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学習と成長の原動力が  
ワクワク感と感動する気持ちです。  
「ワクワク」していますか？  
「感動」していますか？

The driving force behind learning and growth is  
a sense of exhilaration and enthusiasm.

Do you feel exhilarated?

Are you enthusiastic?

**Kotaro Harada**

Representative Director, CEO



## CEO MESSAGE

On April 1, we will welcome 63 new employees. This time of year reminds me of the Nippon Foundation's Awareness Survey of 18-Year-Olds\*1 - Country and Society survey (November 2019). It is a survey of 1,000 young people in Japan as well as in other Asian, European, and American countries, and the low motivation among Japanese youth was striking. Of the various questions, the following two questions are of particular concern.

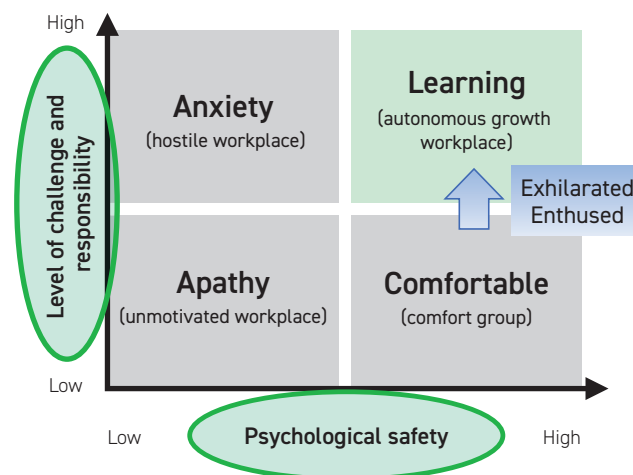
1. In the question "Do you think you can change your country or society by yourself?" only 18% of respondents in Japan answered yes. The highest percentage that answered yes was India at 83%, five out of six respondents.
2. In the question "Do you consider yourself a responsible member of society?" Japan was the only country where 45% of the respondents answered yes, less than 50%, while all other countries had more than 70% of the respondents answering yes.

Sustainable development requires young energy, and just like the human body, nations and companies can only continue to grow through renewal. It is no exaggeration to say that the future of a country or company depends on how well it provides a place for this young force to grow in a positive manner.



How can we nurture young people who have the desire to change their country and society as responsible members? We learned from the lecture given by Mr. Iwade (former rugby team coach of Teikyo University) on April 1, 2022. The content of the lecture was about the zone where both people and organizations grow vigorously, characterized by high psychological safety\*2 and high levels of challenge

and responsibility. In this zone, each member exercises leadership, and learns and helps each other every day to achieve high goals. What Torishima particularly values is raising the level of as many people as possible from the Comfortable zone (comfort group) to the Learning zone (autonomous growth workplace), as shown in the figure below.



(Created based on the diagram on page 23 of *The Strength to Enjoy Adversity* by Masayuki Iwade, Nikkei BP)

The driving forces behind this are enthusiasm and exhilaration. We will become a company that is indispensable to society that contributes to the achievement of safety and security as well as carbon neutrality in Japan and around the world. By continuing to pursue this ideal state, Torishima aims to become an organization where everyone grows, driven by the surplus of enthusiasm and exhilaration that we generate.

(At the management policy meeting on March 21, 2024)

\*1: Awareness Survey of 18-Year-Olds  
(The Nippon Foundation)

[https://www.nippon-foundation.or.jp/what/projects/eighteen\\_survey](https://www.nippon-foundation.or.jp/what/projects/eighteen_survey)

On April 3, immediately after the management policy meeting, the results of the new Country and Society survey were released for the first time in five years. 46% of respondents in Japan answered yes to question 1 above, and 61% to question 2, both significant increases. Although still lower than other countries, the results are a bit reassuring.

<https://www.nippon-foundation.or.jp/who/news/pr/2024/20240403-100595.html>

\*2: Psychological safety

An organization with psychological safety is one in which people feel safe expressing their thoughts and feelings to anyone, and share a sense of security that their comments and remarks will not cause deterioration of relationships.



## COO MESSAGE

# Torishima's Strategy for Sustainable Growth in FY2024

Alister Flett Director, COO

Torishima's success has been built on our commitment to operational excellence and a clear focus on our customers, principles that remain central to our vision for the future.

Thanks to everyone's efforts, our medium-term plan, established in 2021, aimed at sustainable growth towards a decarbonized society, has not only been met but exceeded. In FY2023, we surpassed our FY2029 targets!

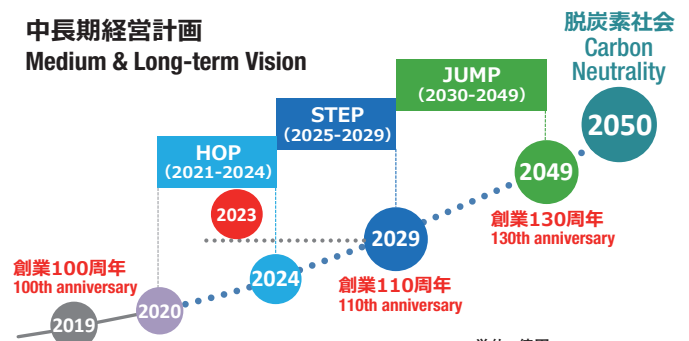
In 2024, our ambition remains steadfast. We are committed to fostering a culture of excellence where every employee is empowered to contribute their best. Our focus extends beyond mere targets; it is about instilling a "No.1" mindset of continuous improvement and challenging ourselves to exceed industry standards in every aspect of our work.

