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Material Sector Briefing

Asahi Kasei Corp.

December 21, 2023

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01 Performance Forecast and Approach To Business Portfolio Transformation

02 Material Sector Growth Businesses

1. First priority: Digital Solutions
2. Growth potential: Energy Storage (separators)
3. Growth potential: Hydrogen-Related
4. New initiatives for added value

03 R&D Strategy

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01

Performance Forecast and Approach To Business Portfolio Transformation

Fiscal 2023 forecast

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Year-on-year income growth in each area, but slower-than-expected recovery in Environmental Solutions

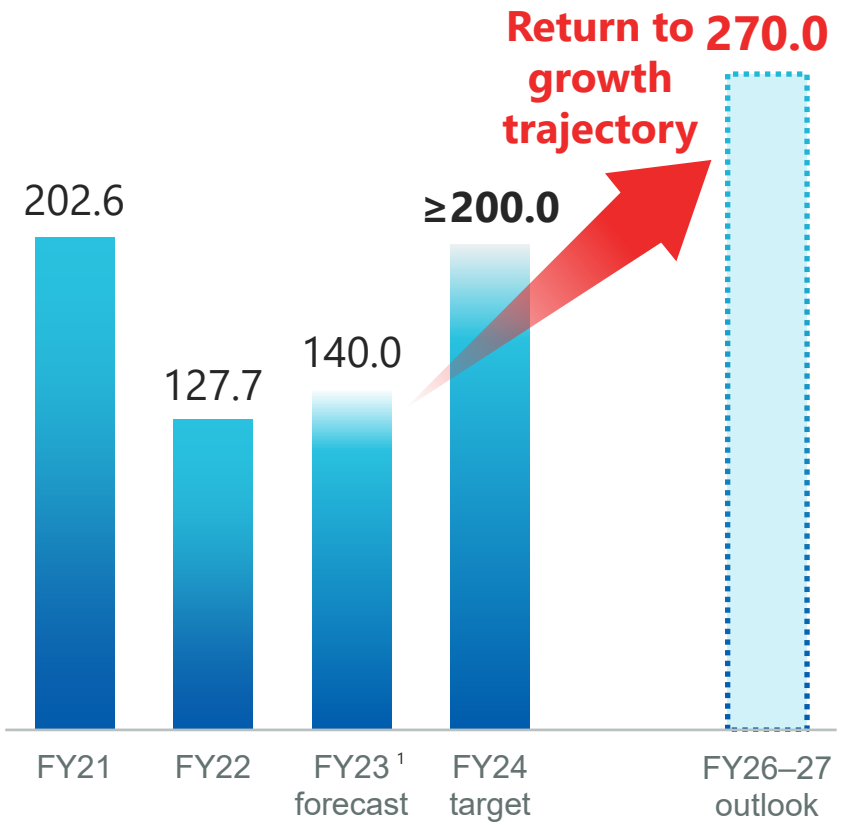
Operating income (¥ billion)

	FY 2022 result	FY 2023 forecast	Overview by business
Health Care	41.9 →	46.4	• Decreased income in Health Care business category with higher SG&A expenses and impact of consolidation of Bionova • Increased income in Critical Care with improved reimbursement conditions for LifeVest and higher sales prices for defibrillators
Homes	75.4 →	79.8	• Steady income in Homes business category with impact of lower volume of work for order-built homes but firm performance of real estate • Increased income in Construction Materials with progress in passing on increased costs
Material: Life Innovation	27.8 →	30.5	• Increased income with improved demand in electronics and semiconductor markets and effect of marketing activity for product adoption in H2
Material: Mobility & Industrial	10.8 →	13.6	• Increased income with greater shipments and improved terms of trade for car interior material in H1 and greater shipments of engineering plastics for automotive and solar power applications in H2
Material: Environmental Solutions	(2.3) →	4.2	• Improved earnings in separators with lower amortization of goodwill and increased shipments with new adoptions • Basic Materials remaining sluggish with maintenance turnaround in H1 and slow demand recovery

Progress on medium-term targets

Fiscal 2024 targets have become more challenging in the current operating climate, but working to achieve them through additional earnings improvement measures

Operating income (¥ billion)



(¥ billion)	FY 2023 forecast (Nov. 2023)	FY 2024 target (Apr. 2023)
Health Care	**46.4**	**60.0**
Homes	**79.8**	**95.0**
Material	**49.5**	**110.0**
Life Innovation	30.5	47.0
Mobility & Industrial	13.6	26.0
Environmental Solutions (excl. Basic Materials)	10.3	26.0
Basic Materials	(6.1)	23.0
Corporate expenses and eliminations	**(35.7)**	**≈(60.0)** (incl. buffer)
Consolidated	**140.0**	**≥200.0**

Note: Sums of figures within Material do not equal the segment totals.

Prospects for reaching targets

Health Care

Expanding as planned with income growth from Critical Care and overseas pharma

Homes

Steadily advancing larger and higher value-added units based on changing domestic environment

Material

- Delayed recovery with deteriorated environment in China, and semiconductor and automotive markets
- Advancing earnings improvement measures

[1] Announced in Nov. 2023

Basic management stance

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Material
Taking challenges for social transformation with **technology** and **innovation**

Homes
Generating steady earnings while providing comfortable **living**

Health Care
Advancing **global management** and driving the **growth** of the group

Continually raising productivity (maximum asset utilization)

Growth through challenges, steady earnings generation

Bold business portfolio transformation

Two aspects of sustainability for Asahi Kasei

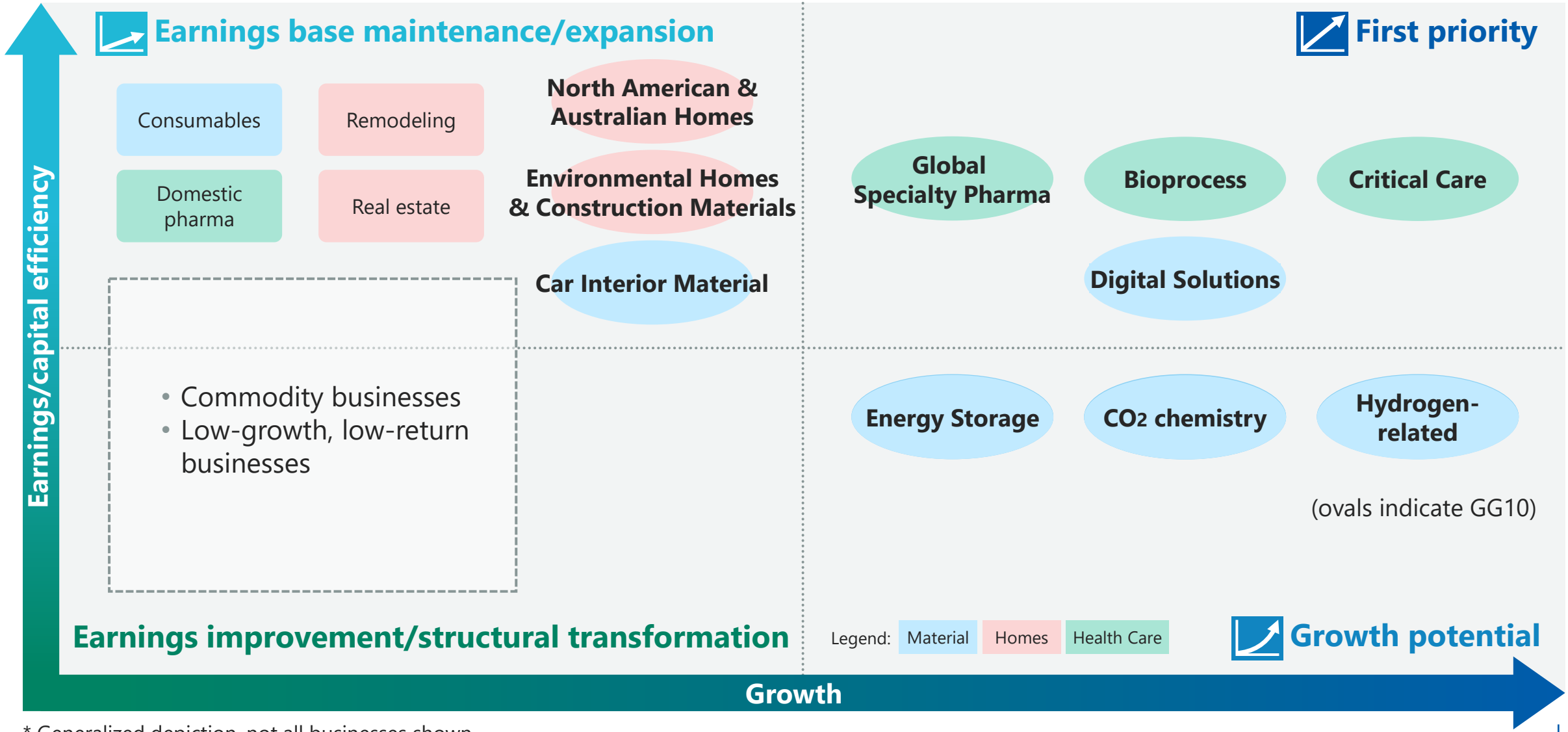
Contributing to sustainable society (realization of Group Vision)

Sustainable growth of corporate value

Action aligned with Group Values

Asahi Kasei's business portfolio*

Advancing actions according to classification based on clear position within business portfolio



* Generalized depiction, not all businesses shown.

Business portfolio transformation

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Steadily advancing medium-term projects as planned, accelerating studies for structural transformation of petrochemical chain-related businesses

A Aiming to gain effect of structural transformation during medium-term management plan (FY 2022–2024)

Scale of subject businesses (FY 2021 sales)

>¥100 billion

Projects executed

- Establishment of joint venture for spunbond nonwovens
- Divestiture of pellicles business
- Closure of Iwakuni Plant for AAC
- Divestiture of businesses of Asahi Kasei Pax

\+

Projects under study

Basic chemicals businesses, etc., in the Material sector

B Structural transformation of petrochemical chain-related businesses from longer-term perspective

Scale of subject businesses (FY 2021 sales)

≈¥600 billion*

Status of studies

- Regarding naphtha cracker, advancing studies with potential partners in western Japan considering capacity optimization and carbon neutrality
- Regarding products and areas with little relation to domestic chain, accelerating individual studies from “best owner” perspective

* Some overlap with category A.

Material sector outlook

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Grow

Focusing investment on fields with notable market expansion, achieving continuous growth

- Energy Storage (separators)
- Digital Solutions

Challenge

Taking challenges to create new businesses that contribute to sustainability with original technology, forming future pillars of the sector

- Hydrogen-related
- CO_2 Chemistry
- Energy Storage (solutions)

Cultivate

Pursuing P-PaaS (Product-based Platform as a Service) **leveraging technological expertise, successively raising earnings with high capital efficiency**

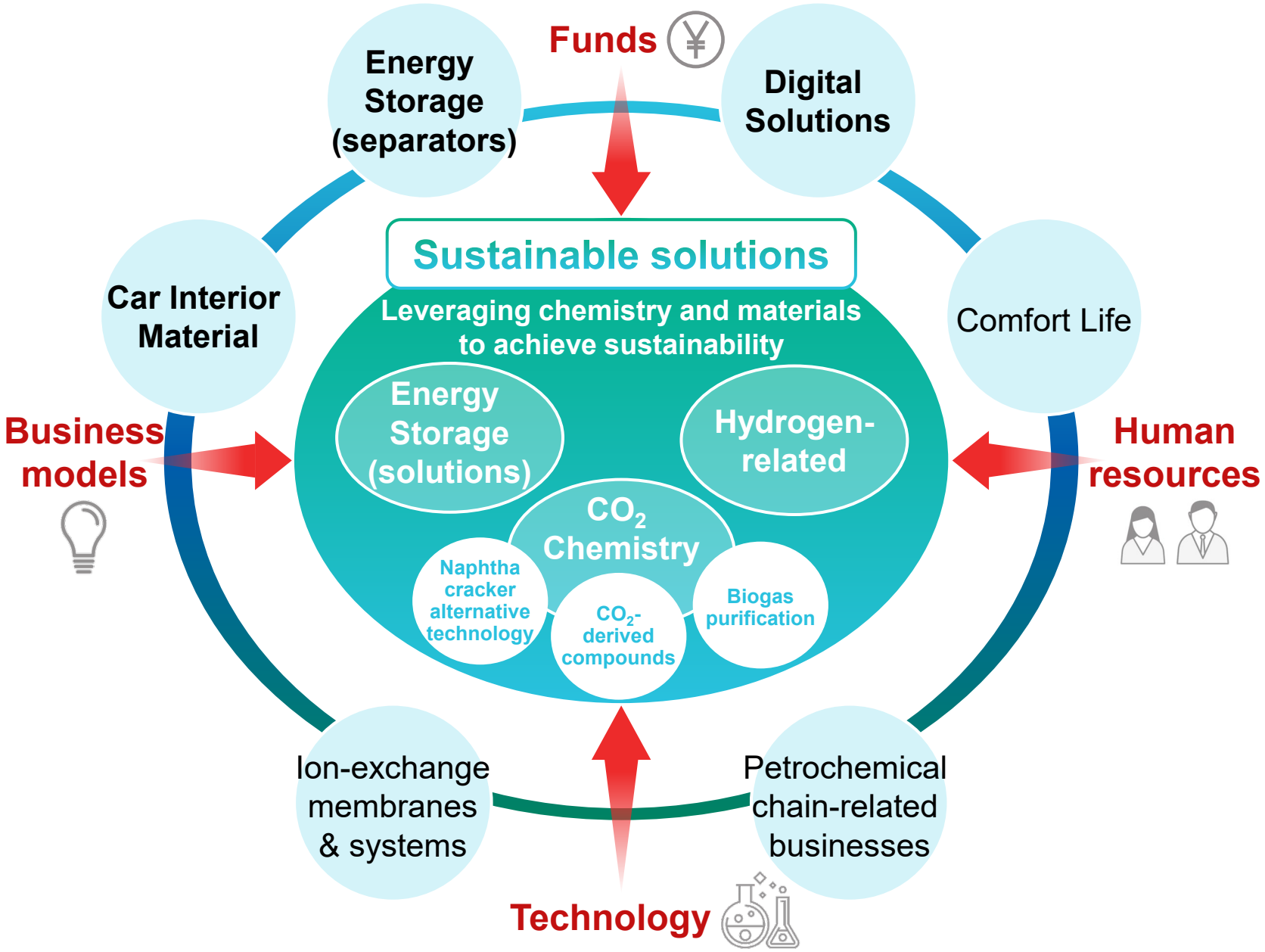
- Car Interior Material
- Ion-exchange membranes & systems

Change

Advancing structural reform of petrochemical chain, seeking transformation from low growth, low capital efficiency, and high volatility

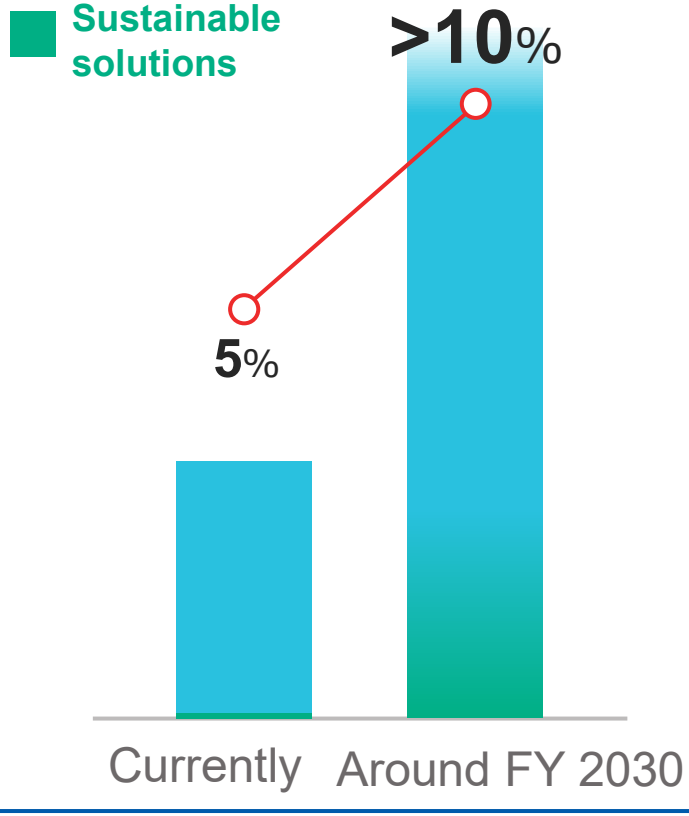
- Petrochemical chain-related businesses

Material sector long-term vision



Material sector earnings concept

Bar graph: operating income
Line graph: operating margin



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Material Sector Growth Businesses

1. **First priority: Digital Solutions**
2. Growth potential: Energy Storage (separators)
3. Growth potential: Hydrogen-Related
4. New initiatives for added value

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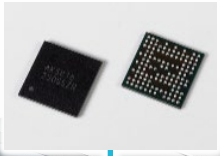
Contributing to expanding xEV and related infrastructure markets with distinctive products for increased range, faster charging, and more comfortable interiors

xEV interior and power train

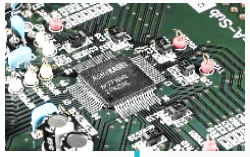
WGF reflective polarized film
(head-up display)

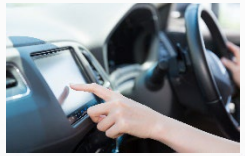
Millimeter wave radar IC
(interior sensing)



CO_2 sensor module
(interior sensing)

Audio DSP
(sound management)





Plastic optical fiber
(interior transmission)

Novacure latent hardener
(motor, engine, structural adhesive)

Charging stations, etc.

Current sensor IC
(fast charging)

Legend: Blue indicates electronic component
Green indicates electronic material

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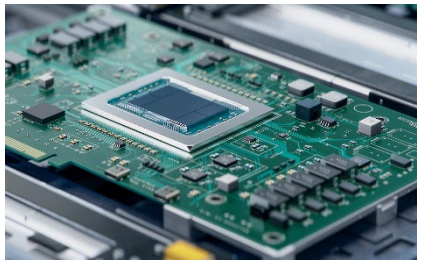
Wide range of distinctive products including highly functional devices for smartphones, IoT terminals, base stations, and servers, and electronic materials for semiconductors for high-speed communications

Base stations, servers



Sunfort photosensitive dry film for printed circuit boards
(multi-layered, thinner)

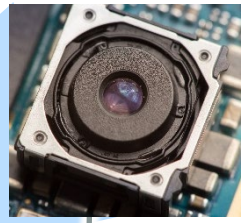
Novacure latent hardener
(leading-edge IC packaging)

Pimel semiconductor buffer coat and interlayer dielectric
(leading-edge semiconductors)

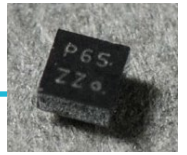
Glass fabric for printed wiring boards and package substrates
(multi-layered, thinner)

Smartphones, IoT terminals

CPS[1] control IC
(image stabilizer)



Novacure latent hardener
(camera module, precision adhesive)



Electronic compass IC
(high-precision 3-axis compass)

[1] Close position sensing

Legend: Blue indicates electronic component
Green indicates electronic material

Future Vision for Digital Solutions Business

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Leveraging the strength of having both electronic components and electronic materials, accelerating expansion and growth to become a major pillar of earnings for the Material sector

Digital Solutions domain strategy

xEV ICT E&E

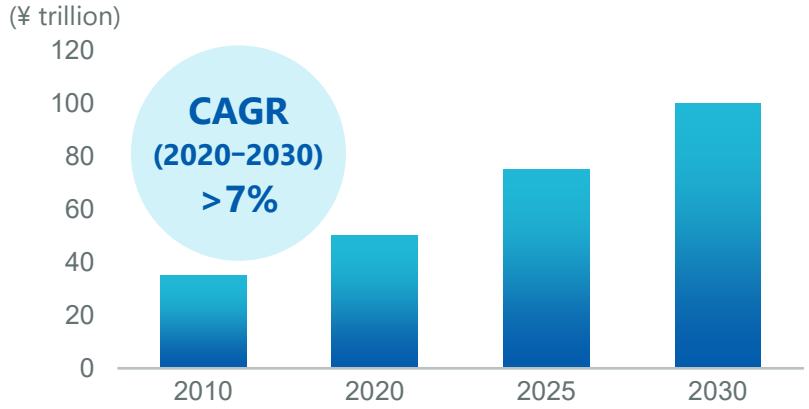
Accelerating growth with distinctive leading-edge niche products and services to firmly take on the market leader in the key markets of **xEV**, **ICT**, and **environment & energy** through unified management of components and materials businesses

Electronic components	Providing solutions focused on **value chain and customer value provision by integrating sensor technology, analog design, and software technology**
Electronic materials	Providing highest-standard quality assurance and technical support centered on photosensitive material for the latest semiconductor and packaging processes supporting **finer features, higher density, and higher frequency**

In addition to autonomous growth by using DX to accelerate product development and advance innovation, studying value creation including in-licensing, M&A, etc.

