

Business Briefing

Functional Products Business

June 7, 2024

Furukawa Electric Co., Ltd.
Functional Products Division
General Manager, Ryoji Ono

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Projections of future sales and earnings in these materials are “forward-looking statements.”

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FURUKAWA ELECTRIC CO., LTD.

1. 2025 Mid-term Plan - Road to Vision 2030

- (1) Basic policy and product lineup designed to solve social issues
- (2) Market overview (medium-term)
- (3) Policy & strategy
- (4) Net sales & operating income (FY23 result, FY24 forecast, FY25 target)

2. FY24

- (1) Policy & strategy
- (2) Measures to grow the business and improve earnings, and net sales forecast

AT & Functional Plastics Division

Thermal Management Solution & Products Division

Memory Disk Division

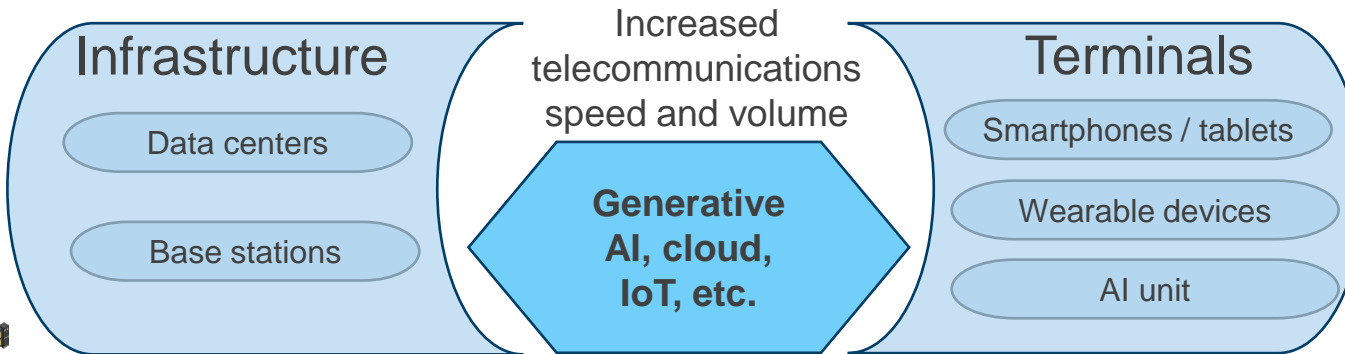
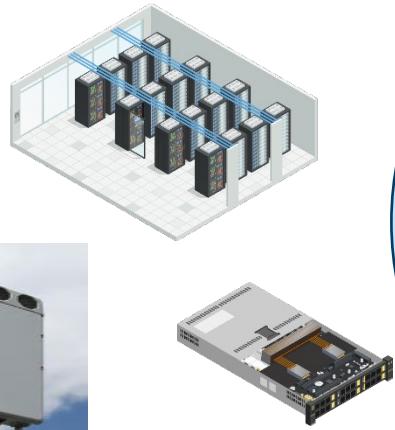
Copper Foil Division

- In FY23, the full-scale market recovery did not materialize, but there have recently been signs of a recovery.
The market is expected to grow in the medium-term.
- In FY24, continue to grow by acquiring new domains and new customers through “high performance” and “well-differentiated” products.
- Establish a system that can immediately respond when the market recovers during FY24.

Functional products market and basic business policy

Create in partnership with the customer, and provide solutions

Support the growing telecommunications and social infrastructure markets by leveraging our proposal and development capabilities for new products that match customer needs



Functional product lineup that supports the growing telecommunications and social infrastructure markets



Aluminum blanks



Heat sinks



Tape for semiconductor process



Electrolytic copper foil



Vapor chamber



Heat sinks for solar power



Green trough



Renewable energy

Eco & Environment

Railroads / roads

Evacuation shelters

Disaster prevention & mitigation

Flooding, water damage



Mat for evacuation shelters



Folding water barrier

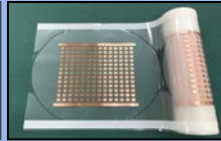
Functional product lineup that supports the growing telecommunications and social infrastructure markets

Broad, characteristic lineup of high performance, well-differentiated products that respond to various social issues

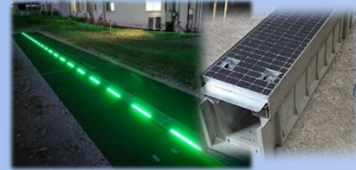
Realize tougher infrastructure/ increased data traffic



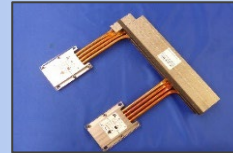
Tape for 5G next-generation devices



Smart cities/ high performance troughs



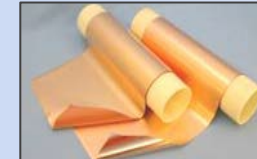
Thermal dissipation products for CPUs



Aluminum HDD blanks



Electrolytic copper foil for printed wiring boards



Clean energy

Realize a carbon free society/ renewable energy



Thermal dissipation products for solar power



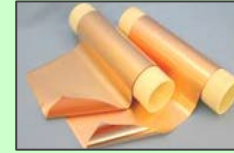
Troughs for slopes



Nikko hydroelectric power station



Solar power at the copper foil plant



Use of renewable energy at the Imaichi Plant



Use of renewable energy at the plant in the Philippines

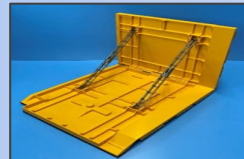
Realize cities that remain functional during disasters/ disaster prevention & mitigation



