KURARAY CO., LTD.

Management Briefing

Growth Opportunities of Genestar Business

Presenters:

Hitoshi Kawahara	President and Representative Director
Yoji Ikemori	Managing Executive Officer, President of Isoprene Company and General Manager of Genestar Division

December 17, 2024

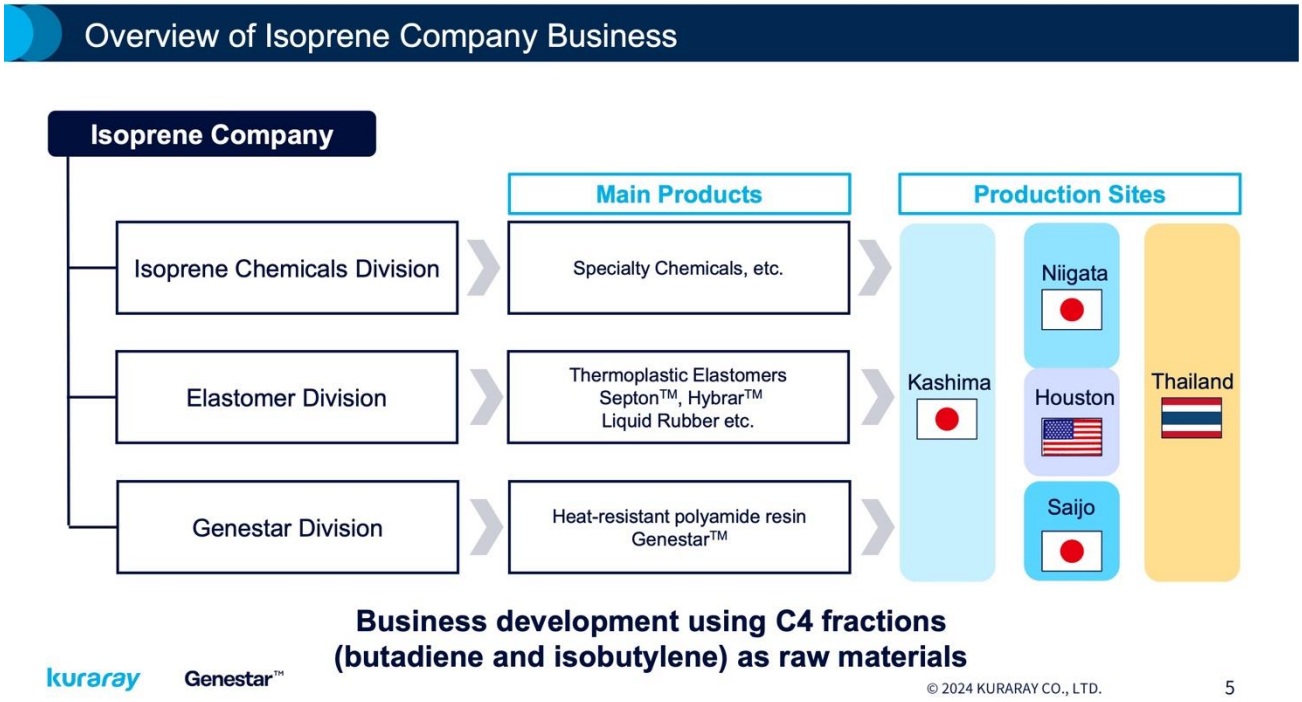


I am President Kawahara.

Today, I would like to discuss growth opportunities for the Genestar business. The Isoprene segment, to which Genestar belongs, started operation of its new Thai plant in February 2023. Three businesses are currently operating and selling in Thailand.

Among them, today's theme, Genestar, is one of Kuraray's core businesses that we expect to grow further in the future, including electric/electronics and automotive applications.

Yoji Ikemori, Managing Executive Officer, President of the Isoprene Company and General Manager of the Genestar Division, will give an explanation, followed by a question-and-answer session.



I am Ikemori, General Manager of the Isoprene Company and General Manager of the Genestar Division. I will explain the growth opportunities for GENESTAR™.

Before I explain GENESTAR™, I would like to give an overview of the Isoprene Company.

The Isoprene Company consists of three divisions, the Isoprene Chemicals Division, the Elastomer Division, and the Genestar Division, and is a company that develops businesses using butadiene and isobutylene, C4 fractions, as raw materials.

The Isoprene Chemicals Division manufactures and sells various specialty chemical products based on our organic synthesis know-how cultivated over many years.

The Elastomer Division manufactures and sells thermoplastic elastomers such as SEPTON™, HYBRAR™, and liquid rubber.

The Genestar Division manufactures and sells GENESTAR™, a heat-resistant polyamide resin, by polymerizing a 9-carbon monomer, which is produced in the organic synthesis chain of the Isoprene Chemical Division.

The Isoprene Company has production sites in Japan, the US, and Thailand, and the production sites for each business are shown on the slide.

Overview of Production Site in Thailand

Place	**: Map Ta Phut, Rayong Province, Thailand** **(WHA Eastern Industrial Estate within the petrochemical complex)**
Start of operation	**: In stages from February 2023**
Production Capacity	**: Kuraray Advanced Chemicals(Thailand)** **Isobutylene derivative MPD (production capacity: 5,000t/y)** **: Kuraray GC Advanced Materials** **Hydrogenated styrenic block copolymer Septon™ (production capacity 16,000t/y)** **Heat-resistant polyamide resin Genestar™ (production capacity 13,000t/y)**
Investment amount	**: Approx. 60 billion JPY (Kuraray's expense: approx. 40 billion JPY)**

※Calculated using the exchange rate as of the date of the investment decision, December 26, 2018)



