December 5, 2025

Mitsubishi Heavy Industries, Ltd. 42nd Series Unsecured Bond (The 2nd Series of Mitsubishi Heavy Industries Transition Bonds) Reporting (FY2024)

Introduction

Mitsubishi Heavy Industries (MHI) Group has developed “Mitsubishi Heavy Industries, Ltd. Green/Transition Finance Framework” *1 with the aim of further promoting the initiatives* 2 set forth in its 2040 Carbon Neutrality Declaration and Roadmap to Achieve Carbon Neutrality. We are working on " Decarbonize existing infrastructure," " Build a hydrogen solutions ecosystem," and " Build a CO_2 solutions ecosystem," which are Eligible businesses and/or projects of Transition Projects defined in the framework.

*1：https://www.mhi.com/finance/stock/esg/transitionbond/pdf/fw.pdf
*2：https://www.mhi.com/company/aboutmhi/carbon-neutral

The proceeds from Mitsubishi Heavy Industries, Ltd. 42nd Series Unsecured Bond (The 2nd Series of Mitsubishi Heavy Industries Transition Bonds) issued on August 31, 2023, have been allocated to new investments and refinancing of existing investments in Metals machinery (hydrogen-reduced ironmaking etc.) classified as “Build a hydrogen solutions ecosystem” and CO_2 capture and storage classified as “Build a CO_2 solutions ecosystem,” which are Eligible businesses and/or projects of Transition Projects. Both projects are proceeding as planned in terms of the allocation and the development and demonstration of technologies.
MHI group's energy transition initiatives to achieve a Carbon Neutral society are progressing as planned. We will continue our efforts to achieve Net Zero by 2040 and realize a Carbon Neutral society.

1. Allocation Reporting (As of March,31 2025)

The following table shows the allocation of the net proceeds from the ¥10 billion raised by the 2nd Series of Mitsubishi Heavy Industries Transition Bond, excluding issuance costs.
The unallocated balance is managed in cash or cash equivalents, and the allocation is scheduled to be completed in FY2025.

(Unit: million Yen)

Section			Amount
Proceeds raised (Amount Excluding Issuance Costs from the Issue Amount of the Bonds)			9,952
Proceeds used			7,926
	Metals machinery (hydrogen-reduced ironmaking etc.) – (1)	New investment	739
		Refinancing	617
	CO_2 capture and storage – (2)	New investment	5,264
		Refinancing	1,306
Proceeds to be used			2,026

2. Impact Reporting

(1) Metals machinery (hydrogen-reduced ironmaking etc.)

Research and development of hydrogen reduction ironmaking technology

・Project overview

The development and design for the demonstration of HYFOR (Hydrogen-based Fine Ore Reduction: Technology for 100% hydrogen reduction of fine ore generated during iron ore beneficiation. It can also be reduced with natural gas and gradually increase the hydrogen mixing ratio and does not require sintering or pelletizing process due to the fluidized bed.)

・Period

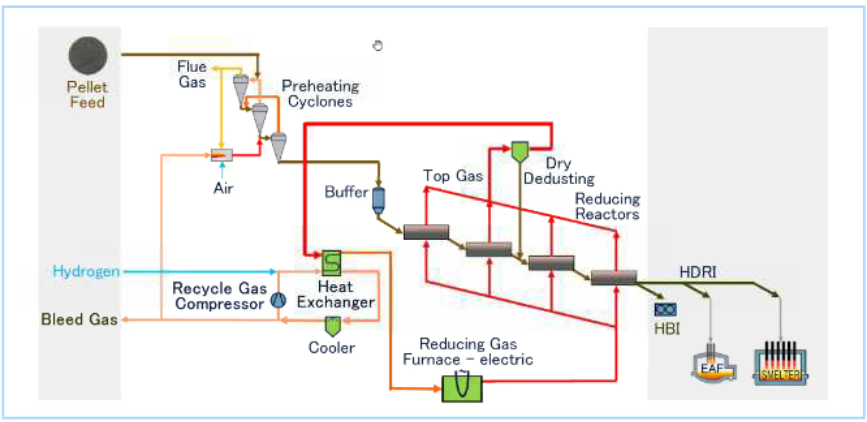
FY2021-2025 (planned)