In preparation for our recent TGT meeting, I reviewed some old presentations from 2006 which discussed Innovation and a Year of First Experiences for Torishima. Over 15 years have passed since then, and we continue to achieve significant new developments every year. It's exciting to think that we can continue to challenge and create new opportunities for Torishima products, demonstrating our ability to grow and develop as an organization and as individuals.

The year ahead promises to be one of execution, with a record level of sales input and significant orders to fulfill. From our domestic teams striving to increase output to our international projects driving innovation, it is the dedication and expertise of our employees that will drive us forward.

Two key areas of focus for 2024 are digital transformation (DX) and green energy innovation (GX). DX represents an opportunity to enhance operational efficiency and deliver better experiences to our customers by empowering our employees. Meanwhile, GX reflects our commitment to sustainability and the development of renewable energy solutions in an exciting new market.

## 中長期経営計画 Medium & Long-term Vision



	単位：億円	
	2023年度	2029年度 (目標)
売上高	811	1,000
営業利益	68	100
	billion yen	
	FY2023	FY2029 (Plan)
Sales	81.1	100
Operating Profit	6.8	10



To support our GX initiative, we have established a new department dedicated to green energy innovation. Led by Keisuke Hiraki, this team will drive initiatives aimed at developing pumping solutions for the new energy market, including hydrogen and ammonia, and promoting them globally. This is an exciting challenge in a new market, and there is a real drive in Japan to promote these technologies worldwide, inspiring everyone.

Looking beyond 2029, our vision is clear: simplicity, scalability, and sustainability. By focusing on achievable growth targets and harnessing the power of innovation and collaboration, we are working towards our long-term goals of 1000, 100, 10 (sales of JPY 100



billion, operating profit of JPY 10 billion, operating profit ratio of 10%).

Taking on difficult challenges creates an opportunity for all of us to grow as individuals, and I look forward to you joining me on Torishima's journey to improve and develop in 2024.

## 2024年度トリシマの持続的な成長戦略

取締役共同coo Alister Flett

トリシマのこれまでの成功は、ポンプ事業へのコミットメントと顧客志向ゆえであり、これからもそうです。脱炭素社会に向け持続可能な成長をめざした中期経営計画は、皆さまの努力のおかげで2023年度の目標を達成し、既に2029年度の目標を上回っています!

2024年度も、私たちの志は揺るぎません。トリシマは、従業員一人ひとりがベストを尽くせるような卓越した企業文化の醸成に取り組んでいきます。また「No.1」マインドを浸透させ、業務のあらゆる面で継続的な改善を続け、業界標準を超えることに挑戦します。

先日TGTミーティングの準備のため、「イノベーションとトリシマに入社して」という2006年からのプレゼンを見直しました。あれから15年以上が経ちましたが、私たちは毎年のように新しい発展を成し遂げ続けています。製品の新たな可能性に挑戦・創造し続け、組織として、そして個人として成長し、発展していくことができると思うとワクワクします。

今年度は過去最高の売上高を記録し、多くの受注に対応していく実行力のある年になると確信しています。生産量の増加に邁進する国内チームからイノベーションを推進する海外プロジェクトに至るまで、私たちを前進させる原動力となるのは、皆さんの貢献と専門知識です。

今年度の重点分野は、デジタル・トランスフォーメーション(DX)とグリーン・エネルギー・イノベーション(GX)の2つです。DXは、従業員の能力を向上させることにより業務効率を高め、お客様にさらなるご満足を提供することを表します。一方、GXは、サステナビリティ(持続可能性)へのコミットメントと、新市場における再生可能エネルギー・ソリューションの開発を表します。

そして、GXを推進するため、平城本部長が率いる事業開発統括本部を新設しました。この部署は、水素やアンモニアを含む次世代エネルギー市場向けのポンプの開発とグローバルな普及をめざします。これはエキサイティングな挑戦であり、日本にはこうした技術を世界に普及させようという意欲があり、人々を鼓舞しています。

トリシマには、2029年度以降を見据え「シンプルで、スケールアップでき、持続可能であること」というはっきりとしたビジョンがあります。達成可能な成長目標に焦点を当て、イノベーションとコラボレーションの力を活用することで、私たちは売上高1,000億円、営業利益100億円、営業利益率10%という長期目標に向かって取り組んでいます。

困難な課題に挑戦することは、私たち全員が個々に成長する機会を生み出します。2024年度には、さらなる向上と発展に向けたトリシマの旅へ一緒に参加できることを楽しみにしています。

# Eliminating Flood Damage and Protecting Stable Agricultural Production

## Yashafukuro Drainage Pumping Station Hachirogata Land Improvement District

### History of Hachirogata Land Reclamation

The Yashafukuro Drainage Pumping Station is located in Hachirogata-cho in northwestern Akita Prefecture. With an area of 17 km<sup>2</sup>, Hachirogata-cho is the smallest town in Akita Prefecture and has relatively little snowfall for the prefecture. It is known for its Gannin Odori dance, which has a history stretching back over 300 years, and Hitoichi Bon Odori, one of the three major Bon Odori dances in Akita Prefecture, both of which are designated as Intangible Folk Cultural Properties by Akita Prefecture.

