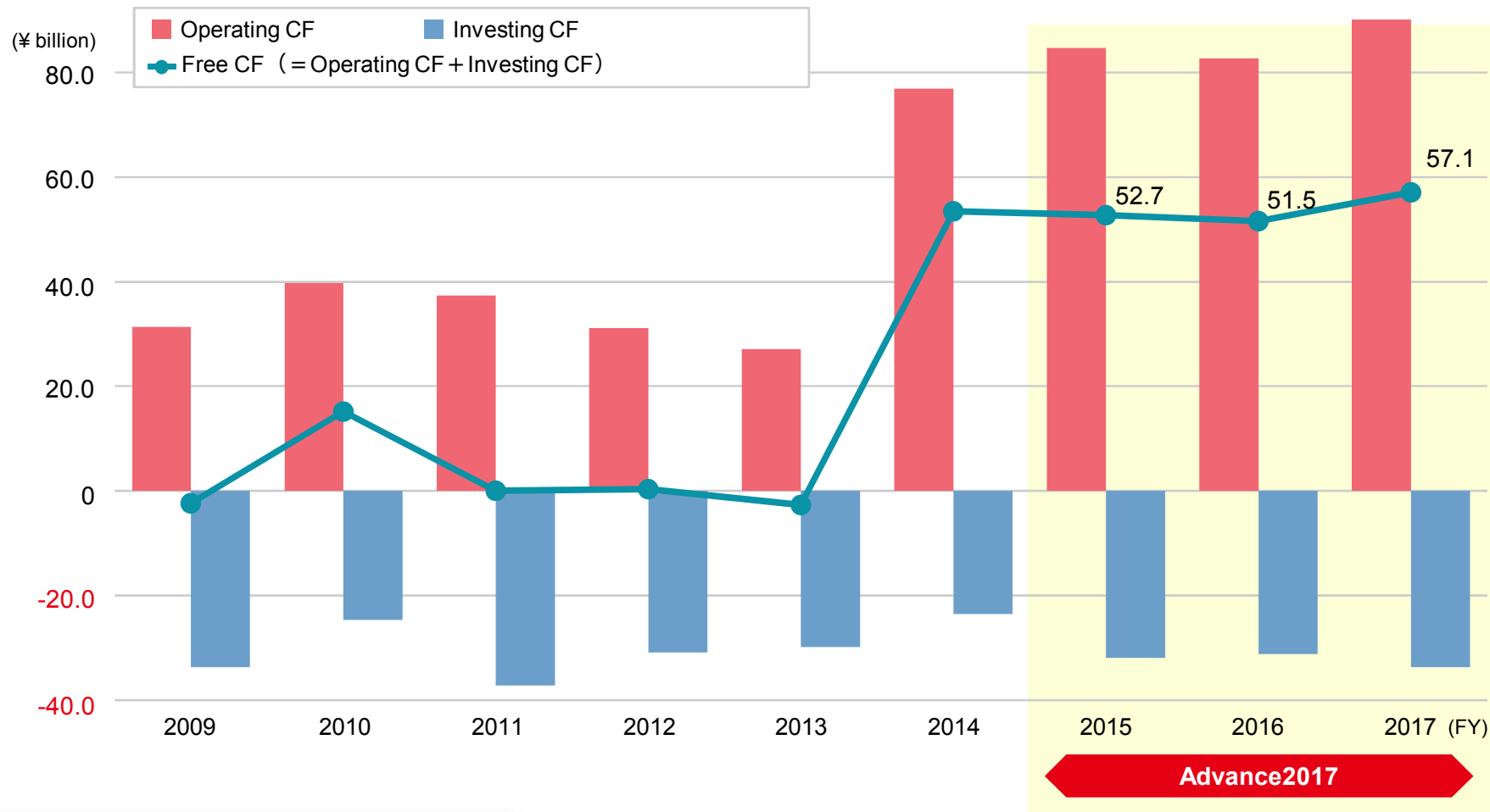
\*1 MAB  
monoclonal antibody pharmaceuticals including biosimilars

Entries in red are activities planned for inclusion in the next medium-term management plan.

## Review of Previous Medium-Term Management Plan, MGC Advance2017

### Cash flows

As a result of improved profitability, free cash flow came to a cumulative 161.4 billion yen for the fiscal years covered by Advance2017.



## Contents

---

- 1 | Review of Previous Medium-Term Management Plan,  
MGC Advance2017
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MGC Advance2020
- 3 | Business Plans by Segment  
New Medium-Term Management Plan, MGC Advance2020

# Overview of New Medium-Term Management Plan, MGC Advance2020

## Business environment

### Megatrends and important social issues

#### Changes in the natural environment

- Global warming
- Biodiversity crisis

#### Changes in social conditions

- Reducing environmental impact
- Changing international affairs
- Changing demographics
  - Graying societies with declining birthrates
  - Growing economies of developing countries
- Promotion of diversity
- Technological innovation
- Integration of IoT, AI, Big Data
- Increasing awareness of environmental, social, and governance (ESG) issues



### Business opportunities and risks

#### Opportunities

- Reducing environmental impact
- Diversifying demand
- Improving quality of life
- Data and communications infrastructure requiring faster and larger capacity
- Revolution in the automobile industry

#### Risks

- Increasing risk of climate change
- Changing international affairs
- Unpredictable energy prices and difficult-to-predict currency values
- Labor shortage and total demand falling in Japan
- Falling behind in technological innovation

## Overview of New Medium-Term Management Plan, MGC Advance2020

### Fundamental philosophy and Group vision

#### Fundamental philosophy

**MGC contributes to societal growth and harmony  
by creating a wide range of value through chemistry.**

#### MGC Group vision: Creating values to share with society

**The MGC Group harnesses the power of chemicals and the individual efforts of each person in the Group to create products and technologies that are needed by and provide values to society, to help resolve social issues, and help realize a sustainable society.**

## Overview of New Medium-Term Management Plan, MGC Advance2020

Fundamental objectives, strategies, and numerical targets

### Fundamental objectives

- | Enhancing the corporate value of the MGC Group
- | Deepening the trust of MGC Group stakeholders

### Strategies Five strategies for achieving the fundamental objectives

- | Strengthening the earning power of existing businesses with a focus on the core businesses
- | Creating and developing new businesses
- | Implementing investment strategies to form an optimal business portfolio
- | Promoting unified MGC Group management
- | Improving total enterprise quality to support sustainable growth

### [ Numerical Targets ]

#### | Consolidated earnings targets for fiscal 2020 (JPY)

Sales: ¥750 billion    Operating income: ¥65 billion    Ordinary income: ¥90 billion    ROE: 12% or higher

## Overview of New Medium-Term Management Plan, MGC Advance2020

### Fundamental objectives

#### Enhancing the corporate value of the MGC Group

The MGC Group will further enhance its corporate value through its management strategies and by expanding its existing businesses and advancing into new business areas while constantly pursuing safety, efficiency, productivity, and profitability.

#### Deepening the trust of MGC Group stakeholders

The MGC Group will seek to deepen the trust of all stakeholders in its operations and fulfill its corporate social responsibility as we realize sustainable growth.



