

Business Briefing

Functional Products Business

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Agenda

2022-2025 Medium-term Management Plan (25 Mid-term Plan)

- ① Basic policy and product lineup designed to solve social issues
- ② Market overview
- ③ Policy & strategy
- ④ Net sales & operating profit
- ⑤ Measures to grow the business and improve earnings, and net sales forecast

AT & Functional Plastics business

Thermal Management Solution & Products business

Memory Disk business

Copper Foil business

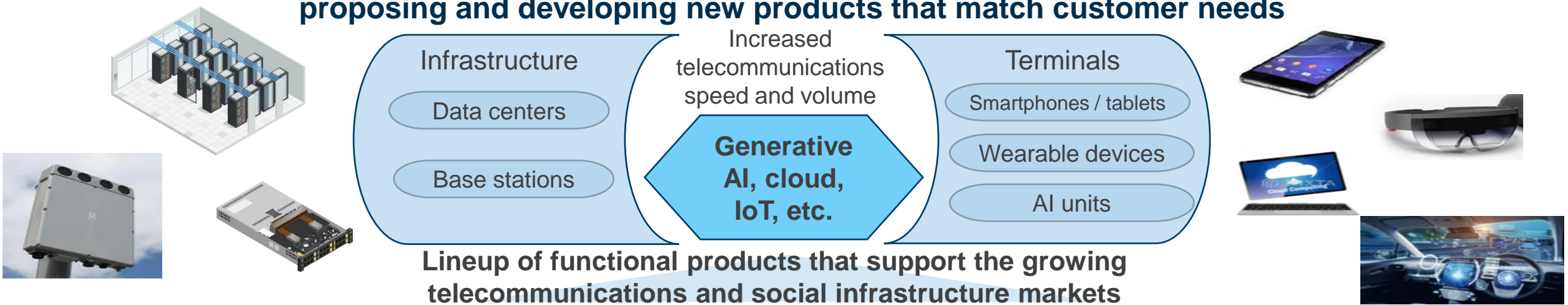
Main points of today's briefing

- AI related markets are all expected to remain extremely active from FY25
- In FY25, will continue to achieve growth by acquiring new domains and customers through “high performance” and “well-differentiated” products
- In response to the extremely robust demand for AI and data center products, will establish a manufacturing system that can thoroughly respond to this strong demand

Market of functional products, Basic policy of business

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 new products that match customer needs



Aluminum blanks	Heat sinks	Tape for semiconductor process	Electrolytic copper foil	Circuit boards for base station antennas

Heat sinks for solar power

SFVP



Renewable energy

Eco & Environment

Railroads / roads



EFLEX

Green trough

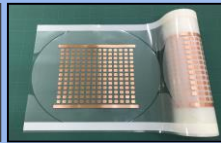
Lineup of functional products that support the growing telecommunications and social infrastructure markets

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

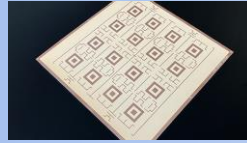
Realize tougher infrastructure/ increased data traffic



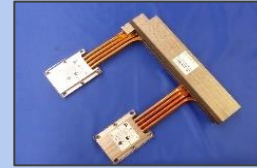
Tape for 5G next-generation devices



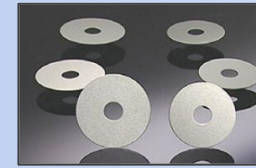
Circuit boards for telecommunications base station antennas



Thermal dissipation products for CPUs

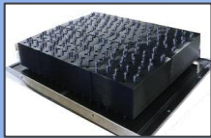


Aluminum HDD blanks



Electrolytic copper foil for printed wiring boards

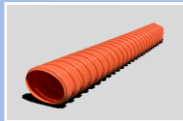
Realize a carbon free society/ renewable energy