【New Production Site in Thailand】



kuraray Genestar™

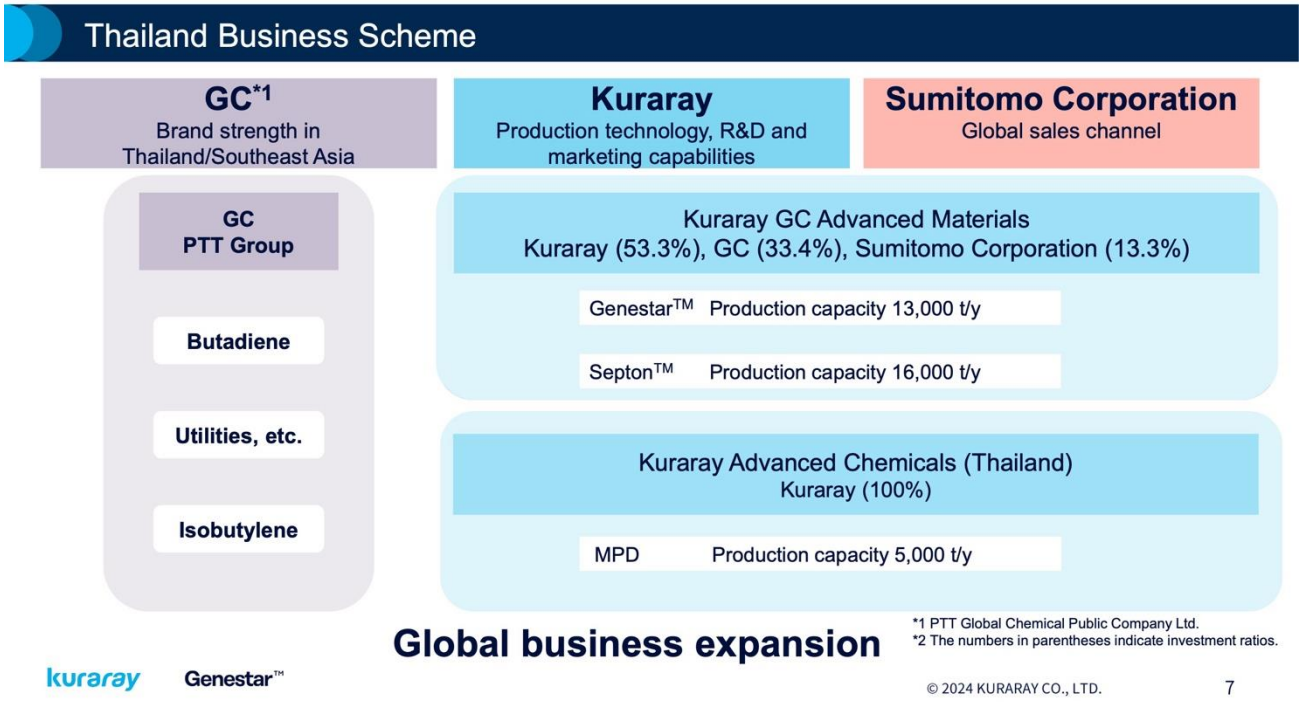
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This is an overview of the new base in Thailand, which started operation last year in 2023.

The new site is located in an industrial estate within a petrochemical complex in Map Ta Phut, Rayong Province, Thailand.

The production items and capacity are, 5,000 tons per year of MPD methyl pentanediol, an isobutylene derivative; 16,000 tons per year of SEPTON™, a hydrogenated styrenic elastomer; and 13,000 tons per year of GENESTAR™, a heat-resistant polyamide resin.

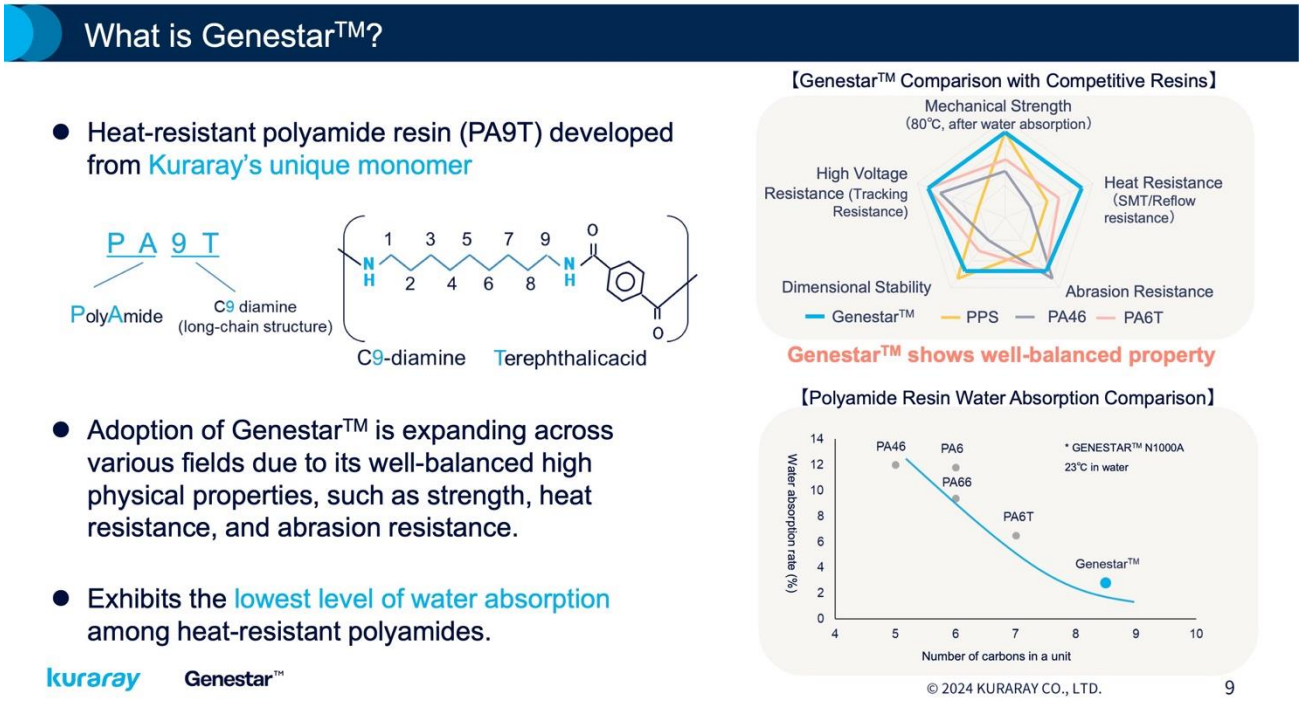
The total investment amount is approximately JPY60 billion at the exchange rate at the time of the investment decision, of which we will bear approximately JPY40 billion.



Thailand Business Scheme.

The basic competitiveness of the new bases in Thailand is based on the stable supply of inexpensive butadiene and isobutylene feedstock and utilities, etc. from GC, a PTT Group company of the Petroleum Authority of Thailand.

The scheme for each product is as follows: GENESTAR™ and SEPTON™ are operated by Kuraray GC Advanced Materials, a three-way joint venture between Kuraray, GC, and Sumitomo Corporation; MPD is operated by Kuraray Advanced Chemicals, a wholly owned subsidiary of Kuraray; and all products are expected to expand globally.



