

# Group Vision 2030 Progress Report Meeting

December 6, 2022

**Kawasaki Heavy Industries, Ltd.**

Yasuhiko Hashimoto,  
President and Chief Executive Officer

 **Kawasaki**  
Powering your potential



As the World Faces Challenges,  
Two Years of **Corporate Transformation** to Provide Solutions to Social Issues in a Timely Manner

FY 2020

FY 2021

From FY 2022

Group Vision 2030  
established

つぎの社会へ、信頼のこたえを

Trustworthy Solutions for the Future

- Creating solutions to social issues
- Building a structure to create solutions
- Building a growth scenario

- Establishment of Kawasaki Motors Ltd

» Record profit achieved

- Establishment of Kawasaki Railcar Manufacturing Co. Ltd

» First profit in five years

- Integration of Ship & Offshore Businesses with Energy, Plant & Environmental Businesses

» Hydrogen business in full swing

- Three focus fields
  - A Safe and secure remotely-connected society
  - Near-Future Mobility
  - Energy and Environmental Solutions

» Initiatives for social implementation in full swing  
(Surgical robot system, PCR testing business, etc.)

» **Actions for sustainable growth**

- Reducing Business Risk
- Investment in growth areas

Structure to support growth

Personnel system reform, digital transformation (DX), etc.

## Our Growth Scenario

**"The scenario we set up two years ago becomes a reality"**

3

Hydrogen and other **new businesses will also become a pillar of earnings** and a stable growth path

Further increase in social needs

2

**Aerospace business** recovers and market grows steadily

Full-scale recovery of aviation demand to recover earnings

1

- Mass production businesses such as **motorcycles, precision machinery and robots** support earnings
- Early launch of PCR testing business contributes to recovery of aviation demand

Generates 80% of profits

# Social Issues are our Starting Point for Solutions

**With the world facing challenges such as carbon neutrality, economic security and logistics disruption, we are confident that the three focus fields promoted by our company will become increasingly important and accurately meet the needs of the times**



Remote society



Population, low birthrate and aging population



Pandemic disaster



Global environment



Energy

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■ Three focus fields

- A Safe and secure remotely-connected society >>> Initiatives for social implementation in full swing (Surgical robot system, PCR testing business, etc.)
- Near-Future Mobility
- Energy and Environmental Solutions

Structure to support growth

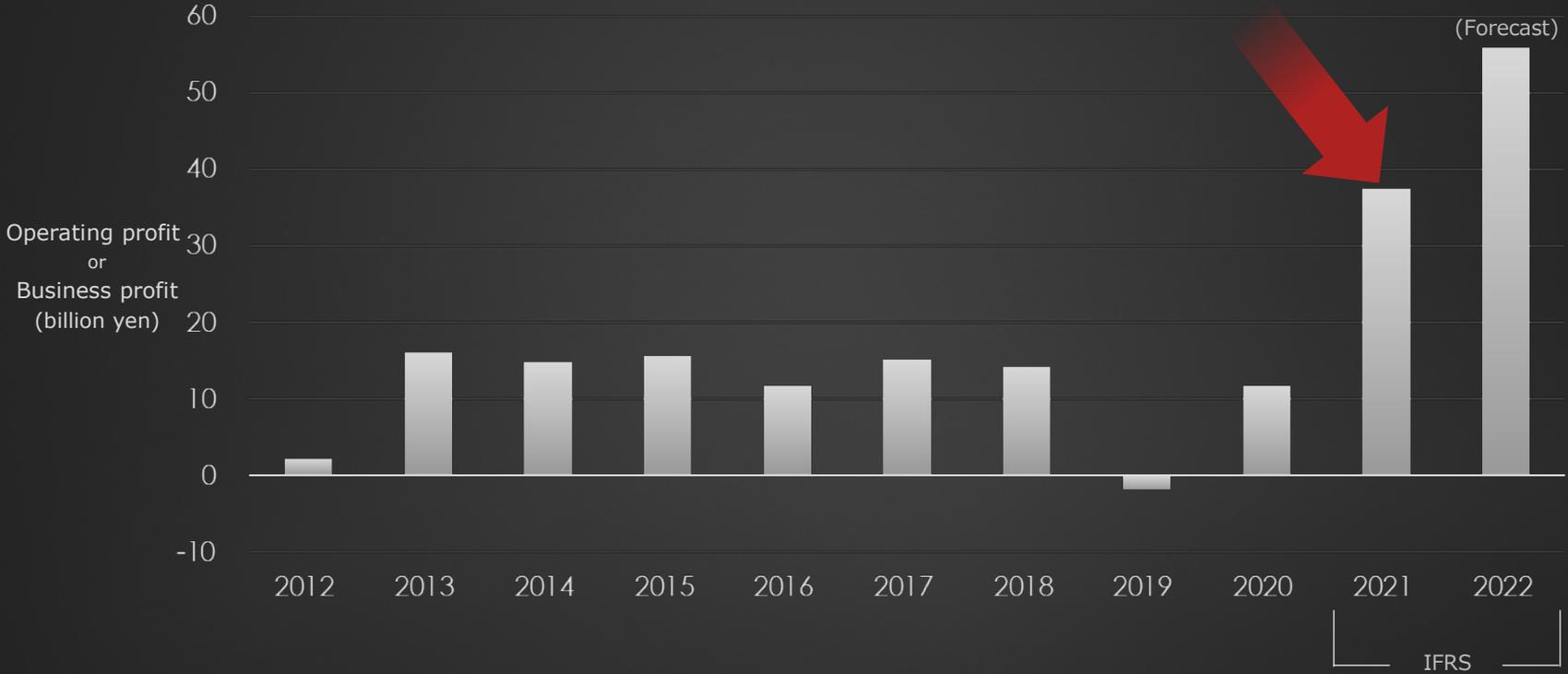
Personnel system reform, digital transformation (DX), etc.



# **Motorcycle and Engine Business**

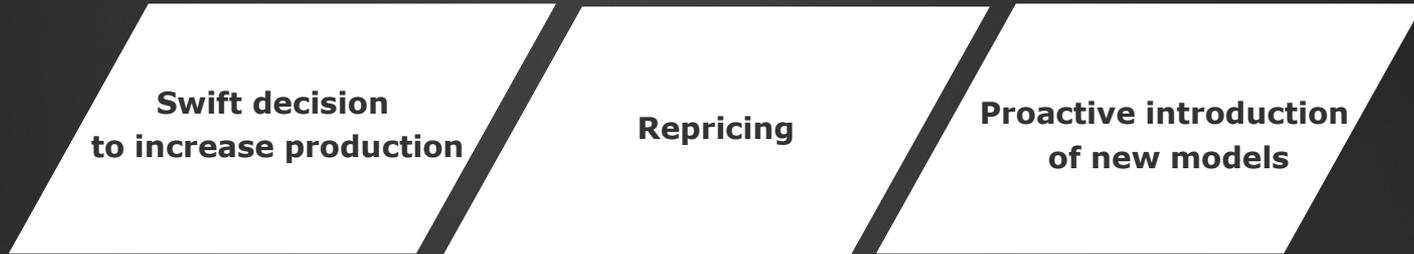
# Profit and Loss in Motorcycle & Engine Business

**In FY2021, profits skyrocketed at the same time as the spin-off**



## Factors Contributing to the Profit Growth

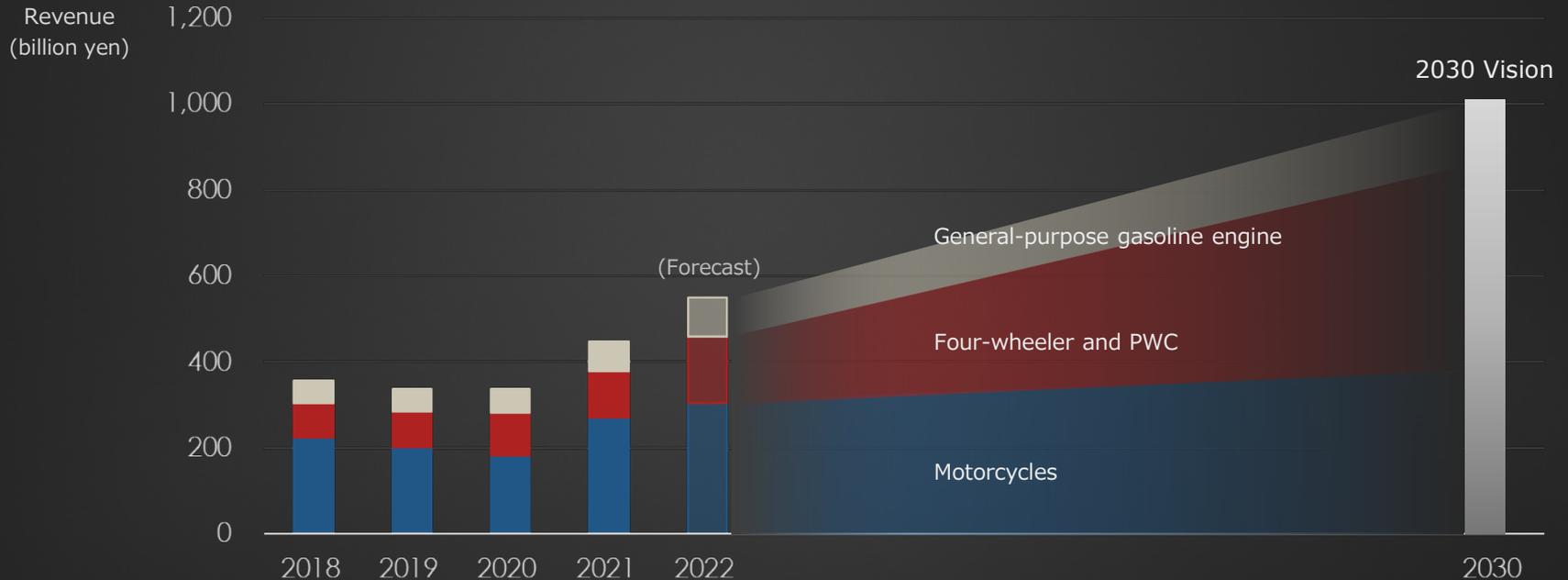
**Transforming business operations through the spin-off** in addition to the benefits from the rise in demand associated with the COVID-19 and the weak yen



Responding to changes in the environment and making **accurate and timely business decisions**  
The result is a **sophisticated financial structure**

# Motorcycle & Engine Business Outlook

- Demand for motorcycles remains strong, especially in Europe and the United States.
- **Demand for off-road four-wheelers in the North America remains strong, driving expansion of the business**



# Off-Road Four-Wheelers in the North American Market

A four-wheeler with a wide variety of use in the great outdoors across the United States



**ROV**  
**(Recreational Off-highway Vehicle)**



**ATV**  
**(All Terrain Vehicle)**

## Expanding ROV market

**ROV has become more popular** in recent years, having excellent ride quality and payload capacity, and their convenient use for leisure and work.



