June 19, 2025

Kuraray Management Briefing

KURARAY CO., LTD.

Today's Theme

Growth Opportunities of PVOH Resin Business

Hitoshi Kawahara
President and Representative Director

Tomoyuki Watanabe
Director and Managing Executive Officer
President of Vinyl Acetate Resin Company
President of Vinyl Acetate Film Company
Officer Responsible for Electronics Materials Promotion Division

Kazunari Matsumoto
Executive Officer
General Manager of Poval Resin Division

Overview of Vinyl Acetate Chain

Overview of Vinyl Acetate Chain

We manufacture and sell resins, films and fibers with the foundataion of vinyl acetate monomer (VAM)

Vinyl Acetate Chain

Vinyl Acetate Segment

Poval Resin Division

KURARAY POVAL™,
EXCEVAL™,
ELVANOL™
PVOH resin

Eval Division

EVAL™
EVOH resin and film

PLANTIC™
Biomass-derived gas barrier material

Poval Film Division

Optical-use
poval film

MonoSol Division

Water-soluble
PVOH film

Advance Interlayer Solutions Division

Trosifol™,
Butacite™
PVB film

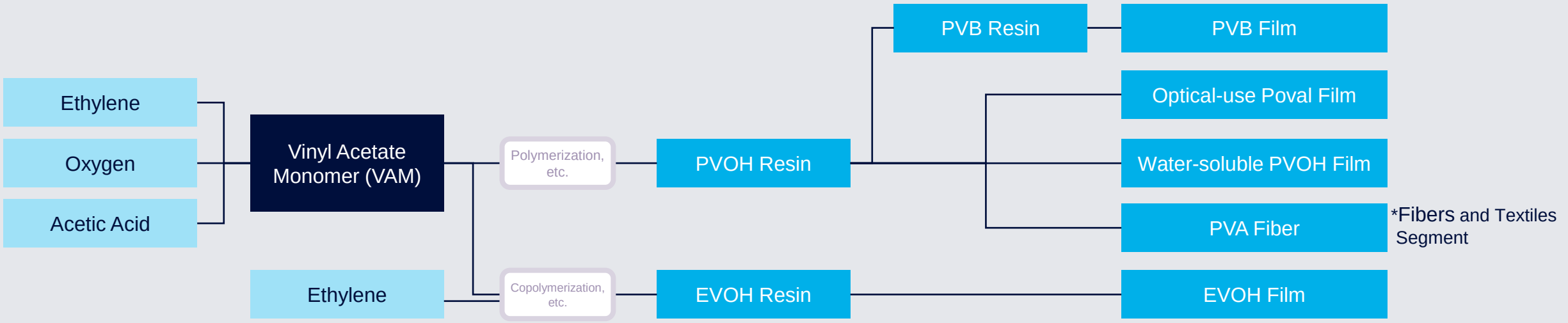
SentryGlas™
Ionoplast interlayer

Fibers and Textiles Segment

Fibers and Industrial Materials Division

KURALON™,
KURALON K-II™
PVA fiber

Integrated Vinyl Acetate Chain based with Vinyl Acetate Monomer (VAM) as the Foundation



Strengths of each value chain

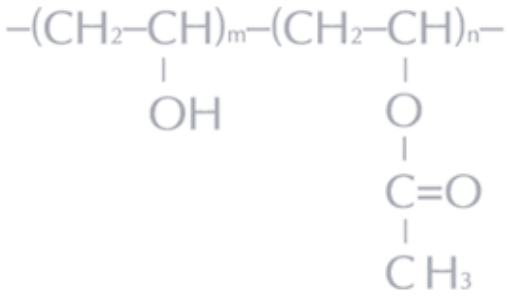
Kuraray strengths and strategies	R&D	Raw Material Procurement	Manufacturing	Logistics and Distribution	Marketing, Sales, and Servicing
	We promote comprehensive R&D throughout the value chain, upstream to downstream, from raw material monomers to resins, films, and other processed products	By increasing the internal production ratio of the base raw material VAM, we have created a framework for stable raw material procurement that also minimizes cost fluctuations	We operate production bases in our main regions of the United States, Europe, and Asia, realizing an integrated production system based on stable product supply through our global supply chain and highly developed technical strengths	We achieve cost reduction and stable supply by appropriate inventory management through a global product management system, together with increasingly sophisticated logistics	We use global collaboration to analyze markets, attract new customers, and offer solutions based on concerted Group efforts

Growth Opportunities of PVOH Resin Business

What is PVOH Resin?

