Focal Field 1

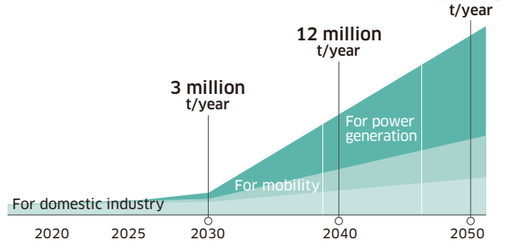
Working toward the stable generation of clean energy

1. Realizing a hydrogen society in an early stage

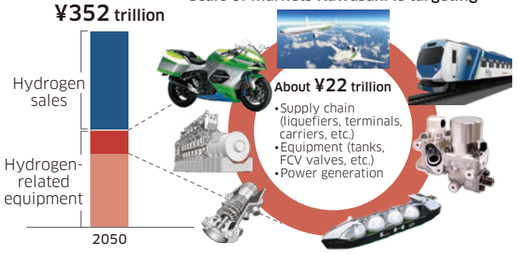
Hydrogen Market to Reach ¥352 Trillion in 2050

The Japanese government revised its Basic Hydrogen Strategy in June 2023. The new strategy sets a target of introducing 12 million tons of hydrogen by 2040 and sets milestones to increase the predictability of the existing targets of 3 million tons in 2030 and 20 million tons in 2050. Supplying large volumes of low-cost hydrogen will require the introduction of clean hydrogen from overseas. The global hydrogen-related market is projected to reach some 352 trillion yen in 2050, and Kawasaki Heavy Industries seeks to achieve a large-scale expansion in the scope of business centered on hydrogen-related equipment markets.

Hydrogen energy implementation in Japan*1



Hydrogen market in 2050*2



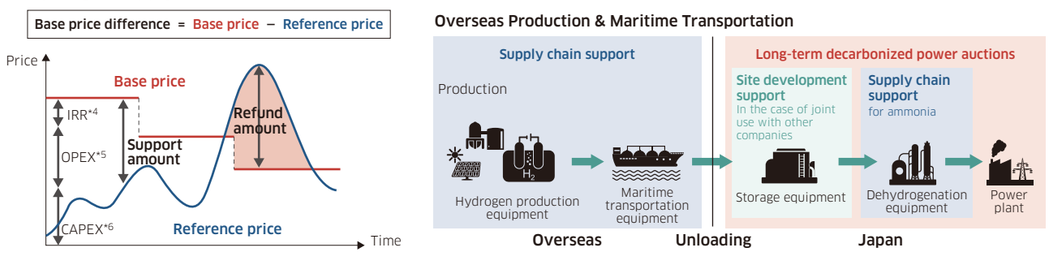
*1 Calculated by Kawasaki based on materials of subcommittees of the Ministry of Economy, Trade and Industry

*2 Calculated by Kawasaki based on Hydrogen for Net Zero, Hydrogen Council

Acceleration of Support for Social Implementation of Hydrogen

The Basic Hydrogen Strategy expressly provides for long-term support for price differentials with existing fuels to businesses that begin supplying low-carbon hydrogen in hydrogen supply chains by around 2030. In addition to supporting the development of hydrogen supply chains, the Strategy describes the details of systems for development of supply infrastructure that will contribute to the creation of demand and makes express mention of tanks and pipelines as the specific scope of support for site development. We will contribute to the social implementation of hydrogen through the provision of equipment and services for all aspects including production, transportation, storage, and utilization.

Conceptual Representation of Price Differences and Collaboration between Systems within Support for Hydrogen Supply Chain Development*3

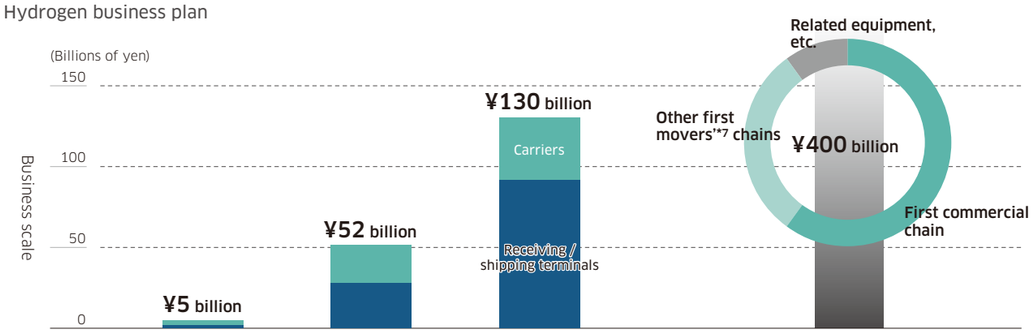


*3 Prepared based on materials of subcommittees of the Ministry of Economy, Trade and Industry (analysis by Kawasaki)
*4 Internal rate of return *5 Operating expenditure *6 Capital expenditure

Seeking a 400-Billion Yen Business in FY 2030

We are making steady progress on three steps for the development of a liquefied hydrogen supply chain. (1) In the spring of 2022, we completed a pilot demonstration of the international transportation of liquefied hydrogen for the first time in the world. (2) Currently, we plan to develop commercial-scale equipment to verify the feasibility of commercialization by fiscal 2030, and then (3) start operation of a commercial supply chain. Through the progress on these steps, we anticipate a business scale in excess of 50 billion yen in fiscal 2025 and 130 billion yen in fiscal 2026. We also anticipate supplying key parts and granting licenses to other companies by fiscal 2030 and plan on achieving a business scale including other first mover chains of 400 billion yen.

Hydrogen business plan

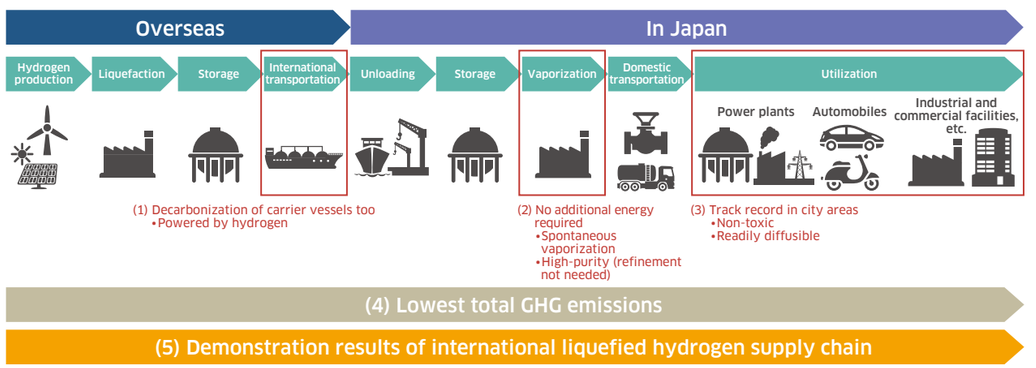


*7 A first mover is a business that plans to start supplying hydrogen by around 2030.

Superiority of Liquefied Hydrogen

We have 40 years of hydrogen handling technology and expertise in the aerospace field, and we also have an established track record with hydrogen power generation operation and electric power supply. Under the Development of Technologies for Realizing a Hydrogen Society project, a project supported by the New Energy and Industrial Technology Development Organization (NEDO) , we achieved the world's first supply of heat and electric power to hospitals and other nearby public facilities through gas turbine power generation using 100% hydrogen fuel in city areas. Since then, we have continued demonstration tests. Also, in the spring of 2022, we completed a demonstration of maritime transportation between Japan and Australia and cargo handling using the *SUISO FRONTIER*, the world's first liquefied hydrogen carrier, which we constructed, demonstrating the feasibility of an international liquefied hydrogen supply chain. Liquefied hydrogen is the least expensive and most promising energy carrier over the medium- to long-term for various reasons. It is non-toxic, and vaporized hydrogen gas can be used as fuel without treatment when transported by carrier. No work is required to crack energy carriers to desorb hydrogen, and no energy losses are incurred from refinement at demand sites such as Japan. Due to this, facilities at demand sites can be simple and compact. From an environmental perspective, it has the lowest greenhouse gas emissions in the international hydrogen supply chain.

