



## **Ebara Corporation**

IR Day 2023

December 4, 2023

## Event Summary

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<b>[Company Name]</b>	Ebara Corporation	
<b>[Company ID]</b>	6361-QCODE	
<b>[Event Language]</b>	JPN	
<b>[Event Type]</b>	Investor Conference	
<b>[Event Name]</b>	IR Day 2023	
<b>[Fiscal Period]</b>		
<b>[Date]</b>	December 4, 2023	
<b>[Time]</b>	13:00 – 14:20 (Total: 80 minutes, Presentation: 80 minutes)	
<b>[Venue]</b>	Webcast	
<b>[Number of Speakers]</b>	5	
	Shugo Hosoda	Executive Officer, Division Executive of Corporate Strategic Planning, Finance and Accounting Division & CFO
	Masao Hodai	Executive Officer, Chief Operating Officer, Precision Machinery Company
	Isao Nambu	Executive Officer, Division Executive, Equipment Division, Precision Machinery Company
	Seiichi Tsuyuki	Executive Officer, Division Executive, Components Division, Precision Machinery Company
	Akihiro Osaki	Division Executive of Corporate Strategic Planning Division

## Presentation

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**Osaki:** Thank you for your patience. Thank you very much for joining us today at Ebara IR Day 2023. The time has arrived, and we will now begin the meeting.

Today's presentation materials are available on our website, so please take a look at them as well.

I would now like to introduce the participants for today. Masao Hodai, Executive Officer, Chief Operating Officer, Precision Machinery Company.

**Hodai:** My name is Hodai. Thank you very much.

**Osaki:** Isao Nambu, Executive Officer, Division Executive, Equipment Division, Precision Machinery Company.

**Nambu:** My name is Nambu. Thank you very much.

**Osaki:** Seiichi Tsuyuki, Executive Officer, Division Executive, Equipment Division, Precision Machinery Company.

**Tsuyuki:** My name is Tsuyuki. Thank you very much.

**Osaki:** Shugo Hosoda, Executive Officer, Division Executive of Corporate Strategic Planning, Finance and Accounting Division and CFO.

**Hosoda:** My name is Hosoda. Thank you very much for your time.

**Osaki:** I am Mr. Osaki of, the Division Executive of the Corporate Strategic Planning Division, and I will be the moderator. Thank you very much for your cooperation.

First, Hosoda will explain the company-wide strategy of E-Plan 2025, Ebara Group's business portfolio, and the value creation story.

Thereafter, Hodai will explain the mid-to-long-term business strategy of Precision Machinery Company, followed by Nambu's presentation on the evolution of semiconductor manufacturing technology, CMP process technology trends, and mid-to-long-term strategy. Finally, Tsuyuki will explain about component products, sub-fab solutions and green technology and will close the briefing with a question-and-answer session.

The briefing is scheduled to end at 4:00 PM.

To begin, Hosoda, the Executive Officer in charge of IR, will offer his greetings and explain the company-wide strategy of E-Plan 2025, Ebara Group's business portfolio, and the value creation story.

**Hosoda:** My name is Hosoda. Thank you all very much for attending Ebara IR Day 2023 today. Thank you very much for your kind attention.

We consider this IR Day to be an IR Day focusing on the precision machinery segment, which is one of our core businesses. As you are all aware, this segment has been growing remarkably over the past few years. While it is expected to expand significantly over the medium to long term, it is a business area with a large degree of volatility.

In terms of our business performance this fiscal year, the precision machinery business was affected by the adjustment phase in the semiconductor-related market, and orders were relatively weak. Despite this, the overall performance of our group has been relatively strong up to Q3.

The relative weakness of the semiconductor-related market was covered by other segments, such as energy, which is a good aspect of our company as a multi-segment corporate group. I would summarize the results as if we covered for each other.

Now, although the business portfolio of our company consisting of multiple segments is one of the themes of my presentation, multiple segments are often viewed negatively from the perspective of conglomerate discounting, etc. We, on the contrary, view them positively.

From the perspective of being engaged in various businesses, of course, we can diversify risk and stabilize performance. Still, we also believe that the existence of multiple segments is a unique strength of our group. I would like to explain this in my presentation today.

## Long-term Vision of E-Vision 2030 - EBARA in 2030



### Long-term vision of E-Vision 2030 :

Solve social issues through businesses with a market-in perspective toward the world in 2030

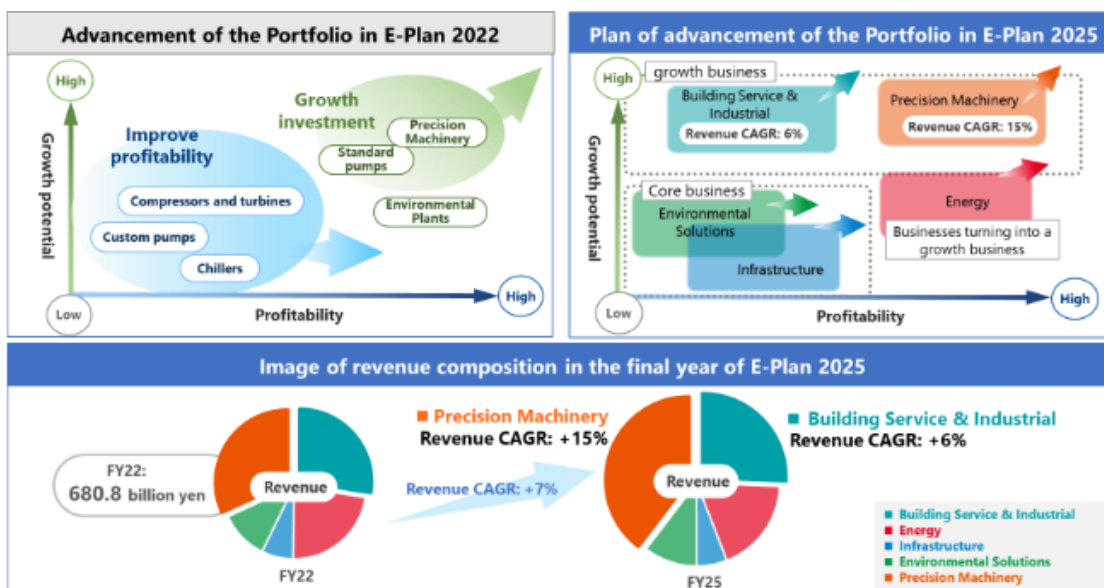


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First, this is the usual introductory slide. Our long-term vision, E-Vision 2030, is to contribute to solving social issues through our business and to enhance our corporate value in terms of both social and environmental value as well as economic value.

As a result, we have set forth our aspirations to achieve revenue of JPY1 trillion or more and market capitalization of JPY1 trillion or more by 2030. As of the end of last week, the market capitalization was approximately JPY780 billion, so I understand there is still room for the stock price to increase a little more to reach JPY1 trillion.

# EBARA Group Business Portfolio



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Now, in terms of how we will achieve our desired goal of JPY1 trillion in revenue through our business portfolio, this slide shows the image of our business portfolio as of 2025, which is set forth in our current medium-term management plan, E-Plan 2025.

For the time being, it is assumed that the structure of the precision machinery segment will drive business expansion. Until a decade or so ago, the Group had many unprofitable divisions and unprofitable businesses in each of its businesses, and we have a history of implementing drastic measures to improve profitability and, in some cases, withdrawing from some of our businesses themselves, as has been the case for the past 10 years or so. As a result, we are now left with these five business segments. Regarding the five remaining business segments, while there are various individual issues, these five business segments have a certain degree of earning power, and we are aware that they remain in place because they are such businesses.

Therefore, currently, we do not envision a bold replacement of the business portfolio as part of our business portfolio management. On the other hand, since ROIC management is our basic policy, we will adjust the allocation of invested capital to each business in a fair and balanced manner while maximizing ROIC, WACC, and spread for each business. This is the basic policy of our business portfolio management during the current medium-term management plan period.

The fact that these businesses exist together within our group does not mean that they exist together by chance but rather that these five business segments exist out of necessity to some extent.

The five business segments do not exist independently and discretely. Rather, they exist together as a single group. Thus, there are synergies among them. We believe that our business portfolio is composed of these synergies.

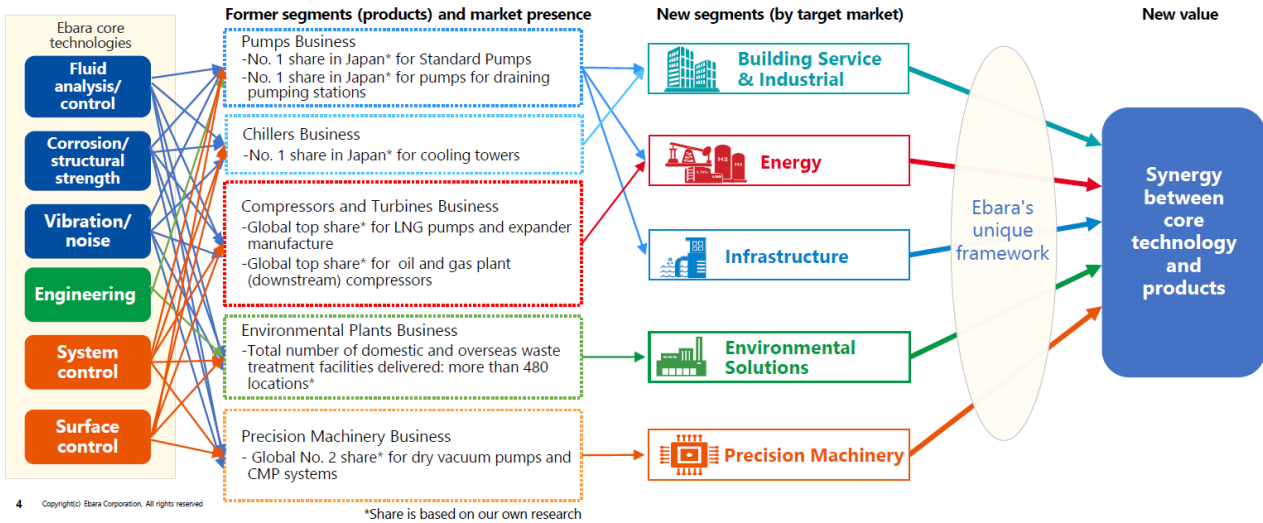
# Source of Inter-business Synergy (1): Ebara's Technology and Intellectual Property



- A group of core technologies common to each product, business, and market serves as a source of synergy between businesses
- Core technology is refined through product delivery and operation results. Accumulated know-how further improves core technology and contributes to other businesses

Product development, equipment sales, accumulation of product know-how

From 2023: New value creation



Specifically, one of the sources of synergies among the businesses is the existence of core technologies shared among the Group's products and markets and core technologies shared horizontally within the Group.

In this slide, the technology group on the far left is our core technology group. These common core technologies were provided to customers in their respective markets as added value through products and services. Based on the delivery results provided to the customer and the operation results after the delivery, the accumulated knowledge gained from these results will further refine the core technology group that is shared across the business. Furthermore, we understand that our business is based on a cycle in which the core technologies are shared again in each product market and the synergies among businesses that result from this cycle.