Hachirogata, which gives the town its name, was once Japan's second largest lake after Lake Biwa, with a total area of 22,024 ha. Plans to reclaim Hachirogata and turn it into farmland have been proposed many times since the Edo period (1603-1867), but each time the plan failed to be implemented due to financial reasons, etc. However, after World War II, a plan to increase farmland was promoted as a national project to alleviate food shortages, and after many difficulties and much trial and error, the major project was completed in 1977. Most of the water area was reclaimed as land, and today it is a treasure trove of agricultural products, especially rice. The three remaining water bodies (Hachirogata Regulating Pond, Eastern Drainage Channel, and Western Drainage Channel) are called Lake Hachiro, and still retain the beautiful scenery nurtured by Hachiro Lagoon.

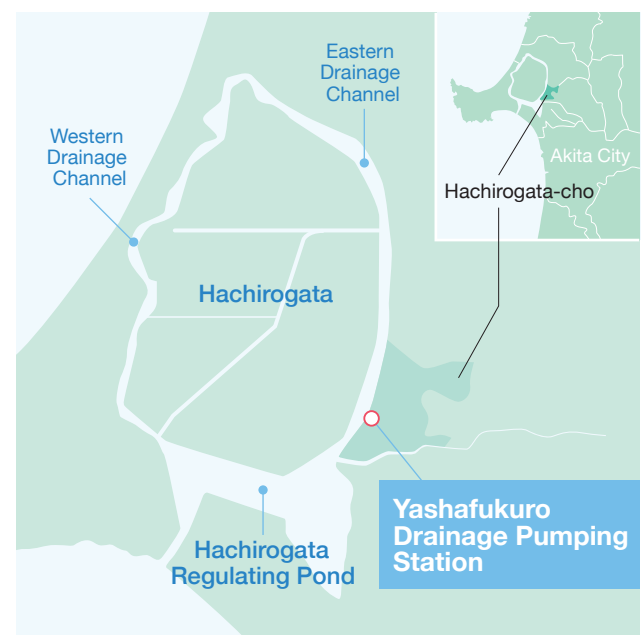
### Function of the Yashafukuro Drainage Pumping Station

For more than 30 years since its completion in 1987, the Yashafukuro Drainage Pumping Station has played the role



Outside view of drainage pumping station

of draining agricultural water collected through the main drainage canal into the Eastern Drainage Channel. However, in recent years, due to increased rainfall and development within the watershed, the amount of water flowing into the pumping station has been on the rise, and the aging of the facility has reduced its drainage capacity, resulting in significant flooding damage (damage caused by the accumulation of unnecessary water on farmland). Therefore, the building was reconstructed in 2021 and the pump facilities were updated. The pumping station was originally designed at a high floor level to prevent flooding even at the highest water level on the inflow side, but a pump with an integrated submersible motor was adopted to ensure drainage functions even at the highest possible level of flooding, storm surge, or tsunami.







Pump with integrated submersible motor

Pump Usage	For Flooding	For Regular Use
Orders Recieved	in 2021	in 2021
Pump Type	ISV800-SM	ISV600-SM
Quantity	1 unit	1 unit
Capacity	74 m³/min	45 m³/min
Total Head	2.9 m	3.0 m
Motor Rating	55 kW	40 kW

Mr. Soma and Mr. Kobayashi of the Hachirogata Land Improvement District, who cooperated with our interview, said, “The existing Yashafukuro Drainage Pumping Station had one engine-driven and one motor-driven pump, which required many auxiliary units, making it difficult to determine the cause of any problems. Since the renewal, the entire pumping station has fewer auxiliary units, making it easier to inspect, operate, and maintain. Also, we were saved from flooding damage in the Yashafukuro area during the torrential rains in July 2023.” We will continue to make rational and economical proposals utilizing our know-how and new technologies as a pump manufacturer, and contribute to make the facility beneficial to the people in the surrounding areas.

