

# Carbon Neutrality Briefing

March 18, 2022  
**Eisaku Ito**  
Executive Vice President & CTO



- **MISSION NET ZERO**
- **Our Vision of a Carbon Neutral World**
- **Status of Solutions Development**
- **Summary**

Allow me to begin today's briefing.

Here are the main topics that I will cover.

I will start by outlining MISSION NET ZERO and MHI's vision of Carbon Neutrality. I will then discuss our investment plans and the development status of the solutions that will make it happen. Finally, I would like to speak about business development.

# MISSION NET ZERO

First off is MISSION NET ZERO.

## MISSION NET ZERO



# MISSION NET ZERO

Through our group products, technologies, and services that help reduce CO<sub>2</sub> emissions, as well as new solutions and innovations to be developed with partners around the world, Mitsubishi Heavy Industries Group will contribute to realizing "Net Zero" emissions for the world as a whole.

To this end, each and every one of our employees is embracing and internalizing "Mission Net Zero" and will act to implement a "Net Zero" future.



Target Year	Reduce CO <sub>2</sub> emissions across MHI Group Scope 1&2	Reduce CO <sub>2</sub> emissions across MHI's value chain Scope 3 + reductions from CCUS
2030	-50% (compared to 2014)	-50% (compared to 2019)
2040	Net Zero	Net Zero

Scope 1&2: The calculation standard is based on the GHG Protocol.

Scope 3: The calculation standard is based on the GHG Protocol. However, we also account for reductions achieved by CCUS as an MHI original index.

GHG: Greenhouse Gas CCUS: Carbon dioxide Capture, Utilization and Storage

© MITSUBISHI HEAVY INDUSTRIES, LTD. All Rights Reserved.

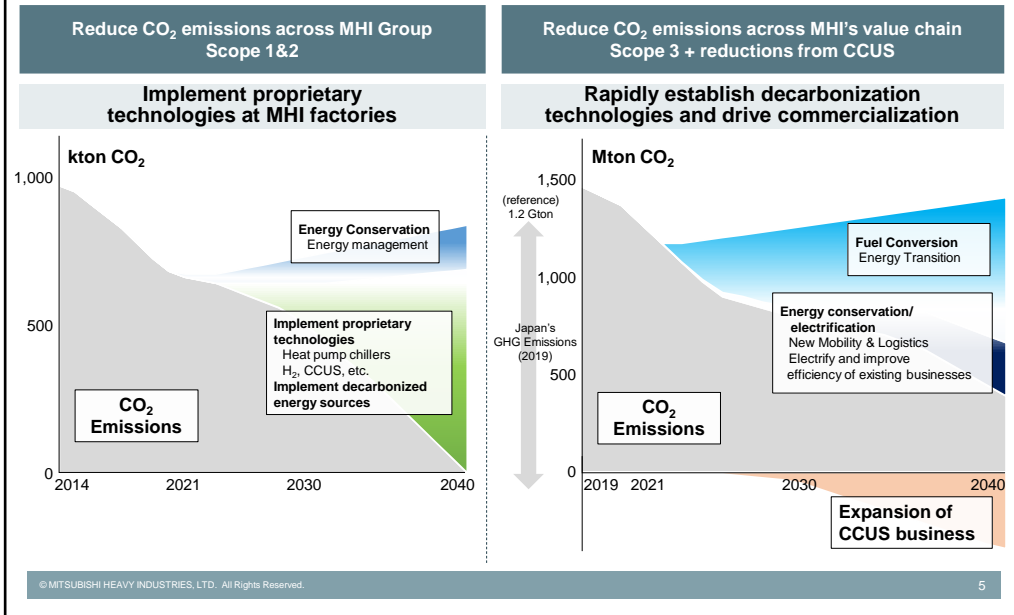
4

\*As CO<sub>2</sub> comprises 99% of MHI Group's GHG emissions, we have focused our targets solely on the reduction of CO<sub>2</sub> in order to simplify our message.

MHI Group announced MISSION NET ZERO last October. Achieving a Carbon Neutral world is a global challenge. As a proven leader in the area of decarbonization, we believe we have a responsibility to lead the way in addressing Climate Change.

We will contribute to the achievement of Net Zero with a wide range of products, technologies, and services which help reduce CO<sub>2</sub> emissions. Specifically, we aim to achieve a 50% reduction by 2030 and Net Zero by 2040.

## Roadmap to MISSION NET ZERO



The following is a roadmap towards completion of MISSION NET ZERO.

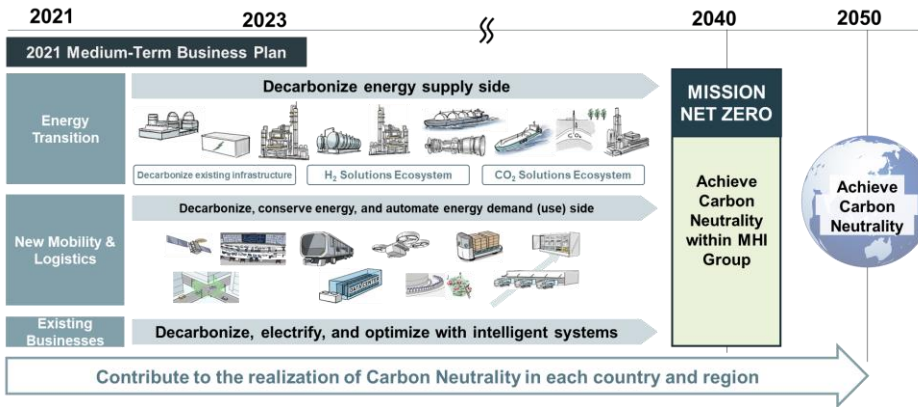
For Scope 1 and 2 emissions, we have already made considerable reductions in the past. Going forward, we will adopt our own technologies at our factories to achieve Net Zero by 2040.

We will reduce Scope 3 emissions on a scale that exceeds Japan's total CO<sub>2</sub> emissions. We will contribute to global implementation by establishing decarbonization technologies, including Energy Transition initiatives, at an early stage.

## Roadmap to MISSION NET ZERO Achievement



### Achieve Carbon Neutrality within MHI Group by 2040 and deploy decarbonization solutions around the world



© MITSUBISHI HEAVY INDUSTRIES, LTD. All Rights Reserved.

6

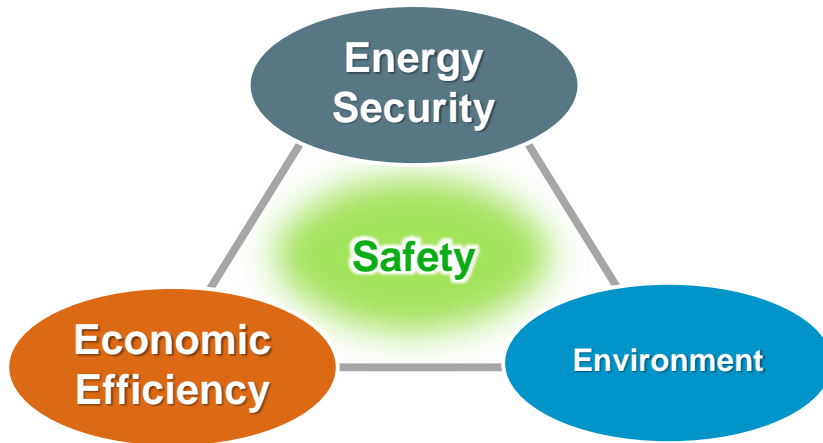
We aim to achieve Carbon Neutrality within MHI Group by 2040 and actively deploy the results of our efforts to society at large to achieve Carbon Neutrality.

Today, I would like to share with you our thinking on Carbon Neutrality, which has not been adequately expressed in the introduction of individual products or press releases to date.

# Our Vision of a Carbon Neutral World

First, I would like to talk about MHI Group's vision of a Carbon Neutral world.

Sustainable increase in environmental value is predicated on balancing stable energy supply with both sound economics and safety



We have thought nonstop about the 3 Es of energy for more than 20 years now, and since 2014, we have considered what in Japan we call the 3Es + S. A sustainable increase in environmental value is predicated on a stable energy supply, economic efficiency, safety, and security. We cannot achieve a sustainable Carbon Neutral world if we only consider environmental value.



- Not just a value chain
- Create environmental and economic value by connecting diverse industries

→ Quickly commercialize with MHI's wide range of products and services

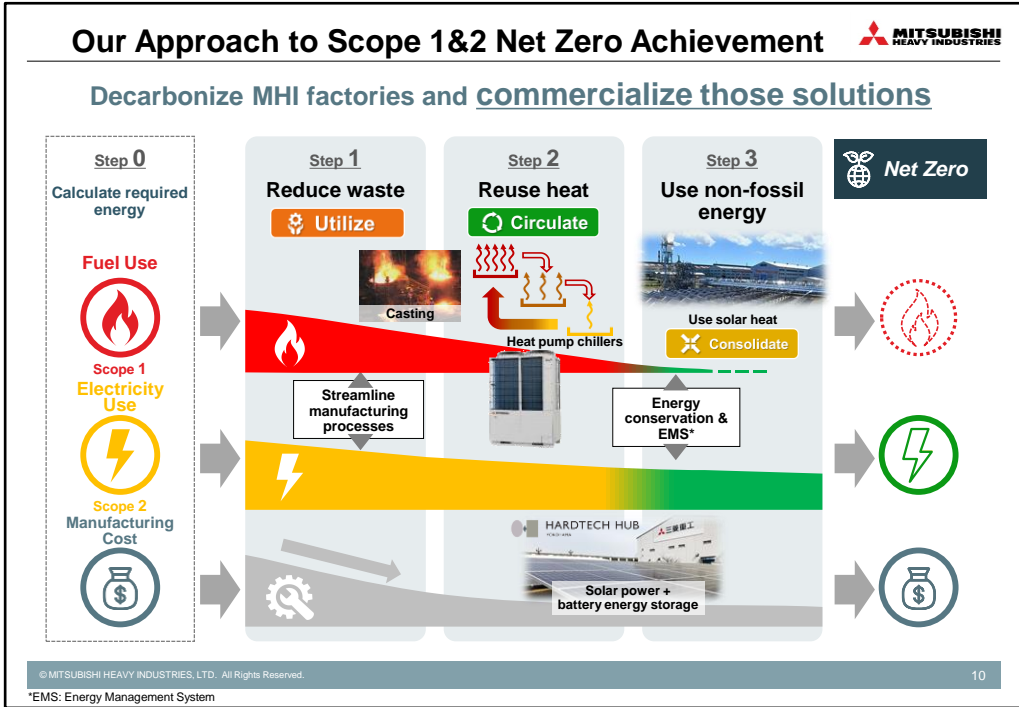
## 6 keywords for achieving this:



We believe that a sustainable Carbon Neutral society is one where people coexist in diversity. We also need a Carbon Neutrality solutions ecosystem that ensures the 3Es + S.