Thermal dissipation products for solar power



Protective conduits for renewable energy cables



Nikko / hydroelectric power



Copper foil / Solar power



Imaichi / Use of renewable energy



Philippines / Use of renewable energy

Clean energy

Realize safe, secure cities



Square EFLEX



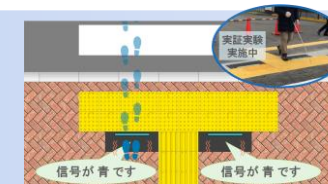
Mat for evacuation shelters



Folding water barrier



High performance troughs



High performance crosswalk support system

Realize a recycling-based society/ environmental recycling



Green trough



Electrolytic copper foil



EFCELL packaging materials



EFCELL office supplies



Foam recycling: Use of recycled materials

Social issues

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE



7 AFFORDABLE AND CLEAN ENERGY



11 SUSTAINABLE CITIES AND COMMUNITIES



3 GOOD HEALTH AND WELL-BEING

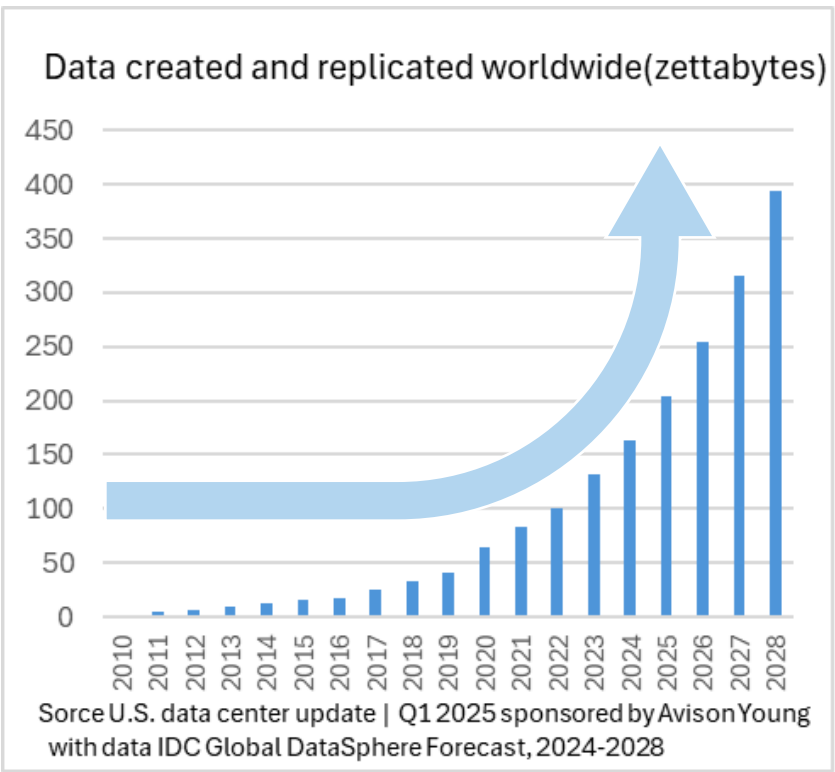


12 RESPONSIBLE CONSUMPTION AND PRODUCTION

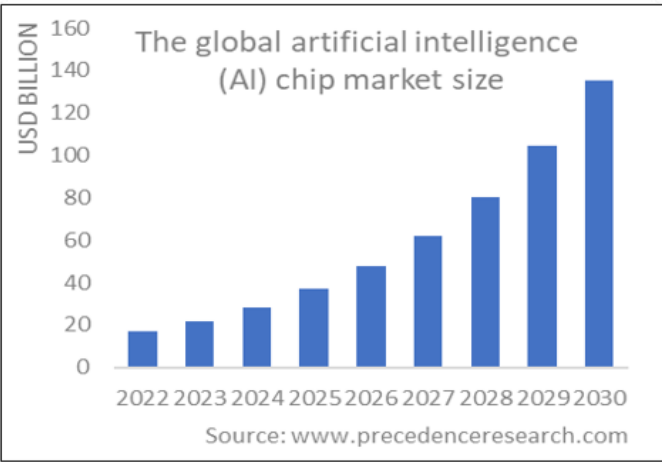
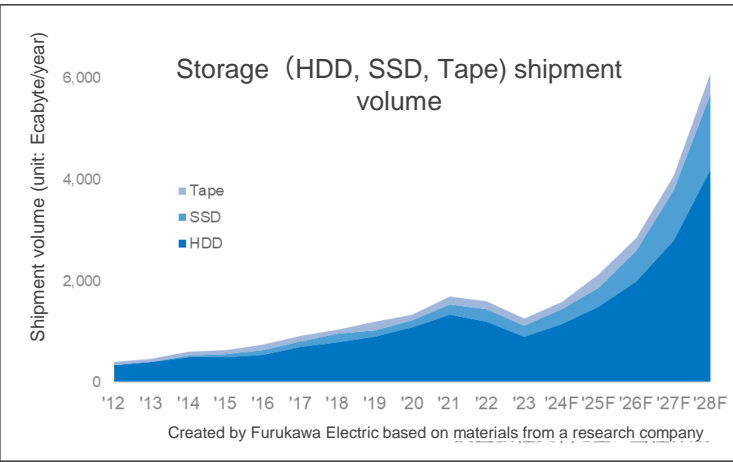
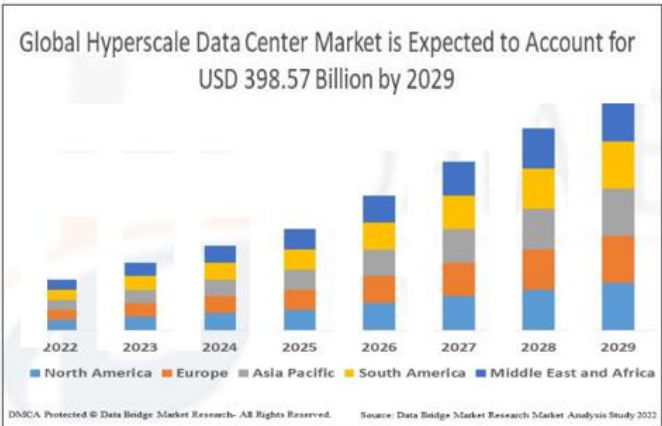
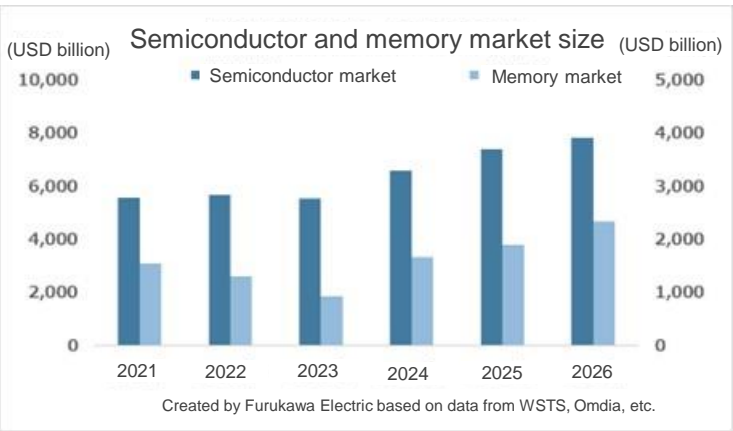


Focus on the market trends, and provide “well-differentiated”, “high performance” products to the related markets

Volume of data generated worldwide and data traffic will increase in the future

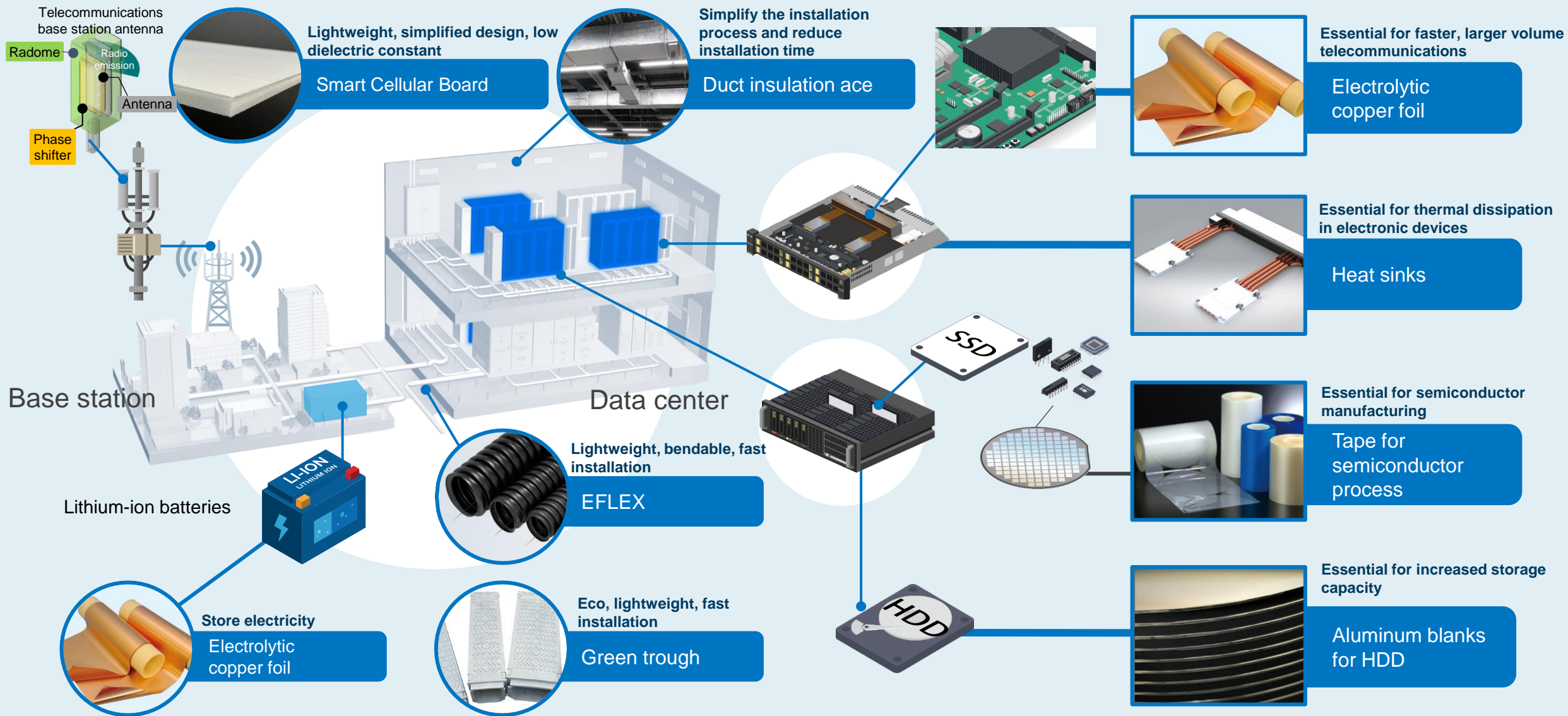


In many of the Functional Products businesses and product market, there is no change to trend of medium to long-term market growth following increased data volumes



Functional Products: Example of use at data centers

Our products of the Functional Products business, including peripheral devices, are used in many areas within the global market centered on high performance servers in data centers



Overall Functional Products segment

- In FY25, continue to achieve growth by acquiring new domains and customers through “high performance” and “well-differentiated” products
- Establish a system that can immediately respond when demand recovers in the electronics market

AT & Functional Plastics business

- Along with establishing 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.
- Through product lineups that utilize foam technology and total route design technology, contribute to the establishment of next-generation infrastructure for data centers.
- Work to develop and increase sales of environmentally-friendly products.

Thermal Management Solution & Products business

- Increase topline sales by continuing to contribute to solving social issues as a core partner through the provision of well-differentiated solutions and services.
- Quickly grasp the risks and opportunities based on global, market and customer trends, and aim to 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 high value-added thin blanks is KSF in the short and medium-term, so continue to increase orders.