(Interview by Yoshihiro Kikuchi, Sendai Branch)



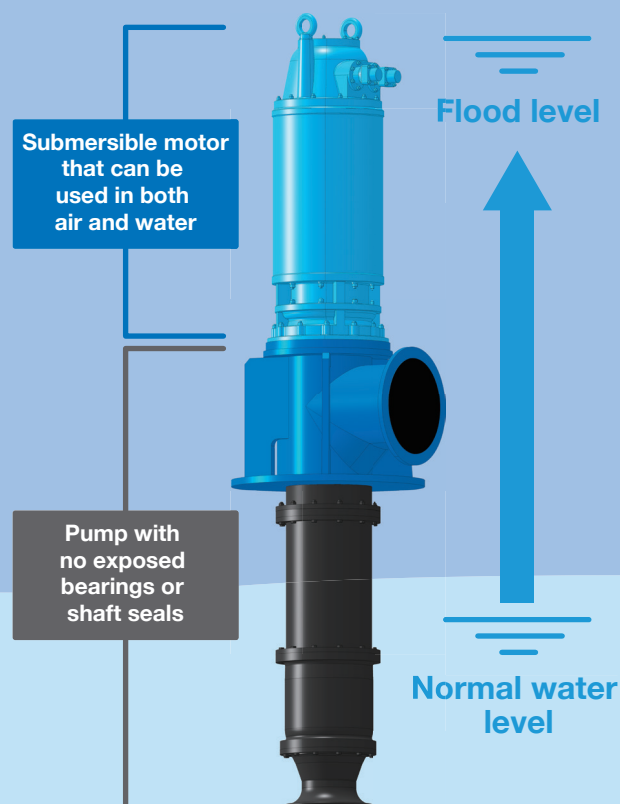
Mr. Soma and Mr. Kobayashi, who cooperated in the interview

## Pump with integrated submersible motor that can operate even in the event of flooding

Pumps are driven by motors, so if a pumping station is flooded by heavy rain and the motors are submerged in water, the pumps will become inoperable, leading to increased flood damage.

Pumping stations are generally installed higher than the ground level to prevent the motor from being submerged in water. However, due to the increasing occurrence of heavy rains in recent years, there have been an increasing number of cases where motors become submerged at conventional installation heights and become inoperable.

Torishima's pumps with integrated submersible motors have a watertight structure that integrates the pump and motor into a watertight unit, so even if a pumping station is flooded, the pump can operate and ensure drainage functions. This also has the benefits of simplifying the equipment and improving earthquake resistance.



# Project Highlights

01

## Received order for large-scale repair work based on a comprehensive evaluation of technical proposals and company evaluations

### Renewal work of pump facilities for Kamisugi Drainage Pumping Station in Kumamoto Prefecture

The Kamisugi area, where the Kamisugi Drainage Pumping Station is located, is in the southern part of Kumamoto City and produces rice and other crops in its vast paddy fields. The low-lying area is sandwiched between the Midori and Hamado Rivers. During heavy rains, the water level of the Hamado River rises and natural drainage becomes impossible, so the pumping station was constructed and put into service in FY1974. However, 50 years have passed since the pump facilities was installed, and there were fears that flooding could occur due to functional deterioration caused by aging.

The bidding for this renewal project was based on a comprehensive evaluation bidding method, in which technical proposals and company evaluations were taken into account in the bid amount. Regarding the technical proposals, the themes of the project included construction issues such as ensuring quality, safety, and installation accuracy. We were awarded the contract because we conducted a thorough investigation of the local conditions and our proposal to meet the needs of the project was highly evaluated.

The objective of this project was to restore drainage functions by updating pump facilities to eliminate flooding

damage to rice paddies, etc., and to stabilize agricultural management by developing the farming of eggplants and other highly productive agricultural products. With high expectations being placed on this important project to improve the safety of the region and the agricultural environment, we are currently designing and manufacturing equipment and developing a construction plan for completion in March 2027.

It is still fresh in our minds that we held the Kumamoto Food Fair at the Torishima head office last December. This event was one of our objectives to support the increased consumption of agricultural products produced in Kumamoto Prefecture. We would like to take this opportunity to thank the company, its employees, and their families for their cooperation in making the event a great success.

Pump Name	Main Pump	Main Pump
Pump Type	SP2000	SP1800
Quantity	1 unit	2 units
Motor Rating	580 kW	470 kW

02

## Utilized a vortex preventing pump that allows for low water level operation

### Received order from Japan Sewage Works Agency for vertical mixed-flow pump for Shunan City Nomura Kaisaku Drainage Pumping Station

Shunan City is located in Yamaguchi Prefecture, the westernmost prefecture of Honshu (Japan's largest island), and faces the Seto Inland Sea. One of the nation's leading petrochemical complexes is located along the Seto Inland Sea coast, and in addition to basic materials industries such as steel, petroleum, and chemical products, the manufacture of transportation machinery, mechatronics and electronic component-related products, and pharmaceutical products are also thriving. In recent years, the area has become

famous for fantastic night views of factories created by the countless lights emitted from the vast industrial complex, and has been recognized as one of Japan's Night View Heritage sites.

The Nomura Kaisaku Drainage Pumping Station, to which the pumps will be supplied, is located in a corner of the petrochemical complex southeast of JR Shinnanyo Station, and is one of the largest drainage pumping stations in the city, boasting a planned inflow rate of 1,640 m<sup>3</sup>/min.



In FY2020, the No. 2 main pump (1,200 mm diameter horizontal mixed-flow pump) equipped with a vortex preventing device was delivered to this drainage pumping station, allowing for operation at water levels 80 cm lower than the existing pump. The operation manager praised the pump, saying, “We were able to lower the water level in the inflow canal, allowing us to manage the operation with plenty of leeway even during heavy rainfall.”