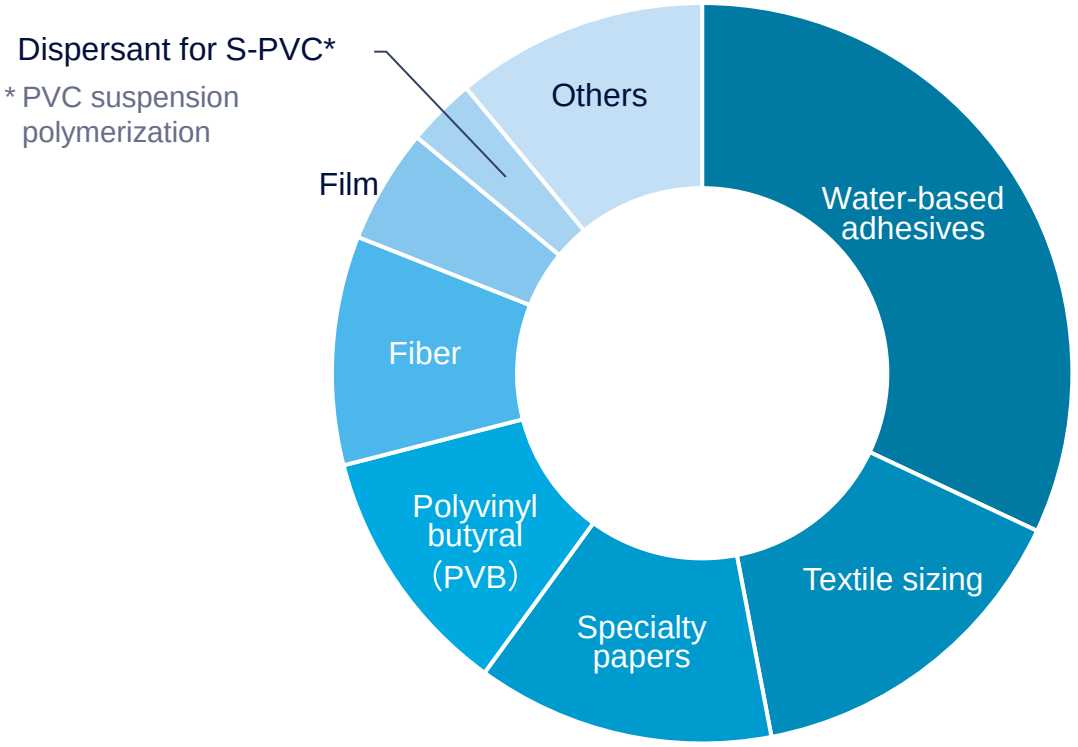
- Abbreviation of polyvinyl alcohol, a water-soluble polymer. Kuraray was the first in the world to successfully industrialize it in 1950
- Among water-soluble polymers, it has the highest level of film strength and is biodegradable in its aqueous state

[Chemical Structure]

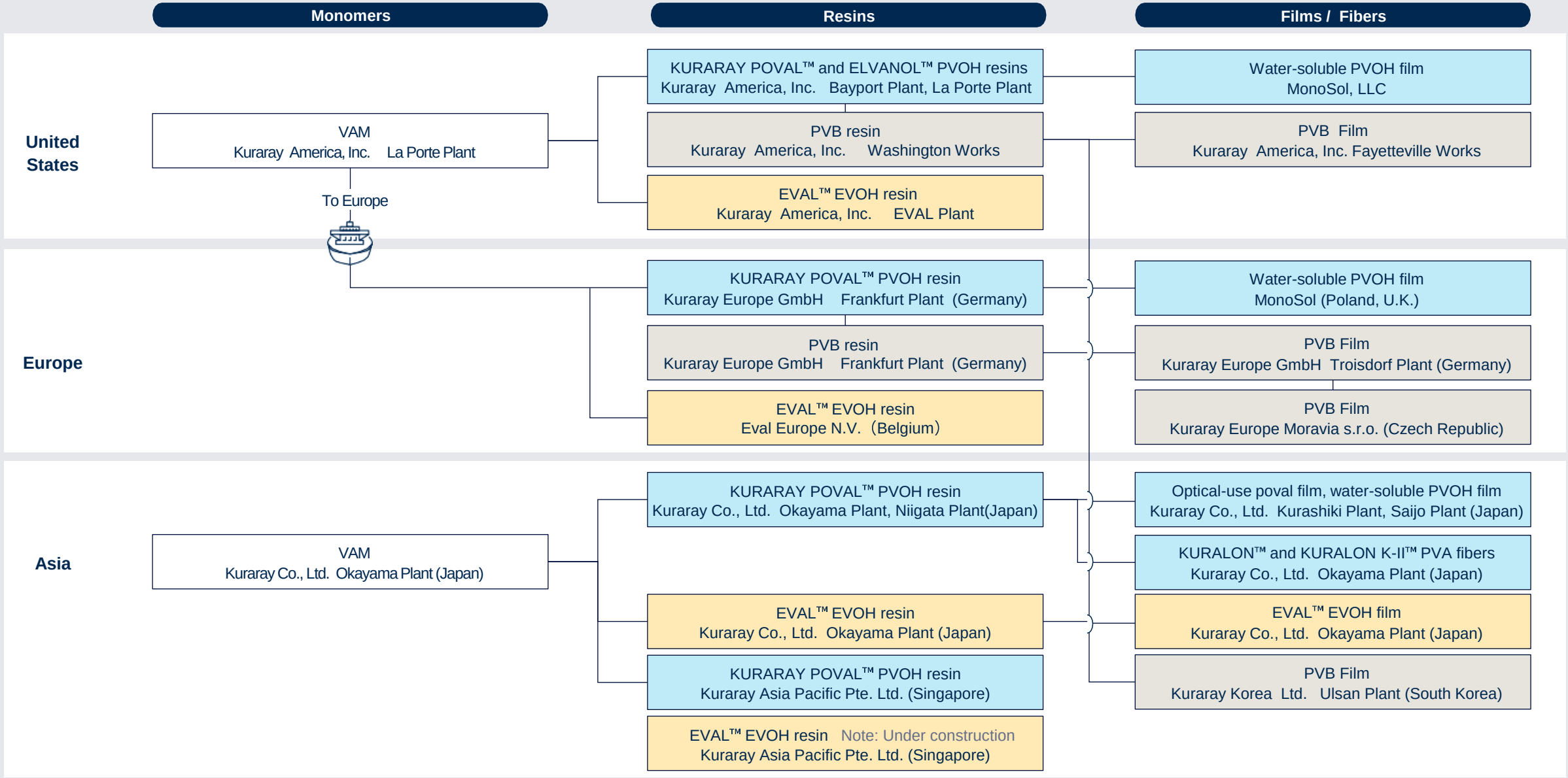


- Through structural control, properties such as solubility, strength, barrier performance, and surface activity are well-balanced, leading to widespread use in essential everyday applications such as water-based adhesives, water-based coatings for specialty papers, and soluble unit dose systems for detergent

Global Demand Quantity for PVOH Resin
(Based on in-house research)