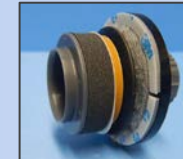
Square EFLEX



Mat for evacuation shelters



Folding water barrier



Exterior wall penetration



Moisture activated waterproofing

Realize a recycling based society/ environmental recycling



Green trough



Electrolytic copper foil



EFCELL packaging material



EFCELL office supplies



Foam recycling: EFLEX filler



Social issues

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE



7 AFFORDABLE AND CLEAN ENERGY



11 SUSTAINABLE CITIES AND COMMUNITIES



3 GOOD HEALTH AND WELL-BEING

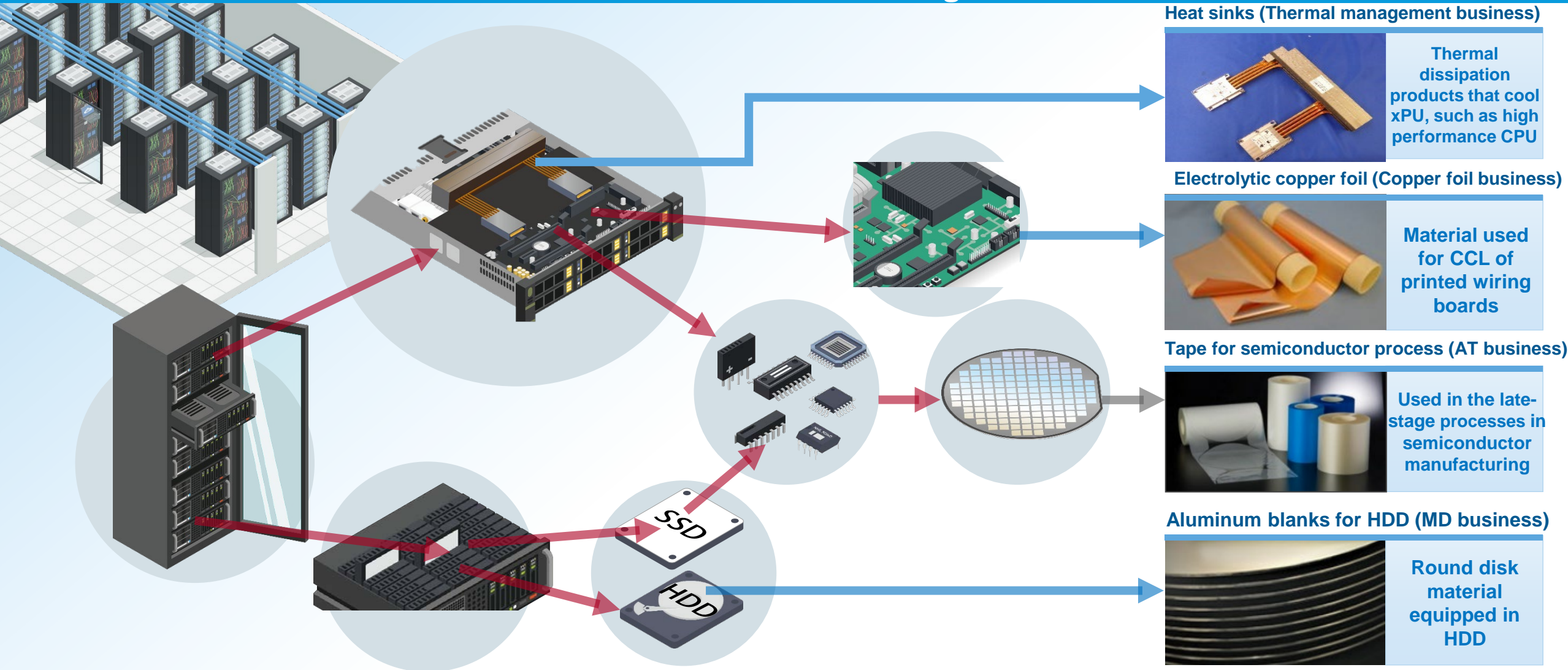


12 RESPONSIBLE CONSUMPTION AND PRODUCTION



Functional Products – Example of use at data centers

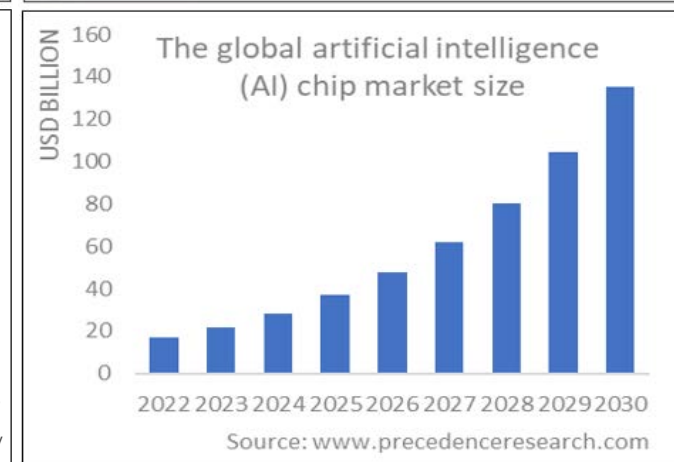
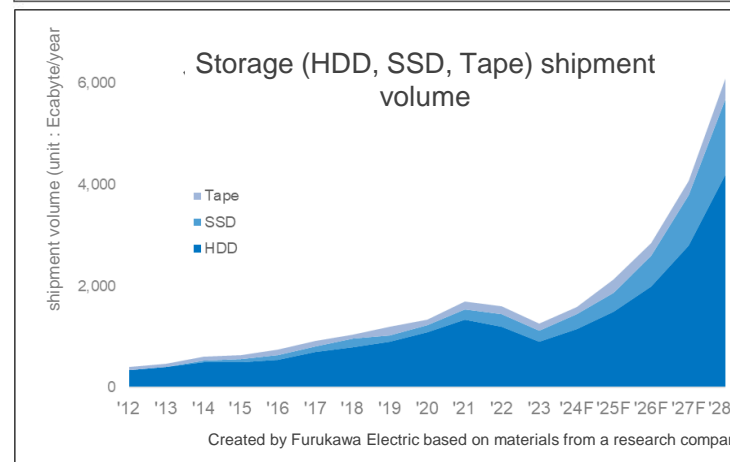
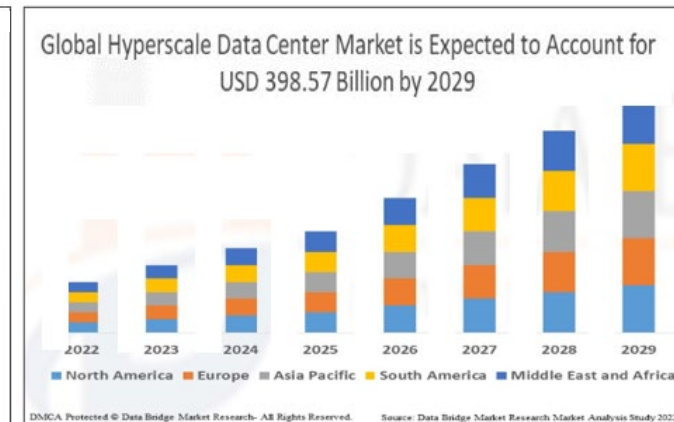
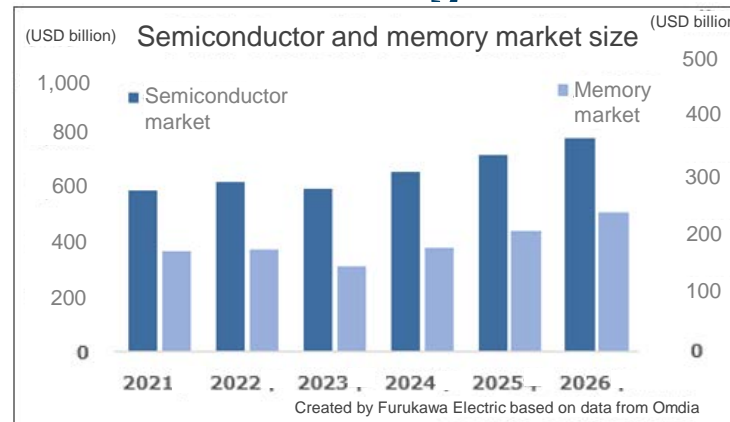
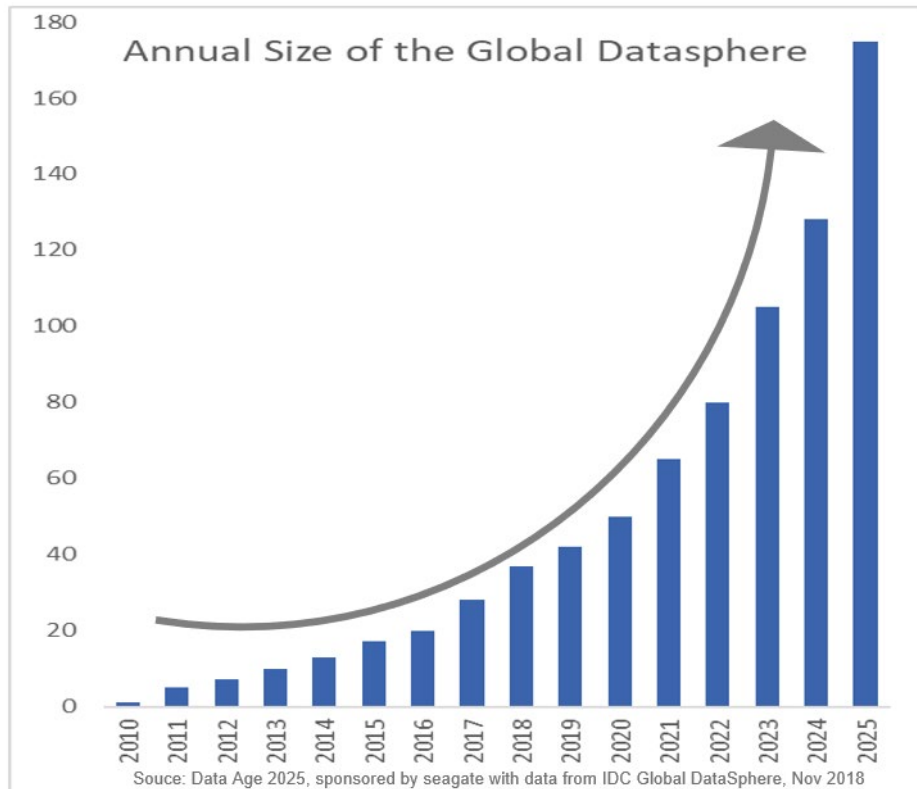
The products of the Functional Products business are used in many parts of high performance servers in data centers within the global market



Focus on the trend markets, and provide “well-differentiated” , “high performance” products to the related markets

Although the market is currently undergoing a correction, the volume of data generated worldwide and data traffic will increase in the future

Most functional product businesses and product markets will grow in the medium-to long-term following the increased data volumes



Provide electronics products with an awareness of “high performance” and “well-differentiated” to growth markets

1. Continue to develop products aimed at swiftly responding to the changing customer requirements, provide electronics products with an awareness of “high performance” and “well-differentiated” to growth markets and support the telecommunications and social infrastructure markets
2. Contribute to realizing a sustainable society and secure the next generation profit base, by “differentiation” aimed at solving social issues as leveraging the new products directed at Society 5.0 for SDGs and creating a framework for becoming carbon neutral.