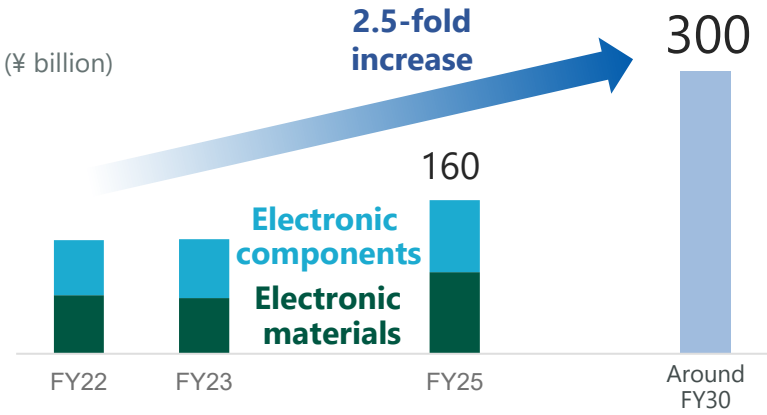
Growth of semiconductor market

Global market scale



Source: Japan's Ministry of Economy, Trade and Industry

Digital Solutions sales outlook



Strengths and future prospects of electronic components business

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Accelerating development of solutions as a rare device manufacturer having strengths in both compound semiconductor elements and mixed-signal LSIs; advancing value provision to expand the realm of perception by combining technologies

Core technologies

Raising position in established markets and capturing new markets with combination of competitive core technologies

Sensor technology
Magnetic sensors, infrared gas sensors, organism millimeter-wave sensors, etc.

+

Analog signal processing technology
Low power consumption, low noise, low distortion, precise temperature compensation, etc.

+

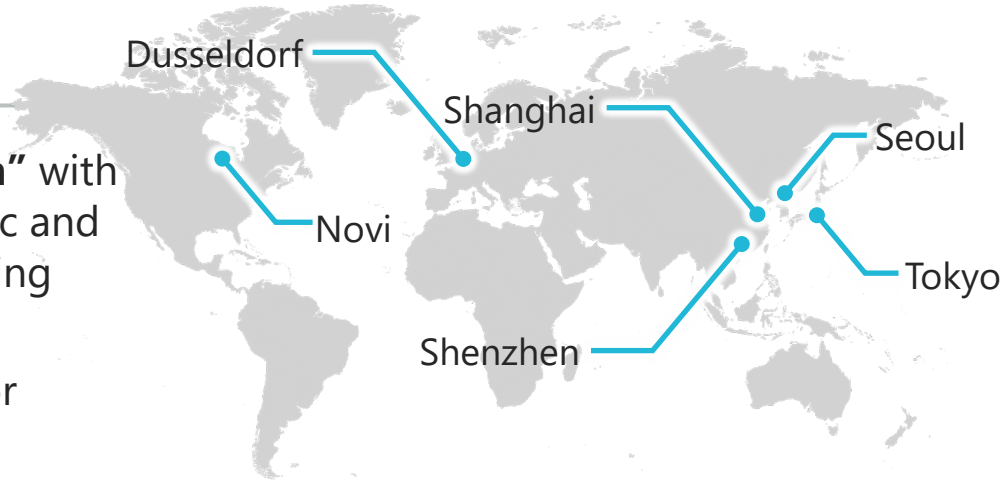
Software/algorithm technology
Environmental simulation, data analysis, noise/echo cancellation, speech recognition, etc.

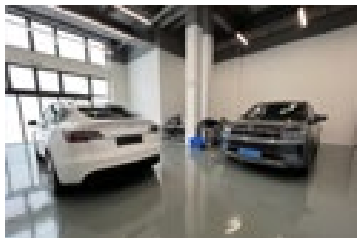
Marketing strategy

Solution business with marketing strategy focused on providing value to the end user

Example **Garage Labs**

- For the rapidly expanding EV market, **"co-creation"** with vehicle manufacturers of each country on magnetic and current sensors, as well as DSP*, software, and tuning technology centered on sound
- Clearly grasping market trends and value chains for provision of solutions to customers



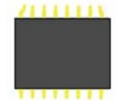
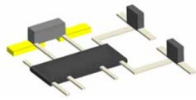


* Digital signal processor

Currentier coreless current sensor

Providing new value in the automotive field with high-performance current sensor combining compound semiconductor technology, analog circuit technology, and package design technology

Applications	• Industrial servo motors, inverters, robot control, next-generation power devices (SiC, GaN, etc.)
Strengths	• Current sensing with small size, high precision, fast response, and low heat generation enabled by high-precision Hall element and original package technology
Record	• Over 30 million shipped • Conserving energy with large air conditioners, etc. (certified as Environmental Contribution Product of Asahi Kasei)

Current sensor configuration		Other company's coreless current sensor 	Shunt resistor + isolation amplifier 
High precision	○	×	○
Low heat generation	○	△	×
Small size	○	○	×

○ good △ fair × poor

Providing value in the automotive field

- **Contributing to longer EV range with smaller drive system using fewer parts, as well as faster charging**
- **Collaborating with module manufactures to accelerate proposals to set manufacturers**

Envisaged points of use	- Power supply control system (battery control, charging control) with electrification of vehicle drive - Power supply module of charging stations

VELVET SOUND audio solution brand

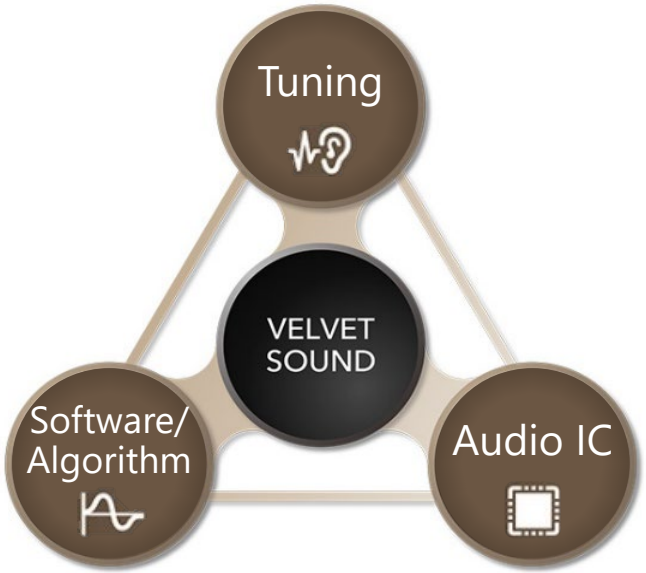
Providing extremely high-end sound to EV interiors with audio space design and noise cancellation solutions

Strengths

- System design, software, and tuning know-how from over 35 years of audio LSI development
- Providing a world of sound that makes you feel like you're really there by thorough technological pursuit with sound-source focused approach

Record

- Over 200 million DSPs tailored to car interior sound design have been shipped



Daishin Kashimoto
1st Concertmaster, Berlin Philharmonic

"With Asahi Kasei's ICs and tuning technology, you can get the sensation of being in an audio room even with ordinary speakers."

Providing value in the automotive field

To meet heightened needs for the vehicle interior audio environment due to electrification, providing realistic sound experience while reducing engine and road noise for a high-quality audio space like a concert hall

Highly flexible original DSP and optimized software/algorithm developed to process various audio signals inside a vehicle

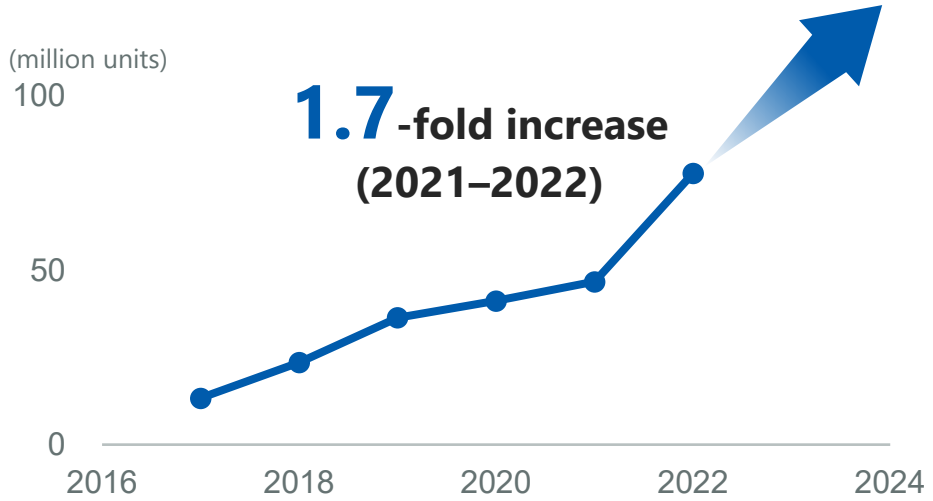
Meeting the automotive industry's needs for high sound quality with integrated solutions combining system design, audio ICs, software, and tuning

Mobile device camera control solution (CPS[1] control IC)

Contributing to higher performance and smaller size of cameras as a leader in driver ICs for image stabilization and autofocus driver ICs for smartphone cameras

Market	• Heightened needs for image stabilization and high-speed autofocus as mobile device camera performance increases
Strengths	• Providing both hardware and software solutions considering mass production for small modules which are difficult for final product manufacturers to model • Comprehensive support system
Record	• Over 4 billion shipped

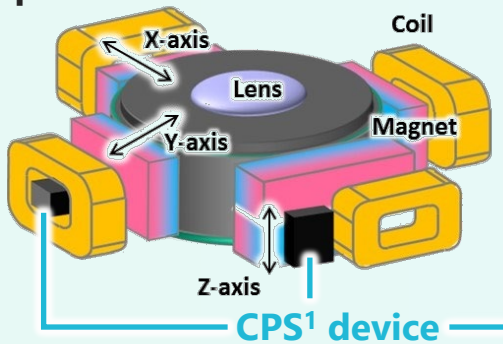
Chinese smartphone cameras with OIS[2]

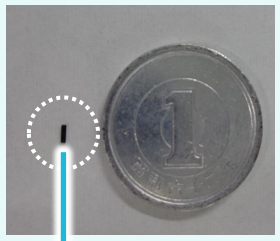


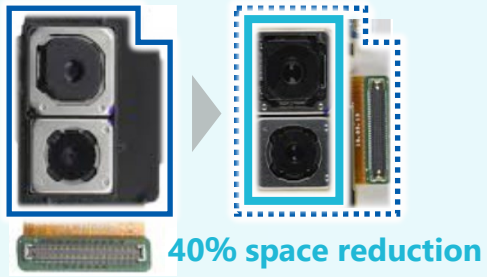
Note: Calculated by Asahi Kasei based on market data

Providing value in the smartphone field

- **Leveraging magnetic sensor technology accumulated over many years to achieve precise position detection and control while contributing to higher performance and smaller size of cameras**



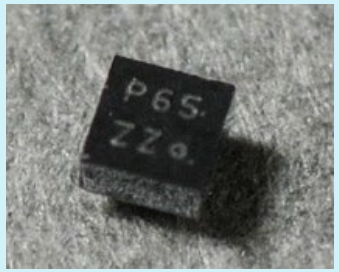




Miniaturization with ultra-small OIS[2] driver

Electronic compass

- Business started in 2003, contributed to spread of mobile devices with geomagnetic sensing function
- 6.7 billion units shipped (as of Mar. 2023)



[1] Close position sensing
[2] Optical image stabilization

Strengths and future prospects of electronic materials business

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Rapid evolution of chiplets[1] and packaging technology along with finer features, higher density, and higher frequency semiconductors (18% CAGR forecasted[2] in next-generation semiconductor packaging market)

- Leading the market with photosensitive material that supports finer processing of leading-edge semiconductors
- Providing high-quality, high-performance materials while coordinating with customers

Diversification of packaging, **expansion of new value chain** with merger of front-end and back-end processes

Front-end process

Semiconductor chip, packaging process materials

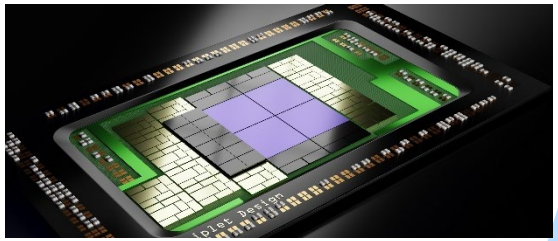
Pimel
(photosensitive insulator)

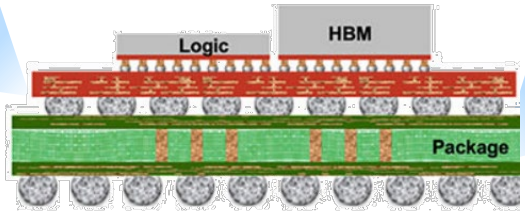
Novacure
(latent hardener)

- Evolution of redistribution layer process
- Finer primary packaging

Next-generation semiconductor package process material

Chiplets





PCB[3], packaging material

Sunfort
(photosensitive dry film)

Novacure
(latent hardener)

Glass fabric
(PCB insulator)

- Finer package substrates
- High-precision adhesive technology
- Low conductivity

Back-end process

Proposing optimum materials for **next-generation packaging market**
based on record with materials for semiconductor chips, substrates, and packaging processes

[1] Chiplets are small ICs having specific functions that are combined together in a single package. [2] Total of FO-WLP and FO-PLP (source: Fuji Chimera Research Institute, Inc.) [3] Printed circuit board

Pimel photosensitive insulator

Contributing to leading-edge semiconductor processes with high quality; expanding sales through reinforced capability for technological development and enhanced framework for quality assurance and manufacturing

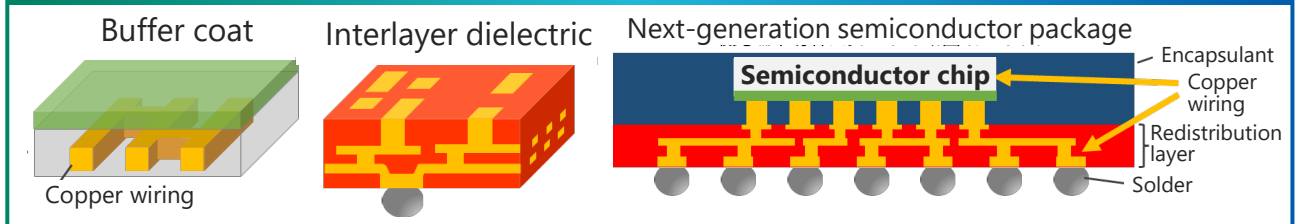
Applications
- Photosensitive material for semiconductor buffer coat and interlayer dielectric for copper wiring

Market
- **7% CAGR (2022–2028) forecasted** for next-generation semiconductor packaging inter-layer insulation

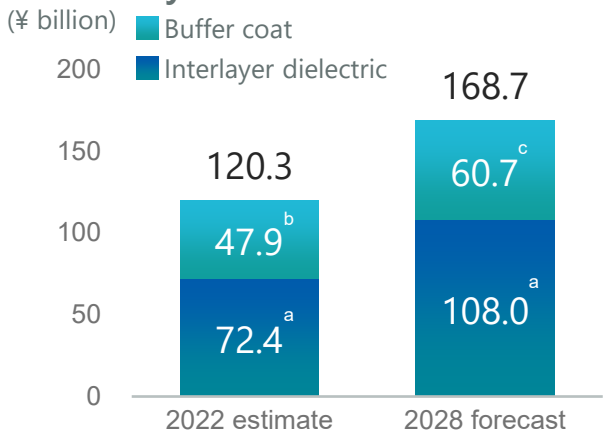
Strengths
- Leading the market with swift and stable supply of products that meet customer requirements based on years of accumulated technological development capability and quality assurance framework
- Ascertaining customer needs related to leading-edge semiconductor processes and swiftly developing products accordingly; patent score quickly rising as a result

Record
- Contributing to leading-edge innovation; receipt of 2020 “Excellent Performance Award” from TSMC

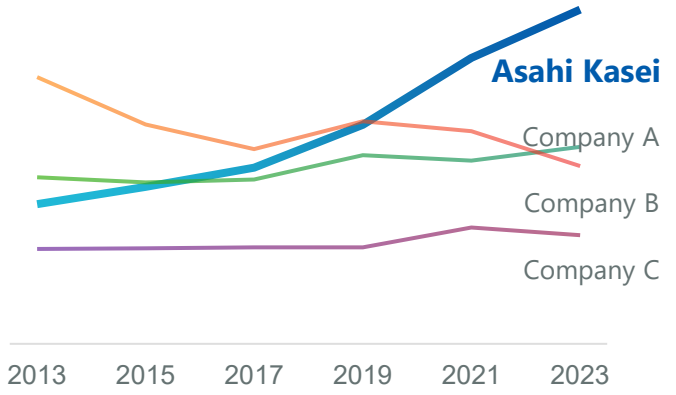
Main applications



Semiconductor buffer coat and interlayer dielectric market forecast



Patent score



Note: Plotted by Asahi Kasei using PatentSight

Strategy and outlook: Enhancing supply of leading-edge products

Establishment of QA Annex in 2023, new line in Fuji scheduled to start in 2024 (investment >¥15 billion)

Sales forecasted to double between 2022 and 2030

- Using materials informatics to shorten development time and develop innovative materials
- Development focused on finer processes and strengthening customer relationships

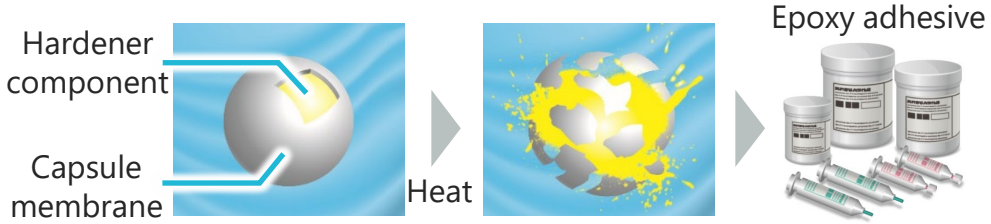
[a] Fuji Chimera Research Institute, Inc. [b] Fuji Keizai Co., Ltd. [c] Asahi Kasei estimate

