

Climate Change

Approach

The IHI Group sees taking measures against climate change as a particularly important issue in ESG management and is doing everything possible to accomplish this. Climate change has an enormous social and economic impact and is a vital social issue for companies to address in order to realize sustainability and one that the IHI Group believes it should focus on.

Participation in Third-party Initiatives

TCFD

The IHI Group became a signatory to the Task Force on Climate-related Financial Disclosures (TCFD) by resolution of the Board of Directors in May 2019. This framework plays a role as a tool to formulate strategies able to strengthen risk management and cultivate business opportunities.



GX League Basic Concept

In February 2022, the IHI Group endorsed the GX League Basic Concept announced by the Ministry of Economy, Trade and Industry, joining it in April 2023.

The GX League is a group of companies that are actively working on Green Transformation (GX), established as a forum for discussion on reforming socioeconomic systems and practices in their entirety for the creation of new markets, together with government, academics, and financial players who are also taking part in the GX challenge.



Relationships with Industry Associations

The IHI Group is a member of various industry associations including the Japan Society of Industrial Machinery Manufacturers and the Society of Japanese Aerospace Companies. The Group also participates in seminars and other events held by government and industry groups to gather information and share it within the Group.

The IHI Group sets targets and takes action to meet or exceed the climate change targets set by governments and industry organizations.

Responses to and Support for Public Regulations

The IHI Group supports laws, policies, regulations, and so on relating to climate change and responds to them appropriately at each domestic and overseas business site.

In particular, IHI is a specified business operator under the Act on Rationalization of Energy Use and Shift to Non-fossil Energy (the Energy Conservation Act), and as such, is obligated to make efforts to reduce energy consumption intensity by an average of 1% per year. In the IHI Group Environmental Action 2023 plan, which covers fiscal 2023 to fiscal 2025, the Group sets reduction targets in line with the Energy Conservation Act. By implementing energy-saving measures at each site, the entire Group is promoting the efficient use of energy.

Climate Change

Governance

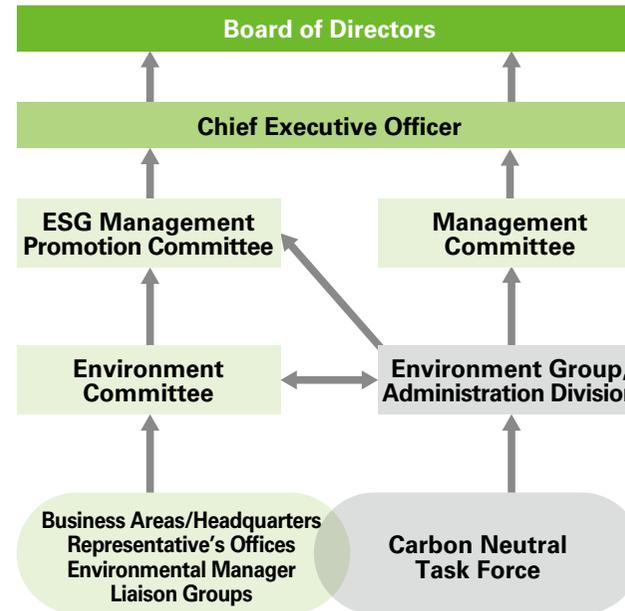
Structures for Implementing Initiatives to Become Carbon Neutral

The IHI Group deliberates on and determines approaches and important matters concerning climate change countermeasures through the Environment Committee, a Group-wide body.

In fiscal 2021, the Group established a task force comprising members from different divisions to promote initiatives to become carbon-neutral throughout the entire value chain. Until fiscal 2023, the Administration Division and Corporate Planning Division served as the secretariat to the task force, but in fiscal 2024, the secretariat was consolidated within the General Affairs Division to carry out these activities more efficiently and accelerate their implementation. Reports on the activities of the task force are made to the Environment Committee, which deliberates on them. The details of discussions by the Environment Committee are reported to the ESG Management Promotion Committee, and feedback received from management is disseminated throughout the Group.

Amid discussions at these meetings and committees, matters related to important management decision-making are deliberated on by the Management Committee, which serves as the decision-making body for management execution, and are then submitted to the Board of Directors.

● System for Achieving Carbon Neutrality



P. 11 Sustainability Management

P. 16 Environmental Management

Climate Change

Strategy

IHI Carbon-Neutral 2050

The IHI Group is committed to achieving the Paris Agreement's effort target of "Keeping the global average temperature increase to 1.5°C compared to pre-industrial levels" by promoting "IHI Carbon-Neutral 2050."

The Group aims to halve direct and indirect greenhouse gas emissions (Scope 1, 2) from its business activities compared to 2019 by fiscal 2030 and achieve effectively zero emissions by 2050. As short-term measures, the Group established the IHI Group Environment Action Plan 2023 (FY2023–FY2025) and set targets of reducing total Scope 1 and 2 emissions by 12,000 t-CO₂e and reducing energy intensity (energy consumption per unit of sales) by 3% compared to fiscal 2022 through capital investment.

