Transition Finance | Case Study 11 : Mitsubishi Heavy Industries, Ltd.

Overview

■ Corporate Profile

Industry	Heavy Industry
Location	Japan
Business	Manufacturing, installation, retail and service providing in collaboration with group companies in the following segment; Energy Systems, Plants & Infrastructure Systems, Logistics, Thermal & Drive Systems, Nuclear Energy Systems, Machinery Systems, Integrated Defense & Space Systems, Commercial Aviation Systems.

■ Bond Outline

Planned Issue Date	• 2022FY
Planned Issue Amount	• To be announced (term : 5 years (expected))
Structuring Agency	• Mitsubishi UFJ Morgan Stanley Securities Co., Ltd
Evaluation Agency	• DNV BUSINESS ASSURANCE JAPAN K.K.

3rd Party Evaluation

- Mitsubishi Heavy Industries, Ltd. (hereinafter MHI) acknowledges the need for systems, facilities and machines dedicated to low/decarbonization in order to achieve carbon neutrality by 2050. Thus, they have set 2040 Net Zero target for Scope 1,2 and 3 (customers' Scope 1&2) .
- MHI's transition roadmap is aligned with sectoral roadmap* formulated by METI and MLIT. Their roadmap is planned in a way for the society as a whole to reduce CO_2 by contributing to the reduction of CO_2 throughout the value chain of various key industries.
- MHI plans an investment of 180 billion yen by 2023 on growth areas including decarbonization. It includes projects financed via green/transition finance. We have confirmed that these investment plans will be executed in a timely manner based on internal governance and process.

*Technology Roadmap formulated for several sectors

Candidate for Use of Proceeds

Project Categories	Eligibility Criteria
Decarbonize existing infrastructure	✓ **Hydrogen gas turbine (co-firing)*** • Ammonia gas turbine (co-firing) • LNG-fueled high-efficiency gas turbine ✓ **Steam power (conversion to ammonia co-firing)*** • Gas engine for power generation (hydrogen co-firing) • Material handling (high efficiency and fuel cell powered)
Build a hydrogen solutions ecosystem	✓ **Hydrogen production (blue or turquoise, etc.)*** • Ammonia production (blue or turquoise, etc.) • Hydrogen compressors (for hydrogen production, transport and storage, etc.) ✓ **Metals machinery (hydrogen reduction steelmaking, etc.***
Build a CO_2 solutions ecosystem	✓ **CO_2 capture and storage*** • CO_2 transport (liquefied CO_2 carries, etc.)
Renewable Energy	• Wind power (wind power plants) • Geothermal power (geothermal power plants)
Clean Energy	✓ **Hydrogen gas turbine (hydrogen power generation businesses and/or projects for 100% hydrogen firing)*** • Ammonia gas turbine (ammonia power generation businesses and/or projects for 100% ammonia firing) • Hydrogen/ammonia production (green) • Steam power (conversion to 100% ammonia firing) ✓ **Gas engine for power generation (100% hydrogen firing)***

* : Optional Use of Proceeds of subsequent transition bond

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

Element 1 (Transition Strategy and Governance)	• Transition strategy : transition roadmap is designed to contribute towards both energy supply and demand, to achieve 2040 net zero. • Governance : established an organizational structure to monitor, evaluate and manage transition projects.	Element 3 (Science based Targets & Pathways)	• Reduction targets covers Scope 1,2 and 3. • Furthermore, transition roadmap to achieve these targets are aligned with sectoral roadmaps formulated by METI and MLIT and are considered to be science based.
Element 2 (Materiality)	• Contributes to the environment and supports the promotion of MHI's business as the Use of Proceeds are closely linked to their core business and measurements to reduce society's CO_2.	Element 4 (Transparency)	• plans an investment of 180 billion yen by 2023 on growth areas including decarbonization. • Amount required, planned allocation, environmental impact for the planned project will be disclosed when practically possible.

■ Transition Strategy and Science-based Targets （Elements 1・3）

○Emission Reduction Targets

Scope	2030	2040
Scope 1 , 2 ※1	-50% (Compared to 2014)	Net Zero
Scope 3 +reduction from※2	-50% (Compared to 2019)	Net Zero

※1 Scope1,2 : The calculation standard is based on the GHG Protocol.
※2 Scope3 : The calculation standard is based on the GHG Protocol. However, we also account for reductions achieved by CCUS as an MHI original index.

