



Ebara Corporation

EBARA IR Day 2024

October 9, 2024

Event Summary

[Company Name]	Ebara Corporation
[Company ID]	6361
[Event Language]	Japanese
[Event Type]	Investor Conference
[Event Name]	EBARA IR Day 2024
[Date]	October 9, 2024
[Time]	09:30 – 11:37 (Total: 127 minutes, Presentation: 90 minutes, Q&A: 37 minutes)
[Venue]	Webcast
[Number of Speakers]	4
	Shugo Hosoda Executive Officer, CFO
	Takanobu Miyaki Executive Officer, President, Energy Company
	Teruaki Tsukamoto Division Executive, CP Hydrogen Strategic Business Unit
	Akihiro Osaki Division Executive, Group Public Relations and Finance Division

Presentation

Osaki: Thank you for your patience and for joining us today for EBARA IR Day 2024 despite your busy schedules. The time has arrived, and we will now begin the meeting. Today's materials are posted on our website, so please take a look at that as well.

Let me now introduce our participants. Mr. Takanobu Miyaki, President of the Energy Company.

Miyaki: My name is Miyaki. Good morning. Thank you very much.

Osaki: Mr. Teruaki Tsukamoto, CP Hydrogen Strategic Business Unit Division Executive.

Tsukamoto: My name is Tsukamoto. Thank you for your time today.

Osaki: CFO, Mr. Shugo Hosoda, responsible for investor relations.

Hosoda: My name is Hosoda. Thank you.

Osaki: I am Osaki, Division Executive of Group Public Relations and Finance Division, and I will be the moderator. Thank you very much. Today's schedule consists of two sessions, with Q&A to be held in each session. After a brief greeting from Mr. Hosoda, Session 1 will begin. The briefing is scheduled to end at 11:30 AM. We would like to begin with a greeting from Mr. Hosoda, our Executive Officer in charge of IR.

Hosoda: Good morning, everyone. My name is Hosoda. Thank you very much for your participation in our IR Day. As always, we would like to thank you again for your interest in the business and management activities of our group.

We have been holding IR Day once a year since 2021. This year marks our fourth IR Day. Last year, the theme was our semiconductor-related business. This year, for the first time in two years, we would like to focus on our energy business.

Our main presenters today will explain the current status and future prospects of the Energy Segment, an existing business segment, and the Hydrogen business, which is in the business incubation stage with a view to future market expansion. Prior to the two sessions, I would like to briefly touch on the current positioning of both businesses within the entire Ebara Group.

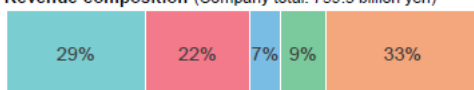
Positioning of the Energy Segment



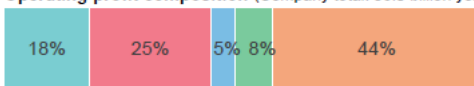
- In the current Medium-Term Management Plan, E-Plan 2025, we position the Energy Segment as a business that will be transformed into a growth business
- We will combine our collective technology and maximize synergy through the integration of compressors & turbines, cryogenic pumps, and custom pumps businesses
- Provide solutions to support target markets facing the energy transition to fuels such as ammonia and hydrogen

FY2023 Segment-specific revenue and operating profit

Revenue composition (Company total: 759.3 billion yen)



Operating profit composition (Company total: 86.0 billion yen)

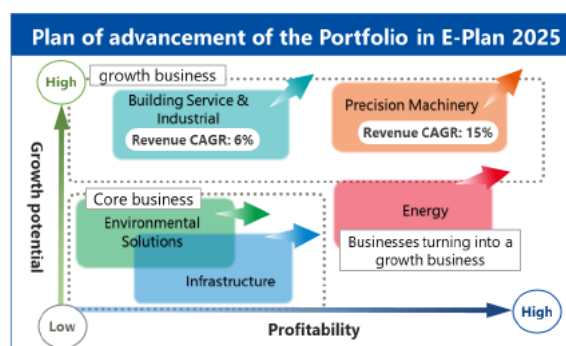


■ Building Service & Industrial ■ Energy ■ Infrastructure ■ Environmental Solutions ■ Precision Machinery

Energy Segment	
- Revenue:	167.2 billion yen, ratio: 22%
- Operating profit:	22.3 billion yen, ratio: 25%

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Position in E-Plan 2025



First is the energy segment. As you are probably aware, the energy segment is one of our five existing segments and it accounted for 22% of our sales revenue and 25% of our operating profit in the last fiscal year on a consolidated basis, making it the second largest profit generator in the entire group after the precision machinery segment.

Its operating profit margin is also relatively high at 13.4% in the last fiscal year, thanks in part to the relatively high proportion of after-sales business in this entity. This segment is already one of the pillars that drive our entire group.

Under our current medium-term management plan, E-Plan 2025, which is a three-year plan ending in FY2025, the energy segment is positioned as a business that will be transformed into a growth business.

The energy segment's target is primarily the oil and gas market, however, the market and customers themselves are in the midst of transition amid the shift to carbon neutrality. We do not passively view these changes as mere changes in the external environment, but rather as a growth business in a new business environment, where we are proactively involved in market and customer transitions and propose necessary solutions. This business is positioned as a business that will transform into a growth business in a new and growing business environment.

Energy transition does not happen overnight, so there are various practical steps that are now being taken, such as retrofitting existing plants to make more efficient use of fossil fuels, and shifting to intermediate solutions such as LNG, which is a relatively preferable fossil fuel. Amid all of that, there are a variety of business opportunities that can serve as an extension of our existing business.

We are developing and providing the optimum equipment for our existing customers' new attempts, such as sustainable air fuel (SAF) production and ammonia conversion to power generation fuel, by making full use of our accumulated technologies and know-how.

In addition, we are simultaneously promoting the development of compressors for hydrogen and CO₂ that contribute to carbon neutrality. We are performing ambidextrous management within a single energy segment, so to speak, and that requires dynamic steering. Such is the situation. We recognize that, to date,

the relatively strong performance in the past year was because it was well steered, and the results are reflected in our business performance.

With regard to its background, as you may already know, Ebara as a whole transitioned to a new structure, a target market-based organization, starting last fiscal year. In this transition, all of our products facing the energy market, such as compressors and turbines, cryogenic pumps, and other custom pumps, are now handled within a single organization, allowing us to provide more flexible solutions to the energy transition that we are advancing together with the market and our customers. In a sense, we are reaping the results of the structural reform toward a target market-based organization in a more tangible form from an early stage. And it would not be an exaggeration that where we are seeing the benefits most would be in the Energy Company.

Positioning of Hydrogen-related Business



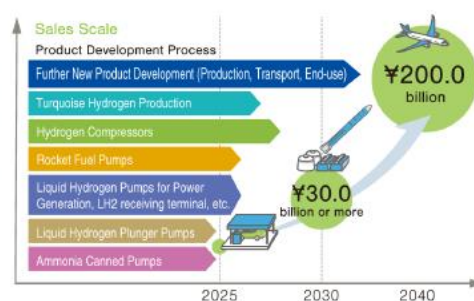
- Positioned as an internal Strategic Business Unit (Corporate SBU), aiming for commercialization
- Develop and launch liquid hydrogen pumps by leveraging the ultra-low temperature technology cultivated through cryogenic pumps for LNG and the technology related to materials and fluids we have accumulated through multiple businesses
- Contribute to the societal adoption of a hydrogen supply chain by supplying liquid hydrogen pumps. Aim for hydrogen-related business growth on the scale of 200.0 billion yen by 2040

Hydrogen-related business development image based on a positive cycle of innovation in Ebara's core technology and business synergy



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Business scale growth image for the hydrogen-related business



These are the current positions of the energy business, followed by the hydrogen-related business. I mentioned that we are simultaneously promoting our existing businesses and new business development through ambidextrous management within the Energy Company, but the business related to liquid hydrogen pumps is treated as a separate business unit within the corporate function, called the corporate project hydrogen strategic business unit.

The liquid hydrogen pump-related business is still in the business incubation stage, and considering the amount of investment required and other factors, the decision was made to separate the business from existing businesses and to move forward while it is being supported by the entire company and all our businesses, rather than holding it within one existing business entity.

There is, of course, the economic aspect of building a solid business foundation by investing the necessary capital while providing company-wide support, but at the same time, there is the technical aspect in that the core technological elements involved in this business and its development are connected to the core technological elements that span all the businesses in our group, and we need to develop by making full use of those elements. For both economic and technological reasons, we have chosen not to place this business under the authority of a single entity, but rather under our corporate jurisdiction.

In fact, liquid hydrogen, which is a cryogenic fluid with a temperature of minus 253°C, is a difficult substance to handle due to various factors, such as its low density, but we recognize that the development of a pump for it is something that can only be achieved by combining and integrating the core technologies of our group that we have accumulated over the years. And this is why we feel there is a space for us to be able to contribute.

Through today's presentation, we hope to convey to you that we are steadily preparing to provide the components and equipment necessary for the social implementation of hydrogen-related infrastructure as a realistic solution.

Ebara Initiatives in the Energy Segment and Hydrogen-related Business



- Accelerated initiatives for realizing a carbon neutral society by 2050, contributing to the realization of a sustainable society as outlined in our long-term vision, E-Vision 2030

Initiative	Press release
> Developed the world's first Liquid Hydrogen Booster Pump	February 24, 2023
> Developed Canned Motor Pump for Liquid Ammonia	September 4, 2023
> Developed the World's First Hydrogen-powered Absorption Chiller/Heater	December 7, 2023
> Ebara Elliott Energy Wins Contract to Provide Compressor For Thailand's First Sustainable Aviation Fuel (SAF) Project	May 7, 2024
> Agreement with Tokuyama Corporation Concerning Pilot Test of Hydrogen-Powered Absorption Chiller-Heater	July 22, 2024
> Successful Operation of Canned Motor Pump for Liquid Ammonia	July 29, 2024
> EBARA Announces Construction of World's First Full-Scale Equipment Testing and Development Center Fully Equipped with Liquid Hydrogen Pump Testing Facilities	September 12, 2024
> Concluded Comprehensive Agreement with Innovative Space Carrier Inc. for the Development of Rocket Engines Utilizing Electric Pumps	September 27, 2024

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Progress in the Energy Segment (Press Releases)



-Developed Canned Motor Pump for Liquid Ammonia (September 4, 2023 release)
 -Successful Operation of Canned Motor Pump for Liquid Ammonia (July 29, 2024 release)

Background

- Amid the global decarbonization trend, Japan is leading the way in the evaluation of ammonia as a fuel
- As the adoption of ammonia as a fuel increases, markets have need for the safer transport of ammonia

Overview

Pump characteristics	- Developed a pump that can be used in equipment that uses ammonia as fuel - By comprising a structure through which the motor part is immersed in liquid ammonia, use is possible without liquid ammonia leaks
Demonstration test results	- Successful demonstration test using actual liquid ammonia at customer site - Confirmed not only the reliability of the design structure but that this product contributes to safety and environmental impact reduction



Canned motor pump for liquid ammonia

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Ebara Elliott Energy Wins Contract to Provide Compressor For Thailand's First Sustainable Aviation Fuel (SAF) Project (May 7, 2024 release)

Overview of sustainable fuel development project underway in Bangkok

Operation	- BSGF Company Limited (Joint venture between Bangchak Corporation Public Company Limited, BGGI Public Company Limited, and Thanachok Oil Light Company Limited)
Summary	- The first sustainable aviation fuel (SAF) commercial production unit in Thailand - Through SAF production, it is possible to reduce aviation industry greenhouse gas emissions by approximately 80,000 tons per year

Developed the World's First Liquid Hydrogen Booster Pump (February 24, 2023 release)

■ Background

- By 2050, hydrogen will account for 10% or more of global energy trade value (2022 announcement by IRENA <International Renewable Energy Agency>)
- In August 2021, our company launched a hydrogen-related business project as a business unit overseen directly by the corporate office

■ Overview

- From 2019, as a NEDO-subsidized project, we developed the world's first liquid hydrogen booster pump for hydrogen power generation
- Results of actual liquid hydrogen test (-253°C) were favorable



Liquid hydrogen booster pump

EBARA Announces Construction of World's First Full-Scale Equipment Testing and Development Center Fully Equipped with Liquid Hydrogen Pump Testing Facilities (September 12, 2024 release)

■ Background

- Amid the global decarbonization trend, hydrogen is expected to play a key role in the fight against global warming as it does not emit CO₂ during combustion
- We have already launched the world's first liquid hydrogen booster pump
- For safe and stable use of liquid hydrogen pumps, performance testing using actual liquid hydrogen is required before shipping. This center enables us to rapidly establish a testing system

■ Overview

Location	Futtsu City, Chiba Prefecture (company-owned land)
Investment amount	Approximately 16.0 billion yen
Facility details	- Liquid hydrogen pump performance test facility, related elemental technology development facility, etc. (Closed-type indoor test facility that is not affected by weather)
Construction completion	June 2026 (planned) * Part of the test facility is scheduled to be operational in 2025

The following is a list of press releases related to today's theme that we have issued in the past two years. The individual press releases can be accessed from our website, so I won't go into them here, but I believe that you can see from these press releases that what I have been talking about so far is continuing to progress in a concrete form.

Appendix: September 12, 2024 News Release

EBARA Announces Construction of World's First Full-Scale Equipment Testing and Development Center Fully Equipped with Liquid Hydrogen Pump Testing Facilities

Hydrogen Pump Testing Facilities
 ~EBARA will invest a total of approximately 16 billion yen to support Japan's social infrastructure with technology and realize a hydrogen society~

2024.09.12

Visual concept of the testing and development center

EBARA Corporation will establish a new equipment testing and development center for hydrogen infrastructure-related equipment in Futtsu City, Chiba Prefecture, Japan, to contribute to the realization of a hydrogen society.

1. Background

Amid the global trend toward decarbonization, hydrogen, which does not emit CO₂ when burned, is expected to play a key role in addressing climate change. The EBARA Group is working to apply its technologies and business expertise to implement the "Production, Transport, and Use" of hydrogen throughout society. We have already launched the world's first liquid hydrogen booster pump and are marketing it around the world.