Flow of the Entire Supply Chain and Superiority of Liquefied Hydrogen



Working Toward the World's First Commercial Liquefied Hydrogen Supply Chain
Reliably implementing verification of large-scale equipment for commercialization and ascertaining the economic feasibility of commercialization

Determination of liquefied hydrogen shipping/receiving terminals

Japan Suiso Energy, Ltd., in which we have invested, Iwatani Corporation, and ENEOS Corporation are working to deliver a "Liquefied Hydrogen Supply Chain Commercialization Demonstration Project"*1 as part of the Large-Scale Hydrogen Supply Chain Establishment project of the Green Innovation Fund Support*2 operated by the New Energy and Industrial Technology Development Organization (NEDO). This will be the world's first large-scale maritime transportation technology for liquefied hydrogen, capable of transporting tens of thousands of tons annually, demonstrating an international liquefied hydrogen supply chain that is integrated from upstream to downstream. Specifically, Kawasaki will supply the large-scale equipment needed for establishing the feasibility of commercialization including liquefied hydrogen carriers and on-land liquefied hydrogen tanks.

A decision was made in March 2023 that the shipping terminal will be the Hastings district of Victoria, Australia which has abundant natural resources, and the receiving terminal will be the Kawasaki Coastal Area (located in the Kawasaki district of Kawasaki City, Kanagawa Prefecture) in consideration of the potential demand for hydrogen from the nearby Keihin Industrial Complex as well as access to existing port infrastructure. We have taken a reliable first step toward establishing a commercial-scale international liquefied hydrogen supply chain.

*1 Demonstration project for the commercialization of liquefied hydrogen supply chains
Project period: FY2021–2030 (planned)
Project overview:
https://green-innovation.nedo.go.jp/en/project/hydrogen-supply-chain/
*2 Green Innovation Fund Support: A 10-year project that will provide continuous support from R&D and verification to social implementation to companies and other organizations that are sharing ambitious and specific targets between the public and private sectors and tackling related management issues in order to achieve Japan's goal of becoming carbon neutral by 2050.
Special website: https://green-innovation.nedo.go.jp/en/

Development of technology for cargo tanks for large liquefied hydrogen carriers completed

In June 2023, we advanced the design and manufacture of a performance-verification tank for a cargo containment system (CCS) for use on large liquefied hydrogen carriers and conducted performance verification tests. This work was carried out under a NEDO subsidy program known as the "Technology Development Project for Building a Hydrogen Society, Technology Development for Using Hydrogen Energy on a Large Scale, Development of Large-Scale Transport and Storage Equipment and Export and Import Terminal Equipment for Liquefied Hydrogen."

The CC61H type test tank designed and manufactured at this time is similar in size to the planned CCS for use in large liquefied hydrogen carriers, and by adapting the thickness of structural materials and heat insulation materials to the dimensions of the actual vessels, we verified the integrity of the new structure including the assembly, welding, and workability of insulation materials. In the final stage of development, we performed gas replacement, cooling, and heat-up tests using the test tank, confirming that efficient gas replacement can be carried out in the large internal space of the tank using inert gas and that insulation performance was achieved as planned.

Establishment of tank manufacturing technology and structural analysis technology

A 40,000 m³ class test tank

Collaboration with Kansai Electric Power Company premised on establishment of a commercial supply chain

In December 2022, we signed an MOU (memorandum of understanding) with Kansai Electric Power Company on collaboration relating to maritime transportation and other issues for the establishment of a liquefied hydrogen supply chain.

Through this collaboration, we will investigate and examine maritime transportation of liquefied hydrogen as well as the overseas production, liquefaction, and storage of hydrogen and receiving of hydrogen in the Himeji area.

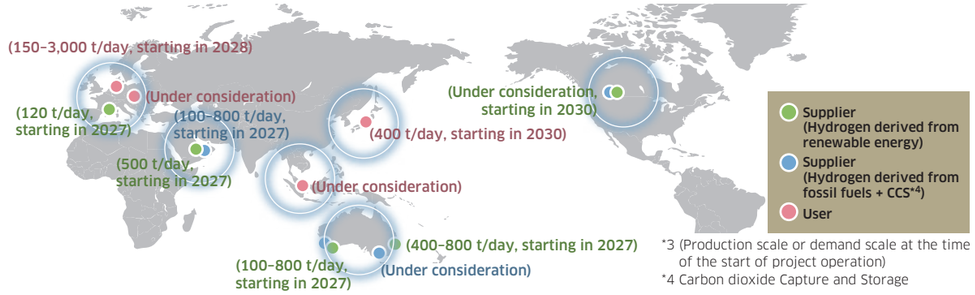
Collaboration agreement with Kawasaki City

In September 2023, we signed a collaboration agreement with Kawasaki City to pursue continuous regional economic development by creating hydrogen demand in the Kawasaki Coastal Area and the early achievement of carbon neutrality in Japan with a view to establishing a commercial-scale liquefied hydrogen supply chain.

Collaboration agreement signed with Kawasaki City

Forming Partnerships That Advance Both Hydrogen Supply and Creation of Demand

Steady progress made on requests for investigation made to us from around the world



*3 (Production scale or demand scale at the time of the start of project operation)
*4 Carbon dioxide Capture and Storage

Seeking to create massive hydrogen demand in the power generation and transportation sectors, which will be critical for achieving a hydrogen-based society

Even if it is possible to produce and transport large amounts of hydrogen energy, it will be meaningless unless there are sites for large-scale utilization. Creating hydrogen demand is an essential condition for achieving a hydrogen-based society.

At Kawasaki Heavy Industries, in addition to verifying the technologies needed to increase scale and the economic feasibility through commercialization demonstrations, we are working to generate demand for hydrogen in the power generation, transportation, and other sectors so that large-scale demand for hydrogen can be created.

Collaboration memorandum signed with Resonac on development of hydrogen power generation business in the Kawasaki district

In October 2023, we signed an MOU with Resonac Corporation on collaboration for development of the hydrogen power generation business in the Kawasaki district with a view to using hydrogen around 2030.

Through this collaboration, both companies will seek decarbonization by launching a hydrogen power generation project of at least 100 MW (equivalent to CO_2 reduction of 700,000 tons*5) at the Resonac Kawasaki business site around 2030, when an international liquefied hydrogen supply chain is expected to be established, and to supply clean energy to the electric power market as well as for use by themselves. The Kawasaki district, where the Resonac Kawasaki business site is located, is suitable for large-scale hydrogen procurement through maritime transportation from the Coastal Area. The two companies will take advantage of this geographical benefit to investigate and examine business schemes, power generation system specifications, hydrogen supply methods, and other issues relating to development of the hydrogen power generation business, which will become a major hydrogen user.

Collaboration memorandum signed with Resonac

*5 Calculated based on "Results of Evaluation of the Status of Progress of Global Warming Countermeasures in the Electric Power Business Field" (reference version) issued by the Ministry of the Environment (P. 36).

Strategic collaboration agreement signed with ADNOC

In April 2023, we signed a strategic collaboration agreement on the establishment of liquefied hydrogen supply chains with the Abu Dhabi National Oil Company (ADNOC), the state-owned energy company of the United Arab Emirates (UAE).

Through this strategic collaboration, both companies will jointly investigate large-scale hydrogen production and liquefaction, ancillary infrastructure facilities, and maritime transportation of liquefied hydrogen to users in Japan and overseas with the aim of establishing a commercial-scale international hydrogen supply chain.

Hydrogen Small Mobility & Engine Technology Research Association established

In May 2023, Kawasaki Motors, Ltd., Suzuki Motor Corporation, Honda Motor Co., Ltd., and Yamaha Motor Co., Ltd. obtained approval from the Ministry of Economy, Trade and Industry and established a technological research association called "HySE" (Hydrogen Small mobility & Engine technology) with the aim of conducting fundamental research on hydrogen engines for use in small mobility vehicles including motorcycles, Japan-originated mini-vehicles, small vessels, construction machinery, and drones. HySE will leverage knowledge and technology acquired from gasoline engines and collaborate to achieve the early creation and widespread adoption of hydrogen engines for small-scale mobility equipment. In October, HySE announced with Toyota Motor Corporation that it will compete in the Dakar Rally, which will be held in January 2024, with the HySE-X1, a hydrogen fuel engine vehicle.

