

# Climate Change

## Climate Change

### Approach/Policies

The IHI Group sees taking measures against climate change as one important management issue 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.

### IHI Carbon-Neutral 2050

The IHI Group aims to be carbon-neutral in its processes overall by reducing the direct and indirect (Scope 1 and 2) greenhouse gas (GHG) emissions from its business activities as well as Scope 3 emissions from the upstream and downstream processes in its value chain.

## IHI Carbon-Neutral 2050

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

- Goal for fiscal 2030

The IHI Group will cut the amount of its business activity GHG emissions in half by fiscal 2030 (Scope 1 and 2) compared to fiscal 2019.

**P.93 Targets and Results**

**P.40 Innovation Management**

### Participation in Third-party Initiatives

#### TCFD

In May 2019, the IHI Group became a signatory to the Task Force on Climate-related Financial Disclosures (TCFD) by resolution of the Board of Directors. 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.



## Climate Change

### Structure

The IHI Group engages in environmental initiatives that include measures to combat climate change centered on the Environment Committee chaired by the Officer in charge of Group ESG (Director and Managing Executive Officer).

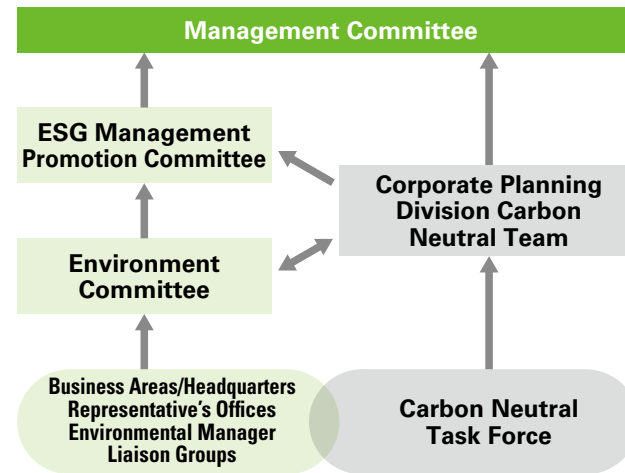
In fiscal 2021 the Group put together a task force comprising cross-divisional members for advocating carbon-neutral initiatives throughout the entire value chain. From fiscal 2022 this task force is being led by the General Manager of the Corporate Planning Division, with the Administration and Corporate Planning Divisions acting as the secretariat.

In fiscal 2023 the Company established a group in charge of carbon neutrality in its Corporate Planning Division to strengthen this setup. The group reports on its activities to the ESG Management Promotion Committee and other management team meetings to receive guidance and accelerate initiatives.

**P.11 Sustainability Management**

**P.87 Environmental Management**

### ● System for Achieving Carbon Neutrality



### Targets and Results

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

In fiscal 2023 the Board of Directors set the goal of halving the GHG emissions (Scope 1 and 2) from our plants, offices, and other business establishments during fiscal 2019 by fiscal 2030.

To date, we have been focusing on Scope 1 and 2 based on the Japanese government's 46% reduction by 2030 policy (in comparison to fiscal 2013). However, in the IPCC AR6 Synthesis Report during March 2023, it was reported that further reductions in GHG emissions are necessary in order to keep the earth's temperature rise under 1.5°C. In accordance with this, we newly developed our goals for fiscal 2030. Since the IHI Group's new mid-term goal is based on fiscal 2019, it is one that surpasses Japanese government policy and recommendations made by the IPCC.

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.

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● CO<sub>2</sub> Emission and Energy Consumption Targets and Results (IHI Group Environmental Action Plan 2019)

(Scope: IHI and consolidated subsidiaries)

Action Plans	Targets	KPI	FY2018 Results (Base Year)	FY2021 Results		FY2022 Results	
					Reduction Rate		Reduction Rate
Reduce the environmental impact in plants, offices, etc.	Reduce CO <sub>2</sub> emissions intensity* <sup>1</sup> by at least 4% by FY2022 compared to FY2018	CO <sub>2</sub> emissions intensity (t-CO <sub>2</sub> /100 million JPY)	22.2	18.8	15.3%	15.9	28.2%
	Reduce energy consumption intensity* <sup>1</sup> by at least 4% by FY2022 compared to FY2018	Energy consumption intensity (TJ/10 billion JPY)	39.3	20.0	49.1%	17.0	56.9%

\*1 Net sales revenue as the denominator.

