

Aerospace Systems

Reaching greater heights in the domains of aviation and space through the integration of cutting-edge technologies

Since Kawasaki's launch of aircraft manufacturing in 1918, we have branched out into a wide range of businesses as one of Japan's leading makers of aircraft and aircraft engines.

The spread of the COVID-19 pandemic, which began in 2020, exerted a serious impact on commercial business, but fiscal 2022 saw a full-fledged recovery of air travel demand, and Kawasaki's business picked up considerably as well. In addition, following the Ministry of Defense's policy of drastically strengthening Japan's defense capability, the defense business environment is improving too.

Although we are concerned about an impact due to extra inspections of engines becoming necessary in the PW1100G-JM commercial aero engine program, we will continue to secure stable revenue in our core businesses in the commercial and defense fields. Furthermore, we will continue to promote initiatives toward the creation of future opportunities, such as technological development contributing to the strengthening of defense capability and the core technological development of hydrogen aircraft toward the realization of a decarbonized society.

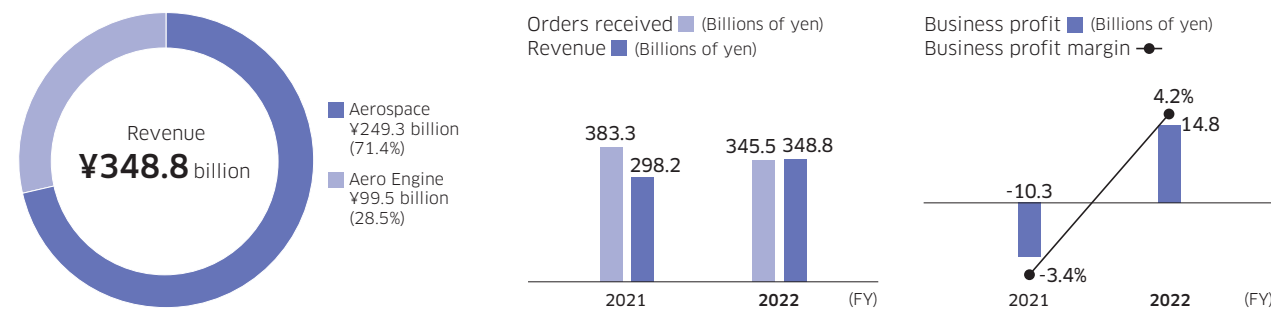


Hiroyoshi Shimokawa
President, Aerospace Systems Company

Main Products

- Aircraft for the Japan Ministry of Defense
- Commercial helicopters
- Jet engines
- Parts for commercial aircraft
- Missiles/Space equipment
- Aerospace gearboxes

Achievements in Fiscal 2022



Orders received	Change from previous fiscal year ↓	Decreased compared to the previous fiscal year when major orders were received from MOD despite an increase in component parts for commercial aero engines
Revenue	Change from previous fiscal year ↑	Increased due to an increase in component parts for commercial aero engines and Boeing
Business profit	Change from previous fiscal year ↑	Improved due to revenue increase and a profitability improvement in component parts for commercial aero engines

SWOT Analysis by Business

Core Competence (Strengths)	Aerospace	<ul style="list-style-type: none"> • Technological capabilities as a manufacturer of finished aircraft acquired through the defense aircraft business (system integration capabilities) • Technological capabilities based on international joint development with Boeing, and sophisticated, large-scale production facilities • High quality and productivity through the Kawasaki Production System (KPS)
	Aero Engine	<ul style="list-style-type: none"> • Sophisticated technological capabilities built through international joint development projects and developing engines for defense aircraft • High quality and productivity through leading-edge production technology
	Shared	<ul style="list-style-type: none"> • Broad expansion of development, manufacturing, and services to aircraft and aero engines
Challenges (Weaknesses)		<ul style="list-style-type: none"> • High degree of reliance on specific customers (high-volatility revenue structure) • Businesses that require large volumes of invested capital
Opportunities	Aerospace	<ul style="list-style-type: none"> • Substantial recovery in commercial aircraft demand due to the post-COVID rebound • Long-term growth in air passenger and air freight volume in line with economic growth in emerging countries • Increase in defense budget and ongoing development and production of domestically-manufactured defense equipment • Improvement in profitability of defense equipment • Prospects of defense equipment exports
	Aero Engine Shared	<ul style="list-style-type: none"> • Increase in demand as a result of long-term growth in the commercial aircraft market • Decarbonization of the aircraft industry
Risks (Threats)	Aerospace	<ul style="list-style-type: none"> • Fiercely competitive environment, reflecting competition for market share between Boeing and Airbus • Rise of manufacturers in emerging countries • Supply chain risks throughout international joint development structures
	Aero Engine	<ul style="list-style-type: none"> • Development risks related to introducing cutting-edge technologies • Substantial impact if risks materialize (risks borne by other companies) in international joint development projects (commercial aero engines)