Novacure latent epoxy hardener

Hardener for adhesives used in camera modules and next-generation semiconductor packaging; high added value with revolutionary microcapsule technology

Applications

- Widely used as hardener for epoxy adhesive in electrical and electronic fields



Strengths

- Distinctive microcapsule technology enables stability in storage and rapid curing at low temperature
- Obtaining new niche applications as the de facto standard latent curing agent

Market

- Advances in package manufacturing processes resulting in greater need for material allowing low-temperature packaging

Main applications

Strategy and outlook

- **Contributing to the advance of next-generation semiconductor packaging by enabling high-precision adhesion processes with easily controllable hardener**
- **Forecasting sales to double from 2022 to 2030 along with growth of the next-generation packaging market**

Glass fabric for printed circuit boards

Leading the market with development of advanced glass fabric supporting high-speed communications infrastructure that is rapidly expanding with AI demand

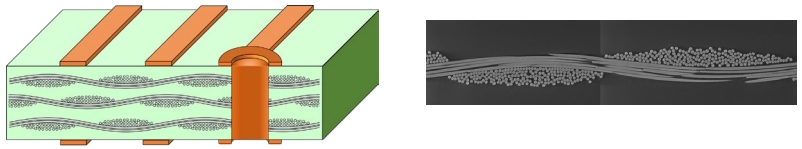
Application
- Woven fabric of glass fiber used as reinforcement and insulator for printed circuit boards

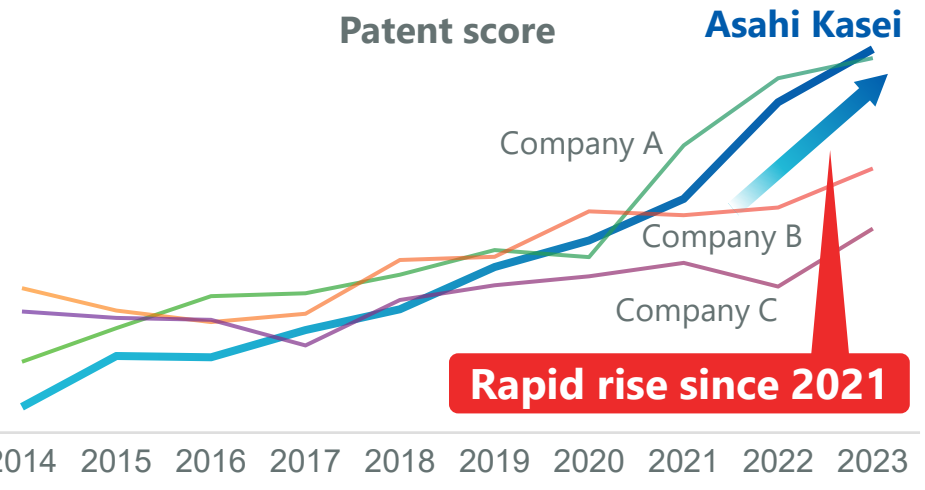
Strengths
- Market-leading development of high-quality advanced products such as ultra-thin fabric for smaller and thinner digital devices such as smartphones and tablets, with higher-speed and higher-volume data transmission

Record
- Rich record of adoption by wide range of customers with proposals for customized products

Type of application	Trend	Glass fabric requirements
Communications terminals	Thinner layers	Ultra-thin, **low dielectric**
Semiconductor packaging	Higher transmission speed	**Low dielectric, low thermal expansion** (ultra-thin for semiconductors)
Base stations, servers		
Routers, switches		

Circuit board cross section





Note: Plotted by Asahi Kasei using PatentSight

Strategy and outlook

- **Spread of AI is leading to sharp demand growth for low-dielectric glass fabric that enables high-speed communications with low attenuation; growth also expected in routers and switches for high-speed communications servers**
- **Capturing demand growth by focusing on development of next-generation products, sales forecasted to triple from 2022 to 2030**

Sunfort photosensitive dry film

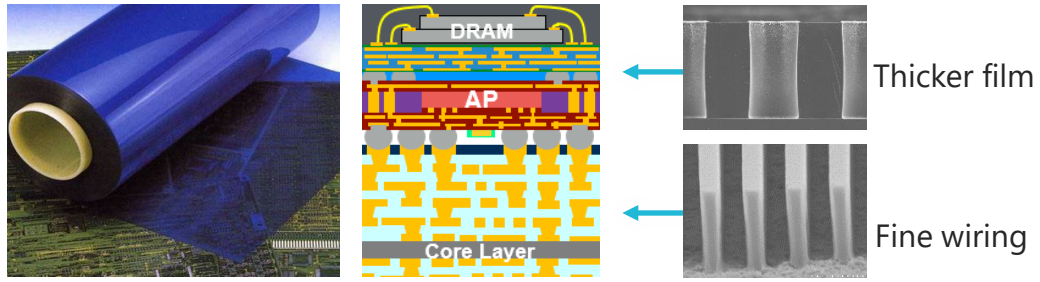
Leading the market by accelerating development with high technological capability aligned with customer needs as demand expands for advanced semiconductor package substrates

Applications

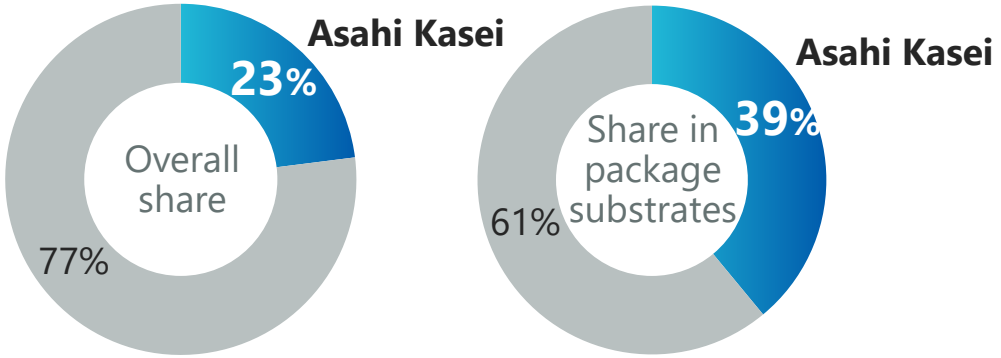
- Used to form wiring patterns on printed circuit boards and package substrates used in PCs, smartphones, servers, and automobiles
- High share of the global market, supplied to industry leaders; expanding adoption in growing field of advanced semiconductor packaging

	Strengths	Main market trends
Advanced	• Technological development capability (high resolution, high adhesion) • High quality	• Thinner and higher-density advanced package substrates
Conventional	• Diverse product lineup • Technical support to improve customer yields	• Investment in emerging markets (China plus one) • Expansion of applications (EVs, IoT, etc.)

Advanced package substrate example



2022 photosensitive dry film share by volume[1]



Strategy and outlook

- **Leading the market with enhanced development for advanced package substrates**
- **13% CAGR forecasted[2] from 2022 to 2028 in demand for photosensitive dry film for package substrates with increase in area of wiring**

[1] Asahi Kasei estimate [2] Fuji Chimera Research Institute, Inc.

Accelerating expansion and growth of Digital Solutions domain

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Accelerating **co-creation with market leaders of each application** in EVs and other expanding markets

Further burnishing Asahi Kasei's strength in **niche technology,** advancing high-performance components and materials **that support advanced technology**

Investment for expansion in leading-edge technology areas on the order of ¥100 billion planned by 2030

Accelerating **expansion and growth of Digital Solutions** to become a **major pillar of the Material sector**

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02

Material Sector Growth Businesses

1 First priority: Digital Solutions

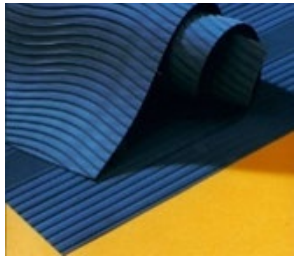
2 **Growth potential: Energy Storage (separators)**

3 Growth potential: Hydrogen-Related

4 New initiatives for added value

Separator business

Leading technological innovation based on long history as a pioneer in each type of separator

	Lithium-ion battery (LIB) separator		Lead-acid battery separator
	Hipore wet-process separator	Celgard dry-process separator[1]	Daramic[1]
			
Characteristics	Over 40 years of history; Hipore flourished as separator for LIB invented by Asahi Kasei Honorary Fellow Akira Yoshino in 1985		Business started in the 1930s; polyethylene separator developed in 1972
	High performance and safety; performance and safety further enhanced by coating	Well-balanced cost and performance; high lithium-ion permeability	
Main applications: Consumer electronics	■	■	
Main applications: Automotive: BEV (NMC[2])	■	■	Automobiles, etc.
Main applications: Automotive: BEV (LFP[3])		■	Automobiles, etc.
Main applications: Automotive: HEV		■	Automobiles, etc.
Main applications: ESS[4]		■	

[1] Celgard and Daramic acquired with Polypore in 2015. [2] Batteries using nickel-manganese-cobalt cathodes. [3] Batteries using lithium iron phosphate cathodes. [4] Energy storage system

LIB separator market and Asahi Kasei's target

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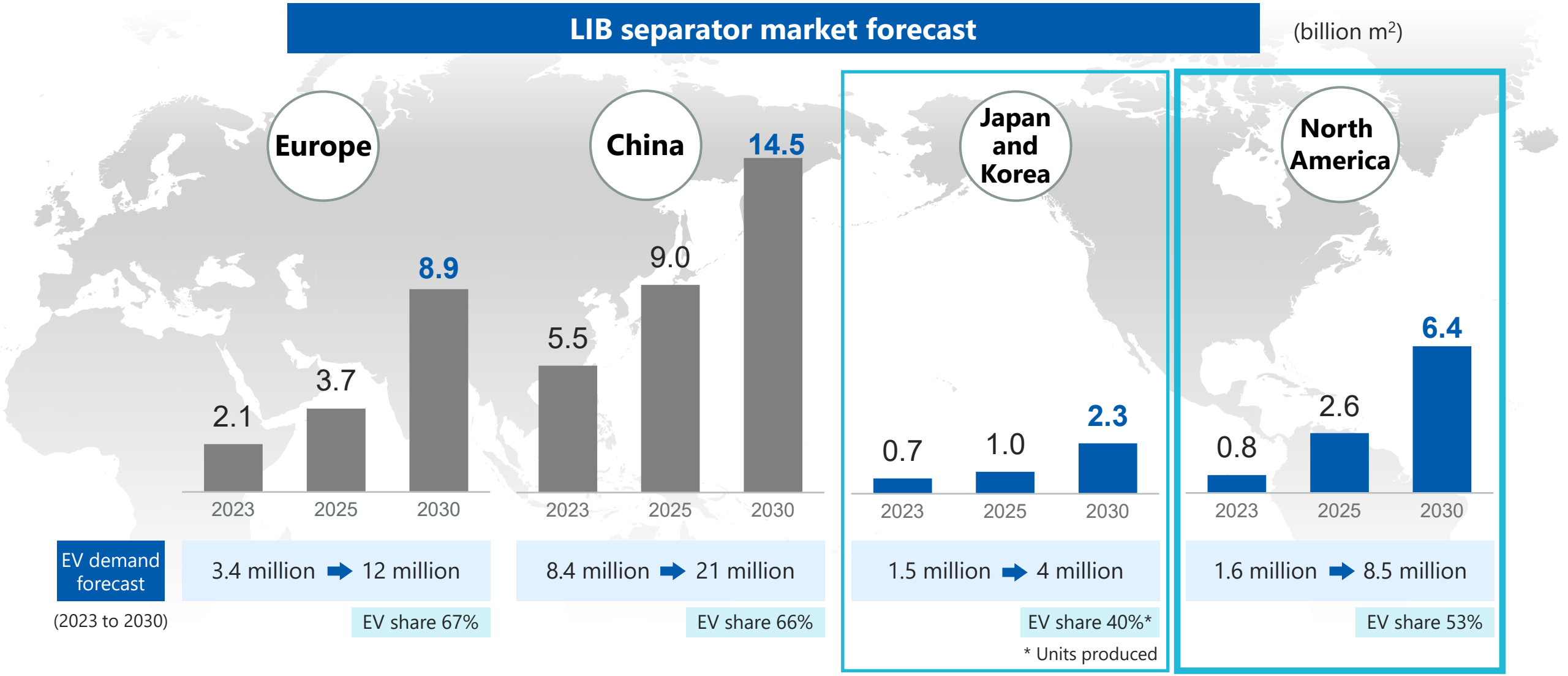
Main target is North America where rapid expansion of EV market is forecasted



Note: Asahi Kasei estimate

Business opportunity in North America

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Advancing plant investment, aiming to secure market share in North America where rapid demand growth and establishment of new supply chains are forecasted

Spread of EVs and fostering of related industries supported by the Inflation Reduction Act (IRA) in the U.S. and various government policies

Rapid EV market expansion

Some sluggishness but North American EV market share forecasted to reach 53% in 2030

Promoting production of EVs, LIBs, and their components in the region

Favorable treatment of products made in the region; subsidies for plant investment, tax incentives for EV purchase*

Aiming for swift decision on further investment in addition to new coating lines announced in the U.S.

* The IRA provides tax incentives for EV purchase conditional on proportion of battery components value created in North America; increasing from 50% in 2023 to 100% in 2029.

Expansion of coating capacity (announced October 31, 2023)

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Decision to invest ≈¥40 billion to add new coating lines in the U.S., Japan, and Korea, to meet growing demand in automotive LIB applications

U.S.
(Charlotte, NC)

Japan
(Hyuga, Miyazaki)

Korea
(Pyeongtaek, Gyeonggi)

- Successive start-up from H1 FY 2026; raising coating capacity to ≈1.2 billion m^2/year (equivalent to 1.7 million EVs)
- U.S. construction time and cost reduced by location within existing Celgard facilities; meeting needs of customers establishing supply chains in North America
- Coating enables higher heat resistance, strength, and energy density, while raising productivity of customers' battery manufacturing process; supplying high-quality products that meet customers' needs by leveraging Asahi Kasei's high development capability, production technology, and environmental technology

Hipore shipment volume and investment

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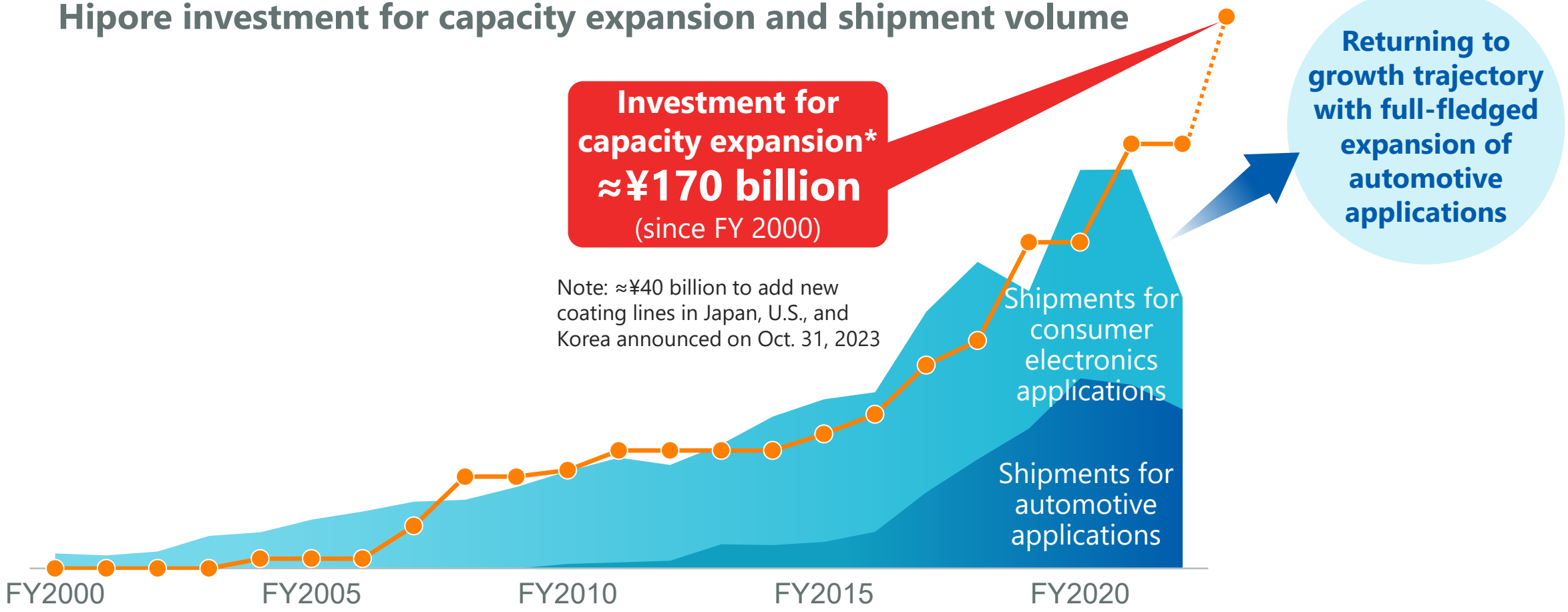
Current situation challenging with sluggish demand in consumer electronics and delay in expansion of automotive market, but vigorous new inquiries in our target markets; aiming to return to growth trajectory with full-fledged expansion of automotive applications

Hipore investment for capacity expansion and shipment volume



* Cumulative investment for capacity expansion (since FY 2000) by fiscal year of announcement

Business strategy for North America

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Maximum utilization of accumulated technology, know-how, and customer relationships

Asahi Kasei's strengths

Knowledge derived from many years in membrane business	Various membrane businesses based on high level of technology; world's only separator manufacturer* with in-house PE raw material
Both wet process and dry process	Meeting needs of wide range of battery types; Celgard is only high-volume manufacturer* in North America
High productivity	High extrusion speed, high yield; business platform for unmatched cost competitiveness
Products and technologies that add value to batteries	Uniform quality with even long and wide film; products to extend battery service life; coating technology to meet various customer needs
Technology and initiatives to reduce environmental burden	Initiatives to reduce effluent solvent; non-fluorinated coating; initiatives to reduce process losses; recycling initiatives

Moving to build business in North America

Leveraging various means to build North American business; not following conventional path of business

Utilizing external funds

Vertical and horizontal alliances

After establishing North American platform, advancing battery-related service business

* Asahi Kasei estimate.