The new pump is a motor-driven vertical pump instead of the existing engine-driven horizontal pump, which improves startability, operability, and ease of maintenance and management. Vortex prevention measures are also

employed in this pump to allow for operation at low water levels. Further reducing the burden of operation management and enabling operation in accordance with inflow volumes, this pump is expected to contribute to disaster prevention and mitigation in the surrounding area by improving the functionality of the pumping station.

Pump Name	No.6 Main Pump
Pump Type	SPV900
Quantity	1 unit
Motor Rating	160 kW

## 03

### Received order for test blast furnace pumps for carbon-neutral steelmaking

**Received order for a total of eight units, including high-pressure return water pumps for a carbon-recycling test blast furnace for JFE Steel Corporation’s East Japan Works (Chiba District)**

JFE Steel Corporation is a steel manufacturer formed through the merger of Kawasaki Steel Corporation and Nippon Kokan (NKK) in 2003. Since its establishment, JFE Steel Corporation has led the steel industry under the corporate philosophy of “The JFE Group will contribute to society with the world’s most innovative technology.”

As a pioneer in the Keiyo Industrial Zone, JFE Steel Corporation’s East Japan Works (Chiba District) was Japan’s first integrated steelmaking plant built in the postwar period. The large-scale steel mill, which covers an area around 170 times the size of the Tokyo Dome (approximately 7.66 million m<sup>2</sup>), produces high-grade steel products using state-of-the-art technology and equipment.

The company has adopted Torishima pumps for the construction of a new carbon-recycling test blast furnace\* for carbon-neutral steelmaking. This pump supplies return water (water that can be used repeatedly) to various locations and is an important piece of equipment that supports the operation of the test blast furnace.

The carbon-recycling blast furnace is designed to reduce CO<sub>2</sub> emissions by reacting CO<sub>2</sub> generated in the

blast furnace with hydrogen to convert it into methane, which is then recycled as a reducing agent to reduce carbon consumption.

The company has been using Torishima pumps at its East Japan Works as well as at other steel mills, and the high evaluation of Torishima pumps’ past achievements, quality, and performance has led to the order.

Steel is a fundamental material that supports society and our daily lives, used in buildings and machinery as well as automobiles, household appliance, steel cans, tableware, and many other fields. We will continue to contribute to carbon neutrality and people’s daily lives as well as the production of high-quality steel products through our high-performance, high-quality pumps.

\* Adopted in the “Development of low-carbon technologies using external hydrogen and CO<sub>2</sub> contained in blast furnace exhaust gas” of the New Energy and Industrial Technology Development Organization (NEDO), a national research and development agency, under its research and development commission and grant project JPNP21019, Green Innovation Fund Project: Hydrogen Utilization in Iron and Steelmaking Processes.

Pump Name	High-pressure return water pump	Low-pressure return water pump	Hot water pump	Pure water circulating pump	Slave supply water pump
Pump Type	CDM450×350EN	CDM400×350IN	CDM350LN	CAM150-500	CAM40-315
Quantity	2 units	1 unit	2 units	1 unit	2 units
Motor Rating	740 kW	355 kW	110 kW	110 kW	3.7 kW

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The article in this section is only available in the print version.

Thank you for your understanding.

## 05

### **TR-COM system contributes to smart maintenance of equipment**

#### **Received order for b-Monitor 2 from Teijin Limited for its Matsuyama Factory**

Teijin Limited is a major chemical manufacturer in Japan, supplying a wide range of high-performance and advanced materials on a global scale. The company's Matsuyama Factory is Japan's largest materials-related core business site, with research and development centers for several businesses and commercial plants, and supports the materials business by conducting research and development for related businesses and producing its own products.

The Matsuyama Facility Center of the company's Maintenance Engineering Department, which is in charge of facility management at the factory, was considering a number of machine condition monitoring tools to achieve smart maintenance. They found our knowledge and

expertise as a pump manufacturer in the field of rotating equipment and maintenance persuasive, and implemented Torishima's TR-COM system.

TR-COM is a system that collects vibration data from machines using small sensors, captures changes in the vibration frequency spectrum, and uses a unique diagnostic method to detect abnormalities in early stages. In addition to the b-Monitor 2 wireless vibration sensor, the company has also adopted the t-Gateway fixed type repeater.

Preparations to begin system operation are underway, and the TR-COM system is expected to contribute to smart maintenance of the company's facilities.



# 06

## Received order for pumps for blue hydrogen production plant in the U.S.

### Received order from Air Products and Chemicals, Inc. for 12 pumps for the Louisiana Clean Energy Complex

Air Products and Chemicals, Inc., a U.S. company, is a world leader in industrial gases, producing and supplying industrial gases for a wide range of industries including petroleum, chemical, and electrical in the United States, Europe, Asia, and other regions. In addition to oxygen, nitrogen, and argon, Air Products also handles hydrogen, helium, and carbon dioxide, which are used in the petroleum refining, chemical products, and other industries.