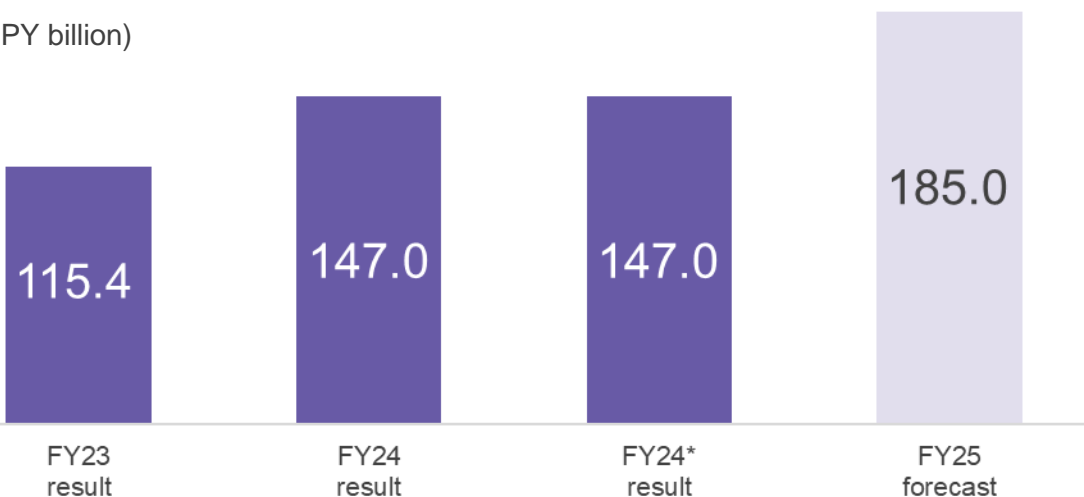
Copper Foil business

- 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 neutral, introduce renewable energy and actively work to save energy.

Net sales and operating profit trends

Net sales

(JPY billion)



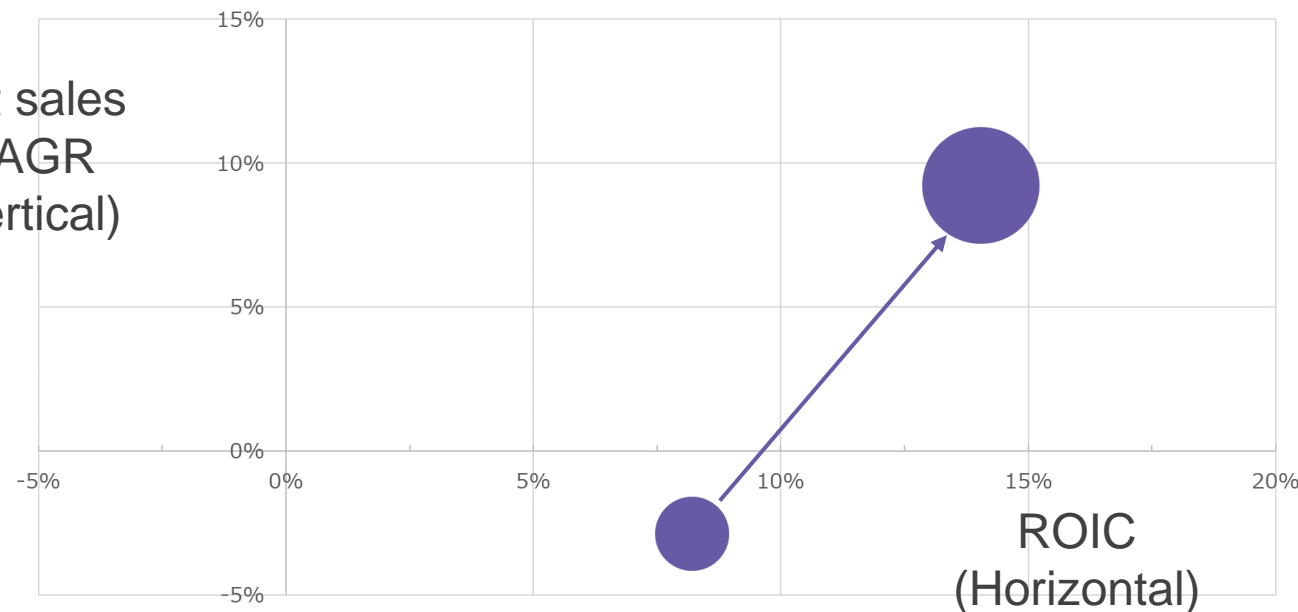
Operating profit

(JPY billion)



ROIC(FY21 result → FY25 forecast)

Net sales
CAGR
(Vertical)



Vertical ↑ : Net sales CAGR (FY17-FY21 → FY21-FY25)
Horizontal → : ROIC (FY21 → FY25)
Bubble○ : NOPAT (FY21 → FY25)
※Negative value for the white balance of the bubble

※ CAGR: Compound annual growth rate, ROIC: Return on invested capital (after taxes)
NOPAT: Calculated as net income + interest expenses after taxes in accordance with IFRS

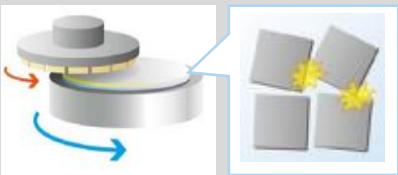
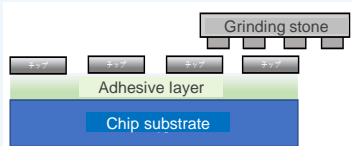
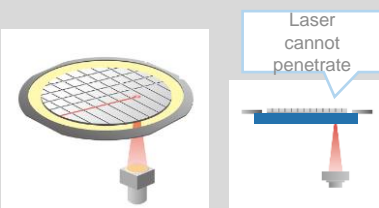
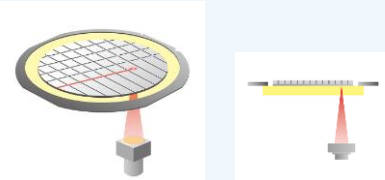
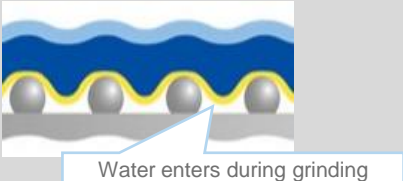
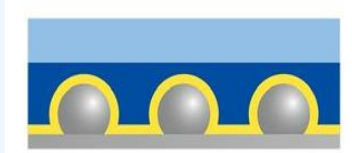
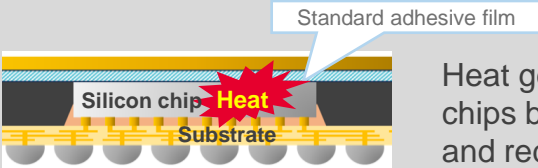
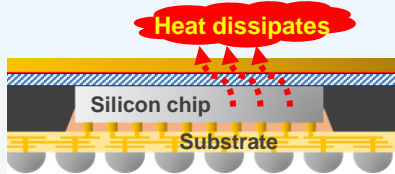
- * Changes to segments and sub-segments, as well as partial changes to head office expenses allocated from FY25. As a result, actual results for FY24 were restated
- Industrial laser business will be transferred from the Infrastructure segment (Communications Solutions) to the Service & Developments, etc. segment
 - Metal power cable business will be transferred within the Infrastructure segment (from Communications Solutions to Energy Infrastructure)