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02

Material Sector Growth Businesses

1 First priority: Digital Solutions

2 Growth potential: Energy Storage (separators)

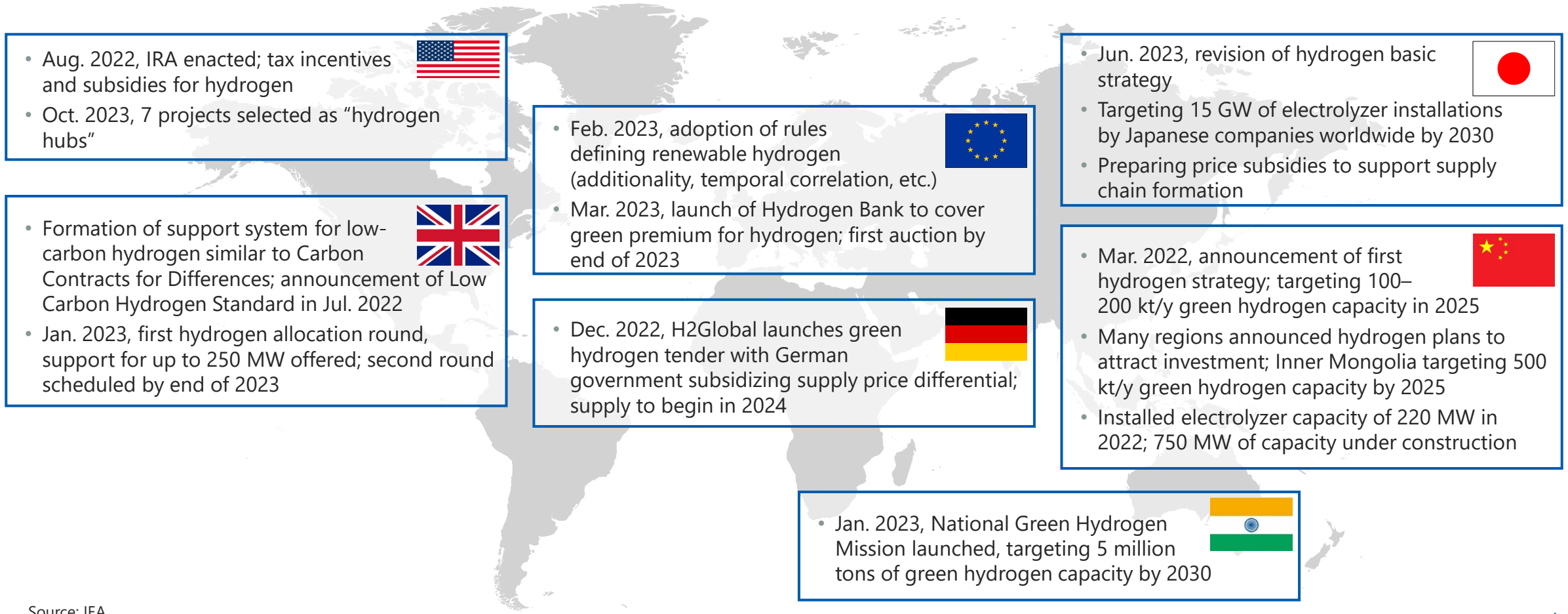
3 **Growth potential: Hydrogen-Related**

4 New initiatives for added value

Major hydrogen policies of the world

Various policies are being enacted to support the establishment of hydrogen markets as essential for decarbonization

- Following Europe's lead, the U.S. enacted measures to support the establishment of hydrogen supply chains in the IRA, etc.
- Various Asian countries including Japan have announced or revised their hydrogen strategies, and global sentiment for hydrogen is rapidly rising



- Aug. 2022, IRA enacted; tax incentives and subsidies for hydrogen
- Oct. 2023, 7 projects selected as "hydrogen hubs"

- Formation of support system for low-carbon hydrogen similar to Carbon Contracts for Differences; announcement of Low Carbon Hydrogen Standard in Jul. 2022
- Jan. 2023, first hydrogen allocation round, support for up to 250 MW offered; second round scheduled by end of 2023

- Feb. 2023, adoption of rules defining renewable hydrogen (additionality, temporal correlation, etc.)
- Mar. 2023, launch of Hydrogen Bank to cover green premium for hydrogen; first auction by end of 2023

- Dec. 2022, H2Global launches green hydrogen tender with German government subsidizing supply price differential; supply to begin in 2024

- Jun. 2023, revision of hydrogen basic strategy
- Targeting 15 GW of electrolyzer installations by Japanese companies worldwide by 2030
- Preparing price subsidies to support supply chain formation

- Mar. 2022, announcement of first hydrogen strategy; targeting 100–200 kt/y green hydrogen capacity in 2025
- Many regions announced hydrogen plans to attract investment; Inner Mongolia targeting 500 kt/y green hydrogen capacity by 2025
- Installed electrolyzer capacity of 220 MW in 2022; 750 MW of capacity under construction

- Jan. 2023, National Green Hydrogen Mission launched, targeting 5 million tons of green hydrogen capacity by 2030

Source: IEA

Water electrolysis market forecast

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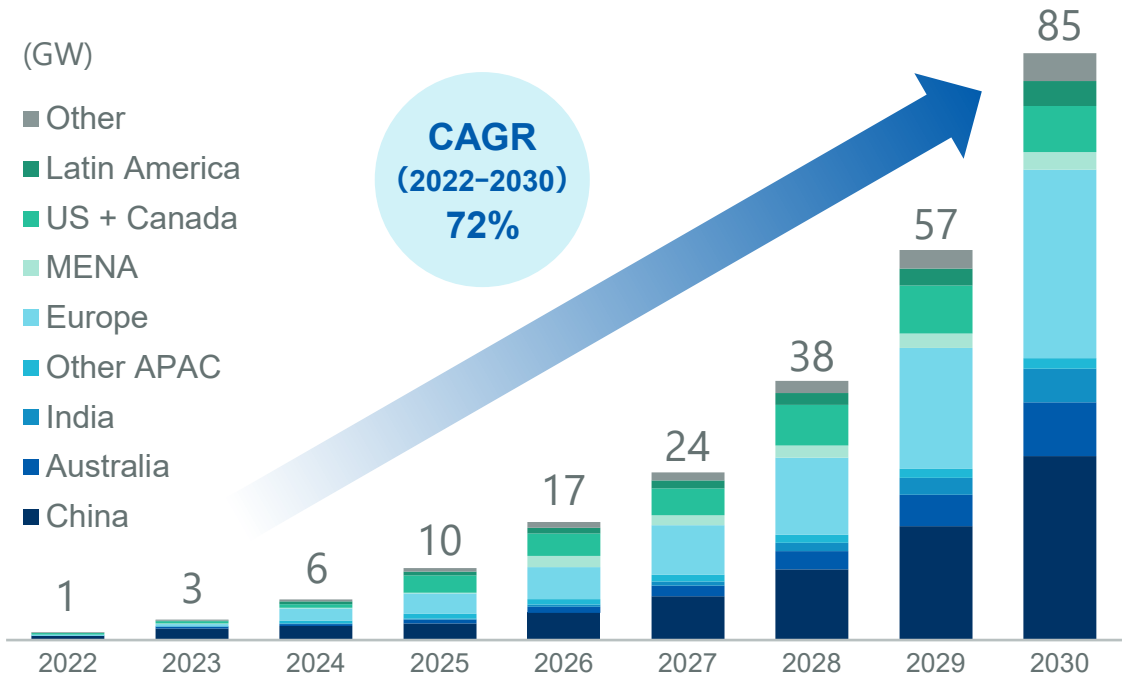
Many hydrogen projects are planned and the market is expected to expand rapidly, but few projects are being actualized

- Yearly global electrolyzer installations are forecasted to rise sharply **from 1 GW in 2022 to 85 GW in 2030**
- If all announced large-scale hydrogen projects are actualized, total investment by 2030 would be $320 billion (including electrolyzer capacity of around 420 GW), but a final investment decision (FID) has been made on less than 10% of them
- Keys to FID are **securing low-cost power**, **securing hydrogen off-takers**, **and economic viability including government support**

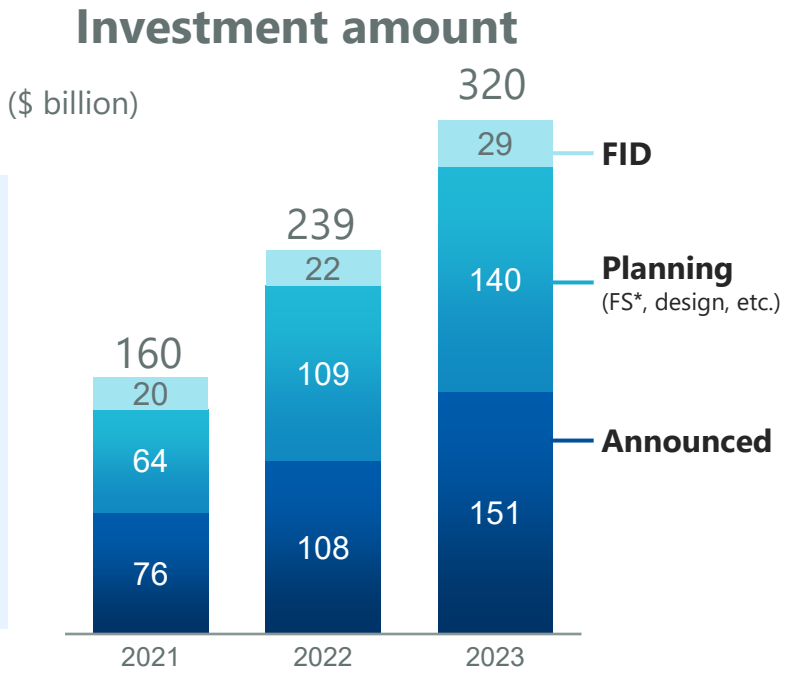
Capacity of electrolyzer installations, per year



Source: BloombergNEF, Hydrogen Council

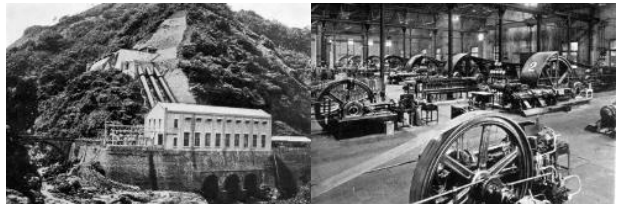
Large-scale projects (≥1 MW)

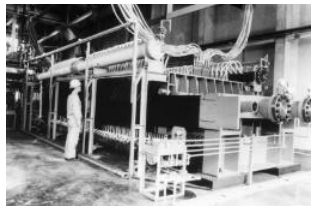
795 projects planned by 2030 ($320 billion)
but FID on ≈**10%** ($29 billion)



* Feasibility study

History of alkaline water electrolyzer development





Acilyzer™

Aqualyzer™

1923

- **Start of hydrogen production by electrolysis using hydropower** for use in ammonia synthesis in Nobeoka, Miyazaki, Japan, the cradle of Asahi Kasei

1975

- Commercialization of ion-exchange process for chlor-alkali electrolysis
- **World's only supplier[1] of in-house ion-exchange membranes and electrolysis systems**
- Adopted at **over 150 plants in 30 countries for** over the course of **more than 45 years** in business; **high global share** in ion-exchange membranes

2010

- **Launched development of alkaline water electrolysis system** based on chlor-alkali electrolysis technology

2020

- Installed **large 10 MW-scale alkaline water electrolyzer** at the Fukushima Hydrogen Energy Research Field (FH2R)[2] and started its operation
- Installed electrolysis system in Germany under ALIGN-CCUS project

Leveraging accumulated technology and know-how, aiming for commercialization of large-scale electrolysis system

[1] Asahi Kasei estimate.

[2] NEDO project: "Hydrogen social construction technical development project/Hydrogen energy system technical development/Technical development concerning business model construction and the large-scale actual proof of a re-energy use hydrogen system"

Validation at FH2R

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Top-tier global track record with 3 years of operation of large 10 MW-scale electrolyzer at FH2R

NEDO TOSHIBA Tohoku Electric Power Co., Inc.
Tohoku Electric Power Network Co., Inc.
Iwatani AsahiKASEI

- Mar. 2020 start of hydrogen production with 10 MW-scale alkaline water electrolyzer using PV and grid power
- Trials of optimal control technology for maximum utilization of fluctuating renewable energy

(NEDO project: "Hydrogen social construction technical development project/Hydrogen energy system technical development/Technical development concerning business model construction and the large-scale actual proof of a re-energy use hydrogen system")

Electrolyzer supplier, capacity	Location	(start-up) 2020 2021 2022 2023
AsahiKASEI 10 MW	Japan (Fukushima)	Mar. 2020
Company A 20 MW	Canada	Jan. 2021
Company B 10 MW	Germany	Jul. 2021
Company C 20 MW	Spain	May 2022
Company C 20 MW	Sweden	Sep. 2023

Source: IEA, company announcements (excluding China)

Formulation of “one-stop solution” business model

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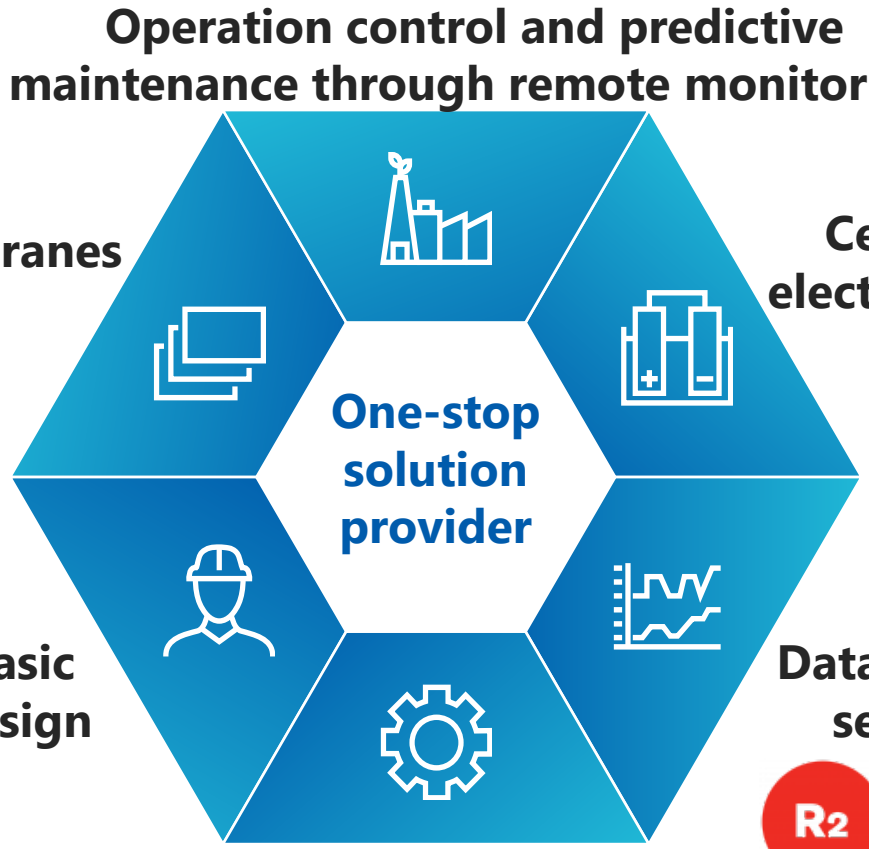
Aiming to provide one-stop total solutions including original technology for large-scale systems and support for optimum operation

Electrolysis cell
All constituent technologies such as electrodes, membranes, and cells developed in-house

10 MW module
Designed based on 10 MW module

100 MW multiple modules
100 MW-scale available through multiple module configuration



Aqualyzer™

R2 MORE THAN JUST MONITORING

Working with subsidiary R2, which develops and sells monitoring equipment for the chlor-alkali process, to study data-driven service to provide optimal operation based on monitoring

Pilot test plant (Kawasaki Works)

Hydrogen business strategy

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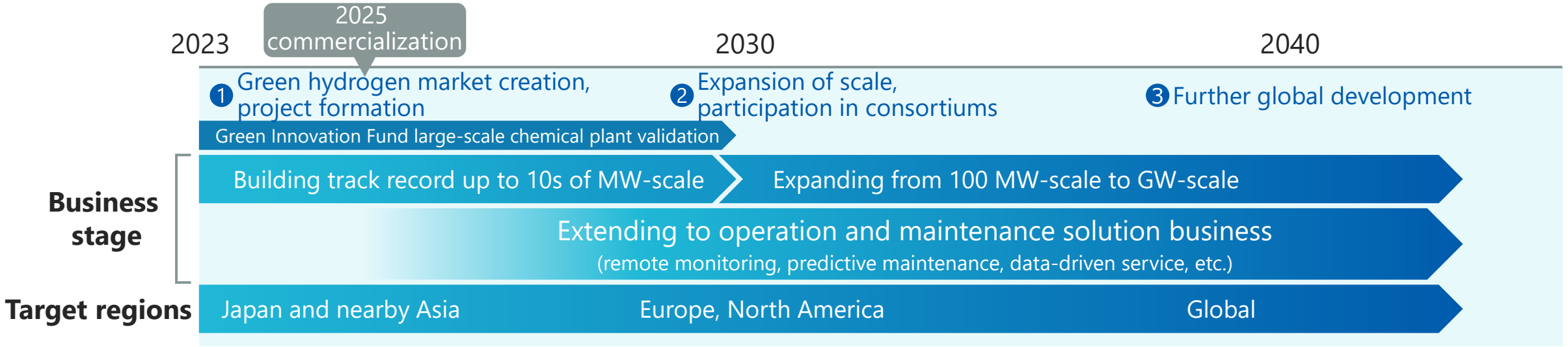
Aiming for commercialization in 2025 and sales on the order of ¥100 billion around 2030 as a leading supplier of electrolysis systems

1 Green hydrogen market creation, project formation	• Gaining know-how on project launch and operation with Japan's Green Innovation Fund validation project • Aiming for commercialization (plant order receipt) in fiscal 2025 centered on Japan and other parts of Asia, building track record of installation and operation
2 Expansion of scale, participation in consortiums	• Europe and North America as main targets considering large-scale renewable energy supply and hydrogen demand; aiming for sales on the order of ¥100 billion around 2030 • Extending to operation and maintenance solution business
3 Further global development	• Driving supply chain formation as a key player in the hydrogen ecosystem



Project supported by NEDO Green Innovation Fund

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Accelerating formation of hydrogen business platform leveraging validation with NEDO Green Innovation Fund project, aiming for early commercialization

Green Innovation Fund Project

Development of large-scale alkaline water electrolysis hydrogen production system and demonstration of green chemical plant

Project scale ≈¥75 billion

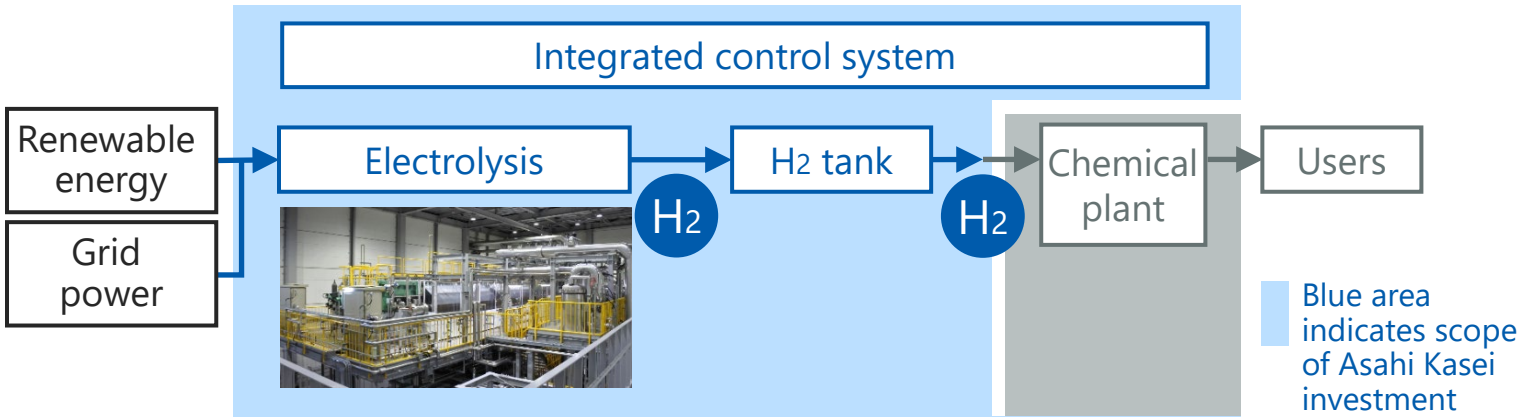
Project term FY21–30

Objectives
- Demonstration of world-class 100 MW-scale plant
- Cost reduction of alkaline water electrolysis system
- Optimal operation control