- ・Implementation of the pilot plant
- ・Development and design associated with the demonstration of prototype plant

・Progress

The Hydrogen-based fine-ore reduction (HYFOR) developed by Primetals Technologies, MHI Group, is the world´s first direct reduction process for iron ore fines concentrates from ore beneficiation whose CO_2 footprint is close to zero because as reduction agent 100% hydrogen is used instead of conventional coal and which does not require any agglomeration like sintering or pelletizing. Primetals Technologies, together with its strategic partner Mitsubishi Corporation, Rio Tinto, a leading mining and materials company, and globally leading steel and technology group voestalpine, worked on building a cooperative framework to fast-track the development of HYFOR and smelter technologies. (Signed a cooperation agreement on April 1, 2025) The participants will implement and operate an industrial-scale prototype plant featuring a new process for potential net-zero CO_2 emissions ironmaking at the voestalpine site in Linz, Austria. Startup of the plant is scheduled for end of 2027. In the first half of 2021, HYFOR pilot plant was commissioned at the voestalpine site in Donawitz, Austria and first tests were successful with modifications and improvements to the plant. Various ore types have been being tested to verify the commercial viability of this technology since 2022.

The schematic flowsheet of the industrial-scale prototype plant, the next step after the pilot plant, is shown in the figure below. After successful pre-heating, the material (iron ore concentrates) is reduced with hydrogen in multi-stage reduction reactors via a buffer. Hydrogen is injected from the inlet of the heat exchanger and is supplied to the reduction reactor via the recycle gas loop. In addition, some of the recycling gas discharged from the heat exchanger is used for the fuel of the pre-heating cyclones.



HYFOR Industrial prototype plant – Schematic flowsheet

[Relevant information] April 8, 2025, News release
Primetals Technologies with Strategic Partner Mitsubishi Corporation, voestalpine, and Rio Tinto to Implement Hydrogen-Based Ironmaking Plant
https://dam.primetals.com/m/20dfa12ba69ac3a6/original/PR2025033368jp-pdf.pdf#_gl=1*adebpw*_gcl_au*MTI1MzUwODE4Mi4xNzUzMjQ3NjMz

(2) CO_2 capture and storage

Improvement of performance of CO_2 capture technology and expanding application

・Project overview

Improving CO_2 Capture Process Performance (strengthening core technologies such as Monoethanolamine (KS-1 and KS-21, etc.)) and expanding large to small and medium-sized product lineup, etc.

・Period

- FY 2030 (planned)

・Progress

As part of our efforts to expand the application of CO_2 capture technology raised by the 2nd Series of Mitsubishi Heavy Industries Transition Bond, MHI has renewed CO_2MPACT™ series, which has been commercialized for decarbonization of a wide range of industries. The new model adopts a mass-produced full-module concept based on standard design as a middle size of CO_2MPACT™. More than 90% of the equipment is modularized into the container size or prefabricated in a workshop. Efficiency improvements, labor savings, and shorter construction periods are expected, such as a 95% reduction in the on-site welding work.

CO_2MPACT™ Mobile

CO_2MPACT™ Full-Module

In addition, MHI is improving the performance of CO_2 capture technology. In an Italian CCS project, MHI successfully captured CO_2 from exhaust gas with significantly lower CO_2 concentration compared to conventional sources. This is part of the Ravenna Carbon Capture and Storage project launched by Eni and Snam, capturing and storing 25,000 tons of CO_2 annually. MHI provided the Process Design Package (PDP) and license through NEXTCHEM, MAIRE's subsidiary. This is a remarkable achievement for the world's first industrial-scale project with such high levels of carbon capture efficiency - one that could be replicated with other industrial processes producing low-CO_2 flue gas.