Initiatives to Achieve Group Vision 2030

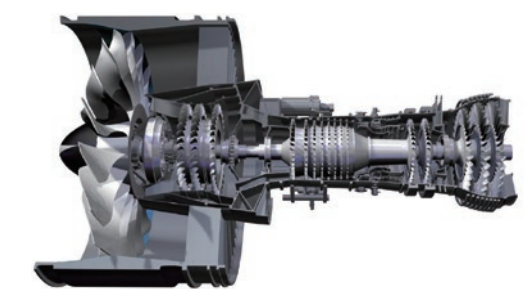
A safe and secure remotely connected society	-
Near-future mobility	<ul style="list-style-type: none"> • Developing vertical take-off and landing (VTOL) aircraft to link logistics bases and cover the last mile • Realizing urban transportation that seamlessly connects people and freight • Provision of Z-Leg™ (Zeta Leg), a one-stop service for arranging air travel
Energy and environmental solutions	<ul style="list-style-type: none"> • Studying CO₂-powered (hydrogen-fueled) air transportation systems

Priority Measures and Concrete Initiatives

Securing stable revenue in core business	<ul style="list-style-type: none"> • Reducing costs for existing orders for aircraft from Boeing and for Aero Engine for commercial aircraft to secure profit • Re-development of supply chains and systems for increasing production in conjunction with the recovery of demand • Steadily promoting existing developmental orders and mass production contracts for defense aircraft and helicopters
Revising technology strategy in accordance with market changes	<ul style="list-style-type: none"> • Promoting development of technology including the use of civilian technologies to expand orders in the defense business and reinforce defense capabilities • Initiating development of environmental technologies for a decarbonized society leveraging the NEDO Green Innovation Fund
Strengthening the financial base	<ul style="list-style-type: none"> • Reviewing the fixed cost structure • Reducing inventories through production innovation



RC-2



PW1100G-JM
Photo provided by Japanese Aero Engines Corporation

Rolling Stock

A railway systems manufacturer meeting customer needs by delivering the highest standard of technology

Since Kawasaki began the manufacture of rail cars in 1906, we have expanded our business centering on plants in Japan and the United States as Japan's top manufacturer possessing the highest levels of technology.

Continuing from fiscal 2021, in fiscal 2022 our structural reforms bore fruit, and we were able to yield a profit for the second consecutive period. Furthermore, in our North American business, due to the credibility we have gained through our extensive track record, we received an option order from New York City Transit Authority for an additional 640 new-generation R211 subway cars. This order provided a firm foothold toward the stability of our North American business.

Against the background of structural reforms carried out since our split from Kawasaki Heavy Industries, Ltd. in October 2021, we will strive to enhance profitability by accepting orders at reasonable prices, promoting concentration on focal markets, and introducing the production know-how of the Kawasaki Group.

