

# Industry & Infrastructure Business Plan

Takashi ISHIZUKA

Executive Vice President,

President and CEO of Industry & Infrastructure

July 12, 2019

Mitsubishi Heavy Industries, Ltd.

## 1. Business Overview

- 1-1. Sales Overview
- 1-2. Management Structure
- 1-3. FY2018 Major Topics

## 2. 2018 Medium-Term Business Plan Progress Status

- 2-1. Review of FY2018
- 2-2. 2018 Business Plan Numerical Targets
- 2-3. Core Strategies for FY2019/FY2020 and Medium/Long Term
- 2-4. Core Measures for FY2019/FY2020 and Medium/Long Term

## 3. Summary

[Supplementary Material]

- Supplement-1. **Material Handling Equipment**
- Supplement-2. **Thermal Systems**
- Supplement-3. **Turbochargers**
- Supplement-4. **Metals Machinery**
- Supplement-5. **Engines**
- Supplement-6. **Machinery Systems**
- Supplement-7. **Machine Tools**
- Supplement-8. **Commercial Ships**
- Supplement-9. **Engineering**

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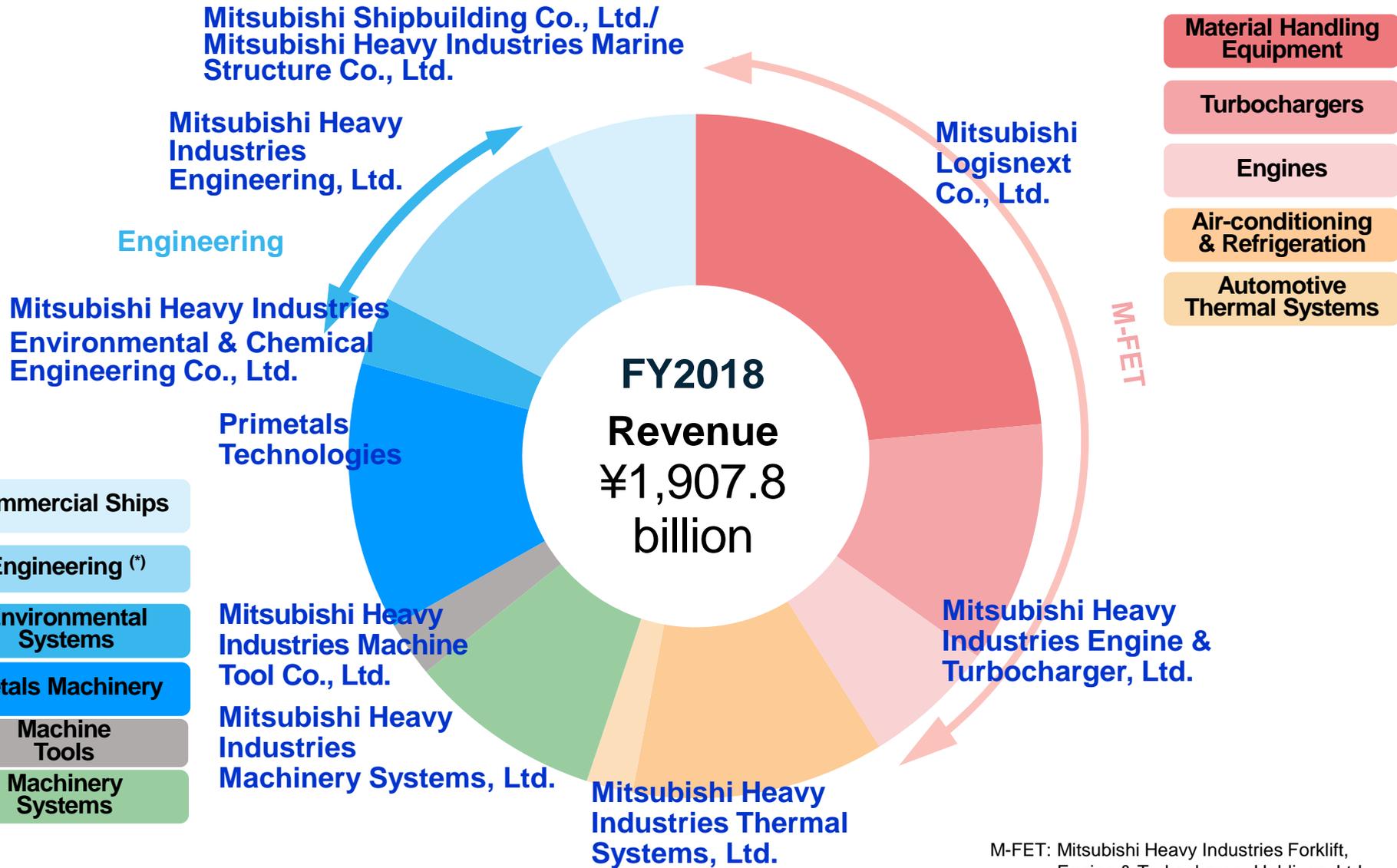
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# 1-1. Sales Overview



(\*) Chemical plants, Transportation systems, CO<sub>2</sub> capture plants

M-FET: Mitsubishi Heavy Industries Forklift, Engine & Turbocharger Holdings, Ltd.

# 1-2. Management Structure



**Takashi Ishizuka**  
Executive Vice President  
President and CEO  
of Industries & Infrastructure (I&I)



**Hisayuki Fujihara**  
Senior Vice President  
Vice President, I&I



**Masaaki Kusunoki**  
Senior Vice President  
Vice President, I&I



**Yoshio Nakayama**  
Senior Vice President  
Senior Chief Engineer,  
I&I



**Hiroshi Arakawa**  
Senior Fellow  
General Manager, I&I



**Yuuji Yoshigi**  
General Manager, I&I  
Head of Hiroshima  
Machinery Works

Business Strategy  
Department

Administration  
Department

High Speed Railway  
Department

**Mitsubishi Shipbuilding Co., Ltd.** **Koji Okura**, President & CEO  
Head of Commercial Ships SBU



**Mitsubishi Heavy Industries Marine Structure Co., Ltd.** **Kunio Shiiba**, President & CEO  
Head of Marine Structures SBU



**Mitsubishi Heavy Industries Engineering, Ltd.** **Shigehisa Kobayashi**, President & CEO  
Head of Engineering SBU



**Mitsubishi Heavy Industries Environmental & Chemical Engineering Co., Ltd.** **George Kanno**, President & CEO  
Head of Environmental Systems SBU



**Mitsubishi Heavy Industries Forklift, Engine & Turbocharger Holdings, Ltd.** **Atsushi Maekawa**, President & CEO



**Mitsubishi Logisnext Co., Ltd.** **Takashi Mikogami**, President & CEO  
Head of Handling Equipment SBU



**Mitsubishi Heavy Industries Engine & Turbocharger, Ltd.** **Takeshi Kajino**, President & CEO  
Head of Engine/Turbocharger SBU