Recreational vehicles with an emphasis on driving performance for sports and leisure purposes and high rough road mobility

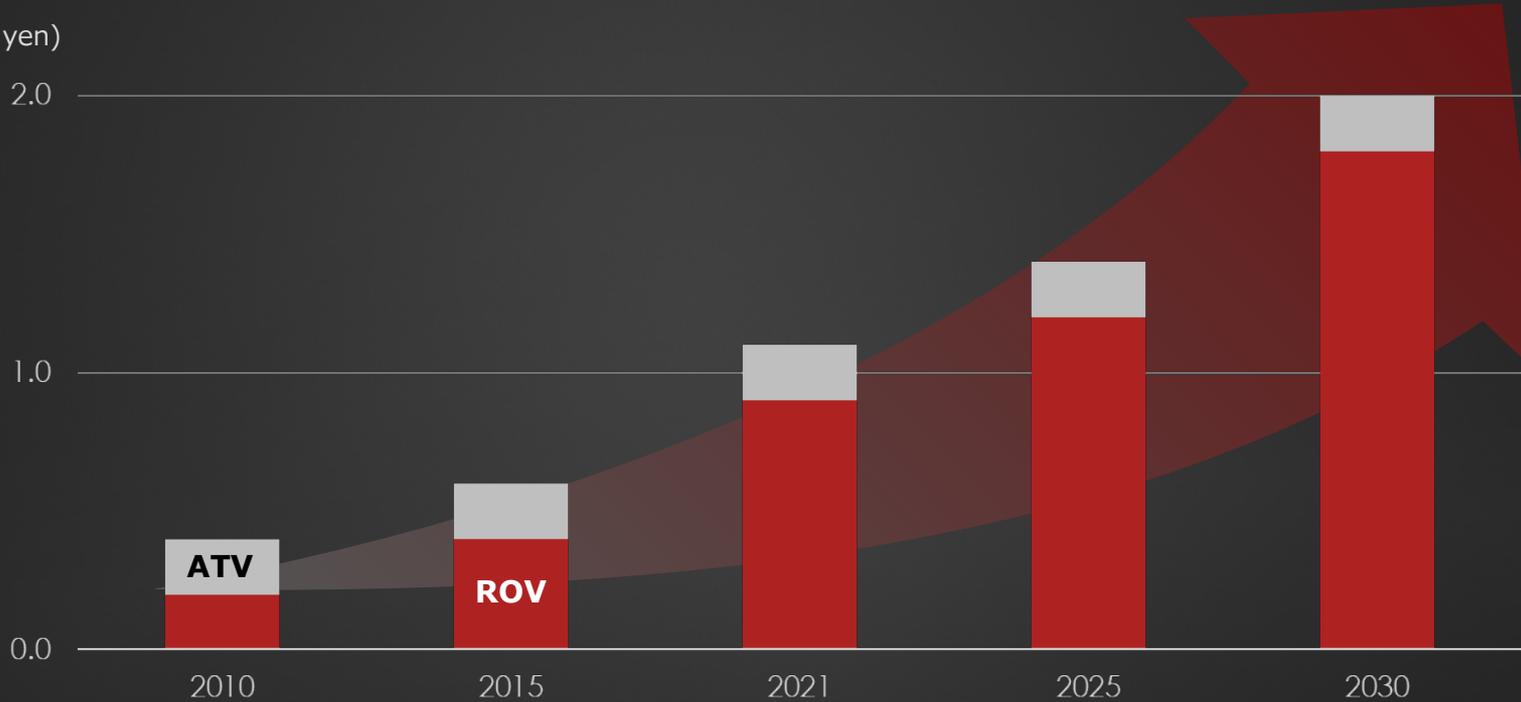


Utility vehicles with emphasis on convenience and loading performance for work applications

# Off-Road Four-Wheelers in the North American Market (estimate by Kawasaki)

Market continues to grow as ATVs shift to more expensive ROVs

(trillions of yen)

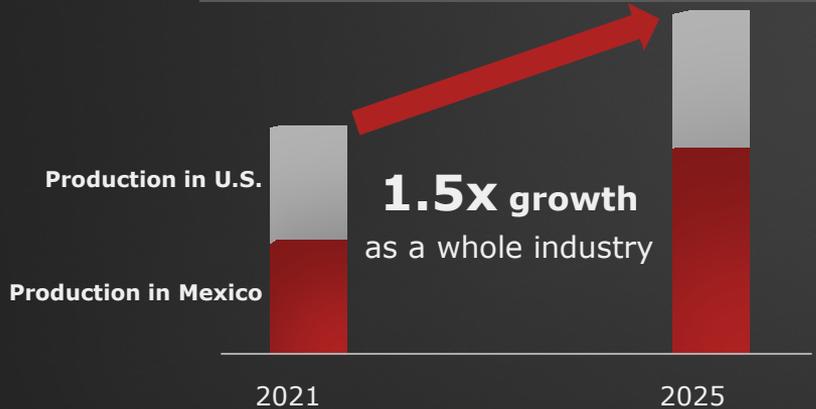


# Industry Trends

Each company expects demand in the four-wheelers market to remain strong and plans;

- **to invest in increased production in Mexico**, where it is easier to retain employees and more cost-effective
- Continuous **introduction of new models**

## Industry-wide production capacity for four-wheelers



Case of Company A:

- **Four-wheeler plant in Mexico to open** in fall 2021
- 1.5 times increase in production capacity
- plans to double by the end of 2023

Case of Company B:

- **Expansion of four-wheeler plant in Mexico** in 2022 (Over \$100 Mil.)
- 1.35 times capacity by the end of 2022

\*Industry-wide capacity is estimated by our company

## Our strategy

### Strengthening production capacity

Invest more than 30 billion yen in total by 2025 to double production capacity from **50,000 units to 100,000 units**

### Introduction of competitive new models

After 2023, focusing on non-entry categories,  
**continue to introduce new models every year**

# Progress in Investment to Increase Production of Four-Wheelers



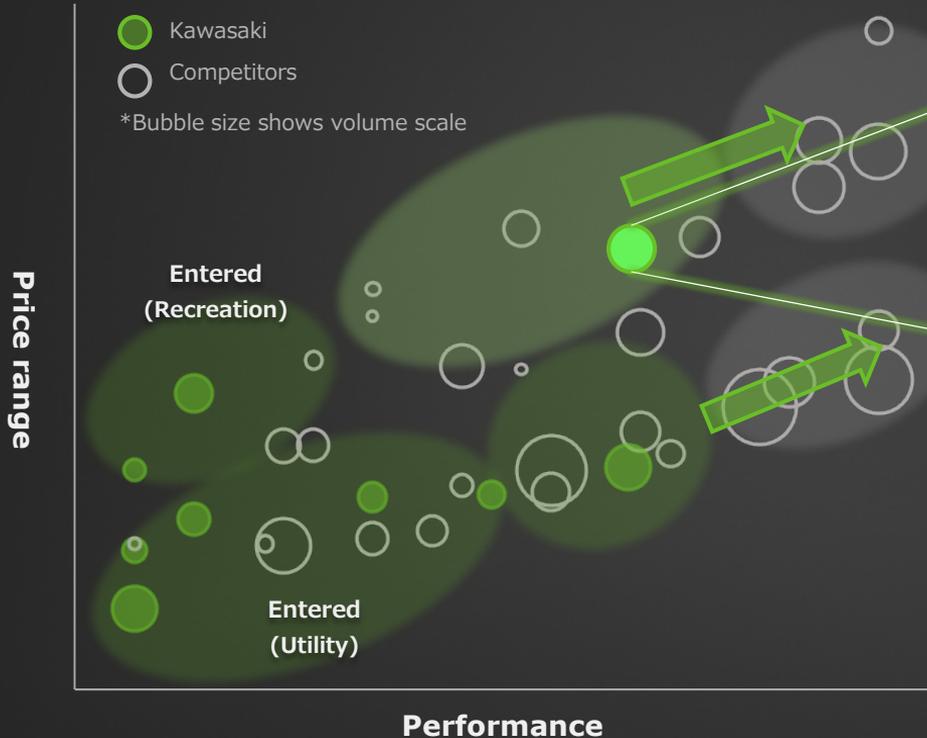
Lincoln plant to increase production capacity by March 2023  
(Production scale: 70,000 units / year)



New plant in Mexico: Starts operation in December 2023  
(Production scale: 30,000 units / year)

# Introducing Competitive New Models

The main market is shifting towards faster and larger models



TERYX Series (Recreation)

Introductory models in new segments are highly valued by the market

In the future, we will introduce new models in new segments that take advantage of Kawasaki's unique technologies

# Effect of Introducing Models into New Segments

Introductory models have surely penetrated the market and increased the presence of **Kawasaki** and in new segments

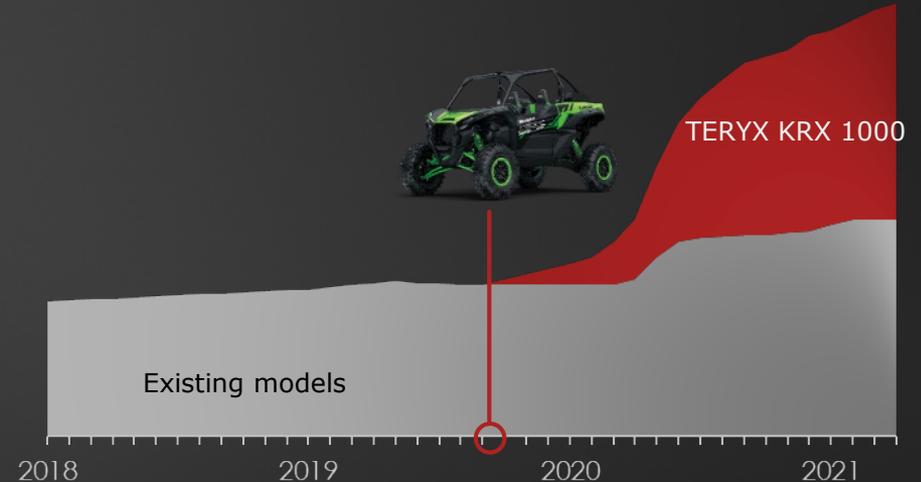


## TERYX KRX 1000 (2020 model)

Offering an exciting sporting experience that combines high mobility with excellent ride quality. "Honored by the magazine for the recognition we were aiming for"

- ATV. COM / SPORT UTV OF THE YEAR (2020)
- UTV DRIVER / EDITOR'S CHOICE (2021)
- UTV DRIVER / BEST SPORT SIDE-BY-SIDE (2022)

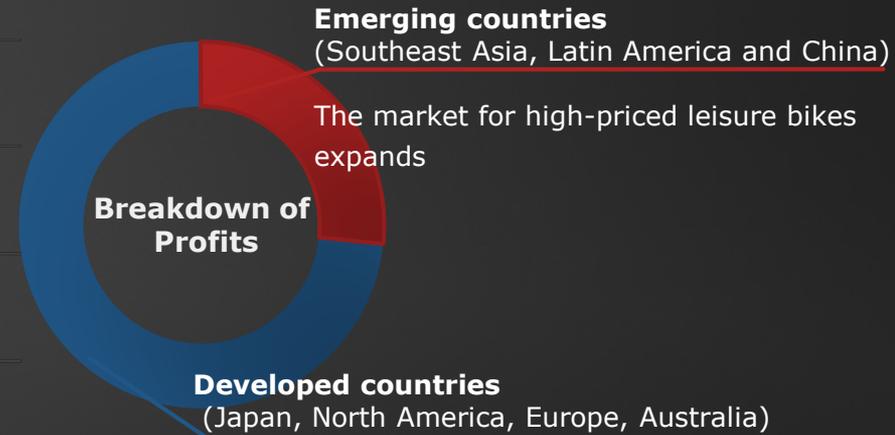
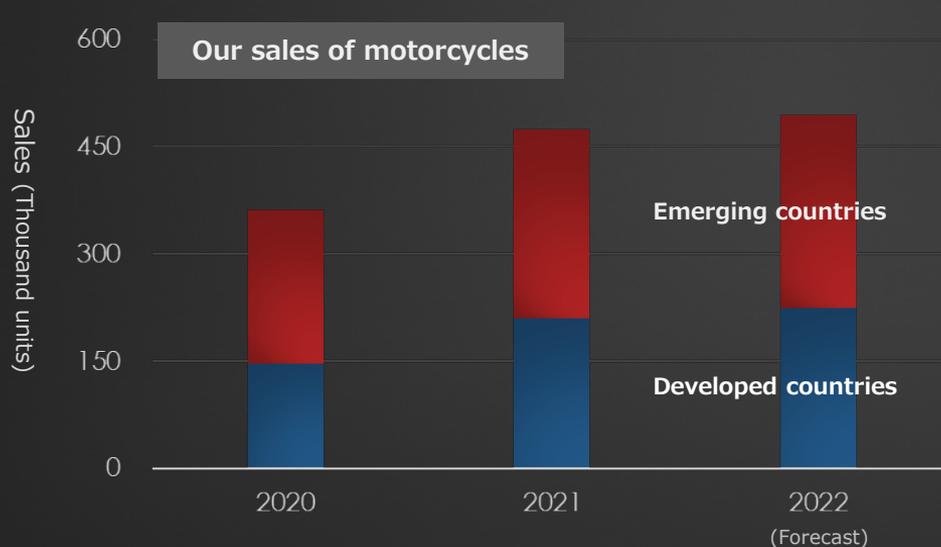
## Sales Trends in Kawasaki's recreation category



