

Business Segment IR Meeting

Mitsubishi Materials Corporation is aiming for further growth by implementing measures at each in-house company.

【Speaker】

Toshinori Ishii, Managing Executive Officer, President of Advanced Products Company

Tetsuya Tanaka, Managing Executive Officer, President of Metalworking Solutions Company

Katsuyoshi Isaji, Managing Executive Officer, President of Metals Company

Yoshiaki Arai, Managing Executive Officer, President of Environment & Energy Business Company

< 1. Advanced Products Company >

1. Advanced Products Company



Toshinori Ishii (hereinafter referred to as "Ishii"): Hello everyone, I am Toshinori Ishii, President of Advanced Products Company. Thank you for taking time to attend our business briefing today.

<Business Overview (Copper & Copper Alloy)>

1. Advanced Products Company (Copper & Copper Alloy, Electronic Materials & Components)



I would like to start with an overview of our business. Advanced Products Company consists of two businesses: the Copper & copper alloy business and the Electronic materials & components business.

First, let me give you an overview of the Copper & copper alloy business. We are engaged in the manufacture and sale of copper alloys and products backed by our processing technologies, with our key markets being infrastructure, such as automobiles, semiconductors and electronics, and industrial equipment.

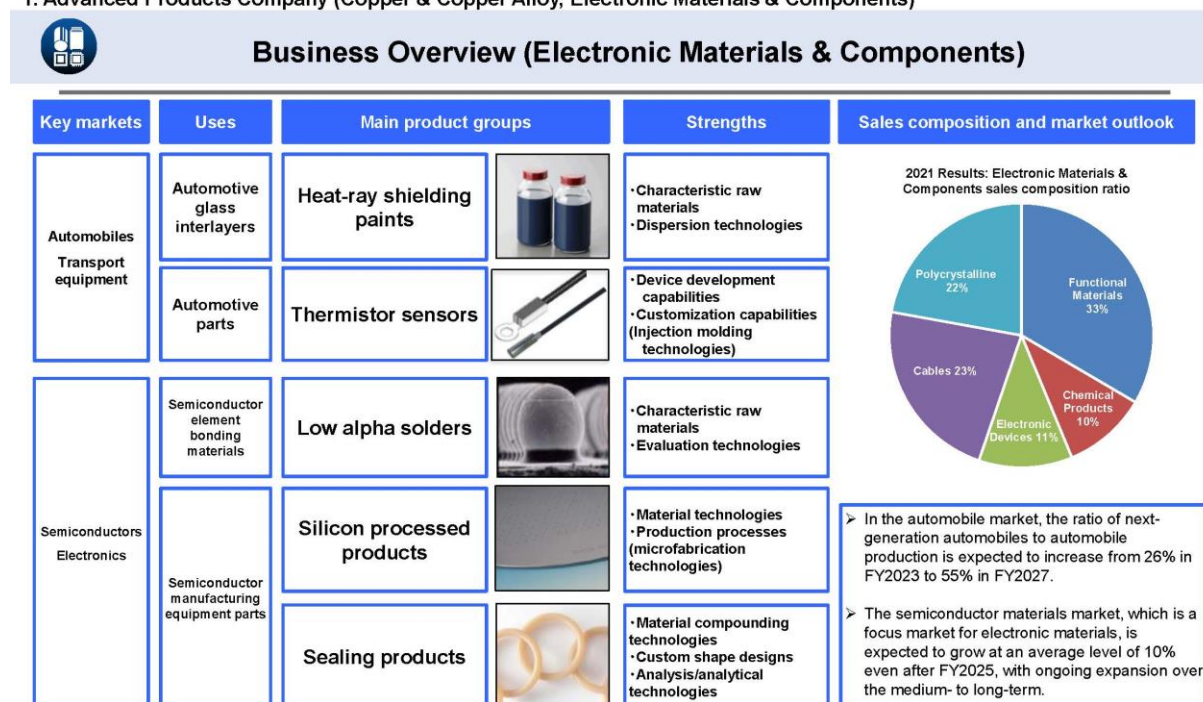
The pie chart on the right side of the slide shows the net sales composition by business segment. Rolled products include terminal connectors for automobiles and products related to semiconductors and electronics.

And extruded products include ECO BRASS for automotive equipment. Domestic subsidiaries process rolled products such as sheets, strips, and bars, and extruded products, and include copper rods and bus bars for semiconductor lead frames and infrastructure.

For Luvata, this includes parts for overseas equipment and MRI. Other products not shown in the table on the left side of the slide include alloy strips and pure copper wire for cables and wires.

<Business Overview (Electronic Materials & Components)>

1. Advanced Products Company (Copper & Copper Alloy, Electronic Materials & Components)



Now let me proceed with an overview of the Electronic materials & components business. With automobiles and semiconductors/electronics as our key markets, we develop products tailored to customer needs based on our product development capabilities and advanced evaluation technologies.

The pie chart on the right side of the slide shows the net sales composition by business segment. Functional materials include low-alpha solder and processed silicon products. The Chemicals business includes heat-ray shielding paints and some silicon processed products.

Electronic Devices and Electronic Wires include thermistor sensors and sealing materials, respectively. In the Polycrystalline business, high-purity silicon for silicon wafers is the main product.

<Progress of the FY2023 Strategy | Priority Measures>

1. Advanced Products Company (Copper & Copper Alloy, Electronic Materials & Components)



Advanced Products Company (Copper & Copper Alloy, Electronic Materials & Components)

Progress of the FY2023 Strategy | Priority Measures

Long-term goals | Global First Supplier


- Create new businesses and products through the sophistication and integration of our core competencies to realize the wants of society and customers
- Accelerate of marketing activities to replicate successful practice from a market perspective

Medium-term Management Strategy

- Enhancing marketing capabilities
- Planning and development of new products and creation of new businesses based on product roadmaps
- Expansion of global bases
- Strengthen manufacturing capabilities (standardize operations, establish mass production system)
- Key account strategy (to become a first-call vendor)
- Securing and developing excellent talent

Key Measures for FY2023 Strategy		FY2022 Results	Plans for FY2023 and beyond
All businesses	Assignment of key account (KA) managers acting cross-sectionally (1)	Established KA strategy activities	Improve KA strategy activities from customers and market perspectives
	Digital Marketing Utilization	Conducted technical exchange meetings and identified new projects by utilizing digital marketing	Promote the use of digital marketing in overseas markets
	Development of new products and new businesses (2)	Conducted discussions, etc. on each technical theme with the customers' R&D departments	Shift from specific customer development themes to prototype and mass production
Copper & copper alloy	Business restructuring of the rolling and extrusion business and strengthening of production system (3)	Established a plan to install facilities for increased production	No major changes to the plan
		Rolling: Promoted start-up of new slitting and packaging machines in Wakamatsu, and washing, slitting, and packaging machines in Sanpo	Progress towards full-scale operations in 2023-2024
		Promoted start-up of increased copper mold production at Sakai Plant	
Electronic materials & components	Market development and sales expansion of products for next-generation vehicles (2)	Extrusion: Reviewed process streamlining	Design mass production process for major automakers
		Built partnerships with key customers and responded to their needs by utilizing the development roadmap for xEV components	Establish a system to continuously increase production and improve production efficiency
		Established a system to increase production to meet customer demand and improved production efficiency	

5


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5

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I would like to present the progress of the current Medium-term Management Strategy. We are running the in-house company with the growth strategy shown in the upper right corner of the slide toward the long-term business goals shown in the upper left corner of the slide.

Below that, we show the priority measures that incorporate the growth strategy into specific measures. I will explain later about (1) through (3), shown in red.

< (1) KA Strategy Activities >

1. Advanced Products Company (Copper & Copper Alloy, Electronic Materials & Components)



(1) KA Strategy Activities

Activities up to now

- Sharing development roadmaps with KA from the design stage of next-generation products
- New product developments in line with future technology trends

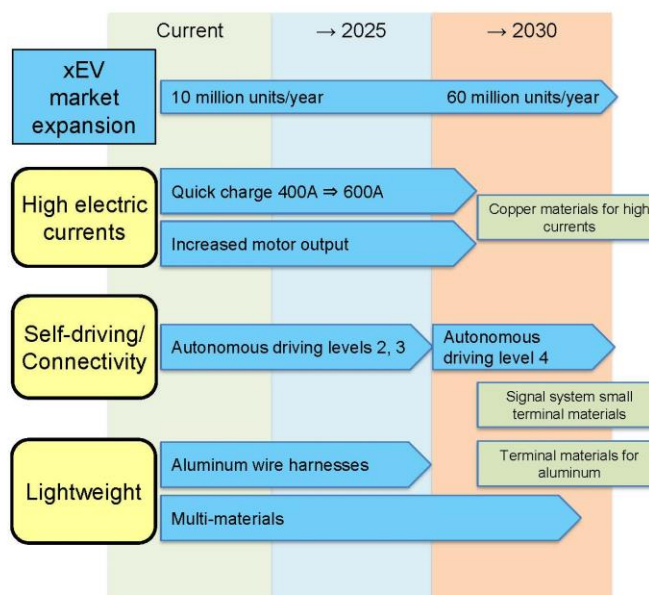


Future activities

- Continue developments in line with roadmaps
- Improve customer satisfaction by introducing digital technologies (SFA/CRM) to further strengthen customer contact points



Example: Next-generation vehicle (xEV) roadmap (copper materials)



This section describes the strategic activities of key accounts. Our policy is to become the first-call vendor for our customers and aim for the number one market share.

We have formulated strategies for each of our key account companies and continue to work on KPIs such as the number of sample orders and the number of business negotiations. By selecting key accounts based on existing customers, appointing an account manager from the sales department for each, and sharing the development roadmap with the key accounts, we are now able to develop products in line with technology trends.

In FY2023, we will continue this effort by broadening our focus to include the customers critical to our future, as well as introducing digital marketing tools such as Sales Force Automation and Customer Relationship Management. By doing so, we will further strengthen our competitive edge and improve customer satisfaction.

On the right side of the slide shows an image of the roadmap we are sharing with our customers. The yellow square shows the technology drivers that realizes xEV market expansion, and to the right of it are the technology trends that will inform that expansion. Beyond that, the green square represents an example of a product needed in the future.

< (2) Development of New Products and Businesses >

1. Advanced Products Company (Copper & Copper Alloy, Electronic Materials & Components)

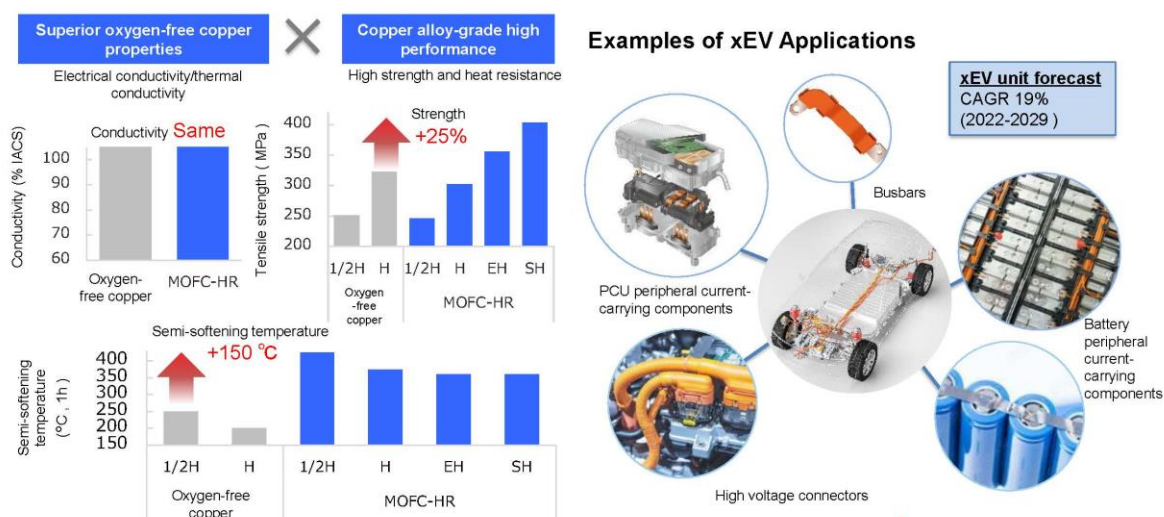


(2) Development of New Products and Businesses

■ Oxygen-free copper MOFC-HR

Proprietary development of the world's highest level of strength and heat resistance

Minor degradation of characteristics even in environments with high thermal loads. **Ideal as component for electrical equipment requiring high currents and high heat dissipation under harsh environmental conditions**, especially for xEVs and next-generation energy.



7

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Here I would like to present the status of new products and business development by technical theme.

The first example is the high-current-capable copper materials shown on the roadmap mentioned earlier. Oxygen-free copper MOFC-HR combines the world's highest level of strength and heat resistance. We have developed a material that does not lose its material strength due to heat even when heated by a high current. High current flow means good heat conduction, making it suitable for applications that require high heat dissipation. For xEVs, we are working with key accounts to develop the material for use in the applications shown in the figure on the right side of the slide.

The bar graph on the left side of the slide shows the technological superiority. The graph represents a comparison of the electrical conductivity, tensile strength, and softening temperature of MOFC-HR with those of conventional oxygen-free copper.

Electrical and thermal conductivity are equivalent to conventional oxygen-free copper, and tensile strength, a measure used when comparing strength, can be increased by 25% depending on manufacturing conditions. The softening temperature, indicating heat resistance, can be increased by up to 150°C depending on the manufacturing process. Thus, MOFC-HR is expected to be used in electrical components for x-EVs because of its ability to transport heat and electricity efficiently and maintain hardness at high temperatures.

< (2) Development of New Products and Businesses >

1. Advanced Products Company (Copper & Copper Alloy, Electronic Materials & Components)

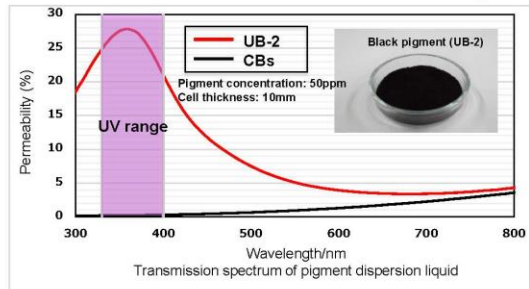


(2) Development of New Products and Businesses

■ High UV permeability black pigment NITRBLACK UB-2

Black pigment with the world's highest standard in high UV permeability

Facilitates UV curing of resin not possible with carbon black.