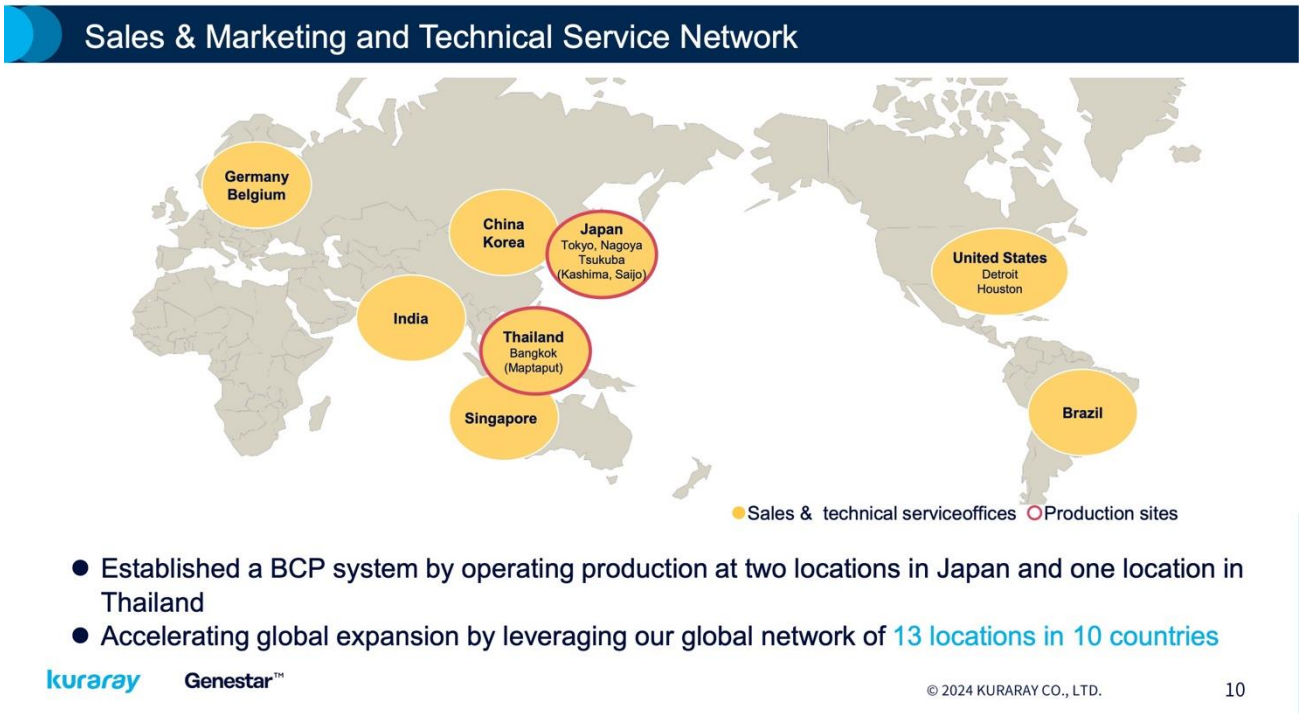
I will now turn to the main topic of today's discussion, the growth opportunities for GENESTAR™.

First, let us briefly explain about GENESTAR™.

GENESTAR™ is a heat-resistant polyamide resin, one of our only-one products, which was developed in-house from raw material monomers based on our proprietary technology. The molecular structure is shown in the material. The resin is classified as a polyamide with a carbon number of 9 and polymerized with terephthalic acid to form PA9T.

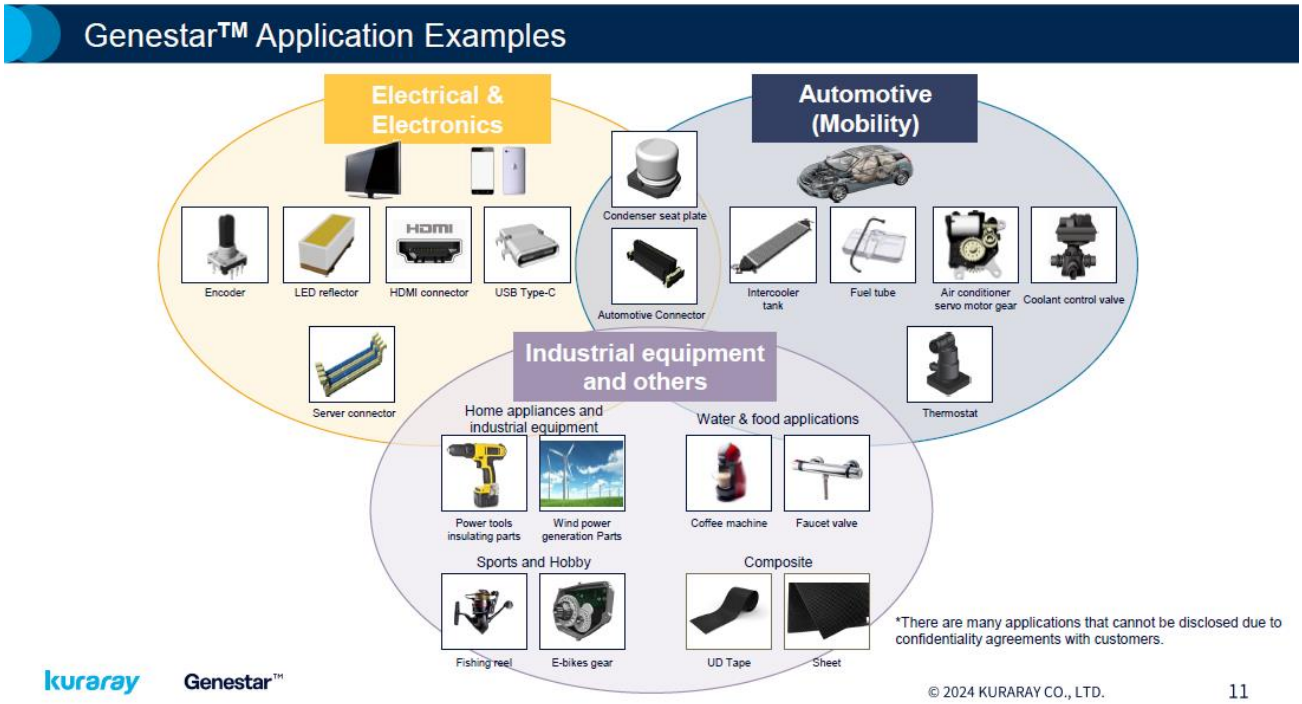
As shown in the radar chart comparing with competing resins, it shows well-balanced and high physical properties such as strength, heat resistance, and abrasion resistance, and its application is expanding in various fields.

