

December 2019 Asahi Kasei Corporation

Asahi **KASEI** 



#### Outline

1. Review of "Cs for Tomorrow 2018" and business environment

- 2. Vision and goals
- 3. Medium-term management initiative "Cs+ for Tomorrow 2021"





#### (1) Financial results

Profit growth achieved during previous initiative, with operating income at <a href="new record high">new record high</a>
exceeding the target

Cs for Tomorrow 2018

	(¥ billion, unless otherwise specified)	FY2015	FY2016	FY2017	FY2018	15–18 annual growth	FY2018 target announced Apr. 2016
	Net sales	1,940.9	1,883.0	2,042.2	2,170.4		2,200.0
	Operating income	165.2	159.2	198.5	209.6	8.3%	180.0
	Operating margin	8.5%	8.5%	9.7%	9.7%		8.2%
Dunfitabilita	EBITDA <sup>1</sup>	274.8	268.4	311.9	313.6	4.5%	300.0
Profitability	EBITDA margin	14.2%	14.3%	15.3%	14.5%		13.6%
	Net income	91.8	115.0	170.2	147.5		110.0
	EPS (¥)	66	82	122	106	17.2%	78
Conital	ROIC <sup>2</sup>	7.9%	7.8%	9.7%	8.8%		7.0%
Capital efficiency	Net income per shareholders' equity (ROE)	8.6%	10.5%	14.0%	11.1%		9.0%
Shareholder	Dividends per share (¥)	20	24	34	34		
returns	Total return ratio	30.4%	29.1%	27.9%	39.0%		35.0%
Financial health	D/E ratio	0.43	0.35	0.23	0.31		0.50
	Exchange rate (¥/\$)	120	108	111	111		110

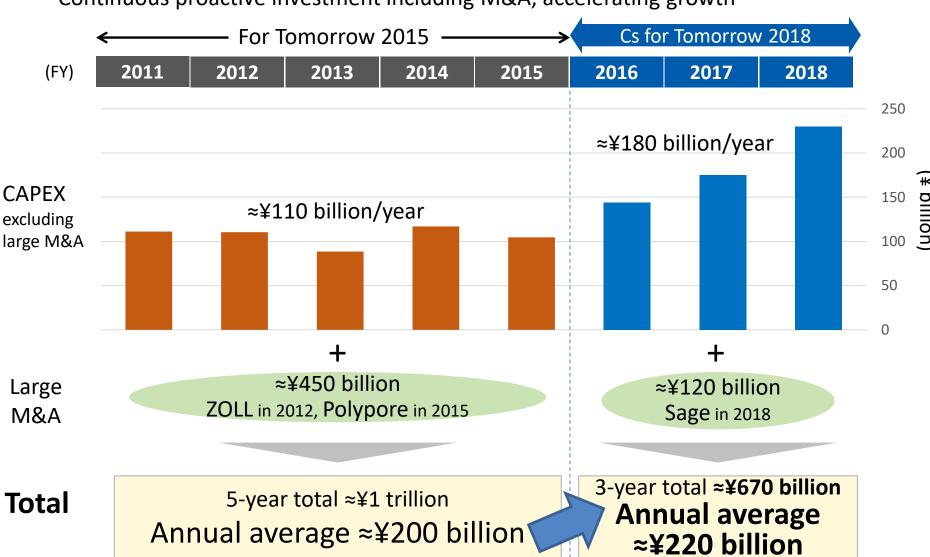
 $<sup>^{\</sup>rm 1}$  Operating income, depreciation, and amortization (tangible, intangible, and goodwill)

<sup>&</sup>lt;sup>2</sup> (Operating income – income taxes) / average annual invested capital



#### (2)-1 Capital expenditure

Continuous proactive investment including M&A, accelerating growth



Note: Figures on decision-adopted basis



#### (2)-2 Capital expenditure: target markets

Investments centered on key fields such as Automotive and Environment/Energy

# Health Care & Hygiene

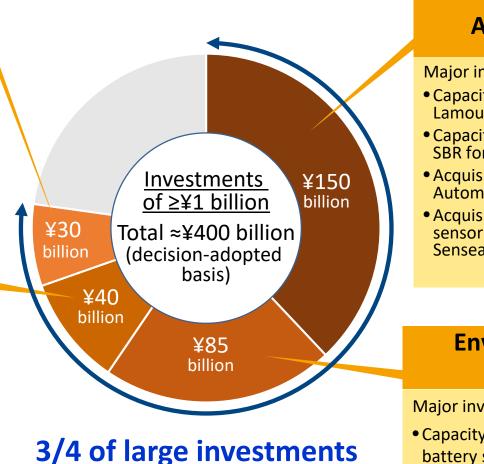
#### Major investments:

- Capacity expansion of spinning for Planova virus removal filters
- Augmenting pharmaceutical product pipeline
- Capacity expansion of spunbond for disposable diapers

#### **Homes**

#### Major investments:

- Capital alliance with Australian home-builder McDonald Jones Homes Pty Ltd
- Acquisition of US supplier of pre-fabricated building products Erickson Framing Operations LLC
- Capital alliance with Mori-Gumi Co., Ltd.



#### **Automotive**

#### Major investments:

- Capacity expansion for Lamous microfiber suede
- Capacity expansion for S-SBR for fuel-efficient tires
- Acquisition of Sage Automotive Interiors, Inc.
- Acquisition of Swedish gas sensor module maker Senseair AB

#### Environment/ Energy

#### Major investments:

 Capacity expansion for Li-ion battery separator

Note: Figures by field are approximate



#### (3) Business Environment

#### Expectations for sustainability; changing industrial structure













Explosive population growth







Changing trade environment





#### (1) Sustainability for Asahi Kasei

Contributing to **sustainable** society

Providing solutions to the world's challenges

Business development; Innovation

Internal and external connections/dialogue

High profitability

→ Return to

stakeholders

Sustainable growth of corporate value

Sincerity, Challenge, Creativity

#### (2) Portfolio transformation

#### Vision of founder Shitagau Noguchi

"As industrialists, we must be cognizant that, to improve the living standard, our ultimate mission is to contribute to people by supplying abundant highest-quality daily necessities at the lowest prices."



# Contributing to sustainable society

Grasping social needs, dynamic portfolio transformation, developing business that makes life better



Social need:
Higher standard of living in developing countries

Acceleration of globalization

Diversity &

Capability to

change

Social need: Abundance of goods



Social need:

Comfort and

convenience

Petrochemicals/synthetic fibers

Social need: Establishment of livelihood base

Chemical fertilizer/regenerated fiber/explosives

1920s 1950s

1970s

**2000s** 

Const. mat./homes

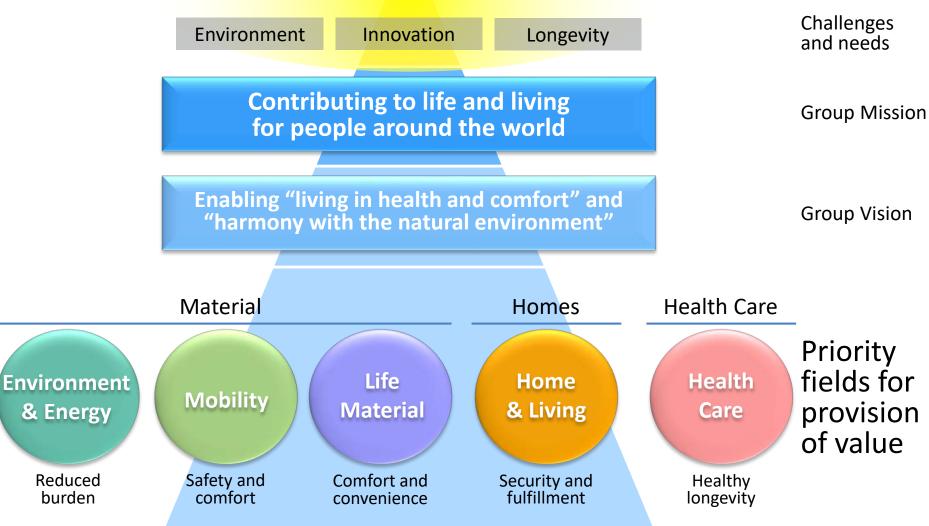
Electronic devices/materials

Healthcare



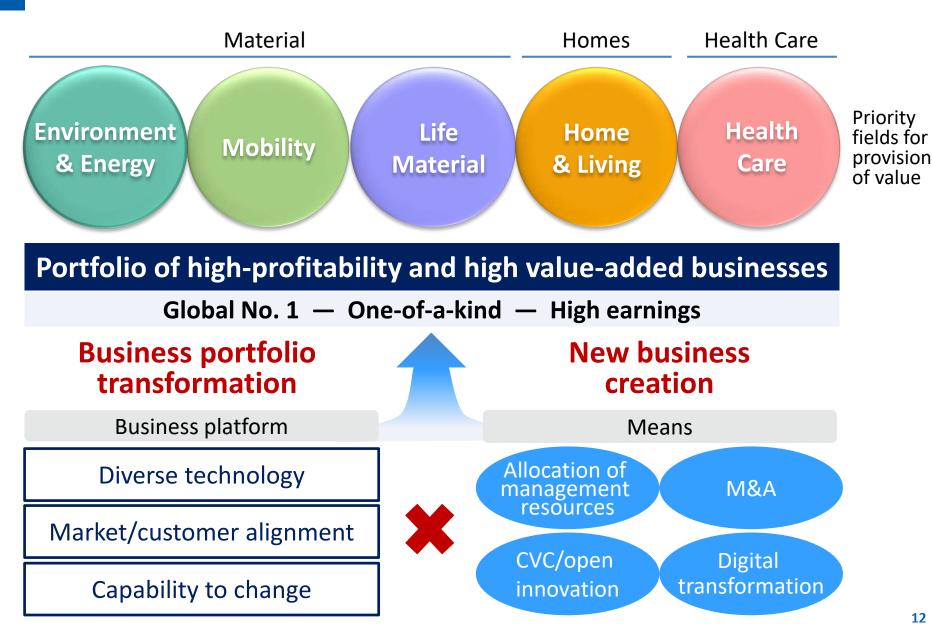
#### (3) Priority fields for provision of value

#### Contributing to sustainable society





#### (4) How we create value





#### (5) Approach to realize sustainable society

# Reducing greenhouse gas (GHG) emissions

- Expanding businesses that help reduce GHG emissions
- Reduced emissions from our own production processes







17 PARTNERSHIPS FOR THE GOALS

# Solutions to plastic issues

- Reduce, Reuse, Recycle
- Elucidating the mechanism of microplastic formation
- Sharing issues





Proactive measures, not only alone but also in concert with other companies and associations



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3. Medium-term management initiative "Cs+ for Tomorrow 2021"