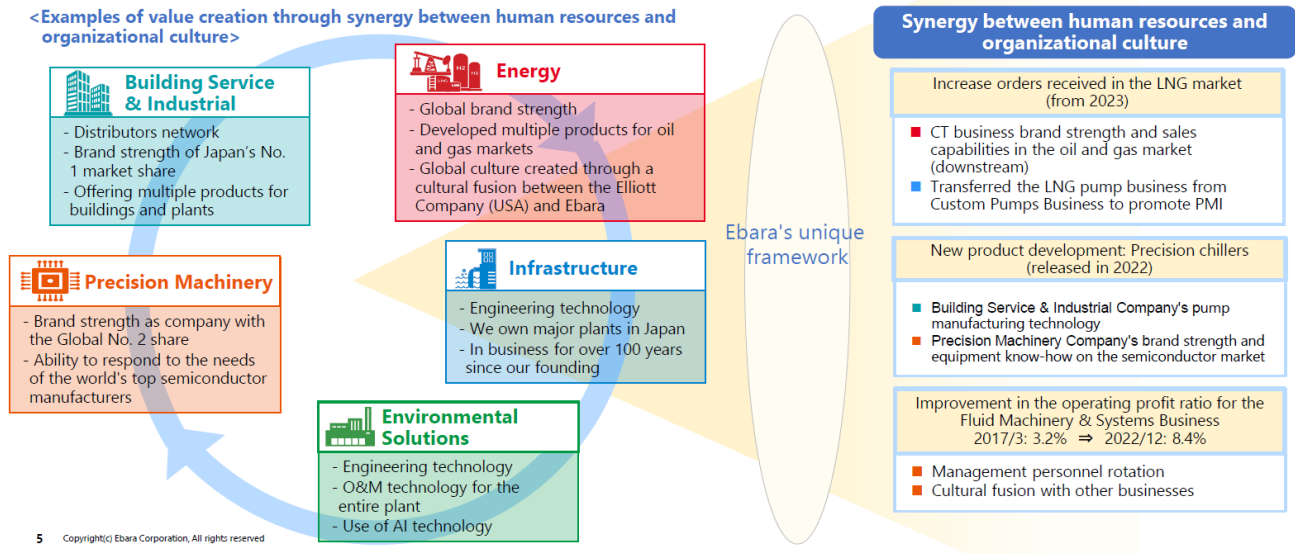
The important thing is that the knowledge accumulated in each business segment does not remain the sole property of that business segment but is sublimated into a common group-wide technological asset as a core technology that is shared among businesses. To facilitate the successful implementation of such a process, we are devising our own unique mechanism, which I will explain later.

## Source of Inter-business Synergy (2): Ebara's Human and Organizational Assets



- Expanded business and enhanced management through the exchange and fusion of human resources, culture, and brand strength between multiple segments with different organizational cultures
- Currently, orders for the LNG market are increasing due to the PMI effect of compressors/cryopumps, an area in which we have years of experience

<Examples of value creation through synergy between human resources and organizational culture>



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The second source of synergies among businesses is the synergies arising from the distinctive organizational cultures of each of the five business segments in each of the five face-to-face markets.

What I am describing here are the five business segments. For example, in the building service and industrial segment, we have the most expertise in the performance and reliability of pumps, blowers, and other stand-alone equipment. In addition, the building service and industrial segment has a very strong organizational culture both in Japan and overseas in terms of its ability to build commercial distribution channels through its network of distributors.

In the energy segment, which is written in red, as you know, this is Elliott Company based in the US. We acquired Elliott Company in the US, which is now a part of our group. We have the ability to develop global businesses originating from Elliott Company. The management style of this business entity has a unique culture that Japanese companies do not have. The energy company is characterized by the fact that it is keenly pursuing global development with this, an aspect that is not easily followed by other entities in our company.

The infrastructure segment, for example, focuses on domestic public works projects. Still, other entities cannot easily imitate the track record and stable reliability we have built up over the years.

The environmental solutions segment is the only one that handles plant construction, engineering, and operations. From this perspective, the plant operation knowledge, including operation and maintenance, is unique to this business.

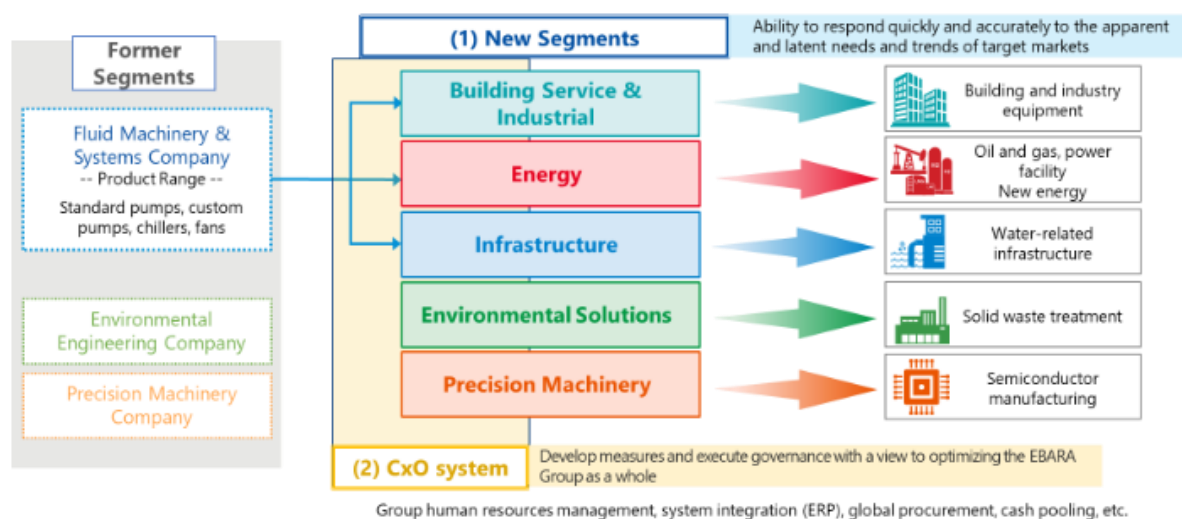
In addition, the precision machinery segment, which is one of today's themes, is a segment that has unique strengths that are slightly different from those of other business units in terms of its ability to respond to customers who make high-level demands for miniaturization and cutting-edge processes, in other words, in the so-called "demanding" aspect unique to the semiconductor industry, and to provide solutions that are firmly tailored to such customers.

These organizational cultures exist not only in each segment separately but also in a system in which the good points of each business segment are mutually beneficial to each other, including personnel exchanges. Such a system is in place within the Group, which is one of the strengths of our group as a conglomerate or conglomerate of companies.

## Appendix: Organization by Target Market



- As a mechanism to accelerate value creation, we substantially reorganized the organization on a large scale by (1) transforming into new segments by target market and (2) establishing a new cross-segment function.
- Established new cross-segment functions, including a CxO system, in 2023 to enable businesses to focus on creating value in target markets



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One of the ways in which we are working to turn these disparate elements into shared assets is the organizational structure for each face-to-face market, implemented from the current fiscal year.

This picture shows the new organizational structure for the face-to-face market organization we introduced in the current fiscal year. This is often explained mainly in terms of face-to-face market-based organizations. The front entrance of each company or business unit is to face the market and customers directly at the front door and to absorb the customers' needs and provide solutions. In the backyard, the new organizational structure introduced this year is centered on the CxO system described here, which is connected horizontally and promotes the sharing and integration of core technologies and organizational culture. This lateral skewering is one of our innovations to promote the sharing of core technologies and organizational culture mentioned earlier.



# Ebara's Unique Framework (1): Strategic Table of Technological Capabilities



- Strategic Table of Technological Capabilities: Visualization table for linking technology and people through a technical talent map
- By understanding important technologies facing a lack of human resources, we can speed up the establishment of systems for enabling the reliable transfer and development of technology.
- This will identify proprietary technologies and insufficient important technologies, and encourage internal and external technical collaborations.



	Infrastructure	Energy	Building Service & Industrial	Precision Machinery	Environmental Solutions										
Core technologies representing the characteristics of five in-house companies	Pr Planning & Proposal	Pj Project Management	Rc Refrigerating Compressor		Bi Boiler										
	Cm Constructor Management	Pt Power Transmission Device	Cr Cryogenic Engineering	St Steel Technology	Hi Heat Integrated System	Rc Refrigerating Compressor	Es Embedded Software	Tg Timing Gear	Po Polish	Vt Vacuum Technology	Pl Electro Plating	Ce Clean Environment	Ds Data Science	Rb Robot	Py Pyrolysis & Gasification
	Qa Quality Assurance	Fl Fluid	Ch Chemistry	Sm Sliding Materials	Ea Electro-magnetic Analysis	Mw Motor Under Water	Pu Pump System	Ml Magnetic Levitation	Cl Cleaning	Ep End Point Detector	Oz Ozone Water	Eg Exhaust Gas Treatment	Mt Material	Eg Exhaust Gas Treatment	Mh Material Handling
	Ma Maintenance	Ei Electrical Instrumentation	Mt Material	Am Additive Manufacturing	Mm Motor Manufacturing	Sm Sliding Materials	So Systems Operation	Mo Motor Control	Mc Machining	Tr Throughput	Eb Electron Beam	Pz Plasma	Na Numerical Analysis	Md Measurement & Diagnosis	Ca Chemical Analysis
Common technology	Bt Bearing Technology	Va Vibration & Acoustics	Sd Structural Design	Na Numerical Analysis	Fd Fluid Machine Design	De Digital Engineering									
Overlapping technology supporting the core technology and common technology of the five in-house companies	Ca Chemical Analysis	As Assembly	Cs Casting	Ie Industrial Engineering	Mc Machining	Pm Preventive Maintenance	Ps Production System	Pw Press Working							
	Ch Chemistry	Va Vibration & Acoustics	Fl Fluid	Ht Heat Technology	Mn Motion Control	Mt Material	Na Numerical Analysis	Xr Extended Reality	Ds Data Science	Am Additive Manufacturing	We Welding	Ts Thermal Spray	Re Reverse Engineering	Nd Non Destructive Testing	Rb Robot

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This table of technological capabilities is another example of Ebara's unique mechanism to create synergy among businesses.

Recently, I have been presenting it on various occasions as one of our unique innovations. Some of you may have already seen it at our human capital management seminars and elsewhere. This table of core technologies for each company shows what kind of company, what kind of business, what kind of core technologies it possesses, and where they are located. This is a visualization of the core elemental technologies that exist in each organization and business and has the effect of facilitating collaboration and mutual support among the respective entities.

By combining this technology with human resource map information, such as which people are in charge of which technology, we can visualize which elemental technology is being inherited by which organization and by whom and use this information to quickly identify requirements for technology succession and human resources that need to be reinforced.

In addition, by looking at this information, we can determine what technological aspects our company lacks and how we can use this information in collaboration with outsiders and in our M&A strategy. We also aim to disclose this information not only for internal use but also for disclosure to external parties so that they will be interested in the technical aspects of our company's products and services, which may lead to collaboration with them or lead to new collaborations with external parties. This is a mechanism or a tool that aims to trigger new collaborations with external parties. We are evaluating it as a very useful tool for creating synergies among businesses from a technological perspective.

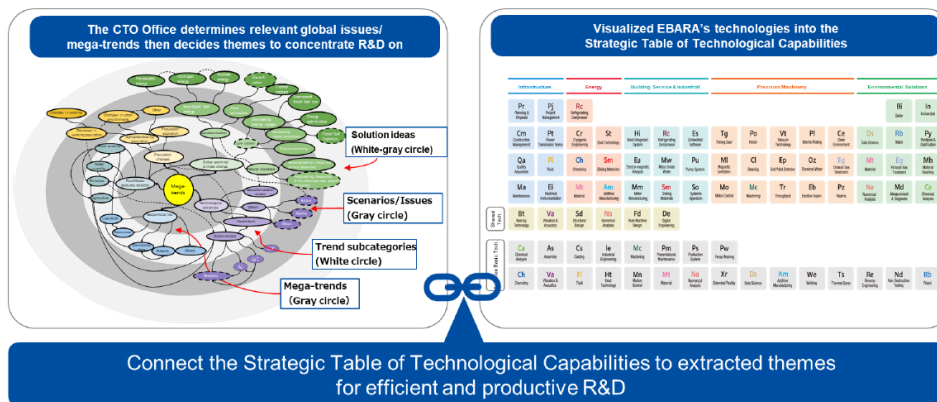
## Ebara's Unique Framework (2): CTO Function



- CTO function: Established the CTO Office consisting of members responsible for the marketing and technology of each in-house company. Through this office, we will bundle various foundational technologies, evaluate combinations, and coordinate new value creation.