# Strategy for Motorcycles Business



- The market is expected to remain strong especially in emerging countries, and Kawasaki will maintain its presence in developed countries, while focusing on high-value-added areas in emerging markets with growth potential and enhance our brand strength.
- Accelerating development of electrified/hydrogen-fueled engines in response to the trend toward decarbonization



Focus on high-value-added areas that are expected to continue to grow, to achieve sustainable growth

# Establish Kawasaki Brand through the Dealer Policy

Kawasaki Plaza, 86 stores nationwide since 2017 (as of October 2022)



Our domestic motorcycles sales **2.7 times** (compared to 2016)  
**No. 1 market share for 5 consecutive years** since 2017,  
in large-sized motorcycles\*

\*Domestic market: 401 cc or more

# Brand Power Rooted in Customer Value: Tradition and Innovation

Introducing a "Retro sports" model that retains the DNA of the classic motorcycle but incorporates the latest technology



**Z900RS**



**Z650RS**



The Z900RS has been the top-selling large-sized motorcycle in Japan for 4 consecutive years since 2018.

Currently No. 1 in cumulative total for 2022.

**EICMA** (10-13 NOVEMBRE 2022. MILANO)

# PREPARE FOR TAKE-OFF

AS SEEN IN THIS SUMMER'S HIT FILM



# The Challenge to Become Carbon Neutral: Leading the Motorcycle Industry in Electrification

Achieve carbon neutrality through all options



**The first motorcycle-style  
battery Electric Vehicles  
by a Japanese manufacturer  
Release 2 models in 2023**

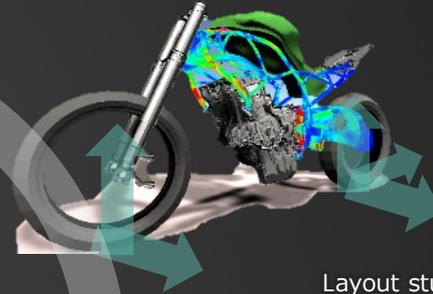
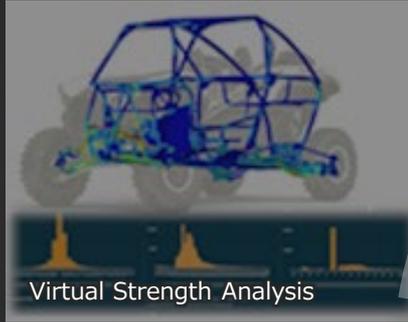
**First strong hybrid  
motorcycle\* in the  
Industry  
Release in 2024**

**Hydrogen two-wheelers  
Planned to be released  
in the Early 2030s**

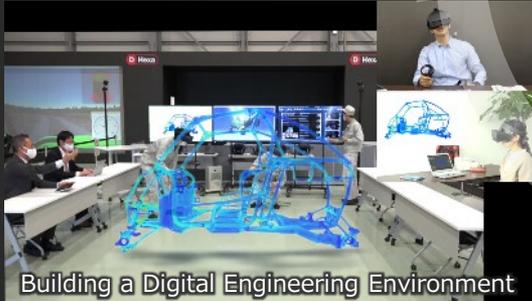
\*Can run on either engine or motor

# Continuously Create New Products Rooted in Customer Value

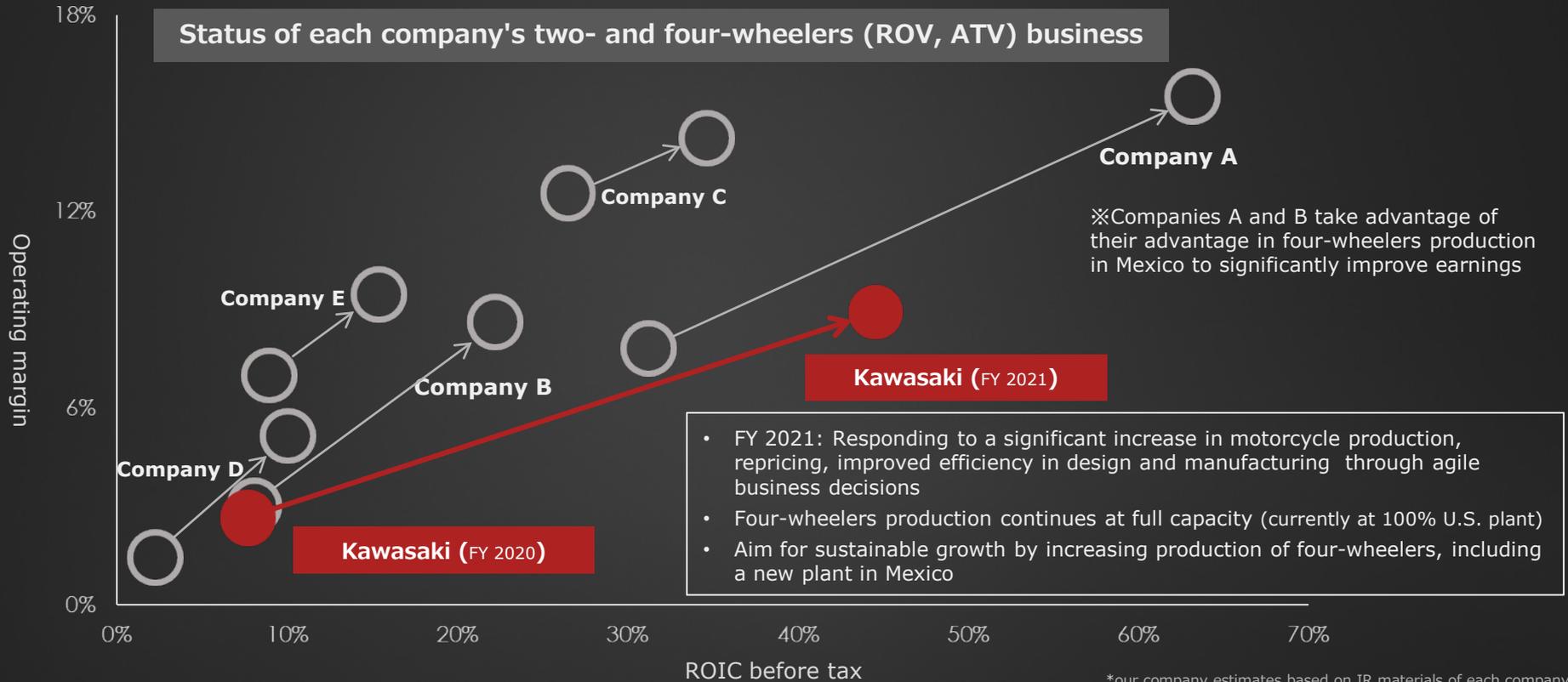
**Significantly shortened development time and reduced development costs**  
through the use of digital technology



**Efforts to reduce  
prototyping through  
digital design**



# Our Company in the Industry (FY 2020 → FY 2021)



\*our company estimates based on IR materials of each company

## Change in Reportable Segment Name

With further expansion of the four-wheelers business in the future, the name of the reportable segment will be changed for the purpose of consistency with the business strategy of Kawasaki Motors, Ltd.

Before: Motorcycle & Engine



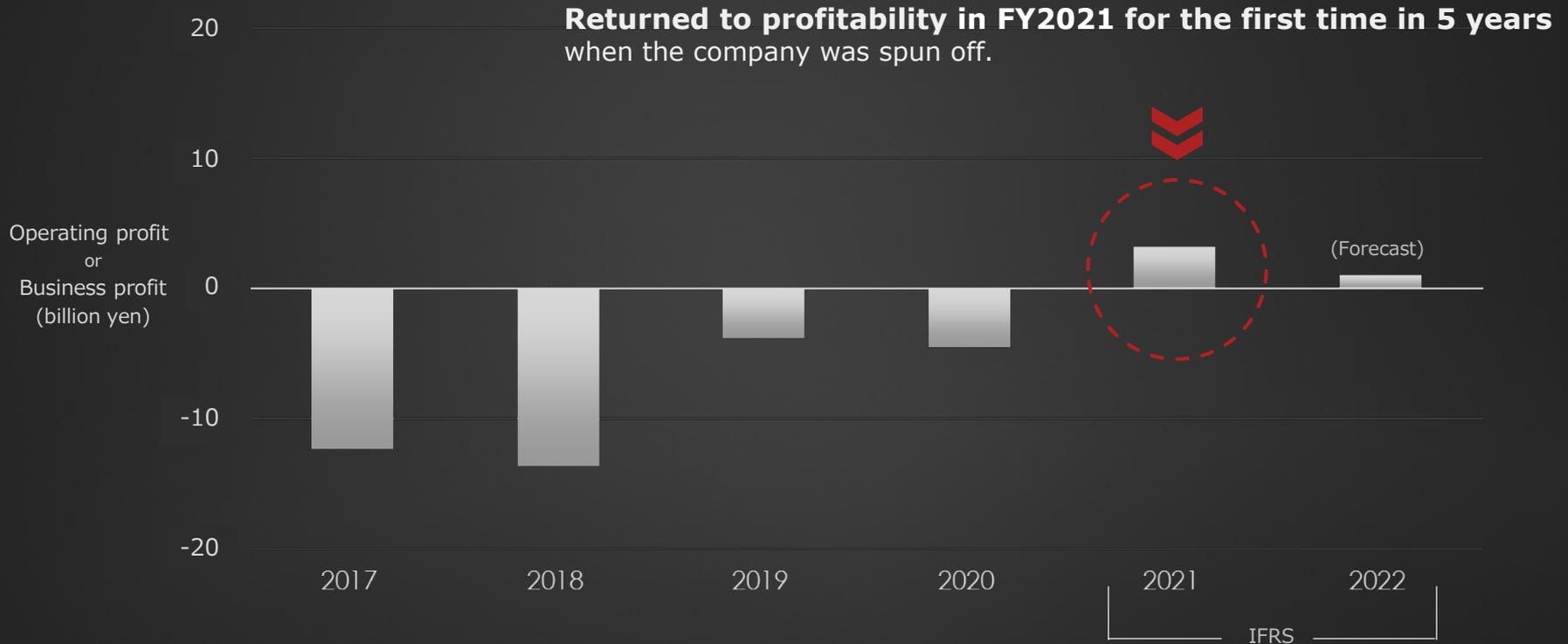
After: **Power Sports & Engine**

\*Power sports: motorcycles, off-road four-wheelers, PWC (Personal Water Craft)