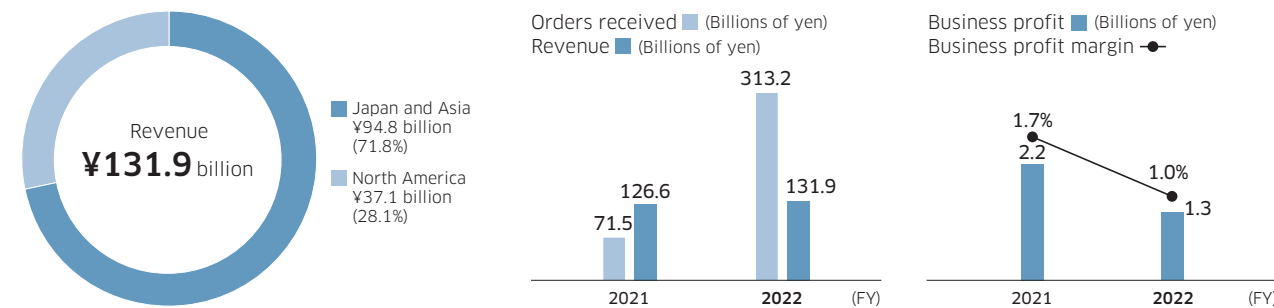


Hiroshi Murao
Representative Director, President and Executive Officer,
Kawasaki Railcar Manufacturing Co., Ltd.

Main Products

- Electric train cars (including Shinkansen [bullet trains] and new transit systems)
- Electric and diesel locomotives
- Passenger coaches
- Bogies

Achievements in Fiscal 2022



Orders received	Change from previous fiscal year ↑	Increased due to major orders such as optional R211 subway cars for New York City Transit
Revenue	Change from previous fiscal year ↑	Increased due to an increase in the U.S. and Japan
Business profit	Change from previous fiscal year ↓	Deteriorate due to the impact of delays in Long Island Rail Road project in the U.S., despite an increase in revenue

SWOT Analysis by Business

Core Competence (Strengths)		<ul style="list-style-type: none"> • Ability to fulfill contracts cultivated from extensive domestic and overseas track record • Partnership capabilities with other companies in execution of overseas projects (Kawasaki Initiative) • High-tech expertise built on comprehensive heavy industry strengths leveraging synergies with other business areas
Challenges (Weaknesses)		<ul style="list-style-type: none"> • Small business scale in comparison with major overseas competitors • Business model centered on rolling stock supply (fulfilling railway system needs through facility to engage in external partnerships)
Opportunities	<ul style="list-style-type: none"> Domestic Market Asian Emerging Nations Market North American Market Common to all Markets 	<ul style="list-style-type: none"> • Demand for rail cars that contribute to carbon neutrality • Shift of cargo transportation to railways • Demand for urban transportation infrastructure • Participation in high-speed railway project in India • Demand for subway and commuter train rolling stock • Provision of remote track monitoring • Expanding stock demand including components, maintenance contracts, and repair and rebuild work for rolling stock
Risks (Threats)	<ul style="list-style-type: none"> Domestic Market Asian Emerging Nations Market North American Market 	<ul style="list-style-type: none"> • Decline in operations at domestic plants due to lower investment in rail cars during the COVID-19 pandemic • Intensifying price competition due to declining demand • Country risk in new markets for Kawasaki • Emergence of Chinese companies • Soaring prices for materials and equipment • Securing human resources

Initiatives to Achieve Group Vision 2030

A safe and secure remotely connected society	<ul style="list-style-type: none"> • Streamlining of rolling stock and rail track maintenance, promotion of condition monitoring projects aimed at automation and labor saving
Near-future mobility	<ul style="list-style-type: none"> • Achieving railways mobility which seamlessly connects people and commodities
Energy and environmental solutions	<ul style="list-style-type: none"> • Catering to carbon-neutral needs for internal combustion rolling stock

Priority Measures and Concrete Initiatives

Compliance with delivery schedules for overseas projects	<ul style="list-style-type: none"> • Dhaka MRT Line-6 • Fiscal 2023: Delivery of last rail cars and depot equipment • U.S. R211 • Fiscal 2024: Delivery of last rail cars (base contract) • Fiscal 2025: Start of delivery of mass production rail cars (Option 1 contract)
Achieving quality levels trusted by customers	<ul style="list-style-type: none"> • Reduction of failures and reworking expenses • Further advancement of the Kawasaki Production System (KPS) and deployment at plants in North America
Expansion of component and aftersales service sales and of maintenance businesses	<ul style="list-style-type: none"> • Expansion of remote track monitoring equipment in North America and development of a service provision platform • Expansion of sales of rolling stock condition monitoring equipment for domestic railways operators