UV resin curing test results with 0.05wt% added to rabbit-shaped resin

Carbon black (CB)	High UV permeability black pigment (UB-2)
<p>● Insufficient curing</p> <ul style="list-style-type: none"> Thin film formed only on surface Liquid inside 	<p>○ Complete curing</p> <p>UV permeates deep inside and resin is fully cured</p>

Examples of NITRBLACK Applications



Black matrix for LCDs



Black matrix

Black material market
520 million yen (2022)
UB-2 is the world's first UV curable black pigment.



Light shielding materials for camera modules, IR sensors, etc.

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The second example is NITRBLACK UB-2, a black pigment with the world's highest level of high UV (ultraviolet light) permeability. Specifically, as shown in the figure on the right side of the slide, its applications include display black matrices and light shielding materials for sensors, etc.

The graph on the left side of the slide shows the reasons for the use of NITRBLACK. When curing resins containing black pigment with UV, conventional black pigment carbon black can only be cured up to the halfway point, as in the rabbit-shaped resin on the lower left of the slide, due to poor UV permeability.

However, resins with NITRBLACK can be fully cured. Since UV can penetrate even to the smallest of details, we expect to see applications in which microstructures such as the one shown on the right side of the slide are required.

< (3) Strengthening Production Systems (Increased Production) >

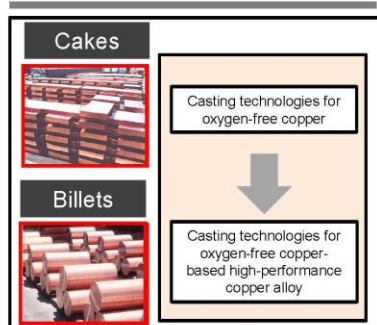
1. Advanced Performance Products Company (Copper & Copper Alloy, Electronic Materials & Components)



(3) Strengthening Production Systems (Increased Production)

Strengthening production systems for molded and rolled copper products

Increased production of molded copper (cast products)



Further strengthening of rolling business



Objective of increased production

- ◆ Strengthen and expand core business (copper sheets and strips)
- ◆ Further expansion of market share
- ◆ Take on challenge of global markets

		Sakai Plant	Sambo Plant	Wakamatsu Plant
Location		Sakai, Osaka Prefecture	Sakai, Osaka Prefecture	Aizuwakamatsu, Fukushima Prefecture
Plan	Increased production	30% higher than current production		
	Investment purpose	Casting facility upgrades	Additional washing machines, slitters and packaging machines	Additional slitters and packaging machines, reflow tin plating line upgrades
	Schedule	To start operations in 2023	To start operations in 2024	To start operations in 2024*
Progress		Upgrades at all three plants proceeding according to plans		

Note: Upgraded reflow tin plating line to start operations in 2023.

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Next, I would like to introduce some topics related to strengthening the production system, our priority measure.

First, I would like to explain how we are enhancing our production system for rolled products in the Copper & copper alloy business. Our Copper & copper alloy business evolves casting technology for oxygen-free copper into casting technology for oxygen-free copper-based high-performance copper alloy, which is then processed into copper & copper alloy products such as cakes, billets, copper sheet and strip products, and others. We are planning to further expand our market share for the global market.

To achieve this plan, we are making capital expenditure to increase production by 30% by FY2025, while balancing our alloy casting capacity with the production capacity of our mainstay copper sheet and strip products at our three production sites.

< (3) Strengthening Production Systems (Increased Production) >

1. Advanced Products Company (Copper & Copper Alloy, Electronic Materials & Components)



(3) Strengthening Production Systems (Increased Production)

Strengthening Columnar Crystal Silicon Production System at Mitsubishi Materials Electronic Chemicals

Increased production of replacement parts components for semiconductor manufacturing equipment



Columnar crystal silicon
(square ingot)

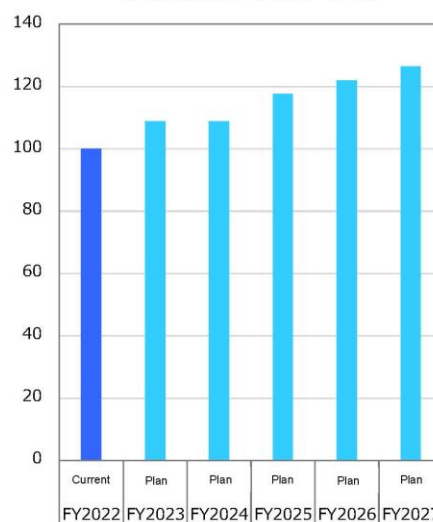


Ring-processed product
(semiconductor manufacturing equipment component)

- Among world's largest silicon crystals with maximum outer diameter of 1,200mm
- High purity and strength, with good thermal properties and processability
- Contamination prevented by use of same high-purity silicon in components as used in semiconductors
- Polycrystalline silicon with columnar crystal structure that is crystal-grown in one direction and solidified

Location		Mitsubishi Materials Electronic Chemicals
		Akita, Akita Prefecture
Plan	Increased production	Increase ingot production 1.3 times over current levels by 2026
	Investment purpose	Buildings, casting furnaces
	Schedule	To start operations in FY2025
Progress		Expansions proceeding as planned

Ingot production capacity (Index with FY2022 = 100)



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Next, I would like to present a case study on production increase of columnar crystal silicon, a raw material for processed silicon products. By increasing the production of columnar crystal silicon, we can increase the production of production components such as ring-processed products, made by cutting and processing this silicon, to meet the increasing demand for semiconductors.

Our columnar crystal silicon is unique in size, mechanical properties, purity, and crystallinity, and we will increase our production capacity by 30% in FY2025 to meet the subsequent increase in demand. You can see an image of the increase in production in the bar graph on the right side of the slide.

< (3) Strengthening Production Systems (Increased Production) >

1. Advanced Products Company (Copper & Copper Alloy, Electronic Materials & Components)



(3) Strengthening Production Systems (Increased Production)

Strengthening production systems in the seal products business

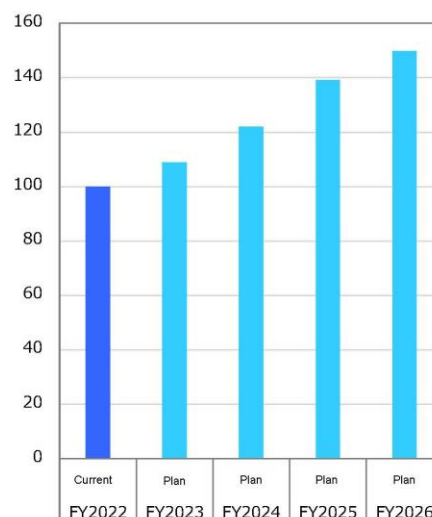
Increased production of sealing materials for semiconductor manufacturing equipment



- Sealing materials for semiconductor manufacturing equipment (plasma-resistant seals for dry etching equipment, etc.)
 - Plasma-resistant, PFOA*-free
- *Abbreviation for Perfluorooctanoic acid.
Content restricted by REACH regulations.

Location		Mitsubishi Cable Industries, Ltd., Kumagaya Office
Plan	Increased production	Approximately 1.5 times the current sales of products (above) in 2025
	Investment purpose	Existing building renovations, clean rooms
	Schedule	To start operations in FY2023
Progress		Expansions proceeding as planned

Production capacity on a sales basis
(Index with FY2022 = 100)



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11

Next, I would like to explain the production increase for sealing materials. As with columnar crystal silicon, the main applications are production components related to semiconductor manufacturing.

Due to the high integration of semiconductors, demand is increasing in the field of plasma-resistant seals for dry-etching equipment. At the same time, there is a growing demand for materials that do not contain regulated substances such as PFOA (perfluorooctanoic acid) for environmental performance.

To meet these demands, we are investing to enable a 50% increase in production by FY2026. The image of the production increase is shown in the bar chart.

We are committed to meet our customers' needs by linking marketing results to new product development and increased production investment plans.

That is all I have for you today. Thank you so much for your attention.

<2. Metalworking Solutions Business Company>

2. Metalworking Solutions Business Company

 MITSUBISHI MATERIALS

Tetsuya Tanaka (hereinafter referred to as "Tanaka"): Hello, I'm Tetsuya Tanaka, President of Metalworking Solutions Company. Thank you so much for your time today.

<Metalworking Solutions Business Overview>

2. Metalworking Solutions Business Company



Metalworking Solutions Business Overview

Major industry	Main product group		Company	Strengths	Sales composition	Market outlook
Automobiles Transport equipment	Cutting tools		Mitsubishi Materials MOLDINO Tool Engineering	<ul style="list-style-type: none"> •Cemented carbide material manufacturing technologies •Coating technologies (CVD/PVD) •Extensive lineup (indexable tools to solid tools) 	80%	<ul style="list-style-type: none"> •Despite concerns about the pandemic and global supply chain disruptions, the gradual recovery trend continues
Aerospace						
Medical						
Die & Mold						
Mine excavation Secondary batteries Steel	Rock tools Wear-resistant tools		MMC Ryotec	<ul style="list-style-type: none"> •Cemented carbide material manufacturing technologies •Design capabilities as strength in wear-resistant and rock tools 	11%	<ul style="list-style-type: none"> •Mine excavation, construction, and secondary battery markets all continue to recover
Cemented carbide Semiconductors Secondary batteries	Tungsten powder Advanced metal powder		Jan New Metals	<ul style="list-style-type: none"> •Integrated production, from tungsten recycling to smelting 	9%	<ul style="list-style-type: none"> •Growing demand for high melting point materials due to the growth in electronic components

Let me start with an overview of the Metalworking Solutions Business. In the Metalworking Solutions Business, we supply cutting tools, rock tools, wear-resistant tools, tungsten powder and advanced metal powder to a wide range of industries. The main business is the cutting tools business, which accounts for about 80% of total sales.

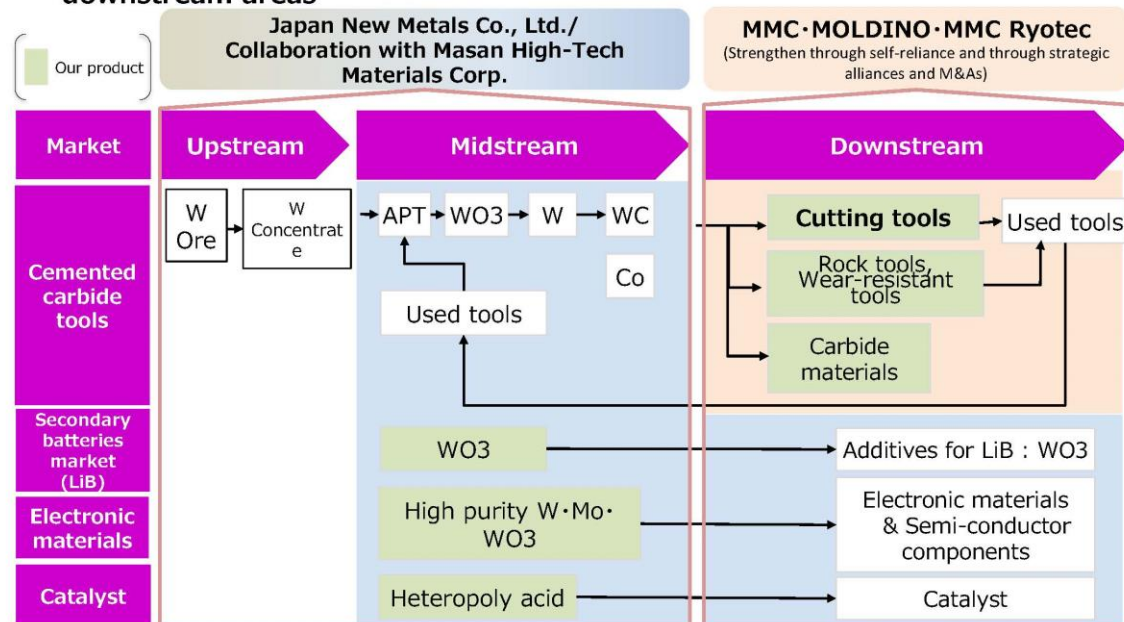
<Metalworking Solutions Business Overview>

2. Metalworking Solutions Business Company



Metalworking Solutions Business Overview

- Operate business from upstream to downstream areas, with the focus on downstream areas



14

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In the Metalworking Solutions Business, our operations extend from upstream to downstream areas in the value chain of the metal tungsten. From upstream to midstream areas, Japan New Metals Co., Ltd. as well as the collaboration with Masan High-Tech Materials Corporation, a company in which we invested in the year before last, are in charge.

For the downstream area, we are in charge together with MOLDINO Tool Engineering, Ltd., and MMC RYOTEC Corporation. We collect used cemented carbide cutting tools in the downstream and return them to Japan New Metals Co., Ltd. in the midstream for recycling.

<Cemented Carbide Cutting Tool Market Outlook>

2. Metalworking Solutions Business Company



Cemented Carbide Cutting Tool Market Outlook

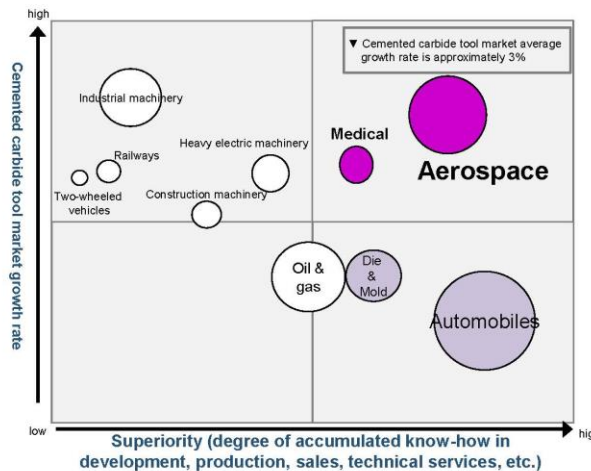
Demand for cemented carbide cutting tools is expected to grow at an annual rate of about 3%, reaching approximately 2.6 trillion yen per year in 2030.

*1.57 trillion yen/year (2021)

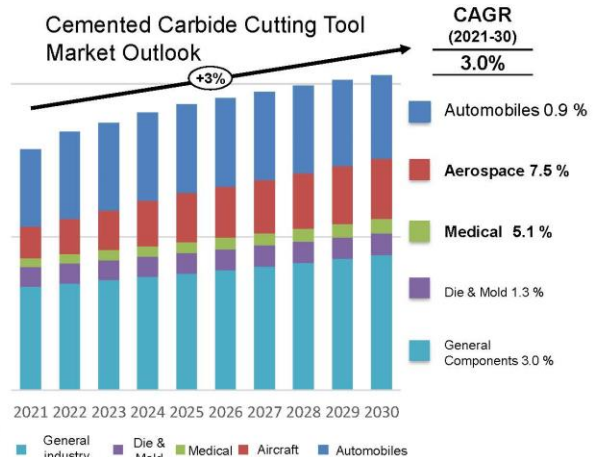
[Unit: hundred million yen]



Note: Mitsubishi Materials estimate.