The company's current project, the Louisiana Clean Energy Complex, will be the largest facility of its kind in the world, producing more than 750 million cubic feet per day of blue hydrogen in Louisiana, USA. Blue hydrogen produced at the facility will be supplied to the U.S. Gulf Coast region via pipeline. Approximately 95% of the CO<sub>2</sub> produced in the production of blue hydrogen will be captured, compressed, and safely and permanently sequestered deep underground. The blue hydrogen will

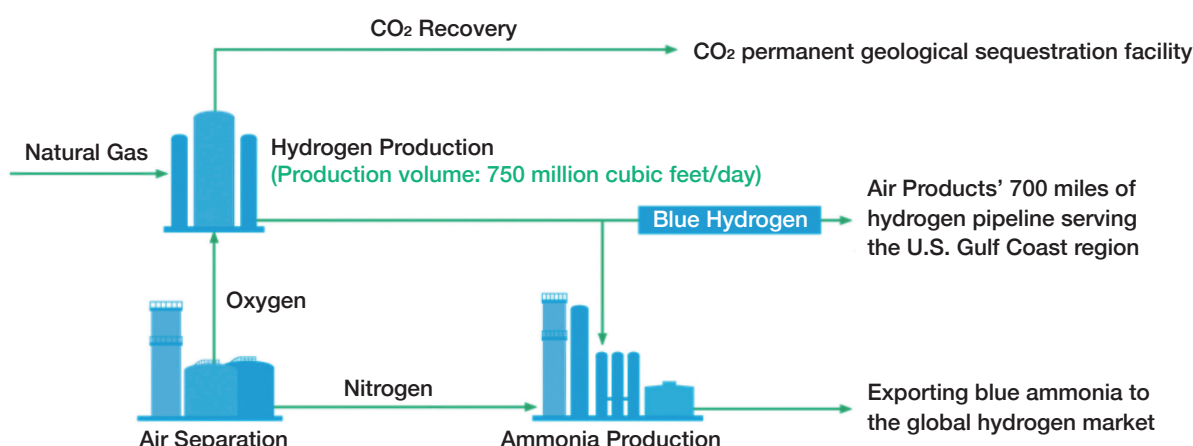
also be supplied to ammonia production plants that will convert it into easily transportable ammonia, which will be supplied to the global hydrogen market as blue ammonia.

Torishima has received an order from this company for 12 pumps, including 6 syngas scrubber pumps, for this facility. One of the reasons we received the order was the strong evaluation of the reliability and safety of Torishima's glandless pumps when handling high-temperature, high-pressure fluids.

We will continue to contribute to the formation of a sustainable society by providing highly reliable pumps.

Pump Name	Syngas Scrubber Pump	Process Condensate Pump
Pump Type	HLV300-500/1M	CHR80-315X
Quantity	6 units	6 units
Motor Rating	310 kW	11 kW

### Louisiana Clean Energy Complex Blue Hydrogen Production and Supply



# Project Highlights

07

## Large order for pumps for irrigation project led by the Egyptian government

**Received order from the Egyptian government for 75 pumps for 9 pumping stations in the Future of Egypt Phase 2 project (Reclamation 400,000 Feddans\*)**

Egypt is a large country, but since about 95% of its land is desert, most of its population is concentrated in the Nile River delta and a small area in the Nile River basin. The country's population is currently the largest in the Arab region at 110 million, and is expected to further increase to 175 million by 2050. The rapid population growth is not only increasing the demand for food, but is also aggravating problems such as loss of existing farmland (conversion to residential land) and shortage of water resources. This is causing concerns about the burden on the agricultural sector.

To resolve this situation, the Egyptian government is developing a new agricultural area (New Delta) southwest of the Nile River delta region, aiming for sustainable agriculture and self-sufficiency. In the New Delta Project launched in 2021, an artificial river was constructed with the capacity to supply water to approximately 900,000 hectares of farmland in the future. The Future of Egypt Project is the starting stage of the above project, which plans to gradually develop part of the Western Desert (the desert area west of the Nile River) into approximately 440,000 hectares of agricultural land.

The project is planned in three phases, and Torishima has received an order for a total of 75 pumps to be used at 9 pumping stations for Phase 2 of the project. The water used for farmland development and cultivation of approximately 170,000 hectares will be supplied by Torishima's pumps.

Torishima has delivered more than 1,000 pumps, including irrigation pumps, to the country. In recent years,

Torishima's track record of manufacturing and supplying more than 200 large pumps during the COVID-19 pandemic without delays in delivery was greatly appreciated by the government, and led to this latest order. Torishima plans to build a pump maintenance plant in the country and will contribute to solving water and food problems by supplying highly reliable pumps and providing a complete service system.

\* Feddan is a unit of land area in Egypt, where 1 Feddan = 0.42 ha (400,000 Feddan = 168,000 ha).



Pump Name	G-1	H-34	I-5 (No.22)	K-28
Pump Type	SPV1100	CDM800×700	CDM500×400IN	CDM800×700
Quantity	5 units	5 units	5 units	5 units
Motor Rating	1,700 kW	900 kW	250 kW	790 kW

Pump Name	N-70-1, 2, 3	N-71-1	N-71-2	O-11	O-31
Pump Type	CDM800×700	CDM800×700	CDM800×700	CDM900LA	CDM600KA
Quantity	30 units	10 units	5 units	5 units	5 units
Motor Rating	1,050 kW	940 kW	1,130 kW	710 kW	200 kW



# 08

## Replacement of other manufacturer's pumps for an Australian thermal power plant

**Received order from LYB Operations & Maintenance Pty Ltd for natural air-cooled boiler circulating pumps for Loy Yang B Power Station**

We have received an order from LYB Operations & Maintenance Pty Ltd of Australia for two natural air-cooled boiler circulating pumps and one spare motor for the Loy Yang B Power Station.