Dhaka MRT Line-6 cars for Dhaka Mass Transit Company Limited in Bangladesh



4000 series subway cars for Yokohama City Transportation Bureau

Energy Solution & Marine Engineering

Seamless progress from low carbon to decarbonization through highly efficient products and hydrogen technologies

Ever since the establishment of the Kawasaki Tsukiji Shipyard in 1878, we have been developing business in the four fields of energy, plants, marine machinery, and ship and offshore structures based on our strengths in technological prowess and quality. In addition, we have set "hydrogen and carbon neutral" as a new business field in fiscal 2023.

In fiscal 2022 revenue improved from the loss incurred in fiscal 2021 due to the increased price of steel material, and there also was a considerable increase in orders for submarines for the Japan Ministry of Defense, LPG/ammonia carriers, and power generation facilities.

In our existing businesses, we will endeavor to maintain and improve earnings power through appropriate risk management. Furthermore, we will promote the development of products and transition products that contribute to the low-carbon and decarbonized society and aim to achieve high growth in the domain of "energy and environmental solutions" set out in the Group Vision 2030.



Motohiko Nishimura
President,
Energy Solution &
Marine Engineering Company

Main Products

Hydrogen and carbon neutral

- Shipping/receiving terminals
- Liquefied hydrogen tanks
- Onshore LNG tanks
- Carbon dioxide capture, utilization and storage (CCUS)

Energy

- Gas turbine cogeneration systems
- Gas and diesel engines for power generation
- Steam turbines
- Aerodynamic machinery
- Boiler plants
- Combined cycle power plants (CCPPs)

Plant

- Industrial plants (cement, fertilizer, and others)
- Municipal waste incineration plants
- Material handling systems
- Tunnel boring machines
- Crushing machines

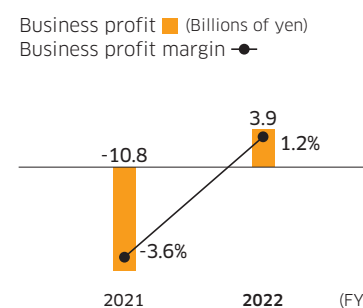
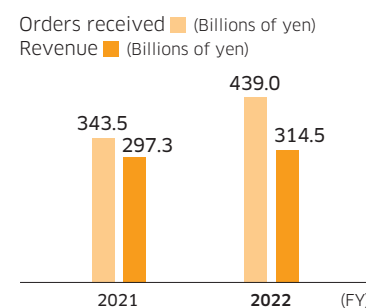
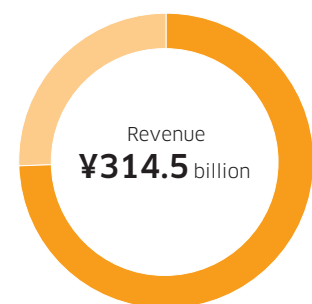
Marine machinery

- Marine gas turbines/reduction gear
- Marine reciprocating engines
- Marine propulsion systems

Ship & offshore structure

- Gas carriers
- Liquefied gas carriers
- Jetfoils
- Submarines

Achievements in Fiscal 2022



Orders received	Change from previous fiscal year ▲	Increased due to an increase in submarine for the Japan Ministry of Defense, LPG/ammonia carriers, and power generation facilities
Revenue	Change from previous fiscal year ▲	Increased due to an increase in Energy business and construction work for submarines for the Japan Ministry of Defense, despite a decrease in construction work for domestic municipal waste incineration plants
Business profit	Change from previous fiscal year ▲	Improved due to revenue increase and an improved equity in gains, despite a deterioration in some projects