AT & Functional Plastics business

【AT】 Future business developments ①

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

Technology for cutting-edge processes

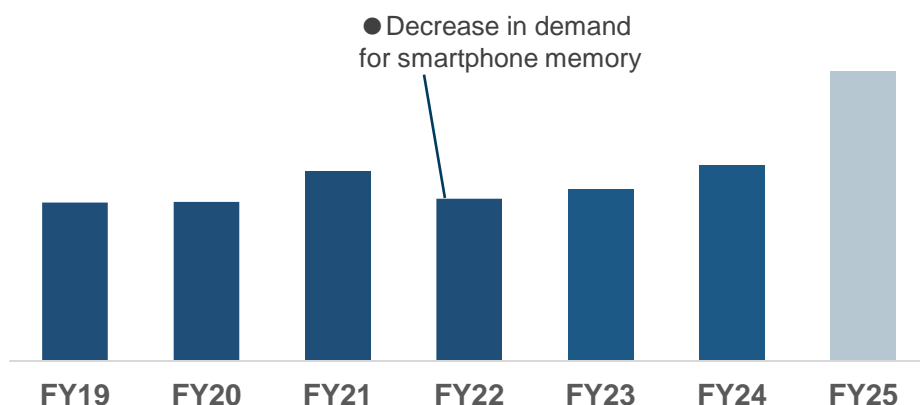
Technology trend	Issue faced by the customer		Solution provided by Furukawa Electric	
Thinner wafers <ul style="list-style-type: none"> Wafers are becoming thinner in order to increase memory performance through chip stacking In response to thinner wafers, a laser is used when cutting the wafer 		Thinner semiconductor chips are more prone to chipping during grinding		BG tape for SDBG <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		Transparent tape for HBM <p>Using tape with excellent transparency enables the laser to cut the wafer</p>
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 closely follow the contours of the bumps, thickness precision is reduced and water may enter during grinding		BG tape for ultra-high bumps <p>Achieve excellent contour fit for ultra-high bumps</p>
Heat generation <ul style="list-style-type: none"> Increased chip density results in greater heat generation 		Heat generated from denser chips builds up in the package and reduces performance		Thermal conduction DDF <p>Dissipate heat from the semiconductor chip using adhesive film with good thermal conductivity</p>

【AT】 Future business developments ②

Establish a system for stable supply directed at the semiconductor market recovery
and increased demand for high performance semiconductors

Medium to long-term demand growth
in the semiconductor market

Net sales of Furukawa Electric's tape for semiconductor process



※Unified based on the new accounting standards

- From the second half of FY22, a global slowdown occurred in the semiconductor market centered on memory for smartphones
- The market gradually recovered from the second half of FY24 and is expected to continue to grow long-term
- Demand for high performance semiconductors is increasing due to the more widespread introduction of generative AI

Establish a system for stable supply by increasing production capacity

Establish a system utilizing 3 manufacturing plants

■ Build the 2nd plant at the Mie Works

Total investment: About JPY7.0 billion

(FY22-25)

May 2024 Open the plant and start trial
mass production

April 2025 Start mass production

Establish a mass
production system
utilizing 3 manufacturing
plants



Hiratsuka Plant



Mie 1st Plant



Mie 2nd Plant

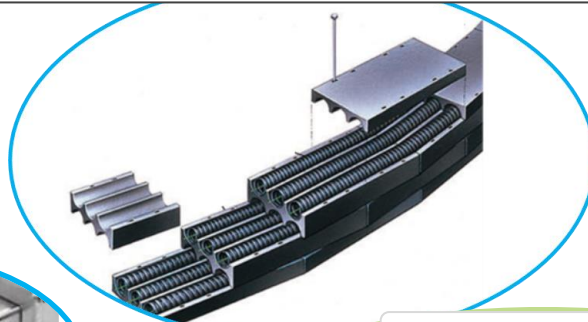
【Functional Plastics】 Future business developments

Contribute to next-generation infrastructure systems for data centers

Insulation for air conditioning ducts



Unitized lightweight multi-row conduits



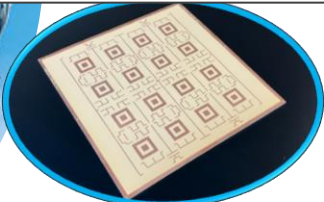
Protective conduits for extra-high voltage power cable