(1) Stance for "Cs+ for Tomorrow 2021"





(2) Concept

#### **Contributing to** sustainable society

Contributing to life and living for people around the world

Priority fields for provision of value

**Environment** & Energy

Mobility

Life Material

Home & Living

Health Care

#### New "C"

## Care for People, Care for Earth

Employee action principles

Creating new value

"Cs" in CT2018

Compliance Communication

Connect

Challenge

Strengths

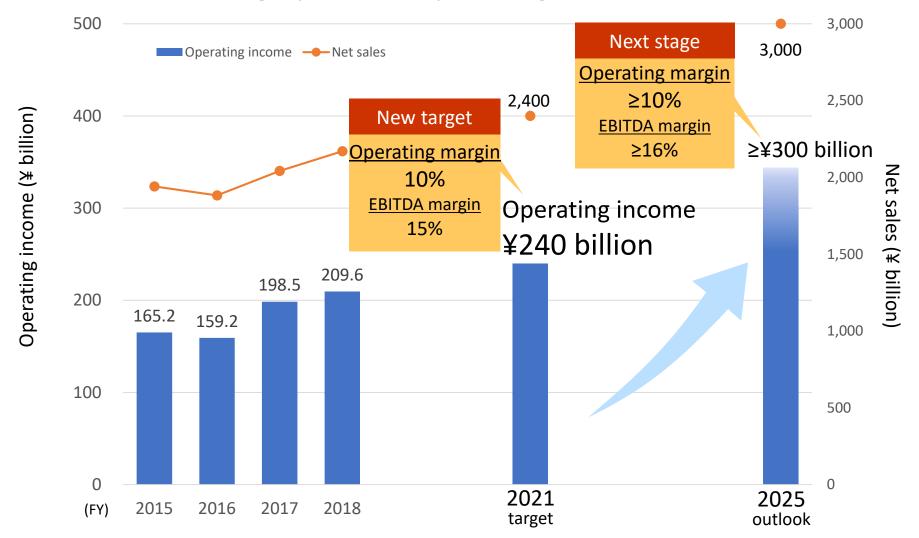
**Diversity & Capability to change** 



#### (3) Financial objectives

Sustainable profit growth exceeding global GDP growth

→ "Portfolio of high-profitability and high value-added businesses"



#### Asahi **KASEI**

#### (3) Financial objectives: performance metrics

	(¥ billion, unless otherwise specified)	FY2015	FY2018	FY2021 target	18–21 annual growth	FY2025 outlook
	Net sales	1,940.9	2,170.4	2,400.0		3,000.0
	Operating income	165.2	209.6	240.0	4.6%	≥300.0
	Operating margin	8.5%	9.7%	10.0%		≥10.0%
Drofitability	EBITDA <sup>1</sup>	274.8	313.6	370.0	5.7%	≥480.0
Profitability	EBITDA margin	14.2%	14.5%	15.4%		≥16.0%
	Net income	91.8	147.5	180.0		
	EPS (¥)	66	106	130	7.2%	
Capital	ROIC <sup>2</sup>	7.9%	8.8%	9.0%		Aiming for FY2021
efficiency	Net income per shareholders' equity (ROE)	8.6%	11.1%	11.1%		level or above
Financial health	D/E ratio	0.43	0.31	≈0.5		
	Exchange rate (¥/\$)	120	111	110		

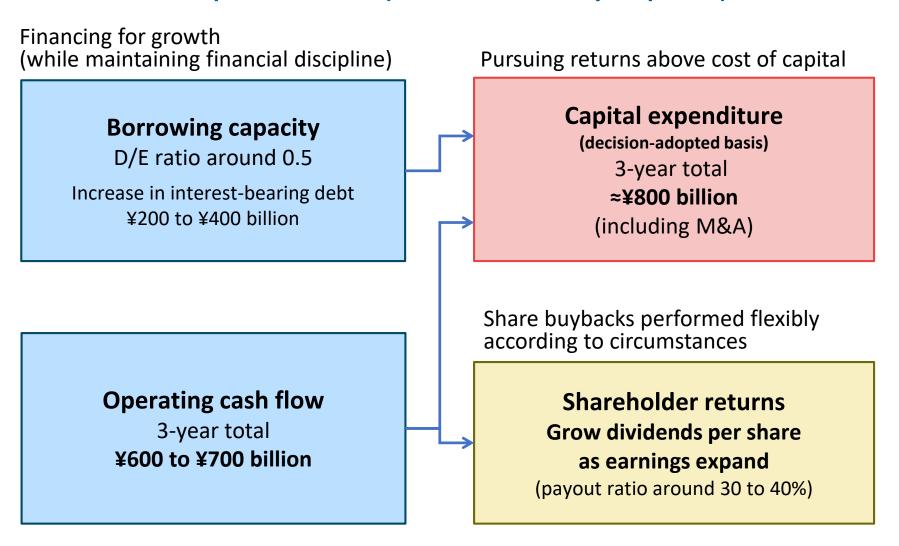
 $<sup>^{\</sup>rm 1}$  Operating income, depreciation, and amortization (tangible, intangible, and goodwill)

<sup>&</sup>lt;sup>2</sup> (Operating income – income taxes) / average annual invested capital



#### (3) Financial objectives: Capital allocation

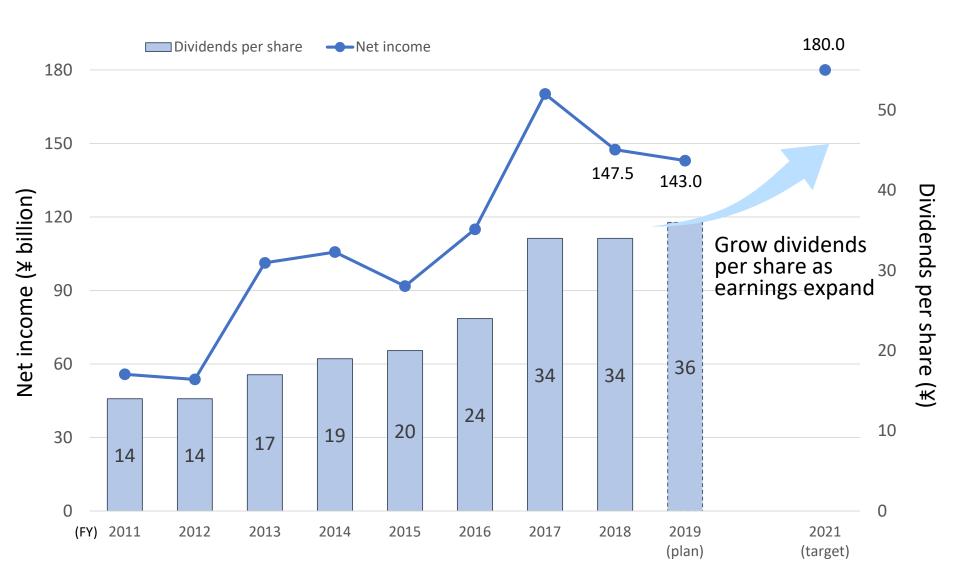
#### Framework for capital allocation (FY2019–FY2021 3-year period)



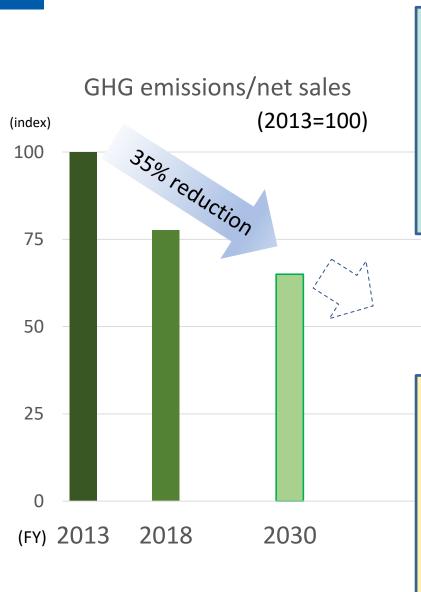
#### 2021" Asahi**KASEI**

#### 3. Medium-term management initiative "Cs+ for Tomorrow 2021"

#### (3) Financial objectives: dividend policy



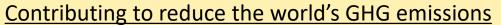
#### (3) Objectives for sustainability



#### Reducing our own GHG emissions

- Further reduction in GHG emissions Installing lower-emission equipment, optimizing plant operation
- Greater use of low-carbon energy Increasing renewables and LNG
- R&D for further GHG reduction

#### **Toward a sustainable society**



- Businesses that contribute to energy conservation and reduced GHG emissions
  - Battery separators, lightweighting resins, net zero energy houses, CO<sub>2</sub> sensors, etc.
- Technology development/commercialization for clean environmental energy Green hydrogen production, CO<sub>2</sub> chemistry, etc.

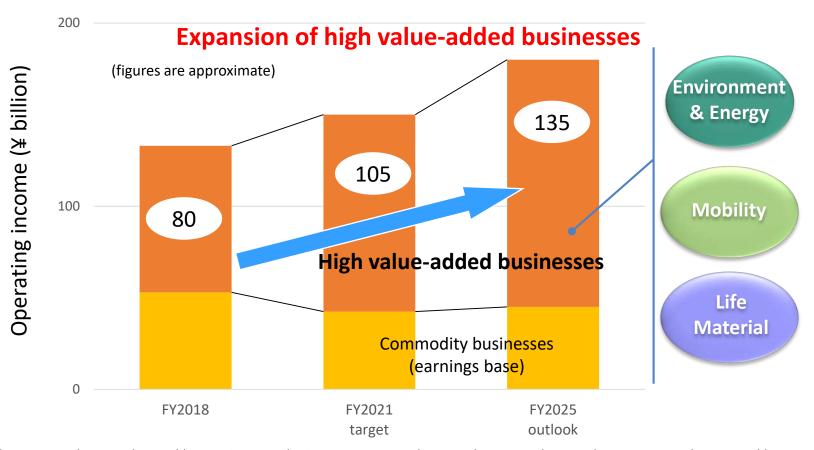




#### (4)-1 Growth Strategy: Material

#### Basic strategy

# Flexible allocation of management resources to priority fields



#### Asahi **KASEI**

#### (4)-1 Growth Strategy: Material -Environment & Energy

Contributing to the environment with various technology (CO<sub>2</sub> chemistry, semiconductors, etc.)