**Primetals Technologies, Limited** **Satoru Iijima**, CEO  
Head of Metals Machinery SBU



**Mitsubishi Heavy Industries Thermal Systems, Ltd.** **Kaoru Kusumoto**, President  
Head of Air-conditioning & Refrigeration SBU



**Kimiharu Takeda**, Vice President  
Head of Automotive Thermal Systems SBU



**Mitsubishi Heavy Industries Machinery Systems, Ltd.** **Mamoru Hasegawa**, President  
Head of Machinery Systems SBU



**Mitsubishi Heavy Industries Machine Tool Co., Ltd.** **Keiichiro Iwasaki**, President & CEO  
Head of Machine Tools SBU



# 1-3. FY2018 Major Topics

## Commercial Ships



Christening and launch ceremony of KITAKAMI for Taiheiyo Ferry

## Material Handling Equipment



Market launch of “Rack Fork Auto”  
laser-guided type AGF

AGF: Automated guided forklift

## Metals Machinery



Strong orders for “EAF Quantum\*” from steel manufacturing companies in China and other countries

\* Newly developed electric arc furnace realizing significant reductions in power consumption, running costs and CO<sub>2</sub> emissions.

## Air-conditioning & Refrigeration



“ETI-Z Series” of high-efficiency next-generation centrifugal chillers featuring low-GWP refrigerant won a METI Minister’s Award for energy savings.

GWP: Global Warming Potential

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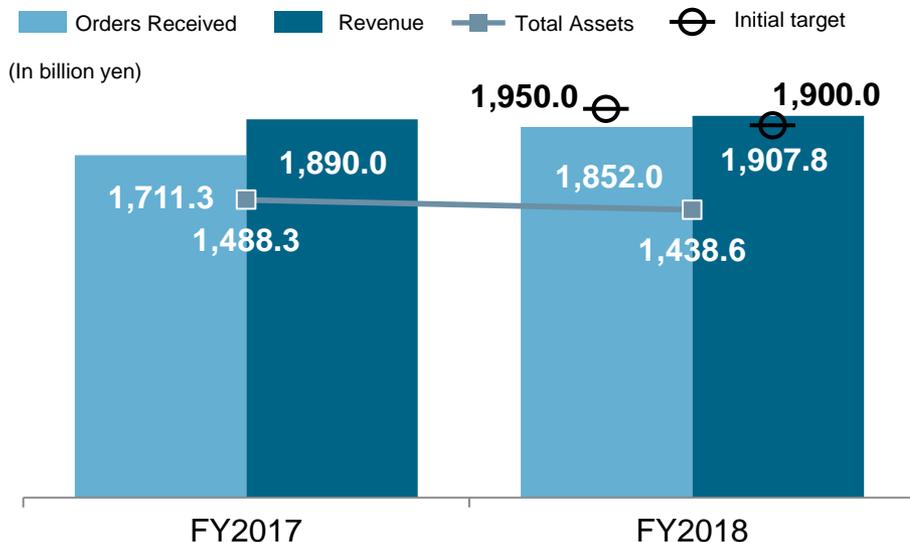
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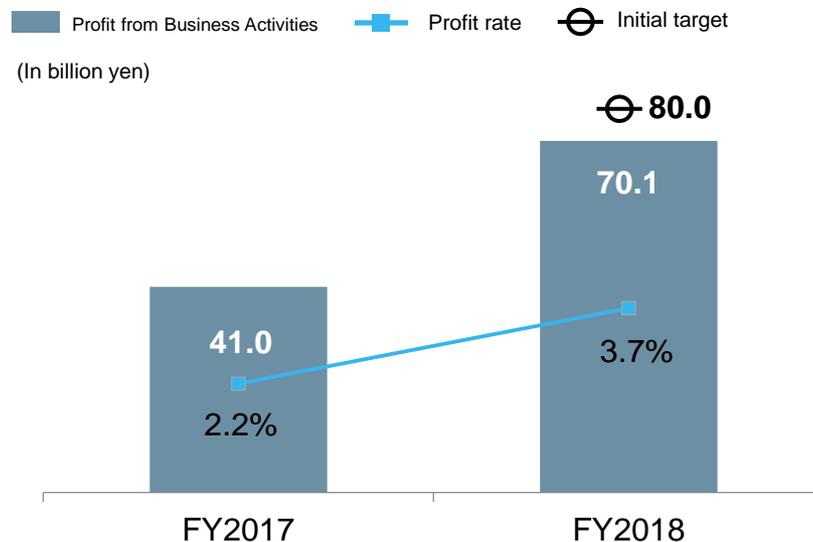
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# 2-1. Review of FY2018

## Orders Received, Revenue, Total Assets



## Profit from Business Activities



## Results

### Orders received

+¥140.6bn YoY

Commercial ships, chemical plants, material handling equipment

¥98.0bn below target

Chemical plant project deferment

### Revenue

+¥17.8bn YoY

¥7.8bn above target

### Profit from business activities

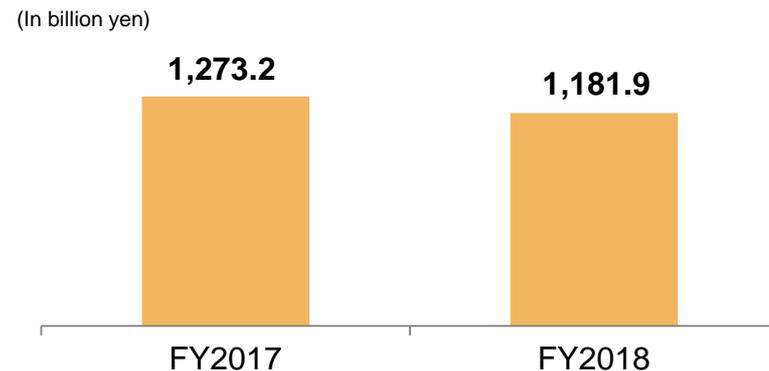
+¥29.0bn YoY

Improvement in profitability of transportation systems ,  
Increased sales of material handling equipment