Note: Mitsubishi Materials estimate.



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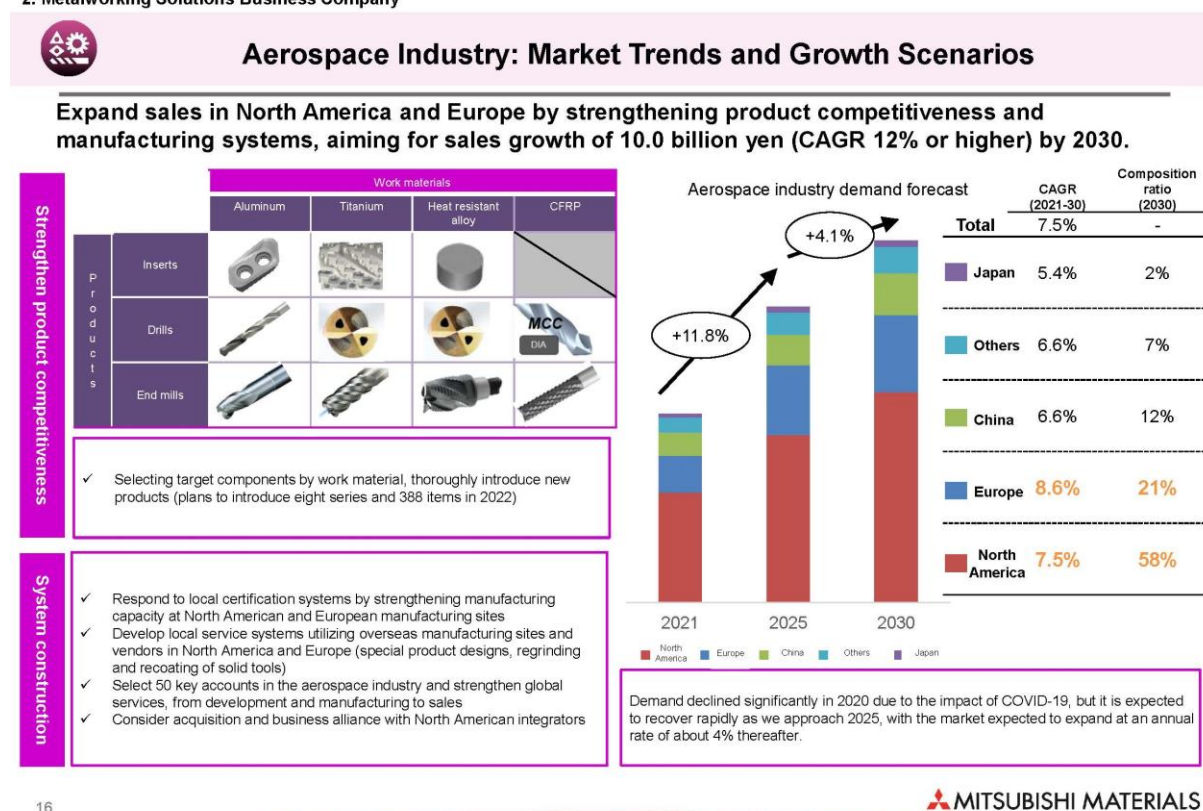
Let me explain the size of the global market for cutting tools, our main business. As shown in the graph on the right, we expect the demand for cemented carbide cutting tools to grow at an annual rate of about 3% and reach a scale of over 2 trillion yen in 2030.

The left graph shows the market growth rate of cemented carbide cutting tools on the vertical axis, the superiority of our products on the horizontal axis, and the size of the circle represents the market size as of 2030, with our target markets being the automotive, aerospace, medical, and die & mold industries.

Regarding our initiatives in the aerospace and medical industries, where we expect the market growth, I will explain in detail from the next page onward.

<Aerospace Industry: Market Trends and Growth Scenarios>

2. Metalworking Solutions Business Company



First, let me explain about the aerospace industry. The graph on the right shows the projected demand for cutting tools in the aerospace industries.

Although demand fell sharply in 2020 due to COVID-19, we expect the market size to expand at an annual growth rate of more than 7% through 2030, especially in North America and Europe.

Here is an explanation of our key measures. To strengthen our product capabilities, we categorize aerospace parts by work material and will thoroughly launch new products to target tools for machining difficult-to-cut materials where we can demonstrate our performance superiority.

As for the supply system, we plan to expand sales beyond the market growth rate by increasing manufacturing capacity in North America and Europe, where market growth is expected, and by strengthening our service bases and collaborating with local integrators.

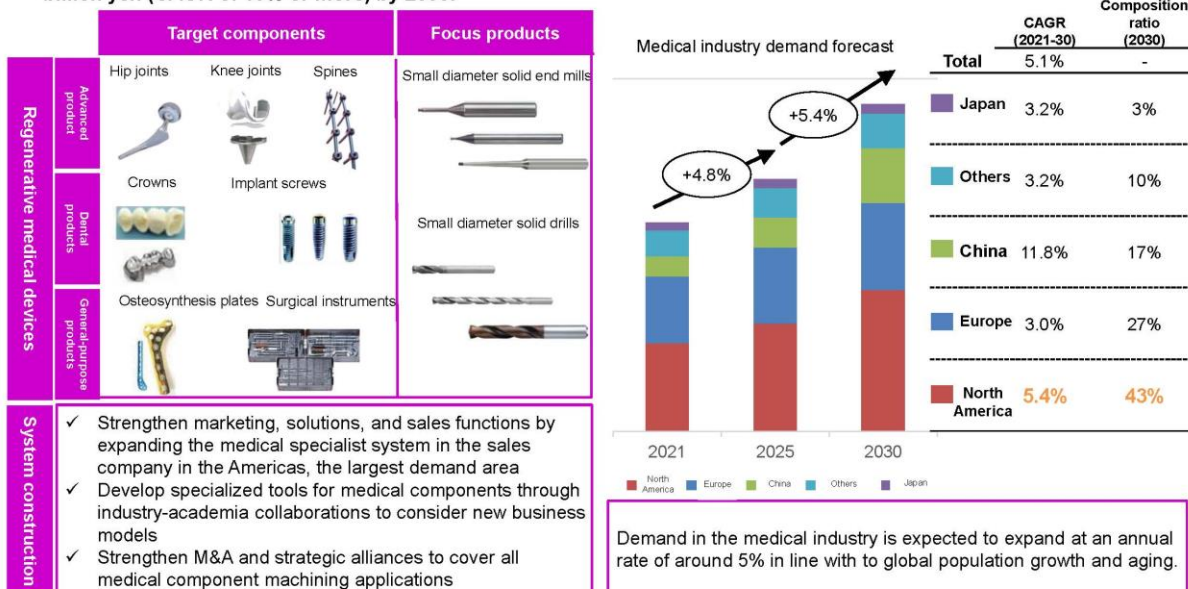
<Medical Industry: Market Trends and Growth Scenarios>

2. Metalworking Solutions Business Company



Medical Industry: Market Trends and Growth Scenarios

Focusing efforts on the regenerative medical devices segment (advanced, dental, and general-purpose products) on the strengths of small-diameter solid drills and end mills with performance superiority, aiming for sales increase by 7.6 billion yen (CAGR of 19% or more) by 2030.



Next is about the medical industry. We expect the medical industry will also experience an increase in demand due to the global population growth and aging, and assume that the market size will expand at an annual growth rate of about 5% through 2030.

Many regenerative medicine device parts are machined from difficult-to-cut materials such as titanium alloys and cobalt-chromium alloys, and we plan to expand sales by taking advantage of our strength in small-diameter solid tools for machining difficult-to-cut materials.

In addition, we plan to focus on strengthening our functions in the North American area, accounting for approximately 40% of demand as of 2030, and to expand medical parts machining applications by the development of specialized tools through industry-academia collaboration, M&A, and by strengthening alliances.

<Progress of the FY2023 Strategy | Priority Measures>

2. Metalworking Solutions Business Company



Progress of the FY2023 Strategy | Priority Measures

Long-term business goals Top 3 supplier in strategic markets		Specific Measures in FY2023 Strategy	<ul style="list-style-type: none">Establish a competitive global business baseProvide high-efficiency tools and digital solutionsTransition to smart factory and optimization of logistics and supply chainIncrease recycling rate in our tool recovery system and utilize renewable energyExpand advanced powder business to rechargeable battery market	
Long-term strategy	<ul style="list-style-type: none">Promote clean manufacturingProvide high-efficiency products with advanced technologyExpand advanced metal powder business in electronic devices			
Priority Measures		FY2022 Results		Plans for FY2023 and beyond
Provide products and services near customers through a four-polar system	Formulated a basic concept with each site for <u>transferring control function</u> such as manufacturing, sales, inventory.	<u>First establish European control base</u> , then expand to the Americas and China		
Develop highly efficient tools	Launched sales of <u>629 new products</u> targeting key industries	Develop tools for machining difficult-to-cut materials for key industries, plan to launch <u>2,641 new products</u> in FY2023		
Promote transition to smart factories	Formulated factory vision based on business strategy <u>to raise the manufacturing capability to the next level</u>	Promote <u>cross-departmental projects</u> to improve efficiency of goods, people and equipment, including progress, spare capacity, and physical management		
Expand cemented carbide recycling and utilize renewable energy	<u>Achieved a recycling rate of 44% in FY2022</u> (FY2023 Strategy target: 35%)	Collaborate with Masan High-Tech Materials Corporation and <u>expand the amount of cemented carbide scrap collected from overseas areas</u> to achieve a recycling rate of 80% by 2030 (FY2023 target: 50%)		
	In line with the revision of GHG reduction targets, the plan was changed to make the <u>entire amount of electricity used in the manufacturing process virtually CO2-free</u> by FY2031	Begin purchasing renewable energy electricity at domestic manufacturing sites, plan to <u>increase by 11% each year</u>		
Expand advanced metal powder business to rechargeable battery market	Engaged in developments for the <u>commercialization of advanced metal powder for in-vehicle secondary batteries</u>	<u>Continuous implementation of prototype evaluation tests</u> at secondary battery manufacturers (lot repeatability confirmation)		
	<u>Considered technical cooperation</u> with Masan High-Tech Materials (MHT) regarding advanced tungsten powder	<u>Continue consideration with MHT</u>		

Here is an update of our current progress of the Medium-term Management Strategy. Our long-term business goal is to become the Top 3 supplier in strategic markets. Specific measures are shown in the box on the upper right, and priority measures are shown in the table below. I will explain some of them from the next page onwards.

<Building a Global Business Foundation (Four-polar System Concept)>

2. Metalworking Solutions Business Company

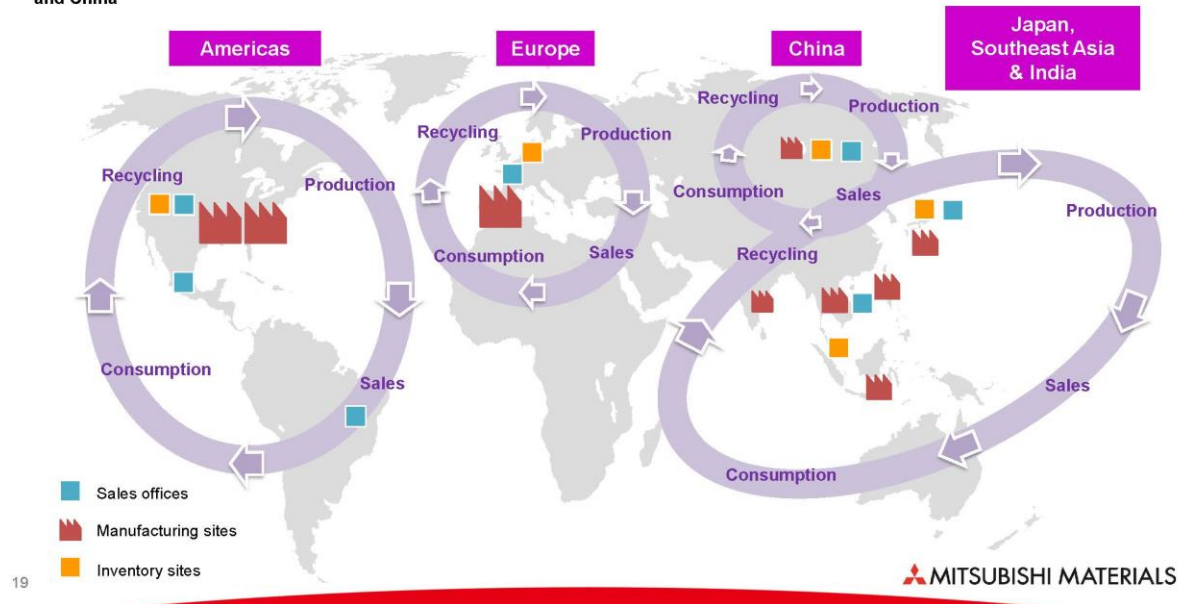


Building a Global Business Foundation (Four-polar System Concept)

Provide products and services near customers by integrating and strengthening the manufacturing and sales functions within each region.

- Mitigate the risk of supply chain disruptions caused by changes in international situation and natural disaster risks
- Streamline logistics to reduce greenhouse gas emissions

First establish a control base in Europe, where demand for tools is expected to grow, then enhance functionality of sites in the Americas and China



Now, I would like to proceed with our global four-polar system as part of our efforts to build a global business platform. By shifting control functions previously concentrated in Japan, and production functions previously concentrated in the low-cost Asian region, to each region, we will accelerate local production for local consumption, and speedily provide products and services from near the place of demand. At the same time, we plan to reduce the risk of supply chain disruptions, caused by geopolitical risks and pandemics, as well as to reduce CO2 emissions from transportation.

We plan to establish a control base in Europe, anticipating growing demand, first, and then gradually expand to North America and China.