The graph of water absorbency also shows the highest level of low water absorbency among polyamide resins, and it has excellent dimensional stability and high voltage resistance characteristics.



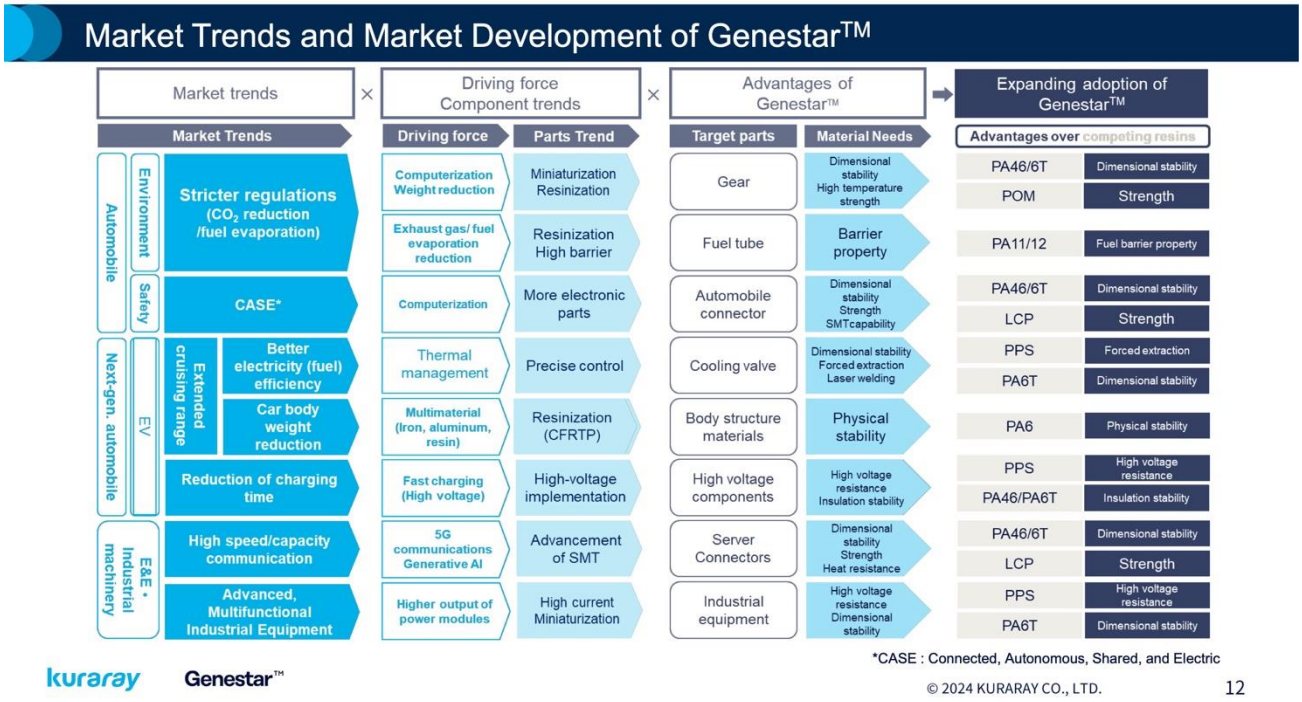
I will explain the global network of GENESTAR™ business.

Sales and technical service centers are indicated in yellow, and production centers are circled in red. As you can see, we have total of three production bases, two in Japan, Kashima and Saijo, and one in Thailand, and we have a complete BCP system. In addition, we are accelerating our global expansion with 13 sales and technical service bases in 10 countries around the world.



Next, I will explain some examples of GENESTAR™ application.

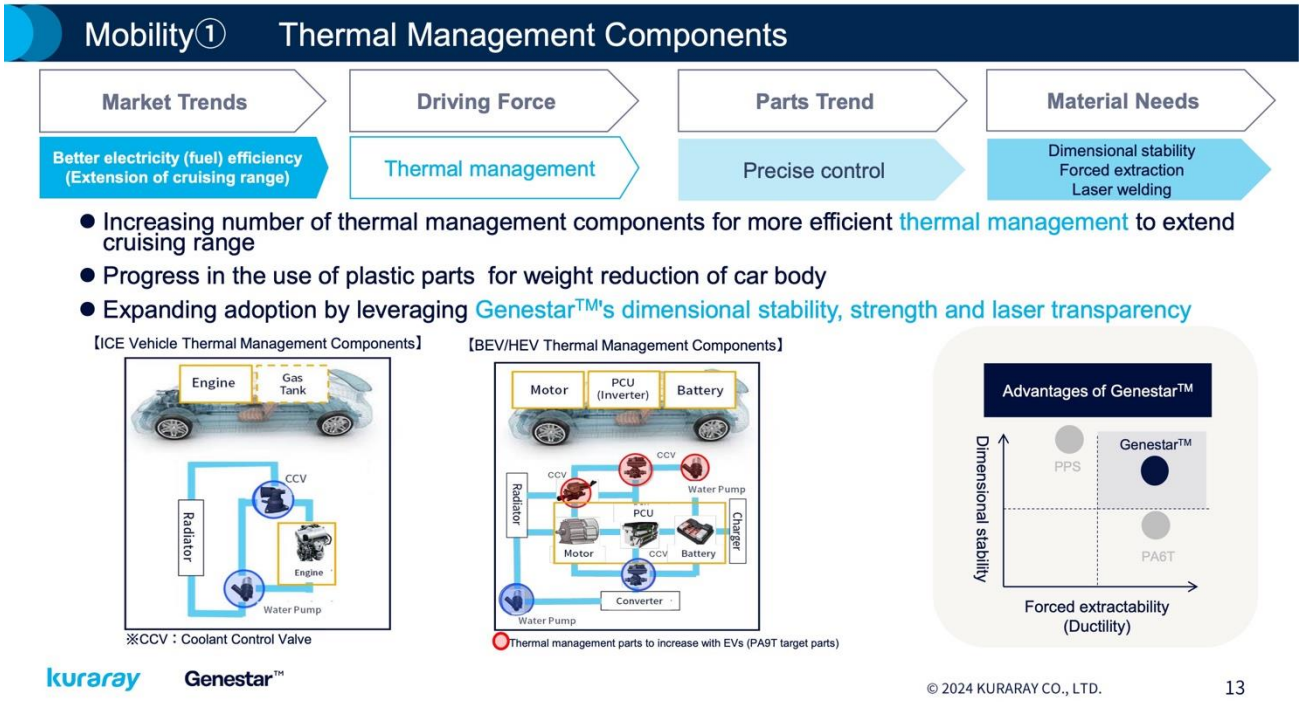
GENESTAR™ is used mainly in the electrical and electronics fields, such as PCs and smartphones, and in the automotive field, such as gears, piping, and functional parts, and sales are expanding globally. In addition, although many applications cannot be disclosed in detail due to confidentiality issues with our customers, we are seeing accelerated adoption in many new applications, including industrial equipment and other applications.