## ● Greenhouse Gas (GHG) Emissions and Energy Consumption

(Scope: IHI and consolidated subsidiaries)

Item	FY2019	FY2020	FY2021	Presence/Absence of Third-party Verification	FY2022	Presence/Absence of Third-party Verification	
GHG	GHG emissions (Scope 1 + Scope 2)* <sup>3</sup> (t-CO <sub>2</sub> e)	254,227	225,066	220,138	○	215,753	○
	Scope 1 (t-CO <sub>2</sub> e)	64,724	58,517	64,270	○	61,469	○
	CO <sub>2</sub> (t-CO <sub>2</sub> )	—	—	—	—	60,178	○
	CH <sub>4</sub> (t-CO <sub>2</sub> e)	—	—	—	—	447	○ (Domestic only)
	N <sub>2</sub> O (t-CO <sub>2</sub> e)	—	—	—	—	85	○ (Domestic only)
	HFCs (t-CO <sub>2</sub> e)	—	—	—	—	469	○ (Domestic only)
	PFCs (t-CO <sub>2</sub> e)	—	—	—	—	0	○ (Domestic only)
	SF <sub>6</sub> (t-CO <sub>2</sub> e)	—	—	—	—	290	○ (Domestic only)
	NF <sub>3</sub> (t-CO <sub>2</sub> e)	—	—	—	—	0	○ (Domestic only)
	Scope 2 (market-based) (t-CO <sub>2</sub> )	189,503	166,549	155,868	○	154,284	○
	GHG emissions intensity* <sup>1</sup> (t-CO <sub>2</sub> e/100 million yen)	18.3	20.2	18.8	—	15.9	—
Energy	Energy consumption* <sup>2,3</sup> (TJ)	2,468	2,283	2,348	○	2,294	○
	Fuel consumption (TJ)	1,044	974	1,084	○	1,019	○
	Electricity consumption (TJ)	1,398	1,276	1,229	○	1,230	○
	Heat consumption (TJ)	—	7	5	○	0	○
	Steam consumption (TJ)	0	0	0	—	0	—
	Renewable energy used (TJ)	26	26	31	○	45	○
	Energy consumption intensity* <sup>1</sup> (TJ/10 billion yen)	17.8	20.5	20.0	—	17.0	—

\*1 Sales revenue as the denominator.


\*2 Changed the method of calculating energy consumption since fiscal 2019.

\*3 The total value for each item is rounded off and may not match the figures in the breakdown.

● CO<sub>2</sub> Emission and Energy Consumption Targets (FY2023–2025)

Action Plans	Targets	KPI
Climate change	A 6,000t-CO <sub>2</sub> reduction in Scope 1 and 2 with capital investment	Reduced amount of GHG emissions (t-CO <sub>2</sub> )
	Reduce energy consumption intensity by 3% in FY2025 from that in FY2022	Energy consumption intensity (TJ/10 billion JPY)

## ● Third-party Verification of Data

JQA		No.1811004585
Environmental Information Independent Verification Report		
<b>To: IHI Corporation</b>		
<b>1. Objective and Scope</b>		
Japan Quality Assurance Organization (hereafter, "JQA") was engaged by IHI Corporation (hereafter, "the Company") to provide an independent verification on "FY2022 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, water withdrawal, water discharge and waste discharge (hereafter, "the Environmental Information") in the Report was correctly measured and calculated, in accordance with the "FY2022* 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 2022 of the Company ended on March 31, 2023.		
<b>2. Procedures Performed</b>		
JQA conducted verification in accordance with "ISO 14064-3" for GHG emissions, and with "ISAE3000" for energy consumption, water withdrawal, water discharge and waste discharge respectively. The organizational boundaries of this verification include the head office of IHI Corporation, sixty-three domestic sites and thirteen overseas sites of the IHI Group. The scope of this verification assignment covers Scope 1 & 2 GHG emissions, energy consumption, water withdrawal, water discharge, general waste discharge, industrial waste discharge, hazardous waste discharge and valuables for domestic sites, and Scope 1 & 2 CO <sub>2</sub> emissions, energy consumption, water withdrawal, 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"> <li>Performing validation of integrated functions to check the Rule prior to the on-site assessment.</li> <li>Conducting on-site verification at the Company's four domestic sites: IHI AEROSPACE Tomioka Plant, IHI Soma No.1 Aero-Engine Works, IHI Soma No.2 Aero-Engine Works and IHI Castings Soma Plant. The location of sampling sites for on-site assessment were selected by the Company.</li> <li>On-site assessment to check the Reports' scope and boundaries; monitoring points of energy consumption, water withdrawal and discharge; GHG emission sources; waste discharge; and monitoring and calculation system.</li> <li>Vouching: Cross-checking the activity data against evidence.</li> </ul>		
<b>3. Conclusion</b>		
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.		
<b>4. Considerations</b>		
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, Kandasudacho, Chiyoda-ku, Tokyo, Japan July 25, 2023		