AT & Functional Plastics business

- Solve the technological issues arising from the increasingly sophisticated and complex semiconductor manufacturing processes, contribute to the evolution of semiconductors and support telecommunications and social infrastructure.
- Contribute to the renewable energy market and increasing national resilience through next-generation infrastructure (underground conduit system, etc.) and disaster prevention & mitigation products.
- Support 5G/6G infrastructure through high performance foam products.

Memory Disk business

- Based on the technology accumulated over the past 50 years, continue to provide high performance materials to customers.
- Support safe, high quality storage infrastructure worldwide through the customer.

Thermal Management Solution & Products business

- Continue to provide well-differentiated cooling solutions for maximizing the potential of semiconductors that continue to generate more heat.
- For the heat generated from semiconductors, provide next-generation cooling solutions, including water cooling and liquid immersion, and help customers save energy and decarbonize. Work to introduce clean energy at the main manufacturing sites.

Copper Foil business

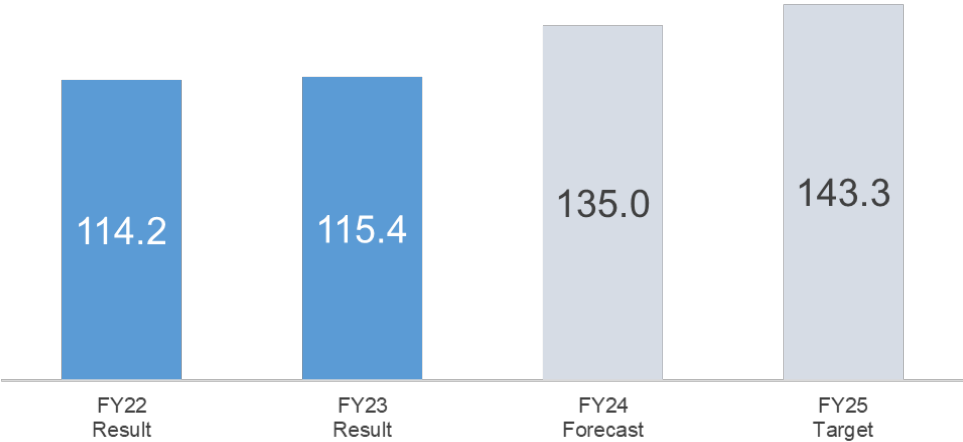
- Along with supplying highly reliable copper foil with characteristic features to CCL manufacturers and battery manufacturers, also supply to new customers in new domains.
- With the aim of developing new applications for electrolytic copper foil, create in partnership with customers in new domains in addition to existing customers.

Net sales and operating income during the 2025 Mid-term Plan

Net sales

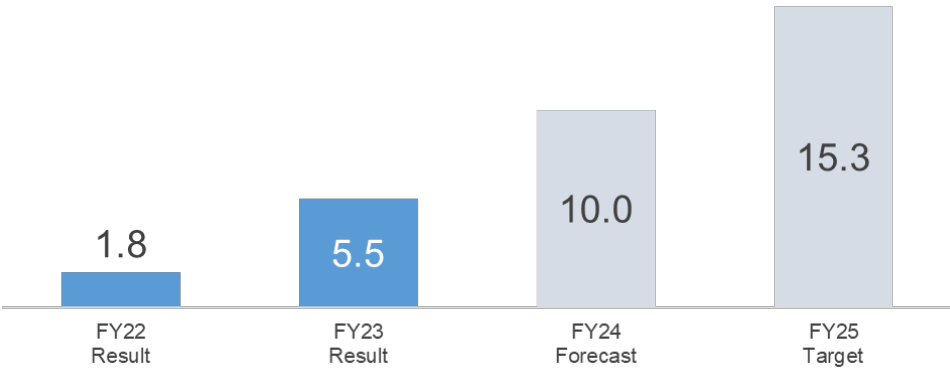
*Deconsolidated TOTOKU ELECTRIC CO., LTD. from FY22 Q4

(JPY billion)

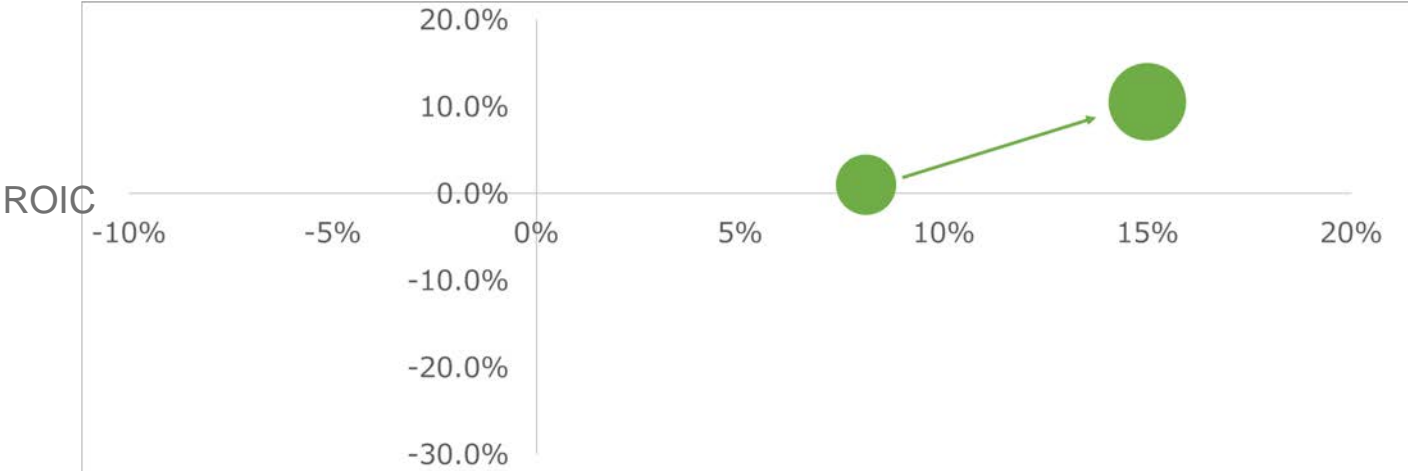


Operating income

(JPY billion)



ROIC (FY23 result → FY25 target)



Net sales CAGR

Vertical axis: Net sales CAGR (FY22-23→FY22-25)
Horizontal axis: ROIC (FY23→FY25)
Bubble: NOPAT (FY23→FY25)

- * Net sales in FY25 used to calculate net sales CAGR have been adjusted based on the **average** exchange rate in the FY24 forecast
- * CAGR: Compound annual growth rate, ROIC: Return on invested capital (after taxes)
NOPAT: Calculated as net income + interest expenses after tax in accordance with IFRS
- * Deconsolidated TOTOKU ELECTRIC CO., LTD. from FY22 Q4

Functional Products segment

- In FY24, continue to achieve growth by acquiring new customers in new domains through “high performance”, “well-differentiated” products
- Establish a system that can immediately respond when market demand recovers this year

AT & Functional Plastics business

- Along with preparing a system for stable supply directed at the market recovery, aim to increase sales by promoting the development of technology for cutting edge processes, expanding conformance to the specifications for new projects and horizontal deployment.
- Roll out new developments in new domains that utilize next-generation infrastructure and foam technology, and promote new proposals for the disaster prevention & mitigation and renewable energy markets.
- Work to develop and increase sales of environmentally-friendly products.

Thermal Management Solution & Products business

- Through the provision of well-differentiated solutions and services, continue to contribute to solving social issues as a core partner, and increase topline sales.
- Quickly grasp the risks and opportunities based on global, market and customer trends, and increase profits by swiftly and proactively formulating and executing specific measures.