This page provides a representative example of GENESTAR™'s future market development.

As for GENESTAR™, we expect significant demand growth in the future, especially for target parts that take advantage of material characteristics, while responding to market trends in the automotive, electrical/electronic, and industrial equipment markets, and we aim for sustainable growth.

The following pages provide examples of typical applications.

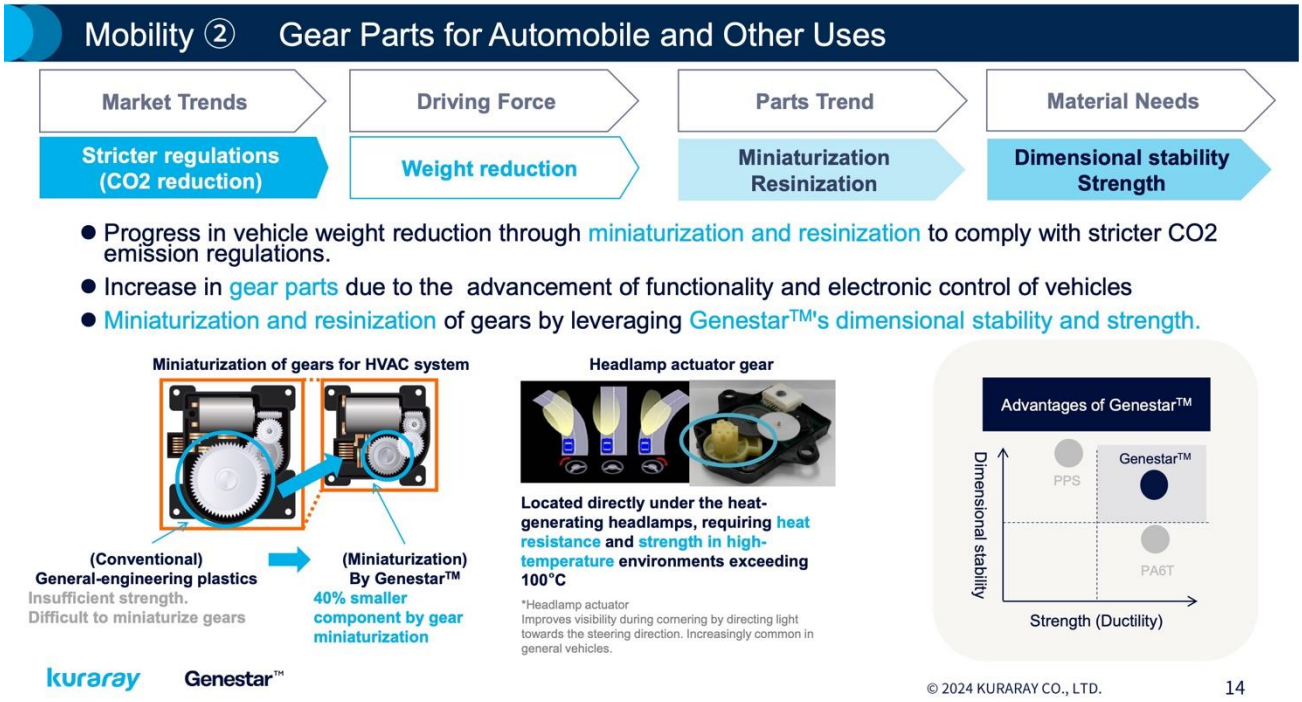


First, we will discuss thermal management components, which are typical target components for mobility.

Thermal management components are components that efficiently manage the heat generated by a vehicle. In particular, EVs and hybrids equipped with batteries require more thermal management components to improve battery efficiency, as indicated by the red circles in the figure below.

Some of the thermal management components still use metal, but the use of resin for these components will also contribute to weight reduction.

GENESTAR™ has excellent material properties against competing polyamides, such as dimensional stability due to low water absorption, and against PPS, such as forcible punching and laser weldability, and is currently being adopted globally at an accelerated pace.



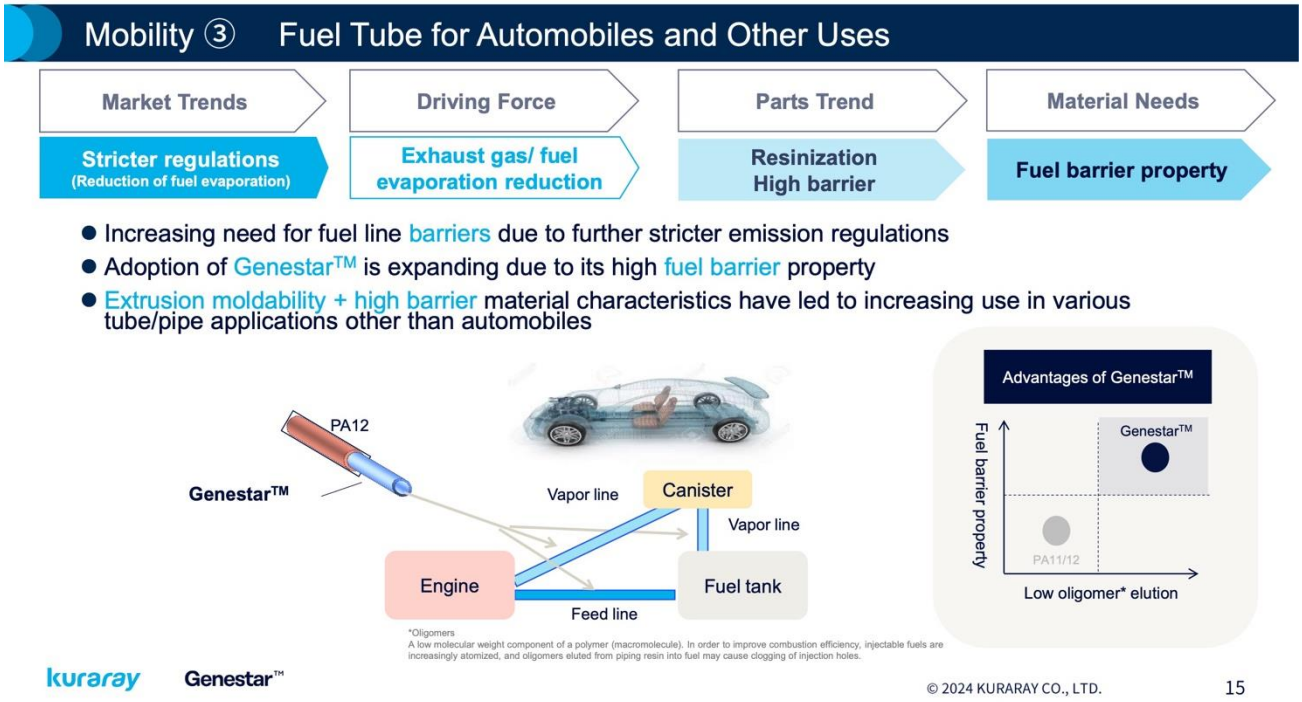
Next, we will explain an example of meeting environmental regulations by downsizing and weight reduction of automotive parts.