The plant is a lignite-fired core power plant owned by Alinta Energy Pty Ltd, a major Australian power company, and is located in the Latrobe Valley, 160 km east of Melbourne, Victoria. With a generating capacity of 1,200 MW, it is the third largest thermal power plant in Victoria, meeting approximately 20% of the state's electricity demand.

This is the first order for boiler circulating pumps received by Australian Fluid Handling Pty Ltd (AFH), which became a Torishima Group company in 2022, through LYB Operations & Maintenance Pty Ltd, the power plant operator. The project entails replacing existing boiler circulating pumps manufactured by another company.

In addition to the design that was in line with the existing facilities, Torishima's technical capabilities, product durability and stability, and extensive track record of delivering pumps to thermal power plants around the world were highly evaluated, leading to the order.

Torishima has delivered more than 800 boiler circulating pumps to power plants in Japan and overseas. We will continue to contribute to the stable supply of electricity and environmental conservation in Australia while meeting the diverse needs of our customers through our products and services based on the technology and know-how we have cultivated over the years.

Pump Name	Boiler circulating pump
Pump Type	HLAV400-565/1C
Quantity	2 units + 1 spare motor
Motor Rating	900 kW

## TORISHIMA NEWS | Mar. - May. 2024

### Induction Ceremony for FY2024

The induction ceremony was held on April 1, and 63 new employees (including Kyushu Torishima Co., Ltd.) joined the company in FY2024, the largest number in recent years.

#### CEO Harada's speech (summary)

Today is the happiest and most joyous day of the year for Torishima as new people join our company. Thank you all for choosing Torishima. Today, we are taking on the challenge of solving issues such as (1) global warming, (2) energy efficiency, and (3) energy conversion to liquefied gas (hydrogen and ammonia), and we at Torishima have jobs that will play vital roles over the next 20 to 30 years. Torishima will continue to contribute to the prosperity of the earth and the continuation of human life. I know that the COVID-19 pandemic has been difficult due to various restrictions, but we will support you even if you fall or get injured, so I hope that you will rise up and take on challenges with excitement.

I hope that you will grow in this process and become valuable human beings:

- (1) Be healthy in mind and body.
- (2) Become professionals.
- (3) Acquire the habit of hard work.
- (4) Observe the rules of society.
- (5) Give back to society.



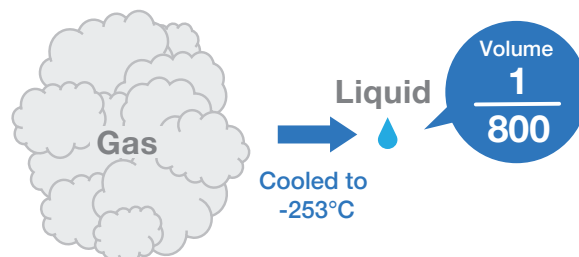
Mr. Kohei Adachi, representing the new employees, made a pledge of joining the company

## World's First

## Successful Operation Test of a Large-Flow, High-Efficiency Liquid Hydrogen Pump

Torishima has been developing large-flow-rate, high-efficiency liquid hydrogen pumps, which are indispensable in every stage of hydrogen production, transport, and use

The use of hydrogen, which does not emit CO<sub>2</sub> during combustion, is essential to achieving carbon neutrality. However, a major challenge in achieving this goal is to reduce the cost of hydrogen, and liquefying hydrogen to 1/800 its volume as gas and transporting it in large quantities is a possible effective solution. What is essential is a pump that can efficiently transfer liquid hydrogen cooled to -253°C at large flow rates without gasification.



Combining the high-temperature, high-pressure, multi-stage pump technology that Torishima has developed over many years with the high-temperature superconducting motor technology that Kyoto University has been researching and developing, led to the creation of a pump that solves conventional technical problems

In 2021, Torishima began development of a liquid hydrogen pump in collaboration with Program-Specific Professor Taketsune Nakamura of the Graduate School of Engineering, Kyoto University, who has been researching high-temperature superconducting motors. In FY2023, the project was adopted by the New Energy and Industrial Technology Development Organization (NEDO) as a subsidized project, part of Development of Technologies for Building a Competitive Hydrogen Supply Chain, and development has been accelerated.