2. Overview

This center is designed to conduct equipment performance tests and develop elemental technologies using liquid hydrogen (actual liquid) to ensure that liquid hydrogen pumps, which are indispensable for the construction of hydrogen supply chains in Japan and other countries around the world, can be implemented in society. This center will be the world's first full-scale commercial product testing facility for liquid hydrogen pumps using actual liquid.

Next is slide six. Among our recent press releases, we have put here the one that we released on September 12 in particular, in which we announced the establishment of a new full-scale center for the product testing

and development of liquid hydrogen pumps at a total cost of JPY16 billion. The center will be able to conduct performance tests of actual products on a commercial scale before shipment, and to conduct shipment tests using actual liquid hydrogen.

As we have extensive experience providing cryogenic pumps for LNG, we have an understanding of the importance of such technology. We have decided that establishing such a facility is essential for providing practical solutions to customers. We believe this will likely be the world's first facility capable of conducting real liquid hydrogen tests on a commercial scale.

In this context, we are steadily preparing to contribute to the social implementation of hydrogen-related infrastructure, and this is one concrete example of our efforts.

That concludes my explanation. Next, we will move on to the presentation session by each presenter. Session 1 will cover the energy business. Thank you very much.

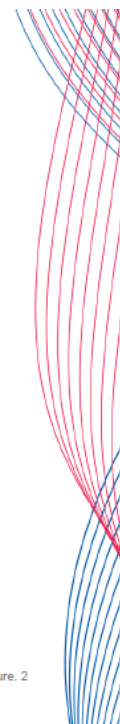
Osaki: We will now begin Session 1. Mr. Takanobu Miyaki, President of Energy Company, will give an overview of the Energy Company's business and its efforts toward a decarbonized society.

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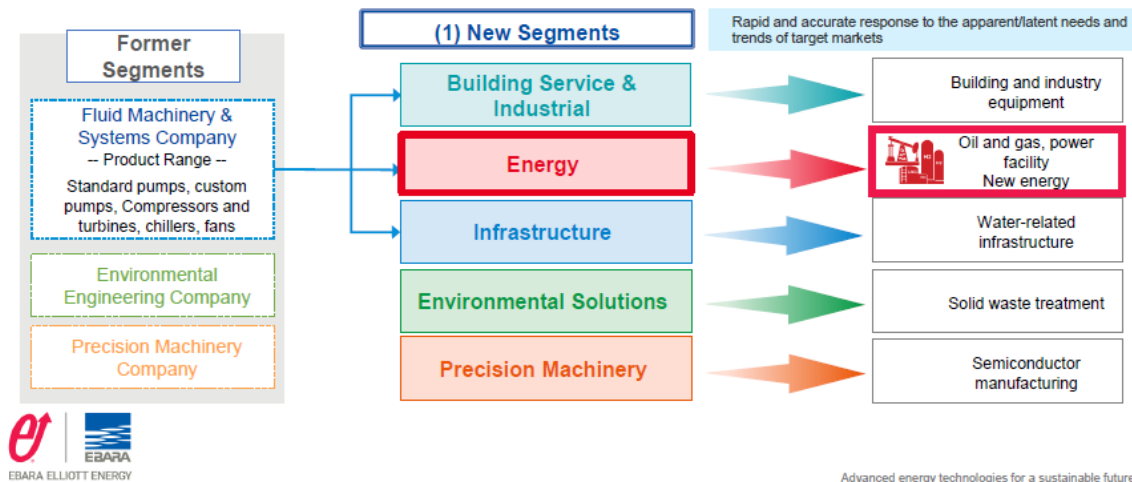


Miyaki: Once again, good morning, everyone. I am Miyaki, Executive Officer, and President of Energy Company. Thank you for your time today. Today I am going to talk mainly about these three topics.

First, an overview of the Energy Company, and second, the progress of our current medium-term management plan, E-Plan 2025. And finally, I would like to talk to you about sustainability initiatives we are undertaking to move toward decarbonization.

Shift to Target Market-Based Structure

- To pursue customer-oriented value creation, in 2023 we shifted from a product-based structure to a target market-based structure
- We integrated the Custom Pump business and the Compressor & Turbine business to newly form the Energy Company



First, let me talk about the shift to a target market-based structure and the creation of the Energy Company. As Mr. Hosoda explained earlier, our Company was established in January 2023 by integrating the custom pump business, which was previously part of the Fluid Machinery & Systems Company, and the compressor and turbine business, which is the core of the Elliott Group.

In addition to the current oil and gas and electric power markets, the target markets include ammonia, hydrogen, and other energy-related markets.

Energy Company Overview

■ Company Vision

Be the best solution provider in the energy sector by providing premier equipment and service, while actively leading sustainability efforts worldwide.

■ Major target markets

Oil and gas, electricity, hydrogen, ammonia, next-generation energy



■ Main products and services



Pumps

Provide products and services to energy-related facilities such as petrochemical plants and power plants. Supply the specialized pumps needed to realize a decarbonized society



Compressors and steam turbines

Used in Oil and gas, petrochemicals, LNG plants, new energy, and various other applications that require rotating machinery. Provide a broad product selection that response to customer needs.



Cryogenic pumps and expanders

Fulfill the role of transporting cryogenic temperature LNG, mainly at LNG liquefaction plants. Track record boasting the world's top share for deliveries in the cryogenic products domain, a field that requires advanced technology



Global services

Service and support function offering repairs and modifications, including parts, field services, and support for competitor products

Next is the overview. The Ebara Group has formulated its vision for 2030, called E-Vision 2030, and E-Plan 2025, a three-year medium-term management plan ending in 2025. Based on these, our company has developed the company vision you see above.

There are two points here. The first is to break away from the traditional product-out mindset and become a customer- and market-oriented solution provider. We must position products and services as tools to solve customers' problems and issues.

The second point is that in response to the megatrend of decarbonization, as Mr. Hosoda mentioned, we will be proactive and work together with our customers to lead and shape the times toward building a sustainable society centered on new energy. This is the core of our company vision.


Supporting the World with Energy Company Products and Services

Ability to provide solutions for various markets

- For water-related facilities
- For power plants
- For oil & gas plants (downstream)


Cryogenic pumps and expanders for LNG plants

Top global share




Oil & gas plant (downstream) compressors

Top global share




Custom pumps for oil & gas, chemical, and fertilizer markets

Over 54,000 units



Custom pumps for power plants

Over 16,000 units



Engineered compressors

Over 3,500 units

Engineered turbines

Over 1,400 units



Source: Ebara survey

Advanced energy technologies for a sustainable future. 5

These are some of our product and service achievements. In particular, we have a very strong track record in the LNG and petrochemical fields within oil and gas, and in the field of custom pumps, especially in power generation and fertilizers, as you can see. Based on these achievements, we are working to realize the company vision I mentioned earlier.

Energy Company Growth Strategy

■ Medium-Term Management Plan E-Plan 2025 Basic Policies

- 1** Establish new business models in the areas of sustainability and services to lead the shift to renewable energy and contribute to decarbonization
- 2** Make structural reforms to further improve profitability in existing business areas
- 3** Integrate Compressors & Turbines and Custom Pumps to deliver new value to customers and markets



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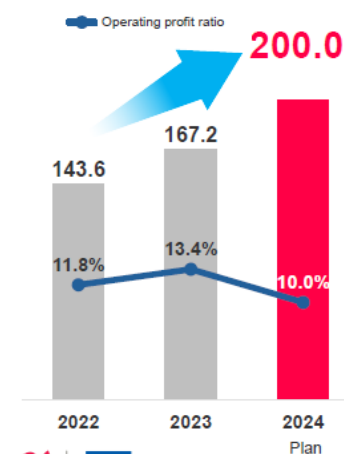
Next, I would like to discuss our current medium-term management plan, E-Plan 2025. First of all, we have three basic policies. The first is to establish a new business model in the areas of sustainability and services. The second is to further improve profitability in our existing business areas. The third is business integration.

We are striving to provide new value to customers and markets through the integration of compressors, turbines, and custom pumps.

With regard to performance, we achieved the E-Plan 2025 target of an operating margin of 12% or more in 2023, ahead of schedule, by making progress in improving profitability, which is one of the pillars of the plan, and by capturing continued brisk demand for S&S, service and support. Revenue is also growing. By 2025, we expect to achieve our business goals under current projections by further promoting these measures.

Energy Company Performance Trends

Trends in revenue (billions of yen)



Highlights

- Products business and S&S business both recorded significantly increased revenue. New Apparatus (Products business) revenues increased thanks to the benefits of selective sales and our front-loading strategy and we captured strong S&S demand.
- Several large-scale orders received for compressors and cryogenic projects for North American LNG market
 - ⇒ Benefits of synergy from the integration of the Compressors & Turbines business and the Cryogenic business
- Orders received for 7 compressors, 3 steam turbines, and 13 custom pump units for a large petrochemical complex in Saudi Arabia
 - ⇒ Received praise from customers as a one-stop provider built on the company's various products and solutions
 - ⇒ Benefits of integrated synergy from transition to a function-specific organization focused on target markets
- In 2023, LNG accounted for 15% of Products business revenue
 - ⇒ Continue to address short and medium-term LNG demand while aggressively investing in sustainability domains and next-generation energy

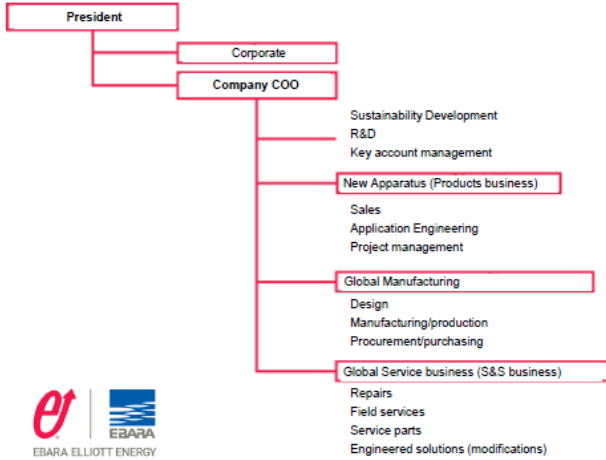
Advanced energy technologies for a sustainable future. 7

As for other topics, as I have mentioned, our new position providing comprehensive solutions for pumps, compressors, and turbines, has been recognized by customers and we have been able to obtain large orders, such as for LNG projects in North America and petrochemical projects in Saudi Arabia.

Company Organization and Functions

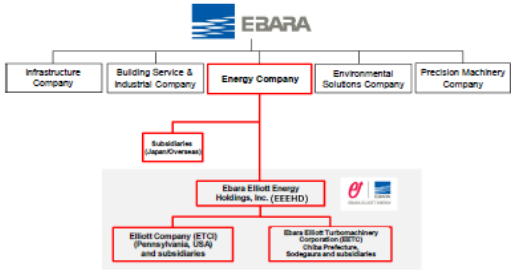
- Transitioned to a function-specific organization focused on target markets by integrating the Compressor & Turbine business and the Custom Pump business
- Provide comprehensive solutions by leveraging strengths of compressors and turbines for gases and pumps for liquids

<Function-specific Organizational Structure for Target Markets>



New Brand Identity | Ebara Elliott Energy

- In January 2024, Elliott Group Holdings, Inc. a business management company under the Energy Company, changed its name to Ebara Elliott Energy Holdings, Inc.
- Rebranded as Ebara Elliott Energy, embodying the integration of conventional Compressors & Turbines with Custom Pumps.



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We have our organizational structure on this slide. Of course, within the Energy Company, there are many individual companies, but as you can see on the left, one of the main features of our business structure is that we operate our global business based on business units that transcend individual companies in each country or products such as pumps, compressors, and turbines.

We believe that this is a very effective business operation, especially in terms of facing customers and markets in target markets, and we will continue to strengthen it.

The figure on the right side shows the Ebara Group after our transition to a target market-oriented organization. In January this year, we changed our brand to Ebara Elliott Energy and created a logo to unify our identity, both internally and externally, for our customers and within the Company.

Global Base

- Build a strong global network by integrating Compressors & Turbines with Custom Pumps
- Optimize the service resources of Compressors and Turbines and Custom Pumps while advancing the development and expansion of the new S&S business.



Next is our global locations. One of the strengths of the group's Energy Company is that it has established a global service system that is close to its customers and markets.

During the period covered by this medium-term management plan, for example, we are closing or integrating bases based on customers' market transition rather than keep unprofitable bases, or we are expanding our capacity by positioning flagship bases where market demand is higher, and the market is expected to be more active in the future.

In addition, as I will explain later, we are promoting what we call the optimization of our service system by opening new bases during the period of this medium-term management plan.

Global Bases – Integrated Synergy of Custom Pumps and Compressors & Turbines

■ Saudi Arabia Established S&S site

Established new service center in Dammam, Saudi Arabia through a joint venture between GAS Arabian Services* and Elliott Company, which operates under the Energy Company. Aiming to increase contact with customers and capture S&S demand in Saudi Arabia

- Started operations in 2Q/2023

*GAS Arabian Services: Provides products and services such as automation machinery, instruments, and field services, and provides project management services in fields such as Oil & Gas, petrochemicals, and water and desalination in Saudi Arabia



Photo of Saudi Arabia S&S site



Photo of Indonesia S&S site

■ Relocated and expanded new S&S site in Indonesia

Relocated new service center to Indonesia and upgraded facilities to leverage service resources for Custom Pumps and Compressors and Turbines and strengthen ability to capture S&S demand

- Mutually utilize technical knowhow for equipment, sales, Custom Pumps and Compressors and Turbines
- Started operations in 2Q/2024



EBARA ELLIOTT ENERGY

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I will now give you examples of site establishment and expansion. The one on the top shows a service center, an S&S site, in Saudi Arabia that started operations in 2023. The one below is in Indonesia. This one just started operation from the end of June to July this year.

With Indonesia, in particular, the Ebara Group had an existing service site dedicated to pumps, but we have relocated it and expanded its capacity to handle compressors and turbines as well, and established a base with service functions that can meet customer demand as the Energy Company and the Ebara Group.