Radome



High frequency antenna circuit board



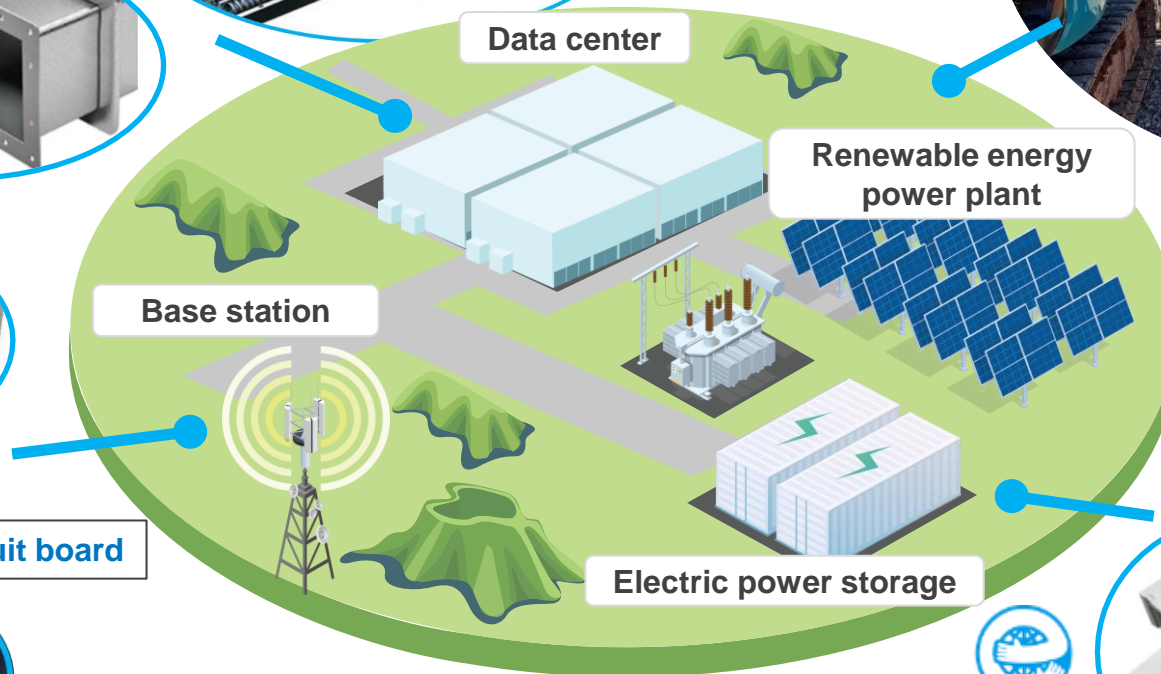
Data center

Renewable energy power plant

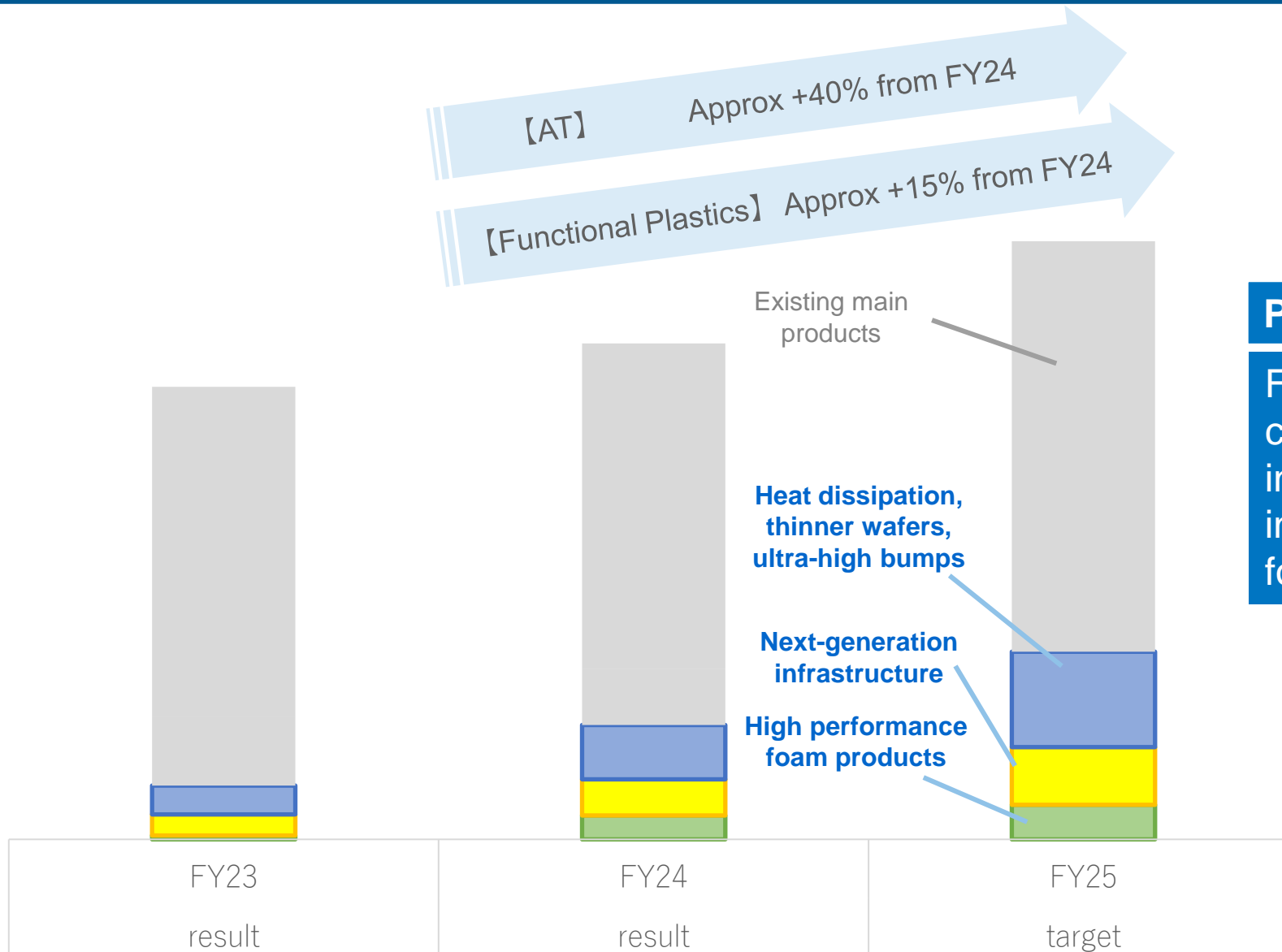
Base station

Cable trough made from recycled plastic

Electric power storage



【AT & Functional Plastics】 Net sales forecast



Point

Focus on increasing net sales for cutting edge semiconductor processes in AT and products for next-generation infrastructure and high-performance foam products in Functional Plastics.

Thermal Management Solution & Products business

【Thermal Management Solution & Products】

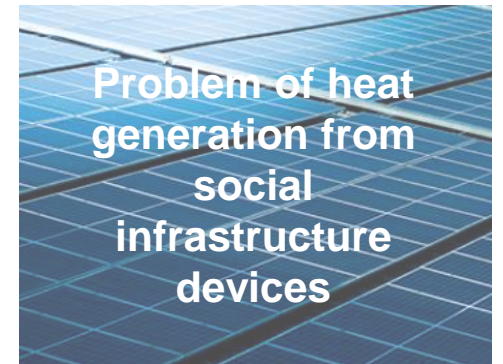
Future business developments

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

Information infrastructure market (Data centers)



Ecology infrastructure market (Railroads, solar power, etc.)



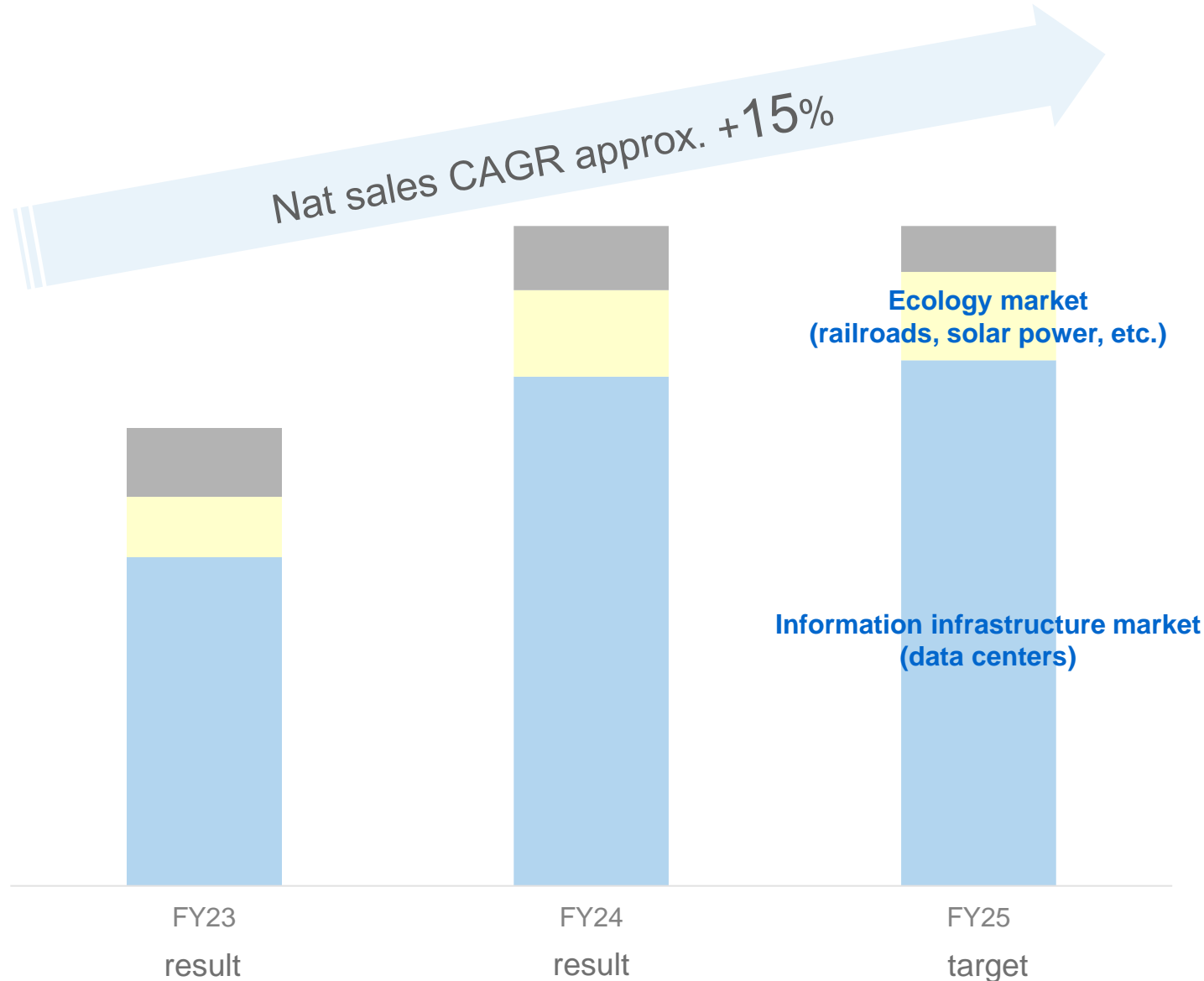
- Respond to greater heat generation and increased density of semiconductors for data centers through **heat pipes, heat sinks, 3D vapor chambers and water-cooled modules**.

- Provide **total solutions** that realize **lightweight and large-scale heat dissipation** by combining **large heat pipes and large vapor chambers**.
- Provide cooling equipment with excellent **weather resistance and corrosion resistance** required for outdoor environments.

Including at the main production site FTL, use 100% clean energy at all plants.
Support the stable operation of social infrastructure, and contribute to realizing a sustainable society.

【Thermal Management Solution & Products】

Net sales forecast



Point

In FY24, in the data center market, heat sinks for generative AI continued to grow significantly.