¥9.9bn below target

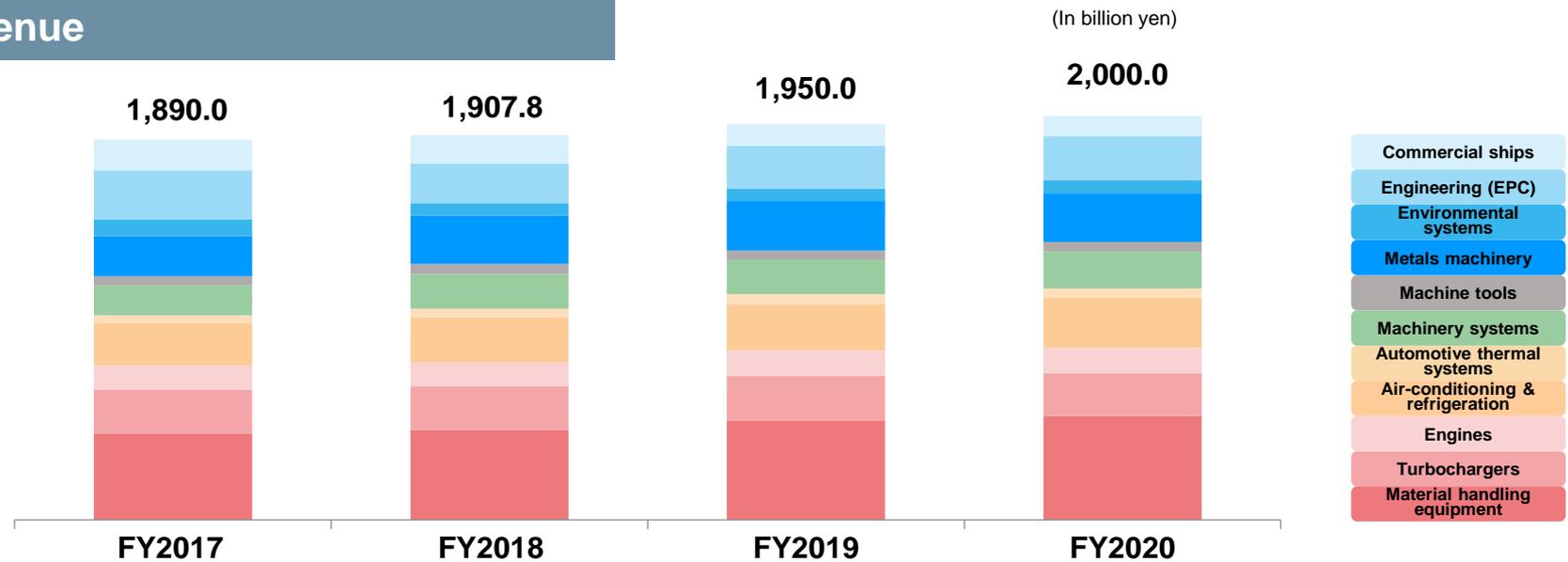
Deterioration in specific project profitability, etc.