Global Supply Chain



Global Network of PVOH Resin Business

Total production capacity: **361,000** t

- 6 production sites worldwide, establishing a robust supply system including high-performance products
  (2 in Japan, 2 in the U.S., 1 in Germany, and 1 in Singapore)
- Leveraging a global sales network to provide solutions to customer needs
- A new technical center will be established in Singapore to strengthen technical services in the Asian region

Application Development of PVOH Resin

Building

Tile adhesive

Wood adhesive

Emulsion adhesive

Dispersant for S-PVC

Glass fiber mat

Cement reinforcement

Glass lamination

Pulp & Paper

Paper tube

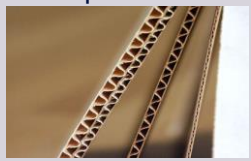
Paper towel

Ink jet paper

Graphical paper

Bank note

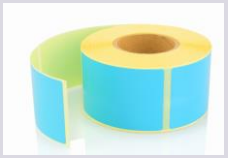
Paper board



Barrier paper

Thermal paper

Release paper



Packaging

Freshness-preserving coating

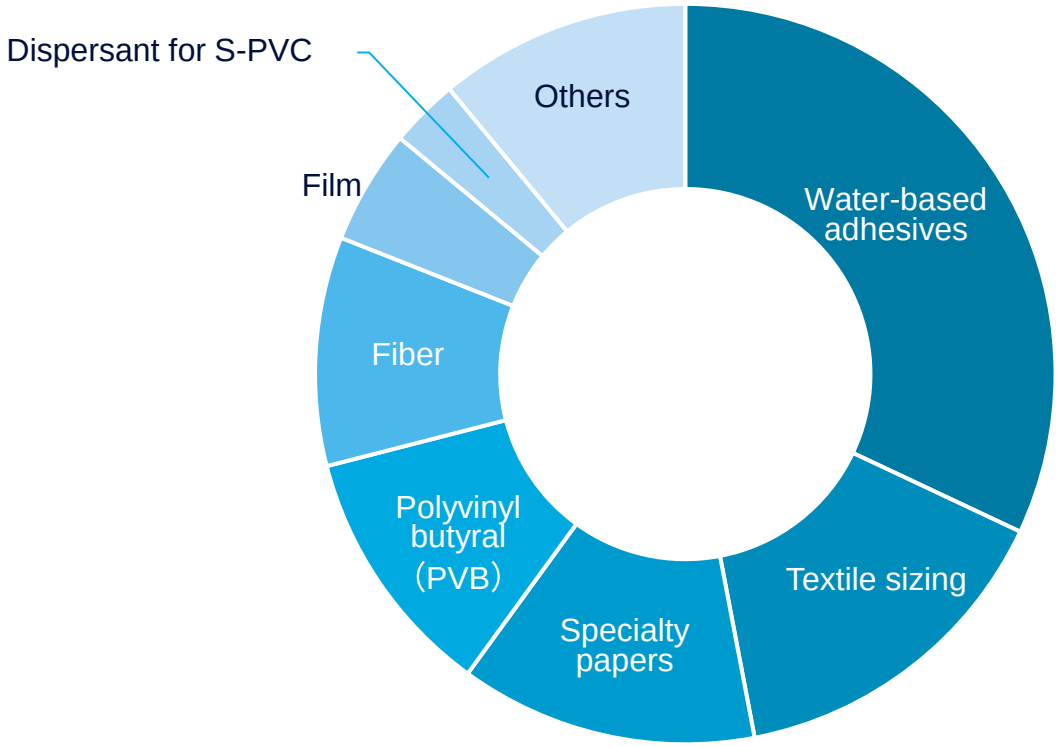
Barrier film

Soluble unit dose systems for detergent

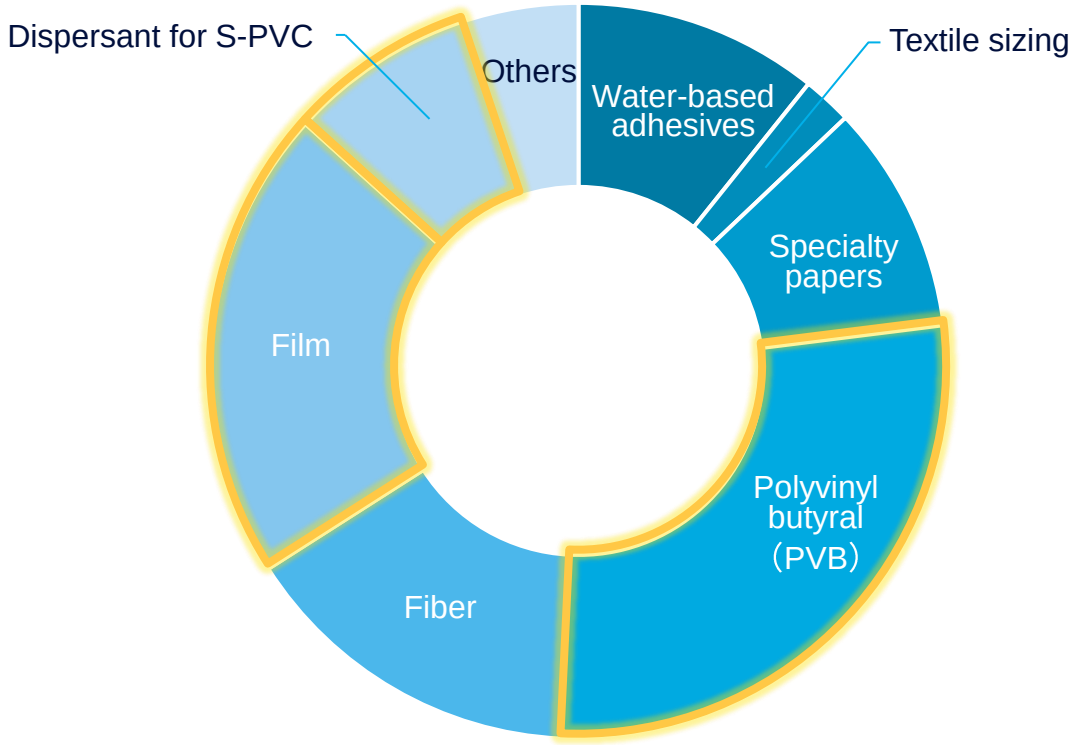
*Due to confidentiality agreements with customers, many applications cannot be disclosed