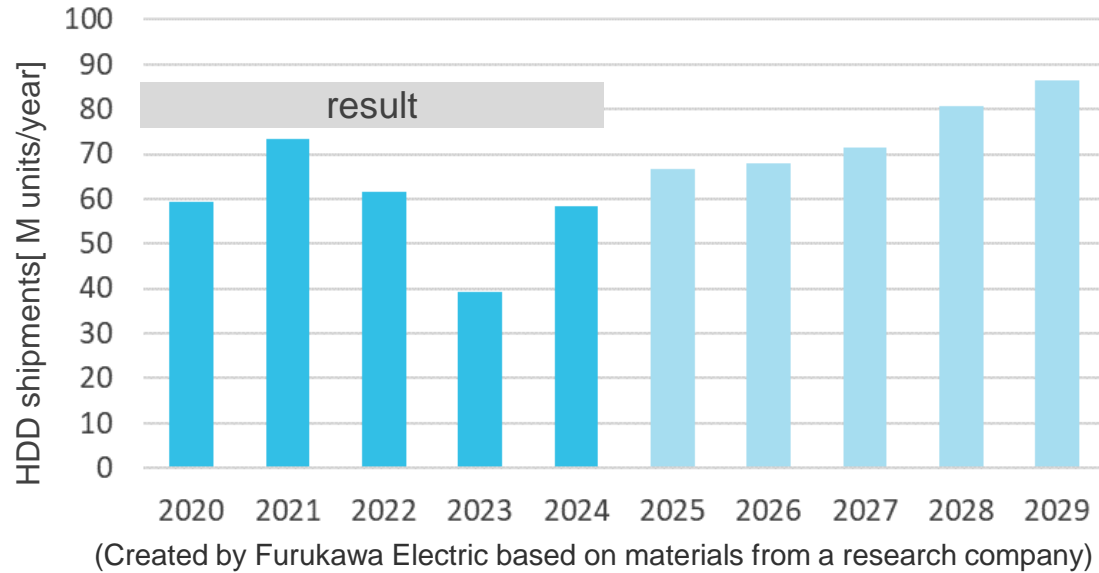
From FY25, directed at the full-scale introduction of heat sinks using the water-cooling method, aim to increase profits by providing well-differentiated products and services in the growing information infrastructure market.

Memory Disk business

【Memory Disk】 Future business developments

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

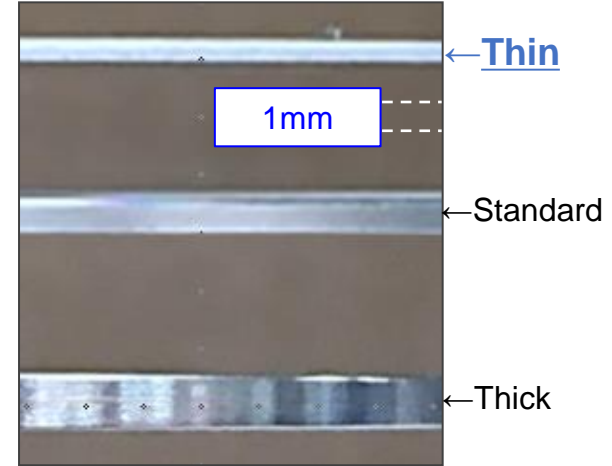
【HDD shipments for nearline storage】



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



The number of disks continues to increase. There were a maximum of 8 disks in 2017, but in 2024, products were launched containing 11 disks (※Image shows an HDD with 10 disks)

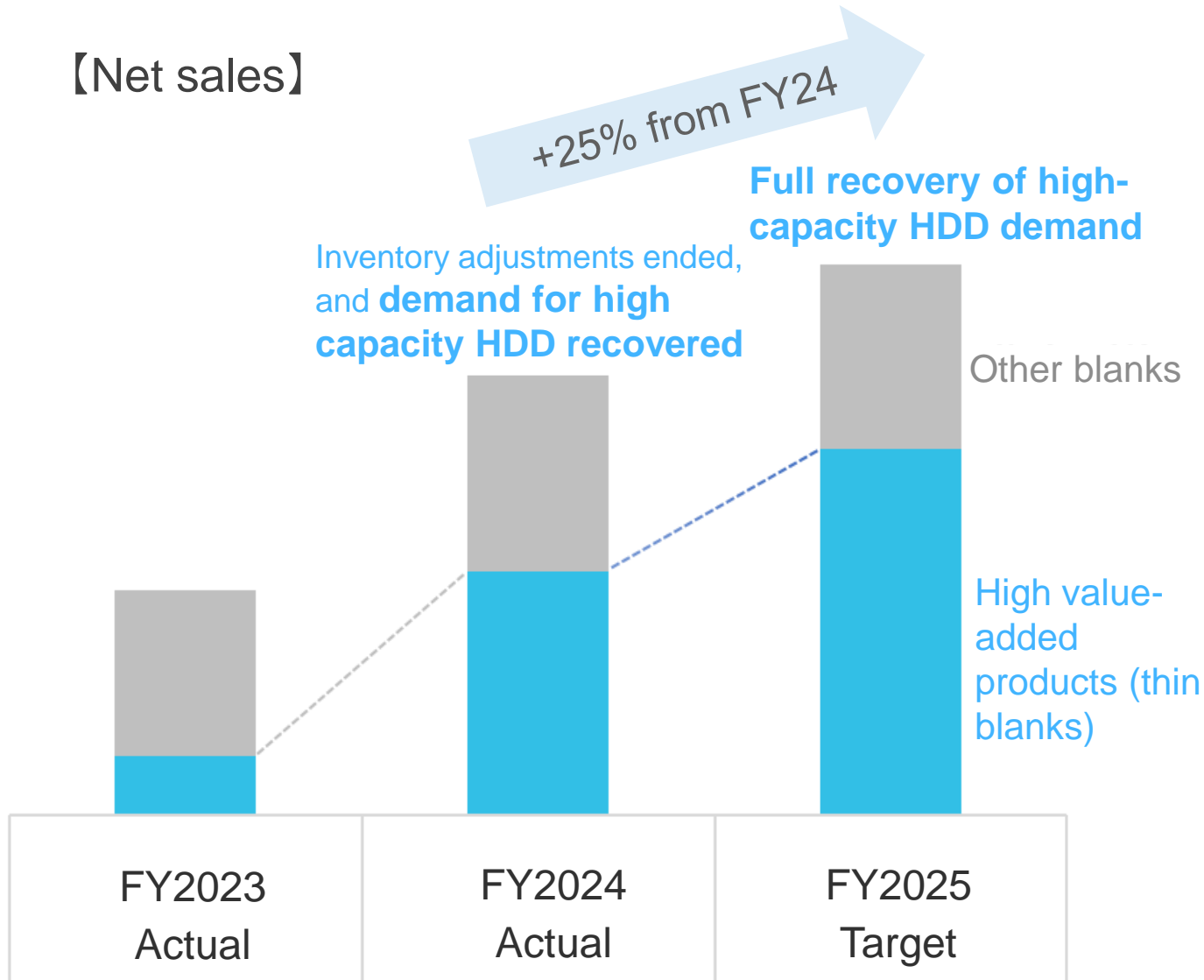


Thin blanks have a thickness of less than 1mm
(Images are all Furukawa Electric blanks)

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

【Memory Disk】 Net sales forecast

【Net sales】



Point

- The market for high-capacity HDD recovered in FY24 after bottoming in FY23 on reduced data center investments. In FY25, the market is expected to undergo a full recovery.
- The capacity of each HDD unit continues to increase each year. As a result, there are growing requests for thinner, high-quality blanks.
- Will continue to respond to customer needs by launching well-differentiated new materials onto the market.