## Order Backlog

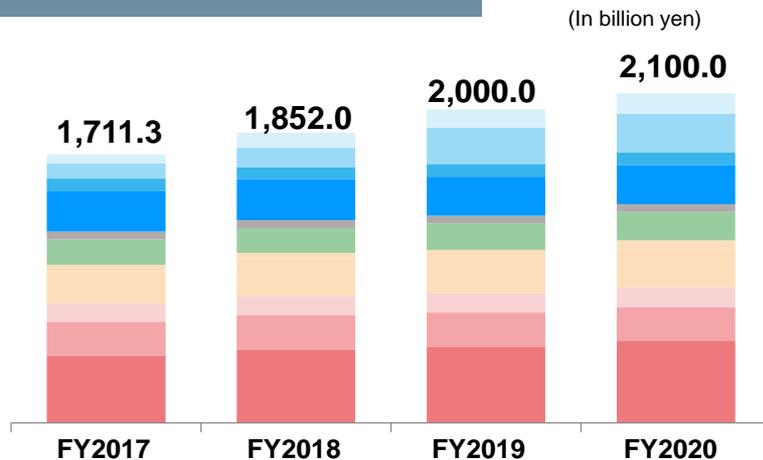


# 2-2. 2018 Business Plan Numerical Targets (1/2)

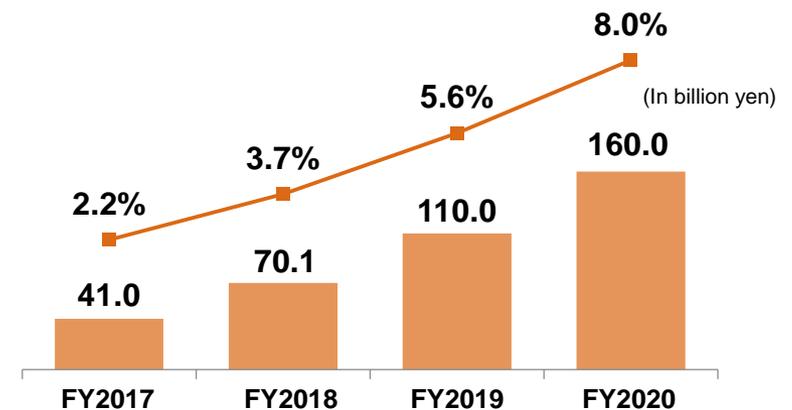
## Revenue



## Orders Received



## Profit from Business Activities

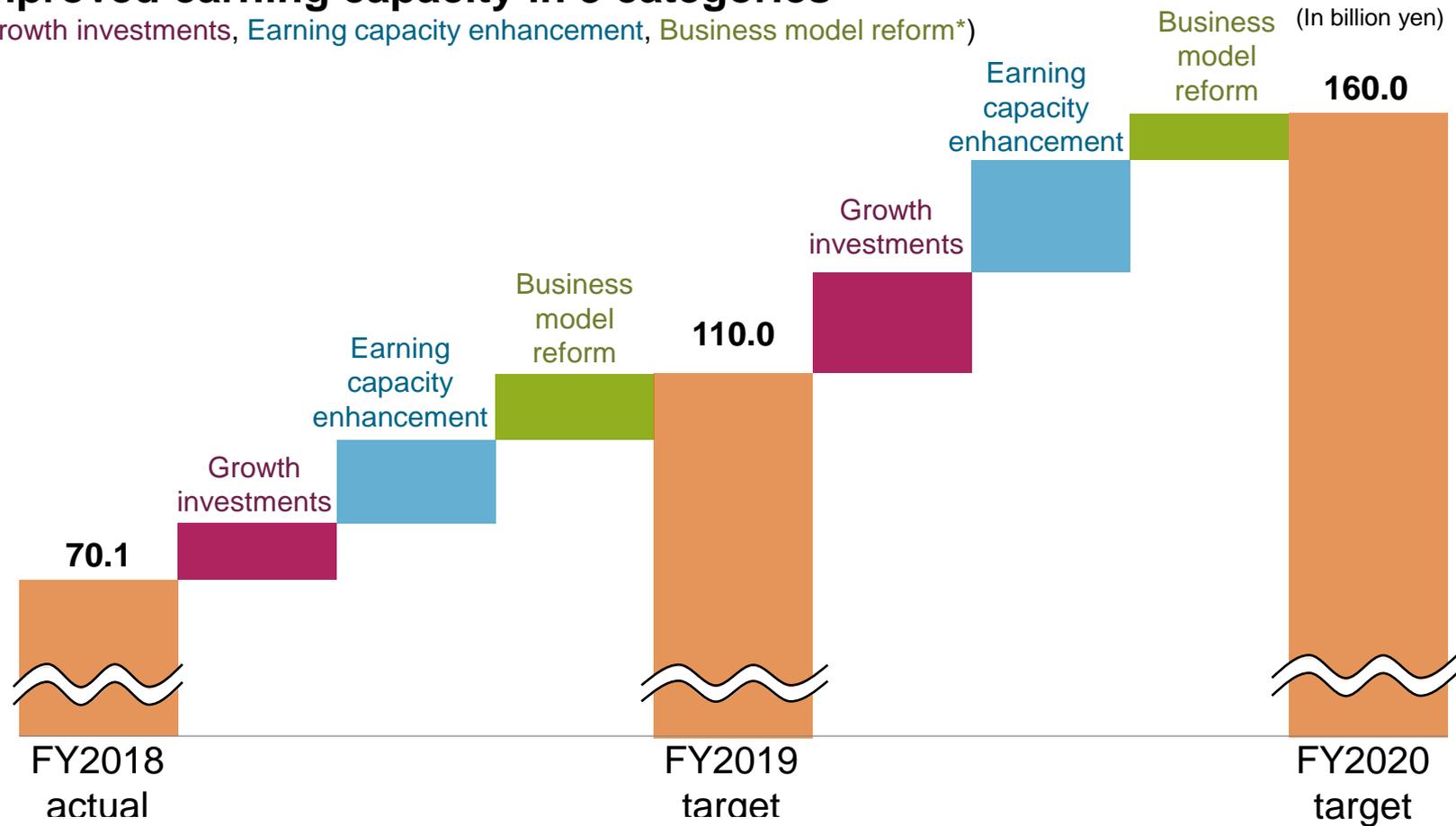


## 2-2. 2018 Business Plan Numerical Targets (2/2)

### Breakdown of Profit from Business Activities Target

#### Improved earning capacity in 3 categories

(Growth investments, Earning capacity enhancement, Business model reform\*)



\* Business model reform : Shift areas of competition,/Shift to new business model

### I&I Business Plan Strategies

- Completed the transformation of all business operations into individual business companies in 2018, consolidating to 7 business groups
- Place emphasis on raising profits through self sustained management of business companies and active use of MHI resources
- Review growth scenarios of existing businesses to assess and realize their maximum value in the medium/long term
  - Divide existing businesses into three categories:
    - **Growth investments**
    - Earning capacity enhancement
    - Shift areas of competition/Shift to new business model

## 2-3. Core Strategies for FY2019/FY2020 and Medium/Long Term (2/3)

	Business environment		Strategies for achieving Business Plan
	When formulating 2018 Business Plan	Current situation	
Material handling equipment Thermal systems Turbochargers	Expanding market	 Possible impact from US-China trade frictions	Growth investments
Metals machinery Engines Machinery systems Machine tools	Market growth remains at same level Market in recovery mode Fierce competition		Earning capacity enhancement
Commercial ships	Supply/demand gap	 Intensifying competition (industry reorganization, etc.)	Shift areas of competition
Engineering	Increased EPC-related risk (shortage of skilled workers overseas, etc.)		Shift to new business model

### Growth Investments

⇒ Secure profit growth in the term of on-going business plan

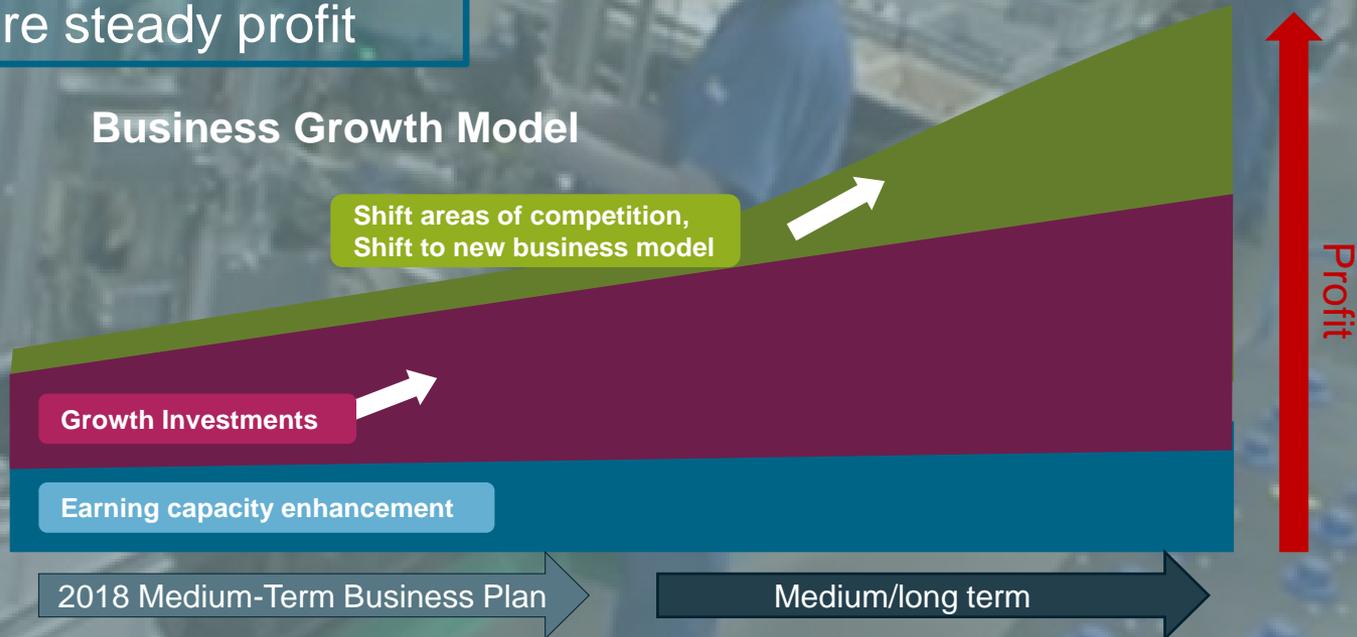
Shift areas of competition, shift to new business model

⇒ Strengthen medium/long term earning capacity

### Earning capacity enhancement

⇒ Secure steady profit

### Business Growth Model



### Growth Investments

Expand revenue and profit  
in growth markets

- **Strengthen marketing**  
(conversion to directly managed dealers, etc.)  
[Material handling equipment, Thermal systems]
- **Develop and launch strategic products**
  - **Promote unmanned, automated operation**  
[Material handling equipment]
  - **Environmentally friendly products**  
[Material handling equipment, Thermal systems, Turbochargers]

Material handling equipment,  
Thermal systems, Turbochargers



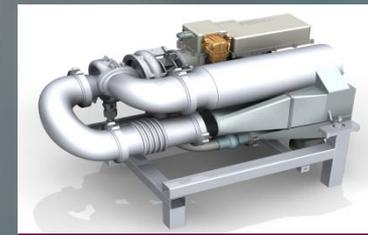
Laser-guided type  
AGF

AGF: Automated guided forklift



Centrifugal chiller  
featuring low-GWP  
refrigerant

GWP: Global Warming Potential



Ultra-compact range  
extender for electric  
vehicles

### Earning capacity enhancement

## Promote higher efficiency in preparation for business environment changes

Metals machinery, Engines,  
Machinery systems, Machine tools

- Further structural reforms, following prior years' PMI Enhancement of life cycle businesses [Metals Machinery]
- Focus resources into core competencies [Engines]
- Promote resource sharing and personnel mobilization [Machinery systems]
- Pursue mass customization, launch new products [Machine tools]