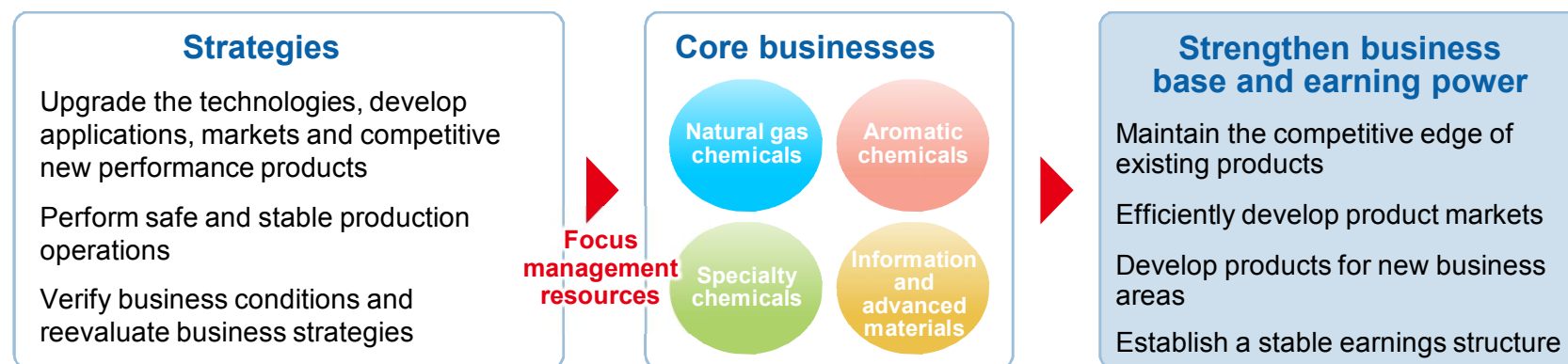
# Overview of New Medium-Term Management Plan, MGC Advance2020

## Five strategies for achieving the fundamental objectives

### Strategy 1: Strengthening the earning power of existing businesses with a focus on the core businesses

**Focus management resources on the core businesses that are the company's strengths and enhance the profitability of existing businesses.**

- We will enhance the profitability of existing businesses by improving our technology, maintaining our competitive advantage, and efficiently developing markets for our products.
- For our existing products, we will develop new applications and markets while also developing applications in new business areas.
- We will conduct safe and stable production operations to enhance our profitability and strengthen our business base.
- Strengthen the business base:
  - Realize a smooth start of operations of the Methanol and Dimethyl ether plant in Trinidad and Tobago and two new super-pure hydrogen peroxide plants in North America.
  - Strengthen production capacity for super polycarbonate resins and our domestic MXDA plant.
  - Begin to plan to construct new MXDA plant (2022).
- Expand the lineup of competitive performance products:
  - Organic Chemical products, MXDA, MX-Nylon, Aromatic aldehydes, Electronic chemicals, High-performance Polycarbonates resins, Super Polycarbonate Resins , BT materials, and Oxygen absorbers.



## Overview of New Medium-Term Management Plan, MGC Advance2020

Five strategies for achieving the fundamental objectives

### Strategy 2: Creating and developing new businesses

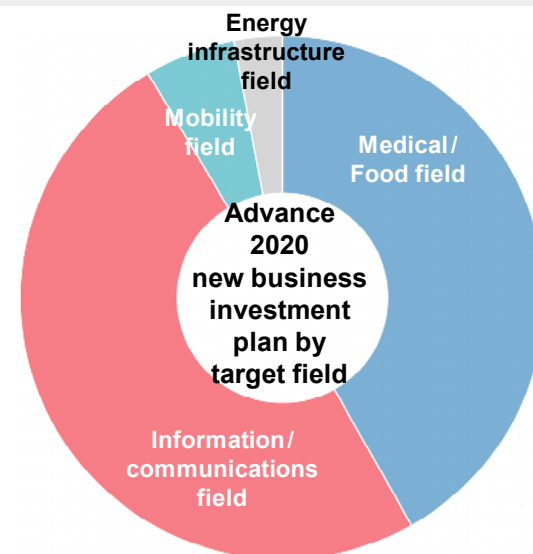
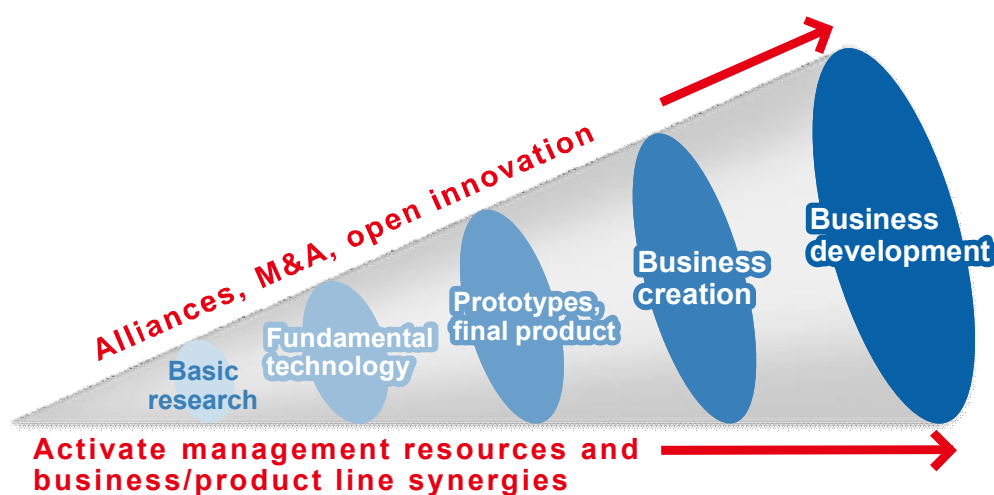
The MGC Group will ensure it continues flourishing by actively developing new technologies and products and creating and developing new businesses. Specifically, we will aggressively invest in the fields of medical and food, information and communications, and mobility.

■ We will develop and launch new technologies and products by increasing our sensitivity to market changes influenced by megatrends and to the speed of those changes. We will also identify specific target markets and seek to launch products in a timely manner to ensure maximum success.

■ We will generate new business by incorporating new management approaches, such as partnerships and M&A, and by actively applying our management resources.

■ We will focus on creating and growing new businesses :

The Life sciences business, Medical packaging materials, Transparent polyimide resin, Raw material for under-layer used for circuit patterning, LiBH<sub>4</sub>-based Solid Electrolytes, and Direct methanol fuel cell.



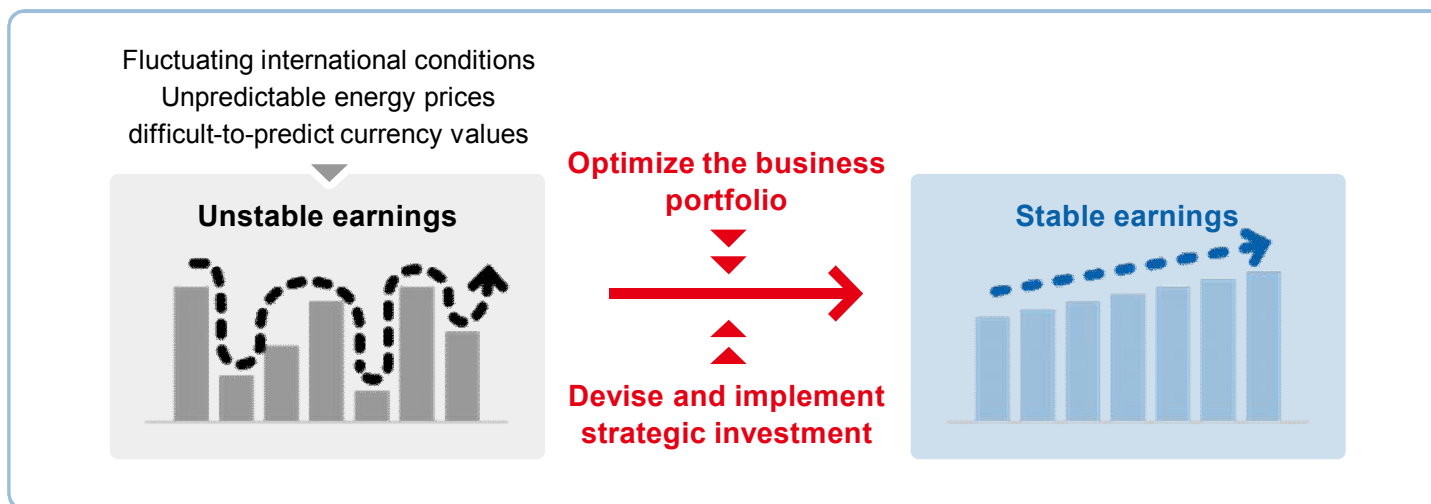
## Overview of New Medium-Term Management Plan, MGC Advance2020

Five strategies for achieving the fundamental objectives

### Strategy 3: Implementing investment strategies to form an optimal business portfolio

**We will devise and implement an investment strategy for forming an optimal business portfolio to establish a stable earnings structure for the Group.**

- We will devise and implement an investment strategy that diversifies revenue sources by constantly generating new technologies, products, and businesses, and that supports a balance of commodity, high-performance, specialty, and new products within the MGC Group.
- We will formulate investment strategies that take into account how megatrends are changing the markets for our products and how quickly the markets are changing. Investments will be geared to growth with the aim of enhancing our corporate value.



