Industry & Infrastructure

The Industry & Infrastructure domain and its diverse range of environmentally friendly products support people’s daily lives in countless ways: air-conditioning systems in households and offices; forklifts in logistics; transportation systems and ships in the movement of people and things; and metals machinery, chemical plants, and a wide range of machinery in the industries and societies, help to make people’s lives and society happier and more fulfilling. In January 2018, we completed a structural reform that transformed all operations into business companies. In this new stage of growth, through our technologies and products, we will move forward social infrastructures and living environments to the future.

Main SDGs contributed to

Operating Performance

(Billions of yen)

- Profit from business activities (Margin)
- Orders received
- Revenue

Orders:
- FY2017: 1,711.3 (41.0% (2.2%)
- FY2018: 1,890.0 (70.1% (3.7%)
- FY2019 (Plan): 1,907.8 (110.0% (5.6%)
- FY2020 (Target): 2,000.0 (2,100.0 (160.0% (8.0%)

<table>
<thead>
<tr>
<th>Domain</th>
<th>FY2017</th>
<th>FY2018</th>
<th>FY2019 (Plan)</th>
<th>FY2020 (Target)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial Ships</td>
<td>1,711.3</td>
<td>1,890.0</td>
<td>1,907.8</td>
<td>2,000.0</td>
</tr>
<tr>
<td>Engineering*</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Environmental Systems</td>
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<tr>
<td>Metals Machinery</td>
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<tr>
<td>Machine Tools</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Machinery Systems</td>
<td></td>
<td></td>
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<tr>
<td>Automotive Thermal Systems</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Air-Conditioning and Refrigeration Engines</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turbochargers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Material Handling Equipment</td>
<td></td>
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</tr>
</tbody>
</table>

* Chemical plants, transportation systems, etc.
Business Environment and Addressing Social Issues

Recently, achieving economic development while reducing environmental impact has become an increasingly important social issue. Environmental regulations are growing more stringent in various fields, prompting MHI Group to increase social contribution through its technologies and experience. For example, more stringent international emissions regulations on ship exhaust gas will go into effect in 2020. We view that demand for compliant equipment is rising in response. Additionally, needs are continuously rising for turbochargers that help improve fuel consumption and reduce CO₂ emissions in automobiles and for centrifugal chillers adapted for use with low-environmental-impact refrigerants.

At the same time, the rapid expansion of e-commerce has exacerbated labor shortages in the global logistics market and prompted the need to improve distribution efficiency.

Over the medium to long term, efforts to address social issues such as urbanization and climate change will be of even greater importance.

Areas of Focus under the 2018 Medium-Term Business Plan

We have divided our business portfolio into three categories: growth investments, earning capacity enhancement, and shift areas of competition/shift to new business models, and are working to strengthen our businesses based on these categories. As for Material Handling Equipment, Thermal Systems and Turbochargers, to expand revenue and profit, we will continue our growth investments in alignment with each strategy to strengthen sales and marketing, as well as developing and launching strategic products. We have positioned Metals Machinery, Engines, Machinery Systems, and Machine Tools under the earning capacity enhancement category. For these businesses, we will strive to enhance efficiency in preparation for business environment changes to secure continuous and steady profit. Focusing on medium- to long-term growth, we will work to achieve differentiation and to shift toward competitive areas for Commercial Ships, thereby strengthening technologies in response to environmental regulations. For Engineering and Environmental Systems, we will work to shift to new business models. Also, in addition to effectively utilizing MHI Group’s shared technology function, we will work to mobilize human resources within the domain, thereby enhancing the competitiveness of each business company.

Business Opportunities in the Near Future

For our diverse range of businesses operated across the globe, we view every need of environmental initiatives and technological innovation in each region or in each industrial field as business opportunities. At the same time, we view every effort to address social issues and respond to global warming, which are now needed to an even greater extent in the global market, as business opportunities. Over the long term, we will capture the changes in infrastructure toward distributed/autonomous configurations as well as changes in flow of resources toward recycling and reuse to create new business opportunities and spur innovation.

Cultivation of Key Technologies and Creation of Synergies

Toward the realization of sustainable social infrastructure, we will focus on development of environmentally friendly and energy-saving solutions, and on improvement of efficiency in operations with labor-saving and unmanned technologies. Furthermore, collaborating with the corporate shared technology functions and utilizing external resources, we will strive to establish and provide common platforms of digitalization for business companies. Through these efforts, we will work to strengthen our businesses.
Opportunities

Material Handling Equipment • Third-largest business scale in the world
Thermal Systems** • Extensive product lineup and world-class environmental and energy-saving technologies
Turbochargers • Development of highly efficient products leveraging high-speed rotational technologies
Metals Machinery • Full product lineup and global presence
Engineering group** • Engineering capabilities that create added value through the integration of technologies
Transportation Systems and Environmental Systems • Advanced system integration capabilities in urban transport and extensive experience with APM**
Chemical Plants • Advanced EPC* management capabilities based on extensive plant experience
Commercial Ships • Superiority over competitors in environmental and energy-saving technologies

*1 Thermal Systems: Air-conditioning & Refrigeration, Automotive Thermal Systems  
*2 Engineering group: Engineering, Environmental Systems  
*3 Automated People Mover (fully automated, driverless vehicles)  
*4 Engineering, Procurement, and Construction