Gear components have been increasing due to the higher functionality of cars and the increase in electronic control. CO2 emissions can be reduced by improving fuel efficiency through downsizing and weight reduction of gear components.

Dimensional stability of GENESTAR™ due to low water absorption and its strength in high-temperature environments have led to its growing use in gear applications.

We will provide you with specific examples. In car air conditioner gears, we have achieved a 40% reduction in size and a weight reduction of approximately 10 g per gear by switching from commodity plastic to GENESTAR™. Around 10 parts like those shown below left are mounted per car, and by using GENESTAR™, it is possible to achieve a weight reduction of 100 g per car.

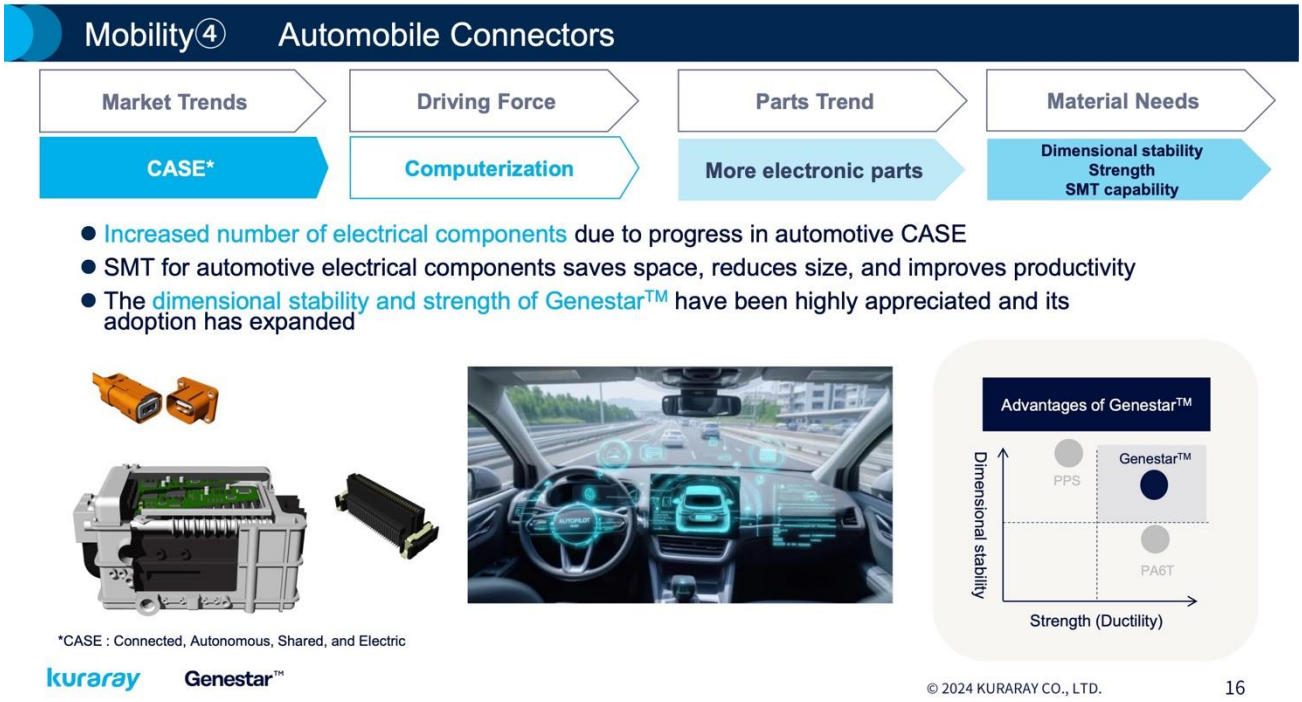
Gears using GENESTAR™ contribute to CO2 reduction by reducing size and weight, and sales are steadily expanding in this application.



The following is an example of compliance with environmental regulations in piping.

As a GHG reduction measure in environmental regulations, the need for materials with barrier properties in fuel lines is increasing year by year. Superior gas barrier properties of GENESTAR™ compared to competing resins have led to its growing use in automotive fuel lines.