<Development of High-Efficiency Tools>

2. Metalworking Solutions Business Company



Development of High-Efficiency Tools

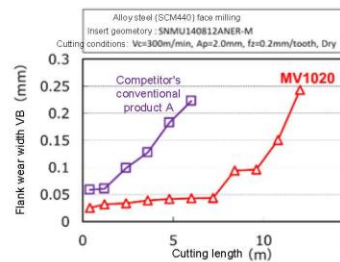
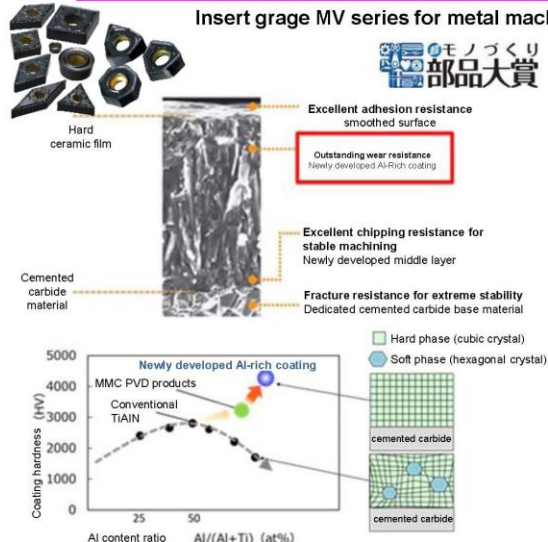
Product development realizing overwhelming performance with core competencies in materials and coating technologies

- A tool achieving world-leading performance by adopting new materials and elemental technologies instead of improving on conventional products

*High efficiency: High speed/high feed (N times), lifespan (N times), cutting resistance (1/N), productivity (1/N), etc.



Insert grade MV series for metal machining (MV1020/MV9005)



- ✓ "Newly-developed Al-rich coating technology" maintains cubic crystals even when Al content of AlTiN film exceeds 80%, which has been difficult with conventional technologies.
- ✓ One-of-a-kind product with industry-leading deposition technologies.
- ✓ Excellent adhesion and wear resistance in machining heat-resistant alloy, which is one of the target components in the aerospace industry.

20

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Here is an explanation of our development of high efficiency tools. With cemented carbide materials and coating technology as our core competencies, we will develop products with unparalleled performance and provide tools that contribute to the productivity improvement of our customers.

For example, we have described on the insert grade applying the Al-rich coating technology.

This is a one-of-a-kind product that demonstrates performance even when the aluminum content in aluminum-titanium nitride coatings exceeds 80%, which has been difficult to achieve with conventional technology, by applying the industry's top coating technology. This product demonstrates overwhelming performance in a wide range of areas from difficult-to-cut materials to steel and cast iron.

<Solutions Proposals Utilizing Technical Centers>

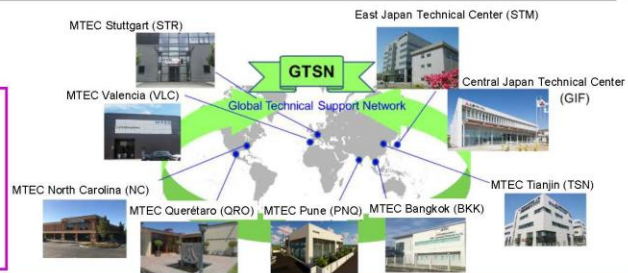
2. Metalworking Solutions Business Company



Solutions Proposals Utilizing Technical Centers

Providing solutions that resolve customers' problems and improve productivity

- Solutions provided to customers around the world from technical centers across the globe
- Analyses and evaluations using various processing machines and technologies
- Proposals to customers backed by CAE analysis, other metrics
- Technical workshops held for various skill levels



Software

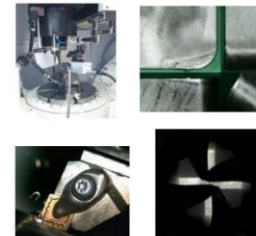
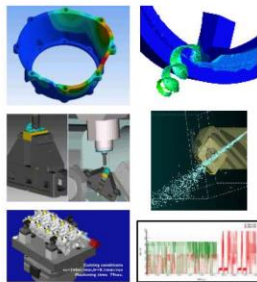
- CAD
- CAM
- CAE (cutting loads/structural analysis)
- Machining simulations

Machine tools (23 units)

- 3-axis M/C (BT30/40/50, HSKA63/100, etc.)
- 5-axis M/C (HSK-A63)
- Lathes (8-inch and 10-inch chucks)
- Automatic lathes (vibration cutting function)
- Multi-tasking machine (10-inch chuck)

Measurement/observation equipment

- Digital microscopes
- 3D measuring microscopes
- High speed cameras
- Multicomponent dynamometers to measure cutting forces
- Surface roughness/contour shape measuring equipment



In addition to the developed products, by utilizing the technical centers located around the world, we will strengthen the provision of solutions to solve our customers' problems and improve their productivity, by chip analysis using CAE, machining path simulation using CAM, and cutting load analysis using cutting monitoring systems, etc. for our high efficiency tools.

<Promoting DX: Provision of Solution Services>

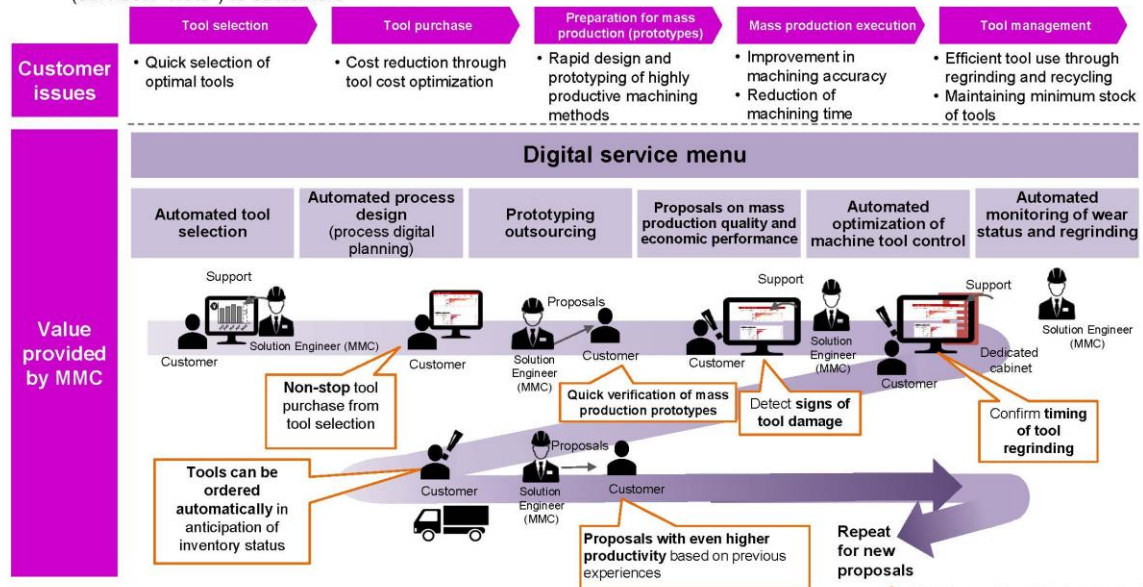
2. Metalworking Solutions Business Company



Promoting DX: Provision of Solution Services

Contributing to customer productivity and cost reductions with the provision of total solutions (tools and digital solutions)

- Transform to a business model that provides not only tools (products: "Mono") but also digital solutions as services (services: "Koto") to customers



22

MITSUBISHI MATERIALS

Now let me introduce you to Koto Selling using DX and providing total solutions. People say the days when you simply need to make a good product to sell are over. We too, are aiming to change our business model from just selling products ("Mono") to selling services ("Koto").

Customers are facing issues in various processes, such as tool selection, tool purchase, mass production preparation, mass production execution, and tool management. We do not just sell consumable cutting tools, but also provide customers with solution experiences to solve their problems in each process and to meet their needs for productivity improvement, thereby contributing to their productivity improvement, cost reduction, and social value enhancement.

We aim to transform the provision of these solution experiences into a new business model as Koto Selling.

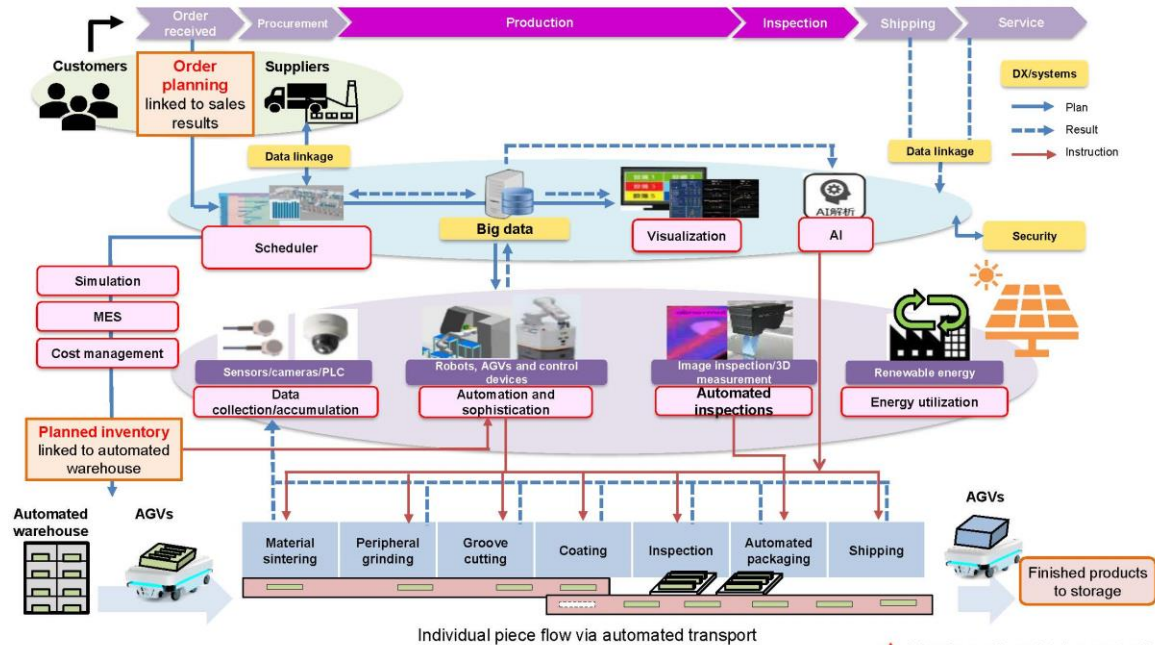
<Promoting DX: Smart Factories>

2. Metalworking Solutions Business Company



Promoting DX: Smart Factories

Promote shorter lead times and labor savings using smart factories to enhance cost competitiveness



23

MITSUBISHI MATERIALS

Here is about strengthening manufacturing capabilities through the use of DX. Through the shift to smart factories at manufacturing sites, we promote the collection, accumulation, and analysis of various data from production planning to shipping, the automation of manufacturing and transfer equipment, and the automation of inspection and measurement technologies.

By realizing smart factories, we will offer highly cost-competitive products by reducing costs through shorter lead times and labor savings, as well as by improving quality and productivity.

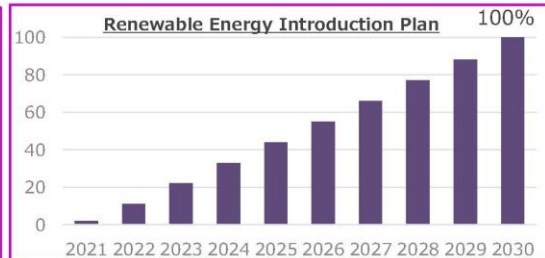


Sustainability Initiatives

Aiming to achieve 100% renewable energy utilization by 2030 to achieve carbon neutrality

Initiative

- Survey of energy usage at manufacturing sites, including overseas
- Establish an action plan for energy saving activities/introduction of renewable energy
- Establish a plan for energy saving improvement activities at domestic and overseas sales offices
- Promote switching to renewable energy (11% annual increase from 2022)

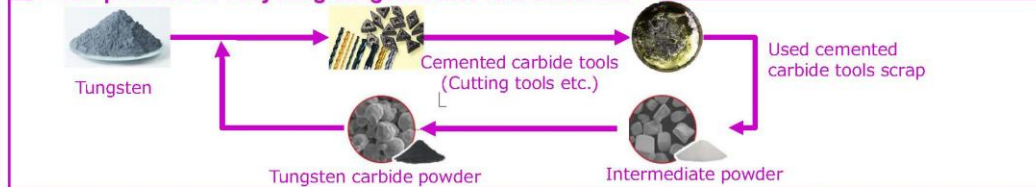


Aiming to achieve a recycling rate of 80% or higher by reinforcing the recycling plant for cemented carbide scrap

Initiative

- Actual recycling rate in the FY2022: 44% (vs. FY2023 Strategy Target: 35%)
- Considering recycling collaboration with Masan High-Tech Materials (Vietnam)

<The process of recycling tungsten into raw materials>



I would like to present our sustainability initiatives. The upper part of the slide shows our plan to introduce renewable energy. In addition to promoting the switch to energy-saving equipment, we will accumulate renewable energy-derived electricity equivalent to 11% annually starting this fiscal year, with the goal of 100% utilization of renewable energy-derived electricity by FY2031.

In order to expand the recycling of cemented carbide tools, we aim to achieve a recycling rate of 80% or more in 2030, and will work to increase recycling processing capacity in cooperation with Masan High-Tech Materials Corporation and to expand the amount of scrap collected globally.

That is all I have for you today. Thank you so much for your attention.

<3. Metals Company>






3. Metals Company

 MITSUBISHI MATERIALS

Hello, I'm Katsuyoshi Isaji, (hereinafter "Isaji") President of Metals Company. I am pleased to meet you today.

<Business Overview>

3. Metals Company

<div>  Business Overview </div>				
Business	Overview	Strengths	Revenue structure	Market opportunities, outlook and future policies
Resources business	 <p>Investing in overseas copper mines for stable procurement of clean copper concentrate</p>	<ul style="list-style-type: none"> Many years of experience in domestic mining operations Long-term amicable relations with major resource providers 	27 billion yen (FY2022 ordinary profit)	<p>Market Opportunities</p> <ul style="list-style-type: none"> Strategy revisions amid the willingness of major resource companies to develop copper mines and decarbonization <p>Market outlook</p> <ul style="list-style-type: none"> Tax hikes, stricter regulations and resistance to development due to resource nationalism and heightened environmental awareness Deeper exploration of new mineral deposits/remote areas/lower grade minerals and rising impurity levels <p>Future policies</p> <ul style="list-style-type: none"> Promote mine development projects and new exploration Develop technologies for the removal of impurities from copper concentrate Review asset portfolio Train resource engineers
Smelting business	 <ul style="list-style-type: none"> Non-ferrous metal smelting using copper concentrate, metal scrap, waste, etc. as raw materials Sales of manufactured electrolytic copper, gold and silver, PGM*, tin, lead and by-products (sulfuric acid, gypsum, etc.) <p>*Platinum group metal</p>	<ul style="list-style-type: none"> Utilization of the highly efficient, eco-friendly Mitsubishi Process for continuous copper smelting The world's No. 1 E-Scrap processing capacity Advanced recycling technologies and business infrastructure Integrated manufacturing system, from raw materials to finished products Various production bases (copper/lead/tin/precious metals/PGM) 	23.2 billion yen (FY2022 ordinary profit)	<p>Market Opportunities</p> <ul style="list-style-type: none"> Enhanced recovery and commercialization of trace components in the process Transition to a recycling-oriented and decarbonized society Expansion of E-Scrap market due to heightened environmental awareness Copper consumption trending upward over the medium- to long-term <p>Market outlook</p> <ul style="list-style-type: none"> Intensifying competition for collection of E-Scrap Brisk market for sulfuric acid, sluggish market for copper slag <p>Future policies</p> <ul style="list-style-type: none"> Implement various measures to increase collection of E-Scrap Further expand volume of E-scrap processing through advances in valuable metal material flow Promote carbon neutral initiatives

Here is an overview of our business. We have two major businesses: the Resources business and the Smelting business. I believe that FY2022 was a good year, with each of our businesses achieving solid ordinary profit. Going forward, despite the market opportunities and risks, we believe that the desire to develop copper mines, including resource majors, will continue, attracting more funds. However, strategies including decarbonization are also required, and we believe it is necessary to keep a close eye on the review process.