An ecosystem is a system that connects and leverages diverse value chains. However, it is not just a value chain. In other words, it is a system that creates both environmental and economic value by linking a wide variety of industries. Our goal is to quickly commercialize these solutions with MHI Group's wide range of products and services.

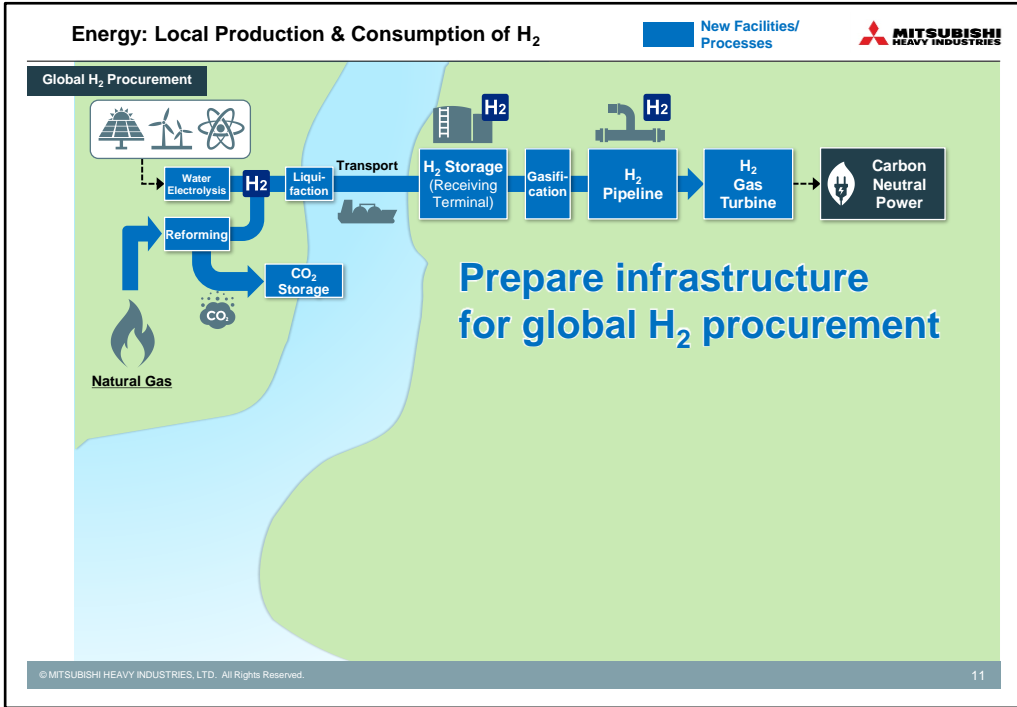
The mechanisms needed to achieve this are represented by these six keywords: Utilize, Separate, Consolidate, Exchange, Circulate, and Synthesize. Let me explain these one by one.



The first example of such an ecosystem is our approach to Net Zero at our factories. Scope 1 is CO2 emissions from fuel use, and Scope 2 is emissions from electricity use.

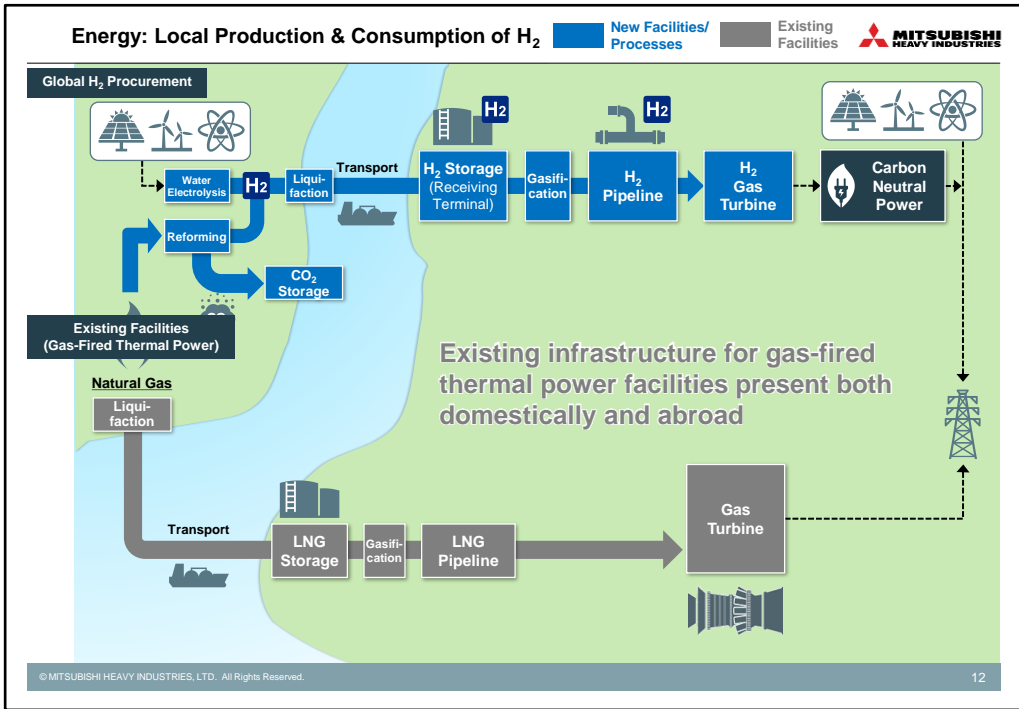
First, we calculate theoretical minimum energy requirements and consider any energy use above this as a target for reduction. We will streamline manufacturing processes utilizing existing equipment and facilities. Heat that is discarded in the manufacturing process will be reused to the fullest extent. Our heat pumps are effective in this regard. In this way, non-fossil fuel energy will replace other energy sources and approach the theoretical minimum value.

As the streamlining of manufacturing processes progresses, waste will be eliminated, and manufacturing costs will go down. In other words, environmental value and economic efficiency can be realized simultaneously. We will promote Carbon Neutrality at our machinery works and then commercialize these technologies and techniques as new businesses.

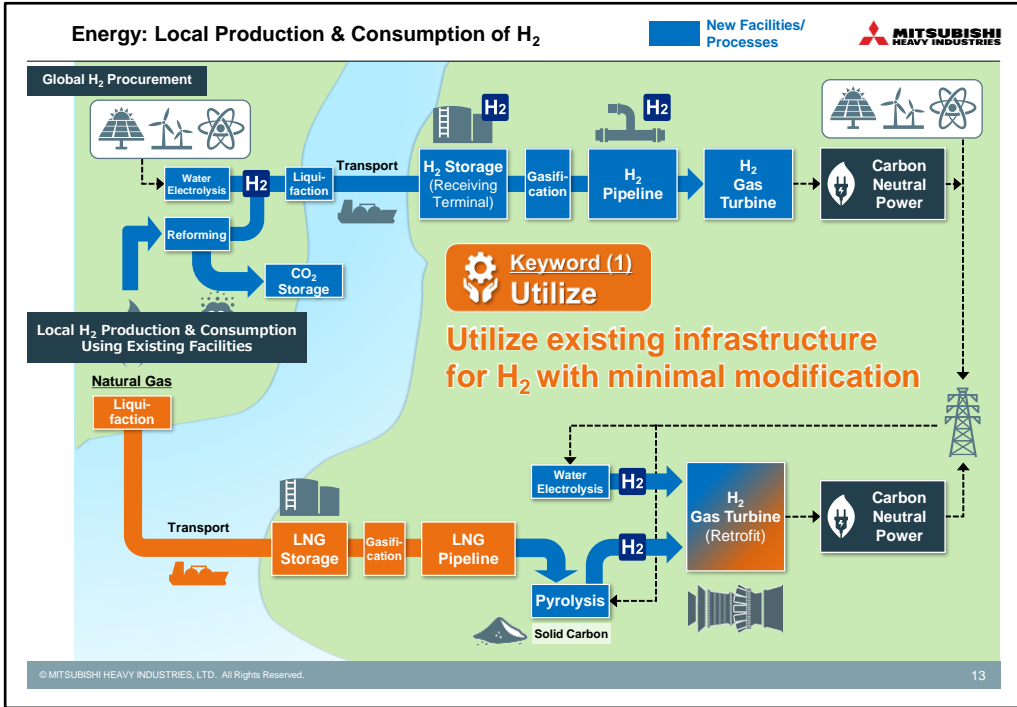


Here is the Carbon Neutrality ecosystem as it relates to Scope 3. First, let me describe the hydrogen solutions ecosystem.

Infrastructure is currently being developed for global hydrogen procurement. This is an example of a value chain in which hydrogen is produced by a natural gas supplier, liquefied, transported, stored, and then used in a hydrogen gas turbine to generate electricity.



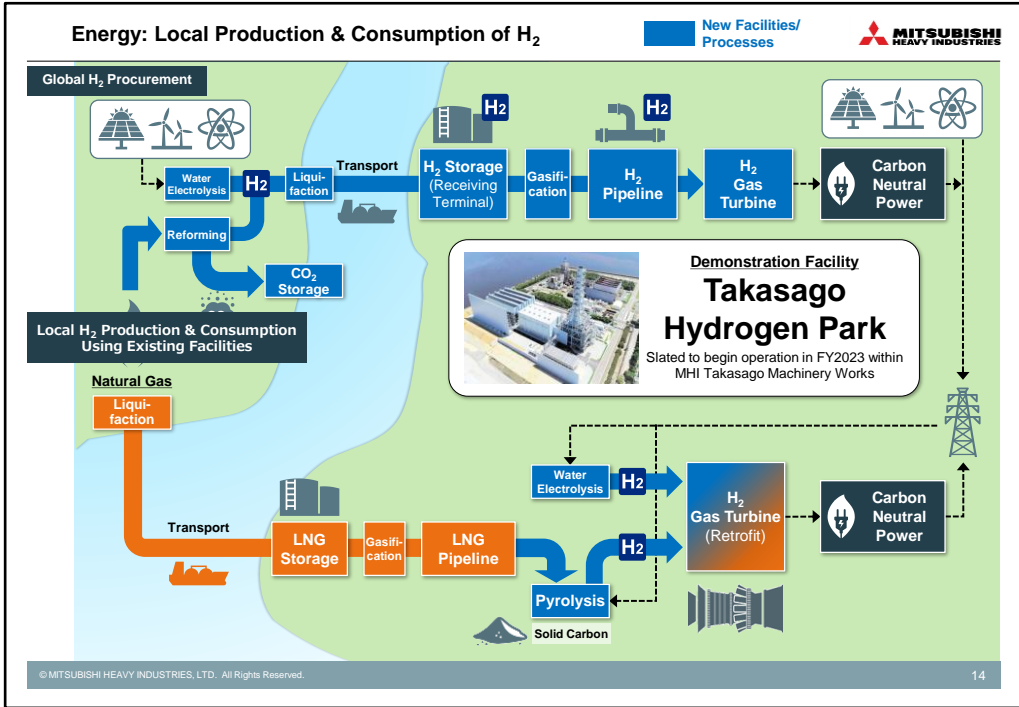
However, there is a lot of existing gas-fired power generation infrastructure in Japan and around the world. So, let's consider the first of the keywords I mentioned at the beginning: Utilize.