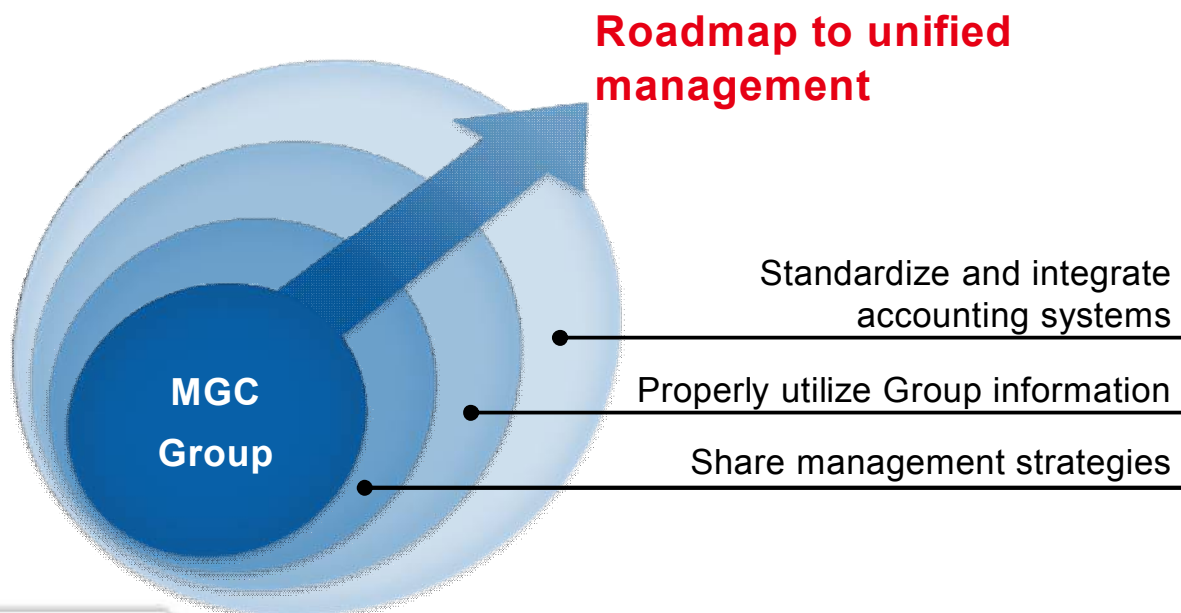
## Overview of New Medium-Term Management Plan, MGC Advance2020

Five strategies for achieving the fundamental objectives

### Strategy 4: Promoting unified MGC Group management

**We will share management strategies throughout our organization and conduct daily operations as a united group of companies to enhance the overall corporate value of the MGC Group.**

- We will accurately determine Group information and continue striving to improve the efficiency of our Group management by introducing business management units (BMU) to facilitate standardizing and integrating the three trade houses of the MGC Group as well as sharing and unifying the accounting systems within the Group.
- We will make our investment management methods more sophisticated from the Group perspective, including formulating an accurate performance evaluation system capable of appraising all of the various investment activities of the Group.



## Overview of New Medium-Term Management Plan, MGC Advance2020

Five strategies for achieving the fundamental objectives

### Strategy 5: Improving total enterprise quality to support sustainable growth

**We will constantly improve the qualities of management resources, including personnel, capital, technology, information, brand, and intellectual assets, and manage and apply these resources effectively.**

- We will raise the level of our awareness and culture of safety in our operations and deepen its application throughout the Group.
- We will strive to operate an effective corporate governance system that we will continually reinforce.
- We will practice compliance while readying and strengthening systems for responding to any manner of risk.
- We will develop human resources.
- We will cultivate research and development capabilities that encourage innovation.
- We will improve the efficiency of our information systems.

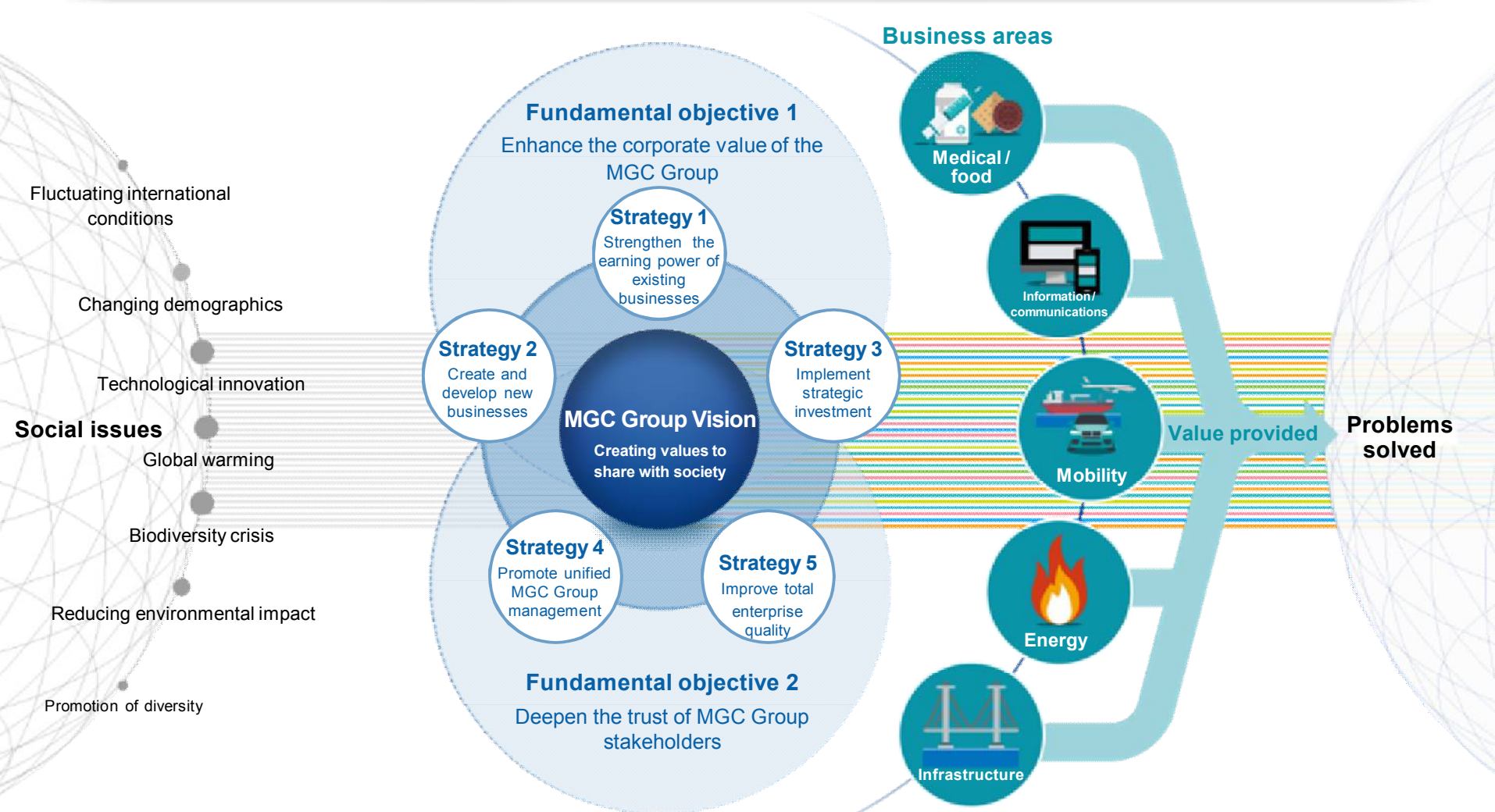
#### Strategies

Raise our awareness and culture of safety  
 Strive to operate an effective corporate governance system that we will continually reinforce  
 Improve compliance and risk management  
 Development of human resources  
 Cultivate our R&D capabilities  
 Improving information system efficiency



# Overview of New Medium-Term Management Plan, MGC Advance2020

A brighter future from bigger dreams !



