



Asahi Kasei Group Strategy for New Business Creation

Heightening and deepening internal connections

April 12, 2017

Asahi Kasei Corporation

AsahiKASEI

Outline

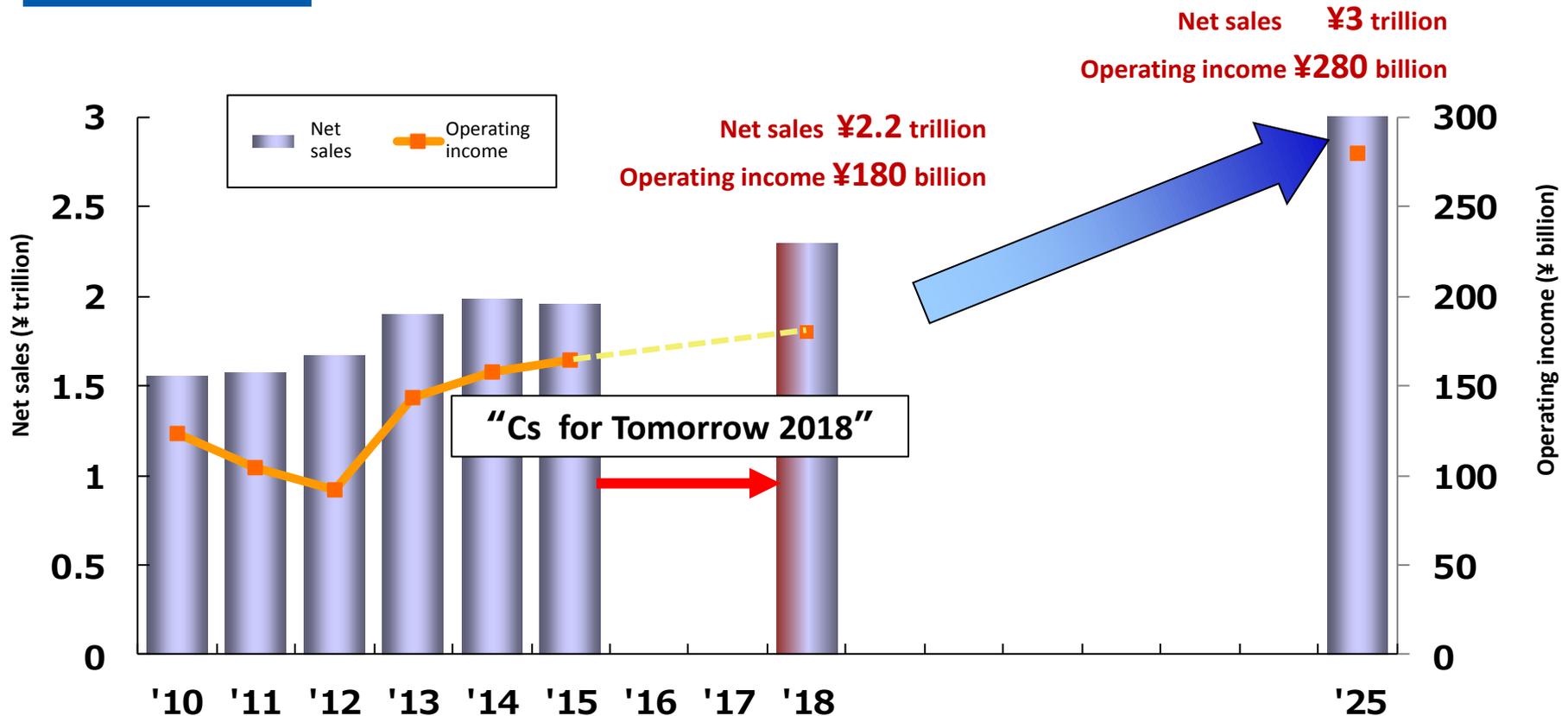
- 1. “Cs for Tomorrow 2018” and vision for 2025**
- 2. Asahi Kasei’s history of growth and new business creation**
- 3. Framework for new business creation**
- 4. Strategy for new business creation**
 - Changing environment surrounding R&D and challenges for new business creation**
 - Analysis of accumulated strengths and core technologies**
 - Aims and approach for new business creation**
- 5. Solution business using IT**
- 6. Essence of new business creation**

1. “Cs for Tomorrow 2018” and vision for 2025

Group's vision for FY 2025

Vision in 2025

Building a portfolio of high value-added businesses with high profitability



Strong emphasis is placed on high added value to achieve the vision for FY 2025

“Cs for Tomorrow 2018”: The three years to build the base to achieve FY 2025 targets