Metal 3D printer

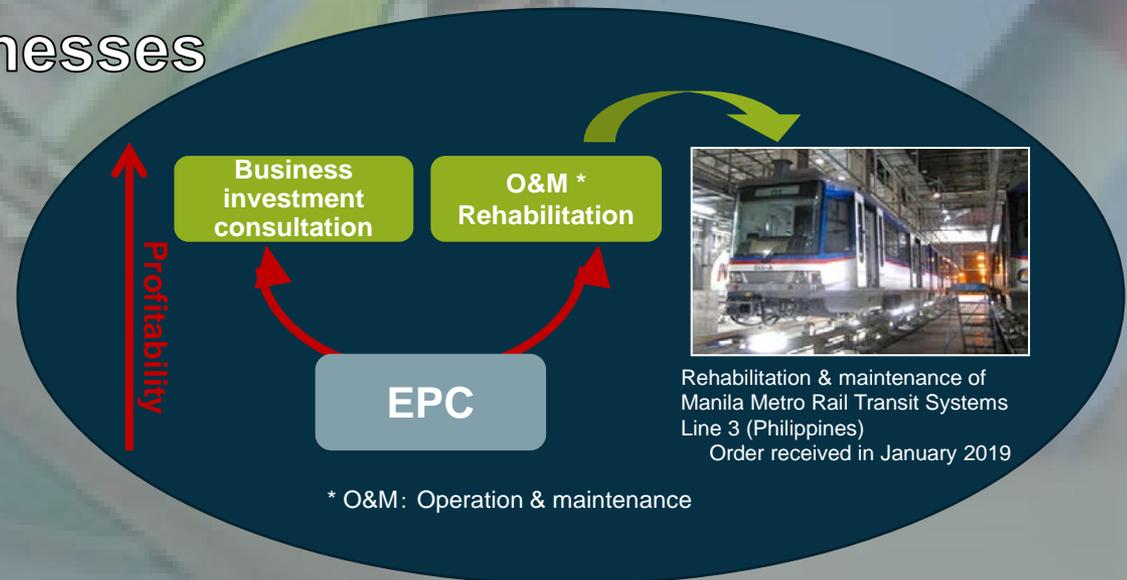


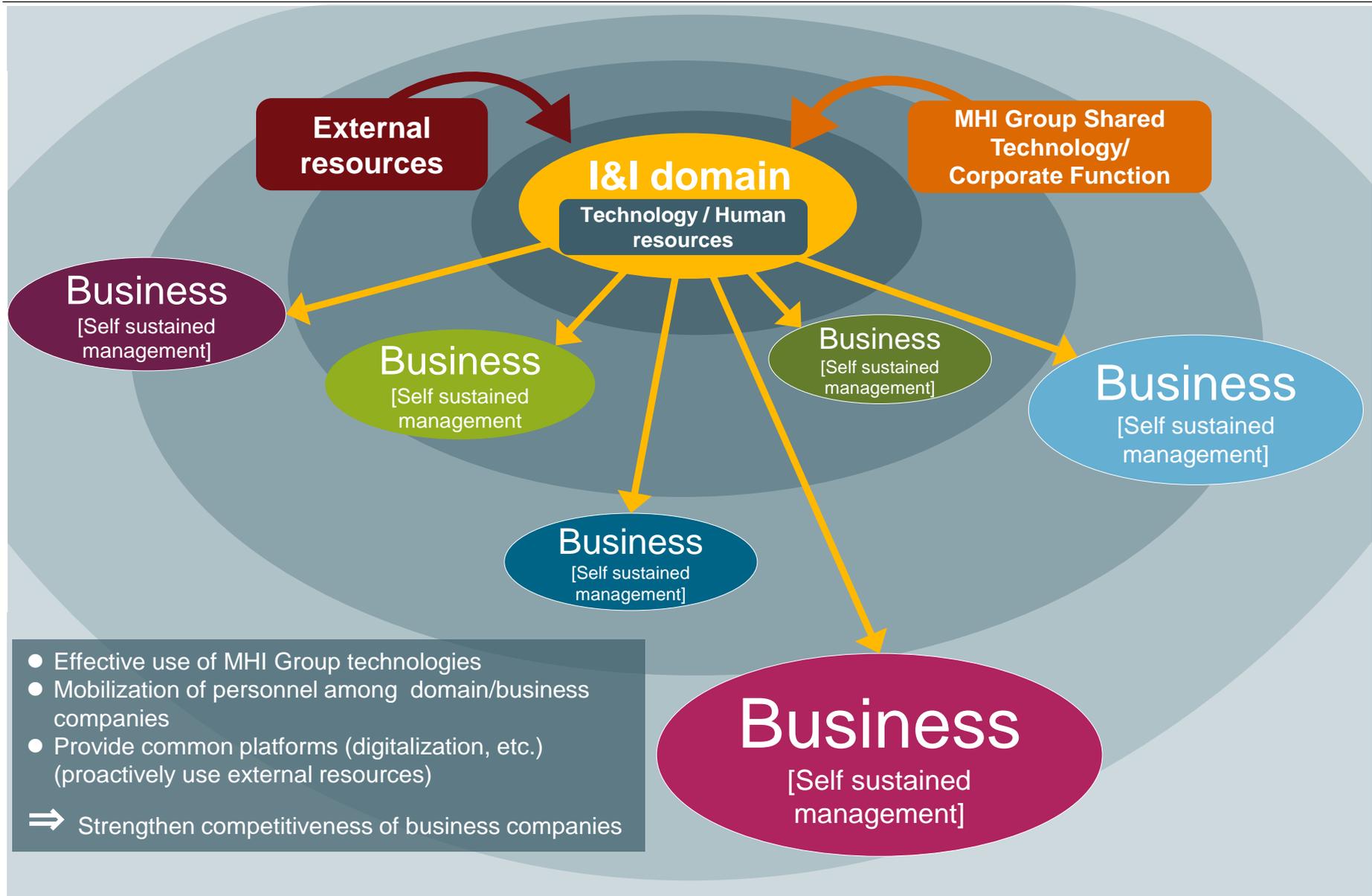
Shift areas of competition,  
Shift to new business model

Commercial ships,  
Engineering

### Improve earning capacity through differentiation

- **High value-added areas** (high-density outfitted ships, etc.)  
[Commercial ships]
- **Marine engineering areas** (response to environmental regulations, etc.)  
[Commercial ships]
- **Lifecycle businesses**  
[Engineering (EPC)]