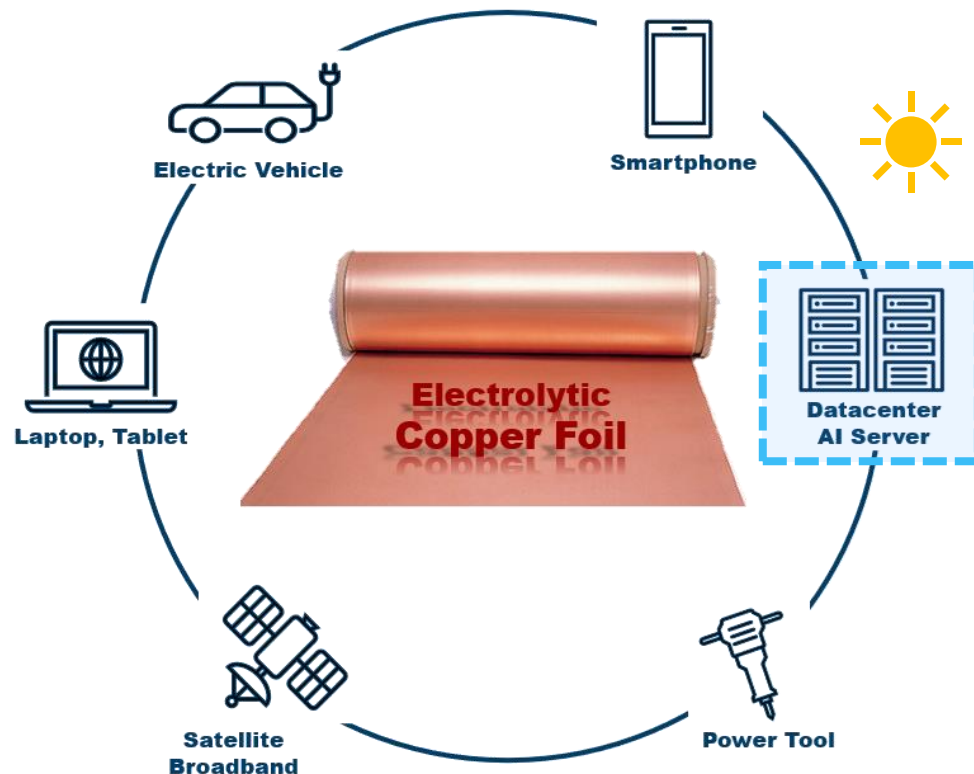
Copper Foil business

【Copper Foil】 Future business developments

Leveraging the customization capabilities, create in partnership with the customer,
and capture the strong demand by transforming the product portfolio

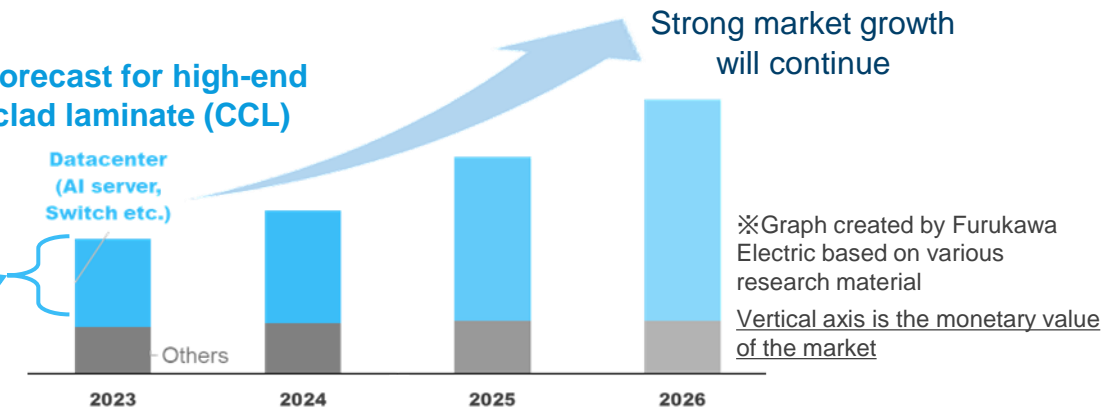
- Concerning the electrolytic copper foil, Furukawa Electric boasts a high level of trust from a broad range of customers earned from its long history as a pioneer in the industry and technological capabilities backed by actual experience.
- From FY23, demand for AI server applications has been strong due to the surging generative AI, and demand for our copper foil for high frequency circuit boards has increased
- Product development cycle is shortening as product performance increases, but by leveraging the customization capabilities, create in partnership with the customer and ride the wave of market growth

Domains in which Furukawa Electric's electrolytic copper foil is used



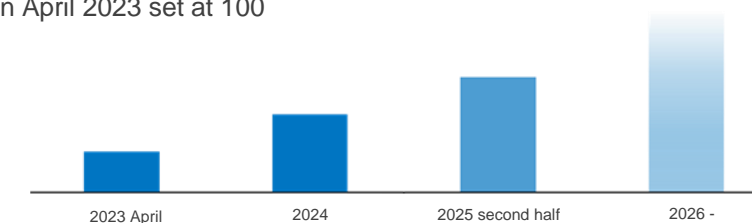
Outlook for the data center market as it relates to the copper foil business

Market forecast for high-end copper clad laminate (CCL)



Changes in Furukawa Electric manufacturing capacity of high performance HVLP foil

※Based on April 2023 set at 100



※HVLP: Hyper Very Low Profile. Copper foil with extremely low surface roughness that is mainly used in high frequency circuit boards.

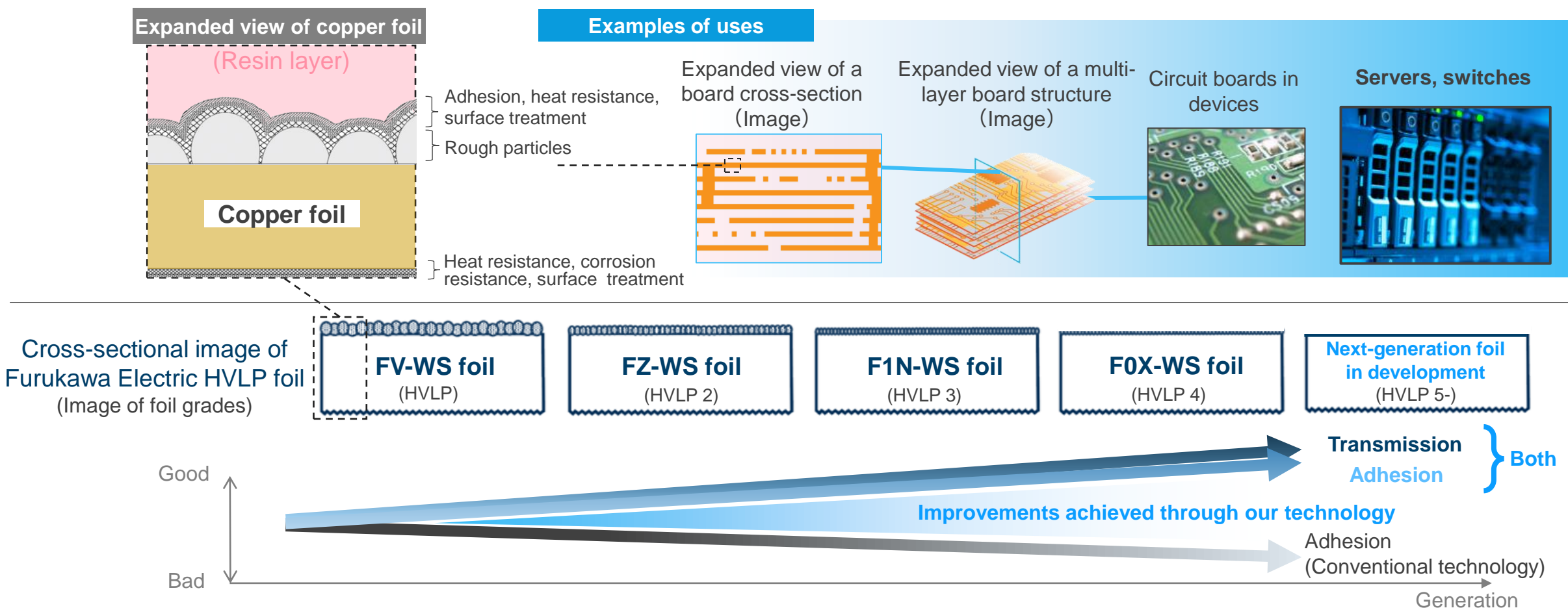
【Copper Foil】 Copper foil for high frequency circuit boards