The Group also aims to achieve effectively zero greenhouse gas emissions released in upstream and downstream processes (Scope 3) by 2050. The Group formulated the Scope 3 Emissions Reduction Roadmap, will reduce emissions with a focus on category 11 (use of sold products) and category 1 (purchased products and services), which have particularly large emissions, to achieve carbon neutrality across Scopes 1, 2, and 3.

Possessing decarbonization technology, the IHI Group will take the lead in contributing toward the realization of a global carbon-neutral society through its efforts in achieving this goal.

IHI Carbon-Neutral 2050

Our 2050 goal to achieve carbon neutrality throughout the entire value chain

Climate Change

Risk and Opportunity Due to Climate Change

The IHI Group conducted simple scenario analyses of four business domains significantly impacted by climate change: the energy business, bridge and water gate business, vehicle turbocharger business, and the civil aero engine business.

The first step set ① a carbon-neutral world as the highest transition risk and ② a world greatly impacted by climate change as the highest physical risk in our own independent scenarios drafted with reference to external scenarios created by the International Energy Agency (IEA) and Intergovernmental Panel on Climate Change (IPCC). The second step identified risks and opportunities for all four business domains. The third step assessed the impact each business has. The fourth and last step drafted countermeasures according to our findings.

In the future, the IHI Group will enhance its ability to leverage scenario analyses in business strategy through efforts, such as assessing the financial impact of climate change.

The IHI Group will proactively incorporate the concepts pursued by TCFD signatories in management policies and business strategies, contributing not only to the sustainable development of our Company, but society as a whole.

Scenario Analysis Process

Step 1 Set independent scenarios

The IHI Group referred to external scenarios* to set independent Group scenarios in anticipation of the world in 2050.

- ① High-transition risk scenario
- ② High-physical risk scenario

Step 2 Identify risks and opportunities

The IHI Group identifies risk and opportunities for the two scenarios created in Step 1.

Step 3 Evaluate the business impact

The IHI Group assigns point values for the potential of occurrence and scale of impact for each risk and opportunity identified in Step 2. The intersection between both define the impact and estimate the influence the risks and opportunities have on our businesses.

Step 4 Formulate countermeasures

The IHI Group formulates measures to respond to these risks and opportunities to foster resilient businesses.

* External reference scenarios:

- A carbon-neutral world
IEA 2DS (qualitative assessment based on the ETP2017 Global technology penetration in LDV stock by scenario, global electricity generation, etc.)
- A world greatly impacted by climate change
RCP 8.5 (qualitative assessment based on the portions relating to wind and flood damage risk of IPCC AR5 WG2)

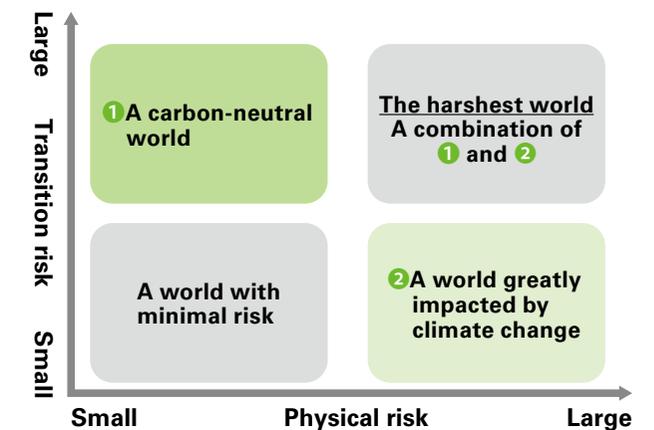
IHI Group Scenarios

① High-transition risk scenario

This scenario presents ① a carbon-neutral world where society at large shifts to mitigate climate change and stop all greenhouse gas emissions.

② High-physical risk scenario

This scenario presents ② a world greatly impacted by climate change that needs to adapt to the physical impact and directly confront drastic devastation by natural disasters.



Countermeasures set to address the two extreme worlds anticipated by these IHI scenarios enhance the resilience of IHI Group businesses against future risks.

The IHI Group can also reduce risks against the harshest world facing both these scenarios (① and ②) at the same time by integrating the countermeasures for each.

Climate Change

The IHI Group divides the risks and opportunities identified for each of the four business domains and the countermeasures into two categories: **1. risks, opportunities, and countermeasures specific to each business** and **2. risks, opportunities, and countermeasures shared across all businesses**.

Risks, opportunities, and countermeasures in 1. are shown in the table below while those in 2. are shown in the table on the next page.