SWOT Analysis by Business

Core Competence (Strengths)	<ul style="list-style-type: none"> • Proposal of solutions that use synergies generated through combinations of high-efficiency core components • Hydrogen production, storage, transportation, and use (power generation) technology • Sales structures with close ties to local communities that use overseas sites in the energy business • Integrated engineering prowess acquired and refined through various plant projects • Streamlining of capacities for business proposals for all optimal ship propulsion systems, centered on core components • Energy-saving, environmental burden-reducing technologies, and ability to develop new ship designs • High-efficiency and high-performance core components that can seamlessly achieve a transition from low carbon to decarbonization while using customer assets
Challenges (Weaknesses)	<ul style="list-style-type: none"> • Number of construction projects undertaken at overseas hydrogen-related plants • Recognition of energy products in overseas markets • Cost reduction of domestic commercial vessel built at domestic shipyard and propulsion systems for private vessels
Opportunities	<ul style="list-style-type: none"> • Acceleration of trend to realize the goal of carbon neutrality, including strengthening of environmental regulations • Expanding demand for facilities that can use both existing fuels and hydrogen in response to increasing needs for decarbonization • Growing demand for energy and infrastructure in emerging and resource-rich countries
Risks (Threats)	<ul style="list-style-type: none"> • Weakening investment appetite paralleling economic slowdowns in emerging countries and resource-rich countries • Energy policy trends in respective countries (taxonomy regulations, amendments to subsidies systems, changes accompanying geopolitical risks, etc.) • Global-level changes to steel materials prices, raw materials and materials costs, logistics costs, and energy prices

Initiatives to Achieve Group Vision 2030

* Autonomous Underwater Vehicle

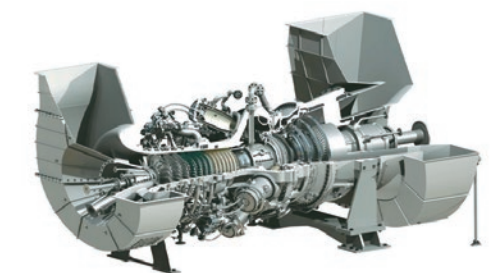
A safe and secure remotely connected society	<ul style="list-style-type: none"> • Promoting the uptake of the Successor-G remotely-operated robotic system that enables diverse work styles • Providing solutions for disaster response, such as stand-by gas turbines • Promoting the automation of waste incinerator operation • Developing AUVs* (SPICE)
Near-future mobility	<ul style="list-style-type: none"> • Promoting the uptake of electric and hybrid propulsion systems (gas engine hybrid-propelled/battery-propelled) for environmentally-friendly vessels • Demonstration testing of advanced safety berthing support system
Energy and environmental solutions	<ul style="list-style-type: none"> • Quickly establishing a hydrogen supply chain (production, transportation, storage, utilization) • Accelerating initiatives aimed at the realization of a hydrogen-based society by working with stakeholders • In an environment where variable renewable energy is increasing, social implementation of gas turbines and gas engines that can provide "adjustability" and energy storage systems with virtual synchronous generator (iVSG*) functions that can provide "inertia" • Undertaking development aimed at the practical application of carbon recycling technology

Priority Measures and Concrete Initiatives

Providing products that contribute to the achievement of a low/decarbonized society	<ul style="list-style-type: none"> • LPG/ammonia carriers • High-efficiency gas turbine/gas engines • New municipal waste incineration plants (energy-saving) • Large-capacity battery propulsion systems for electrically-operated tankers
Developing products for the transition to decarbonized energy	<ul style="list-style-type: none"> • Commercialization of liquefied hydrogen carriers • Commercialization of hydrogen shipping/receiving terminals • Development of marine hydrogen boilers and marine hydrogen-fueled engines • Development of the markets for gas turbine modification work and combustors for hydrogen mixed fuel • Promotion of the introduction of energy-saving systems that use gas turbines and gas engines and can support the transition from low-carbon (natural gas-fired and hydrogen mixed fuel) to decarbonization (hydrogen-only fired) • Development of technologies to separate and capture CO₂ in municipal waste incineration plants



86,700 m³ LPG-fueled LPG/ammonia carrier



L30A 30 MW ultra-high-efficiency industrial gas turbine

Precision Machinery & Robot

Building the future for people and society through integrated solutions that use hydraulic systems and robots

We are contributing to the development of industry both in Japan and overseas, in the field of hydraulic components and systems as a top maker with the industry's foremost scale and production equipment and in the field of robotics as a pioneer of industrial robots.