Breakdown by Application of PVOH Resin

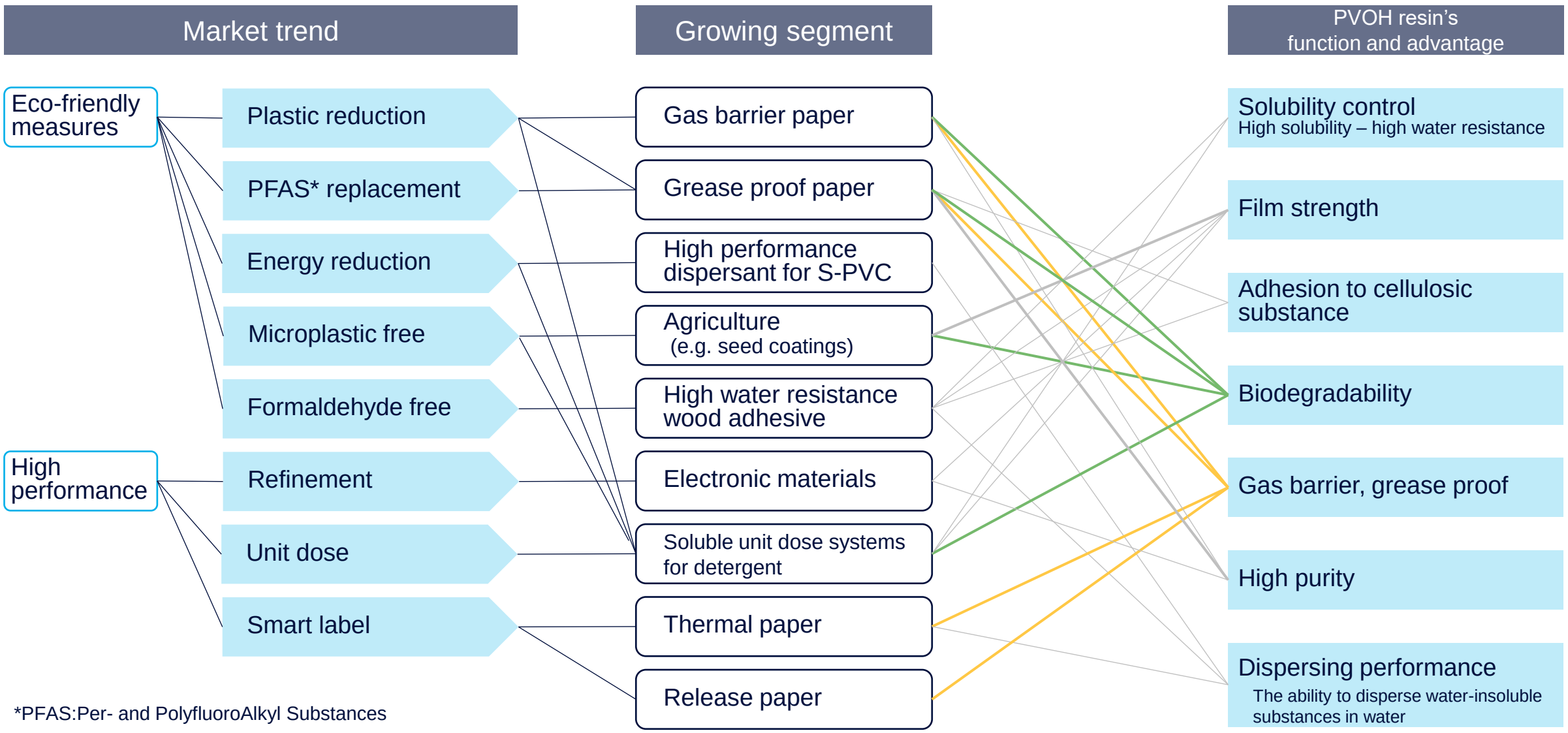
Global Demand Quantity for PVOH Resin
(Based on in-house research)



Sales Quantity Breakdown by Application of Our PVOH Resin
(Including internal transactions)