1. Main Risks, Opportunities, and Countermeasures Specific to Each Business (Four Main Business Domains)

	Energy Business	Bridge and Water Gate Business	Vehicle Supercharger Business	Civil Aero Engine Business
(1) Risks, Opportunities, and Main Countermeasures in a Carbon-neutral World				
Risks	<ul style="list-style-type: none"> Declining demand for large fossil fuel power generation equipment 	<ul style="list-style-type: none"> Increasing procurement costs (carbon tax, etc.) for materials with high CO₂ emissions (concrete, steel, etc.) 	<ul style="list-style-type: none"> Declining demand for combustion engine vehicles unable to address carbon-neutral requirements and a falling demand for existing turbochargers 	<ul style="list-style-type: none"> Declining demand for aircrafts due to carbon-neutral requirements and standardization of alternative highspeed means of transportation
Opportunities	<ul style="list-style-type: none"> Increasing demand for fuel conversion, carbon capture and storage (CCUS), and other decarbonization technologies Increasing demand for regulated power supplies, storage energy, and Power-to-X to provide a stable energy supply as renewable energy becomes the standard 	<ul style="list-style-type: none"> Increasing demand for roads (bridges and tunnels) to provide a more efficient transportation network Increasing demand for railway construction due to expansion of railway systems overseas 	<ul style="list-style-type: none"> Potential to secure market competitiveness and leverage an increase in demand for turbochargers by being first to market with new turbocharger products (electric products in addition to existing models) for carbon-neutral electric vehicles (PHEV, HEV, FCV, etc.) 	<ul style="list-style-type: none"> Increasing demand for the development of aircraft engines supporting carbon neutral requirements and a rise in opportunities due to electrification of engines and utilization of advanced material technologies.
Main countermeasures	<ul style="list-style-type: none"> Rapidly deploy carbon-neutral technologies to society Promote technological development to stabilize the energy supply Expand the lifecycle business through remote monitoring and other Internet of Things (IoT) technologies 	<ul style="list-style-type: none"> Reduce construction schedules and labor costs by labor-saving, remotization, and improving construction methods through promoting digital transformation (DX) 	<ul style="list-style-type: none"> Rapid development and commercialization of turbochargers for electric vehicles that comply with carbon-neutral requirement trends 	<ul style="list-style-type: none"> Early commercialization of electric engines and advanced technologies such as advanced composites.
(2) Risks, Opportunities, and Main Countermeasures in a World Greatly Impacted by Climate Change				
Risks	<ul style="list-style-type: none"> Extreme delays due to on-site construction stoppages or disasters caused by frequent severe weather 	<ul style="list-style-type: none"> Extreme delays due to on-site construction stoppages or disasters caused by frequent severe weather 	<ul style="list-style-type: none"> Suspension of production due to disrupted supply chains caused by frequent severe weather 	<ul style="list-style-type: none"> Suspension of production due to disrupted supply chains caused by frequent severe weather
Opportunities	<ul style="list-style-type: none"> Contributing to early recovery of equipment damaged in severe weather Increasing demand for digital technologies to promote labor saving and remote operation 	<ul style="list-style-type: none"> Increasing demand to build robust national infrastructure Contributing in early recovery of infrastructure damaged in severe weather 	<ul style="list-style-type: none"> No opportunities unique to our business 	<ul style="list-style-type: none"> No opportunities unique to our business
Main countermeasures	<ul style="list-style-type: none"> Expand the lifecycle business through www monitoring and other Internet of Things (IoT) technologies 	<ul style="list-style-type: none"> Expand business beyond lifecycle business with wider perspective to include disaster prevention business Create technologies and systems that contribute to maintenance, disaster prevention, disaster mitigation, and quick recovery of infrastructure 	<ul style="list-style-type: none"> Strengthen supply chains 	<ul style="list-style-type: none"> Strengthen supply chains

Climate Change

2. Main Risks and Countermeasures Shared Across All Businesses

(1) Transition Risks and Countermeasures for a Carbon-neutral World		
Category	Main Items	Main Countermeasures and Transitioning to Opportunities
Policy and legal	Introduction of carbon taxes, stronger industrial waste regulations, raising costs due to the adoption of renewable energy and energy-efficient equipment, etc.	Reduce costs in business activities through efficient production and distribution as well as the proper management of energy consumption
Technology	Raising costs due to research to realize carbon-neutral products and services, failed technological development, etc.	Concentrate investments in technological development while staying acutely aware of policies, technologies, markets, and other social trends
Market	Declining demand for products and services with high CO ₂ emissions, etc.	Actively draft and promote business plans that always anticipate multiple business scenarios to adapt to dramatic changes in market structures
Reputation	Lost opportunities due to poor evaluations of our response to climate change, declining social credibility, etc.	Disseminate easy-to-understand information about products and services that can help both mitigate and adapt to climate change
(2) Physical Risks and Countermeasures in a World Greatly Impacted by Climate Change		
Category	Main Items	Main countermeasures
Acute/Chronic	Ceased business activities due to damaged offices and business sites caused by typhoons, floods, or other natural disasters, etc.	<ul style="list-style-type: none"> Incorporate the response to climate change into the business continuity plans of plants and offices to ensure the safety of Officers and employees and strengthen the supply chain Draft, execute, and manage advance measures in anticipation of foreseeable flood damage

P.17 Environmental Management—Strategy

Risk Management

In addition to short-term business risks, the IHI Group also manages sustainability-related risks that affect the medium- to long-term business environment as a risk to conducting business. In particular the IHI Group assesses the medium- to long-term impact of these risks to the Group and convert them into short-term business risks. The Group has clarified the roles and responsibilities of its Internal Audit Division, corporate divisions, business areas, and business divisions (including affiliated companies), which are managed under a multi-layered risk management framework.