The HySE-X1 (mockup)

Focal Field 1

Working toward the stable generation of clean energy

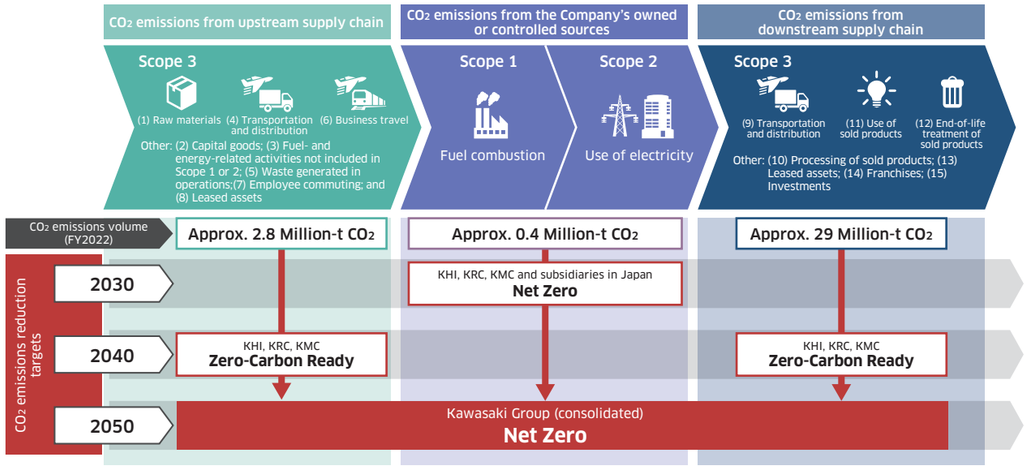
2. Initiatives to achieve zero CO_2 emissions

Carbon neutrality targets

The Group will achieve carbon neutrality for Scope 1 and 2 in Japan by 2030 through independent initiatives focused on hydrogen power generation. To address Scope 3 emissions, we will decarbonize products and services with hydrogenation, electrification, green power grid, alternative fuels, and CCUS*1 as our keywords and strive to achieve by 2040 a status where customers select our Zero-Carbon Ready decarbonization solutions.

We will expand our decarbonization solutions with business partners, and customers, contributing to the early realization of carbon neutrality.

*1 CCUS (Carbon dioxide Capture, Utilization and Storage): Capture CO_2 emissions + Store underground + Utilize CO_2



Note: KHI: Kawasaki Heavy Industries (parent only), KRC: Kawasaki Railcar Manufacturing, KMC: Kawasaki Motors

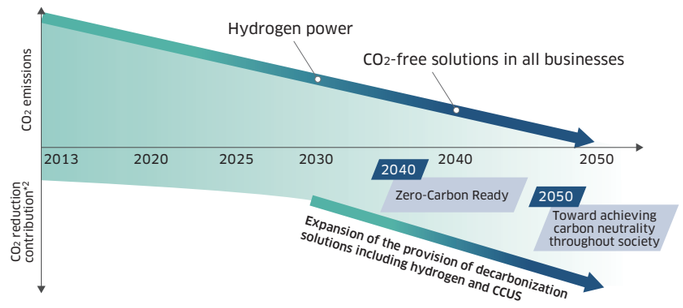
Scope 3 CO_2 emissions reduction targets

(KHI, KRC, KMC)

2040 Zero-Carbon Ready

Reduce CO_2 at least 100% in real terms by engaging in the CCUS business

- Category (i): 80% reduction (compared with fiscal 2021)
- Category (xi): Develop a lineup of CO_2-free standard solutions and facilitate global CO_2 reductions



*2 CO_2 reduction contribution: Equal to the difference between greenhouse gas emissions volumes of earlier products and services and new products and services. A quantification of the contribution to the mitigation (impact) of climate change throughout society as a whole through the provision of products and services.

Scope 1, 2

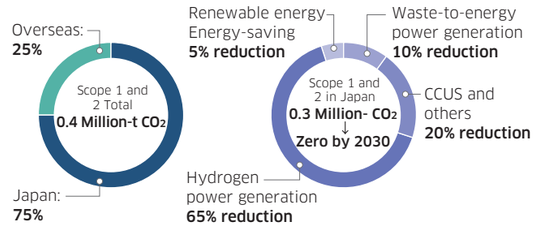
Scope 1, 2 In-house fuel and power use

Carbon Neutrality in Japan by 2030

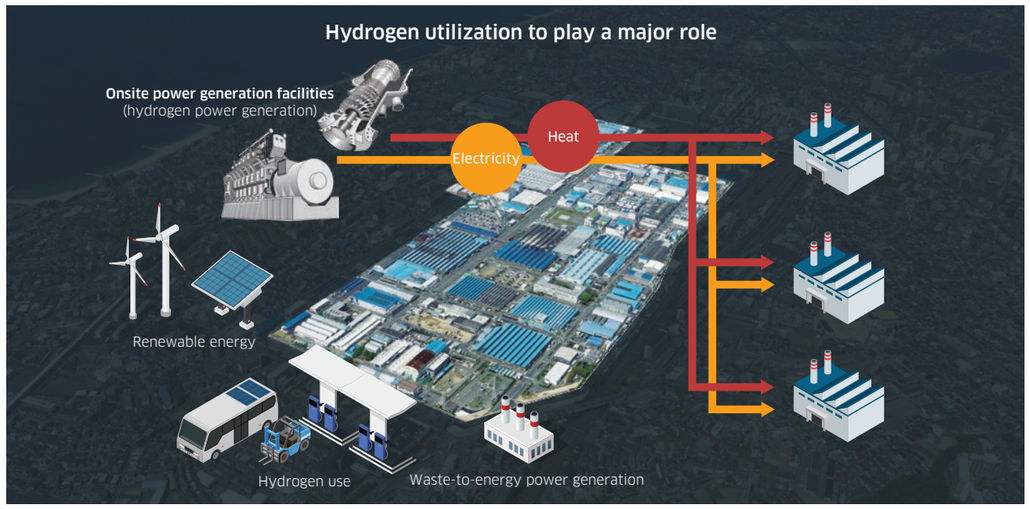
As shown to the right, the Kawasaki Group's Scope 1 and 2 CO_2 emissions are approximately 400,000 tons annually, of which Japan account for three-quarters.

We will continue efforts to save even more energy and promote electrification and the use of sustainable energy, such as solar power generation, to reduce CO_2 emissions through 2030. We will also introduce in-house hydrogen-fueled power generation facilities and achieve zero-emissions plants by combining this with power generation from waste, renewable energy, and other energy sources. Through these initiatives, we plan to achieve independent carbon neutrality with zero CO_2 emissions by the Group in Japan by 2030. We are also working to reduce CO_2 emissions overseas.

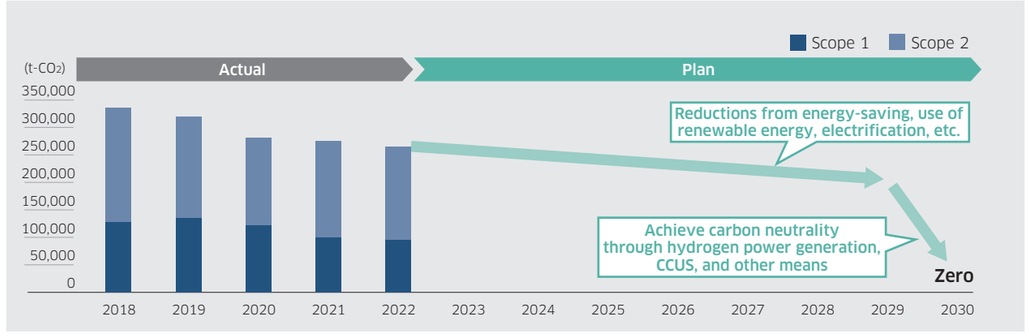
CO_2 Emissions Reduction Plan in Japan



Zero-Emission Plant



CO_2 Emissions (Scope 1 and 2) and Reduction Targets (Domestic Group)



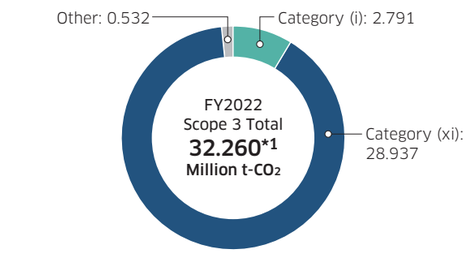
Scope 3

/ Leading Society by Advancing Toward Zero-Carbon Ready

Scope 3 Net Zero can only be achieved when all parties in the value chain including trading partners and clients become Zero-Carbon Ready. The Company will implement the maximum possible measures concerning Scope 3 to become Zero-Carbon Ready by 2040. Specifically, for category (i), we will slash CO_2 emissions by suppliers of materials and parts by 80%, and for category (xi), we will develop a lineup of CO_2-free standard solutions in all businesses. Moreover, we will reduce CO_2 emissions by more than the Company's own Scope 3 emissions by working toward achieving a hydrogen-based society and engaging in the CCUS business, thereby contributing to the early achievement of carbon neutrality around the world.