Corporate Governance



# Overview of New Medium-Term Management Plan, MGC Advance2020

## Numerical targets

### Ordinary income to decline

in fiscal 2018 because of narrower spreads

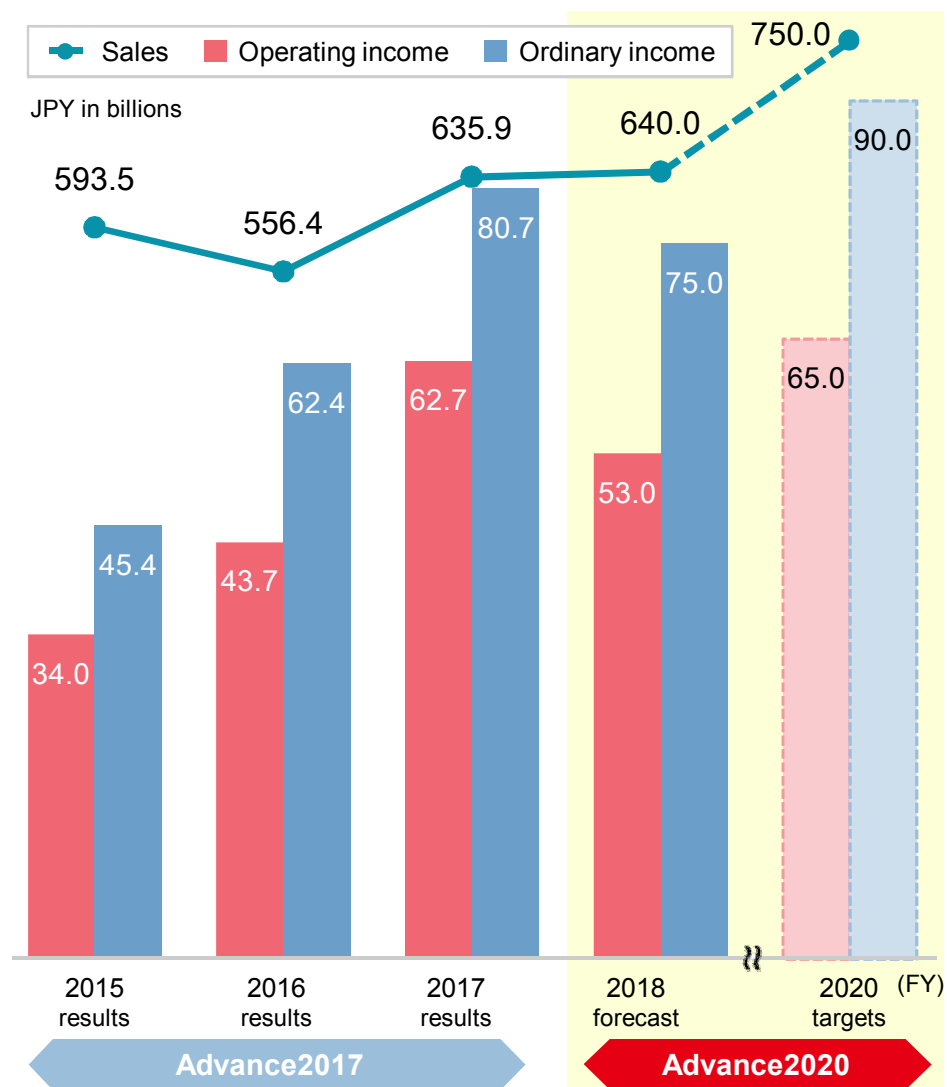
**Growth** in both sales and profits in the final fiscal year of MGC Advance2020

### Consolidated earnings targets for fiscal 2020

JPY in billions

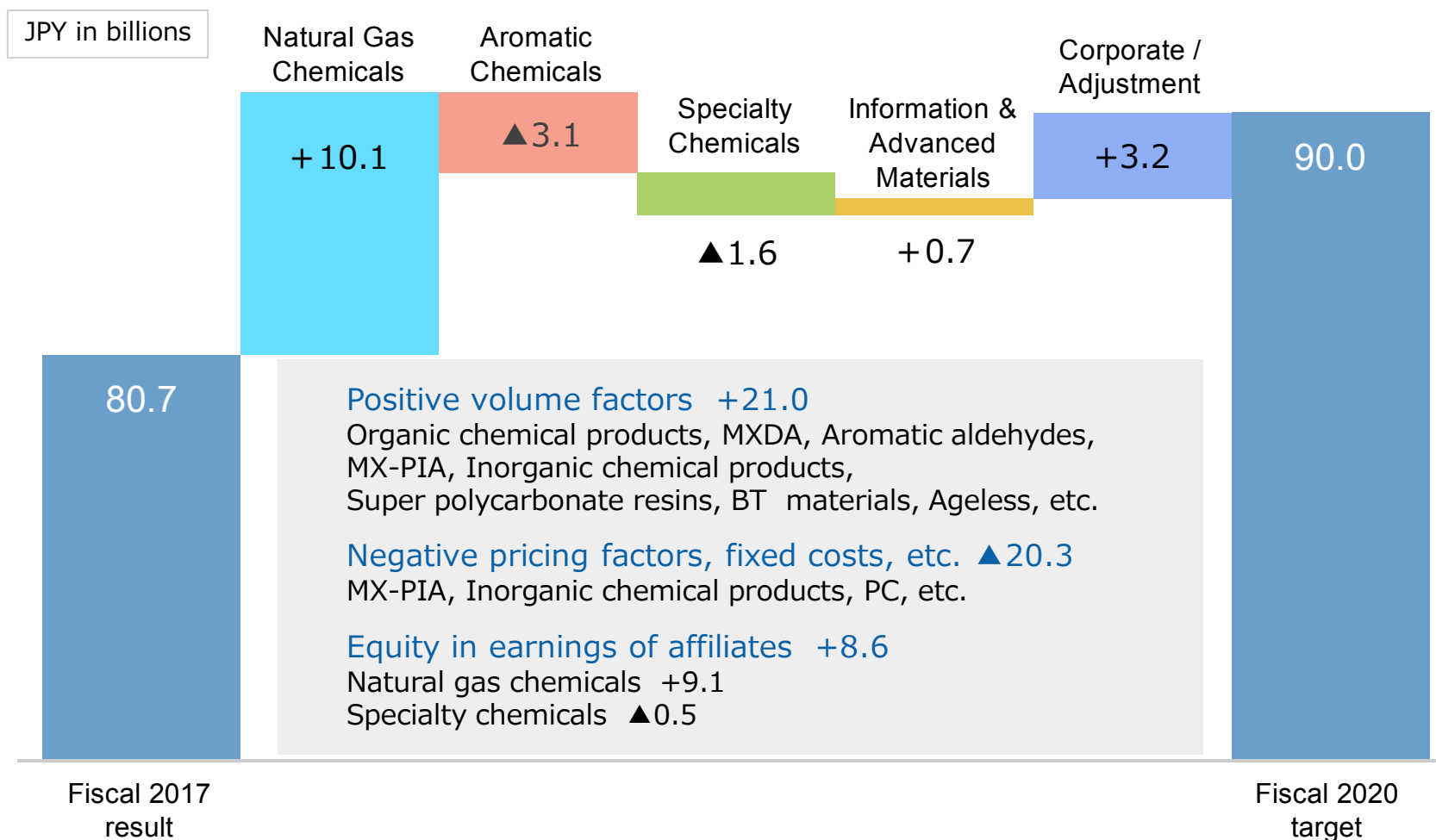
Consolidated performance	Fiscal 2017 results	Fiscal 2018 forecast	Fiscal 2020 targets
Sales	635.9	640.0	750.0
Operating income	62.7	53.0	65.0
Ordinary income	80.7	75.0	90.0
ROE	13.6%	12.5%	12% or higher

Assumptions	Fiscal 2017 result	Fiscal 2018	Fiscal 2020
Exchange rate (JPY/USD)	111	110	110
Crude oil (Dubai) (USD/bbl)	56	60	60