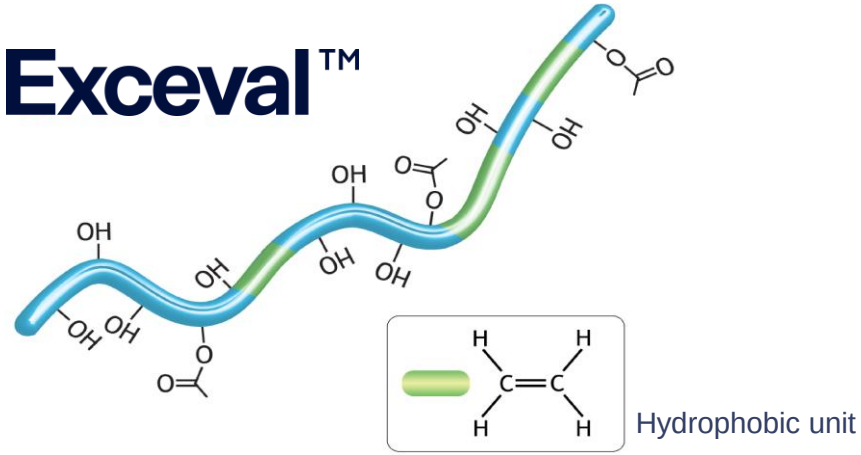
Market Trend and Growing Segment



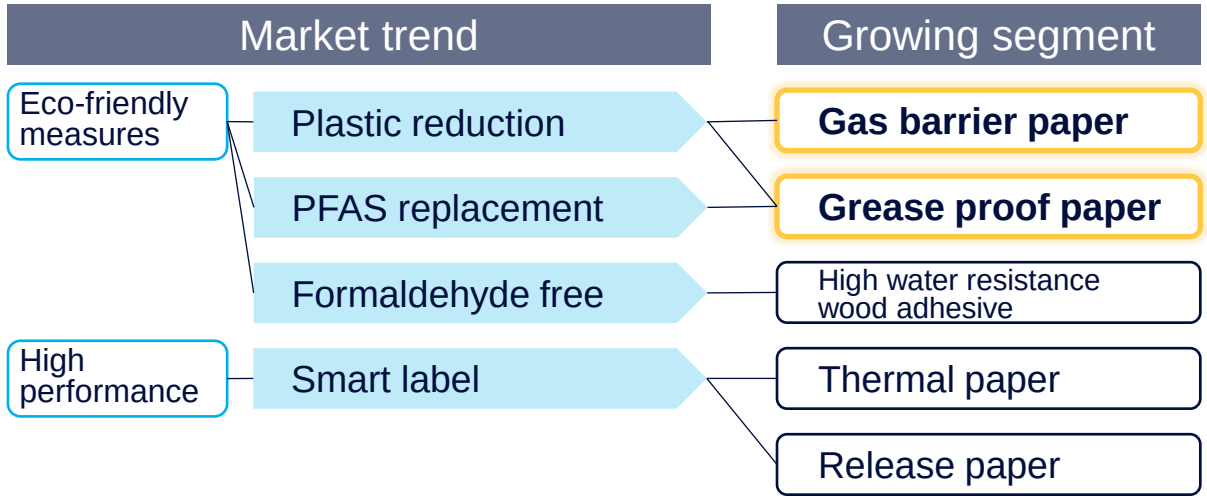
*PFAS:Per- and PolyfluoroAlkyl Substances

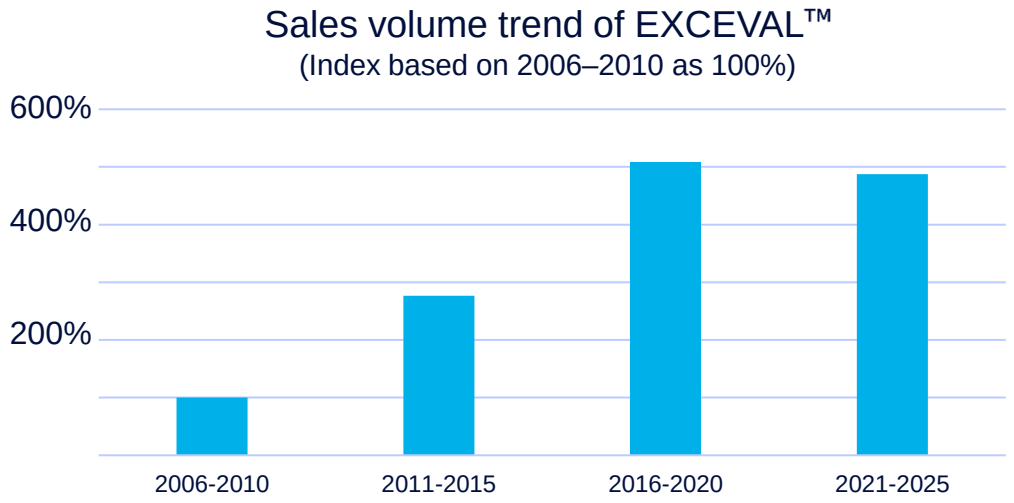
EXCEVAL™ special modified PVOH resin

- Production at overseas began in 2017, accelerating global expansion
- Aiming to enter growing segments and expand the business by developing new products



- Top-level water resistance among water-soluble resins
- Excellent gas barrier properties (oxygen/aroma)
- Outstanding grease poof
- Superior biodegradability in aqueous state
- Compliant with regulations (Food Sanitation Act, FDA, BfR, GB)

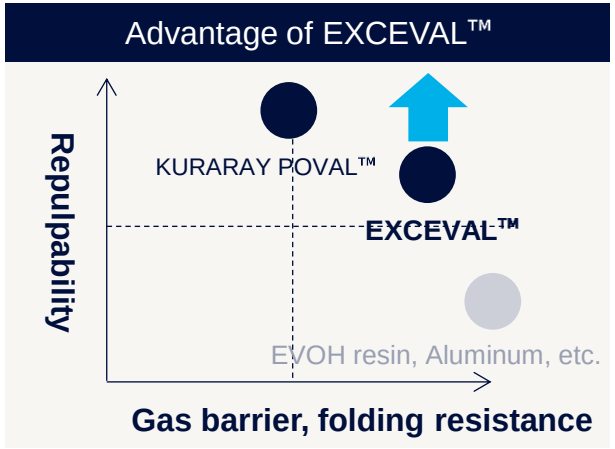




Expansion of EXCEVAL™ to Barrier Paper Application

Gas barrier paper

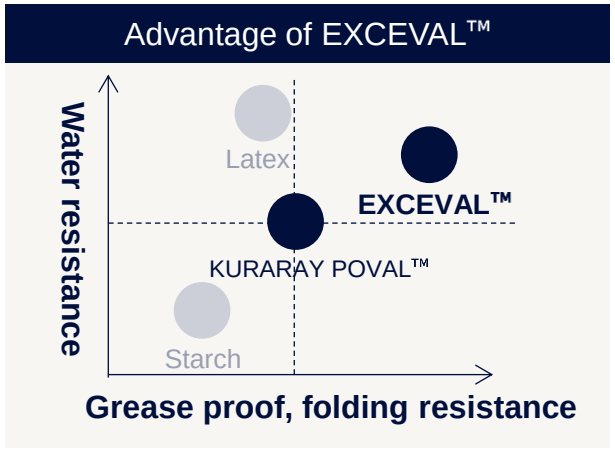
- Adoption is increasing, particularly in Europe, for the packaging of snack foods and chocolates
- By improving repulpability (recyclability), aiming for further adoption