Phase 1	Validation of 10 MW-scale alkaline water electrolysis system and medium-scale green chemical plant in Namie, Fukushima, Japan (Asahi Kasei, JGC)
Phase 2	Demonstration of 60 MW-scale alkaline water electrolysis system and green chemical plant in Malaysia (Asahi Kasei, JGC, Gentari)

Green Innovation Fund Project Phase 2

Together with Gentari of the Petronas Group and JGC, demonstration in Malaysia using a 60 MW-scale alkaline water electrolysis plant to supply ≈8,000 t/y of hydrogen to chemical plant (2027–2030)



- Asahi Kasei
  Nobuko Uetake
- Gentari Hydrogen Sdn. Bhd.,
  Michele Azalbert
- JGC Holdings Corporation
  Masahiro Aika

Demonstration points

- Multi-module control system for fluctuating operation
- Integrated control system for operation optimization

Status of dialogue with potential customers for market entry

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Advancing dialogue with partners to participate in multiple projects being considered worldwide

- Exchanged opinions with various companies for participating in green hydrogen production projects, etc. and **conducted concrete feasibility studies on several projects**
- Forming projects by collaborating with partners while **coordinating with government agencies** as necessary and **considering the use of support systems**

Some main examples

Electrolyzer	**45 MW-scale**	**Studying collaboration with European partners utilizing international demonstration project of NEDO**
Application	Sustainable aviation fuel (SAF)	
Start-up	FY 2027	

Electrolyzer	**10 MW-scale**	**Participating in JH2F (Japan Hydrogen Forum) supported by JETRO to approach hydrogen business hubs in the U.S.**
Application	Demonstration*	
Start-up	FY 2026 or later	

Electrolyzer	**60 MW-scale**	**Feasibility study for large-scale green chemical plant with Gentari and JGC as Green Innovation Fund Project**
Application	Chemical feedstock	
Start-up	FY 2026	

Electrolyzer	**100 MW-scale**	**Studying entry into large-scale green hydrogen projects utilizing Contract for Differences (CFD) subsidy**
Application	District heating	
Start-up	FY 2030	

Coordination with industry associations and funding partners

Hydrogen Council

JAPAN HYDROGEN ASSOCIATION

DNV

HyVelocity Hub

* Local production/local consumption model

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02

Material Sector Growth Businesses

1 First priority: Digital Solutions

2 Growth potential: Energy Storage (separators)

3 **Growth potential: Hydrogen-Related**

4 **New initiatives for added value**

P-PaaS
- **Car interior material**
- **Ion-exchange membrane process for chlor-alkali electrolysis**

Health Care Material **Ceolus**

Car interior material

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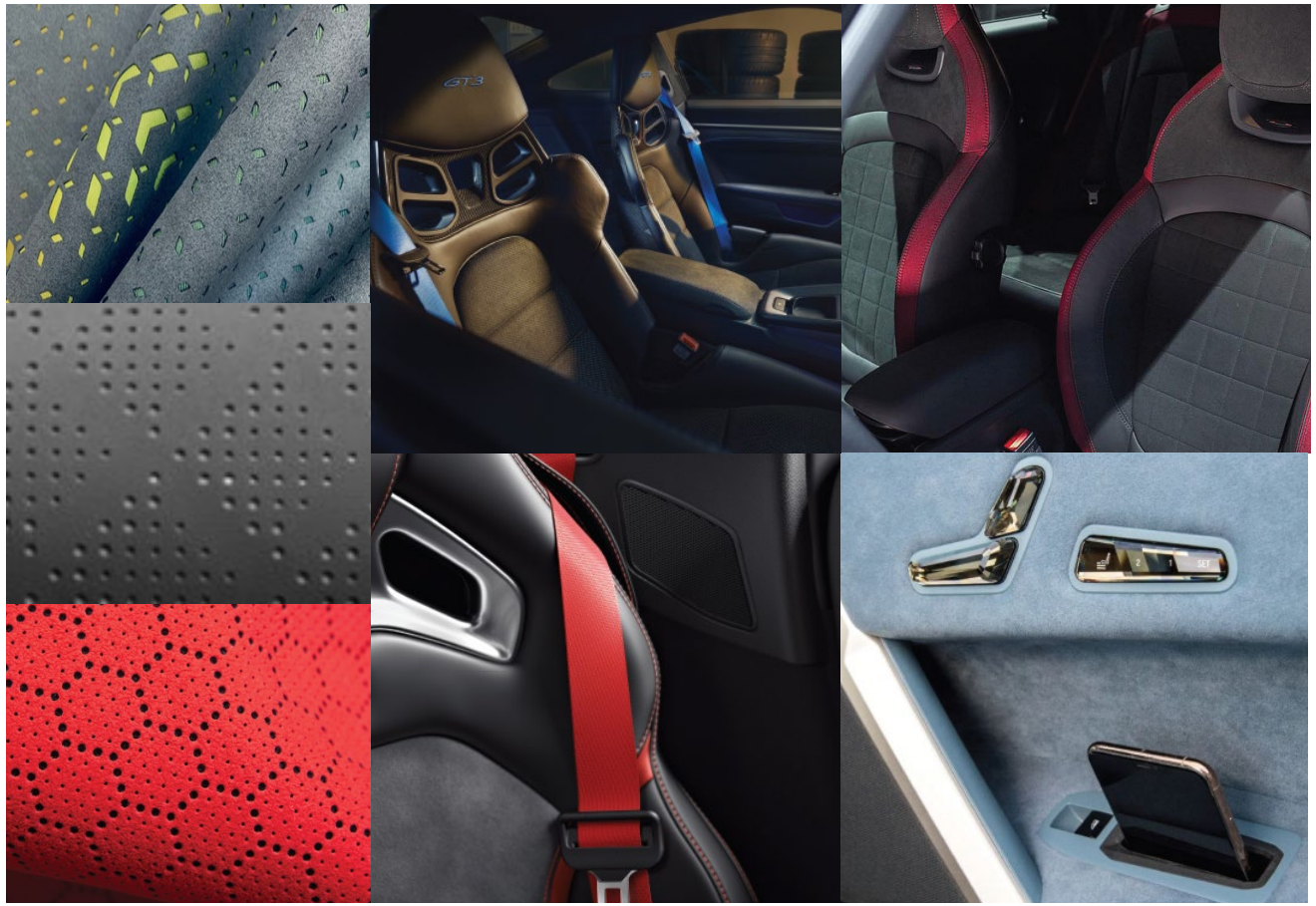
Acquired a business platform for automotive interior materials based on Sage's superior design capability and broad lineup of material

Product and business strengths

- **Proposals in accordance with trends and customer needs**
- **Superior design capability and high quality**
- **High presence among vehicle manufacturers**
- **Global production sites optimized for each region**

- Entry into the automotive interior materials business with **acquisition of Sage in 2018**
- **Established position as a leading supplier in the surface materials market** with innovative design and advanced decoration and post-processing technologies, with direct sales model to vehicle manufacturers
- **Products adopted by many major vehicle manufacturers** mainly in Europe and the U.S.



Strengthening business platform with regional and material strategy

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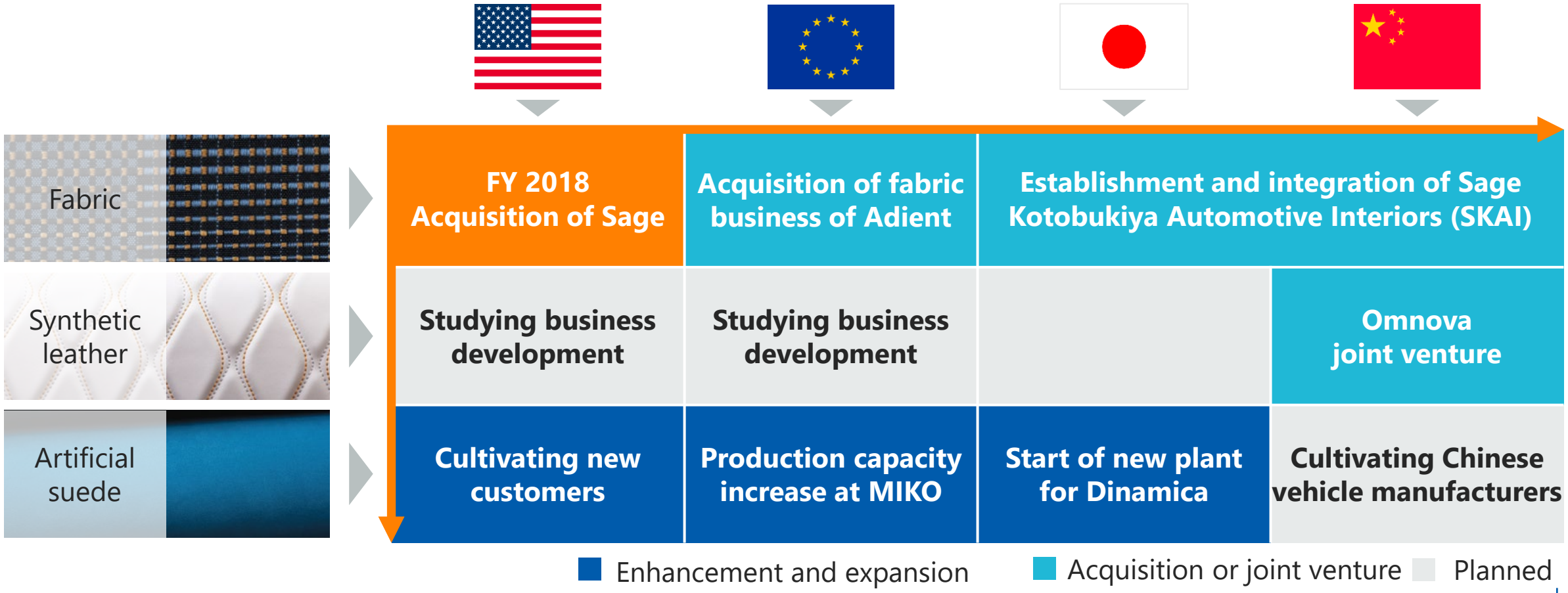
Firmly advancing development of business platform for car interior materials by optimizing production framework for each region and material

- Strengthening cost competitiveness by establishing optimal production and supply systems
- Expanding material lineup to meet customer needs and raising differentiation with enhanced design proposals



Medium- to long-term growth strategy

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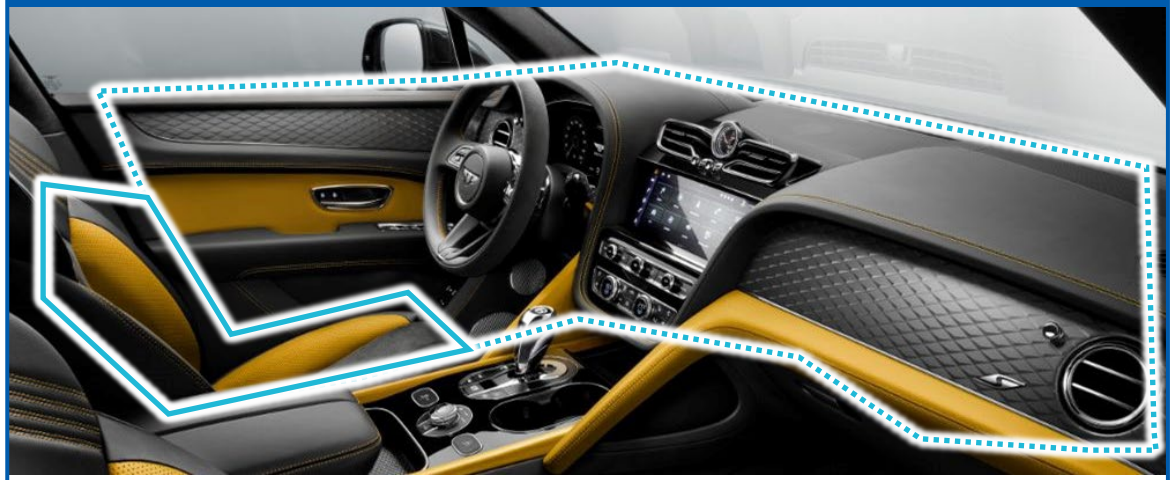
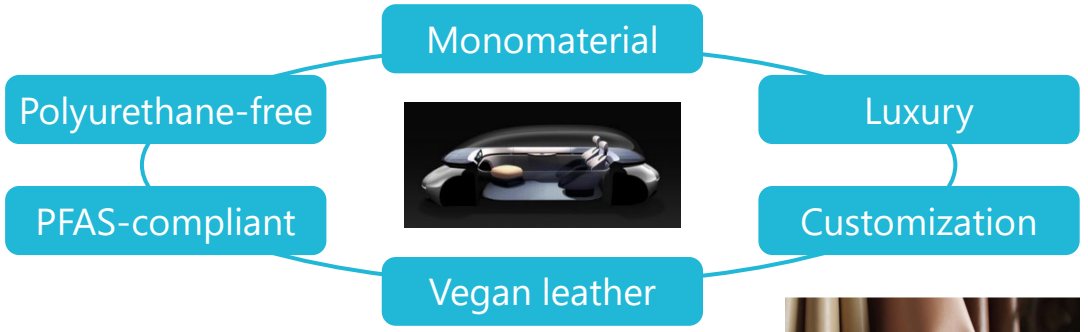
Practical application of autonomous driving will dramatically change the cabin space, and a new market worth ¥800 billion is forecasted in 2030; Asahi Kasei will capture the new market by expanding value provision fields and developing new surface materials

Expansion of value provision fields



Promoting business development of decorative materials that can generate synergies with Sage

Development of new surface materials



▶ Investment in NFW of the U.S.
MIRUM non-petroleum-based leather

- **Strengthening the product portfolio in decorative materials** and expanding field of provision of value to **the entire cabin space**
- **Asahi Kasei to develop new materials** with a luxurious feel using eco-friendly manufacturing methods, and **Sage** to manufacture and sell them
- Accelerating of new product development through **collaboration with startups**

Growth targets for car interior materials business

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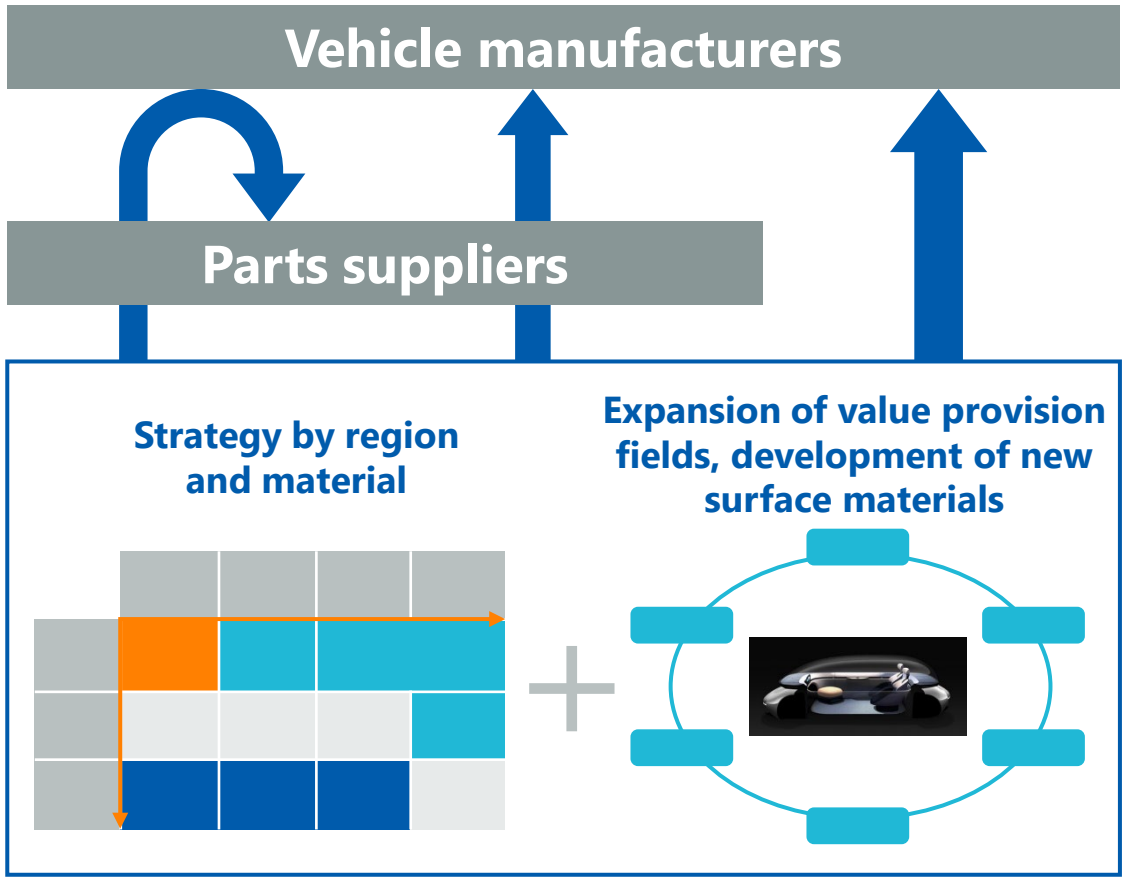
Aiming to more than double sales between fiscal 2022 and around fiscal 2030 by strengthening the existing business platform and leveraging M&A to expand in the cabin space business



Growth strategy

Car interior materials sales concept

Ion-exchange membrane process for chlor-alkali electrolysis

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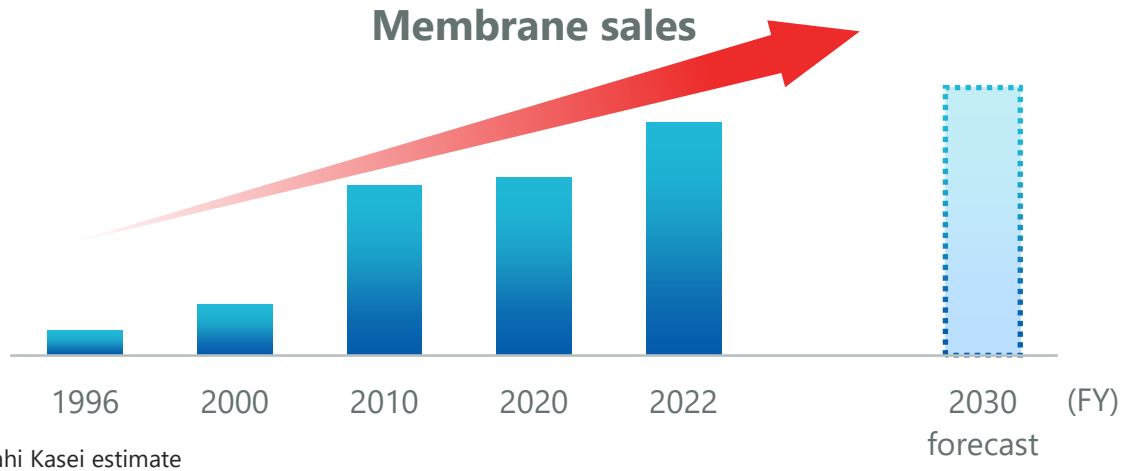
Providing new business value by integrating sales of both products and services as a leading supplier of the chlor-alkali electrolysis process

Application	• System using ion-exchange membranes to electrolyze brine to produce chlorine, hydrogen, and caustic soda
Strengths	• The only company in the industry* that provides all constituent technologies (electrolyzers, membranes, electrodes, and cells) • In 2020 acquired Recherche 2000 Inc. (R2) that develops and sells monitoring equipment and systems for chlor-alkali electrolysis
Record	• Electrolyzer adopted at more than 150 plants in 30 countries worldwide