Global Site – Integrated Synergy of Custom Pumps and Compressors & Turbines

■ Expanding S&S flagship site in Houston, Texas, USA

Improve S&S capabilities to expand the functionality of the Houston service center as a flagship site (Center of Excellence, COE) in the US region

- Expand existing building, modernize manufacturing equipment, and expand workshop to further capture S&S demand for Compressors and Turbines, Custom Pumps, and competitor products
- Operations planned to start: 2Q/2025



Composite image of completed S&S flagship site in Houston

■ Constructing new S&S site in Abu Dhabi

Constructing new S&S site in Abu Dhabi, UAE to further capture S&S demand in the Middle East region, where we have a strong track record for deliveries of Custom Pumps and Compressors and Turbines

- Provide optimal solutions to customers in the Middle East regions, which is expected to see market growth
- In the future, we plan to equip the facility with manufacturing, training, and parts delivery functions to establish it as a flagship site for Europe, the Middle East, and Africa
- Operations planned to start: 4Q/2025



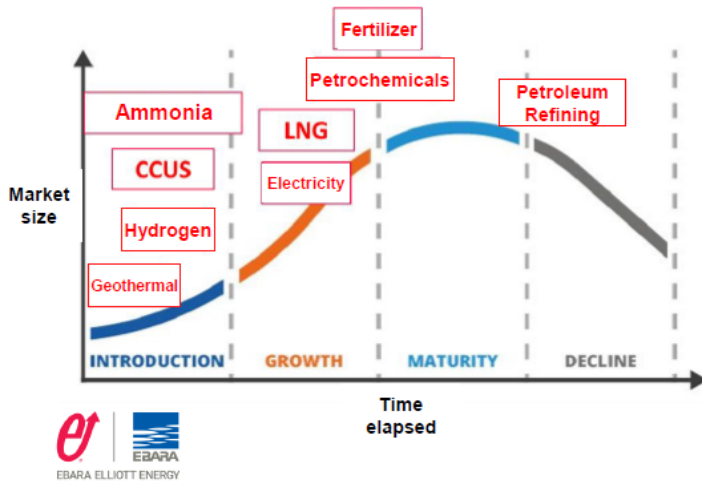
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This page also shows the expansion and establishment of new bases. Houston is the center of LNG and petrochemicals, located in the Gulf Coast region of North America, and also the location of our flagship site. As Houston will continue to be the center in the future, we are currently expanding the capacity of our service center here. We hope that by the middle of next year, we will be able to begin full-scale operations, and the improvements will allow us to better meet the needs of our customers.

As for the site at the bottom, in addition to Saudi Arabia, as I mentioned earlier, demand for service support is increasing rapidly in the Middle East and Gulf countries, and we have decided to establish a new service center in Abu Dhabi, UAE to meet customer demand in these regions. Construction of the new service center is currently underway with plans to begin operations at the end of next year.

Market Trends and Projections

- Although the stage differs depending on the target segment, growth for new business markets is expected to accelerate due to decarbonization



- Decarbonization aimed at achieving carbon neutrality will reduce demand for fossil fuels, but demand for LNG will increase over the short to medium term (2030)
- Petrochemical demand is increasing due to population growth in emerging economies
- New and renewable energy markets such as CCUS, hydrogen, geothermal, and ammonia are expanding
- New S&S demand due to lack of personnel, aging population, and aging equipment at customer facilities and plants



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Next, I would like to introduce our sustainability initiatives. The figure on the left shows where our products are in their life cycle, whether they are in their introductory period, growth period, maturity period, or period of decline. The horizontal axis is the time elapsed, and the vertical axis is the market size.

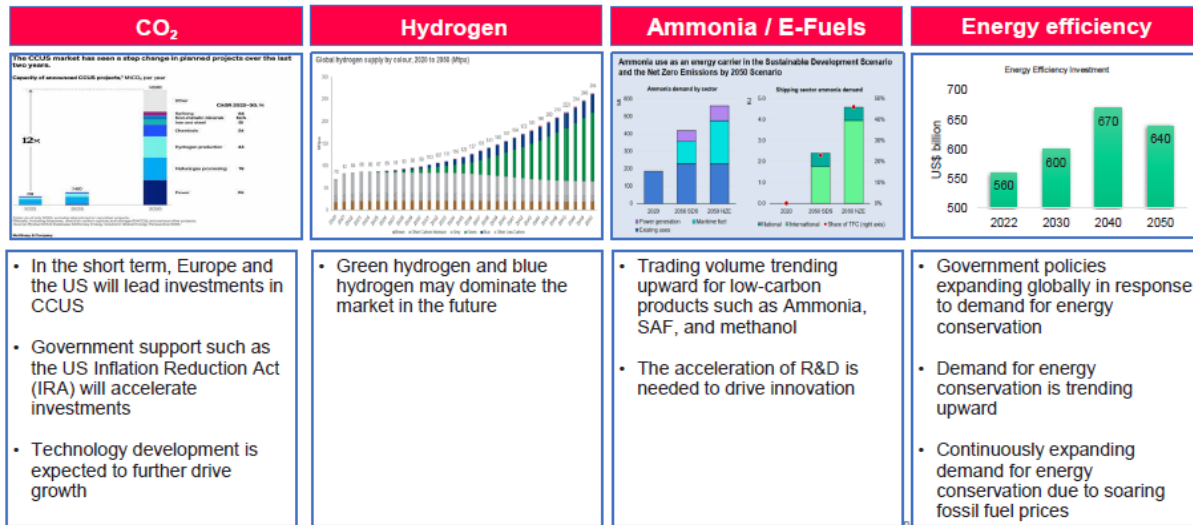
Our strategy is based on this view. Regarding petroleum refining, on the far right of the figure, although there are fluctuations in demand, it is reasonable to believe that the market is beginning to shrink with the expansion of electric vehicles and the electrification of various sectors.

On the other hand, when it comes to fertilizer, ethylene, LNG, and electricity shown second from the left, for example, we still expect growth in the medium to long term due to population growth or an increase in living standards, especially for LNG, which is a bridge to clean energy.

Let us go to the left most part. These are currently in the introduction phase, but eventually we see a transition to new energies and a decarbonized society, where clean energy such as CO₂ solutions, ammonia, hydrogen, and geothermal energy will grow over time, and these are the foundation of our strategy.

Sustainability and Decarbonization Trends and Outlook

- Trend of decarbonization expected to expand in various fields in pursuit of a net-zero society

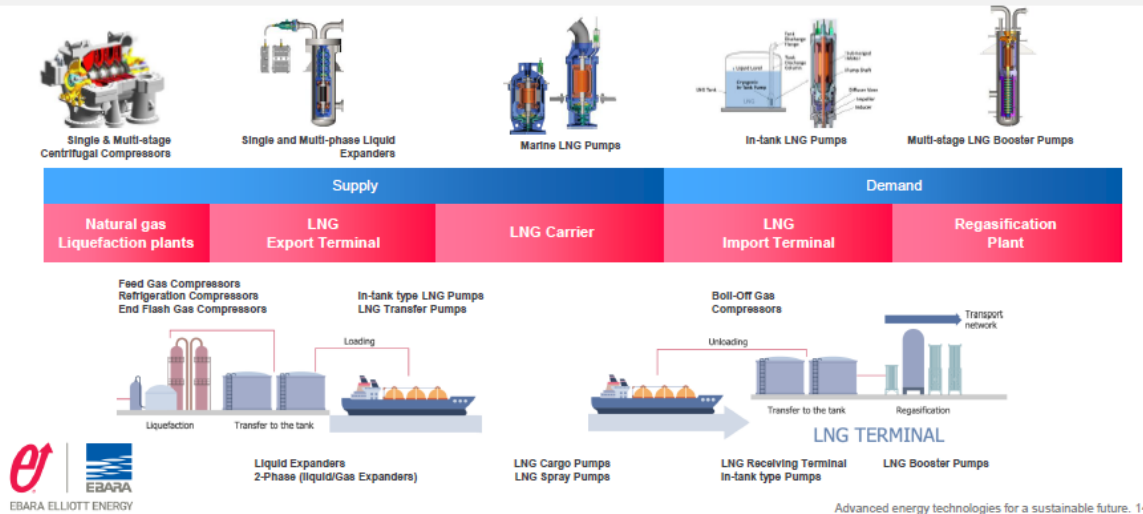


Source: IEA: Energy Efficiency 2022 Report, McKinsey & Company: Global Energy Perspective 2023: CCUS outlook, Wood Mackenzie: Hydrogen Strategic Planning Outlook 2023 Report, IEA: Ammonia Technology Roadmap Report

Based on this market outlook, Mr. Tsukamoto will explain the prospects for hydrogen in more detail later, but for example, in addition to energy conservation in existing areas, we have started or are advancing efforts to provide solutions toward LNG, CO₂, hydrogen, and ammonia.

Energy Company Products that Contribute to the LNG Supply Chain

- Energy Company's strength lies in the ability to offer a comprehensive range of products for the LNG market
- In 2023, we received multiple large-scale orders for compressors and cryogenic pumps/expanders in the North American LNG market. We expect continued growth in orders received from the LNG market

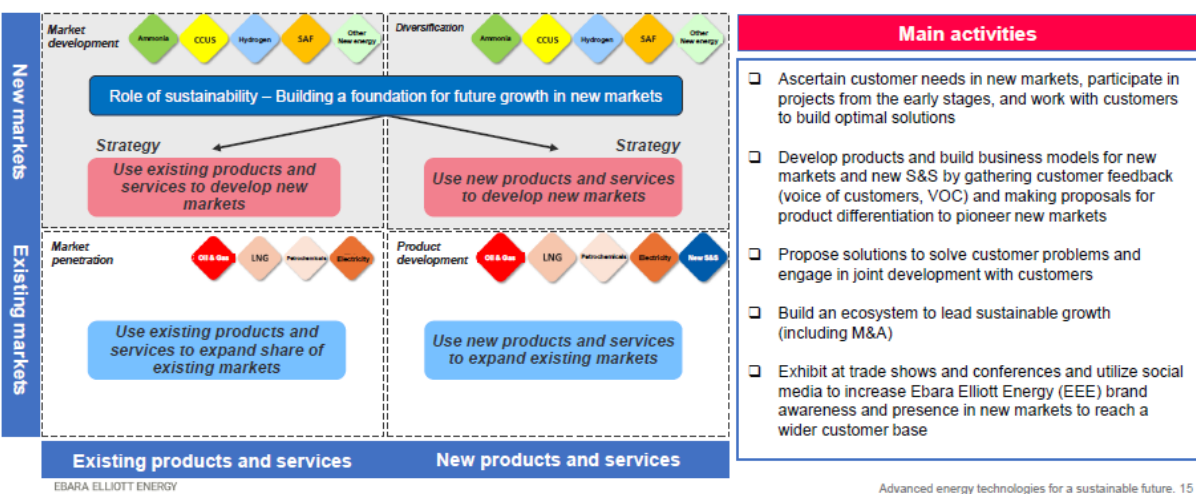


Here are a few of them. As you all know, one of the first things about LNG is that it has the lowest CO₂ emissions of all fossil fuels. The second is that LNG has been attracting attention as an alternative to conventional pipelines from the perspective of energy security, based on the recent situation in Russia and Ukraine. Based on these two points, our view is that LNG growth can be expected in the medium term.

With regard to LNG, I believe we are in a position to offer solutions to our customers throughout the supply chain, from production the left most part, to transportation in the middle, and receiving on the right, through our products such as compressors, ultra-low temperature cryogenic pumps, and expanders that can recover electric power.

Sustainability Business Development Role and Strategy

- Established the Sustainability Business Development Team in 2023
- Team role: Establish a new business model for the sustainability and service fields
 - Build a foundation for future growth in new markets (hydrogen, ammonia, CCUS, SAF, etc.) and develop new businesses in new S&S fields



This slide explains our organization. Regarding new areas, we are still in a situation where the solutions we can offer are a little unclear, and we have to work with our customers to think together about what will happen in the future and what kind of solutions will be necessary.

We know that it is necessary to develop our business by being even more customer- and market-oriented, and so we have created a specialized organization, separate from the existing and ordinary sales and marketing organizations.

This allows us to apply existing products to new markets, as shown below, and to develop new things, products, and solutions for new markets, while still facing customers and markets as we move forward.

Develop New Businesses in New S&S Fields

- Using data from customer sites, we are developing services that contribute to the long-term, stable operation of plants and help customers maximize profits from their corporate activities through the use of our rotating machinery diagnostic technology
- For commercialization, we are entering into partnerships with plant owners and companies in other industries (we have plans to enter into partnerships with several companies)

Target markets	Customer problems	Solutions	Strengths
<ul style="list-style-type: none"> Petrochemicals Refinery LNG Fertilizer/Urea Power generation 	<ul style="list-style-type: none"> ◆ Maximize plant revenues <ul style="list-style-type: none"> Long-term, stable operations Reduce maintenance costs CO₂ reductions 	<p>Diagnosis based on equipment and plant data</p> <p>Consulting</p> <ul style="list-style-type: none"> ✓ Monitoring ✓ Signs of malfunctions ✓ Service life projections ✓ Optimal operations <p>Parts/Repairs/Modifications</p>	<ul style="list-style-type: none"> ● Rotating machinery manufacturer <ul style="list-style-type: none"> ✓ Strong track record ✓ Knowledge and experience ✓ Brand strength ● Global service network ● Provide diverse services



Advanced energy technologies for a sustainable future. 16

Next, I will introduce our approach to new S&S, service and support services. As shown in the section second from the left, we must first identify customer problems like the need for long-term stable plant operations without unexpected shutdowns or stoppages, or the reduction of maintenance costs, CO₂ emissions, or power consumption. Another recent issue for our clients is the lack of experienced personnel.

In response to these, we are promoting remote monitoring and fault prediction in our energy field to solve our customers' problems. We are working with our customers to develop this field by leveraging our technical capabilities, extensive service experience, and network in the field of rotary equipment.