<Example of activities by the CTO Office> Collaboration between R&D themes and Strategic Table of Technological Capabilities

- Organize themes based on social issues and extract R&D themes in which EBARA should engage
- Compare target themes and the Strategic Table of Technological Capabilities to identify the human resources that will be needed in the future



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Now, as another example of a mechanism for creating synergies among businesses, the activities of the chief technology officer organization, which was officially established this term, are mentioned.

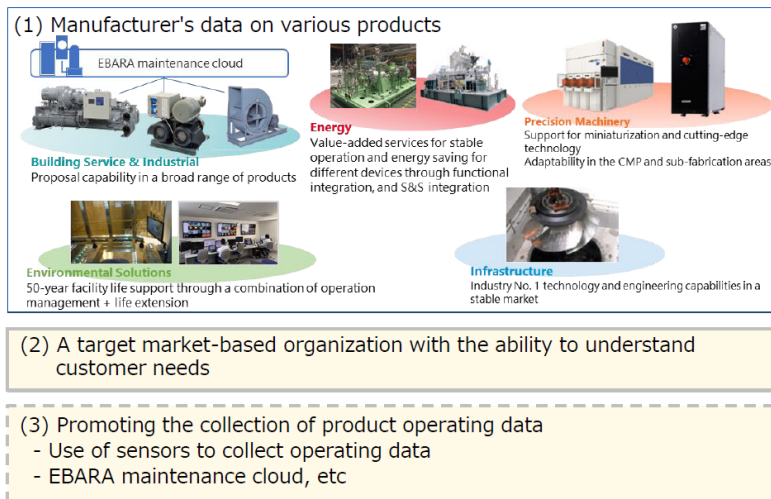
This framework promotes the sharing of component technologies and the integration of each organization's strengths, culture, and advantages from the viewpoints of technology and marketing across businesses and coordinates the combination of these technologies as necessary.

In addition, the entire group has introduced various activities as a framework for creating technology development strategies based on megatrends by encouraging meaningful exchanges among technical personnel in various countries scattered around the world globally. This is also one of our unique innovations and mechanisms for creating synergies among our businesses.

## Example of Leveraging Inter-business Synergy (Existing Business Areas): Solutions Services



- Using our competitive advantage of offering multiple products and services, we are working to transform into a solutions provider that provides "combined solutions" to address customers issues and requests.



**Advanced solution services across multiple products**

What we have discussed so far is what kind of inter-business synergies we can expect as a multi-segment company and how we are devising ways to realize these synergies. From here on, I would like to talk about the examples of synergies that have developed as a result of these efforts.

First, as a new value-added addition to our existing business, we are developing into a solution provider by accumulating information on product installation and operation through maintenance, etc. and using this information as the basis for providing advanced solutions to our customers.

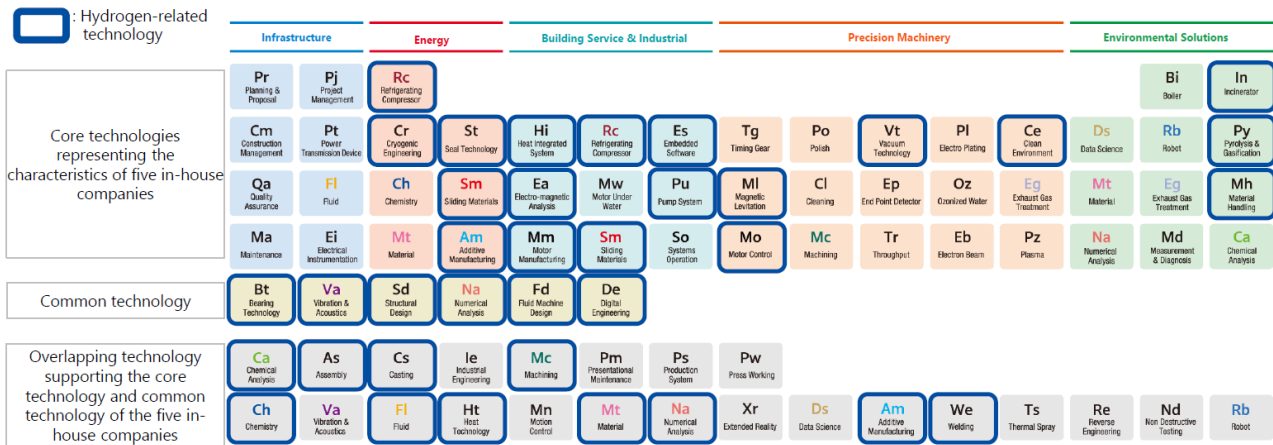
We are now working diligently on both the many sensor groups installed in our product lines and the introduction of systems such as the EBARA Maintenance Cloud, which accumulates the data obtained from these sensors and turns it into knowledge.

As a composite segment, our product line has various levels, and what I am referring to is the level of stand-alone equipment, such as pumps and blowers. In addition, in terms of the equipment level, including control of CMPs, compressors, etc., and in terms of the plant level, including waste incineration plants, etc., the accumulation of data and knowledge from the three different perspectives of individual devices and equipment, the individual device level, the equipment level, and the plant level, allows us to provide solutions from a wide range of different perspectives. We believe that this can be a unique strength of our group.

# Example of Leveraging Inter-business Synergy (Future Business Areas): Hydrogen-related Business



- CP Hydrogen Business Project launched in August 2021
- We are working to create hydrogen-related businesses by fusing new technologies based on core technologies.



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Besides the development mentioned above into a solution provider, another concrete example of synergy between businesses is the hydrogen-related business, which we are developing as a new business that could become a core business in the future.

This is the table of technological elements that I mentioned earlier. Of the current core technologies held within the Group, the elemental technologies that could serve as the foundation for the development of the hydrogen-related business that we are currently developing are circled in blue. A large portion of the elemental technologies that we currently possess as core technologies are being used as the foundation for the creation of the hydrogen business. We are in the process of creating a new hydrogen business by integrating these basic technologies. The technological elements that have been refined in various existing business areas have become the foundation for creating new businesses. I believe this is an example of one aspect of utilizing our strengths as a composite business entity.

## Example of Leveraging Inter-Business Synergy (Future Business Areas): Progress in Hydrogen-related Business

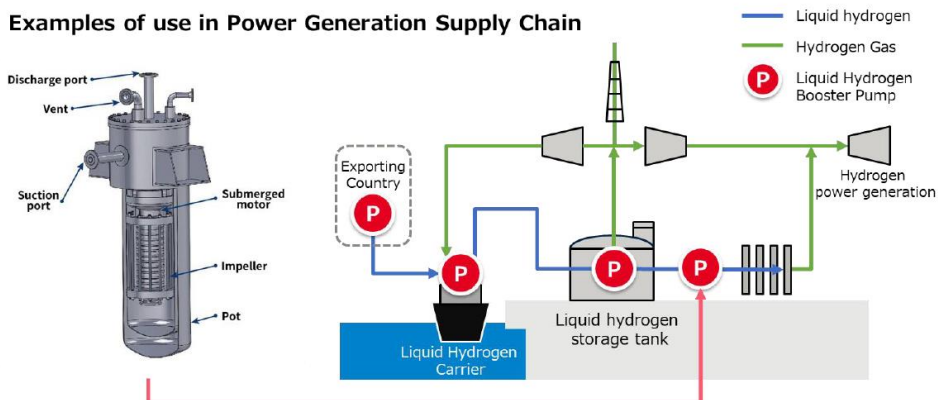


- Developed the world's first liquid hydrogen booster pump (liquid hydrogen temperature:  $-253^{\circ}\text{C}$ ) through actual liquid hydrogen testing
- Contributing to the realization of a hydrogen society by using pumps to connect all types of hydrogen, including large-scale supply chains from overseas

Picture of Liquid Hydrogen Booster Pump



Examples of use in Power Generation Supply Chain



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[https://www.ebara.co.jp/corporate/newsroom/release/company/detail/1208852\\_1673.html](https://www.ebara.co.jp/corporate/newsroom/release/company/detail/1208852_1673.html)

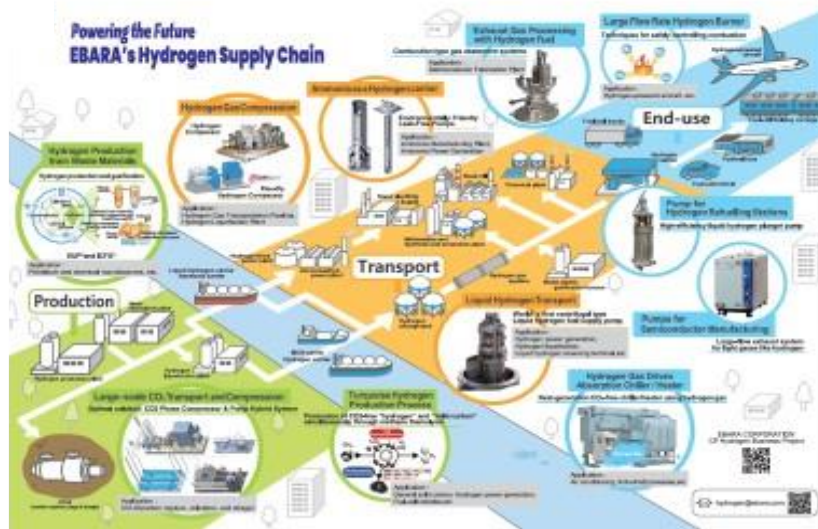
Since the hydrogen business was mentioned earlier, regarding the hydrogen business, we released the following press release in February of this year.

The article states that the Company has succeeded for the first time in the world in developing a pressure booster pump for boosting the pressure of liquid hydrogen at  $-253^{\circ}\text{C}$  after conducting actual liquid hydrogen tests. This has made it possible to apply liquid hydrogen directly from a nozzle to a gas turbine combustor, a process for which there was previously no adequate knowledge, and we are steadily preparing to bring it to market for application in a large-scale supply chain. Needless to say, the core technologies and the knowledge accumulated in other businesses play an important role in developing these products.

# Hydrogen Supply Chain Contribution Concept



- Planning to inject new products in all domains, including power and non-power (transport, industrial, consumer use)
- Contributing to the creation of a decarbonized society by expanding Hydrogen-Related Business



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With this in mind, this slide shows an image of the future hydrogen supply chain and the areas where our products will contribute to it.