## Overview of New Medium-Term Management Plan, MGC Advance2020

### Changes in ordinary income by segment

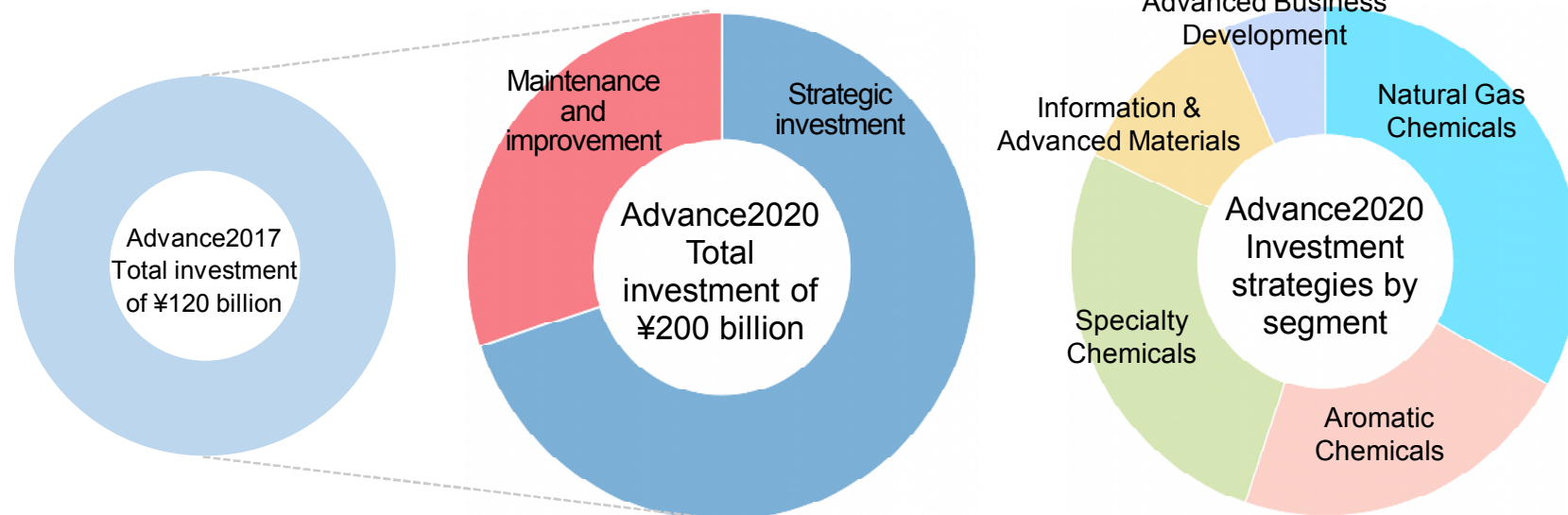




## Overview of New Medium-Term Management Plan, MGC Advance2020

### Investment strategies

- We will enhance the corporate value of the MGC Group by efficiently allocating management resources to strengthen the earning power of our existing businesses and to create and develop new businesses.
- We will invest strategically to construct an optimal business structure with a balance of commodities, high-performance products, specialty products to ensure consistent and stable revenue flow even in a changing external economic environment, such as fluctuations in raw material and fuel costs and in currency values.
- Total R&D investment under Advance2020: ¥66 billion

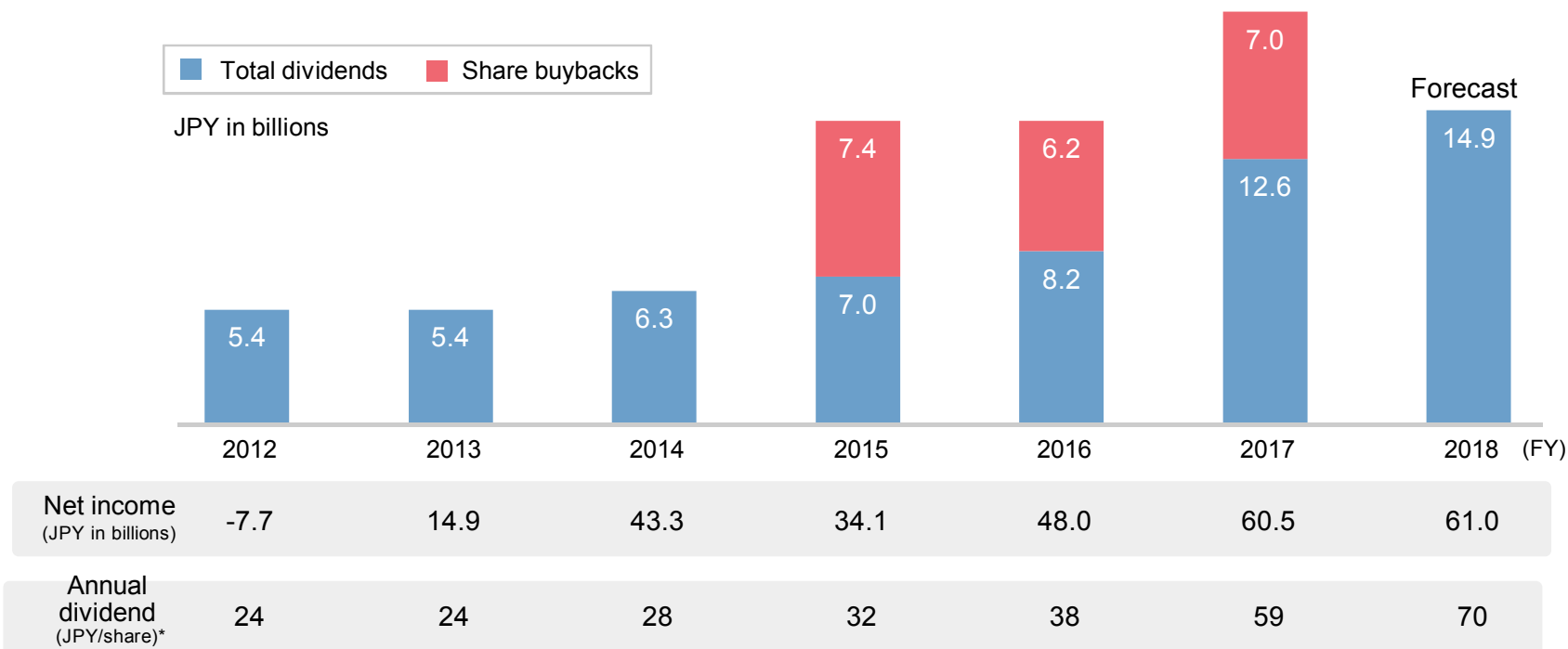


Note: Figures above exclude M&A investments.

## Overview of New Medium-Term Management Plan, MGC Advance2020

### Shareholder return policy

- The MGC Group places topmost management priority on enhancing corporate value.
- The Company will continuously provide stable dividends, while taking operating performance and other factors into account when determining the distribution amount.
- The Company's basic policy is to improve capital efficiency and enhance shareholder returns by flexibly purchasing treasury stock while considering the levels of internal reserves and returns to shareholders.



\*The company conducted a two-for-one reverse stock split on October 1, 2016. Dividend figures predating the share consolidation have been adjusted to show what they would have been had the effects of the share consolidation also applied to them.

## Contents

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1

Review of Previous Medium-Term Management Plan,  
MGC Advance2017

2

Overview of New Medium-Term Management Plan,  
MGC Advance2020

3

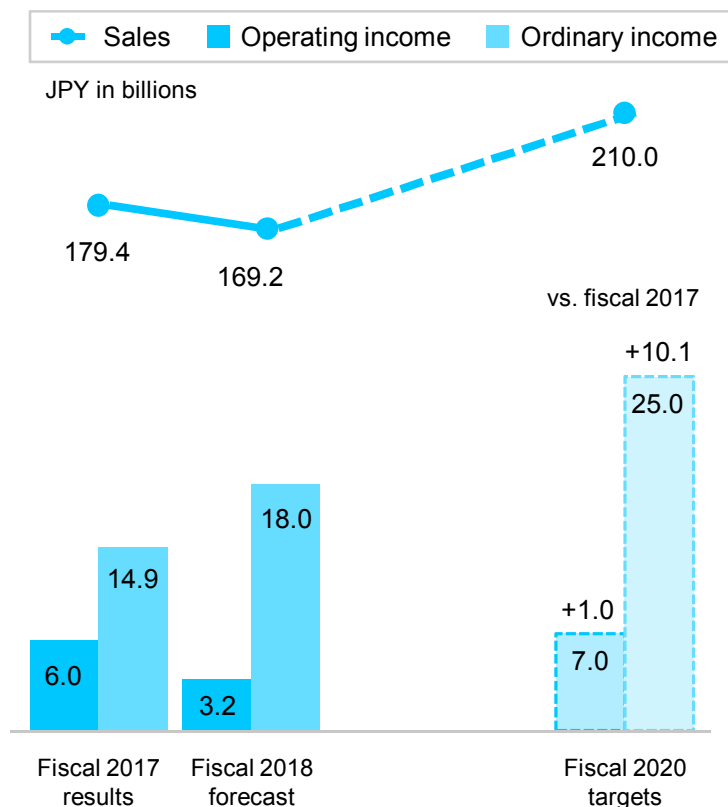
**Business Plans by Segment**  
**New Medium-Term Management Plan, MGC Advance2020**

## Business Plans by Segment

### New Medium-Term Management Plan, MGC Advance2020

#### Natural Gas Chemicals

We will develop our business globally by leveraging our extensive experience in the Methanol and Energy & Resource Development businesses and actively working to create new combinations of MGC Group technologies and derivative products.