Sustainability Business Development Results

▪ Main results

Order received for sustainable aviation fuel project

- Received a compressor order for the first sustainable aviation fuel (SAF) project in Thailand.
- This project involves a SAF production unit that uses 100% used cooking oil
- Through SAF production, it is possible to reduce greenhouse gas emissions by approximately 80,000 tons per year

Started efforts to commercialize remote monitoring and predictive diagnosis with four customers

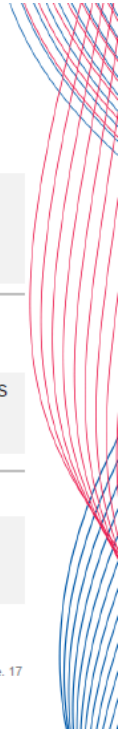
- To commercialize new S&S business, we have agreed to work on remote monitoring and predictive diagnosis with the cooperation of four customers. Through this work, we will demonstrate services that resolve customer problems (partially underway)

Currently evaluating joint development with two customers

- Ebara Elliott Energy (EEE) has approached over 40 existing and new customers to gather information on customer needs in new markets
- Among those, we are currently evaluating prospects for developing solutions jointly with two customers



Advanced energy technologies for a sustainable future. 17



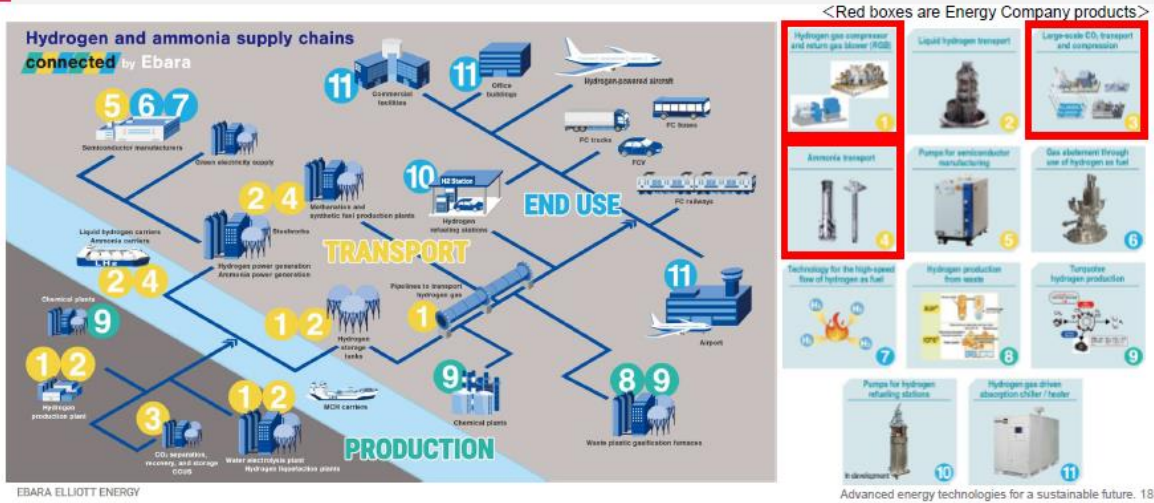
Here are just a few examples of what we have accomplished so far in these new areas, some of which have already been announced through press releases. First, we have the order from a customer in Thailand for compressors to be used in the production process of SAF, or Sustainable Aviation Fuel.

The middle one is the new S&S I mentioned on the previous slide. We are in the process of launching specific joint initiatives with several customers.

The bottom one is not the new S&S but other areas. We are working with existing and new customers to develop solutions by leveraging our proximity and close relationships with end-users, EPCs, and process licensors. This area is also at a stage where concrete results are difficult to obtain, but we are making steady progress.

Energy Company Hydrogen, CO₂, and Ammonia Solutions

- Working to decarbonize supply chains, we are steadily establishing new business models, including product development, in the sustainability field. We are leveraging the special fluid pressurized pumping technology and cryogenic temperature control technology cultivated through our work on pumps and compressors and turbines



Finally, I would like to talk a little about solutions in the CO₂, hydrogen, and ammonia areas. We have thus far developed, compression and pumping technology for special fluids, or ultra-low temperature technology, as well as materials, and then there is a part called aero or hydro. We recognize these technologies as core technologies and are developing solutions in this area, as shown in this figure.

Energy Company Hydrogen, CO₂, and Ammonia Products

- Steadily expanding our product selection to build a decarbonized supply chain that contributes to carbon neutrality
- Advancing preparations for market launch of new solutions by leveraging advanced technology and experience

Initiatives for bringing new solutions to market

Market launch of developed products	<ul style="list-style-type: none"> System for CCS Pump and compressor packages
Accelerate development of products scheduled for market launch	<ul style="list-style-type: none"> Compressors for hydrogen and industrial gas Pumps for the ammonia market
Product development for future markets	<ul style="list-style-type: none"> Develop products for deep geothermal power generation Develop products for solar power generation

Product	H ₂ compressor (Flex-OP)	Leak-free ammonia canned pump	H ₂ compressor
Appearance			
Application	<ul style="list-style-type: none"> Hydrogen/ammonia plants Hydrogen mixed-source/single-source power generation Hydrogen transport (Pipeline) 	<ul style="list-style-type: none"> Ammonia conversion/single-source power generation Ammonia production plant 	<ul style="list-style-type: none"> Liquefied hydrogen plant Hydrogen mixed-source/single-source power generation Synthetic Fuel Plant (SAF)

Product	CO ₂ (injection) pumps	CO ₂ compressor	<CO ₂ Phase> Pump + compressor
Appearance			
Application	<ul style="list-style-type: none"> CO₂ storage CO₂ transfer (Pipeline) 	<ul style="list-style-type: none"> CO₂ storage CO₂ transfer (Pipeline) 	



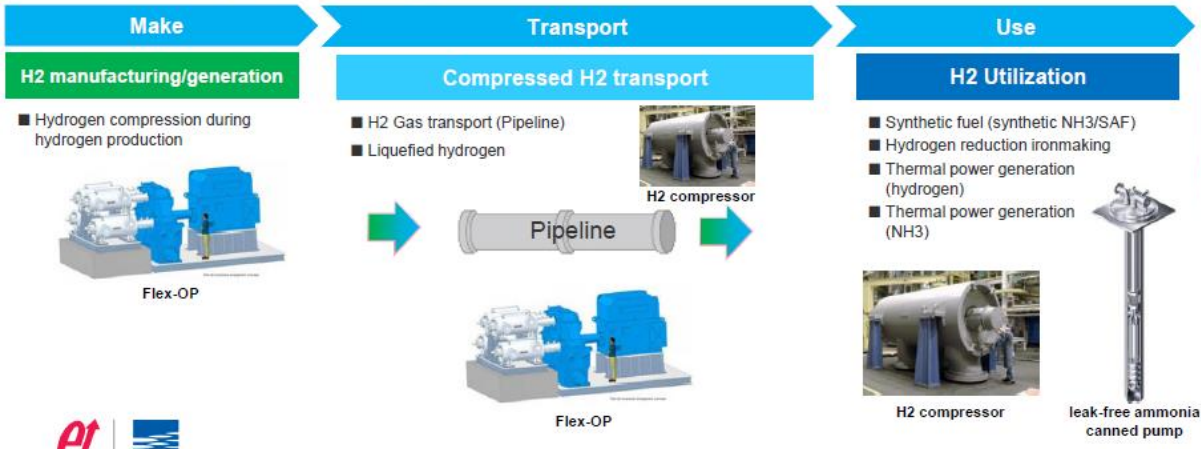
Advanced energy technologies for a sustainable future. 19

Here we see our current product lineup and how we are applying them. One of the first things we are doing is taking proven products and solutions and applying them to new areas with our customers. The other is to

develop and apply newer products to these new areas, and it is essential that we work together with our customers to develop and promote these areas. We are moving forward based on this idea.

Energy Company Hydrogen and Ammonia Solutions

- To contribute to a decarbonized society through hydrogen, we are launching/expanding our selection of products that can broadly cover production, transportation, and use
- Currently developing a highly efficient and space-saving hydrogen compressor



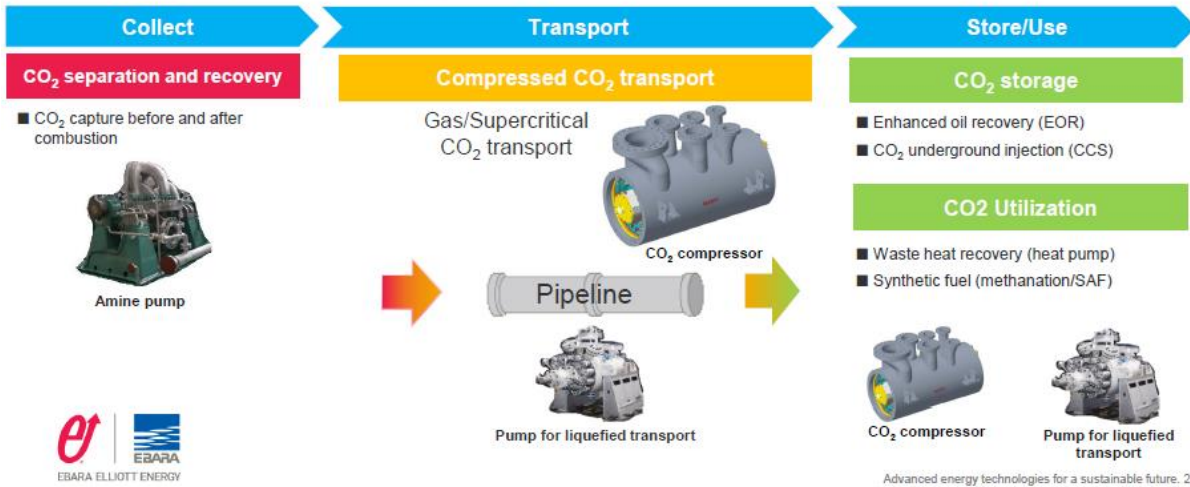
Advanced energy technologies for a sustainable future. 20

*Not limited to the above, pumps and compressors are used in a variety of fields from production to use

While hydrogen will be explained again later, the hydrogen supply chain that we always refer to covers the areas of production on the left, transportation in the middle, and utilization on the right. As you can see here, we are in the process of developing compressors and pumps with the aim of providing comprehensive solutions.

Energy Company CO₂ Solutions

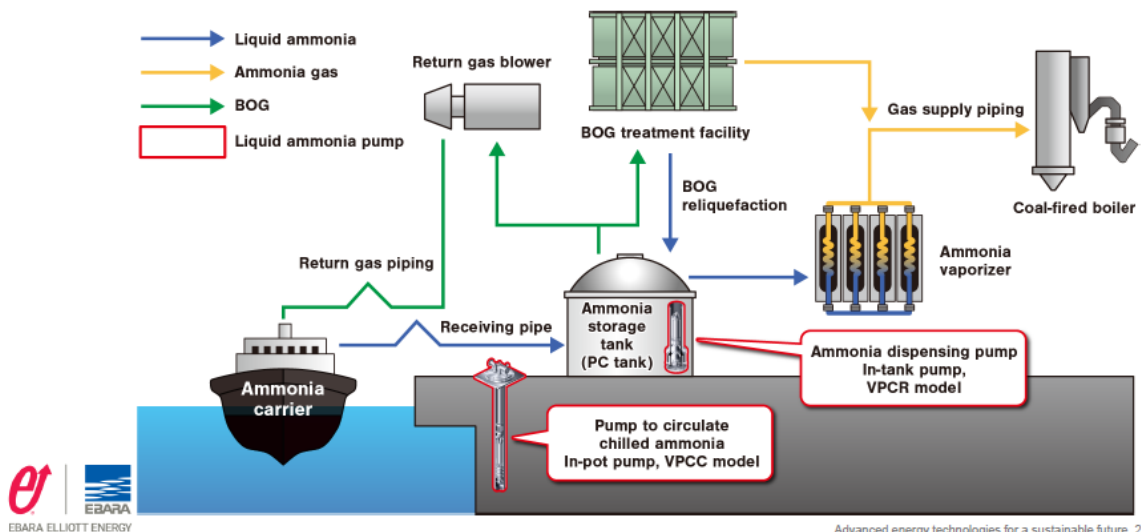
- Leveraging both pump and compressor technology to expand our selection of products that contribute to a decarbonized society in a wide range of fields
- Currently developing a highly efficient and space-saving industrial gas compressor



As for CO₂, although it is shown in terms of CCS and CCUS, capture on the left side of the diagram, transportation in the middle, and storage and utilization also involve compressors and pumps. Hydrogen and CO₂ have very different physical properties and are difficult to handle, but we are developing products that address the problems and concerns of our customers by fully utilizing the fluid compression and material technologies we have cultivated.

Ammonia Power Generation Usage Example (coal thermal power generation)

Flow diagram of liquid ammonia pump intake, storage, and discharge



Regarding ammonia, here is an example of its use in coal-fired power generation. In particular, Japan is in a leading position in the field of ammonia, and as part of its efforts to decarbonize, it is developing and

demonstrating the conversion of coal-fired power plants from conventional coal to ammonia as a fuel in the entire supply chain.

Press Release 2024.07.29

「Successful Operation of Canned Motor Pump for Liquid Ammonia」

- EBARA CORPORATION (EBARA) announces the successful operation of its new leak-free canned motor pump for liquid ammonia*¹, which features a newly developed structure introduced in September 2023. The product was delivered to JERA Co., Inc.'s Hekinan Thermal Power Station for demonstration of fuel ammonia substitution, and it successfully operated using liquid ammonia on-site.

1. Background

Amid the global trend towards decarbonization, ammonia is expected to be effective in reducing greenhouse gases not only as an energy carrier that can transport hydrogen cost-effectively and efficiently but also as a fuel that does not emit CO₂ during combustion. However, due to its toxic and odorous nature, safe handling of ammonia is essential. To contribute to the safer transfer of actual liquid ammonia compared to conventional products, EBARA developed this leak-free pump with a new structure in 2023*².

2. Overview

The delivered product features a design where even the motor part is immersed in liquid ammonia, allowing it to operate without leaking liquid ammonia externally. In this demonstration test, the product was installed in an outdoor environment at the power plant and operated using liquid ammonia under various patterns and loads. In all cases, the product achieved excellent results in terms of performance and functionality. During operation, it was quieter compared to conventional products, and there were no leaks of liquid ammonia, confirming not only the reliability of its design but also its safety and environmental benefits. The product will continue to be used in the demonstration tests for fuel ammonia conversion scheduled until June 2024.

3. Future Plan

The utilization of ammonia aimed at reducing greenhouse gases (CO₂) is being planned globally, and the demand for leak-free pumps is expected to expand throughout the entire supply chain, including thermal power plants. EBARA is one of the world's leading pump manufacturers and has extensive experience in handling low to cryogenic temperature liquids. We will use this experience to support the use of alternative fuels, such as fuel ammonia, throughout supply chains.