Scope 3 Breakdown by Categories

(Million t-CO_2)



*1 Category (xi) is the total for the Kawasaki Group. Other is the total for Kawasaki Heavy Industries (non-consolidated), Kawasaki Motors, and Kawasaki Railcar Manufacturing

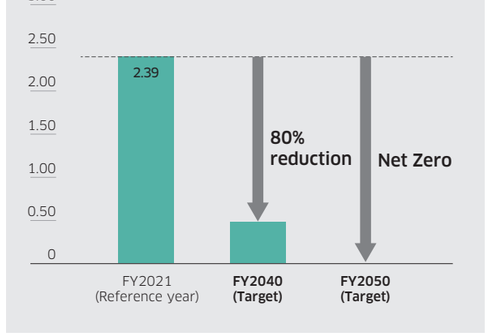
Scope 3 Category (i) CO_2 emissions from procurement of materials and parts

Support industrial initiatives with hydrogen and CCUS solutions to further accelerate reductions

The Company will deepen collaboration with business partners that supply materials and parts, including sharing emissions data, offering support for CO_2 reductions and striving for early achievement of zero emissions. This will be achieved by means not limited to in-company utilization by the Group of solutions such as hydrogen power, hydrogen fuel, and other alternative fuels, as well as CCUS, but also by providing these solutions to business partners.

As a first step, in fiscal 2023, we introduced tools for visualizing CO_2 emissions from procuring in some businesses and conducted briefings and study sessions on carbon neutrality for business partners. Going forward, we will expand these initiatives company-wide and build cooperative structures with business partners for reducing emissions.

Scope 3 Category (i) (CO_2 reductions scenarios)



Scope 3 Category (xi)*2 Providing customer solutions

Provide CO_2-free solutions to all customers

We will take action to decarbonize products and services with hydrogenation, electrification, green power grids, alternative fuels, and CCUS as our keywords.

•Initiatives in the leadup to 2030 (short term)

Through Kawasaki Ecological Frontiers, a program for certification of environmentally friendly products, and other initiatives, we will continue to reduce the energy consumption and improve the efficiency of existing products and promote the shift to hybrid electric and battery electric motorcycles and other vehicles as part of the transition to a decarbonized society. We will also conduct development for the commercialization of hydrogen energy and expand the use of hydrogen in gas turbines, gas engines, and other equipment. Furthermore, we will work toward the development of Kawasaki CO_2 Capture and DAC for the capture and use of CO_2.

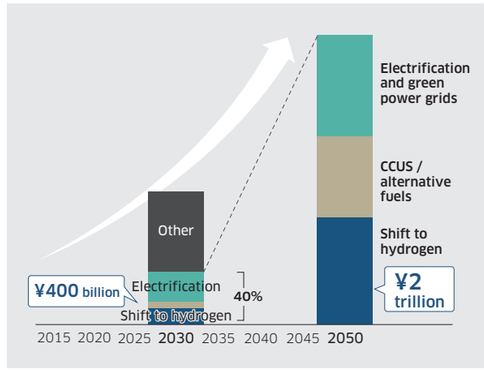
•Initiatives in the leadup to 2040 (medium to long term)

The Group will actively further the following three major initiatives.

(1) We will provide CO_2-free fuels and electrical power to society with a focus on the hydrogen business.
(2) We will make a selection of choices for electrification and CO_2-free fuels available to customers utilizing our various solutions including mobility and robots.
(3) In addition to CO_2 capture, we will promote the effective use of CO_2 including the manufacture of synthetic fuels and chemical products to achieve a circular CO_2 society.

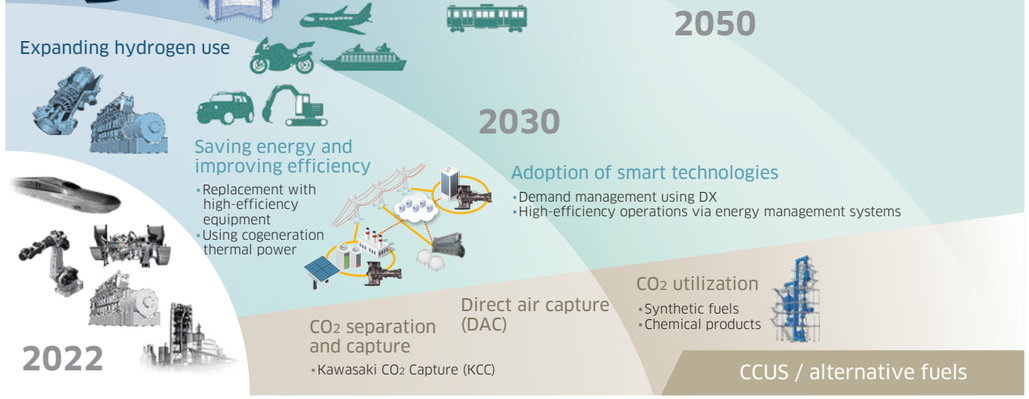
With these three pillars, the Group will make choices available to our customers of products and services (excluding defense and related; emergency products business) that contribute to the achievement of carbon neutrality by 2040, and promote global reductions in CO_2.

Envisioned Scale of Business by Future Solution

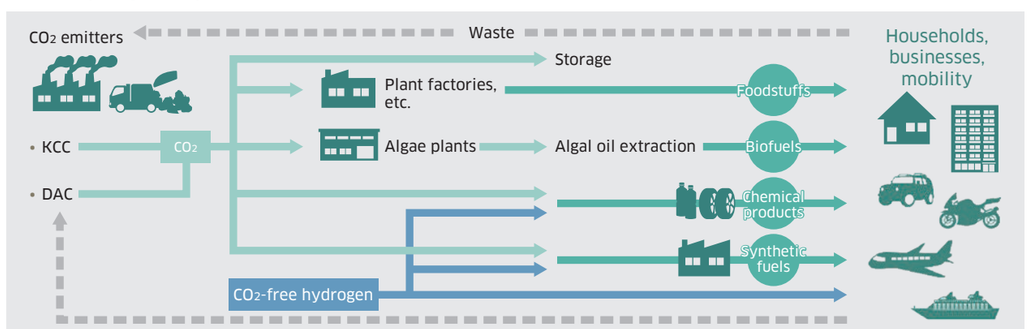


*2 From fiscal 2021, the Group modified its calculation method to allow more accurate records of emissions levels for Scope3 category (xi). Previously, CO_2 emissions levels for products such as hydraulic machinery, manufactured as parts to be incorporated in finished products, were calculated by tallying the CO_2 emissions levels of the finished products such as construction machinery. However, from fiscal 2021, these calculations will also take into account the degree of contributions and weight ratios for final products. Also, in fiscal 2022, we expanded the scope of calculation from the total for Kawasaki Heavy Industries, Kawasaki Motors, and Kawasaki Railcar Manufacturing to the entire Group.

Decarbonization Solutions



A CO_2-recycling Society



Disclosure in Line with the Recommendations of the Task Force on Climate-related Financial Disclosures

Under its Group Vision 2030, the Kawasaki Group will actively contribute to the realization of a society in which the average global temperature rise is held to 1.5°C above pre-industrial levels—the goal of the Paris Agreement—through its business, by advancing its hydrogen business, CCUS* and other efforts. At the same time, the Group is moving forward with measures, based on risk analysis, to address increasingly severe natural disasters, including business continuity planning (BCP), supply chain resilience and others. Here we report on climate change-related information based on TCFD recommendations.