#### Global challenges/trends



Greater adoption of clean energy



Transition to low-carbon society

#### Care for Earth

#### Clean energy

Battery separators
Alkaline water electrolysis system
to produce green hydrogen

#### Energy conservation/ environmental improvement

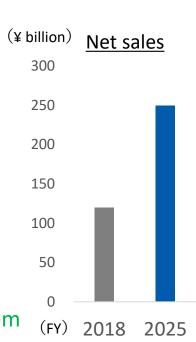
CO<sub>2</sub> sensors Water filtration modules Ion-exchange membranes

#### **Low-carbon society**

Next-generation CO<sub>2</sub> chemistry New CO<sub>2</sub> separation/recovery system

Green indicates under development Note: Some overlap with other fields



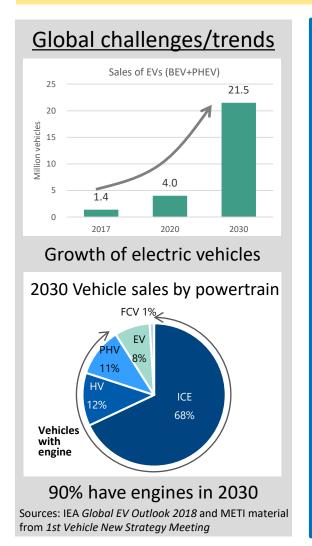




#### (4)-1 Growth Strategy: Material - Mobility

# Contributing to the future of mobility with technology for safety, comfort, and environment





# Care for People Safety and security Airbag material Alcohol sensor Contactless pulse sensing Comfortable space Lamous microfiber suede Low-VOC\* material

Low-VOC\* material

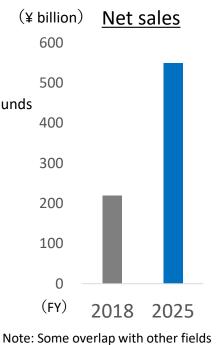
A/C CO<sub>2</sub> sensors \* Volatile organic compounds

#### Care for Earth

#### **Fuel economy**

S-SBR for tires
Lightweighting materials
Lead-acid battery separator
EV/HEV

LIB separator/related material
Green indicates under development





#### (4)-1 Growth Strategy: Material -Life Material

Contributing to healthy and comfortable daily life with distinctive products and technological strength





#### Global challenges/trends



Global population growth



5G Communications revolution

#### Care for People

#### **Comfort/convenience**

Disposable diaper material 5G-related (glass fabric, etc.) Regenerated cellulose fiber

#### Health

Pharmaceutical/food additives UVC LEDs for disinfection

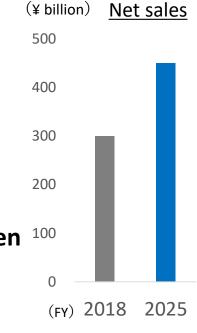
#### Care for Earth

Reducing food loss/ Reduced environmental burden

Saran Wrap Ziploc

Water-washable printing plates





#### **AsahiKASEI**

3. Medium-term management initiative "Cs+ for Tomorrow 2021"

#### (4)-1 Growth Strategy: Material -unit strategy

Priority fields for provision of value

Environment & Energy



#### **Basic Materials SBU**

Strengthening as the base of earnings for the Asahi Kasei Group

→ Advancing Sustainable Chemistry



#### **Performance Products SBU**

Expansion centered on fields of Mobility and Life Material

→ Strengthening business infrastructure for Mobility in Europe, North America, China

Mobility





#### **Specialty Solutions SBU**

Expansion centered on fields of Environment & Energy and Life Material

→ Expansion of core businesses



#### Asahi Kasei Microdevices Corp.

Advanced technology innovation; providing value that meets needs (discerning market trends for the Asahi Kasei Group)

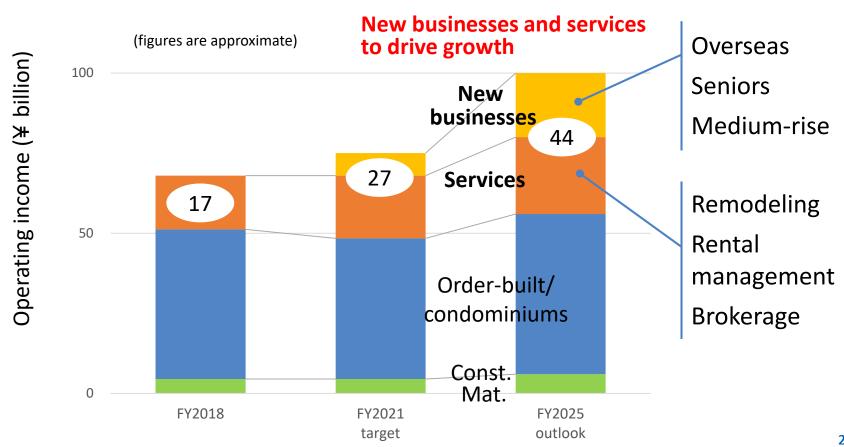
→ Expansion in automotive, industrial applications



#### (4)-2 Growth Strategy: Homes

#### **Basic strategy**

#### Reinforcing and extending value chain management





#### (4)-2 Growth Strategy: Homes

# Contributing to superior social infrastructure and comfortable living through our know-how gained in urban markets





#### Challenges/trends in Japan



More frequent natural disasters



Diversification of lifestyles

#### Care for People

#### Safety/security

60-year long-life homes
Disaster-resistance
Long-term retention of asset
value

#### Comfort/health

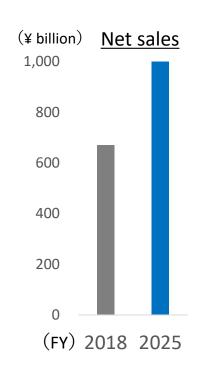
Living in a good thermal environment
Diverse modes of residence

#### Care for Earth

#### **Environment**

Net zero energy houses Photovoltaic power High-performance insulation

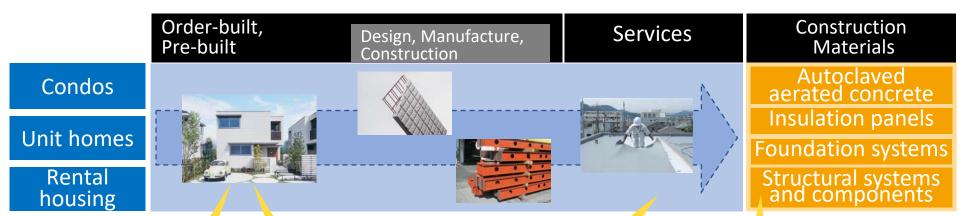






#### Asahi KASEI

#### (4)-2 Growth Strategy: Homes



Developing related/growth markets by leveraging our strengths

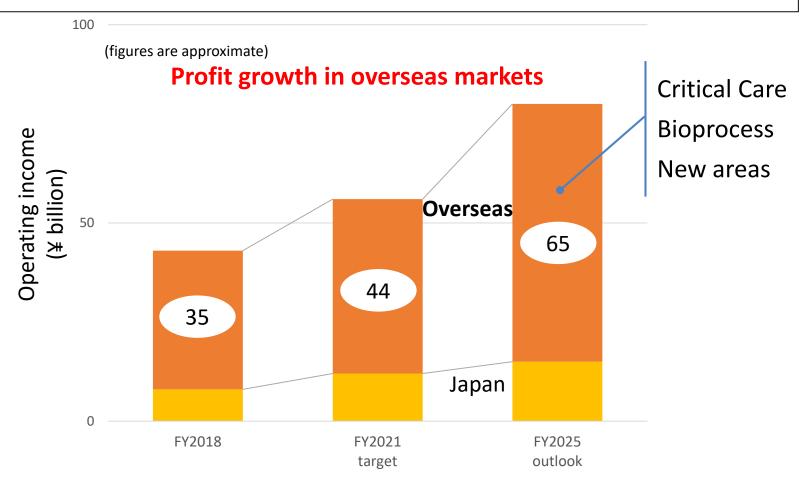




#### (4)-3 Growth Strategy: Health Care

#### Basic strategy

#### **Further accelerating transformation** to a global health care company





#### (4)-3 Growth Strategy: Health Care

Contributing to healthy longevity with pharmaceuticals and medical devices discerning the needs of the aging society



#### Global challenges/trends



Rapid aging of society

1	Ischemic heart disease (angina, acute myocardial infarction, cardiac arrest)
2	Stroke (hemorrhagic and ischemic)
3	Chronic obstructive pulmonary disease
4	Lower respiratory infections
5	Alzheimer disease and other dementias

Top 5 global causes of death
Source: WHO fact sheet

#### Care for People

# Treatment Acute conditions (critical care, circulatory)

Recomodulin, Thermogard, therapeutic apheresis, defibrillators, LifeVest, acute myocardial infarction, stroke

## <u>Chronic conditions (orthopedics, dialysis)</u>

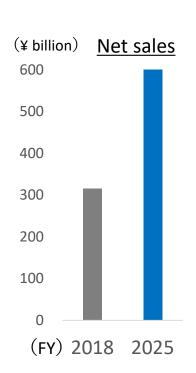
Teribone, Reclast, Kevzara, dialysis, autoimmune disease, pain relief

#### **Biosafety**

### **Supporting the safety of biotherapeutics**

Virus removal filters, bioprocess equipment Green indicates under development







#### (4)-3 Growth Strategy: Health Care

#### **Global operations**

Accelerating transformation to be a global health care company by optimizing business infrastructures to develop world-wide business

#### **New innovation**

Creating new products and services by promoting connections within the Group and by incorporating innovation globally

# Strengthening existing business

Strengthening profitability of existing pharmaceuticals and medical devices, building a stable business platform able to withstand changes in the market environment

#### **Stronger organization**

Ensure steady implementation of each measure to strengthen sales of existing products and reinforce the product pipeline

#### **Promotion of strategic business development**

Seeking M&A opportunities not only in existing areas but also in new areas, and acquiring businesses that contribute to sustainable growth

#### (4)-4 Growth Strategy: Key financial objectives by sector

(¥ billion)		FY2015	FY2018	15–18 annual growth	FY2021 target	18–21 annual growth	FY2025 outlook
	Net sales	1,004.4	1,176.2		1,350.0		1,600.0
	Operating income	79.2	129.6	17.8%	150.0	5.0%	180.0
Material	Operating margin	7.9%	11.0%		11.1%		11.3%
	EBITDA	136.4	190.7		240.0		280.0
	EBITDA margin	13.6%	16.2%		17.8%		17.5%
	Net sales	632.4	659.8		750.0		1,000.0
	Operating income	71.0	68.2	-1.4%	75.0	3.2%	100.0
Homes	Operating margin	11.2%	10.3%		10.0%		10.0%
	EBITDA	80.5	77.2		89.0		120.0
	EBITDA margin	12.7%	11.7%		11.9%		12.0%
	Net sales	285.4	316.2		370.0		600.0
	Operating income	36.2	41.8	4.9%	56.0	10.2%	80.0
<b>Health Care</b>	Operating margin	12.7%	13.2%		15.1%		13.3%
	EBITDA	67.4	68.6		83.0		135.0
	EBITDA margin	23.6%	21.7%		22.4%		22.5%