# Rolling Stock Business

# Profit and Loss in Rolling Stock Business



## Transformation of business operations through the spin-off



**Pursue contracts  
at fair prices**

**Focus on  
specific markets**

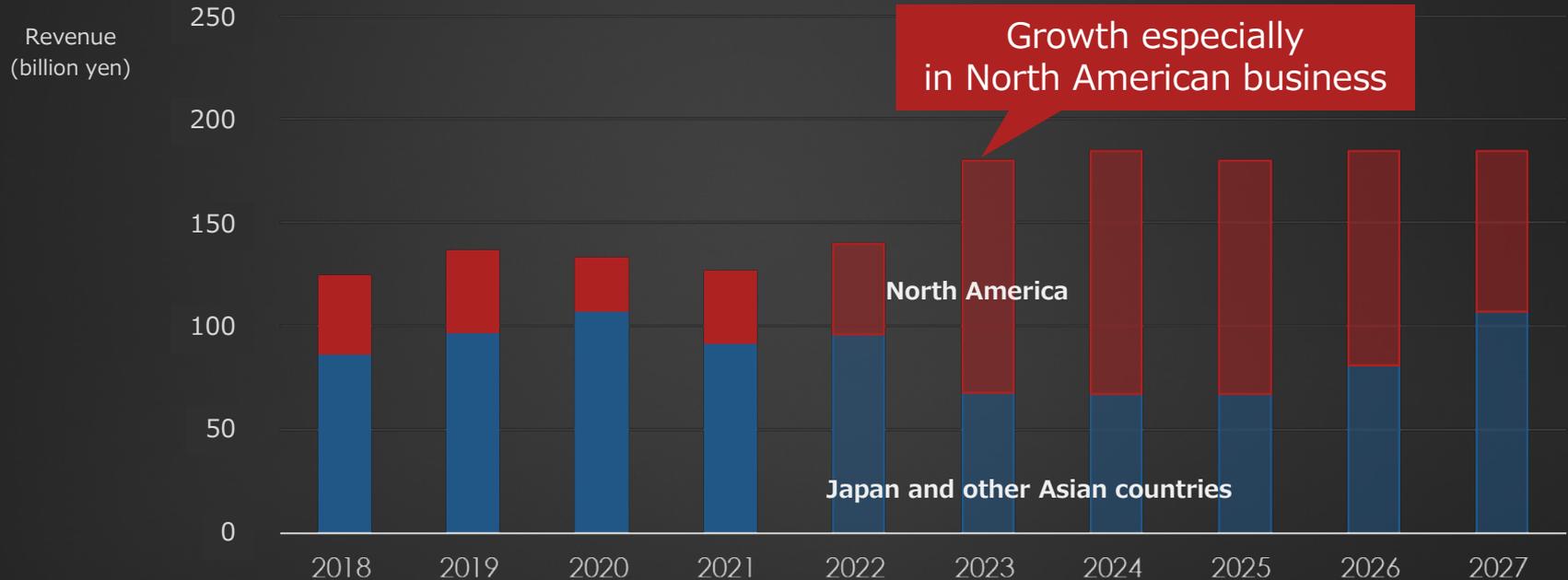


**Expertise in production  
of Kawasaki Group**

**Improvement  
in profitability**

## Future Plan in Rolling Stock Business

Relatively stable global demand is expected for the Rolling Stock Business in the future due to the demand for capacity increase of public transport in city area and relief of environmental burdens.



## North American Market

Focus on the projects for railway operators in the NY area, where many railcars are in service and Kawasaki can perform the projects through its technical capabilities

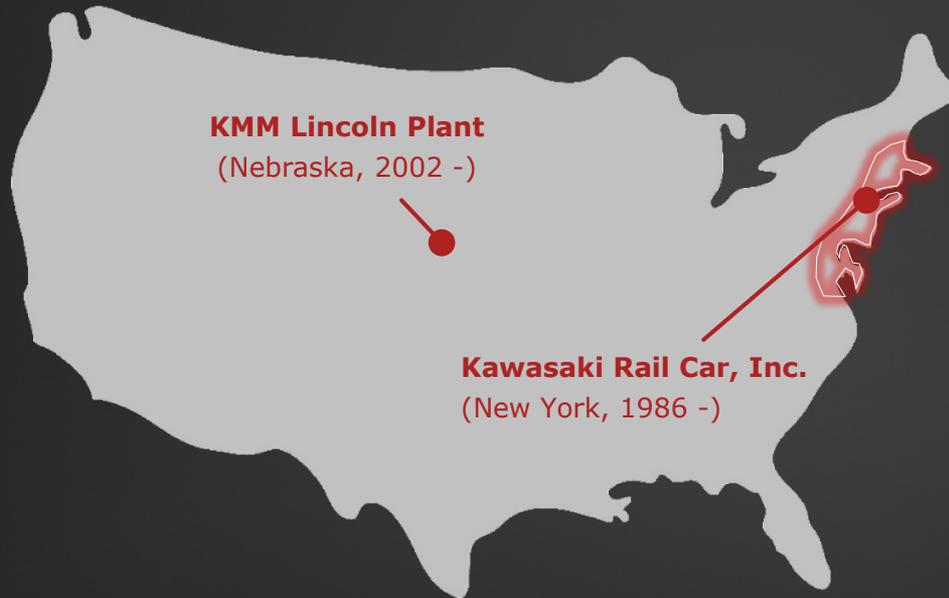


Of the **23,000 railcars** operating in the US,  
Northeast Corridor accounts for about 66%

In particular, about **46%** in the NY area

## Over 40 years of experience in North America

With marketing and production bases located in the U.S., our customer-oriented approach has been highly appreciated, establishing the **Kawasaki** brand.



Delivered the R62  
New York City subway  
Cars in 1983



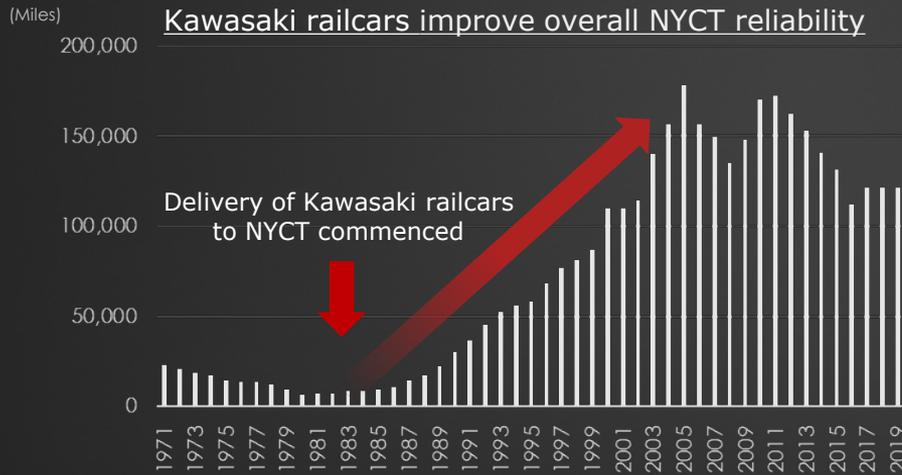
Commenced delivery of  
R211 Subway Cars to MTA  
New York City Transit in  
2021

# Major customers in the NY area

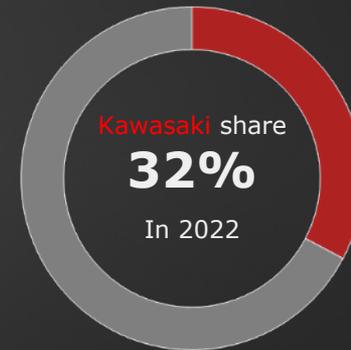
## New York City Transit Authority (NYCT)

One of the largest transit operators in the world in terms of route length, rider ship and fleet size (approximately 6,500 railcars in operation)

### Mean distance between failures (MDBF)

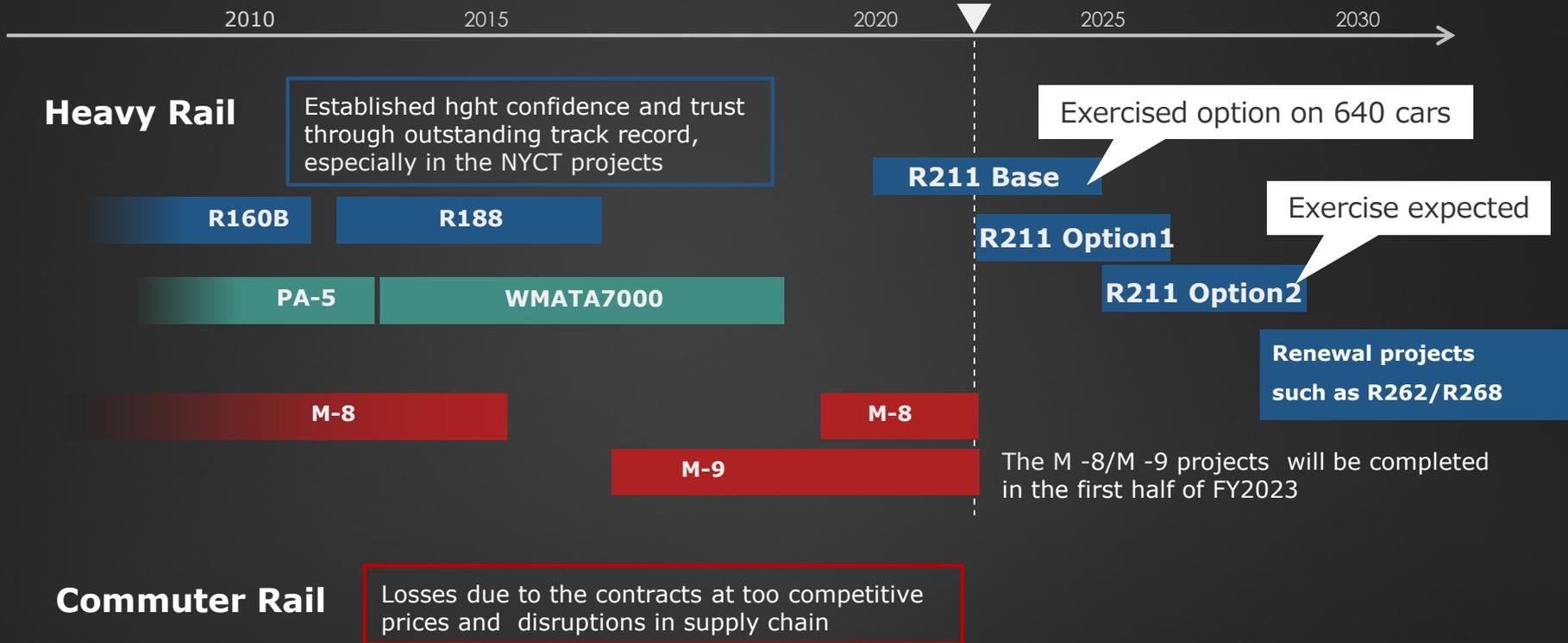


**Valued as a long-term partner with outstanding reliability**



※New York City Transit Car-Borne Maintenance: Present & Future

# Project Status in North America Market



## Major North American Projects: Status of R211

Production of the R211 project will continue until Fiscal Year 2026.



Manufactured at full capacity at KMM Lincoln Plant

- Approval to Exercise Option 1 (640 Additional Cars)  
(October 26, 2022)
- Option 1 Price approx. \$1.7 billion (¥258 billion)

If Option 2 is exercised, the total number of cars under this contract will be increased up to 1,612, with a total contract value of approximately \$4.1 billion (¥597 billion), making R211 the largest rail car deal in our history.