P.112 Risk Management

Climate Change

Metrics and Targets

The IHI Group aims to achieve carbon neutrality throughout its entire value chain by 2050.

In fiscal 2023, the Board of Directors adopted a resolution setting a goal of halving the Group's fiscal 2019 GHG emissions from plants, offices, and other business establishments (Scope 1 and 2) by fiscal 2030.

CO₂ Emission and Energy Consumption Targets and Results (IHI Group Environmental Action Plan 2023 [FY2023–2025])

Action Plans	Target	KPI	FY2022 Results (Base Year)	FY2023 Results	
					Status of Achievement
Climate change	A 12,000 t-CO ₂ e reduction in Scope 1 and 2 with capital investment	Reduced amount of GHG emissions (t-CO ₂ e)	215,753 t-CO ₂ e (emissions)	211,970 t-CO ₂ e (emissions)	3,783 t-CO ₂ e reduction
	Reduce energy consumption intensity by 3% in FY2025 from that in FY2022	Energy consumption intensity (TJ/10 billion yen)	17.0	17.6	3.5% increase

GHG Emissions (Scope 1 and 2) and Energy Consumption

(Scope: IHI and consolidated subsidiaries)

Item	FY2019	FY2020	FY2021		FY2022		FY2023	
				Third-party Verification		Third-party Verification		Third-party Verification
GHG emissions (Scope 1 + Scope 2) (t-CO ₂ e)* ¹	254,227	225,066	220,138	○	215,753	○	211,970	○
Scope1 (t-CO ₂ e)	64,724	58,517	64,270	○	61,469	○	65,033	○
CO ₂ (t-CO ₂)	—	—	—	—	60,178	○	63,393	○
CH ₄ (t-CO ₂ e)	—	—	—	—	447	○ (Domestic only)	974	○ (Domestic only)
N ₂ O(t-CO ₂ e)	—	—	—	—	85	○ (Domestic only)	85	○ (Domestic only)
HFCs(t-CO ₂ e)	—	—	—	—	469	○ (Domestic only)	281	○ (Domestic only)
PFCs(t-CO ₂ e)	—	—	—	—	0	○ (Domestic only)	0	○ (Domestic only)
SF ₆ (t-CO ₂ e)	—	—	—	—	290	○ (Domestic only)	299	○ (Domestic only)
NF ₃ (t-CO ₂ e)	—	—	—	—	0	○ (Domestic only)	0	○ (Domestic only)
Scope 2 (market-based) (t-CO ₂)	189,503	166,549	155,868	○	154,284	○	146,937	○
GHG emissions intensity (t-CO ₂ e/100 million yen)* ^{2, *3}	18.3	20.2	18.8	—	15.9	—	16.0	—
Energy consumption (TJ)* ¹	2,468	2,283	2,348	○	2,294	○	2,322	○
Fuel consumption (TJ)	1,044	974	1,084	○	1,019	○	1,070	○
Electricity consumption (TJ)	1,398	1,276	1,229	○	1,230	○	1,184	○
Heat consumption (TJ)	—	7	5	○	0	○	0	○
Renewable energy used (TJ)	26	26	31	○	45	○	69	○
Energy consumption intensity (TJ/10 billion yen)* ^{2, *4}	17.8	20.5	20.0	—	17.0	—	17.6	—

*1 The total value for each item is rounded off and may not match the figures in the breakdown.

*2 The numerator of the intensity is GHG emissions (Scope 1 + Scope 2) and the denominator is net sales revenue.

*3 GHG emissions intensity in FY2023 is 14.2 t-CO₂e/100 million yen, excluding special factors.

*4 Energy consumption intensity in FY2023 is 15.6 TJ/10 billion yen, excluding special factors.