## Climate Change

### Initiatives

#### Initiatives to Become Carbon Neutral

In order to reach our 2050 goal to achieve carbon neutrality throughout the entire value chain, we have begun incorporating the following transition plan.

#### ● Transition Plan to Become Carbon Neutral

Items Under Our Transition Plan		Overview	Related Items
Governance		<ul style="list-style-type: none"> <li>Confirmation regarding our goals, measures, and achievements to realize IHI Carbon-Neutral 2050 at our Board of Directors meeting</li> <li>Implementation of planning, practices, and evaluation at our ESG Management Promotion Committee meeting</li> </ul>	P.11
Scenario analysis		Reflecting scenario analyses for our four major business domains in their strategies	P.96–98
Finance plan		Formulating and executing a financial plan for IHI Carbon-Neutral 2050	Plans currently under development
Value chain engagement and low carbon initiatives	Supply chain engagement	Conducting supplier engagement, self-assessment questionnaires, and emission surveys	P.81
	Customer engagement	Presenting development stories	P.79
	Expanding our portfolio of low-carbon products and services	Increasing our development, marketing, and sales of decarbonized products	P.41
	Efforts to reduce emissions in direct operations	Incorporation into production and equipment planning by an expert task force	P.93, P.95
Risks and opportunities		Engineering methods to minimize risks and maximize opportunities in response to climate change	P.97–98
Targets		<ul style="list-style-type: none"> <li>Achieve carbon neutrality throughout the entire value chain by 2050</li> <li>Compared to FY2019, reduce Scope 1 and 2 emissions in half by 2030</li> </ul>	P.92
Scope 1, 2, and 3		<ul style="list-style-type: none"> <li>Amount of IHI Group's Scope 1, 2, and 3 emissions</li> <li>Scope 1 and 2 emissions are third-party verified</li> </ul>	P.94

#### ● Initiatives to Become Carbon Neutral

Business operations	Procurement	<ul style="list-style-type: none"> <li>Partner with eco-friendly businesses</li> </ul>
	Production	<ul style="list-style-type: none"> <li>Pioneer the adoption of new technologies, including for in-house products and systems</li> <li>Fuel conversion</li> <li>Use of renewable energy</li> </ul>
Products and services	Improve current technologies Transition	<ul style="list-style-type: none"> <li>Enhance efficiency of current power plants</li> <li>Lighten and electrify products</li> <li>Utilize renewable energy</li> </ul>
	Introduce new technologies Transformation	<ul style="list-style-type: none"> <li>Use hydrogen and ammonia</li> <li>Recycle carbon</li> </ul>

#### Reducing CO<sub>2</sub> Emissions from Business Activities

The IHI Group makes every effort to reduce CO<sub>2</sub> emissions from plants, offices, and other business establishments by both actively pursuing energy-efficient business practices and promoting the use of low-carbon energy.

Its energy-efficient initiatives not only enhance operations but also make all the necessary capital investments. 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 CO<sub>2</sub> emissions is shipping and transport. The IHI Group strives to promote modal shifts through greater load efficiency and active use of marine vessels.

## Climate Change

### Information Disclosure Based on TCFD Recommendations

#### Governance

The IHI Group has a duty to contribute to society and the environment in a way that will realize a sustainable society. We know management with clearly defined values is essential to governance making these contributions possible.

We have identified issues considered important toward this ESG Management as material issues, and have established the ESG Management Promotion Committee as a forum for discussing and deciding policies, implementation methods, and plans of action. The ESG Management Promotion Committee is chaired by the Chief Executive Officer and consists of officers at the executive level and above. In addition to this, we put a Group-wide Environment Committee and a task force in place to advocate for carbon-neutral initiatives.

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.

The IHI Group regards combating climate change as an important ESG management issue, and is managed by the ESG management promotion system above.

