MOVE THE WORLD FORWARD MITSUBISHI HEAVY INDUSTRIES GROUP

# MHI Group in Indonesia

## Introduction


18 November 2024

PT Mitsubishi Heavy Industries Indonesia



MITSUBISHI HEAVY INDUSTRIES INDONESIA

# Outline of Mitsubishi Heavy Industries Group

Mitsubishi Heavy Industries (MHI) Group is one of the world's leading industrial groups, spanning energy, smart infrastructure, industrial machinery, aerospace, and defense.

Corporate Movie https://www.youtube.com/watch?v=3pxh4fJR0Jg

Revenue (FY2023)

**¥4,657.1 billion**

**(US$30.8 billion)**

- Energy Systems ..... 37.8%
- Plants & Infrastructure Systems ..... 17.0%
- Logistics, Thermal & Drive Systems ..... 28.2%
- Aircraft, Defense & Space ..... 17.0%

## Energy Systems

- Gas & steam power systems
- Compressors
- Marine machinery, etc.
- Nuclear power systems
- Aero engines

## Plants & Infrastructure Systems

- Commercial ships
- Environmental systems
- Machinery systems, etc.
- Engineering
- Metals machinery

## Logistics, Thermal & Drive Systems

- Material handling systems
- Turbochargers
- Automotive air conditioners, etc.
- Engines
- HVAC systems

## Aircraft, Defense & Space

- Commercial aviation
- Missile systems
- Special vehicles (tanks)
- Space systems, etc.
- Defense aircraft
- Naval ships
- Maritime systems (torpedoes)

# Outline of Mitsubishi Heavy Industries Group

## Energy Systems

- GTCC Div. (Turbines)
- Steam Power Maintenance Innovation Div.
- AQCS Div.

Mitsubishi Heavy Industries Marine Machinery & Equipment Co., Ltd.

Mitsubishi Heavy Industries Aero Engines, Ltd.

Mitsubishi Heavy Industries Compressor Corporation

## Logistics, Thermal & Drive Systems

Mitsubishi Logisnext Co., Ltd.

Mitsubishi Heavy Industries Engine & Turbocharger, Ltd.

Mitsubishi Heavy Industries Thermal Systems, Ltd.

## Plants & Infrastructure Systems

Mitsubishi Shipbuilding Co., Ltd.

Mitsubishi Heavy Industries Environmental & Chemical Engineering Co., Ltd.

Primetals Technologies, Limited

## Nuclear Energy Systems

## GX Solutions

MHI Engineering, Ltd.

## Machinery Systems

Mitsubishi Heavy Industries Machinery Systems, Ltd.

## Integrated Defense & Space Systems

- Aircraft & Missile Systems Div.
- Space Systems Div.
- Land Systems Div.
- Naval Ship & Maritime Systems Div.

## Commercial Aviation Systems

MHI RJ Aviation ULC

## Chief Regional Officers

- Europe, Middle East & Africa
- China
- India
- Asia Pacific

As of Oct. 1st 2024

# MHI Group in Indonesia

## PT Mitsubishi Heavy Industries Indonesia

Started full-scale operations in April 2020. Taking over MHI Group's representative role of Jakarta Liaison Office run from 1984, to boost marketing of MHI products and solutions focusing on social infrastructure projects and to strengthen after-sales service operations in Indonesia.

## PT Mitsubishi Power Indonesia

Established August 2008
Business: New Sales, Marketing & After-Sales for
- GTCC Power Plant
- Coal-Fired Power Plant including AQCS
- Geothermal Power Plant

## PT MHI Engine System Indonesia

Established September 2007
Business: New Sales, Marketing & After-Sales for Diesel & Gas Engine Generator

## PT Power Systems Service Indonesia

JV of PT PAL Indonesia, Mitsubishi Power Asia Pacific Pte. Ltd., and Mitsubishi Corporation (MC)
Established August 1994.
Business: After-sales services relating to repair, periodical inspection, technical assistance and engineering services for Mitsubishi Power steam and gas turbines.