In addition, one thing that concerns me a little these days is the rise of resource nationalism. Or, while the rise in environmental awareness is not a bad thing, it has led to the emergence of various regulations, which we need to deal with.

Our future policy might sound simple, but we will continue to promote the development projects we are working on. Furthermore, I firmly believe that it is all about looking ahead and conducting new explorations.

As for the Smelting business, we understand that the role and presence of smelting will increase as we move toward a recycling-oriented and decarbonized society. In addition, demand and consumption of copper are expected to increase over the medium- to long-term and we intend to grow by taking a firm grasp of this trend.

However, we expect the competition will be extremely fierce in this market. Therefore, we need to take various measures to be competitive, and are actually proceeding with them. We intend to ensure the development of these measures. Furthermore, we recognize our commitment to carbon neutrality in smelting is a must, although the hurdles are quite high.

<Metals Business>

3. Metals Company



27

MITSUBISHI MATERIALS

The slide shows a schematic diagram of the logistics. The Group's core smelters process copper concentrates from mines and recycled raw materials from urban mines. The photo above, shown in the orange frame marked smelter, is Naoshima Smelter & Refinery, and below is Onahama Smelter & Refinery (Onahama Smelting and Refining Co., Ltd.)

Copper cathodes, our main product, are consumed most within the Company and are turned into copper & copper alloy products at Advanced Products Company and delivered to customers. In addition, some copper cathodes, precious metals, and by-products are sold directly to customers in Japan and overseas, and exports have been increasing in recent years. We sell copper slag to customers such as cement companies.

Progress of the FY2023 Strategy Priority Measures			
Long-term business goals Leader in environmentally-friendly mining & smelting business		FY2023 Strategy	<ul style="list-style-type: none"> Secure clean copper concentrate by investing in new mines Develop impurity removal technology in copper concentrate Optimize valuable metal material flow Reduce fossil fuels
Long-term strategy	Stable supply and recycling of nonferrous metal materials, predominantly copper • Creation of a sustainable raw material portfolio consisting of clean copper concentrate and E-Scrap/•Promotion of recycling/•Response to climate change		
Key Measures for FY2023 Strategy		FY2022 Results	Plans for FY2023 and beyond
Mining	Securement of clean copper concentrate by investing in new mines	The Zafranal copper project was partially delayed from the original plan due to local conditions in Peru (e.g., COVID-19). We made an application on obtaining an environmental permit (EIA). Conducted detailed engineering, stripping and other construction work at the Mantoverde mine in preparation for the start of sulfide ore production in 2024 (58% progress against 62.6% plan as of the end of June 2022)	Make final investment decision after obtaining the environmental permit (EIA) for Zafranal copper project Steadily progress Mantoverde copper project construction work (The ore dressing plant and tailings dam construction will be completed by the end of FY2024)
		Started trial operation of the ore dressing plant expansion at Copper Mountain Mine from the end of November 2021	Optimize mining operations , including expansion
Smelting	Optimization of material flow for valuable metal	Increased recovery of valuable metals through the installation of slime leaching equipment at the Naoshima Smelter and Refinery. The tin recovery facility installed at Hosokura Metal Mining Co., Ltd. continued stable operations and recovered tin steadily.	Develop technologies for separation and recovery of trace components in E-Scrap for further efficient recovery of valuable metals
	Reduction in fossil fuels	Identified and optimized factors limiting E-Scrap input , which can also be used as an alternative fuel, to reduce fossil fuel consumption (Progress as planned)	Promote fossil fuel substitution through increased E-Scrap processing by taking advantage of the superiority of Mitsubishi Process for continuous copper smelting

I would like to present the current progress of the Medium-term Management Strategy. The slide shows the results of the Mining business in FY2022, and we will continue to promote these measures in FY2023 and beyond.

As for the Zafranal Mine, we applied for the environmental permit in February of this year and it was received. Efforts to obtain the final permit are underway, and we aim to obtain it by the end of current fiscal year. We are unable to provide details on the final investment decision at this moment, as it will be made after that.

As for the Mantoverde mine, construction work is proceeding as planned. As of June, nearly 60% has been completed, and we are targeting to start production in 2024. As for Copper Mountain, an expansion work has been completed as well, and optimization is underway to fully utilize its facilities.

As for smelting, we are working to increase the recovery of valuable metals such as precious metals and tin. The amount of tin recovered has been increasing due to the construction of a new tin recovery facility, which is now operating stably. We will continue to develop separation and recovery technologies for trace components contained in recycled raw materials to generate earnings.

Also, to reduce the use of fossil fuels, we are striving to increase the amount of E-Scrap processed, that can also be used as an alternative fuel. Since we can also take advantage of the superiority of Mitsubishi Process for continuous copper smelting, we would like to leverage this advantage.

<Mining Investment Objectives>

3. Metals Company



Mining Investment Objectives

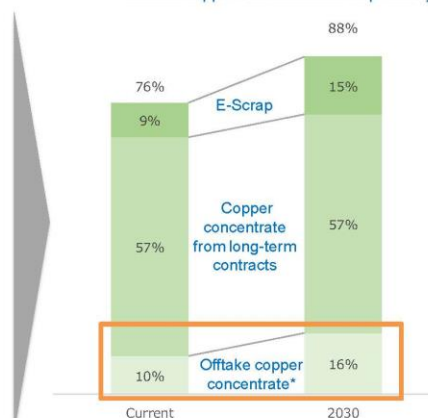
- Mining investment is essential for MMC to acquire clean copper concentrates with few impurities and maintain the copper smelting business, which is the foundation of its business.
- Amid global trends toward the realization of a decarbonized society, copper smelting and refining is expected to continue to expand going forward, and MMC must acquire interests in copper mines and enjoy the benefits of high copper prices as demand expands.

Megatrends (risk factors)

- Increase in copper concentrate impurities
- Increase in impure inputs due to expansion of E-Scrap processing
- Intensifying competition to acquire copper concentrate
- Increased uncertainty due to resource nationalism
- Headwinds confronting copper mining due to growing environmental awareness

Long-term strategy

Build a sustainable raw materials portfolio that can cover approximately 90% of copper raw materials required by copper smelters.



*Offtake: Long-term trading rights tied to mining investment interests.

Mantoverde copper mine (Chile)



Zafranal mining claim (Peru)



 MITSUBISHI MATERIALS

The primary objective of the mining investment is to acquire clean copper concentrates to promote recycling in the Copper smelting business, which is the foundation of our business. As shown in the graph in the center of the slide, the current stable procurement ratio is 76%. This includes off-take copper concentrates from copper mines that we have invested in, copper concentrates from long-term contracts that come from mining companies with whom we have long-standing relationships, and E-Scrap, a recycling feedstock. We are working to increase this to 88% by 2030.

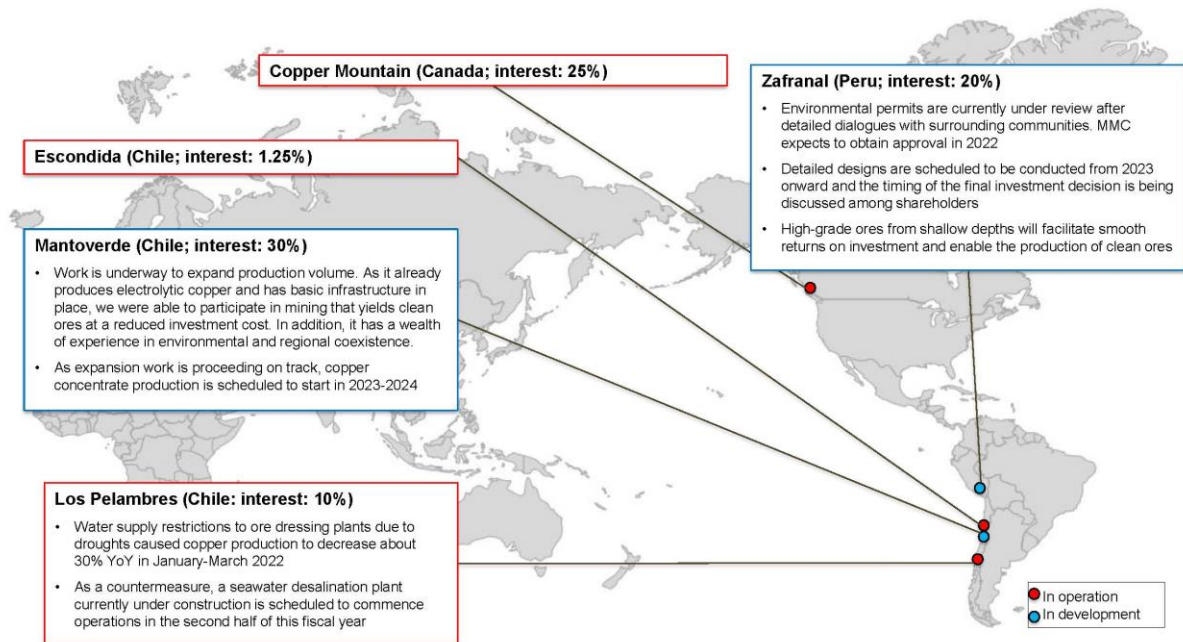
Also, as we expect copper prices to increase as demand grows, we are willing to invest in mines where we can take advantage of its benefits.

<Interest-holding Mines>

3. Metals Company



Interest-holding Mines



30

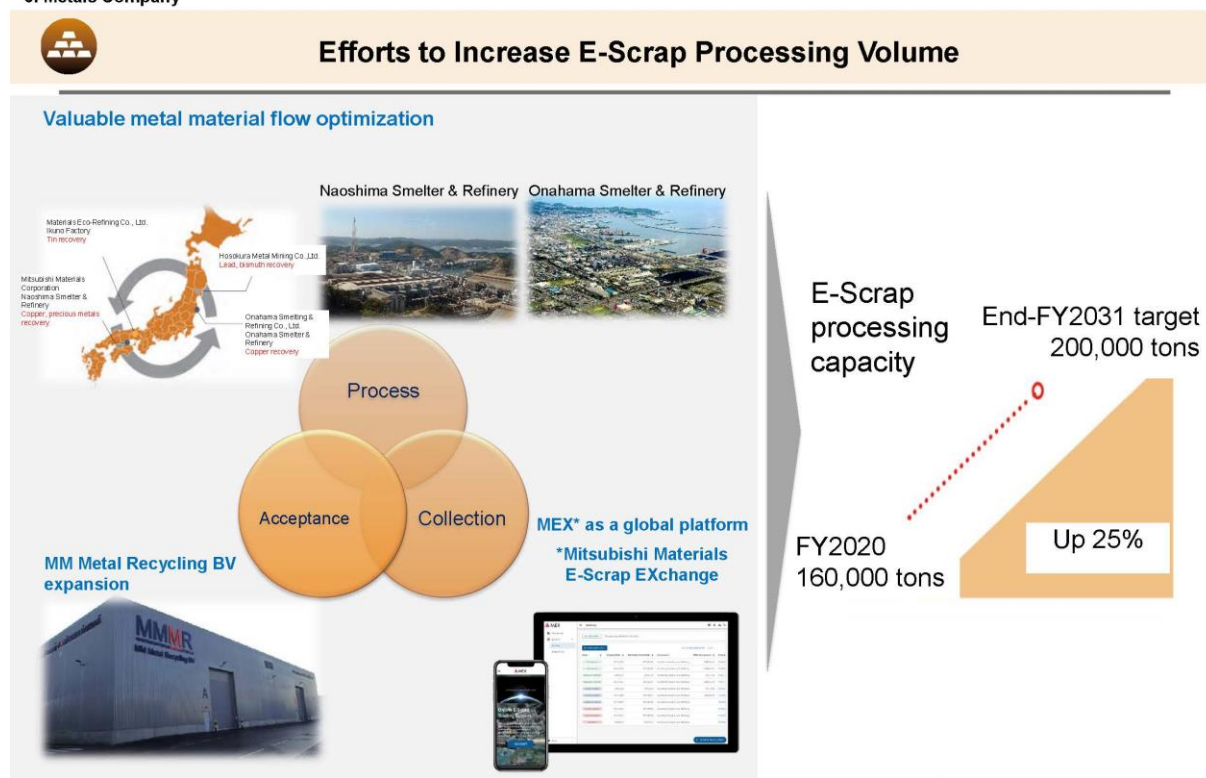
MITSUBISHI MATERIALS

The slide shows the mines we currently hold interests in. Copper Mountain, Escondida mine, and Los Pelambres, circled in red, are already in operation. Mantoverde and Zafranal, circled in blue, are projects that will begin development and production in the future.

As for Los Pelambres, the plant operation has not been at full capacity since around the beginning of this year due to the water shortage in Chile. As a countermeasure, a plant to desalinate seawater is currently under construction and will be operational in the second half of the current fiscal year, an initiative that will enable us to address water shortages.

<Efforts to Increase E-Scrap Processing Volume>

3. Metals Company



31

MITSUBISHI MATERIALS

The following is an overview of our efforts to process E-Scrap. The measures to increase throughput include optimization of valuable metal material flow.

As a measure to increase collections, first, for receiving, we expanded MM Metal Recycling in the Netherlands last year in order to strengthen logistics. In addition, we have developed and started operating a digital platform, Mitsubishi Materials E-Scrap EXchange (MEX). Through these measures, we hope to increase E-Scrap processing capacity by 25% to 200,000 tons by the end of FY2031.