For clarity, existing infrastructure is indicated in orange.

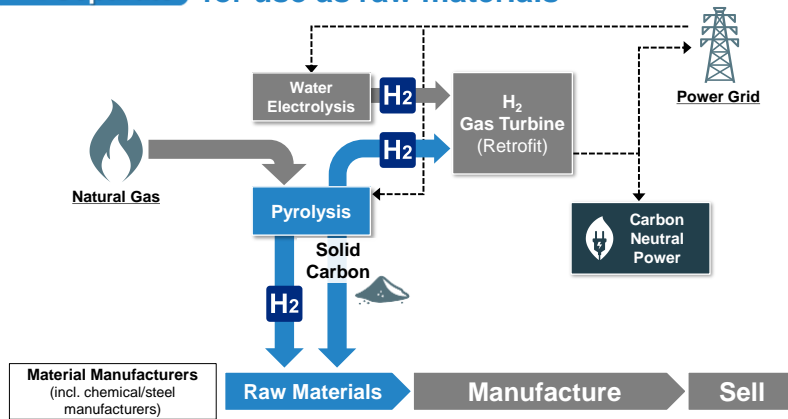
Existing infrastructure can be used for hydrogen with minimal modification. Specifically, water electrolysis units will be added to produce hydrogen using Carbon Neutral electricity from the existing power grid. Similarly, natural gas delivered by an existing gas pipeline can be pyrolyzed to produce hydrogen. This is called turquoise hydrogen.

The important thing to remember here is that you do not have to invest in equipment all at once. Little by little, we can increase the production of hydrogen and mix it with natural gas to be fired in a gas turbine. No modifications to a gas turbine are required for 30% mixed firing. Even 100% hydrogen firing can be achieved by simply replacing the combustor. The most economic method of hydrogen power generation can be achieved by locally producing and consuming hydrogen.



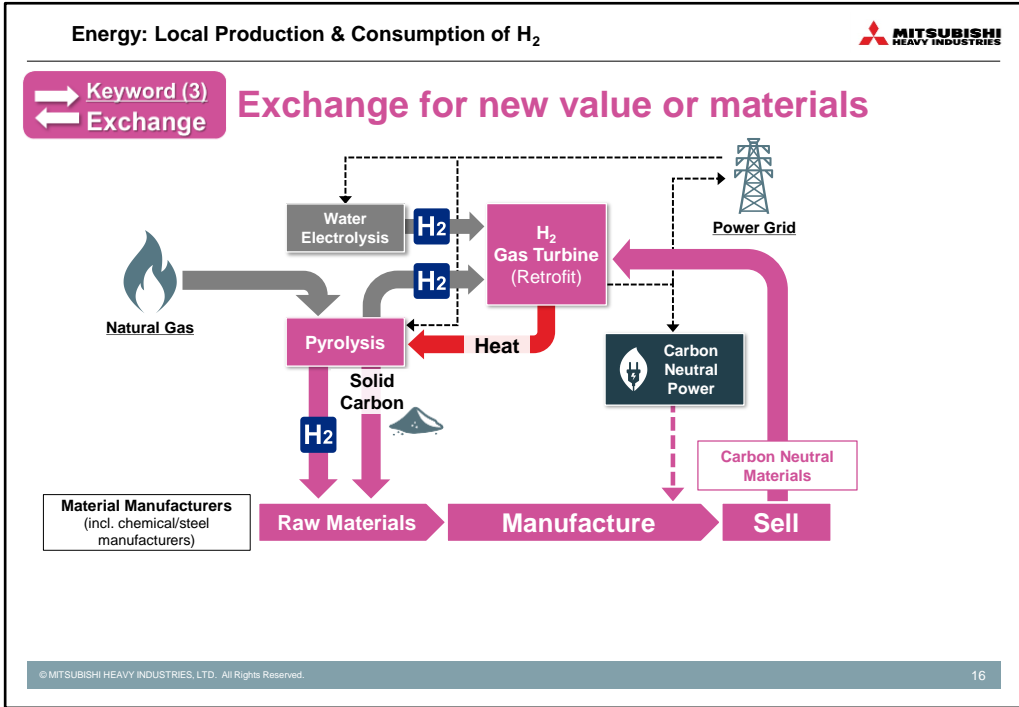
To validate these technologies, we are working to build our new Takasago Hydrogen Park facility. The plant will begin generating power from hydrogen in FY2023.

**Keyword (2) Produce H<sub>2</sub> and solid carbon for use as raw materials**  
**Separate**



Local production and local consumption of hydrogen includes the second keyword: Separate. In this case, natural gas is separated into hydrogen and solid carbon.

This solid carbon can be used as a raw material by manufacturers of materials such as chemicals and steel. This is one example of how value chains from different industries can coexist.

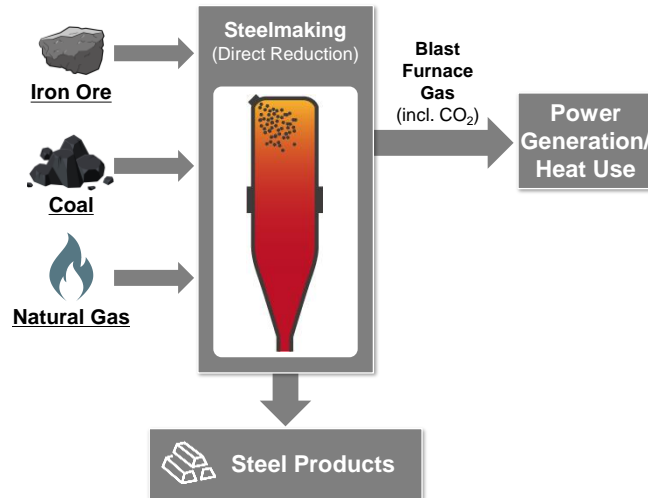


Next is the third keyword: Exchange. This is indicated in pink.

In the hydrogen gas turbine example, heat that the gas turbine would normally exhaust is sent to a natural gas pyrolysis unit, which returns the resulting hydrogen to the gas turbine to be used as a fuel. If a material manufacturer were built next to the power plant, there could be an exchange of heat for raw materials.



## CO<sub>2</sub> Recycling in Steelmaking




Next, we will consider an example of the steelmaking industry as a CO<sub>2</sub> solutions ecosystem.

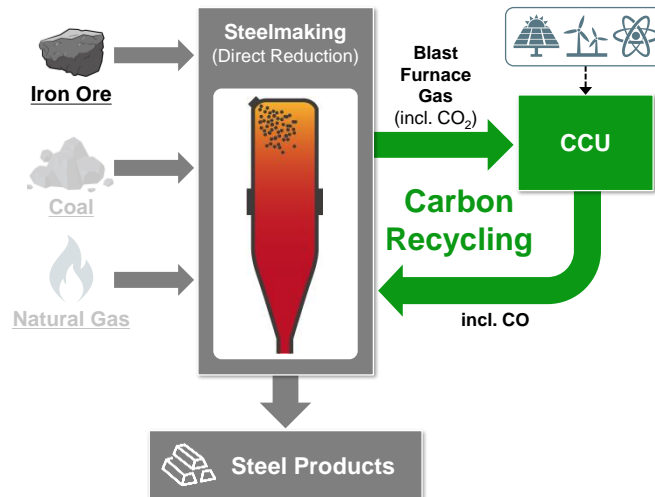
The steelmaking process uses iron ore as a raw material and emits CO<sub>2</sub> as blast furnace gas. Let us examine CO<sub>2</sub> recycling in steelmaking.

## Materials: CO<sub>2</sub> Recycling in Steelmaking



 **Keyword (4)**  
**Circulate**

**Reuse carbon within the steelmaking process**



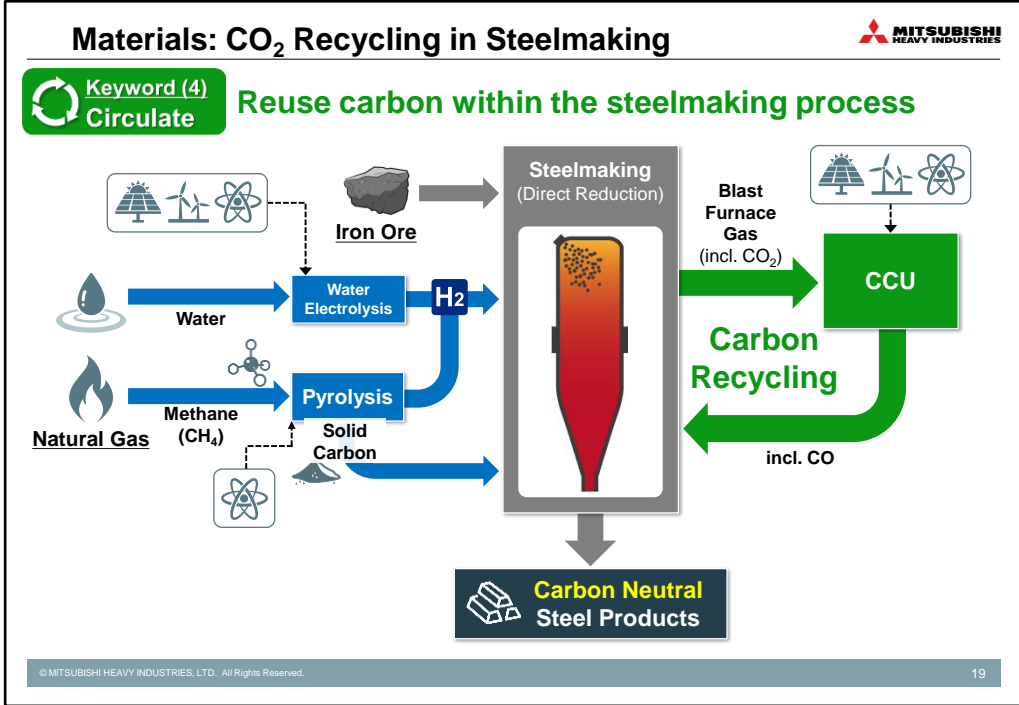
© MITSUBISHI HEAVY INDUSTRIES, LTD. All Rights Reserved.