Furthermore, MHI installed the CO_2 capture unit at Arcelor Mittal's Ghent steel plants in Belgium and conducted a demonstration test of CO_2 capture from the steelworks as well as technology for reutilizing the captured CO_2. This process involves capturing CO_2 from blast furnace off-gases, and off-gases from the hot strip mill reheating furnace by MHI's CO_2 capture unit, and converting the captured carbon dioxide into carbon monoxide, using D-CRBN's plasma technology. The carbon monoxide can be used as a reductant in the steelmaking process - replacing part of the coke or metallurgical coal used in the blast furnace - or as a basic ingredient in Gent's Steelanol plant, for chemicals or alternative fuel production.

In Japan, ITOCHU Corporation, Nippon Steel Corporation, Taiheiyo Cement Corporation, Mitsubishi Heavy Industries, Ltd., INPEX CORPORATION, Taisei Corporation, and ITOCHU Oil Exploration Co., Ltd. announced in September 2024 that the Tohoku Region West Coast CCS initiative (hereinafter "the Initiative") that the seven companies jointly proposed, has been selected by the Japan Organization for Metals and Energy Security (hereinafter "JOGMEC") to conduct "Engineering Design Work for Japanese Advanced CCS Projects", a public offered project. The Initiative involves the concept of using ships to transport CO_2 separated and captured at the Nippon Steel's Kyushu Works Oita Area and the Kawasaki Plant of DC CO., Ltd., a Taiheiyo Cement Group company, to candidate storage sites. MHI is studying and engineering design work for the ship transportation of liquified CO_2 and receiving and storage facilities, as well as studying and engineering design work for the separation, capture, and liquefaction of CO_2 emitted from candidate storage sites and shipping facilities. The seven companies will continue to cooperate with each other to contribute to the realization of a sustainable society by aiming for the early social implementation of CCS in Japan.

[Relevant information] July 8, 2024, News release
World-first Trial of New Technology to Recycle CO_2 Emissions from Steel Production Begins at ArcelorMittal Gent, Belgium
https://www.mhi.com/news/240708.html

[Relevant information] September 4, 2024, News release
Seven Companies Announce to Conduct Engineering Design Work for Japanese Advanced CCS (Carbon Capture and Storage) Project
https://www.mhi.com/news/240904.html

[Relevant information] September 18, 2024, News release
Europe's First Post-Combustion Carbon Capture Plant Starts Operation with MHI Technology as part of the Ravenna CCS Project, Phase 1
https://www.mhi.com/news/24091802.html

[Relevant information] September 19, 2024, News release
Renewal of Compact CO_2 Capture System "CO_2MPACT™" Series
-- Releasing a New Model that Adopts Full-Module Concept for Mass Production as a Middle-Size Class --
https://www.mhi.com/news/240919.html

3. MHI Group's Transition Initiative

Realizing a Carbon Neutral Society is a global issue, and we believe that as a technology leader, with a proven track record in the field of decarbonization, it is MHI's responsibility to help lead the fight against climate change.

The steady execution of its Energy Transition Strategy will contribute to the realization of the Government of Japan's goal of carbon neutrality by 2050.

MHI considers the execution of Green/ Transition Finance as the funding for our initiatives toward achieving MHI group's Net Zero in 2040, and believe that dialogue with stakeholders through the framework of green and transition finance, annual reports, integrated reports, etc. will serve as an opportunity to disseminate our company's Initiatives. MHI's long-term strategy will be reviewed when government policies or other assumptions change.

4. External Review

MHI has received an annual review of the performance up to March 2025 from DNV Business Assurance Japan K.K. and has posted the review results on our website.

5. (Relevant information) The 2nd Series of Mitsubishi Heavy Industries Transition Bonds Reporting

・The 2nd Series of Mitsubishi Heavy Industries Transition Bonds Reporting (FY2023)
https://www.mhi.com/finance/stock/esg/transitionbond/pdf/42tb_reporting2023.pdf