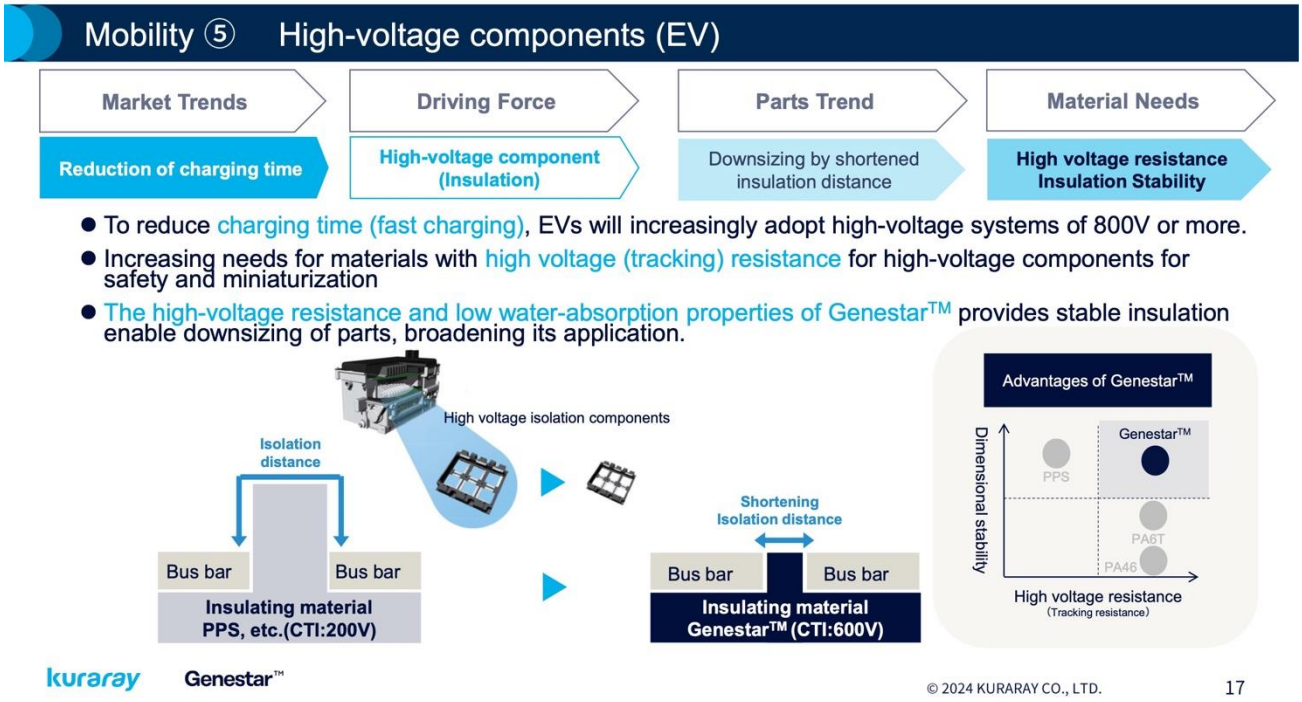
In addition to automobiles, various industries are promoting compliance with environmental regulations, and the need for high-barrier GENESTAR™ is increasing for various applications.



Here we will explain examples of the deployment of electrical and electronic components for mobility.

CASE progress has led to an increase in electrical and electronic components in cars. To achieve high integration of automotive electrical components such as connectors, GENESTAR™ contributes to space saving and miniaturization of automotive components such as power control units, as shown below left.

Compared to competing polyamides, superior low water-absorption properties of GENESTAR™ have been highly regarded for significantly reducing production defects, known as blisters, that occur in customers' production processes, and its global adoption is expanding.

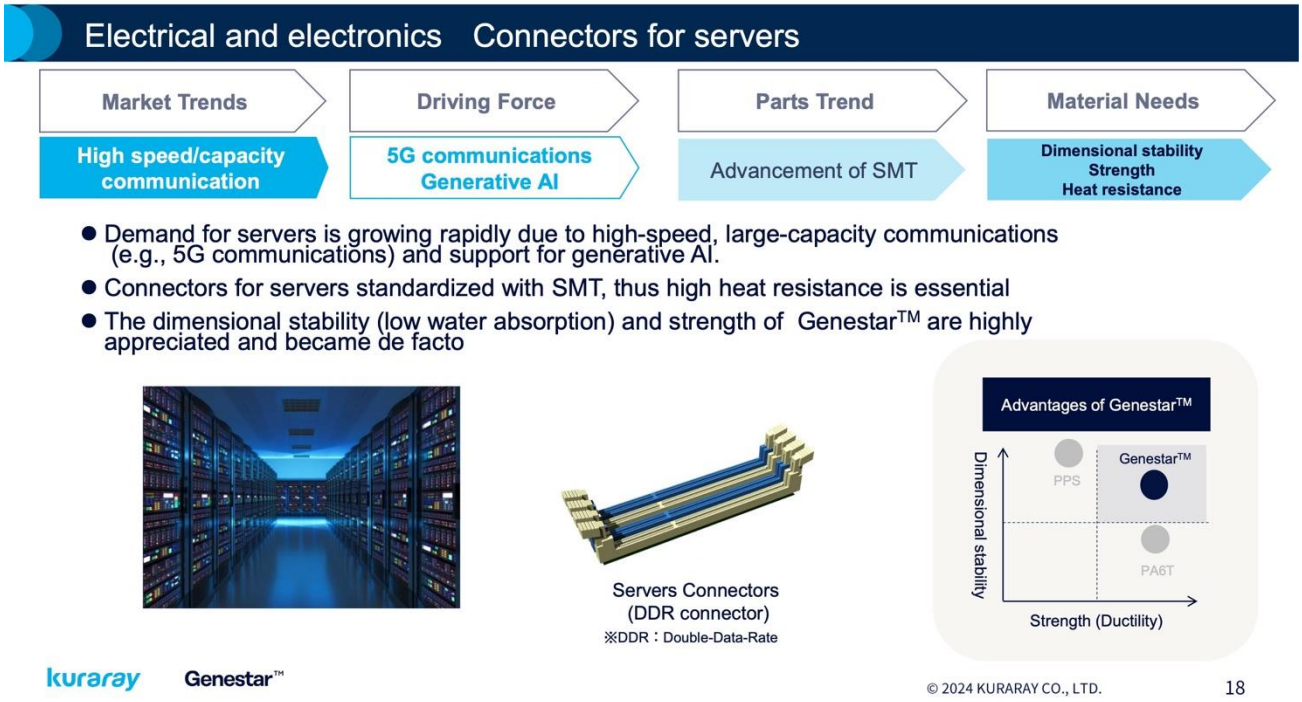


Finally, in the last part of the mobility section, we will explain an example of the deployment of high-voltage components in EVs.

One of the challenges for the widespread use of EVs is the long battery charging time. Various ways to reduce charging times, such as fast charging, are now starting to happen, and an increasing number of newer model EVs are using higher-voltage systems that exceed 800 volts. This trend is expected to accelerate in the future.

Materials are required to have high-voltage resistance characteristics in order to ensure the safety and miniaturization of components with higher voltages. GENESTAR™ has already been highly evaluated by many customers due to the resin's high voltage resistance and its ability to maintain insulation stability due to low water absorption.