Customer requirement	Desired properties of materials
Plastic reduction	Gas barrier properties for paper
Improved recycling rate	Suitability for paper coating, repulpability
Alternative to fluorinated coatings	Grease proof, water resistance, folding resistance
Non toxic product	Regulatory compliance for food packaging

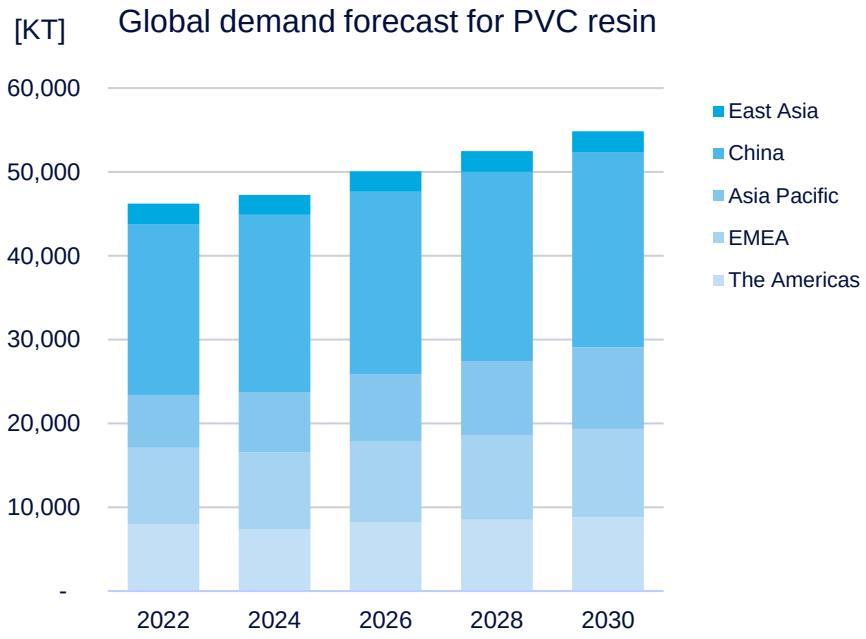
Grease proof paper

- The demand for alternative materials to fluorinated coatings has been rapidly increasing due to strengthened PFAS regulations in recent years
- By proposing grease proof coatings based on EXCEVAL™, adoption is increasing. Aiming for global expansion



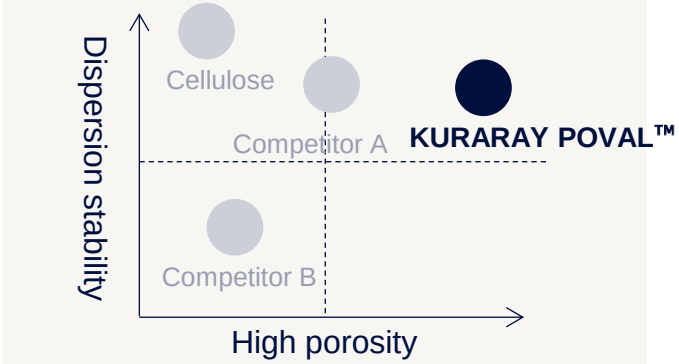
Specialized Grade of KURARAY POVAL™ for Dispersant for S-PVC

- PVC resin is growing globally at CAGR 2–3% as a key material supporting social infrastructure such as water pipes, window frames, etc.
- A specialized grade to provide high porosity PVC particles contributing to reduced drying energy
- With growing demand in the Asian region, adoption is increasing. Aiming to solidify our position in the market through capacity expansion and the launch of new products

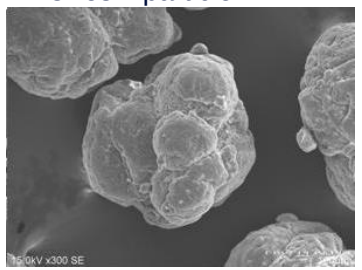


Customer requirement Manufacturing cost reduction	Desired properties of materials
Reduction of cycle time	Superior dispersion stability
Reduced drying energy	Provide high porosity