#### P.11 Sustainability Management (Structure)

#### Strategy

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. We will steadily continue these efforts to

achieve carbon neutrality throughout the value chain. By expanding the existing life-cycle business of our IHI Group products to our customer value chain and by improving the value we provide, we contribute to the realization of carbon neutrality for our customers. We invest management resources derived through our life-cycle business from a customer value chain perspective into the development of new technologies and systems that contribute to carbon neutrality as well as growth business and development-focus business, 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 our business activities.

#### Risk and Opportunity Due to Climate Change

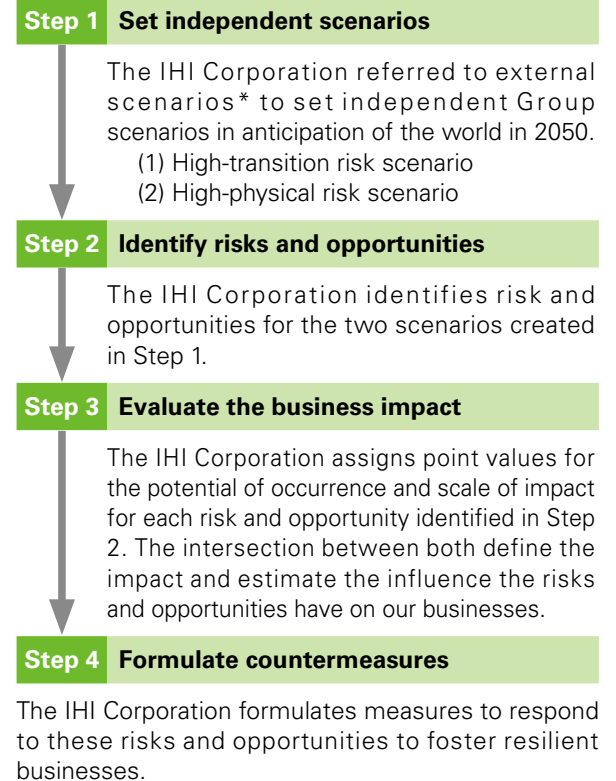
The IHI Group conducted simple scenario analyses of four business domains significantly impacted by climate change: the energy business, bridge and water gate business, vehicle turbocharger business, and the civil aero engine business.

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



\* External reference scenarios:

- A carbon-neutral world  
IPCC RCP 2.6, IEA 2DS Scenario, etc.
- A world greatly impacted by climate change  
IPCC RCP 8.5, etc.

**Climate Change**

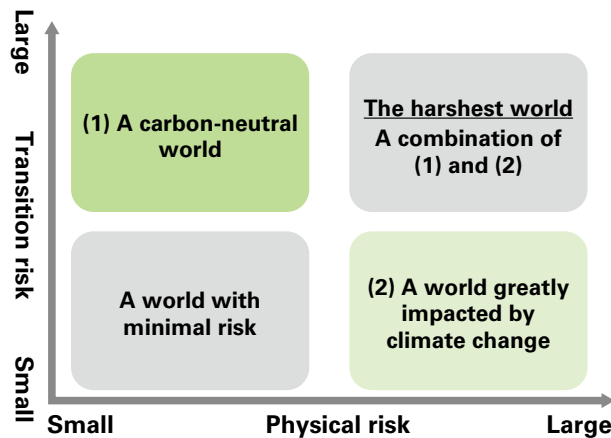
● **IHI Group Scenarios**

(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 at the same time by integrating the countermeasures for each.

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

## 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 <sub>2</sub> 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"> <li>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</li> <li>Draft, execute, and manage advance measures in anticipation of foreseeable flood damage</li> </ul>

## 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 we assess the medium- to long-term impact of these risks to the IHI 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.35 Risk Management**

## Metrics and Targets

Under Carbon-Neutral 2050, the IHI Group has pledged to make its entire value chain carbon-neutral by 2050. We aim to be carbon-neutral in our processes overall by reducing the direct and indirect (Scope 1 and 2) greenhouse gas emissions from our business activities as well as Scope 3 emissions from the upstream and downstream processes in our value chain.

For greenhouse gases (Scope 1 and 2), we have set a target to halve our emissions from fiscal 2019 by fiscal 2030.

**P.92 Climate Change (Approach/Policies)**

**P.93 Climate Change (Targets and Results)**

**P.95 Climate Change (Initiatives)**