Basic strategy

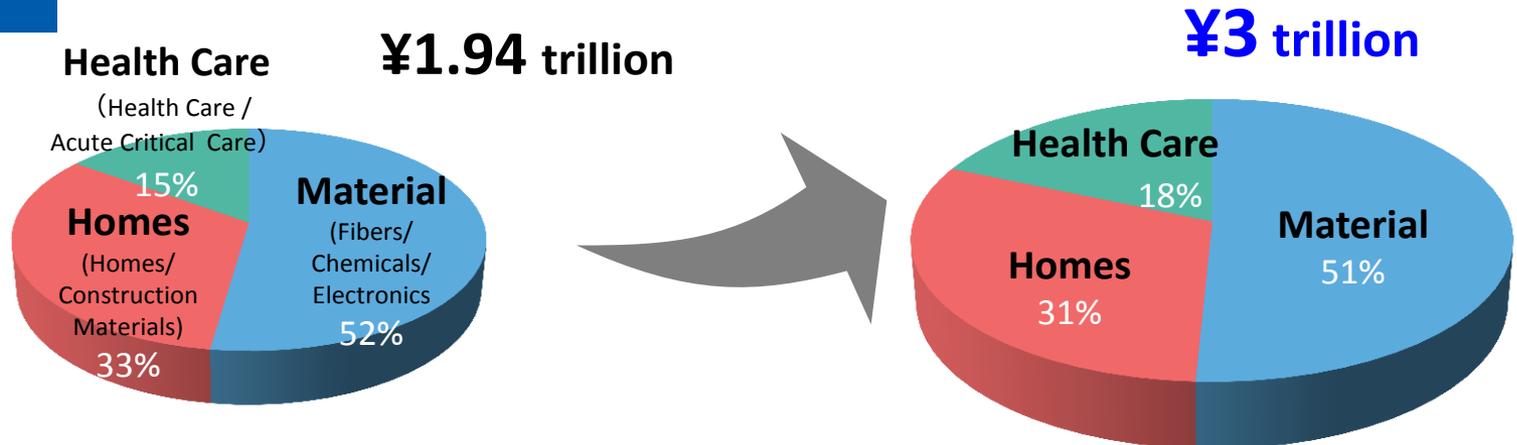
Pursuit of growth and profitability

Creation of new businesses

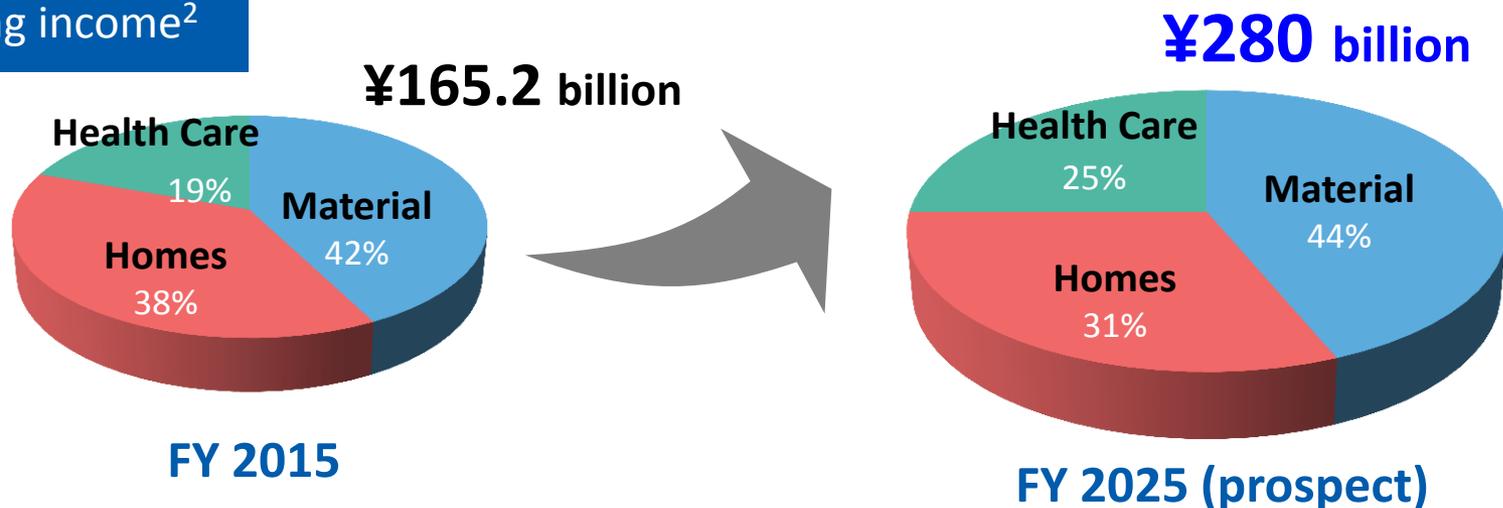
Acceleration of globalization

Vision for FY 2025 by segment

Net sales¹



Operating income²

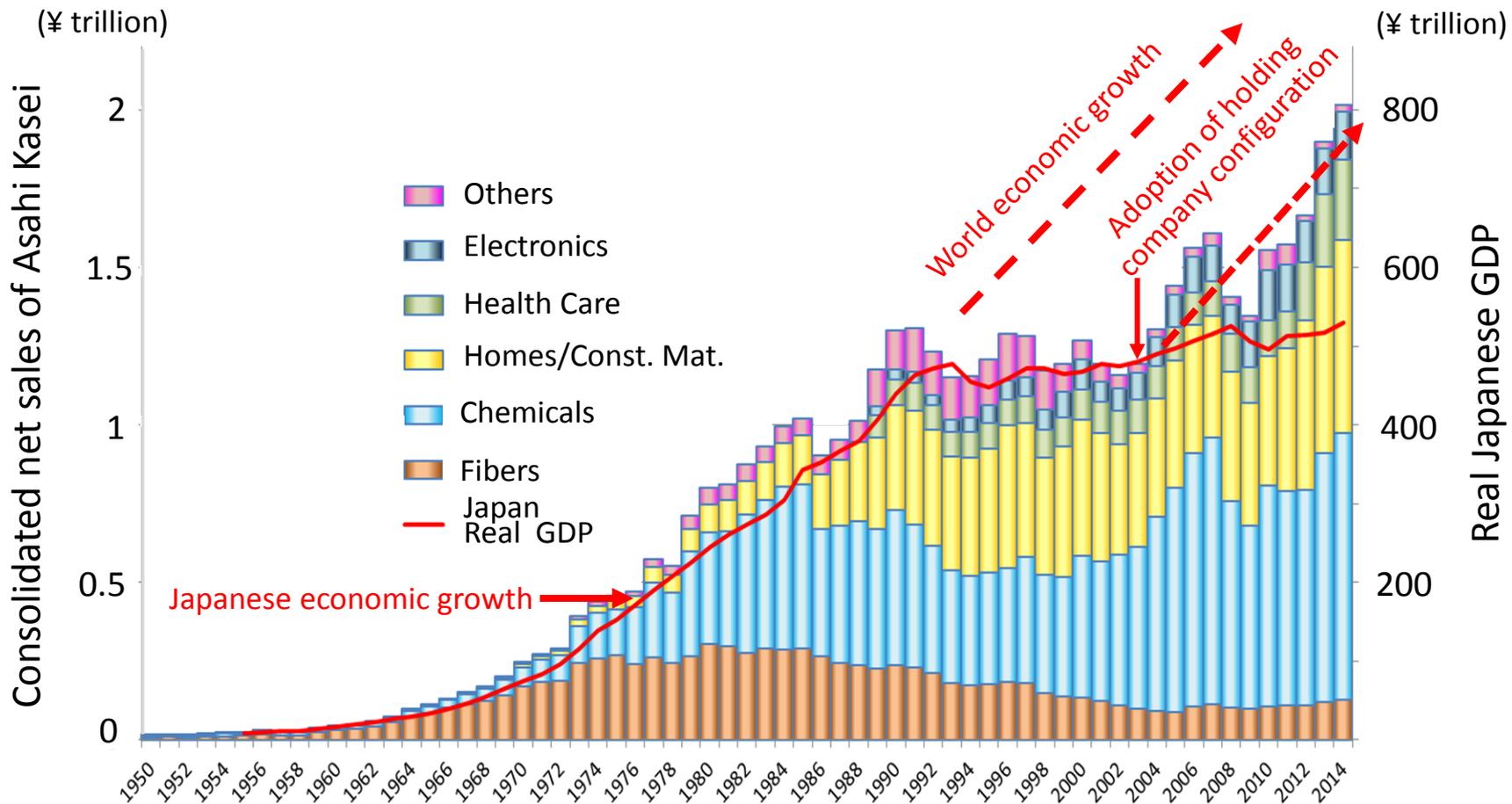


¹ Percentages calculated by dividing each segment's net sales by consolidated net sales less net sales in the "Others" category.

² Percentages calculated by dividing each segment's operating income by consolidated operating income less operating income in the "Others" category and corporate expenses and eliminations.

2. Asahi Kasei's history of growth and new business creation

Asahi Kasei's sales compared to Japan's GDP



Features of new business creation from the past cases of Asahi Kasei

Newly developed materials take time to become profitable

- Need to find applications that match the materials' characteristics
- Dependent on market ramp-up of end products

Committing strategic resources to new businesses that transform the business portfolio

- Entry into petrochemicals, homes, electronic devices
- Acquisition of ZOLL (acute critical care), acquisition of Polypore (proactive expansion)

Highly profitable businesses resulting from start of R&D prior to market formation ahead of other companies

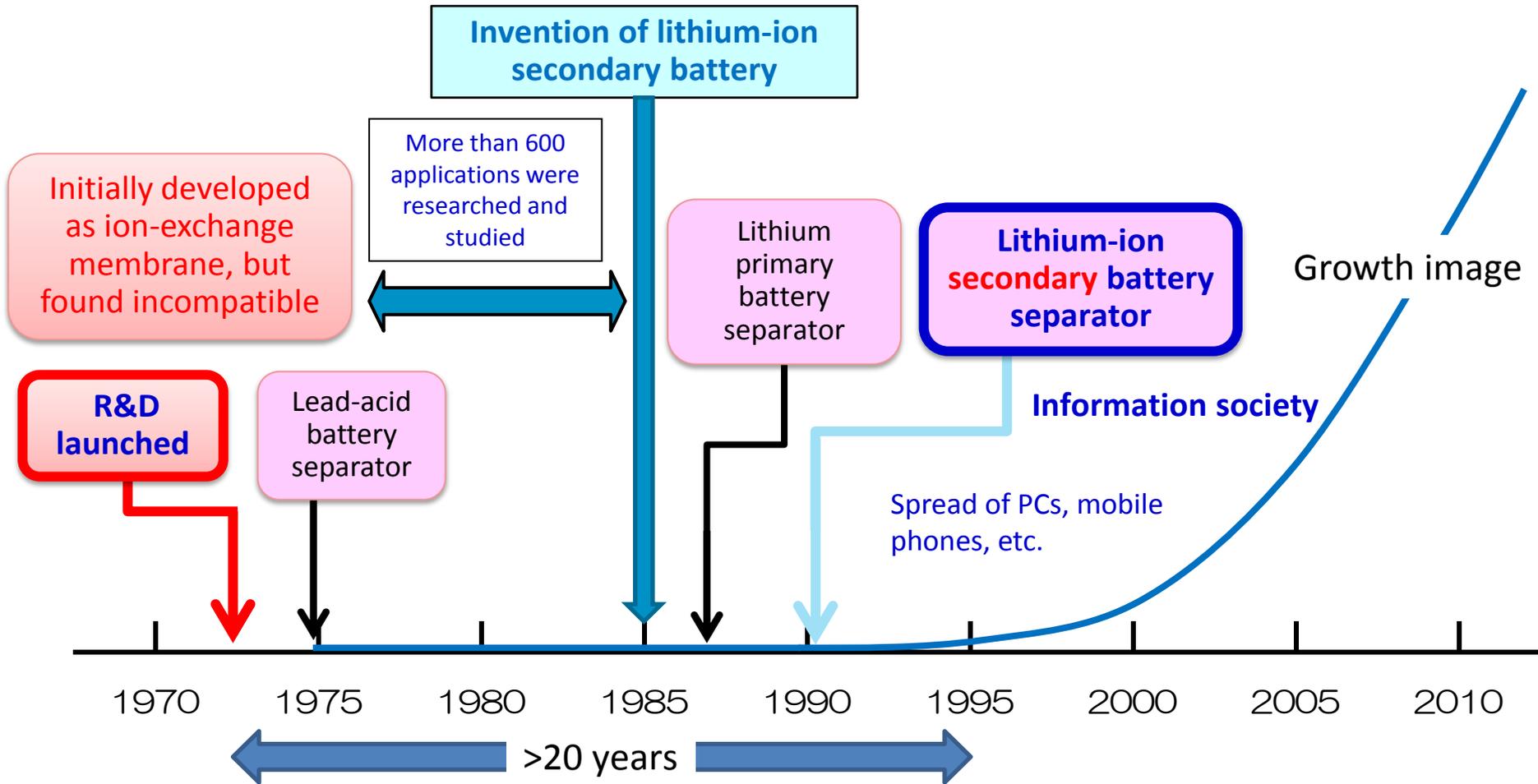
- Ion-exchange membrane
- Li-ion battery separator
- Virus removal filter
- Electronic compass, etc.

Broad lateral extension to develop various businesses centered on same core technology

- Polymer/processing technology
- Performance polymers
- Membrane/separation technology
- Catalyst/process technology
- Compound semiconductors → magnetic and other sensors → UVC LEDs

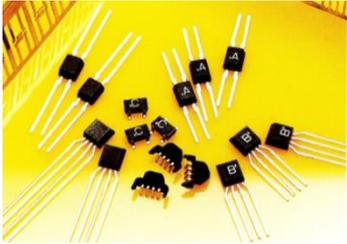
Past example of new business creation: Hipore flat-film polyolefin membrane

Hipore succeeded in an application different than originally intended



Past example of new business creation: Magnetic sensor

Product-oriented development → change in needs/environment → expansion into various applications