The EBARA Group aims to contribute to the achievement of the Sustainable Development Goals (SDGs) by addressing material issues identified in its long-term vision and executing the medium-term management plan to increase corporate value.



*1 Conducted by JERA Co., Inc. and IHI Corporation as part of a subsidy project by NEDO (New Energy and Industrial Technology Development Organization).

*2 "Development of a Canned Motor Pump for Liquid Ammonia" published on our website on November 20, 2023



Picture of Test



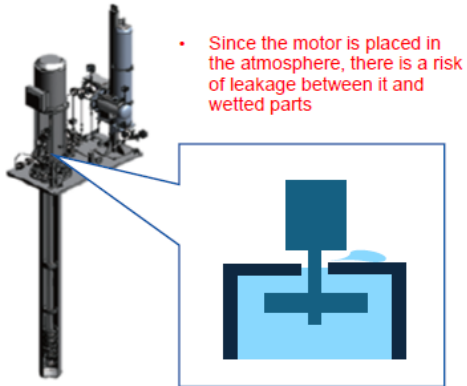
This is from a press release. Here we share that we conducted a demonstration test on the substitution of fuel from coal to ammonia at the coal-fired power plant I mentioned earlier, at JERA's Hekinan Thermal Power Station. For this, we delivered a leak-free canned motor pump for liquid ammonia with a new structure.

We actually delivered the system to the site for a trial run using actual liquid ammonia, and the operation was a success. We would like to work together with our customers to identify how we can improve, refine, and develop our products in the future by participating in their actual initiatives.

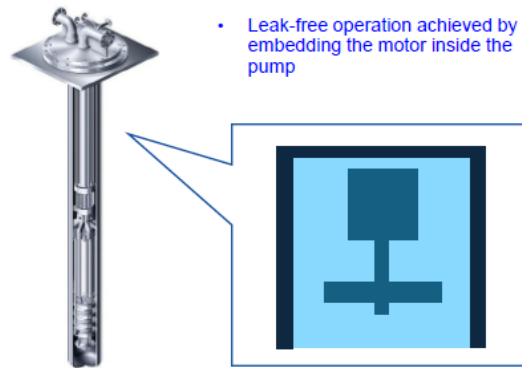
Features of Ammonia Pumps

- Ammonia has a strong odor and is toxic, so the prevention of leakage is critical
- We use a structure that minimizes the risk of leakage to ensure safe transport of liquid ammonia

■ Conventional pump



■ Leak-free pump (uses canned motor)



Advanced energy technologies for a sustainable future. 24

This slide shows the features of the ammonia pump. Ammonia is a substance that has been used widely up to now, but it has a strong odor and is toxic in its conventional form and requires a great deal of skill to handle it.

In particular, when used in power plants, leakage to the outside is of great concern, so we are working to achieve no leakage by integrating the motor inside the pump, as shown here.

Summary

▪ Megatrend: Decarbonization

- Short- and medium-term demand for LNG will increase
- New energy and renewable energy markets such as CCUS, ammonia, and hydrogen are growing

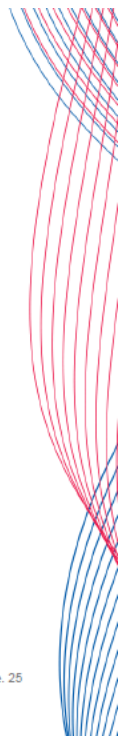
▪ Energy Company Strengths

- Superiority as a one-stop provider of various products and solutions to meet customer needs
- Strong global network through the integration of compressors & turbines with custom pumps
- Strong track record and wide range of critical equipment such as compressors, turbines, and custom pumps for LNG and petrochemicals
- Proximity to end users, EPC, and process licensors
- Providing comprehensive, quality services and support
- Excellent high-speed rotating machinery technology, cryogenic temperature technology, materials technology, and production technology

We will create new value required in the next-generation energy market and lead the building of a sustainable society as the “best solution provider.”



Advanced energy technologies for a sustainable future. 25



Finally, let me go to the summary. First of all, the megatrend is toward decarbonization. This is a megatrend, and although there are a number of things that may impact this, such as the presidential election, from a broad perspective, I believe it will continue to accelerate in this direction.

As I explained earlier, our view is that LNG will grow in the short to medium term in the product life cycle, but in the medium to long term, we believe that efforts to address CO₂ emissions or to use ammonia or hydrogen as a new energy source will expand.

Based on this view, we believe that we can provide comprehensive solutions based on our strengths as the Energy Company of our group, specifically through pumps, compressors, and turbines, which are important parts of energy plants with high power consumption, for example.

The next is the provision of high-quality service and support that we have cultivated over the years. With our proximity to process licensors, EPCs, and end-users, we have an environment where we can work together to provide greater value.

In terms of specific technologies, we will utilize high-speed rotary machinery technology, special liquid compression technology, and technology for handling ultra-low temperatures, and based on the market I mentioned earlier, we will improve existing areas to save energy and so on. However, we will not simply follow the new next-generation energy market but will create new value that is demanded there. We want to be the best solution provider in this field as stated in our vision, taking the lead in building a sustainable society together with our customers and the market.

That concludes my presentation. Thank you very much.

Osaki: Now, let us move on to Session 2. Mr. Teruaki Tsukamoto, CP Hydrogen Strategic Business Unit Division Executive, will provide an overview of the progress and future prospects of the hydrogen-related business.

Tsukamoto: Good morning, everyone. I am Tsukamoto of the CP Hydrogen strategic business unit.

At the last IR Day in 2022, I spoke about the global trend toward a hydrogen society and Ebara Corporation's new business direction for the future. Today, we reiterate our expectations for the decarbonization and hydrogen market, as well as our hydrogen-related technologies and directions. I would like to report on our progress over the past two years and discuss our prospects.

Global Greenhouse Gas Reduction/Carbon Neutrality (CN) Efforts and the Role of Hydrogen

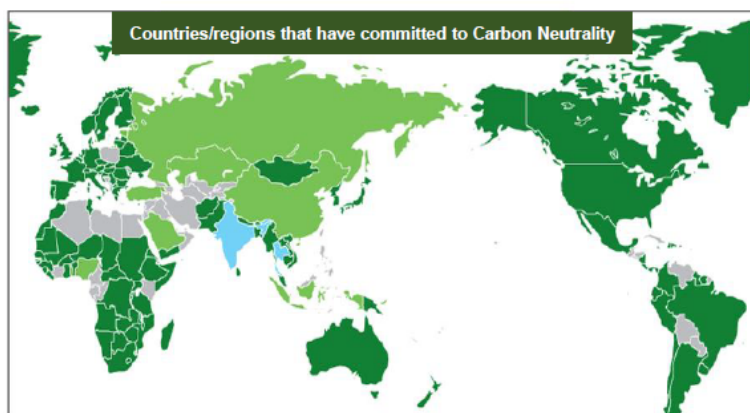


- Reducing 88.2% of global CO₂ emissions in 154 countries and regions worldwide

- Countries with commitments by 2050 (144 countries/regions, 42.2% reduction in CO₂)
- Countries with commitments by 2060 (China: 28.4%, Russia: 4.2%, etc.)
- Countries with commitments by 2070 (India: 6.9%, etc.)

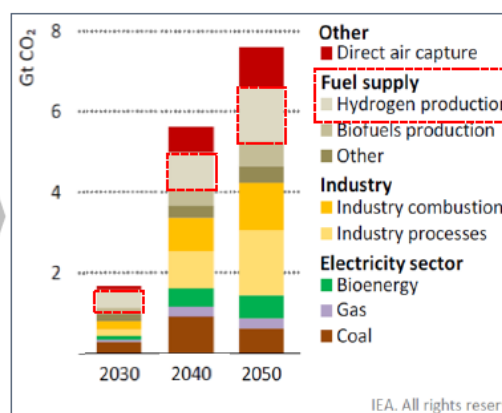
- Hydrogen will contribute to roughly 20% of global CO₂ reductions

- 0.46Gt in 2030, roughly 150 times the 0.003Gt of 2020
- Increase to 1.36Gt in 2050, roughly 20% of the total



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Source: Japan's Energy 2022/02 P5



Reference) Net Zero by 2050: A Roadmap for the Global Energy Sector

As you all know, the need to reduce greenhouse gas emissions around the world is now unquestionable. As shown in the figure here on the left, in 2050, about 144 countries and regions will reduce CO₂ emissions by about 42%. Then, in 2060, China and Russia will be joined by India, and by 2070, the goal is to reduce CO₂ emissions by approximately 88% worldwide. We are in a situation where each country or region is committed as a nation to that goal.

At the same time, if we look at the target for 2030, which is a little closer, Japan will reduce its emissions by about 46% compared to 2013, the EU will reduce its emissions by 55% compared to 1990, and the US will reduce its emissions by 68% compared to 2005. We recognize that each country and industry has set its target values and is now striving toward that intermediate goal.

It is said that various efforts are necessary to achieve these goals, and many say that measures taken around the world are still insufficient to meet near-term goals.

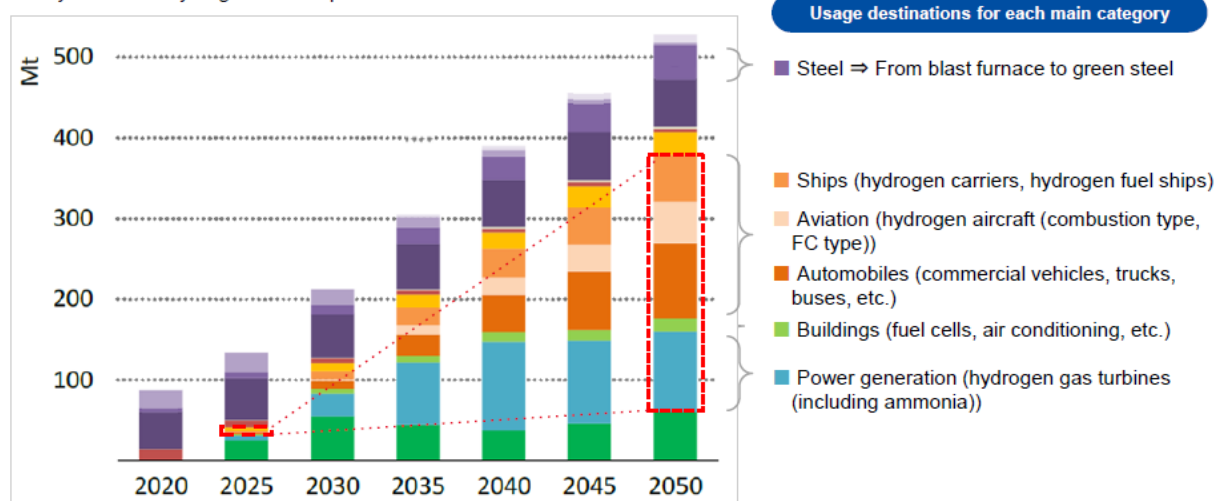
In this context, please take a look at the figure on the right, which is a document compiled by the International Energy Agency showing how to reduce CO₂ emissions. To reduce CO₂ emissions in 2030, 2040, and 2050, the primary approach includes direct air capture, which is shown in red, and these industry areas, which are shown in orange, are expected to grow.

On the other hand, as shown in the red dotted line, the role of hydrogen is gradually increasing, and it is estimated that by 2050 hydrogen will contribute to approximately 20% of the world's CO₂ emissions reductions.

Direction of Global Hydrogen-related Energy Utilization



- Hydrogen use will increase by more than six-fold in 2050 compared to 2020
- The fields of power generation and transportation are projected to account for nearly 60% of all hydrogen consumption



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Reference) Net Zero by 2050: A Roadmap for the Global Energy Sector

I would like to show you what exactly this 20% hydrogen will be used for in this diagram.

The graph here shows a gradual increase in the use of hydrogen, which is said to increase more than sixfold by 2050 compared to 2020. For example, the power generation area shown in light blue at the bottom is power generation and energy conversion using hydrogen gas turbines and the like.

In addition, the orange area in the middle of the graph shows a gradual increase in the use of hydrogen as a fuel for commercial vehicles, trucks, buses, and other heavy-duty vehicles, as well as for large mobility vehicles such as hydrogen aircraft and ships, starting in 2025. By 2040 or 2050, we expect these areas to account for about 60% of the total and play a central role in hydrogen utilization.

Please look at the light purple area shown above. There is information that around 2030, the steel industry will be moving away from blast furnaces to green steel. We believe that these initiatives for hydrogen steelmaking will gradually become apparent and will play a very important position by 2050.

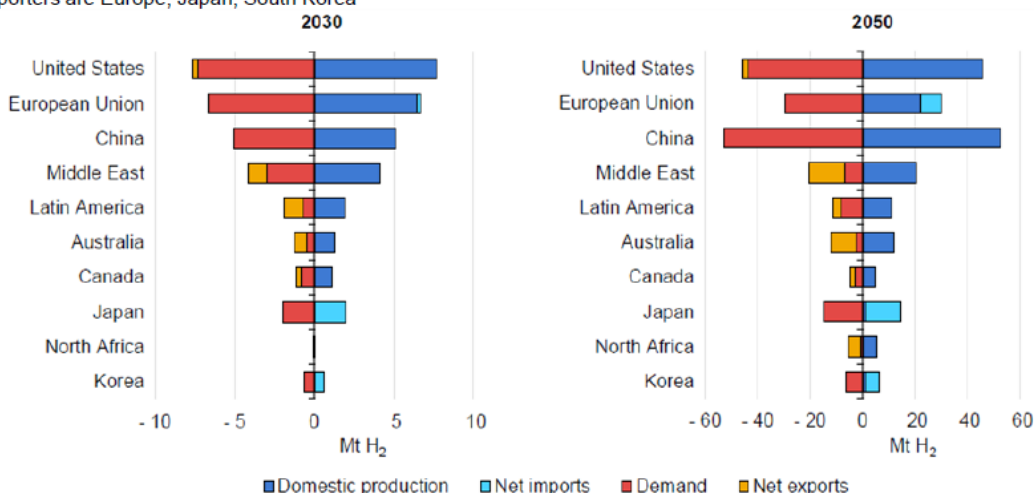
Please look at the lime-green area. We see hydrogen becoming gradually more widespread around 2030, and we anticipate that this will create a need for hydrogen-utilizing products for buildings as well as the construction industry. And this is also expected to be one of the most important market destinations by 2050.