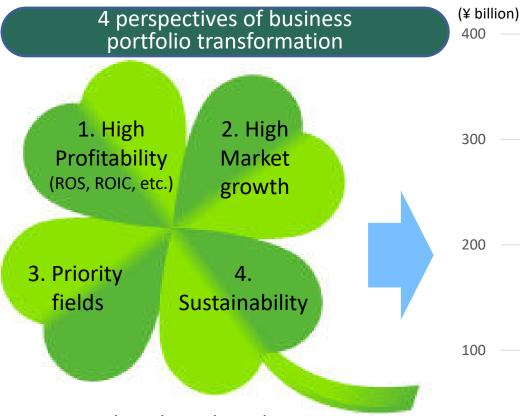
#### Asahi **KASEI**

Material

#### (5)-1 Action plan: Business portfolio transformation

Profitable structure with sustainable and high value-added businesses through business portfolio transformation

400



#### (commodity businesses) 300 Material (high value-added businesses) 200 Health Care 100 **Homes** 0 FY2016 FY2017 FY2018 FY2025

Operating income\*

#### Decision-making based on the 4 perspectives

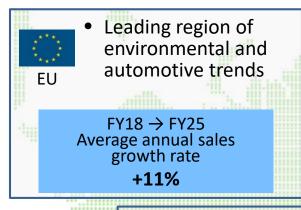
- Allocation/reallocation of human resources and capital
- Continuously seeking non-linear and immediate opportunities including M&A

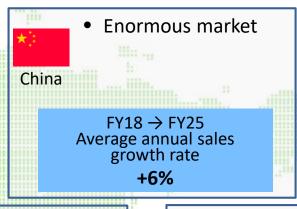
\*Sum of outlook for each sector differs from consolidated total

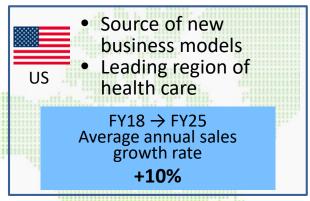
outlook

#### (5)-2 Action plan: Strengthening global operations

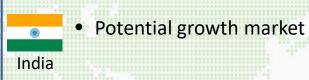
Businesses expansion in accordance with market characteristics; promoting growth and creating synergies through regional coordination among different businesses







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- Potential growth market
- Major production sites

# Functions provided by each of the regional headquarters

- Disseminating the Group Mission
- Strengthening executive management
- Recruiting/training local personnel

- Sharing information
- Group-wide marketing
- Promoting R&D



#### (5)-3 Action plan: Creating new businesses

Basic concept for creating new businesses

**Various core technologies x Marketing functions x Connections** 



- High-level experts system to deepen and expand core technologies
- Promoting digital transformation by nurturing experts

 Strengthening cooperation with other companies, government/academia and internal cooperation among sectors

### **AsahiKASEI**

### 3. Medium-term management initiative "Cs+ for Tomorrow 2021"

### (5)-3 Action plan: Creating new businesses

### Care for People

### Care for Earth

#### **Examples of new business**

Alkaline water electrolysis for hydrogen production

High performance composites (cellulose nanofiber, etc.)

**UVC LEDs** 

New sensors (CO<sub>2</sub> sensor, odor sensor, etc.) Materials related to new batteries/cells (solid-state battery/fuel cell)

#### **Examples of core technologies**

Polymerization Spinning

Polymers Processing Catalysts Processes

Compound semiconductors
LSIs

Membranes Separation

Anti-quake/Anti-fire Durability/Insulation



3. Medium-term management initiative "Cs+ for Tomorrow 2021"

### (5)-4 Action plan: Strengthening the platform

-heightening businesses

# Heightening by digital transformation



Establishing an effective and efficient strategy

# Materials Informatics

Dramatically improving development speed

# Production technology innovation

Enahancing productivity by IoT

### **IP Landscape**

Formulating strategies based on IP

Strengthen the IT infrastructure Data platform, Tools, Human resources

#### Trends and issues to consider

Game changing

Productivity revolution

Technology handover

**IP** strategy

Increase digital professional personnel to over 150 people by March 2022 to accelerate digital transformation

# 3. Medium-term management initiative "Cs+ for Tomorrow 2021" Asahi KASEI

### (5)-4 Action plan: Strengthening the platform -HR

Creating new value by diversity and capability to change

### **Human resources**

# Working environment

Leadership development program

Growth of experts and line managers

Leveraging local personnel



**Liveliness Creativity** 



**Expertise** 

Continuous human resource development (engagement)

Support for life events

Increased options for working styles

Sincerity Challer

Challenge Creativity

Linkage with business strategy & business portfolio transformation

### 3. Medium-term management initiative "Cs+ for Tomorrow 2021"

### **AsahiKASEI**

### (5)-4 Action plan: Strengthening the platform -safety, quality, risk management, compliance

### Creating new value

### **Compliance**

- Raising awareness
- Code of Conduct
- Regular committee meetings
- Before incident Regular inspection
- After incident Clear procedure

### **Risk management**



- Secure human resources
- Prevention measures
- Enlightenment

**Diversity** Capability

to change

- Ensure quality awareness
- Eliminate human error by
- Secure quality in supply chain

Quality

Strengthening the platform for the Asahi Kasei Group Positioned as key management issue to raise the overall level



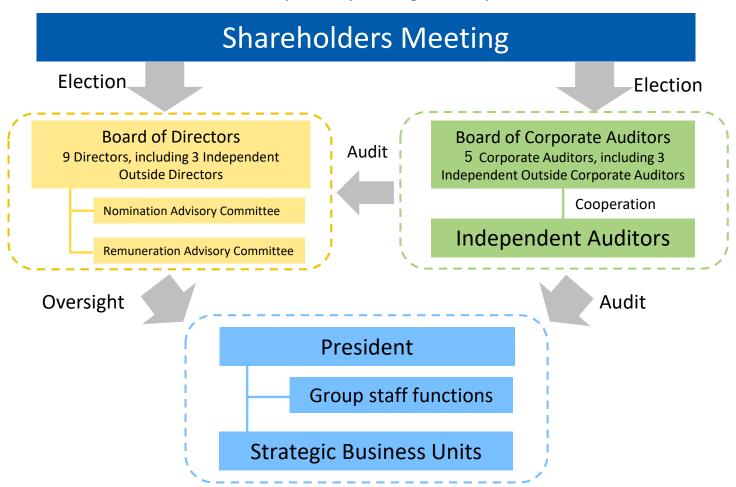
3. Medium-term management initiative "Cs+ for Tomorrow 2021"

### (5)-4 Action plan: Strengthening the platform

-corporate governance

# Continuously developing sound corporate governance to ensure "diversity" and "capability to change"

Providing information to, and sharing IR activities with, Outside Directors and Outside Corporate Auditors; stock-based remuneration system; optimizing the composition of officers, etc.





# Reference

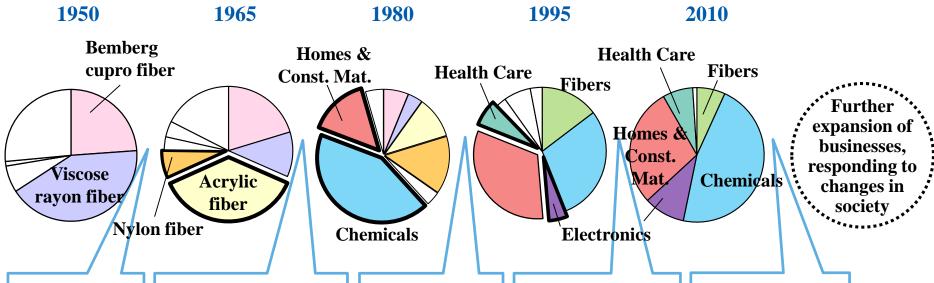
# History of business portfolio transformation

#### Change in sales composition

Sufficiency of daily necessities, improvement in quality of homes, development of public infrastructure

**Increased comfort** and convenience

Heightened environmental consciousness, evolution of ICT



Expansion into synthetic fiber businesses

Expansion of petrochemicals; construction of petrochemical complex

Start of housing business

Start of electronics businesses

Start of health care business

Expansion of housing business

Business portfolio restructuring

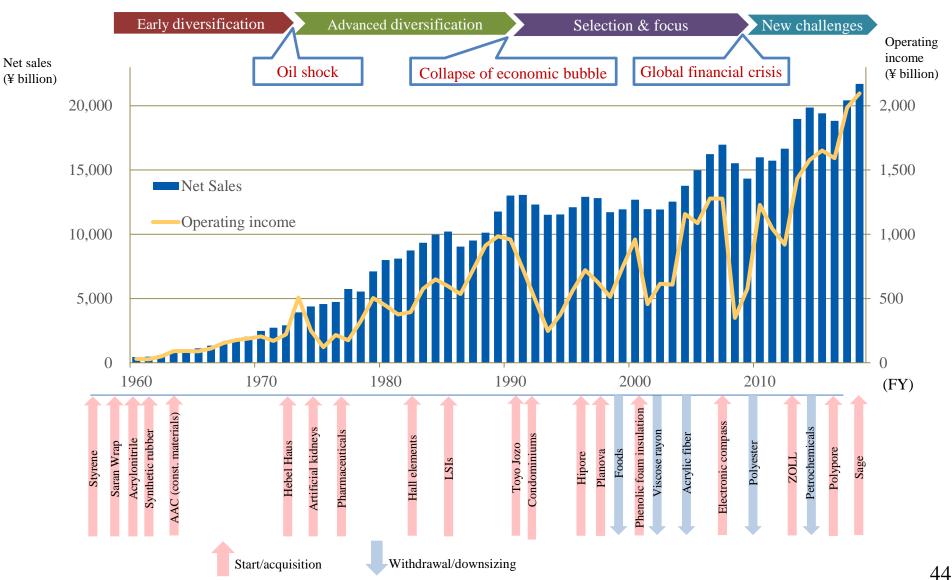
Expansion of global businesses

Start of critical care business

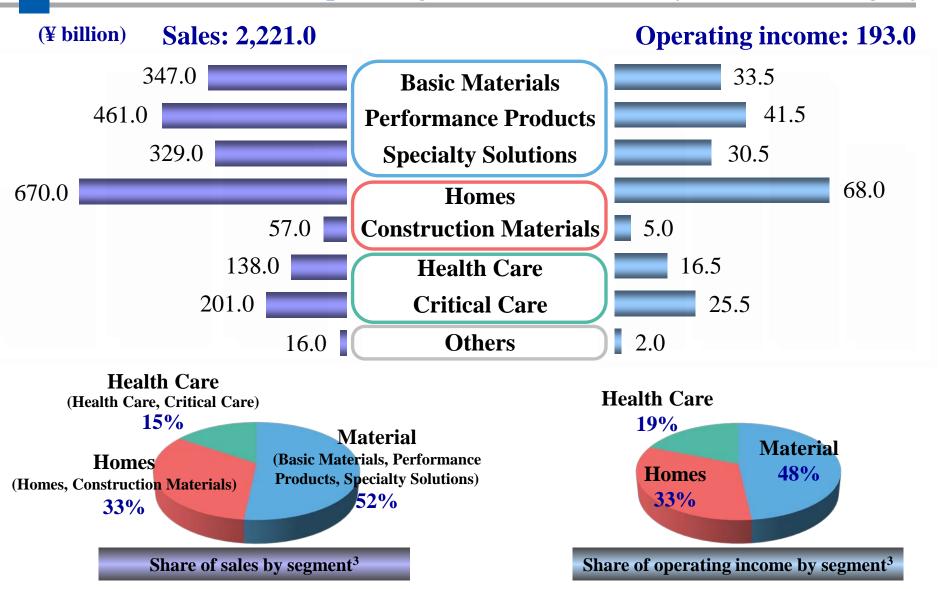
Expansion of separator business



## Growth according to the changing times



### FY 2019 sales and operating income forecast<sup>1</sup> by business category<sup>2</sup>



<sup>&</sup>lt;sup>1</sup> As of November 2019.