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**Toward further growth**

**Achievement of 2018 Medium-Term Business Plan**



**Business companies**  
Self sustained management

**Domains**  
Proactive resource allocation

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**Business Environment**

- Exponential expansion of e-commerce market
- Rapid increase in need for material handling solutions

- 1) Automation (unmanned, manpower saving)
- 2) Safety enhancement

**Challenges**

- Growth of conventional businesses
- Business model conversion
- Technology differentiation



**Measures**

- Expand base load business scale and improve earning capacity  
⇒ Complete PMI, expand servicing operations, etc.
- Further growth centered on growth strategies
  - 1) Expansion of direct sales, entry into rental and used vehicle businesses  
⇒ Acquisition of North American dealer, etc.
  - 2) Expansion of AGF (automated guided forklift) business
  - 3) Global collaboration with business partners
  - 4) Upfront investment in future technologies and businesses



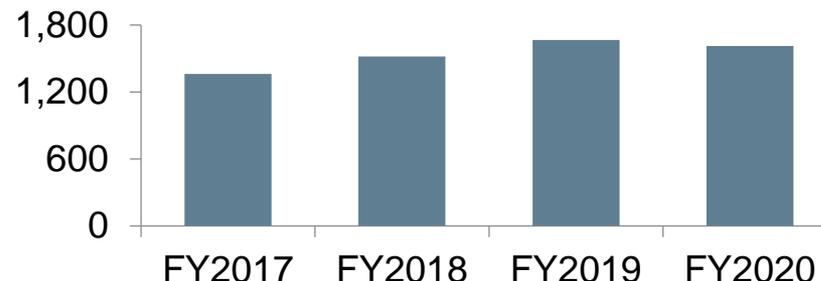
Laser guided type AGF  
AGF: Automated guided forklift



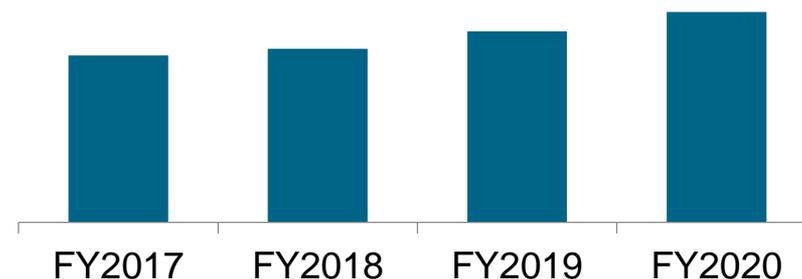
Human detection and tracking system

## Market Scale

(Thousand units)



## Business Scale (Revenue)



## Business Environment

- Market to remain solid despite concerns over US-China trade frictions. Stable growth is expected to continue.
- Environmental awareness is increasing.
- Electric vehicles market is expanding.



## Measures

- Strengthen sales network, especially in Europe and China
- Continually launch environment-friendly products
- Expand business in electric compressors for electric vehicles
- Strengthen R&D

Focus on expanding business scale through promotion of the above measures



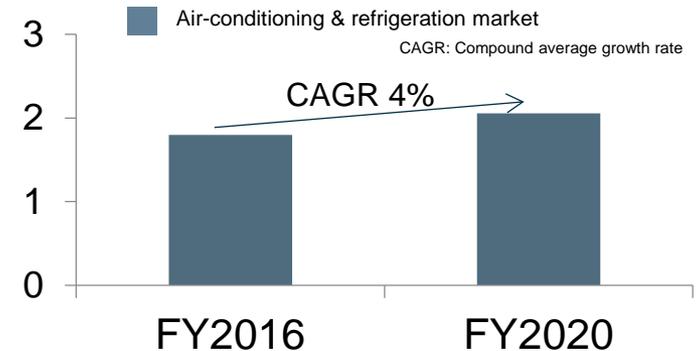
Natural Refrigeration condensing unit



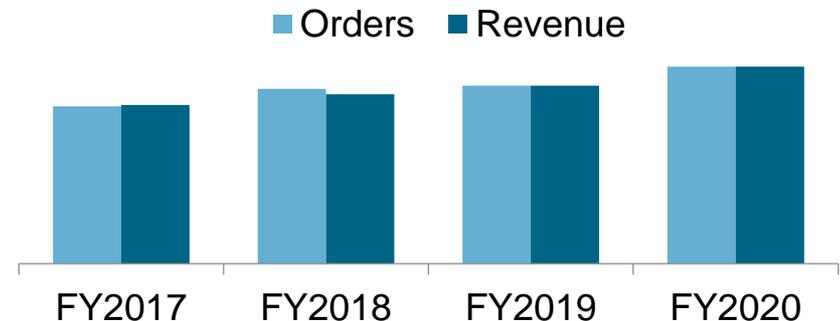
Electric compressor

## Market Scale

(In trillion yen)



## Business Scale (Orders and Revenue)



**Business Environment**

- Power trains becomes more diversified due to tightening of environmental regulations.
- Motorization is expanding in emerging economies.
- US-China trade frictions

**Challenges**

- Strengthen development capability to offer products for a diversified power train line-up.
- Expand sales in emerging economies
- Enhance earning capacity

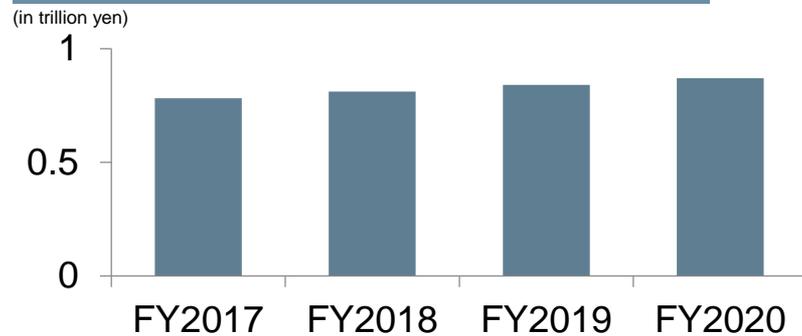


**Measures**

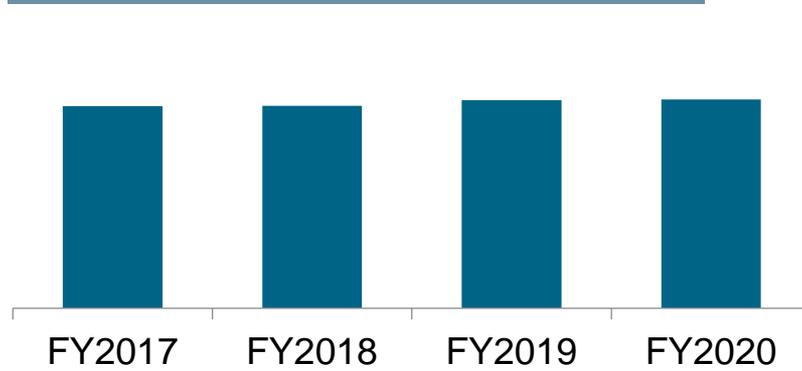
- Development of turbochargers designed for hybrid and plug-in hybrid vehicles which are expected to become the main-stream among fuel-efficient vehicles
- Development of lower-cost turbochargers for emerging economies
- Improvement of productivity by applying IoT to increase operating ratio, and strive to fully automate production lines