Memory Disk business

- Following the need for thinner blanks, aim to continue launching well-differentiated new materials onto the market.
- Increasing sales volumes of the high value-added thin blanks is KSF in the short and medium term, so continue to increase orders.

Copper Foil business

- As a true partner to customers, “quickly” develop new products that respond to changing customer requirements, and continue to provide new products with an awareness of “high performance” and “well-differentiated” to future growth markets.
- Based on a strong awareness of carbon neutrality, introduce renewable energy and actively work to save energy.

AT business and Functional Plastics business

Contribute to the further evolution of semiconductors by solving the technology issues for cutting-edge processes

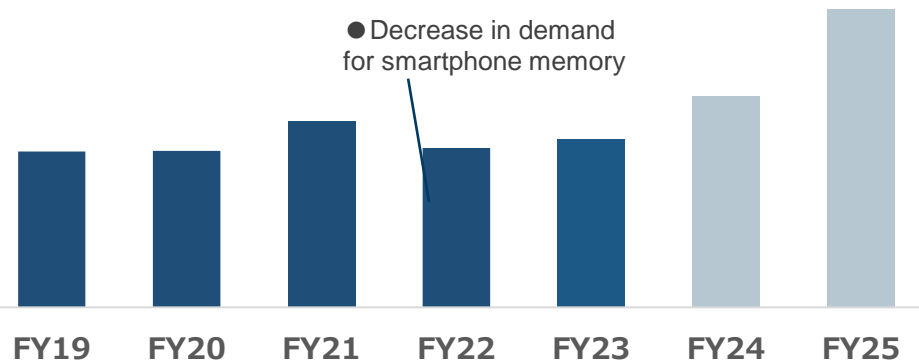
Technology trend	Issue faced by the customer		Solution provided by Furukawa Electric
Thinner wafers <ul style="list-style-type: none"> Wafers are becoming thinner in order to increase memory performance through chip stacking In response to thinner wafers, a laser is used when cutting the wafer 		As semiconductor chips become thinner, chipping occurs more easily during grinding	<p>Optimize the conditions to prevent cracking by controlling the base film and adhesive properties</p>
		Standard tape has low transparency, making it impossible for the laser to cut the wafer	
Ultra-high bumps <ul style="list-style-type: none"> Use of FOWLP packages that enable increased chip density and high speed transmission is becoming more widespread. BG tape is attached to the surface of ultra-high bumps (solder bumps) and back grinding is conducted 		If the tape does not follow the contour of the bumps closely, thickness precision is reduced and water may enter during grinding	<p>Tape with excellent transparency makes it possible to cut the wafer with a laser</p>
		Heat generated from increased chip density builds up in the package and reduces performance	
Heat generation <ul style="list-style-type: none"> Increased chip density results in larger amounts of heat generated 		Dissipate heat from the semiconductor chip using adhesive film with good thermal conductivity	

Establish a system for stable supply directed at the semiconductor market recovery and demand growth

□ Medium-to long-term demand growth in the semiconductor market

Sales of Furukawa Electric tape for semiconductor process

● Decrease in demand for smartphone memory



*Unified based on the new accounting standards

- From the second half of FY22, the global semiconductor market has been weak centered on memory for smartphones
- Market is expected to gradually recover from the second half of FY24 and continue to grow long-term thereafter

★ Establish a system for stable supply by increasing production capacity

Build the No 2 AT plant at the Mie Works

CAPEX: About JPY 7.0 billion (FY22-FY25)

September 2022: Commence construction

May 2024: Open the plant and start trial of mass production

April 2025: Plan to start mass production

- Reuse waste heat energy
- Install solar power

And implement other measures to reduce the environmental impact of the manufacturing process



Contribute to building next-generation infrastructure

Total route design through systemized conduits

Square EFLEX



EFLEX Through



ROM-Box

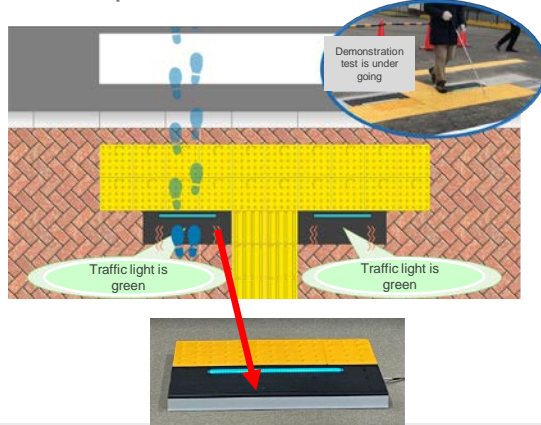


Develop new products directed at the next-generation society

New conduits



System to support high performance cross walks



Develop new markets and high performance products that use foam technology

Materials for base station



Radome

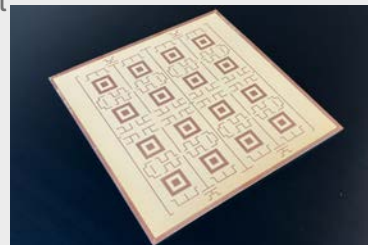
Radio waves

Antenna

Telecommunications base station

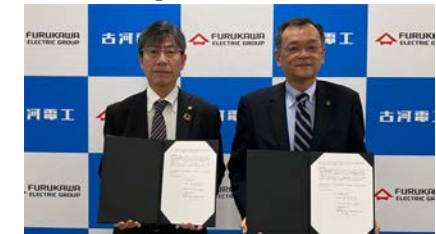
Phase shifter

High frequency circuit board

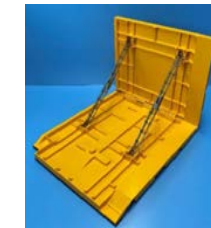


Contribute to society through the development and sales of disaster prevention & mitigation products

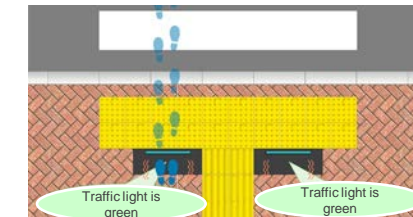
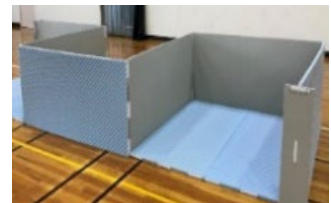
Concluded a “Cooperation Agreement for Safe and Secure Town Development” with Hiratsuka City in Kanagawa Prefecture