* Carbon dioxide Capture, Utilization and Storage

Governance (Organizational governance of climate-related risks and rewards)

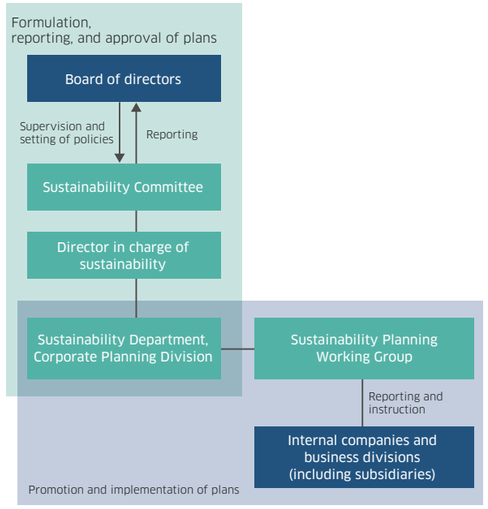
In the Kawasaki Group, the Board of Directors is the highest decision-making body that deliberates and decides fundamental sustainability policies and fundamental plans throughout the Group. The Sustainability Committee, under the supervision of the Board of Directors, determines those measures to be taken rooted in the basic plan the Board of Directors has decided and reports on their progress to the Board of Directors.

The Sustainability Committee deliberates and reports on the following items.

1. Measures contributing to realization of the sustainability of both society/environment and our Group and enhancement of our Group's corporate value, as well as their practice and state of achievement
2. Measures to understand, reduce, and eliminate the negative social and environmental impact of our Group's business activities, as well as their practice and state of achievement

The Committee in principle meets at least two times per year. In fiscal 2022, it convened three times and made reports to the Board of Directors.

Sustainability Promotion System



Metrics and Targets (Indicators and targets employed when assessing and managing climate-related risks and opportunities)

The Group has established CO_2 emissions reduction targets, as shown in the chart at right.

For domestic Scope 1 and 2, including Group companies, our goal is to achieve self-sustaining carbon neutrality by 2030 through initiatives centered primarily around hydrogen power generation. For Scope 3, targets have been established for main categories (i) and (xi).

Our goal is for zero CO_2 emissions across the Group as a whole by 2050, in line with the CO_2-free target set out in the Kawasaki Global Environmental Vision 2050.

For details regarding CO_2 emission reduction targets, see pp. 39–42.

Kawasaki Group CO_2 Emissions Reduction Targets

Scope 1, 2	Scope 3
2030 Carbon Neutrality Scope: Domestic Group companies	2040 Zero-Carbon Ready Contribute to carbon negative by realizing a hydrogen-based society and promoting commercialization of CCUS Category (i): 80% reduction Category (xi): Promote CO_2 reductions in the world Scope: Kawasaki Heavy Industries, Kawasaki Motors, Kawasaki Railcar
2050 Carbon Neutrality Scope: Entire Group (consolidated)	

Risk Management (Methods for identifying, assessing and managing climate-related risks)

The identification and assessment of risks related to sustainability including climate change are conducted by the Sustainability Committee. Changes in the business environment and in the demands and expectations from stakeholders are evaluated from a risk management perspective, and deliberated and reported on as necessary responses. With respect to regular reviews of materiality, too, risk assessments regarding various issues are conducted based on the results of these scenario analyses.

Risks affecting the entire company such as those related to the BCP are managed centrally by departments charged with risk management. They continuously assess and monitor risks with respect to items related to sustainability, particularly those items related to a global environment aimed at achieving carbon neutrality and a circular society, and items related to human capital that aim to strengthen the human capital and organizations responsible for delivering new value.

The results of these risk assessments and the identified risks are reported to the Board of Directors which, based on their deliberations over the approach to addressing them, provide the necessary feedback to those departments subject to those risks.

Strategy (Actual and potential impact of climate-related risks and opportunities on business, strategy and financial planning)

In energy and environmental solutions, one of three focal fields defined in the Group Vision 2030, the Group is actively advancing business aimed at realizing a decarbonized society through the hydrogen business, CCUS and other efforts.

Recorded below is the scenario analysis process conducted in the formulation of Kawasaki's climate change strategy.

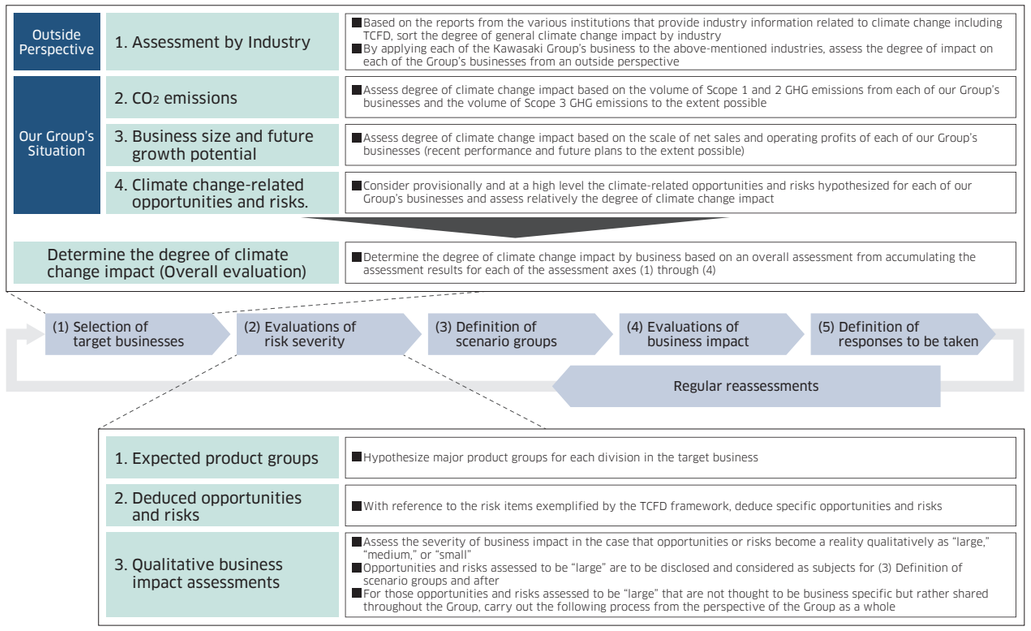
Scenario Analysis Process

Scenario analysis is conducted through a process that entails (1) Selection of target businesses, (2) Evaluations of risk severity, (3) Definition of scenario groups, (4) Evaluations of business impact, and (5) Definition of responses to be taken.

Considering consistency with the Group Vision 2030, the year 2030 was set as the target year, and the 1.5ºC and 4ºC scenarios were adopted. The business impact of the 1.5ºC and 4ºC scenarios and the results of the considerations on the measures to be taken are described on the tables on pp. 45–48.

Going forward, we will regularly conduct reviews and advance the sophistication of the scenario analysis.