## Major Marketing & Sales Partners

> BME / NAVIGAT Energy: Engine Generator set
> PT Turbotech Indonesia: Marine Engine Services
> Berkat Sarana Aircon (BSA) / Graha Berkat Trading (GBT): Air Conditioning Systems (AC & VRF)
> Berca Mandiri Perkasa: Forklift
> Sumber Bangun Sarana (SBS): Centrifugal Chiller

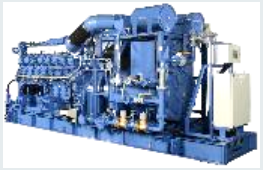
# Achievements of MHI Group in Indonesia

## Power Plant

- **18 GW** (Total supply capacity) with CCGT, Geothermal and Coal-fired power plant


## Diesel & Gas Engine Generator Set

- **No.1 market share in Indonesia** with 3,000+ delivery records of gensets ranging from 500 to 5,750 kW engine output


## Infrastructure

- **8 Chemical & Fertilizer Plants**
  Delivered since 1998
  Ammonia, Urea, Sulfuric Acid, etc.
- **Depok Depot Project**
  Completed in 2007
  Largest class train depot in ASEAN
- **Java Main Line**
  Manggarai – Cikarang
  Completed in 2017
  > Double-double tracking
  > Electrification
  > Signal system renewal




## Industrial Equipment

- Air Conditioning System/Chiller
- Forklift No.1 Market Share
  (Brands: MITSUBISHI, UNI CARRIERS, NICHIYU, CAT and TCM)
- Compressor
- Marine Engine
- Food & Packaging Machinery
- Printing & Packaging Machinery



# Factory Solutions

Approach for Low and Zero Carbon Solutions for Factories

PT Mitsubishi Heavy Industries Indonesia

# Low or Zero Carbon Approach

It's not realistic to go toward zero emission directly at this moment because of clean fuel ($H_2$, $NH_3$, etc.) availability and affordability.
To achieve the $CO_2$ reduction target in 2030, "Low Carbon" approach is necessary.

