

# Transition Finance | Case Study 9: IHI Corporation

## Case Study Overview

### ■ Corporate Profile

Industry	Heavy industry
Location	Japan
Business	One of the major heavy industry companies in Japan. Business activities include "Resources, Energy & Environment," "Social Infrastructure & Offshore Facilities," "Industrial Systems & General-Purpose Machinery," and "Aero Engine, Space & Defense."

### ■ Bond Outline

Planned issue date	• After April 2022
Planned issue amount	• Approximately 15 billion yen
Evaluation agency	• Japan Credit Rating Agency, Ltd.

### 3<sup>rd</sup> Party Evaluation

- In November 2021, IHI set a long-term goal of achieving carbon neutrality by 2050 across its value chain, and has already announced mid-term targets for reductions of Scope 1, 2, and Scope 3 (Resources, Energy & Environment business area). The use of the funds in this framework is evaluated as contributing to the reduction of CO2 emissions in the entire value chain over the medium to long term.
- IHI's transition strategy was developed based on the results of a scenario analysis in line with TCFD recommendations, and was evaluated as an important strategy for the transition of the group's business model. It is also confirmed that a governance structure has been established to ensure the effectiveness of the transition strategy.
- In addition, it is confirmed that the transition strategy and use of funds are consistent with the technology roadmaps for the power, gas, and chemical sectors, as well as the roadmaps for the aviation and shipping sectors, etc., related to transition finance.
- It is confirmed that IHI has an investment plan to allocate more than 30% of the approximately 380 billion yen to be invested over the three years from FY2020 to the creation of growth businesses such as hydrogen- and ammonia-related technologies and electrification technologies.

### Major Use of Proceeds

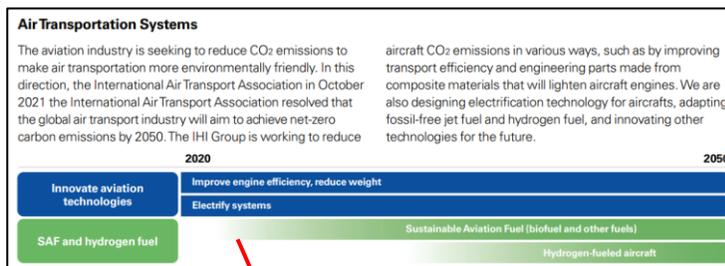
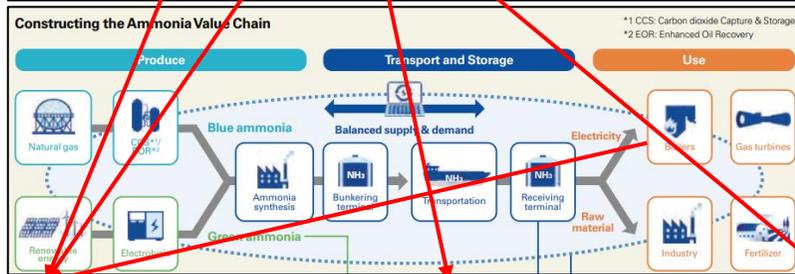
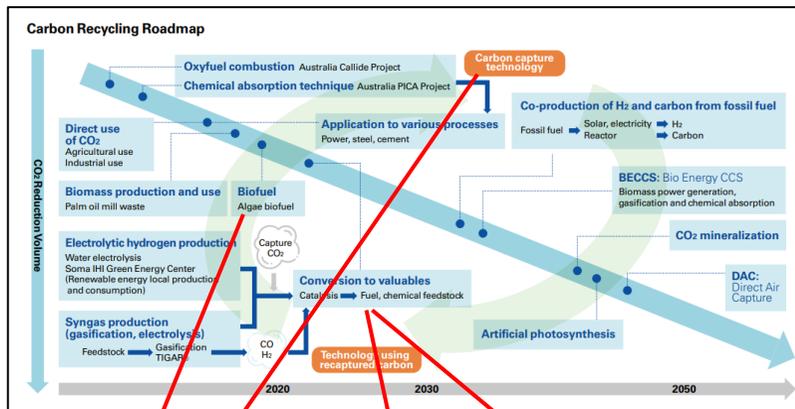
Fields	Contents	Major Projects (Examples)
Electrification	Initiatives for zero emission mobility	<ul style="list-style-type: none"> <li>• Development of more electric architecture for aircraft and propulsion</li> <li>• Electric turbochargers for fuel cell systems, etc.</li> </ul>
Carbon Solutions	Establishment of ammonia value chain	<ul style="list-style-type: none"> <li>• Development of ammonia co-firing technology for coal boilers</li> <li>• Development of 100% ammonia combustion technology for gas turbines, etc.</li> </ul>
	Realization of carbon recycling	<ul style="list-style-type: none"> <li>• Development and demonstration of CCUS technology</li> <li>• Development of olefin production technology through CO2 recycling, etc.</li> </ul>
	Small modular reactor (SMR)	<ul style="list-style-type: none"> <li>• Demonstration of Small modular reactor technology through international collaboration</li> </ul>
Integrated social solutions for maintenance and disaster prevention mitigation	Building regional solutions based on data collaboration	<ul style="list-style-type: none"> <li>• Tropical peatland consulting, etc.</li> </ul>
Reducing CO2 emissions in business operations (Scope1,2)	Reduction of CO2 emissions in business operations	<ul style="list-style-type: none"> <li>• Fuel switching at business sites, promotion of electrification, upgrading to energy efficiency equipment, introduction of renewable energy, etc.</li> </ul>