Process for Scenario Analysis (1.5ºC Scenario)



Climate Change Scenario Analysis

1.5°C Scenario (As of 2030)　When the Group Vision 2030 policy is implemented

*1 Financial impact … ★: less than ¥10 billion; ★★: ¥10 billion or more, less than ¥100 billion; ★★★: ¥100 billion or more

Business Segment		Energy Solution & Marine Engineering Segment	Aerospace Systems Segment	Powersports & Engine Segment	Precision Machinery & Robot Segment	Rolling Stock Segment
Assumptions		•Decarbonization of energy will progress rapidly worldwide, and energy conservation, energy conversion and the shift toward non-fossil fuels will advance in Japan as well. •An international supply chain will be built for hydrogen and ammonia, power generation from these means will begin. Strategic placement of hydrogen stations advances. •Energy security will become increasingly important in Japan.				
		•At power plants and the like, carbon reduction and decarbonation (through the use of hydrogen fuels, biofuels, and e-fuels [i.e., synthetic fuels]) will advance.	•Global air passenger traffic will increase as the middle class grows in emerging economies. The use of sustainable aviation fuel (SAF), such as biofuels, and hydrogen will advance.	•For motorcycles and four-wheelers, electrification will advance, as does carbon reduction and decarbonation (through the use of hydrogen fuels, biofuels, and e-fuels [i.e., synthetic fuels]).	•For construction machinery and industrial machinery, electrification will advance, as does carbon reduction and decarbonation (through the use of hydrogen fuels, biofuels, and e-fuels [i.e., synthetic fuels]).	•For rolling stocks in non-electrified regions, carbon reduction and decarbonation (through the use of hydrogen fuels, biofuels, and e-fuels [i.e., synthetic fuels]) will advance. •In keeping with the realization of a hydrogen-based society, the need for hydrogen transport using railroads will grow.
Opportunities	Hydrogen-related	•Demand will increase for liquefied hydrogen plants, liquefied hydrogen storage tanks, liquefied hydrogen carriers, hydrogen gas turbines, hydrogen gas engines and marine hydrogen engines, etc.	•Efforts to develop aircraft that use hydrogen as fuel will progress toward 2040.	•Demand will increase for motorcycles and four-wheelers, etc. equipped with hydrogen engines.	•Demand for construction machinery equipped with hydrogen engines and fuel cells will increase. Installation of hydrogen stations will also advance.	•Demand for rolling stocks that use hydrogen for fuel will increase. •Demand for liquefied hydrogen container freight cars as the means for transporting hydrogen will increase.
	CCUS and alternative fuels	•Demand will increase for CO_2 recovery plants/equipment and use of CO_2. •Demand for plants that use biomass will increase.	•Demand for sustainable aircraft fuel (SAF) will increase.	•Demand for motorcycles and four-wheelers, etc., that use biofuels and e-fuels (synthetic fuels) will increase.	–	–
	Electrification	•Demand will increase for marine electric propulsion systems and marine fuel cell and storage batteries.	•Development of electric aircraft will advance.	•Demand for electric and hybrid motorcycles and four-wheelers will increase.	•Demand for the electrification of construction machinery will increase. •Accompanying electrification, demand for semiconductor manufacturing robots will increase.	•Demand for rolling stocks powered by storage batteries will increase.
	Other	•Demand will increase for reduced GHG vessels, marine LPG/LNG engines and ammonia transport.	•Demand will increase for fuel efficient engines.	•Demand will increase for fuel efficient engines.	•Demand for hydraulic advanced electronic control systems to improve fuel economy will increase.	•Modal shift from internal combustion means of transportation (automobiles, aircraft, etc.) will advance particularly for freight traffic, and demand for electric locomotives will increase.
		•Demand for such solutions businesses as digitalization and robotics that improve the productivity and energy-saving performance of factories and facilities will increase.				
Risks	Products and services	•Demand for LNG power generation facilities will decline.	•Demand for aircraft will decline (modal shift to rail cars, etc.).	•Demand for gasoline-powered vehicles will decline.	•Demand for diesel construction machinery will decline.	–
	Development investment	•R&D and capital investments related to hydrogen-based products and services will increase.	•R&D and capital investments in new types of aircraft and engines will increase.	•R&D and capital investments in EV/HEV will increase. •R&D and capital investments in solving battery issues (durability, output), e-fuel and use of hydrogen technology will increase.	•R&D and capital investments directed toward the use of hydrogen technologies and the development of hydrogen-related machinery will increase.	•R&D and capital investments toward hydrogen-powered rolling stocks and storage battery-powered rolling stocks will increase.
		•R&D and capital investments in productivity improvements and energy saving such as through digitalization and robotics will increase.				
	Other	•Due to delays in infrastructure development, etc. widespread adoption of hydrogen may fall behind our assumptions.				
Financial Impact*1	Net sales	•Carbon neutrality-related net sales, including hydrogen: ¥600 billion (FY2030)				
		★★★ (Sales of hydrogen-related products will rise)	★ (Creation of hydrogen aircraft will come around 2040 or later)	★★★ (Move first with the shift from gasoline-powered vehicles to EV/HEV, and shift to e-fuel and hydrogen will progress)	★★	★
	Investment amounts	•Carbon neutrality-related investments: ¥350 billion (FY2020–FY2030)				
		★★★ (Including use of GI Fund)	★★ (Including use of GI Fund with respect to the development of hydrogen aircraft)	★★★ (Investment of ¥150 billion for the period FY2023–FY2027)	★★	★
Kawasaki's measures to address opportunities and risks	Hydrogen-related	•With an eye toward commercialization, we have promoted the GI Fund's commercialization demonstration projects to achieve greater scale at lower cost. We are actively promoting alliances with relevant companies to realize an international supply chain.	•Kawasaki is also promoting R&D in hydrogen aircraft core technology. We are advancing studies of airport infrastructure, etc. utilizing the hydrogen supply chain.	•Stimulate demand by encouraging the development of mobility and general-purpose engines utilizing hydrogen engines.	•Bring to market energy saving-type hydrogen compressors for hydrogen stations. •Improve development efficiency and cut development costs by collaborating with other companies and moving to outsourcing on such projects as hydrogen supply systems.	•Promote the development of hydrogen-powered rolling stocks. •Promote the development of liquefied hydrogen tank container freight cars.
	CCUS and alternative fuels	•Kawasaki has completed a demonstration of a CO_2 recovery plant under NEDO*2 and Ministry of the environment projects based on the strength of our submarine technology, and are advancing efforts to scale up and strengthen cost competitiveness of the plant toward commercialization. We are investigating a wide range of possibilities for utilization of CO_2, including synthetic fuels. *2 New Energy and Industrial Technology Development Organization •Expand sales of boilers compatible with a wide variety of biomass fuels.	•Advance development of SAF-compatible engines.	•Promote development of motorcycles, four-wheelers, etc., that e-fuel compatible.	–	–
	Electrification	•Expand sales of hybrid/electric propulsion systems, etc.	•Advance development of electrification.	•Deploy EV/HEV in at least 10 models by 2025, and replace major models with EV/HEV by 2035.	•Advance responding to electrification, including with the K-Axle™ electric hydraulic pump unit. •Develop and bring to market further low power consumption technologies for the robots we manufacture.	•Promote the development of storage battery-powered rolling stocks.
	Other	•In addition to meeting immediate transport demand with ammonia carriers, provide hydrogen engines and hydrogen supply systems for coastal vessels, which are the primary target ship types for our marine LNG gas engines. •Meet demand for LNG power generation from an energy security perspective, while also promoting a conversion to hydrogen gas turbines and hydrogen gas engines.	•Promote R&D in composite materials and high-efficiency systems. •To cope with rising research and equipment costs, promote R&D in low-cost production technology using robot technology and IOT. Also increase development efficiency through alliances with other companies.	•With regards to development costs and capital investments, we will control costs by standardizing components and outsourcing, including through collaboration with other companies.	•Introduce energy-saving systems for construction machinery and expand the application of failure diagnostic systems for energy-saving purposes •Provide operational energy estimates and real-time monitoring services for robot systems. •Promote the development of surgical robot system and remote robot systems.	•Improve our ability to respond to increased demand for electric locomotives.

Note: GI Fund(Green Innovation Fund); EV(Electric Vehicle); HEV(Hybrid Electric Vehicle); GHG(Green House Gas)

Climate Change Scenario Analysis

4°C Scenario (as of 2030)　As shown below, the 4ºC scenario will invite a worsening of the global economy, and so we will make every effort to contribute to the early realization of decarbonized society (Group Vision 2030).