If Option 2 is completed, **Approximately 50%** of NYCT's cars will have been manufactured by Kawasaki.

# Status of Washington Metro 7000-Series

Announced by WMSC (Washington Safety Commission) on September 20, 2022

- In 2014, incidents of expansion of wheel distance **occurred on railcars manufactured by other companies.**
- A study by a consultant hired by WMSC found that, depending on **the alignment of the derailment guards installed** turnout, outward forces are applied to wheels and wheels move outward. This condition propagates a risk of derailment.

Announced by WMATA on October 25, 2022

- Obtained safety certification for the Silver Line Extension section and approval of the plan to resume the 7000 Series to service from WMSC. **All 748 cars of 7000 Series will return to service** to begin operations on all routes.

# Status of Japanese domestic and Asian markets

Order Backlog of domestic and Asian project is about 150 billion yen

(At of 9/E 2022, Japan: 136.2 billion yen, Asia: 18.7 billion yen)

## Topics (Japan)

- Riderships of rail transports are in recovery by reviving foreign visitors through ease of border restrictions for COVID-19 and depreciation of Japanese Yen.
- Proposed new generation railcars including hydrogen fuel cell car, for contribution to carbon neutral of railway operators
- Proposed car condition monitoring, fully-automated operation and maintenance facility utilizing robotics technology, for ease of work load of railway operators

## Topics (Asia)

- In manufacture and delivery of railcars for Dhaka Line 6, the first mass rapid transit system in Bangladesh where development of large mass rapid transit network is currently planned. Kawasaki considers Bangladesh as the most focused market.
- Preliminary design review of India high-speed rail rolling stock commenced
- Participating in tender for Singapore Cross Island Line and others

# Business Strategy for Domestic and Asian

- Leveraging outstanding technical and manufacturing capabilities and track record in a wide range of rolling stock, including Shinkansen bullet trains, conventional trains and locomotives, Kawasaki will continue to provide railcars that meet market needs and establish mutually beneficial relationships with customers.
- Ensuring appropriate profits through contracts taking considerations into competitive advantage, profitability, risk and contribution to the business value

JR East E7 Series/JR West W7 Series



JR Kyushu YC1



JR Freight EF 510 -300 subclass



Dhaka MRT Line 6



# Towards further growth

Outstanding supply reference of rolling stock at respective markets is valuable business assets of Kawasaki. Kawasaki will take business opportunities in life cycles of rolling stock and pursue a position of long-term business partner of railway operators.

## Japan Market

## Technical Development

Automation and ease of human load is expected through cutting-edge technologies.



PA-5 overhaul



Remote Track Monitoring System

## Asian Market

## Maintenance Practice

Maintenance support is expected to rolling stock suppliers as one stop-service in developing countries

## US Market

## Expansion

Long-term stable supply of maintenance parts and heavy maintenance service is expected.

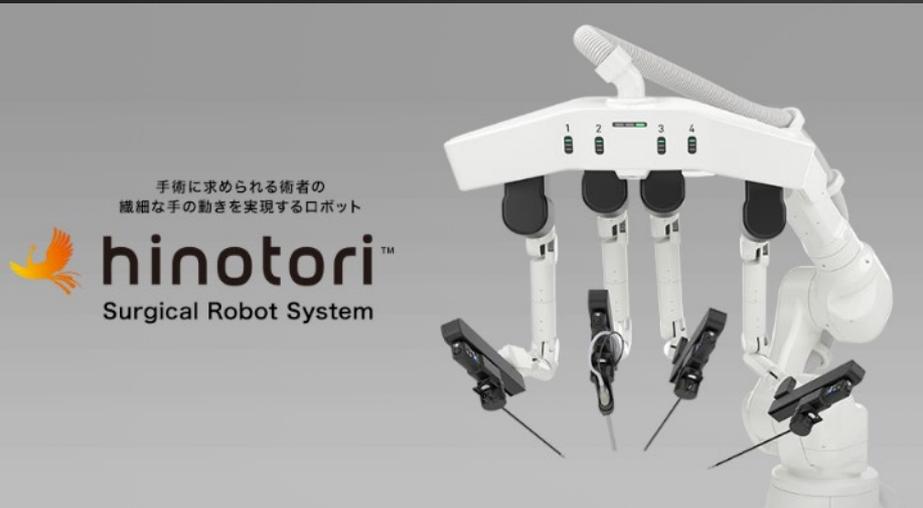
**Establish and expand "market-in" service business through development, practice and expansion cycle.**



**Progress in “A Safe and Secure Remotely-Connected Society”, and “Near-Future Mobility”**

## For Health Care Workers Facing Lives

In addition to the steady growth in the number of cases using hinotori™ surgical robot system, Medicaroid has started a demonstration experiment with an eye on the future of telemedicine.



### August 2020

As Japan's first robotic system to assist surgery, received manufacturing and marketing approval for use in the field of urology

### October, 2022

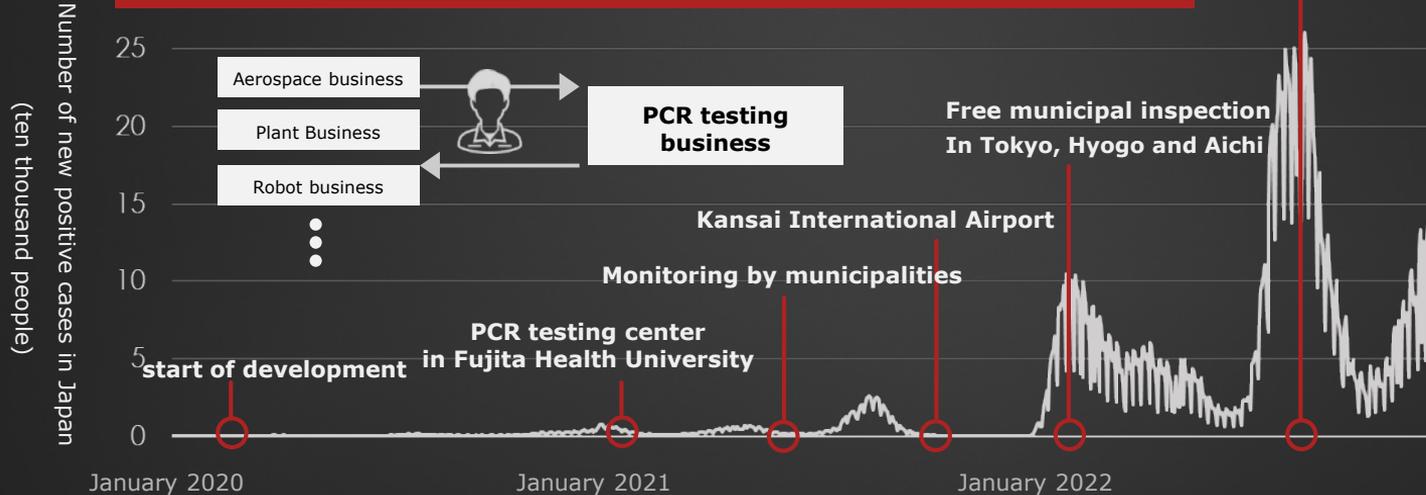
Approved for gastrointestinal surgery and gynecology

This approval will cover approx. 90% of robotic surgeries performed in Japan.

# Contribution to the Restoration of Social Mobility

In just one year, the company launched a PCR testing business that uses robots to "realize mass and high-precision testing in a short time and continuously," contributing to hospital inspections, inspections for local governments, airport departure inspections and other projects.

- **Automated inspection by robots**
  - **Flexible resource allocation** across the group
- >> Respond to a major wave of demand fluctuations and **continues to operate**



PCR test results

Cumulative total:

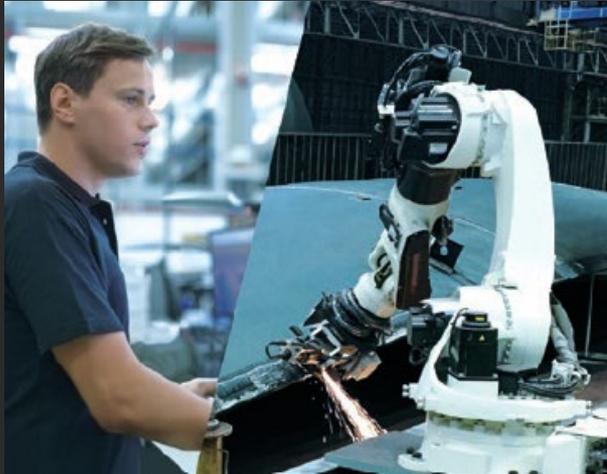
Approx. **700,000** people



\*Adapted from "Trends in the number of new positive cases by day" (the Ministry of Health, Labour and Welfare)

# New Business Moves with Major Companies Based on Robots

Collaborate beyond traditional business areas to create new solutions to current and future challenges



In December 2021, KHI established Remote Robotics, Inc. as a joint venture with Sony Group, Inc., aiming to create a remote society where all people can participate in society



Collaborating with Microsoft on industrial metaverse initiatives, aiming to enable collaboration on the metaverse and remote robot operation with digital twins.

# Autonomous and Remoteness of Air Mobility (Unmanned VTOL)

Offering solutions as a top domestic manufacturer with a rich track record of helicopter manufacturing for defense and civilian sectors combined with knowledge of aviation safety

- Participated in projects in Central and South Alps (2021)
- **Aiming to solve logistics problems in urban areas** by starting with mountain cargo transportation to demonstrate the system.



Payload capacity: 200 kg

Dual Use



Utilized in unmanned and remote **defense, disaster prevention and mitigation**

# Solution of Indoor Positioning System "iPNT-K"

**Positioning people and things indoors** without GPS signals using Wi-Fi signals

Providing new ways of working and living by linking with various services



# Solution of Indoor Positioning System "iPNT-K"

The market for indoor positioning services expected to grow up to **1.17 trillion yen in 2035** due to rising demand year by year\*

## Information on facilities



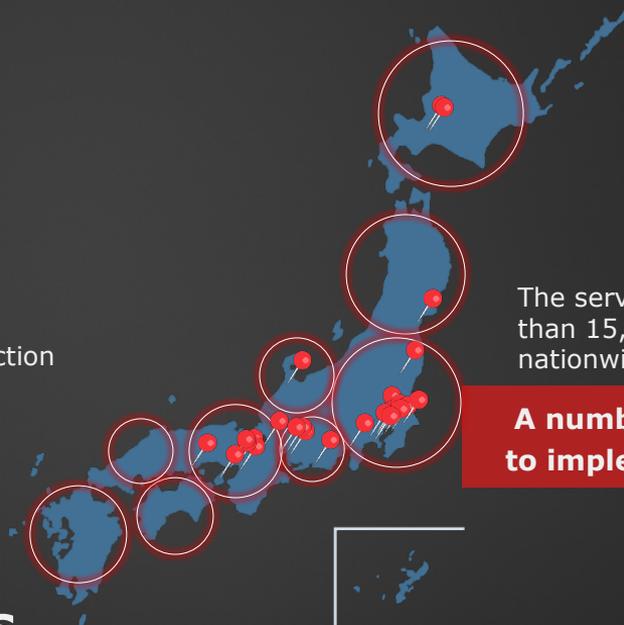
- Public facilities
- commercial facilities
- Airport and rail facilities
- Smart Buildings