<sup>&</sup>lt;sup>2</sup> Figures for operating income by business category include intrasegment transactions which are eliminated from the segment totals.

<sup>&</sup>lt;sup>3</sup> Pie charts exclude "Others" category and "corporate expenses and eliminations."

### Ideal for Asahi Kasei (current & future)

Mission

Contributing to life and living for people around the world

Vision

Providing new value to society by enabling "living in health and comfort" and "harmony with the natural environment"

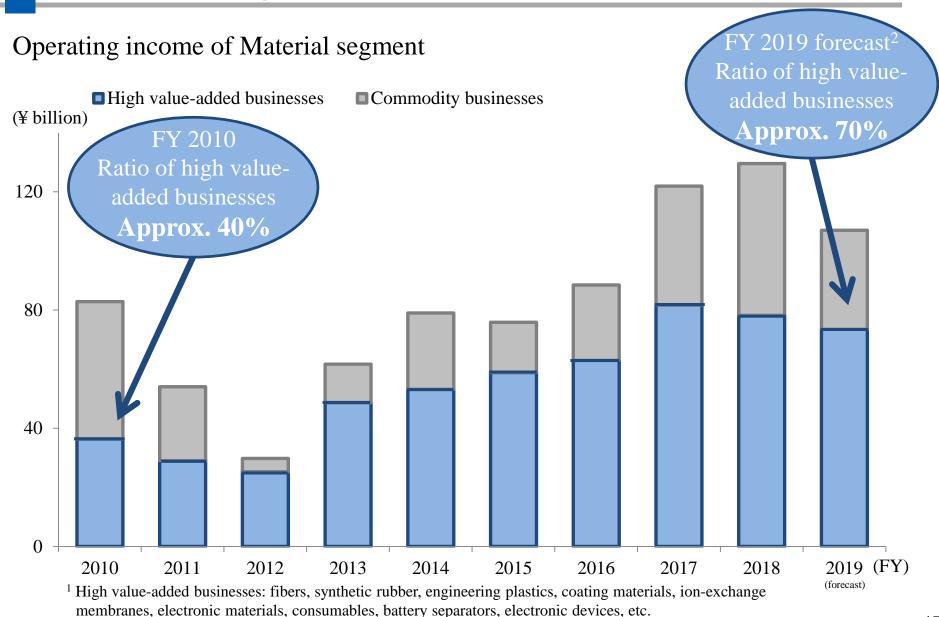
Values

"Sincerity," "Challenge," "Creativity"

### "Creating for Tomorrow"

Working on ESG issues (Environmental, Social, Governance) based on our Mission, Vision, and Values

# Growth in high value-added businesses<sup>1</sup> (1)



<sup>2</sup> Forecast in November 2019.

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# Growth in high value-added businesses (2)

	FY 2018 sales (¥ billion)	Commodity business	High-value added business		
Basic Materials	399.7	Petrochemicals (AN, etc.)			
Performance Products	457.1	Fibers, synthetic rubber, engeneering plastics, consum			
Specialty Solutions	320.8	Coating materials, ion-excomembranes, electronic devices, etc.			
Others	(1.5)	_			
Material total	1,176.2				
	Sales (¥ billion)	Commodity business	High-value added business		
FY 2010 <sup>1</sup>	966.9	approx. 40%	approx. 60%		
		↓	<b>↓</b>		
FY 2015	1,004.4	approx. 35%	approx. 65%		
		<b>\</b>	↓		
FY 2018	1,176.2	approx. 35%	approx. 65%		
		$\downarrow$	<b>\</b>		
FY 2019 forecast <sup>2</sup>	1,139.0	approx. 30%	approx. 70%		
		$\downarrow$	<b>\</b>		
FY 2025 outlook <sup>2</sup>	1,600.0	approx. 25% approx. 75%			

<sup>&</sup>lt;sup>1</sup> Total of sales in Chemicals, Fibers, and Electronics in FY 2010.

<sup>&</sup>lt;sup>2</sup> As of November 2019.



# Basic Materials (1) Main products of petrochemicals

As of May 2019

				As of May 2019
	Asahi Kasei Capacity (kt/y)	Main competitors	Main applications	Asahi Kasei's position/strengths
Acrylonitrile	981	Ineos Nitriles Ascend	ABS, acrylic fiber, carbon fiber; captive use for ABS, adiponitrile	Plants in Japan, Korea, and Thailand 2nd largest producer in the world
Styrene	390	Lyondell Basell Ineos Styrolution Shell	PS, EPS, ABS, SB latex, unsaturated polyester, SBR; captive use for PS, ABS, SB latex, SBR	After 320 kt/y plant in Mizushima closed in Feb. 2016, business to focus on domestic market and captive use
Methyl methacrylate	170	Mitsubishi Chemical Sumitomo Chemical	MS, MBS, coating materials, cast sheets; captive use for PMMA	Proprietary, cost-competitive C4 process
Cyclohexanol	180	Shandong Haili BASF	Adipic acid; captive use for adipic acid	Proprietary, economically-competitive, environmentally-friendly process with fewer waste  Mainly for captive use
Polyethylene	236	(Domestic) Japan Polyethylene Prime Polymer	Films, miscellaneous goods, food containers, injection molding; captive use for LIB separator	Business development taking advantage of unique characteristics based on distinctive catalyst technology, including high density Polyethylene
Polystyrene	315	(Domestic) Toyo Styrene DIC	Food containers, food packaging, toys, miscellaneous goods, construction materials	Production and sales by PS Japan Largest producer in Japan



## Basic Materials (2) Strengthening of operations in Japan

Strengthening petrochemical operations by establishing the optimum production configuration for stable earnings and enhanced competitiveness to cope with contracting domestic demand and price competition from products made overseas based on low-priced feedstock

Business	Location	Capacity (thousand tons)	Major applications	Closure schedule
Naphtha cracker	Mizushima	(unified with Mitsubishi Chemical's facility)	Production of basic petrochemical products such as ethylene and propylene	February 2016
AN	Mizushima Kawasaki Korea Thailand	200 100 150 581 200	ABS, acrylic fiber, carbon fiber, acrylamide, adiponitrile	August 2014
Styrene	Mizushima	320 390	Polystyrene, ABS, synthetic rubber	February 2016
ABS resin	Mizushima	65	Automotive, home electronics, office equipment	December 2015
SB latex	Mizushima Kawasaki	36	Paper coating, adhesives, paint	December 2015
Epoxy resin	Mizushima Fuji	(undisclosed)	Coatings, adhesives, electronics	May 2015



### Performance Products (1) Main products: Fibers -1

### Bemberg cupro fiber

- Only manufacturer in the world
- Global development for wide range of applications such as linings, functional innerwear, and ethnic garments

### Roica premium stretch fiber

- Global development of high-function and high-quality brand; production plants in Japan, Taiwan, China, Thailand, and Germany
- Launch of recycled spandex for the first time in the world in July 2015, which is the world's only spandex certified under the Global Recycle Standard

### Leona nylon 66 filament

- Expansion in automotive airbag application in addition to tire cord application with superior strength and heat resistance
- Capacity expansion; start-up in first half of FY 2020









### Performance Products (2) Main products: Fibers -2

#### **Nonwovens**

Offering distinctive nonwovens made of different materials and by original production technology for wide range of applications

#### Eltas spunbond

Increased demand in hygienic application (8-10% annual growth by shipment volume in ASEAN, China, and India); Decision to expand capacity in Thailand; start-up in July 2021



Eltas

#### Bemliese continuous-filament cellulose nonwoven

Increased demand in facial mask application; capacity expansion in February 2017



Bemliese



#### Lamous microfiber suede

- Sales expansion centered on automotive upholstery application; Decision to expand capacity; start-up in second half of FY 2021
- Acquisition of Sage Automotive Interiors, Inc., manufacturing and selling vehicle seat fabric using Lamous, in September 2018





### Performance Products (3) Main products: Engineering plastics

### **Engineering plastics**

#### Advancing global growth strategy; reinforcing automotive-related businesses

- Leveraging computer-aided engineering (CAE) technology with weight-saving proposals for automotive parts
- Development of materials based on sophisticated technologies for polymer design, alloys, and compounding
- Global operations for production (compounding), sales, and technical service

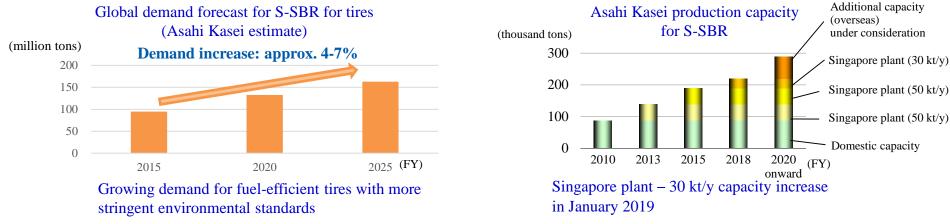
Product	Strategy	Main automotive applications
Leona polyamide 66	Global development of specialty polyamide with superior heat resistance, durability, rigidity, and appearance	Engine compartment parts (cylinder head covers, etc.)
Tenac polyacetal	Production of low-VOC products in both Mizushima, Japan, and Zhangjiagang, China, and global sales expansion	Vehicle interior parts, fuel- system parts, electric motor parts
Xyron modified polyphenylene ether	Global development of superior grades centered on office equipment, photovoltaics, automobiles, and rechargeable battery applications	Electrical system parts (relay blocks, electric vehicle battery parts, etc.)
Polypropylene compounds	Sales expansion leveraging 2nd plant in US and sales subsidiary in Mexico	Radiator fans, fan shrouds, etc.