18

The fourth keyword is Circulate, which we have indicated in green.

CO<sub>2</sub> from the blast furnace gas is captured by a CO<sub>2</sub> capture system. We are currently developing technologies to efficiently convert CO<sub>2</sub> to CO.

CO<sub>2</sub> is converted to CO and returned to the reduction process. This will greatly reduce the amount of coal and natural gas needed to make steel. By recycling carbon throughout the process, we not only reduce CO<sub>2</sub> emissions, but we also reduce the consumption of raw materials and fuel. This is another example of combining environmental value with economic efficiency.



The hydrogen production section from the hydrogen gas turbine page has been added to the left in blue.

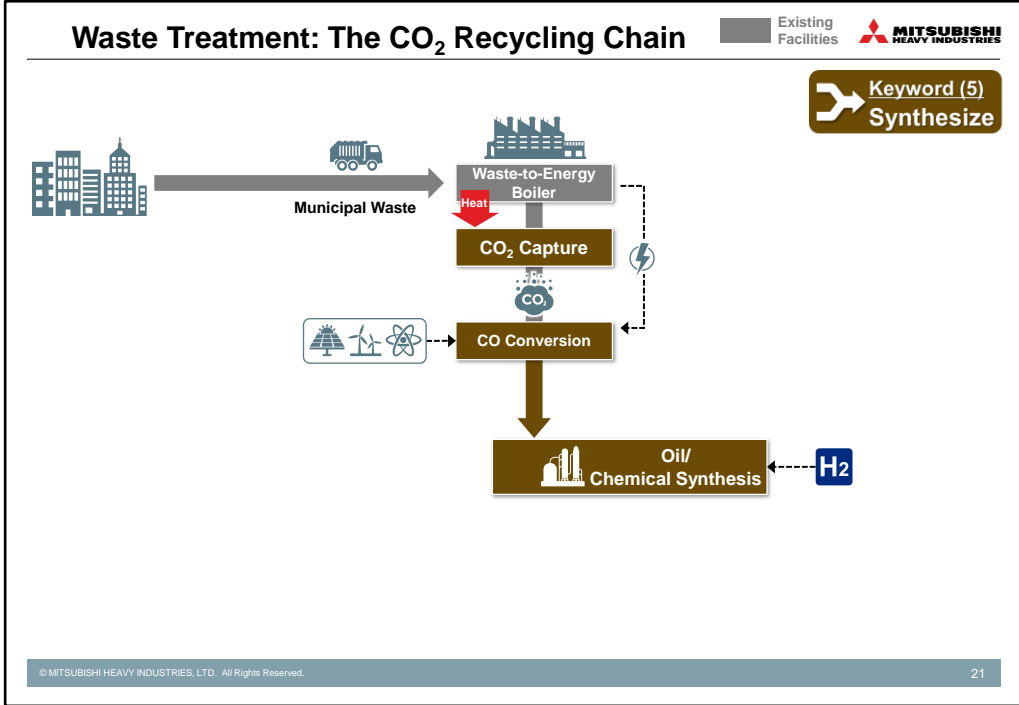
Coal and natural gas can be replaced with solid carbon and hydrogen. Carbon Neutral steel products can be used in a variety of products. This is a great example of carbon recycling between different industries.

## Waste Treatment: The CO<sub>2</sub> Recycling Chain

Existing Facilities 



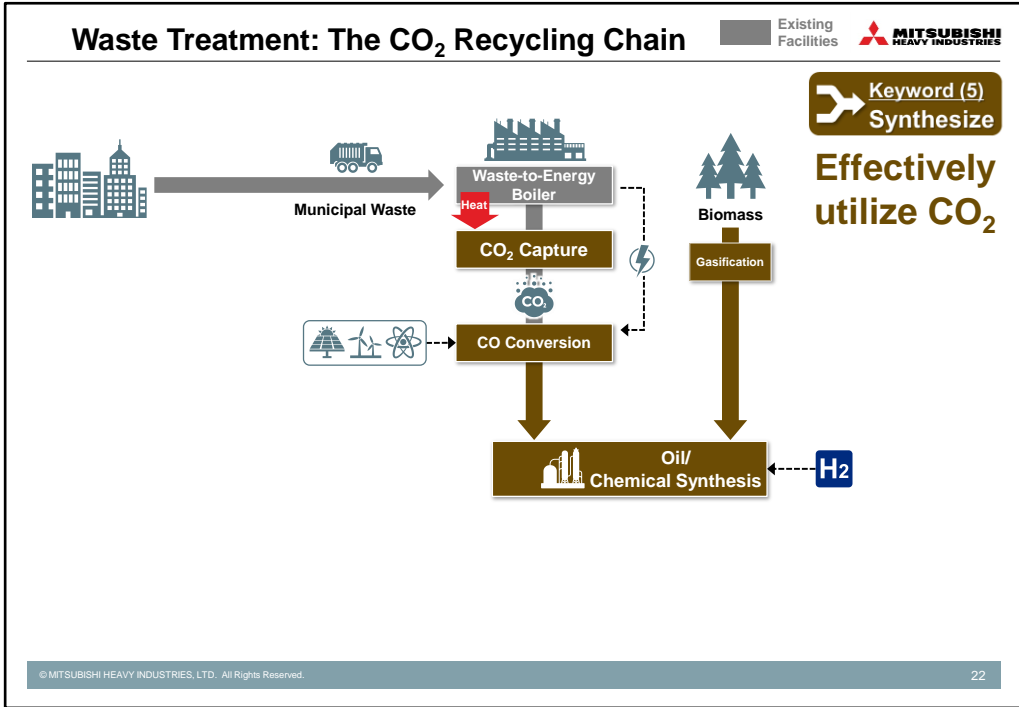
The following is the case of a waste-to-energy boiler. It emits CO<sub>2</sub>.



This brings us to the fifth keyword: Synthesize. It is indicated in brown.

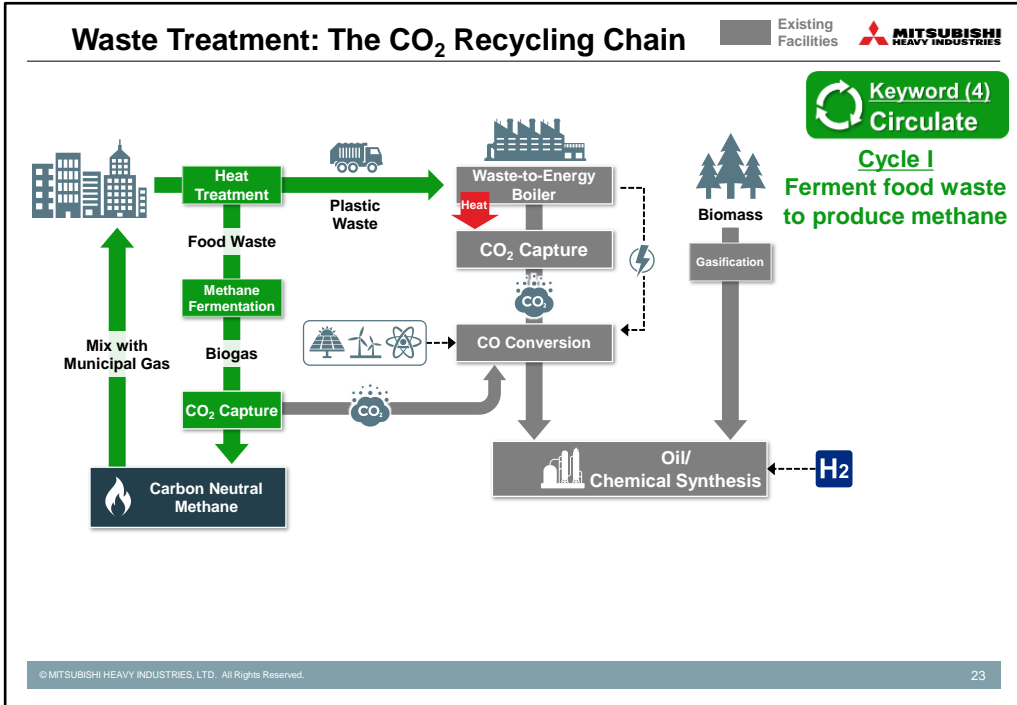
CO<sub>2</sub> and heat generated from waste to energy boilers can be effectively utilized. MHI is currently developing technology to convert CO<sub>2</sub> into CO using Carbon Neutral electricity.

By adding hydrogen to CO<sub>2</sub>, syngas, a mixture of CO and hydrogen, is obtained. Syngas is a raw material for oil and chemical products.



A biomass gasifier, which produces CO, has been added to the right side of this slide.