<Measures to Increase E-Scrap Processing Volume: Valuable Metal Material Flow Optimization>

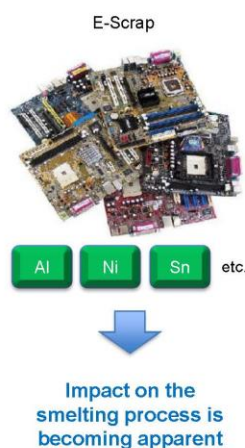
3. Metals Company



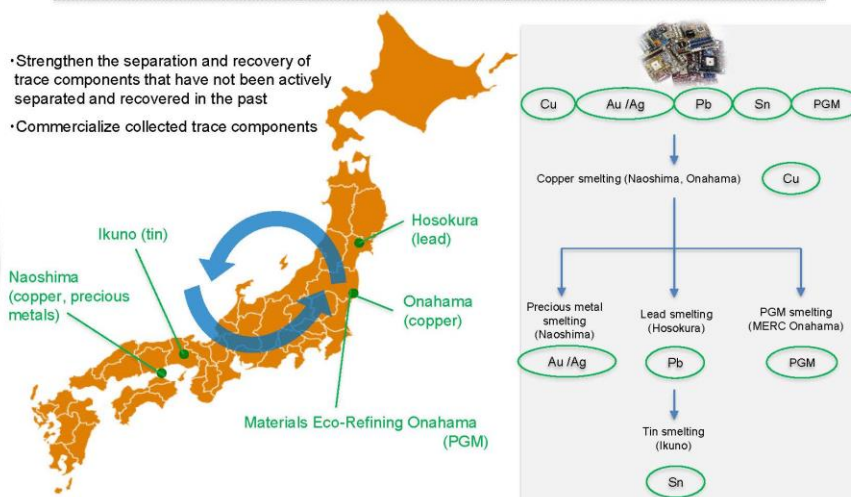
Measures to Increase E-Scrap Processing Volume: Valuable Metal Material Flow Optimization

- MMC will optimize material flow connecting various production bases (copper, lead, precious metal, tin and PGM smelting) to efficiently recover various valuable metals contained in E-Scrap. To this end, MMC will develop the necessary smelting technologies and improve smelter operations.
- Improve profitability by selling valuable metals recovered from E-Scrap.

Initiative background



Material grid overview



E-Scrap's recycled raw materials contain various trace components that, if not separated and recovered, will adversely affect the copper smelting process and the precious metal process. To avoid this, we need to enhance separation and recovery. In addition, the recovered material is a valuable metal and can lead to increased revenues.

As part of such efforts, we are working to comprehensively strengthen the Group's production sites, based on Naoshima and Onahama, Ikuno for tin, Hosokura for lead, and Material Eco-Refine Onahama for PGMs.

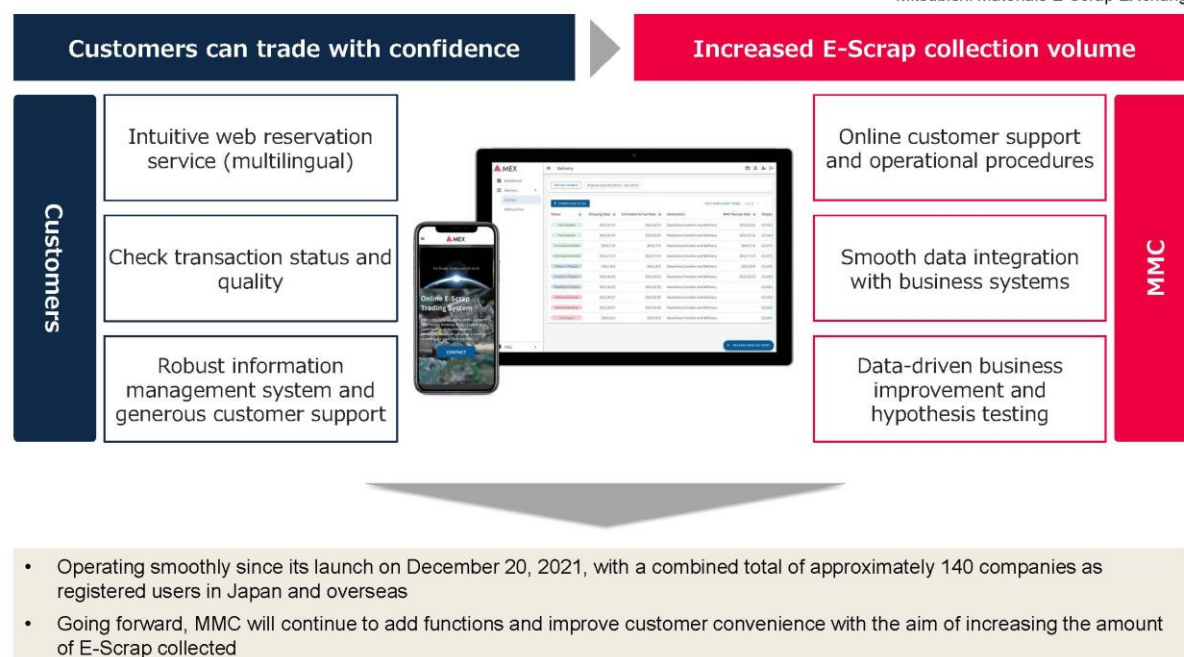
<Measures to Increase E-Scrap Collection: MEX* as a Global Platform>

3. Metals Company



Measures to Increase E-Scrap Collection: MEX* as a Global Platform

*Mitsubishi Materials E-Scrap EXchange



33

MITSUBISHI MATERIALS

I would like to explain MEX, which started operation on December 20, 2021. MEX was created to provide customers with a secure, extremely convenient, and easy transaction experience.

Not only can customers book deliveries, but they can also easily check online when the delivered items arrived at Naoshima or Onahama, when they were processed, and what kind of quality they were. In addition, customer support has the function to easily and quickly respond to various problems.

Not only on the customers' side, but also on the Company's side, we can improve operational efficiency and use the data obtained to improve the operation itself. We believe that this will be a very significant weapon for the Company.

Thankfully, since its launch, the service has already gained popularity with more than 140 customers in Japan and overseas. We intend to add more functions in the future to differentiate us from our competitors.

That concludes my presentation.

<4. Environment & Energy Business Company>

4. Environment & Energy Business Company

 MITSUBISHI MATERIALS

Yoshiaki Arai (Arai): I am Yoshiaki Arai, President of Environment & Energy Business Company. I am pleased to meet you today.

<Business Overview>

4. Environment and Energy Business Company

Business	Business overview	Strengths	Revenue structure	Market Opportunities Market Outlook
Environmental Recycling Business	 Home appliance recycling, automobile recycling, food waste biogasification, Incineration fly ash recycling	Recycling processing technologies Rare earth recovery technologies Incineration fly ash recycling technologies Proprietary recycling system (smelters, cement plants)	1.5 billion yen (FY2022 ordinary profit)	<ul style="list-style-type: none"> ● Opportunities Depletion of mineral resources: Increased demand for recycled resources ● Risks Competitor trends and market entry Manufacturer restructuring Emitting municipality trends
Renewable Energy Business	 Geothermal power, hydroelectric power, solar power	Experience in geothermal energy development and operations	1 billion yen (FY2022 ordinary profit)	<ul style="list-style-type: none"> ● Opportunities Depletion of energy resources Domestic energy security Climate change (global warming) Reduced CO2 emissions Increased demand for renewable energy ● Risks Building consensus with stakeholders National policy changes, legal reforms

First, let me give you an overview of our business. Environment & Energy Business Company consists of the Environmental recycling business and the Energy business. The Environmental recycling business focuses on four business segments: home appliance recycling, automobile recycling, food waste biogasification, and incinerated fly ash recycling. The Company is developing its business by considering the entire municipal waste as a market. The profit scale is 1.5 billion yen in actual results for FY2022.

In the Energy business, we focus on the Renewable energy business and engaged in geothermal, hydroelectric, and solar power generation. Our strength lies in the experience in geothermal development and operation, and our profit scale is 1 billion yen in FY2022 actual.

<Progress of the FY2023 Strategy | Priority Measures>

4. Environment and Energy Business Company

Progress of the FY2023 Strategy | Priority Measures

Long-term Business goals

(Environmental recycling) Driving force of resource-recycling systems
(Renewable energy) Leading company in geothermal development

Long-term strategy

- Provision of a safe recycling system with thorough traceability, etc.
- Decarbonization by expanding renewable energy business

FY2023 Strategy

- Expand home appliance recycling business, advancement of automation, and improvement of added value of recovered products
- Demonstrate LiB recycling technology and solar panel recycling technology
- Secure stable plant operations in fly ash recycling business and biogasification business
- Complete Komatagawa new hydroelectric power plant, construction of Appi geothermal power plant, and survey of new geothermal sites, survey of new small hydropower

	FY2023 Strategy priority measures	FY2022 Results	Plans for FY2023 and beyond
Environmental recycling	Promote automated dismantling in home appliance recycling	<ul style="list-style-type: none">• Completed the concept for robotization of AC outdoor unit compressor removal and recovery work, launched production of demonstration machine• Transferred picking robot technology to home appliance recycling plant and commenced operations	<ul style="list-style-type: none">• Demonstrate robotic technologies facilitating removal and recovery work• Introduce picking robots for next home appliance recycling plants• Conduct technological developments for home appliance model number recognition systems
	Enhance added value of recovered products	<ul style="list-style-type: none">• Implemented resin pelletization at a home appliance recycling plant	<ul style="list-style-type: none">• Dismantling and separation of black motors (separate recovery of copper, iron, etc.)
	Demonstrate LiB recycling technologies	<ul style="list-style-type: none">• Launched system demonstration of LiB extraction, pyrolysis, crushing and sorting	<ul style="list-style-type: none">• Ongoing implementation of system demonstrations
	Demonstrate solar panel recycling	<ul style="list-style-type: none">• Made improvements to further enhance glass peeling performance	<ul style="list-style-type: none">• Introduce of post-improvement processes to home appliance recycling plants
	Stable operation of incineration fly ash recycling business	<ul style="list-style-type: none">• Continued to improve facilities, reduced trouble in transportation systems and established a foundation for stable operations	<ul style="list-style-type: none">• Increase acceptance volume and promote process optimization
	Stable operation of food waste biogasification business	<ul style="list-style-type: none">• Continued to improve equipment, with generally stable operations• Promoted digital transformation (DX)	<ul style="list-style-type: none">• Promote business by increasing collection volumes and stabilizing operations• Promote the visualization of environmental value
Renewable energy	Complete Komatagawa new hydroelectric power plant	<ul style="list-style-type: none">• Final lining work is underway at the Komatagawa new hydroelectric power plant	<ul style="list-style-type: none">• Commence commercial operations in December 2022
	Construct Appi geothermal power plant	<ul style="list-style-type: none">• Construction of Appi geothermal power plant progressed as planned, including preparation of approach roads and commencement of production well drilling	<ul style="list-style-type: none">• Proceed with planned construction of Appi geothermal power plant• Participate in Esan geothermal resources survey project
	Survey new geothermal areas	<ul style="list-style-type: none">• Selected for JOGMEC subsidy survey and conducted field survey (Komonomori)	<ul style="list-style-type: none">• Selected for JOGMEC subsidy survey and conduct field survey (Komonomori, upper Appi River)
	Survey new small hydropower	<ul style="list-style-type: none">• Survey progressed generally as planned	<ul style="list-style-type: none">• Continue conducting surveys

I would like to present the progress and priority measures of the current Medium-term Management Strategy. In environmental recycling, we aim to become a driving force of resource-recycling systems. Priority measures include the promotion of automated disassembly for home appliance recycling, improvement of added value of recovered products, and expansion of items, such as demonstration of solar panel recycling, demonstration of lithium-ion battery (LiB) recycling technology for automobile recycling, expansion of collection volume and stable plant operations for incineration fly ash recycling and food waste biogasification, and visualization of environmental values as promotion of DX in food waste biogasification, as shown on the slide.

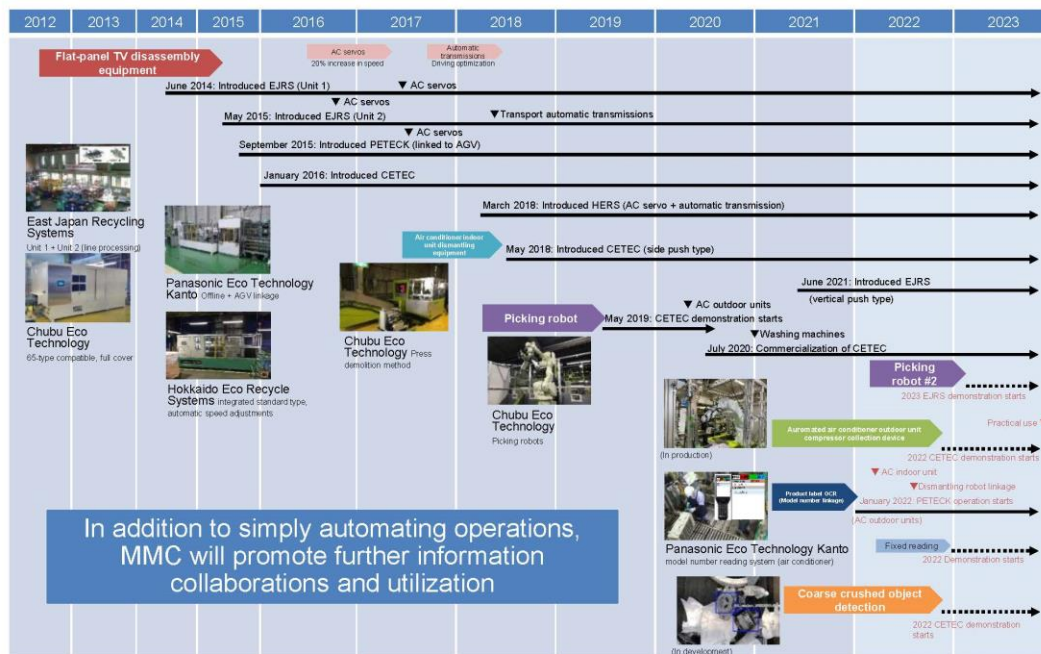
Regarding renewable energy, we promote decarbonization through the expansion of the Renewable energy business with the aim of becoming a leading company in geothermal development. Construction of the Komatagawa new hydroelectric power plant and the Appi Geothermal Power Plant is proceeding as planned, and studies for new geothermal energy and new small hydroelectric power plants are underway.

<Environmental Recycling: Promoting Automated Dismantling (Automation Technologies Developed Thus Far)>

4. Environment and Energy Business Company



Environmental Recycling: Promoting Automated Dismantling (Automation Technologies Developed Thus Far)



The next slide shows our demolition automation to date and the technological developments we are currently working on. We engage in disassembly equipment for flat-screen TVs and indoor units of air conditioners, application development of picking robots, automatic compressor recovery equipment for outdoor units of air conditioners, and a system for reading model numbers on product labels, etc.