## Market Scale



## Business Scale (Revenue)



**Business Environment**

- **The market is recovering**
- **Growing trend toward capital investment**
- **Environmental awareness is increasing.**

**Challenges**

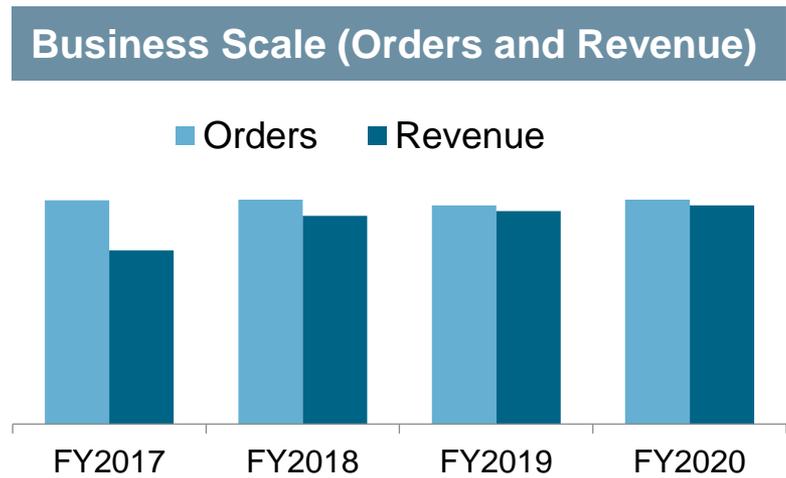
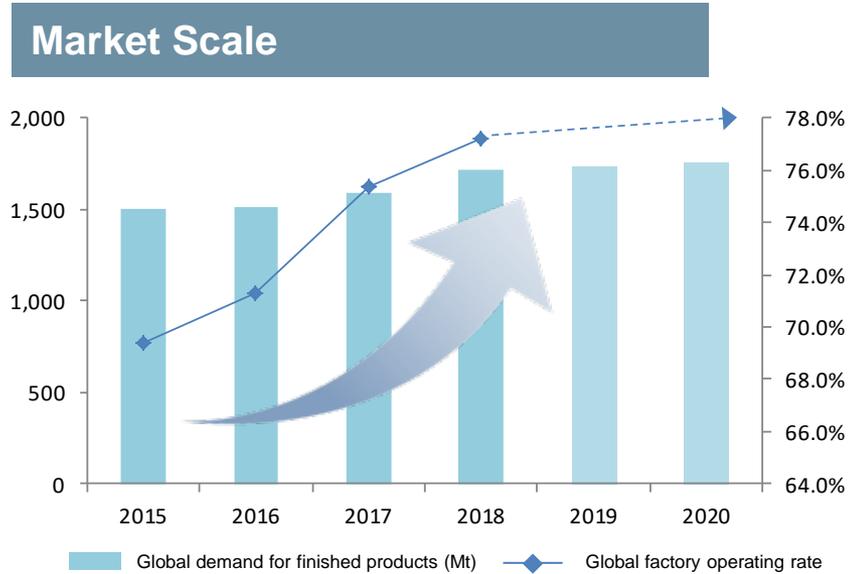
- **Capture demand and expand market share**
- **Pursue further efficiency through further optimization of organization and processes**



**Measures**

- **Focus on strategic products**
  - Expand sales of ESP lines
  - Expand portfolio of environment-friendly products
- **Strengthening of lifecycle business**
  - Expand maintenance servicing business
  - Expand and improve digitalization

ESP: Endless strip production (environment-friendly, integrated metal production line requiring low investment cost)  
 Compared to conventional lines with separate processes for casting and rolling, ESP significantly reduces energy consumption, CO<sub>2</sub> emissions and running costs.



**Business Environment**

- Stable demand for stand-by generators is continuing. (data centers, large commercial facilities, etc.)
- Demand is appearing in emerging economies for distributed power systems, and in Japan for new power generation and urban development needs.

**Challenges**

- Further strengthen core competencies for high output segment (1-3 MW)
- Response to demand for power supply system combining renewable energy and DR and VPP



**Measures**

- Response to demand for stand-by generators
  - Development of ultra-high-efficiency engines
  - Expansion of generator set business
    - Achievement of high added value
    - Expansion of after-sale servicing business (Attract customers through IoT and AI)
- Development, demonstration and business development of hybrid electric power supply systems
- Development of new services in DR and VPP areas

DR: Demand response VPP: Virtual power plant



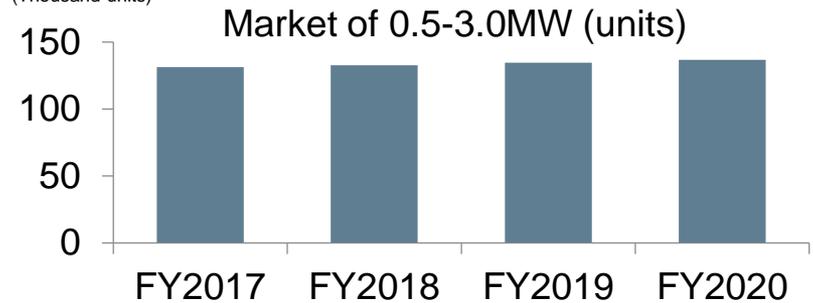
Engine for generators/Marine Engines



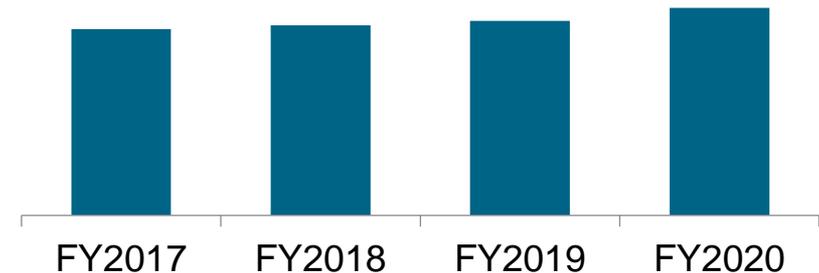
Engine Generator Equipment

### Market Scale

(Thousand units)



### Business Scale (Revenue)



**Business Environment**

- The domestic market, which accounts for 70% of revenue, is firm.
- Business is stable on multiple products and focus on after-sale services.

**Challenges**

- Although domestic business is forecast to remain stable, significant future growth is unlikely.