Third-party Verification of Data

JQA		No.1811004815
Environmental Information Independent Verification Report		
To: IHI Corporation		
1. Objective and Scope		
Japan Quality Assurance Organization (hereafter, "JQA") was engaged by IHI Corporation (hereafter, "the Company") to provide an independent verification on "FY2023 IHI Group Environmental Data" (hereafter, "the Report"). The content of our verification was to express our conclusion, based on our verification procedures, on whether the statement of information regarding GHG emissions, energy consumption, renewable energy consumption, total water withdrawal, total water discharge and waste discharge (hereafter, "the Environmental Information") in the Report was correctly measured and calculated, in accordance with the "FY2023* IHI Group Environmental Information Collection and Calculation Rule" (hereafter, "the Rule"). The purpose of the verification is to evaluate the Report objectively and to enhance the credibility of the Environmental Information.		
*The fiscal year 2023 of the Company ended on March 31, 2024.		
2. Procedures Performed		
JQA conducted verification in accordance with "ISO 14064-3" for GHG emissions, and with "ISAE3000" for energy consumption, renewable energy consumption, total water withdrawal, total water discharge and waste discharge respectively. The organizational boundaries of this verification include sixty domestic sites and thirteen overseas sites of the IHI Group. The scope of this verification assignment covers Scope 1 & 2 (Market-based) GHG emissions, energy consumption, renewable energy consumption, total water withdrawal, total water discharge, general waste discharge, industrial waste discharge, hazardous waste discharge and valuables for domestic sites, and Scope 1 & 2 (Country location-based) CO ₂ emissions, energy consumption, renewable energy consumption, total water withdrawal, total water discharge, waste discharge and valuables for overseas sites. The verification was conducted to a limited level of assurance and quantitative materiality was set at 5 percent of each subject of the Environmental Information in the Report. Our verification procedures include:		
<ul style="list-style-type: none"> Confirming the Rule and overall control prior to the on-site assessment. Conducting on-site verification at the Company's three domestic sites: IHI Corporation Toyosu IHI Building, Toyosu Energy Service Co., Ltd. and IHI Agri-Tech Corporation Matsumoto Head Office. The location of sampling sites for on-site assessment was selected by the Company. On-site assessment to check the Reports' scope and boundaries; monitoring points of energy consumption, renewable energy consumption, water withdrawal and discharge; GHG emission sources; waste discharge; and monitoring and calculation system. Vouching: Cross-checking the activity data against evidence. 		
3. Conclusion		
Based on the procedures described above, nothing has come to our attention that has caused us to believe that the Environmental Information in the Report is not materially correct or has not been prepared in accordance with the Rule.		
4. Considerations		
The Company was responsible for preparing the Report, and JQA's responsibility was to conduct verification of the Environmental Information in the Report only. There is no conflict of interest between the Company and JQA.		
 Sumio Asada, Board Director For and on behalf of Japan Quality Assurance Organization 1-25, Kandassudacho, Chiyoda-ku, Tokyo, Japan August 1, 2024		

Climate Change

The IHI Group calculated its Scope 3 emissions based on the GHG Protocol and the Ministry of the Environment Guideline*. Within Scope 3, emissions from category 11 (use of sold products) were the highest, followed by category 1 (purchased products and services).

* A basic guideline for calculating GHG emissions for organizations across the supply chain.

● GHG Emissions (Scope 3)

(Unit: t-CO₂e)

Item	Calculation Methods	Scope of Calculation	Emissions				
			FY2019	FY2020	FY2021	FY2022	FY2023
GHG emissions (Scope 3) total			881,504,000	322,462,000	177,593,000	184,475,000	403,575,000
1. Purchased goods and services	Calculation based on expenditures	IHI and consolidated subsidiaries	4,930,000	4,075,000	4,197,000	4,665,000	5,130,000
2. Capital goods	Calculation based on amount of capital investment	IHI and consolidated subsidiaries	270,000	162,000	145,000	205,000	239,000
3. Fuel and energy-related activities not included in Scope 1 or Scope 2	Calculation based on consumption of various types of energy	Domestic consumption of electric power and city gas only	15,000	14,000	13,000	13,000	13,000
4. Upstream transportation and delivery	Calculation based on weight, distance, and energy for each means of transportation	IHI	2,000	1,000	1,000	1,000	1,000
5. Waste generated in operations	Calculation based on waste generated	IHI and consolidated subsidiaries	10,000	8,000	8,000	8,000	9,000
6. Business travel	Calculation based on amounts of business travel expenses	IHI and consolidated subsidiaries	13,000	14,000	14,000	14,000	14,000
7. Employee commuting	Calculation based on amount of commuting expenses	IHI and consolidated subsidiaries	4,000	4,000	4,000	4,000	4,000
8. Upstream leased assets	Calculation included in Scope 1 and 2	—	—	—	—	—	—
9. Downstream transportation and distribution	Not covered*1	—	—	—	—	—	—
10. Processing of sold products	Not covered*2	—	—	—	—	—	—
11. Use of sold products	Calculation based on energy consumption by products*3	IHI and consolidated subsidiaries	876,260,000	318,184,000	173,211,000	179,565,000	398,165,000
12. End-of-life treatment of sold products	Not covered*4	—	—	—	—	—	—
13. Downstream leased assets	Calculation included in category 11	—	—	—	—	—	—
14. Franchises	Not covered*5	—	—	—	—	—	—
15. Investments	Not covered*6	—	—	—	—	—	—

*1 Many products are excluded because they are rarely transported after delivery and installation and as a result, emissions are minimal.

*2 In many instances, finished products are delivered, and even if there are parts, the emissions from assembly and so on are minimal, and as a result, they are excluded.

*3 For calculation method for civil aero engines, please refer to the following page. [P.133 Scope 3 Category 11 Calculation Method for Civil Aero Engines](#)

*4 Many products are made of metal and are recyclable, thus the final disposal volumes are minimal and the amount of waste is small, and have been excluded as a result.

*5 The IHI Group does not use a franchise format, making it ineligible.

*6 In Ministry of the Environment materials (frequently asked questions and answers on supply chain emissions calculations), category 15 applies to private financial institutions, and accordingly, is excluded.