IT/mobile devices/smartphones

PC/energy-efficient appliances/
in-vehicle electronics

Precise motor control/spread of Video
cassette recorder

Spread of smartphones
Electronic compass



Cellular phones/
digital cameras



Appliances

Extension to
automotive application



Power window/current sensor

Windows95

CD-ROM → DVD



PC cooling fan



Floppy disk
drive

Video
cassette
recorder

Adopted for
audio
equipment
motor

Launched
development
for crash
sensor/Hall IC

Development
of airbag

Motor applications

1970 1975 1980 1985 1990 1995 2000 2005 2010

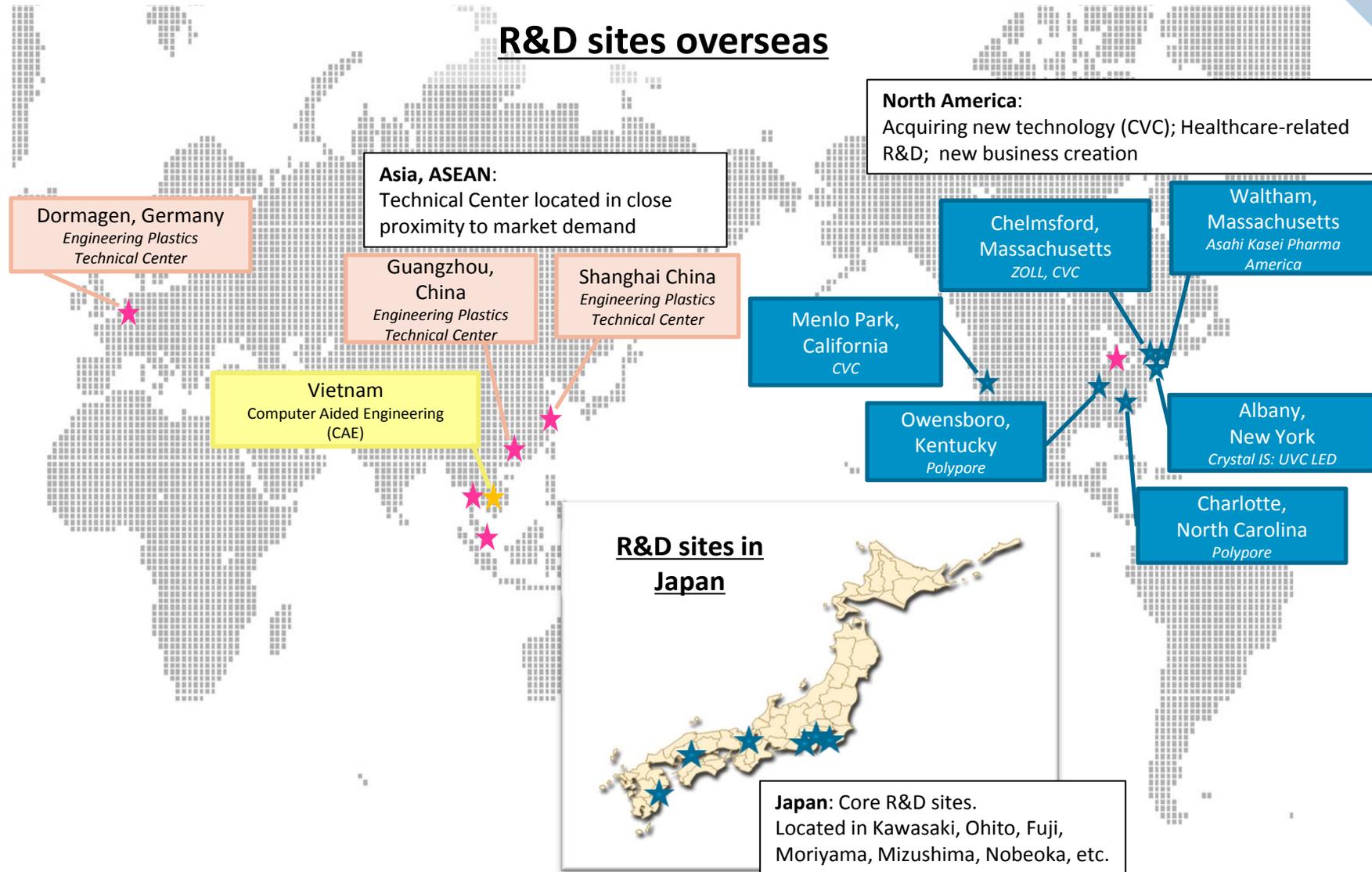
Miyazaki
Electronics Co.,
Ltd. founded

3. Framework for new business creation

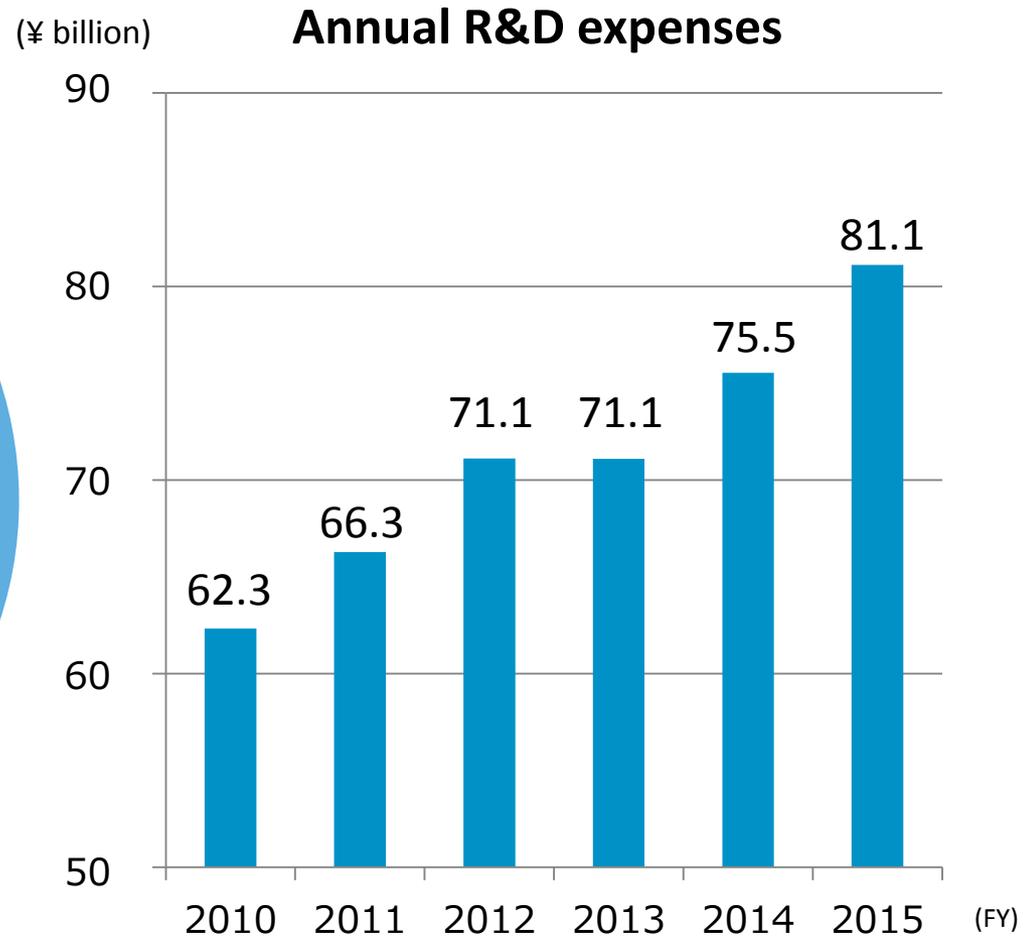
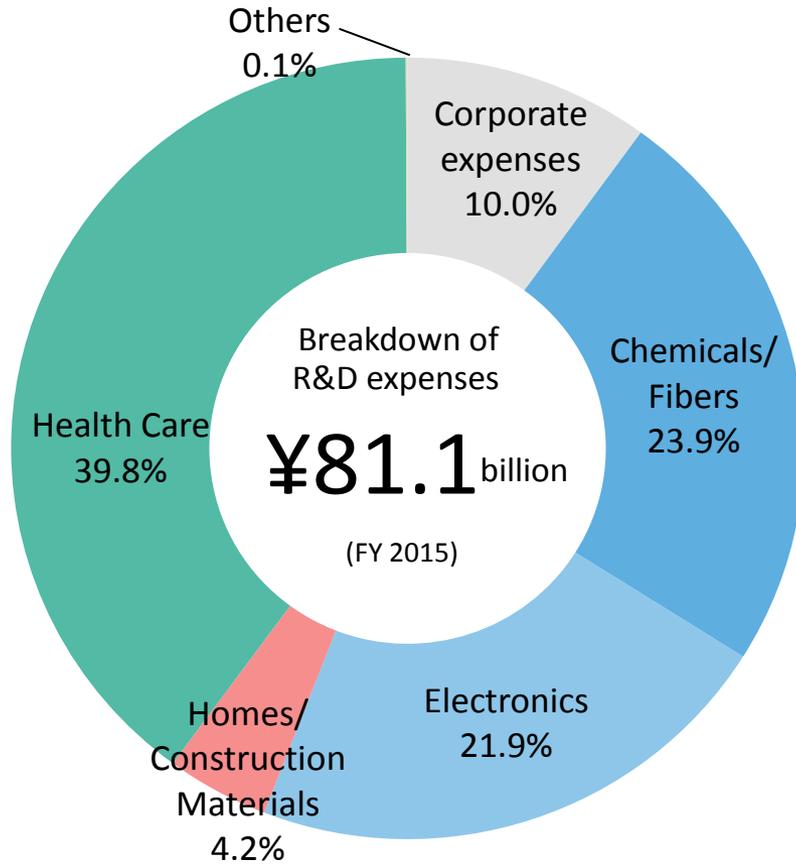
R&D Organization