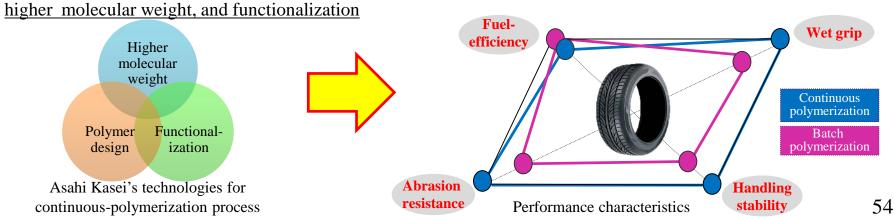
### Performance Products (4) Main products: Synthetic rubber (S-SBR)

### Synthetic rubber (solution-polymerized SBR)

- Top share in Asian market for solution-polymerized SBR (S-SBR) for fuel-efficient tires
- Enhancing overall tire performance, with good balance of fuel efficiency and wet grip
- Technology for both continuous and batch polymerization processes; taking the lead in proactively expanding capacity for continuous process, with fewer competitors



Enhancing all four main performance characteristics of tires through original technologies for polymer design,





# Performance Products (5) Acquisition of Sage (i)

# Acquisition of Sage Automotive Interiors, a US-based manufacturer of automotive interior material

✓ September 2018 completion of acquisition of Sage (transaction price of approximately \$700 million¹)

#### Overview of Sage

Business Description	Development, manufacture, and sales of various fabrics as automotive interior material (No. 1 global share for vehicle seat fabric <sup>2</sup> )
Locations	Headquarters: Greenville, South Carolina, USA Production Bases: USA, Italy, Poland, Romania, Brazil, China
Net Sales (million \$)	FY 2015: 359.3 / FY 2016: 415.6 / FY 2017: 474.9
Employees	Approx. 2,200 (consolidated, as of March 31, 2018)
Business relationship	Sage purchases Lamous from Asahi Kasei and sells it to automakers and Tier-1 suppliers after processing (dyeing, etc.)



Premium fabrics (Sage Echelon brand)

Dinamica:

Luxury microfiber suede with elegance and high color-development

⇒Using Lamous of Asahi Kasei



Innovation in product technology

■ Yes Essentials fabrics:
High-performance and sustainable fabrics for proofing against stain, water, smells, static, and bacteria

<sup>&</sup>lt;sup>1</sup> The total acquisition price including Sage's net interest-bearing debt is \$1.06 billion.

<sup>&</sup>lt;sup>2</sup> Woven and knitted fabric for vehicle seats (not including natural and synthetic leather)



# Performance Products (6) Acquisition of Sage (ii)

### **Background of acquisition**

- ✓ The automotive industry is in a period of transformation referred to as CASE, and such new trends create significant growth opportunities.
  - ⇒Changing needs for performance and characteristics of materials create opportunities for Asahi Kasei having wide-ranging products and technologies.









- ✓ For vehicle interiors, new needs focusing on safety, comfort, and design are emerging.
  - ⇒The automotive interior materials market is expected to grow by about 5–6% per annum, due to various changes in automotive interiors.

### Aim of acquisition

Strengthening Asahi Kasei's position in the growing automotive interior market, and contributing to the expansion of its automotive-related business

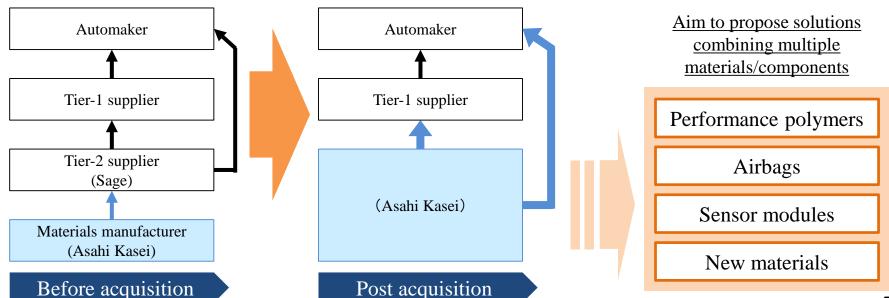
⇒Decision to acquire Sage; having strong presence among automakers and Tier-1 suppliers based on its comprehensive proposal capabilities, advanced design capabilities, and processing technology related to automotive interior material



## Performance Products (7) Acquisition of Sage (iii)

### **Expected effects of acquisition**

- ✓ Enhanced access to vehicle manufacturers and Tier-1 suppliers, in order to swiftly and accurately ascertain trends and needs in the automotive industry, by expansion of supply chain from upstream to midstream.
- ✓ Proposal and provision of comprehensive vehicle interior designs and solutions leveraging Sage's design and marketing capabilities in combination with various Asahi Kasei products and technologies, such as fibers, plastics, and sensors.
- ✓ Utilizing Sage's sales, manufacturing, and marketing bases as management infrastructure and resources for the global expansion of Asahi Kasei's operations.





### Specialty Solutions (1) Main products (i)

### Main products of performance materials

Product	Main applications	Asahi Kasei's position
Microza UF and MF membranes	Water filtration	Top-tier world share: No. 1 share in the US municipal water treatment market
Aciplex ion-exchange membranes	Chlor-alkali electrolysis	Membranes: No. 1 world share
Membrane-process electrolyzer		Electrolyzers: No. 2 world share
Duranate HDI-based polyisocyanate	Non-yellowing polyurethane curing	World top-3 share
	(coatings, inks, adhesives, cast molding, etc.)	No. 1 domestic share
Ceolus microcrystalline cellulose	Additives for pharmaceuticals and foods	No. 1 domestic share
Sunfort dry film photoresist	Forming copper circuit patterns on printed wiring boards and semiconductor packaging	World top-3 share: 30%
APR and AFP photopolymers and platemaking systems	Printing plates for packaging such as cardboard, labels, and film	No. 1 domestic share
Glass fabric	Electrical insulation for printed circuit boards, used in compact portable devices such as smartphones, and devices for telecommunications infrastructure	Top-tier world share in super thin fabric and low dielectric fabric



### Specialty Solutions (2) Main products (ii) Battery separators

#### **Integrate technology and marketing, deliver value to customers**

- Utilize Asahi Kasei Group technology for materials, analysis, and manufacturing
- Optimum global manufacturing, marketing, and development configuration to meet customer needs



- Presence and development strength in consumer electronics
- Market expansion in automotive applications



- •Strength in automotive and ESS¹ applications
- Rapid market expansion in automotive applications from stricter environmental regulation



- World-leading presence
- Stable market growth centering in emerging countries
- Market inflection with spread of ISS<sup>2</sup> vehicles

Solidify world-leading position through unique solution proposal ability having both wet and dry processes, with global manufacturing, marketing, and development configuration, meeting various customer needs

Strengthen customer support, capture demand in emerging markets, develop new products with group technology

#### Pursue synergy between lead-acid and Li-ion battery separators

<sup>&</sup>lt;sup>1</sup> Energy storage systems

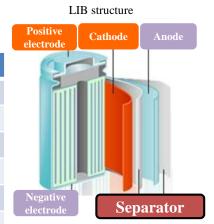
<sup>&</sup>lt;sup>2</sup> Idling stop and start

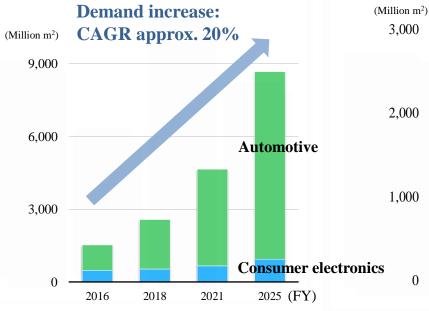


### Specialty Solutions (3) Capacity expansions for LIB separator

# Capacity expansions for LIB separator to prepare for upcoming EV market growth

Process	Location	Capacity	Start-up schedule
Wet	Moriyama, Shiga, Japan	Approx. 60 million m <sup>2</sup> /year	First half of FY 2018
Dry	North Carolina, the US	Approx. 150 million m <sup>2</sup> /year	Second half of FY 2018
Wet	Moriyama, Shiga, Japan	Approx. 200 million m <sup>2</sup> /year	First half of FY 2019
Wet	Moriyama, Shiga, Japan	Approx. 90 million m <sup>2</sup> /year	First half of FY 2020
Wet	Moriyama, Shiga, Japan	Approx. 300 million m <sup>2</sup> /year	First half of FY 2021
Dry	North Carolina, the US	Approx. 150 million m <sup>2</sup> /year	First half of FY 2021





**Demand forecast for LIB separator**<sup>1</sup>

- Approx. 3,000

  1,550

  1,010

  1,010

  1,010

  1,010

  1,010

  2016 2018 2019 2020 2021

  (Plan) (Plan) (Plan) (Plan) (Plan)

  A solai Kassai paradyatian sopposity for
  - Asahi Kasei production capacity for LIB separator

- ✓ Swiftly meeting various market needs with both wet-process and dryprocess separators
- ✓ Further expand capacity to meet rising global demand

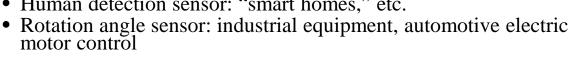


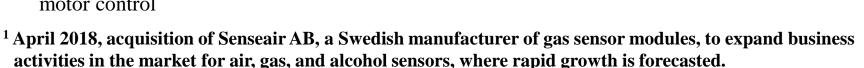
### Specialty Solutions (4) Main products (iii) Electronic devices

Product	Main applications	Asahi Kasei's position	Main competitors	
Electronic compass	Smartphones, tablets, etc.	World's No. 1	Memsic	
Devices for camera module	Camera modules for smartphones	Top tier in the world (magnetic sensors)	Renesas Electronics, On Semiconductor	
LSIs for crystal oscillator	Smartphones, communication devices	World's No. 1	Panasonic, EPSON	
LSIs for high-end audio	Smartphones, high-end audio equipment	Top tier in the world	ESS Technology, Cirrus Logic, TI	
LSIs for automotive audio/visual/navigation	Car audio, navigation system, hands-free system, etc.	Top tier in Japan	NXP Semiconductors, Texas Instruments	
Hall elements for motor control	Air conditioner, household appliances, computer cooling fans, industrial equipment	World's No. 1	_	

#### Various sensing solutions for the IoT era

- Hall elements: motor control
- Electronic compass: smartphones, tablets
- Close position sensing: digital cameras, smartphones
- Electric current sensor: industrial equipment (inverters, servomotors, robots)
- Gas sensor<sup>1</sup>: indoor air quality monitoring system
- Human detection sensor: "smart homes," etc.