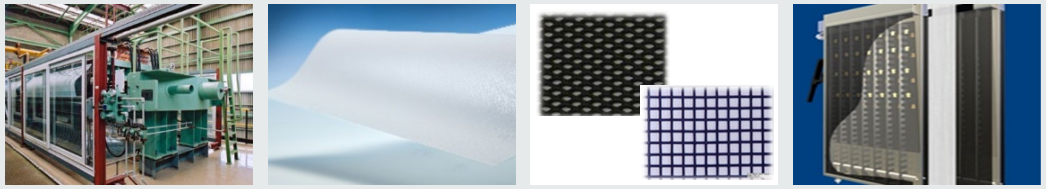
Compared to fiscal 1996, membrane sales volume rose 9-fold in fiscal 2022 and is forecast to reach 11-fold in fiscal 2030



* Asahi Kasei estimate

Enhancing recurring business

Conventionally supplied replacement items such as membranes for electrolyzers sold



Electrolyzer | Membrane | Electrodes | Cell

+

New business model with expanded services and enhanced support

Expanded services	Enhanced global framework
Providing services for predictive maintenance and optimal operation with R2's monitoring system	Providing local support and services with maintenance sites in North America, Europe, and Asia

Enhancing recurring business based on monitoring

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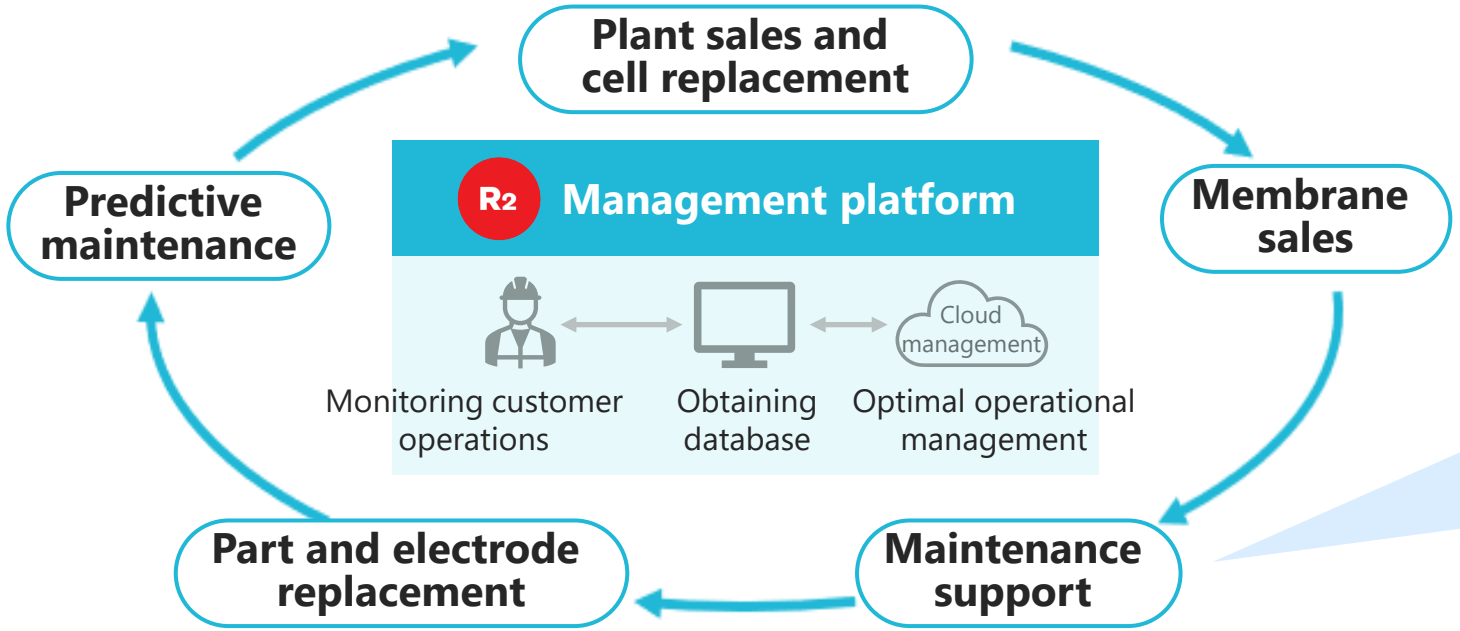
Expanding membrane sales by providing high value-added services and strengthening customer relationships through enhanced recurring business

Enhancing recurring business

Developing data-driven services to support optimal operation based on monitoring

Supporting customers with predictive maintenance and optimal operation proposals by combining R2's monitoring system with Asahi Kasei's product development technology and technical support capabilities



Chlor-alkali electrolysis cell rental service

Launching demonstration trial of rental service for replacement during maintenance of cells in Europe

- Reduction of production loss due to repairs and reduced electricity consumption through stable operation
- Contributing to the Circular Economy of precious metals and other metals

Studying creation of synergies by expanding the customer base, various technologies, and service platform accumulated over many years into the business of alkaline water electrolysis hydrogen production

Ceolus microcrystalline cellulose
(pharmaceutical and food additive)

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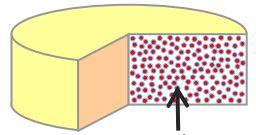
High domestic market share meeting various consumer needs with high performance and high quality

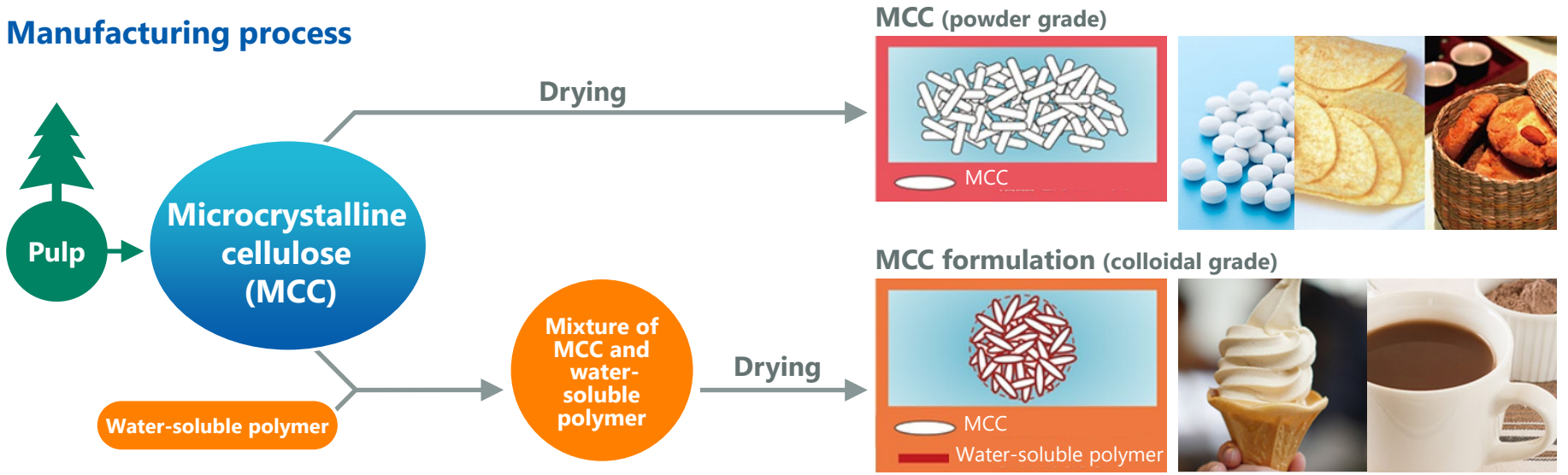
Application	• Cellulose-based excipient widely used for forming, bulking, and diluting tablets and capsules for pharmaceuticals and nutraceuticals
Strengths	• Excellent compactibility and powder flowability required for tablet manufacturing • Providing stabilizing function with a small additive amount for emulsification and suspension stability of beverages, and shape and strength improvement of food products
Record	• High share in the domestic market with strengths of high quality, high-performance products, and support that meet customer needs; sales volume overseas expanding

CEOLUS™
Just Pure Performance

Pharmaceutical application (tablet)



Manufacturing process



Excipient for tablets, food texture retention, oil and water retention, etc.

Prevention of sedimentation and solidification of beverages and syrups, improvement of food shape retention, etc.

Accelerating overseas expansion by increasing sales of high-performance Ceolus grades

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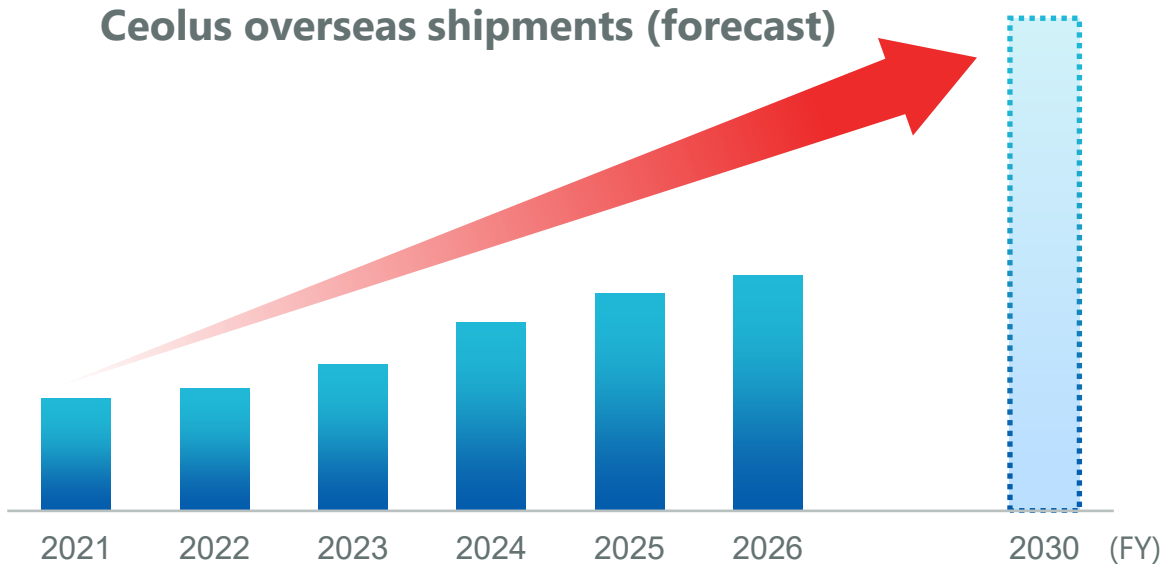
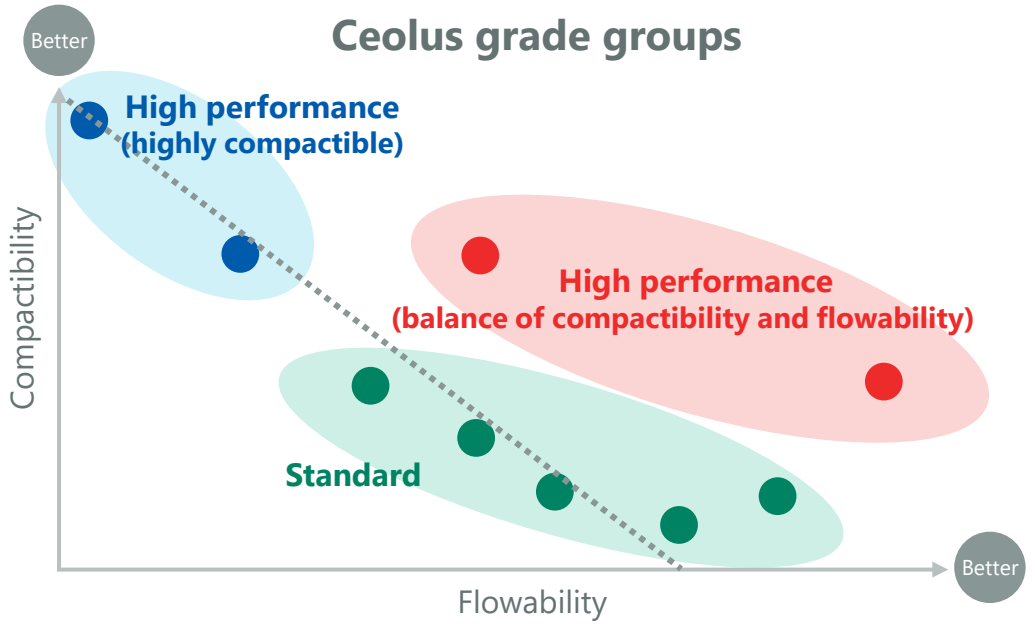
Aiming for significant growth in overseas markets by expanding supply capacity with the addition of a second plant, in Mizushima (Kurashiki, Okayama, Japan)

- New plant in Mizushima to improve stable supply to existing customers and expand sales in growing overseas markets for pharmaceuticals and functional foods; start-up in October 2023, investment of ≈¥13 billion
- Highly evaluated overseas for high quality and original high-performance grades that contribute to problem solving
- Accelerating overseas expansion by increasing overseas salesforce and strengthening marketing





High-performance products such as grades featuring high compactibility and grades featuring a balance of compactibility and flowability enable tablets to be made easier to swallow, smaller, and formulated with multiple ingredients, with improved productivity

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03

R&D Strategy

R&D Framework

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With Corporate Research & Development working on long-term group-wide projects to create next-generation businesses, each business unit has its own R&D functions to enhance the competitiveness of existing businesses

Asahi Kasei

Corporate Research & Development

- Technology Policy Center
- CVC Office
- Corporate IP
- Platform Laboratory for Science & Technology
- Chemistry & Chemical Process Laboratory
- Energy Solutions Laboratory
- Sustainable Polymers Laboratory
- Research Laboratory of Advanced Science & Technology

Digital Value Co-Creation

- Digital Strategy Initiative
- Corporate IT Management
- CX Transformation Initiative
- Informatics Initiative
- Smart Factory Initiative

Material

Asahi Kasei (operating units)

Environmental Solutions SBU
- R&D Planning and Business Development
- Green Solution Project

Mobility & Industrial SBU
- R&D Planning and Business Development

Life Innovation SBU
- R&D Planning and Business Development
- UVC Project

Asahi Kasei Microdevices

- R&D Center

Homes

Asahi Kasei Homes

- Housing R&D Center
- Lifestyle R&D Laboratory
- Condominium Rebuilding Research Center

Asahi Kasei Construction Materials

- Quality Assurance & Technology Management Dept.
- Building & Housing Materials Engineering & Development Dept.
- Insulation Engineering & Development Dept.
- Foundation Systems Engineering & Development Dept.

Health Care

Asahi Kasei Pharma

- Clinical Development Center
- Pharmaceuticals Research Center

Veloxis Pharmaceuticals

- Clinical Development Function

Asahi Kasei Medical

- Research and Business Development Division

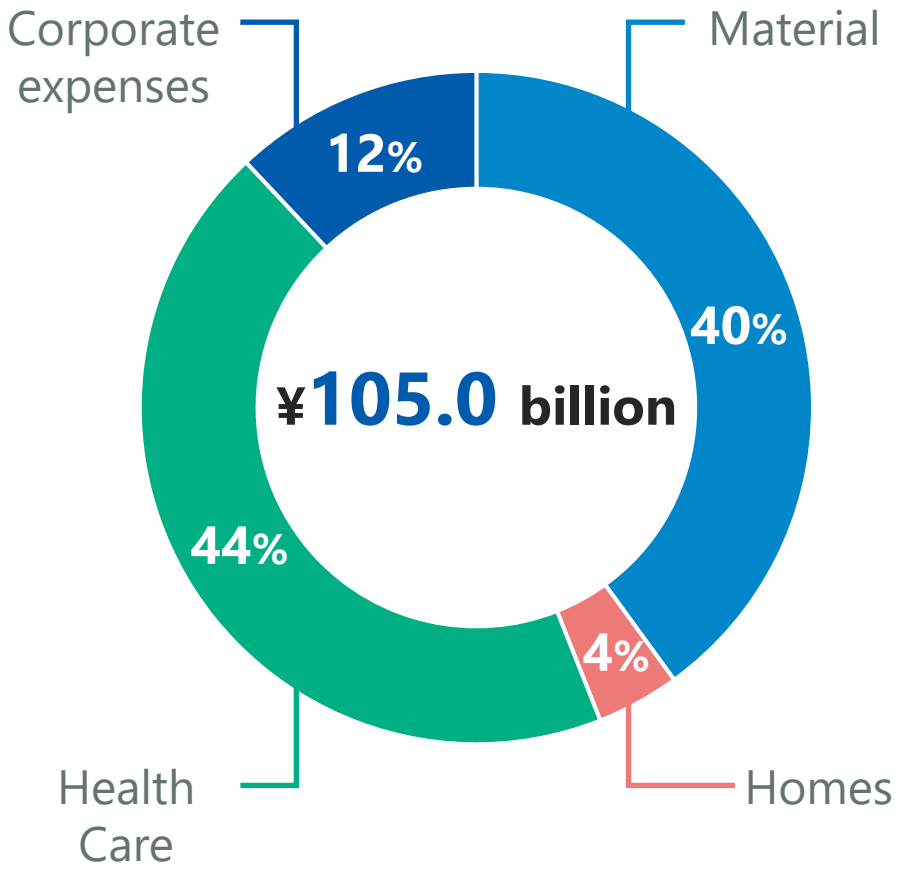
ZOLL Medical

- R&D departments

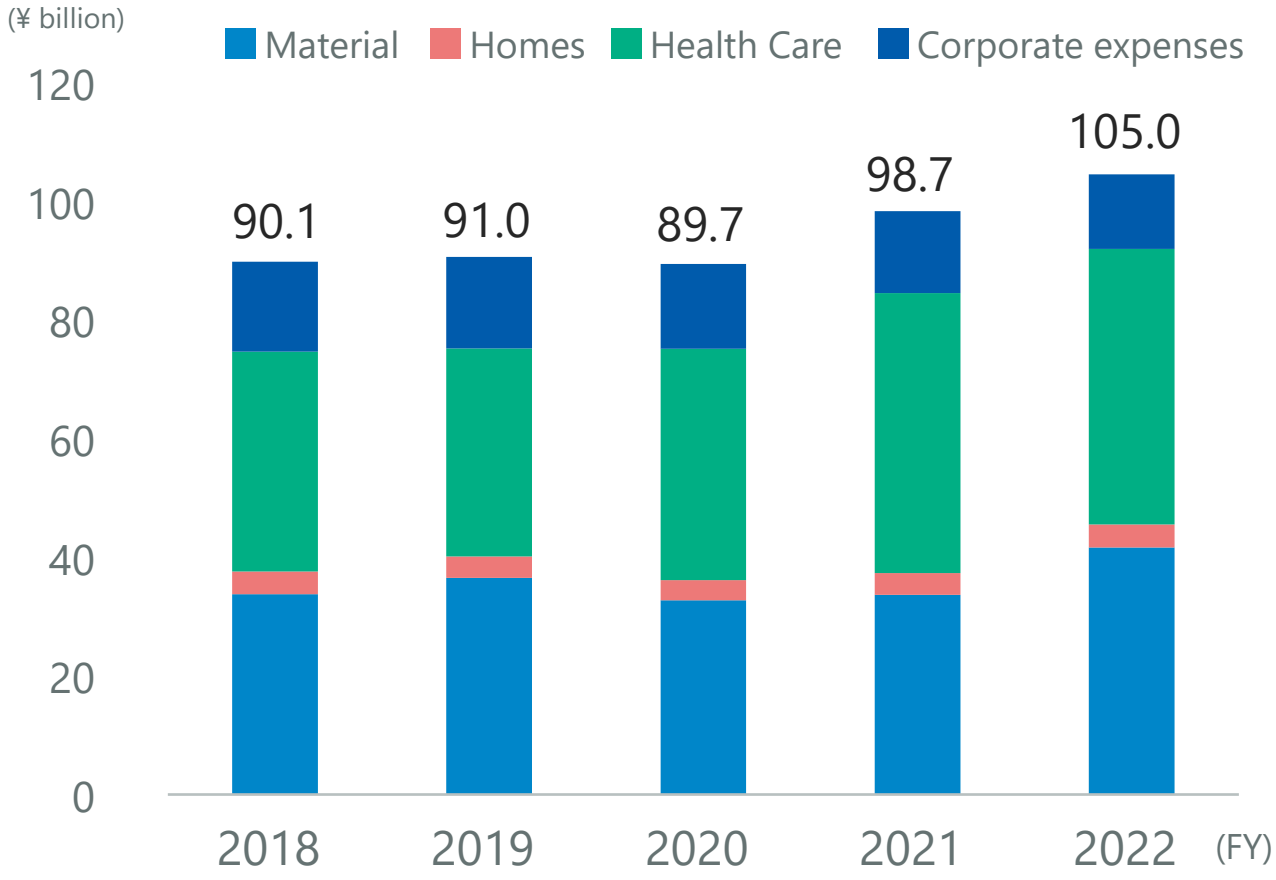
R&D expenditure

Expenditure for R&D is increasing in growth fields in Health Care and Material (separators, batteries, electronic materials, etc.)