The number of high-voltage systems for EVs is expected to further increase in the future, and we anticipate that the adoption of GENESTAR™ will expand accordingly.

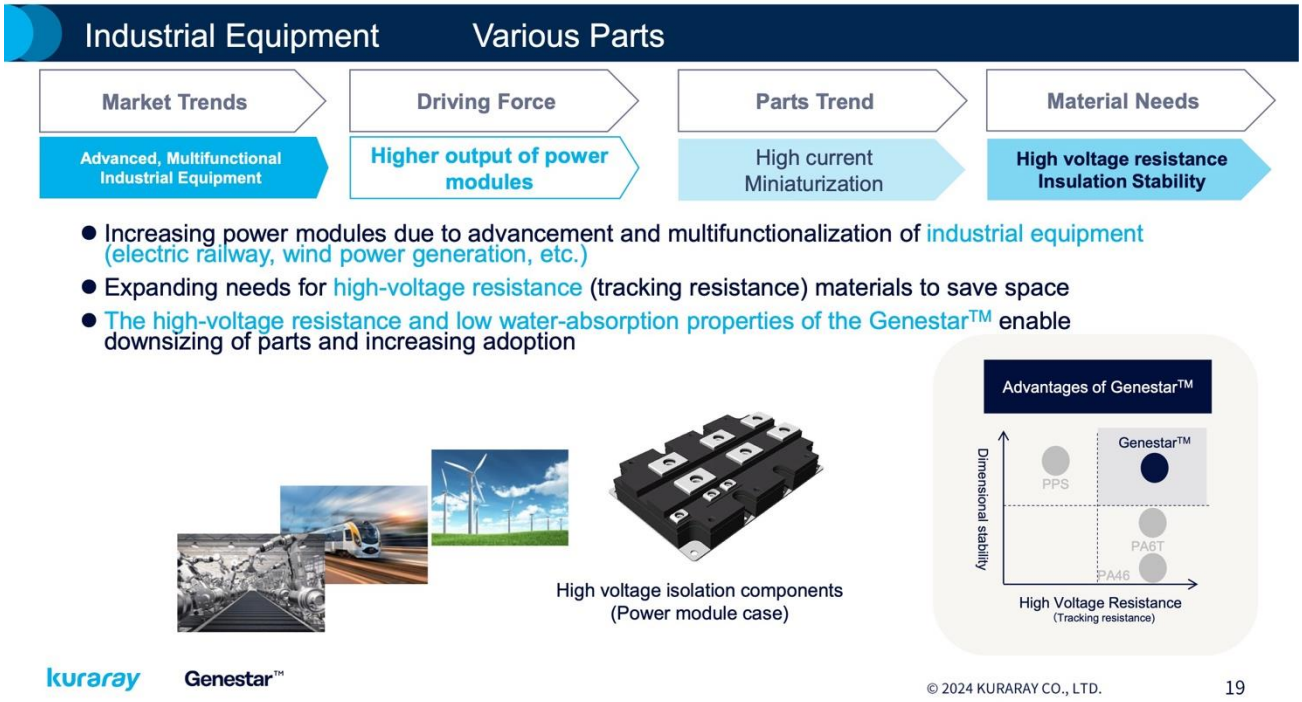


This slide will provide an overview of 5G communications and generative AI-enabled server applications in electrical and electronics.

5G communication enables data transmission at significantly higher speeds and capacities than conventional communication technologies. You may also be aware that data centers are being expanded around the world to accommodate generative AI. Demand for servers used in data centers is currently surging in response to 5G and AI.

These servers use dozens of long connectors, called DDRs, in a single server. In the server production process, a process called surface mounting is standardized, which requires materials to have high heat resistance, low water absorption, and strength.

As explained earlier, GENESTAR™ has an excellent balance of various properties and has established a position as the de facto standard material for DDR connectors. Demand for this application is expected to grow at an annual rate of over 20% in the future.



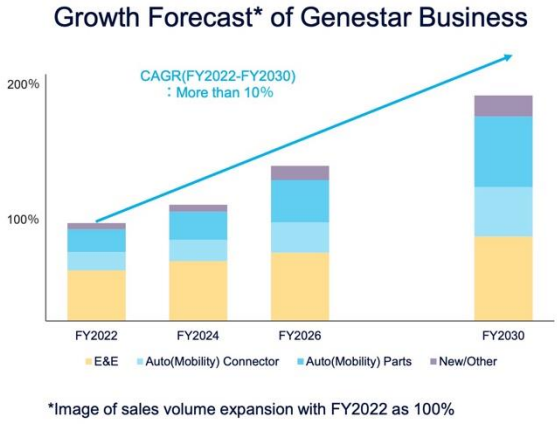
The following section describes the various components of industrial equipment.

Various components of industrial equipment are required to improve efficiency, energy conservation, and reliability, and as a result, components are becoming more sophisticated and multifunctional. To achieve these goals, power modules are increasingly being used, which can perform multiple functions in a single module.

Power modules used in electric railways and wind power generation are subject to high voltages, so the resin must have high voltage resistance properties. In addition, the use of resin with anti-high-voltage characteristics for components can shorten the edge-to-edge distance between components, contributing to the miniaturization of components.

In addition to the resin's anti-high-voltage properties, GENESTAR™'s low water-absorption properties for maintaining insulation stability have led to its growing use in these industrial equipment components.

Future Development of Genestar Business



Achieved CAGR of 10% (FY 2022-2024)
Continued 10% growth is expected

- Increased adoption of auto parts due to weight reduction, electronic control, and electrification(EV)
- Further expansion into global markets including EU, US, and Asia
- Consideration of second phase expansion of Thailand plant

Heat-resistacne	High voltage resistance	**Mobility**	Thermal Management, gear, tube, connector, etc.
Low water absorption (Dimensional stability)	High strength	**E&E**	Connectors for Servers, power modules, etc.
Hydrolysis resistance	Laser weldability	**New**	Home appliances, industrial equipment, faucet, food contact, composites, etc.
Fuel barrier property	Abrasion resistance		

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As I have explained so far, we will continue to leverage superiority of GENESTAR™ to meet the growing demand for target components in promising market trends.

From 2022, which is the starting year of the medium-term management plan “PASSION 2026”, we expect to achieve a CAGR of 10% in volume terms through 2024, and we aim to achieve sustained growth of 10% or more per year from 2025 onward.

That is all from me.