Business Segment	Energy Solution & Marine Engineering Segment	Aerospace Systems Segment	Powersports & Engine Segment	Precision Machinery & Robot Segment	Rolling Stock Segment
Assumptions	•Many countries withdraw from the Paris Agreement, and rising temperatures are left to take their course. Japan also fails to implement policies to reduce greenhouse gas emissions. •Typhoons, floods and other natural disasters chronically occur and intensify. Food shortages, water shortages and so forth due to climate change become chronic. This invites an increase in epidemics and a rise in death rates. •Owing to these factors, the destabilization of all countries' economies advances, and crime as well as international conflicts also increase.				
Opportunities	–				
Risks	•The frequent occurrence of natural disasters may increase damage to power generation and transmission equipment, and increase the occurrence of delays in parts procurement and delivery due to supply chain disruptions.				
	•Lack of progress in adoption of hydrogen and CCUS may cause delays in return on investments and require reevaluation of business plans.	–	•Temperature changes may reduce lawn growth and shrink the general-purpose engine market.	•With the spread of hydrogen not advancing because investment recovery is delayed, and a review of business plans may become necessary.	•Modal shift from internal combustion means of transportation (automobiles, aircraft, etc.) may not advance.
Financial Impact (Net sales, physical losses)	•FY2030 net sales: Negative impact will be large (the opportunity for ¥600 billion in carbon neutrality-related net sales including hydrogen as hypothesized in the 1.5ºC scenario is lost) •Recovery of investments will be delayed (R&D and capital investments related to hydrogen projects, hydrogen aircraft development, and EV/HEV motorcycles) •Physical losses: Based on the estimates shown below, minimum losses will be ¥4 billion for damages at production sites (loss of fixed assets) and ¥24 billion for damages from a halt in operations due to supply chain disruptions (sales decrease) •Food risks, water risks, economic instability, supply chain chaos, and other factors produced by temperature rise will have an enormous impact on operations				
Measures to address opportunities and risks	•Work to deliver at an early date our decarbonation solutions, and by making the most of the Kawasaki Group's strengths, check the growth of related systems, construction machinery, and robots. •To address physical losses that can become major losses, work to strengthen our supply chain and advance measures to raise the siting of electric damage due to increasingly serious natural disasters through, for example, distributed power sources, emergency power generators, disaster response helicopters and facilities at all of our plants.				

Note: EV(Electric Vehicle); HEV(Hybrid Electric Vehicle); GHG(Greenhouse Gas)

Process and Results for Scenario Analysis (4ºC Scenario)

With regard to damage to production sites caused by natural disasters under the 4ºC scenario, we have evaluated the business impacts as shown on the tables below as risks shared in common throughout the Kawasaki Group.

Anticipated Risks　■ A natural disaster such as flooding occurs, (A) facilities at production sites are damaged, and (B) the supply chain is disrupted, leading to a halt in operations.

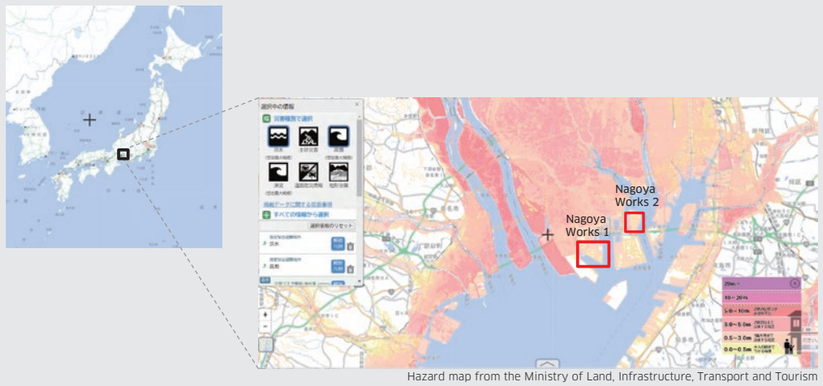
(4) Business impact evaluations

1. Identification of high-risk sites

(A) Damage to production sites

■ Identify high-risk sites based on the Ministry of Land, Infrastructure, Transport and Tourism hazard maps, the World Resources Institute "Aqueduct Water Risk Atlas," and past damage reports
- •Applies to 13 of the 26 domestic production sites
- •Applies to 8 of the 16 overseas production sites

Example of domestic production sites (26 sites)

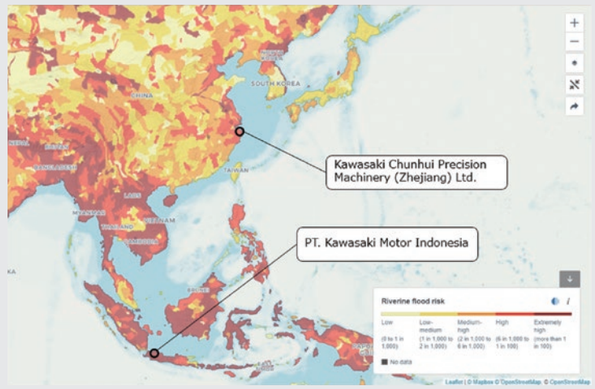


Hazard map from the Ministry of Land, Infrastructure, Transport and Tourism

(B) Damage from a halt in operations due to supply chain disruptions

■ Based on the World Resources Institute's "Aqueduct Water Risk Atlas" and past damage reports, determine high-risk sites
- •Does not apply to domestic production sites owing to a lack of past damage reports
- •Applies to 4 of our 16 overseas production sites

Example of overseas production sites (16 sites)



2. Preliminary calculation of damage

(A) Damage to production sites

■ Calculations of expected damages for 2030 at high-risk sites are below
■ Rate of increase of harm to GDP is based on the World Resources Institute's "Aqueduct Global Flood Analyzer"
■ Result: ¥4 billion

Hypothesized cost of damage at high-risk sites based on damage reports (fixed assets based on book value) x growth rate of damage to the GDP

(B) Damage from a halt in operations due to supply chain disruptions

■ Calculations of expected damages for 2030 at high-risk sites are below
■ Rate of increase of harm to GDP is based on the World Resources Institute's "Aqueduct Global Flood Analyzer"
■ Result: ¥24 billion

Hypothesized cost of damage at high-risk sites based on damage reports (based on net sales) x growth rate of damage to the GDP

Figure Sources
Japan production sites: Map created using hazard map information from the Ministry of Land, Infrastructure, Transport and Tourism <https://disaportal.gsi.go.jp/hazardmap/maps/index.html>.
Production sites outside of Japan: Map created using information from WRI Aqueduct Water Risk Atlas <https://www.wri.org/data/aqueduct-water-risk-atlas>.

Focal Field 2

New value creation using remote technology

Create a society that is affluent, safe, and secure for all with remote technology

Kawasaki's Solutions to Social Issues

- In industrial robots, we will use automation and remote technologies to offer solutions to labor issues ranging from worker shortages in developed countries to difficult and dangerous worksites.
- In the healthcare field, we will alleviate patient burden, the increasing burden on doctors, and regional healthcare disparities
- Reflecting work and lifestyle diversification, we will facilitate remote work environments that enable participation in society regardless of distance, lifestyle constraints, or health limitations as well as the use of overseas workers and skilled workers.
- We will use sophisticated and diverse transportation and energy equipment to prevent and alleviate damage from increasingly severe natural disasters and help ensure economic continuity and stability in daily life.

Of these, here we introduce the following initiatives.

Achieving Telemedicine

Related Business
- Precision Machinery & Robot

hinotori™ Surgical Robot System

Kawasaki established Medicaroid Corporation as a joint venture with Sysmex Corporation to develop, manufacture, and sell medical robots. On the basis of the industrial robot technologies that Kawasaki accumulated over a history of more than 50 years, Medicaroid developed the *hinotori*™ Surgical Robot System, and introduction of the system into medical settings in Japan has been expanding since certification was acquired in 2020. As of October 2023, the system has conducted a total of more than 2,500 urological, gynecological, and general surgeries. Since the system's launch, we have used feedback from physicians to provide upgraded versions and new models with enhanced usability while promoting business in Japan, and in September 2023, we obtained approval for sales in Singapore, a first step toward global expansion.

In addition, we are participating in remote surgery and surgery support projects and conducting demonstration testing as initiatives for solving social issues. There are high expectations that this technology will contribute to solving regional disparities in healthcare.

In October, we conducted successful demonstration testing between two sites in Singapore and Aichi, Japan, which are separated by a distance of approximately 5,000 km.

The *hinotori*™ Surgical Robot System, from Medicaroid Corporation

Transforming Work Styles with Remote Technology

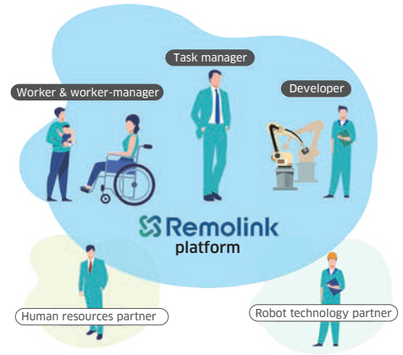
Related Business
- Precision Machinery & Robot

Seeking a Remotely Connected Society in Which Every Person Can Participate

In December 2021, Kawasaki established Remote Robotics Inc., a joint venture with Sony Group Corporation. The company is working to develop this new business with the purpose of realizing a remotely connected society in which every person can participate and proposing new work styles.