Folding water barrier



Mat for evacuation shelters



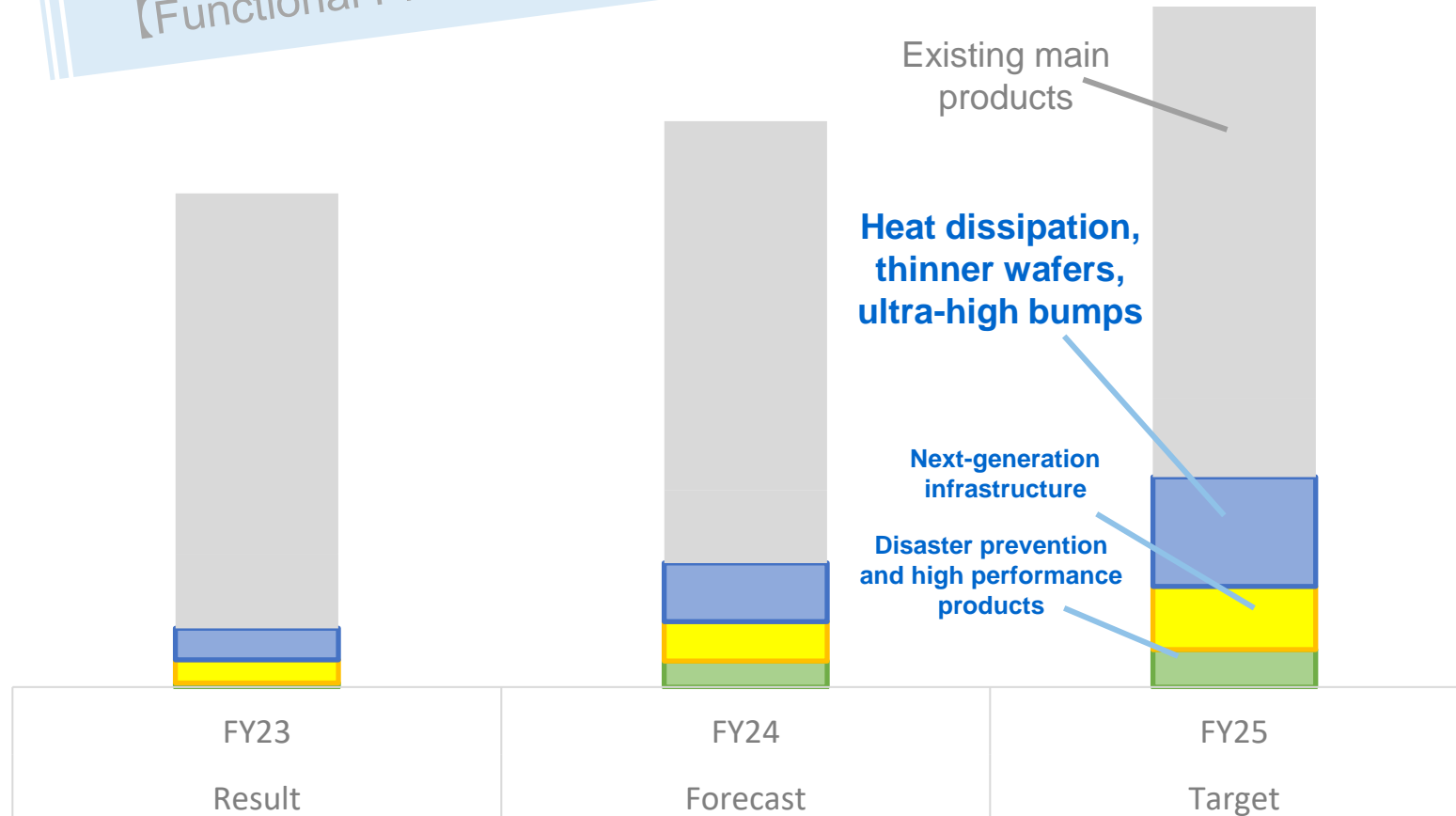
System to support high performance cross walks

Use recycled materials and raw materials not derived from fossil fuels

【AT & Functional Plastics】 Net sales forecast

【AT】 Net sales CAGR approx. +33%

【Functional Plastics】 Net sales CAGR approx. +13%



Point

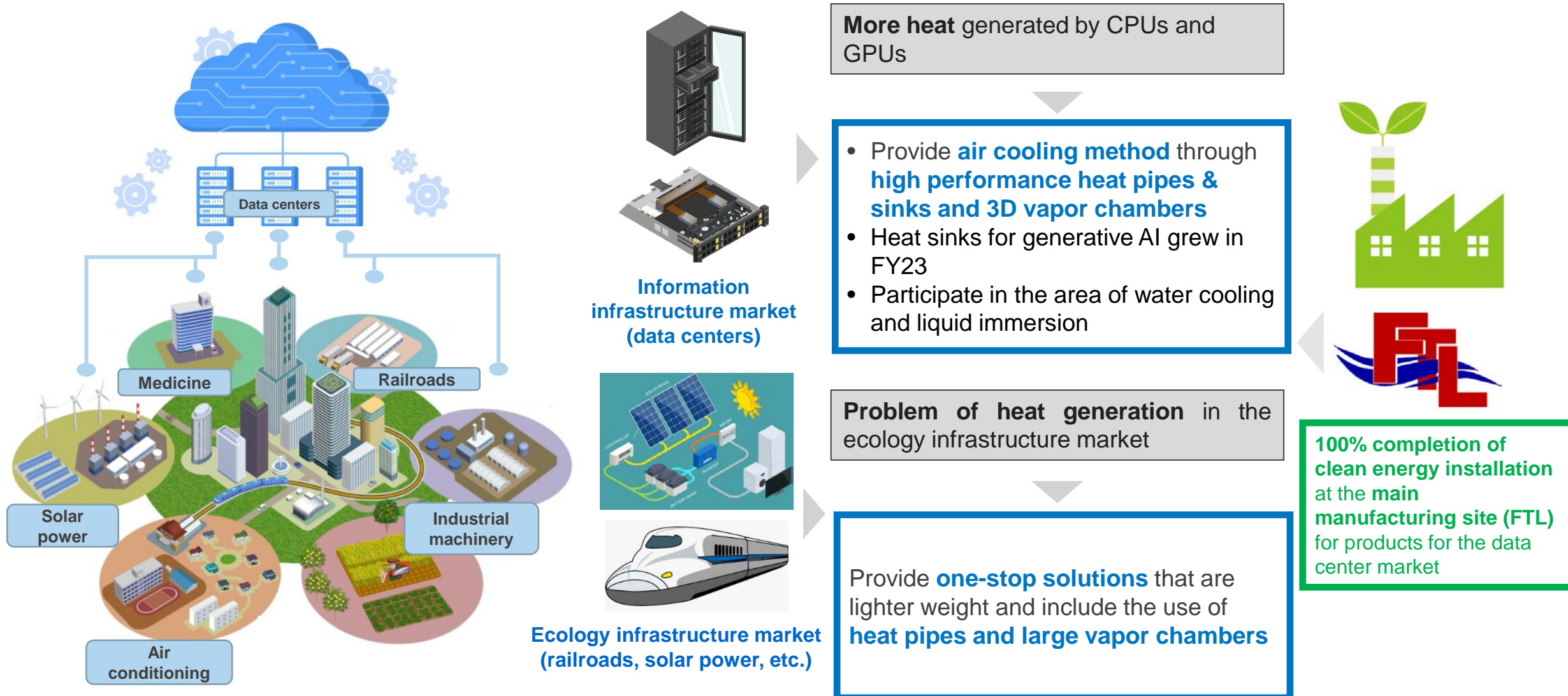
Increased net sales by focusing on cutting edge semiconductor processes in AT, in businesses that provide solutions for a safety, peaceful and low environmental impact society in functional plastics

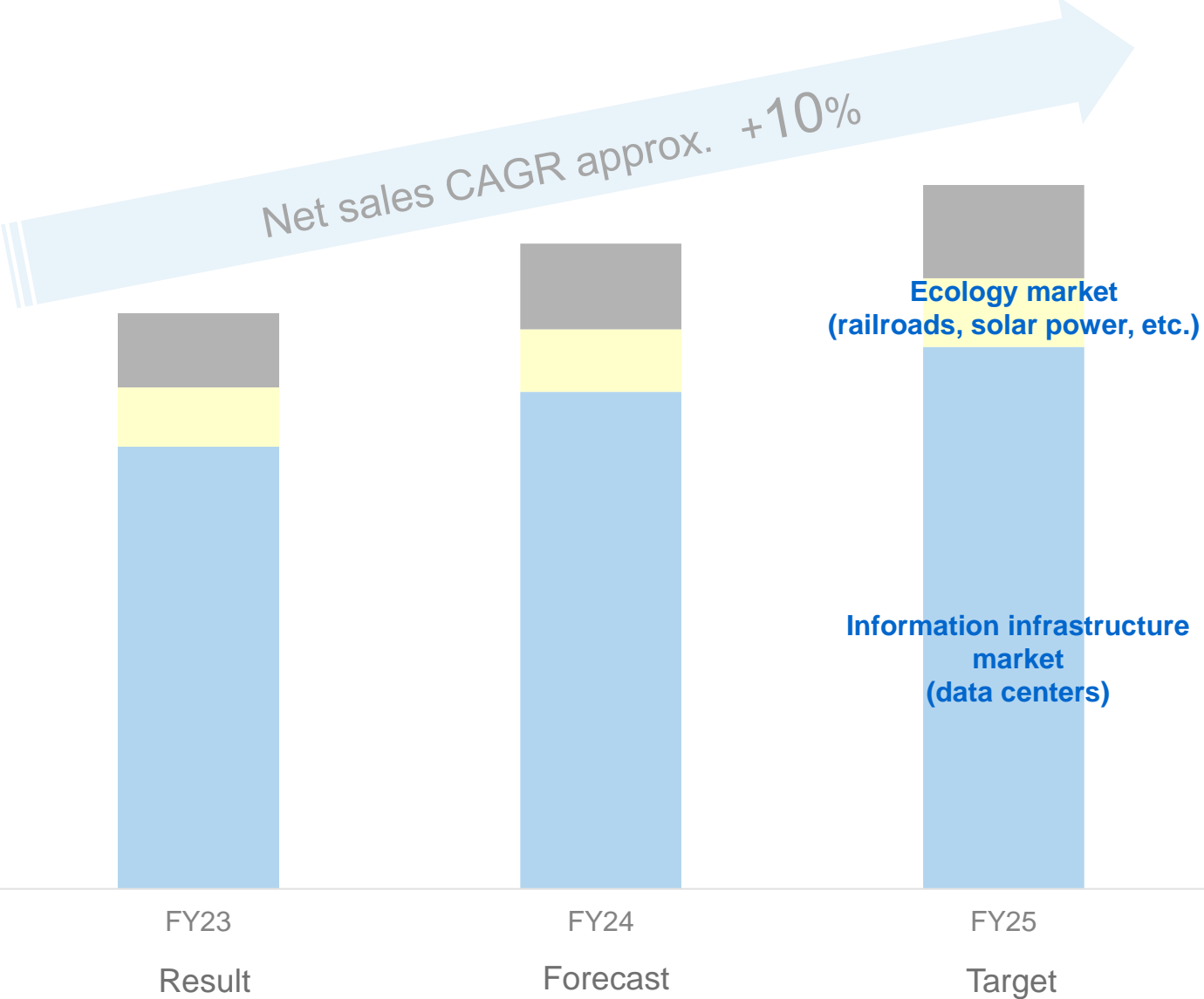
* “%” indicates the percentage of total sales