Main R&D bases around the world

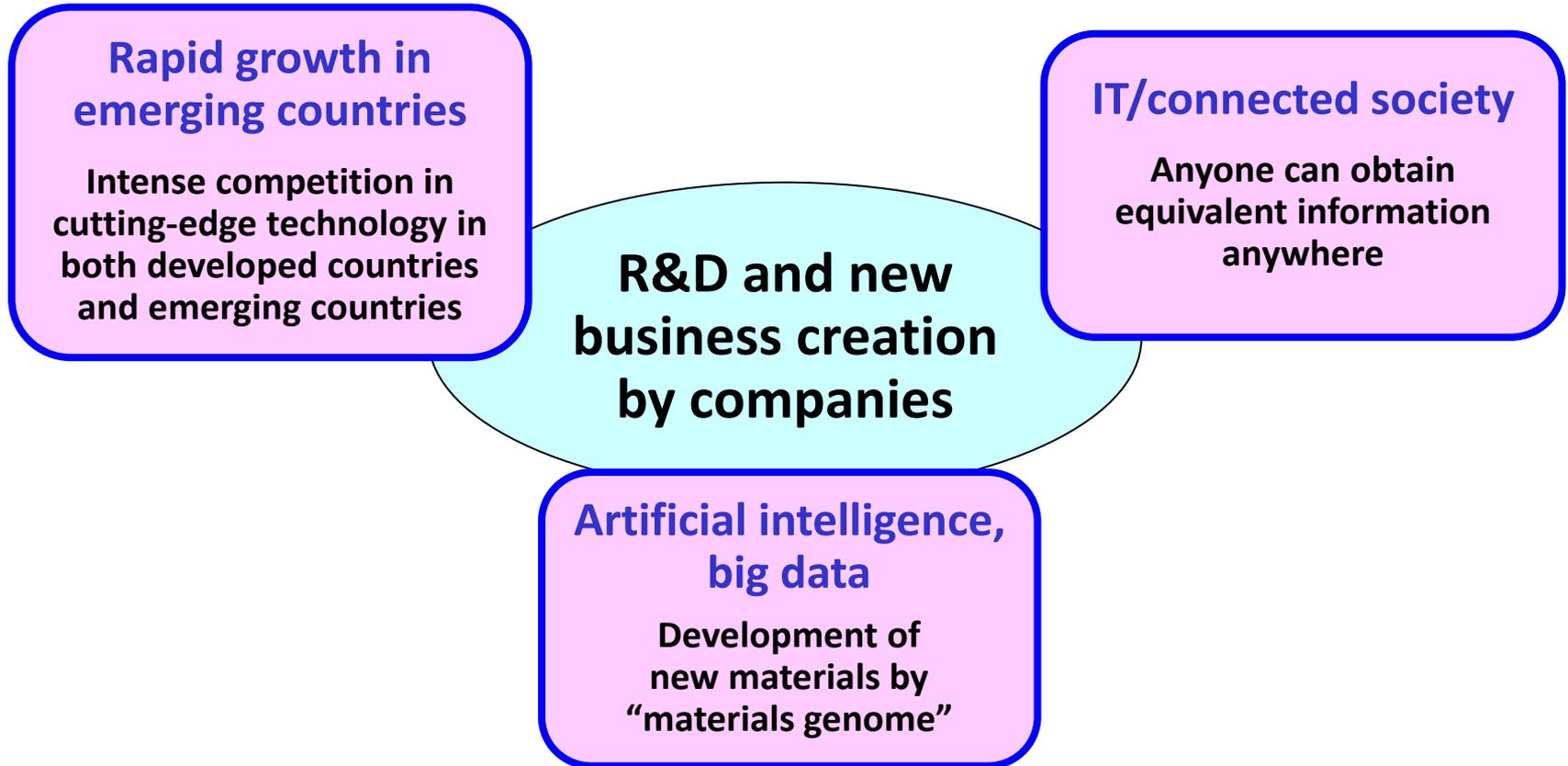


Asahi Kasei Group's R&D expenses



4. Strategy for new business creation

Changing environment surrounding R&D



- Risk that what was thought to be superior will lose its superiority
- Limitations to individual optimization → adapt to changes in business/technology environment
- Need to take inventory of accumulated competitive advantages, technologies, and business platforms; reevaluate competitive advantages

Measures to cope with environmental changes related to new business development

Transformation of business portfolio by business expansion and new business creation

Acquiring missing parts (by CVC etc.)

Outside alliances (by joint R&D etc.)

Which business to create?
(which mountain to climb?)
“ability to discern”

Halfway

Halfway

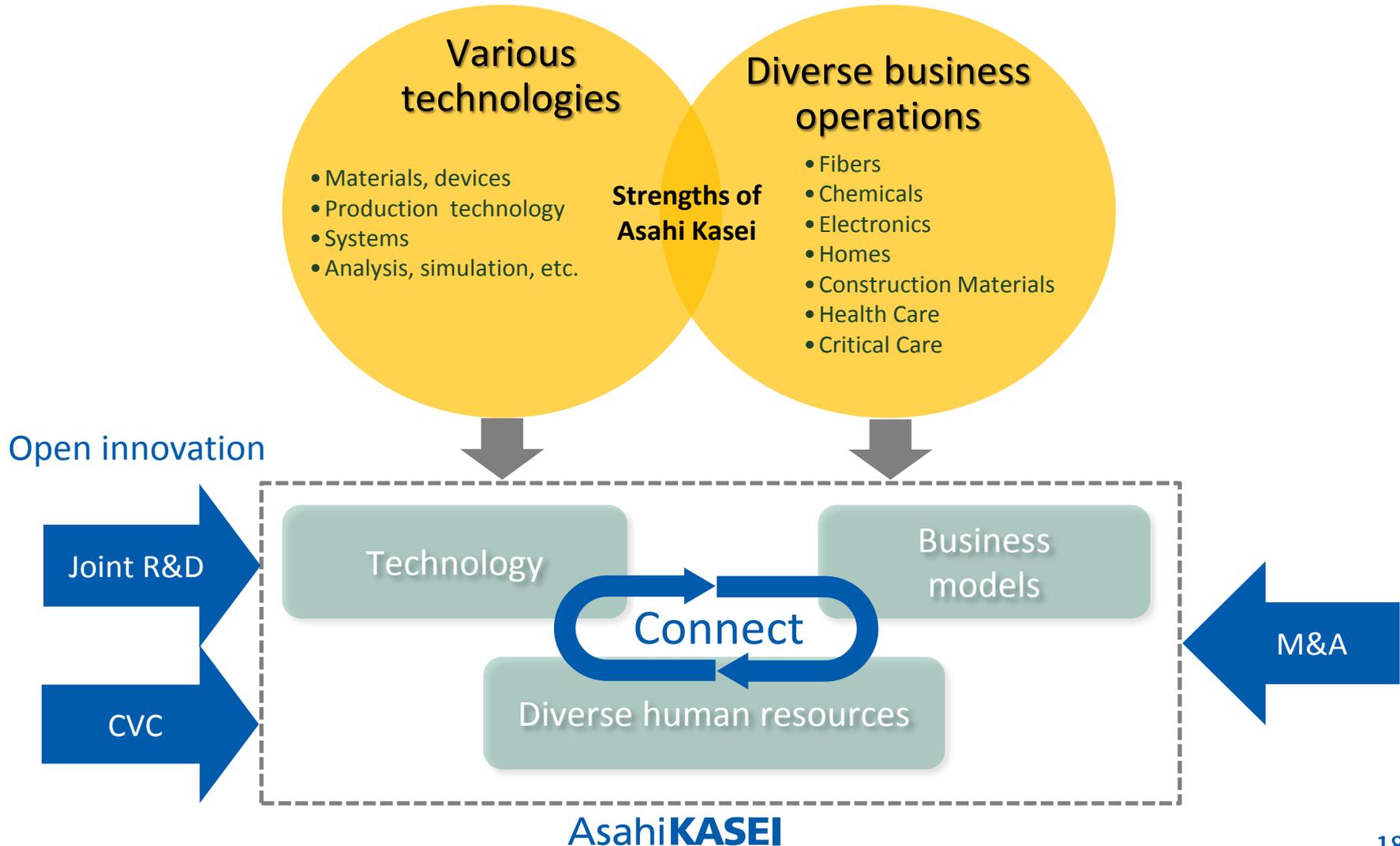
R&D, business development
Exerting combined strength through internal connections

Asahi Kasei Group's sources of competitiveness

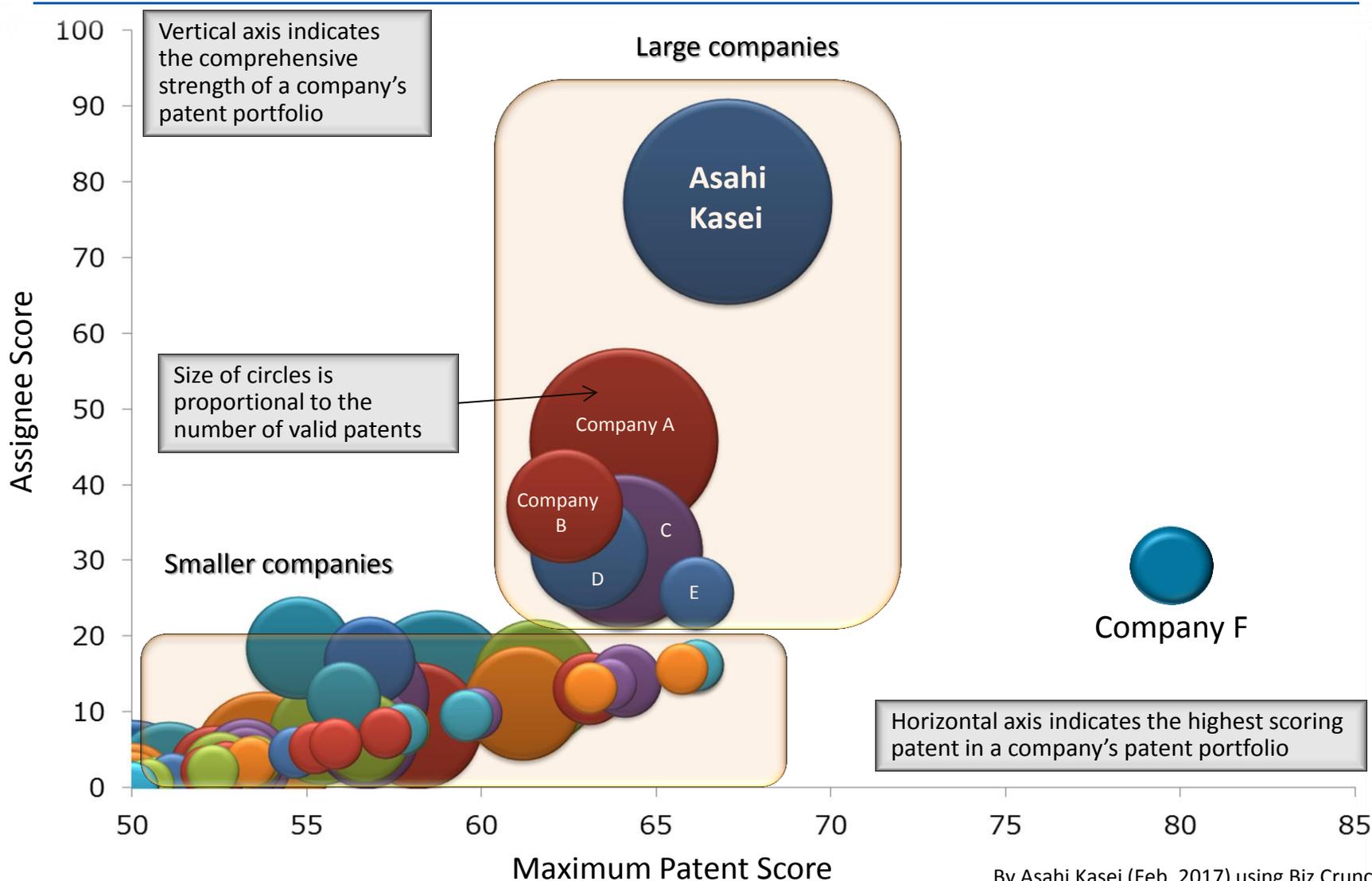
1. Accumulated core technologies, production technologies, know-how
2. Business platforms, diverse market channels, business models

New business creation under the medium-term management initiative “Cs for Tomorrow 2018”

Leveraging Asahi Kasei’s diversity to create value through combinations among various technologies and businesses