In fiscal 2022, on the one hand we achieved our highest ever revenue for robots for semiconductor manufacturing equipment, but on the other we struggled due to the tight lockdown policy and stagnation of the construction machinery market in China. In addition, it is expected that in fiscal 2023 semiconductor market conditions will temporarily decline and the construction machinery market in China will slump, so the business environment is becoming increasingly severe.

In the field of hydraulic components and systems, our aim is to improve our profitability by utilizing Kawasaki's strengths in quality and development capability to introduce new products and systems in response to the electrification and automation of construction machinery. And in the field of robotics, through open innovation we will tap new fields with high levels of growth potential, such as medical care and logistics.

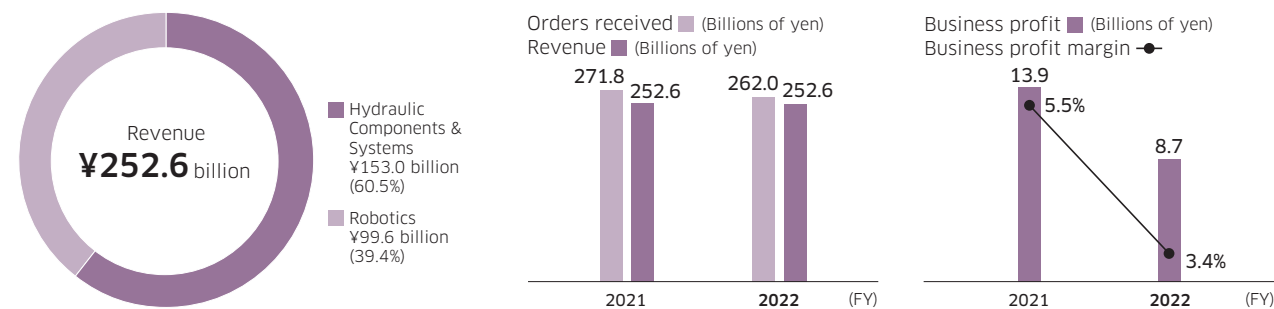


Hidehiko Shimamura
President,
Precision Machinery & Robot Company

Main Products

- Hydraulic components for construction machinery
- Hydraulic components for agricultural machinery
- Hydraulic components and systems for industrial machinery
- Hydraulic steering gears for marine products
- Hydraulic deck machinery for marine products
- Industrial robots
- Medical and pharmaceutical robots

Achievements in Fiscal 2022



Orders received	Change from previous fiscal year ↓	Decreased due to a decrease in hydraulic components for construction machinery market in China despite an increase in Robotics
Revenue	Change from previous fiscal year →	Remained at the same level due to an increase in Robotics despite a decrease in hydraulic components for construction machinery market in China
Business profit	Change from previous fiscal year ↓	Decreased due to higher prices of raw materials and electrical components, temporarily reduced operations due to the China's lockdown, and decrease in hydraulic components for construction machinery market in China

SWOT Analysis by Business

Core Competence (Strengths)	Hydraulic Components & Systems	<ul style="list-style-type: none"> Accumulated world-class, leading-edge technology, systemization capabilities, and brand power in the area of excavator hydraulic machinery Ability to respond to customer requests
	Robotics	<ul style="list-style-type: none"> Diverse production sites within the Group as a comprehensive heavy industries enterprise Ability to develop applications and make system proposals closely matched to customer needs Ability to create new technologies and new fields in such areas as medicine and remote control technology
Challenges (Weaknesses)	Hydraulic Components & Systems	<ul style="list-style-type: none"> Sales expansion for aftersales service business High percentage of sales to the Chinese construction machinery market
	Robotics	<ul style="list-style-type: none"> Need to expand business to realize merits of scale
Opportunities	Hydraulic Components & Systems	<ul style="list-style-type: none"> Advances in electrification and automation of construction machinery Need to expand sales in such fields as agricultural machinery and forestry machinery
	Robotics	<ul style="list-style-type: none"> Expansion of fields of robot application through the realization of coexistence and collaboration between humans and robots Expansion of demand intended to eliminate labor shortages and raise quality Progress in use of robots beyond industrial applications (such as medical treatment and nursing care)
Risks (Threats)	Hydraulic Components & Systems	<ul style="list-style-type: none"> Emergence of competing manufacturers and intensifying competition in the Chinese construction equipment market Long-term slump in the Chinese construction machinery market
	Robotics	<ul style="list-style-type: none"> Increasingly fierce competition with rival companies Sluggish demand for semiconductor manufacturing machinery
Shared	Shared	<ul style="list-style-type: none"> Rising materials costs