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## Alignment with the Four Elements in Basic Guidelines on Climate Transition Finance

<p>Element 1 (Transition Strategy and Governance)</p>	<ul style="list-style-type: none"> <li>Transition strategy: A strategy to achieve carbon neutrality in 2050 across the value chain has already been developed. TCFD scenario analysis is also performed and the strategy is important for business model transition.</li> <li>Governance: A governance structure is in place to ensure the effectiveness of the transition strategy.</li> </ul>	<p>Element 3 (Science based Targets &amp; Pathways)</p>	<ul style="list-style-type: none"> <li>Set mid-term targets for Scope 1, 2, and 3 toward carbon neutrality in 2050.</li> <li>The transition strategy and use of proceeds are consistent with the roadmap for power, gas, chemical, aviation and shipping sectors.</li> </ul>
<p>Element 2 (Materiality)</p>	<ul style="list-style-type: none"> <li>"Measures against climate change" is positioned as a key management issue.</li> </ul>	<p>Element 4 (Transparency)</p>	<ul style="list-style-type: none"> <li>Of the total investment of approximately 380 billion yen over 3 years, more than 30% will be used to create growth businesses such as hydrogen- and ammonia-related technologies.</li> <li>In addition to the status of fund appropriation, reports on the progress of R&amp;D projects and their intended effects will be provided to the extent possible.</li> </ul>

### Transition Strategy and Science-based Targets (Elements 1 and 3) | IHI's Roadmap to 2050 CN and Correspondence with Each Roadmap



A-Tug		ClassNK Safety assessment Nippon Kaiji Kyokai Fundamental research for guidelines Support for regulation clearance						
Item	Assignment	FY21	FY22	FY23	FY24	FY25	FY26	FY27
Main Engine	IHI Power System	4-stroke engine development & fabrication, shop trial etc.			Delivery			
Ship Design & Buildings	NYK Line	Hull Design, buildings, sea trial etc.						
Operation	NYK Line	Regulation clearance, formulate operation manuals etc.				Demonstration & Commercialization		

AFAGC		ClassNK Safety assessment Nippon Kaiji Kyokai Fundamental research for guidelines Support for regulation clearance						
Item	Assignment	FY21	FY22	FY23	FY24	FY25	FY26	FY27
Main Engine	Japan Engine Corporation	2-stroke engine development & fabrication, shop trial etc.			Delivery			
Aux. Engine	IHI Power System	4-stroke engine development & fabrication, shop trial etc.						
Ship Design & Buildings	NSY Nihon Shipyard	Hull Design, buildings, sea trial etc.						
Operation	NYK Line	Regulation clearance, formulate operation manuals, business model evaluation etc.				Demonstration & Commercialization		

Aligned with "ammonia co-firing/mono-firing", "CCUS," and "biomass co-firing," etc. in METI's roadmap for power sector.

Aligned with "synthetic methane" in METI's roadmap for gas sector.

Aligned with "production of hydrocarbons such as olefins from CO<sub>2</sub>," etc. in METI's roadmap for chemical sector.

Aligned with MLIT's roadmap for aviation sector and IATA's "Net zero carbon 2050 resolution."

Aligned with "hydrogen and ammonia" in MLIT's roadmap to zero emission from international shipping.