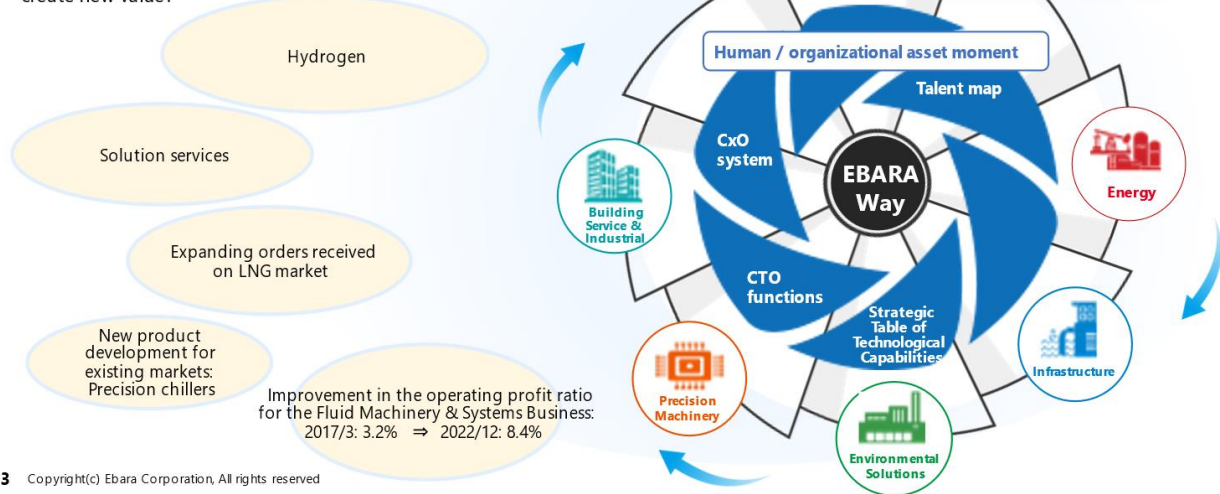
In implementing social infrastructure in the coming hydrogen society, I believe there will be many aspects where our core technologies, which have been cultivated in the composite segment, will be utilized in various aspects.

This is the last slide of my presentation. In summary, I would like to emphasize that we believe that the existence of multiple business segments is a unique strength of our group. Moreover, the source of synergy between businesses is the existence of technologies and intellectual assets centered on common core technologies and human organizational assets consisting of the distinctive organizational culture possessed by each organization. Not only do these assets exist, but they do not exist separately in each business. They are promoted through a unique mechanism to sublimate them into an organizational knowledge shared by the entire group, such as a technical human resource map or activities under the CTO organization's jurisdiction. As a result, as specific examples of synergies, we have mentioned that we are expanding into solution providers and hydrogen-related businesses.

## Ebara Value Creation “Impellers”(Impeller Model)



- Ebara's current business portfolio is based on common core technology
- Through our unique business portfolio, we possess a wide range of technologies, intellectual assets, human assets, and organizational assets
- One of our greatest strengths is our unique framework for using these assets to generate synergy. Through past, current, and future endeavors, we continue to create new value.



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Although it may seem a bit forward, this slide shows our value creation model in the form of an impeller of a rotating machine such as a pump, which is Ebara's value creation infrastructure model. We would like to maximize and effectively utilize the strengths arising from the unique business structure of Ebara Group and work toward the realization of our aspirations as set forth in our long-term vision.

This concludes my part of today's explanation. Thank you very much.

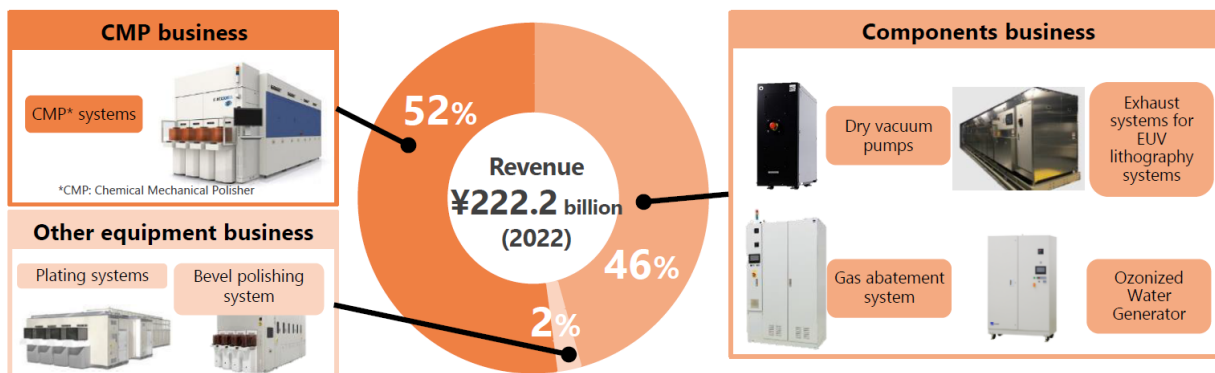
From here on, while we have been talking about the Group as a whole, we believe that the precision machinery segment will be the driver of our business expansion in the complex business group for the time being, so we would like to move on to the topic of the precision machinery segment. Thank you very much.

**Osaki:** Now, I will move on to the presentation on the precision machinery segment. Masao Hodai, Executive Officer, Chief Operating Officer of Precision Machinery Company, will explain the mid-to-long-term business strategy of the Precision Machinery Company.

**Hodai:** My name is Hodai of the Precision Machinery Company.

## Our Company's Basic Policies

We apply the world's highest level of technology and support towards providing solutions for the manufacturing processes and sub-fab areas that support semiconductor miniaturization and sophistication to offer new value toward the evolution of industry.



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First, I will give you an overview of the company.

First of all, the company's basic policy is to provide solutions with world-class technologies, support the manufacturing processes and sub-fabrication areas that support the miniaturization and sophistication of semiconductors, and provide new value in the evolution of the industry.

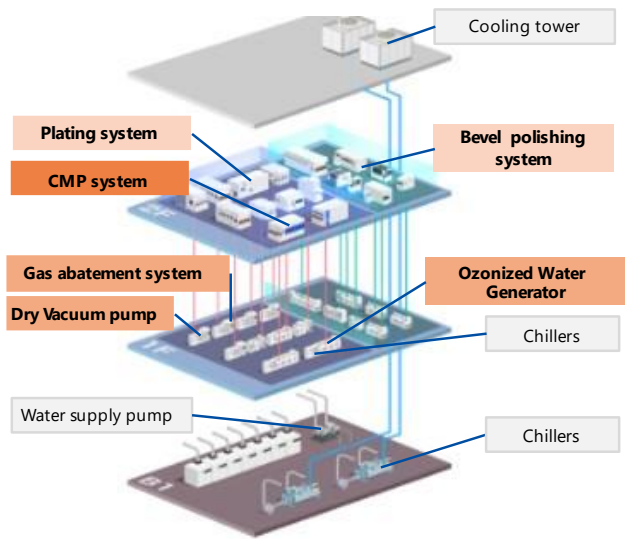
As you are well aware, semiconductors have become indispensable in various industries and are expected to continue growing in the future. At the same time, demand for the miniaturization and sophistication of semiconductors is increasing, and manufacturing equipment and related facilities must evolve to meet this demand. We believe it is our responsibility to contribute to the continued development of the semiconductor industry by supporting our customers' manufacturing activities with our strength in advanced technologies in a wide range of fields and meticulous customer support.

In addition to the semiconductor field, the components company also develops products for the LED and solar cell industries, as well as for general industrial applications. The company has three segments: CMP business, other equipment business, and component business. The CMP business, which will account for more than half of our total revenue in 2022, is engaged in developing CMP equipment used for wafer planarization in the semiconductor manufacturing process.

Next, although under-represented in terms of revenue, we have wafer plating equipment and bevel polishing equipment in the other equipment business. In the component business, which accounts for a little less than half of our revenue, we have ozonized water generator, gas abatement systems for EUV lithography equipment, and our mainstay dry vacuum pumps and gas abatement systems.



# Ebara Products Are Widely Used in Semiconductor Factories



**2F (clean room)** Devices to manufacture semiconductors  
CMP systems Bevel polishing systems  
Plating system

**1F (sub-fab)** Devices to assist manufacturing equipment  
Dry vacuum pumps Gas abatement system  
Ozonized Water Generator Chillers

**Basement (machine room) and Rooftop:** Devices to support plant  
 Water supply pumps Chillers  
 Cooling towers

✓ **The only manufacturer in the world supplying such a wide range of products for semiconductor plants.**

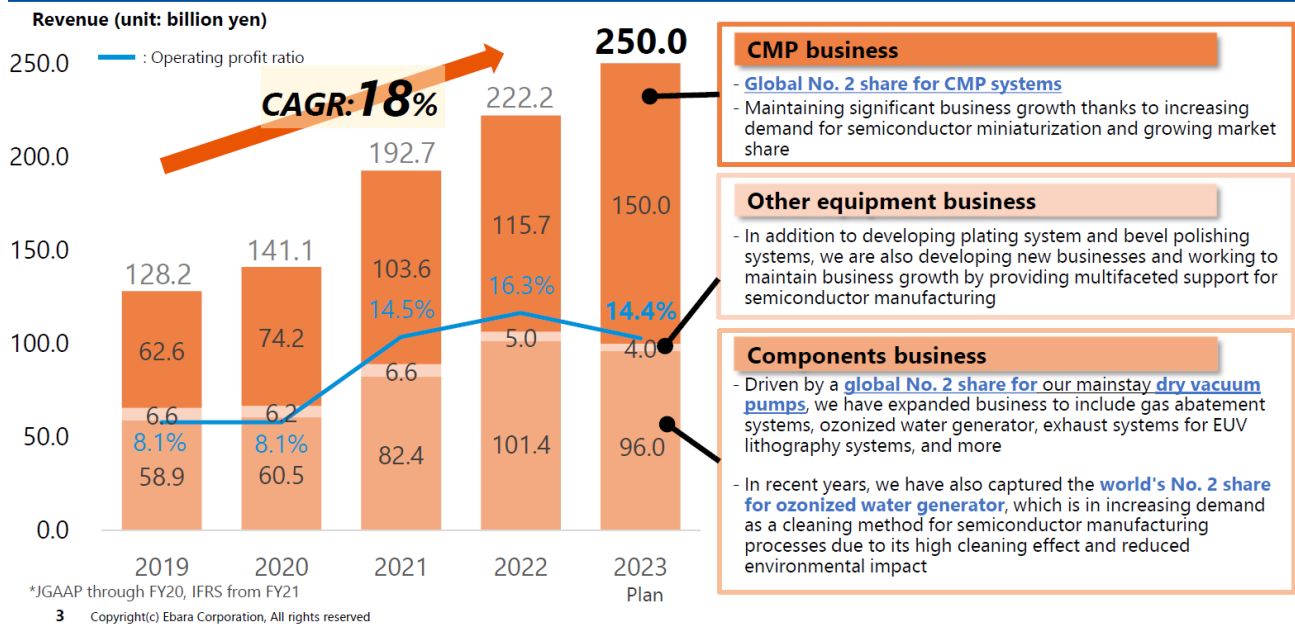
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This is an example of using Ebara Group products, including our company's, in a typical semiconductor manufacturing plant.

First, equipment for manufacturing semiconductors directly in the clean room, and second, equipment for constructing the manufacturing environment inside the equipment and treating the gases emitted in the sub-fabricated area below the clean room is provided by the company. In addition, we have a lineup of water supply pumps, cooling towers, and chillers that support the operation of the Ebara Group's semiconductor plants.

We believe we are the only manufacturer worldwide that can provide such a wide range of products to semiconductor plants.

# Precision Machinery Company Results (Consolidated)



This page shows the consolidated revenue and operating margin of the company.

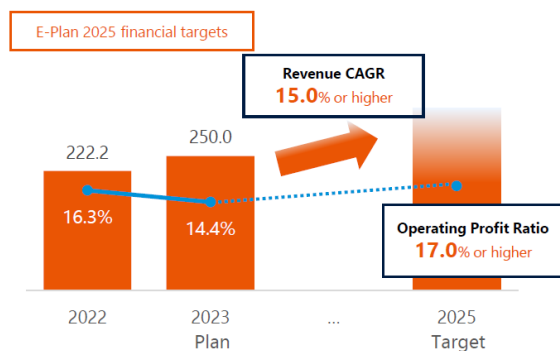
Since 2019, our performance has been growing steadily. The COVID-19 disaster, which took effect in earnest starting in 2021, has triggered the shift to DX in all industries. The accompanying surge in semiconductor demand has enabled us to grow significantly.