### Homes (1) Order-built homes

#### Hebel Haus and Hebel Maison high-end urban homes

• Exceptional resistance to earthquake and fire, and full-fledged aftersale service (60-year inspection system)

#### Innovative proposals for urban lifestyle

- A pioneer of 3-story and two-generation homes
- Leading share in 3–4 story homes market in urban areas; expanding into medium-rise homes (5+ story)
- Developing business in homes for seniors

# Development of urban markets from Kanto westward and focus on order-built homes

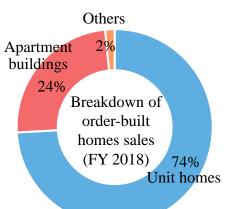
- Most of sales in order-built homes coming from 3 major areas in Japan (Tokyo area, Nagoya area, Osaka area)
- Rebuilding accounts for approximately half of order-built homes
- Not purchasing large tracts of land, building houses, and selling parcels; specializing in order-built homes



Hebel Haus unit homes



Hebel Maison apartment buildings





## Homes (2) Housing-related businesses

#### Real estate

#### **Atlas condominium buildings**

 Rebuilding of older condominiums based on obtaining accord among owners



#### **Rental management**

Management of Hebel Maison rental units mainly
in buildings subject to 30-year all-unit leaseback
system

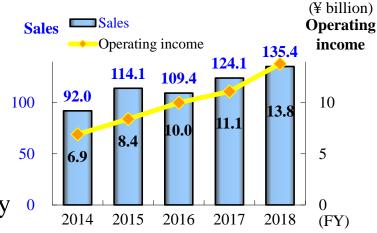
### Remodeling

# Targeting the 280,000 Hebel Haus and Hebel Maison buildings sold to date

 Focusing on renovation in addition to maintenance such as waterproofing and exterior painting



#### Performance of real estate



#### Performance of remodeling



Homes



### Homes (3) Sales and order trends

(¥ billion, % indicates year-on-year comparison)

Value of new orders		Sales of o	order-built	;	Sales of real estate <sup>1</sup>			Sales of C	Other			Order		
			the term	homes	, etc. 1,2	Pre-built homes	Rental housing	Other	Total	remodeling	sales <sup>3</sup>	Consolidated		backlog
FY15	H1	217.3	(-0.2%)	183.8	(-2.2%)	10.4	33.5	1.7	45.6	27.8	0.9	258.0	(+0.8%)	554.6
	H2	183.1	(-12.0%)	227.7	(+5.3%)	27.7	39.0	1.8	68.4	28.1	0.7	325.0	(+9.9%)	513.1
	annual	400.4	(-5.9%)	411.5	(+1.8%)	38.1	72.5	3.5	114.1	55.9	1.6	583.0	(+5.7%)	
FY16	H1	206.6	(-4.9%)	183.5	(-0.1%)	11.8	41.2	1.8	54.8	27.0	(0.5)	264.8	(+2.6%)	538.8
	H2	194.3	(+6.1%)	220.8	(-3.1%)	9.5	43.5	1.6	54.6	29.1	0.8	305.3	(-6.1%)	515.8
	annual	400.9	(+0.1%)	404.3	(-1.8%)	21.3	84.7	3.4	109.4	56.1	0.4	570.2	(-2.2%)	
FY17	H1	193.1	(-6.5%)	182.7	(-0.4%)	12.0	45.3	1.6	59.0	26.8	1.1	269.6	(+1.8%)	528.9
	H2	212.5	(+9.4%)	224.1	(+1.5%)	14.7	47.8	2.5	65.1	28.4	1.1	318.7	(+4.4%)	520.9
	annual	405.6	(+1.2%)	406.8	(+0.6%)	26.8	93.2	4.2	124.1	55.2	2.2	588.3	(+3.2%)	
FY18	H1	210.1	(+8.8%)	175.5	(-4.0%)	16.8	49.7	1.6	68.1	27.2	1.0	271.8	(+0.8%)	557.8
	H2	241.5	(+13.6%)	228.2	(+1.8%)	13.2	52.1	2.1	67.4	31.2	6.1	332.9	(+4.5%)	575.0
	annual	451.6	(+11.3%)	403.7	(-0.8%)	29.9	101.8	3.7	135.4	58.4	7.1	604.7	(+2.8%)	
FY19	H1	201.9	(-3.9%)	197.3	(+12.4%)	7.6	54.4	2.3	64.3	32.0	11.3	304.9	(+12.2%)	589.0
	H2 forecast	232.1	(-3.9%)	232.7	(+2.0%)	29.9	57.1	4.2	91.2	31.5	9.7	365.1	(+9.7%)	598.3
	annual forecast	434.0	(-3.9%)	430.0	(+6.5%)	37.5	111.5	6.5	155.5	63.5	21.0	670.0	(+10.8%)	

<sup>&</sup>lt;sup>1</sup> As the rental management operation of Asahi Kasei Homes was transferred to Asahi Kasei Realty & Residence, the corresponding sales previously included in order-built homes, etc., are combined with rental housing under real estate beginning with H2 2015.

<sup>&</sup>lt;sup>2</sup> Maintenance sales, which were included in SG&A expenses, are included in sales from H1 FY 2019.

<sup>&</sup>lt;sup>3</sup> Results of Erickson Framing Operations LLC and its consolidated subsidiaries, acquired on November 30, 2018 (US Eastern time), are included from Q4 2018.



## Construction Materials: Main products

### Hebel autoclaved aerated concrete (AAC)

- No. 1 share in Japan
- Lightweight and highly durable with outstanding flame-resistance and thermal insulation



# Neoma Foam phenolic foam insulation panels and Neoma Jupii floor insulation panels for wood-frame houses

- Long-lasting, world-leading insulation performance
   Neoma Zeus launched in January 2018 with the highest level of performance among insulation materials
- Eco-friendly material with no CFCs used during production
- High flame resistance; carbonizes without spreading flame





# Pharmaceuticals (1) Main products

		Mechanism/			Sales (¥ billion)				
	Generic name	substance class	Indication	Formulation	FY15	FY16	FY17	FY18	
Teribone	Teriparatide acetate	Synthetic human parathyroid hormone (PTH)	Osteoporosis with high risk of fracture	Injection	26.7	23.9	26.8	28.3	
Recomodulin	Recombinant thrombomodulin alfa	Anticoagulant	Disseminated intravascular coagulation	Injection	12.3	12.6	11.8	11.8	
Flivas	Naftopidil	Dysuria treatment	Benign prostatic hyperplasia	Tablet	9.3	5.9	4.6	3.3	
Bredinin	Mizoribine	Immunosuppressant	Rheumatoid arthritis, kidney transplantation, nephrotic syndrome, lupus nephritis	Tablet	5.1	4.2	3.6	3.0	
Elcitonin	Elcatonin	Eel calcitonin derivative	Osteoporosis pain	Injection	5.1	4.4	3.4	2.3	
Reclast	Zoledronic acid	Osteoporosis drug	Osteoporosis	Injection	-	0.4	1.1	1.4	
Kevzara	Sarilumab (rDNA origin)	Interleukin-6 inhibitor	Rheumatoid arthritis not responding well to conventional treatments	Injection	_	-	0.0	1.3	



# Pharmaceuticals (2) Product pipeline

Development stage	Code name, form, generic name	Classifications	Indication	Region	Origin	Remarks
Approved	MN-10-T, autoinjection, teriparatide acetate	Osteoporosis drug	Osteoporosis with high risk of fracture	Japan	In-house	New formulation; new dose
Phase III	AK1820, injection/ capsule, isavuconazole	Antifungal agent	Invasive fungal infections	Japan	Licensed	
Phase II	ART-123, injection, recombinant thrombomodulin alfa	Anticoagulant	Chemotherapy- induced peripheral neuropathy (CIPN)	Japan	In-house	Additional indication
Pending approval (overseas)	Flivas, tablet, naftopidil	Dysuria treatment	Benign prostatic hyperplasia	China	In-house	
Phase III	ART-123, injection, recombinant thrombomodulin alfa	Anticoagulant	Severe sepsis with coagulopathy	United States, Europe, etc.	In-house	
(overseas)	HE-69, tablet, mizoribine	Immunosuppressant	Lupus nephritis, nephrotic syndrome	China	In-house	Additional indication



## Medical devices: Main products

### **Dialysis-related products**

- Leading position in hemodialysis-related products market in Japan —approx. 32% share<sup>1</sup> in dialyzers
- Accelerated overseas development to meet needs in different countries and different regions



### Planova virus removal filters

- World's No. 1 share; contributing to improved viral safety and productivity in manufacturing processes for biopharmaceuticals and plasma derivatives<sup>2</sup>
- Medium-to-long-term market growth for biopharmaceuticals and plasma derivatives approx. 10% per year
- Tightening regulations for virus removal, proliferation of biosimilar products
- Growth in emerging markets (China, India, South America) in addition to main markets of Europe and US
- Construction of a new plant for the spinning of cellulose hollow-fiber membranes for Planova virus removal filters (completed in September 2019)
- Acquisition of ViruSure, an Austrian provider of biosafety testing services in October 2019

<sup>&</sup>lt;sup>1</sup> Asahi Kasei estimate.

<sup>&</sup>lt;sup>2</sup> Mainly monoclonal antibodies and immunoglobulins.

### Critical Care (1)

#### Resuscitation

- ✓ Wide lineup of resuscitation-related products
  - Defibrillators for hospitals and EMS
  - AEDs (automated external defibrillators)
  - Automated CPR
  - Ventilators, etc.