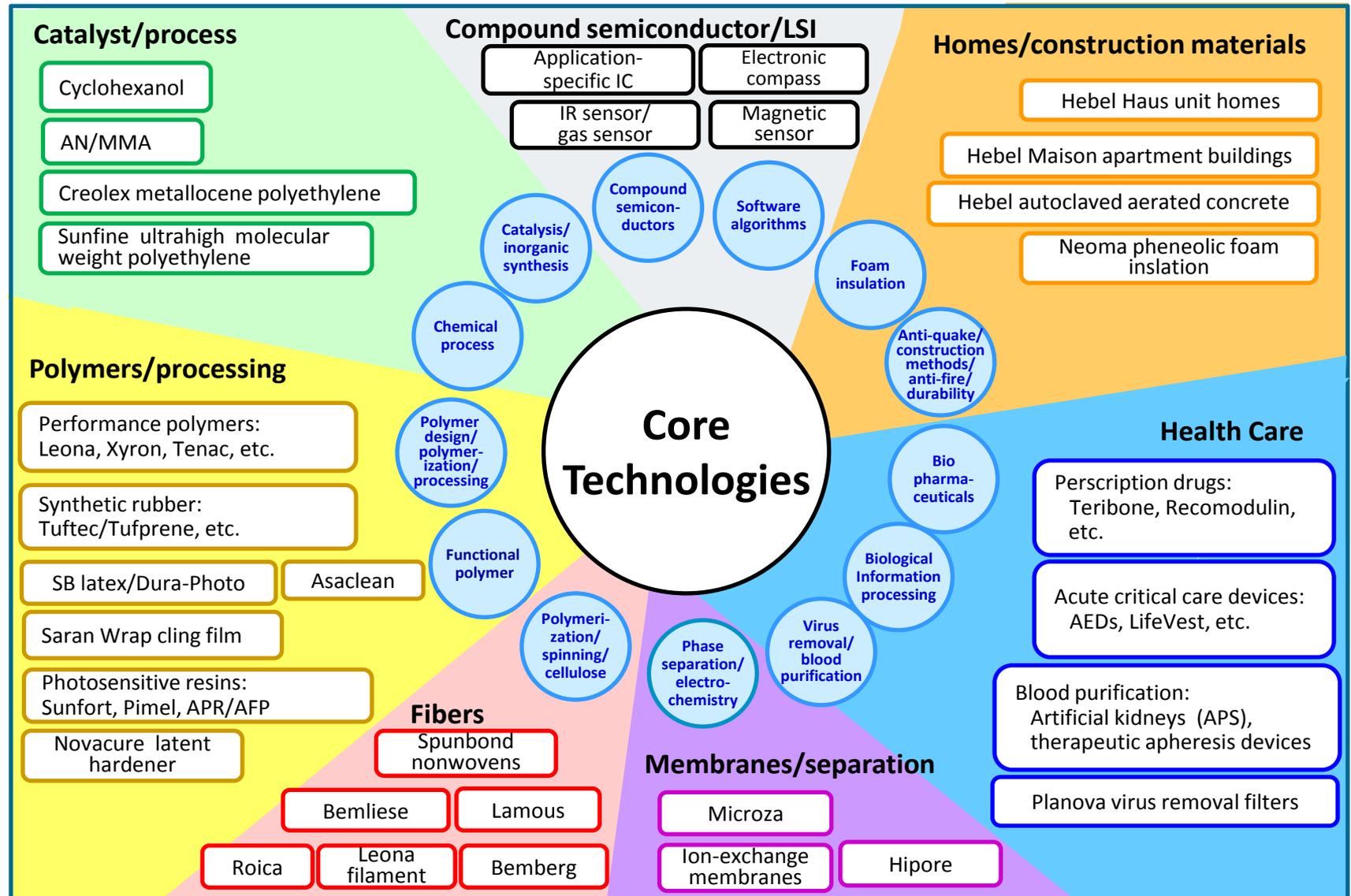


Example of competitive analysis of patents (Membrane for electrolysis)



By Asahi Kasei (Feb. 2017) using Biz Cruncher from Patent Result Co., Ltd.

Core technologies that support Asahi Kasei Products



Accumulated business platforms

Material

Fibers
Chemicals
Electronics

Products related to living (apparel material, consumables, etc.)
Healthcare-related material

Automotive-related products (structural material, interior material, tire material, LSIs, sensors)
Environment/energy-related material (battery separator)

**Various business
platforms that contribute
to life and living for
people around the world
(market channels in each business)**

Homes

Homes
Construction Materials

Long-life urban homes
(ability to develop lifestyle proposals)
Construction materials
(products for homes, structural components)

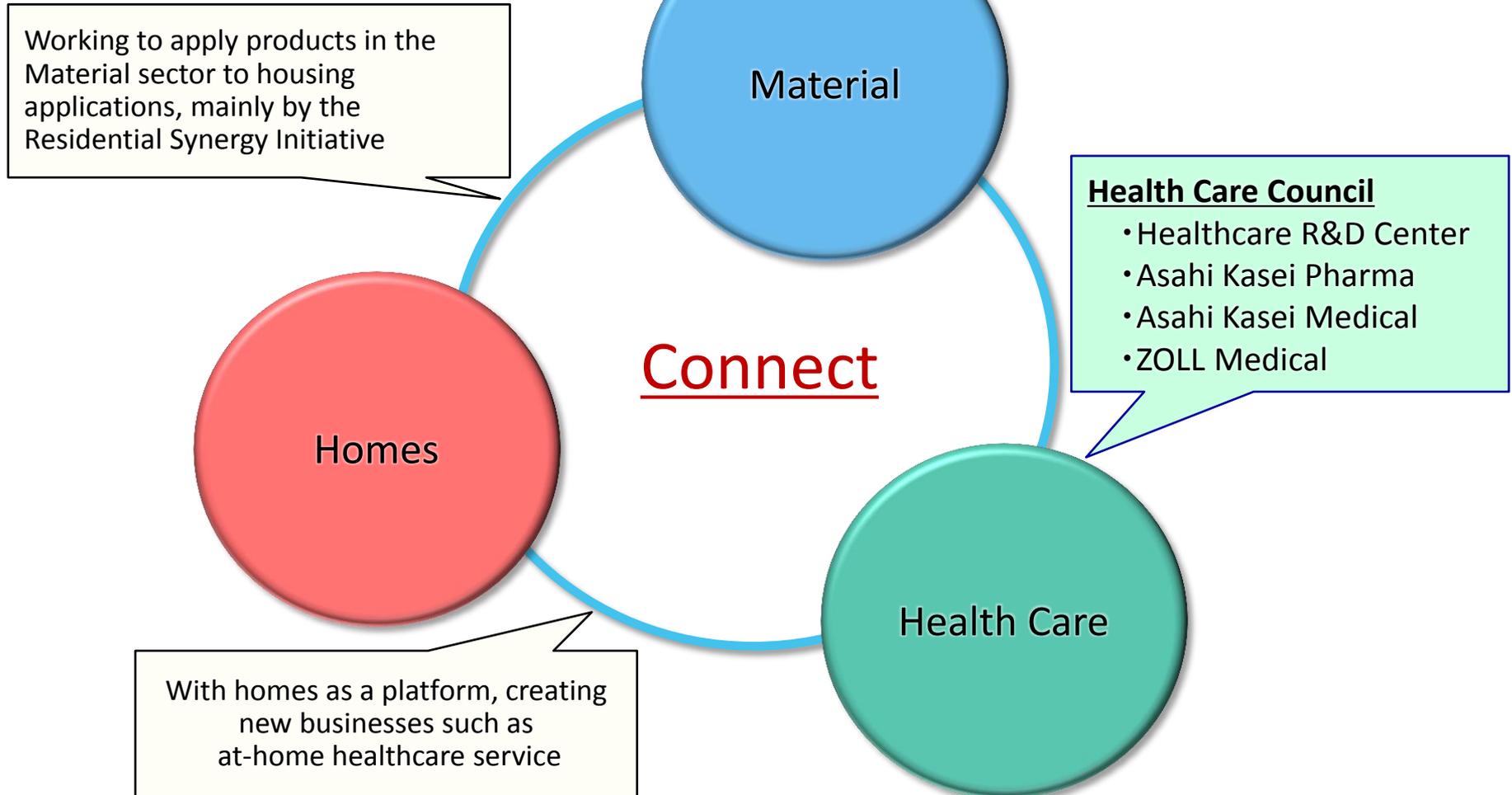
Health Care

Health Care
Critical Care

Business expansion in United States
Blood purification devices
Bioprocess products
Pharmaceuticals (musculoskeletal)
Acute critical care devices & systems

New business creation through collaboration among three business sectors

Connecting the strengths of each business sector to create unique new businesses



Aims and approach for new business creation

Our main areas of focus to address social issues



Fostering and acquiring core technology

Acquiring technology seeds
Applying technology laterally

CVC

Coordination/
combination



Heightening added value

Business models,
solutions

M&A

Utilizing market channels

Enhancing and fully utilizing business platforms

Approach for new business creation viewed by market axis and technology axis

	Established mature markets	Established growth markets	New markets	Potential future markets
Existing technologies/ improvements/ combinations	until FY2018		until FY2025	
	Maximizing value of established businesses A <ul style="list-style-type: none"> • Brand strength/market channels • Cost competitiveness • Services 		Marketing C <ul style="list-style-type: none"> • Full utilization of Asahi Kasei Group technologies and business platforms • Acquiring missing parts (CVC) 	
	Creating added value from new perspectives B <ul style="list-style-type: none"> • Higher added value from solutions 			
Newly developed technologies	B-to-C in Health Care and Homes sectors D <ul style="list-style-type: none"> • Better therapy • Comfortable residential living 		Accelerating R&D E <ul style="list-style-type: none"> • Acquiring technology seeds/sprouts by CVC • New business models 	
	B-to-B in Material sector <ul style="list-style-type: none"> • Disregarding mature markets • Pursuing originality and differentiation in growth markets 			Long-term perspective F <ul style="list-style-type: none"> • Develop/acquire leading-edge technology • Collaboration with outside research institutions

Categories A and C: Coordinate with strategic business units and core operating companies

Category B: Utilize information technology, study new business models

Category D: Review programs, examine originality and differentiation

Category E: Focus on strong points and accelerate

Category F: Basic/exploratory research in collaboration with universities and government research organs