## Management of people and properties



- Hospitals
- factories and construction
- Logistics
- Accommodation

Since its release in July 2021,  
Has received more than **600 inquiries**



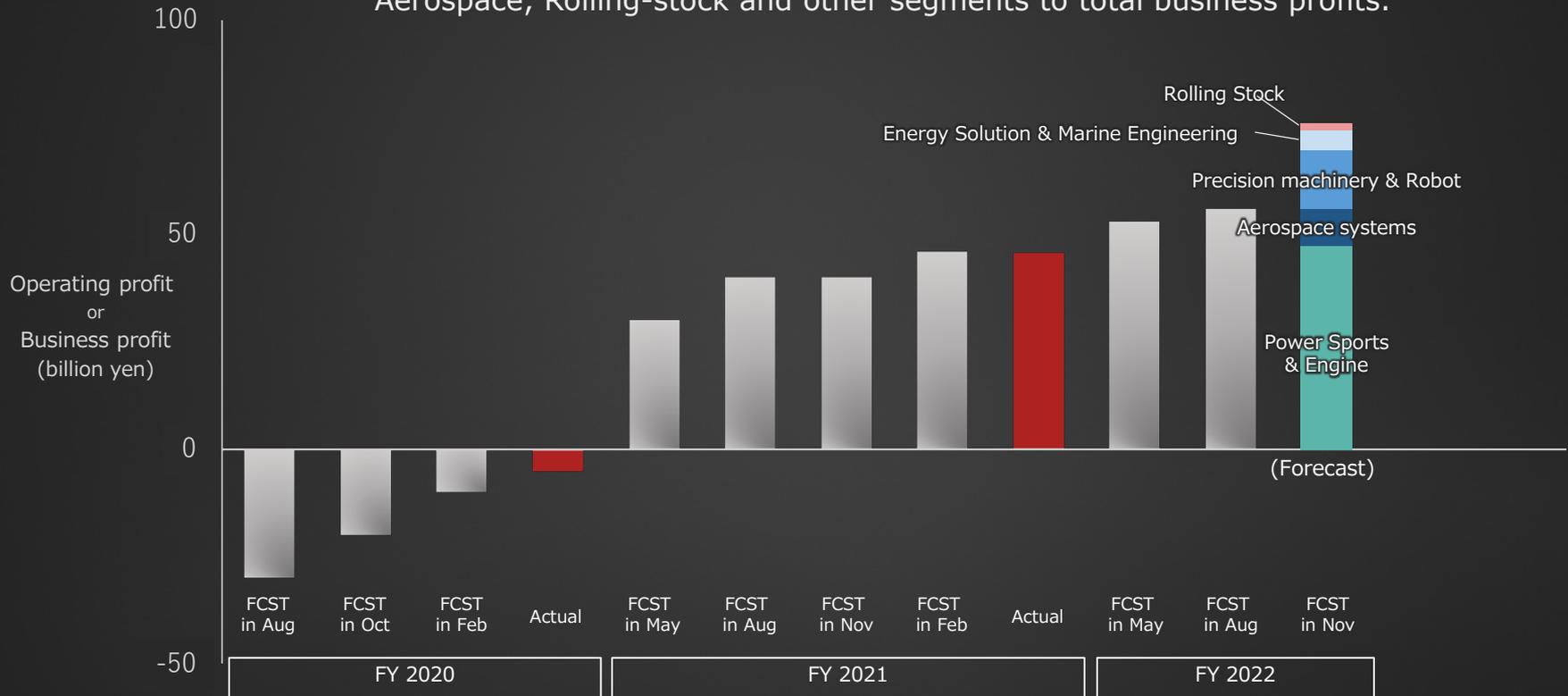
The service area already covers more than 15,000 floors in 1,300 facilities nationwide.

**A number of projects are underway to implement our company solutions**

\*Seed Planning "indoor positioning Services Market Trends and Future Prospects 2020"

# Future Business Outlook

In FY2023, revenue and profits are expected to increase due to an increase in the ratio of Aerospace, Rolling-stock and other segments to total business profits.





New Values

A Safe and Secure  
Remotely-Connected  
Society



Cross Over

つぎの社会へ、  
信頼のこたえを

Trustworthy Solutions  
for the Future



© HySTRA

Energy and Environmental  
Solutions



Near-Future Mobility

Frontier



© HySTRA

# Energy and Environmental Solutions

Looking ahead to the future of KHI group, we are fostering **the hydrogen business** as the core of our Energy and Environmental Solutions business as a major pillar.



**Presenter**

**Eiichi Harada**

Managing Executive Officer

**General Manager, Hydrogen Strategy Division**

- 2009 Proposed hydrogen supply chain plan and began development
- 2015 Established a professional organization for hydrogen business and promoted business development as a leader
- Chief Director of CO<sub>2</sub>-free Hydrogen Energy Supply-chain Technology Research Association / CEO of Japan Suiso Energy, Ltd.

# Group Vision 2030 Progress Report Meeting

- Challenge to Carbon Neutrality -

December 6, 2022

**Kawasaki Heavy Industries, Ltd.**

Kawasaki Heavy Industries, Ltd.

Managing Executive Officer, General Manager of Hydrogen Strategy Division

Eiichi Harada

 **Kawasaki**  
Powering your potential





# Progress of hydrogen business

# International hydrogen supply chain: completed pilot demonstration

February 2022

**World's First International Liquefied Hydrogen Transportation**  
Liquefied hydrogen carrier 'SUIISO FRONTIER' attracts high level of interest from both home and abroad



# Three steps and progress toward realizing a liquefied hydrogen supply chain

2015

2020

2025

2030

2040~

## Pilot Demonstration

- Completed demonstration

## Demonstration towards Commercialization

- Building a business scheme
- Development of commercial scale equipment

## Commercial Chain Operation

## To establish commercial supply chain business schemes

Establish a company responsible for the stable and massive supply of hydrogen



### Japan Suiso Energy, Ltd.

Founded in June 2021, CEO Eiichi Harada

#### Aim of the establishment

- Formed by various companies with technology and knowledge related to hydrogen and energy
- Consolidates operations and business know-how related to hydrogen production and transportation
- Conduct commercial demonstrations and contribute to the quick establishment of commercial chains efficiently by consolidating business know-how

# The business scheme of hydrogen supply chain



Various companies with technology and knowledge related to hydrogen and energy are under consideration for participation  
(Expected to become an equity method affiliate of our company in fiscal 2024)

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# Progress of commercial scale equipment development on demonstration

Pilot Demonstration



HySTRA

1,250m<sup>3</sup>



Proven for 40 years



Electricity consumption in general households

\* equivalent to about 5,000 households

Spherical tank: 2,500 m<sup>3</sup>

Demonstration towards Commercialization



160,000 m<sup>3</sup>



advantageous to large scale

Cylindrical tank: 50,000 m<sup>3</sup>

Development of commercial-scale equipment is steadily underway at Kawasaki Heavy Industries

Commercial Chain



160,000 m<sup>3</sup> x 2 Carriers Cylindrical Tank: 50,000 m<sup>3</sup> x 4 (plan)



Household electricity consumption \*

Equivalent to about

**400,000 houses**

\*Estimation condition: 50% generation efficiency, use up all tanks in one month

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## Commercial Chain Operation

- Start of specific discussions on government assistance
- First mover\* arrives

\*First mover: Business operator planning to start hydrogen supply by around 2030

# Accelerated government move for social implementation of hydrogen

## Japanese government

2021: Green Innovation Fund of 2 trillion yen established to support research and development toward decarbonization

2022: New GX transition bonds (tentative) of 20 trillion yen to facilitate business conversion and stimulate private investment



With the growing importance of economic security,

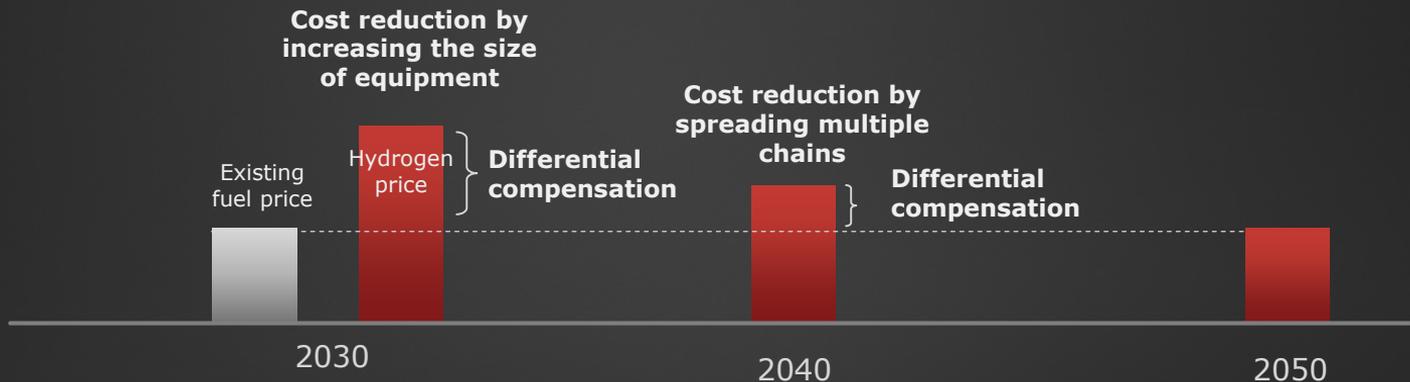
## Discussions on government support for the social implementation of new energy

are accelerating and taking shape in Japan and other developed countries such as the UK and Germany.

# “Support for First Movers” to promote the early introduction of hydrogen energy

## System under consideration by Japanese government

- First mover: start commercial operations around 2030.
- Systems under consideration: CAPEX support, differential compensation, etc.



### Differential compensation

The **Japanese government** will make up for the difference in the value of LNG and other existing fuels during the introduction period, accelerating the introduction of hydrogen.

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\*First mover: Business operator planning to start hydrogen supply by around 2030

## Collaboration with first-mover operators

### The Kansai Electric Power Co., Inc.

Announced the establishment of a liquefied hydrogen supply chain from the overseas to Himeji  
(August 26, 2022: Fourth meeting of Joint Conference on Hydrogen and Ammonia, Agency for Natural Resources and Energy)

On the construction of this supply chain:

### Signed MOU to collaborate with Kawasaki Heavy Industries

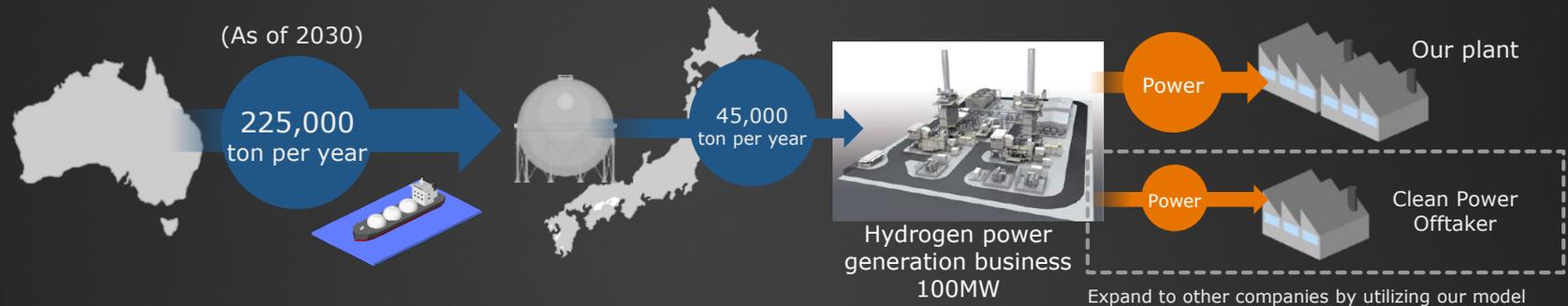
(December 2, 2022)



Kawasaki will meet the expectations for the social implementation of hydrogen such as hydrogen power generation in 2030 through the supply of commercial-scale equipment, for instance, liquefied hydrogen shipping and receiving stations and large liquefied hydrogen carriers.