Climate Change

Initiatives

Mitigating Climate Change (Initiatives to Become Carbon Neutral)

Reducing CO₂ Emissions from Business Activities

The IHI Group makes every effort to reduce CO₂ emissions from plants, offices, and other business establishments by both actively pursuing energy-efficient business practices and promoting the use of low-carbon energy.

Initiatives for the efficient use of energy not only enhance operations, but also cover all necessary capital investment. The Group has put in place energy management standards to drive these operational improvements. These standards aim to provide ideal operation conditions and criteria to review operational management. These standards also become a knowledge base to conduct training on energy efficiency through outside experts in an effort to heighten the management quality of Managers.

The Group's capital investments systematically renew aged equipment with energy-efficient equipment and adopt renewable energy sources. Another aspect important to reducing CO₂ emissions is shipping and transport. The IHI Group strives to promote modal shifts through greater load efficiency and active use of marine vessels.

Reducing GHG Emissions from Products and Services

The IHI Group promotes efforts to mitigate climate change through reduction in two steps: (1) Reducing greenhouse gas emissions by utilizing existing technology and equipment and (2) Building new technology and techniques. The Group will steadily continue these efforts to achieve carbon neutrality throughout the value chain.

By expanding the existing lifecycle business of the IHI Group products to its customer value chain and by improving the value it provides, the Group contributes to

the realization of carbon neutrality for its customers. The Group invests management resources derived through its lifecycle business from a customer value chain perspective into the development of new technologies and systems that contribute to carbon neutrality as well as growth businesses and development-focus businesses, aiming for both carbon neutrality and increased sustainable growth.

Moreover, by actively introducing these new technologies and systems within the IHI Group, this will in turn lead the early realization of carbon neutrality in its business activities.

● Initiatives to Become Carbon Neutral

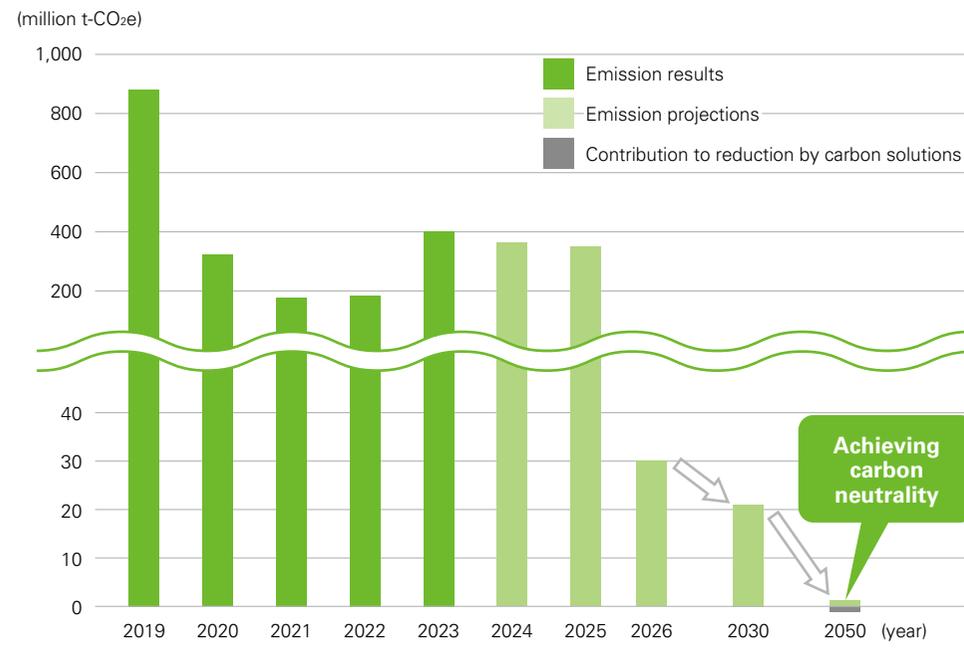
Business operations	Procurement	● Partner with eco-friendly businesses
	Production	● Pioneer the adoption of new technologies, including for in-house products and systems ● Fuel conversion ● Use of renewable energy
Products and services	Improve current technologies Transition	● Enhance efficiency of current power plants ● Lighten and electrify products ● Utilize renewable energy
	Introduce new technologies Transformation	● Use hydrogen and ammonia ● Recycle carbon

Climate Change

Reducing Scope 3 Emissions

The majority of IHI Group's Scope 3 emissions fell under category 11 (use of sold products) with coal-fired power plant boilers accounting for most of these emissions during fiscal 2023. However, new boiler construction will be completed by fiscal 2025, with emissions expected to decrease significantly from fiscal 2026 onwards. The Group also aims to significantly reduce emissions from other products included in category 11 by 2050 by converting to clean energy and improving energy consumption efficiency. In order to achieve these goals, the IHI Group has devised a roadmap for reducing its Scope 3 emissions by 2050. In line with this roadmap, the Group will continue to reduce GHG emissions throughout the life cycle of our products from the material procurement, design, and manufacturing stages and use after customer purchase. Furthermore, the Group aims to create a carbon-neutral society by working to come up with carbon solutions to reduce its carbon footprint, such as building a fuel ammonia value chain and through carbon dioxide capture, utilization, and storage (CCUS).