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## Key Points in the Case Study (Element 3: Science based Targets & Pathways)

- IHI has already announced its long-term target of achieving carbon neutrality across its value chain by 2050.
- The company has already set and announced its mid-term targets: a 46% reduction in Scope 1 and 2 by 2030, and a 50% reduction in the resources, energy, and environment business area, which accounts for the majority of Scope 3, by 2035.
- In the resources, energy, and environment business area, which accounts for the majority of Scope 3 emissions, the number of emission-intensive businesses including coal-fired thermal power is expected to shrink by 2030. On the other hand, the market for technologies related to renewable energy, hydrogen, ammonia, etc. is expected to grow, and the company aims to develop these businesses into their core businesses through market expansion of new businesses (CN-related businesses, hydrogen, ammonia, etc.) that will contribute to carbon neutrality.

### ■ IHI's CO2 Reduction Targets

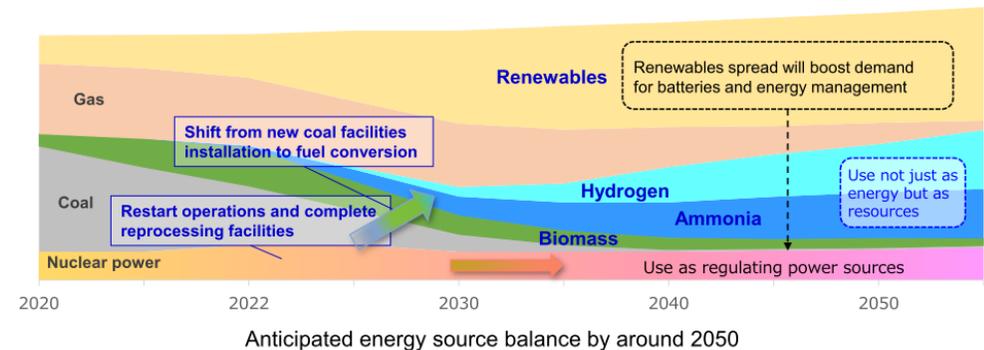
	Scope 1,2	Scope 3
Mid-term target	46% reduction by 2030	50% reduction by 2035 (Resources, Energy, and Environment business area)
Long-term target	Carbon neutral across the value chain by 2050	

\*In response to the "IHI Carbon Neutral 2050" declared in November 2021, the IHI Group is in the process of setting interim reduction targets to achieve these targets and is considering more carefully scrutinized and ambitious reduction targets with a view to announcing them in the next medium-term business plan.

### ■ IHI's Assumed Changes in Energy Composition for 2050 CN

#### Scenario for becoming carbon neutral by 2050

- Assume transition to **economy reliant on hydrogen and ammonia and renewable energy**
- Focus on **fuel usage of ammonia**, making whole ammonia supply chain carbon-neutral (production and logistics systems already in practical use and can be employed at existing power generation facilities, with immediate effect on reducing carbon emissions)
- Undertake **carbon capture and storage and carbon dioxide valorization** to streamline transition from hydrocarbon-centric economy



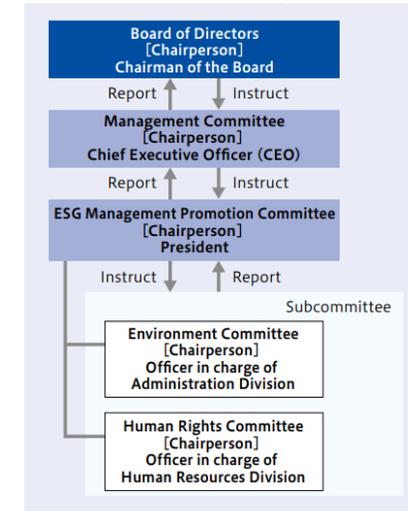
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## Key Points in the Case Study (Element 1: Transition Strategy and Governance, Element 4: Transparency)

Governance

- In FY2021, the IHI Group established the ESG Management Promotion Committee, chaired by the Chief Executive Officer. The purpose of the committee is to examine basic policies and measures for ESG management, and to evaluate and improve their implementation.
- The Environment Committee and the Carbon Neutral Task Force are placed under the umbrella of the ESG Management Promotion Committee to implement and follow up on group-wide measures.