Thermal Management Solution & Products business

【Thermal Management Solution & Products】 Future outlook

Develop and provide high performance, well-differentiated products for the issue of heat generation centered on the main production site (FTL in the Philippines)





Point

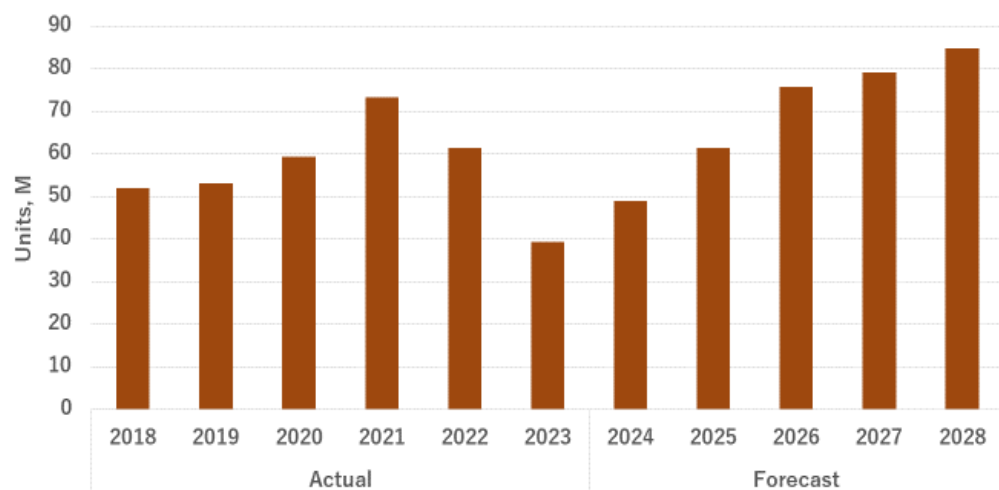
In FY23, in the data center market, heat sinks for generative AI grew significantly.

From FY24, provide well-differentiated products and services in the growing information infrastructure market, including participating in the area of water cooling and liquid immersion heat sinks, and work to increase profits.

Memory Disk business

As blanks continue to become thinner, grow by responding to customer needs through well-differentiated materials

Changes in HDD shipments for nearline storage

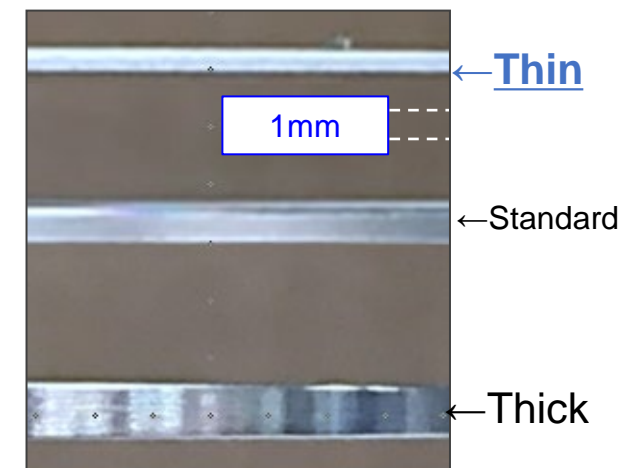


Created by Furukawa Electric based on materials from a research company

【Internal view of a new HDD】 【Comparison of blank thickness】

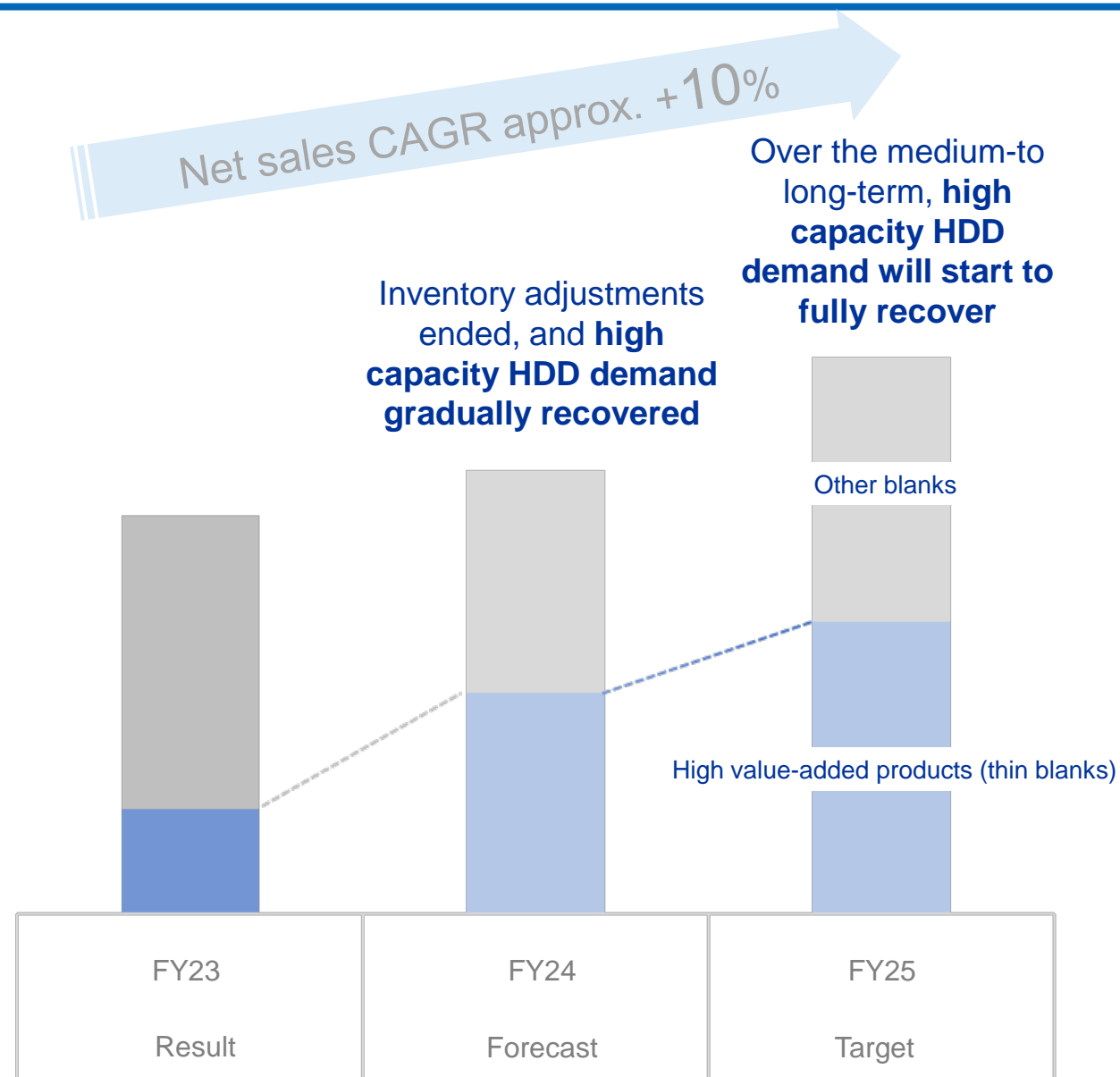


Number of disks continues to increase, and there are now HDD with 10 disks



Thin blanks have a thickness of less than 1mm (Images are all Furukawa Electric blanks)