**Low Carbon Approach**
Clean fuel price >> Natural gas price

**Zero Carbon Approach**
Clean fuel competitive

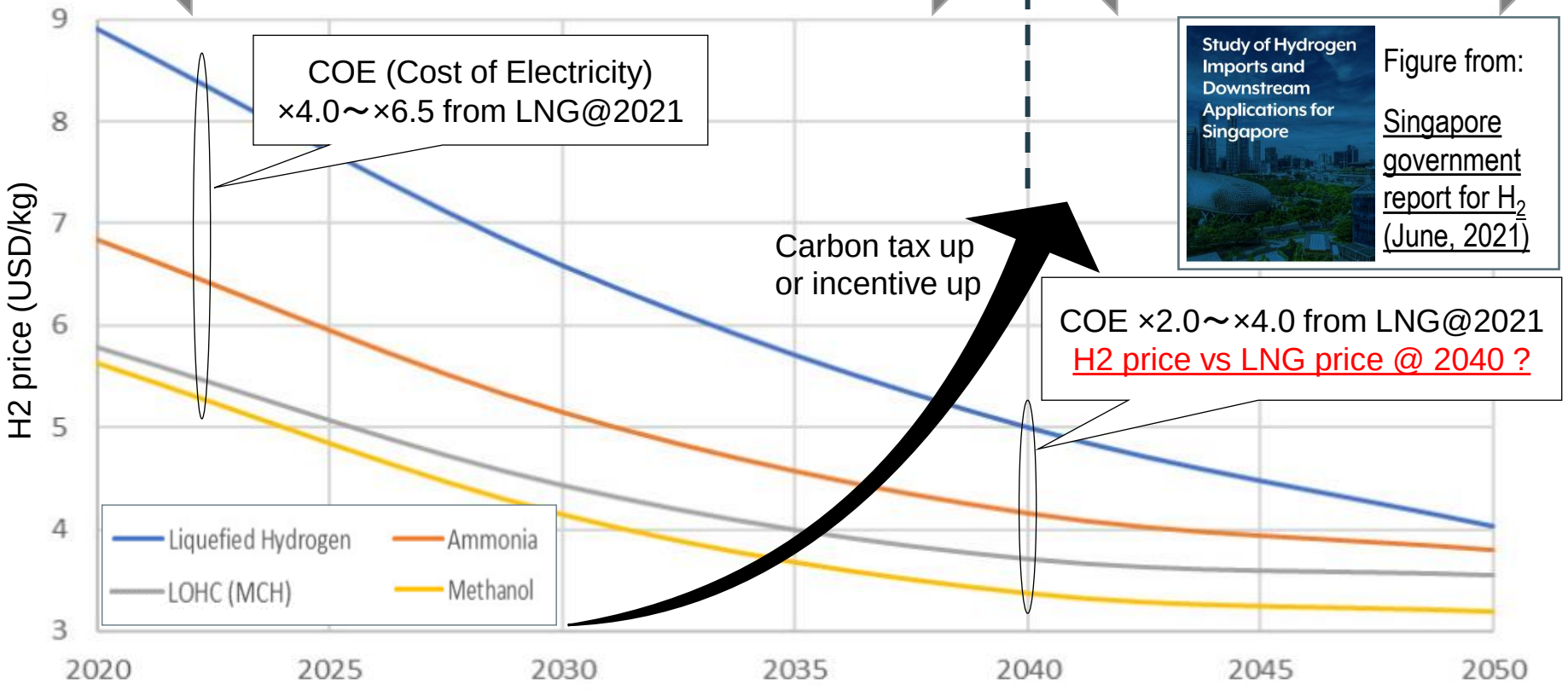






Figure from:
Singapore government report for $H_2$ (June, 2021)

# Approaches for Low and Zero Carbon

## From Heat and Cooling Demand Sector

- Optimization of Chiller Operation
- High Efficiency Chiller
- The Most Fit and Efficient Cooling System (AC, VRF, Chiller)

## From Power Generation Sector

- Renewable Source of Electricity (Solar PV, Wind, Etc.)
- Lower Emission of Electricity (Coal Fired Power Plant to Gas Power Plant)
- Zero Carbon Emission of Electricity (H2/NH3 Fuel)
- Biofuel Source of Electricity
- Co-Generation (Electricity & Steam)

## Other Approaches

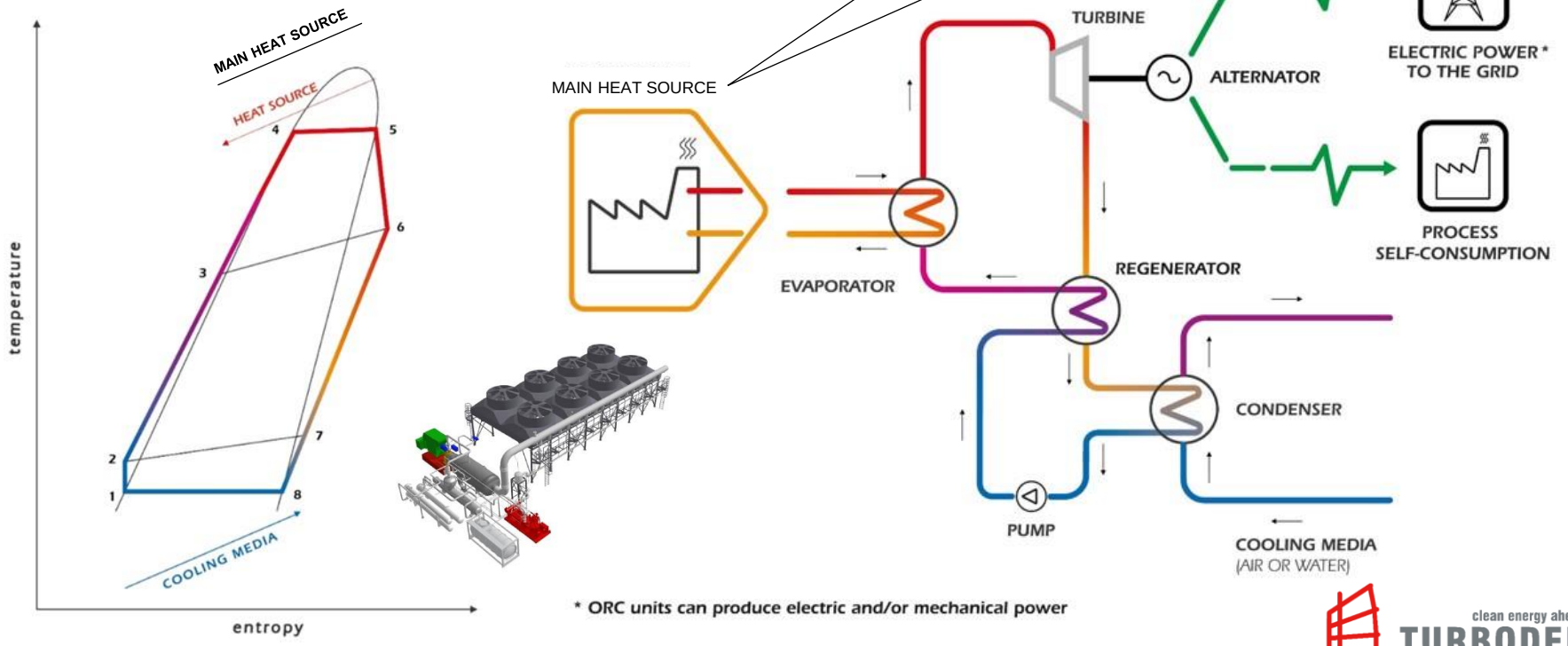
- Waste Heat Recovery to Electricity (Organic Rankine Cycle – ORC)
- Waste Heat Recovery – Large Heat Pump (LHP)
- CO2 Capture and Utilization
- Etc.