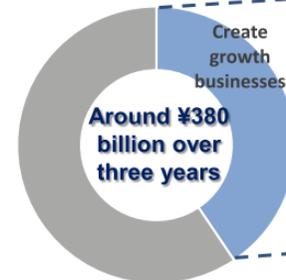
FY2021 Sustainability Promotion System



- IHI has announced plans to invest approximately 380 billion yen over three years starting in FY2020 in order to realize the creation of growth businesses set forth in its medium-term management plan. More than 30% of this amount will be allocated to the creation of growth businesses, such as the development of hydrogen- and ammonia-related technologies and electrification technologies.

Investment plan

### Create growth businesses that address social issues



### Strengthen R&D and deploy inorganic measures to create growth businesses

- Develop hydrogen and ammonia-related technologies
- Develop electrification technologies, including for aero engines and fuel cells
- Develop new materials and advanced manufacturing technologies, notably for carbon fiber reinforced polymer and ceramic matrix composites
- Develop technologies related to digital transformation and artificial intelligence
- Invest strategically, including through acquisitions

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## Case Study Key Points (Element 4: Transparency)

- In addition to the appropriation of funds, IHI has decided the reporting contents for projects and their details. Although there are some restrictions on disclosure contents, such as ongoing research and joint research with other companies, IHI will report those contents to the extent possible.

### ■ Correspondence between use of funds and reporting items

Field	Contents	Major Project (Example)	Reporting Items
Electrification	<b>Initiatives for zero emission mobility</b>	<ul style="list-style-type: none"> <li>Developing more electric architecture for aircraft and propulsion</li> <li>Electric turbochargers for fuel cell systems, etc.</li> </ul>	<b>Report the outline of technologies and products, outline and progress of R&amp;D plans and participating projects, etc., and explanations of targeted effects, etc. to the extent possible for disclosure</b>
Carbon Solutions	<b>Establishment of ammonia value chain</b>	<ul style="list-style-type: none"> <li>Development of ammonia co-firing technology for coal boilers</li> <li>Development of 100% ammonia combustion technology for gas turbines, etc.</li> </ul>	
	<b>Realization of carbon recycling</b>	<ul style="list-style-type: none"> <li>Development and demonstration of CCUS technology</li> <li>Development of olefin production technology through CO2 recycling, etc.</li> </ul>	
	Small modular reactor (SMR)	<ul style="list-style-type: none"> <li>Demonstration of Small modular reactor technology through international collaboration</li> </ul>	Report to the extent that disclosure is possible, such as the outline of technologies and products, and the progress and results of the business
Integrated social solutions for maintenance and disaster prevention mitigation	Building regional solutions based on data collaboration	<ul style="list-style-type: none"> <li>Tropical peatland consulting, etc.</li> </ul>	Report the outline of technologies and products, outline and progress of R&D plans and participating projects, etc., and explanations of targeted effects, etc. to the extent possible for disclosure
Reducing CO2 emissions in business operations (Scope1,2)	Reduction of CO2 emissions in business operations	<ul style="list-style-type: none"> <li>Fuel switching at business sites, promotion of electrification, upgrading to energy efficiency equipment, introduction of renewable energy, etc.</li> </ul>	Report on activities to reduce CO2 and their effectiveness to the extent practicable.

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## Case Study: IHI Corporation Transition Bond

### Modelability Review Results: Approval

This is a new type of transition bond that contributes to other sectors through Scope 3 reductions, and is appropriate as a model case.

#### Main Opinions

##### Transition strategy

- A challenging example of efforts to reduce Scope 3 emissions, which account for the majority of emissions in the value chain.
- The technology developed by IHI are very important initiatives that contribute to decarbonization in each industry, and their strategies and specific contents are desirable as a model case.
- Research and development of power generation using hydrogen and ammonia, which are key technologies to switch from coal-fired power generation, is strategically important, and its inclusion in the use of funds is commendable.

##### Scientific basis

- Confirmed that mid-term and long-term targets have been set for Scope 1-3.
- For Scope 3, in energy, which accounts for the majority of emissions, the contribution of coal-related reductions is significant. In addition to this, reductions from new technologies also form the basis for the reductions. The strategy for new technologies is consistent with the roadmaps for the power, gas, chemicals, aviation, and shipping.

##### Other factors/Others

- Since the development of innovative technologies involves risk, from an investor's perspective, it is desirable to ensure as much transparency as possible regarding the progress of technological development.
- When funds are allocated with investments in other companies, it is important to show with as much transparency as possible how they contribute to the company's transition strategy and how the project is progressing.
- It is expected that the company will lead not only in usage of funds assumed this time, but also in transitions such as fuel conversion for industrial furnaces and chemical production from gas, through the extension of existing technologies.