- ✓ As data volume increases, HDD will continue to be equipped with more disks per unit
- ✓ In order to increase the number of disks equipped, each disk will need to be thinner
- ✓ Respond to the customer need for thinner, and fulfill market expectations by launching well differentiated new materials



Point

- Although the market for high capacity HDD mainly for data centers has temporarily contracted, demand will remain strong over the medium- to long-term.
- The capacity of each HDD unit continues to increase each year. As a result, there are growing requests for thinner, high quality blanks.
- Continue to respond to customer needs by launching well-differentiated new materials onto the market.

Copper Foil business

Continue to improve the product portfolio, such as focusing on copper foil
for the growing high frequency circuit board market

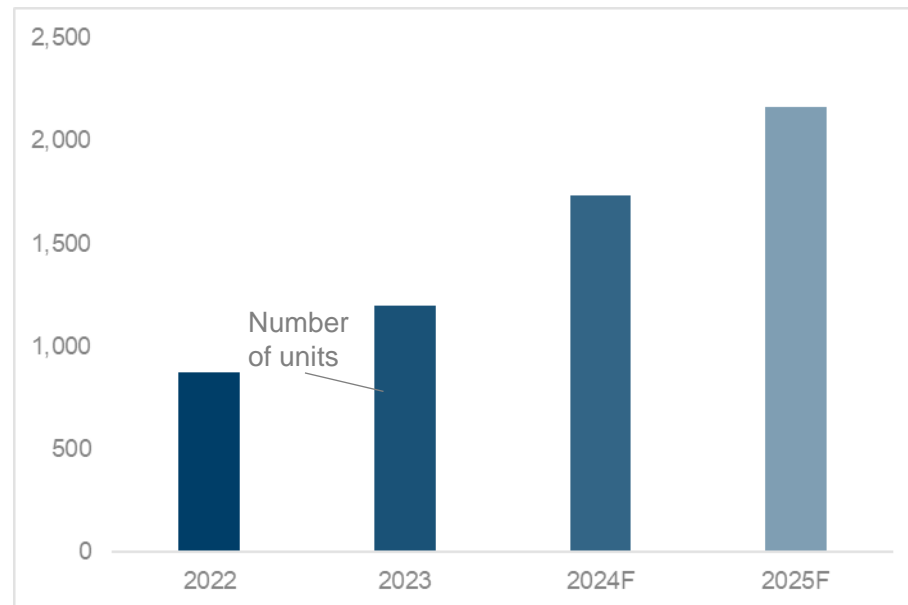
Develop & launch well-differentiated products using original surface processing technology

X

Create in partnership with the customer based on a high level of trust (quality, development capability)

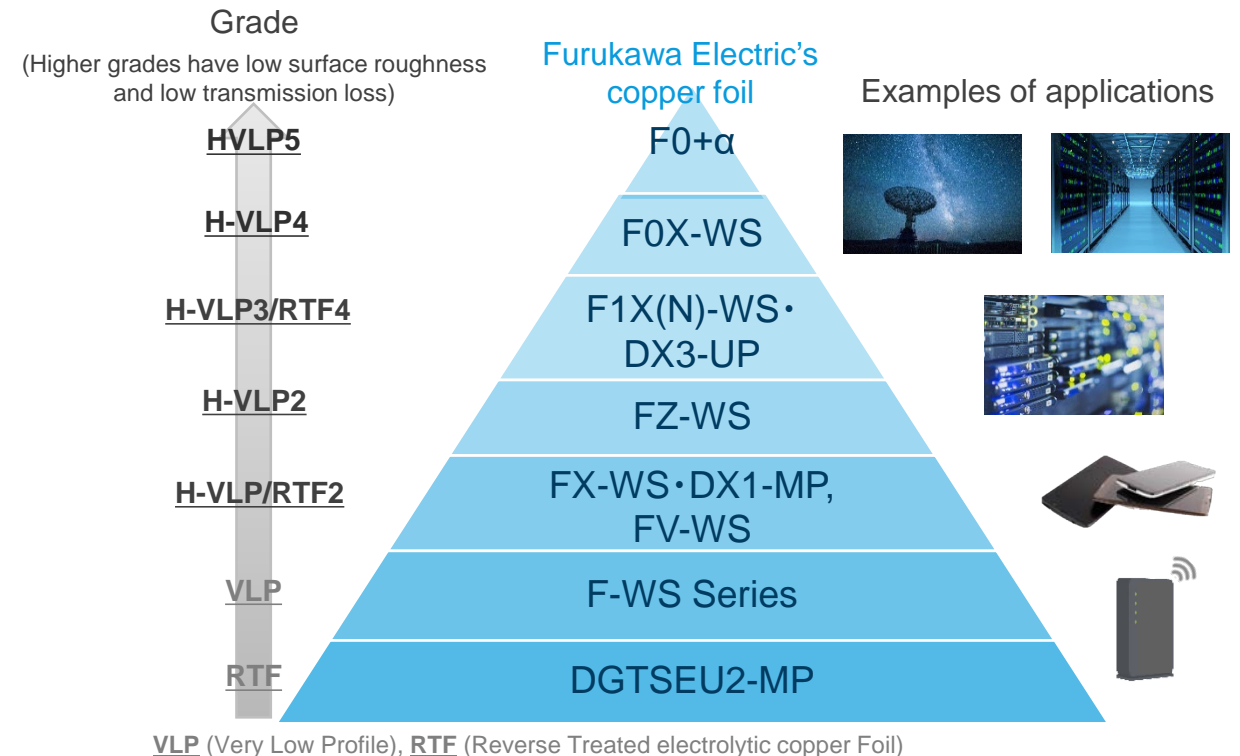
Continue to “improve the product mix” to high margin products with expected growth potential