Scope 3 Emissions Results and Projections



Regarding civil aero engines, which serve as the IHI Group's main product, the Group is working with business partners to make its entire supply chain, including material procurement, carbon neutral. Additionally, the Group is making efforts to improve conventional aero engine fuel efficiency and develop revolutionary aero engines with the goal of improving aircraft energy efficiency as a whole. Moreover, the Group will be focusing on developing and expanding the use of sustainable aviation fuel (SAF) production technology, aiming for carbon neutrality across its entire value chain. In particular, the IHI Group has taken an interest in fuel ammonia. The Group plans to build a value chain by leveraging its strengths throughout each stage in the process, from fuel manufacturing, receiving, storage, and utilization. This will be beneficial toward expanding the use of fuel ammonia and contributing to reducing GHG emissions among society as a whole.

Scope 3 Emissions Reduction Roadmap

		2020	2030	2040	2050
Category 11	Transition to clean energy	Development of fuel conversion technology (ammonia)	Promotion and expansion of products using fuel ammonia	Promotion and expansion of the use of biomass power generation	Development of methanation technology
	Improving energy consumption efficiency	Development and expansion of the use of SAF manufacturing technology	Improvement of conventional aero engines	Development of revolutionary aero engines	Launch of revolutionary aero engines
Category 1	Carbon neutralization throughout the supply chain	Support for improving customer operations	Improvement of product functionality and efficiency	Sharing information and improving cooperation among business partners	Expansion of carbon-neutral product purchasing
		Support for business partners to decarbonize their operations	Support for business partners to decarbonize their operations	Support for business partners to decarbonize their operations	Support for business partners to decarbonize their operations
Reduction contribution	Carbon solutions	Establishment of ammonia value chain	Expansion of fuel ammonia supply	Development of CCUS technology	Reduction contribution through fuel conversion and introducing CCUS technology
		Reduction contribution through fuel conversion and introducing CCUS technology	Reduction contribution through fuel conversion and introducing CCUS technology	Reduction contribution through fuel conversion and introducing CCUS technology	Reduction contribution through fuel conversion and introducing CCUS technology

Climate Change

Adapting to Climate Change

Preparations for Disasters to Continue Business Operations

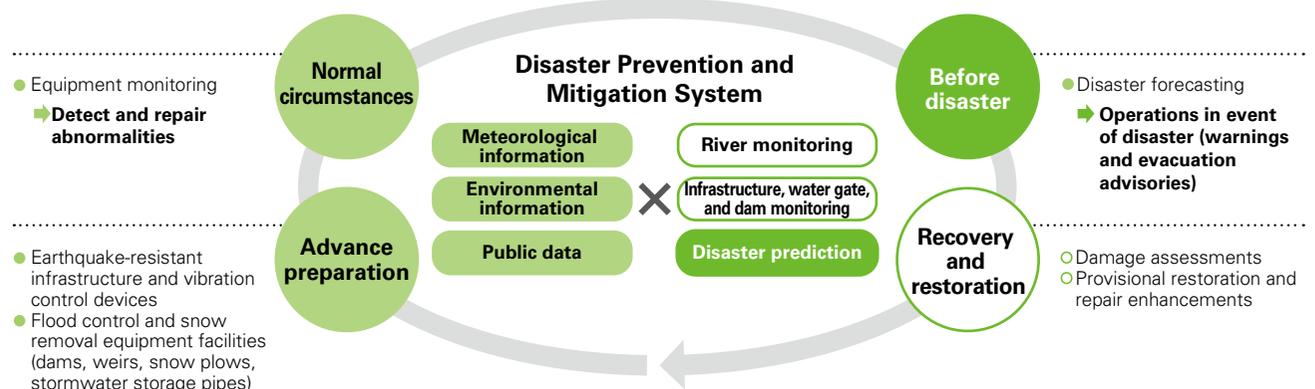
The IHI Group established rules on organizational structures and actions to be taken in normal times and during disasters and makes preparations for the occurrence of large-scale earthquakes, typhoons, and other wind and flood disasters.

