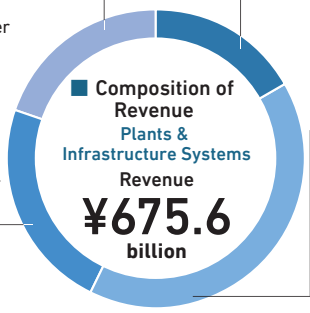
Plants & Infrastructure Systems

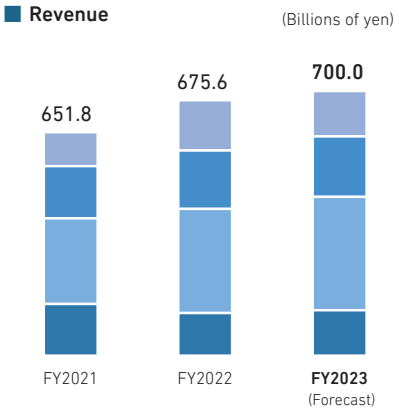
Others
¥132.9 billion
Key products and services
- (Commercial ships) Passenger ferries, general commercial ships, special purpose ships, shipbuilding engineering, etc.
- (Environmental systems) Air quality control systems, Waste-to-Energy systems, sludge treatment systems, etc.
- (CO_2 capture systems) CO_2 capture plants, etc.

Machinery Systems
¥154.5 billion
Key products and services
- ITS, parking systems, machinery systems, food & packaging machinery, steel structure plants, printing & packaging machinery, etc.



Engineering
¥112.7 billion
Key products and services
- Transportation systems
- Chemical plants, etc.

Metals Machinery
¥275.5 billion
Key products and services
- Ironmaking plants
- Steelmaking plants
- Continuous casting plants
- Rolling mills
- Strip-processing and finishing lines, etc.



Overview of FY2022 and Key Strategies in the Medium to Long Term

Business Environment

Against a backdrop of efforts to confront problems related to climate change, the markets for decarbonization and the pursuit of energy efficiency across a variety of fields are expanding. Among others, these include demand expansion in the field of clean-fuel (fuel ammonia and hydrogen) for chemical plants in engineering; increased business opportunities from growing decarbonization needs across various industrial sectors in CO_2 capture systems; greater investment in "green steel" among steelmakers, particularly in Europe and the US, in metals machinery; initiatives in mechatronic technological capabilities in machinery systems for the mobility field; environment-friendly solutions such as LNG fuel gas supply systems in commercial ships; and proposals to increase added value leveraging the Group's decarbonization expertise and technology in environmental systems. In these ways, we are proactively addressing Energy Transition and Smart Infrastructure (energy savings and demand-side decarbonization through smart social infrastructure) – both set as growth fields for MHI.

Business Status

Consolidated orders received decreased year on year to ¥845.4 billion, as declines primarily in engineering outweighed growth from machinery systems. Revenue was higher year on year at ¥675.6 billion, reflecting growth mainly in metals machinery and machinery systems. Profit from business activities was higher than the previous year, at ¥32.7 billion, largely from growth in metals machinery and commercial ships.

As initiatives for FY2022, in engineering, we are aiming to receive orders for new transportation systems' projects that expected to see a recovery in demands, in addition to steady O&M service and system enhancement business. In chemical plants, meanwhile, we are focusing on the field of clean-fuel, where demand is expanding.

In metals machinery, against a backdrop of expanded investment in "green steel," we are winning orders at levels that surpass our initial business plans. In addition to the current product lineup enabling greater pursuit of material and energy efficiency, we are conducting pilot tests of hydrogen-based direct reduction steelmaking technology, as we work to establish a superior position in the market by accelerating development and verification of technologies that address environmental needs.

In machinery systems, we are strengthening existing businesses and after-sales services through DX utilization, and taking steps toward early commercialization in mobility and other new fields.

For commercial ships, in addition to high-density outfitted ships – the mainstay vessel type in the new shipbuilding business – along with a focus on infrastructure service ships, for which demand is now rising following the passage in Japan of the Economic Security Promotion Act, we are also spurring growth in engineering business related to environment-friendly solutions. In environmental systems, now that our newly developed waste-to-energy technology (V-type stoker) has achieved target performance benchmarks and is garnering strong praise from customers, we will push ahead to the next phase of business development. In CO_2 capture systems, we are accelerating initiatives ahead of business expansion, including accommodating a variety of emissions sources and strengthening partnership.

FOCUS Contributing to Decarbonization in the Steelmaking Industry through Practical Use of HYFOR: Hydrogen-based Fine-ore Reduction

Signing ceremony between the four companies involved

With an increased focus on decarbonization worldwide, steel producers across the globe are searching for breakthrough technologies to reduce carbon emissions and transform their production processes. Currently, the conventional blast furnace route is the most prominent means of steel production. However, the blast furnace for iron ore reduction is the most carbon-intensive part of this process; finding ways to improve this process is thus key to decarbonizing the steel industry.

Hydrogen-based Fine-Ore Reduction (HYFOR), which MHI Group member Primetals Technologies has developed, is the world's first direct reduction process for iron ore ultra-fines that do not require any material preprocessing like sintering or pelletizing and is capable of operations with 100% hydrogen as a process gas. HYFOR provides a nearly zero-carbon production process and can effectively replace the blast furnace. For producers, this alleviates concerns surrounding carbon taxes and controls production costs stemming from emissions trading systems (ETS).

The HYFOR pilot plant in Leoben, Austria

HYFOR is currently at an advanced stage of development with a fully functional pilot plant in Leoben, Austria, and the next step in upscaling the technology to an industrial prototype is already around the corner. In December 2022, Primetals Technologies, together with Mitsubishi Corporation, voestalpine and Fortescue, signed MOU to begin the project planning phase of the industrial-scale prototype plant, combining HYFOR with Smelter technology* to increase the applicability of HYFOR-produced iron. Through the practical implementation of HYFOR, Primetals Technologies will contribute to achieving decarbonization in the long-considered "hard-to-abate" steel industry.

*An additional innovation technology from Primetals Technologies. By using electricity as the energy source in blast furnaces where direct reduced iron (DRI) produced by HYFOR is melted and ultimately returned, combining this with HYFOR will make green steel a reality.

▶ Stakeholder Voices

Dr. Alexander Fleischanderl
Senior Vice President and Head of Green Steel
Primetals Technologies

Our technologies are game-changing innovations for making green steel a reality!

It's still early days for "green steel." However it covers everything from the generation of renewable energy and energy storage solutions—including hydrogen and ammonia production—to the optimal use of these energy sources to produce green steel. Our HYFOR technology, based on decades of work in the direct reduction and hydrogen space, and the Smelter are game-changing innovations. The steel industry is already on the journey to green steel, and I believe Primetals Technologies will substantially contribute to this transformation.