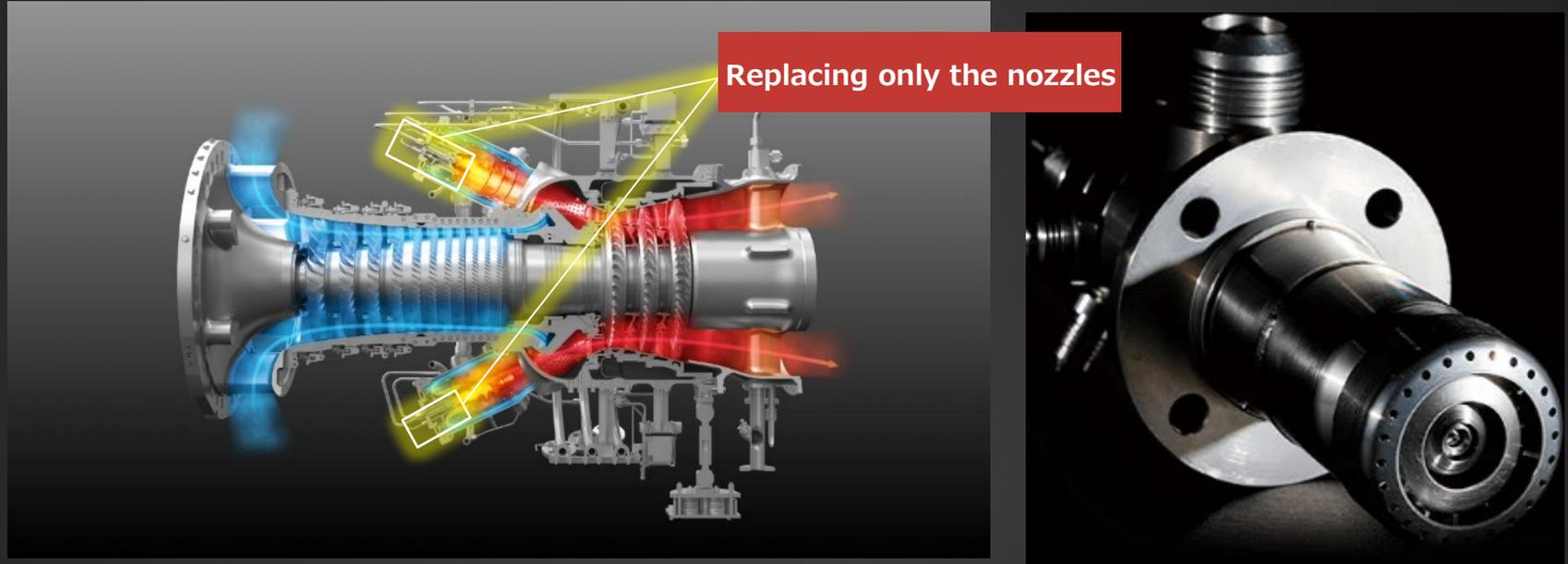
# Becoming a pioneer through decarbonization management by using hydrogen

Kawasaki Heavy Industries is leading the world in achieving a zero-emission plant by partially utilizing imported hydrogen in-house.



- Began specific study of the locations of hydrogen power plants, clean power suppliers, and business operations
- Aim to start operations in 2030 (Judgment of starting construction based on feasibility and environmental assessment by 2027)
- Plans to invest about 50 billion yen (assuming funding through internal carbon pricing)

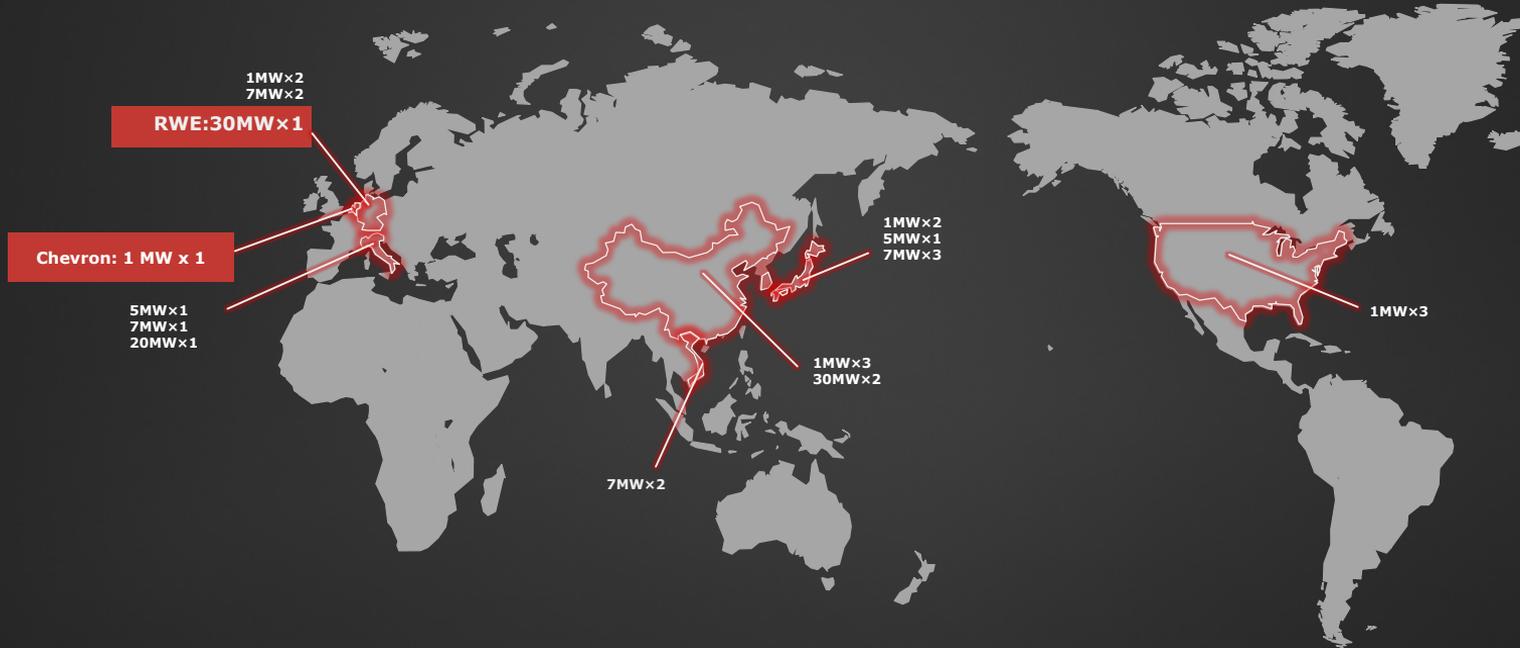
# Smooth decarbonization solution for existing gas turbines customers



- Kawasaki has a lineup of hydrogen-compatible gas turbines that range from mixed-firing to single-firing (0 ~ 100%).
- Kawasaki's gas turbines are also hydrogen compatible only with the nozzle replacement.

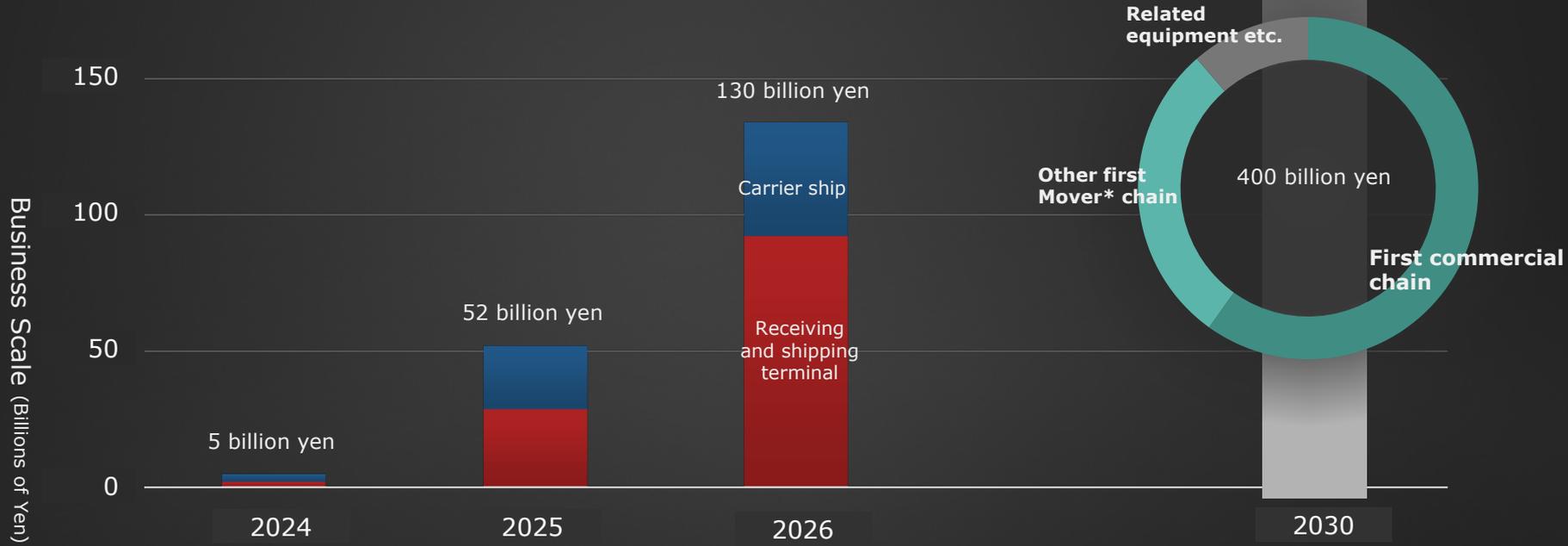
## Much attention from foreign countries on hydrogen gas turbines

- Demonstration of hydrogen co-fired and single-fired power generation is scheduled to begin in 2025 with RWE, a major German power company
- Received an order from Chevron (Belgium) to remodel an existing natural gas turbine for hydrogen co-firing.
- Dozens of hydrogen power inquiries coming and being handled in our company from around the world



# Prospects for hydrogen business

- Demonstration towards commercialization has been progressing steadily, and will become the first commercial chain in fiscal 2030.
- In parallel, other first-mover\* chains have been in progress.