#### <Methanol>

- Start up the Trinidad and Tobago Project as planned (Start of commercial operations in 2019)
- Maintain stable, efficient operations at existing JVs (Saudi Arabia, Venezuela, Brunei)

#### <Energy & Resource Development>

- Start up the Wasabizawa Geothermal Power Plant, Akita Prefecture, Japan, as planned (Start of operations in 2019)
- Plan construction of the Appi Geothermal Power Plant, Iwate Prefecture, Japan (Operational startup targeted for 2023)

#### <Organic chemicals>

- Provide stable supply based on safe, stable operations
- Create new businesses based on proprietary catalysts and synthesis technology

#### <Life sciences>

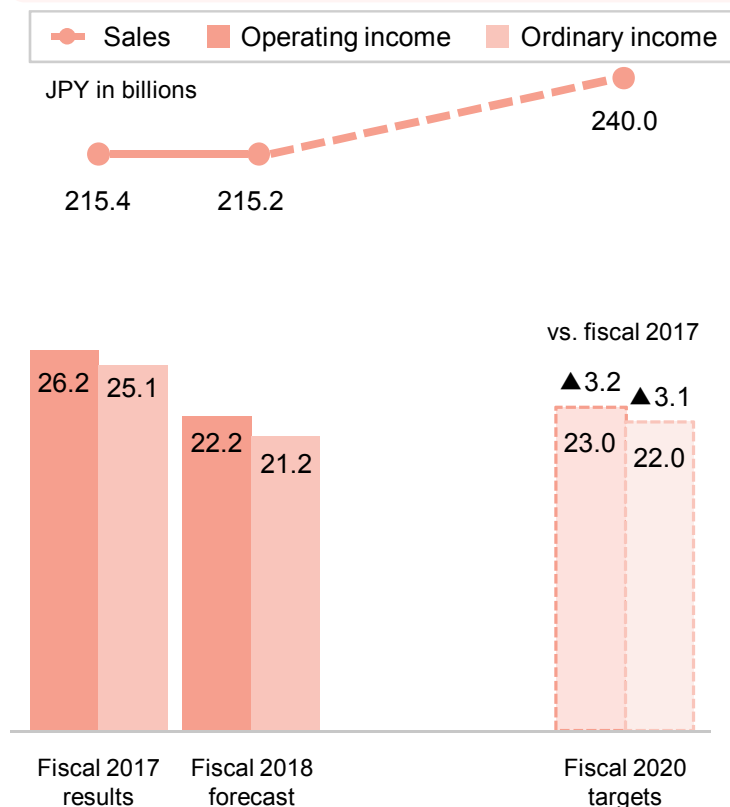
- Continuously launch new bio-products based on enhanced R&D activities
- Advance the bio-pharmaceutical business focusing on antibody drugs

## Business Plans by Segment

### New Medium-Term Management Plan, MGC Advance2020

#### Aromatic Chemicals

We will maintain stable operations in existing commodity products as our foundation business. We will develop a high-value-added business by creating new technologies and products and working closely with our customers to develop specialty products and new products for new markets.



#### <MXDA/MX nylon>

- Pursue sales expansion strategy in overseas
- Develop markets for water-based coatings, low-sensitivity coatings, and CFRP
- Construct new MXDA facility (Operational startup targeted for 2022)

#### <Aromatic aldehydes>

- Develop new derivatives based on HF/BF<sub>3</sub> catalyst technology

#### <MX / PIA>

- Provide stable supply based on safe, stable operations
- Establish a core business resistant to changes in market prices and the external environment

#### <Foamed plastic> JSP\*

- Expand growth businesses (Automobile parts, Construction materials, etc.)
- Expand business areas through a strategy of differentiation from the customer's perspective

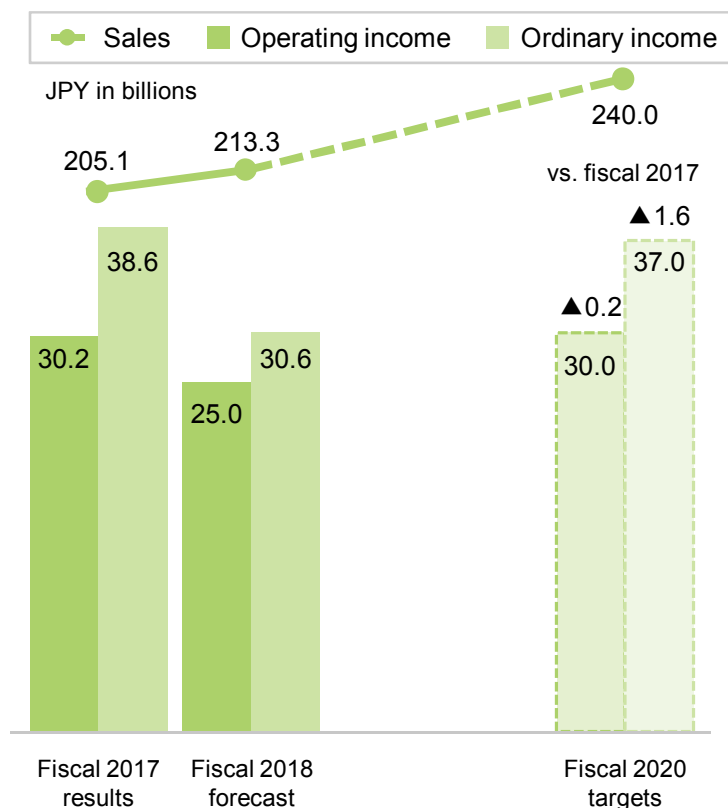
\*JSP is an MGC Group company in the aromatic chemicals segment.

## Business Plans by Segment

### New Medium-Term Management Plan, MGC Advance2020

#### Specialty Chemicals

We will focus management resources on increasing the MGC Group's presence in the information and communications and mobility fields and on expanding sales of high-value-added products.



#### <Hydrogen peroxide>

- Further strengthen MGC's business base as Japan's top manufacturer
- Develop high-value-added markets, including disinfection agents and environment-related items

#### <Chemicals for the electronics industry>

- Start up two new North American plants
- Develop new chemicals with leading-edge semiconductor technologies

#### <Polycarbonate Resin>

- Develop and expand sales of highly functional resins and sheet/film, as well as other high-value-added products
- Expand sales of High-refractive-index and Low-birefringence Special Polycarbonate Resin
- Supply high-quality products to meet customer demands

#### <Polyacetal resin>

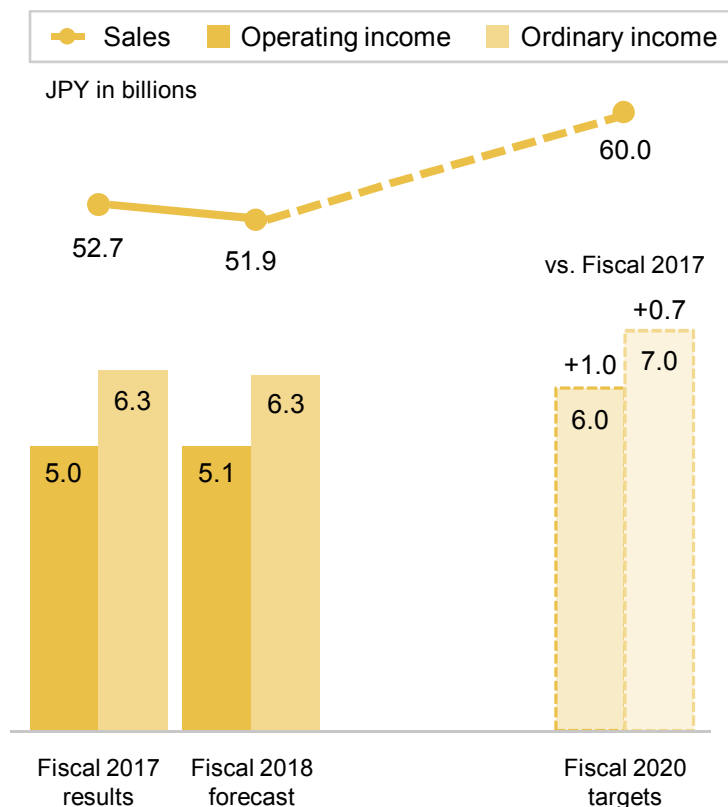
- Launch and expand sales of new products for the automobile and OA markets
- Develop drinking-water pipe and other water-system markets

## Business Plans by Segment

### New Medium-Term Management Plan, MGC Advance2020

#### Information & Advanced Materials

We will expand our market by improving our existing products and filling out our lineup, and we will create new business to develop new products.