Breakdown of FY 2022 R&D expenses



Annual R&D expenses



Innovations from corporate R&D (since the 1990s)

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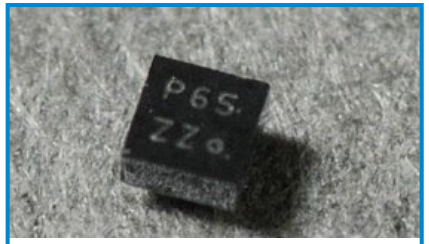
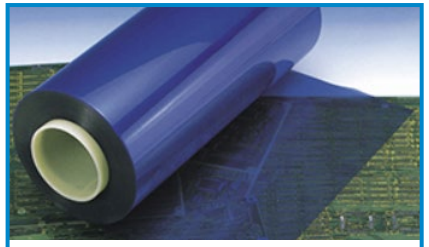
Contributing to society with innovation from a long-term perspective across all three sectors

Hall elements
(GaAs, InAs)



Electronic compasses

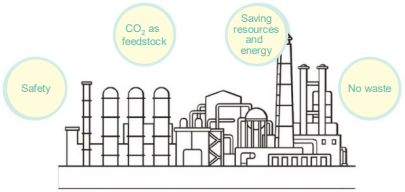
Pimel photosensitive polyimide



Sunfort photosensitive dry film

Neoma Foam phenolic foam insulation panels

Cyclohexene process for cyclohexanol

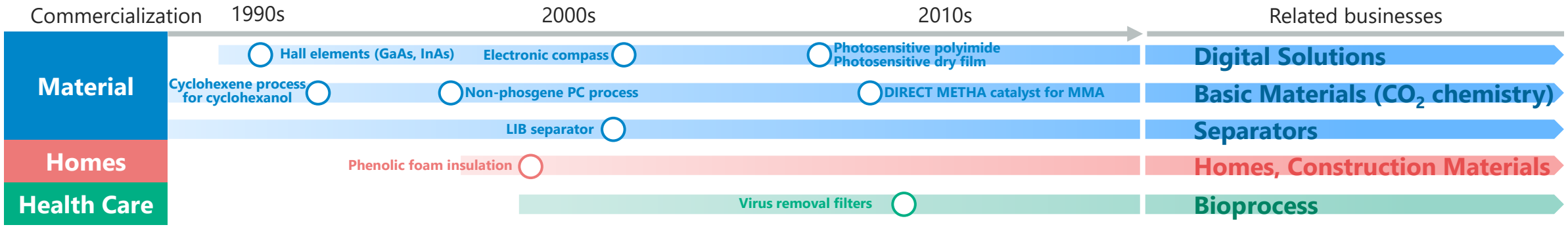


Non-phosgene polycarbonate process

DIRECT METHA catalyst for MMA

Hipore Li-ion battery separator (2-component)

Planova virus removal filter
(PVDF hollow-fiber membrane)



Features of Asahi Kasei's R&D and strengths of its core technologies

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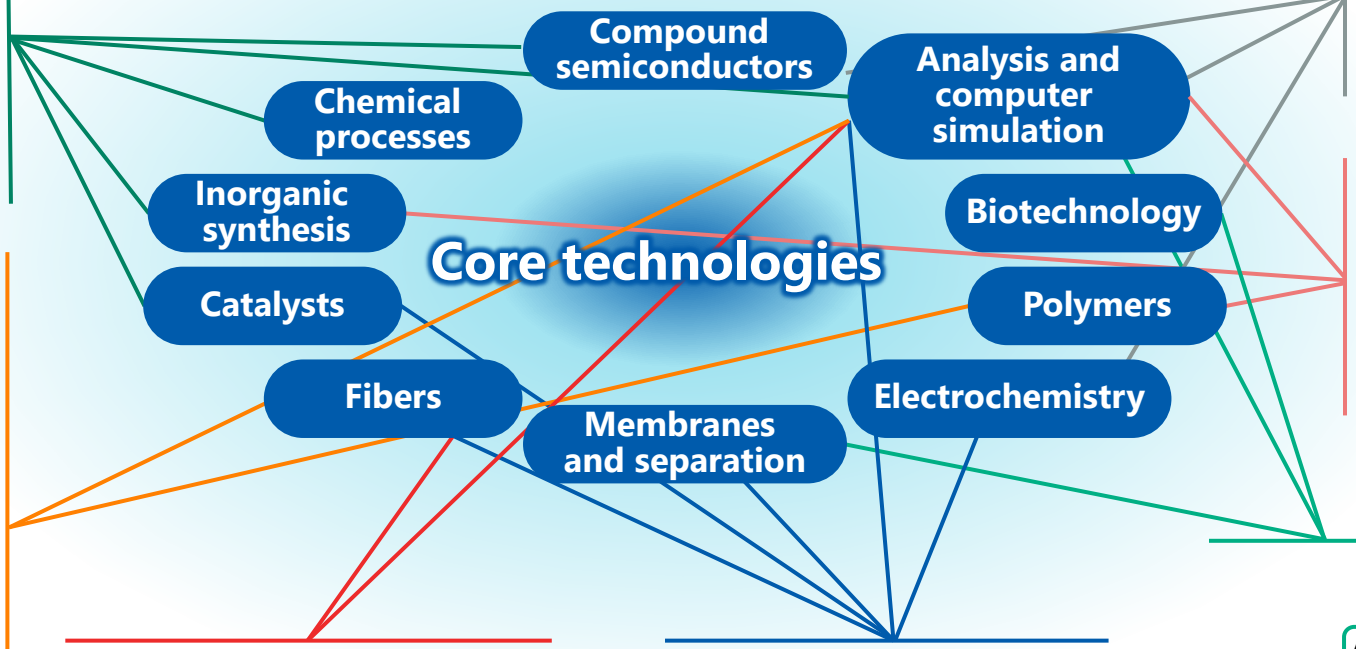
Asahi Kasei's distinctive portfolio of core technologies has been continually burnished through a century of new business creation



Catalysts, chemical processes

- AN, MAN
- MMA
- Cyclohexanol
- Polycarbonate
- Creolex metallocene HDPE
- Sunfine ultra high molecular weight PE

Polymers, processing

- Leona, Xyron, and Tenac engineering plastics
- Synthetic rubber
- SB latex
- Asaclean purging compound for molding machines
- Saran Wrap cling film
- Sunfort photosensitive dry film
- Novacure latent hardener for epoxy

Compound semiconductors, LSIs

- Mixed-signal ICs
- Electronic compasses
- IR sensors, gas sensors
- Magnetic sensors

Homes, construction materials

- Hebel Haus
- Hebel Maison
- Hebel autoclaved aerated concrete
- Neoma Foam insulation panels

Health Care

- AEDs, LifeVest, and other critical care devices
- Teribone, Recomodulin, and other pharmaceuticals
- Hemodialysis and therapeutic apheresis (blood purification)
- Planova virus removal filters

Fibers

- Spunbond nonwovens
- Roica premium stretch fiber
- Dinamica artificial suede
- Leona nylon 66 filament
- Bemberg cupro fiber
- Bemliese cupro nonwoven fabric

Membranes and separation

- Microza filtration membranes
- Ion-exchange membranes
- Hipore lithium-ion battery separator
- Alkaline water electrolysis

New businesses being created through corporate R&D

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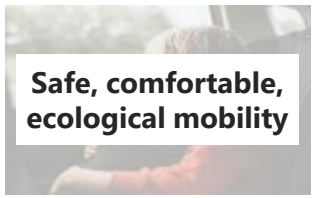
Aiming to contribute to sustainability through the creation of businesses with combinations of diverse core technologies

Core technology	Business contribution period	2030s	2040s
Polymers Compound semiconductors	**Electronic materials** Next-gen semiconductor materials	**Ultra-wide bandgap semiconductors** AlN substrate, power semiconductors, UVC laser diode	
Polymers Fibers	**Multimaterials** CRS, CNF, resin glazing, etc.	**Sustainable polymers** Cellulose, recycled, long-life	
Catalysts Inorganic synthesis Chemical processes	**CO_2 chemistry** Special isocyanates	**Sustainable chemistry** Bio-based feedstock	
Electrochemistry Polymers Membranes and separation	**Batteries** Electrolytes, lithium doping	**Hydrogen** Hydrogen production	
Membranes and separation Biotechnology	**Separators** Wet-process, dry-process	**Bioprocess** FO/MD membrane systems	

Challenges being tackled



Accelerating R&D to create new businesses

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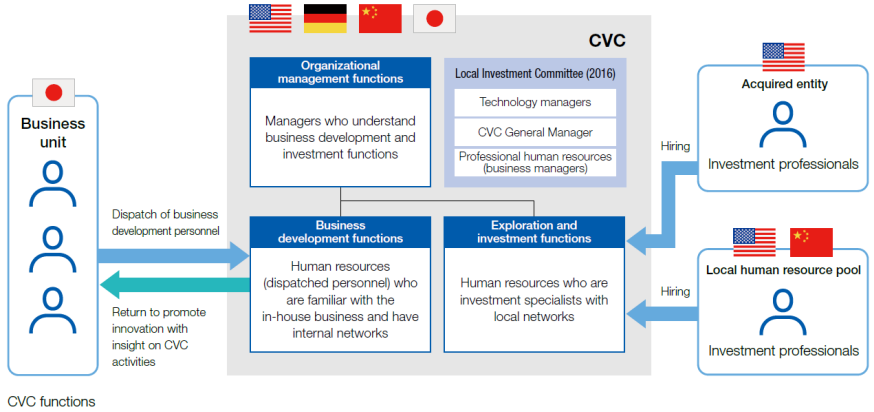
Accelerating collaboration with external resources by CVC and open innovation while strengthening internal R&D management

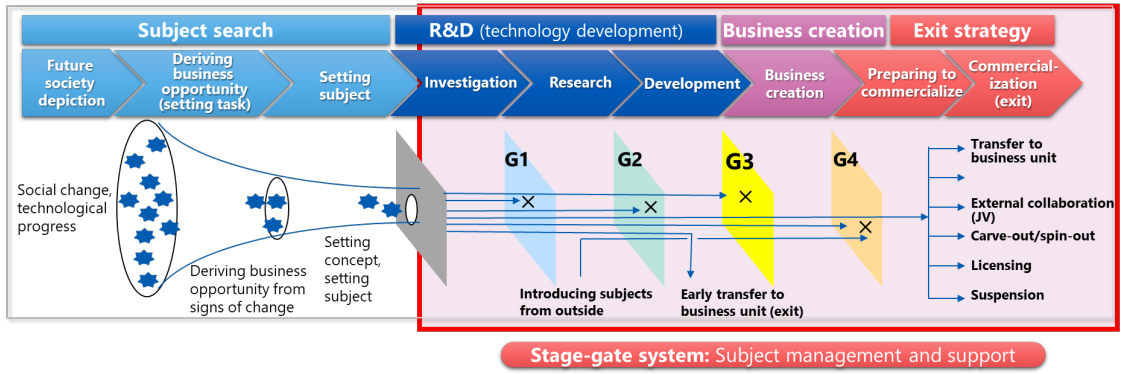
Enhancement of Corporate Venture Capital (CVC)

Strengthening local operation and internal collaboration in 4 countries



Original stage-gate system emphasizing development of business

Integrated discussions including QA, manufacturing, etc. early on



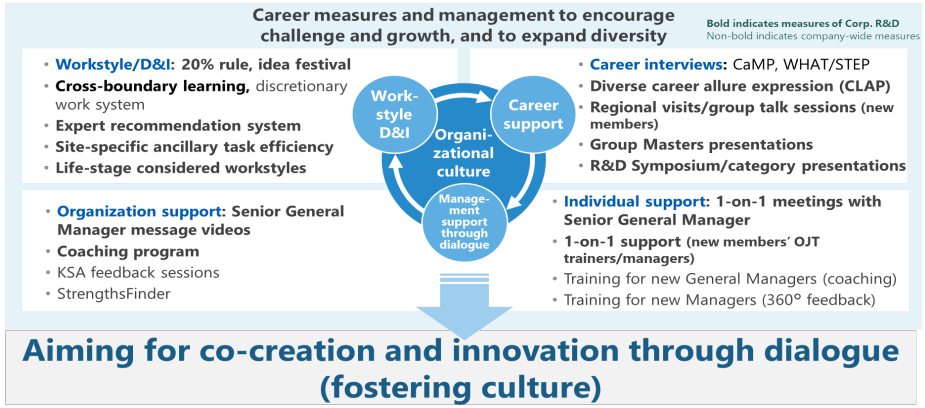
Obtaining missing parts through open innovation

Accelerating co-creation with new partners beyond ordinary commercial channels

Reference (Japanese only): https://tomoruba.eiicon.net/articles/4272

Fostering a culture of innovation

Building a framework and fostering a culture that nurtures specialists



R&D subject #1
Contributing to actualization of a carbon- and hydrogen-recycling society

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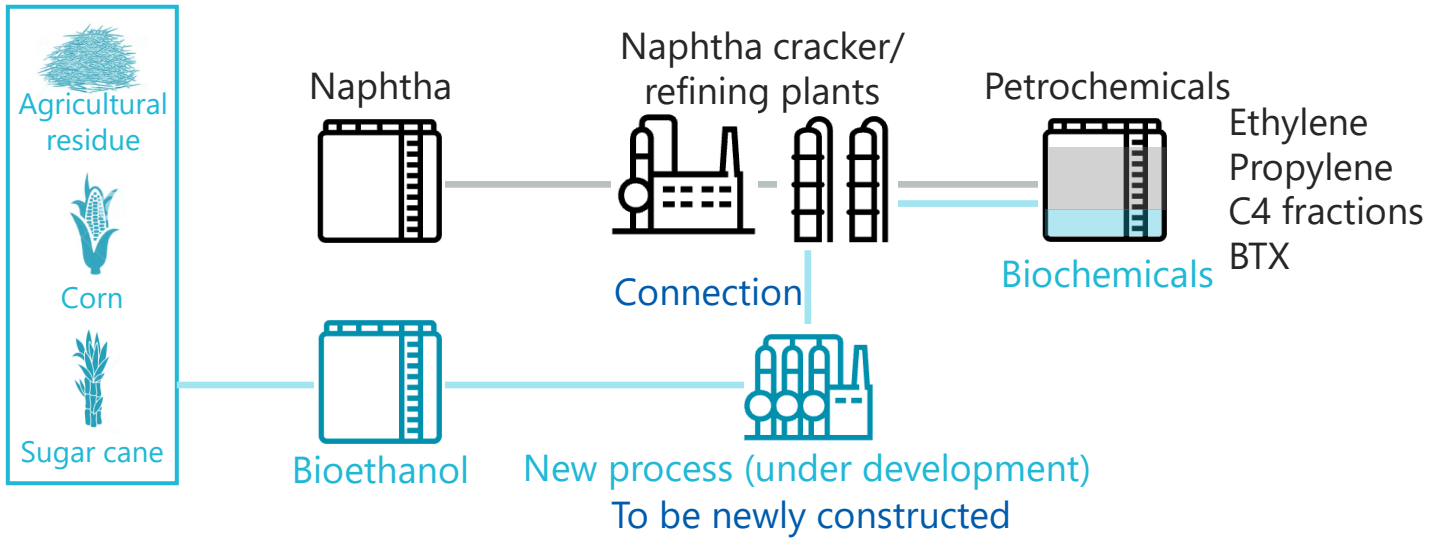
Process development and design for manufacturing basic biochemicals from bioethanol; studying construction of a 40–50 kt/y-scale plant targeting operation in FY 2027 with biochemicals for sale

Demonstration and commercialization of biochemical production from bioethanol



Scale **40–50 kt/y**

Start-up **FY 2027 target**

Outline

- **Commercial-scale demonstration of basic chemicals from bio-based feedstock**
- **Connection to and integration with naphtha cracker refining system**
  Minimal capital investment, application of biomass balance approach

Reducing GHG emissions; advancing reduction of CFP* for our basic chemicals and derivatives

Aiming to obtain ISCC certification and supply biochemicals through the biomass balance approach

Acquiring data through the demonstration; planning to offer a technology package for future JVs and licensing business

* Carbon footprint of products

R&D subject #1
Contributing to actualization of a carbon- and hydrogen-recycling society