The working age population (persons from 15 to 64 years old) is predicted to decline by 630,000 annually, and even as concerns regarding labor shortages heighten, the number of job-seekers within the non-working age population was 2.53 million people who want to work but find it difficult to obtain employment. Remote Robotics is contributing to solutions to social issues through the Remolink platform.

Remote Robotics began providing Remolink Builder, a service that enables users to start small in remote robot system development, in May 2023. The Company also began providing Remolink, a cloud-based service that makes possible new types of remote work via robot, in July 2023. It is proposing new options that are not limited to the choice between entirely manual work or entirely automated work and enable allocations of tasks between humans and robots through remote operation.



The Remolink platform uses remote robots to connect businesses and workers

Development of New Business in the Healthcare Field

Related Business
- Precision Machinery & Robot

Leveraging Knowledge from Our PCR Testing Service to Expand Business Fields

From 2021 to May 2023, we provided 850,000 tests in cities and at airports through our PCR testing service, contributing to infection countermeasures and the recovery of social and economic activity, and received acclaim from various quarters.

We renamed the Healthcare Business Promotion Group in April 2023 and will use the knowledge and technologies gained through our PCR testing service to develop new business in the healthcare field with the aim of contributing to the realization of 100-year healthy life expectancy in the coming aging society in collaboration with the human relationships we have established and other companies (business partners). Specifically, we seek to establish business models for services that contribute to automation and labor-saving in individualized healthcare and nursing care fields during fiscal 2023.

Use acquired knowledge and know-how to develop new business in the healthcare field

Establish a society with 100-year healthy life expectancy

Medical testing
Genomic analysis, pharmaceutical development support

In-hospital logistics
Inter-hospital transportation, human flow management

Telemedicine
Remote surgery and diagnosis

Other
In-hospital testing
Medical tourism
Pain-free medical care, palliative care
Nursing care, rehabilitation, etc.

Focal Field 3

Transforming the movement of people and freight

Create a society where people and freight move safely, quickly, and efficiently using new forms of mobility

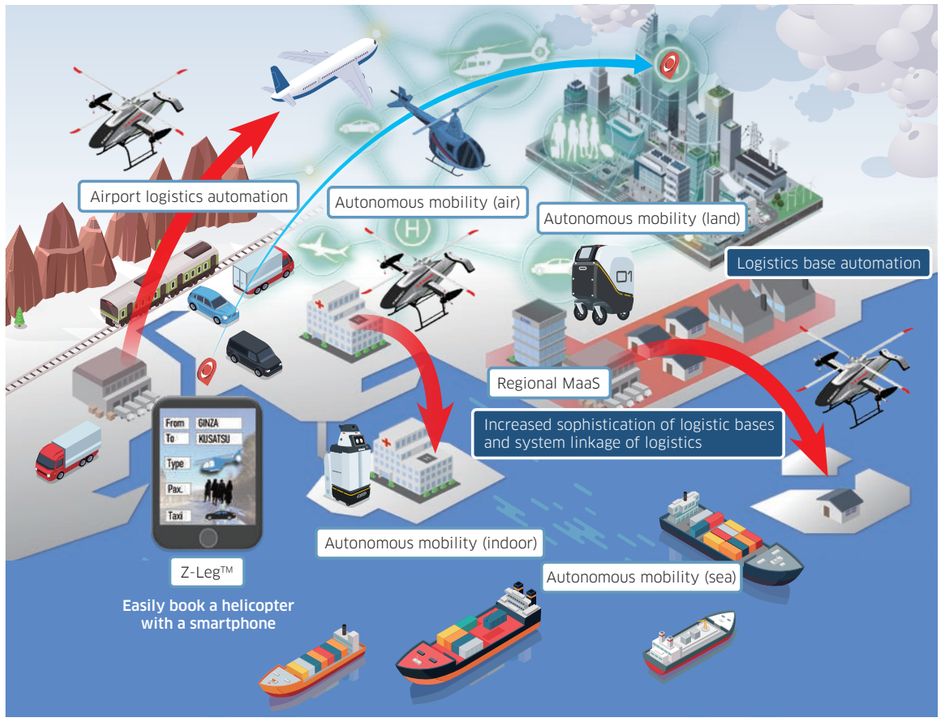
Kawasaki's Solutions to Social Issues

- We will provide new solutions based on Kawasaki's wealth of technologies necessary to the transportation chain, including those related to airplanes, helicopters, ships, rolling stocks, and motorcycles. These solutions will address the changing manner of mobility, including growth in e-commerce, sharing services, and demand for personal mobility.
- Addressing the increasingly severe issues related to labor shortages and worsening working conditions caused by growing logistics volumes, we will offer new systems that combine transportation equipment with robotics and remote technologies.
- We will offer solutions leveraging new transportation systems that combine land and air transport to address such issues as time lost in transport due to higher traffic congestion because of economic development and disruptions caused by increasingly serious natural disasters.

Working toward the social implementation of near-future mobility

We have been building strategic partnerships in logistics since fiscal 2022 with the aim of achieving social implementation in regional cities, commercial facilities, hospitals, etc.

In addition, we will also encourage deregulation and institutional development with regard to remote and autonomous mobility.



Super City Using Near-Future Mobility

Commercialization of new modes of mobility

Related Business
- Aerospace Systems
- Powersports & Engine

* Vertical Take-Off and Landing aircraft

Our Activities for Social Implementation of the K-RACER Unmanned VTOL* Aircraft

In order to address the labor shortage in the logistics industry ,we are developing the K-RACER unmanned VTOL Aircraft that combines our helicopter technology with the compact, high-power engines that our motorcycles have. Its characteristics are the ability to take off and land vertically without a runway and having a payload capacity that a drone cannot achieve. In 2021, we conducted a successful proof of concept of unmanned cargo transport through collaboration by the K-RACER-X1, which has a payload capacity of 100 kg, and a delivery robot. Going forward, we are pursuing social implementation of an aircraft with a capacity of 200 kg.

As an initiative for social implementation, we received a contract from Ina City, Nagano Prefecture for an Unmanned VTOL Cargo Transport Platform Development Project. Under this project, we will coordinate with stakeholders and perform permitting and licensing procedures pursuant to laws and regulations in order to achieve delivery of materials to mountain lodges, which are facing a shortage of pilots, weather conditions unique to mountainous regions, and other issues.

K-RACER unmanned VTOL aircraft

Automation of delivery work

Related Business
- Precision Machinery & Robot
- Powersports & Engine

Trial of In-Hospital Delivery Service Started Using Indoor Delivery Robot

Working in collaboration with Fujita Health University and SEQSENSE Inc., we started a trial of a delivery service using the FORRO indoor delivery robot on July 10, 2023 in an effort to reduce the burdens on medical professionals. Three FORRO robots worked 24-hour shifts delivering specimens and drugs, and we are confirming the frequency and volume of each delivery and the impact on medical professionals so that we can provide delivery services that are similar to actual operations.

Through this trial, we will create a system where humans and robots can work together and develop an environment for the provision of even higher-quality healthcare.

FORRO indoor delivery robot

One-stop service for air travel arrangements

Related Business
- Aerospace Systems

Provision of Z-Leg™

As the mobility as a service (Maas) industry grows rapidly, we launched Z-Leg™, an innovative solution for travelers in need of one-stop helicopter booking.

This service enables users to easily make online arrangements for a helicopter, pilot, helipad, and ground transportation all at once. In fiscal 2022, we teamed up with JTB Corp. to take a first step toward the creation of an innovation in Japanese tourism. The customers will use only highly-safe twin-engine aircraft, such as the BK117 series, which were jointly developed by the Company and its partner. In the future, we plan to expand the service so that we can provide value such as convenience and safety, not only for travelers, but also for healthcare and rescue needs.

Z-Leg™ one-stop service for air travel arrangements