Example of new business creation in Category C: Alkaline water electrolysis system

System to convert renewable energy into hydrogen as energy storage medium



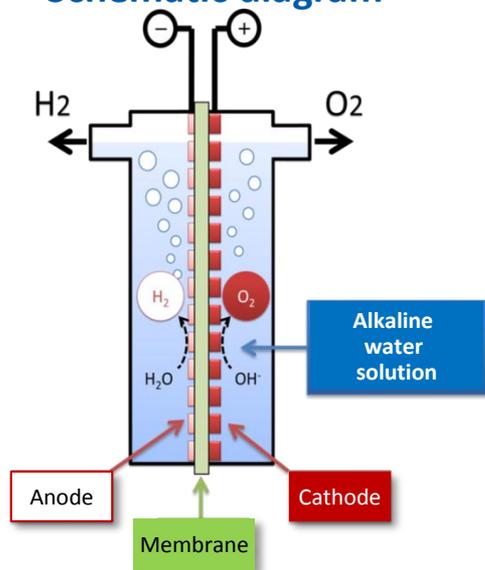
Energy conversion by electrolysis
Electricity → Hydrogen



“Power-to-Gas”
energy storage

- Fuel-cell vehicles
- Hydrogen power generation
- Clean energy (methane, ethanol)

Schematic diagram



Clean Energy Project

- Utilizing world-leading core technology: brine electrolysis, catalyst, and membrane tech.
- World's highest energy efficiency with commercial-scale plant
- Ability to take orders for 10 MW systems by end of FY2017
- Accelerating commercialization with demonstration plant in Europe, the market with the greatest potential

Demonstration plant



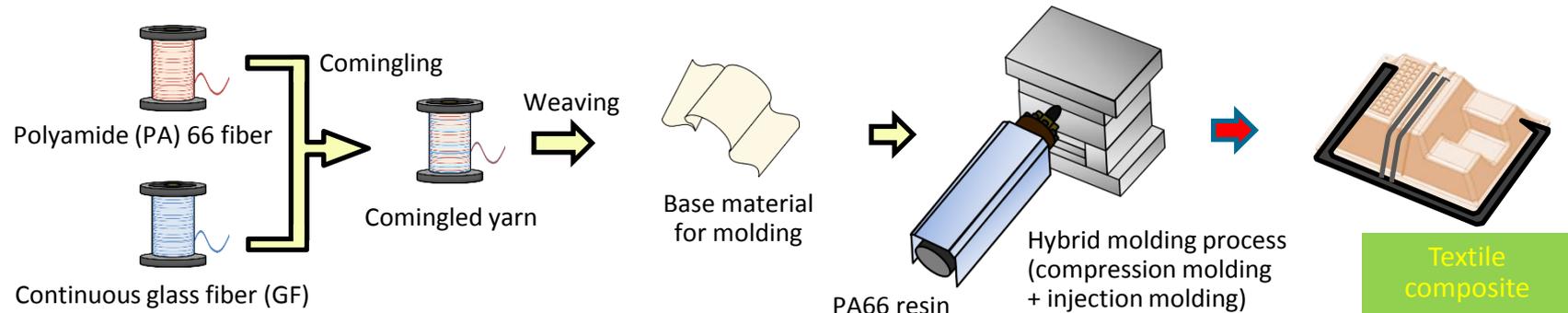
Demonstration plant anticipating 10 MW capacity started operation in Nov. 2015 under NEDO* project

* New Energy and Industrial Technology Development Organization

Example of new business creation in Category D: High-performance composite materials

Combinations of fiber, resin, and processing technology

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



High degree of design freedom

Hybrid (compression and injection) molding with the flexible base material enables complex shapes

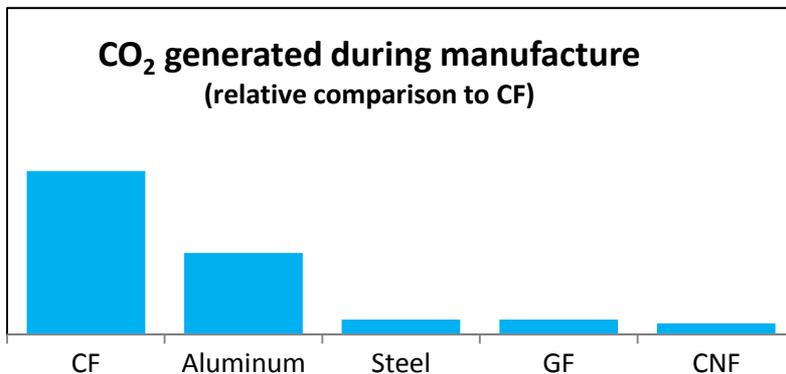
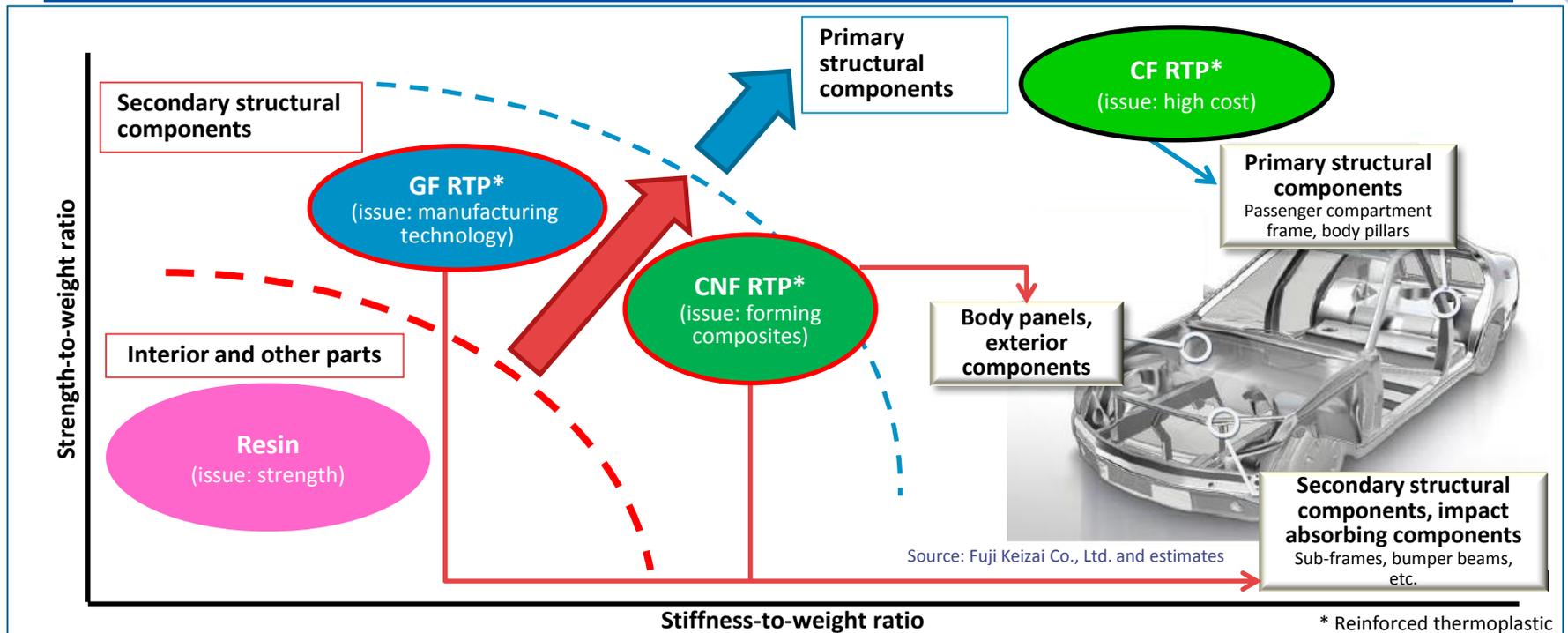
Outstanding strength-to-weight ratio

Improved strength and rigidity compared with conventional GF reinforced PA66 resin; outstanding strength of interface between GF and resin

2) Cellulose nanofiber (CNF) nonwoven sheet

- Uniform dispersion is the key to obtaining maximum performance from CNF
- Developing CNF nonwoven sheet that already has a network structure enabling impregnation with epoxy, etc.

Targets for high-performance composite materials



- Glass fiber (GF) and cellulose nanofiber (CNF) are presumed to generate less CO₂ during manufacture than carbon fiber (CF) and aluminum
- Using thermoplastic material → recyclable (eco-friendly)

Example of new business creation in Category E: UVC LED

- ◆ Compound semiconductor as core technology for business expansion
Hall elements (world-leading share) → IR sensor, CO₂ sensor, etc. → UVC LED using aluminum nitride (AlN)