The CMP business has grown significantly due to market expansion and increasing demand for miniaturization, and the component business has also expanded with a focus on our mainstay dry vacuum pumps. In addition, demand for ozonized water generator for cleaning applications has been increasing recently, and we are expanding our revenue and market share. Although the semiconductor market is in an adjustment phase this year and investment by major customers is generally sluggish, we believe that the market will return to a recovery trend from next year onward and continue to grow over the medium to long term.

# Growth Strategy for the Precision Machinery Company



<b>Long-term vision E-Vision 2030</b>	<b>Business Vision</b>	<b>Contribute to the development of society through partnerships and distinctive technologies centered on the semiconductor field while helping create a more enriched world through endeavors in new fields</b>
<b>Medium-Term Management Plan E-Plan 2025</b>	<b>Basic Policies</b>	<ul style="list-style-type: none"> <li>• Provide unique value not only by providing products and services, but also by offering solutions for customers' process and utility challenges</li> <li>• Shift from a regional strategy to a global account strategy to expand market share through strategic planning and overall global optimization in line with customers' global expansion</li> </ul>
	<b>Basic Strategies</b>	<ul style="list-style-type: none"> <li>• Strengthen product and solution development capabilities</li> <li>• Increase production capacity</li> <li>• Reconstruct global business infrastructure to accommodate expansion of business scale</li> </ul>



**E-Plan 2025 non-financial targets**

Materiality	KPIs (FY2025 targets)
 Contribute to the creation of a sustainable society	Reduction of GHG emissions from semiconductor manufacturing processes through gas abatement (20% reduction from 2022)
 Elevate standards of living and support abundant lifestyles for all	Reduction of GHG emissions from dry vacuum pump manufacturing (10% reduction from 2022)
	Pure water use by CMP equipment (30% reduction from 2022)
	Develop foundational technology for 14Å semiconductor manufacturing

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I will now explain our growth strategy.

First, under our long-term vision, E-Vision 2030, which shows where we want to be in 2030, we contribute to society's development with partnership and only one technology, mainly in the semiconductor field, while challenging new fields and creating a prosperous world.

In order to achieve this long-term vision, we are promoting various initiatives in accordance with our medium-term management plan, E-Plan 2025, and have identified two basic policies.

First, to expand our business scope by providing unique solutions to solve our customers' process and utility challenges. Second, we will pursue strategies in line with our customers' global expansion. To this end, we are also developing a structure from a global overall optimization perspective.

Next, we have three basic strategies to achieve these goals.

The first is to strengthen our product and solution development capabilities. In the CMP and other equipment businesses, we will strengthen our solution development system based on a market-in approach in order to respond to the trend toward miniaturization and diversification of customer needs. As part of this effort, we are constructing a new R&D facility at our Fujisawa Plant. In the component business, we will provide solutions for the entire sub-fab area of semiconductor factories by offering products that respond to the technological evolution of green technology and semiconductor manufacturing processes.

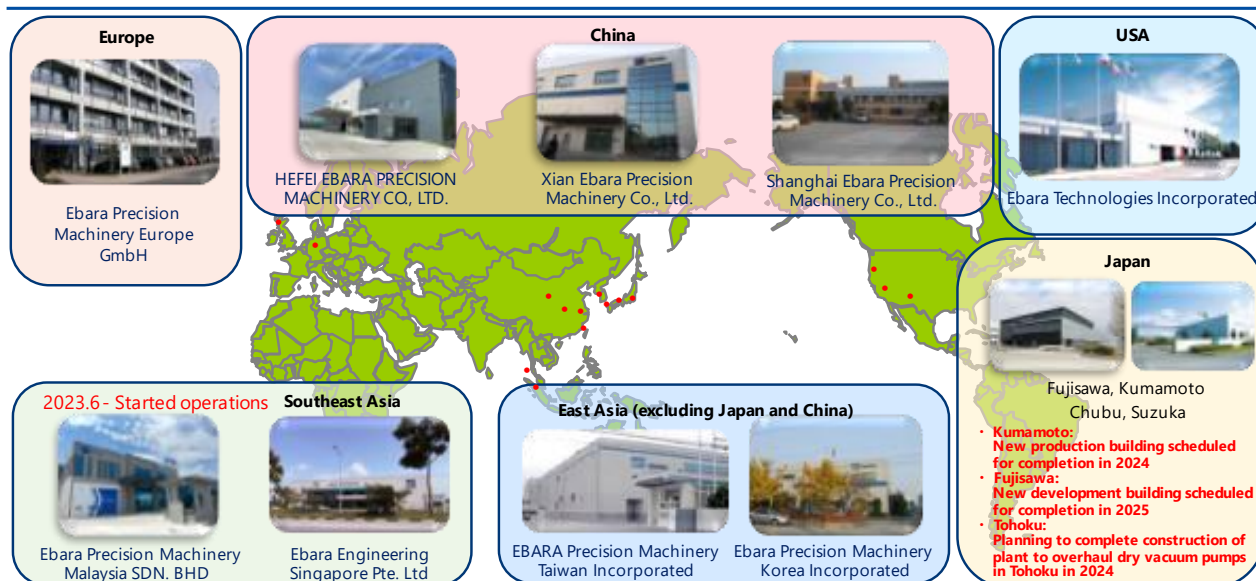
Next, we will continue to increase production capacity. We have begun constructing a new production building at our Kumamoto Plant, which is responsible for CMP mass production. In addition, we will further advance automation at the Fujisawa V7 Plant, our main production base for dry vacuum pumps, while increasing production and making new investments at our overseas bases close to our customers.

In addition, we will rebuild our global business infrastructure. Ensuring the safe supply of parts is a major issue. Since this year, we have been promoting the strengthening of our supply chain, including the establishment of multiple lines of suppliers and overseas procurement bases. We are also restructuring our inventory policy, which has been based on the just-in-time policy, in light of recent experiences.

By steadily implementing these growth strategies, we aim to achieve an operating margin of at least 17% by 2025 and a revenue CAGR of at least 15% over the three years of the medium-term management plan. The semiconductor industry is highly volatile, and this volatility will greatly affect our single-year performance. Nevertheless, we expect the market to grow over the medium to long term. To ensure that we make forward-looking investments and achieve growth that outperforms the market, we will continue to develop our business.

The company has also set non-financial goals from the perspective of contributing to realizing a sustainable society. Among the materialities listed in the SDGs, the company has identified contribution to the creation of a sustainable society and contribution to the creation of an evolving affluent lifestyle as important issues, has established specific KPIs, and continues to work toward achieving these goals.

## Precision Machinery Company Global Network



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The company has support bases in the areas where its customers are located, each operating as a group company.

In addition to revenue activities, these bases provide field support for delivered equipment and overhaul services for dry vacuum pumps and other equipment. In addition, some of these bases also manufacture dry vacuum pumps locally. In order to respond to future increases in demand, we are considering building a new manufacturing base for dry vacuum pumps, in addition to adding a new building to the Kumamoto Plant at CMP.

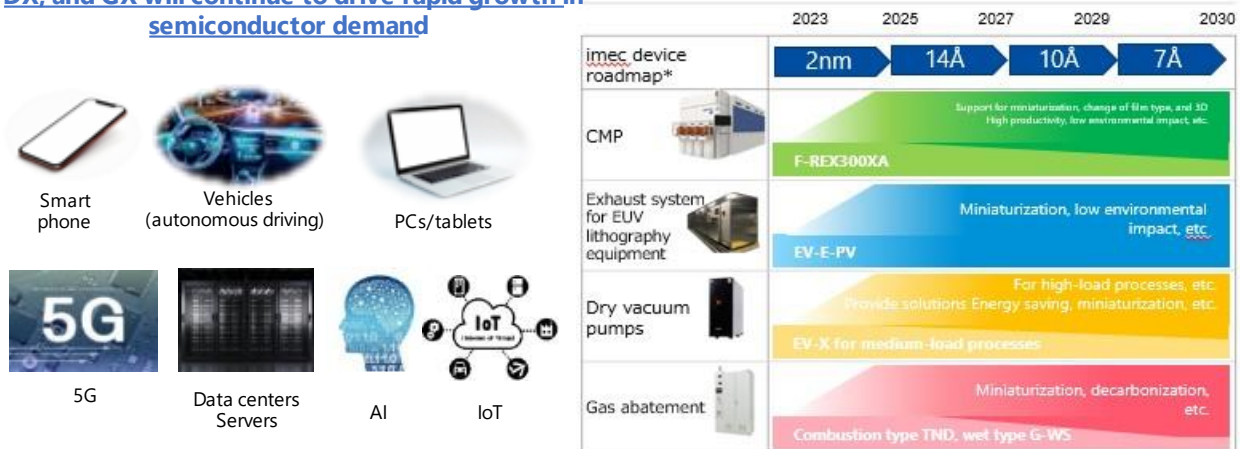
Furthermore, in response to the expanding service and support business, an overhaul plant for dry vacuum pumps started operation at our Malaysian base this fiscal year. In Japan, we are constructing an overhaul plant in the Tohoku region.

# Opportunities for Future Business Growth



**Growth in IoT, Cloud, AI, Automated Car, 5G (ICAC5), DX, and GX will continue to drive rapid growth in semiconductor demand**

**Semiconductor miniaturization shifts from nm to Å**



\* imec, Belgium's independent nanotech semiconductor research institute, has published a logic device roadmap to 14Å and beyond. (Excerpt from imec Future Summit 2022)  
We assume a 7Å generation for development and a 14Å generation for commercial use by 2030

\*Refers to the EBARA model number

The company sees the following opportunities for business growth.

The first is the demand for semiconductors. The performance demand for semiconductors is constantly increasing. Although our products are invisible to end consumers, the semiconductors manufactured using them are indispensable for PCs, tablets, smartphones, IoT devices, and automated driving technology. In addition, demand for semiconductors is rapidly increasing because of the spread of servers for data centers, AI, 5G, and other technologies.

We refer to the Internet of Things or IoT, cloud computing, AI or Artificial Intelligence, automated cars, and fifth generation communication or 5G as the ICAC5. In the field of IoT cloud, a huge amount of data detected by CMOS image sensors and other sensors is stored in cloud servers, and the volume of data will continue to increase.

As AI advances, demand for AI-specific semiconductors will increase. The recent prosperity of ChatGPT is astonishing. In the car industry, the amount of semiconductors installed continues to grow exponentially to accommodate EVs and automated vehicles. With the advancement of 5G communications, the volume of communications data will increase dramatically, and the semiconductor usage of the devices that handle them will also increase. Furthermore, it is said that 6G, the next-generation communication technology, will begin to spread in 2030. In addition, the demand for semiconductors to support DX in various fields, SDGs, and the expansion of GX toward a decarbonized society is rapidly expanding.

As long as we seek to realize a more convenient world, the demand for semiconductors will continue to increase over the medium to long term. The importance of the company's products and solutions that support the manufacturing of evolving semiconductors will increase. The company will need to develop its business to respond to market expansion.

Second is the technological innovation of semiconductors. The technology for the miniaturization of semiconductors has been advancing rapidly, and it is said that it will reach the angstrom range, which is one-tenth of the current nanometer scale.

The roadmap on the right shows the direction of development for each of our major products based on imec's roadmap for miniaturization.