#### <Electronic materials>

- Respond to technological trends toward faster, higher-volume communications and lighter, thinner, more-compact devices in the electric and electronics industries, and expand sales in peripheral markets
- Develop semiconductor package materials and peripheral materials for automobile, AI/IoT-related device, and next-generation telecommunication (5G) applications
- Improve Japanese plants in terms of adaptability to demand fluctuations and ability to turn out a greater variety of products  
Improve Thai plants by expanding the variety of products handled and by enhancing supply reliability and production efficiency through cooperative operation

#### <Oxygen absorbers>

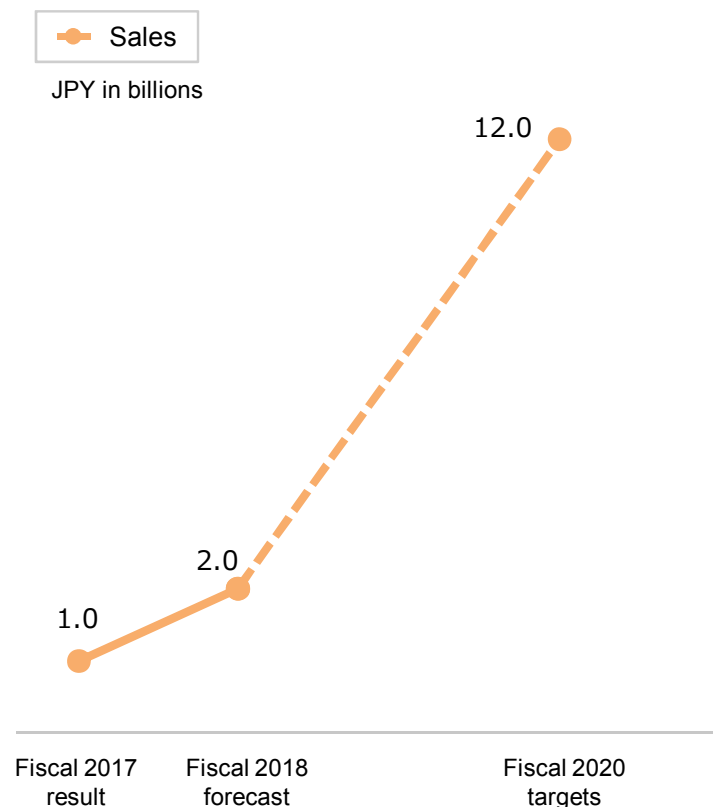
- Increase Japanese market share and expand sales in overseas markets
- Expand sales of plastics containers made with oxygen absorber resin (pouches, film, bottles)
- Expand sales to the pharmaceutical and industrial-product markets
- Maintain safe, stable operations, and provide reliable supply at the two plants in Japan and Thailand

## Business Plans by Segment

### New Medium-Term Management Plan, MGC Advance2020

#### New businesses

We will use M&A and various business investment methods to supplement our proprietary technologies and continually work to create and build up new businesses to contribute to the advancement of society.



#### <Plastic vials and syringes>

- Promote commercialization of plastic vials and syringes applying OXY-CAPT™ technology

#### <Nucleic acid pharmaceuticals>

- Advance R&D through investment in Veritas In Silico Inc., which is performing R&D in nucleic acid pharmaceuticals

#### <Factory farming business>

- Construct a large-scale vegetable factory with 100% artificial lighting and enter the factory farming business by collaborating with Farmship, Inc. (Start of production planned for 2019)

#### <Active optical cable>

- Promote commercialization of Active optical cables through investment in Optomind Inc. (South Korea), which develops and sells active optical cables

#### <Complex hydride solid electrolyte>

- Develop Solid Electrolytes that can be used with all-solid-state lithium-ion batteries



## INQUIRIES

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May 11, 2018

**MITSUBISHI GAS CHEMICAL COMPANY, INC.**

# New Mid-Term Management Plan Appendix

May 11, 2018

**MITSUBISHI GAS CHEMICAL COMPANY, INC.**

**Appendix: Sales, operating income and ordinary income by segment;  
Results, forecast and targets (JPY in billions)**

	FY 2012 results	FY 2013 results	FY 2014 results	FY 2015 results	FY 2016 results	FY 2017 results	FY2018 forecast	FY2022 target
<b>Sales</b>	467.9	534.4	529.5	593.5	556.4	635.9	640.0	750.0
Natural Gas Chemicals	161.8	194.8	197.6	175.6	153.5	179.4	169.2	210.0
Aromatic Chemicals	130.1	141.5	123.3	205.8	194.4	215.4	215.2	240.0
Specialty Chemicals	132.5	154.5	166.0	170.2	172.2	205.1	213.3	240.0
Information & Advanced Materials	53.2	55.4	58.2	55.2	50.2	52.7	51.9	60.0
Corporate / adjustment	▲ 9.8	▲ 11.9	▲ 15.6	▲ 13.5	▲ 13.9	▲ 16.9	▲ 9.7	0.0
<b>Operating income</b>	11.4	11.4	14.9	34.0	43.7	62.7	53.0	65.0
Natural Gas Chemicals	1.7	2.7	2.7	4.1	2.5	6.0	3.2	7.0
Aromatic Chemicals	0.7	2.8	3.0	15.2	18.3	26.2	22.2	23.0
Specialty Chemicals	6.9	3.9	8.2	13.0	21.6	30.2	25.0	30.0
Information & Advanced Materials	4.1	4.2	3.8	4.0	4.8	5.0	5.1	6.0
Corporate / adjustment	▲ 2.2	▲ 2.3	▲ 2.8	▲ 2.4	▲ 3.6	▲ 4.9	▲ 2.7	▲ 1.0
<b>Ordinary income</b>	27.6	30.8	42.0	45.4	62.4	80.7	75.0	90.0
Natural Gas Chemicals	15.9	18.4	27.2	13.9	14.3	14.9	18.0	25.0
Aromatic Chemicals	▲ 0.8	2.1	1.0	13.7	17.5	25.1	21.2	22.0
Specialty Chemicals	6.7	3.8	9.1	15.5	26.8	38.6	30.6	37.0
Information & Advanced Materials	4.4	4.8	4.0	3.8	6.1	6.3	6.3	7.0
Corporate / adjustment	1.4	1.5	0.5	▲ 1.6	▲ 2.4	▲ 4.3	▲ 1.2	▲ 1.0

## Appendix: key Indicators (1)

	FY2012		FY2013		FY2014		FY2015		FY2016	
	H1	H2	H1	H2	H1	H2	H1	H2	H1	H2
Exchange rate (JPY/USD)	79	87	99	102	103	117	122	118	105	112
Crude oil(Dubai) (US\$/BBL)	106	107	103	105	104	63	56	36	43	51
Methanol (US \$ /MT)	385	364	375	449	432	358	301	230	230	327
Mixed Xylene (US\$/MT)	1,190	1,320	1,230	1,160	1,100	730	740	630	660	680
Bisphenol A (US\$/MT)*	1,500 ~1,800	1,600 ~2,000	1,550 ~1,800	1,550 ~1,700	1,600 ~2,000	1,200 ~1,900	950 ~1,500	850 ~1,100	1,000 ~1,200	1,000 ~1,400
Polycarbonate (US\$/MT)*	2,500 ~2,800	2,500 ~2,800	2,400 ~2,600	2,400 ~2,600	2,500 ~2,700	2,300 ~2,700	2,100 ~2,650	2,000 ~2,400	2,200 ~2,500	2,400 ~2,800

	FY2017		FY2018 (Forecast)	FY2020 (Assumptions)	Remarks
	H1	H2			
Exchange rate (JPY/USD)	111	111	110	110	
Crude oil(Dubai) (US\$/BBL)	50	62	60	60	
Methanol (US \$ /MT)	296	381	335	355	Asia spot average price
Mixed Xylene (US\$/MT)	650	725	705	705	Spot price (FOB-Korea)
Bisphenol A (US\$/MT)*	1,100 ~1,300	1,200 ~1,700	1,200 ~1,800	1,000 ~1,600	Average CIF price
Polycarbonate (US\$/MT)*	2,500 ~2,900	2,900 ~3,900	2,700 ~3,900	2,300 ~3,200	

Note: Methanol price forecasts are expressed for the following periods.