# Approach: Waste Heat Recovery (ORC)

- Waste heat can be converted into electricity
- No fuel required → Zero $CO_2$ emission
- No major overhaul (only minor maintenance)
- JCM to shorten cost investment return

Main heat source can be from waste heat of various processes, such as: furnace (glass, steel, etc.), kiln, boiler, exhaust gas from engine or turbine, geothermal, etc.

* ORC: Organic Rankine Cycle

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# Approach: Waste Heat Recovery (ORC)

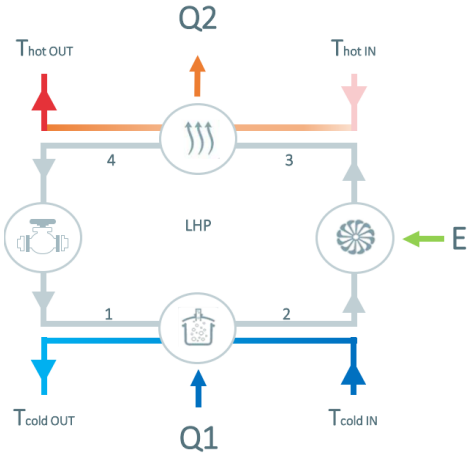
Some Examples of Applicable Sectors for ORC



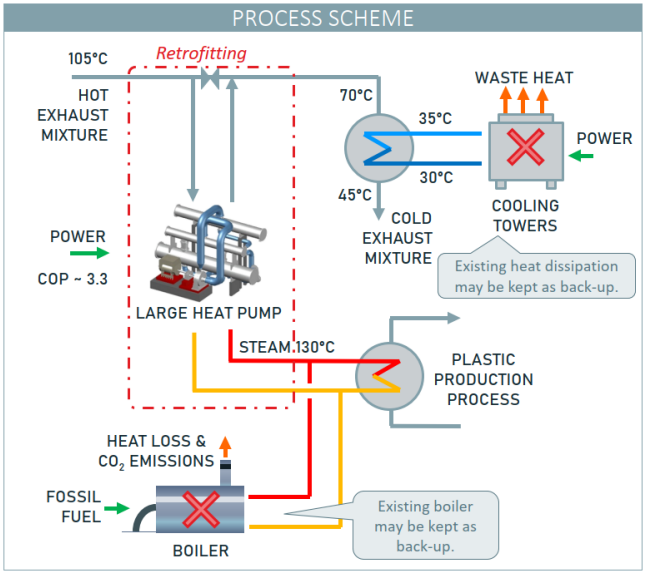

# Approach: Large Heat Pump (LHP)

Large Heat Pumps (LHP) are utility-scale heating plant, designed to transfer large quantities of heat from a lower temperature source to a higher temperature heat user.