Defibrillators for hospitals and EMS

No. 1 share in the world



**AED** 





AutoPulse Ventilator

non-invasive cardiac support pomp

#### LifeVest

- ✓ The only product of its kind to receive regulatory approval
- Wearable defibrillator for patients at risk of sudden cardiac arrest—provides protection during high-risk periods such as while waiting for an ICD<sup>1</sup> implant (average usage duration 3 months; rented to patients)
- Recommended in both Europe and US clinical guidelines; has been used by almost 600,000 patients worldwide

**LifeVest** wearable defibrillator

#### Circulation

- ✓ <u>Intravascular temperature</u> <u>management system</u>
  - Expanding into area of acute myocardial infarction through acquisition of TherOx, Inc. Thermogard temperature management system



#### Data

#### ✓ Software for EMS & fire

- Managing operations from dispatching and tracking emergency vehicles to transmitting patient data from ambulance to hospital

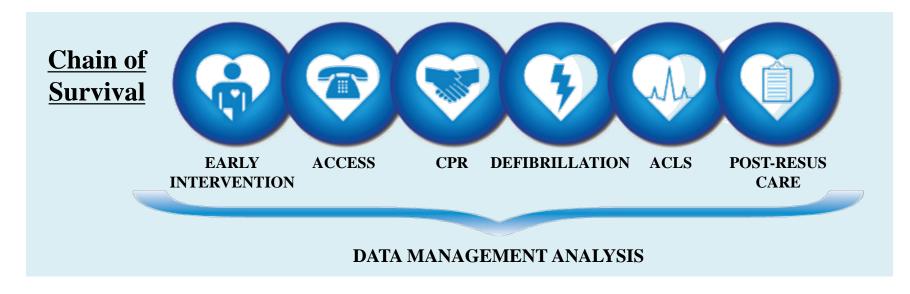


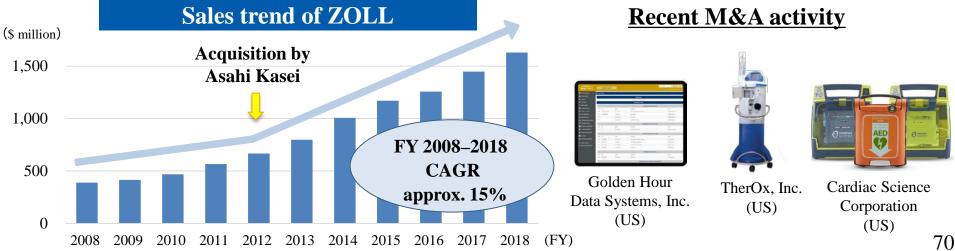
<sup>1</sup> Implantable cardioverter defibrillator



## Critical Care (2)

- Product lineup addressing every link in the Chain of Survival
- Strengthening the acute critical care product portfolio by M&A







# Example (1) CO<sub>2</sub> gas sensor business

Clean environmental energy

Healthy/comfortable longevity with peace of mind

# Air quality

Human health Productivity

Well-sealed buildings (increased CO<sub>2</sub> concentration)

# Energy saving

Efficient ventilation

Global warming

CO<sub>2</sub> refrigerant

#### CO<sub>2</sub> gas sensor

Application for invisible optics sensing technology

Compound semiconductors (Asahi Kasei)

CO<sub>2</sub> sensor modules (Senseair AB)

Small size
High sensitivity
Low power consumption
Long life
Fast response



Potential use for different gases and various purposes

homes In vehicles

Agriculture

In

----

Alcohol

detection

Mass transit

?

Outside

air

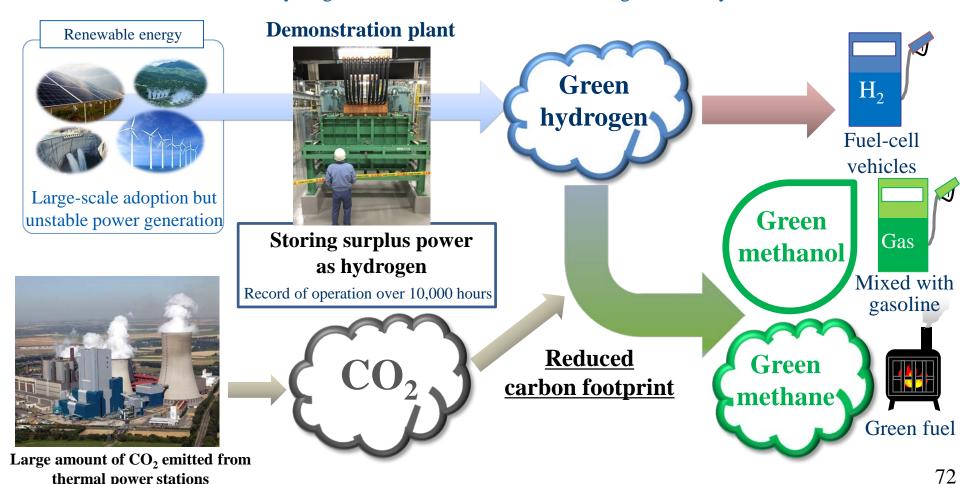
thermal power stations



## Example (2) Alkaline water electrolysis system

# Addressing challenges in a growth market by combining electrolysis, catalyst, and membrane technology

- World's highest energy efficiency with demonstration plant anticipating 10 MW capacity
- Accelerating commercialization with demonstration plant in Europe, the market with the greatest potential
- •Selected for the Fukushima Hydrogen Research Field, the world's largest-scale system of 10 MW

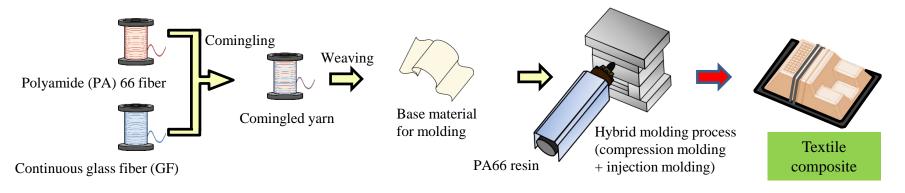




# Example (3) High-performance composite materials

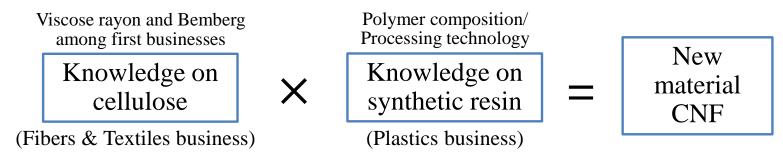
### Connecting fiber, resin, and processing technology

### 1) Material to replace metal for weight reduction in automotive structural parts



- ✓ High degree of design freedom: Able to create parts that have complex shapes
- ✓ Outstanding strength-to-weight ratio: Improved strength and rigidity compared with conventional GF reinforced PA66 resin

### 2) Development of cellulose nanofiber (CNF) composite



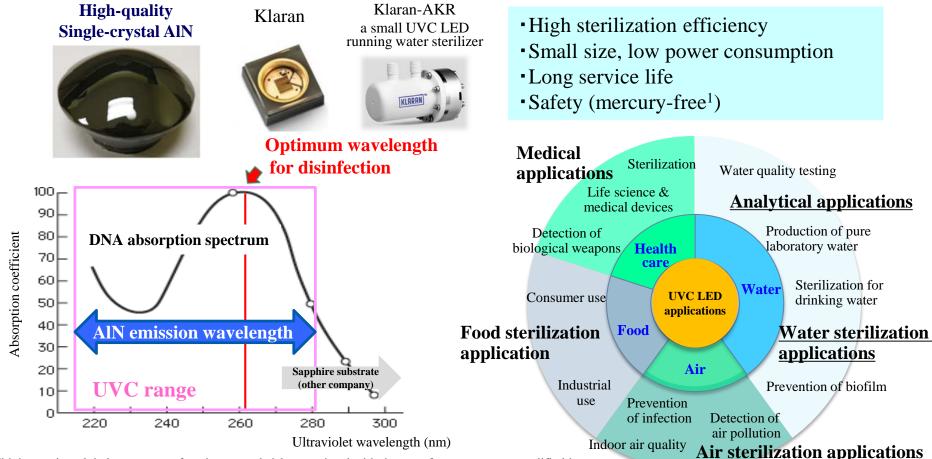


# Example (4) UVC LED

### Business expansion based on core technology in compound semiconductors

Hall elements (world-leading share)  $\rightarrow$  IR sensor, CO<sub>2</sub> sensor, etc.  $\rightarrow$  UVC LED using aluminum nitride (AlN)

#### Mass production of UVC LEDs using the world's only 2-inch single-crystal AlN substrate

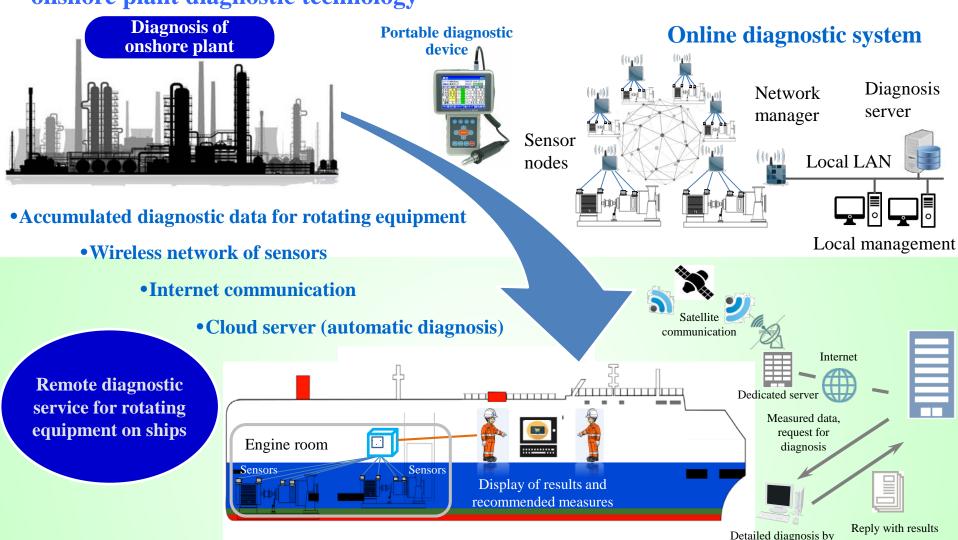


<sup>&</sup>lt;sup>1</sup> With increasing global awareness of environmental risks associated with the use of mercury, as exemplified by the Minamata Convention on Mercury which came into force in August 2017, there has been a heightening need for a UV light source to replace mercury lamps that are currently used to disinfect drinking water, etc.



Example (5) IoT for plant diagnosis—applied to solutions for shipping industry

Providing remote diagnostic service for rotating equipment on ships leveraging onshore plant diagnostic technology



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# Revision of business categories

Beginning with FY 2019, the business categories in the Material segment are reclassified from the former Fibers, Chemicals, and Electronics into Basic Materials, Performance Products, and Specialty Solutions.

Segments	Business categories					
	Former		New			
Material	Fibers		Basic Materials (Former petrochemicals)			
	Chemicals (Petrochemicals, performance		Performance Products (Former Fibers, performance polymers, consumables)			
	polymers, performance materials and consumables)		Specialty Solutions (Former performance materials, separators, electronic devices)			
	Electronics (Separators, electronic devices)		Others			
Homes						
Health Care						
Others	No change					
Corporate expenses and eliminations						



# <u>Disclaimer</u>

The forecasts and estimates shown in this document are dependent on a variety of assumptions and economic conditions. Plans and figures depicting the future do not imply a guarantee of actual outcomes.

# **Creating for Tomorrow**

The commitment of the Asahi Kasei Group:

To do all that we can in every era to help the people of the world

make the most of life and attain fulfillment in living.

Since our founding, we have always been deeply committed

to contributing to the development of society,

boldly anticipating the emergence of new needs.

This is what we mean by "Creating for Tomorrow."