These trends estimated by the IEA and others are close to what I have seen and felt in the last two years traveling to various places. I believe that a key growth strategy for us is to proactively anticipate future needs and effectively address them.

Global Supply and Demand Balance for Hydrogen



- Demand for hydrogen-related energy is expected to increase by 5x to 10x in each region
- Exporters include North America, Middle East, Latin America, Australia, Canada, and North Africa.
Importers are Europe, Japan, South Korea



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Reference) Global Hydrogen Review 2022

Another thing I would like to introduce is the balance between the supply and demand of hydrogen in the global market. The left-hand side shows the supply-demand balance in 2030, and the right-hand side shows the supply-demand balance in 2050. Red indicates demand, then blue indicates manufacturing capacity in the home country, orange indicates the amount exported, and light blue indicates the amount imported.

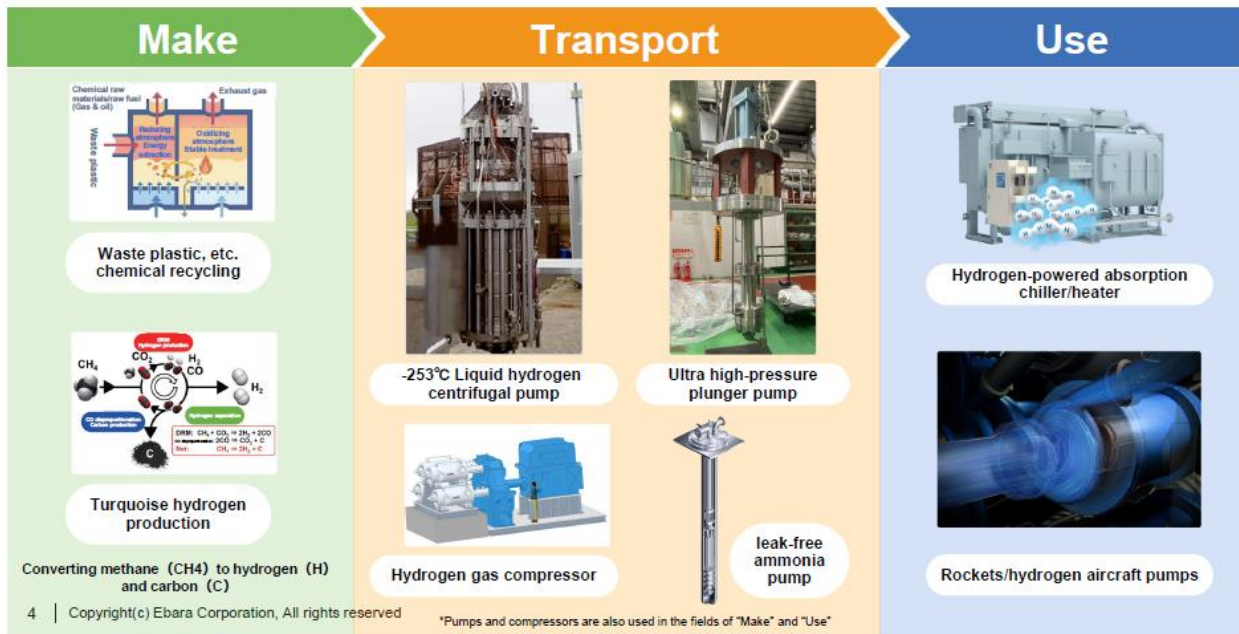
As you can see here, for example, if you look at the left side of the year 2030, the Middle East, Latin America, and Australia will be the main exporting regions around 2030. And Japan and South Korea are expected to be the main importers.

By 2050, as I mentioned earlier, the scale of the horizontal axis has changed, so you should see this six times, but the projection is that exports from the Middle East and Australia will increase even more. And as a new exporting region, North Africa is expected to grow.

One very interesting thing about the right figure showing 2050 is the European region. The second from the top shows the EU changing into a hydrogen import region. This is due in part to the suspension of imports of natural gas pipelines from Russia and other countries, which was also touched on briefly in the Energy Company section.

In any case, I believe that the major trend is that regions that can produce inexpensive clean hydrogen using cheaper electricity and resources will be suitable for hydrogen production, that exports will expand to countries with low energy supply and demand ratios, and that broad regions such as North America, China, and Europe will grow as a large market of regional production for regional consumption. I see this as a major trend.

Main Hydrogen-related Technologies Promoted by our Group



Based on these trends in the hydrogen market, the Ebara Group is currently promoting the hydrogen business across the Group. The following diagram shows the components of the hydrogen supply chain: make, transport, and use. We hope to support society overall by developing our group’s highly compatible technologies in all of these areas.

For example, in the sector of “make” on the left, we have gasification technology that thermally decomposes waste plastic to extract hydrogen, and turquoise hydrogen production technology that decomposes methane to separately purify hydrogen and carbon.

In the sector of “transport,” in the middle, we developed a liquid hydrogen pump that handles minus 253 Celsius liquid hydrogen, which still presents a great challenge for the supply chain. And the hydrogen compressors and ammonia pump I mentioned earlier. We are moving forward to support the “transport” sector by leveraging our strengths in fluid technology and rotating equipment.

In particular, various methods of transporting hydrogen have been considered in the market, such as liquid hydrogen transportation, compressed gas hydrogen, and ammonia. As to which method is most efficient and which is most suitable, this will vary depending on the locality, the amount of transportation, and the use of the destination. Therefore, we see multiple options growing in a balanced manner. And Ebara has the technology to take advantage of all of them.

Now, onto the “use” side. Today we are introducing a hydrogen-fired absorption chiller/heater that is expected to be used for future air conditioning of buildings, as well as a fuel supply pump used in space rockets and hydrogen aircraft.

We believe that Ebara’s greatest strength is its broad range of technologies that can approach the entire hydrogen society market.

Process Development to “Make” Clean Hydrogen



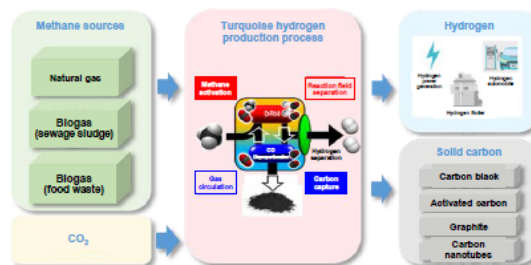
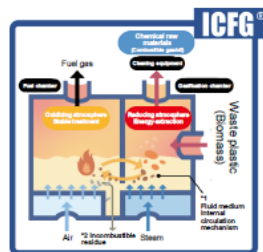
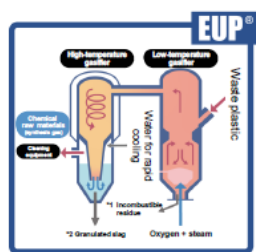
Two types of chemical recycling to make hydrogen

Separates clean hydrogen and carbon from methane

EUP^{®1} (development completed)
(Ebara-Ube Process)

ICFG^{®2} (undergoing validation)
(Internally Circulating Fluidized-bed Gasifier)

Turquoise Hydrogen Production (in development)



- License granted to JGC HD
- Project for hydrogen production from waste plastic
- **Currently receiving inquiries concerning projects, etc.**

- Garnering attention as a recycling technology to replace waste-fueled power generation
- **Pilot test facility** is currently being constructed on Ebara land in Sodegaura, Chiba Prefecture

- Confirmed that hydrogen and solid carbon can be separated
- **Achieved continuous operation of DRM reactor for 50 hours** (2024 goal of 100 hours)

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¹ EUP[®] is a registered trademark of UBE Corporation and Ebara Environmental Plant
² ICFG is a trademark of Ebara Environmental Plant in Japan

³ DRM: Methane dry reforming reaction

Next, I would like to present our progress over the past two years. Let me start with the processing technologies for producing clean hydrogen I mentioned earlier. Ebara has two technologies for gasifying waste plastics.

Of those displayed on the left, the one in the leftmost in particular, is the EUP gasification process, which has a characteristic that enables us to purify highly concentrated hydrogen from gasified waste plastics that are cleaner and specifically sorted and selected. Hydrogen produced by this process is currently being used for ammonia production and has been in operation in Kawasaki City from 2003 to the present. This is the only and longest proven, reliable technology in the world in operation at the customer’s site.

Currently, we have licensed this technology to JGC Holdings Corporation for market development in Japan and overseas, and we feel that we are receiving an increasing number of specific inquiries, so we would like to take firm steps toward social implementation.

The other one is called ICFG, the one on the right, and is another gasification technology. This is a technology that can perform gasification and combustion at the same time, so in that sense, it is slightly different from the previous one in that it can process waste plastics that are a little dirty or mixed with garbage together.

In Japan, it is mainstream to generate power from waste product processing, but ICFG is expected to be the next generation of chemical recycling technology. We are currently constructing a pilot test facility on our site at Sodegaura Plant in Chiba Prefecture, where we will collect refining data on oil, olefins, hydrogen, etc., and expand it as the next generation of chemical recycling.

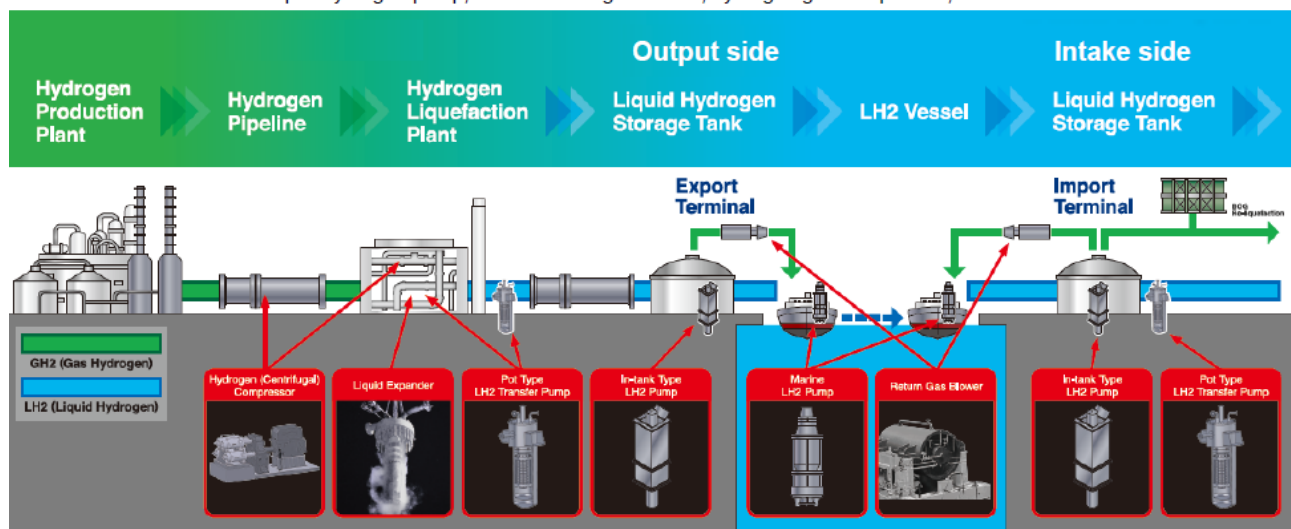
The right side mentions turquoise hydrogen, which, as I mentioned earlier, is a next-generation technology that thermally decomposes biogas and methane to refine hydrogen and carbon and is currently undergoing demonstration tests. This process is particularly when methane and CO₂ are decomposed in a reactor. The hydrogen that comes out of it will be something that can be put into the manufacturing process. In particular, we expect solid carbon to be utilized in various ways such as carbon black, carbon nanotubes, activated carbon, and various other carbon materials, and we hope to contribute to resource conservation in the materials field.

At present, we are continuing our lab-based demonstration testing and have confirmed 50 hours of continuous operation. We are planning to extend the operation time further next year, and then to conduct a demonstration for the next pilot project.

Rotating Equipment is Essential in the Hydrogen Transport Supply Chain



- Building a liquid hydrogen supply chain is essential for shifting to liquid hydrogen from the utilization and export/import of LNG
- "Connect" with -253°C liquid hydrogen pump, -240°C return gas blower, hydrogen gas compressor, etc.



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This is an example of a large-scale hydrogen supply chain. There was a mention of the LNG supply chain earlier. I think there are some similarities in terms of importing and exporting energy.

As you know, for hydrogen to be widely used in the future, it will be necessary to lower its cost to a level acceptable to society. To achieve this, it is important to produce and transport larger quantities of hydrogen at a lower cost. As with the conversion from petroleum to LNG at minus 163 degrees Celsius about 50 years ago, people around the world are now considering the possibility of converting to liquid hydrogen in the future.

As I have mentioned many times before, Ebara has more than 100 years of history and expertise in fluid technology and rotating equipment, and we want to use these to support this supply chain.

For example, taking this flow as an example, the gas produced at the hydrogen production plant on the far left is pumped to a plant for liquefaction. In these areas, the hydrogen compressors introduced earlier will be utilized.

The hydrogen liquefied in that liquefaction plant is then transported to the export terminal. At this export terminal, an expander for liquid hydrogen pumps and power recovery or an in-tank pump installed in a large liquid hydrogen storage tank at minus 253 degrees, special pumps that can be put into this minus 253 degrees Celsius, and other equipment needed for such infrastructure facilities will be required.

For marine transportation, various types of liquid hydrogen pumps are needed, including those for marine vessels and those for receiving and using vessels.