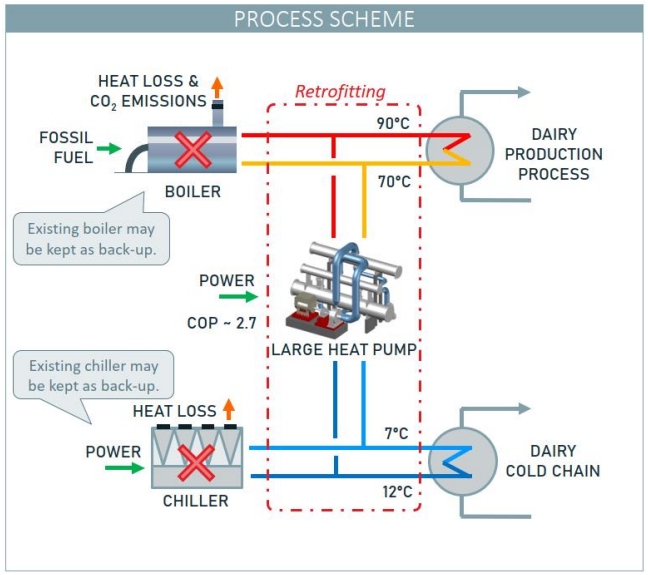
Below are 2 examples of possible application




## Case Study: Plastic Forming Plant




## Case Study: Dairy Production Plant

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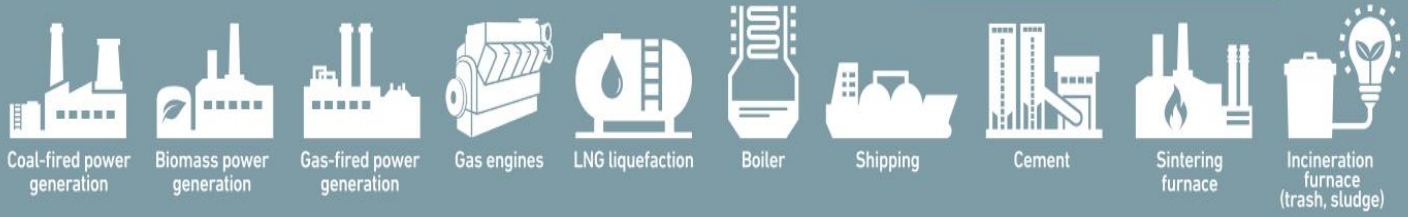
# Approach: Carbon Capture

## Compact $CO_2$ Capture Plant

- $CO_2$ capture capacity : (0.3 - 200TPD)
- Reasonable initial cost and shorter delivery time by standardization.
- Space-saving design


Image of Capacity 0.3 TPD

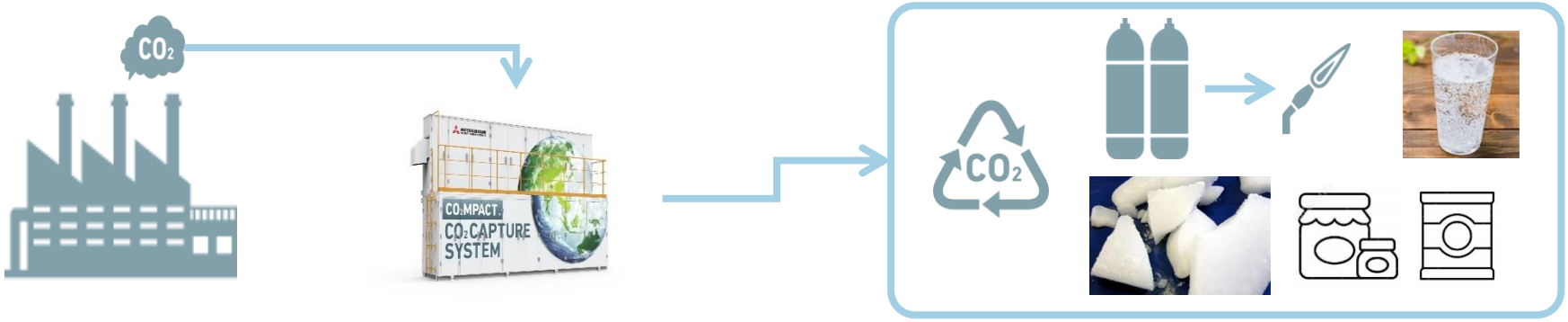
$CO_2$ sources




$CO_2$ Emitter
Furnace, Engine, etc.

$CO_2$ Capture
By Compact System

$CO_2$ Utilization
as Welding Gas , Dry Ice, Food Preservation, Soda, etc.



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