Through fiscal 2014:

1H: January–June

2H: July–December

From fiscal 2015:

1H: April–September

2H: October–March

## Appendix: key Indicators (2) Consolidated (JPY in billions)

	FY2012	FY2013	FY2014	FY2015	FY2016	FY2017	FY2018 Forecast	FY2019 Plan	FY2020 Plan
Capital expenditure	30.9	25.4	22.2	30.5	35.0	30.9	45.0	47.0	50.0
Depreciation & amortization	23.0	23.5	23.7	26.7	25.6	27.0	27.0	30.0	32.0
R&D expenditure	15.1	16.1	16.8	18.9	19.2	18.9	22.0	22.0	22.0
Employees (as of March 31)	5,323	5,445	8,254	8,176	8,034	8,009	8,239	8,250	8,350

**Appendix: “Creating values to share with society:”**  
The MGC Group’s diverse product portfolio

**Five target fields of business to focus on**



**Medical /  
food**



**Information /  
communications**



**Mobility**



**Energy**



**Infrastructure**





**MGC Group Vision: Creating values to share with society**

The MGC Group harnesses the power of chemicals and the individual efforts of each person in the Group to create products and technologies that are needed by and provide values to society, to help resolve social issues, and to help realize a sustainable society.

We will continue to develop our wide range of diverse products in the five fields where we can make the most profound contribution. While pursuing profit, our greater objective is to create social and environmental values that helps realize a safer and more secure society.

## Appendix: “Creating values to share with society:” Medical/food field




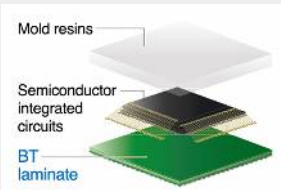


Products	End-use application	Source of competitiveness	Helping to realize a safe and secure society
BioPQQ Elion™ SA*1	Material for functional foods	Technology for continuous culture of microorganisms  Strain cultivation technology	The use of PQQ as a material for functional foods suitable for a super-aging society is approved in Japan and overseas  
Antibody drugs	Biosimilar	Technology for cultivating animal cells  Production process development	Antibody drugs are superior in effectiveness and safety in comparison with conventional low-molecular- weight drugs.  
OXYCAPT™	Plastic viral and syringe	Polymerization technology  Multilayer forming technology	OXYCAPT is a multilayered resin vial and syringe. It achieves oxygen-barrier properties equivalent to that of glass.  
Oxygen absorbers MX-Nylon	Maintaining quality and freshness of foods and drinks	Oxygen absorber technology  Polymerization technology	AGELESS and MX-Nylon reduce food waste and lower CO <sub>2</sub> emissions by increasing distribution efficiency.  

\*1 Elion™ SA:S-adenosylmethionine-containing yeast

## Appendix: “Creating values to share with society:” Information/Communications field



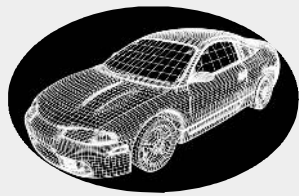



Products	End-use application	Source of competitiveness	Helping to realize a safe and secure society
Special polycarbonate resin	Camera lenses (High refractive index and low birefringence)	Polymerization technology  Resin composition development capability	High refractive index helps to thin the lens and low birefringence reduces optical distortion and helps to image clarity. Manufacturing method reduces environment impact. 
Neopulim (transparent polyimide resin)	Organic EL displays	Polymerization technology	Our thin, lightweight, flexible, and crack-resistant Neopulim film enables portability for organic EL displays. 
Chemicals for the electronics industry	Liquid crystal displays Semiconductors	High-purity technology  Clean technology	Our chemicals for the electronics industry are key elements of technology innovation in electronic equipment used in mobile devices, household electronics, and automobiles. 
BT materials	Materials for semiconductor packages	Polymerization technology Filler technology Composite design technology	BT materials contribute to smaller, thinner, lighter-weight, higher-performance, and energy-saving components used in mobile devices, household electronics, and automobiles. 



## Appendix: “Creating values to share with society:” Mobility field



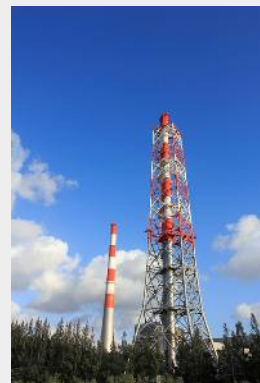


Products	End-use application	Source of competitiveness	Helping to realize a safe and secure society
Polycarbonate Polyacetal	Automotive interior and exterior parts	Polymerization technology Resin composition development capability	The light weight will further enhance vehicles' in-city road performance through lower fuel consumption and, ultimately, lower CO <sub>2</sub> emissions. 
Foam*1	Automotive interior and exterior components	Foaming technology	Foam provides superior collision safety and is lightweight. Note: Foam is a core material in rear car seats. (Foam has high shock-absorbent properties) 
MXDA / 1,3BAC	Automotive interior and exterior parts	Synthesis technology	Used as a hardening agent for GFRP/CFRP, MXDA/1,3BAC contributes to lighter weight, reduced fuel consumption and lower CO <sub>2</sub> emissions. 
GMA	Automotive topcoat paints	Manufacturing technology	GMA is a coating material used to weatherproof paints and make them resistant to acid rain and scratches. 

\*1: Foam products are manufactured by MGC Group company JSP.




## Appendix: “Creating values to share with society:” Energy field



Products	End-use application	Source of competitiveness	Helping to realize a safe and secure society
Methanol	Direct methanol fuel cells (DMFCs)	Synthesis technology Catalyst technology	DMFC is a power-generation system using a methanol aqueous solution. This is a low-noise and clean-combustion gas. 
Geothermal power generation	Clean renewable energy	Resource and exploration development technology	Using geothermal energy enables clean and stable power generation with lower CO <sub>2</sub> emissions. 
Natural gas-fired power generation	Low-environmental-impact energy	High-efficiency power generation systems	MGC is a partner in the natural gas power plant at Soma Port, Fukushima Prefecture, a low-impact power plant facility supplying stable energy. 
Ammonia	Coal-fired power generation Used for denitration	High-pressure gas handling technology	Ammonia is used as a reducing agent for denitration and to reduce industrial air pollution by eliminating nitrogen oxide.

## Appendix: “Creating values to share with society:” Infrastructure field



Products	End-use application	Source of competitiveness	Helping to realize a safe and secure society
Chemicals for the electronics industry BT materials	Information & communication infrastructure	High-purity technology Clean technology Polymerization technology	These products contribute to the high-speed, high-volume communications infrastructure for mobile communications and self-driving cars. 
MXDA	Water-based epoxy resin coatings	Synthesis technology	MXDA is used with water-based epoxy resin coating. Water-based coatings avoid the use of organic solvents, reduce environmental impact and contribute to workers safety and security. 
Hydrogen peroxide	Environmental chemicals	Oxidation technology	The Fenton method uses hydrogen peroxide and a catalyst to clean up soil contaminated with volatile organic compounds (VOCs). 
QOL Innovation Center Shirakawa	QOL-enhancement product manufacturing and development sites	New products development site	The center creates high-efficiency electric and gas energy systems with the aim of reducing environmental impact. 