○Example of CO_2 Reduction Solution

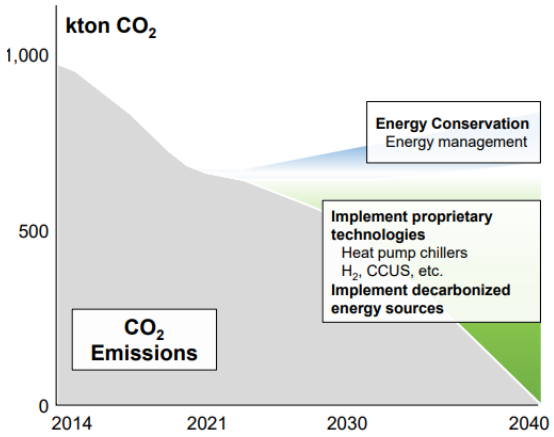
Example of CO_2 Reduction Solutions for Existing Facilities	Reduction Rate*
Replace coal-fired thermal power plant with natural gas GTCC	-60 to -65%
30% mixed hydrogen firing in GTCC/engine	-10%
100% hydrogen firing in GTCC/engine	-100%
20% biomass/ammonia mixed firing in coal-fired thermal power plant	-20%
100% biomass/ammonia firing in coal-fired thermal power plant	-100%
Hydrogen reduction steelmaking + electric arc furnace	-65%

*: Reduction rate compared to existing assets (using fossil fuel)

○The Image of Emission Reduction

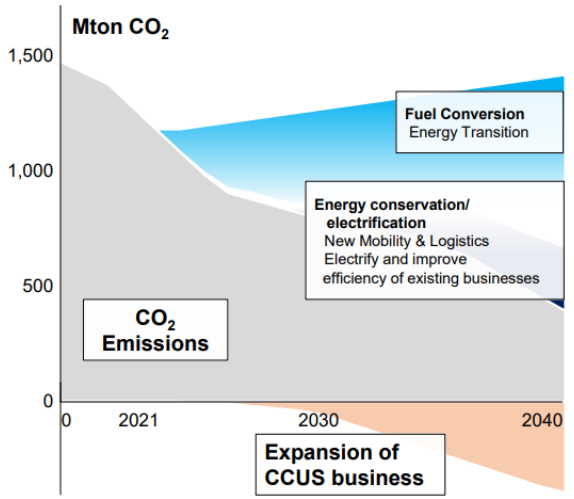
Reduce CO_2 emissions across MHI Group Scope 1&2

Implement proprietary technologies at MHI factories



Reduce CO_2 emissions across MHI's value chain Scope 3 + reductions from CCUS

Rapidly establish decarbonization technologies and drive commercialization



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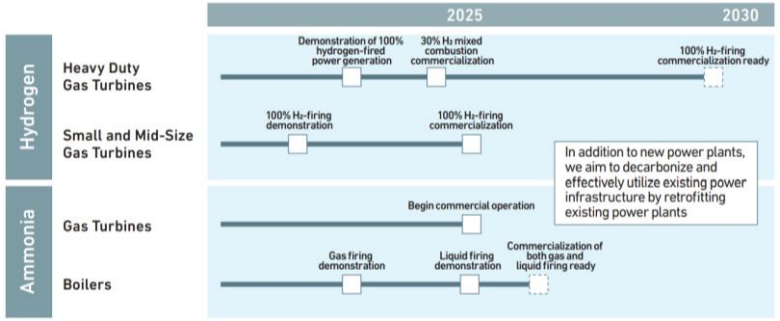
Key Points in the Case Study (Element 3 : Science based Targets & Pathways)