P.115 Crisis Management

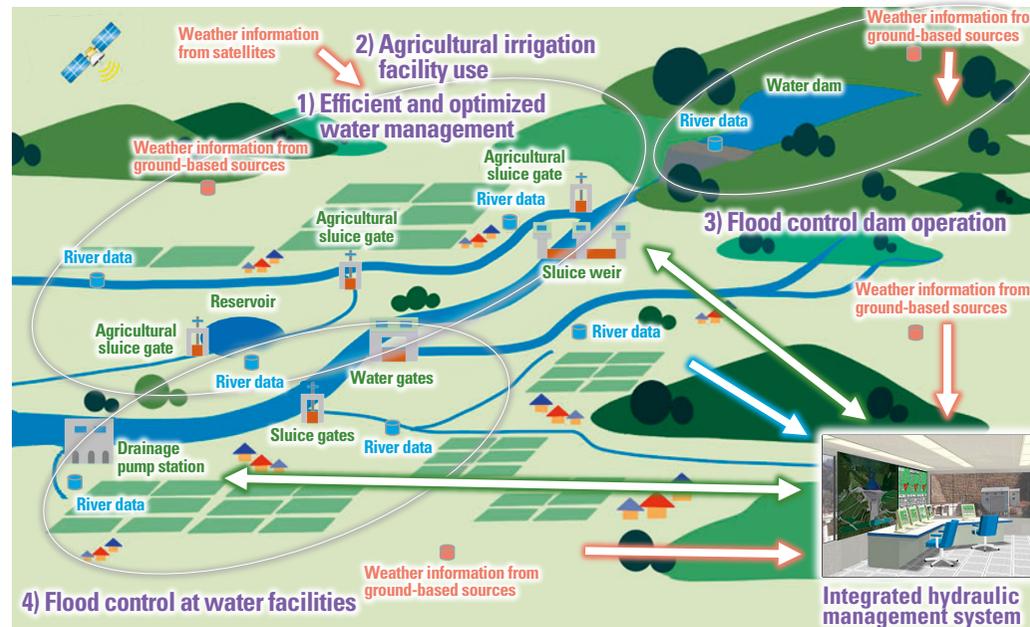
Preventing and Mitigating Disasters through Products and Services

The IHI Group seeks to create safe, secure, and livable communities and is developing infrastructure that is resilient against natural disasters and economical and building systems that integrate disaster and damage forecasts that can minimize human casualties with infrastructure. As infrastructure development, the Group is conducting timely and appropriate maintenance projects that leverage its advanced maintenance knowledge, sensing technology, and monitoring technology for infrastructure with a focus on bridges. To minimize human casualties and economic losses from disasters, the Group forecasts disasters based on meteorological information and disaster-related sensing data and performs integrated flood control management that optimally controls regional infrastructure (river management facilities including dams, sluice gates, and drainage pumping stations). In addition, the Group contributes to the rapid restoration of normal lives by providing products and services that are useful for recovery from disasters.

Creating a Resilient Social Infrastructure



Integrated Hydraulic Control



Reference

Scope 3 Category 11 Calculation Method for Civil Aero Engines

This page explains Scope 3 category 11 calculation method for the IHI Group's civil aero engines.

Scope 3 category 11 includes greenhouse gas (GHG) emissions from the use of goods and services sold by the reporting company.

Commercial aircraft are required to achieve net-zero GHG emissions by 2050 in accordance with an international agreement specified by the International Civil Aviation Organization (ICAO). The IHI Group recognizes the importance of the calculation and evaluation of GHG emissions during use of its engines to achieve carbon neutrality in the civil aero engine business, which is positioned as one of our growth businesses.

The calculation formula for the IHI Group civil aero engine Scope 3 category 11 is shown as follows. The Group calculates the value based on the amount of GHG emissions generated during the use of its aero engines sold in the relevant fiscal year, taking account of the ratio of engine to aircraft weight, and the ratio of participation in engine development programs.

Scope 3 category 11 for IHI civil aero engines

$$= \sum \left\{ \left(\begin{array}{l} \text{Number of} \\ \text{engines sold} \end{array} \times \begin{array}{l} \text{Total lifetime of} \\ \text{the sold engine} \end{array} \times \begin{array}{l} \text{Annual fuel} \\ \text{consumption} \\ \text{per engine} \end{array} \times \begin{array}{l} \text{Emission} \\ \text{factor} \end{array} \right) \right. \\ \left. \times \left(\begin{array}{l} \text{Engine weight} \\ \text{ / Aircraft weight} \end{array} \right) \times \begin{array}{l} \text{Ratio of participation in engine} \\ \text{development programs} \end{array} \right\}$$

① GHG emissions during the total lifetime of the sold aero engines in the relevant fiscal year

The Group calculates GHG emissions during the total lifetime of the sold engine in the relevant fiscal year by multiplying amount of fuel consumption during the use of engines sold (number of engines sold × total lifetime of the sold engine × annual fuel consumption per engine) by emission factor (CO₂ emissions per unit of fuel consumption).

The emission factor is based on the values defined by the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) established by ICAO. It also takes into account potential changes through the future implementation of sustainable aviation fuel (SAF).

② Ratio of engine to aircraft weight

Since the engine is a part of the aircraft, it is necessary to multiply (engine weight / aircraft weight) in accordance with the Technical Guidance for Calculating Scope 3 Emissions, the international standard GHG protocol for calculating and reporting GHG emissions.

Engine and aircraft weight are dry weight based on data provided by the European Union Aviation Safety Agency (EASA).

③ Ratio of participation in engine development programs

Civil aero engines are usually developed jointly by several companies. Companies participating in engine development programs share development costs and management risks. They bear business costs and receive profits depending on the ratio of participation under individual contracts. Considering it appropriate to allocate GHG emissions during the use of engines according to the ratio of the participation in engine development programs, the Group multiplies the relevant participation ratio.

The calculation of Scope 3 category 11 for civil aero engines does not include engine maintenance and the manufacture of spare parts.