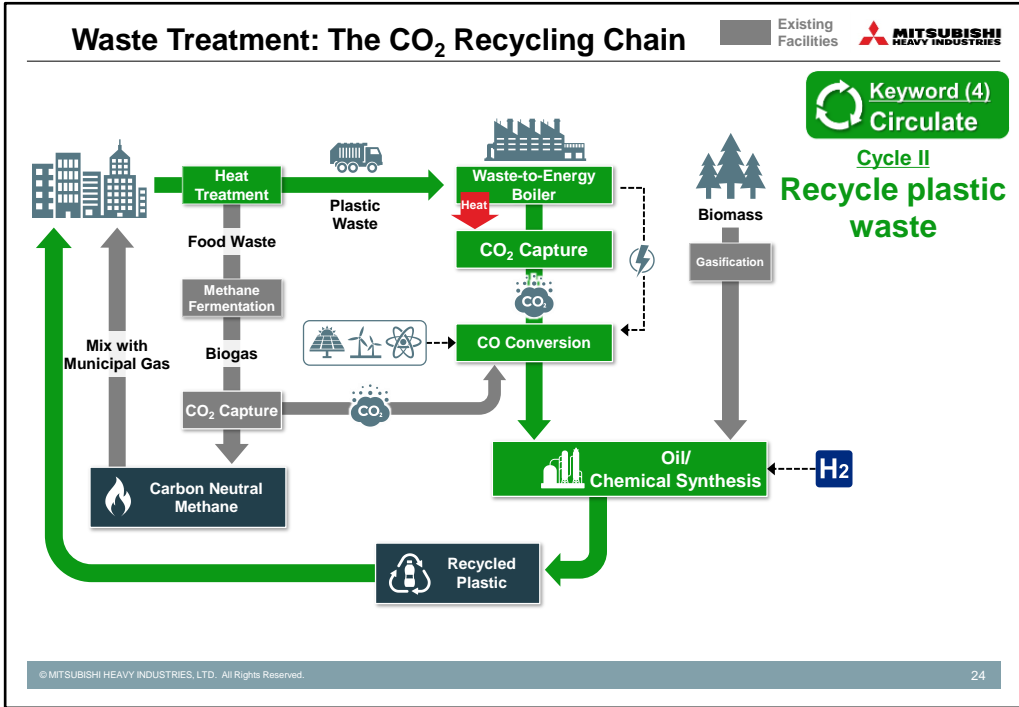
This is also an MHI Group product. Similar to the previous slide, chemical products can be synthesized by combining CO with hydrogen.



The fourth keyword, Circulate, has been added to the left side in green.

At the MHI Research & Innovation Center, we are currently validating a methane fermentation system which breaks down food waste and generates methane. This methane can be mixed with natural gas. In this way, the natural gas industry will also join the CO<sub>2</sub> solutions ecosystem.

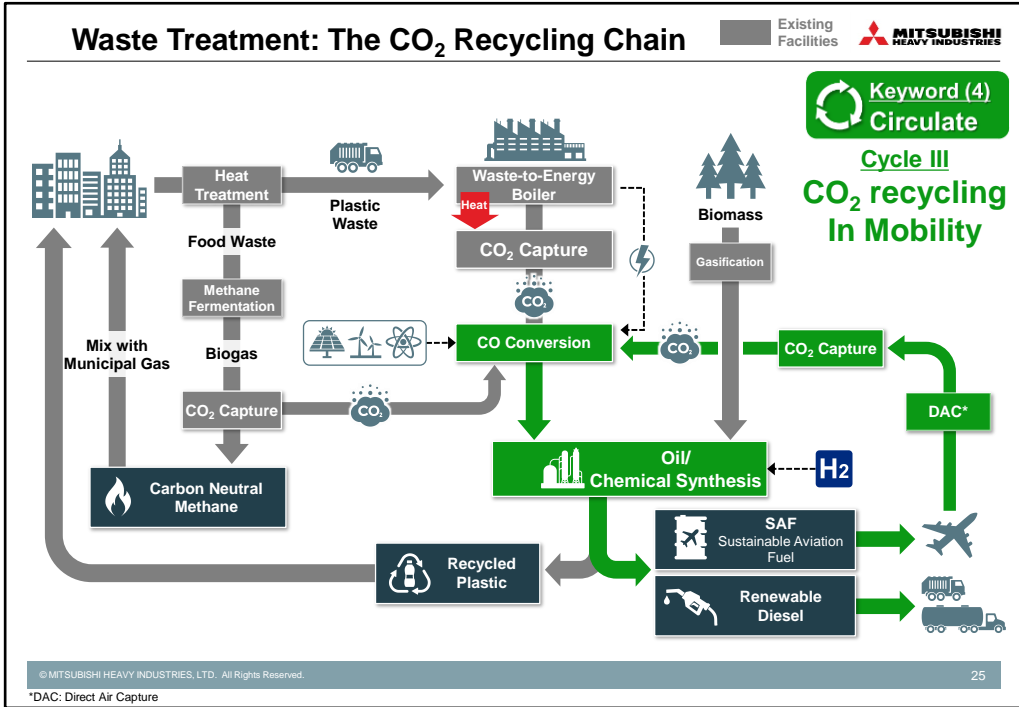
In addition, plastic waste can be separated out and recycled, which reduces the total amount of waste. This is another form of carbon recycling.



Let's look at the next keyword, Circulate, from the perspective of plastics. A large cycle has been indicated in green.

This is the cycle of plastic waste recycling.

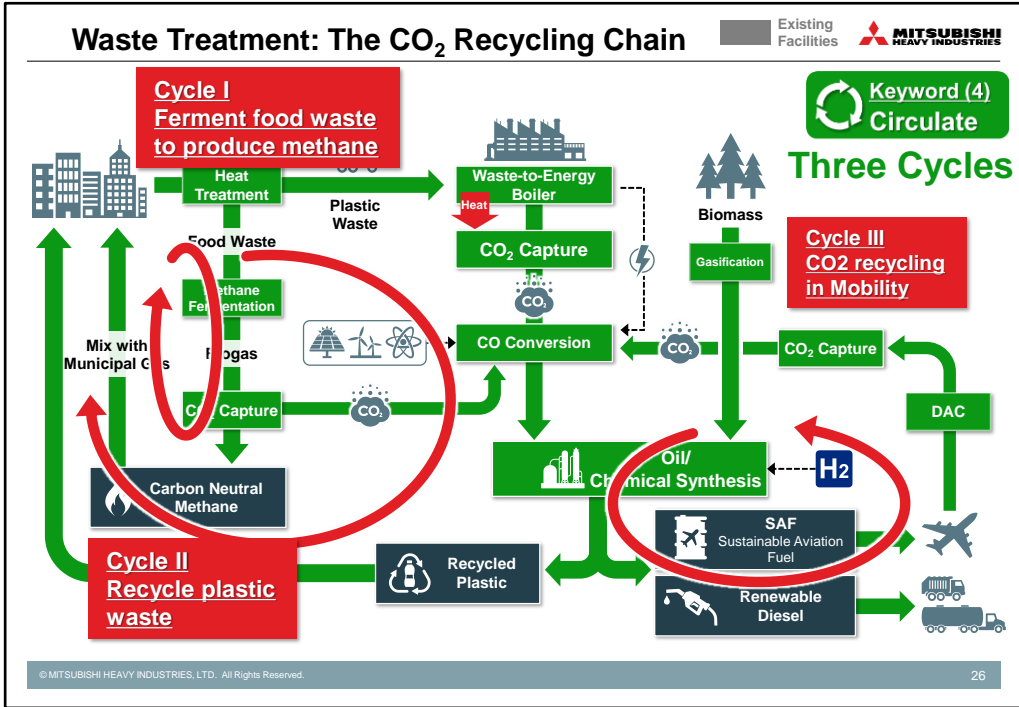




Let's return to the topic of oil synthesis. Now the right side has been highlighted in green.

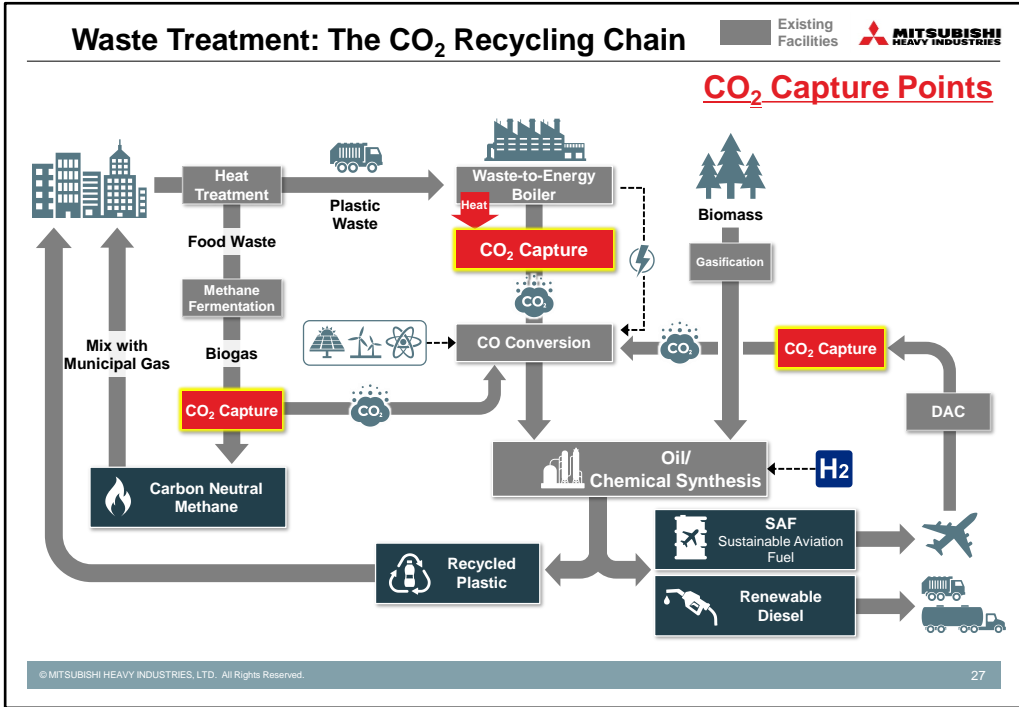
Oil that was originally food waste or biomass and can be used as Sustainable Aviation Fuel, SAF. Normally, CO<sub>2</sub> from aircraft is emitted into the atmosphere, but by performing Direct Air Capture, that CO<sub>2</sub> can be captured, and a CO<sub>2</sub> recycling chain can be created on the right side. DAC can be achieved using MHI CO<sub>2</sub> capture equipment.

Renewable diesel fuel, shown at the bottom right, can be produced in the same way as SAF, so this is truly a Mobility-focused CO<sub>2</sub> recycling chain.