\*First mover: Operators planning to start supplying hydrogen by around 2030

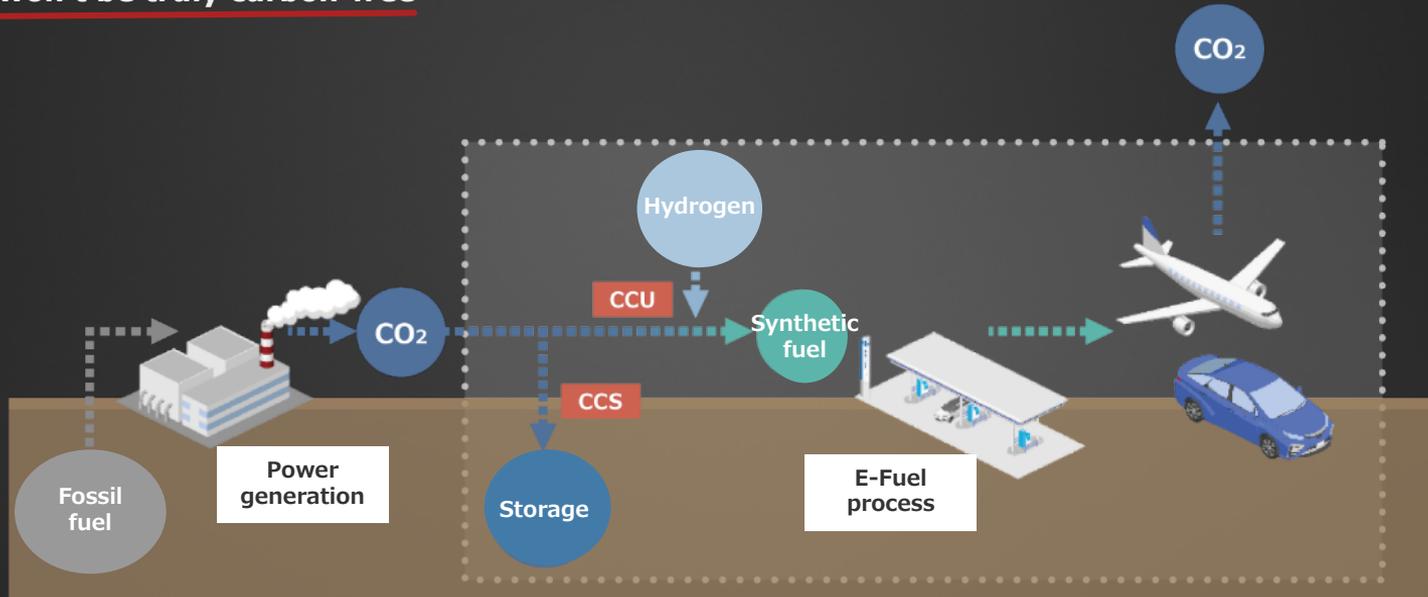


# Initiatives to separate and capture CO<sub>2</sub> from the atmosphere

# Toward true carbon neutrality

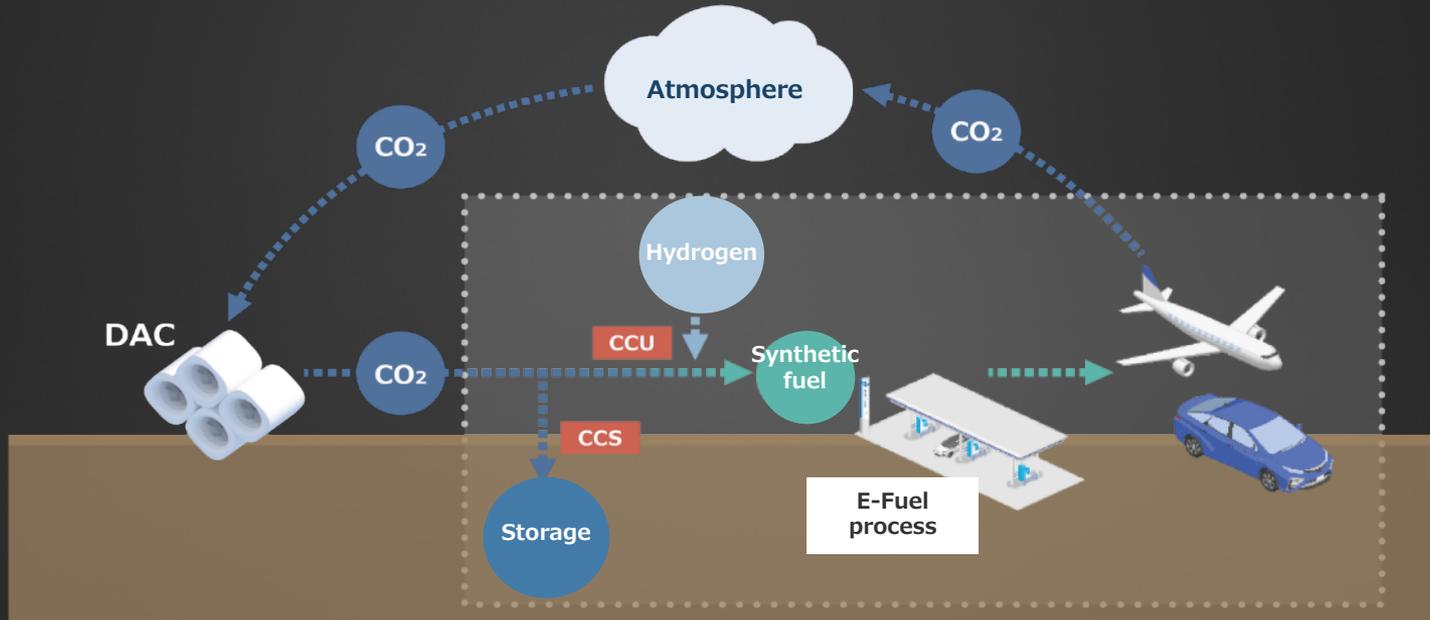
To achieve carbon neutrality, CO2 capture and storage from exhausted gas and use of synthetic fuels for mobility is not sufficient.

## It won't be truly carbon-free



# Toward true carbon neutrality

Carbon-free hydrogen + Realizing 'synthetic fuel' from **CO<sub>2</sub> captured from the atmosphere**, and **DAC (Direct Air Capture) is a key technology**



# Technology for capturing CO<sub>2</sub> from the atmosphere: Direct Air Capture (DAC)

Submarine



DAC(Direct Air Capture)



Developed technology to remove CO<sub>2</sub> which is essential to enclosed spaces 40 years ago (Exactly the DAC technology itself)  
Kawasaki's CO<sub>2</sub> Capture Technology for Japanese Submarines

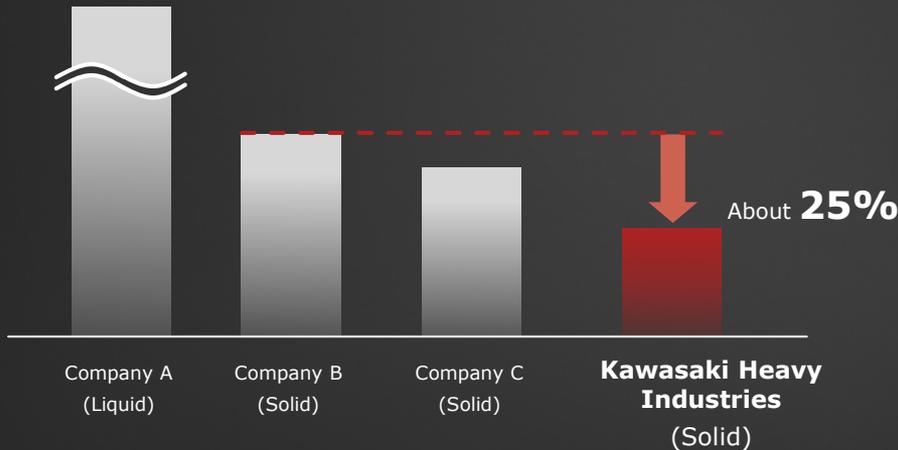
The demonstration was completed in 2022, and captured CO<sub>2</sub> from the air was confirmed to be almost **100%** pure

# Our unique CO<sub>2</sub> capture technology

Because CO<sub>2</sub> can be desorbed from solid sorbent at low temperatures,

**Achieving DAC through energy conservation** by using renewable energy and unused waste heat

Thermal energy required for capturing CO<sub>2</sub>



Individual solid sorbent



**In-house developed solid sorbent to save energy**

# Market environment surrounding DAC is changing rapidly

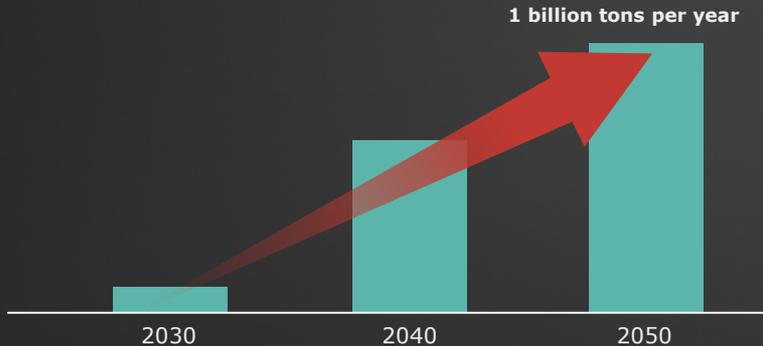


## The Inflation Reduction Act of 2022 passed in the US

Subsidization of up to \$180 per ton for DAC CO<sub>2</sub>

This **significantly improves the economics of DAC.**

### Growth of the DAC market



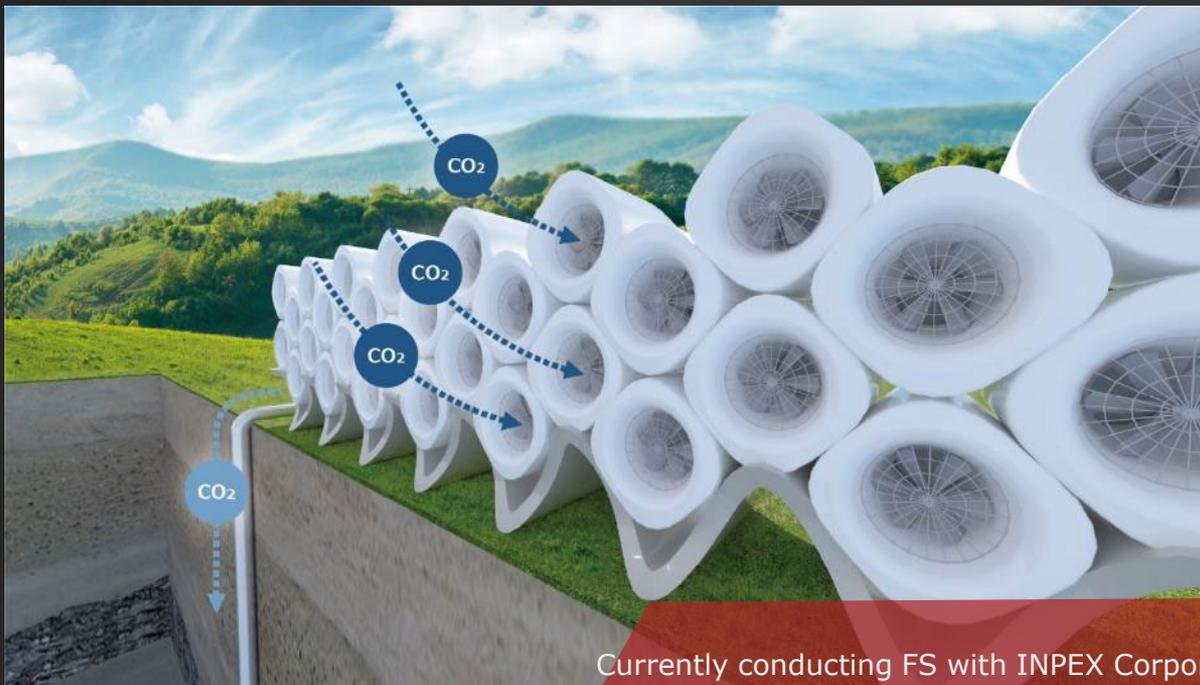
Rapidly expanding, especially in North America.

In 2050, the market size is expected to be 20 trillion yen \*

\*Estimated by Kawasaki Heavy Industries, assuming 20,000 yen/ton in 2050

## Toward Large-Scale and Commercialization of DAC

By 2030, aiming at commercialization from overseas which is economically rational, and has high CO<sub>2</sub> storage potential



Currently conducting FS with INPEX Corporation with a view to starting the domestic **demonstration of underground storage of CO<sub>2</sub> captured by DAC** (400 tons per year)

**We will contribute to the early realization of global carbon neutrality by expanding the decarbonization solutions, including our group's hydrogen business**