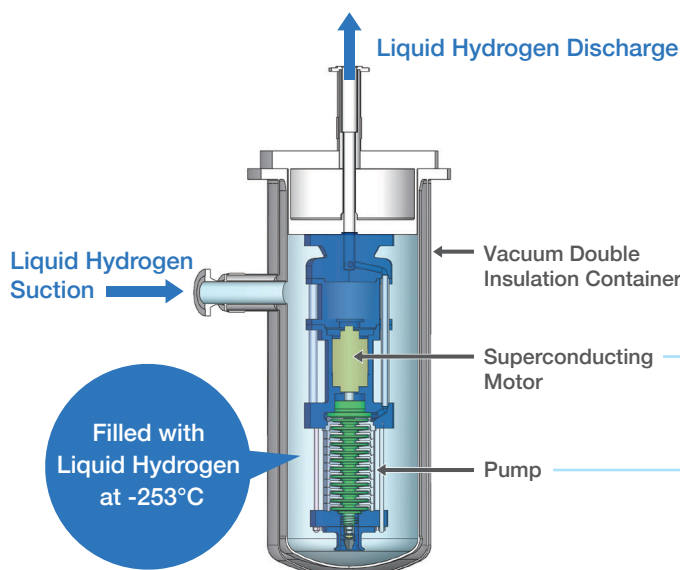
On March 6 and 7, an operational test using liquid hydrogen at -253°C was conducted at the Noshiro Rocket Testing Center (Akita Prefecture) of the Japan Aerospace Exploration Agency (JAXA).

The performance was confirmed to be as expected. **We achieved the world's largest flow rate as a liquid hydrogen pump and the world's highest pressure for boosting volume by a centrifugal pump.**

This innovative achievement represents a breakthrough in a major technological and cost challenge.



Operation test using liquid hydrogen at -253°C at the Noshiro Rocket Testing Center



Taking advantage of the extremely low-temperature environment of -253°C for liquid hydrogen, a high-temperature superconducting motor is used to reduce motor heat generation to the utmost limit and suppress gasification of liquid hydrogen.

#### Specifications of the developed pump

Flow rate: 30.5 m<sup>3</sup>/hr

Pressure: 1.6 MPaG

Rotation speed: 5,000 min<sup>-1</sup>

High-speed rotation boosts the pressure of liquid hydrogen with low density

## A press conference for the liquid hydrogen pumps was covered by various media outlets

An online press conference was held for the media on April 11 in conjunction with the successful operation test of the large-flow-rate liquid hydrogen pump. Various media outlets (newspapers, magazines, TV, etc.) have covered the project, and there has been a great deal of interest in the liquid hydrogen pump, which is essential to achieving carbon neutrality.

We will continue to develop this pump with the aim of achieving even higher flow rates and pressures in preparation for the commercialization of the hydrogen supply chain after 2030. This will contribute to reducing the cost of hydrogen supply to 20 yen/Nm<sup>3</sup>, a future target set by the Japanese government.



To watch the video recording of the online press conference, please scan the code.

## Renovation of Foundry Completed, Production Capacity Increased 1.5 Times

On April 3, a ceremony to celebrate the completion of the foundry and a lighting ceremony was held in a solemn atmosphere, and a prayer was offered for its safe and secure operation. The new high-frequency electric furnace was tapped in the presence of approximately 80 people from the companies involved in the project and Torishima's Foundry Section.

Torishima is one of the leading pump manufacturers in Japan with its own in-house foundry, and has established an integrated production system from casting to machining, assembly, testing, and coating. In order to increase productivity and improve the work environment for further growth, the foundry was renovated for the first time in about 50 years, since its completion in 1975.

The renovated foundry has increased earthquake resistance and dust collection capacity, and includes equipment to reduce labor in hazardous work areas such as close to the molten iron.

In addition, a new high-frequency electric furnace with a capacity of 10 tons and sand processing equipment have

been installed in an effort to reduce power consumption. We also expect to reduce carbon dioxide emissions by approximately 190 tons per year. With this major renovation, production capacity is expected to increase to 1.5 times the current level, and we will shorten delivery times and lower costs by strengthening our capacity to manufacture large and special parts used in pumps and by manufacturing parts in-house.



First molten metal produced in the new high-frequency electric furnace



Updated shake-out machine (blue) and mixer (red)



# Wakasa Bay Training Program for New Employees

A training program for new employees was held for two nights and three days at the National Wakasawan Youth Outdoor Learning Center.

The training included riding cutter boats, outdoor cooking, sports competitions, and other activities with an emphasis on teamwork.

Through the program, participants strengthened their bonds with each other, transcending barriers of origin, gender, age, and language, in a fulfilling training experience.

April 3 to 5



**Schedule** .... Due to poor weather conditions on the first and second days, most of the activities were held indoors, and on the final day, the participants were able to participate in cutter boat training.

## Day 1 • Group work

Each group created a poster with the theme of The Society and Dreams We Want to Realize by 2050.

## Day 2 • Sports competition (volleyball)

- Message game
- Outdoor cooking

## Day 3 • Cutter boat training

- Group work



Group work

Sports competition



Cutter boat training



Outdoor cooking



## Impressions of the training .....

- I'm glad I could participate in the training because it strengthened the bonds between my colleagues.
- I will try to make use of what I learned in the training in my actual work.
- The group work was thought-provoking and made me realize that as a member of society, I need to think about the future while I'm doing my job.

The posters the groups created are displayed in the Minakuru Lounge on the second floor of the Head Office & Works building. The posters are bursting with the fresh sensibility of new employees, and senior employees stopped to admire them.

Posters created



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