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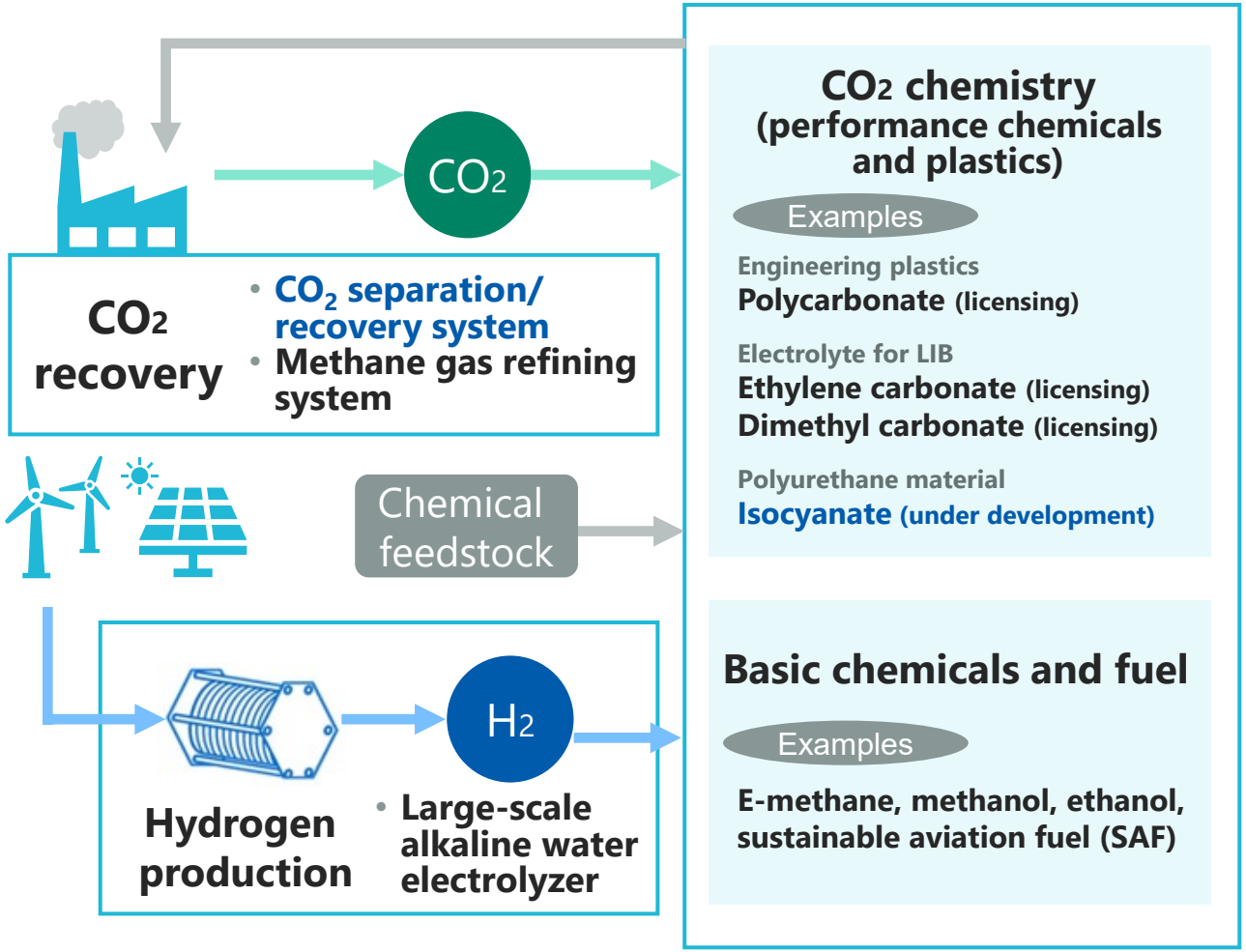
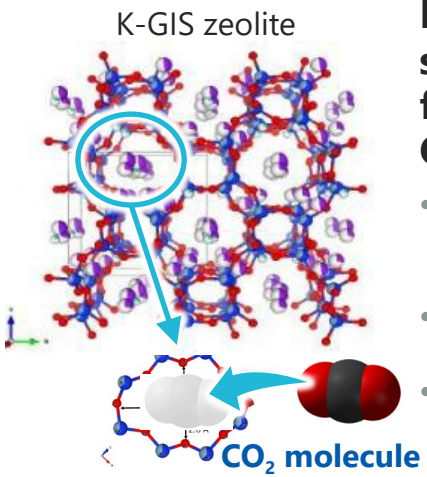
Accelerating commercialization of three key technologies for achieving a carbon- and hydrogen-recycling society (CO_2 recovery, CO_2 chemistry, and hydrogen production)



CO_2 separation/recovery

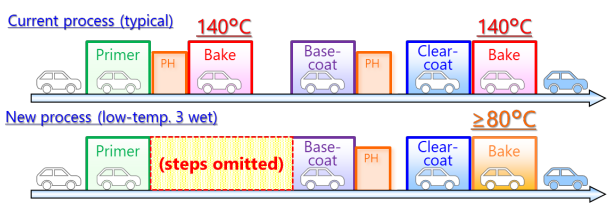


Proprietary zeolite enables selective adsorption of CO_2 from mixed gases such as CO_2/N_2 and CO_2/CH_4

- Adsorption efficiency some 10 times higher than conventional materials
- Requires half the energy of existing amine-based processes
- In addition to CO_2 recovery, also usable for CO_2 removal; recovery of high-purity methane was verified

Isocyanate production technology using CO_2 as raw material (world's first*)

World's first production technology* for special polyurethane material using CO_2 derivative based on urea isocyanate production technology



Greatly reducing environmental burden of automotive coating process (low-temperature curing and reduction of process steps)

* Asahi Kasei estimate

R&D subject #2
Developing businesses with core technology (membranes and separation)

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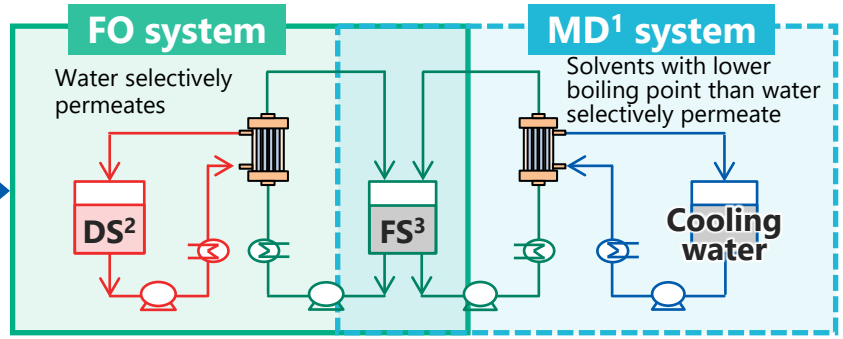
Accelerating the development of new businesses while strengthening existing businesses by enhancing membranes and separation technologies

Development based on the core phase separation technology

Bioprocess forward osmosis (FO) membrane

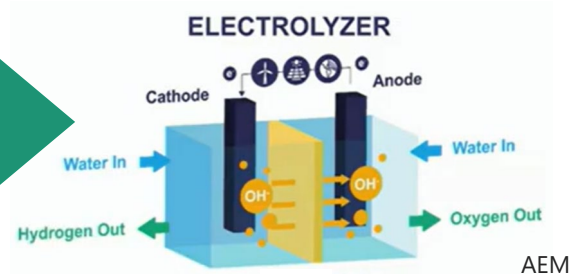
FO/MD hybrid system for innovative pharmaceutical manufacturing process



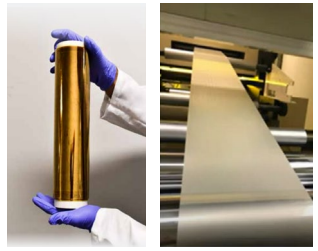
- Concentrating heat-sensitive agents such as peptides at room temperature
- Much faster than freeze-drying, less energy required

Anion exchange membrane (AEM)

Hydrogen production system which is expected to greatly improve both performance and cost



AEM



AEM by Ionomr Innovations, which Asahi Kasei invested in, featuring superior durability

[1] Membrane distillation [2] Draw solution [3] Feed solution

R&D subject #3
Developing businesses with core technology (compound semiconductors)

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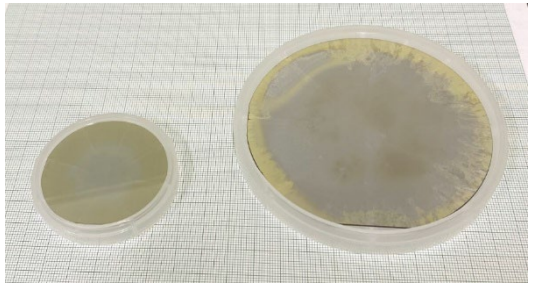
Aiming to commercialize AlN substrates for power semiconductors based on the core AlN technology, which has achieved 2 world's firsts*

World's first* 4-inch aluminum nitride (AlN) wafer



Collaborating with Crystal IS (CIS) of the U.S.

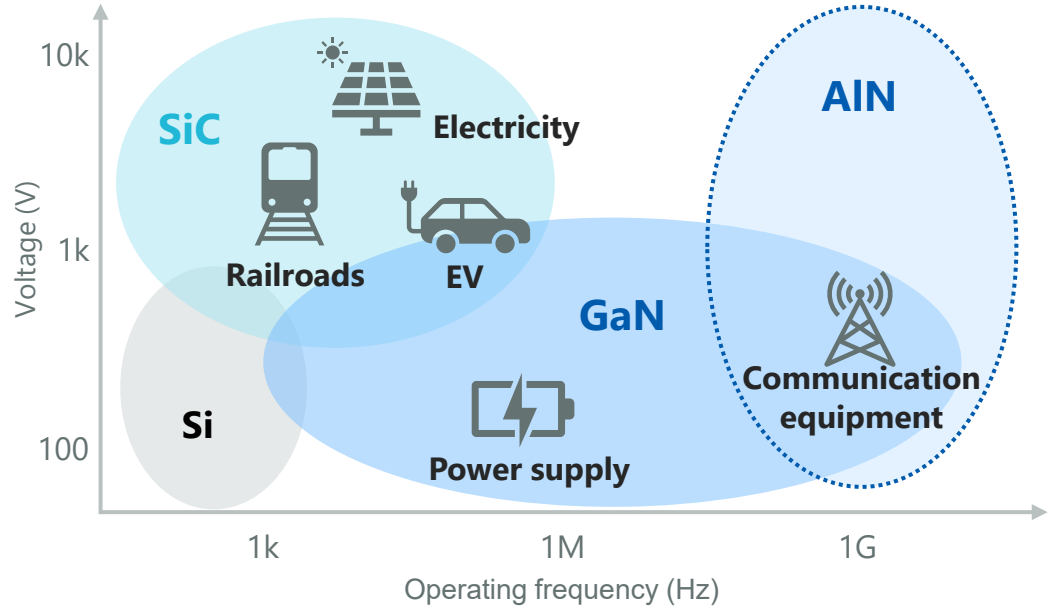
World's first* Continuous room-temperature operation of UVC semiconductor laser

(UVC region at 274 nm)

Joint research with a group led by Professor Hiroshi Amano of Nagoya University

Suited to applications in measurement and analysis, resin processing, sterilization, etc.

Positioning of AlN substrate among power semiconductors



Distinctive features as a semiconductor substrate
(high-frequency compatibility, high dielectric breakdown strength)
Achieved a dielectric breakdown field strength of 7.3 MV/cm in an AlGaN p-n diode on an AlN substrate in the joint research with Nagoya University, **far exceeding the limits of SiC and GaN**

Enables smaller size and lower power consumption in next-generation high-speed communications, etc.

* Based on the Asahi Kasei Group's research of published academic presentations and papers

Examples of intangible asset utilization contributing to business

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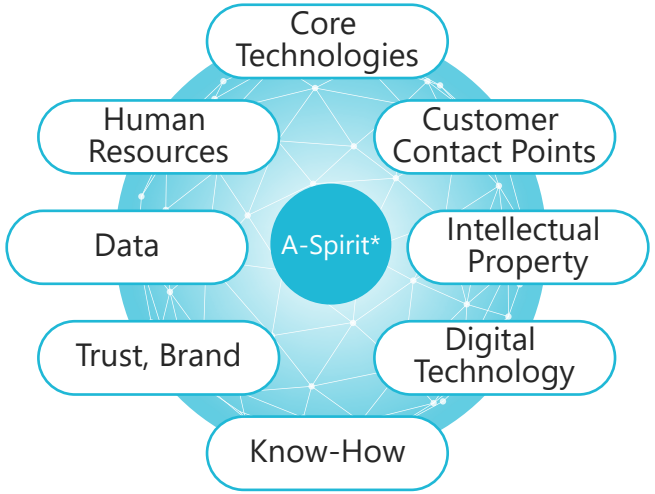
Further contribution to business earnings through maximum use of intangible assets to raise competitiveness

Promoting maximum use of intangible assets

- Maximum use of intangible assets promoted under medium-term management plan
- Aiming to enhance sustainable growth of corporate value through the organic combination of intangible assets regarded as important management resources

Overview of intangible assets of Asahi Kasei

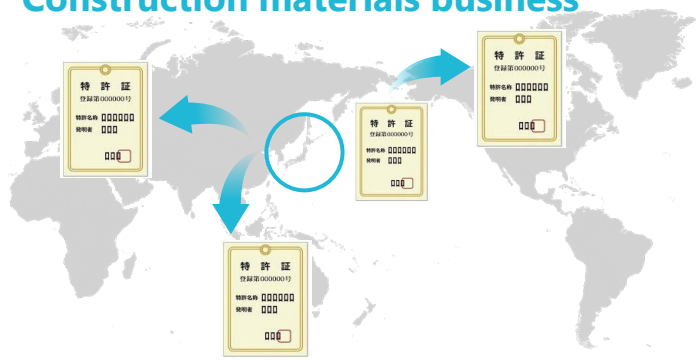


Earnings from utilization of intangible assets

- While providing products and services mainly in Japan, the construction materials business holds IP rights for some core technologies overseas; such IP is used to contribute to earnings
- In fiscal 2023 IP licenses were granted in countries where we do not operate, raising earnings in the construction materials business by several hundred million yen

Use of IP rights in countries where we do not operate

Construction materials business



Enhancing efforts to leverage IP and intangible assets to further expand such examples

* Asahi Kasei's heritage nurtured since its founding, including ambitious motivation, healthy sense of urgency, quick decisions, and spirit of advancement.

Further utilization of intangible assets

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A new earnings structure that differs from the traditional products sales business: Technology value Business Creation (TBC)

Aiming to **generate earnings through both "speed" and "asset light"** factors by **gaining value from intangible assets (patents, know-how, data, algorithms, etc.)** comprising Asahi Kasei's vast accumulated technology by **providing them in various forms not limited to licensing**

Curbing capital expenditures | **Earnings early in the co-creation stage** | **Swift adaptation to changes in the environment**

Conventional business

Investments, costs

Subject search → Research → Development → Manufacture → Sale

Commercialization pursuing best ownership

Earnings

TBC

- **Patents**
- **Know-how**
- **Data**
- **Algorithms**

Costs

Value by co-creation
- Joint development contract fees
- Consortium fees
- Consultation fees

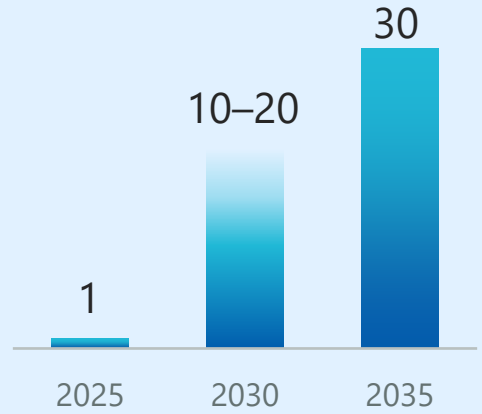
Earnings

Grant of usage rights
- License fees
- Asset usage fees
- Platform usage fees
- Software usage fees

Earnings

Transfer of ownership
- Technology licensing
- Licensing

TBC earnings target (¥ billion)



Subjects under consideration

- Lithium-ion capacitor
- Superionic conductive electrolyte
- others

TBC example #1: LiC (lithium-ion capacitor)

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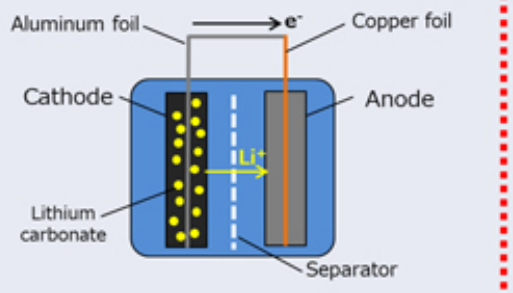
Leveraging a chemistry perspective to significantly reduce manufacturing costs by utilizing lithium pre-doping technology to eliminate the need for high-cost lithium foil

Technology license package that enables low-cost LiC production

Core technology

	Novel lithium doping technology
Structure	
Doping method	Oxidative decomposition of lithium source at cathode by applying voltage
Characteristics	No perforated foil or lithium metal foil ⇒ Use of non-perforated foil and lithium carbonate which are generally available as LiB material

- Over 1.3-fold increase in both capacity and input/output performance*
- Low-cost LiC can be manufactured using generally available materials and equipment

Application examples; value provided to customers

Power storage

Long service life and low cost for backup power supply

Industrial machinery

Significant reduction of charging time for electrical machinery

Public equipment

Longer LIB service life and utilization of short-cycle power by combination with LiC

Utilizing Asahi Kasei's proprietary sets of technology for multiple applications, mainly through licensing

* Compared to Asahi Kasei's conventional LiCs

TBC example #2: Superionic conductive electrolyte

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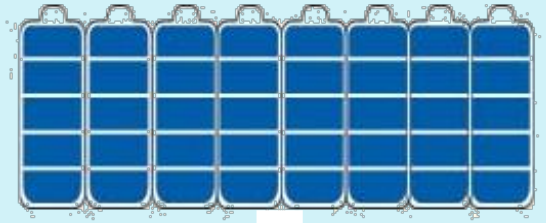
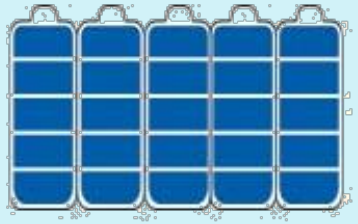
Contributing to a low-carbon society by increasing the value of lithium-ion batteries with superionic conductive electrolyte technology

Provision of value to customers (1)

Lower cost and smaller size by reducing the number of batteries needed



Reduced number of batteries



Core technology

Interface control technology for superionic conductive electrolyte (**twice** that of ordinary electrolyte)

High power

Quick charging

Increased capacity

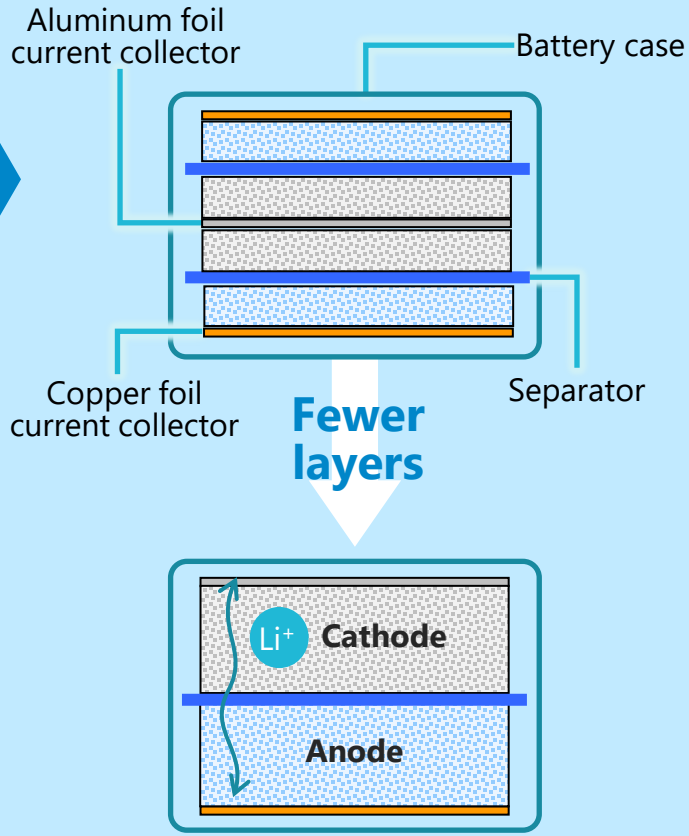
Superionic conductive electrolyte

Low temperature performance

Material cost reduction

Provision of value to customers (2)

Higher capacity and lower cost by greater electrode thickness



Ideal for Asahi Kasei's R&D

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R&D strategy

Core technologies / **Strategic domains**

Open innovation

Development by co-creation, acceleration of practical application

DX, intellectual property

Maximizing the value of intangible assets

Contributing to sustainability by creating new businesses through innovation

AsahiKASEI

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.”

Reference: Material business categories

Business categories	Main businesses	
Environmental Solutions	**Separators**	
	Membrane solutions (**ion-exchange membranes**, etc.)	
	Hydrogen-related	
	CO_2 chemistry	
	Synthetic rubber & elastomers	
	Basic Materials	Petrochemical-related business
Mobility & Industrial	**Car interior material**	
	Engineering plastics	
	Performance coating materials	
Life Innovation	**Digital Solutions**	**Electronic materials**
		Electronic devices
	Comfort Life	High-performance materials (**Ceolus** and other functional additives, etc.)
		Fibers (apparel, etc.)
		Consumables

Note: Businesses shown in **bold** are explained in this briefing