For CMP, we will continue to provide solutions for miniaturization that will evolve to 14 angstroms and beyond while pursuing high productivity and reducing environmental impact. In gas abatement systems for EUV lithography equipment, we will provide solutions that respond to the equipment's evolution and aim to reduce environmental impact further. In dry vacuum pumps and gas abatement systems, we will continue to provide solutions that meet customers' needs throughout the sub-fab area.

In addition to the conventional miniaturization of semiconductors, we are aiming to improve performance through layering. In stacking, a high level of wafer flatness is also required, and we have developed and accumulated technologies to solve this problem, enabling us to meet our customers' needs.

While being aware of these two major trends, we hope you deepen your understanding of our growth strategy through the following sessions, in which you will hear explanations from the managers of our CMP business, component business, and each of our business segments. With that, we will now move on to the presentations by the general managers of the two businesses. Thank you all very much.

**Osaki:** Now for the next presentation. Isao Nambu, Executive Officer, Division Executive, Equipment Division, Precision Machinery Company, will explain the evolution of semiconductor manufacturing technology, CMP process technology trends, and medium-to-long-term strategies.

**Nambu:** My name is Nambu. I will give an overview of our machinery business products.

## CMP Business Overview

**About Chemical Mechanical Polishing (CMP)**

- A process for chemically and mechanically polishing wafers (semiconductor substrates) to achieve the nanometer<sup>\*1</sup>-level flatness required in the semiconductor manufacturing process.  
\*1 1 nanometer is one millionth of a millimeter
- CMP is unique among semiconductor processing, where even the smallest amount of dust can affect performance, due to the large amount of foreign matter utilized.
- Industry's first platform for conducting polishing and cleaning on the same device. Since then, this system has been an indispensable part of the semiconductor process.
- The application of CMP to the wiring process was praised by Dr. Moore, the father of semiconductors, as the biggest surprise.

**CMP business product line**

**Model F-REX300XA<sup>\*2</sup>**

**Model F-REX300X<sup>\*2</sup>**

**Model F-REX200M2<sup>\*2</sup>**

\*2 Refers to the EBARA model number

**CMP market scope<sup>e3</sup>**

\*3. Market scope based on EBARA survey

- CMP demand growing significantly with the increasing high integration of semiconductors
- **Market scope projected to double<sup>e4</sup>** by 2030 (compared to 2020) \*\* EBARA survey
- We have a global **No. 2** share  
Achieving a total of **3,000 units** shipped in 2022
- We possess distinctive technology formed through over 30 years of experience and extensive knowhow/patents

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We started our CMP business in 1992 and have contributed to the expansion of CMP in the semiconductor industry.

Although CMP is a difficult product to understand, it is named CMP equipment using the first letter of the English name chemical mechanical polishing. This technology is necessary for the planarization of substrates called wafers, which are used to make semiconductor substrates. Circuits are stacked on silicon wafers, and the device surfaces are polished with an abrasive solution to planarize or make the film thickness uniform.

In terms of precision, wafers with a diameter of 300 mm are now the mainstream process, and this equipment achieves a very high degree of planarity, such as achieving a film thickness variation of several 7 nm on a 300 mm wafer.

There are various types of CMP equipment and semiconductor manufacturing equipment, but I would like to introduce CMP equipment that is a bit special among them.

Since semiconductor devices, as you all may already know, are used to form extremely fine circuits, they are in an environment where anything that interferes with these fine circuits, such as dust that reduces the cleanliness of the circuits, is extremely undesirable. However, as mentioned earlier, CMP uses an abrasive solution to polish the circuit surface, so it is a process that deliberately supplies foreign matter to the fine circuits. At that time, it was extremely frowned upon in the semiconductor process.

Against this backdrop, polishing machines were installed in a basement room, which was not a clean room, and were separated from other equipment. In addition, after polishing, abrasive residue remained, which had to be cleaned up. This is another aspect of the semiconductor process that has been extremely difficult to deal with.

In response to this, we have developed what we call dry-in/dry-out, which is an integrated system in which wafers enter the CMP equipment in a dry state, go through the polishing process, and then undergo the cleaning process. Then, they are dried and taken outside. We are proud to say that the CMP equipment and CMP market have expanded greatly in the semiconductor market as a result.

Since then, the adoption of CMP has spread rapidly, and it is now an indispensable process for cutting-edge semiconductor processes. In 2018, an academic conference on semiconductors, SSDM, was held, and Dr. Gordon Moore, known as the father of semiconductors, took the stage during a panel discussion there. During the panel discussion, a question was asked as to what the most surprising thing in Dr. Gordon Moore's knowledge of semiconductors was, and his response was that using CMP in the semiconductor wiring process was the biggest surprise of all. This is the kind of CMP equipment that we are currently developing and producing as our mainstay products.

We believe that the CMP process will be used more and more in the future for the miniaturization and integration of semiconductors, and we have included a semiconductor market forecast based on our own research in the upper right-hand corner of this page. We believe the semiconductor market will grow more than twice as much as it did in 2020 by 2030.

In this market, we have shipped more than 3,000 units in total, and we are currently in second place in terms of global market share. By utilizing this experience, knowledge, and patents, we would like to differentiate ourselves from our competitors and establish a competitive edge in order to achieve further growth.

# Strategy for Major CMP Processes



	Logic	Memory
Major processes (Layer image diagram)	<p>(Example: Backside Power Delivery Network (BS -PDN))</p>	<p>(Example: 3DNAND Memory Hybrid bonding (left diagram) and DRAM High Bandwidth Memory(right diagram))</p>
Market trends	<ul style="list-style-type: none"> <li>- CMP market growth projected to be on par with or slightly higher than other processes</li> <li>- In addition to miniaturization, the move toward higher integration is advancing with the introduction of bonding technology using three-dimensional layering</li> <li>- Opportunities to utilize CMP have increased compared to conventional integration</li> </ul>	
Our position and future strategy	<ul style="list-style-type: none"> <li>- Metal layers have the most opportunities for both miniaturization and bonding, which are driving growth for these markets.</li> <li>- We will capture market share for the metal layer CMP process, which is one of our strengths</li> </ul> <p>⇒ <b>Achieve growth that outpaces the market by increasing our market share</b></p>	

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Here is a slide that illustrates what CMP will be used for in the semiconductor process.

As I mentioned earlier, CMP contributes greatly to device miniaturization and high integration. To give a broad explanation, as the so-called high integration progresses, it becomes a matter of how much circuitry can be packed into the same area, so the tendency is to move upward, like a skyscraper. If you think about it in this way, it is very easy to understand.

In the past, the current focus of attention in the area of high integration mentioned earlier was how much greater the integration could be achieved on a single wafer. Still, recently, we have approached the limit of miniaturization. It has become clear that in order to achieve high integration, it is necessary to use multiple wafers. There is a growing trend to create circuits on one wafer and then on another wafer and to integrate them together.

The figure on the left is logic, and the figure on the right is memory.

The left side is the backside of the logic product. Until now, semiconductor circuits were only formed on the wafer surface in the semiconductor manufacturing process, but circuits are now formed on the backside as well, and a power supply network is being created there.

The wiring for the power supply line was created on the second wafer, and the process is now moving toward higher integration by bonding the two wafers together. Still, when laminating the two wafers, by shaving both of the lamination surfaces and making them very smooth, the process is expected to be able to laminate them beautifully. Furthermore, on the second wafer, various wiring and process circuits must be created, so multiple layers of CMP processes are expected here as well, and the number of CMP applications for logic products is expected to increase more and more in the future.

The diagram on the right side shows a memory diagram, and the middle part is a stacking diagram of NAND memory. Conventionally, the memory of NAND memory consists of memory storage elements and logic circuits that retrieve data from the storage elements, which are realized on a flat surface. Still, we recognize that there is a growing need to create a logic circuit on one wafer and a memory element on another wafer and then attach them together at the end. In this case, the CMP process is expected to increase in terms of



precision in attaching the two wafers together by smoothing, grinding, and flattening the surfaces of the two wafers before attaching them together.

The rightmost figure of memory is referred to as DRAM, which is a memory form that can retain memory when the power is turned on. Today, especially with the evolution of generative AI and other technologies, high-bandwidth memory is gaining popularity, and this type of memory requires extremely high integration of the memory elements of the DRAM. Here, too, as I mentioned earlier, each time wafers are laminated, a CMP process is required, and for the high bandwidth memory process, the CMP process associated with lamination is expected to increase.

Based on these general trends in various semiconductor chips, we can say that the number of CMP processes will increase significantly with higher integration. Among these, CMP can be broadly divided into two processes: the oxide film process and the metal film metal process. Among these polishing objects, we expect that the number of metal objects to be joined, in the sense of joining, will increase greatly. In this context, we have a very strong share of the metal polishing process, and we intend to leverage this strength to increase our share of CMP in the lamination process, which is expected to increase in the future.

## Growth Strategy for the CMP Business

- Strengthen Product and Solution Development Capabilities-



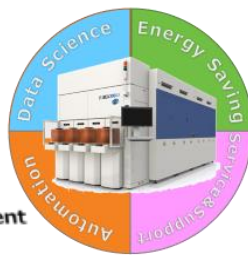
E-Vision2030

Semiconductor Miraturization- Aim for 14Å

E-Plan2025

Strengthen product and solution development capabilities

- Building a market-in solution development system
- Enhancing research and development facilities
- Creating new value through data science utilization



### Building a new equipment development building

Construction of a new development building (V8) began at the Fujisawa District. This will strengthen our mainstay CMP systems and the overall equipment business (scheduled for completion in summer 2025).

- Expanding our development areas and accelerating development by establishing an IoT network
- Strengthening process evaluation and proposal capabilities for customers
- Developing next-generation process utilizing the latest development equipment, inspection equipment, and utility environments



Conceptual image of completion

EOI: EBARA Open Innovation, a joint research framework with universities  
imec: An international research Institution

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This slide is an explanation of our development strategy.

As integration continues to advance and semiconductors increasingly adopt CMP, we are proceeding with development with great emphasis on anticipating customer needs and developing products accordingly. In this context, we believe it is important to collaborate with various external organizations not only for independent development but also for developing basic technologies and technologies for mass production applications.

As for research, Ebara is conducting joint development with an international research institute, imec to research CMP for cutting-edge semiconductor manufacturing technology. We believe that imec is very advanced in the research and development of cutting-edge semiconductors, and by developing equipment and processes with imec, we will be able to develop processes for cutting-edge areas.

In addition, for more fundamental areas beyond R&D with imec, we have established a network called Ebara Open Innovation, which mainly consists of academia, both domestic and foreign universities and technical colleges. We are conducting a great deal of joint research through this network. We are working to elucidate and develop elemental technologies through this open innovation network, including polishing, cleaning, and other data simulations.

Next, moving closer to the production line, we have CMP equipment as part of our collaboration, but CMP equipment does not complete the semiconductor process alone. In terms of the prior process of film deposition and the bonding process that I mentioned earlier, the bonding process comes after the CMP process, so the connection between these processes is very important.

In this context, we are actively engaged in cooperative activities with equipment manufacturers in our industry and consumable material manufacturers that develop CMP consumables, among others. Through these collaborations, we are promoting issues related to pre- and post-processes and the development of solutions to these issues. We are proceeding with development in such a way that we can ultimately offer solutions to our customers.

Of course, we are further strengthening our focus on independent development, and Fujisawa is our development base, where we are developing elemental technologies for polishing, cleaning, process technology, and process control, as well as developing new equipment. Construction of a new development building began this year with the aim of starting operations in 2025.

Including this new development building, we will continue to add value to our CMP equipment by making it more intelligent and proactively incorporating data science technology using AI and machine learning, especially in the midst of recent advances in process elucidation. By promoting a wide range of R&D activities, from basic research to solution development, as I have just described, we hope to provide the market with solutions that can be trusted.