Not just automation, we are promoting DX in conjunction with LCA evaluations to visualize environmental values, such as production management systems and environmental impact assessments, through further information linkage and data utilization.

<[Video] Processing internal boards of flat-screen TV (Automatic dismantling of unscrewing) >

4. Environment and Energy Business Company



[Video] Processing internal boards of flat-screen TV (Automatic dismantling of unscrewing)



38

This page is a video.

 MITSUBISHI MATERIALS

This section presents flat-screen TVs disassembly equipment. Flat-screen TVs are fastened with up to about 300 screws. Previously, the screws were removed manually, but now robots find the screws through image processing and remove them.

What makes it unique is that while the flat-screen TV moves on the conveyor, the robot also moves in synchronization to remove the screws. Conveyor speed is designed to be efficient, slowing down for large numbers of screws and speeding up for small numbers of screws.

By using two robots, screws can be removed at approximately the same speed as humans. We also have a device automatically feeding flat-screen TVs to the robots, allowing them to dismantle them by automatic operation, during breaks or at night.

<[Video] Picking recovered items of air conditioner outdoor unit>

4. Environment and Energy Business Company



[Video] Picking recovered items of air conditioner outdoor unit



39

This page is a video.

 MITSUBISHI MATERIALS

This is a robot picking disassembled air conditioner parts on a conveyor. We used to collect parts manually, but now the robot can sort and collect them using image processing and AI learning functions. It collects compressors, motors, transformers, etc.

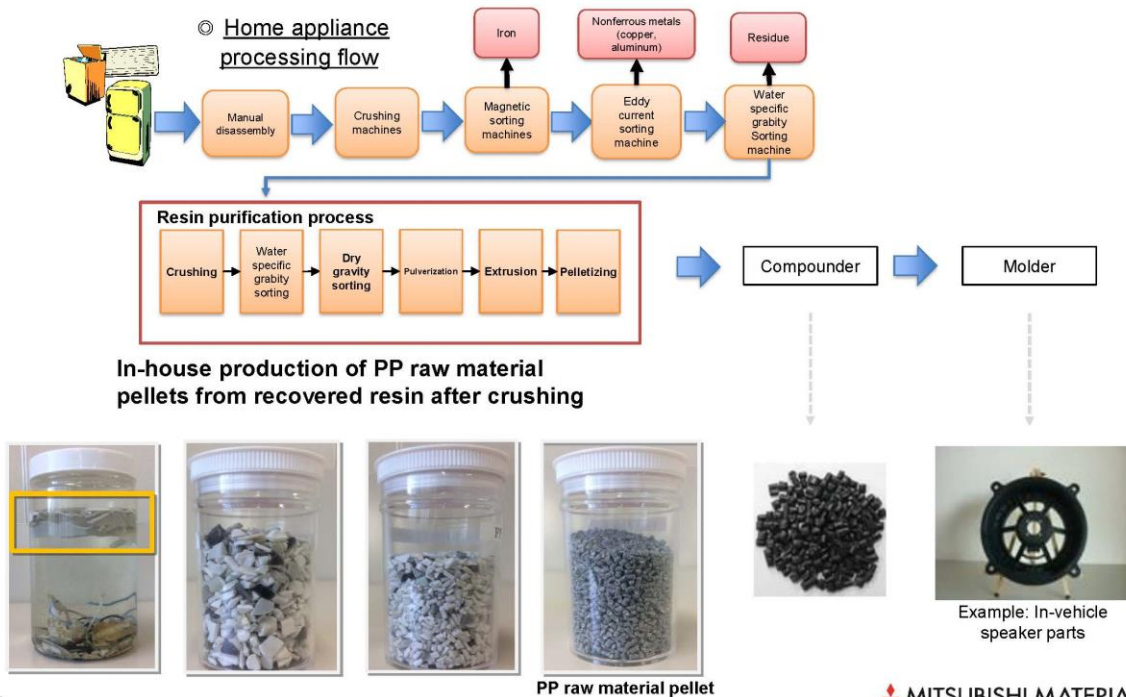
Because some compressors weigh about 10 kg each, we believe that this will reduce heavy workload and eliminate the labor shortage issues and the negative image of recycling as 3Ds (Dirty, Dangerous and Demanding) activity. We apply and deploy these technologies.

<Environmental Recycling: Enhancing Added Value of Recovered Materials>

4. Environment and Energy Business Company



Environmental Recycling: Enhancing Added Value of Recovered Materials



40

MITSUBISHI MATERIALS

Now let's move on to the value-adding of recovered materials. After shredding home appliance casings in a large crusher, further crushing, sorting, extruding, and pelletizing of the mixed resin enables in-house production of PP (polypropylene) raw material pellets.

These PP raw material pellets are currently reused as the casings for automobile speakers. In addition to metals, we are ready to recycle resins that comprise a high proportion of home appliances.

<Environmental Recycling: Demonstration of Lithium-ion battery (LiB) recycling technology>

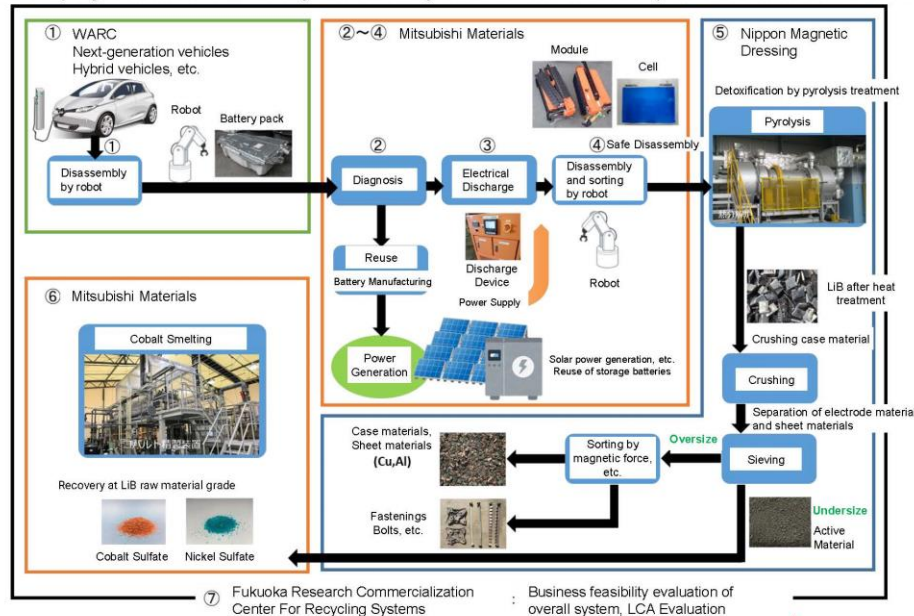
4. Environment and Energy Business Company



Environmental Recycling: Demonstration of Lithium-ion battery (LiB) recycling technology

■ Overall optimal LiB reuse, recycling technology, and system demonstration in the Kitakyushu region

*Demonstration project commissioned by the Ministry of the Environment (Period: FY2021 to FY2023)



41

MITSUBISHI MATERIALS

This is about the technological demonstration for the integrated treatment and recycling system of lithium-ion batteries (LiB). The project was commissioned by the Ministry of the Environment and is being implemented for three years, from FY2021 to FY2023.

The Company is responsible for the overall coordination of the project. For EV and hybrid vehicles, we remove LiBs from the vehicle body, diagnose and discharge the detached LiBs, and then safely dismantle them using a robot.

After dismantled LiBs are detoxified by pyrolysis treatment, they are crushed and sorted to recover active materials. We conduct integrated treatment system demonstration in Kitakyushu in cooperation with other companies to recover cobalt and nickel by refining the recovered active materials.

Also, we conduct LCA evaluation of the entire system. In June, we installed a robot for LiB disassembly, our main equipment, and are currently in the process of starting trial operations.

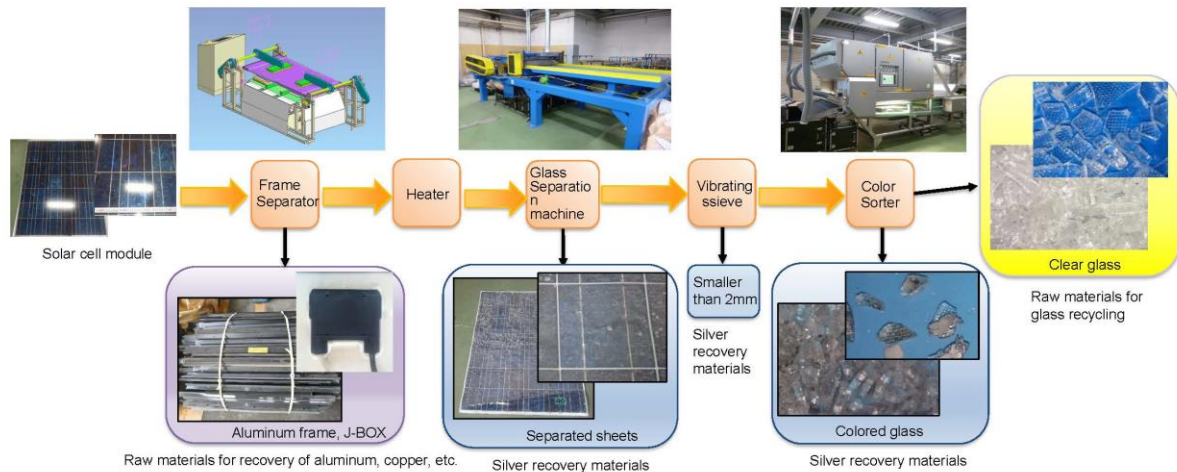
<Environmental Recycling: Solar panel recycling demonstration>

4. Environment and Energy Business Company



Environmental Recycling: Solar panel recycling demonstration

© Solar cell module processing process



Demonstration in home appliance recycling plant

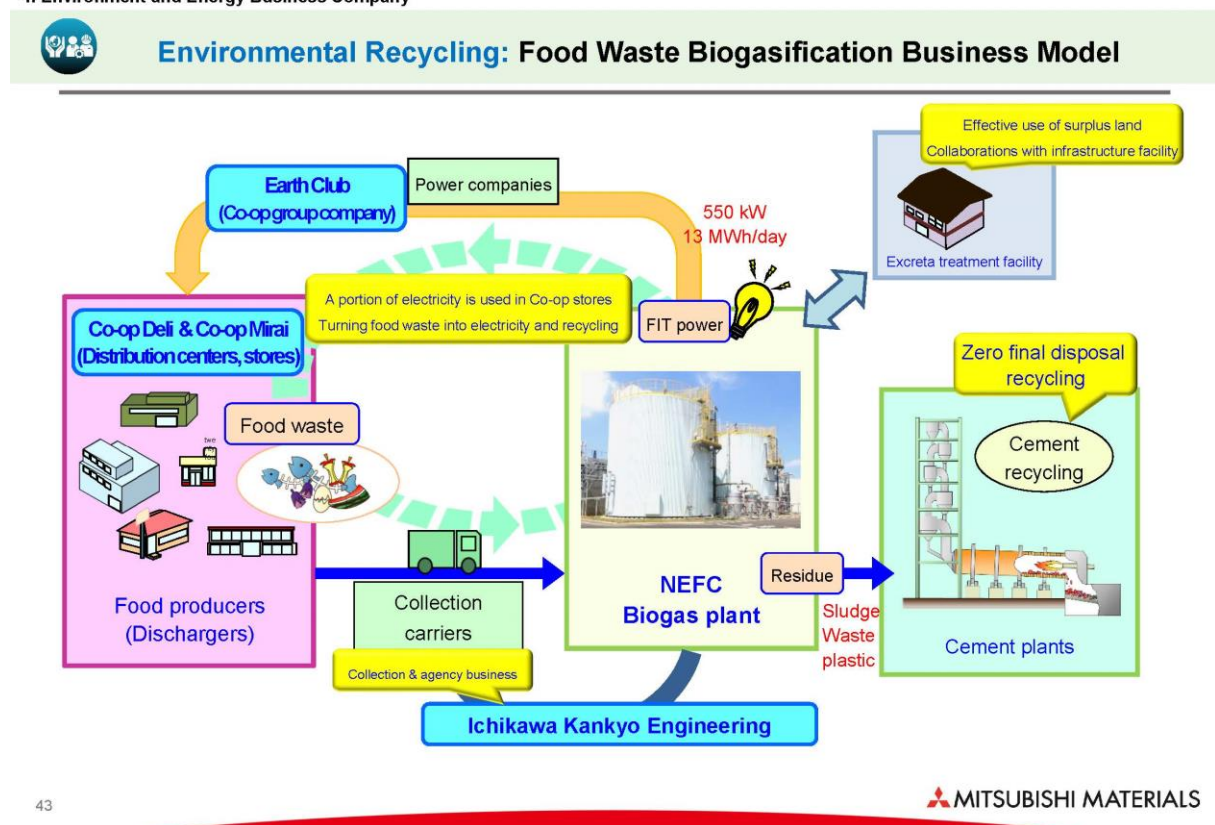
- | | |
|---|--|
| <ol style="list-style-type: none"> I. Improving quality and recovery rate of glass and back sheet by improving the separation II. Labor and manpower saving through automation of frame separation and panel transfer III. Reduced transportation and recycling costs by cutting back sheets | <p>⇒ Introduction of heating equipment and remodeling of the glass separation machine</p> <p>⇒ Introduction of frame separator and panel transfer equipment</p> <p>⇒ Introduction of seat cutting machines</p> |
|---|--|

This is related to the demonstration of solar panel recycling, a large amount of which is expected to be disposed of in the future. The key point is to detach the glass, which has a high composition ratio, from the panel to enable recycling.

It is also important to recover silver from the back sheet, which contains silver in the electrodes. We are studying this issue at the home appliance recycling plant, including the expansion of the product lineup.

<Environmental Recycling: Food Waste Biogasification Business Model>

4. Environment and Energy Business Company



43

MITSUBISHI MATERIALS

The figure on the slide shows a business model for food waste biogasification. Food waste generated from supermarkets, convenience stores, food factories, etc. is collected and transported to our group company, New Energy Fujimino Co., Ltd. (hereinafter "NEFC"). Electricity generated at NEFC's biogas plant is sold under the FIT system, and this electricity is supplied to The Earth Club Co., Ltd. (hereinafter "Earth Club"), a retail electricity provider and a group company of Japanese Consumers' Co-operative Union (JCCU).

A portion of the waste delivered to the plant is turned into electricity, which is used at the offices and stores of Co-op Deli and Co-op Mirai, shareholders of Earth Club. We have built a loop where food waste is converted into electricity and circulated.