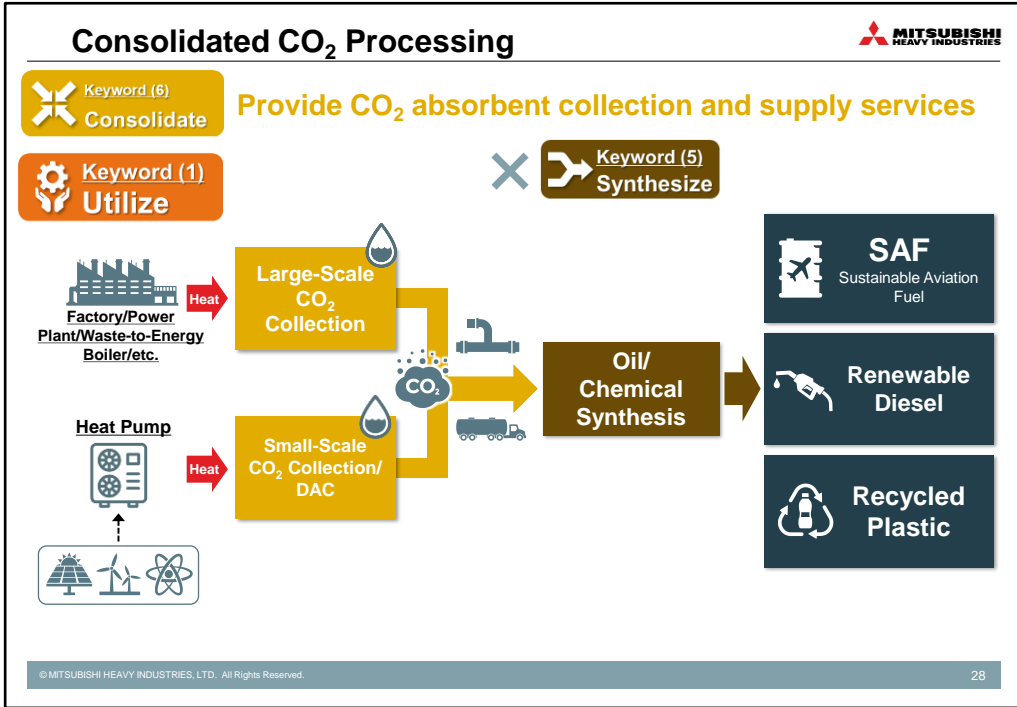
This all has become a bit complicated. To summarize, by incorporating MHI's existing products as well as new technologies under development into existing waste incineration facilities, we can create three major carbon recycling chains.

Value chains in differing industrial sectors will become increasingly connected. All value chains will be characterized by satisfying environmental value while also being highly economical through the use of by-products. This is exactly the Carbon Neutrality solutions ecosystem MHI Group is aiming for.



By the way, have you noticed that there are multiple CO<sub>2</sub> capture points in these three cycles? We have highlighted them in red on this slide.

Multiple collection points exist at disparate locations. This is where the last keyword, Consolidate, comes in. I will explain this on the next page.



MHI has a 70% market share in large-scale CO<sub>2</sub> capture equipment for use in chemical and power plants. We have recently launched a lineup of small, modular CO<sub>2</sub> capture systems as well.

Modular CO<sub>2</sub> capture systems are available for all industrial sectors. Existing infrastructure in all industries can be utilized without modification, and CO<sub>2</sub> capture equipment can be installed according to its scale. Heat required for CO<sub>2</sub> capture is generated at low cost by our heat pumps. These small amounts of CO<sub>2</sub> can then be collected at volume by consolidation, making the synthesis of oil and other materials more efficient and less expensive.

We are also considering providing CO<sub>2</sub> absorbent supply and collection services, as well as remote operation of CO<sub>2</sub> capture equipment for thousands or tens of thousands of facilities.

# Status of Solutions Development

So far, I have introduced some of the examples of the Carbon Neutrality solutions ecosystem that MHI Group is aiming for, namely, the coexistence and success of a wide variety of industries.

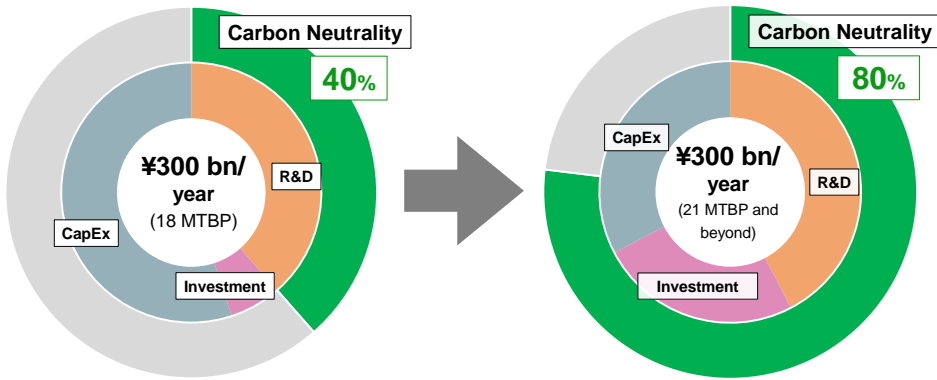
Here are some examples of individual products and technologies that will make this possible.

## Carbon Neutrality Investments\*



\*Investments: Total of capital expenditures, investments, and R&D costs

**Execute large shift in funds to R&D and investments,  
reaching 2 trillion yen by 2030**



Shift investment to decarbonization ecosystem development in each business, focusing on six keywords (1. Utilize, 2. Separate, 3. Exchange, 4. Circulate, 5. Synthesize, and 6. Consolidate) mentioned in the previous section

© MITSUBISHI HEAVY INDUSTRIES, LTD. All Rights Reserved.

30

But first, let me lay out our investment plan.

The ratio of R&D and investment will be significantly increased to an accumulated total of 2 trillion yen through 2030. We will also double the percentage of investment in Carbon Neutral products from 40% to 80% to accelerate the development of our technology and product areas.

## Energy Management System

**Begin use in FY2022**

Validation to begin in FY2022 as a core part of the MHI Group Integrated Development Plan

- Leverage position as equipment manufacturer**  
 Utilize knowledge base regarding core energy supply products such as power plants and HVAC to develop algorithms which account for lifecycle costs and operability
- Compatible with carbon neutral equipment**  
 Install solar panels and battery energy storage equipment. Develop carbon neutrality management technologies.
- Verify effectiveness with simulations**  
 Simulate operational changes and/or installation of new equipment. Quantify cost and decarbonization effectiveness, and increase accuracy of return on investment calculations
- Use latest evaluation indices**  
 Energy cost and battery charge/discharge cost models using the latest techniques, including leveled lifecycle costing, are included in control algorithms

The diagram illustrates the Energy Management System architecture. It features a central 'HARDTECH HUB YOKOHAMA' connected to three energy sources: a 300kW power plant, 100kW-500kWh battery storage, and a 100kW solar panel. These sources feed into a 'Supply Optimization Algorithm' and a 'Demand Optimization Algorithm'. The demand algorithm is linked to 'YHH Demand-Side Equipment', which includes a 'Data Center' and a 'Motor'.

**YHH CN Type EMS Core System Development**

Phase	Timeline
Development	2021 - 2022
Validation	2022 - 2023
Commercialization	2023 - 2024

Key milestones include: 'Install CN models in factories' (2022), 'EMS base system for customer use' (2022), and 'Commercialization' (2023). The system is part of the '2021 Medium-Term Business Plan'.

© MITSUBISHI HEAVY INDUSTRIES, LTD. All Rights Reserved. 31

Now, I'll briefly discuss the readiness of individual products as it pertains to Carbon Neutrality.

First off, here is an Energy Management System, which is required for all industrial sectors in the ecosystem.

We will validate Carbon Neutral solutions management technology by installing solar panels, battery storage equipment, and a data center at Yokohama Hardtech Hub, and also by linking with external fluctuating clean energy sources. We will begin validation operations in FY2022, and after decarbonizing our factories, we will commercialize the system.

## Heat Pump Chillers



### Begin validation in FY2022

Complete prototype design and fabrication in FY2022 and validate at in-house manufacturing facilities in FY2023

#### ■ Reduce CO<sub>2</sub> emissions from heating processes

Electrify heating processes in factories and other facilities. Develop energy conserving heat pump chillers. Achieve large decrease in CO<sub>2</sub> emissions.

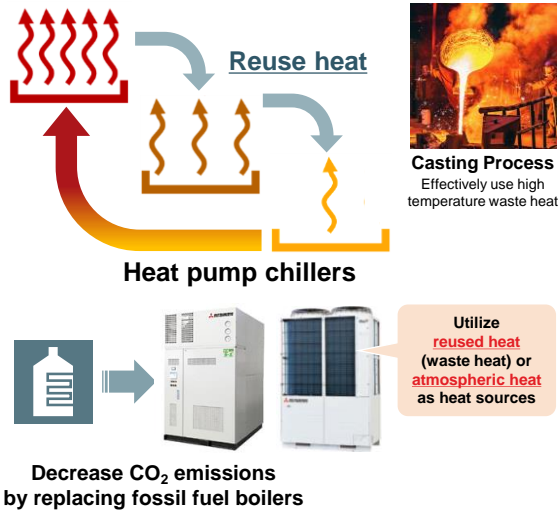
#### ■ Leverage existing product development and manufacturing technologies

Quickly commercialize while ensuring high reliability

#### ■ Provide decarbonization solutions for heating processes

Combine heat and energy equipment design and development capabilities with engineering knowledge base cultivated in existing businesses

### Factory Decarbonization Solutions



© MITSUBISHI HEAVY INDUSTRIES, LTD. All Rights Reserved.

32

Heat pumps are key to decarbonizing factories.

By increasing the lineup in the high-temperature range above 100C and replacing existing factory boilers, we will contribute to decarbonization in many industries. We will complete the design and production of a prototype in FY2022 and begin operation at our machinery works in FY2023.



## Mihara Carbon Neutral Factory



### Achieve a fully Carbon Neutral factory by the end of FY2023

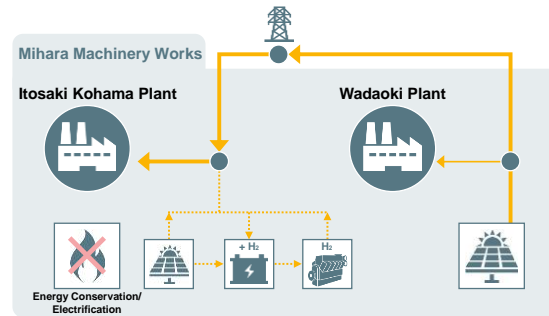
Demonstrate the achievability of MISSION NET ZERO by offsetting 10,000 tons-CO<sub>2</sub>/year

#### ■ Install solar panels

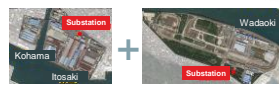
Install an amount of solar panels equivalent to the electricity consumption of Mihara Machinery Works. Achieve Scope 2 decarbonization with this dedicated renewable energy source.