Initiatives to Achieve Group Vision 2030

A safe and secure remotely connected society	<ul style="list-style-type: none"> Developing healthcare-related businesses, such as the <i>hinotori</i>™ surgical robot system and a robotic operating table Building the remote robot platform business connecting people who want to work with businesses seeking labor
Near-future mobility	<ul style="list-style-type: none"> Creating delivery robots to link logistics bases and cover the last mile Trial of in-hospital delivery services started using the FORRO indoor delivery robot
Energy and environmental solutions	<ul style="list-style-type: none"> Developing hydrogen fuel-related products Reinforcing and expanding the hydraulic machinery and systems solutions business

Priority Measures and Concrete Initiatives

Developing electrification and automation technologies for construction machinery	<ul style="list-style-type: none"> Developing and supplying the latest hydraulic machinery and systems for electrification and automation to support customers' development of future-oriented construction machinery
Developing hydrogen-related products for realization of a decarbonized society	<ul style="list-style-type: none"> Started accepting orders for energy-saving hydrogen compressors for hydrogen stations
Promotion of open innovation	<ul style="list-style-type: none"> Accelerating the launch of new products through collaboration with start-ups (lineup of collaborative robots in EMEA regions)



Development of hydraulic machinery and systems in response to the electrification and automation of construction machinery



Nyokkey social robot relating to a safe and secure remotely connected society and near-future mobility

Powersports & Engine

Let the Good Times Roll! Kawasaki delivers the ultimate in excitement

Ever since Kawasaki commenced the production of engines for motorcycles in 1953, we have been turning out innovative products based on our company mission of "Let the Good Times Roll."

Fiscal 2022 was a difficult year. The outdoor leisure boom sparked by the COVID-19 pandemic showed signs of subsiding, and the impact of rising material and component cost and logistics confusion continued. Nevertheless, our shift to reasonable prices backed by improved brand power and timely management utilizing our agility as an independent company were effective, and we were able to achieve further growth over fiscal 2021.

Going forward, in the off-road four-wheeler segment, which is expected to see continued market growth, we will expand production capacity through the construction of a new factory and strive to expand the business. We will also promote positive management, such as accelerating the development of battery electric vehicles and hybrid electric vehicles with an eye on future low-carbon emissions and decarbonization.

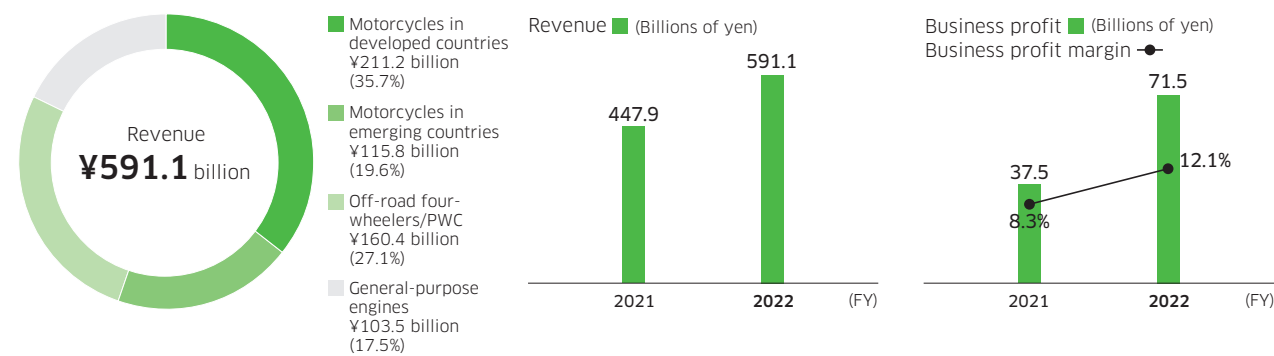


Hiroshi Ito
Representative Director, President and Chief Executive Officer,
Kawasaki Motors, Ltd.