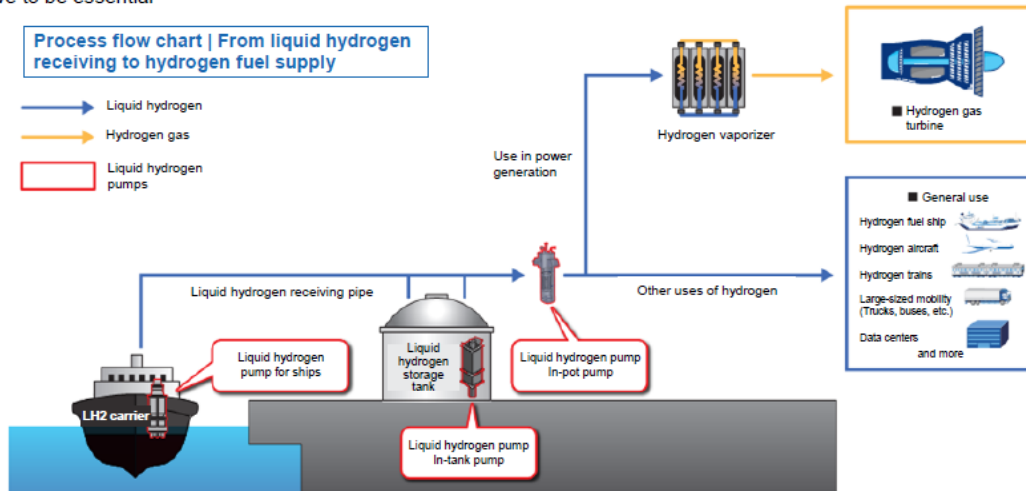
When liquid hydrogen is transported, it evaporates from there, generating gases that boil off. We will make effective use of such gas. Also, the cryogenic gases used in the process where the liquid is sent when this handling is done, and the cold gas is returned instead. Blowers that handle cryogenic gases, such as minus 250 to minus 240 degrees Celsius, are also indispensable equipment. At Ebara we will develop critical equipment

and contribute to enhancing the overall supply chain by being the unique company that integrates various supply chains.

Liquid Hydrogen Boost Pump for Hydrogen Gas Turbine Power Generation (example)



- There are expectations that LNG power plants will shift to hydrogen mixed-fuel and hydrogen-only combustion, particularly in Japan. Liquid hydrogen pumps will play an important role in this shift
- Hydrogen gas turbines require high-pressure supply, and high-pressure liquid hydrogen pumps developed by Ebara will prove to be essential



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To get into specifics, this is an example of a hydrogen gas turbine using a pressure booster pump for liquid hydrogen for power generation as mentioned earlier.

In particular, a major initiative is to convert the fuel used in existing LNG power plants for gas turbines to hydrogen, and various companies and the government are currently leading a mixed-fuel power generation demonstration in which hydrogen is partially mixed in as a fuel. We recognize that this will be the beginning of a demonstration of 100% hydrogen-fired power generation in the future.

To supply hydrogen to these hydrogen-fired and mixed-fired hydrogen gas turbines, hydrogen must be delivered at high pressure. In particular, hydrogen has a small molecular weight, low density, and a temperature of minus 253 degrees Celsius, so a liquid hydrogen pump that pumps large amounts of hydrogen at high pressure is not yet commercially available. We believe that this is a difficult area where Ebara's experience and technology can be utilized, and we are currently developing this area and conducting a commercial demonstration.

We would also like to develop various types of pumps that can be used for various applications, such as hydrogen-powered fuel ships, aircraft, hydrogen-powered trains, and mobility vehicles.

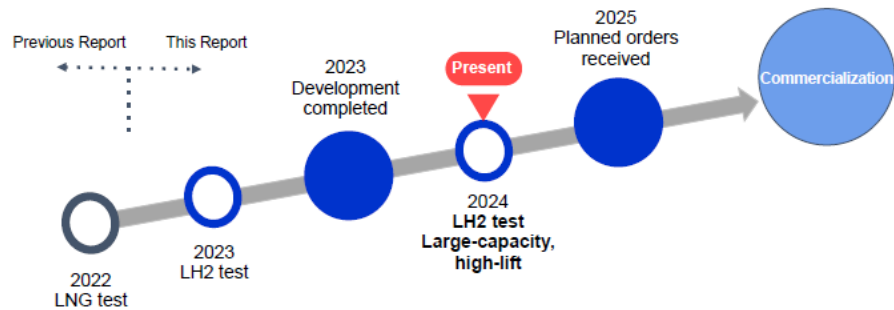
Development Progress for Liquid Hydrogen Pumps (Centrifugal)



- Since 2023, we are conducting advanced development to capture global needs for liquid hydrogen pumps
- Anticipating demand for liquid hydrogen pumps in various applications, including small-flow, large-flow, and high-pressure, as well as for use on land and ships



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Update Information

- 2023 LH2 test: Real fuel test (-253°C) conducted at JAXA Noshiro Rocket Testing Center
- 2023 completed development: Conducted data verification and product design, and launched sales of first model
- 2024 LH2 test: Development and testing carried out to meet needs for higher pressure and larger capacity
- 2025 Orders received: Aiming to receive orders for real-world projects

This is the liquid hydrogen pump that we introduced in 2022, and I would like to discuss the progress over the past two years. Last time, we conducted an LNG test at minus 163 degrees Celsius. I shared at that time that we had developed a pump and have conducted the liquid LNG test.

Subsequently, in 2023, we conducted an actual liquid hydrogen test at minus 253 degrees Celsius using JAXA's Noshiro Rocket Testing Center in Akita Prefecture. Our press release touched on this topic. In 2023 we made the press release of the world's first liquid hydrogen pressure boosting pump.

We are currently working on various data verifications and design improvements using these test results. Design reviews have been completed for the next specific customer commercialization. We are in the process of preparing for further design and manufacturing with the goal of receiving orders in 2025.

On the other hand, the next generation's needs include not only the first model we have developed, but also higher pressures and capacities, and we are in the process of developing more products to meet these needs and provide high-value-added solutions.

I would like to show you a video clip of some of the tests we conducted.

The products we tested this time are still a little small, a little low-pressure, or what we call Step 1, in terms of the overall supply chain construction I just showed you.

Of course, many customers use something of this size. In fact, the large-scale supply chain shown in the previous slide is more than an order of magnitude larger than the pump shown in the photo, and several dozen times larger. I believe that the ability to test and verify the actual performance of the pumps will be an important point from now on.

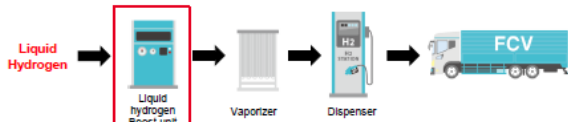
The area that appeared completely white on screen earlier is frost forming at minus 253 degrees Celsius. Once this is inserted deep underground, the pump setup will be complete.

Our Futsu plant and hydrogen developers are on site, taking a variety of data in this way.

Progress on Plunger Pump (Reciprocating Type) for Hydrogen Stations

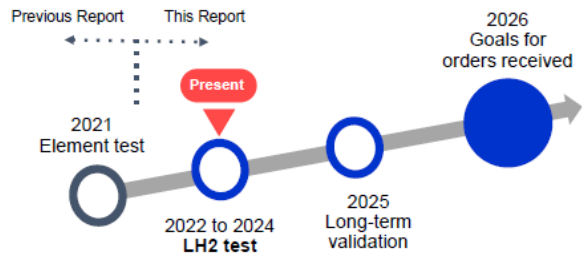


- Start liquid nitrogen and liquid hydrogen tests between 2023 and 2024, and aim for long-term validation in 2025
- The station market to trend upward from 2025 in North America (especially California), the EU, South Korea, etc.



Expectations for large-sized and commercial vehicles

Compared to gas pressure models, liquid models are superior in terms of space efficiency, continuous filling capacity, reduced filling time, and energy savings, making them advantageous for large-scale mobility applications



Update Information

- 2022-2023: Liquid hydrogen test conducted using actual model
- 2024: Planning element tests and liquid nitrogen tests using improved model
- 2025: Aiming for long-term validation through liquid hydrogen test using improved model

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Next, I would like to discuss the progress in the development of plunger pumps for hydrogen stations. This will be a hydrogen station for mobility, and the market is expected to grow in North America, Europe, and South Korea. Market conditions are particularly favorable for large commercial vehicles, which are being considered.

Depending on the demands of this mobility, I expect that this type of pump will have different pressures and capacities and will be divided into several product repertoires. One of the main things we are working on now is a pump that supplies at an ultra-high pressure of 90 megapascals. Although there are some leading manufacturers in the world, the market is still in the process of development.

Last time I mentioned we have started development with elemental testing in 2021. After that, Ebara continued to conduct liquid nitrogen tests on actual models and then liquid hydrogen tests and is now developing markets and potential customers.

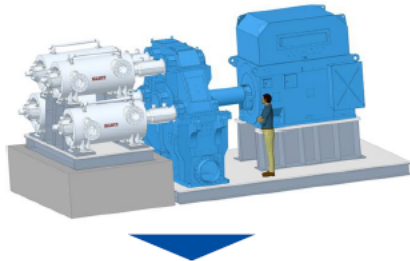
However, it is my understanding that it has not yet been completed, and we are currently designing and developing an improved model based on the knowledge we have gained from this project. Next year, we will conduct another actual fluid test to demonstrate long-term operation, and then we will do our best to achieve our goal of receiving the first order in 2026.

Progress on Hydrogen Compressors and Ammonia Pumps (Energy Company)



Pipeline connecting compressors

👉 Expectations for hydrogen gas pipelines in wide-area supply chains such as North America



- Elliott developed Flex-OP hydrogen compression solution in 2022
- Our Group is collaborating to develop a next-generation model that enables 100% hydrogen
- Currently conducting sales to receive orders and build a regional supply chain

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Leak-free ammonia canned pump

👉 Global expectations for ammonia power generation and large capacity hydrogen carrier



- 2023: Developed a leak-free ammonia pump
- 2023: Successful LPG test of in-tank pump for ammonia
- 2024: Successful fueled operation at demonstration plant

Next, this is the hydrogen compressor and ammonia that I mentioned earlier in the energy company. These two pieces of equipment are critical for the construction of the hydrogen supply chain. The hydrogen business we are working on now is firmly linked to the Energy Company, which is pushing for the development and market launch of hydrogen compressors. We are working diligently now to get our products to market and running from the late 2020s to around 2030.

One more thing about ammonia. Ammonia co-firing is one option, which is one of the ways to transport hydrogen in the world, and the need for this method is also quite large. So, given the success in the actual liquid operation of the leak-free ammonia pump I mentioned earlier, I would like to strive to fill the needs of hydrogen carriers and pour company-wide efforts to begin acquiring new customers.

“World’s First” Hydrogen-powered Absorption Chiller/Heater that Uses Hydrogen in Building Air Conditioning



- Collaborated with EBARA REFRIGERATION EQUIPMENT & SYSTEMS (ERS) to develop the world's first hydrogen-powered absorption chiller/heater in 2023
- Achieving zero CO₂ emissions by changing the fuel of conventional gas and oil absorption chiller/heater to hydrogen



Update Information

- Developed hydrogen-powered absorption chiller/heater in 2023
- **Conducting continuous test run since August 2024**
(Tokuyama Cultural and Sports Center, Shunan City, Yamaguchi Prefecture)
- Increasing number of inquiries from local governments, developers, and private companies regarding use in next-generation air conditioning equipment
- Scheduled to start selling as a system (ERS) that is ready for hydrogen use

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Another product I would like to introduce is a hydrogen-powered absorption chiller/heater that we are developing with the Building Service and Industrial Company. Conventional air conditioning equipment requires fuel like city gas or oil. By replacing this with hydrogen in the future, it will be possible to reduce CO₂ emissions during use to zero.

Last year in 2023, we conducted a hydrogen combustion test. We have also been conducting a continuous demonstration test for heating and cooling from this August, at a facility in Shunan City, Yamaguchi Prefecture. So far, we have been able to confirm good operational results.

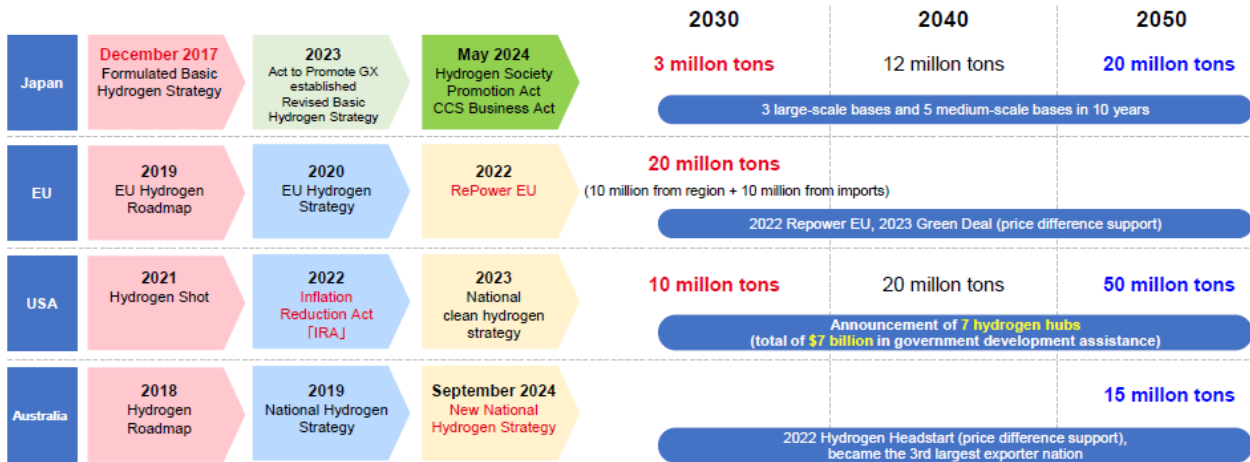
We believe inexpensive hydrogen use is still a long way off in Japan. However, the building industry, developers, and local governments that emphasize value-added, carbon-neutral construction are friendly to these new initiatives, and we are seeing a lot of positive feedback from those who are willing to take on the challenge.

Some customers are also considering the effective use of byproduct hydrogen from existing factories. We are now preparing hydrogen-ready products for such customers.

Global Hydrogen Strategy and Hydrogen Market Growth



- Starting with Japan's Basic Hydrogen Strategy in 2017, hydrogen strategies were formulated around the world
- In particular, the EU, the United States, and Australia established numerical targets and supplementary budgets for 2030 and beyond, accelerating the social adoption of hydrogen
- South Korea, the Middle East, and China also developed hydrogen strategies to boost growth



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Now that I have talked a little bit about our products, I would like to touch on our global hydrogen strategy and the growth in the size of the market.

As many of you know, Japan was the first country in the world to enact a basic hydrogen strategy in 2017. Since then, there have been aggressive legal developments: the GX Promotion Law in 2023, the Hydrogen Society Promotion Law in 2024, and the CCS Project Law in 2024.

The goal is to use 3 million tons of hydrogen by 2030 and 20 million tons by 2050, and there are plans for three large-scale hubs and five medium-scale hubs in Japan.