#### ■ Utilize as R&D proving ground

Execute challenging adoption of energy conservation, electrification, fuel conversion, and renewable energy sources while using as a proving ground for various technologies and carbon neutral solutions



CO<sub>2</sub> = 10,000 tons  $\approx$  x 700,000 trees



This is the new Mihara Carbon Neutral Factory initiative.

Solar panels equivalent to the electricity consumption of Mihara Machinery Works will be constructed at the plant site. We will decarbonize the power we use and also utilize the facility as a proving ground for the development of other technologies.

## Takasago Hydrogen Park



### Begin operation in FY2023

A one-stop-shop for validating hydrogen-related technologies from hydrogen production to power generation

#### ■ Add hydrogen production and storage equipment to existing demonstration plant

Test and validate water electrolysis, turquoise hydrogen\*, SOEC\*\* and other technologies in-house and improve product reliability

\*Turquoise hydrogen: H<sub>2</sub> obtained through pyrolysis of methane into H<sub>2</sub> and solid carbon

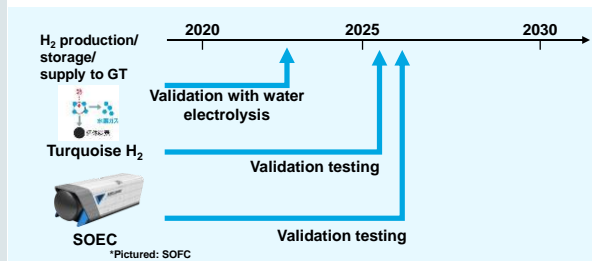
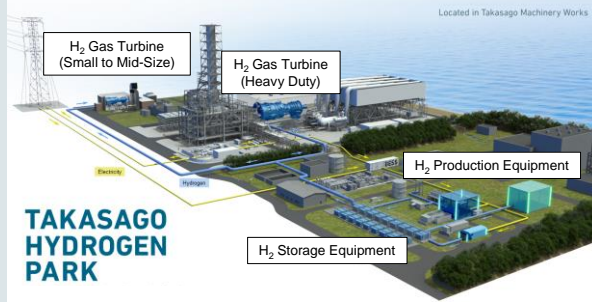
\*\*SOEC (Solid Oxide Electrolyzer Cell): High temperature steam electrolysis

#### ■ Validate hydrogen gas turbine technology

Validate technology in lead up to commercialization of 30% mixed firing in heavy duty gas turbines and 100% hydrogen firing in small to mid-size gas turbines by 2025

#### ■ Combine and evolve energy infrastructure and hydrogen technologies

Make progress toward establishing a hydrogen solutions ecosystem, which will help achieve a sustainable society by linking various industries with hydrogen technologies



© MITSUBISHI HEAVY INDUSTRIES, LTD. All Rights Reserved.

34

The new Takasago Hydrogen Park will add hydrogen production and storage equipment to the existing GTCC demonstration plant at Takasago Machinery Works. This will enable validation testing of an integrated process from next-generation hydrogen production technology to power generation using hydrogen gas turbines.

After validating the system using water electrolyzation, we plan to produce turquoise hydrogen by pyrolyzing methane into hydrogen and solid carbon, among other initiatives. Operation is scheduled to begin in FY2023.

## Hydrogen Gas Turbine (EU Taxonomy Compliant)



### EU Taxonomy Compliant

Leveraging Takasago Hydrogen Park, develop hydrogen gas turbine technology that complies with the EU Taxonomy's strict CO<sub>2</sub> emissions standards. Development schedule meets Taxonomy timing requirements as well.

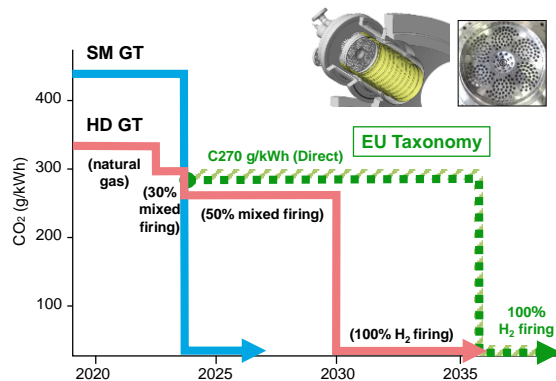
#### ■ Small to mid-size gas turbines

Validate on actual equipment at Takasago Hydrogen Park in preparation for commercialization of hydrogen gas turbines by 2025, meeting the EU Taxonomy deadline

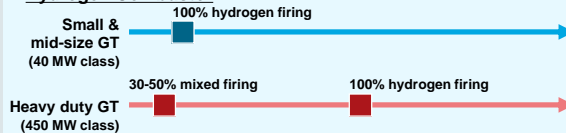
#### ■ Heavy duty gas turbines

Development of 30% mixed hydrogen firing technology was completed in 2018. Validation will be performed at Takasago Hydrogen Park in the lead up to commercialization in 2025.

Forecasted to achieve 100% hydrogen firing by 2030 and meet the EU Taxonomy requirements a full 5 years before the deadline



### Hydrogen Combustor



© MITSUBISHI HEAVY INDUSTRIES, LTD. All Rights Reserved.

35

Here is the status of hydrogen gas turbine development.

For small and mid-size gas turbines, we plan to validate 100% hydrogen firing at Takasago Hydrogen Park in 2024. This technology is EU Taxonomy compliant.

The development of 30% mixed firing has been completed for heavy duty gas turbines, and validation will start in 2023.

The development of 50% mixed firing and 100% hydrogen firing will be completed in 2024 and 2030, respectively, both of which are before the EU Taxonomy standards come into effect.

# Nuclear Power



## Carbon-free, large-scale power source

Nuclear power is a stable power source, which does not emit CO<sub>2</sub> during operation and also is not affected by weather. Therefore, we believe it will be essential to the achievement of a Carbon Neutrality.

### Restart existing plants and complete the nuclear fuel cycle

Currently focusing on restarting existing plants, building Specialized Security Facilities\*, and completing the nuclear fuel cycle

### Develop a next-generation light water reactor

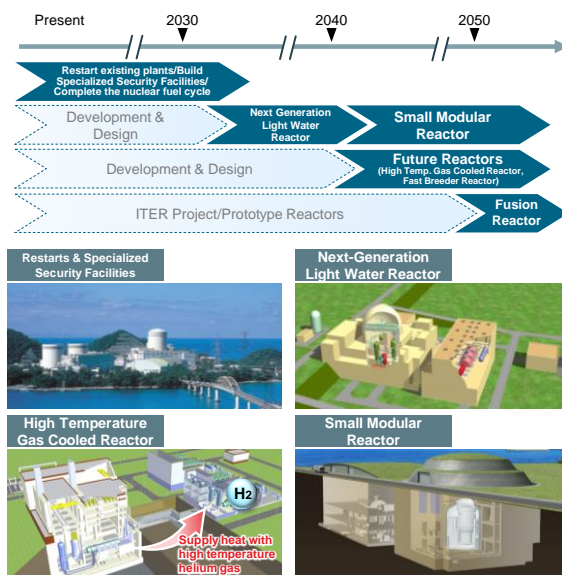
Develop a next-generation light water reactor with further improvements to safety, aiming for commercialization in the mid-2030s

### Develop future reactors and fusion reactors

Develop and commercialize small modular reactors, high temperature gas-cooled reactors, and fast breeder reactors to satisfy the diversifying market needs of the future

## High-volume, stable, carbon-free hydrogen production using high temperature gas-cooled reactors

Contribute to meeting decarbonization and hydrogen use needs of various industries including steelmaking by achieving high-volume, stable hydrogen production with high temperature gas-cooled reactors



© MITSUBISHI HEAVY INDUSTRIES, LTD. All Rights Reserved.

36

\*Specialized Security Facilities: Isolated, large-scale facilities used to safely shut down a reactor in the event of such security incidents as airplane strikes or terrorist attacks

Nuclear power does not emit CO<sub>2</sub> during operation, is not affected by weather conditions, and is a stable power supply. This makes it essential for realizing a Carbon Neutral society that satisfies the 3Es + S criteria. We will contribute to the stable production of hydrogen using high-temperature gas-cooled reactors, while making steady progress in restarting operations, completing the nuclear fuel cycle, and developing next-generation light water reactors.

## Biomass Gasifier



### Achieved world's first regularly scheduled flight\* powered by SAF

Sustainable Aviation Fuel (SAF) produced from wood biomass

#### ■ Integrated biojet fuel manufacturing technology

Established by MHI, JERA, Toyo, and JAXA under contract from NEDO\*\*

#### ■ Validated in a pilot plant

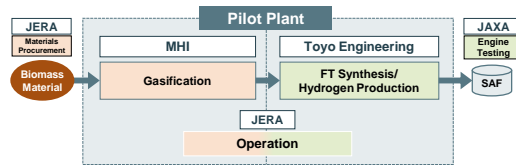
Built a pilot plant and validated the achievability and efficacy of a gasifier with processing capacity of 0.7 ton/day and a gas production output of approx. 1,000 Nm<sup>3</sup>/day during FY2017-2020.

#### ■ Adaptable to any region

Achieved an SAF production process using captured CO<sub>2</sub> including from DAC

\*Outline of domestic regularly scheduled flight powered by SAF produced from wood pulp:

- Date: June 17, 2021
- Flight: JAL 515
- Route: Tokyo-Haneda to New-Chitose (Japan domestic)
- Aircraft: Airbus A350-900



Biomass Gas Equipment



Biojet fuel meeting ASTM quality standards



View of pilot plant (within JERA Shin-Nagoya Thermal Power Station)

© MITSUBISHI HEAVY INDUSTRIES, LTD. All Rights Reserved.

37

\*\*NEDO: New Energy and Industrial Technology Development Organization

This is a gasifier that produces Sustainable Aviation Fuel, which I explained during the section on waste treatment.

We have already developed technology to produce SAF through the gasification of biomass under contract from NEDO. In 2021, MHI and our partners supplied SAF to the world's first regularly scheduled airline flight powered by SAF.

Since aviation fuels need to be adapted to the characteristics of each region, we will promote the establishment of a process from CO<sub>2</sub> capture, including DAC, to SAF production.