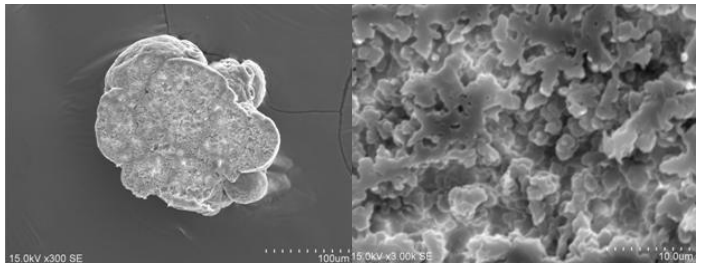
Advantage of KURARAY POVAL™



PVC resin particle



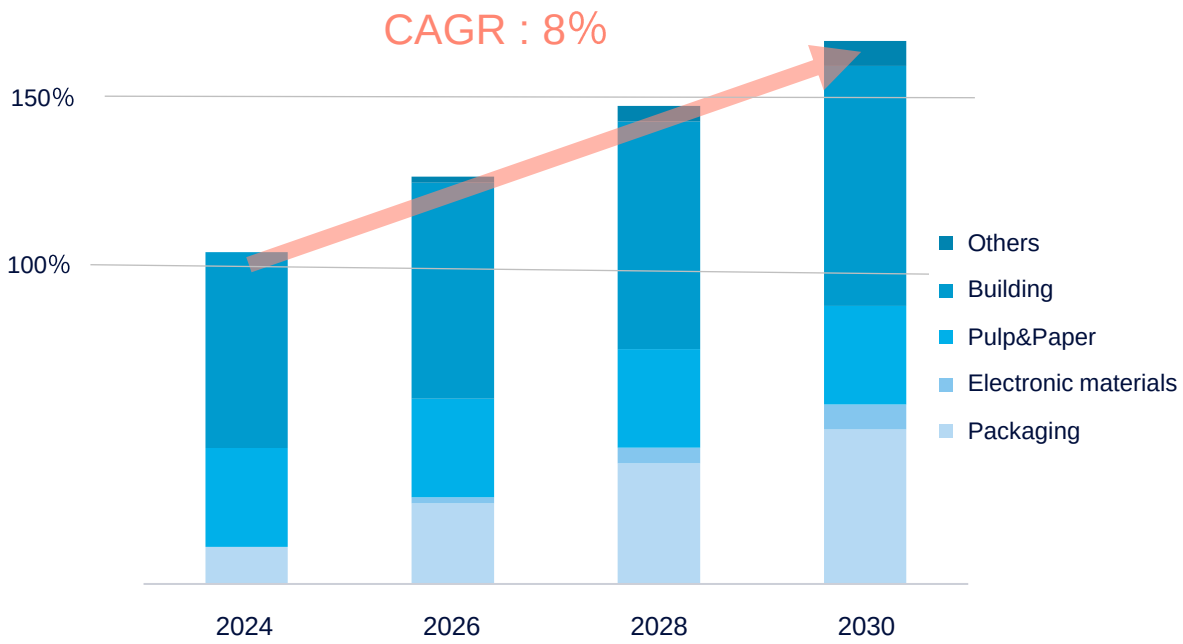
Cross section of the particle



Future Growth Opportunities of High Performance Products

Growth outlook for high performance* products

(Image of sales expansion based on 2024 as 100%)

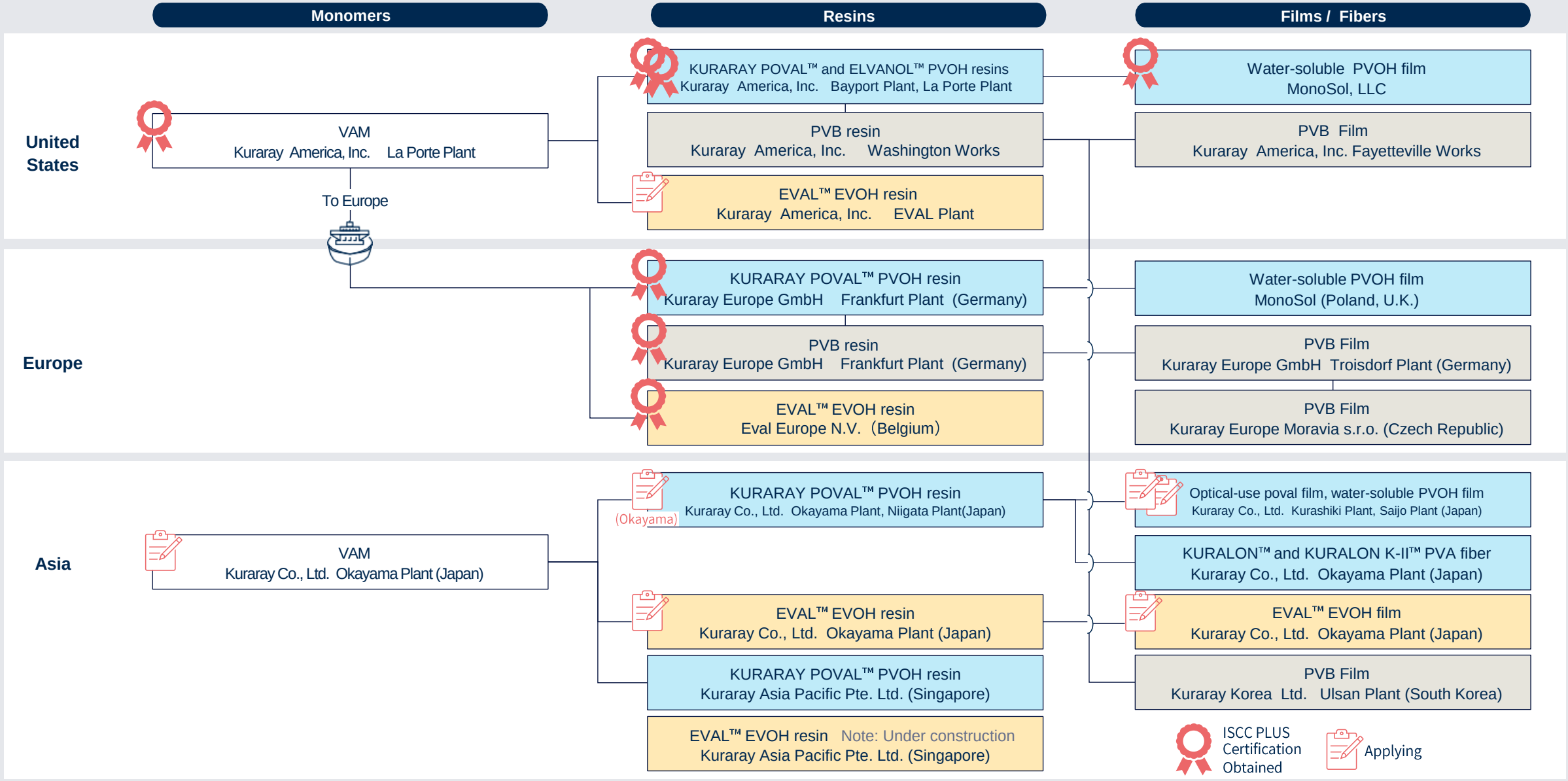


*High performance products: Product grades achieved through Kuraray's advanced technological capabilities, offering high capability and high quality