For details, see the Furukawa Electric homepage
https://www.furukawa.co.jp/en/rd/review/fr050/fr50_03.pdf

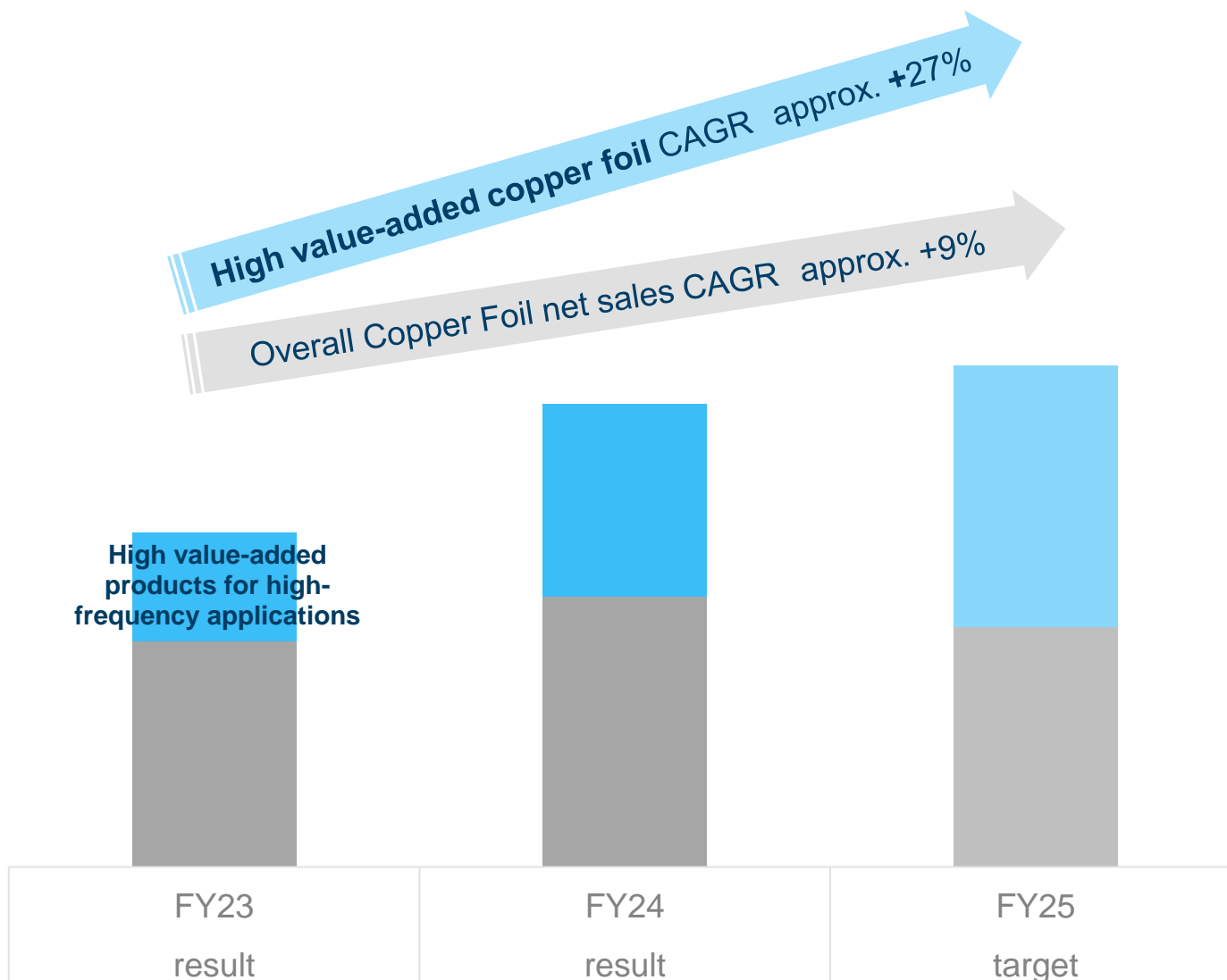


While maintaining good adhesion, develop electrolytic copper foil with excellent transmission characteristics by minimizing surface roughness

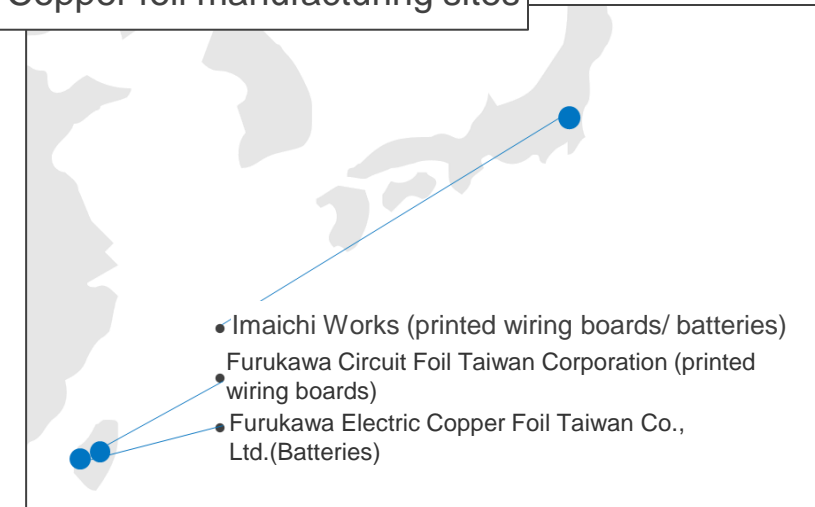
- As shown in the images below, the copper foil forms intricate layers, but the surface of the foil is further refined through multiple surface treatments
- As one of the few electrolytic copper foil manufacturers in the world with development, technology and manufacturing know-how accumulated over many years, aiming to launch higher performance products and developing next-generation foil



【Copper Foil】 Net sales forecast



Copper foil manufacturing sites



Point

- From around the second half of FY23, sales volumes of high value-added products mainly for AI servers increased, and this trend continued in FY24.
- In FY25, high value-added products will continue to drive growth, and net sales are expected to increase.

Thank you

FURUKAWA ELECTRIC GROUP PURPOSE

**Composing the core
of a brighter world.**

Appendix

- Business overview
- Product overview

【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】

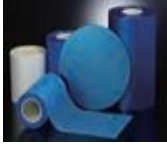
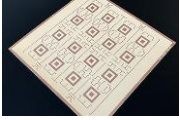


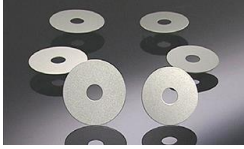

Business environment Main revenue opportunities	Strengths as a division
<ul style="list-style-type: none">• Further growth of telecommunications and social infrastructure demand resulting from increased data traffic and more widespread use of 5G• Solving social issues such as SDGs and carbon neutral	<ul style="list-style-type: none">• Well-differentiated, strong technological capabilities and patents• Rapid, thorough customer service that combines engineering and sales
Business environment Main menaces 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 initiatives directed at further advancement of BCP through site optimization and reducing environmental impact, including carbon neutral

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

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



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 conduits for cables ● Troughs made from recycled materials ● Insulation materials ● High performance foam 	<ul style="list-style-type: none"> ● High performance heat sinks and heat pipes, 3D vapor chambers, water-cooling modules 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 conduits for underground cable ● Troughs for holding cables ● Insulation for air conditioning ducts ● Circuit boards for base stations 	<ul style="list-style-type: none"> ● Thermal dissipation for CPUs and GPUs used in data center servers ● Thermal dissipation for power semiconductors used in 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 including smartphones, PCs and 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 ● Public highway companies and road subcontractors ● Air conditioning duct manufacturers ● RAN vendors 	<ul style="list-style-type: none"> ● Data center and telecommunications base station operators ● Railroad companies and power conditioner manufacturers ● Medical device manufacturers ● Air conditioning and industrial equipment manufacturers 	<ul style="list-style-type: none"> ● HDD substrate manufacturers 	<ul style="list-style-type: none"> ● Wiring board material manufacturers ● Lithium-ion battery manufacturers