## Modular CO<sub>2</sub> Capture Equipment

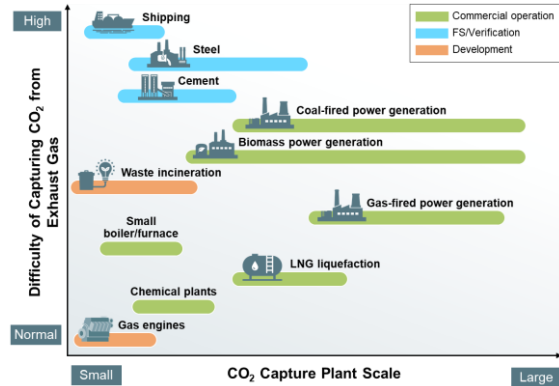


**Shipped first production unit in FY2021**

**Fill out the product lineup by FY2023**

Commercialize units for ships, gas engines, waste incinerators and others

- **Proprietary CO<sub>2</sub> capture technology**  
Extensive commercial experience and high capture rate (over 90%) for chemical and thermal power plants
- **Expand equipment lineup (0.3-200t/day)**  
Develop equipment targeting not only large but also small- and medium-sized emission sources to diversify CO<sub>2</sub> recovery demand
- **Modularize and standardize**  
Development of low-cost general-purpose equipment aiming to reduce size (70% reduction in installation area) and minimize on-site construction (75% reduction compared with conventional equipment)
- **Remote monitoring and O&M**  
Option to minimize customer effort. Begin validation testing in 2022. Commercialize CaaS\* business in 2024.



© MITSUBISHI HEAVY INDUSTRIES, LTD. All Rights Reserved.

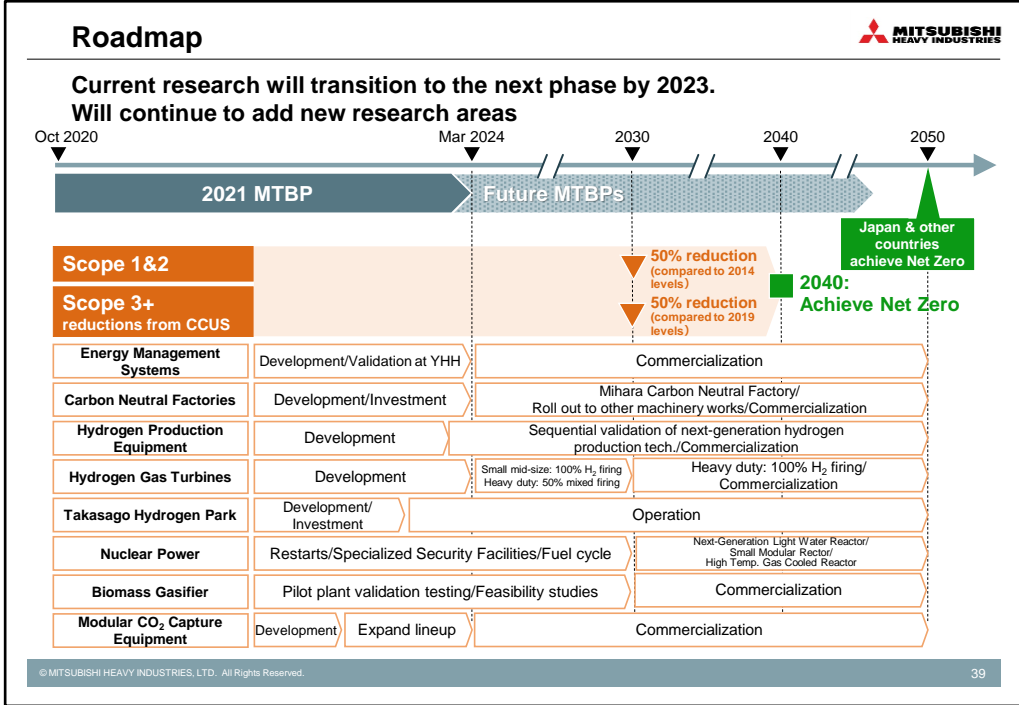
38

\*CaaS (CO<sub>2</sub> Capture as a Service): A business covering all processes of CO<sub>2</sub> capture, collection, storage and conversion/utilization

This slide explains small, modular CO<sub>2</sub> capture systems.

MHI Group has approximately a 70% market share in CO<sub>2</sub> capture equipment on a capacity basis. We are expanding our equipment lineup and can contribute to decarbonization in all industries.

We will also introduce remote monitoring and O&M services to minimize customer labor and costs, and CO<sub>2</sub> Carbon Capture as a Service to supply, collect, and renew absorbent for use in carbon capture systems. MHI will become a key player in the CO<sub>2</sub> solutions ecosystem across diverse industrial sectors.



This is the development roadmap for individual products and technologies.

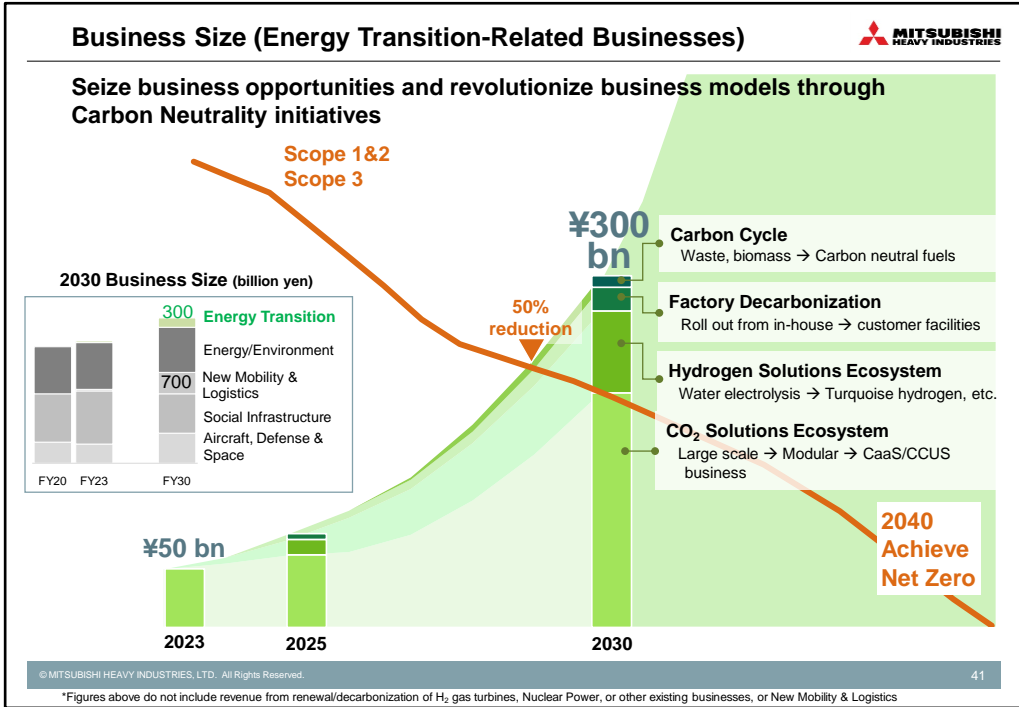
In the current fiscal year, which is the first year of the 2021 Medium-Term Business Plan, we have already begun development of many new technologies and products, and new ideas are being generated every day. Most of these will be core technologies in the solutions ecosystems introduced today. They will enable value chains from diverse industries to balance environmental value with economics. Prototype production and validation testing will be conducted sequentially, and we will commercialize new products as they become ready.

In this way, MHI Group will achieve a 50% reduction in Scope 1&2 emissions by 2030 and Net Zero by 2040.

# Summary

Allow me to summarize today's presentation.





This slide shows revenue levels from Energy Transition-related businesses in green.

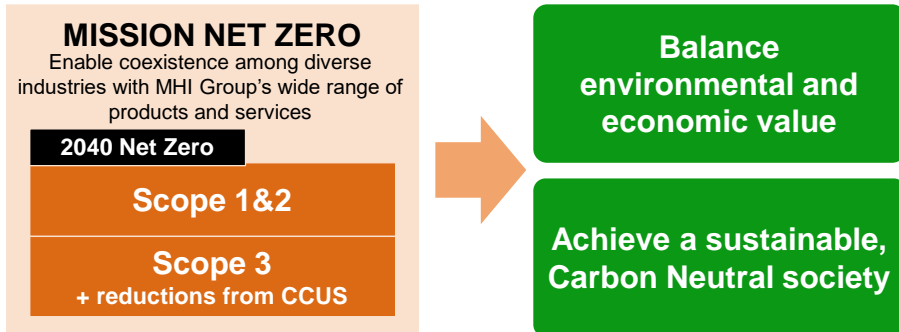
Through Carbon Neutrality, we will create business opportunities and transform our business models. We will develop CO<sub>2</sub> and hydrogen solutions ecosystems, carbon recycling, and factory decarbonization. The solutions ecosystems I mentioned today will connect various industries, and we expect that they will expand very rapidly.

## Philosophy and Vision for Achieving a Carbon-Free World



### Our Principles

- We deliver reliable and innovative solutions that make a lasting difference to customers and communities worldwide
- We act with integrity and fairness, always respecting others
- We constantly strive for excellence in our operations and technology, building on a wide global outlook and deep local insights



© MITSUBISHI HEAVY INDUSTRIES, LTD. All Rights Reserved.

42

Our philosophy and vision for achieving a Carbon-Free world is in harmony with MHI's principles.

Through MISSION NET ZERO, we aim to enable coexistence among diverse industries with MHI Group's wide range of products and services.

By combining not only environmental value but also economic value, we will realize a sustainable Carbon Neutral world.



- MHI Group will disclose two climate change scenarios in accordance with the TCFD framework (scheduled for April 2022)

## ESG Finance

- Plans to issue transition bonds (FY2022)  
Selected as model example for the Japan Ministry of Economy, Trade and Industry's 2021 Climate Finance Model Projects (March 17, 2022)
- Issued green bonds for two consecutive years  
FY2020: 25 billion yen, FY2021: 15 billion yen
- Executed positive impact finance loan agreement (Amount: 2 billion yen, Date of execution: March 14, 2022)

Finally, we will continue to actively pursue climate-related disclosures.

In April, we will disclose two climate change scenarios in accordance with the TCFD framework.

Additionally, we will accelerate our initiatives by utilizing ESG finance, including transition bonds, green bonds, and positive impact finance.

Thank you for your attention.

**MOVE THE WORLD FORWARD**

**MITSUBISHI  
HEAVY  
INDUSTRIES  
GROUP**