As for sludge and waste plastics generated from the biogas plant, they are used as raw materials and fuel substitutes at the cement plants of our affiliate companies.

One of the unique features of recycling at cement plants is that it does not generate secondary waste, such as incineration, and allows for zero final disposal site recycling. Therefore, everything is put to good use, including food waste and accompanying packaging.

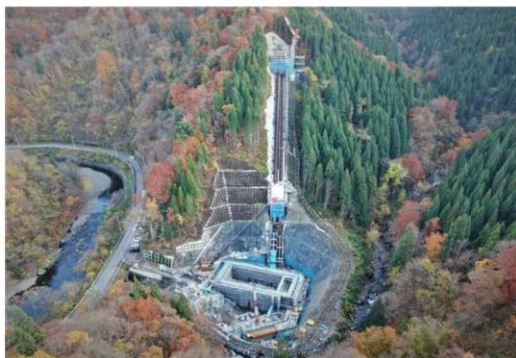
<Renewable Energy: Power plants under construction>

4. Environment and Energy Business Company



Renewable Energy: Power plants under construction

	Komatagawa New Power Plant	Appi Geothermal Power Plant
Operator	Mitsubishi Materials Corporation	Appi Geothermal Energy Corporation (MMC has 51% stake)
Authorized output	10,326kW	14,900kW
Scheduled to start operation	December 2022	April 2024



※Komatagawa 1st and 2nd (7,470 KW in total) will be abandoned.

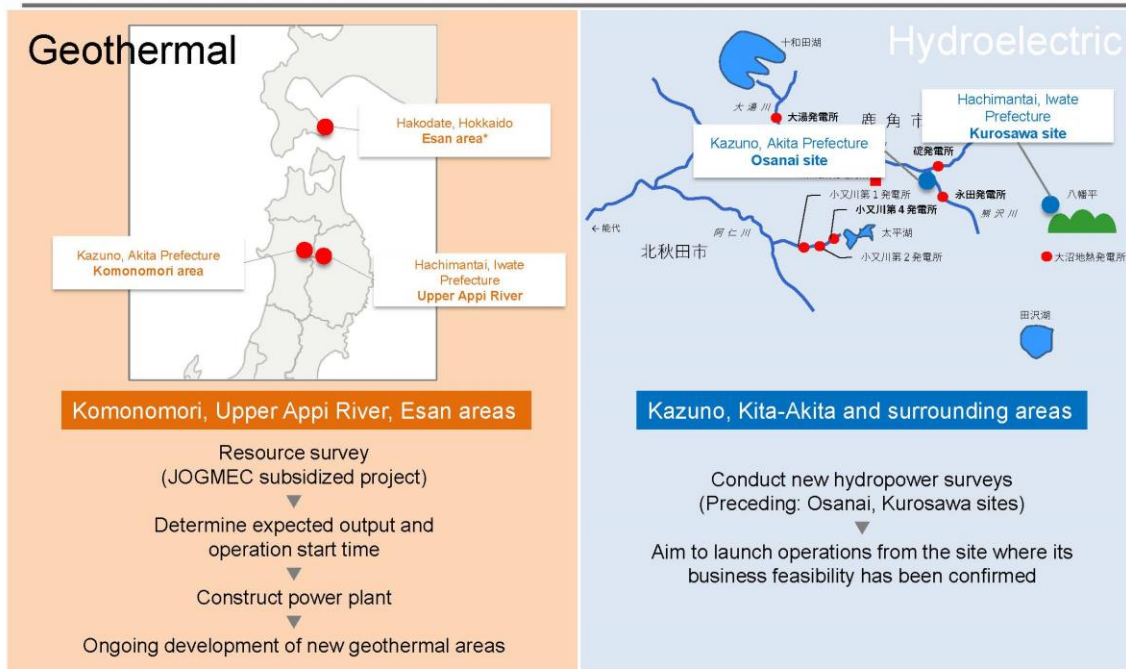
Here are some renewable energy related power plants that are currently under construction. On the left is the Komatagawa new hydroelectric power plant, scheduled to start operation in December 2022, and on the right is the Appi Geothermal Power Plant, scheduled to start operation in April 2024. Construction is currently proceeding as planned.

<Renewable Energy: New Power Plants (Geothermal, Hydroelectric)>

4. Environment and Energy Business Company



Renewable Energy: New Power Plants (Geothermal, Hydroelectric)



*Esan area: Invested 30% in Hakodate Esan Geothermal LLC and participated in project.

45

 **MITSUBISHI MATERIALS**

I would like to talk about the study of new power plants. The left side of the slide shows geothermal-related explanations. We conduct resource surveys in the Komonomori area in Kazuno City, Akita Prefecture, the upper reaches of the Appi River in Hachimantai City, Iwate Prefecture, and the Esan area in Hakodate City, Hokkaido, with subsidies from JOGMEC.

Based on the research results, if the expected output can be achieved, we will proceed to build a power plant and further develop new geothermal areas.

The right side of the slide is hydropower-related. Regarding hydropower, we are conducting research on new hydropower in Kazuno City and the surrounding areas. We will consider the project with the aim of constructing it from the site where its business feasibility has been confirmed.

That concludes my presentation

Question and Answer Session

Q&A (Summary): Market environment of oxygen-free copper

Q: What is the market environment for oxygen-free copper MOFC-HR, including competition and position in the market?

Ishii: Our target with MOFC-HR is the xEV market. How much the xEV market will grow in the future is still somewhat unknown, but we would like to increase our market share. Our advantages are in oxygen-free copper, so we hope to differentiate ourselves from our competitors and increase our market share by quickly entering the customer base.

Q: Are the competitors for oxygen-free copper the Japanese copper & copper alloy manufacturers ?

Ishii: Yes, that's correct.

Q&A (Summary): Advantages of oxygen-free copper

Q: Regarding the oxygen-free copper that you mentioned earlier, where specifically do you see its advantages versus the competitors?

Ishii: Regarding oxygen-free copper, thankfully many customers have already inquired about it. Our major advantages is that we are closely tied to the key accounts I explained today, taking the position of first call vendor. From there, I believe that we have been able to quickly secure market share by expanding into new products, namely, oxygen-free copper plus alloys, and by having them evaluated.

Q&A (Summary): Forward-looking orders in the Copper & copper alloy business

Q: Regarding the Copper & copper alloy business, you plan to increase production capacity considerably from around 2024. Do you have any confirmed orders at this point?

Ishii: Although we do not have any confirmed major contracts or orders yet, we believe that we can expect to receive ongoing orders based on the business we have done to date. The investments currently underway are intended to increase production capacity due to the inadequacy of current production capacity. Considering the current expected volume, we anticipate additional investments will be necessary.

Q&A (Summary): Positioning of Luvata in the Copper & copper alloy business

Q: How do you position Luvata in the Copper & copper alloy business in terms of efforts to capture synergies in the overall strategic plan?

Ishii: Regarding Luvata, we fully understand the need for synergies. However, since we acquired Luvata, we have first undertaken structural reforms within Luvata, as the company has been suffering due to the business environment and other factors. The outlook is now clear, and performance is gradually returning to normal.

Under such circumstances, we have started taking measures such as sending materials from the Japan side to create synergies.

Q&A (Summary): Growth prospects for columnar crystal silicon and sealing materials

Q: For columnar crystal silicon and sealing materials, can we expect growth to outpace the growth of the semiconductor production equipment market? Please tell us about the market outlook.

Ishii: The components where columnar crystal silicon is used are replacement parts and are linked to the volume of semiconductor wafers and semiconductors themselves rather than to semiconductor manufacturing equipment, but we hope to outpace market growth by increasing our market share.

Since seals are attached to semiconductor manufacturing equipment and the replacement frequency is not as high as that of components where columnar crystal silicon is used, one basic guideline is the growth of the equipment market. However, we are somewhat of a latecomer to this field, and intend to leverage our unique characteristics to increase our market share and thus outpace the growth of the equipment market.

Q&A (Summary): Impacts of the widespread use of EVs on the demand for cemented carbide cutting tools

Q: Regarding the Metalworking Solutions Business, I am concerned that the increase in EVs may reduce the intensity of use of cemented carbide cutting tools. On page 15 of the reference material (hereinafter "handout"), is it correct to understand that the overall demand for cemented carbide cutting tools will grow, partly due to the growth of aerospace industry?

Tanaka: Since EVs will not have conventional engines and transmissions, we estimate that the amount of cemented carbide cutting tools used per vehicle will decrease by about 25 to 30% compared to gasoline-powered vehicles.

The handout we presented today shows the outlook for the cemented carbide cutting tools market through 2030. We expect that demand will peak in 2030, and beyond that, we expect that demand will slightly decline due to the shift to EVs for automobiles.

Q&A (Summary): Status of investment in the Metalworking Solutions Business

Q: With regard to cemented carbide cutting tools, I have the impression that you will make quite a bit of upfront investment. Will the costs be a bit heavy at the beginning, and profits will come later?

Tanaka: While we intend to make investments without going beyond our financial structure to secure a solid profit every year, we also consider actively using our funds for M&As and other activities.

Q&A (Summary): Recent achievements in the Metalworking Solutions Business for aircraft and medical applications

Q: With regard to the Metalworking Solutions Business, you have talked about the aircraft and medical applications previously, but do you have any results or responses that you feel have been achieved in the past couple of years?

Tanaka: As for aircraft, the industry has been the most affected by COVID-19, resulting in a considerable decline in terms of actual orders. Amid such a situation, we have recently started testing new products gradually, and the MV series with high aluminum content, as explained today, has been highly evaluated in the machining of engine parts, which are difficult-to-cut materials. Although full-scale recovery of production is still some time away, we are in the process of steadily conducting tests.

As for medical applications, our main focus is on end mills, and a new topic is our efforts to obtain 3D data of the inside of the mouth and digitalize the machining of dentures.

Q&A (Summary): Impacts from introducing renewable energy and higher recycling ratios in the Metalworking Solutions Business

Q: In the Metalworking Solutions Business, how do you organize the impact on orders and costs towards increasing renewable energy to 100% and the tungsten recycling ratio to 80% by 2030?

Tanaka: As you are aware, increasing the renewable energy ratio increases costs, however, one of the motivations for our efforts is that we must move forward quickly to ensure our survival in the marketplace.

We believe DX, smart factory initiatives, and other measures will absorb the cost impact, however, depending on the electricity price changes, we fear that the situation may become quite severe.

As for recycling, in general, I believe that recycling can produce products at a lower cost than digging ore from mines to make products, but at this moment, tungsten raw material prices are soaring, resulting in almost no price difference between those derived from recycling and those derived from ores. But we believe that the peak is at the point where there is no price difference, and that recycling has other economic advantages.

Q&A (Summary): Scale and timeframe for establishing a global business platform for the Metalworking Solutions Business

Q: Regarding the Metalworking Solutions Business, from the diagram shown on page 19 of the handout, it appears the establishment of a global business platform is a rather large project. Do you plan to expand the business platform globally and in each region in the future as you did with your investment in Masan High-Tech Materials Corporation for recycling-related business? Also, what is your sense of the scale and timeframe for building a business platform?

Tanaka: Overall scale-wise, as shown on page 15 of the handout, we hope to achieve a global market share of 10%, or 200 billion yen, in 2030, when the cemented carbide cutting tool market is expected to exceed 2 trillion yen. Roughly twice as large as the current size. We are considering M&A and other actions in the process, but rather than making decisions on a regional basis, we, as the global headquarters, would like to take the lead in considering such actions.

Regarding the timeframe, we have a manufacturing facility in Spain, and we are developing a plan to expand that manufacturing capacity. We also have sales companies in Europe, and are thinking of setting up a management company that includes them. We hope to move on to the U.S. as we identify issues, etc., through our efforts in Europe, and I believe that the next fiscal year will be one of the first starts for Europe.

Q&A (Summary): Changes in taxation system in Chile and political instability in Peru

Q: The tax system is about to change in Chile, how does the Company analyze the situation? The Mantoverde copper mine that you intend to develop is located in Chile, and Peru, where the Zafranal mine is located, is also experiencing political instability. How do you evaluate the situation?

Isaji: We are concerned about the tax situation in Chile, which is beyond our control. From the information we have obtained now, although it is not expected to be fatal, the situation is still unpredictable. Although Chilean government has several proposals, depending on the situation, it may be tougher than our expectation. It will take some time to reach a final settlement, but in any case, we will pay close attention to the situation and take action wherever we can.

As for Peru too, we are concerned about the current situation, as it is beyond our control. However, I believe that Peru has a strong bureaucratic organization, and they have taken good care of the Zafranal mine for which we are working on the procedures. I think copper mining is a valuable resource for Peru, and also a necessary part of the country's system, so I believe the project will be carried out properly.

Q: Does that mean that you will continue to develop the mine?

Isaji: That's right.

Q&A (Summary): Quantitative effects of the E-Scrap's platform MEX

Q: Could you describe any quantitative effects of the E-Scrap platform MEX, such as an increase in collection volume or a decrease in costs?

Isaji: I feel certain positive effects, but we do not have a quantitative grasp of the effects. We are having a little difficulty in collecting shipments due to the economic downturn and logistical disruptions caused by COVID-19, and it is difficult to ascertain the extent of the impact. However, we understand that domestic collections are about 10% higher compared to the past, and that overseas collections, while decreasing in total for the reasons mentioned earlier, are as effective as or more effective than domestic collections.

Q&A (Summary): Company-wide positioning for the Environment & Energy Business

Q: I believe that the Environment & Energy Business is an area with growth potential. Please tell us about how you position the business from a company-wide perspective, such as the allocation of investments and whether you will actively pursue M&As.

Arai: We are currently reviewing the Medium-term Management Strategy for the next term. In this context, we are now considering recycling and renewable energy as businesses that we should promote.

Q&A (Summary): Timeframe for commercialization of LiB and solar panel recycling

Q: What are your thoughts regarding the timeframe for the future commercialization of LiB and solar panel recycling?

Arai: With regard to LiBs, we are in the process of conducting demonstration tests with various partners on two major processes: how to safely remove LiBs installed in automobiles, and how to recover metals used in LiBs. Since the actual release of LiBs for automobiles is still some time away, and I do not think it will be economically feasible right now, we continue to study while looking ahead, checking technical issues and other factors.

As for solar panels, the amount of waste is still small at present, but we expect to see a large number of FIT-introduced panels being disposed of between 2030 and 2035. We expect that the amount of waste will probably be between 350,000 and 500,000 tons, about the same as the current amount of material recycled for home appliance recycling. We have started preparing for this now, and from this year we plan to put in a demonstration facility at the home appliance recycling plant and gradually start the demonstration test as we go along. We would like to move forward with these efforts and find the right timing.