## Growth Strategy for the CMP Business

### - Increase Production Capacity -



Construction of a new CMP production building (scheduled for completion in 2024)

- Started construction of a new production building (K3) in Kumamoto District to respond to medium- to long-term growth in semiconductor demand
- Expanding existing production capacity by more than 1.5x to achieve new business expansion and flexible responses to customer needs
- Proactively promote digitalization and realize the concept of production x digital transformation (DX) Aiming to further improve productivity and production capacity

Conveyor (RFID identified stocking)

Digital picking (Lamp guided delivery)

MES<sup>1</sup> (Work Instruction/Management)

AIE<sup>2</sup> (Assembly Procedure Manual)

Paperless (e-ledgers)

Dashboard (Area map)

Automated test (Labor saving)

Production x digital transformation (DX)

\*1. Manufacturing Execution System (MES)  
\*2. Assembly Instruction Evidence (AIE)

This slide shows the expansion of production capacity.

The speed of development in the semiconductor market is accelerating annually. The development that I have been talking about earlier will become a very important weapon for us. On the other hand, it is meaningless if we cannot deliver products adequately, so we are planning to increase our production capacity by constructing a new building, which we call the K3 Building, at our mass-production plant in Kumamoto to increase capacity.

Construction of the K3 Building is aimed at increasing the current production capacity by 1.5 times and is scheduled to start in 2023, with completion at the end of next year. As I mentioned earlier in the development section, we have been talking about AI, machine learning, and so on, and we are also very focused on improving production efficiency. As mentioned here, we have been introducing automation and digital transformation, such as automatic recognition by RFID, digital picking, and work process management using MES, etc. We are planning to accelerate this process further in the K3 Building to build a more efficient process.

We have been actively promoting the digitalization of our production lines, including supply chain management, and we are now looking to expand our business further and respond flexibly to our customers' needs by improving both quantity and quality based on expanding our production lines.

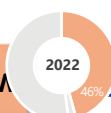
This concludes my overview of the machinery business. Thank you all very much.

**Osaki:** Now for the next presentation. Seiichi Tsuyuki, Executive Officer, Division Executive, Components Division, Precision Machinery Company, will explain about our component products, sub-fab solutions and green technologies.

**Tsuyuki:** My name is Seiichi Tsuyuki. I oversee the Component Division. Thank you very much for your kind attention.

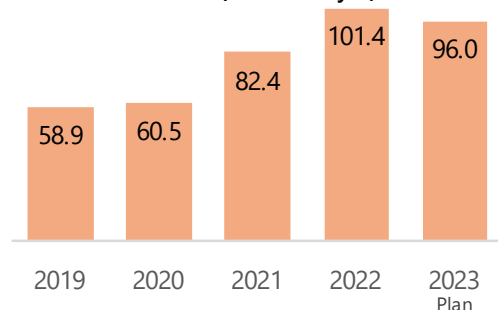
I will now introduce our business strategy for this business, including solutions in the area called sub-fab in semiconductor manufacturing plants and green technologies for reducing environmental impact.

## Components Business Overview








- Providing value and solutions to "Sub -fab" areas downstream of clean rooms in semiconductor factories
- Total shipments of dry vacuum pumps reached **200,000 units** in June 2022
- Global **No. 2** share for dry vacuum pumps

Transitions in Revenue (unit: billion yen)



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Components business product line		
Dry vacuum pumps		A non-contact vacuum pump that does not use oil or liquid for sealing. Achieves a clean vacuum without backflow or diffusion of water or oil.
Gas abatement systems		Processing equipment that detoxifies and safely discharges various gases used in manufacturing processes. Used for purposes such as decomposing GHGs, detoxifying toxic gases, safely processing flammable gases, and deodorizing odorous gases.
Ozonized Water Generator		Equipment for producing ozone water. Ozone water is highly oxidizing and is used during cleaning to remove organic substances and metal impurities and form oxide films on material surfaces, as well as applications such as sterilization, bleaching, and deodorization.
Exhaust systems for EUV lithography systems		Vacuum exhaust system connected with an EUV lithography systems. Achieves energy savings and a smaller footprint while maintaining the ability to exhaust the large flow of hydrogen required for the EUV exposure process.
Precision chillers		Device for controlling process temperatures in semiconductor manufacturing equipment. Uses environmentally-friendly coolant. *Building Service & Industrial Company products

First, let me give you an overview of our component business.

This business mainly provides products and solutions for the sub-fab area, which is located downstairs in the clean room of a semiconductor plant.

In particular, this business started with Ebara's strength in the original pump technology and pump rotary machinery technology. The heart of this business, dry vacuum pumps, has been adopted in the factories of many of our customers worldwide. Currently, the cumulative total of our shipments exceeds 200,000 units, and we are currently in second place in terms of global market share.

In the semiconductor manufacturing process, a vacuum environment is extremely important for treating various types of gases in a clean environment, which is indispensable.

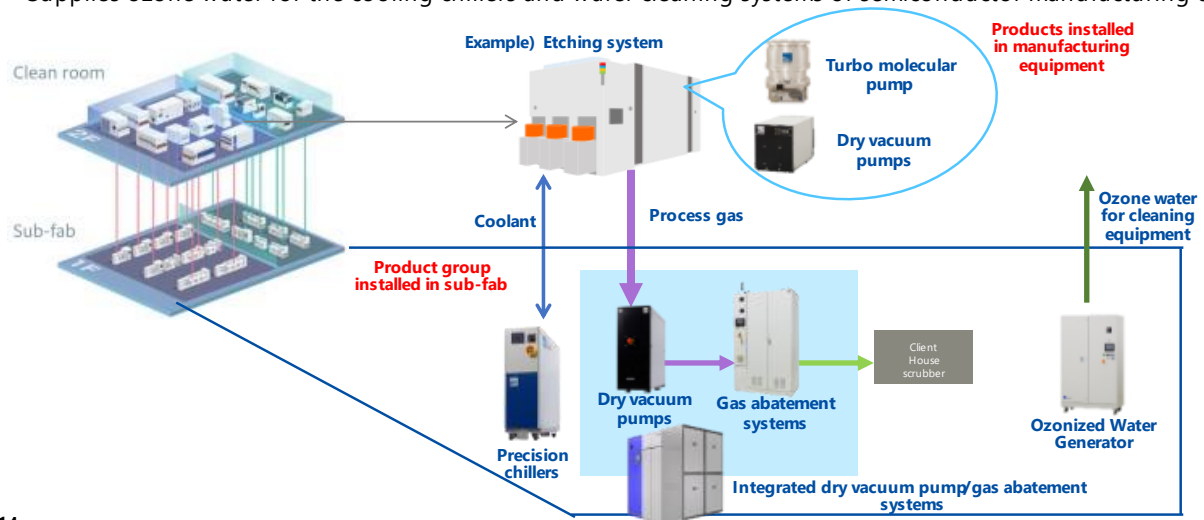
As mentioned earlier in the explanation given by Nambu in the equipment business, the number of processes will continue to increase in the future as semiconductors become more sophisticated. In addition, behind the gases discarded from the dry vacuum pumps in this business, such gases include those that are very toxic or have a very high potential for global warming. In order to break them down and render them harmless, gas abatement systems is indispensable. In addition, as semiconductors continue to evolve, wafers must be cleaned even more thoroughly as they become finer and more sophisticated. Recently, there has been an increase in the use of ozonized water generator in cleaning equipment.

Furthermore, for EUV lithography equipment, we have released an gas abatement system that integrates our dry pumps and gas abatement systems, and the needs of major device manufacturers are increasing as EUV lithography equipment becomes mainstream for miniaturization in the future. With this lineup, our products play a large role in factories' semiconductor manufacturing equipment and ancillary equipment.

## Installation Environment for Components Business Products inside Semiconductor Factories



- Vacuum products that create a vacuum environment in semiconductor manufacturing equipment and products detoxify process gases
- Supplies ozone water for the cooling chillers and wafer cleaning systems of semiconductor manufacturing equ



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This page shows a more detailed illustration.

This diagram simply shows how dry vacuum pumps and other component devices are connected in a customer's semiconductor. The top left of this diagram is a clean room. Our CMP is also located in the clean room on the top floor. Under the clean room where the semiconductor manufacturing process equipment is installed, we usually install our products in a sub-fab, which we call the downstairs area, in which the upper floor is connected to the lower floor by piping, and the chamber of the equipment is evacuated and vacuumed.

Dry vacuum pumps are connected to a large number of products in semiconductor manufacturing equipment that require a vacuum environment, such as CVD, PVD, EUV, and etching equipment, which also account for a very large proportion of such products. Behind these products is always the gas abatement systems, so we have both of these systems and in order to provide value through their integration, we work closely with not only device manufacturers but also equipment manufacturers in the development of our products.

The supply of ozonized water generator is also increasing to semiconductor production equipment manufacturers, and we are working to meet the increasing demand for this equipment in conjunction with more advanced semiconductor manufacturing.

## Growth Strategy for the Components Business - Strengthen Product and Solution Development Capabilities



### Using component product integration to transform into an exhaust system solutions provider

1. Value-added solutions for the entire sub-fab area at semiconductor plants
2. Using green technology to reduce customer environmental impact and running costs
3. Responding to technological advances in semiconductor manufacturing processes
4. Expansion into industrial areas beyond semiconductors, LEDs, LCDs, and solar cells



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On that note, I would like to explain our growth strategy for the main growth of our business.

First, the products themselves. We will continue to focus on refining our products, including product development, revenue, and after service. Still, we will also create a new business model by combining our multiple product lines and providing value and solutions in the sub-fab area of semiconductor factories.

In addition, we will focus on energy conservation, especially on reducing the environmental impact of the recent carbon neutrality movement, responding to the further evolution of the semiconductor manufacturing process, which requires several key technologies, and expanding our business by shifting existing products and technologies to new markets other than the semiconductor manufacturing market.

# Growth Strategy for the Components Business - Strengthen Product and Solution Development Capabilities



## 1. Value-added solutions for the entire sub-fab area

### ■ Proposals for packaging multiple products and exhaust systems including piping, valves, and heaters

- Eliminates the need for customers to design and arrange construction for piping and valves between each product, significantly shortening construction time
- Safety design that performs overall control including each product and each part, and that accounts for interlocks

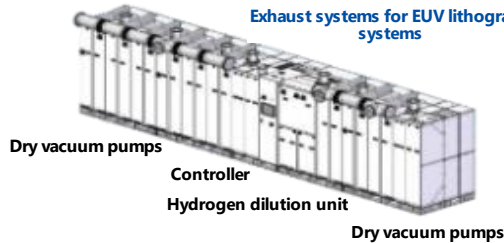
### ■ Providing in-house support and on-call support for sub-fab (for the products of our company and other companies)

- Providing safety and security by supporting customers 24 hours a day through Ebara's global network system

Integrated dry vacuum pump/gas abatement systems



Exhaust systems for EUV lithography systems



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Specifically, the following pages will explain the details.

First, in terms of providing value and solutions to the sub-fab area as a whole, very few of our competitors offer dry vacuum pumps, such as waste gas abatement systems and ozonized water generator, as we do.

Rather than simply offering multiple products, we are actively proposing package technologies and integration, including piping and wiring between products, operation, and various controls. We are working to provide new value propositions that reduce the customer's time and effort, shorten construction time, and reduce running costs through optimized operation.