Strengths

Expertise cultivated in a wide range of product fields and effective utilization of resources within the domain

Material Handling Equipment • Increasing market for logistics solutions with expansion of e-commerce business
Thermal Systems • Rising awareness toward environmental preservation
Turbochargers • Growing trend toward downsized engines with turbochargers in response to environmental and fuel performance regulations
Metals Machinery • Increasing demand for energy savings and low-environmental-impact products, expanding demand for high-value-added products such as high-grade steel sheets
Engineering group** • Increase in customer needs through the entire plant lifecycle of the EPC business
Transportation Systems and Environmental Systems • Market growth in emerging countries due to economic development and urbanization
Chemical Plants • Increasing plant investment in natural gas-producing countries (including the U.S. and Central Asian countries)
Commercial Ships • Increasingly stringent environmental regulation of maritime transport

Weaknesses

Tendency to be affected by short-term economic fluctuations
Engineering group • Volatility in orders received
Commercial Ships • Relatively weak cost competitiveness on repeated construction of ships with the same specifications

Threats

Rise of manufacturers in emerging countries and sense of uncertainty in the global economy
Engineering group • Emergence of new players due to the arrival of alternative technologies
• Increasing risks due to changes in the external environment (geopolitical risks, etc.) and customer demands
Commercial Ships • Increasingly severe competition as the gap between supply and demand for new ships persists, reorganization of South Korean shipbuilding industry

Dividing Existing Businesses in Three Categories

Growth investments:
Material Handling Equipment
Thermal Systems
Turbochargers

Expand revenue and profit in growth markets

Enhance efficiency in preparation for the business environment changes

Sample areas of competition:
Commercial Ships
Engineering/Environmental Systems

Shift to new business models:

Accelerate shift to high-value-added areas such as high-density outfitted ships

Shift areas of competition:
Commercial Ships
Engineering/Environmental Systems

Accelerate shift to high-value-added areas such as high-density outfitted ships

Earning capacity enhancement:
Metals Machinery
Engineers
Machinery Systems
Machine Tools

Focus resources into core competencies

Resource sharing and mobilization of human resources

Pursue mass customization and launch new products

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Metals Machinery
Engineers
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Strategies

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Growth in the Mass and Medium-Lot Product Manufacturing Business

The mass and medium-lot product manufacturing business, such as Material Handling Equipment, Thermal Systems, and Turbochargers, is currently driving growth for MHI Group. In these businesses, we will focus on growth investments, including M&A, as we work to achieve further business expansion.

In the mass and medium-lot product manufacturing business, we have continued to achieve an annual growth rate of 16% since fiscal 2012 owing to our global expansion initiatives and the series of collaborations with overseas partners, M&A, and so on. In fiscal 2019, we expect to record revenue of ¥1 trillion. To steadily achieve the goals of the 2018 Medium-Term Business Plan, we will implement the following initiatives.

For Material Handling Equipment, demand is increasing due to the spread of e-commerce. At the same time, the need for automation and safety in operation is rising due to labor shortages in the logistics industry. Under these circumstances, we are further enhancing sales and marketing and have acquired direct sales stores in North America that allow us to expand direct sales and enter into new business such as the rental/used vehicle business. We will also strengthen our global collaboration with overseas partners. Furthermore, we will strive to achieve differentiation by providing unmanned and labor-saving solutions such as the laser-guided type AGF* that leverage our technological capabilities.

For Air-conditioning & Refrigeration Systems, we foresee stable market growth to continue due to the strengthening of environmental regulations, centered on advanced countries, and the economic growth in emerging countries. In response to this, we will further reinforce our global sales network especially in Europe and China and continue to introduce environmentally friendly products. In addition, for Automotive Thermal Systems, we will expand the electric compressor business with a view to rapid growth of the EV market. To ensure the success of these initiatives, we will strengthen our R&D activities as well in both of these businesses.

For Turbochargers, we will aim to maintain and expand our share in the global markets where we are seeing market growth due to the further tightening of fuel efficiency (CO2 emissions) regulations. We will also work to increase sales in emerging countries, where motorization continues to progress. At the same time, we will promote the development of products designed for EVs, hybrid vehicles, and plug-in hybrid vehicles in response to the diversification of powertrains. We are also improving our productivity applying IoT, aiming to further strengthen our profitability.

Revenue Results and Forecasts for the Mass and Medium-Lot Product Manufacturing Business

(Billions of yen)

<table>
<thead>
<tr>
<th>Year</th>
<th>Material Handling Equipment</th>
<th>Thermal Systems</th>
<th>Turbochargers</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>300</td>
<td>600</td>
<td>900</td>
</tr>
<tr>
<td>2013</td>
<td>600</td>
<td>1,200</td>
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<td>2014</td>
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<tr>
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<tr>
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<tr>
<td>2018</td>
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<td>4,800</td>
</tr>
<tr>
<td>2019</td>
<td>2,400</td>
<td>4,800</td>
<td>5,400</td>
</tr>
<tr>
<td>2020 (FY)</td>
<td>2,700 (Plan)</td>
<td>5,400 (Target)</td>
<td>6,000</td>
</tr>
</tbody>
</table>

*Annual growth rate between fiscal 2012 and fiscal 2020: 16%

* 15-month accounting period, due to change of account closing at some consolidated subsidiaries

*MHI REPORT 2019

Introduction
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