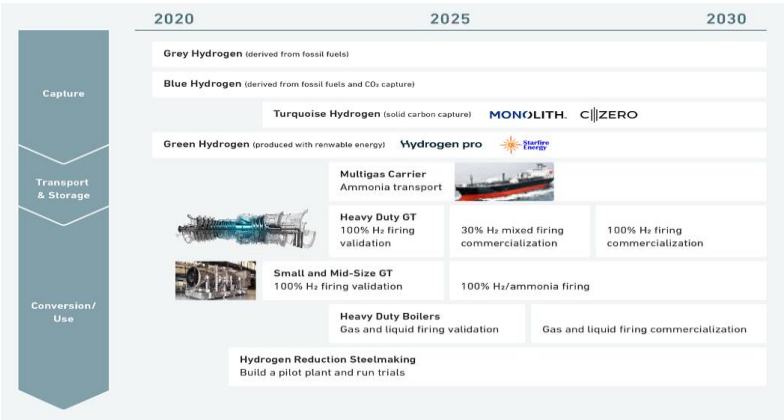
Relationship of MHI Roadmap and Sectoral Roadmaps

MHI Roadmap

Decarbonize existing infrastructure



Build a hydrogen solutions ecosystem



Build a CO_2 solutions ecosystem

KS-1™, KS-21™: A proprietary amine absorbent jointly developed with Kansai Electric Power CO₂NNEX™: A digital platform for visualizing CO₂ logistics to be jointly developed with IBM Japan
* CCUS : Carbon dioxide Capture, Utilization and Storage

Sectoral Roadmaps (for transition finance)

METI Power Sector
-"ammonia firing"
-"hydrogen firing"
-"ammonia mixed-firing"
-"hydrogen mixed-firing"

METI Chemical Sector
-"fuel switching to hydrogen, ammonia"

METI Gas Sector
-"water electrolysis" (hydrogen production)
-"transport from overseas" (hydrogen)
-"hydrogen combustion equipment etc."

METI Iron and Steel Sector
-"Direct hydrogen reduction"

METI·MLIT Various Sectors※
-「CO_2 capture」
※Iron and Steel, Chemical, Power, Gas, International Shipping, Cement etc.

Key Points

- As a leading company in which they supply fundamental infrastructure to major domestic industries, MHI sets 2040 Net Zero for Scope 1~3 and established a strategy in order to contribute to Japan's 2050 carbon neutrality.
- Their strategy is aligned with the sectoral roadmap (Power, Gas, Iron and Steel, Chemical, International Shipping) formulated by METI and MLIT.
- The issuance of this transition bond allows MHI to procure funds to support the execution of projects in the strategy through transition bond and is in accordance with the 2021-2023 investment plan (180 billion yen on growth area including decarbonization).

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Transition Finance | Case Study : Mitsubishi Heavy Industries, Ltd.　Transition Bond

Modelability Review Results: Approval

As a supplier of fundamental infrastructure, they have set an ambitious target and is appropriate as model cases

Main Opinions

Transition strategy

- Making energy sector as the center, it is an aggressive business portfolio change to achieve 2040 carbon neutrality.
- It is a transition strategy that supports other industries' transition in areas they hold strengths; Having strengths in decarbonize existing infrastructure, hydrogen solutions ecosystem and CO_2 solutions ecosystem.
- Important to note that they plan a steady low-carbonization towards 2030 by energy savings and fuel switching in the short term.

Scientific basis

- Acknowledging the need to install facilities and machinery beforehand for Japan to achieve 2050 carbon neutrality and setting 2040 net zero target including Scope 3 is highly ambitious.
- Specific reduction measurements and assumption for Scope 1~3 makes it easier to relate them with the strategy, and moreover, they are aligned with sectoral roadmaps

Other elements/others

- MHI is a company with Japanese cutting-edge technology, and without their decarbonization technologies for plant/energy, decarbonization of other sectors will be more challenging. Thus, projects and initiatives of MHI is of extreme importance.
- CO_2 capture technologies have long been studied and only recently have they started to become as a business opportunity.
- Expect the government to adequately incentivize the company and promote the realization of hydrogen solutions ecosystem and CO_2 solutions ecosystem. These initiatives are important form the perspective of stable energy supply, which its importance was reemphasized by recent situation in Ukraine.

This document focuses on the contribution of transition finance to the realization of Japan's carbon neutrality by 2050 and the Paris Agreement, and does not cover any of the risks associated with transition finance as a financial instrument. It should be noted that even in the model case of this project, there are credit risks and other risks (in the case of bonds, price fluctuation risks, liquidity risks, etc.) as in ordinary financing.