In addition, semiconductor factories operate 24 hours a day, 365 days a year, so it is important and necessary to have a support system that can respond to this situation. Regarding the provision of services at this sub-fab, in order to minimize customer downtime and increase uptime, we have established a business model of overhaul, in which we are always on call globally and regularly to disassemble, inspect, and restore pumps to a new state. We have established a system to provide safe and reliable service and support to our customers by always having a factory close to the customer.

## 2. Using green technology to reduce customer environmental impact and running costs

### ■ Strengthening efforts to reduce the environmental impact of the semiconductor industry as a whole

- With increasing importance being placed on whether a product is environmentally friendly when selecting equipment, we are actively providing products and developing technology and products that contribute to the environment.

<Direction of technology/product development>

- ▶ **Dry vacuum pumps: smaller, lighter, and lower power consumption**
- ▶ **Reducing fuel consumption and eliminating fossil fuels for gas abatement systems**
- ▶ **Reducing environmental impact by improving greenhouse gas decomposition performance of gas abatement systems**
- ▶ **Visualizing utility usage and the conversion of utility usage into electricity using an operating status monitoring system**

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### Semiconductor growth

Semiconductors will continue to grow as a path to enriching people's lives and building the future of industry



### Increase in CO<sub>2</sub> emissions

As semiconductors become increasingly miniaturized, CO<sub>2</sub> emissions during manufacturing are also increasing, raising concerns about their impact on the environment

Second, we are also working on reducing environmental impact through green technology as an important measure.

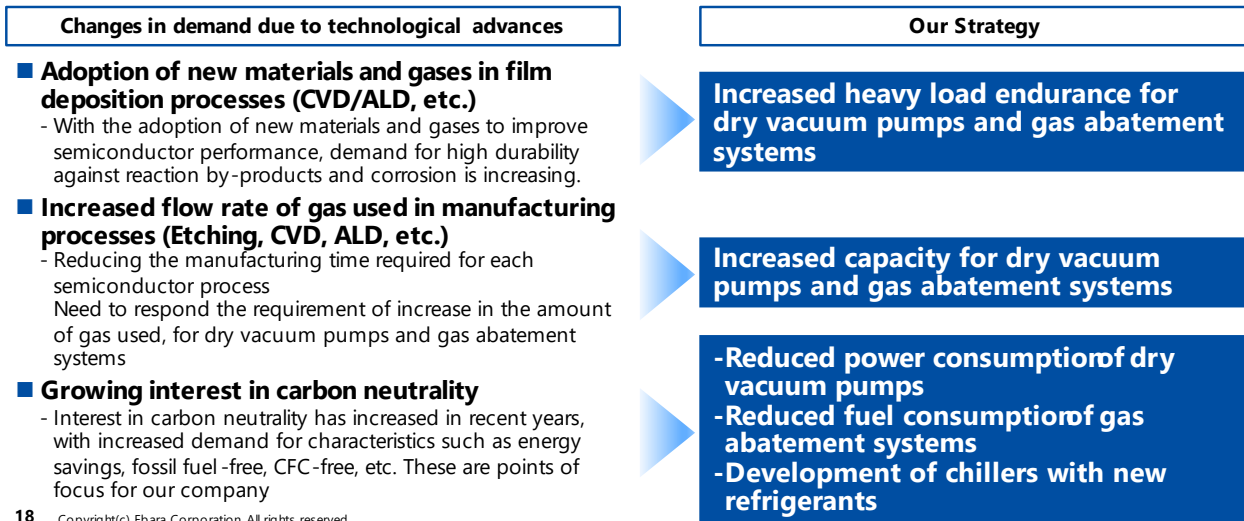
As you know, many of our customers in the semiconductor industry are leading companies worldwide, and they are making great efforts to reduce their environmental impact. As shown in the figure on the right, as the number of semiconductors increases in the future, people's lives will become more convenient. Still, our customers are also concerned that CO<sub>2</sub> emissions related to the production of semiconductors themselves will increase.

In selecting equipment, we consider it important to ensure the product is environmentally friendly, so we will further promote technological development in the areas shown in blue below. We are actively providing products that contribute to the environment and developing technologies and products by further advancing technological development in areas such as downsizing, reducing weight, saving energy, reducing fuel consumption, and creating equipment that does not use fossil fuels.

# Growth Strategy for the Components Business - Strengthen Product and Solution Development Capabilities



## 3. Responding to technological advances in semiconductor manufacturing processes



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Third, I would like to address the technological evolution of the semiconductor manufacturing process.

Semiconductor device manufacturers are constantly conducting research to improve the performance of semiconductors, to make them smaller, to save energy, and to reduce costs. As a result, new materials and new gases are being used to create new processes.

These changes are placing a tremendous load on our pumps, waste gas treatment equipment, and other equipment product lines. Accordingly, it is necessary to improve the durability of the products, vacuum performance, processing performance, and the powdery byproducts of chemical reactions that occur after the gases are discharged from the semiconductor device depending on the temperature and conditions. Corrosive gases may be generated, and the products must be resistant to such gases.

We have a dedicated development plant where we develop materials that can withstand such environments, conduct thorough research on the temperature characteristics of gases, and develop products that can withstand such environments and ensure longevity that will have an impact on products. Proactive product development is carried out by running actual gases through our products and by conducting demonstration tests.

On the other hand, in order to shorten the manufacturing time of semiconductors, there is an increasing trend to flow a lot of gas in each semiconductor manufacturing process. In response to the need for large gas flow, we have been working closely with our customers from the development stage to understand their needs for larger flow rates and larger pumps and have been developing products accordingly.

As I have repeatedly mentioned, customers are becoming increasingly interested in carbon neutrality. Ebara focuses on product development intending to reduce environmental impacts, such as products with lower power consumption, fossil fuel-free products, and CFC-free products. In particular, our dry vacuum pumps are currently rated as having the industry's top-class energy-saving performance in terms of power consumption.






# Growth Strategy for the Components Business - Strengthen Product and Solution Development Capabilities



## ■ New products for the semiconductor market

- Pursuing durability against reaction by-products and corrosion, and energy/footprint savings
- Achieve both improved production efficiency and decarbonization

Process	Product	Solution	Carbon Neutral
Lithography	Exhaust systems for EUV lithography systems 	Large flow hydrogen exhaust	Hydrogen recycling, etc.
CVD/ALD	<b>New dry vacuum pumps</b> <b>New gas abatement systems</b>	High durability and energy saving Large flow rate processing/small footprint	Energy saving technology using waste heat NOx emission reduction
Etch	<b>New gas abatement systems</b> Dry vacuum pumps (Model: EV-X*)	Multi-chamber compatible	Power reduction PFCs gas treatment
TSV (Adv. Packaging)	Dry vacuum pumps (Models: EV-X*, EV-M*) 	Energy saving, reduced footprint	Power reduction
Wafer Bonding (BS-PDN)	Dry vacuum pumps (Model: EV-S*)	Energy saving, reduced footprint	Power reduction
Cleaning	Ozonized Water Generator (Model: OZW*) 	Highly concentrated ozone production	Reducing environmental impact

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\*Refers to the EBARA model number

The following is a list of our products and solutions before the semiconductor manufacturing process I have explained so far, as well as our efforts to become carbon neutral.

As I have explained, we are developing products that aim to reduce environmental impact, such as carbon-neutral products, while providing products with high flow rates, energy savings, reduced footprints, and higher performance as the value we offer.

# Growth Strategy for the Components Business - Strengthen Product and Solution Development Capabilities




## 4. Expansion into industrial areas beyond semiconductors, LEDs, LCDs, and solar cells

### ■ Oil rotary pumps have been used in liquid chromatograph mass spectrometers (LC-MS) for many years, but in recent years more and more are replacing them with dry vacuum pumps for the following reasons:

- Oil contamination inside the mass spectrometer due to oil backflow
- Oil contamination in the environment near the installation site due to regular oil changes
- Want to save time and effort needed for oil changes

### ■ Contributing to various markets with Dry Vacuum Pumps that utilize vacuum technology cultivated in the semiconductor market

### ■ Aiming to increase sales by capturing the market where oil pumps are being replaced by dry vacuum pumps

Market	Process	Product	Solution
Medical/Materials Semiconductor	Mass spectrometry Electronic microscope	Dry Vacuum Pumps (Models: EV-SA*, EV-PA*) 	Low noise/low vibration
Smartphone panels Lenses	Vapor deposition equipment	Dry Vacuum Pumps (Models: EV-A*, EV-S*)	Large flow continuous processing
Jewelry	Artificial diamond refining	Dry Vacuum Pumps (Model: EV-A*)	Maintenance reduction

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Please move on to the next.

Finally, I would like to talk about our response to markets other than semiconductors.

Vacuum pumps are a technology with a very long history, but it is generally said that such vacuum-related products were already developed around the 1600s. Thereafter, various vacuum pumps have been developed and used in various research institutes and industries. However, there are still many fields where oil rotary or oil-based vacuum pumps are used as the mainstream.

On the other hand, since we have been developing semiconductor vacuum pumps, oil in the pumps causes oil back, thus contaminating the vacuum. Therefore, dry vacuum pumps have become the mainstream vacuum technology in the semiconductor industry.

In the semiconductor industry, oil contamination from oil rotary pumps and the need to change the oil are common problems, so there is a trend toward eliminating and replacing such issues with dry vacuum pumps, which have been gaining momentum.

We can see the expansion of these applications. To keep up with this trend, we are developing and expanding the revenue of products for the medical market, such as those listed here, the mass spectrometer market, and other industrial markets.

## Growth Strategy for the Components Business - Increase Production Capacity



### ■ V7 automated plant - Completed in 2019, production started in 2020

- Early adopter of production automation technology using robots and IoT to strive for the highest quality and address future labor shortages
- Integrated production within the same building with efficient processing, assembly, testing, and logistics processes tailored to demand fluctuations
- Actively using DX to monitor production status in real time and revamped our internal systems, including the creation of an automatic planning system using AI
- Solar panels installed on the roof and power generation began on November 29, 2023

Fujisawa V7 automated plant building exterior



Module automatic assembly line



Internal system configuration



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Last but not least, I would like to introduce the production capacity of our product business.

The photo here shows the V7 plant, which started production in 2020. This is the first plant in the industry to be built for the purpose of automating production in conjunction with the expansion of production capacity. In particular, this factory is engaged in the automated machining of rotors, which are the core of dry vacuum pumps producing performance, and casings, which are the counterpart of the rotors, as well as the automated assembly of motors and total pump unit modules. Accompanying this, we are taking on the challenge of achieving the world's highest quality. We are also taking on the challenge of new manufacturing in order to respond quickly to the labor shortages that are naturally expected in the future.

By utilizing robots, IoT, and DX, we can check the production status and operation status in real time so that we can efficiently process and assemble products in the same factory according to changes in demand, etc. We have built this factory based on this concept.

## Growth Strategy for the Components Business - Increase Production Capacity-



- Aiming for No. 1 share in dry pump market by 2030, increasing finished product assembly and overhaul capabilities
- Continued investment in automation at V7 automated plant (Fujisawa), which started operations in 2020



Construct a plant to overhaul dry vacuum pumps (Tohoku Region)

Scheduled for completion in July 2024

Automated dry vacuum pump plants  
Continue investments in automation (Fujisawa)

Construct second factory for assembly of finished products of dry vacuum pumps (Taiwan)  
Scheduled for completion in June 2026

Construct a plant to overhaul dry vacuum pumps (Malaysia)  
Launched operations in June 2023



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We are currently planning to expand our production and overhaul capacity looking at the global market.

Going forward, we will continue to respond to the semiconductor market, which is expected to expand even further, by establishing a solid QCD system that includes not only products but also services while keeping a firm grasp on customer trends.

This concludes my presentation of the component business.

Thank you all for your attention.