An compound annual growth rate (CAGR) of 8% is projected for 2024 to 2030

- Steady capture of the growing demand for PVC resin in the Asia region
- Expansion of formaldehyde free and high water resistance wood adhesive
- Expansion of adoption in gas barrier paper and grease proof paper
- Launch of differentiated products for soluble unit dose systems for detergent with improved solubility
- Launch of high performance and high quality products for electronic materials
- Expansion of microplastic free coatings for agricultural use (e.g., seed coatings)

Status of Obtaining ISCC PLUS Certification



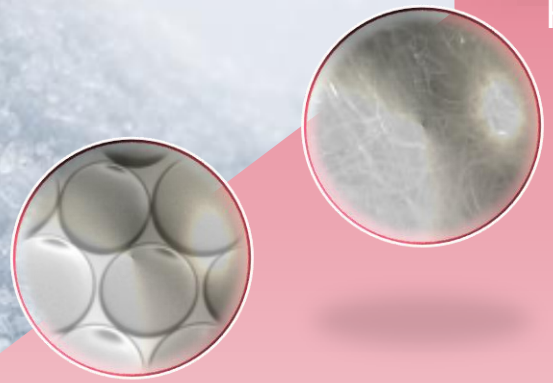
Initiatives for New Solutions

Initiatives for New Solutions

Health Care/QOL

Food Crisis
Global Warming

GHG Reduction
Carbon Neutral



Pharmaceuticals and
Regenerative Medicine

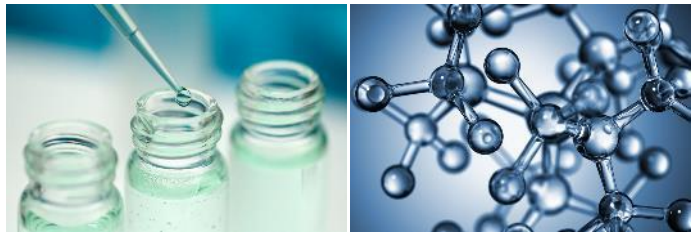
Agriculture

Bio-Raw
Materials

- A paradigm shift is beginning to take place in the medical and food sectors
- Cell-based manufacturing is a new industry

The era of mass culture of cells

Conversion from small molecule pharmaceuticals



Biopharmaceutical
-Antibody drugs and vaccines

Proteins made by **Cells** used as Drugs

Regenerative medicine
-Cell and gene therapy

Cells as Medicine

Red Biotechnology

Transformation of food supply sources

Cellular agriculture
-Cellular foods and cultured meat

Cells as Food

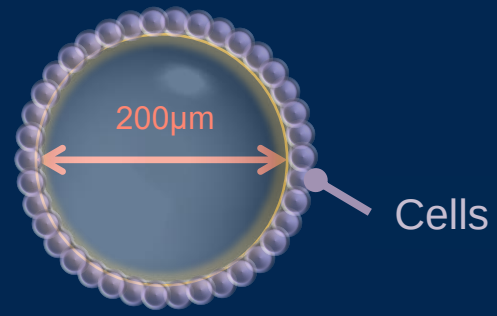
Green Biotechnology

High growth is expected in the cell mass culture market

Expansion to SCAPOVA™ Microscopic Cellular Solidifying Microcarriers

kuraray

Microscopic cellular solidifying microcarriers derived from Polyvinyl Alcohol



Scapova™

PVA Microcarriers for cell mass culture

1 Cultivation efficiency

- Swells approximately 10 times and increases surface area
- Easy to scale up
- Easy to detach and easy to collect cells

2 Safety

- Extremely low rate of microfractures
- Quality control equivalent to GMP*

*GMP:Good Manufacturing Practice

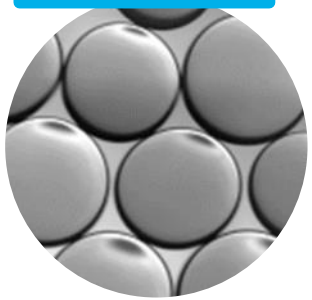
3 Handling

- Ready to Use
  (No washing required before use)
- Cellular observation is possible

Promote product development and peripheral businesses in cell culture-related processes

Cell production process	Cell culture	Cells/culture media separation and recovery	Cryopreservation transport	3D organization (Organs and meat)	Cell use (Transplant/for food)
Elemental technology	Mass culture technology	Recovery of culture fluid reuse / Wastewater treatment	Preservation technology	Cell stacking technology	Cell scaffold technology / Immunoisolation technique

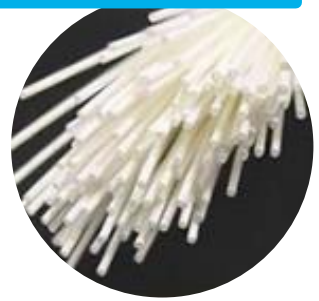
Microcarriers



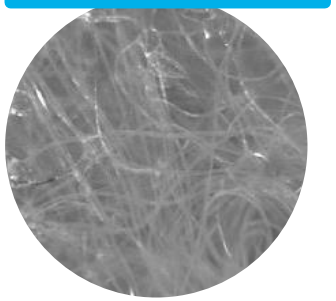
Water treatment technology

Hydrogel

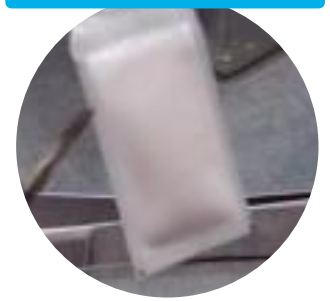
Hollow fiber membrane



Fibers & nonwovens



Implantable devices



- The performance forecasts, outlooks, and business plans described in this document are based on current assumptions and estimates regarding future business environments and economic conditions. Please be aware that actual performance may differ from these projections.