**Measures**

- Efficiency enhancement through optimal allocation: resource sharing and human resources mobilization
- Allocate resources into global markets where growth is anticipated (box making machinery, etc.)
- Further strengthening of earning capacity through application of digitalization in after-sale servicing business

### Box Making Machines



Box making machine

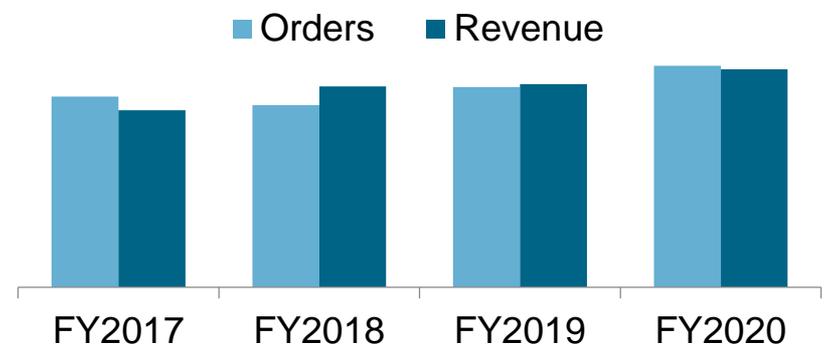
- High-performance, high-priced machines are well received in Japan, US and Europe.
- Development and launch of medium-performance, mid-priced machines
- Expansion of business scale through expanded and improved lineup

### Digitalization of After-sale Services

- Manpower shortages and challenges in skill transfer are emerging at after-sale servicing sites.
- Promoting education of young employees and acquisition of multiple capabilities through video and voice-based digital tools



### Business Scale (Orders and Revenue)



**Business Environment**

- Gears are becoming of increasingly higher precision (short term: vehicle applications, medium/long term: robot applications).
- Applications of metal 3D printing technology are poised to accelerate (medium/long term)
- Business negotiations are becoming delayed due to US-China trade frictions.



**Measures**

- Expanding sales of gear grinding machines
- Development of small-diameter modular gear cutting machines and tools
- Market entry of metal 3D printers
- Acceleration to MCMD

\* MCMD: Mass Customization Modular Design



Gear grinding machine

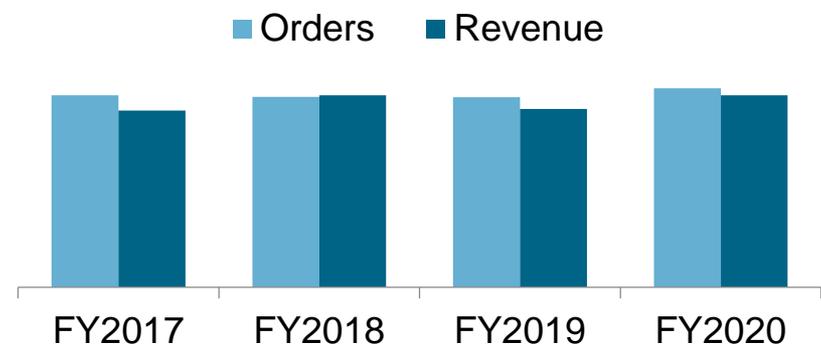


Double-column, 5-face milling machine



Metal 3D printer

**Business Scale (Orders and Revenue)**



Business Environment

- Demand is stable for domestic ferries and government ships
- Gas carriers face intensifying competition against Chinese and Korean companies.  
(Reorganization of Korean shipbuilders, etc.)
- Demand is increasing for environmental equipment supported by more stringent environmental regulations.



Measures

- Acceleration of shift to high-density outfitted ships  
(ferries, government ships, etc.)
- Realization of low-cost gas carriers
- Strengthening of marine engineering business  
(response to environmental regulations (SOx scrubber, FGSS, etc.) and safety regulations)
- Initiatives toward becoming the customer's lifecycle partner  
(cruise ship repair, etc.)

FGSS: Fuel gas supply system



Ferry



Special-purpose vessel

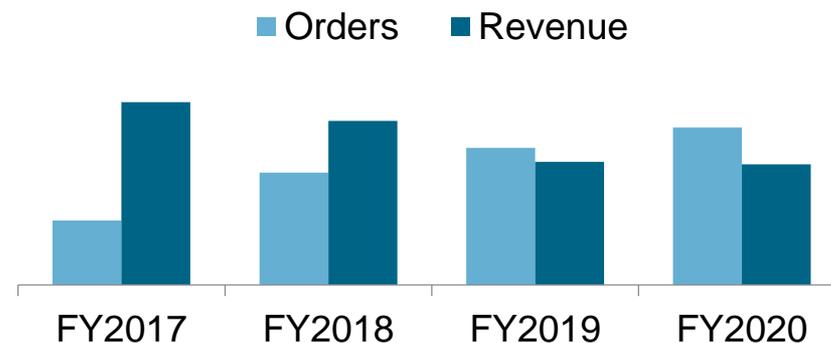


LPG carrier



SOx scrubber

**Business Scale (Orders and Revenue)**



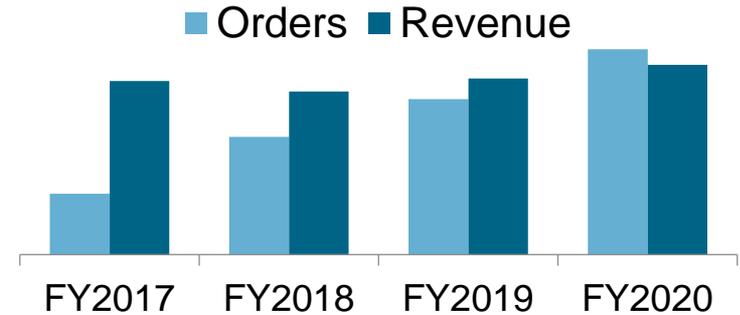
Business Environment

- **Customer needs are increasingly sophisticated and complicated.**  
(single product/technology ⇒ concept design to O&M management)
- **EPC business is becoming less profitable.**  
(increasing construction costs)
- **Domestic and overseas engineering companies are shifting to new business model.**
- **Environmental awareness is increasing globally.**

O&M: Operation & maintenance  
EPC: Engineering, procurement & construction



**Business Scale (Orders and Revenue)**



Challenges	Measures
<b>New business model and portfolio for diversifying profitability</b>	<ul style="list-style-type: none"> <li>• <b>Development of business considering plant lifecycle, concept design to O&amp;M management.</b> (expansion and improvement of project financing and engineering after-sales service business, etc.)</li> </ul>
<b>Improve profitability of large projects</b>	<ul style="list-style-type: none"> <li>• <b>Project management through digitalization</b></li> <li>• <b>Strengthening of risk management functions during bidding phase</b></li> <li>• <b>Appropriate management of construction partners.</b></li> </ul>
<b>Accelerate development of core technologies</b>	<ul style="list-style-type: none"> <li>• <b>Development of differentiated technologies for waste to energy plant, CO<sub>2</sub> recovery systems, APM, etc.</b></li> </ul> <p>APM: Automated People Mover</p>

**MOVE THE WORLD FORWARD**

**MITSUBISHI  
HEAVY  
INDUSTRIES  
GROUP**