Main Products

- Motorcycles
- Off-road four-wheelers (Utility vehicles, ATVs)
- Personal watercraft (PWC)
- General-purpose engines

Achievements in Fiscal 2022



Revenue	Change from previous fiscal year	Increased due to an increase in motorcycles for North America and Southeast Asia, four-wheelers for North America, and general-purpose gasoline engines, in addition to the impact from the depreciation of the yen and appropriate pricing
Business profit	Change from previous fiscal year	Improved due to a revenue increase, despite rising raw material and logistics costs

SWOT Analysis by Business

Category	Business	Details
Core Competence (Strengths)		<ul style="list-style-type: none"> • Sales and marketing capabilities that realize unique, premium brands • Development, production, procurement, and quality assurance capabilities that create products embodying both heritage and innovation • Global production, sales, and service structure • Advanced technology expertise built on comprehensive heavy industry strengths leveraging synergies with other companies in the Kawasaki Group
		<ul style="list-style-type: none"> • Securing production capacity to respond to rapidly rising demand • Building agile organizational structures that can respond to rapid change
Opportunities	Motorcycles	<ul style="list-style-type: none"> • Stable demand in developed countries with mature markets • Medium- to long-term market expansion in emerging countries due to expanding populations and economic growth • Market expansion in North America due to well-established demand for outdoor leisure
	Utility vehicles, ATVs & PWC General-purpose engines Shared	<ul style="list-style-type: none"> • Firm growth of the lawn-related market, reflecting U.S. housing market expansion • Collaborations and alliances with other companies • Establishing a brand image in the carbon neutrality field
Risks (Threats)	Motorcycles	<ul style="list-style-type: none"> • Expansion into the leisure sector by brands from emerging markets, such as China and India • Intensifying price competition in emerging markets
	Utility vehicles, ATVs & PWC Shared	<ul style="list-style-type: none"> • Intensifying product development competition and price competition • Rising customs tariffs and parts costs accompanying intensification of U.S.-China trade friction • Attenuating demand due to global inflation and tightened monetary policies, including increased interest rates in the U.S. • Difficulty procuring engine parts in conjunction with advancing electrification • Higher development expenses and product prices due to tightening of environmental regulation

Initiatives to Achieve Group Vision 2030

A safe and secure remotely connected society	<ul style="list-style-type: none"> • Providing advanced rider and driver support • Providing disaster response solutions
Near-future mobility	<ul style="list-style-type: none"> • Realizing a society equipped to achieve the safe environmentally-friendly mobility of people and commodities • Commercializing new modes of mobility towards the elimination of manpower shortages in the logistics field
Energy and environmental solutions	<ul style="list-style-type: none"> • Making use of hydrogen fuel • Shifting to battery electric vehicles/hybrid electric vehicles

Priority Measures and Concrete Initiatives

Supplying products as much as demanded	<ul style="list-style-type: none"> • Continuously introduce new models • Flexibly change production and sales plans • Maintain appropriate inventory levels
Expansion of the off-road four-wheeler business and decarbonization/electrification solution	<ul style="list-style-type: none"> • Investing in development toward the enhancement of product competitiveness • Start and stabilization of operations at new Mexican plant • Development and launch of electrified and hybrid models • Joint research on hydrogen engines with other companies
Promoting business process re-engineering through DX	<ul style="list-style-type: none"> • Increased efficiency of global operations through digitalization • Reduction of development times and higher efficiency through the use of digital technologies
Securing free cash flow	<ul style="list-style-type: none"> • Securing stable free cash flow for future investment



MULE PRO-FXT™ 1000 LE RANCH EDITION



Ninja e-1 and Z e-1