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



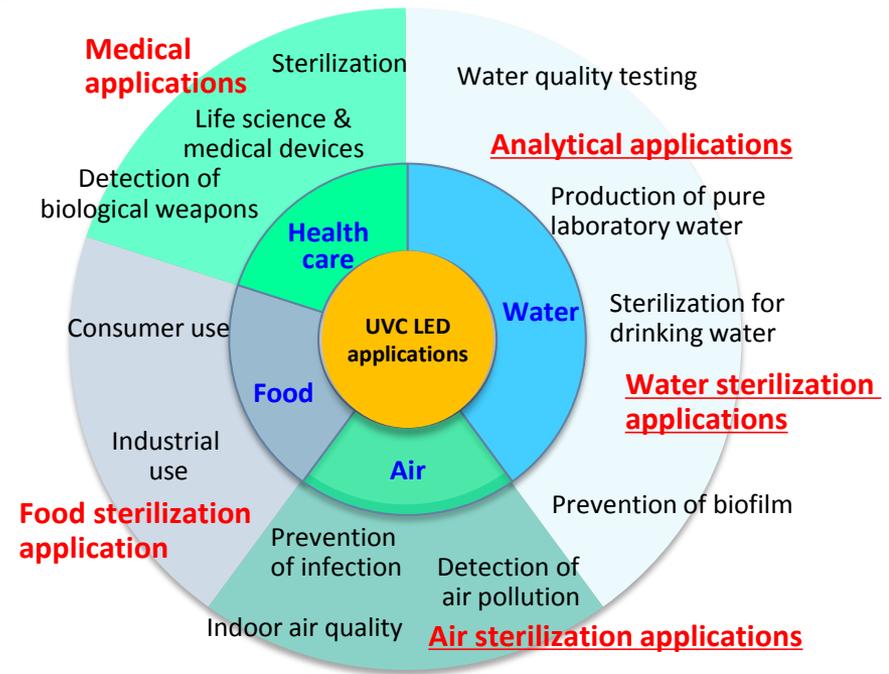
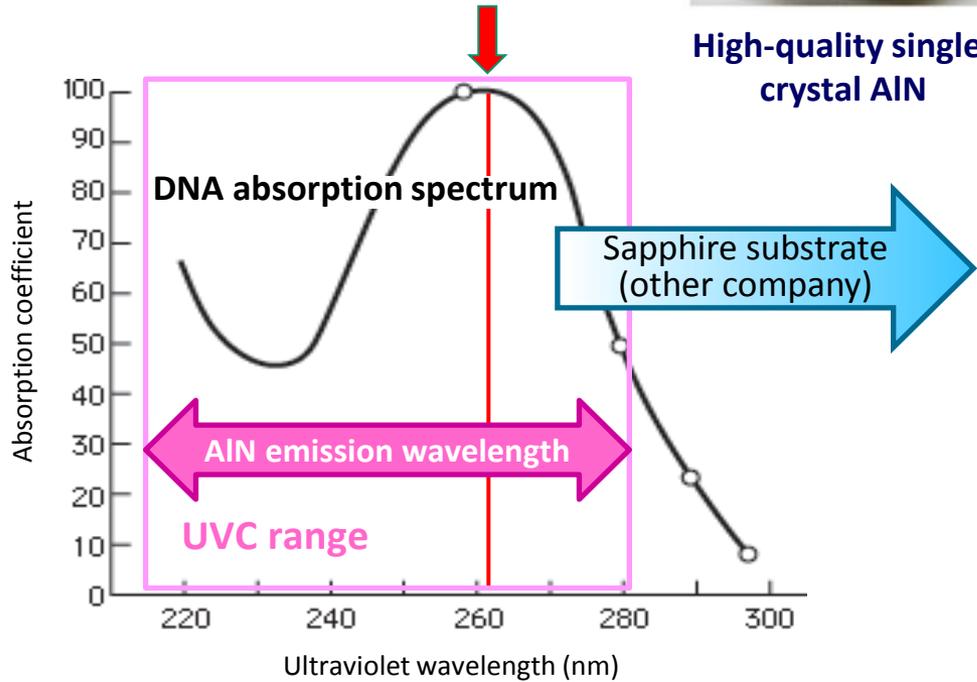
Klaran

Optimum wavelength for disinfection



High-quality single-crystal AlN

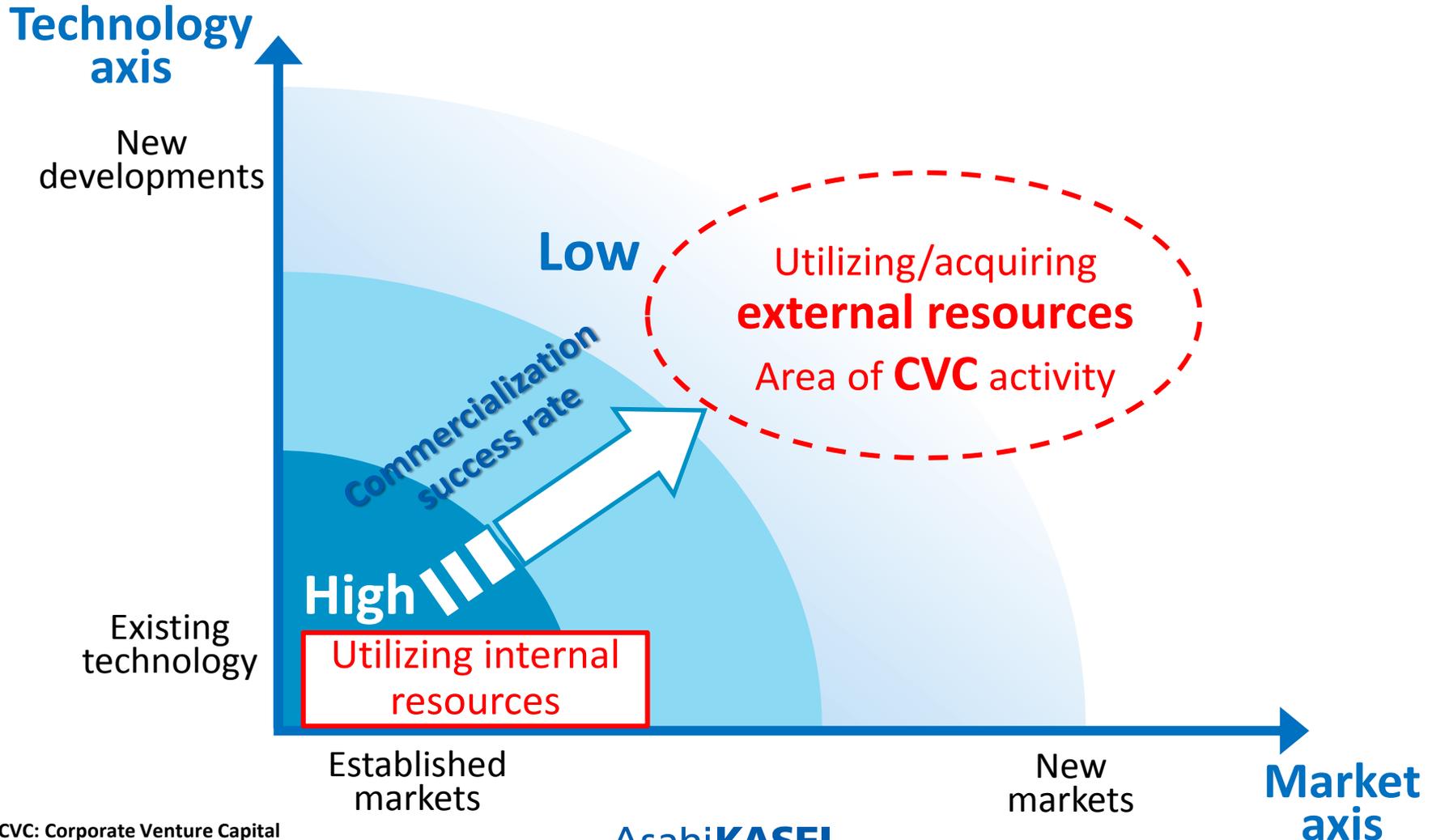
Developing new markets around the world with Klaran UVC LED for disinfection; incorporation in end product designs is advancing



CVC* Function:

Bringing in sprouts in Categories C and E

Utilizing venture companies in highly innovative fields to reduce risks and accelerate commercialization

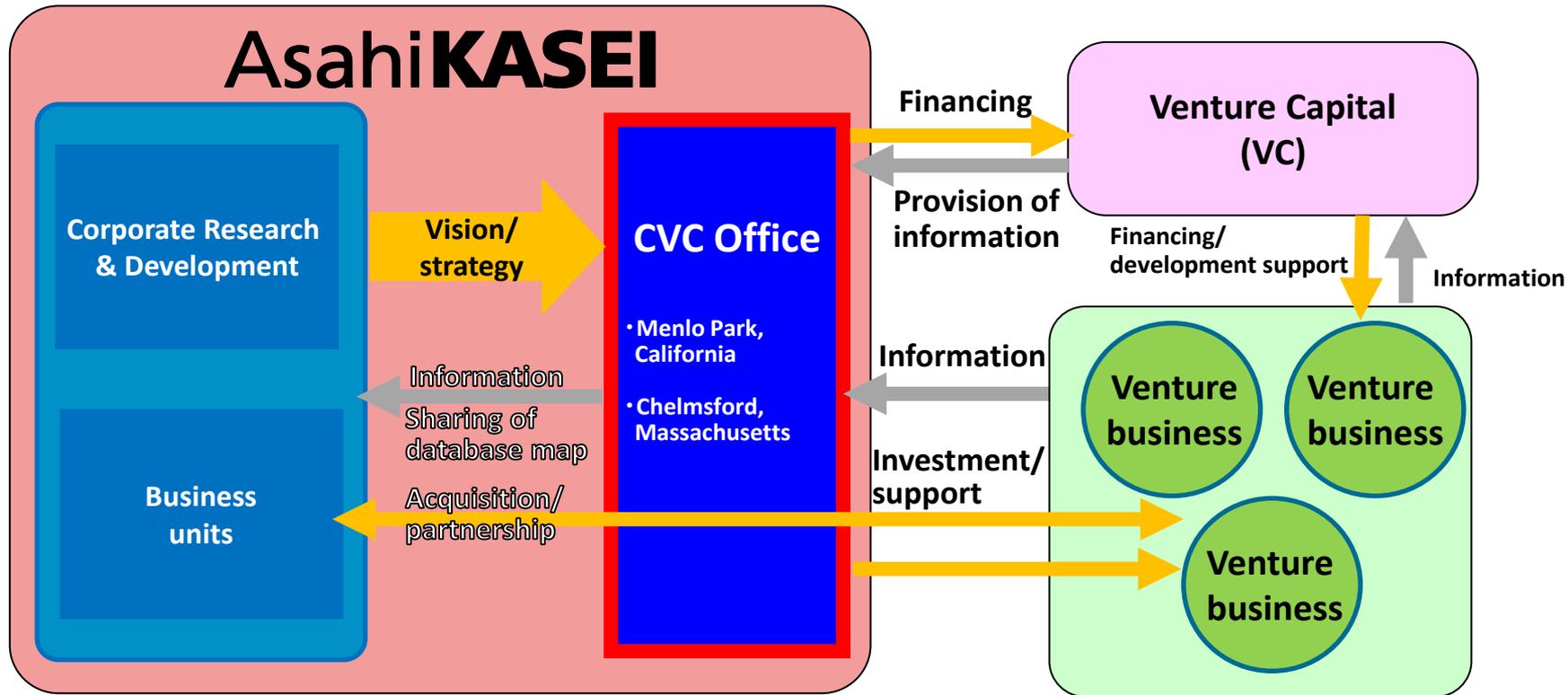


* CVC: Corporate Venture Capital

CVC Office:

Bringing in sprouts in Categories C and E

- Building information networks through venture capital (VC)
- Identifying venture businesses that are compatible with Asahi Kasei
- Acquiring technology and proposing/advancing new business development through partnership with/acquisition of venture business

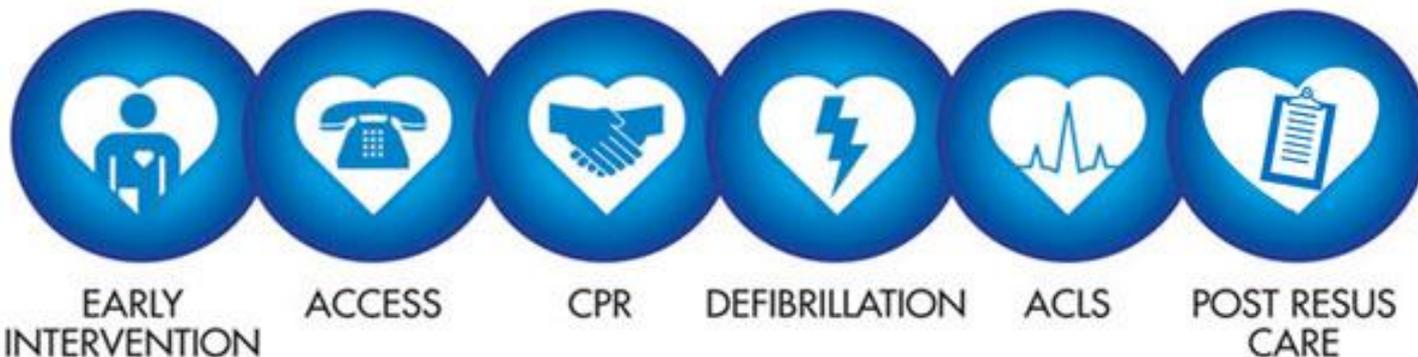


5. Solution business using IT

Creating added value from new perspectives (Category B)

ZOLL products in the "Chain of Survival"

Chain of Survival



ZOLL's products strongly support every phase of the Chain of Survival

ZOLL products



LifeVest
wearable defibrillator



RescueNet
data management suite for fire and emergency medical services



AutoPulse
non-invasive cardiac support pump



AED Plus
automated external defibrillator

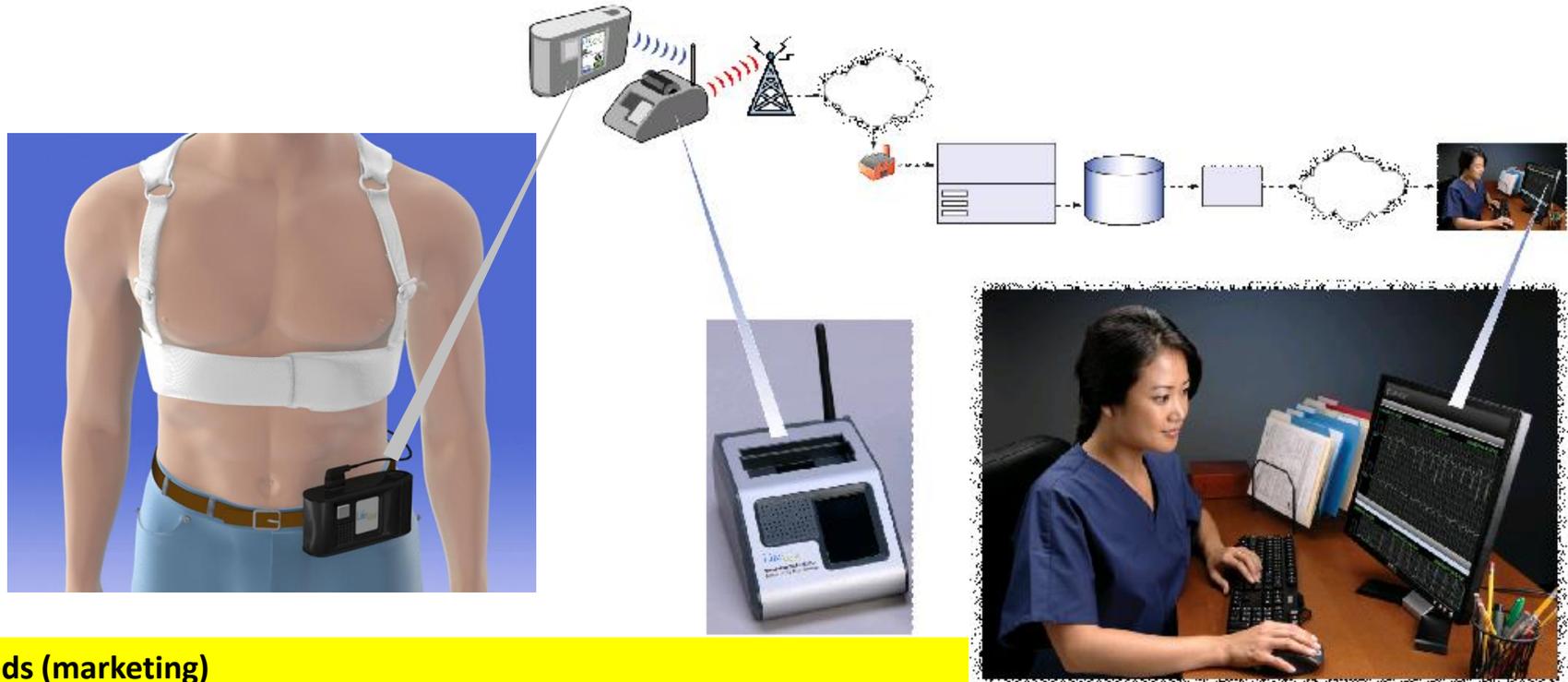


X Series AED Pro
defibrillators for hospitals and EMS



Thermogard
temperature management system

LifeVest solution business



Needs (marketing)

- Enabling patients at high risk of sudden cardiac arrest to stay outside the hospital
- If ventricular fibrillation or other life-threatening arrhythmia occurs
→ life-saving shock without delay

Emergency measures when an event occurs; using ICT to support patients

- Continuous monitoring of patient's ECG
- Enabling physicians to check patient's condition through online system linked to the LifeVest*
- 24-hour call center for inquiries; enabling information on state of operation of the device to be shared

* Patient's data transmitted from the LifeVest is displayed on a computer screen. Medical professionals can check if patients are wearing the device and ECG data before and after an event. Able to send alerts to patients' cell phones, etc., in the case of important clinical information.

ZOLL

Examples of solutions business being advanced and developed

Plant maintenance services

- Web-based remote automatic vibration diagnostic system
 - Stable operation of plant and equipment (rotating machinery, industrial robots, etc.)
- Electric power system analysis service

Stable supply solution for hydrogen from water electrolysis

- Monitoring and optimization based on sensor data
 - Electrolyzer maintenance
 - Hydrogen production prediction and control system

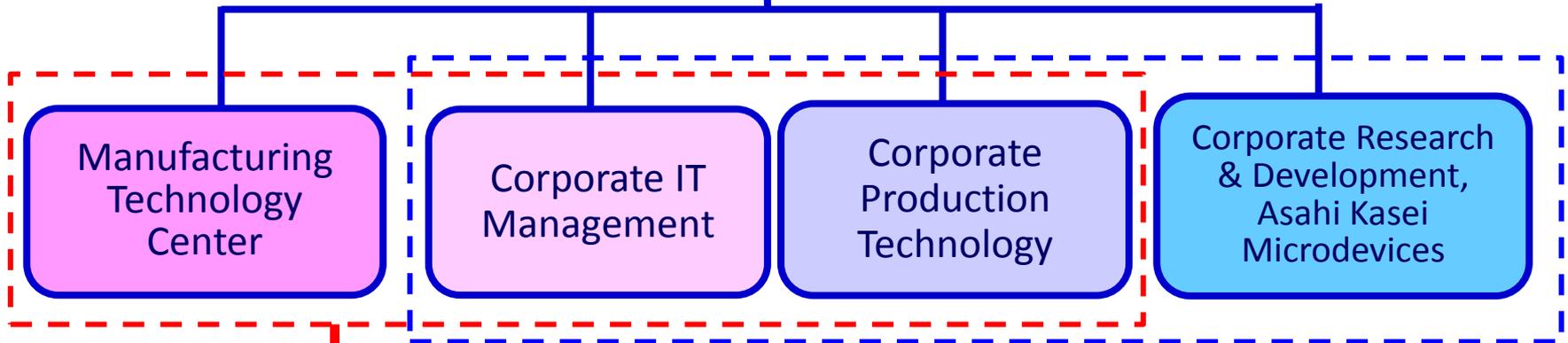
Disinfection solutions (water, air, surfaces) using UVC LED

- Developing solution business in disinfection applications
 - 1st stage: Selling devices, consulting on design optimization
 - 2nd stage: Extension to disinfection modules and systems

Enhancing business activity utilizing IoT, AI, Big Data

Coordinated utilization of advanced IT

Organized by Corporate Production Technology



Manufacturing and production technology innovation

High-mix production/decrease of experienced workers/passing on skills/overseas expansion

1. Optimized plant operation and energy consumption
2. Supply chain innovation, mass customization
3. Risk management, prevention/remote maintenance
4. Standardization/enhancement of operating procedures

Acceleration of development/creation of high value-added businesses

Application to development/high added value/business analysis

1. Materials informatics
2. Development of solution business/extension to total service
3. Technology/business analysis, competitive analysis
4. Competitive analysis of M&A targets

6. Essence of new business creation

Essence of new business creation under “Cs for Tomorrow 2018”

1. Creating and developing new markets ourselves

- Creating business producing hydrogen by water electrolysis
- Strengthening CO₂ chemistry business (environmental compatibility)
- Creating diverse markets for disinfection by UVC LED
- New sensors (various environmental gas sensors including CO₂ sensor)

2. Leveraging diverse core technologies, business platforms, ability to discern

New business creation through combinations of diverse technologies and businesses

- Technology in Material sector (materials/devices/software)
→ Expansion in healthcare applications, pursuit of residential comfort

3. Creating high value added business by combining different cultures

- Asahi Kasei: Developing components; carefully building technology from the ground up
- ZOLL: Ability to construct business models; creating business by determining targets based on established technology

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.”

AsahiKASEI