Increased demand for AI servers following the launch of generative AI



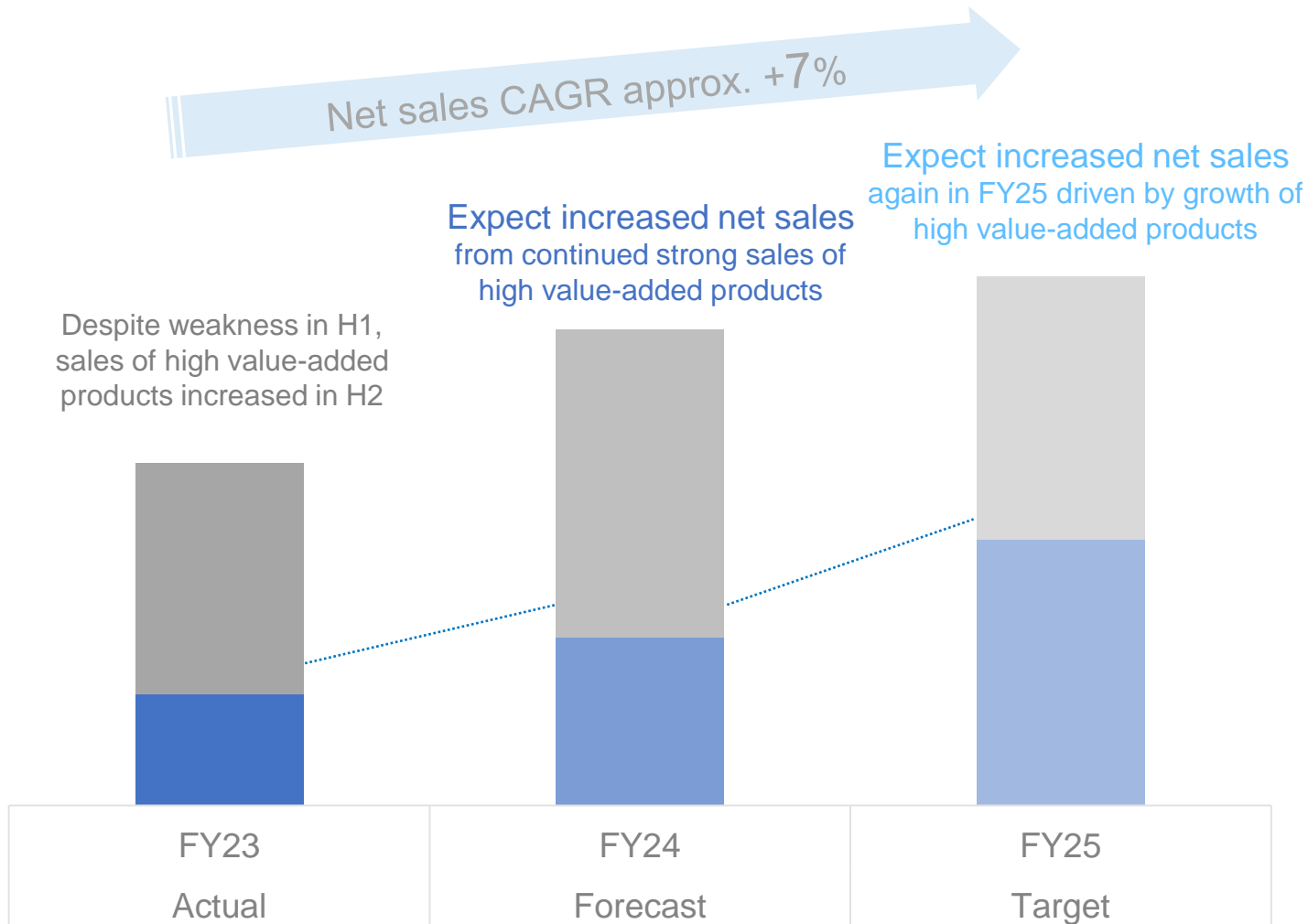
(Graph: Forecast growth of AI servers (thousand units/ year)
Created by Furukawa Electric based on materials from a research company)

Furukawa Electric's high end copper foil is used in AI servers



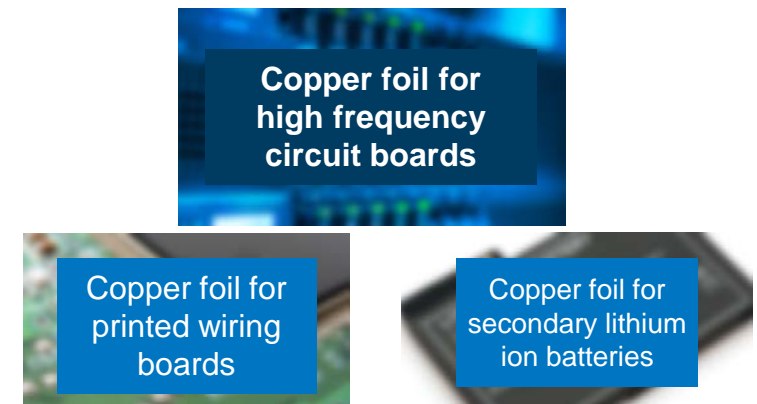
【Copper Foil】 Net sales forecast

Led by copper foil for high frequency circuit boards, high value-added products will account for about 50% of net sales in FY2025



Point

Along with providing well-differentiated products with high reliability to customers, continue to develop new applications and provide to new customers.



Thank you very much for your attention





【2025 Mid-term Plan (Road to Vision 2030 -Transform and Challenge-) Basic policy】

Create in partnership with the customer, and provide solutions.

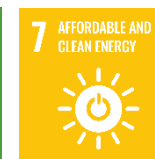
Support the growing telecommunications and social infrastructure markets by leveraging our strengths in proposing and developing products that match customer needs.

【Business environment, strengths and issues】

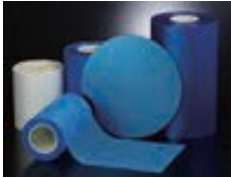
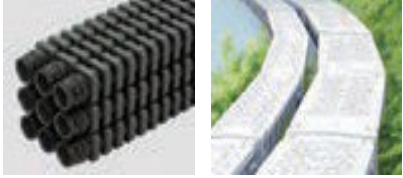
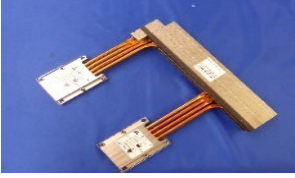
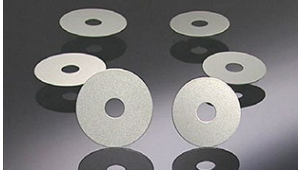

Business environment – Main revenue opportunities	Strengths as a division
<ul style="list-style-type: none"> Further growth of telecommunications and social infrastructure demand resulting from increased data traffic and more widespread use of 5G Solving social issues such as SDGs and carbon neutral 	<ul style="list-style-type: none"> Well-differentiated, strong technology development capability and patents Rapid, thorough customer service that combines engineering and sales
Business environment – Main menace and risks	Issues as a division
<ul style="list-style-type: none"> Supply instability within the supply chain caused by geopolitical risk Soaring raw material and transportation costs 	<ul style="list-style-type: none"> Maintain and improve the design and development capabilities for continuing to generate well-differentiated technology Further promote the initiatives directed at further advancement of BCP through site optimization and reducing the environmental impact, including carbon neutral

【Main business strategy for achieving the 2025 Mid-term Plan】

- Continue to develop products aimed at swiftly responding to the changing customer requirements, provide electronics products with an awareness of “high performance” and “well-differentiated” to growth markets and support the telecommunications and social infrastructure markets.
- Contribute to realizing a sustainable society and secure the next generation profit base, by “differentiation” aimed at solving social issues as leveraging the new products directed at Society 5.0 for SDGs and creating a framework for becoming carbon neutral.



Appendix – Product overview

Business	AT* & Functional Plastics *AT: Advanced Technology Tape		Thermal Management Solution & Products	Memory Disk	Copper Foil
Product images					
Renewable energy		●	●		
Telecommunications infrastructure	●	●	●	●	●
Mobility		●	●		●
Main products	<ul style="list-style-type: none"> ● Tape for semiconductor process 	<ul style="list-style-type: none"> ● Protective pipes for cables ● Troughs made from recycled materials ● Insulation materials 	<ul style="list-style-type: none"> ● High performance heat sinks and heat pipes, 3D vapor chambers and other thermal dissipation products 	<ul style="list-style-type: none"> ● Aluminum blanks for HDD 	<ul style="list-style-type: none"> ● Electrolytic copper foil for printed wiring boards ● Electrolytic copper foil for batteries
Main applications	<ul style="list-style-type: none"> ● Surface protection, immobilization, etc. during semiconductor wafer processing 	<ul style="list-style-type: none"> ● Protective pipes for underground cable ● Troughs for holding cables ● Insulation for air conditioning ducts 	<ul style="list-style-type: none"> ● Thermal dissipation for CPUs and GPUs used in data center servers ● Thermal dissipation for power semiconductors used for railroads and renewable energy 	<ul style="list-style-type: none"> ● HDD for data centers, desktop computers, surveillance cameras, etc. 	<ul style="list-style-type: none"> ● Wiring boards for electronic devices, such as smartphones and PCs, and for high-end servers, such as AI servers and telecommunications servers ● Cathode material in lithium ion batteries for electric vehicles, smartphones, power tools, etc.
Main customers	<ul style="list-style-type: none"> ● Semiconductor manufacturers ● Foundry manufacturers 	<ul style="list-style-type: none"> ● General construction companies and subcontractors ● Railroad companies ● Highway public corporations and road subcontractors ● Air conditioning duct manufacturers 	<ul style="list-style-type: none"> ● Data center and telecommunications base station operators ● Smartphone & PC manufacturers ● Railroad companies and power conditioner manufacturers ● PC & medical device manufacturers 	<ul style="list-style-type: none"> ● HDD substrate manufacturers 	<ul style="list-style-type: none"> ● Wiring board material manufacturers ● Lithium ion battery manufacturers