The EU is the most active region in the hydrogen market. The strategy for the region is to plan for 10 million tons of intra-regional manufacturing and regional manufacturing in 2030, and then 10 million tons as imports. The EU has also been ahead of the curve in providing price differential support to bridge the gap between production and market prices until hydrogen is up and running, with a particular strategy centered on green hydrogen.

On the other hand, the US is trying to proceed at a speed unmatched anywhere in the world, taking advantage of the huge amount of money from the Inflation Control Act of 2022. We are currently estimating a maximum usage rate of 50 million tons in 2050 and have also announced plans for seven hydrogen hubs across the US to begin promoting hydrogen utilization in each region.

Australia is also developing a new national strategy, aiming to become the third largest exporter of hydrogen from renewable energy sources, lignite, and blue hydrogen from CCS.

All of these countries and regions are overcoming various challenges and pushing forward toward a future hydrogen society, and South Korea, the Middle East, and China are also following suit and driving growth.

Establishing the World's First Full-scale Commercial Product Testing and Development Center



- Establishing the world's first full-scale commercial product testing and development center fully equipped with fueled testing equipment for liquid hydrogen pumps

(Provisional name) Ebara - Hydrogen Equipment Test and Development Center (E-HYETEC)



Location: Futtsu City, Chiba Prefecture (company-owned land)
Site area: Approx. 18,000m² (Building area approx. 2,800m²)
Completion: June 2026 (planned)
*Certain test facilities scheduled to begin operations in 2025



- Liquid hydrogen pump product performance testing (centrifugal pumps, plunger pumps)
- Development of related foundational technology

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We have been focusing on the development of pumps, especially the liquid hydrogen pumps I mentioned earlier, to respond to the global hydrogen supply chain and commercialization efforts that require these pumps. As I mentioned earlier, the next step is commercialization and then social implementation.

What you see here is the world's first real-scale commercial equipment test and development center, and the new construction is underway. We named it "E-HYETEC." This center will be especially focused on centrifugal pumps and reciprocating plunger pumps for stations, which are the main products planned for testing.

The properties of liquid hydrogen and its behavior in fluids are still not fully understood, and many engineers and academics are actively researching this area. Continuous research and development, as well as component testing, will be necessary moving forward.

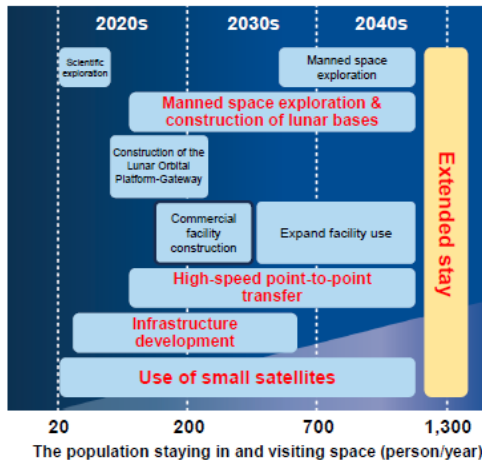
We have received concerns from our customers around the world about the actual use of hydrogen. Ebara is committed to thoroughly understanding these issues and providing highly reliable products for commercial use. To achieve this, we have determined that performance testing with actual liquid hydrogen is essential, leading to this investment.

This is the only facility available at this time that can test large-capacity, ultra-high-pressure liquid hydrogen pumps needed for future large-scale applications at actual scale. By achieving this ahead of others, we aim to provide reliable products promptly when our customers need them, thereby securing a solid market share.

Challenge Ourselves to New Business Fields: Into the Aerospace Industry



- Contributions on the ground, transport of goods, and lunar surface/space ST infrastructure
- Contribute to the evolution of humankind by connecting Earth and space, anywhere and faster



14 | Copyright(c) Ebara Corporation, All rights reserved Red: Main target domain

Step 3 (from 2040)	Lunar surface/space ST infrastructure (Water treatment, energy, life infrastructure)
▶ Low-gravity environmental transport technology (pumps for space infrastructure), hydrogen technology	
Step 2 (from 2027)	Transport of goods in space (Orbital transport, high-speed point-to-point transport)
▶ Satellite thruster pumps Thrusters (satellite/debris removal)	
Step 1 (from 2024)	Contribution on the ground (Transport small satellites between low earth orbits)
▶ Pumps for space rocket engines (supply system)	

Blue: Development implementation phase

Finally, I would like to highlight our efforts in the aerospace industry. As part of this hydrogen-related business, we are taking on the challenge of entering the aerospace business. Last time, in 2022, I introduced a cryogenic rocket fuel supply pump for use in commercial rockets.

Traditionally, liquid hydrogen has been the primary fuel for large, mission-critical rockets. Therefore, it can be said that hydrogen and space are highly related and highly compatible technological fields. For civilian use, however, liquid methane is mainly used at something like minus 161 degrees Celsius. Nevertheless, both aerospace and hydrogen share compatible technologies such as cryogenic temperatures and high-speed rotation, both areas in which Ebara can leverage our technological strengths.

I summarized our goals for the space business on this page. On the left is an overview of the different stages and initiatives concerning aerospace. In this context, we are particularly targeting the areas shown in red, such as the use of small satellites, infrastructure development, and high-speed transportation between two points.

As the first step we are developing mainly pumps for space rocket engines, but we would like to try pumps for satellite thrusters in the second step, and gradually approach infrastructure.

Although the space industry is still in its infancy, the number of satellite rocket launches worldwide has reached about 200 per year. Further increases are expected in the future. It is said that the private sector will drive this trend in the future. By working on this now, we hope to create the next Ebara business growth.

Pumps for Space Rocket Engines | Status of Development





Electric Pump

Unlike conventional turbo pumps, an electric motor is used as the drive machine, providing new value in engine maintainability and thrust control

Target markets

- Space rocket engines
- Artificial satellites
- Point-to-point high-speed transport (P2P)
- Transport of goods in space
- Debris removal





July 2024 : Prototype of electric pump for rocket completed

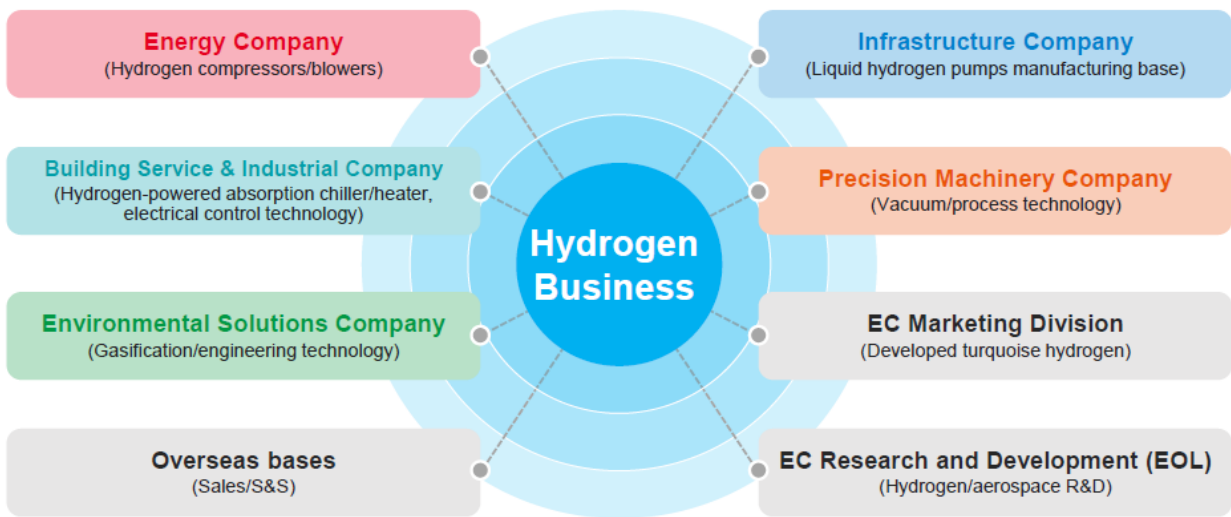
September 2024 : -196°C liquid nitrogen test completed

2025 : Liquid methane fueled test planned

Aiming for inclusion in launch plans from 2027

Over the past two years, we have made progress on the development of electric pumps for space rocket engines. We successfully completed a high-speed rotation test at JAXA Kakuda in September this year. We hope to conduct the next test using actual fluid next year.

Creating Technology Synergy with the Hydrogen Business Across the Entire Ebara Group



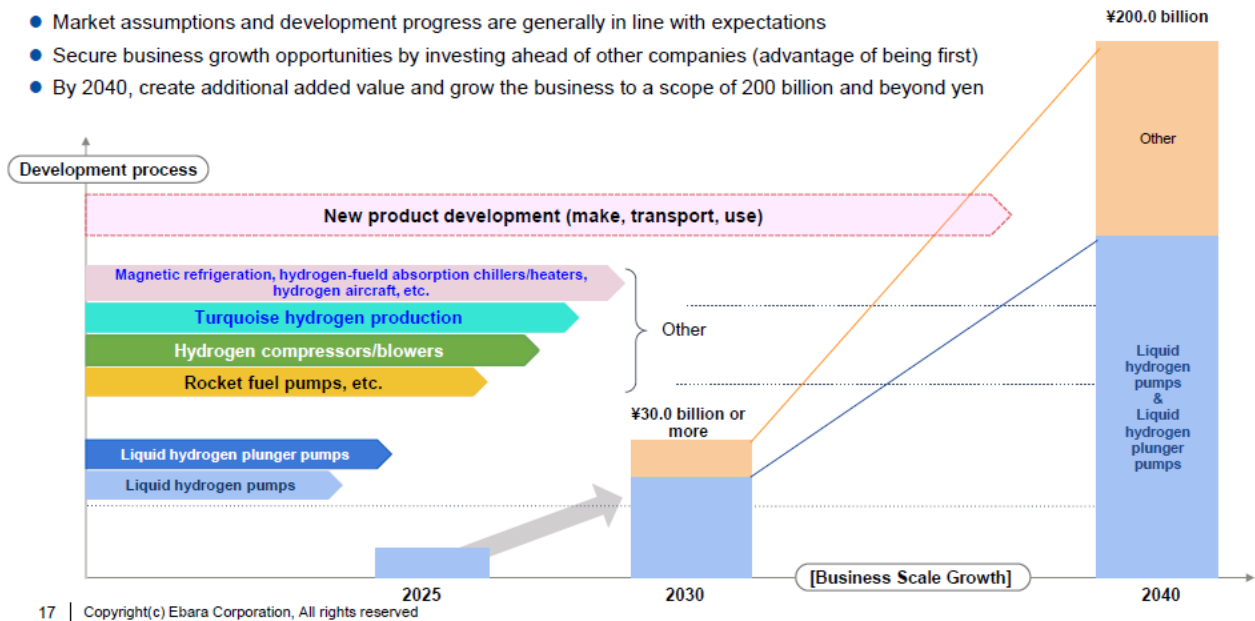
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Ebara is leveraging the technology and expertise it has built up over time to create new technologies, which are designed to benefit from the synergies of organizations across the group. As shown here, we support the hydrogen business by leveraging the strengths of these organizations. The hydrogen business provides various feedback to all companies. We are also collaborating with corporate marketing, overseas offices, and R&D to advance our research.

About Hydrogen Market Business Growth



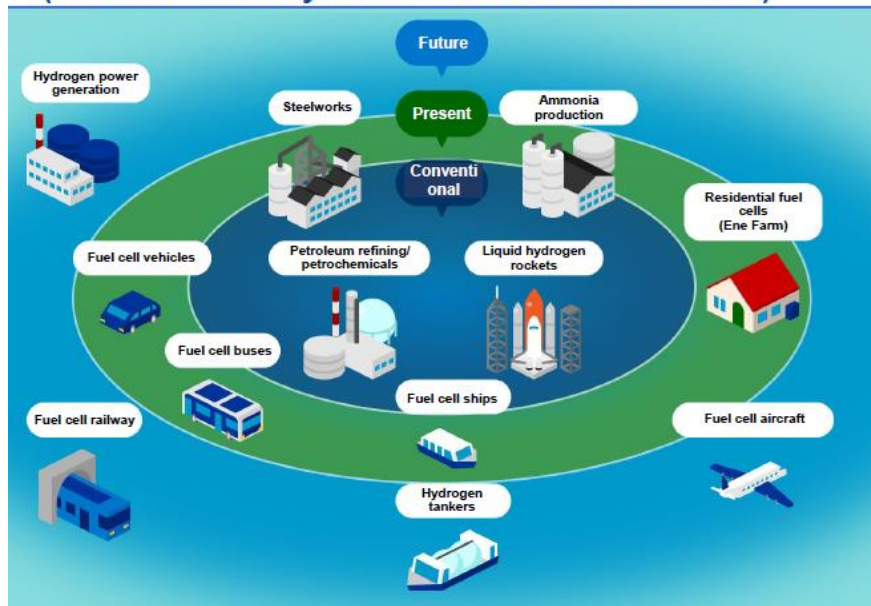
- Market assumptions and development progress are generally in line with expectations
- Secure business growth opportunities by investing ahead of other companies (advantage of being first)
- By 2040, create additional added value and grow the business to a scope of 200 billion and beyond yen



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Based on these factors, regarding the business growth we have been targeting, we are proceeding as pictured here, aiming for business scale of JPY30 billion by 2030 and JPY200 billion by 2040. The blue part is specifically regarding the scale of the liquid hydrogen pump or plunger pump business, which I highlighted today. We would like to promote the testing center I mentioned to ensure it contributes to this business growth.

Hydrogen Technology is Expected to be Used in a Variety of Ways (from the Ministry of the Environment website)



By building Ebara's new technology and businesses, we can make contributions in all hydrogen-related domains



We will pursue upfront investments and technology development to take on the challenge of realizing a hydrogen society

Source: Ministry of the Environment website https://www.env.go.jp/seisaku/list/ondanka_saisei/lowcarbon-h2-sc/about-hydrogen/index.html

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This is the last slide. The hydrogen-related products have been applied to numerous existing businesses and industrial fields. As you can see here, we believe that various ways of utilization will emerge.

We would like to connect these areas to the next stage by promoting the creation of more challenging technologies and businesses. We believe that Ebara has sufficient technology and strength to do so, and we look forward to your continued understanding and support.

This concludes my presentation.